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Network Control Center (NCC) User Planning System (UPS) User's Guide for Release 13

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Preface

The purpose of this Network Control Center (NCC) User Planning System (UPS) User's Guide is to provide an overview of UPS capabilities and design.

This document is controlled by the UPS Sustaining Engineering Review Board (SERB). This document will be changed by Documentation Change Notice (DCN) or complete revision. Proposed changes to this document must be submitted to the UPS SERB along with supportive material justifying the proposed change. Comments or questions concerning this document and proposed changes shall be addressed to:

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Abstract

This user's guide to operating the Network Control Center (NCC) User Planning System (UPS) Release 13 software provides an overview of UPS capabilities and design, and illustrates and describes the Graphical User Interface (GUI). Also included are specific procedures for starting the system; logging on to the system; setting up and maintaining the database; executing the scheduling, communications, and reporting functions; and switching operations to backup equipment.

Keywords: *Graphical User Interface (GUI), Network Control Center (NCC), User Planning System (UPS)*

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Section 1. Introduction

1.1 Purpose and Scope

1.1.1

This document is a reference manual and guide to operating the Network Control Center Data System (NCCDS) User Planning System (UPS). The UPS was developed by the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC) as a scheduling aid for users of the spacecraft tracking and communications services provided by the Tracking and Data Relay Satellite System (TDRSS). The NCCDS at GSFC is responsible for maintaining TDRSS service schedules for all users. The UPS assists a user in generating and validating requests for TDRSS services, transmits the requests to the NCCDS, receives the confirmed schedules back from the NCCDS, and presents them to the user.

1.1.2

This document provides an overview of the UPS capabilities and design, and illustrates and describes the Graphical User Interface (GUI). Also included are specific procedures for starting the system; logging on to the system; setting up and maintaining the database; executing the scheduling, communications, and reporting functions; and switching operations to backup equipment.

1.1.3

UPS requirements are defined in the *Network Control Center (NCC) User Planning System (UPS) System Requirements Document* (see Reference 1). The design of the UPS software is described in the *Network Control Center (NCC) User Planning System (UPS) Detailed Design Specification* (see Reference 2). The design of the UPS database is described in the *Network Control Center (NCC) User Planning System (UPS) Data Base Design Document* (see Reference 3).

1.2 Document Organization

1.2.1

This document is divided into the following sections:

a. Section 1 introduces the document, summarizes the UPS capabilities, and defines the UPS operating environment.

b. Section 2 summarizes the UPS requirements and provides an overview of the UPS design.

c. Section 3 explains the system startup and shutdown procedures.

d. Section 4 describes and illustrates general features of the UPS GUI.

e. Section 5 presents the procedures for logging on and logging off, and describes the general capabilities and system status information available to each user.

f. Sections 6 through 12 describe the user interfaces and system capabilities in each of the following functional areas: mission operations, mission set-up, orbital data operations, scheduling, report generation, database querying, and system administration.

g. Appendixes A, B, C, D, E, F, and G provide alert messages, report formats, Schedule Add Request (SAR) validation rules, and Tracking and Data Relay Satellite (TDRS) Scheduling Window (TSW) information, Recurrent Scheduling (RS) concepts, RS prototype language specification, and RS prototype examples respectively.

h. Appendix H provides a list of Abbreviations and Acronyms.

i. Appendix I provides a list of References.

1.2.2

Each panel description presented in Sections 6 through 12 includes a brief introduction and the following detailed subsections:

a. Panel Items. Lists and briefly describes the purpose and usage of each presentation item in the panel. These items include text fields into which data are entered or displayed, radio buttons used to choose from a set of mutually exclusive options, checkboxes for making selections that are not mutually exclusive, scrolling textlists from which items may be selected, scrolling text displays for viewing only, pulldown menus, and buttons for initiating actions.

b. Panels. Identifies the other panels or pulldown menus that may be displayed in response to selections made from the current panel.

c. Description. Describes the processing initiated from the panel, including the validation of data entered, functions performed when certain choices are made, processes that may be initiated by selecting certain action buttons, and the results or output of those processes.

d. Error and Informational Messages. Lists and explains the messages that relate to each panel or to processing initiated from that panel.

1.3 Conventions in This Document

To aid the reader in distinguishing the various User Interface elements, this document uses the following typographic conventions:

a. Panel names are shown in Arial font. Example: the Schedule Planning panel.

b. Menu names are shown in Fette Engschrift font. Example: the Orbital Data Ops pulldown menu.

c. Menu items are shown in Book Antiqua font. Example: the Initiate Orbital Process option.

d. Panel items are shown in Courier New font. Example: the `Delete TSWs` checkbox.

1.4 Background

1.4.1

Information generated by the data-gathering activities of NASA-sponsored spacecraft is now available due to the successful deployment of the TDRSS, a network of satellite and ground-based communications systems used by all other non-Department of Defense (DOD) missions. Users who wish to access the TDRSS must schedule their communications sessions through the NCCDS at GSFC, which is responsible for maintaining the schedule for all spacecraft communication throughout the network. Throughout this document, the UPS user refers to the person (interactive) or computer system (electronic) that inputs data into the UPS.

1.4.2

To confirm UPS user requests for time in the TDRSS service schedule, the NCCDS must evaluate:

a. Availability of the TDRSS communications satellites, through which future low-level spacecraft may communicate with users.

b. Availability of the ground station equipment at the White Sands Ground Terminal (WSGT) and the future Second TDRSS Ground Terminal (STGT).

1.4.3

When there is more than one request for an overlapping time and TDRS antenna, the NCCDS accepts or denies a request on the basis of priority and urgency. The NCCDS, however, does not evaluate whether the user satellite is physically capable of communicating with the TDRS within the time period requested.

1.4.4

To assist the user in scheduling access to the NASA Communications (Nascom) resources, the UPS accepts user communication service requests, transmits them to the NCCDS, receives the confirmed schedules back from the NCCDS, and presents them to the user. The UPS can also use orbital data provided by the GSFC Flight Dynamics Facility (FDF) through the UPS user to verify that the requested TDRSS time is usable for communications between the user satellite and TDRSS.

1.4.5

The UPS context diagram is shown in Figure 1-1. In this diagram and throughout this document, the term UPS user means the entity that inputs TDRSS scheduling requests and other required data to the UPS. As shown in Figure 1-2, this entity may be an interactive user on a terminal directly controlled by the UPS software (referred to as the interactive user) or a computer system that has access to the scheduling and orbital data from the FDF (referred to as the electronic user). Depending on the mission environment and the terminology used by the mission, the electronic user may correspond to the FDF, the Payload Operations Control Center (POCC), or the Command Management System (CMS).

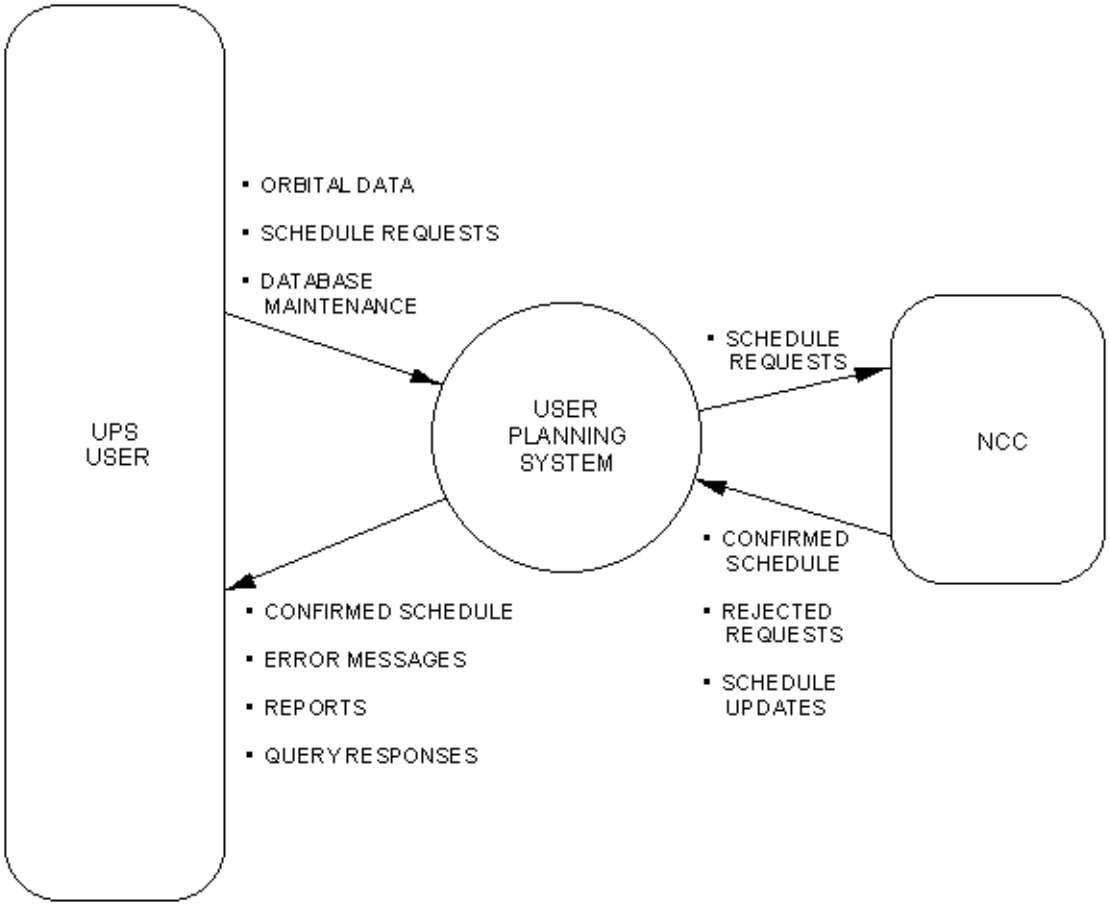


Figure 1-1. UPS Context Diagram

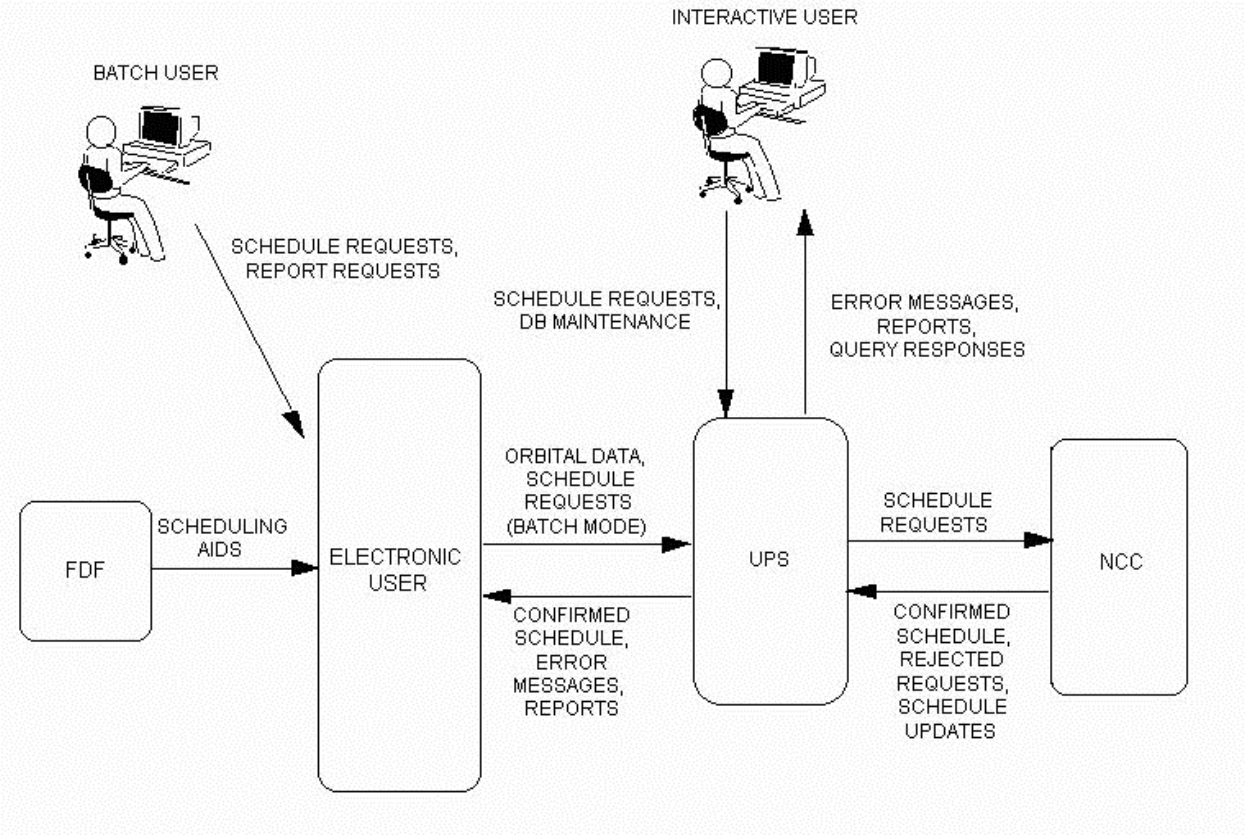


Figure 1-2. UPS Interfaces

NOTE

Throughout this document, the term "schedule request" denotes several formats of electronic messages: a Schedule Add Request (SAR), Alternate Schedule Add Request (Alternate SAR), Schedule Delete Request (SDR), Replace Request, and Wait List Request.

1.4.6

As directed by the UPS user, through interactive user transmission or message-forward plans, the SARs are transmitted to the NCCDS. On a weekly basis, the UPS may also receive orbital and attitude data from the electronic user to perform communications validation on user requests.

1.4.7

A simulation capability allows users to test the setup of new missions. This capability serves the additional function of providing a safe training mode of operation for new users; they can become familiar with the UPS and its facilities without affecting actual system operations.

1.5 UPS Environment

1.5.1 General

This section describes the UPS external interfaces and the hardware and software environments in which the UPS is designed to operate.

1.5.2 External Interfaces

1.5.2.1 General

As shown in Figure 1-2, the UPS has three external interfaces: the interactive user, the electronic user, and the NCCDS.

1.5.2.2 Interactive User

The interactive user performs the following functions:

a. Defines and builds the mission databases.

b. Updates the databases.

c. Monitors system operation.

d. Mounts and reads orbital data tapes.

e. Enters schedule requests.

f. Creates reports.

g. Queries the UPS database.

1.5.2.3 Electronic User

a. The electronic user is a computer system external to the UPS (there may be more than one). (See Reference 4 for details about the interface between the UPS and the electronic user.) An electronic user may provide the UPS with the information listed below:

   1. Orbital data for SAR, Alternate SAR, and Replace Request validation, which the UPS may receive in the form of Predicted Site Acquisition Tables (PSATs) and User Antenna Views (UAVs). These data formats are defined in the *Flight Dynamics Division (FDD) Generic Data Product Formats Interface Control Document* (see Reference 5).

   2. Orbital data for SAR, Alternate SAR, and Replace Request validation, which the user may receive in the form of TDRS Communication Windows (TCWs) and Generic TDRS Views (GTVs) (LandSat-7 only). These data formats are defined in the *Interface Control Document Between the Network Control Center (NCC) User Planning System (UPS) and the Electronic User* (see Reference 4).

3. Batch schedule requests for forwarding to the NCCDS, which the UPS receives in the formats defined by the *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6).

b. The electronic user may also request the following:

1. UPS database reports.

2. Results of queries using the Structured Query Language (SQL) facilities of the Oracle Relational Database Management System (RDBMS).

c. The UPS will respond to the electronic user with the requested report or the Oracle query result. The formats of these requests and data messages are defined in the *Interface Control Document Between the Network Control Center (NCC) User Planning System (UPS) and the Electronic User* (see Reference 4).

1.5.2.4 UPS/NCCDS Interface

The UPS transfers schedule requests to the NCCDS. The NCCDS responds to the schedule requests with confirmed schedules, rejection messages, declined messages, and schedule updates. The interface between the UPS and the NCCDS is defined in detail in the *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6).

1.5.3 Hardware Environment

Figure 1-3 illustrates the UPS hardware architecture concept. Because the UPS may be used in a variety of environments to support varied missions, the UPS software was designed to be portable to many potential hardware hosts.

1.5.4 Main UPS Software Environment

1.5.4.1 General

The main UPS software environment consists of the following six major parts:

a. Operating System: UNIX

b. Programming Language: American National Standards Institute (ANSI) Standard C

c. GUI: Motif, an industry-standard user interface package produced by the Open Software Foundation (OSF)

d. User Interface Development Environment: Transportable Applications Environment (TAE)

e. RDBMS: Oracle

f. Communications: File Transfer Protocol (FTP) and Transmission Control Protocol/ Internet Protocol (TCP/IP).

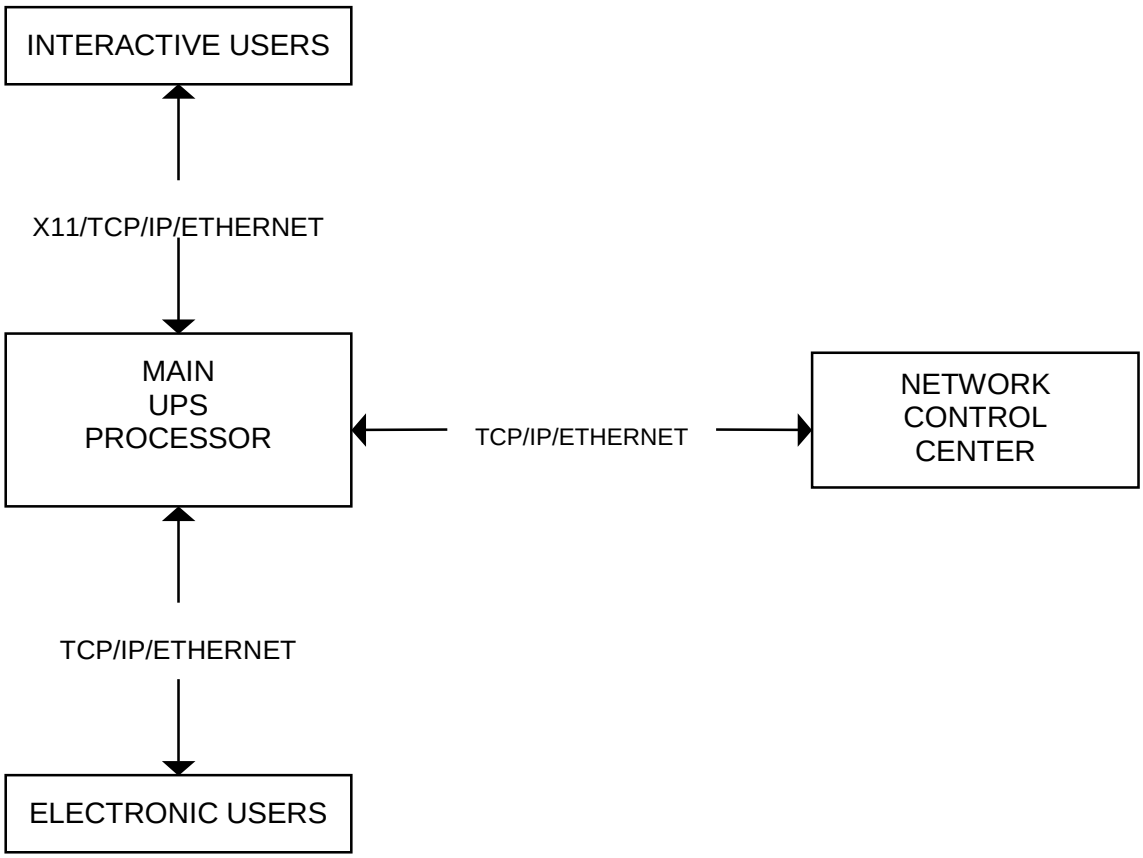


Figure 1-3. UPS Hardware Architecture Concept

1.5.4.2 UNIX Operating System

The UNIX operating system selected for UPS software development is available on more hardware hosts than any other and is the major target of current operating system standardization efforts. The UPS complies with the X-Open UNIX standard, and is also ANSI compliant. This standard is the definition of the operating system interface as it appears to application programs (e.g., system calls and libraries). It is based on UNIX and increases the scope of portability from source code lines to the operating system calls. The UPS is deployed on an HP-UX Release 10 platform. This operating system complies with the Institute of Electrical and Electronics Engineers (IEEE) Standard 1003.1 and contains most features of the two major UNIX variants in existence today (Berkeley Software Distribution [BSD] and System V Interface Definition [SVID]).

1.5.4.3 ANSI Standard C Language

The language selected for the UPS is the C language, which is bundled with the UNIX operating system and is designed to work efficiently with it. The C language has also been the subject of recent standardization efforts; that is, the Draft ANSI C Standard X3.159-198x. The C compiler provided by HP with the HP-UX operating system complies with this draft standard. All C language statements used in UPS comply with the draft standard.

1.5.4.4 Graphical User Interface

a. User interaction with the UPS occurs through a GUI, which is based on Motif and the X-Window system. The X-Window protocol originated at the Massachusetts Institute of Technology (MIT) and later came under the control of the X-Consortium, a group representing most of the workstation vendors. X-Windows is an established standard across a variety of computing platforms.

b. The final release of the UPS user interface will incorporate the industry-standard OSF/Motif user interface package and uses a mouse as an input device. Motif includes the following components:

   1. Toolkit. A set of utilities layered on top of X-Windows.

   2. Widget Set. Software for creating instances of common graphical objects, such as command buttons, scroll bars, and menus.

   3. OSF/Motif Style Guide (see Reference 7). A collection of stylistic recommendations for designing user interfaces consistent with other products that use the package. The UPS design reflects many of the style concepts in this document.

   4. Motif Window Manager (MWM). A utility program for moving and resizing windows.

c. Windows used in the UPS screens will be configurable in varying degrees using MWM, which allows a user to manipulate windows by providing services designated to each window at design time. These services are minimized (iconify) and moved.

d. Using MWM, the user may move a window to view some information on another window, which is underneath the window currently on the screen (this occurs only rarely in the UPS application). (Clicking on an object on the screen is used to describe moving the cursor to the object by manipulating the mouse, and pressing, or clicking, the left-hand button on the mouse.) When movement is allowed, clicking on the title bar with a drag-and-click operation causes the window to move until the mouse button is released. Pressing the iconify button causes the window to become an icon. These operations are also available from the window menu, which is accessed by clicking on the graphical button in the upper left-hand corner of the window frame.

1.5.4.5 Transportable Application Software Development Environment

a. Some parts of the UPS interactive interface is built with a package developed at GSFC called TAE PLUS. TAE PLUS is a portable software development environment designed to support the rapid building, tailoring, and management of Motif-compliant X-Window user interfaces.

b. When a user logs on to the UPS, a main window is displayed on the screen. This window contains a series of TAE widgets that allow the user to access various subsystems of the UPS interface. Using the mouse to make selections, the user descends into subsequent panels to enter input parameters.

c. These parameters are retrieved by the application using the supplied routines described above.

1.5.4.6 Oracle RDBMS

A design goal of the UPS was to make data handling flexible by providing tools that allow the user to easily change data formatting and reporting. The UPS must operate in a multiuser operational environment that is intolerant of data loss for even short periods of time. The Oracle RDBMS was selected to support these UPS requirements. It also has the following features, which are required by the UPS:

a. Multiuser support.

b. Transaction archiving to reduce lost data.

c. Report definition utility.

d. SQL support.

e. Fourth-generation data manipulation language.

f. Data access security.

g. Portability to a wide range of hardware hosts.

1.5.4.7 Communications

FTP using TCP/IP is used to control file transfers to and from the UPS. This protocol was selected because it is bundled into most UNIX systems and is a widely used standard available on many hosts. FTP and TCP/IP are not part of the X-Open standard.

Section 2. System Overview

2.1 Requirements Summary

2.1.1 General

This section summarizes the UPS functional, security, and performance requirements. The requirements are defined in detail in the *Network Control Center (NCC) User Planning System (UPS) System Requirements Document* (see Reference 1).

2.1.2 UPS Functional Requirements

The UPS functional requirements are as follows:

a. Provide UPS database management:

   1. Build initial mission databases.
   2. Provide security against unauthorized use of data.
   3. Provide data backup, restoration, and archival capabilities.
   4. Provide reporting capabilities.

b. Provide input and validation of orbital data:

   1. Receive orbital data from the electronic user.
   2. Validate orbital data
   3. Compute TDRS Scheduling Windows (TSWs).
   4. Store orbital data and TSWs in the UPS database.

c. Provide interactive and batch input of schedule requests, and validation of schedule requests:

   1. Support the interactive input of individual schedule requests.
   2. Receive batch schedule requests from the electronic user.
   3. Modify, replace, and delete schedule requests, either individually or in bulk.
   4. Validate schedule requests against constraints and TSWs.
   5. Store schedule requests in the UPS database.

d. Provide transmission of schedule requests to the NCCDS:

   1. Retrieve schedule requests from the UPS database.
   2. Convert the schedule request to the NCCDS/MOC ICD format.
   3. Transmit the schedule requests to the NCCDS with or without operator intervention.

e. Provide reception of NCCDS messages and reporting to users:

   1. Receive and validate all schedule-related NCCDS messages.

   2. Update the UPS database to reflect changes in request status and to include confirmed schedule data received from the NCCDS.

   3. Forward messages to the electronic user with or without operator intervention.

2.1.3 UPS Security Requirements

The UPS security requirements are as follows:

a. Support the use of secret passwords to protect access to local and network accounts.

b. Restrict user access to files and directories.

c. Control access to the UPS from the network through selective source-address filtering in the network bridges.

d. Allow only authorized users to access data for each mission.

2.1.4 UPS Performance Requirements

The UPS performance requirements are as follows:

a. Be available 24 hours a day, 7 days a week.

b. Provide a backup capability that allows restarting the UPS on another computer within 1 hour, with minimal loss of data.

c. Allow an experienced user to input schedule requests at an average rate of less than 1 minute per schedule request.

d. Support up to 15 missions.

2.2 Design Overview

2.2.1 General

a. Figure 2-1 shows an overview of the UPS. UPS functions are separated into six subsystems:

   1. System activity monitor subsystem.

   2. Interactive user operations subsystem.

   3. Electronic user message subsystem.

   4. NCCDS message transmission subsystem.

   5. NCCDS message reception subsystem.

   6. UPS communications subsystem.

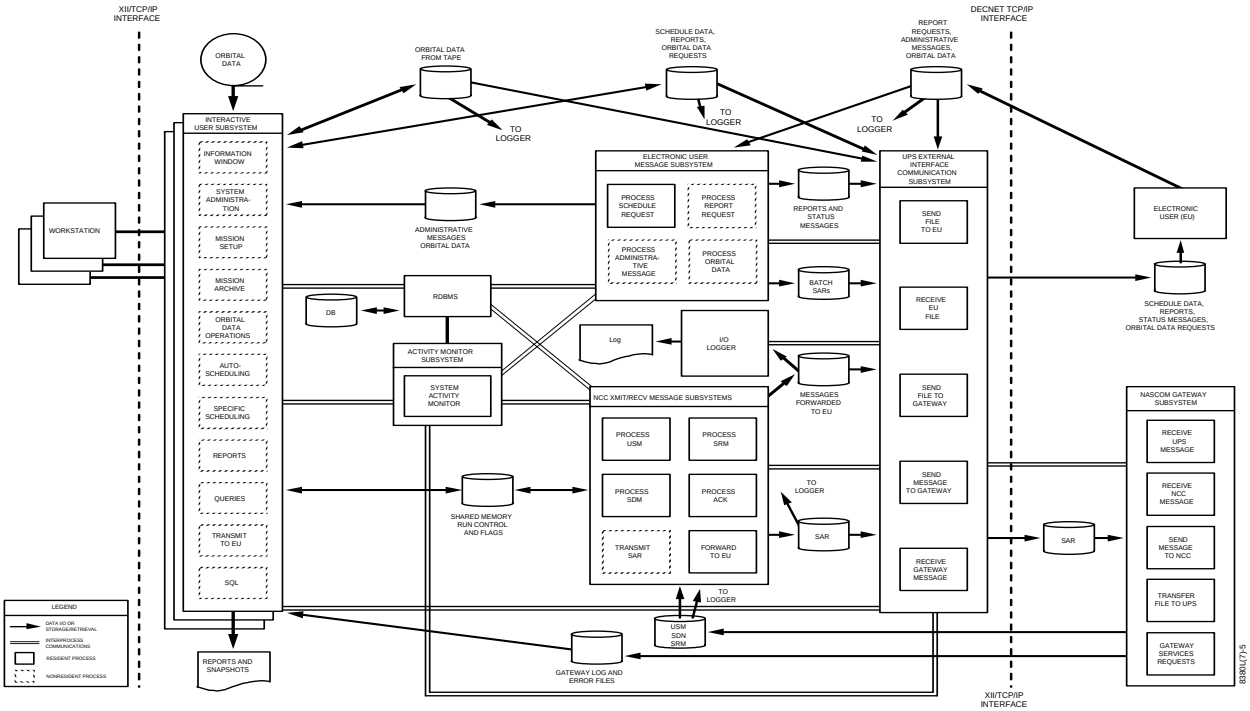


Figure 2-1 UPS Overview

Figure 2-1. UPS Overview

b. The six subsystems run on the main UPS processor. Each subsystem consists of one or more processes that can run concurrently. The processes in the system activity monitor subsystem and the UPS communications subsystem are resident; that is, they are initiated at system startup and run continuously. When not processing data, they are in response-ready modes: the system activity monitor is waiting to receive information or alert messages from other processes, and the communications subsystem is waiting for incoming and outgoing network messages. Some processes in the NCCDS message reception and transmission subsystems and in the electronic user message subsystem are resident; some are initiated by other processes, as needed.

c. All processes in the interactive user operations subsystem are nonresident. The user communicates with these processes through the X-Window interface. When the user logs on, a main window appears at the top of the screen, and remains there until the user logs off. The main window displays alert and status information, provides general functions (such as screen snapshots), and pulldown menus through which the user can select the UPS functions that he/she is authorized to perform. In general, selecting a function from a pulldown menu results in the initiation of a new process that displays and controls lower level windows.

d. The processes on the main UPS processor are linked through their use of a common database, shared files, and several interprocess communication mechanisms supported by UNIX. Information passes between the main UPS processor and the electronic users in the form of files transferred via TCP/IP FTP. Communications between the UPS and the NCCDS is accomplished via direct IP.

2.2.2 System Activity Monitor Subsystem

This subsystem performs the following functions:

a. Maintaining a list of users who are logged on and what missions they are accessing.

b. Receiving alerts and information messages from the other subsystems.

c. Forwarding alerts, information messages, gateway status, and NCCDS status to the active information window processes.

d. Storing alerts and information messages in the activity log.

2.2.3 Interactive User Operations Subsystem

This subsystem performs the following functions:

a. Maintaining an information window for each user:

   1. Accepting the user's logon and mission selection.
   2. Displaying alerts, information messages, gateway status, and NCCDS status.
   3. Accepting alert acknowledgments.
   4. Generating screen snapshots.
   5. Initiating Communication Test Messages (CTMs).
   6. Providing pulldown menus and initiating interactive processes selected by the user.

b. Supporting system administration and mission setup:

   1. Creating and deleting users.
   2. Defining user privileges.
   3. Creating missions.
   4. Deleting missions.
   5. Entering static mission data.
   6. Backing up and restoring databases.
   7. Purging data.

c. Reading an input tape of orbital data.

d. Generating schedule requests interactively:

   1. Building graphic and tabular scheduling aid displays.
   2. Entering a schedule request.
   3. Validating a schedule request.

e. Generating schedule requests automatically.

f. Entering a database query or report request.

g. Generating a database query response or report.

2.2.4 Electronic User Message Subsystem

This subsystem performs the following functions:

a. Processing orbital data, schedule requests, report requests, and administrative messages from the electronic user.

b. Preparing reports for transmission to the electronic user.

2.2.5 NCCDS Message Transmission Subsystem

This subsystem performs the following functions:

a. Retrieving schedule data for transmission to the NCCDS.

b. Building NCCDS messages to be transmitted.

c. Initiating the file transfer to the NCCDS.

2.2.6 NCCDS Message Reception Subsystem

This subsystem performs the following functions:

a. Validating incoming NCCDS messages.

b. Processing messages from the NCCDS.

c. Forwarding messages from the NCCDS to the electronic user.

2.2.7 UPS Communications Subsystem

This subsystem performs the following functions:

a. Communicating with the NCCDS:

   1. Transmitting messages to the NCCDS via TCP/IP sockets.
   2. Receiving messages from the NCCDS via TCP/IP sockets.

b. Communicating with the electronic user:

   1. Transferring files to the electronic user via FTP.

   2. Receiving files transferred from the electronic user.

2.3 Interprocess and Network Communications

2.3.1 General

This Section discusses UPS data storage and interprocess communication mechanisms, and the use of file transfers and socket messages for network communications.

2.3.2 Interprocess Communications

The UPS data storage and interprocess communication mechanisms are summarized as follows:

a. The UPS Database. Access to the database is provided through the Oracle RDBMS, which provides locking mechanisms to control concurrent access to the database. Mission data, orbital data, scheduling parameters, schedule requests, and the activity log are stored in the database.

b. Shared Files. Processes can obtain shared or exclusive access to files through UNIX system calls. Files are used for two primary purposes: (1) to temporarily store messages being passed between UPS, the electronic users, and the NCCDS, and (2) to output reports.

c. Message Queues. UPS processes use message queues supported by UNIX to pass status messages to the system activity monitor. Message queues are also generally used to exchange control and information messages with other processes.

d. Shared Memory. UNIX provides system calls that allow processes to share segments of physical memory. One example is the Run Control Table. This table maintains a record of the resources each process is using. In addition, information in the table can be used by each process to detect potential resource utilization conflicts with other processes and to notify other processes that a resource is being updated. (The term resource here refers to a collection of data (e.g., orbital data or schedule data) that might reside in several database tables.)

e. Semaphores. UNIX provides system calls for performing semaphore operations. The UPS uses a semaphore to control access to the Run Control Table. They are also used as global flags to indicate whether incoming and outgoing messages are to be logged.

2.3.3 Network Communications

a. All messages passing between the main UPS processor and the electronic user are contained in files, which are transferred via TCP/IP FTP. Messages sent by the electronic user are placed in a UPS directory that is continually polled by a process in the UPS communications subsystem. (The polling interval can be set by the system administrator.) The name of each file received indicates the type of message contained in that file. The communications subsystem passes the filename through a message queue to the process in the electronic user message subsystem that handles that specific type of message.

b. Messages are transferred between the NCCDS and the main UPS processor in the form of files via TCP/IP. Unlike the process that receives files from the electronic user, the processes that handle file receipt in the main UPS processor do not rely on polling directories to detect the receipt of files. Rather, because communications between the main UPS processor and the NCCDS are more time critical, each file transfer is accompanied by the transmission of a file transfer notification message through a socket connection to a process waiting to receive the file at the other node. The notification message includes the name of the transferred file. The name of each file received indicates the type of message contained in that file. The UPS communications subsystem passes the filename through a message queue to the process in the NCCDS message reception and transmission subsystems that handle that specific type of message.

c. The main UPS processor and the NCCDS exchange control and service messages through socket connections. The contents and formats of those messages are defined in the *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6).

Section 3. UPS System Startup and Shutdown

3.1 General

This Section describes system startup and shutdown procedures, as well as the TDRS Unscheduled Time (TUT) retrieval background process. The description here assumes that the UPS software release has been installed.

3.2 UPS Database Startup

The UPS employs the ORACLE RDBMS to manage its data stores. Prior to starting any UPS software processes, an Oracle SQL*NET listener and an Oracle instance must be up and running. The setup for the listener and creation of the database are described in the UPS Installation Guide.

a. To start the listener, logon to the Oracle account and type the following:

```
lsnrctl start <listener name>
```

where <listener name> is the name given to the listener during installation (normally *ups_lsnr*).

b. To start the database instance, logon to the Oracle account and type the following:

```
svrmgrl
connect internal
startup
exit
```

NOTE

The environment variable, ORACLE_SID, must be set to the name of the database you wish to start. Refer to the installation guide for more information.

3.3 UPS Main Startup and Shutdown

3.3.1 General

a. As described in Section 2, two types of software run on the main UPS processor: background or resident processes and interactive processes. Before any interactive processing can occur, the background processes must be up and running. These processes become active upon UPS startup and remain active until UPS shutdown.

b. For normal production processing, background process startup and shutdown occur automatically. Startup procedures are executed automatically by the UNIX boot procedures; shutdown procedures are executed automatically by the UNIX shutdown procedures. **The automatic startup at bootup must be set up by system admin personnel during the UPS software installation.**

c. UPS main software can be manually shutdown, leaving UNIX active, for maintenance or other reasons. It can then be manually restarted without having to reboot.

3.3.2 UPS Main System Manual Shutdown

The following steps are performed to manually shut down the UPS:

a. Log into the UNIX account that owns the UPS background processes.

b. Type upsShutdown and wait for all UPS processes to exit. Any active UPS information window will receive a warning that the system is shutting down and the window will be terminated. The last process to exit will be saUpsGo. Active processes can be examined by typing the following shell command to the UNIX prompt:

```
ps -ef | grep <UNIX account of UPS background process owner>
```

When shutdown is complete, “UPS Shutdown Complete” will be broadcast to all users.

c. This procedure does not shut down the Oracle database. To do that, after UPS is shut down, logon to the Oracle account and enter the following commands:

```
svrmgrl
connect internal
shutdown
exit
```

NOTE

The environment variable, ORACLE_SID, must be set to the name of the database you wish to start. Refer to the installation guide for more information

d. Log out.

3.3.3 UPS Main System Manual Restart

The following steps are performed to manually start the UPS:

a. Log into the UNIX account that owns the UPS background processes.

b. If recovery is from a UPS crash, remove the file saUpsGo.pid. If recovery is from a system crash, remove the files saUpsGo.pid and $ORACLE_HOME/dbs/sgadef$ORACLE_SID.dbf. The second file is an Oracle file and must be deleted by the Oracle account.

c. Ensure that the Oracle database and the listener are up before attempting to start UPS. If they are not, refer to paragraph 3.2 for instructions on starting the database and the listener.

d. Type *upsStartup* to start up the UPS process control program *saUpsGo* as a background process. *saUpsGo* will start all other UPS background processes and will itself remain active until the UPS is shut down. As processes are started, they will be listed on the screen. When startup is completed, “UPS Startup Complete” will be broadcast to all users.

e. Log out.

Section 4. User Interface

4.1 General

This section presents general concepts of the UPS user interface and discusses the use of graphic objects that form the user interface, including an example of each graphic object. Throughout all system user interfaces, all objects of a given type will act the same way.

4.2 Mouse

4.2.1 General

The mouse provides a mechanism for pointing at and selecting graphic objects in the display. The movement of the mouse on the positioning pad is reflected by the movement of a cursor in the display. The cursor is normally in the shape of an arrow. During UPS operation, the cursor may change to something other than the normal arrow. For example, the cursor changes to a question mark (?) when help is requested. This change highlights the fact that the normal moving or selecting actions are no longer occurring. In general, when the activity is completed, the cursor returns to its normal arrow presentation. Figure 4-1 presents examples of typical cursors found throughout the UPS.

4.2.2 Terminology

Various terms are used throughout this document that refer to specific mouse actions. These are described below.

	Term	Meaning
a.	Click	To quickly press and release a mouse button
b.	Double-click	To click the mouse button twice in rapid succession
c.	Drag	To hold down the mouse button while moving the mouse
d.	Point	To move the mouse until the mouse pointer on the screen rests on the item of choice

4.2.3 Pointing, Selecting, and Activating

a. The terms *point*, *select* and *activate* have different, and specific, meanings. The mouse cursor will generally change when it is over an object that may have an action taken on it.

b. The Semantic of selecting a display item or menu item is different.

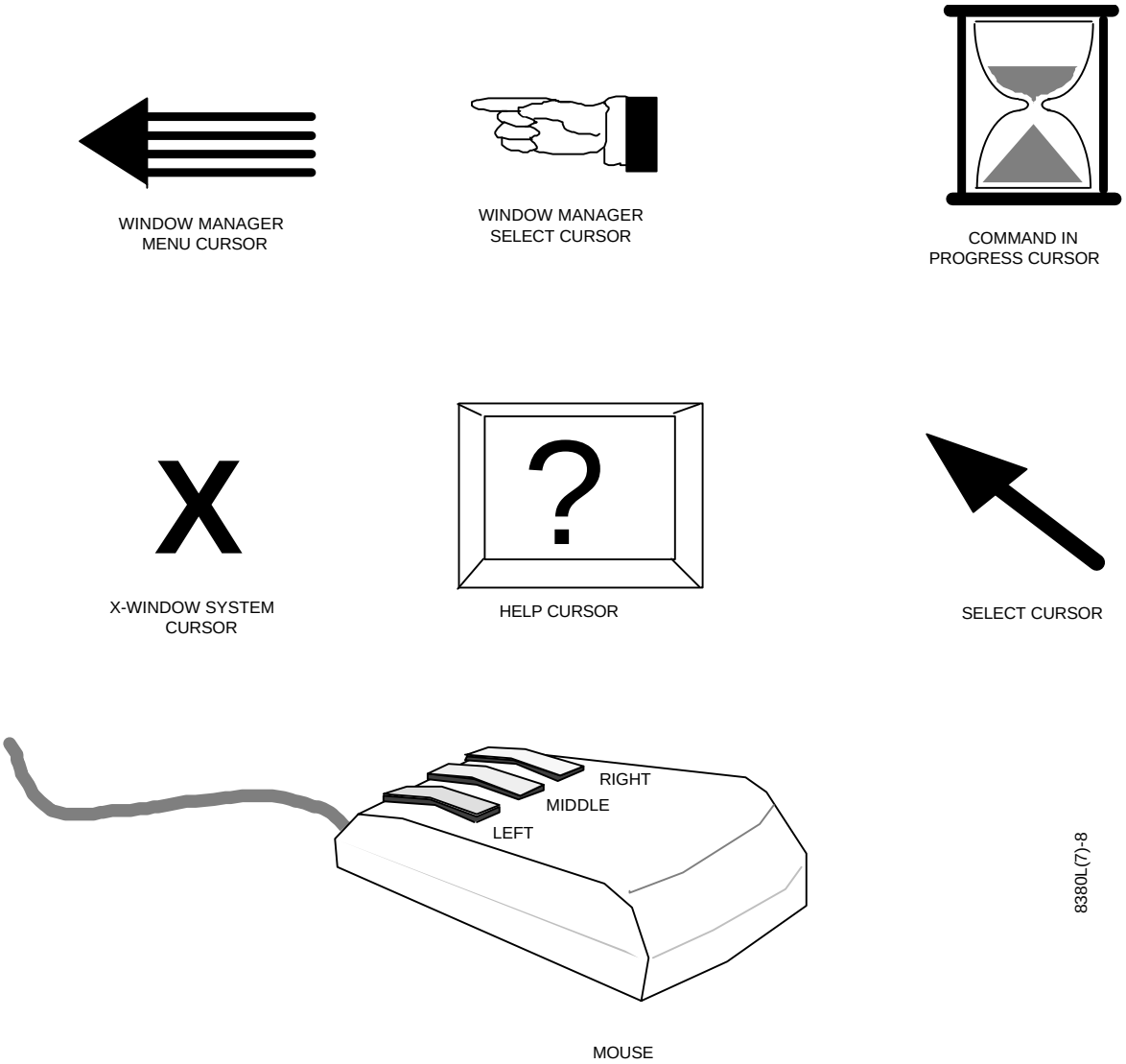


Figure 4-1. UPS Cursors and Mouse Button Positions

c. To *select* a display item or icon means marking it with the selection cursor, which can appear as a highlight, a dotted rectangle, or both. Items in a list, check boxes, and radio buttons are examples of display items that are selectable. Selecting a display item alone does not initiate an action.

d. To *select* a menu item means to start an application, open a window, or carry out a command.

e. The term *activate* refers only to a button, and initiates an action on the part of the system. For example, activating the `Enter` button might start a process. The term *clicks on* is used interchangeably with *activate* throughout this document.

f. Throughout this document, the mouse buttons are referred to individually as follows:

   1. LEFTBUTTON—the leftmost button on the mouse.

   2. MIDDLEBUTTON—the center button on the mouse.

   3. RIGHTBUTTON—the rightmost button on the mouse.

g. Unless otherwise specified, the selection and activation of an object is accomplished by clicking once on the LEFTBUTTON of the mouse.

4.3 Windows

A window is an area of the display that is delineated by a frame and generally associated with some specific function or set of functions. Many windows may appear in the display at one time, and the user may perform many tasks concurrently. Within the UPS, a window generally has a title, which is located in the top center of the window. The title is for identification of the window only and has no action associated with it. Most windows also contain a help box, which is located at the top right and contains a question mark. The help box is used to retrieve additional information about the purpose and use of the window.

4.4 Help Boxes

a. Almost every window displayed at the UPS consoles contains a help box. The help box allows the user to retrieve additional information on the objects contained within the window, or information on how to use the window.

b. To retrieve online help in any window, the user selects and activates the window's help pushbutton, labeled "HELP". The appropriate section of this document will be displayed on a separate panel. The user may scroll up or down to view the available help information. Upon activation of the help panel's "CLOSE" pushbutton, the help panel will be removed from the screen.

4.5 Window Manager

Windows displayed at the UPS consoles appear at predefined positions on the screen. Using the MWM on the UPS (refer to paragraph 1.5.4.4), the user may manipulate these windows.

4.6 Scroll Bars

a. A scroll bar is an object that permits viewing a subset of data with a window called a viewport. Manipulating the scroll bar allows the user to view portions of the data through the viewport. A scroll bar has three components: the scroll arrows, the scroll region, and the scroll box. Scroll bar manipulation is accomplished in three ways:

   1. Moving the mouse cursor over one of the scroll arrows (located at each end of the scrollbar) and clicking the LEFTBUTTON causes the associated object to scroll, or shift, a small distance in the direction of the arrow. Holding the LEFTBUTTON down or additional clicks on the scroll arrow cause additional shifts.

   2. Dragging the scroll box with the LEFTBUTTON down moves the scroll box within the scroll region, shifting the viewable portion of the window. To complete the scroll, the user releases the LEFTBUTTON. The associated viewport shifts to a position on the data proportional to the position of the scroll box in the scroll region.

   3. Clicking the MIDDLEBUTTON anywhere within the scroll region moves the scroll box to that position and shifts the viewport to a proportional position.

b. The position of the scroll box always reflects the position of the viewable portion of the window. An additional autoscrolling feature has been implemented for horizontal scroll bars in the graphical scheduling windows that display a timeline. Any window that incorporates this feature has a scroll region on each horizontal edge of the window. When the user moves or stretches a graphic object within the scroll region, the window will scroll automatically, taking the graphic object (and mouse cursor) out of the scroll region. The mouse cursor remains over the graphic object. Moving or stretching the graphic object back into the scroll region causes the region to scroll horizontally again. Scrolling can be continued in this fashion until the object scrolls to the beginning or end of the window.

4.7 Icons

An icon is a small graphical representation (picture) of a function or window. To select an icon, the user positions the mouse cursor over the icon and clicks the LEFTBUTTON. The action performed when the icon is selected depends on the window containing the icon. For example, selecting an icon may cause some function to be performed or may display another window. (Specific actions associated with the selection of icons are discussed in the section describing each window.)

4.8 Buttons

a. A button, also referred to as a pushbutton, which may appear to be three dimensional, is a rectangle surrounding some text. To activate a button, the user positions the mouse cursor over the button and clicks the LEFTBUTTON. When activated, a button appears to be pressed down. The action performed when a button is activated depends on the window containing the button. For example, activating a button may cause some function to be performed or may display another window. The text within the button

helps identify this function. (Specific actions associated with activating buttons are discussed in the section describing each window.)

b. In the graphical scheduling panels, all buttons that perform similar functions have the same label. In a future release, all buttons within the UPS that perform similar functions will be labeled consistently.

4.9 Pulldown Menus

A pulldown menu is a labeled box. When a user selects a pulldown menu, it expands to include a list of text choices. To select a pulldown menu, the user positions the mouse cursor over the labeled box and clicks the LEFTBUTTON. A menu containing a list of text entries appears below the box. To select an entry, the user moves the mouse cursor down the menu to the entry desired and clicks on it. The menu disappears. The action performed when an entry is selected from a pulldown menu depends on the window containing the menu. For example, selecting an entry from a pulldown menu may cause some function to be performed or may cause another window to be displayed. (Specific actions associated with selections from pulldown menus are discussed in the section describing each window.)

4.10 Popup Menus

a. A popup menu is a menu of text choices that appears when a mouse button is pressed within an area of a window designated to display the popup menu. Figure 4-2 shows a popup menu. Popup menus are invoked by placing the mouse cursor over the object for which a popup menu is associated and clicking on the RIGHTBUTTON.

b. To select an entry from the popup menu, the user positions the mouse cursor over the desired selection and clicks the LEFTBUTTON. The action performed when an entry is selected from a popup menu depends on the window containing the menu. For example, selecting an entry from a popup menu may cause some function to be performed or may cause another window to be displayed. (Specific actions associated with selections from popup menus are discussed in the section describing each window.)

4.11 Scrolling Lists

a. Two types of scrolling lists are used in the UPS: textlists and text displays. A textlist is a scrollable rectangular area that displays text choices that may each be selected. To select an entry from a textlist, the user positions the mouse cursor over the desired text selection and clicks the LEFTBUTTON. If the desired selection does not appear in the viewable portion of the textlist, the user may use the scrollbar to scroll up, down, right, or left through the textlist until the desired selection appears. The action performed when an entry is selected from a textlist depends on the window containing the textlist. For example, selecting an entry from a textlist may cause some function to be performed or may cause another window to be displayed. (Specific actions associated with selections from textlists are discussed in the section describing each window.)

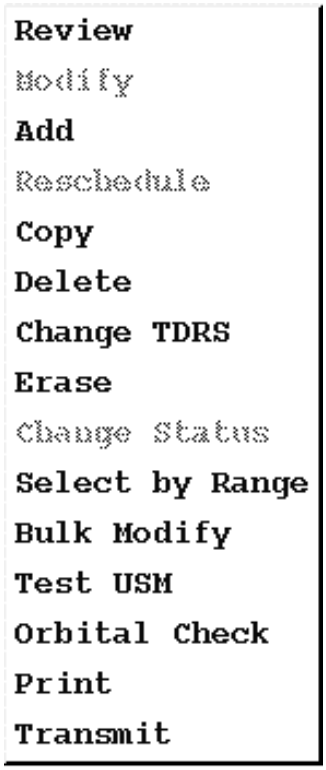


Figure 4-2. Popup Menu

b. A text display is a scrollable rectangular region that can display large amounts of unselectable text. Text displays are output-only lists of text; they may not be selected for action by the user.

4.12 Radio Buttons

A radio button is a labeled set of text choices with a small diamond to the left of each choice. The currently selected value is represented by the darkened or filled diamond. To select an entry from a radio button, the user positions the mouse cursor over the diamond and clicks the LEFTBUTTON. The action performed when a radio button is selected depends on the window containing the radio button. For example, selecting a radio button may cause some function to be performed or may cause another window to be displayed. (Specific actions associated with selections of radio buttons are discussed in the Section describing each window.)

4.13 Text Entry Fields

4.13.1 General

Three types of text entry fields are used in the UPS: a simple text keyin field, a multiple-line text entry area, and a time text keyin field.

4.13.2 Simple Text Keyin Field

A text keyin field is a single-line text entry area. A label may be displayed to the left of the rectangular area surrounding the typing region. To enter text into a text keyin field, the user must first change focus to the text keyin field by tabbing or clicking on the field. After the desired text is entered, changing the focus or pressing the ENTER key completes the entry. The action performed upon completion of the text entry depends on the window containing the text keyin field.

4.13.3 Multiple-line Text Entry Area

A multiple-line text entry area is a large rectangular area into which text may be entered. A label may be displayed above the rectangular area surrounding the editing region. To enter text into this text entry area, the user must first change focus to the text entry area by tabbing to or clicking on the field. Then the user positions the mouse cursor inside the editing region and begins typing. A carriage return must be entered to end each text line. If a carriage return is not entered, the text will wrap onto the next line; however, any characters typed after the end of line will be truncated. To complete the editing session, the user types the Escape (ESC) key on the keyboard while the mouse cursor is positioned inside the editing region. The action performed upon completion of the text entry depends on the window containing the text entry area.

4.13.4 Time Text Keyin Field

a. A time text keyin field consists of a label, a single-line text entry area, and "bump arrows." The label has no functional significance. The single-line text entry area always has a default value and is always in overstrike mode; that is, the size of the time field is of fixed length, the length being dependent on the default scheduling parameters setting—relational or absolute time.

b. Time modifications may be directly entered via the keyboard or by using the bump arrows.

c. Absolute time format shall be YY/DDD/HH:MM:SS, and relative time format shall be DDD/HH:MM:SS or HH:MM:SS. Most time fields will not require a "±". For those that do, the "±" shall be inserted in front of the leftmost digit.

d. The bump arrows are small triangles stacked on top of each other, with their bases facing each other and with the top arrow pointed up and the bottom arrow pointed down. They are positioned slightly to the right of the time entry box. Clicking on the upper bump arrow increments the currently selected digit. A digit is selected by single clicking on it. Clicking on the lower bump arrow decrements the field. Holding down the mouse button on a bump arrow longer than 1 second performs an autorepeat on the bump arrow.

e. The seconds field is incremented or decremented by default. The user may select a different digit within a unit (such as minutes or hours) to increment or decrement by clicking on the particular digit in the time entry box. The selected digit will be highlighted, indicating that it will be incremented or decremented by the bump arrows.

4.14 Timeline Object

4.14.1 General

A Timeline Object is a graphic object rendered as a colored rectangle that represents a real "event" (e.g., SAR, Replace Request, TSW, service, etc.). Timeline Objects are applicable only with the Graphical Scheduling panels. The graphic object is overlaid on a horizontal line representing the duration of the selected time period. The length of the graphic object represents the duration of the underlying event (e.g., SAR, Wait List Request).

4.14.2 Timeline Object Selection

a. The user may select a Timeline Object by clicking on it. As a visual indication that a Timeline Object is selected, the selected Timeline Object will have a thickened border, and the vertical dimension will be shortened, such that a Timeline Object hidden under the selected one will become visible. When the user clicks on a selected Timeline Object again, it will remain selected. When the user clicks in "white space," any selected Timeline Object(s) will be deselected.

b. Some types of Timeline Objects (i.e., SARs and Replace Requests) are allowed to be multiple-selected; that is, more than one Timeline Object may be selected concurrently. There are three methods for multiple-selection of Timeline Objects.

   1. When the user presses the SHIFT key and clicks on a Timeline Object that allows multiple-selection, it will be selected in addition to any other Timeline Objects that are already selected. If one or more Timeline Objects are currently selected and the user presses the SHIFT key and clicks on a selected Timeline Object at the same time, the chosen Timeline Object will be deselected. If the user has the SHIFT key depressed and clicks in white space, the selected Timeline Objects will not be deselected.

2. The user also has the capability for multiple-selection of allowable Timeline Objects by using the “lasso” technique. By clicking on white space in a timeline group and dragging the mouse with the mouse button held down, an outline box will be drawn. When the mouse button is released, all Timeline Objects completely enclosed within the outline box will be selected. If the SHIFT key is held down during the mouse button down-click, all currently selected Timeline Objects will remain selected. Otherwise, all currently selected Timeline Objects will be unselected before the new selections take effect.

3. Multiple selections can also be accomplished by using the Select by Range feature described in paragraph 9.3.9.

4.14.3 Timeline Object Manipulation

a. Certain Timeline Objects (e.g., SARs and services) may be moved, stretched, or shrunk, depending on their status and relation with other Timeline Objects.

b. To move a Timeline Object (such as an untransmitted SAR), the user clicks on the Timeline Object and holds down the mouse button until the cursor changes to a special “move cursor” (approximately 0.5 second). By continuing to hold down the mouse button, the user may then move the Timeline Object along the timeline to a new location.

c. To stretch or shrink a Timeline Object (such as a service, untransmitted SAR, or tolerance “wing” of an untransmitted SAR), the user clicks on either end point of the Timeline Object. A “handle” will be displayed on that end point to serve as a visual clue. By continuing to hold down the mouse button, the user may then stretch or shrink the Timeline Object within the bounds defined for that Timeline Object.

4.15 Keyboard Traversal

a. All pushbuttons, text input boxes, radio button groups, and checkboxes are known as tab groups. The user may use the TAB key to traverse between tab groups (radio buttons, scroll lists, checkboxes, etc.) and use the keyboard arrow keys to traverse within a tab group. Scrolling lists are not currently included within the list of tab groups. If a tab group is disabled (insensitive), it is not included as part of the list of tab groups.

b. All tab groups follow a specific order of traversal; each press of the TAB key traverses the display element focus from top to bottom, right to left, in a circular fashion, where the first element will be the next tab group traversed to, following the last element in focus.

Section 5. User Logon and Information Window

5.1 Overview

When the UPS user logs on to the system, the information window panel is displayed at the top of the screen (see Figure 5-1 through Figure 5-4). This panel remains displayed until the user logs off. The information window displays information and action alerts, and contains the pulldown menus from which all other UPS interactive processes are initiated. Four different sets of menus correspond to the four user access levels, or positions, recognized by the UPS: system administrator, mission coordinator, mission scheduler, and mission user. The capabilities available at each access level are summarized as follows:

a. System administrator:

   1. Create and delete missions.
   2. Copy missions to and from tape.
   3. Purge the activity log.
   4. Purge TDRSS Unused Time (TUT) data.
   5. Maintain TDRS list.
   6. Add and delete system administrators.
   7. View Communication logs.
   8. View Error logs.
   9. Set priorities of system messages.
   10. Turn message logging on or off.

b. Mission coordinator:

   1. Add and delete users.
   2. Maintain translation map and user environment tables.
   3. Set up service specification codes, prototype event templates, and Recurrent Scheduling patterns.
   4. Perform all functions available to mission scheduler and mission user.

c. Mission scheduler:

1. Read orbital data from tape.
2. Generate schedule requests.
3. Transmit schedule requests to the NCCDS.
4. Transmit TSWs to the NCCDS.
5. Transmit messages to the electronic user.
6. Generate reports and queries.

d. Mission user: Generate reports and queries

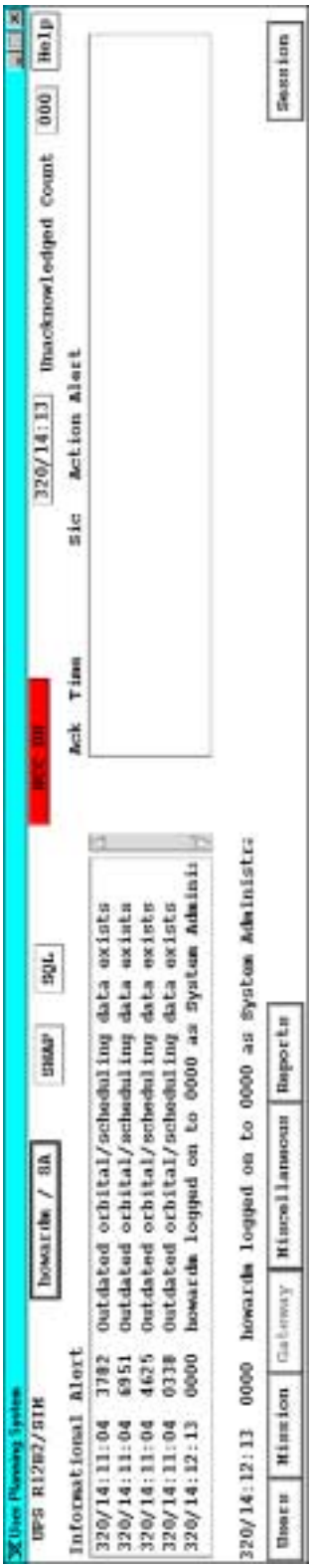


Figure 5-1. System Administrator Information Window Panel

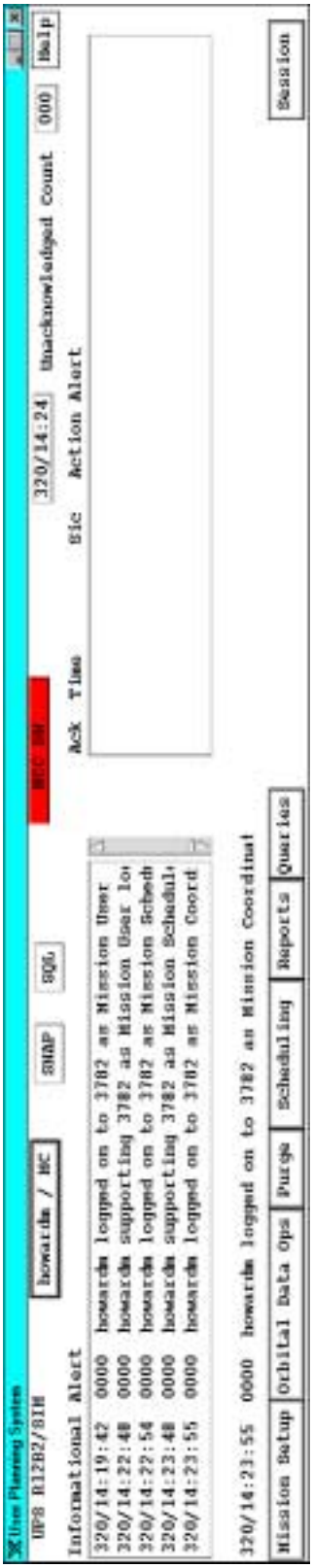


Figure 5-2. Mission Coordinator Information Window Panel

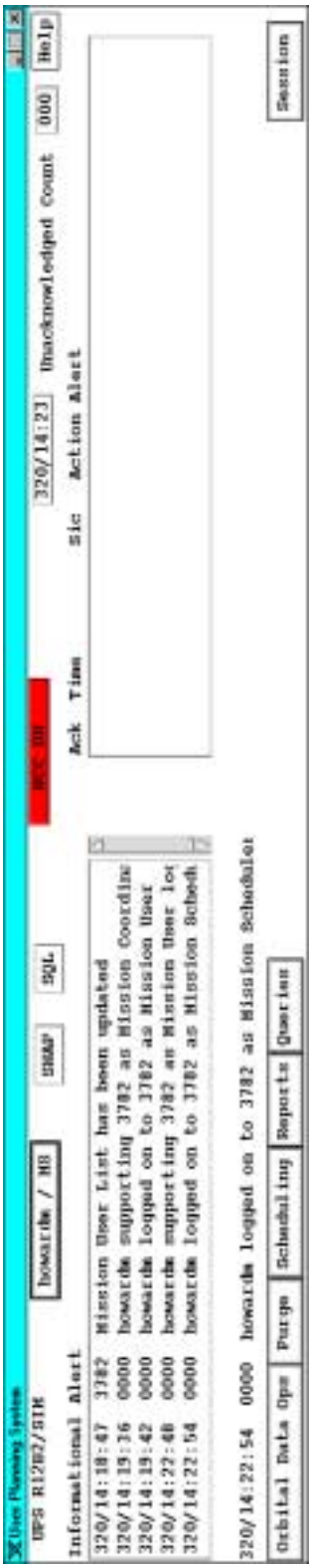


Figure 5-3. Mission Scheduler Information Window Panel

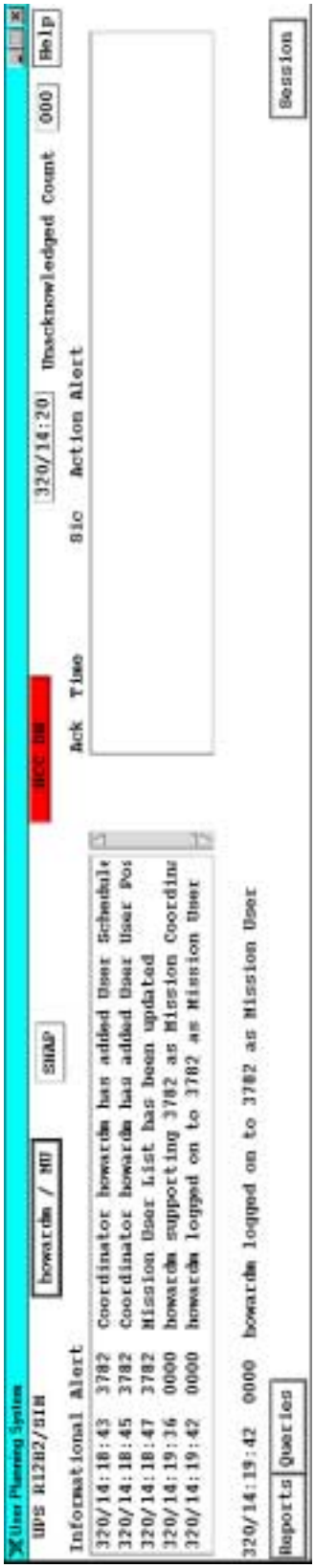


Figure 5-4. Mission User Information Window Panel

5.2 Logon Procedure

There are two types of interactive users, captive and non-captive. The primary difference between them is that the non-captive user gets a Unix system prompt after logging on to the system, while the captive user does not. The captive user goes directly into the UPS application. The non-captive user must type *syrunups* at the Unix prompt to start an interactive UPS session. From this point, both user types will behave the same. A message—"Do you want to suppress Bother Boxes (Y/N)?" - also appears, and the user is expected to type either "y" or "n" (case insensitive) (see Figure 5-5). If the user answers "y", no Bother Boxes will appear throughout this UPS session (Confirm Boxes and all others will appear). Once the user has completed the login procedure, a window appears that allows the user to select the desired position and mission(s) (refer to paragraph 5.3). This window does not appear if the user is authorized to access only one position on one mission.

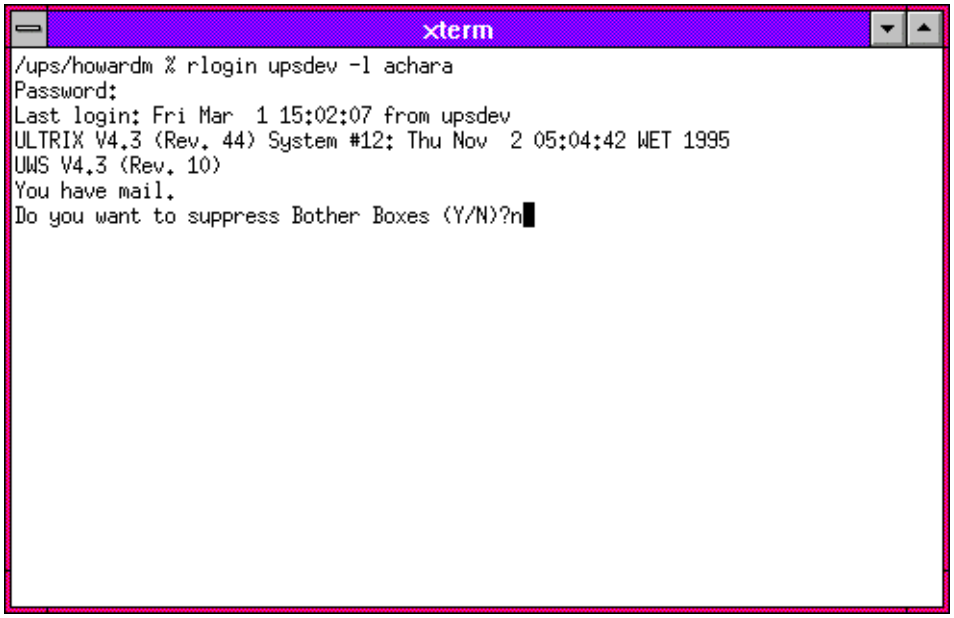


Figure 5-5. Bother Box Interrogative in Login Window

5.3 User Position and Mission Panel

5.3.1 General

a. The User Position and Mission panel (see Figure 5-6) is used to select a position and mission when initially logging on to the UPS. If the user is authorized for more than one mission, ALL may be selected. It does not appear if the user is authorized for only one position and mission. It is not necessary for the system administrator to select a mission.

b. This panel is automatically displayed during the user logon procedure.

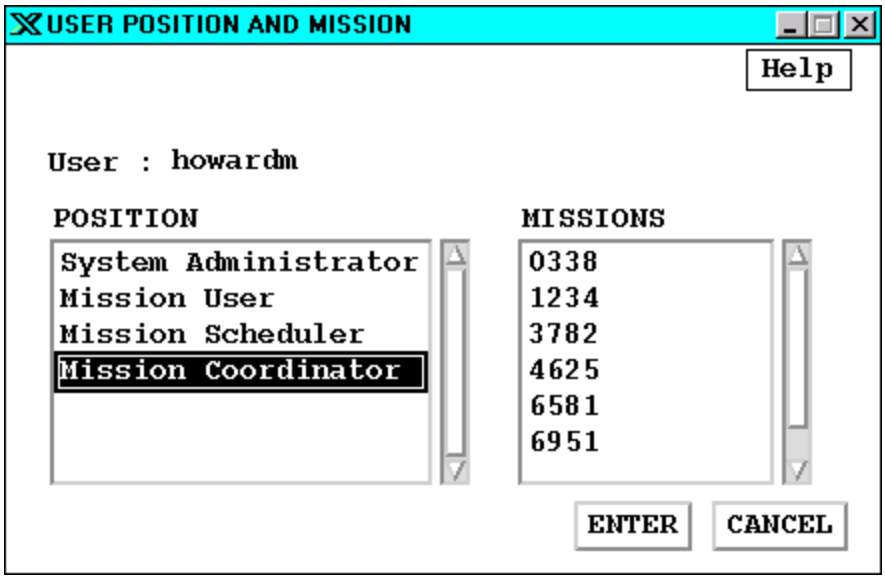


Figure 5-6. User Position and Mission Panel

5.3.2 Panel Items

a. User Display. Name of the user logging on to the UPS.

b. Position Textlist. List of the positions available to the user. The user selects a position; the missions available are then displayed in the mission list.

c. Authorized Mission Textlist. A scrollable list of the missions available to the user for the selected position. The user may select one or more missions from this list. When a mission is selected, it will be highlighted. If a highlighted mission is selected, it will be unselected and unhighlighted.

d. ENTER Button. Continues the logon process.

e. CANCEL Button. Cancels the logon process and redisplays the UNIX prompt.

5.3.3 Panels

The appropriate information window panel is displayed.

5.3.4 Description

a. This panel is used to select the position and mission (or missions) under which the user wishes to log on. After the user logs on to the UNIX account that the interactive UPS session is run under, this panel displays the positions available to the user. The user selects the mission or missions desired and clicks on ENTER to continue the logon process.

b. The user can click on CANCEL at any time to end the log on process and return to the UNIX prompt.

5.4 Information Window Panel

5.4.1 General

a. The Information Window panel is the main interactive panel from which all other interactive processes on the UPS are started. Figure 5-1 through Figure 5-4 depict the various panel configurations displayed depending on the access level selected. It provides capabilities to the user that are available at all times (i.e., not tied to a specified panel). It also displays to the user the communication statuses, informational alerts, and action alerts pertaining to the missions on which the user is a member.

b. This panel is automatically displayed after the user logs on.

5.4.2 Panel Items

a. Release Display. Specification of the UPS release the user is running.

b. User/Position Button. Displays the current user and the user's position. When the user clicks on this button with the mouse, the User Position and Mission panel is displayed. The user can then change his/her position or select new missions on which to work.

c. SNAP Button. Takes a snapshot of the screen and sends it to the default PostScript printer. The user will be notified via a bother box when the snap is complete.

d. SQL Button:

   1. Displays a panel running a restricted subset of SQL *Plus for ad hoc queries to the database. The mission user information window does not have this button. The views available for SQL queries are listed in Table 5-1.

   2. Refer to any SQL *Plus reference manual for instructions on how to perform queries. If a login.sql exists, do not use the "set pause on" command. This command inhibits the proper functioning of the SQL button.

e. NCC Status Display. This is a real time indicator of the Schedule Status connections with the NCCDS. Green indicates that all connections are up, yellow means that some connections are up and some are down, and red indicates that all connections with the NCCDS are down.

Table 5-1. SQL Queries

Table Name	Synonym	Table Name	Synonym
ACTIVITY_LOG	ACTLOG	RS_SERVICE_DEFINITIONS	RSSERVDEFS
ACTIVITY_LOG_DEF	ACTDEF	RS_SUPERPROTOTYPE	SUPER
AUTO_MSG_FWD_FLAGS	AMFF	RS_SUPERPROTOTYPE_TEXT	SUPERTEXT
AUTO_VALID_FLAGS	AVFG	RS_TDRS_LIST	RSTDRSLIST
DEFAULT_CROSS_TRK	DCRS	SAR	SCHADD
DEFAULT_KASAWB_RETURN	DKWR	SAR_CONFIGURATION_CODES	SARCON
DEFAULT_KASA_FORWARD	DKAF	SAR_NCC_CODE	STATUS
DEFAULT_KASA_RETURN	DKAR	SAR_VALID	SVAL
DEFAULT_KSA_FORWARD	DKSF	SCHEDULE_CROSS_TRK	SCRS
DEFAULT_KSA_RETURN	DKSR	SCHEDULE_KASAWB_RETURN	SKWR
DEFAULT_MA_FORWARD	DMAF	SCHEDULE_KASA_FORWARD	SKAF
DEFAULT_MA_RETURN	DMAR	SCHEDULE_KSA_RETURN	SKAR
DEFAULT_NORM_TRK	DNRM	SCHEDULE_KSA_FORWARD	SKSF
DEFAULT_SCHEDULING_PARAMETERS	DEFSCH	SCHEDULE_KSA_RETURN	SKSR
DEFAULT_SIMULATION	DSIM	SCHEDULE_MA_FORWARD	SMAF
DEFAULT_SMA_FORWARD	DSMF	SCHEDULE_MA_RETURN	SMAR
DEFAULT_SMA_RETURN	DSMR	SCHEDULE_NORM_TRK	SNRM
DEFAULT_SSA_FORWARD	DSSF	SCHEDULE_SIMULATION	SSIM
DEFAULT_SSA_RETURN	DSSR	SCHEDULE_SMA_FORWARD	SSMF
DESTINATION_CODES	DEST	SCHEDULE_SMA_RETURN	SSMR
ENABLED_CONSTRAINTS	CONSTR	SCHEDULE_SSA_FORWARD	SSSF
EU_INFO	EUIN	SCHEDULE_SSA_RETURN	SSSR
EVENT_SERVICES	EVNT	SC_TO_TDRS_SUN_ALIGN	OSTSUN
FUNCTION_CODE	FUNC	SERVICES	SERV
INTERFERENCE_CHECKS	INTFCK	SERVICES_USED	SRVUSE
MISSION_USER_LIST	MISSLST	SPACECRAFT_CHARACTERISTICS	SPCHAR
MISS_USER_LIST	MUSER	SUPIDEN_FUNCTION_CODES	SUPC
MULTIPLE_ELEC_USERS	MULTEU	SYSTEM_STATUS	SYST
OLD_SARS	OLDSAR	TDRS_MULTIPATH_FRINGE	ORBMUL
ORBITAL_DATA	ORBDAT	TDRS_NAME	TDRS
ORBIT_POINTS	ORBPTS	TDRS_SCHEDULING_WINDOWS	TSW
ORBIT_POINT_DETAILS	OPDETAIL	SUN_INTRUSION	ORBSUN
PREDICTED_SITE_ACQUISITION	PSAT	TDRS_TO_SC_SUN_ALIGN	OTSSUN
PROTOTYPE_EVENT	PROT	TDRS_UNUSED_TIME	TUT
RSPATTERN	RSPAT	TDRS_VIEW	TDRSVW
RSSPROTOTYPE_EVENT	RSSPROT	TSW_SET_ID	TSW SET ID
RSSTDRS_NAME	RSSTDRS	TSW_SUPERSET	SUPERSET
RSSUBPATTERN	RSSPAT	TUT_SERVICES_USED	TUTSRV
RSTDRS_NAME	RSTDRS	UPS_CONFIG_PARMS	UCPM
RS_OPERANDS	RSOPS	UPS_USER_CONSTRAINTS	USRCNS
RS_PROTOTYPE	RSPROT	USER_ANTENNA_VIEWS	UAV
RS_RUN_INFO	RSRUN	USER_INTERFACE_CHANNELS	USIF
		WS_TO_TDRS_SUN_ALIGN	OWTSUN

f. Time Display. Displays the current system time (to the minute) for the UPS.

g. Informational Alert Textlist. Displays informational alerts to the user. Clicking on an alert brings up the Detailed Alert Information panel to display more detail about the alert.

h. Current Information Alert Display. Shows the most recently received informational alert.

i. Action Alert Textlist. Displays more important alerts that may require user action. The display shows the acknowledgment field, the time of the alert, and the alert. The asterisks in the acknowledgment field indicate that the alert has been acknowledged. Clicking on an unacknowledged alert will acknowledge the alert in the textlist and the database. Clicking on an acknowledged alert brings up the Detailed Alert Information panel to display more information about the alert.

j. Current Action Alert Display. Shows the most recently received action alert.

k. Pulldown Menus. Used to initiate other interactive processes on the UPS. Names of related functions are grouped together in the menus. A function is initiated by pulling down the appropriate menu and selecting the name of the function.

5.4.3 Panels

The following panels are displayed:

a. User Position and Mission panel.

b. Detailed Alert Information panel.

c. SQL*Plus panel.

5.4.4 Description

a. The Information Window panel is the main interactive panel in the UPS. The Information Window panel is displayed at the top of the screen from the time the user first logs on to the UPS until he/she logs off. All other UPS interactive processes are initiated from this panel.

b. The pulldown menus contain selections giving the user the capabilities appropriate to his/her current position. The top bar buttons (SNAP and SQL) provide capabilities that are available to the user at all times, without having to pull up a special screen. Informational and action alerts are displayed to the user through the alert windows and are always visible.

5.5 Detailed Alert Information Panel

5.5.1 General

The Detailed Alert Information panel (see Figure 5-7) is used to display to the user more information about an alert than can be displayed in the limited space of the alert windows. This panel is initiated by either clicking on an alert in the information alert window or by clicking on an acknowledged alert in the action alert window. More than one may be viewed at a time.

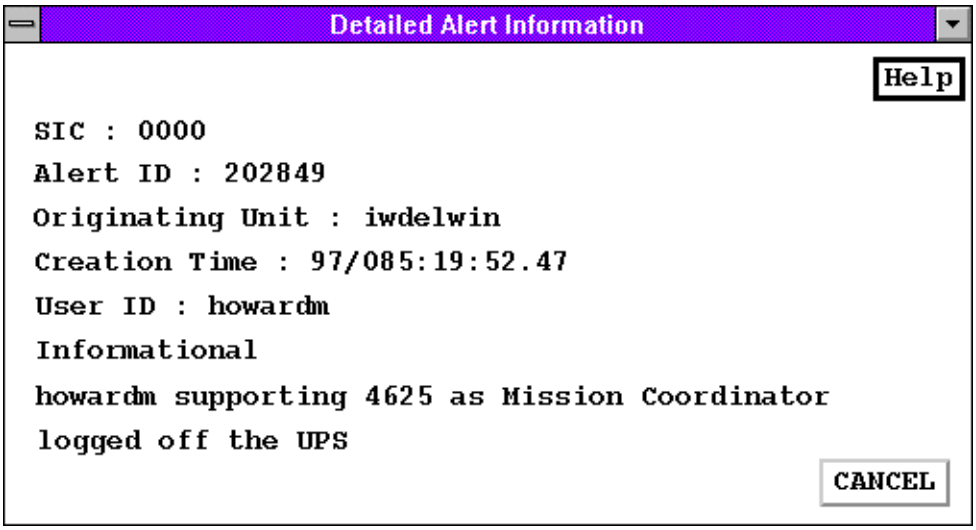


Figure 5-7. Detailed Alert Information Panel

5.5.2 Panel Items

a. SIC. Displays the mission that the alert applies to. If the alert does not apply to a specific mission, the Spacecraft Identification Code (SIC) is listed as 0000.

b. Alert ID. Displays the identification number of the selected alert.

c. Originating Unit. Displays the name of the unit that generated the alert.

d. User ID. Displays the name of the user that was using the process that generated the alert. If the alert was generated by a userless process, the User ID will be blank.

e. Creation Time. Displays the time that the alert was created, in an NCCDS absolute time format.

f. Acknowledged. Displays whether the alert has been acknowledged, or if the alert was an information alert instead of an action alert.

g. Message Text. Displays the full text of the message. If the alert is too long to be displayed on one line, it is split and displayed on two lines.

5.5.3 Panels

This function displays the Detailed Alert Information panel (see Figure 5-7).

5.5.4 Description

The Detailed Alert Information panel is provided to display more detailed information about a selected alert. There is more information contained in the alert data structure than can be displayed in the alert window; this panel gives the user access to that information.

5.6 Logoff Procedure

5.6.1

The user logs off the interactive session by selecting Logoff from the Session menu in the information window (see Figure 5-8). A confirmation box (Figure 5-9) is displayed for the user to confirm the logoff.

5.6.2

The following process occurs if the user does confirm the logoff:

a. All currently displayed interactive windows are erased from the screen. Any work in progress on these windows is lost.

b. Transmission of schedule requests to NCCDS occurs in the background when the XMIT function is started, freeing up the scheduling window for interactive processing. The background processing occurs in the following parallel stages.

   1. First, a list of requests is created. In the background, a schedule request message is created and queued for each request in the list. It may take several seconds to work through a long list. On logoff, the processing of the list will be immediately interrupted. Any requests remaining in the list will not be processed and the XMIT function would have to be restarted by the user to send these requests.

   2. Second, as each individual message is created and queued, another background process dequeues it and sends it to the NCCDS. Any requests that are queued to the second stage are considered processed and no further manual intervention should be required even though the XMIT function was interrupted. A request in this state will have at least a “pending” status (denoted by a “XmtP” value in the request’s UPS Status) and an informational alert would have been generated. It is possible to loose the alert for the last request queued during the logoff procedure. Assuming that logging off was not precipitated by major problems elsewhere in the system, a request’s status could progress beyond XmtP very quickly to acknowledged by the NCCDS (UPS Status = “XmtA”), then to displaying that the request has received a Schedule Result Message (SRM) from the NCCDS (UPS Status = “XmtS”), and finally to confirmed status (UPS Status = “XmtS”, NCC Status = “confrm”).

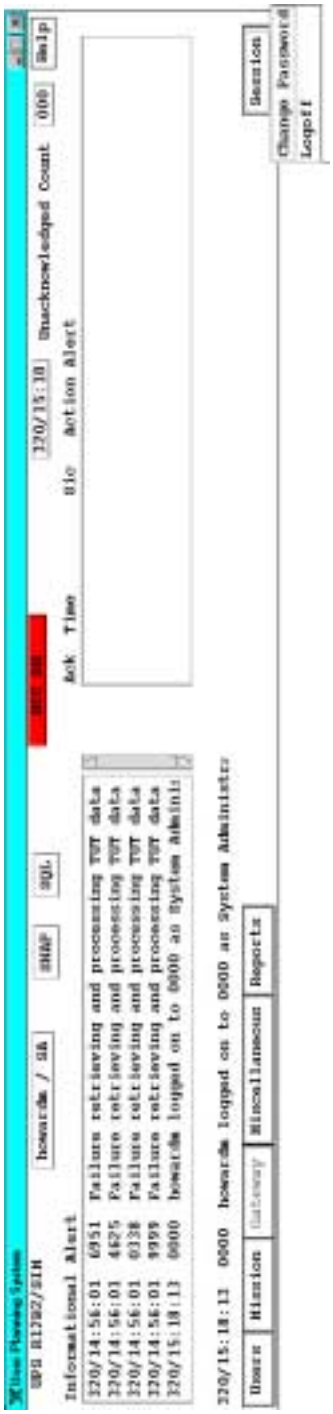


Figure 5-8. Session Menu and Information Window for System Administrator

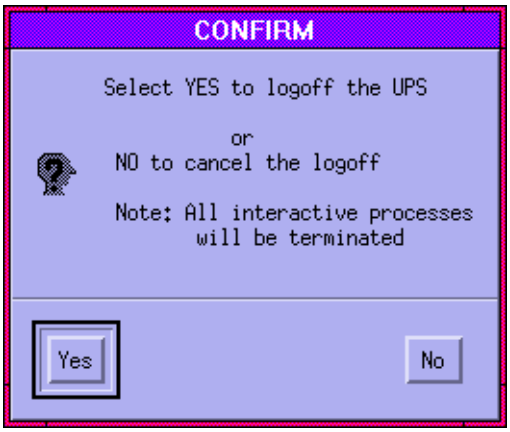


Figure 5-9. Logoff Confirmation Box

5.7 Change Position

5.7.1

Change-Position feature operates similar to a logout/login sequence whereby the current interactive session is ended as though the user logged-out of UPS, but then the user is again presented with the display panel to select another position/ mission to start a new interactive session.

5.7.2

By clicking on the user-ID/position indicator on the displayed information window, the current interactive session is terminated (after the operation is confirmed by the user; see Figure 5-10). Any open windows displayed from this terminated session are also erased and the user is presented with the User Position and Mission Panel for a new position/ mission selection.

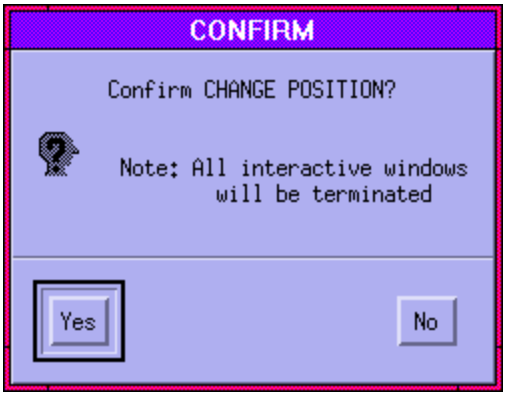


Figure 5-10. Change Position Confirmation Box

5.8 Change Password

The user can change his/her password by selecting Change Password from the Session menu in the information window (see Figure 5-8). This selection initiates the display of a window through which the user has access to the UNIX change password utility (Figure 5-11). The user enters the old password. If the old password is verified, the user enters a new password and then reenters it for verification. If the new password is verified, the user's password is changed and the window is exited.

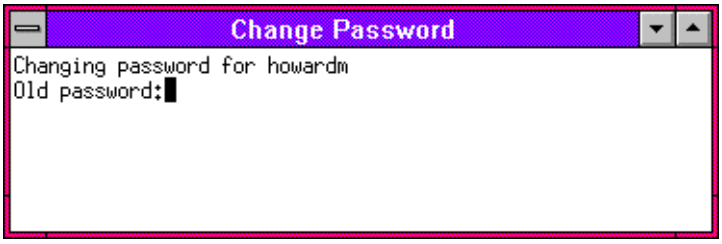


Figure 5-11. Change Password Panel

Section 6. Mission Operations

6.1 Overview

6.1.1

An UPS System Administrator can create and delete missions, copy mission data and database tables to a tape or data file, and copy mission data from a tape or data file back into the mission database. These functions are provided for the system administrator on the Mission pulldown menu in the System Administrator information window (see Figure 6-1).

6.1.2

An UPS Mission Coordinator or scheduler can purge orbital/scheduling data from the database. This function is provided for the Mission Coordinator on the Purge pulldown menu in the Mission Coordinator information window (see Figure 6-2).

6.2 Create Mission

6.2.1 General

a. The Create Mission panel (see Figure 6-3) enables the system administrator to create a new mission on the UPS. The Create Mission function initializes the necessary information in the database tables.

b. This panel is initiated from the Mission Create option of the Mission pulldown menu (see Figure 6-1).

6.2.2 Panel Items

a. `Mission SIC` Text Entry. Enter the four-character Spacecraft Identification Code (SIC).

b. `Mission Coordinator` Text Entry. Enter the UNIX login name for the mission coordinator for the newly created mission.

c. `ENTER` Pushbutton. Creates the mission.

d. `CANCEL` Pushbutton. Exits the Create Mission panel without creating the mission.

6.2.3 Panels

No sub-panels are displayed.

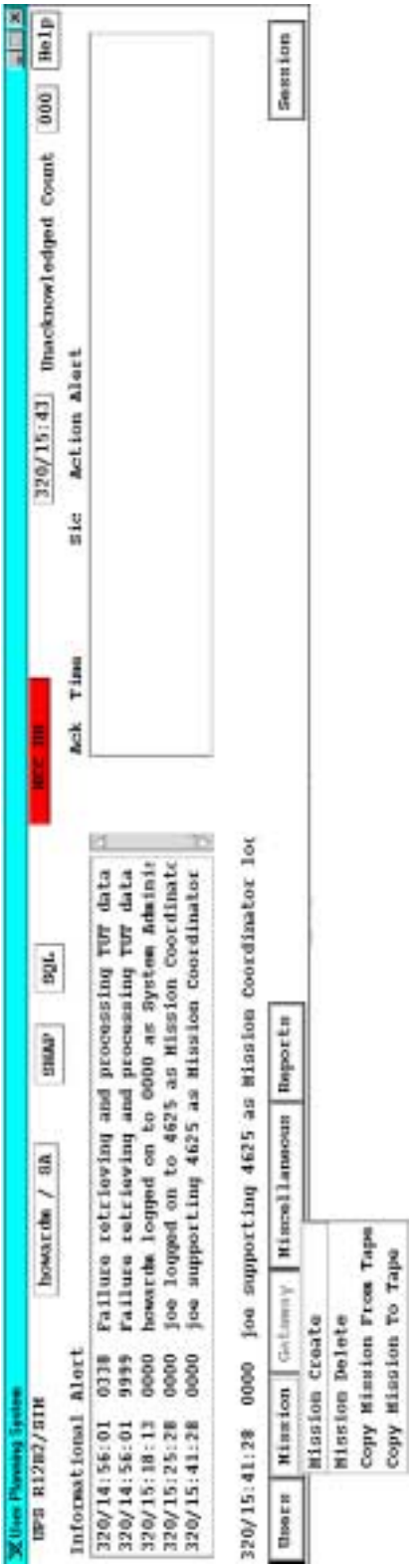


Figure 6-1. Mission Pulldown Menu on System Administrator Panel

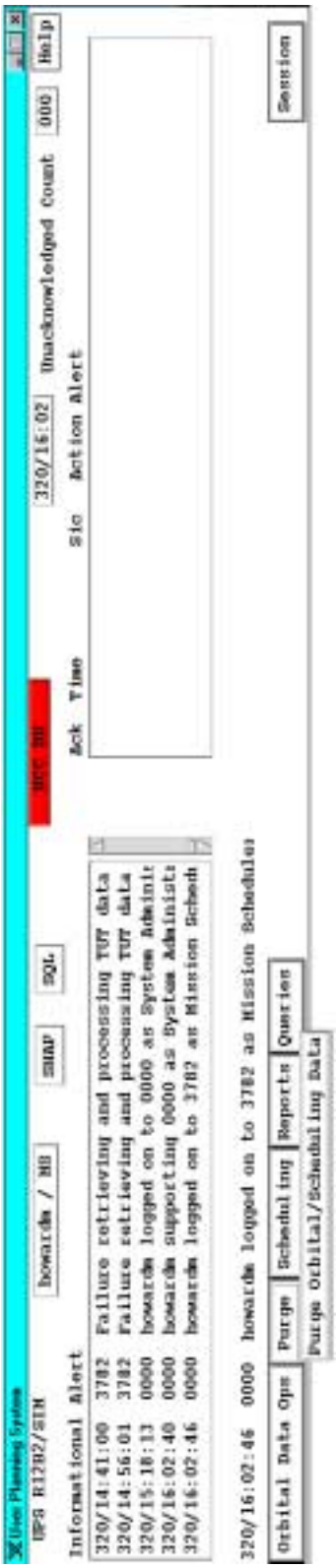


Figure 6-2. Purge Pulldown Menu on Mission Scheduler Panel

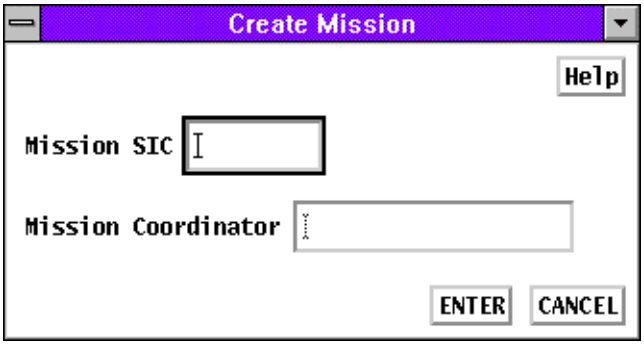


Figure 6-3. Create Mission Panel

6.2.4 Description

The Create Mission panel enables the UPS system administrator to create new missions. The system administrator enters the SIC of the mission to be created and then enters the UNIX user name of the person who will be assigned as mission coordinator. The system administrator then clicks on ENTER to create the mission or on CANCEL to cancel the process and exit the window.

6.3 Delete Mission

6.3.1 General

a. The Delete Mission panel (see Figure 6-4) enables the system administrator to delete a mission from the UPS. The delete mission function updates the appropriate tables in the database and frees the memory that the database has reserved for the mission.

b. This panel is initiated from the Mission Delete option of the Mission pulldown menu (see Figure 6-1).

6.3.2 Panel Items

a. Missions Single-Select Text List. Select the mission to be deleted from the UPS.

b. DELETE Pushbutton. Deletes the mission. When this button is activated, a window is displayed allowing the user to confirm the deletion.

c. CANCEL Pushbutton. Exits the Delete Mission panel without deleting the mission.

6.3.3 Panels

No sub-panels are displayed.

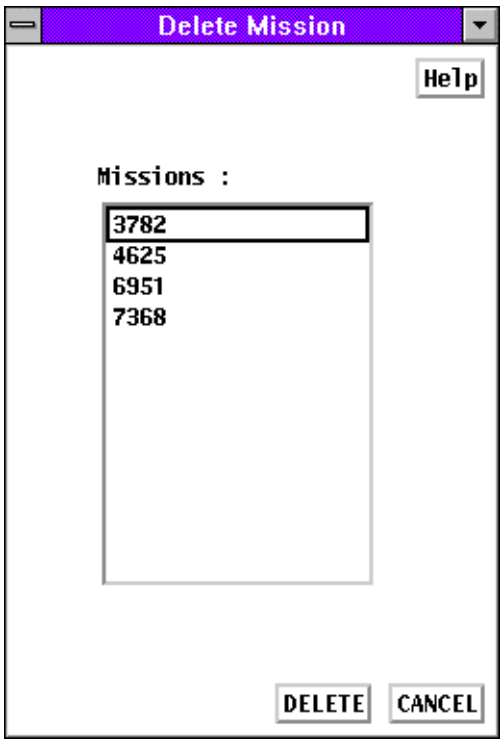


Figure 6-4. Delete Mission Panel

6.3.4 Description

a. The Delete Mission panel enables the UPS system administrator to delete missions from the database. The system administrator selects the mission to be deleted and then clicks on DELETE to delete the mission. A confirmation message is then displayed to confirm the deletion. For a mission to be deleted, only one mission coordinator can exist. If other users exist, the delete request is rejected.

b. CANCEL may be chosen at any time prior to activating ENTER to cancel the process and exit the window.

6.4 Read Mission From Tape

6.4.1 General

The Read Mission From Tape panel (see Figure 6-5) is initiated from the Copy Mission From Tape option of the Mission pulldown menu (see Figure 6-1) and enables the system administrator to read a mission data file created with the Write Mission to Tape function (refer to paragraph 6.5). The data from the file or tape are put back into the database tables from which they were copied. This procedure is usually done for the purpose of populating the database of a newly created mission. The database tables copied by Copy Mission to Tape and Read Mission from Tape are listed below:

DEFAULT_KSA_FORWARD

DEFAULT_SSA_FORWARD

DEFAULT_KSA_RETURN

DEFAULT_SSA_RETURN

DEFAULT_MA_FORWARD

DEFAULT_CROSS_TRK

DEFAULT_KASAWB_RETURN

DEFAULT_KASA_FORWARD

DEFAULT_KASA_RETURN

DEFAULT_MA_RETURN

DEFAULT_NORM_TRK

DEFAULT_SIMULATION

DEFAULT_SMA_FORWARD

DEFAULT_SMA_RETURN

SERVICES

INTERFERENCE_CHECKS

ENABLED_CONSTRAINTS

AUTO_MSG_FWD_FLAGS

DEFAULT_SCHEDULING_PARAMETERS

SUPIDEN_FUNCTION_CODES

DESTINATION_CODES

USER_INTERFACE_CHANNELS

FUNCTION_CODE

SPACECRAFT_CHARACTERISTICS

PROTOTYPE_EVENT

EVENT_SERVICES

AUTO_VALID_FLAGS

SERVICES_USED

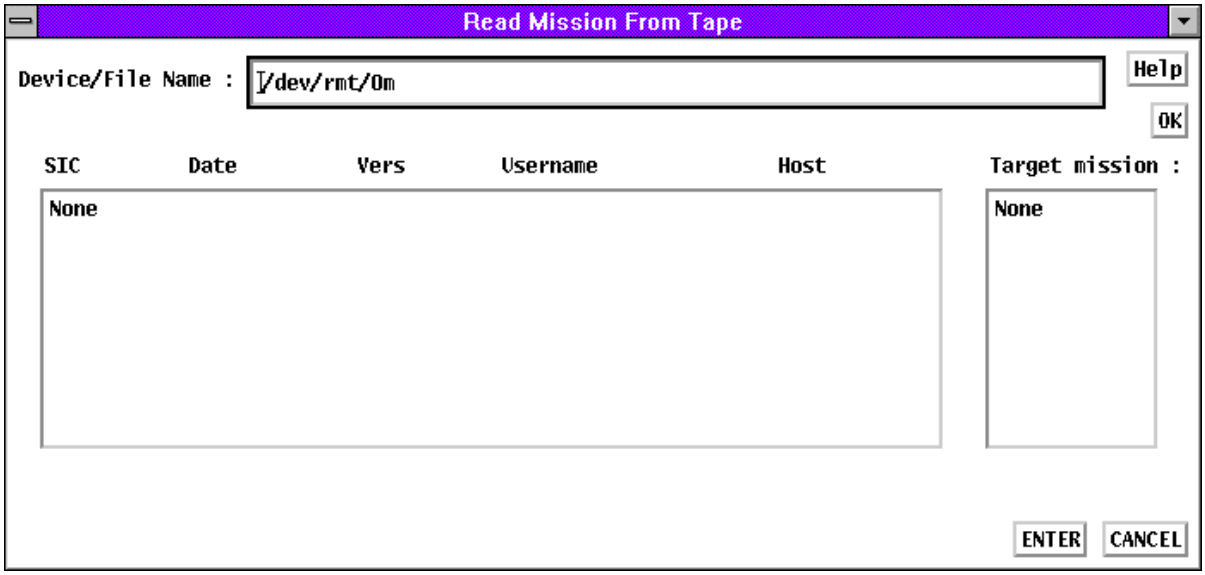


Figure 6-5. Read Mission From Tape Panel

6.4.2 Panel Items

a. `Device/File Name`. Enter the name of the tape or file name to verify against the name assigned when the data file was first created.

b. `OK` Pushbutton. Confirms the device/filename is correct, and displays the available data files and (empty) missions that can be populated.

c. `ENTER` Pushbutton. Reads the data file and place the data into the tables of the selected mission.

d. `CANCEL` Pushbutton. Exits the panel without reading the tape/data file.

e. `Tape/Directory Contents` Single-Select Text List. Lists all missions and their creation information stored on the tape, or in the specified directory. The fields in this list are: SIC, Date, Vers, Username, and Host.

f. `Target Mission` Single-Select Text List. Displays the available missions (only empty missions are available) for which the data read from the file may be copied.

6.4.3 Panels

No sub-panels are displayed.

6.4.4 Description

a. The Read Mission From Tape panel enables the UPS system administrator to read a tape created from the Write Mission to Tape panel. The system administrator enters the tape device name or pathname/ and clicks the OK button. Each mission data file on the tape or in the specified directory will be displayed in the `Tape/Directory Contents` text list, and all empty (usually newly created) missions on the UPS will be displayed in the `Target Mission` text list. When the system administrator selects a data file from the `Tape/Directory Contents` list and a mission from the `Target Mission` list and activates `ENTER`, the data from the selected file will be copied into the mission's database. At the conclusion of the process, the window will automatically close. `CANCEL` may be chosen at any time prior to activating `ENTER` to cancel the process and close the window.

b. The source and target mission SICs do not need to be the same, but the target mission must be empty (refer to paragraph 6.2, Create Mission).

NOTE

Prior to using the newly copied mission operationally, the designated mission coordinator for the mission must specify a Mission Prefix letter through the Mission Setup panel because the Copy Mission From Tape operation leaves the Mission Prefix undefined.

c. If a filename is specified in the Device/Filename entry window, the default path is assumed to be $TMPDIR unless the full file pathname is specified.

NOTE

If the mission data was written to a data file, the same pathname used to write the mission data must be entered into the Device/File Name field. Refer to paragraph 6.5.4 for details.

6.5 Write Mission to Tape

6.5.1 General

a. The Write Mission to Tape panel (see Figure 6-6) enables the system administrator to make a copy of a mission's database tables needed for populating a new mission. The data is written to either a tape device name or a data file. This function is used with the Read Mission from Tape function to initialize newly created missions on the UPS.

b. This panel is initiated from the Copy Mission to Tape option of the Mission pulldown menu (see Figure 6-1).

6.5.2 Panel Items

a. Device/File Name. Enter the name to be assigned to the tape or file being created.

b. Mission Single-Select Textlist. Select the mission to be copied to the tape or data file.

c. Create/Append Radio Buttons. Choose to create a file or append to file.

d. ENTER Button. Writes the selected mission tables to the tape or data file.

e. CANCEL Pushbutton. Exits the panel without writing to the tape/data file.

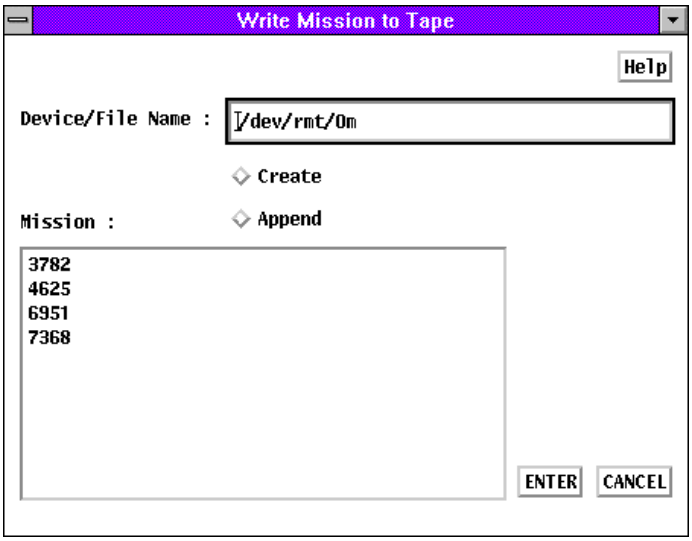


Figure 6-6. Write Mission to Tape Panel

6.5.3 Panels

No sub-panels are displayed.

6.5.4 Description

The Write Mission to Tape panel enables the UPS system administrator to copy a selected mission's database files to a magnetic tape or data file. The system administrator enters a name to be assigned to the tape or data file, selects a mission, activates the CREATE or APPEND pushbutton and clicks on ENTER to write to the tape. CANCEL may be chosen at any time prior to activating ENTER to cancel the process and exit the window.

NOTE

All files saved in the $TMPDIR directory will be deleted when the background processes are stopped and re-started. It is advised that "/tmp" be used as the path in the Device/File Name field, if the mission data is not being copied to tape.

6.6 Purge Orbital/Scheduling Data

6.6.1 General

The Purge Orbital/Scheduling Data function enables the mission coordinator or a mission scheduler of a particular mission to remove obsolete orbital and/or scheduling data. This function is initiated from the Purge Orbital/Scheduling Data option of the Purge pulldown menu (see Figure 6-2).

6.6.2 Panel Items (Two Panels)

6.6.2.1 Purge Type Selection Panel

a. Purge Type. Radio buttons that select the type of purge desired. User can select to purge orbital data, scheduling data, or both orbital and scheduling data.

b. ENTER Button. Register purge type selection, remove the panel, and continue to the Purge Time panel.

c. CANCEL Button. Exit the panel and terminate the process.

6.6.2.2 Purge Time Panel

a. Days (Relative). Enter a number of days' worth of data to save. Defaults to the mission archive age. A value of zero will purge all data.

b. Date/Time (Absolute). Enter date/time in NCCDS time format.

c. ENTER Pushbutton. Purge all orbital and scheduling data for the selected mission based on the absolute or relative time.

d. CANCEL Pushbutton. Exit the panel without purging data.

6.6.3 Panels

The Purge Type Selection panel (Figure 6-7) is displayed to allow the user to select the type of data to purge (orbital and/or schedule). The Purge Time panel (see Figure 6-8) is displayed to allow the user to select a maximum age of data in the orbital and scheduling tables for the mission.

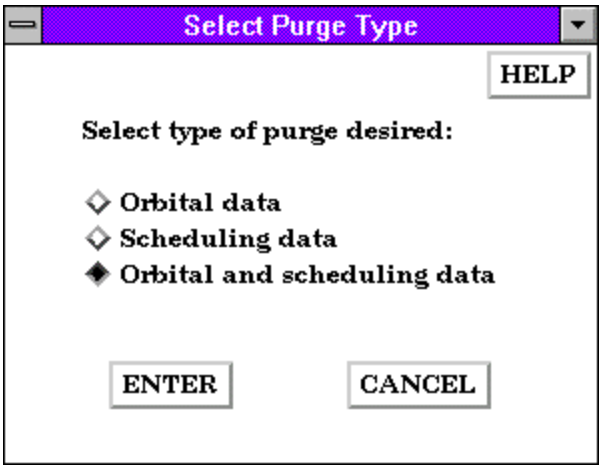


Figure 6-7. Purge Type Selection Panel

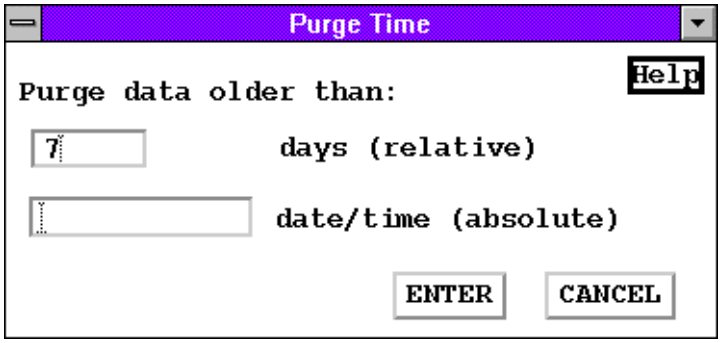


Figure 6-8. Purge Time Panel

6.6.4 Description

The Purge Orbital/Scheduling Data function enables the mission coordinator or mission scheduler to purge from the database orbital and scheduling data for a specific mission that is older than a specified age. The user selects a mission to be purged and enters either absolute or relative time. All related orbital and/or scheduling data for the mission that is older than the maximum age will be purged from the database. The user may activate the `CANCEL` button to cancel the purge.

Section 7. Mission Setup

7.1 Overview

7.1.1

The Mission Setup panels provide the interface for the mission coordinator's initial task of entering data into the mission database tables to be used by the various processes of the UPS system.

NOTE

The mission coordinator is referred to as the user throughout this Section.

7.1.2

The Mission Setup pulldown menu allows access to the following mission setup categories (see Figure 7-1):

a. Auto-processing Parameters.

b. Mission/Spacecraft Characteristics.

c. Mission User List.

d. Orbital Constraint Checking.

e. Orbital Parameters.

f. Prototype Events and Service Specification Codes.

g. Electronic User Parameters.

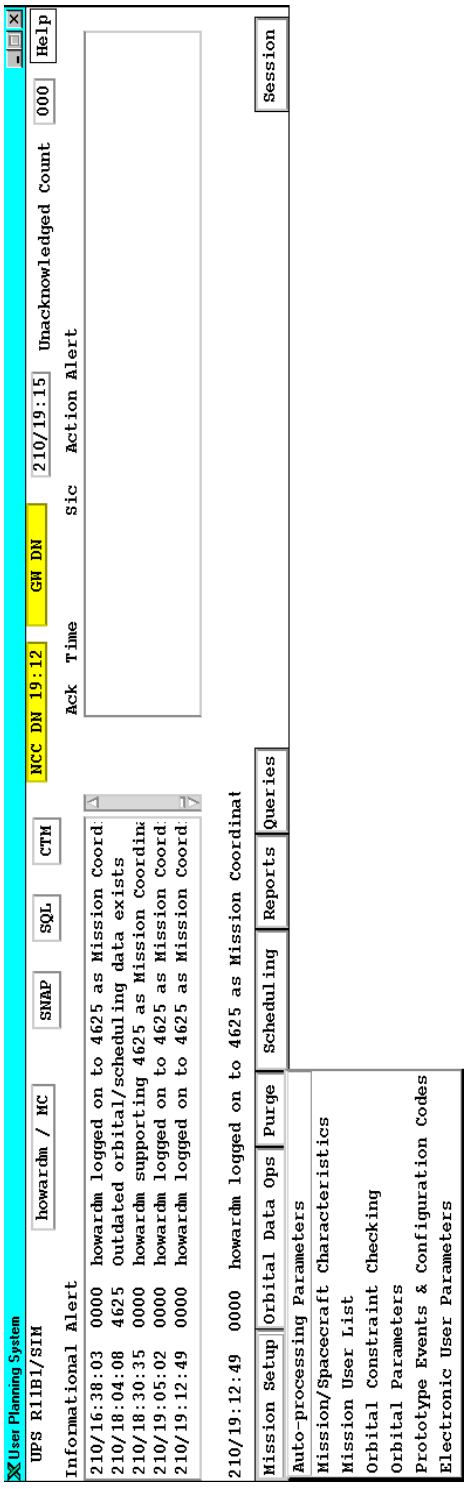


Figure 7-1. Mission Setup Pulldown Menu

7.1.3

Although the pulldown menu lists the categories in alphabetical order for name-searching ease, the actual order in which the mission setup function should be conducted for each category differs from this sequence. Inherent inclusive relationships exist among certain types of mission setup data (e.g., prototype events contain service specification codes, and automatic orbital data validation requires orbital data validation parameters); therefore, it is recommended that the mission setup function be executed in the following sequence:

a. Auto-processing Parameters.

b. Mission/Spacecraft Characteristics.

c. Mission User List.

d. Orbital Constraint Checking.

e. Orbital Parameters.

f. Prototype Events and Service Specification Codes.

g. Electronic User Parameters.

7.1.4

If the user logged in with more than one mission and selects an item from the pulldown menu, a panel is displayed listing the missions chosen at logon time. The user must then select the mission whose setup data is to be created/updated (refer to paragraph 7.2 for details). An attempt is then made to lock all database resources for the selected mission. At this time, if any other users for the selected mission are using functions that already have an established lock on certain mission setup database tables, the user will be issued a warning message stating that the mission setup database resources are being used elsewhere, and asking if the user wishes to continue. This feature allows the user to decide whether mission setup functions should be performed at that particular time. After further investigation, the user may find that the planned mission setup updates have no adverse effect on the other selected mission users, in which case he/she may choose to continue. On the other hand, if the user plans to update prototype event IDs and another user is creating SARs, he/she may choose to discontinue and attempt the update at some later time.

7.2 Mission Selection

7.2.1 General

a. This panel (see Figure 7-2) is used to specify the mission whose setup data is to be created or modified. Because a lock must be performed on the database before adding new missions or updating existing missions, the system must know the specific mission for which the database should be locked.

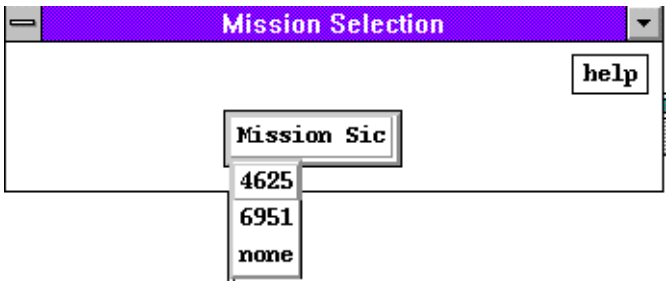


Figure 7-2. Mission Selection Panel

b. This panel is initiated by selecting any option from the Mission Setup pulldown menu (see Figure 7-1).

7.2.2 Panel Items

Mission SIC pulldown menu—Select a particular mission.

7.2.3 Panels

No sub-panels are displayed.

7.2.4 Description

A list of the missions chosen by the user when logging on to the UPS is displayed on this panel after the user selects an item from the Mission Setup pulldown menu. The user then chooses the mission to be updated from the displayed list. Selecting the mission tells the system which part of the database to lock; it also saves the user from having to indicate on each mission setup screen which mission is being updated. It is recommended that the user choose only one mission when logging on to perform mission setup functions. The system assumes that the mission setup data to be updated are those of the mission chosen during logon, thus permitting this panel to be bypassed completely. The “none” option can be selected to return to the System Information Window without selecting a mission.

7.3 Autoprocessing Parameters

7.3.1 General

a. This panel (see Figure 7-3) is used to set the autoprocessing flags used for automatic validation and message forwarding to either on or off.

b. This panel is initiated by selecting Auto-processing Parameters from the Mission Setup pulldown menu (see Figure 7-1).

7.3.2 Panel Items

a. Batch SAR Checks:

1. `Validation Level` Radio Button Group. Selection determines what level of validation will be applied to batch SARs received from the electronic user (e.g., syntax, crossfield, etc.).

2. `Check Orbital Constraints` Checkbox. If selected, batch SARs received from the EU will be validated according to the designated orbital constraints.

b. Automatic Processing From Electronic User:

1. `Process Orbital Data Automatically` Checkbox. If selected, orbital data from the electronic user will be processed without user intervention.

2. `Forward Batch SARs to NCC` Checkbox. If selected, batch SARs received from the electronic user should be automatically forwarded to the NCC. Note that new for Release 12, SDRs and Waitlist Requests from the Electronic User are *automatically* sent to the NCC.

c. Automatic Forwarding to Electronic User:

1. `EU Node` Multiple Select Textlist. Destination Flags checkboxes will be applied to all selected EU Nodes.

NOTE

EU Nodes are defined in the Electronic User Information panel accessed from the Mission Setup pulldown menu from the System Information Window.

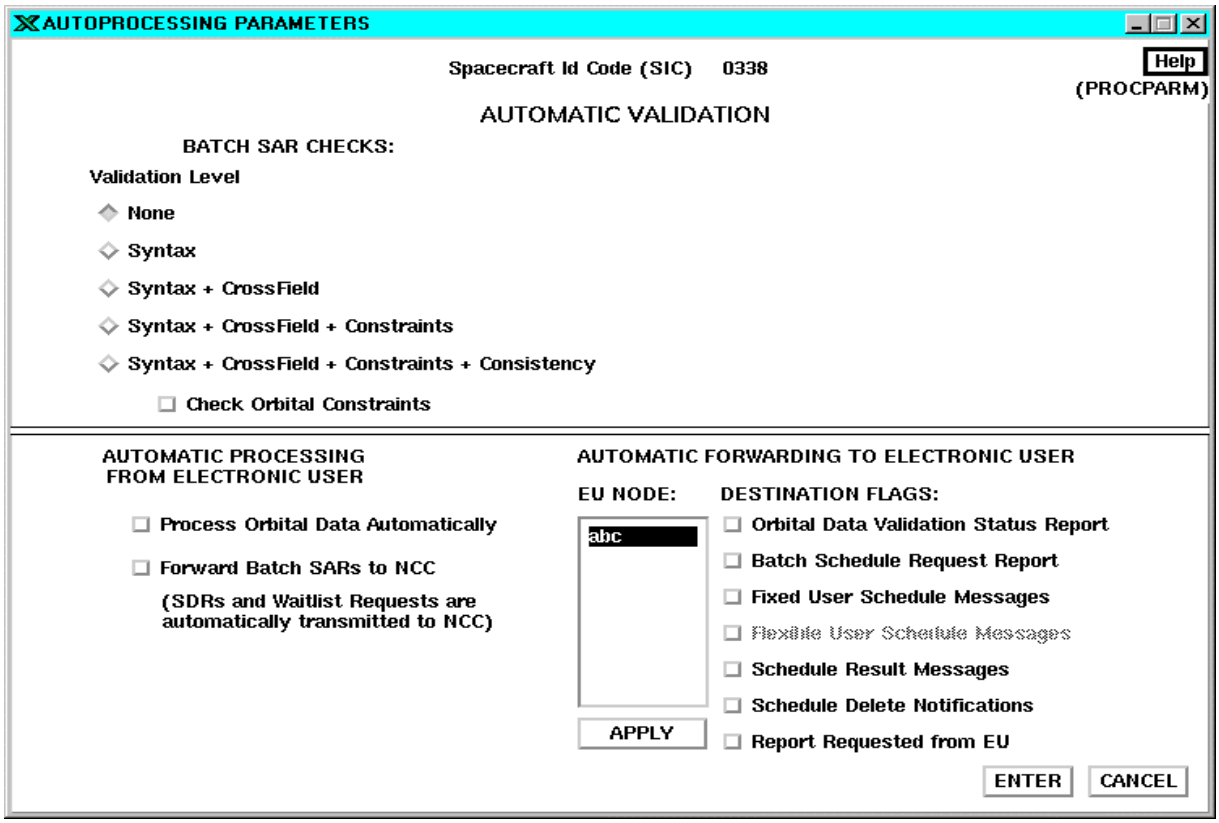


Figure 7-3. Autoprocessing Parameters Panel

2. Destination Flags Checkboxes. These checkboxes determine the type of message to be sent to each selected EU Node.

   (a) `Orbital Data Validation Status Report` Checkbox. If selected, indicates the UPS will forward a status report sharing the results of orbital data validation to all selected EU Nodes upon completion of said validation.

   (b) `Batch Schedule Request Report` Checkbox. If selected, indicates the UPS will forward a status report sharing the results of batch SAR validation to all selected EU Nodes upon completion of said validation.

   (c) `Fixed (Flexible) User Schedule Messages` Checkboxes. If selected, indicates the UPS will automatically forward all Fixed (Flexible) User Schedule Messages (USMs) received from the NCCDS to all selected EU Nodes.

NOTE

1. This option only applies to full support users, and the `Accepts Only Legacy SRMs and USMs` checkbox is not selected in the Mission Spacecraft Characteristics panel.

2. If this checkbox is selected, an UPS shutdown and startup must be performed for the selection to take effect.

(d) `Schedule Result Messages` Checkbox. If selected, indicates the UPS will automatically forward all SRMs received from the NCCDS to all selected EU Nodes.

NOTE

1. If the Accepts Only Legacy SRMs and USMs checkbox is selected in the Mission Spacecraft Characteristics panel, the UPS will translate the (full-support format) SRM into a baseline SRM.

2. If this checkbox is selected, an UPS shutdown and startup must be performed for the selection to take effect.

(e) `Schedule Delete Notifications` (SDN) Checkbox. If selected, indicates the UPS will recreate an SDN in response to an SRM received from the NCCDS, indicating a SAR was deleted, and forward it to all selected EU Nodes.

NOTE

1. This option only applies to baseline users, and the `Accepts Only Legacy SRMs and USMs` checkbox is selected in the Mission Spacecraft Characteristics panel.

2. If this checkbox is selected, an UPS shutdown and startup must be performed for the selection to take effect.

(f) `Report Requested from EU` Checkbox. If selected, indicates the UPS will automatically forward a report requested by an EU to all selected EU Nodes.

NOTE

If this checkbox is selected, an UPS shutdown and startup must be performed for the selection to take effect.

d. `ENTER` Pushbutton. Saves the autoprocessing flags to the UPS database. The Autoprocessing Parameters panel is also erased from the screen. The `ENTER` pushbutton is not visible in query mode.

e. `PRINT` Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The `PRINT` pushbutton is not visible in query mode.

f. `CANCEL` Pushbutton. Cancels processing without saving to the database, and erases the Autoprocessing Parameters panel. If the user has made changes on the screen, he/she will be asked to confirm the cancel action.

7.3.3 Panels

No sub-panels are displayed.

7.3.4 Description

a. This panel is used to control two types of automatic processing: validation and message forwarding. Batch SARs can be validated automatically according to orbital constraints, consistency, and rudimentary rules. These flags controlling the automatic validation can be turned on and off when desired.

b. The message forwarding flags (Destination Flag checkboxes), on the other hand, allow the user to control the automatic message flow to the EU Nodes. Selecting one or more of these checkboxes specifies that the designated messages (batch SARs, USMs, SRMs, SDNs, etc.) are to be forwarded automatically to the specific EU Node(s) when they are received by the UPS.

c. To function properly, both the validation processes and the message forwarding processes require certain parameters from the UPS database. It is therefore recommended that these parameters be set up before any of the autoprocessing flags are turned on. Batch SAR validation against orbital constraints requires interference and Sun alignment check information (refer to paragraph 7.4.2).

d. Forwarding messages to the electronic user requires communication information related to the electronic user (refer to paragraph 7.6.2). The user, however, will still be able to turn certain flags on even if that required information has not yet been set up in the system.

7.4 Mission/Spacecraft Data

7.4.1 General

Mission/spacecraft characteristics, and user interface channels information are discussed in this section.

7.4.2 Mission/Spacecraft Characteristics

7.4.2.1 General

a. This panel (see Figure 7-4) is used to set up the mission/spacecraft characteristics, including Support Identification Codes (SUPIDENs) and user interface channels (an additional panel is used to enter the last type of information). For more detailed information on items such as the SUPIDEN and Vehicle Identification Code (VIC), see *Support Identification Code Dictionary* (Reference 8).

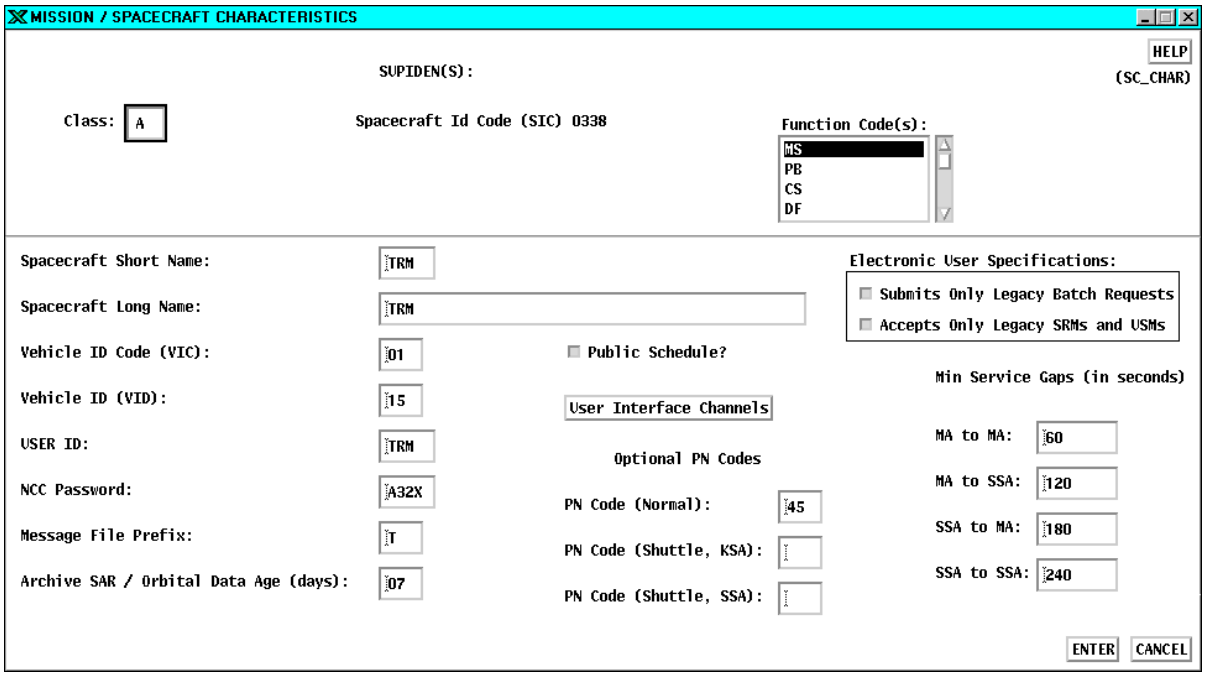


Figure 7-4. Mission/Spacecraft Characteristics Panel

b. This panel is initiated by selecting Mission/Spacecraft Characteristics from the Mission Setup pulldown menu (see Figure 7-1).

7.4.2.2 Panel Items

a. SUPIDENs. The support identification code consists of three separate items:

   1. `Class`.

   2. `Spacecraft ID Code (SIC)` (this field cannot be modified).

   3. `Function code(s)` (more than one may be selected by holding down the control key and clicking on the function codes).

b. `Spacecraft Short Name`. Text entry field for the abbreviated spacecraft name (e.g., COBE or UARS).

c. `Spacecraft Long Name`. Text entry field for the extended mission/spacecraft name (e.g., Cosmic Background Explorer or Upper Atmosphere Research Satellite).

d. `Vehicle ID Code (VIC)`. Text entry field for the two-character VIC.

e. `Vehicle ID (VID)`. Text entry field for the three-character octal Vehicle ID (VID), which is used to identify the spacecraft with which the Space Network (SN) data block is associated.

f. `User ID`. Text entry field for the four-character ID assigned to a user by the NCCDS.

g. `NCC Password`. Text entry field for the password assigned to a POCC by the NCCDS.

h. `Message File Prefix`. Text entry field used to assign a one-character prefix to be used when logging messages.

i. `Archive SAR/Orbital Data Age (days)`. Text entry field used to specify in days the period for purging data.

j. `Public Schedule` Checkbox. Indicates whether mission wants its schedule to be visible to other missions in the UPS database at a multi-mission site.

k. `User Interface Channels` Pushbutton. Displays an additional panel for entering user interface channels (refer to paragraph 7.4.3 for more details).

l. Optional PN Codes. Text entry fields used to assign the Pseudorandom Noise (PN) codes for various service types. The relevant codes are required if transmissions of USMs are to be performed for the electronic user.

   1. `PN code (normal)`.

   2. `PN code (Shuttle, KSA)`.

   3. `PN code (Shuttle, SSA)`.

m. Electronic User Specifications. Radio buttons that specify the type of electronic messages UPS should send to, and receive from, the mission's Electronic User machine.

1. `Submits Only Legacy Batch Requests`. The `Submits Only Legacy Batch Requests` checkbox indicates that the UPS is to accept schedule requests from the EU in baseline format. The UPS will reformat the schedule requests into Full Support format before transmission to the NCCDS, however this modification will be transparent to the user.

2. `Accepts Only Legacy SRMs and USMs`. The SDN message is not used by NCCDS to convey acknowledgment of a schedule request deletion for a Full Support customer. Therefore, the `Accepts Only Legacy SRMs and USMs` checkbox indicates that the UPS is to reformat Full Support SRMs into baseline SRMs and create corresponding SDNs before sending the messages on to the EU. This checkbox also indicates that the UPS is to drop any Flexible USMs received; not sending these messages on to the EU.

NOTE

Since the UPS *only* communicates with the NCCDS using the Full Support (NCC 98) message formats, these two fields allow UPS to continue to support baseline users.

n. Minimum Service Gaps. These text entry values specify, in seconds, the minimum gap allowable between any two service types for the user's mission. These values are used in two ways:

1. The user should inform the NCCDS to store these values in their database, which allows NCCDS to keep the mission's services separated by the specified gap, and;

2. The Recurrent Scheduling process will only create SARs where the specified gap can be maintained, taking into account the flexibilities specified in the SAR (e.g., minimum duration, service plus and minus tolerance).

   (a) `MA to MA`. Displays the minimum time gap between these services that the NCCDS enforces for the mission.

   (b) `MA to SA`. Displays the minimum time gap between these services that the NCCDS enforces for the mission.

   (c) `SA to MA`. Displays the minimum time gap between these services that the NCCDS enforces for the mission.

   (d) `SA to SA`. Displays the minimum time gap between these services that the NCCDS enforces for the mission.

o. ENTER Pushbutton. Saves the mission/spacecraft characteristics, including the destination codes and the user interface channels into the UPS database. The Mission/Spacecraft Characteristics panel is also erased from the screen. The ENTER pushbutton is not visible in query mode.

p. PRINT Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The PRINT pushbutton is not visible in query mode.

q. CANCEL Pushbutton. Cancels processing without saving to the database, and erases the Mission/Spacecraft Characteristics panel. If the user has made changes on the screen, he/she will be asked to confirm the cancel action.

7.4.2.3 Panels

The User Interface Channels panel is displayed.

7.4.2.4 Description

This panel contains various items used to assign values to the general mission/spacecraft characteristics. When this panel is initially displayed, the only field that will already be assigned is the SIC. All items are required, except for the user interface channels.

7.4.3 User Interface Channel

7.4.3.1 General

a. This panel (see Figure 7-5) is used to set up user interface channels. The values entered here are used during syntax/range validation of certain service parameters. If UPS displays the validation error message "User channel ID is not in the UPS Data base", either reenter one of the channel IDs listed in this panel or use this panel to add a new ID to the list of acceptable values.

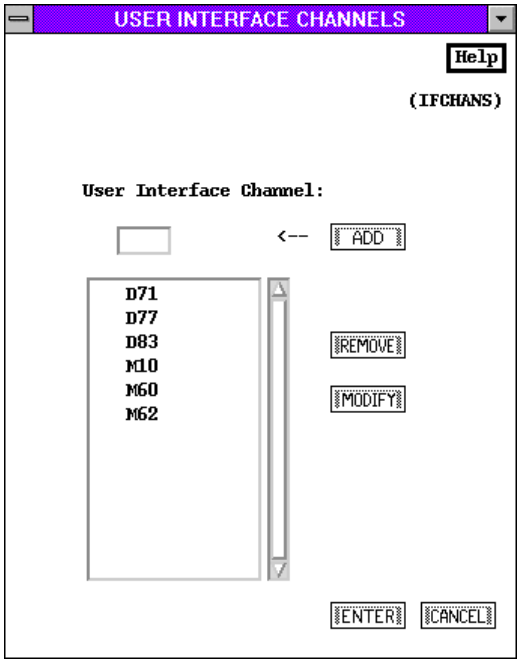


Figure 7-5. User Interface Channels Panel

b. This panel is initiated by selecting `User Interface Channels` pushbutton from the Mission/Spacecraft Characteristics panel (see Figure 7-4).

7.4.3.2 Panel Items

a. `User Interface Channel`. Text entry field used to enter such a code. Format is ANN.

b. Text Display. Area in which both previously defined user interface channels and those currently being added/removed are displayed.

c. ADD Pushbutton. Adds the user interface channel in the text entry field to the text display. The ADD pushbutton is not visible in query mode.

d. REMOVE Pushbutton. Removes the selected user interface channel from the text display. (A row must be selected from the text display; otherwise, this pushbutton will not function.) The REMOVE pushbutton is not visible in query mode.

e. MODIFY Pushbutton. Transfers the user interface channel selected from the text display to the text entry field, allowing the user to change the user interface channel and use the ADD pushbutton to make the modification. (A row must be selected from the text display; otherwise, this pushbutton will not function.) The MODIFY pushbutton is not visible in query mode.

f. ENTER Pushbutton. Returns the user to the Mission/Spacecraft Characteristics panel (the user interface channels are not saved to the UPS database until the ENTER pushbutton on the Mission/Spacecraft Characteristics panel is pressed). The User Interface Channels panel is also erased from the screen. The ENTER pushbutton is not visible in query mode.

g. CANCEL Pushbutton. Cancels processing without saving to the database, and erases the User Interface Channels panel. If the user has made changes made on the screen, he/she will be asked to confirm the cancel action.

7.4.3.3 Panels

No sub-panels are displayed.

7.4.3.4 Description

To add a user interface channel, the user enters a three-character code into the text entry field and clicks on ADD (this step only adds it to the text display; it is not actually added to the database until the user clicks on ENTER in the Mission/Spacecraft Characteristics panel). To remove or modify an existing user interface channel, the user must click on a row in the text display and then click on REMOVE or MODIFY. If satisfied with the changes, the user then clicks on ENTER; otherwise, the user may click on CANCEL.

7.5 Mission User List

7.5.1 General

a. This panel (see Figure 7-6) is used to designate which users (logon IDs) have access to a particular mission and the functions they are allowed to perform under that mission.

b. This panel is initiated by selecting Mission User List from the Mission Setup pulldown menu (see Figure 7-1).

7.5.2 Panel Items

a. `User Logon ID`. Text entry field used to designate a logon ID that will have access to the mission.

b. `Authorized Position`. Radio button used to assign a UPS position to a logon ID. (Refer to paragraph 5.1 for more details on UPS positions.)

c. `Textlist`. Clicking on a row within the textlist copies the logon ID and position to the individual fields above the textlist.

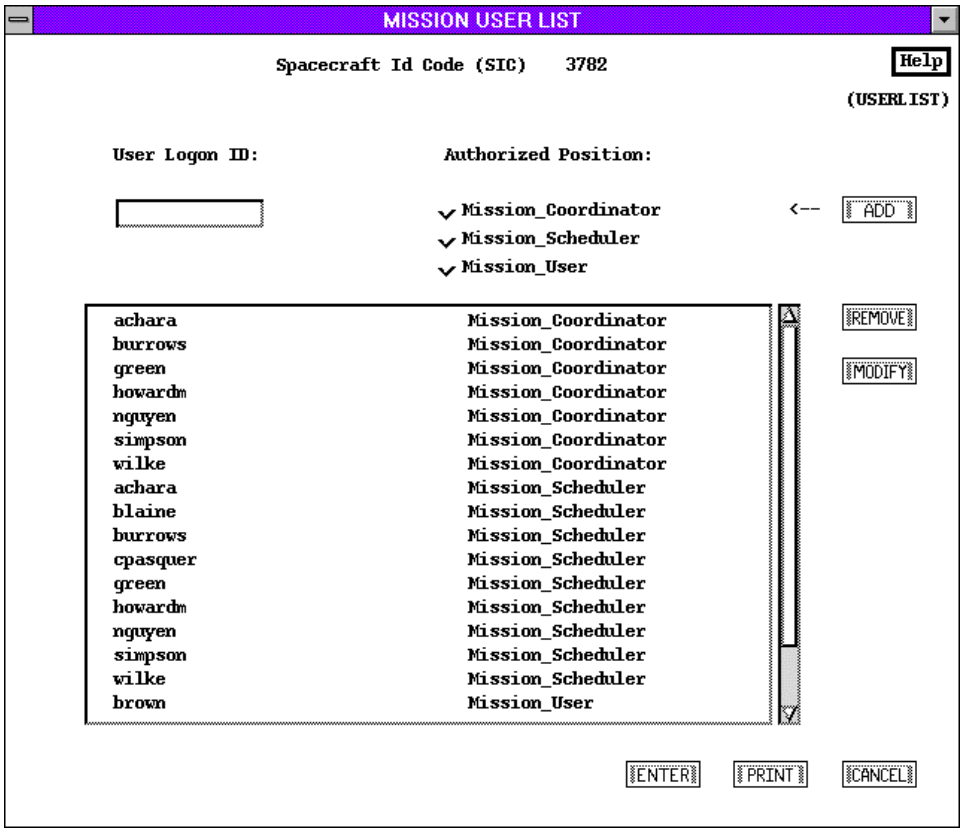


Figure 7-6. Mission User List Panel

d. ADD Pushbutton. Adds the logon ID and position to the textlist.

e. REMOVE Pushbutton. Removes the selected logon ID and position from the textlist. (A row must be selected from the textlist; otherwise, this pushbutton will not function.)

f. MODIFY Pushbutton. Modifies the currently selected row within the textlist to the newly entered logon ID and/or position. (A row must be selected from the textlist; otherwise, this pushbutton will not function.)

g. ENTER Pushbutton. Saves the mission user information to the UPS database. The Mission User List panel is also erased from the screen.

h. PRINT Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report.

i. CANCEL Pushbutton. Cancels processing without saving to the database, and erases the Mission User List panel. If the user has made changes on the screen, he/she will be asked to confirm the cancel action.

7.5.3 Panels

No sub-panels are displayed.

7.5.4 Description

a. This panel is used to set up the list of users who are allowed access to a mission's data and the level of access they are granted (mission coordinator, mission scheduler, mission user). (Refer to paragraph 5.1 for more details on the levels of permission.) A specified user name must belong to an existing Unix user account. Users may not remove or modify their own mission coordinator entry. A bother box is displayed if the user makes an invalid entry.

b. To add a user/position, the user enters the appropriate information in the items above the textlist and clicks on ADD. An alternative method of adding a new entry involves selecting a row, changing the logon ID and/or position, and clicking on ADD. This method provides a quick way to add entries for each position for the same user. To remove an existing user/position, the user must click on a row in the textlist and then click REMOVE. To modify an existing user/position, the user must click on a row in the textlist, change the logon ID and/or position, and then click on MODIFY.

7.6 Orbital Constraint Checking

7.6.1 General

a. The panel that gets displayed when this item is selected from the Mission Setup pulldown menu depends on the mission selected for the `Create TSWs From` item on the Orbital Parameters panel. If a mission selected `PSATs/UAVs`, `PSATs only`, or `GTV data`, the Define TSW Superset ID panel (see Figure 7-7) will be displayed. The Define TSW Set ID panel (see Figure 7-8) will be displayed if the mission selected the `TCW` option. Both panels have a scrolling list that displays existing TSW Superset IDs or TSW Set IDs and a text field to enter new values.

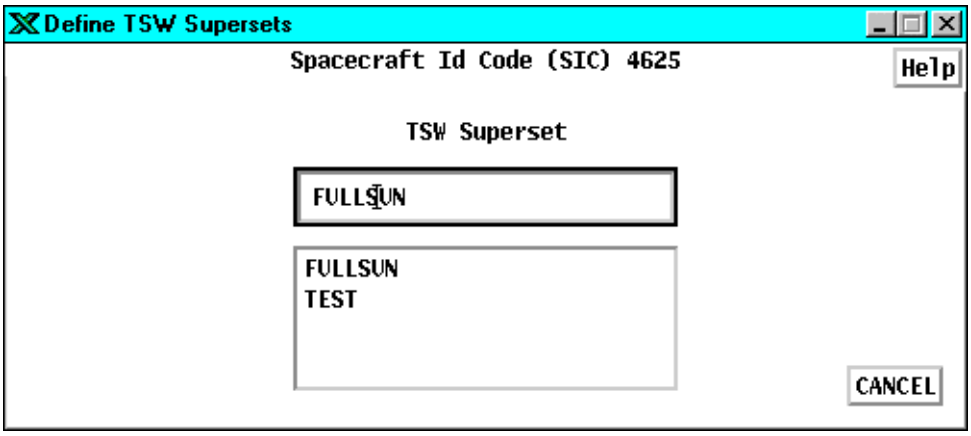


Figure 7-7. Define TSW Supersets Panel

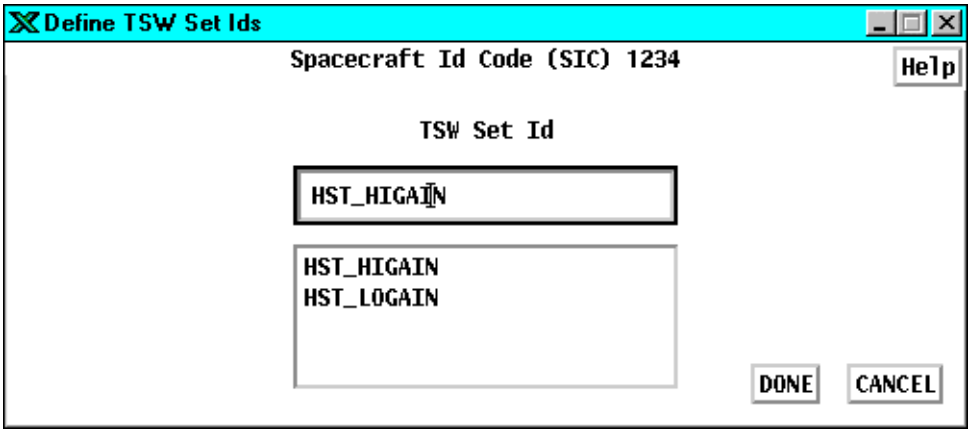


Figure 7-8. Define TSW Set IDs Panel

b. For FDF and GTV missions, if a user selects a Superset ID from the list, it is displayed in the text field. A right mouse click will display a popup menu and the user can modify, review, or delete the ID. If a user enters a new ID in the text field, a right mouse click will display a popup menu that allows the user to add the ID. If the user selects add, modify or review, the Orbital Constraints panel will be displayed. This panel (see Figure 7-9) is used to designate which types of interference and sun alignment checks should be taken into consideration when generating TDRS Scheduling Windows (TSW). This panel is only meaningful to missions that receive PSATs because PSATs describe the various orbital points, anomalies and sun alignments that occur during each orbit. PSAT missions can define multiple TSW Superset IDs and each ID will describe a different combination of view constraints.

c. For example, suppose a mission would prefer to have as many contacts in sunlight as possible, because the spacecraft's batteries are weakening, and the solar array panels are needed to provide power. The mission would, if all contacts cannot be in full sunlight, prefer to have its contacts with no more than 5 minutes of darkness. Finally, since the mission requires at least one contact every 3 hours, it may be forced to have a contact in complete darkness.

d. The mission would define the primary Superset to contain only the sunlight portion of a TDRS view (call it "Fullsun"). The secondary Superset would be defined such that each TDRS view would be "notched out" by those periods of darkness that are greater than 5 minutes (call it "Partsun"). Finally, the tertiary Superset would not be constrained by the sunlight requirement at all (call it "Nosun").

e. Upon initiation of TSW generation (refer to paragraph 8.3), each service specified in the `FDF Service Types Used by Mission` list (refer to paragraph 7.7) will have a set of TSWs generated for each Superset. Obviously, the views generated for the tertiary Superset are going to be longer than the views from the first two but will include undesirable scheduling periods where onboard batteries might be drained (darkness). The mission will send all three (3) sets of TSWs to the NCCDS using the Transmit TSWs to NCCDS process (refer to paragraph 8.4).

f. The user would then, in this example, create 3 schedule requests; one primary and 2 alternates, for each TDRS View, throughout the scheduling period. The primary SAR would specify the use of the Fullsun TSW Set, the first alternate would specify the Partsun TSW Set, and the second alternate would specify Nosun. The NCCDS will try to satisfy the mission's desires by attempting to schedule the primary request first, followed by the each alternate request in turn.

g. The LandSat-7 mission (using GTV TDRS view data) can specify multiple Superset IDs, but since it does not receive PSATs, each set of TSWs generated will be identical.

h. For missions employing TCWs, the user should create a TSW Set ID for each service that will occur in the raw data. The Orbital Constraints panel is not displayed. TCW missions cannot specify any additional constraints on their views. Only one set of TSWs per TSW Set ID will be generated.

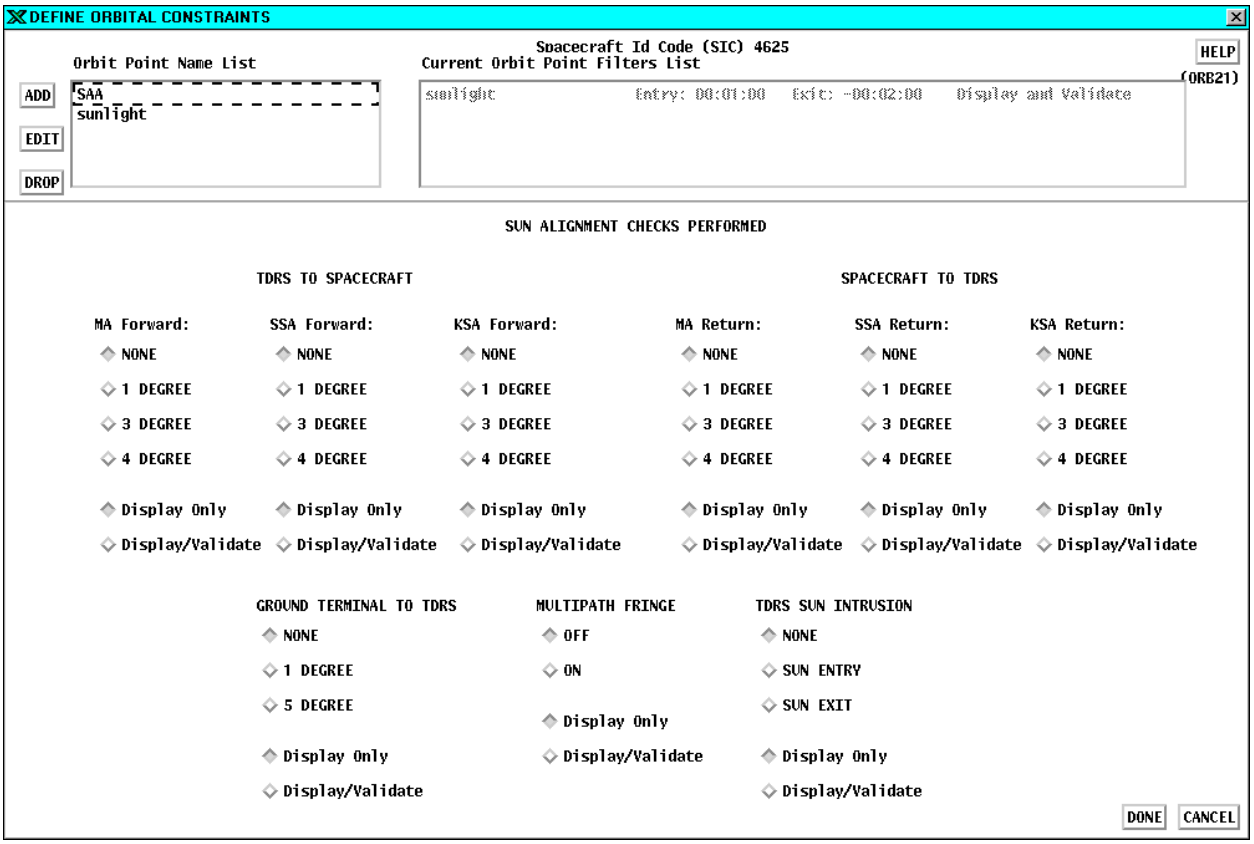


Figure 7-9. Define Orbital Constraints Panel

7.6.2 Panel Items

a. Interference Checks Performed. Multiple selections that determine the types of interferences that should be considered when validating SARs. These can be interference checks such as:

1. Sun Interference Periods (SIPs).
2. South Atlantic Anomaly (SAA).
3. FM radar zone (Radio Frequency Interference [RFI]).
4. Van Allen Belt entry.
5. TDRS Sun entry.
6. TDRS multipath fringe entry.

b. TDRS-to-Spacecraft Sun Alignment Checks. Radio buttons used to designate whether Sun alignment checks should be performed for TDRS-to-spacecraft services, and if so, to what extent (1, 3, or 4 degrees).

   1. Multiple Access (MA) forward.

   2. S-band Single Access (SSA) forward.

   3. K-band Single Access (KSA) forward.

c. `Spacecraft-to-TDRS` Sun Alignment Checks. Radio buttons used to designate whether Sun alignment checks should be performed for spacecraft-to-TDRS services, and if so, to what extent (1, 3, or 4 degrees).

   1. `MA return`.

   2. `SSA return`.

   3. `KSA return`.

d. `Ground Terminal-to-TDRS` Sun Alignment Check. Radio button used to designate whether a Sun alignment check should be performed during ground terminal-to-TDRS communication, and if so, to what degree (1 or 5 degrees).

e. `Multipath Fringe (MPF) Check`. Radio buttons used to designate whether communication between satellite and TDRS should be performed when atmosphere is between satellite and TDRS.

f. `TDRS Sun Intrusion`. Radio button used to designate whether Sun entry or Sun exit check should be performed during satellite and TDRS communication.

g. `Display Only, Display/Validate`. Radio buttons that appear beneath each interference type and sun alignment. These allow the user to specify whether the constraint should only be considered for graphical display purposes or the constraint should be displayed and considered during SAR validation. For example, if a user wants to see MPF displayed as red constraint periods at the end of TSW composites on the Schedule Planning panel, but is still willing to accept events scheduled during MPF periods, under the `Multipath Fringe` label, select `On` and `Display Only`. If the user wants to see the MPF periods graphically and does not want to schedule during these times, under the `Multipath Fringe` label, select `On` and `Display/Validate`.

h. `ENTER` Pushbutton. Saves the interference and Sun alignment check information to the UPS database. The Define Orbital Constraints panel is then removed from the screen. The `ENTER` pushbutton is not visible in query mode.

i. `CANCEL` Pushbutton. Cancels processing without saving to the database and removes the Define Orbital Constraints panel from the screen.

7.6.3 Description

a. This panel is used to specify two types of default scheduling constraints: interferences and Sun alignments. Here the mission coordinator can select zero, one, or more types of interferences whose presence dictates no spacecraft services/communication scheduling take place at that time. The Sun alignment radio buttons work similarly. The user simply indicates the Sun alignment checks to be performed (and to what degree) during SAR validation. The `Check Orbital Constraints` checkbox must be selected for these validation checks to be performed. This checkbox is accessed by selecting Default Scheduling Parameters from the Mission Setup pulldown menu.

b. When the mission coordinator enters changes on this panel, the TSWs for this mission are recomputed if the mission uses FDF or GTV orbital products. TCW missions do not have access to this panel. This recomputation may take several minutes, and the changes are not available for scheduling until it is complete. Informational messages are broadcast to all users of this mission to inform them that the TSWs are changing and again when the TSW recomputation is complete.

c. The interference types (orbital anomaly) that a mission might want to consider during SAR validation have to be entered via the Orbital Parameters panel (refer to paragraph 7.7). The anomalies are listed in a scrolling list at the top of the Orbital Constraints panel. To add an interference type to a TSW superset constraint definition, select the anomaly from the list and click the ADD pushbutton. A secondary panel will pop up that allows the user to indicate if the anomaly is display only or display and validate. In addition, the user can adjust the endpoints of each period of the anomaly. For example, if a mission wants to schedule only in sunlight (inclusive anomaly) but is willing to accept 10 minutes of darkness before and after the sunlight period, adjust the endpoints accordingly on this panel. Click ENTER to save your work. An anomaly can be modified, reviewed, or dropped.

7.7 Orbital Parameters

7.7.1 General

a. The Orbital Parameters panel (see Figure 7-10) is used to:

1. Assign user-defined names to the orbital point parameters defined in the input PSAT file.
2. Assign parameters used to smooth PSAT data.
3. Select service types (defined in the input UAV file) to be used to create TSWs.

b. This panel is initiated by selecting Orbital Parameters from the Mission Setup pulldown menu (see Figure 7-1).

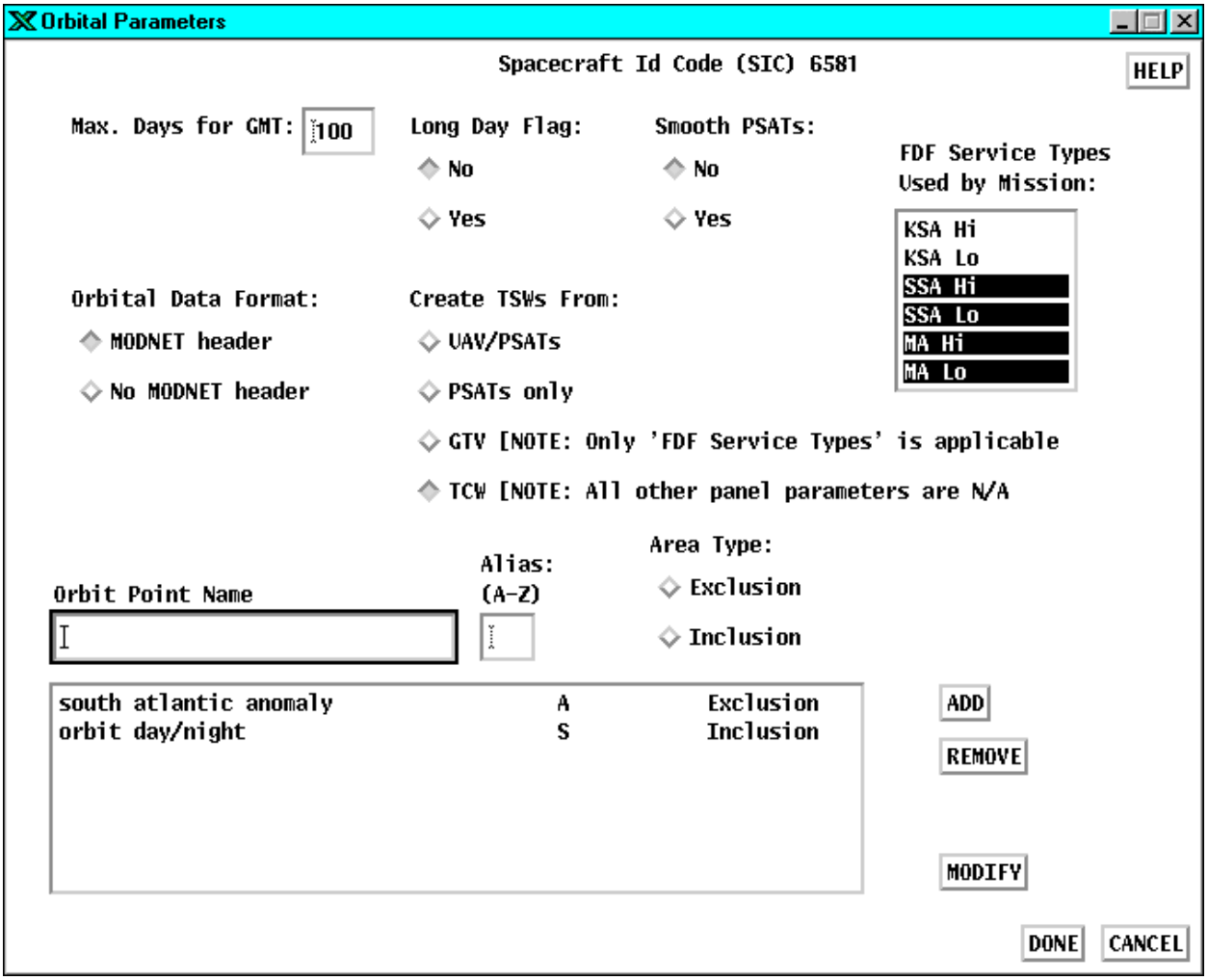


Figure 7-10. Orbital Parameters Panel

7.7.2 Panel Items

a. `Max. Days for GMT`. Text entry field used to enter a value from 1 to 9999. Limit in days from current processing time for orbital data GMTs.

b. `Long Day Flag`. Radio button that sets the flag to no or yes. Used in PSAT smoothing; yes lengthens day to allow addition of daylight entrance or exit event; no lengthens night.

c. `Smooth PSAT`. Radio buttons that set the continuity check to no or yes. Indicate that PSAT smoothing is (yes) or is not (no) to be performed.

d. `Orbital Data Format`. Radio buttons that indicate which format the UPS is to use when receiving PSAT and UAV files. The choices are with MO&DSD Operational/Development Network (MODNET) header or without MODNET header.

e. `Create TSWs From`. Radio buttons that indicate how the UPS is to create TSWs.

1. `UAV/PSATs` indicates the UPS is to "notch" any PSAT data out of UAVs when creating TSWs

2. `PSATs Only` indicates the UPS is to use only PSATs when creating TSWs.

NOTE

This field cannot be toggled while UAV records for the selected mission reside in the database.

3. `GTV Data` indicates that the UPS is to use orbital products obtained from the Electronic User, in the format specified in the *Interface Control Document Between the Network Control Center (NCC) User Planning System (UPS) and the Electronic User* (see Reference 4).

NOTE

Orbital data in the GTV format is only supported for the LandSat-7 mission. Users supplying orbital data in a "TSW-like" format must use the TCW option, described below.

4. `TCW data` indicates that the UPS is to use orbital products obtained from the Electronic User in the new TDRS Communications Window (TCW) format specified in the *Interface Control Document Between the Network Control Center (NCC) User Planning System (UPS) and the Electronic User* (see Reference 4). If a user selects this option, no other parameters on this panel apply.

f. `FDF Service Types Used by Mission`. Multiple selection lists indicating which FDF service types (MA Hi, MA Low, SSA Hi, SSA Low, KSA Hi, KSA Low) are to be used when creating TSWs.

g. `Orbit Point Name`. Text entry field used to enter a name, from 1 to 30 characters, for an orbit point entry (e.g., South Atlantic Anomaly or daylight).

h. `Alias`. Text entry field used to enter an alias for an orbit point entry. This entry is a single uppercase character and must be unique within the list of aliases in the text display. This character must match the PSAT data orbit point ID for the same point.

i. `Area Type`. Specifies how the UPS should treat the area when building TSWs. Inclusive indicates to the UPS that it should create TSWs within the area (i.e., sunlight). Exclusive indicates to the UPS that it should exclude these areas when creating TSWs (i.e., South Atlantic Anomaly).

j. `Text Display`. Area in which both previously defined orbit point entries and those currently being added are displayed.

k. `ADD` Pushbutton. Copies the information from the items above the text display into the text display. The `ADD` pushbutton is not visible in query mode.

l. `REMOVE` Pushbutton. Removes the entry from the text display that was previously selected by the user. The `REMOVE` pushbutton is not visible in query mode.

m. `MODIFY` Pushbutton. Copies the modified information from the items above the text display to update the entry in the text display that was previously selected by the user, and starts the TSW rebuild process. The `MODIFY` pushbutton is not visible in query mode.

n. `DONE` Pushbutton. Saves the orbit parameter data to the UPS database. The Orbital Parameters panel is also erased from the screen. The DONE pushbutton is not visible in query mode.

o. `CANCEL` Pushbutton. Cancels processing without saving to the database and erases the Orbital Parameters panel. If changes were made on the screen, the user will be asked to confirm the cancel action.

7.7.3 Panels

No sub-panels are displayed.

7.7.4 Description

a. This panel contains the items used to validate orbital data, as well as to indicate to the UPS which orbital data header is used, what service types will be used by a mission, and what orbital data will be used to create TSWs. This panel is used both to enter new data and to update existing data. All items are required, except the orbit point entries, for missions that use FDF products. One or more items in the `FDF Service Types Used My Mission` list must to be selected for missions that use GTV-formatted data. If the `TCW` checkbox is selected, **NO** other items on this panel are relevant, and none should be selected.

b. To add an orbit point entry, the user enters the appropriate information in the items above the text display and clicks on `ADD`. (This step only adds it to the text display; it is not actually added to the database until the user clicks on `ENTER` in the Orbital Parameters panel.) Each item is required. To remove or modify an existing orbit point entry, the user clicks on a row in the text display and then clicks on `REMOVE` or `MODIFY`.

c. When the mission is initially created (refer to paragraph 6.2), the `FDF Service Types Used by Mission` field is defaulted to all six types. It is the responsibility of the Mission Coordinator to modify the list to remove any FDF service types that are not desired to be used for building TSWs. The user can only de-select an FDF service type if the TSW Set ID for all SSCs of that type are blank. For example, if the user wants to de-select the `KSA Hi` item, the user must first blank out the TSW Set ID field in all KSA Hi gain SSCs.

d. Each mission must determine if its orbital data include a MODNET header and set the appropriate radio button on the `Orbital Data Format` field. In addition, each mission must determine if the TSWs will be generated using PSAT and UAV information, PSATs only, Generic TDRS View (GTV) data or TCW data, and set the `Create TSWs From` field accordingly. PSATs and UAVs are orbital products generated by the FDF. GTV and TCW data are non-FDF orbital products, whose formats are specified in the *Interface Control Document Between the Network Control Center (NCC) User Planning System (UPS) and the Electronic User* (see Reference 4).

7.8 Prototype Events and Service Specification Codes

7.8.1 General

a. This section discusses the Prototype Events (PEs) and Service Specification Codes (SSCs), formerly known as Configuration Codes (CCs), that are used to create Schedule Add Requests (SARs) or Alternate Schedule Add Requests (Alt SARs).

b. A PE refers to a specific set of SSCs stored in the NCCDS database, while an SSC refers to a specific set of parameters, pertaining to a specific TDRS service (MA, SSA, KSA, SMA, KaSA, KaSAWB), stored in the NCCDS database. The SAR or Alt SAR specifies either a PE or a set of SSCs to be used by the NCCDS to create the requested event. See the *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6) for details on the SAR and Alternate SAR formats.

c. PEs and SSCs are referenced in a SAR or Alt SAR by a 3 character user-defined label. Although the NCCDS allows any three alphanumeric characters to be used, the UPS retains the legacy labeling nomenclature, which consists of a single alphabetic character followed by a 2-digit number. Any letter may be used for a PE, although a "P" is the convention. SSCs are labeled strictly according to Table 7-1 and use a specific first letter for each service type. This table is based on Appendix A of the *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6) with the addition of Ka and SMA services.

d. A SAR or Alt SAR specifies either a single Prototype Event *or* between 1 to 16 SSCs. A key point to keep in mind is that the schedule request submitted by the user refers to the PE or SSC stored in the NCCDS database, and although the UPS provides a mechanism to display them, the parameters stored in the NCCDS database are what are actually being scheduled.

e. The user is responsible for specifying the mission's exact PE and SSC parameters that are to be stored in the NCCDS database. The suggested method is to use the UPS to define the SSCs and PEs expected to be used for the mission, then print or screen snap the applicable ones and give them to the NCCDS data base administrator to enter into the NCCDS database. The NCCDS must have the SSCs and PEs stored before any schedule requests can successfully result in a scheduled event.

f. There are 3 types of Prototype Events: NCCDS-defined, UPS-defined, and Recurrent Scheduling (RS) Prototypes. NCCDS-defined PEs requires the user to coordinate the PE definition with the NCCDS. An UPS-defined PE is stored as a group of SSCs in the UPS database, allowing the user the flexibility to modify the PE without the concurrent coordination of the NCCDS. Lastly, RS Prototypes are used solely in conjunction with the Recurrent Scheduling process. RS Prototypes specify the SSCs to be used to create a schedule request, along with specifications for applying the service start, and stop times to a particular TDRS view. Refer to paragraph 9.2 for further details on the RS process.

Table 7-1. Service Type to Service Specification Code ID Relationships

Service Type	Service Specification Code ID Range
Multiple Access Forward	A01—A99
Multiple Access Return	B01—B99
	C01—C99
	D01—D99
	E01—E99
	F01—F99
S-Band Single Access Forward	H01—H99
S-Band Single Access Return	I01—I99
	J01—J99
	K01—K99
	L01—L99
K-Band Single Access Forward	N01—N99
S-Band Single Access Return	O01—O99
	P01—P99
	Q01— Q99
	R01—R99
S-Band Multiple Access Forward	U01—U99
S-Band Multiple Access Return	V01—V99
Ka-Band Single Access Forward	W01—W99
Ka-Band Single Access Return	X01—X99
Ka-Band Single Access Wide Band Return	Y01—Y99
Multiple Access EET	G01—G99
S-Band Single and Multiple Access EET	M01—M99
K-Band Single Access EET	S01— S99
Tracking	T01—T99

7.8.2 Prototype Events and Service Specification Codes Panel

7.8.2.1 General

a. This panel (see Figure 7-11) is used to select the type of service, NCCDS, UPS, or Recurrent Scheduling Prototype, for which the user wishes to create (or modify) a definition.

b. This panel is initiated by selecting Prototype Events and Service Specification Codes from the Mission Setup pulldown menu (see Figure 7-1).

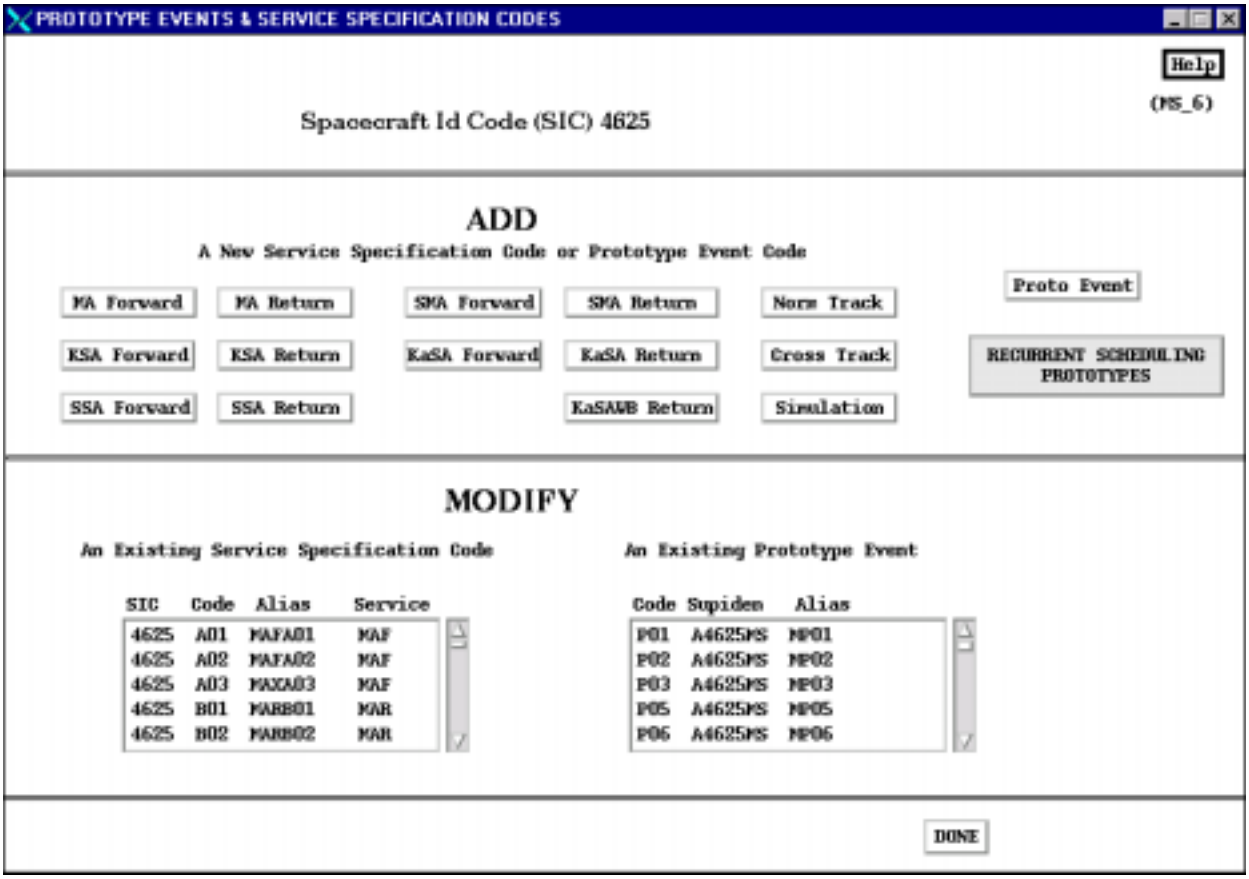


Figure 7-11. Prototype Events and Service Specification Codes Panel

7.8.2.2 Panel Items

a. `SIC—A Display-only field that indicates the spacecraft ID code for the mission of interest`.

b. `MA Forward` Pushbutton. Designates creating a new service specification code for a Multiple Access (MA) Forward service.

c. `KSA Forward` Pushbutton. Designates creating a new service specification code for a KSA Forward service.

d. `SSA Forward` Pushbutton. Designates creating a new service specification code for an SSA Forward service.

e. `MA Return` Pushbutton. Designates creating a new service specification code for an MA Return service.

f. `KSA Return` Pushbutton. Designates creating a new service specification code for a KSA Return service.

g. `SSA Return` Pushbutton. Designates creating a new service specification code for an SSA Return service.

h. `SMA Forward` Pushbutton. Designates creating a new service specification code for an SMA Return service.

i. `KaSA Forward` Pushbutton. Designates creating a new service specification code for a KaSA Return service.

j. `SMA Return` Pushbutton. Designates creating a new service specification code for an SMA Return service.

k. `KaSA Return` Pushbutton. Designates creating a new service specification code for a KaSA Return service.

l. `KaSAWB Return` Pushbutton. Designates creating a new service specification code for a KaSA Wide Band Return service.

m. `Norm Track` Pushbutton. Designates creating a new service specification code for Normal Tracking service.

n. `Cross Track` Pushbutton. Designates creating a new service specification code for Cross Tracking service.

o. `Simulation` Pushbutton. Designates creating a new service specification code for Simulation service.

p. `Proto Event` Pushbutton. Designates creating a new prototype event code.

q. `Recurrent Scheduling Prototypes` Pushbutton. Designates creating or modifying a Recurrent Scheduling Prototype.

r. Existing Service Service Specification Code Textlist. Selects an existing service specification to modify.

s. Existing Prototype Event Textlist. Selects an existing prototype event to modify.

t. DONE Pushbutton. Terminates this panel.

7.8.2.3 Panels

The following panels are displayed:

a. Prototype Events panel.

b. Cross-Support Tracking panel.

c. Normal Tracking panel.

d. Simulation Service panel.

e. KSA Forward Service panel.

f. SSA Forward Service panel.

g. MA Forward Service panel.

h. KSA Return Service panel.

i. SSA Return Service panel.

j. MA Return Service panel.

k. KaSA Forward Service panel.

l. SMA Forward Service panel.

m. KaSA Return Service panel.

n. KaSAWB Return Service panel.

o. SMA Return Service panel.

p. Recurrent Scheduling Superprototype Editor panel.

7.8.2.4 Description

a. When initially setting up (or modifying) a service/event definition, this panel is first displayed. If adding a new service specification code or prototype event definition to the database, the user selects the type of service/event desired.

b. If modifying an existing service specification code or prototype event definition, the user selects the appropriate line from either the Existing Service Specification Code textlist or the Existing Prototype Event textlist. For both the ADD and MODIFY modes, the current panel will remain on the screen and the appropriate service/event panel will be displayed.

7.8.3 Prototype Events Panel

7.8.3.1 General

a. This panel (see Figure 7-12) is used to create, modify, or delete prototype event definitions.

b. This panel is initiated by either of the following:

   1. Activating the `Proto Event` button on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new prototype event.

   2. Selecting an entry from the `Existing Prototype Event` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a prototype event.

7.8.3.2 Panel Items

a. `Prototype Event ID`. Text entry field for the three-character identifier.

b. `Prototype Event Alias` (optional). Text entry field (eight characters) used to designate a unique, more meaningful prototype event identifier to serve as an alternative to the prototype ID.

c. `NCC Defined`. Radio button used to designate if the prototype event definition is defined in the NCCDS database, or will be stored as a group of SSCs in the UPS database.

d. `SUPIDEN` Textlist. Contains valid SUPIDENs. In ADD mode, the user selects a SUPIDEN from the list. In UPDATE mode, the SUPIDEN is highlighted and cannot be changed.

e. Service Specification Code Identifiers. Text entry fields used to identify a particular service specification code definition. The service specification code is the standard identifier of a service definition; the SSC alias is an exclusive UPS feature (not in the NCCDS) providing an alternate and possibly more meaningful identifier than the three-character service specification code. Only one of the two is required; the second will be filled in automatically after entry of the first.

   1. Non-simulation service specification code.

   2. Optional simulation service specification code.

   3. Service specification code alias.

   4. Optional simulation service specification code alias.

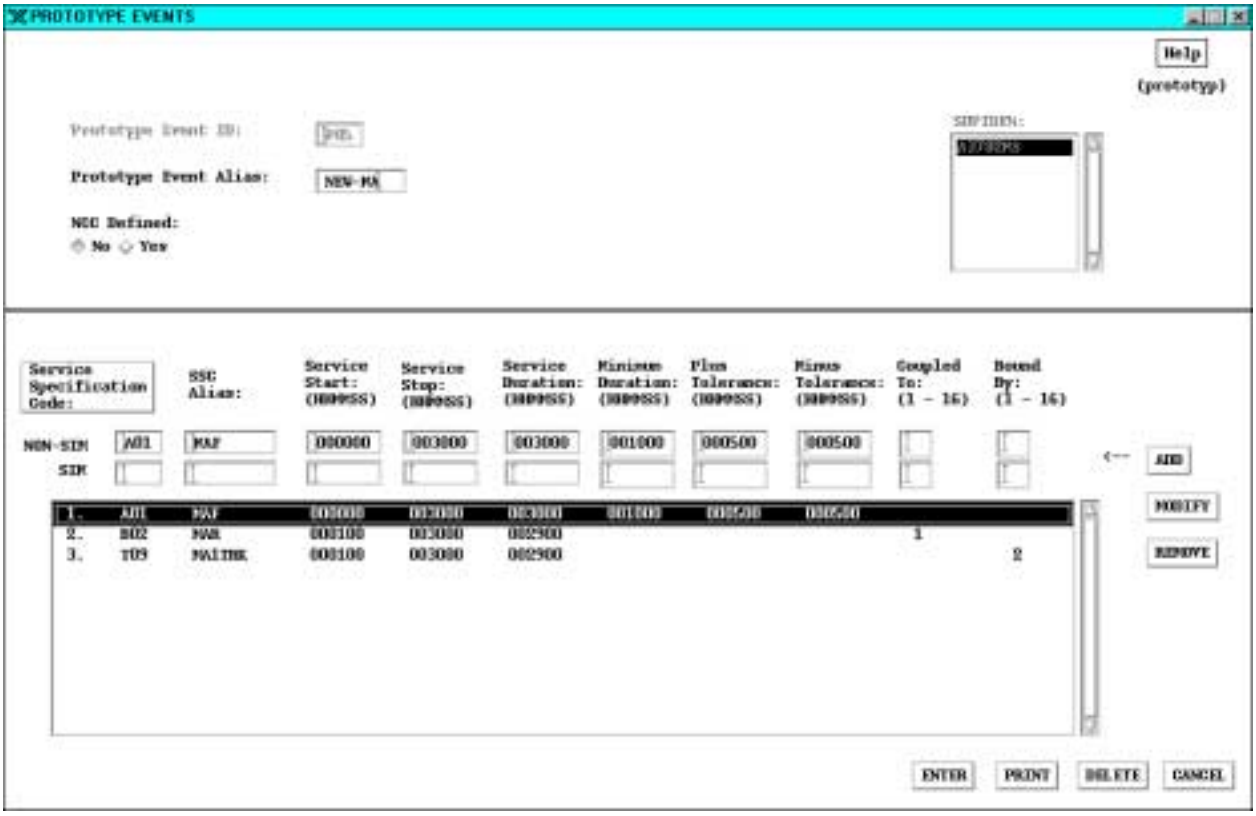


Figure 7-12. Prototype Events Panel

f. `Service Specification Code` Pushbutton. Invokes the Available SSCs panel listing all available SSCs for the SIC.

g. Time period fields. Text entry fields used to indicate the relative start and stop time/duration of a particular service within the prototype event. The start time and one other time field are required. The third time field will be filled in automatically after the first two are entered. All use HHMMSS formats and must be entered in *either* the non-simulation *or* the simulation fields.

   1. `Service Start` (relative time).

   2. `Service Stop` (relative time).

   3. `Service Duration`.

h. Flexibility Time Fields. Text entry fields used to indicate optional service flexibilities allowed desired values for the minimum duration, and plus/minus tolerances for each service. The tolerances specify how far the user will allow the NCCDS to "slide" the service within the schedule request. The minimum duration indicates the least acceptable duration for the service. All use HHMMSS formats and must be entered in *either* the non-simulation *or* the simulation fields.

1. `Minimum Duration`.
2. `Plus Tolerance` (relative time).
3. `Minus Tolerance` (relative time).

i. `Coupled` Field. Text entry field to indicate if service is coupled to another service. This field is active only for prototype event definitions with more than one service that have already been created. If the prototype event definition is being created then save it by pushing the ENTER pushbutton and then modify it by selecting an entry from the `Existing Prototype Event` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11). See the note on coupled and bound fields in paragraph 7.8.3.4.

j. `Bound` Field. Text entry field to indicate if service is bound by another service. This field is active only for prototype event definitions with more than one service that have already been created. If the prototype event definition is being created then save it by pushing the ENTER pushbutton and then modify it by selecting an entry from the `Existing Prototype Event` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11). See the note on coupled and bound fields in paragraph 7.8.3.4.

k. Text Display. Area in which both the previously designated service specification codes (and their respective start and stop times/durations) and those currently being added/removed are displayed. Services are sorted by non-simulation service start times. Simulation services, if they exist are passed to non-simulation services. A simulation service immediately follows its partner, regardless of its start time.

l. `ADD` Pushbutton. Adds the entered service specification code and time period to the text display. The `ADD` pushbutton is not visible in query mode.

m. `REMOVE` Pushbutton. Removes the selected service specification code and time period from the text display. (A row must be selected from the text display; otherwise, this pushbutton will not function.) The `REMOVE` pushbutton is not visible in query mode.

n. `MODIFY` Pushbutton. Replaces the selected service specification code and time period items in the text display with the modified version of them from the text entry fields above the text display. (A row must be selected from the text display; otherwise, this pushbutton will not function.) The `MODIFY` pushbutton is not visible in query mode.

o. `ENTER` Pushbutton. Saves the prototype event parameters to the UPS database. The Prototype Events panel is also removed from the screen. The `ENTER` pushbutton is not visible in query mode.

p. PRINT Pushbutton (not implemented). Generates a printout of the data on the panel in a format similar to a report. The PRINT pushbutton is not visible in query mode.

q. DELETE Pushbutton. Deletes the currently displayed prototype event definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The Prototype Events panel is also removed from the screen. The DELETE pushbutton is not visible in query mode.

r. CANCEL Pushbutton. Cancels processing without saving to the database and removes the Prototype Events panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.3.3 Panels

No sub-panels are displayed.

7.8.3.4 Description

a. This panel contains the items necessary to define a prototype event. Some fields are optional. There is one added UPS feature item that is required -- the NCCDS defined flag, which allows the user to create either prototype event definitions that are stored in the NCCDS database, or those that serve as a template of services, stored only within the UPS database. This feature is meant to overcome the inflexibility of NCCDS-defined events whose services must be modified by the NCCDS operator in the NCCDS database before they can be used (referred to in a SAR) by an UPS user. By creating prototype events that are not NCCDS defined, the user can simply specify a list of service specification codes stored only within the UPS database. When an UPS user creates a SAR using an UPS defined prototype event, the stored list of service specification codes will be used (and sent to the NCCDS) in the SAR, rather than a Prototype Event ID.

b. To add a service (service specification code and corresponding time period), the user enters the appropriate information in the fields under the text labels in *either* the NON-SIM *or* SIM row, and clicks on ADD. This step only adds it to the text display; it is not actually added to the database until the user clicks on ENTER in the panel). The display order of the services depends on the relative start times specified. If necessary, the services will be re-ordered into the order specified in the *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6) when the SAR is created.

c. The flexibility time fields (Minimum Duration, Plus Tolerance, Minus Tolerance), as well as the Coupled and Bound fields are newly available in Release 12, and require careful planning prior to their usage. See the *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers*, Appendix D "*Guidelines for Use of Service-Level Flexibility Parameters*" (see Reference 6) for detailed information on how best take advantage of the use of these fields.

NOTE

The coupled and bound fields are not accessible during the ADD operation. The user must first create and save a prototype and then modify the prototype to set these fields. This approach was necessary because the bound and coupled fields reference absolute service numbers and the ordering of the services in a prototype does not get finalized until the prototype is saved.

d. To remove an existing service from the prototype, the user must click on a row in the text display and then click on `REMOVE`. To modify an existing service, the user copies the service from the text display to the text entry fields above (by clicking on the row), edits the text entry fields as required, and then clicks on `MODIFY` to replace the original text display entry with the modified version. `NCCDS`-defined prototypes may be modified only if there are no SARs that use that prototype.

e. A simulation service is always paired with the "regular" forward, return, or tracking service that immediately precedes it in the list. Clicking on either service of the pair causes both services to be displayed in the text entry fields. When adding a new simulation service, both services must be entered in the text entry fields before clicking on `ADD`. The `NON-SIM` line (first line) of the text entry fields only accepts regular service specification codes. The `SIM` line (second line) of the text entry fields only accepts simulation service specification codes. Entries are validated when clicking on the `ADD` button to prevent a simulation service from being added without a matching regular service.

f. A prototype event may be deleted by activating the `DELETE` pushbutton, provided no SAR exists that uses this Prototype ID.

7.8.4 Available SSCs

7.8.4.1 General

This panel (see Figure 7-13) enables the user to obtain a list of available service specification codes for the current SIC. Selecting an entry from this list will automatically copy it to the appropriate area on the Prototype Events panel.

7.8.4.2 Panel Items

a. `Service Specification Codes`. A textlist used to display each defined SSC, alias, and service type for the current SIC. Clicking on an entry will cause the service specification code and alias to be copied to the appropriate areas on the Prototype Events panel.

b. `CANCEL` Pushbutton. Remove the Available SSCs panel from the screen.

7.8.4.3 Panels

No sub-panels are displayed.

7.8.4.4 Description

a. A list of available service specification codes for the SIC displayed in the Prototype Events panel can be obtained by clicking on the `Service Specification Code` button in the Prototype Events panel. This button is located to the left of the other service field labels on the panel. A panel with a list of service specification code information will be displayed. Each entry in the list contains a service specification code, alias, and service type. When the user clicks on an entry, the service specification code and alias is copied to the appropriate input boxes on the Prototype Events panel.

b. This panel will remain displayed until the user clicks on the `CANCEL` pushbutton or the Prototype Events panel is “canceled”.

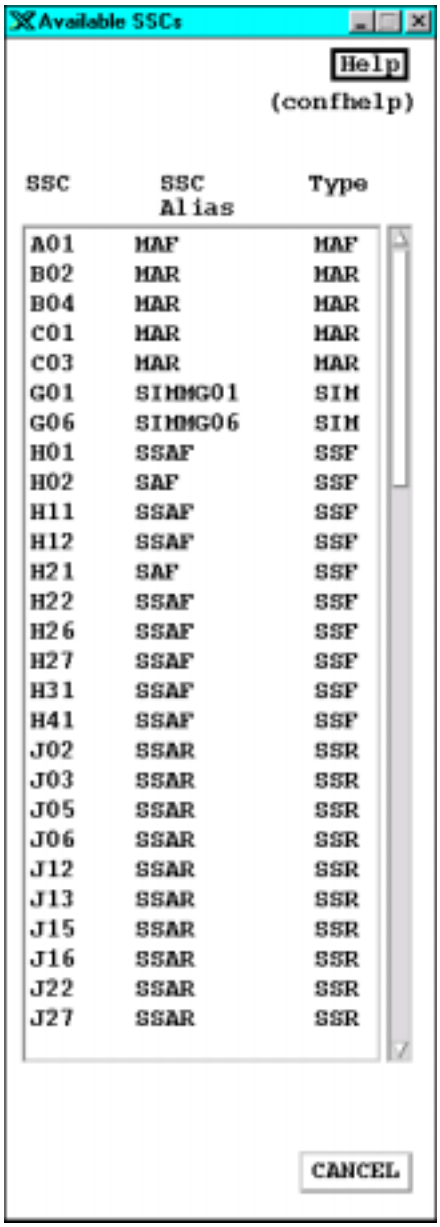


Figure 7-13. Available SSCs Panel

7.8.5 Cross-Support Tracking

7.8.5.1 General

This panel (see Figure 7-14) is used to create, modify, or delete cross-support tracking service definitions. The panel is initiated by either of the following:

a. Selecting the `Cross-Track` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

b. Selecting one of the CTK services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.5.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, see the *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6).

a. Fixed parameters:

   1. `Service specification code`.
   2. `Service specification alias`.
   3. `User interface channel ID`.
   4. `Other interface channel ID, WSGT` (obsolete).
   5. `Tracking type`.

b. Respecifiable parameters:

   1. `Forward link SSC`.
   2. `Return link SSC`.
   3. `Number of samples, STGT`.
   4. `Sample rate (samples per second)`.
   5. `Time transfer required, STGT`.

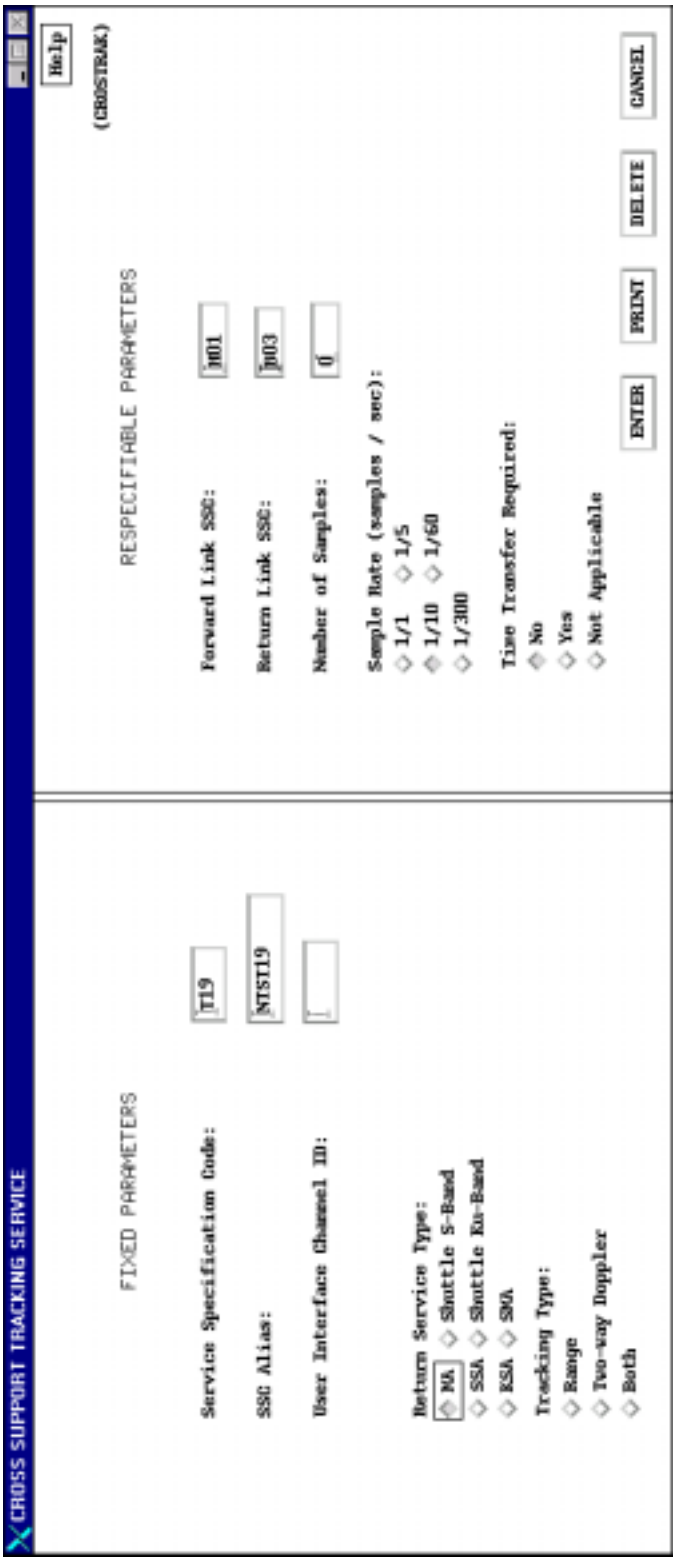


Figure 7-14. Cross-Support Tracking Panel

c. ENTER Pushbutton. Saves the cross-support tracking parameters to the UPS database. The Cross-Support Tracking panel is also removed from the screen. The ENTER pushbutton is not visible in query mode.

d. PRINT Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The PRINT pushbutton is not visible in query mode.

e. DELETE Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The Cross-Support Tracking panel is also removed from the screen. The DELETE pushbutton is not visible in query mode.

f. CANCEL Pushbutton. Cancels processing without saving to the database and removes the Cross-Support Tracking panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.5.3 Panels

The Validation Messages panel may be displayed.

7.8.5.4 Description

a. When adding a new service definition, this panel is initially displayed with all fields blank or unassigned. The user then assigns values to the items and clicks on ENTER to save them. When updating an existing service definition, the panel is displayed with the existing values, the user makes the desired modifications, and clicks on ENTER to save them.

b. The service specification code may be deleted by activating the DELETE pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.6 Normal Tracking

7.8.6.1 General

a. This panel (see Figure 7-15) is used to create, modify, or delete normal tracking service definitions.

b. This panel is initiated by either of the following:

1. Selecting the `Norm Track pushbutton` on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the NTK services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.6.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6).

a. Fixed parameters:

1. `Service specification code`.

2. `Service specification alias`.

3. `User interface channel ID`.

4. `Other interface channel ID, WSGT` (obsolete).

5. `Range tracking`.

6. `Doppler tracking`.

7. `Return service type`.

b. Respecifiable parameters:

1. `Forward link SSC`.

2. `Return link SSC`.

3. `Number of samples, STGT`.

4. `Sample rate (samples per second)`.

5. `Time transfer required, STGT`.

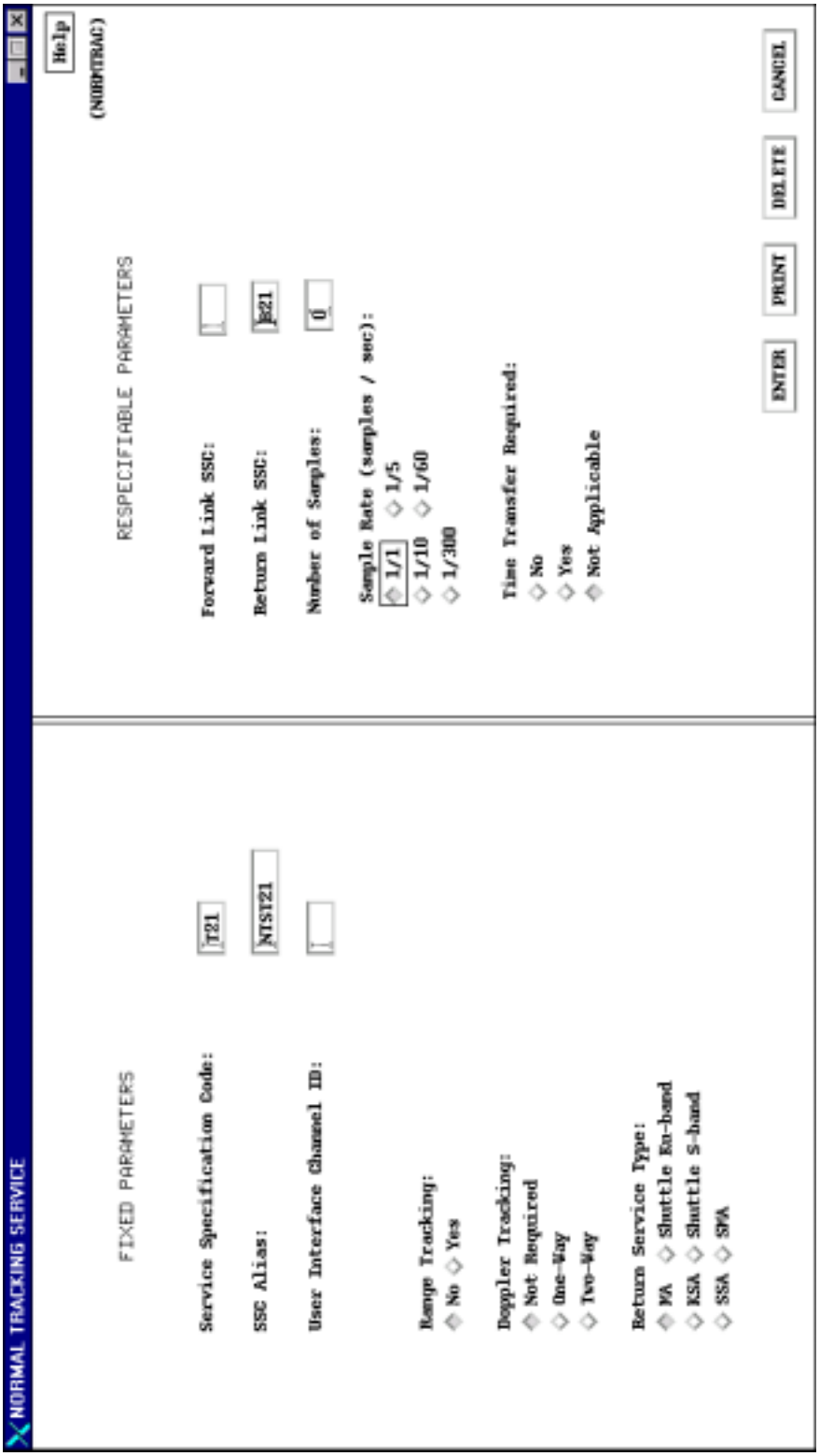


Figure 7-15. Normal Tracking Panel

c. ENTER Pushbutton. Saves the normal tracking parameters into the UPS database. The Normal Tracking panel is also removed from the screen. The ENTER pushbutton is not visible in query mode.

d. PRINT Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The PRINT pushbutton is not visible in query mode.

e. DELETE Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The Normal Tracking panel is also removed from the screen. The DELETE pushbutton is not visible in query mode.

f. CANCEL Pushbutton. Cancels processing without saving to the database and removes the Normal Tracking panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.6.3 Panels

The Validation Messages panel may be displayed.

7.8.6.4 Description

a. When adding a new service definition, this panel is initially displayed with all fields blank or unassigned. The user then assigns values to the items and clicks on ENTER to save them. When updating an existing service definition, the panel is displayed with the existing values, the user makes the desired modifications, and clicks on ENTER to save them.

b. The service specification code may be deleted by activating the DELETE pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.7 Simulation Service

7.8.7.1 General

a. This panel (see Figure 7-16) is used to create, modify, or delete simulation service definitions.

b. This panel is initiated by either of the following:

1. Selecting the `Simulation` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the SIM services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.7.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6). Those parameters that have a separate item for channel 1, channel 2, and/or channel 3 are marked 1, 2, 3, or any combination thereof.

a. Parameters:

1. `Service specification code`.

2. `Service specification alias`.

3. `Simulation EIRP` [Effective Isotropic Radioactive Power].

4. `Simulation G/T` [Gain Temperature].

5. `Service support type`.

6. `Data support`.

7. `TDRSS interface channel ID WSGT` (1, 2, 3).

b. `ENTER` Pushbutton. Saves the simulation parameters to the UPS database. The Simulation Service panel is also removed from the screen. The `ENTER` pushbutton is not visible in query mode.

c. `PRINT` Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The `PRINT` pushbutton is not visible in query mode.

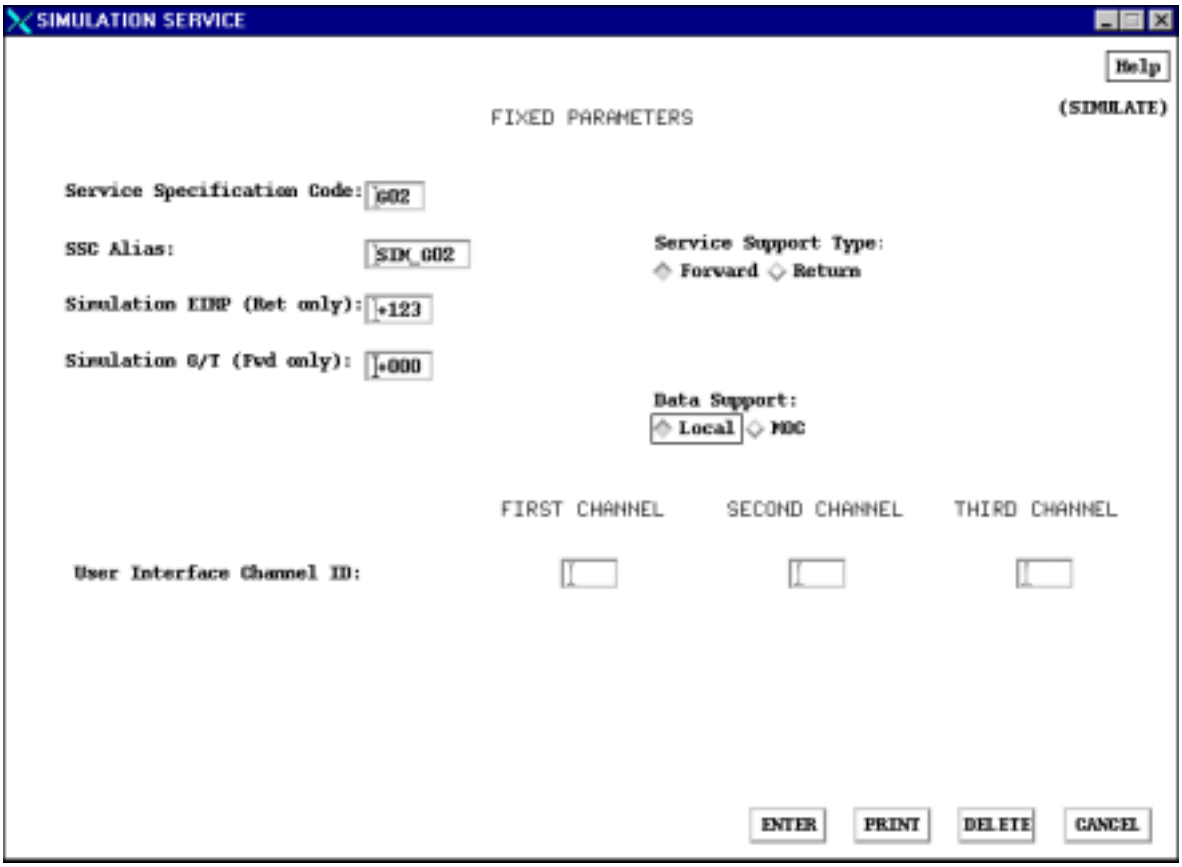


Figure 7-16. Simulation Service Panel

d. DELETE Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The Simulation Service panel is also removed from the screen. The DELETE pushbutton is not visible in query mode.

e. CANCEL Pushbutton. Cancels processing without saving to the database and removes the Simulation Service panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.7.3 Panels

The Validation Messages panel may be displayed.

7.8.7.4 Description

a. When adding a new service definition, this panel is initially displayed with all fields blank or unassigned. The user then assigns values to the items and clicks on ENTER to save them. When updating an existing service definition, the panel is displayed with the existing values, the user makes the desired modifications, and clicks on ENTER to save them.

b. The service specification code may be deleted by activating the DELETE pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.8 KSA Forward Service

7.8.8.1 General

a. This panel (see Figure 7-17) is used to create, modify, or delete K-band Single Access (KSA) forward service definitions.

b. This panel is initiated by either of the following:

1. Selecting the `KSA Forward` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the KSF services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.8.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6). Those parameters that have a separate item for normal and shuttle are marked.

a. Fixed parameters:

1. `Service specification code`.
2. `Service specification alias`.
3. `Service configuration`.
4. `Service subtype`.
5. `Power mode (normal, shuttle)`.
6. `Maximum data rate (normal, shuttle)`.
7. `User interface channel ID (normal, shuttle)`.

b. Respecifiable parameters:

1. `Command channel PN modulation`.
2. `Data rate (normal, shuttle)`.
3. `Receive frequency (normal, shuttle)`.
4. `Polarization (normal, shuttle)`.
5. `Doppler compensation (normal, shuttle)`.

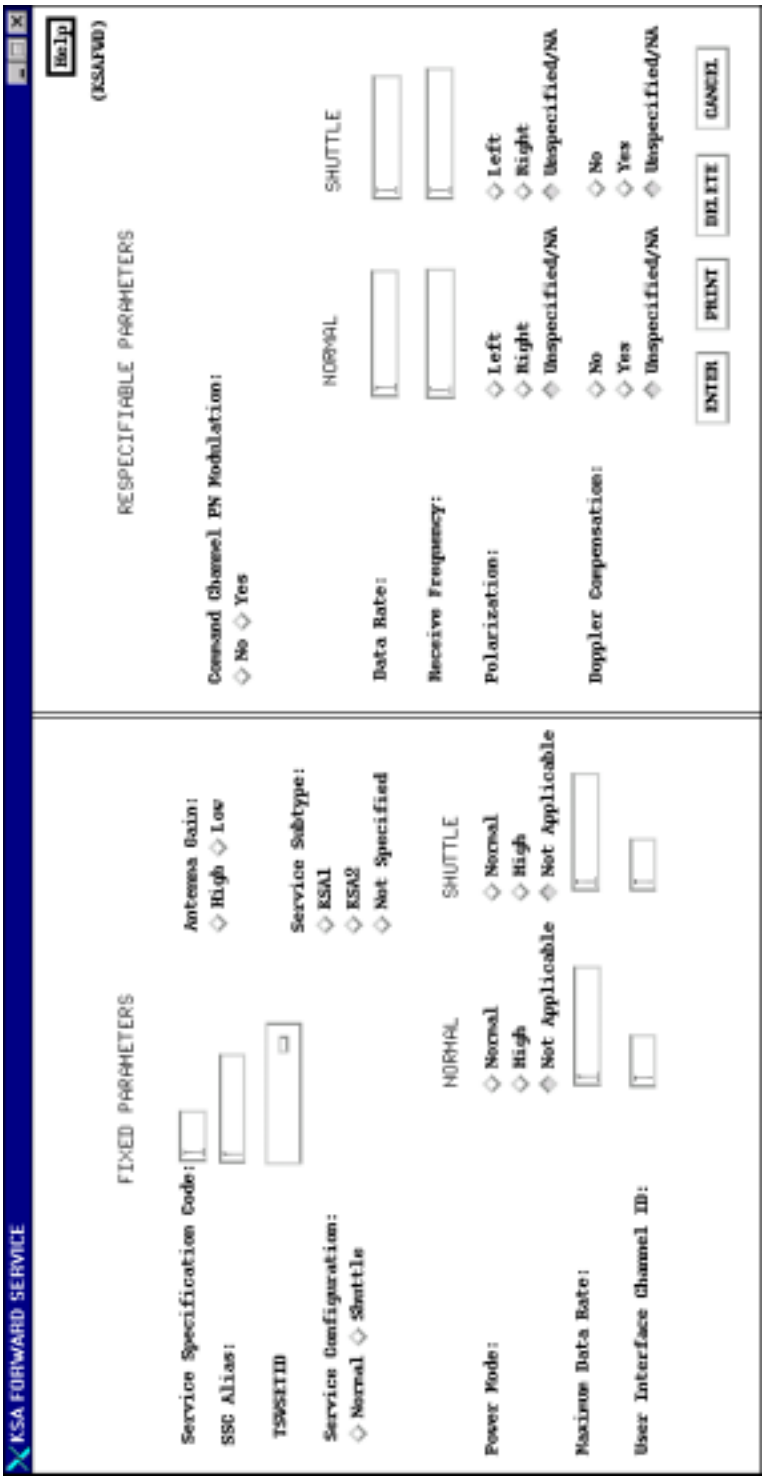


Figure 7-17. KSA Forward Service Panel

c. UPS-only parameters: `Antenna Gain` (Hi or Lo).

d. `ENTER` Pushbutton. Saves the KSA forward parameters to the UPS database. The KSA Forward Service panel is also removed from the screen. The `ENTER` pushbutton is not visible in query mode.

e. `PRINT` Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The `PRINT` pushbutton is not visible in query mode.

f. `DELETE` Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The KSA Forward Service panel is also removed from the screen. The `DELETE` pushbutton is not visible in query mode.

g. `CANCEL` Pushbutton. Cancels processing without saving to the database and removes the KSA Forward Service panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.8.3 Panels

The Validation Messages panel may be displayed.

7.8.8.4 Description

a. When adding a new service definition, this panel is initially displayed with all fields blank or unassigned. The user then assigns values to the items and clicks on `ENTER` to save them. When updating an existing service definition, the panel is displayed with the existing values, the user makes the desired modifications, and clicks on `ENTER` to save them.

b. The `Antenna Gain` field is used by the UPS for orbital constraint validation. This field is *not* transmitted to the `NCCDS` as part of an electronic message. The parameter is embedded in the UAV file format differentiating the orbital view of the user spacecraft's antenna type (Hi or Lo) by service type (MA, SSA, KSA, SMA, KaSA, KaSAWB). This field is used by the UPS to validate the particular service represented by the service specification code against its corresponding TSW. For this purpose, the user must also have the appropriate service selected in the `FDF Service Types Used by Mission` field (refer to paragraph 7.7 for details).

c. The service specification code may be deleted by activating the `DELETE` pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.9 SSA Forward Service

7.8.9.1 General

a. This panel (see Figure 7-18) is used to create, modify, or delete SSA forward service definitions.

b. This panel is initiated by either of the following:

1. Selecting the `SSA Forward` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the SSF services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a new definition.

7.8.9.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6). Those parameters that have a separate item for normal and/or shuttle are marked.

a. Fixed parameters:

1. `Service specification code`.
2. `Service specification alias`.
3. `Shuttle PN rate`.
4. `Maximum data rate`.
5. `Service configuration`.
6. `Service subtype`.
7. `Power mode (normal, shuttle)`.
8. `User interface channel ID (normal, shuttle)`.

b. Respecifiable parameters:

1. `Despun antenna`.
2. `Data rate (normal)`.
3. `Receive frequency (normal, shuttle)`.
4. `Polarization (normal, shuttle)`.
5. `Carrier doppler compensation (shuttle)`.
6. `PN rate doppler compensation (shuttle)`.

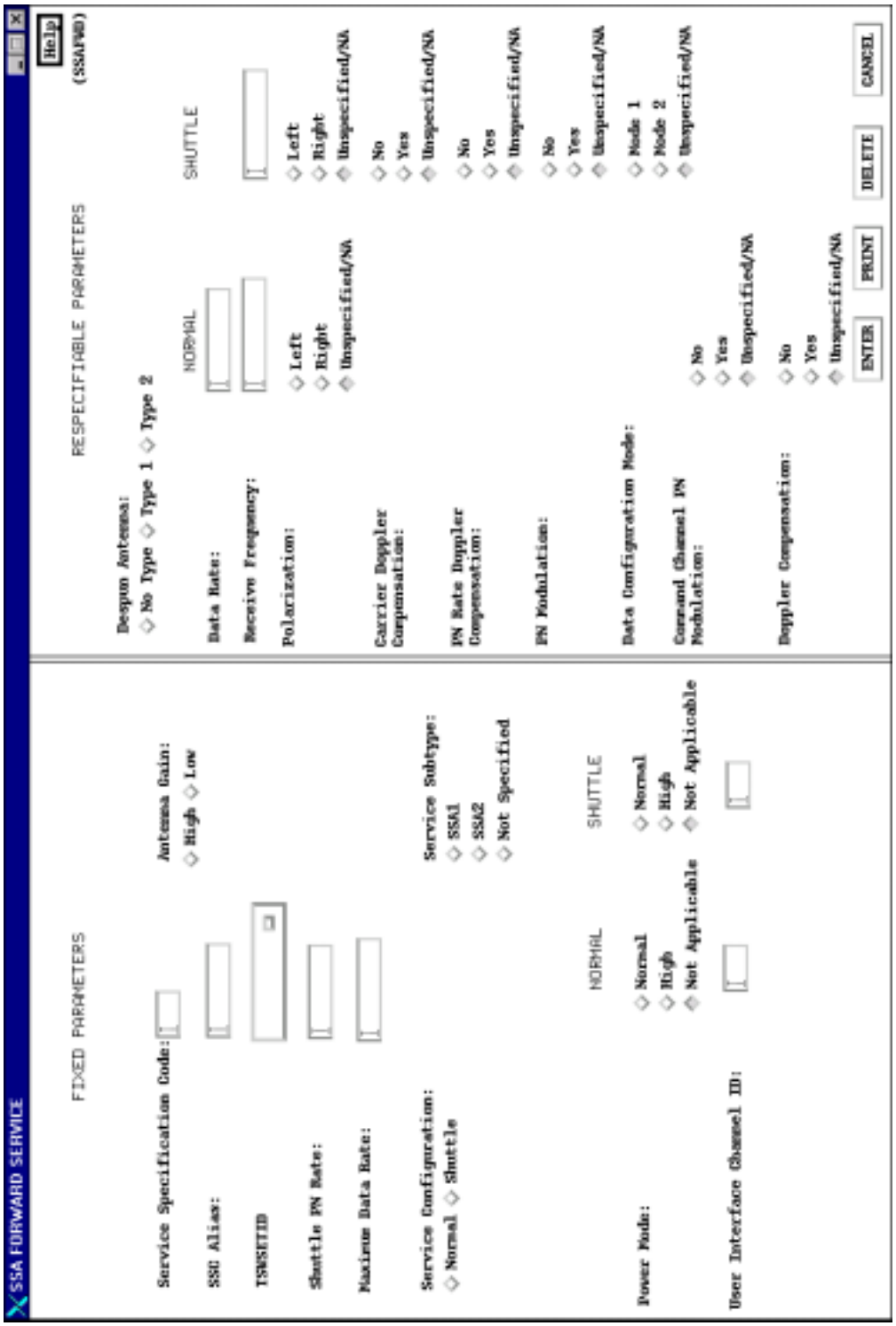


Figure 7-18. SSA Forward Service Panel

7. PN modulation (shuttle).
8. Configuration mode (shuttle).
9. Command channel PN modulation (normal).
10. Doppler compensation (normal).

c. UPS-only parameters: Antenna Gain (Hi or Lo).

d. ENTER Pushbutton. Saves the SSA forward parameters to the UPS database. The SSA Forward Service panel is also removed from the screen. The ENTER pushbutton is not visible in query mode.

e. PRINT Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The PRINT pushbutton is not visible in query mode.

f. DELETE Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The SSA Forward Service panel is also removed from the screen. The DELETE pushbutton is not visible in query mode.

g. CANCEL Pushbutton. Cancels processing without saving to the database and removes the SSA Forward Service panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.9.3 Panels

The Validation Messages panel may be displayed.

7.8.9.4 Description

a. When adding a new service definition, this panel is initially displayed with all fields blank or unassigned. The user then assigns values to the items and clicks on ENTER to save them. When updating an existing service definition, the panel is displayed with the existing values, the user makes the desired modifications, and clicks on ENTER to save them.

b. The Antenna Gain field is used by the UPS for orbital constraint validation. This field is *not* transmitted to the NCCDS as part of an electronic message. The parameter is embedded in the UAV file format differentiating the orbital view of the user spacecraft's antenna type (Hi or Lo) by service type (MA, SSA, KSA, SMA, KaSA, KaSAWB). This field is used by the UPS to validate the particular service represented by the service specification code against its corresponding TSW. For this purpose, the user must also have the appropriate service selected in the FDF Service Types Used by Mission field (refer to paragraph 7.7 for details).

c. The service specification code may be deleted by activating the DELETE pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.10 MA Forward Service

7.8.10.1 General

a. This panel (see Figure 7-19.) is used to create, modify, or delete MA forward service definitions.

b. This panel is initiated by either of the following:

   1. Selecting the `MA Forward` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

   2. Selecting one of the Multiple Access Forward (MAF) services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.10.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6).

a. Fixed parameters:

   1. `Service specification code`.

   2. `Service specification alias`.

   3. `Maximum data rate`.

   4. `User interface channel ID`.

   5. `TDRSS interface channel ID, WSGT`.

b. Respecifiable parameters:

   1. `Data rate`.

   2. `Receive frequency`.

   3. `Doppler compensation`.

   4. `Despun antenna`.

c. UPS-only parameters: `Antenna Gain (Hi or Lo)`.

d. `ENTER` Pushbutton. Saves the MA forward parameters to the UPS database. The MA Forward Service panel is also removed from the screen. The `ENTER` pushbutton is not visible in query mode.

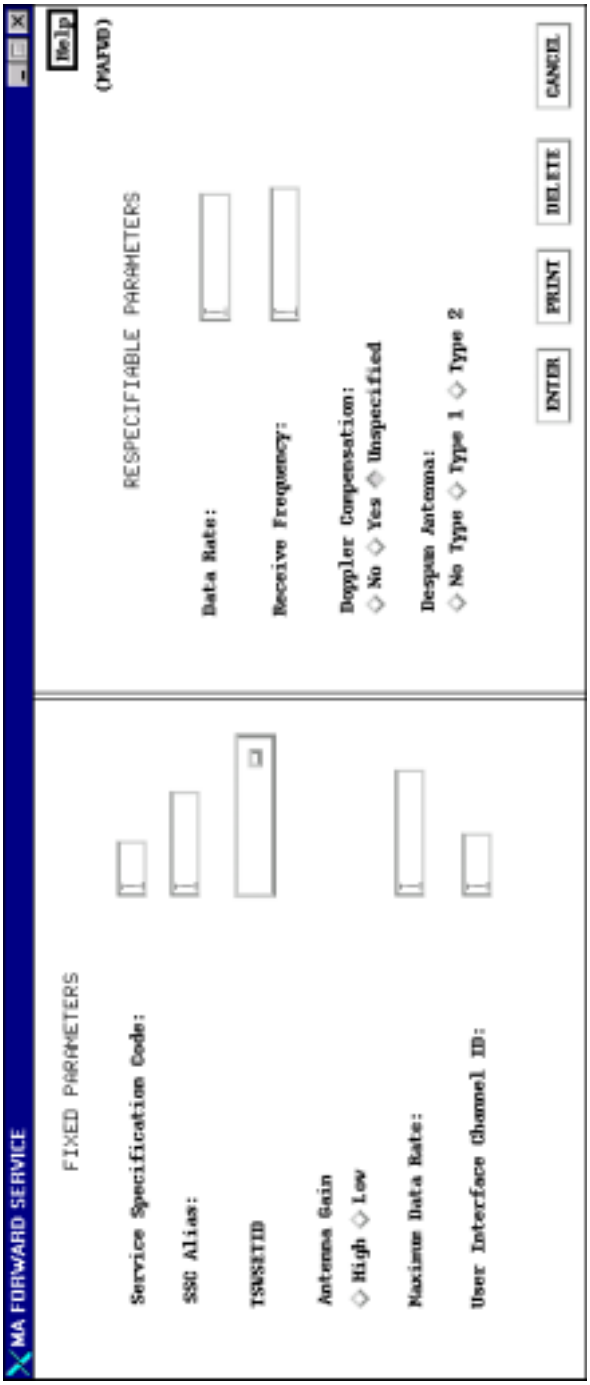


Figure 7-19. MA Forward Service Panel

e. PRINT Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The PRINT pushbutton is not visible in query mode.

f. DELETE Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The MA Forward Service panel is also removed from the screen. The DELETE pushbutton is not visible in query mode.

g. CANCEL Pushbutton. Cancels processing without saving to the database and removes the MA Forward Service panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.10.3 Panels

The Validation Messages panel may be displayed.

7.8.10.4 Description

a. When adding a new service definition, this panel is initially displayed with all fields blank or unassigned. The user then assigns values to the items and clicks on ENTER to save them. When updating an existing service definition, the panel is displayed with the existing values, the user makes the desired modifications, and clicks on ENTER to save them.

b. The Antenna Gain field is used by the UPS for orbital constraint validation. This field is *not* transmitted to the NCCDS as part of an electronic message. The parameter is embedded in the UAV file format differentiating the orbital view of the user spacecraft's antenna type (Hi or Lo) by service type (MA, SSA, KSA, SMA, KaSA, KaSAWB). This field is used by the UPS to validate the particular service represented by the service specification code against its corresponding TSW. For this purpose, the user must also have the appropriate service selected in the FDF Service Types Used by Mission field (refer to paragraph 7.7 for details).

c. The service specification code may be deleted by activating the DELETE pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.11 KSA Return Service

7.8.11.1 General

a. These panels (see Figure 7-20 through Figure 7-22) are used to create, modify, or delete KSA return service parameters.

b. This panel is initiated by either of the following:

1. Selecting the `KSA Return` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the KSR services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.11.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6). Those parameters that have a separate item for channel I, channel Q, channel 1, channel 2, channel 3, shuttle, and/or normal are marked I, Q, 1, 2, 3, shuttle, normal, or any combination thereof.

a. Fixed parameters:

1. `Service specification code`.
2. `Service specification alias`.
3. `Service configuration`.
4. `Service subtype`.
5. `DG2 modulation`.
6. `Return channel time delay`.
7. `DG1 configuration`.
8. `Data channel configuration`.
9. `Interface channel ID, WSGT`.
10. `Maximum data rate (I, Q, 2, 3)`.
11. `User interface channel ID (I, Q, 1, 2, 3)`.
12. `High data rate multiplexer port (I, Q)`.
13. `Symbol format conversion (channels I, Q)`.
14. `Data coding (channels I, Q)`.

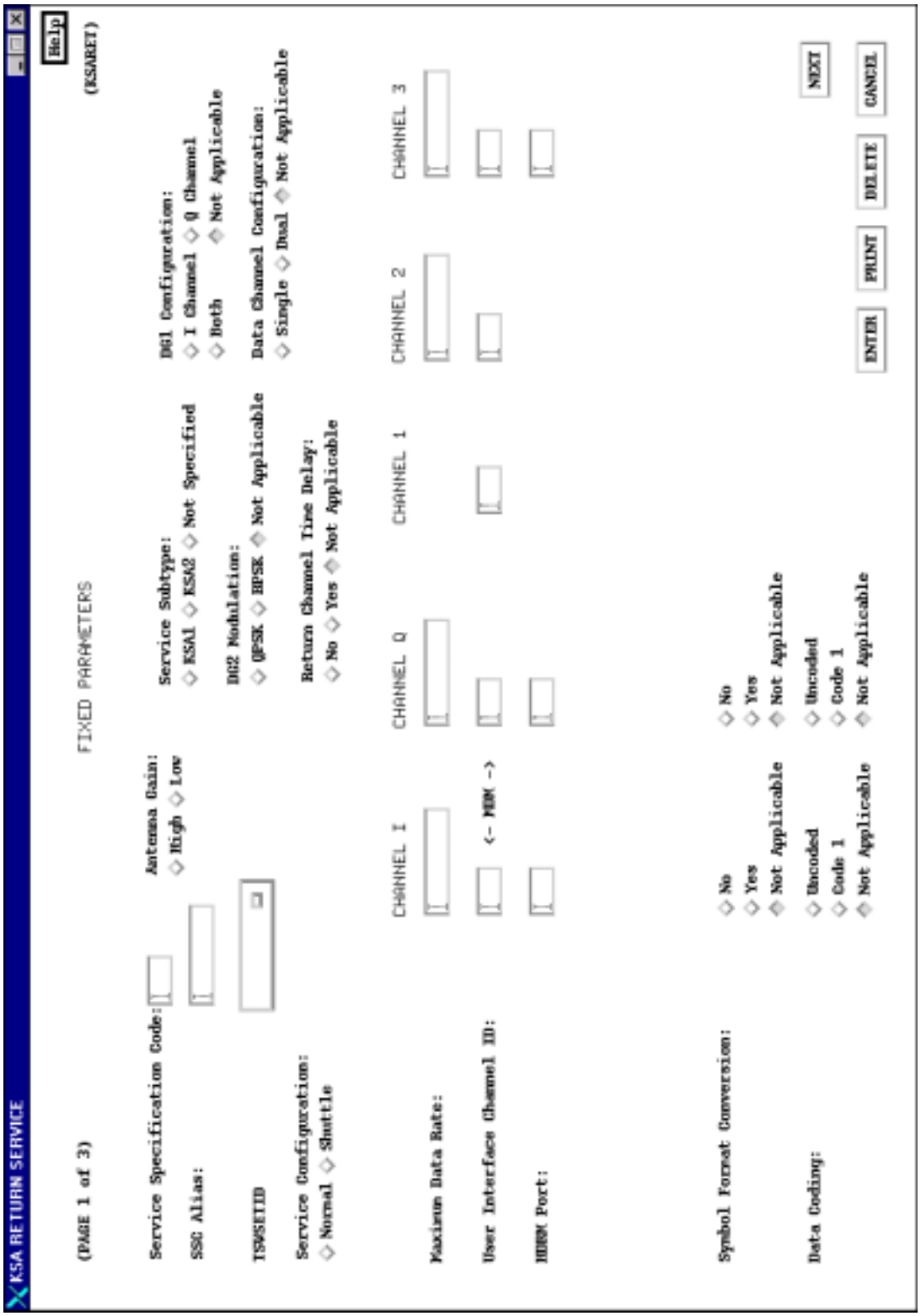


Figure 7-20. KSA Return Service Panel (1 of 3)

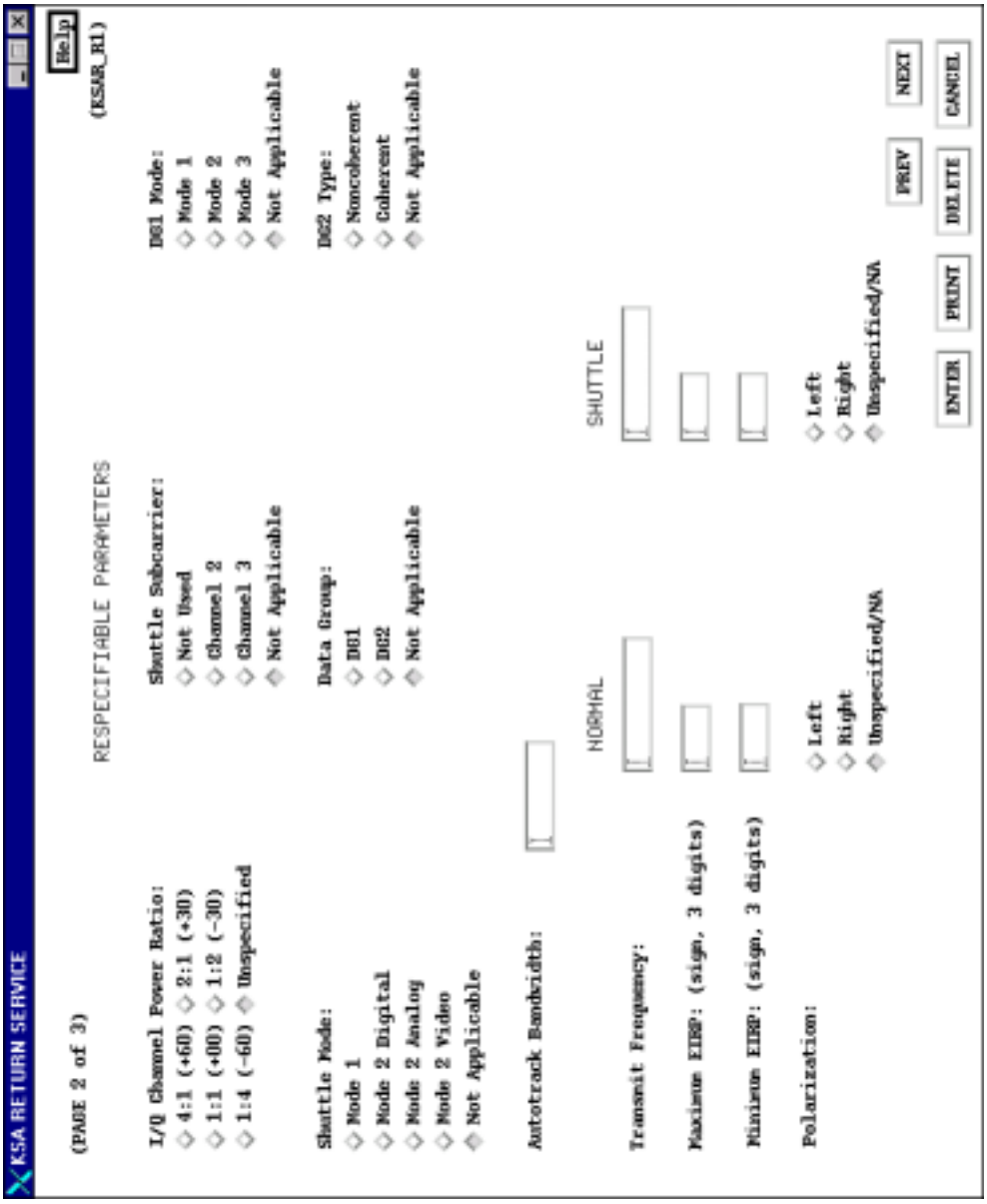


Figure 7-21. KSA Return Service Panel (2 of 3)

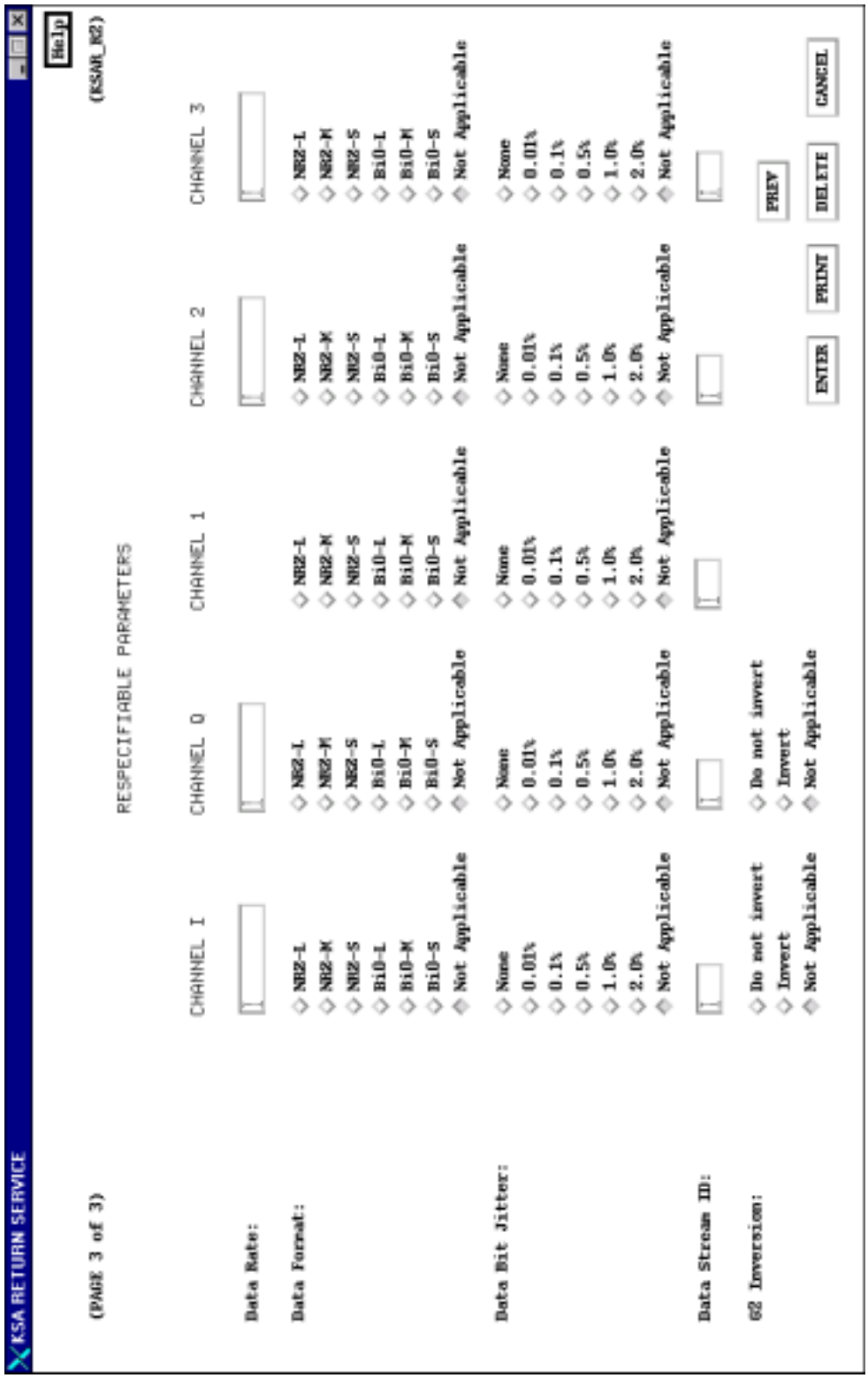


Figure 7-22. KSA Return Service Panel (3 of 3)

b. Respecifiable parameters:

1. `I/Q channel power ratio`.
2. `Shuttle mode`.
3. `Shuttle subcarrier, STGT`.
4. `Data group`.
5. `DG1 mode`.
6. `DG2 type`.
7. `Autotrack bandwidth`.
8. `Transmit frequency (normal, shuttle)`.
9. `Maximum EIRP (normal, shuttle)`.
10. `Minimum EIRP (normal, shuttle)`.
11. `Polarization (normal, shuttle)`.
12. `Data rate (I, Q, 2, 3)`.
13. `Data format (I, Q, 1, 2, 3)`.
14. `Data bit jitter (I, Q, 1, 2, 3)`.
15. `Data stream ID (I, Q, 1, 2, 3)`.
16. `G2 inversion (I, Q)`.

c. UPS-only parameters: `Antenna Gain` (Hi or Lo)

d. `PREV` Pushbutton. Displays the previous KSA Return Service panel. (This pushbutton appears only on pages 2 and 3 of the panel.)

e. `NEXT` Pushbutton. Displays the next KSA Return Service panel. (This pushbutton appears only on pages 1 and 2 of the panel.)

f. `ENTER` Pushbutton. Saves the KSA return parameters to the UPS database. The KSA Return Service panels are also removed from the screen. The `ENTER` pushbutton is not visible in query mode.

g. `PRINT` Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The `PRINT` pushbutton is not visible in query mode.

h. DELETE Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The KSA Return Service panels are also removed from the screen. The DELETE pushbutton is not visible in query mode.

i. CANCEL Pushbutton. Cancels processing without saving to the database and removes the KSA Return Service panels. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.11.3 Panels

The following panels are displayed:

a. KSA Return Service panels (pages 1 through 3).

b. Validation Messages panel.

7.8.11.4 Description

a. When adding a new service definition, the three KSA return panels are initially displayed ("stacked" on top of one another) with all fields blank or unassigned. The user then assigns values to the items (using NEXT and PREV to access each panel) and clicks on ENTER. When updating an existing service definition, the panel is displayed with the existing values, and the user makes the desired modifications and clicks on ENTER to save them.

b. The Antenna Gain field is used by the UPS for orbital constraint validation. This field is *not* transmitted to the NCCDS as part of an electronic message. The parameter is embedded in the UAV file format differentiating the orbital view of the user spacecraft's antenna type (Hi or Lo) by service type (MA, SSA, KSA, SMA, KaSA, KaSAWB). This field is used by the UPS to validate the particular service represented by the service specification code against its corresponding TSW. For this purpose, the user must also have the appropriate service selected in the FDF Service Types Used by Mission field (refer to paragraph 7.7 for details).

c. The service specification code may be deleted by activating the DELETE pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.12 SSA Return Service

7.8.12.1 General

a. These panels (see Figure 7-23 through Figure 7-25) are used to create, modify, or delete SSA return service parameters.

b. This panel is initiated by either of the following:

1. Selecting the `SSA Return` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the SSR services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.12.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6). Those parameters that have a separate item for channel I, channel Q, shuttle, and/or normal are marked I, Q, shuttle, normal, or any combination thereof.

a. Fixed parameters:

1. `Service Specification code`.
2. `Service Specification alias`.
3. `Service configuration`.
4. `Receiver configuration`.
5. `Service subtype`.
6. `DG2 modulation`.
7. `Return channel time delay`.
8. `SSA combining`.
9. `DG1 configuration`.
10. `Data channel configuration`.

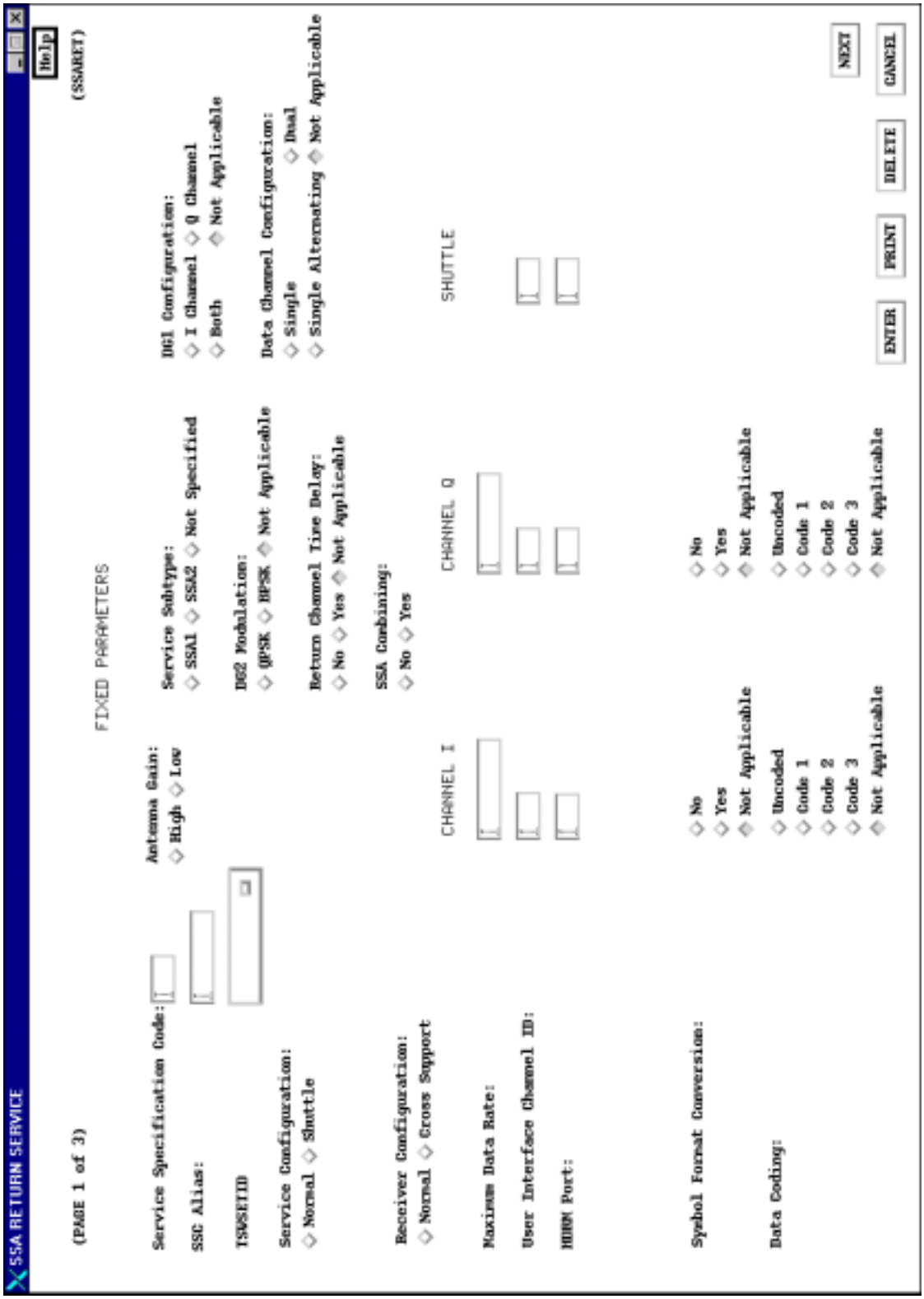


Figure 7-23. SSA Return Service Panel (1 of 3)

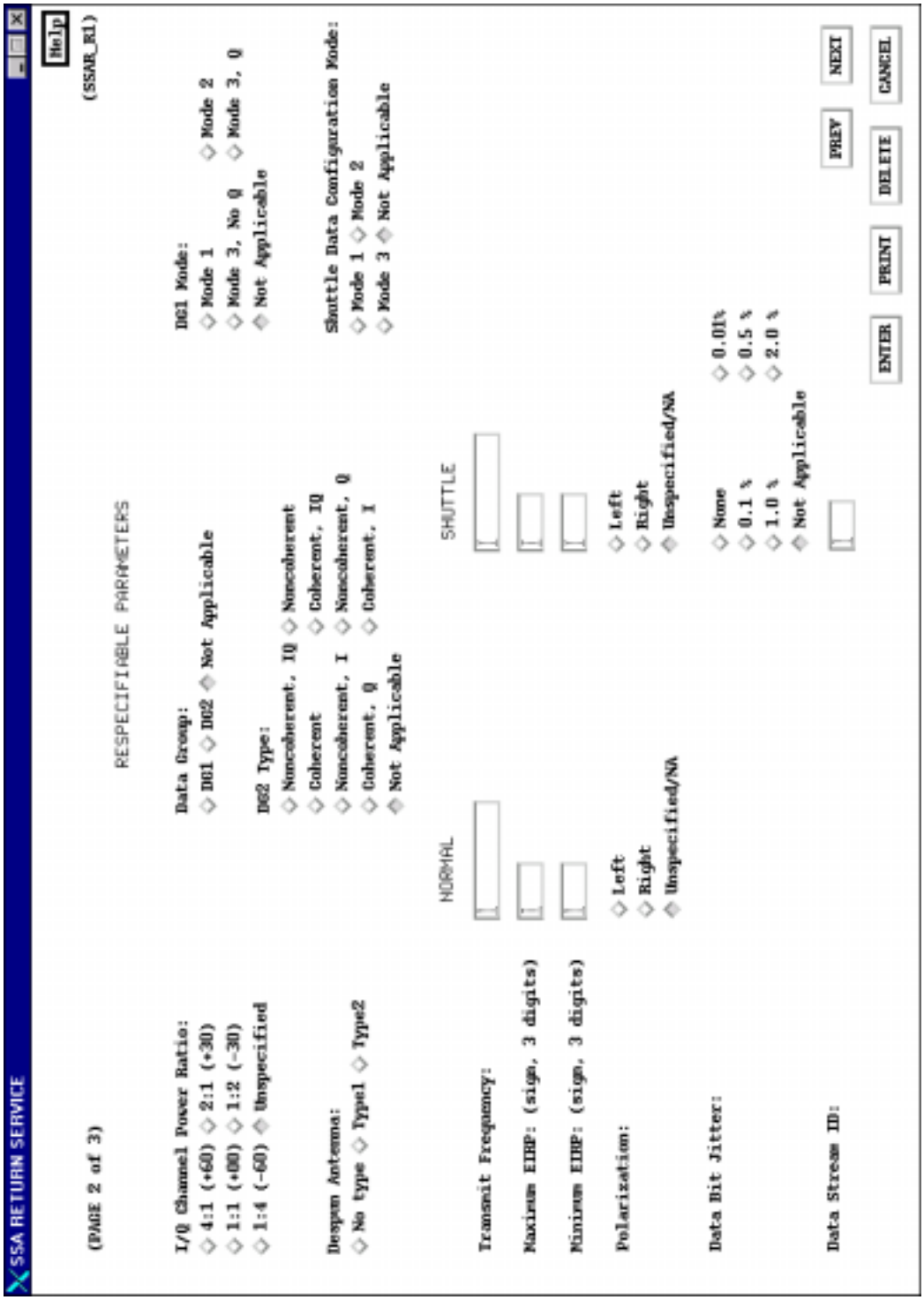


Figure 7-24. SSA Return Service Panel (2 of 3)

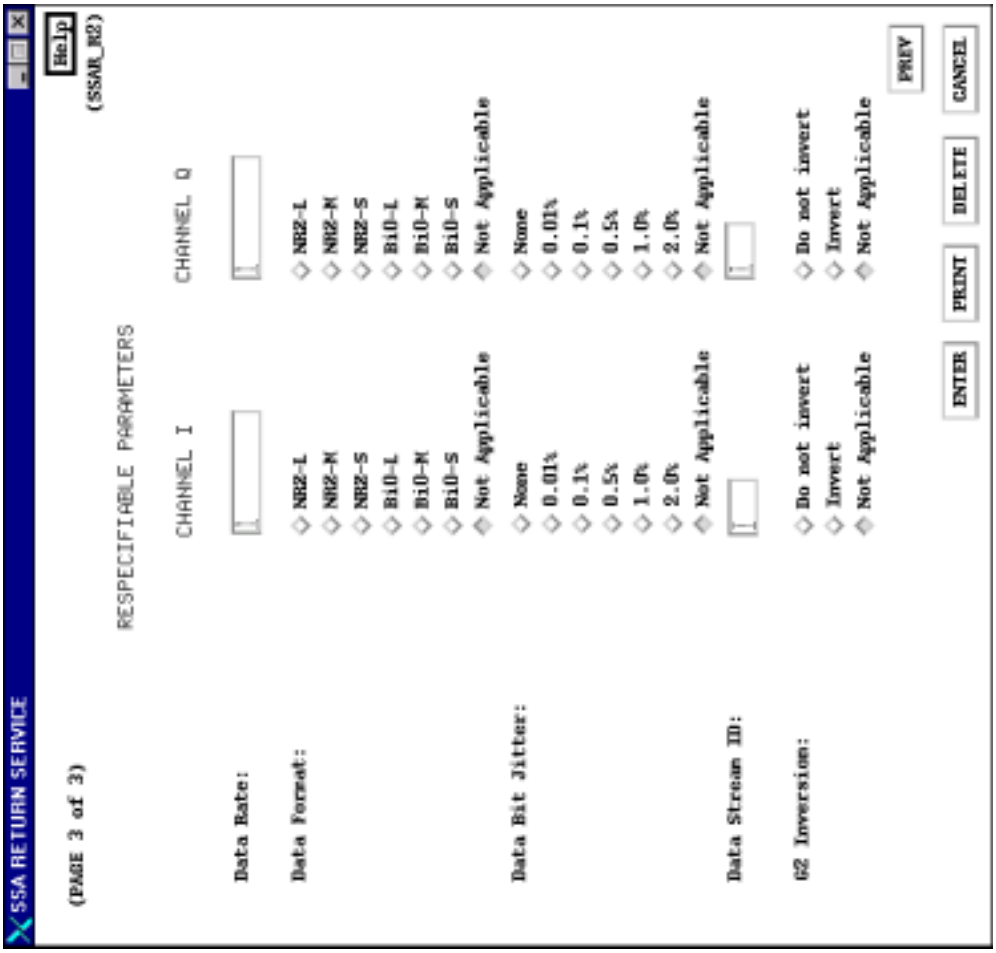


Figure 7-25. SSA Return Service Panel (3 of 3)

11. Interface channel ID, WSGT.
12. Maximum data rate (I, Q).
13. User interface channel ID (I, Q, shuttle).
14. High data rate multiplexer port (I, Q).
15. Symbol format conversion (I, Q).
16. Data coding (I, Q).

b. Respecifiable parameters:

1. I/Q channel power ratio.
2. Despun antenna.
3. Data group.
4. DG2 type.
5. DG1 mode.
6. Shuttle mode.
7. Transmit frequency (normal, shuttle).
8. Maximum EIRP (normal, shuttle).
9. Minimum EIRP (normal, shuttle).
10. Polarization (normal, shuttle).
11. Data bit jitter (shuttle).
12. Data stream ID (shuttle).
13. Data rate (I, Q).
14. Data format (I, Q).
15. Data bit jitter (I, Q).
16. Data stream ID (I, Q).
17. G2 inversion (I, Q).

c. UPS-only parameters: Antenna Gain (Hi or Lo)

d. PREV Pushbutton. Displays the previous SSA Return Service panel. This pushbutton appears on only pages 2 and 3 of the panel.)

e. NEXT Pushbutton. Displays the next SSA Return Service panel. (This pushbutton appears on only pages 1 and 2 of the panel.)

f. ENTER Pushbutton. Saves the SSA return parameters to the UPS database. The SSA Return Service panels are also removed from the screen. The ENTER pushbutton is not visible in query mode.

g. PRINT Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The PRINT pushbutton is not visible in query mode.

h. DELETE Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The SSA Return Service panels are also removed from the screen. The DELETE pushbutton is not visible in query mode.

i. CANCEL Pushbutton. Cancels processing without saving to the database, and removes the SSA Return Service panels. If the user has made changes on the screen, he/she will be asked to confirm the cancel action.

7.8.12.3 Panels

The following panels are displayed:

a. SSA Return Service panel (pages 1 through 3).

b. Validation Messages.

7.8.12.4 Description

a. When adding a new service definition, the three SSA return panels are initially displayed ("stacked" on top of one another) with all fields blank or unassigned. The user then assigns values to the items (using NEXT and PREV buttons to access each panel) and clicks on ENTER. When updating an existing service definition, the panel is displayed with the existing values, and the user makes the desired modifications and clicks on ENTER to save them.

b. The Antenna Gain field is used by the UPS for orbital constraint validation. This field is *not* transmitted to the NCCDS as part of an electronic message. The parameter is embedded in the UAV file format differentiating the orbital view of the user spacecraft's antenna type (Hi or Lo) by service type (MA, SSA, KSA, SMA, KaSA, KaSAWB). This field is used by the UPS to validate the particular service represented by the service specification code against its corresponding TSW. For this purpose, the user must also have the appropriate service selected in the FDF Service Types Used by Mission field (refer to paragraph 7.7 for details).

c. The service specification code may be deleted by activating the DELETE pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.13 MA Return Service

7.8.13.1 General

a. These panels (see Figure 7-26 and Figure 7-27) are used to create, modify, or delete MA return service definitions.

b. This panel is initiated by either of the following:

1. Selecting the `MA Return` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the Multiple Access Return (MAR) services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.13.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6). Those parameters that have a separate item for channel I and/or channel Q are marked I or Q, or any combination thereof.

a. Fixed parameters:

1. `Service specification code`.
2. `Service specification alias`.
3. `MA return link ID`.
4. `Configuration`.
5. `Data channel configuration`.
6. `Return channel time delay`.
7. `Receiver configuration`.
8. `Maximum data rate (I, Q)`.
9. `Symbol format conversion (I, Q)`.
10. `User interface channel ID (I, Q)`.

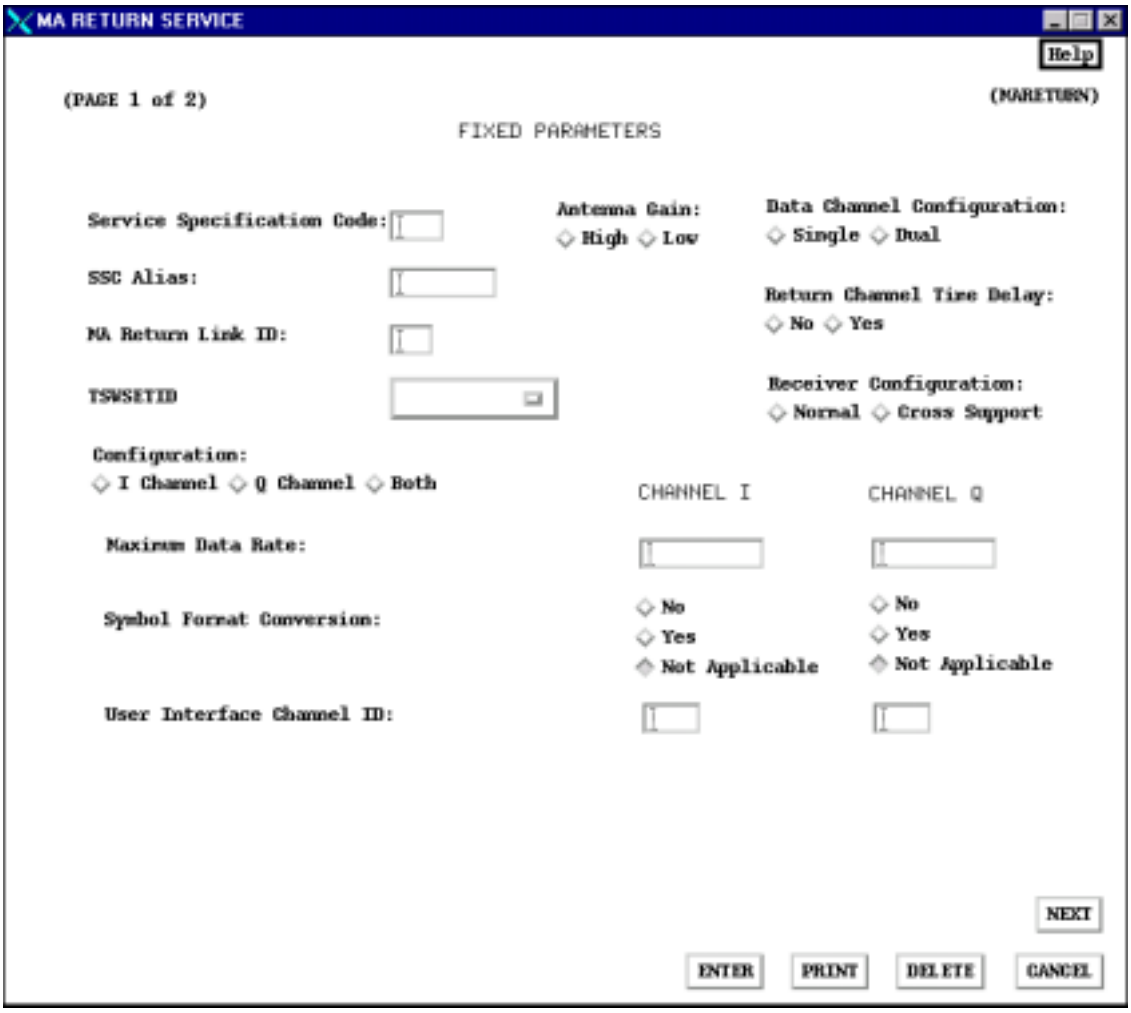


Figure 7-26. MA Return Service Panel (1 of 2)

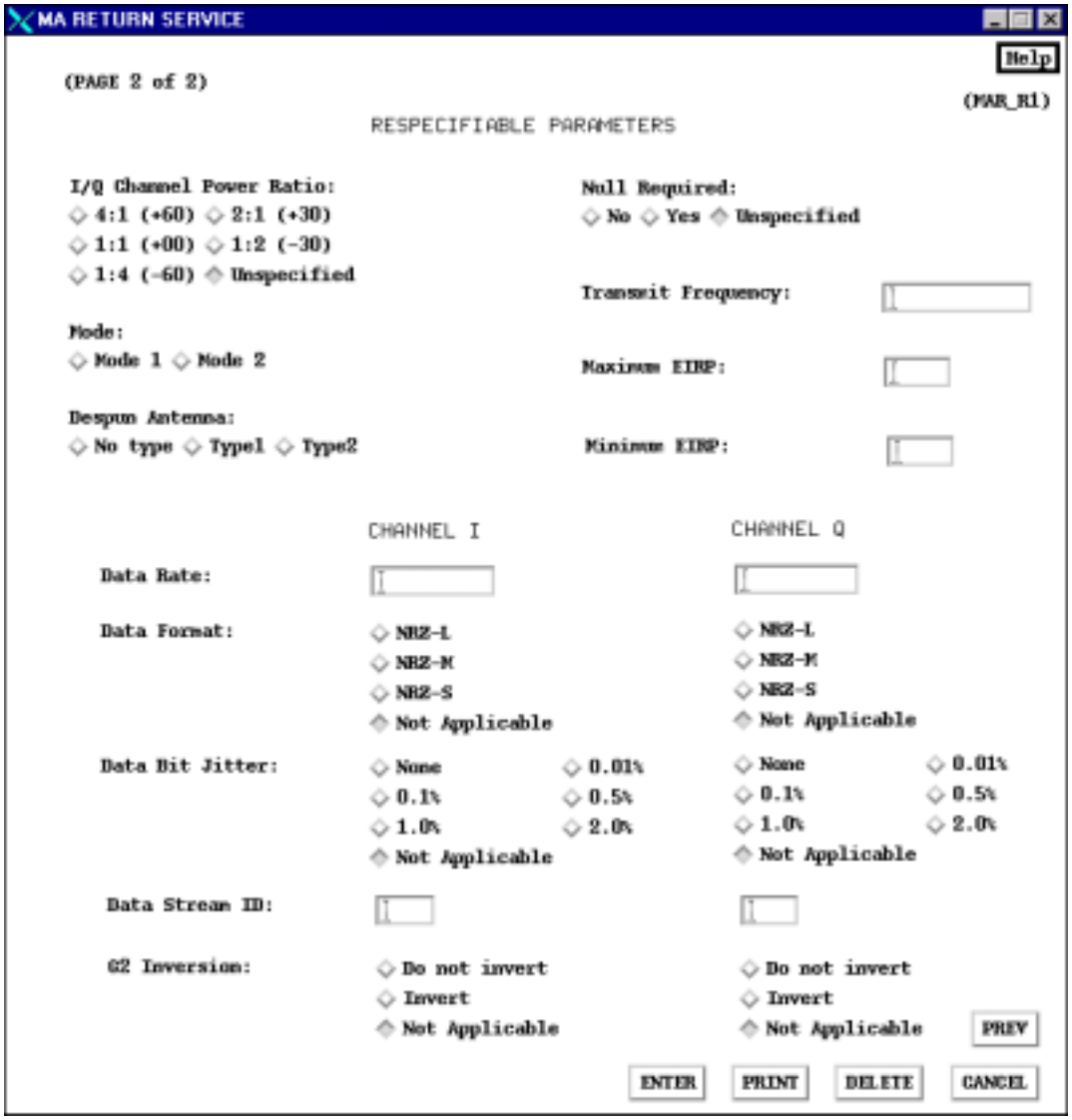


Figure 7-27. MA Return Service Panel (2 of 2)

b. Respecifiable parameters:

1. `I/Q channel power ratio`.
2. `Mode`.
3. `Despun antenna`.
4. `Null required`.
5. `Transmit frequency`.
6. `Maximum EIRP`.
7. `Minimum EIRP`.
8. `Data rate (I, Q)`.
9. `Data format (I, Q)`.
10. `Data bit jitter (I, Q)`.
11. `Data stream ID (I, Q)`.
12. `G2 inversion (I, Q)`.

c. UPS-only parameters: `Antenna Gain` (Hi or Lo)

d. `PREV` Pushbutton. Displays the previous MA Return Service panel. (This pushbutton appears only on page 2 of the panel.)

e. `NEXT` Pushbutton. Displays the next MA Return Service panel. (This pushbutton appears only on page 1 of the panel.)

f. `ENTER` Pushbutton. Saves the MA return parameters to the UPS database. The MA Return Service panels are also removed from the screen. The `ENTER` pushbutton is not visible in query mode.

g. `PRINT` Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The `PRINT` pushbutton is not visible in query mode.

h. `DELETE` Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The MA Return Service panels are also removed from the screen. The `DELETE` pushbutton is not visible in query mode.

i. `CANCEL` Pushbutton. Cancels processing without saving to the database and removes the MA Return Service panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.13.3 Panels

The MA Return Service panels (pages 1 and 2) and the Validation Messages panel are displayed.

7.8.13.4 Description

a. When adding a new service definition, the two MA return panels are initially displayed ("stacked" on top of one another) with all fields blank or unassigned. The user then assigns values to the items (using NEXT and PREV to access each panel) and clicks on ENTER. When updating an existing service definition, the panel is displayed with the existing values, and the user makes the desired modifications and clicks on ENTER to save them.

b. The Antenna Gain field is used by the UPS for orbital constraint validation. This field is *not* transmitted to the NCCDS as part of an electronic message. The parameter is embedded in the UAV file format differentiating the orbital view of the user spacecraft's antenna type (Hi or Lo) by service type (MA, SSA, KSA, SMA, KaSA, KaSAWB). This field is used by the UPS to validate the particular service represented by the service specification code against its corresponding TSW. For this purpose, the user must also have the appropriate service selected in the FDF Service Types Used by Mission field (refer to paragraph 7.7 for details).

c. The service specification code may be deleted by activating the DELETE pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.14 KaSA Forward Service

7.8.14.1 General

a. This panel (see Figure 7-28) is used to create, modify, or delete KaSA forward service definitions.

b. This panel is initiated by either of the following:

1. Selecting the `KaSA Forward` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the KAF services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.14.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6). Those parameters that have a separate item for channel I and/or channel Q are marked I or Q, or any combination thereof.

a. Fixed parameters:

1. `Service specification code`.

2. `Service specification alias`.

3. `Service subtype`.

4. `Power mode (normal)`.

5. `Maximum data rate (normal)`.

6. `User interface channel ID (normal)`.

b. Respecifiable parameters:

1. `Command channel PN modulation`.

2. `Data rate (normal)`.

3. `Receive frequency (normal)`.

4. `Polarization (normal)`.

5. `Doppler compensation (normal)`.

Figure 7-28. KaSA Forward Service Panel

c. UPS-only parameters: `Antenna Gain` (Hi or Lo).

d. `ENTER` Pushbutton. Saves the KaSA forward parameters to the UPS database. The KaSA Forward Service panel is also removed from the screen. The `ENTER` pushbutton is not visible in query mode.

e. `PRINT` Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The `PRINT` pushbutton is not visible in query mode.

f. `DELETE` pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The KaSA Forward Service panel is also removed from the screen. The `DELETE` pushbutton is not visible in query mode.

g. `CANCEL` Pushbutton. Cancels processing without saving to the database and removes the KaSA Forward Service panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.14.3 Panels

The Validation Messages panel may be displayed.

7.8.14.4 Description

a. When adding a new service definition, this panel is initially displayed with all fields blank or unassigned. The user then assigns values to the items and clicks on `ENTER` to save them. When updating an existing service definition, the panel is displayed with the existing values. The user makes the desired modifications and clicks on `ENTER` to save them.

b. The `Antenna Gain` field is used by the UPS for orbital constraint validation. This field is *not* transmitted to the `NCCDS` as part of an electronic message. The parameter is embedded in the UAV file format differentiating the orbital view of the user spacecraft's antenna type (Hi or Lo) by service type (MA, SSA, KSA, SMA, KaSA, KaSAWB). This field is used by the UPS to validate the particular service represented by the service specification code against its corresponding TSW. For this purpose, the user must also have the appropriate service selected in the `FDF Service Types Used by Mission` field (refer to paragraph 7.7 for details).

c. The service specification code may be deleted by activating the `DELETE` pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.15 SMA Forward Service

7.8.15.1 General

a. This panel (see Figure 7-29) is used to create, modify, or delete SMA forward service definitions.

b. This panel is initiated by either of the following:

1. Selecting the `SMA Forward` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the SMF services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.15.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6). Those parameters that have a separate item for channel I and/or channel Q are marked I or Q, or any combination thereof.

a. Fixed parameters:

1. `Service specification code`.

2. `Service specification alias`.

3. `Maximum data rate`.

4. `User interface channel ID`.

5. `TDRSS interface channel ID, WSGT`.

b. Respecifiable parameters:

1. `Data rate`.

2. `Receive frequency`.

3. `Doppler compensation`.

4. `Despun antenna`.

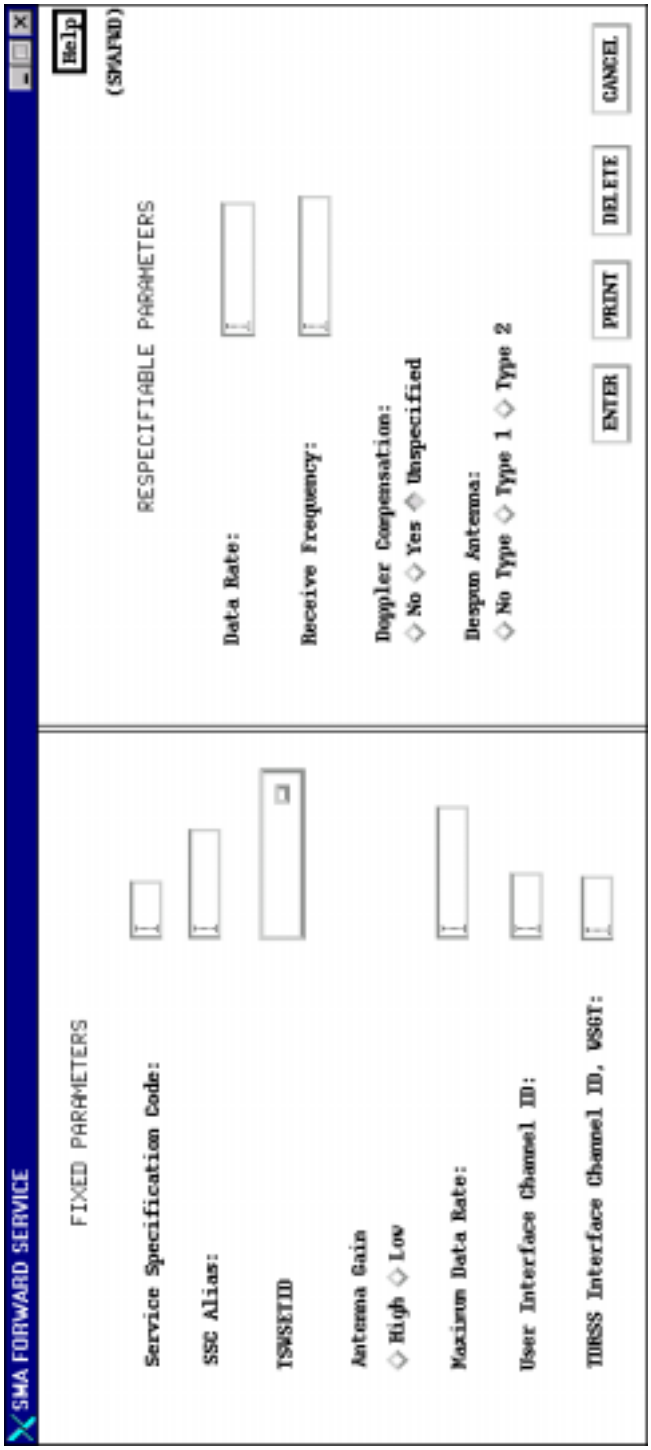


Figure 7-29. SMA Forward Service Panel

c. UPS-only parameters: `Antenna Gain` (Hi or Lo).

d. `ENTER` Pushbutton. Saves the SMA forward parameters to the UPS database. The SMA Forward Service panel is also removed from the screen. The `ENTER` pushbutton is not visible in query mode.

e. `PRINT` Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The `PRINT` pushbutton is not visible in query mode.

f. `DELETE` Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The SMA Forward Service panel is also removed from the screen. The `DELETE` pushbutton is not visible in query mode.

g. `CANCEL` Pushbutton. Cancels processing without saving to the database and removes the SMA Forward Service panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.15.3 Panels

The MA Return Service panel (page 2) and the Validation Messages panel are displayed.

7.8.15.4 Description

a. When adding a new service definition, the two MA return panels are initially displayed ("stacked" on top of one another) with all fields blank or unassigned. The user then assigns values to the items (using `NEXT` and `PREV` to access each panel) and clicks on `ENTER`. When updating an existing service definition, the panel is displayed with the existing values, and the user makes the desired modifications and clicks on `ENTER` to save them.

b. The `Antenna Gain` field is used by the UPS for orbital constraint validation. This field is *not* transmitted to the `NCCDS` as part of an electronic message. The parameter is embedded in the UAV file format differentiating the orbital view of the user spacecraft's antenna type (Hi or Lo) by service type (MA, SSA, KSA, SMA, KaSA, KaSAWB). This field is used by the UPS to validate the particular service represented by the service specification code against its corresponding TSW. For this purpose, the user must also have the appropriate service selected in the `FDF Service Types Used by Mission` field (refer to paragraph 7.7 for details).

c. The service specification code may be deleted by activating the `DELETE` pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.16 KaSA Return Service

7.8.16.1 General

a. These panels (see Figure 7-30 through Figure 7-32) are used to create, modify, or delete KaSA return service definitions.

b. This panel is initiated by either of the following:

1. Selecting the `KaSA Return` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the KAR services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.16.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6). Those parameters that have a separate item for channel I and/or channel Q are marked I or Q, or any combination thereof.

a. Fixed parameters:

1. `Service specification code`.
2. `Service specification alias`.
3. `Service subtype`.
4. `DG2 modulation`.
5. `Return channel time delay`.
6. `DG1 configuration`.
7. `Data channel configuration`.
8. `Maximum data rate (I, Q)`.
9. `User interface channel ID (I, Q)`.
10. `High data rate multiplexer port (I, Q)`.
11. `Symbol format conversion (I, Q)`.
12. `Data coding (I, Q)`.

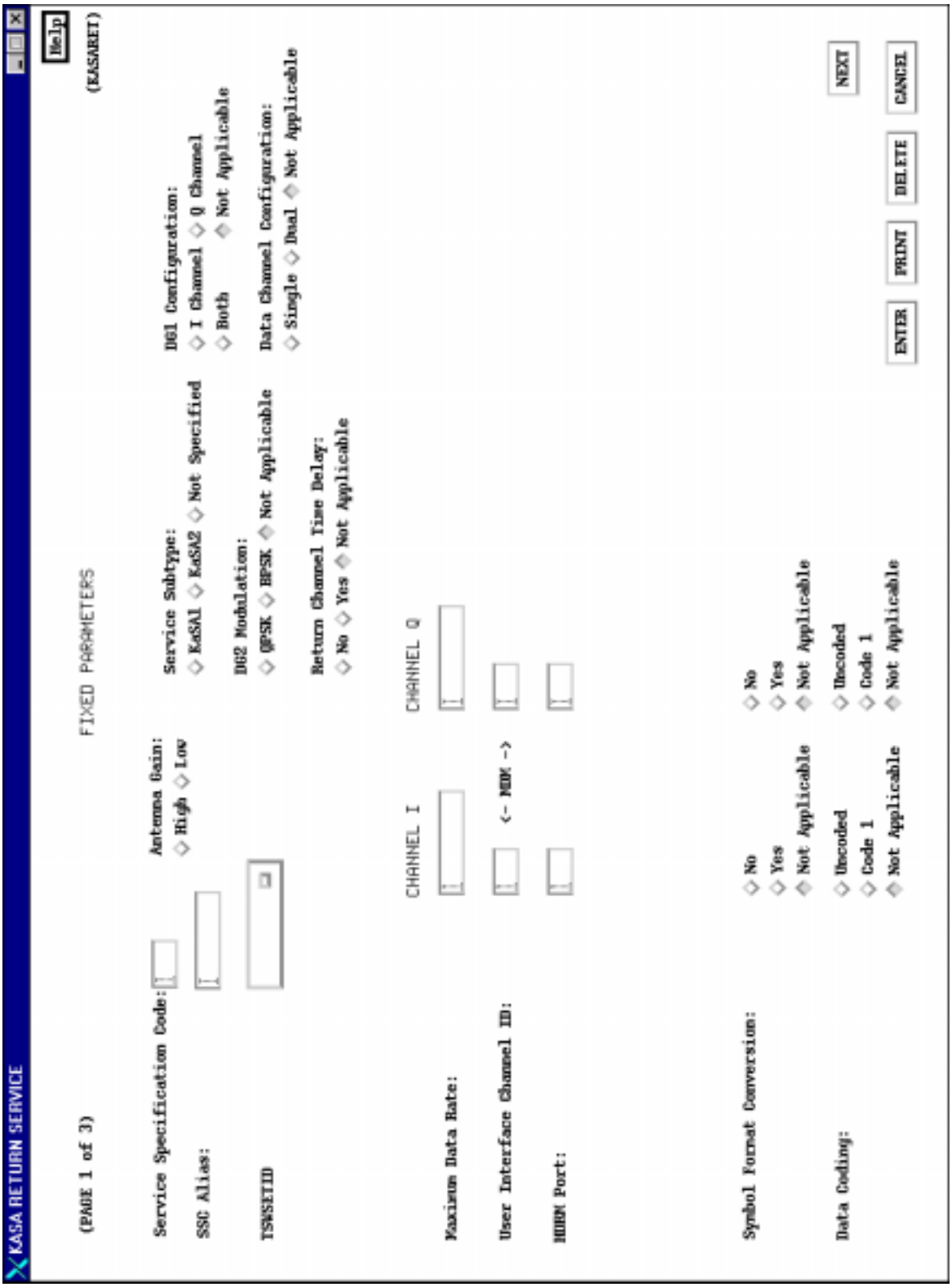


Figure 7-30. KaSA Return Service Panel (1 of 3)

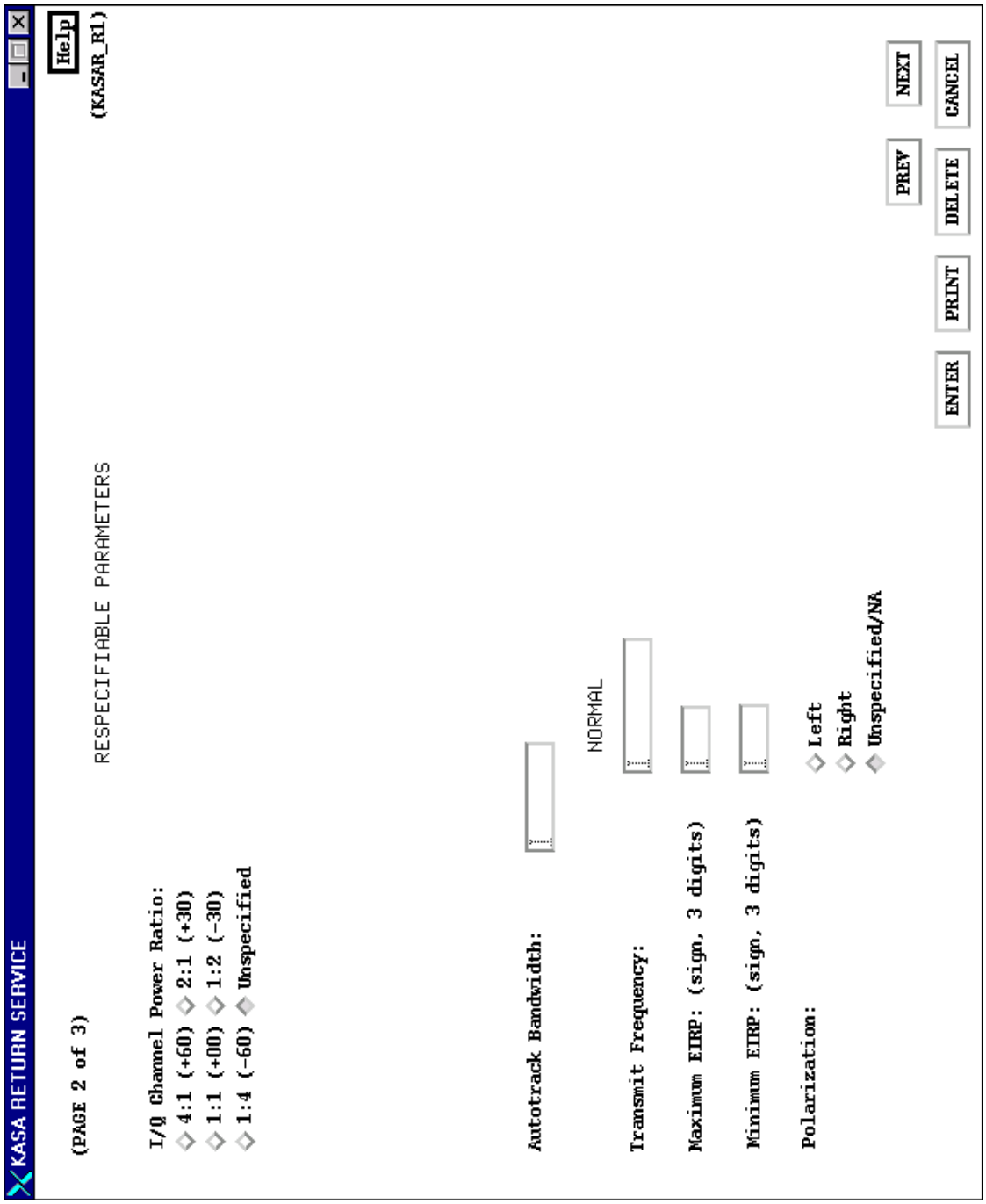


Figure 7-31. KaSA Return Service Panel (2 of 3)

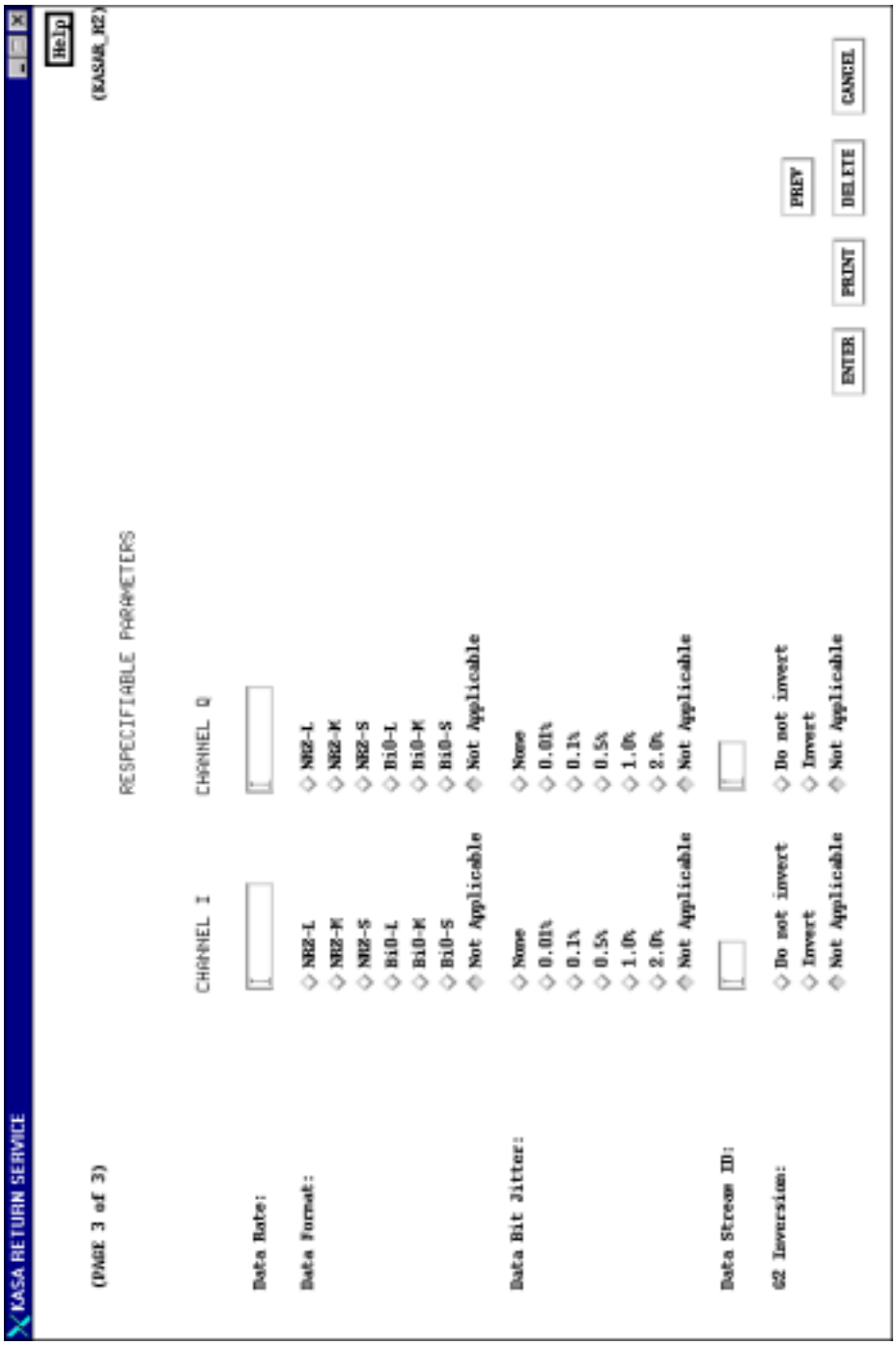


Figure 7-32. KaSA Return Service Panel (3 of 3)

b. Respecifiable parameters:

1. `I/Q channel power ratio`.
2. `Autotrack bandwidth`.
3. `Transmit frequency (normal)`.
4. `Maximum EIRP (normal)`.
5. `Minimum EIRP (normal)`.
6. `Polarization (normal)`.
7. `Data rate (I, Q)`.
8. `Data format (I, Q)`.
9. `Data bit jitter (I, Q)`.
10. `Data stream ID (I, Q)`.
11. `G2 inversion (I, Q)`.

c. UPS-only parameters: `Antenna Gain` (Hi or Lo).

d. `PREV` Pushbutton. Displays the previous KaSA Return Service panel. (This pushbutton appears only on pages 2 and 3 of the panels.)

e. `NEXT` Pushbutton. Displays the next KaSA Return Service panel. (This pushbutton appears only on pages 2 and 3 of the panels.)

f. `ENTER` Pushbutton. Saves the KaSA return parameters to the UPS database. The KaSA Return Service panels are also removed from the screen. The `ENTER` pushbutton is not visible in query mode.

g. `PRINT` Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The `PRINT` pushbutton is not visible in query mode.

h. `DELETE` Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The KaSA Return Service panels are also removed from the screen. The `DELETE` pushbutton is not visible in query mode.

i. `CANCEL` Pushbutton. Cancels processing without saving to the database and removes the KaSA Return Service panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.16.3 Panels

The KaSA Return Service panels (pages 1 through 3) and the Validation Messages panel are displayed.

7.8.16.4 Description

a. When adding a new service definition, the two MA return panels are initially displayed ("stacked" on top of one another) with all fields blank or unassigned. The user then assigns values to the items (using NEXT and PREV to access each panel) and clicks on ENTER. When updating an existing service definition, the panel is displayed with the existing values, and the user makes the desired modifications and clicks on ENTER to save them.

b. The Antenna Gain field is used by the UPS for orbital constraint validation. This field is *not* transmitted to the NCCDS as part of an electronic message. The parameter is embedded in the UAV file format differentiating the orbital view of the user spacecraft's antenna type (Hi or Lo) by service type (MA, SSA, KSA, SMA, KaSA, KaSAWB). This field is used by the UPS to validate the particular service represented by the service specification code against its corresponding TSW. For this purpose, the user must also have the appropriate service selected in the FDF Service Types Used by Mission field (refer to paragraph 7.7 for details).

c. The service specification code may be deleted by activating the DELETE pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.17 KaSAWB Return Service

7.8.17.1 General

a. These panels (see Figure 7-33 through Figure 7-35) are used to create, modify, or delete KaSA Wide Band return service definitions.

b. This panel is initiated by either of the following:

1. Selecting the `KaSAWB Return` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the KWR services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.17.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6). Those parameters that have a separate item for channel I and/or channel Q are marked I or Q, or any combination thereof.

a. Fixed parameters:

1. `Service specification code`.
2. `Service specification alias`.
3. `DG2 modulation`.
4. `Return channel time delay`.
5. `DG1 configuration`.
6. `Data channel configuration`.
7. `Maximum data rate (I, Q)`.
8. `User interface channel ID (I, Q)`.
9. `High data rate multiplexer port (I, Q)`.
10. `Symbol format conversion (I, Q)`.
11. `Data coding (I, Q)`.

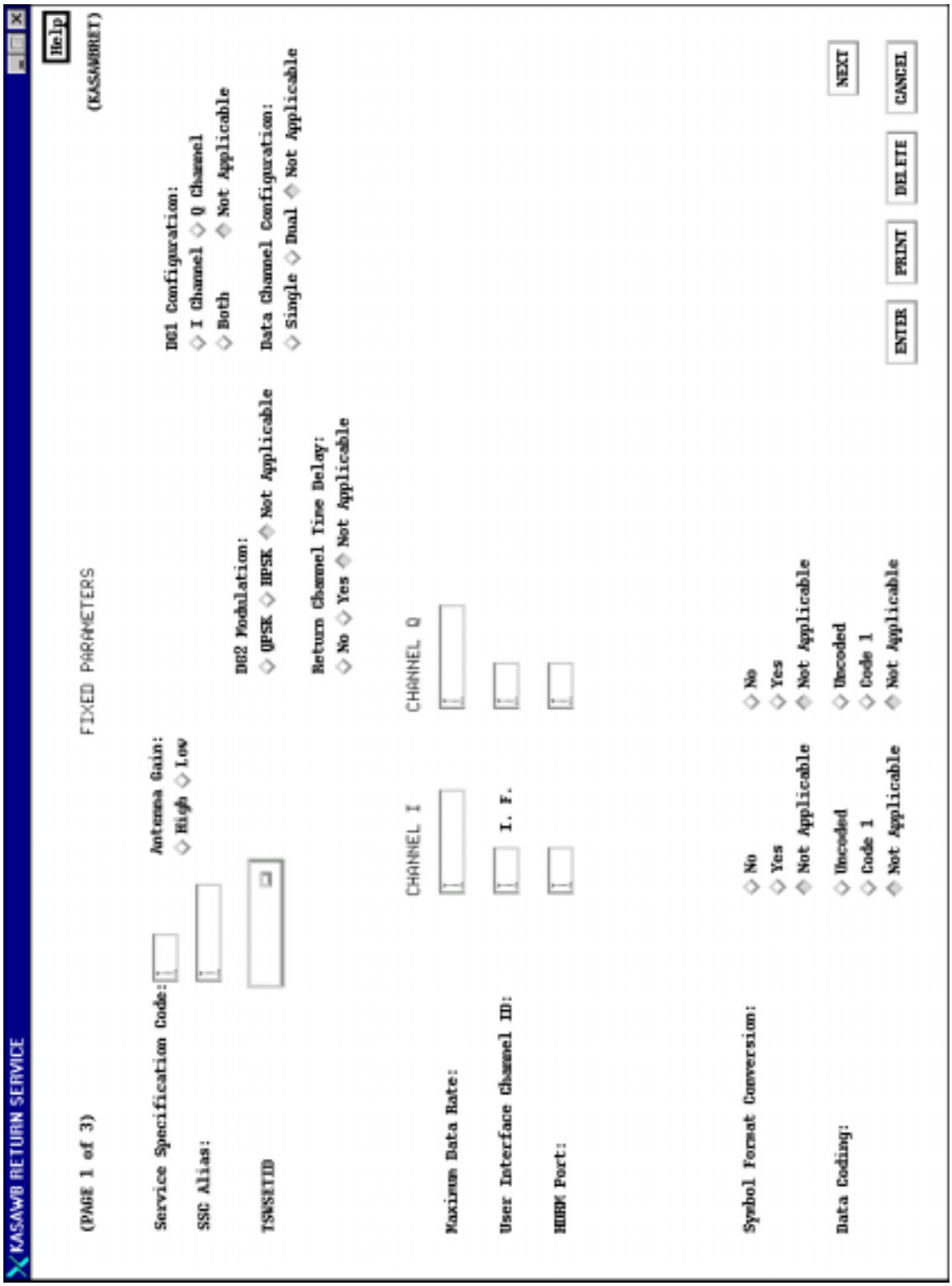


Figure 7-33. KaSAWB Return Service Panel (1 of 3)

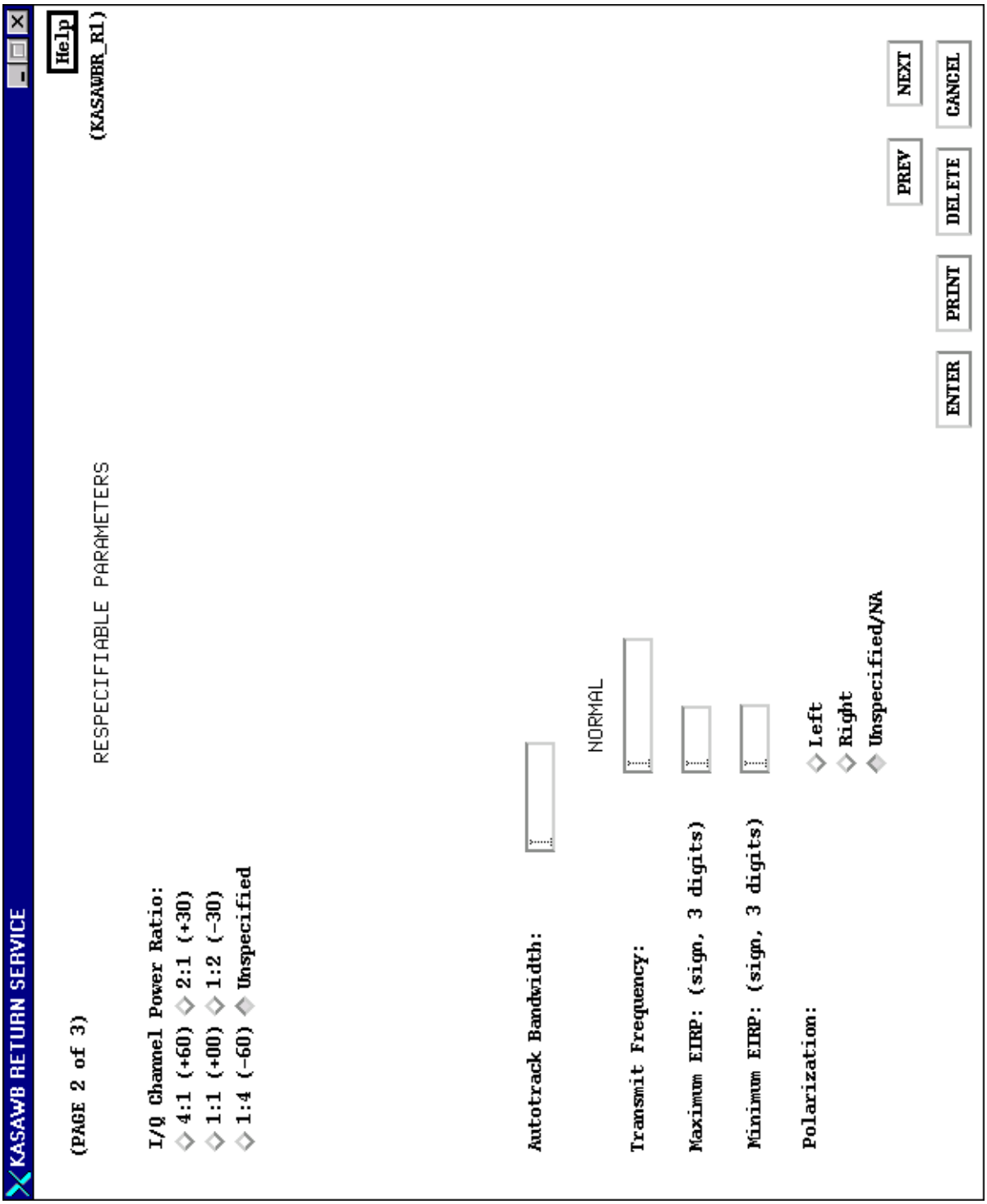


Figure 7-34. KaSAWB Return Service Panel (2 of 3)

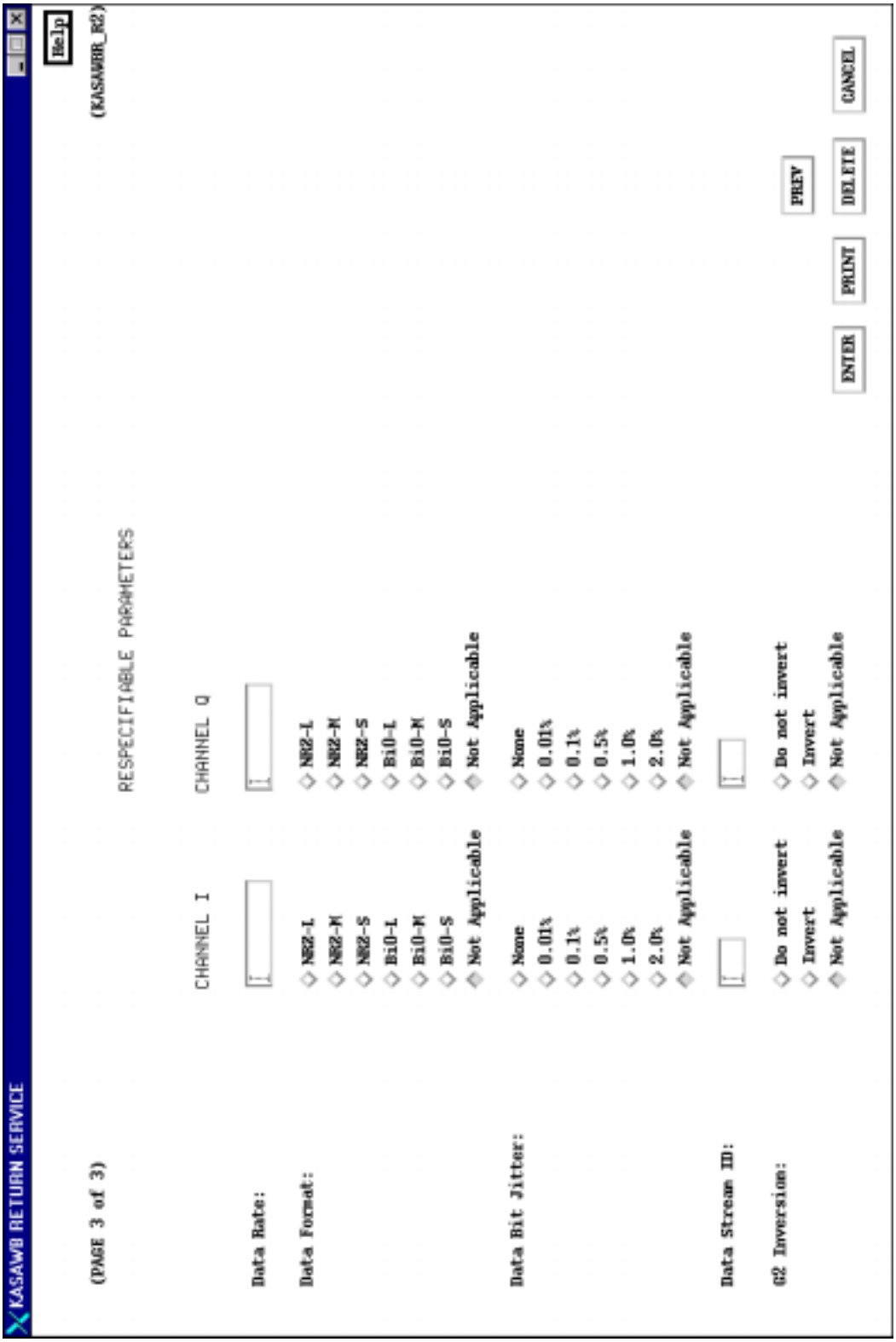


Figure 7-35. KaSAWB Return Service Panel (3 of 3)

b. Respecifiable parameters:

1. `I/Q channel power ratio`.
2. `Autotrack bandwidth`.
3. `Transmit frequency (normal)`.
4. `Maximum EIRP (normal)`.
5. `Minimum EIRP (normal)`.
6. `Polarization (normal)`.
7. `Data rate (I, Q)`.
8. `Data format (I, Q)`.
9. `Data bit jitter (I, Q)`.
10. `Data stream ID (I, Q)`.
11. `G2 inversion (I, Q)`.

c. UPS-only parameters: `Antenna Gain` (Hi or Lo).

d. `PREV` Pushbutton. Displays the previous KaSAWB Return Service panel. (This pushbutton appears only on pages 2 and 3 of the panels.)

e. `NEXT` Pushbutton. Displays the next KaSAWB Return Service panel. (This pushbutton appears only on pages 2 and 3 of the panels.)

f. `ENTER` Pushbutton. Saves the KaSAWB return parameters to the UPS database. The KaSAWB Return Service panels are also removed from the screen. The `ENTER` pushbutton is not visible in query mode.

g. `PRINT` Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The `PRINT` pushbutton is not visible in query mode.

h. `DELETE` Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The KaSAWB Return Service panels are also removed from the screen. The `DELETE` pushbutton is not visible in query mode.

i. `CANCEL` Pushbutton. Cancels processing without saving to the database and removes the KaSAWB Return Service panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.17.3 Panels

The KaSAWB Return Service panels (pages 1 through 3) and the Validation Messages panel are displayed.

7.8.17.4 Description

a. When adding a new service definition, the two MA return panels are initially displayed ("stacked" on top of one another) with all fields blank or unassigned. The user then assigns values to the items (using NEXT and PREV to access each panel) and clicks on ENTER. When updating an existing service definition, the panel is displayed with the existing values, and the user makes the desired modifications and clicks on ENTER to save them.

b. The Antenna Gain field is used by the UPS for orbital constraint validation. This field is *not* transmitted to the NCCDS as part of an electronic message. The parameter is embedded in the UAV file format differentiating the orbital view of the user spacecraft's antenna type (Hi or Lo) by service type (MA, SSA, KSA, SMA, KaSA, KaSAWB). This field is used by the UPS to validate the particular service represented by the service specification code against its corresponding TSW. For this purpose, the user must also have the appropriate service selected in the FDF Service Types Used by Mission field (refer to paragraph 7.7 for details).

c. The service specification code may be deleted by activating the DELETE pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.18 SMA Return Service

7.8.18.1 General

a. These panels (see Figure 7-36 through Figure 7-38) are used to create, modify, or delete SMA return service definitions.

b. This panel is initiated by either of the following:

1. Selecting the `SMA Return` pushbutton on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to create a new definition.

2. Selecting one of the SMR services from the `Existing Service Service Specification Code` textlist on the Prototype Events and Service Specification Codes panel (see Figure 7-11) to modify a definition.

7.8.18.2 Panel Items

For more detailed information on the individual fixed and respecifiable parameters, *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see Reference 6). Those parameters that have a separate item for channel I and/or channel Q are marked I or Q, or any combination thereof.

a. Fixed parameters:

1. `Service specification code`.
2. `Service specification alias`.
3. `SMA return link ID`.
4. `DG2 modulation`.
5. `Return channel time delay`.
6. `DG1 configuration`.
7. `Data channel configuration`.
8. `Receiver configuration`.
9. `Maximum data rate (I, Q)`.
10. `User interface channel ID (I, Q)`.
11. `High data rate multiplexer port (I, Q)`.
12. `Symbol format conversion (I, Q)`.
13. `Data coding (I, Q)`.

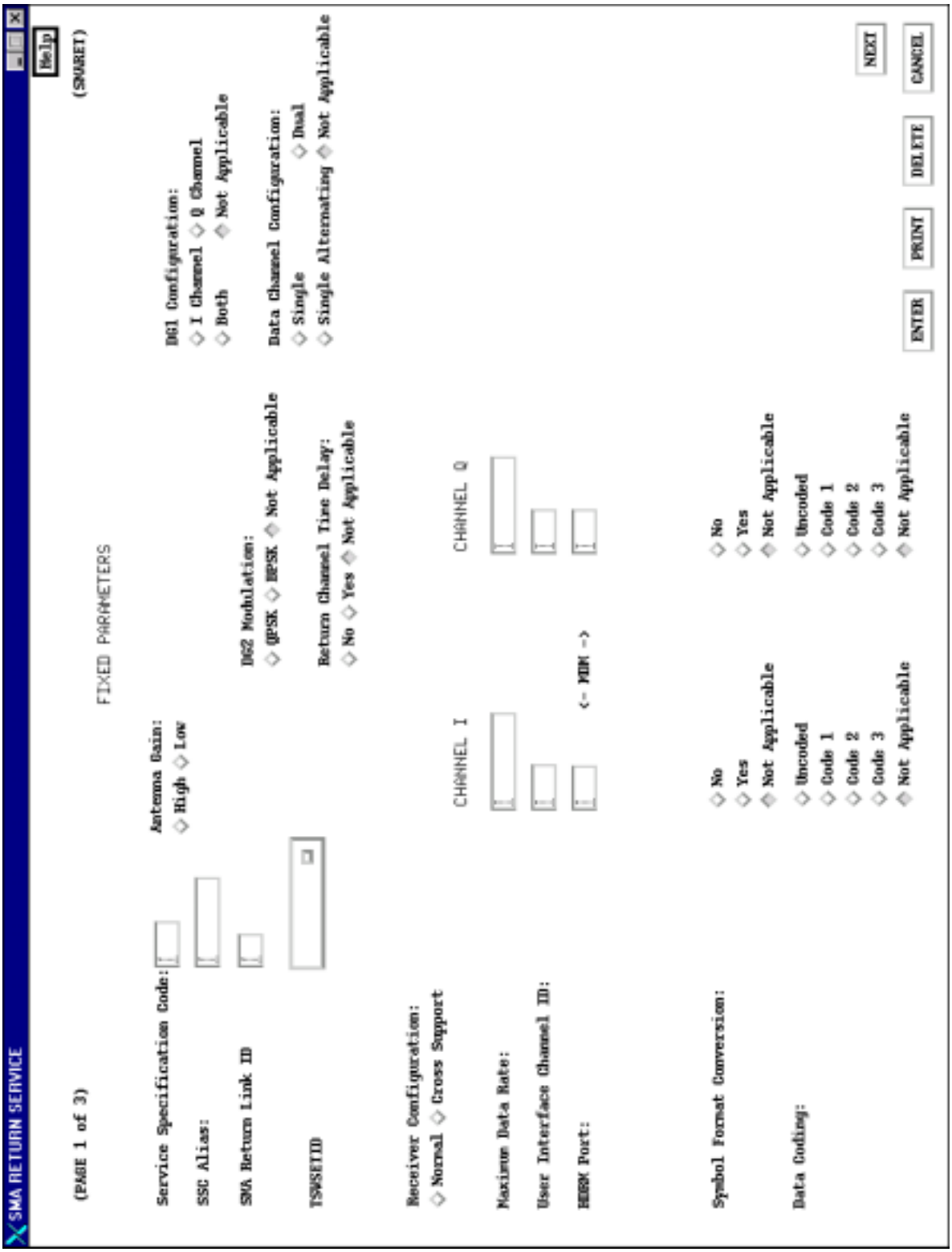


Figure 7-36. SMA Return Service Panel (1 of 3)

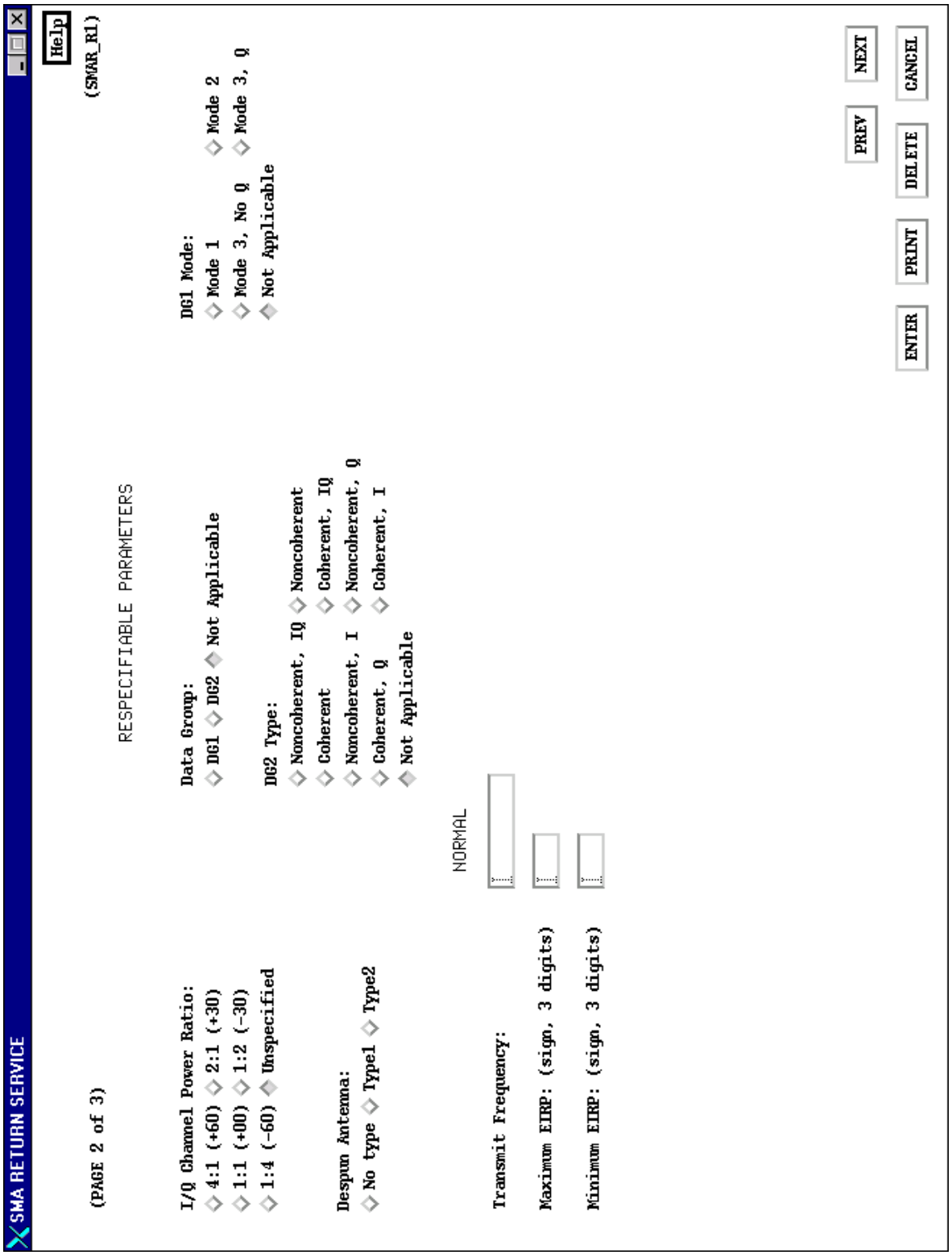


Figure 7-37. SMA Return Service Panel (2 of 3)

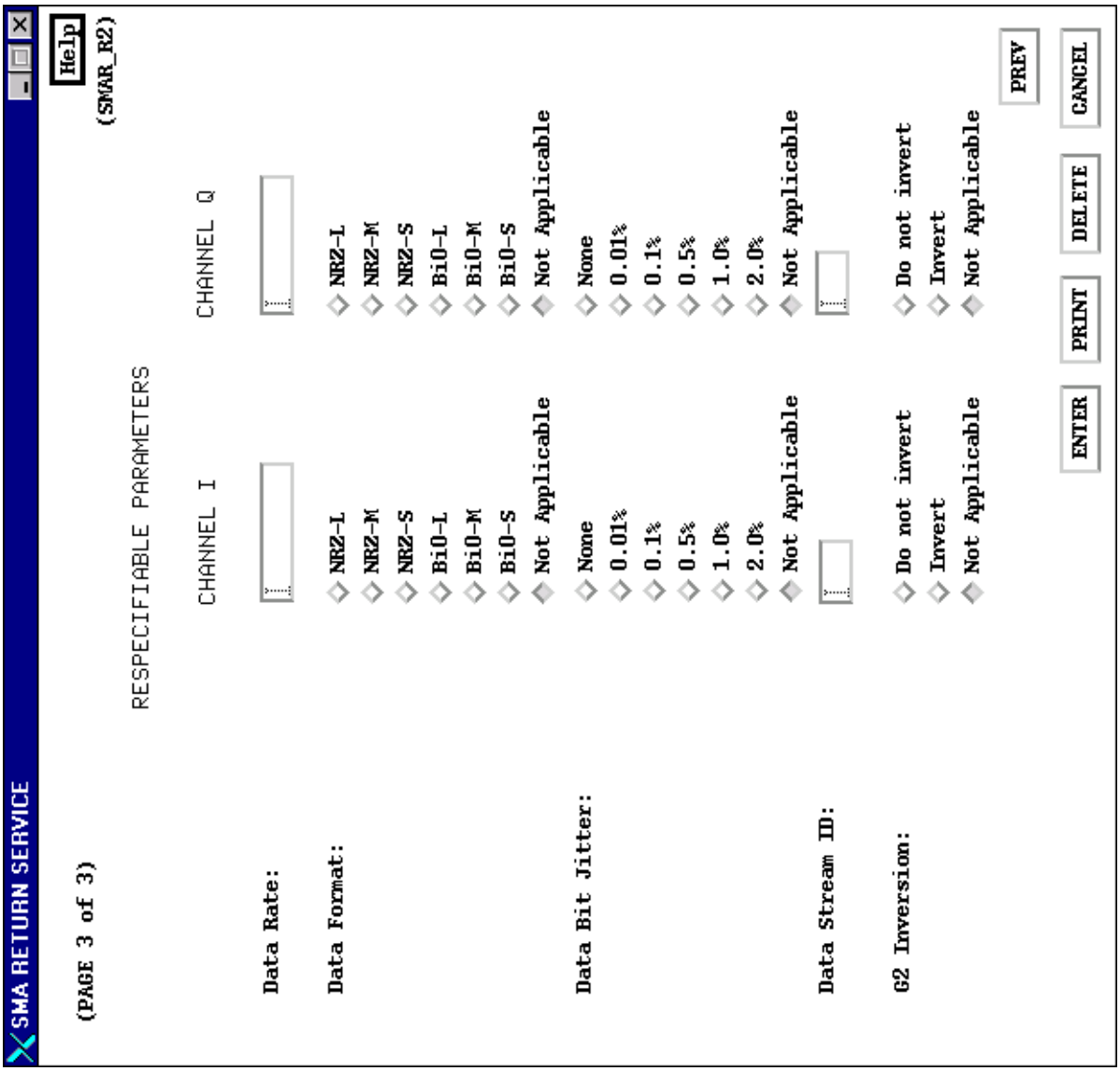


Figure 7-38. SMA Return Service Panel (3 of 3)

b. Respecifiable parameters:

1. `I/Q channel power ratio`.
2. `Despun antenna`.
3. `Data group`.
4. `DG2 type`.
5. `DG1 Mode`.
6. `Transmit frequency (normal)`.
7. `Maximum EIRP (normal)`.
8. `Minimum EIRP (normal)`.
9. `Data rate (I, Q)`.
10. `Data format (I, Q)`.
11. `Data bit jitter (I, Q)`.
12. `Data stream ID (I, Q)`.
13. `G2 inversion (I, Q)`.

c. UPS-only parameters: `Antenna Gain` (Hi or Lo)

d. `PREV` Pushbutton. Displays the previous SMA Return Service panel. (This pushbutton appears only on pages 2 and 3 of the panels.)

e. `NEXT` Pushbutton. Displays the next SMA Return Service panel. (This pushbutton appears only on pages 2 and 3 of the panels.)

f. `ENTER` Pushbutton. Saves the SMA return parameters to the UPS database. The SMA Return Service panels are also removed from the screen. The `ENTER` pushbutton is not visible in query mode.

g. `PRINT` Pushbutton (not implemented). Generates a printout of the data on the panel(s) in a format similar to that of a report. The `PRINT` pushbutton is not visible in query mode.

h. `DELETE` Pushbutton. Deletes the currently displayed service specification code definition from the UPS database. The user is asked to confirm this action to prevent accidental deletions. The SMA Return Service panels are also removed from the screen. The `DELETE` pushbutton is not visible in query mode.

i. `CANCEL` Pushbutton. Cancels processing without saving to the database and removes the SMA Return Service panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

7.8.18.3 Panels

The SMA Return Service panels (pages 1 through 3) and the Validation Messages panel are displayed.

7.8.18.4 Description

a. When adding a new service definition, the two MA return panels are initially displayed ("stacked" on top of one another) with all fields blank or unassigned. The user then assigns values to the items (using `NEXT` and `PREV` to access each panel) and clicks on `ENTER`. When updating an existing service definition, the panel is displayed with the existing values, and the user makes the desired modifications and clicks on `ENTER` to save them.

b. The `Antenna Gain` field is used by the UPS for orbital constraint validation. This field is *not* transmitted to the `NCCDS` as part of an electronic message. The parameter is embedded in the UAV file format differentiating the orbital view of the user spacecraft's antenna type (Hi or Lo) by service type (MA, SSA, KSA, SMA, KaSA, KaSAWB). This field is used by the UPS to validate the particular service represented by the service specification code against its corresponding TSW. For this purpose, the user must also have the appropriate service selected in the `FDF Service Types Used by Mission` field (refer to paragraph 7.7 for details).

c. The service specification code may be deleted by activating the `DELETE` pushbutton, provided no SAR or Prototype Event exists that contains this service specification code.

7.8.19 Recurrent Scheduling Superprototype Editor

7.8.19.1 General

This panel (see Figure 7-39) is used both to create and modify recurrent scheduling SAR generation prototypes (see Appendix F for details on the language specification of RS Prototypes).

7.8.19.2 Panel Items

a. Action Pulldown Menu. Menu allows loading an existing RS Prototype, defining a new RS Prototype, deleting an existing RS Prototype, validating an RS Prototype, and saving a modified RS Prototype (validation is also performed with this selection).

b. Edit Pulldown Menu. Standard cut-and-paste menu.

c. Search Pulldown Menu. Standard text pattern search and replace menu.

d. RS Prototype Text. Text field used to define and/or modify the RS Prototype definition.

7.8.19.3 Panels

An RS Prototype Selection panel is displayed.

7.8.19.4 Description

This panel is used to create and modify RS Prototypes, using a text editor interface.

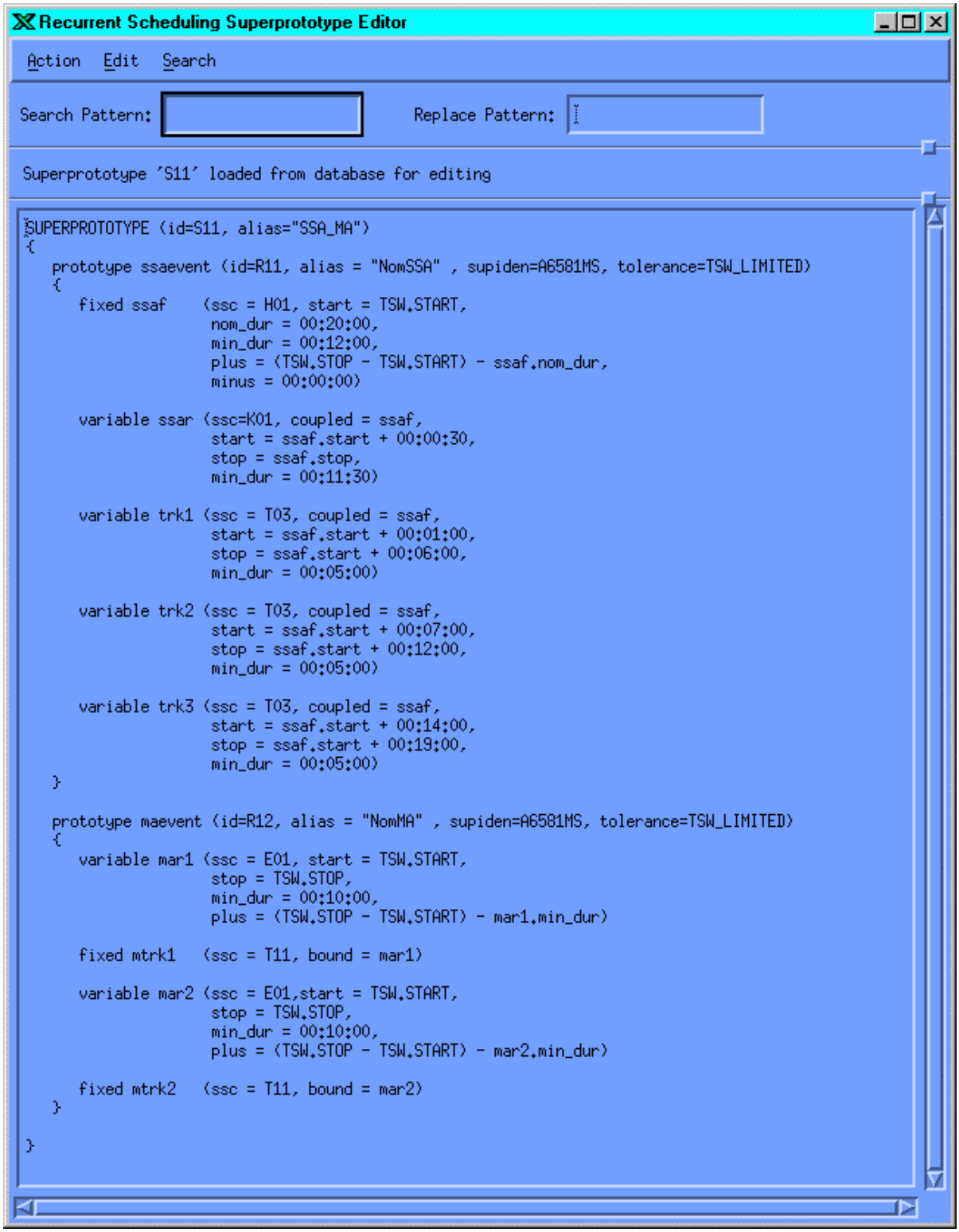


Figure 7-39. Recurrent Scheduling Superprototype Editor Panel

7.9 Electronic User Information

7.9.1 General

a. This panel (see Figure 7-40) is used to solicit and store the node name, filename convention, and the communication protocol for the electronic user. Entering any information on this screen must be followed by an UPS shutdown and startup for the change to take effect. Note that use of this panel is optional. Not all missions will have an Electronic User.

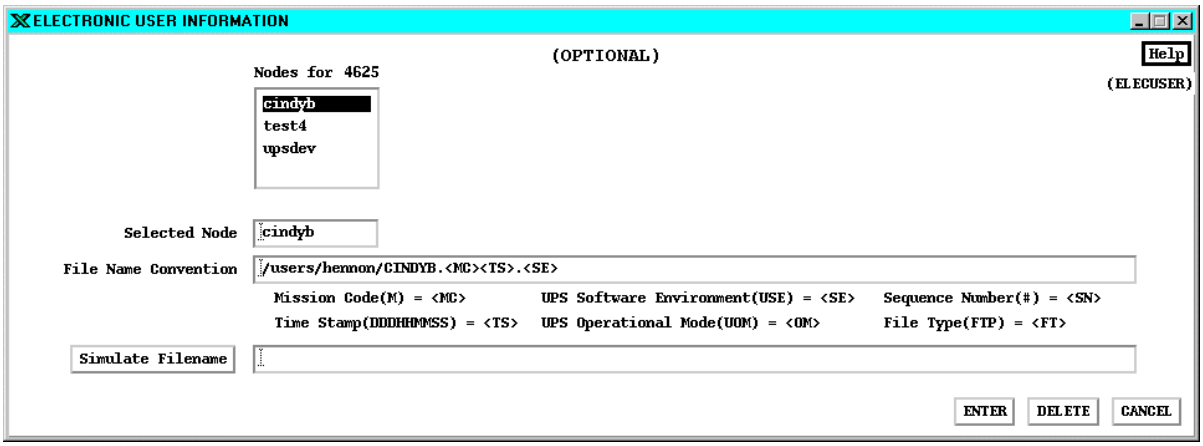


Figure 7-40. Electronic User Information Panel

b. This panel is initiated by selecting Electronic User Parameters from the Mission Setup pulldown menu (see Figure 7-1).

7.9.2 Panel Items

a. `Nodes for` <sic>. Selection list of all electronic user nodes associated with the current mission. Upon selection of a node, the "Selected node" and "Filename convention" fields are updated based on stored values.

b. `Selected Node`. Text entry field used to enter a node name. If one already exists, the associated data is displayed on the screen.

c. `Filename Convention`. Text entry field used to enter the filename convention.

d. `Mission Code (M)` = <MC> Selectable Item. Appends <MC> to filename convention text entry field.

e. `Time Stamp (DDDHHMMSS)` = <TS> Selectable Item. Appends <TS> to filename convention text entry field.

f. `UPS Software Environment (CCC)` = <SE> Selectable Item. Appends <SE> to filename convention text entry field.

g. `UPS Operational Mode (TST)` = <UM> Selectable Item. Appends <UM> to filename convention text entry field.

h. `Sequence Number (#)` = <SN> Selectable Item. Appends <SN> to filename convention text entry field.

i. `File Type (FTP)` = <FT> Selectable Item. Appends <FT> to filename convention text entry field.

j. `Simulate Filename` Pushbutton. Generates a simulated filename.

k. `ENTER` Pushbutton. Saves data associated with the selected node. Only one electronic user can be updated per usage of this panel. The `ENTER` pushbutton is not visible in query mode.

l. `DELETE` Pushbutton. Deletes the selected node from the database. Note that this will not remove all instances of this node for other missions.

m. `CANCEL` Pushbutton. Cancels processing without saving to the database. If the user has made changes on the screen, a warning message will be displayed.

7.9.3 Panels

No sub-panels are displayed.

7.9.4 Description

a. This panel is used to assign a filename convention to files transmitted from the UPS over the Local Area Network (LAN) to the electronic user. Because a mission may not have an electronic user, these fields are optional. To create a new Electronic User Node, a node name and filename convention must be entered. To modify an existing node, either one of the nodes in the list can be selected or an existing node name can be typed in the node name text field. Any changes to the filename convention text can then be saved by pressing `ENTER`.

b. A node name is the name of the electronic user's computer. If the node name already exists in the database, the contents of the filename convention text entry will be populated with the current data automatically.

c. If the user elects to delete the record, it is deleted with no further warning.

d. If the user elects not to delete the record it remains in the EUIN table; other missions can subsequently use it.

e. A filename convention consists of either a relative or absolute path followed by the filename. The path must be separated by forward slashes ("/"), as with any Unix path name. The filename consists of a sequence of characters with one or more of the following template items embedded in any sequence: <TS> time stamp, <MC> mission code, <SE> software environment, <UM> operational mode, <SN> sequence number, and <FT> file type.

f. For example, suppose the user wants to create a filename that consists of the Mission Code followed by the Time Stamp, followed by the letters: "upsCEL". Further, suppose the user wants the file to be placed in the directory: /gro/MSOCC/dataq. In the `File Name Convention` text box, the user would enter: /gro/MSOCC/dataq/. Note that pathname and filename characters are case sensitive. The user would then click on the `Mission Code (M) = <MC>` selectable item (below the text box) which will append the characters <MC> to the user entered pathname. Then the user would click on the `Time Stamp(DDDHHMMSS) = <TS>` selectable item, then the user would type the characters "upsCEL". The final entry in the `File Name Convention` text box will appear as: /gro/MSOCC/dataq/<M><TS>upsCEL.

g. When the user clicks on the `Simulate Filename` pushbutton, the following will appear in the `Simulate Filename` text area: /gro/MSOCC/dataq/ GDDDHHMMSSupsCEL. The G represents the mission code; DDDHHMMSS represents days, hours, minutes, and seconds (see Figure 7-40).

h. To update a filename convention, the user moves the arrow to the filename convention text entry, selects the RIGHTBUTTON of the mouse at the desired cursor location within the text, and begins editing.

Section 8. Orbital Data Operations

8.1 Overview

8.1.1

Orbital data operations consist of the following 3 functions:

a. Load Orbital Data File [Load PSAT/UAV or GTV or TCW files].

b. Initiate Orbital Process [process the PSAT/UAV or GTV or TCW files].

c. Transmit TSWs [to the NCCDS].

8.1.2

The user is provided the option to process orbital data from one or more orbital data files, known as PSAT and/or UAV files (on tape or disk). See the *Flight Dynamics Division (FDD) Generic Data Product Formats Interface Control Document* for the PSAT/UAV format.

8.1.3

The user may elect to use orbital data files that have been electronically transmitted to the UPS from the Electronic User. These files are called TDRS Communication Window (TCW) files (see Appendix D for a discussion of TCWs).

8.1.4

When the user has selected the Process Orbital Data Automatically checkbox on the Autoprocessing Parameters panel (refer to paragraph 7.3), the UPS will process the orbital data files automatically (i.e. the user will NOT have to select the Initiate Orbital Process menu selection). If the checkbox is not selected, an alert message will be displayed that indicates orbital data has been received and can be processed. At that time, the user can initiate orbital data processing.

8.1.5

Orbital data operations are initiated from the Orbital Data Ops pulldown menu that is available from both the mission coordinator and mission scheduler information windows (see Figure 8-1).

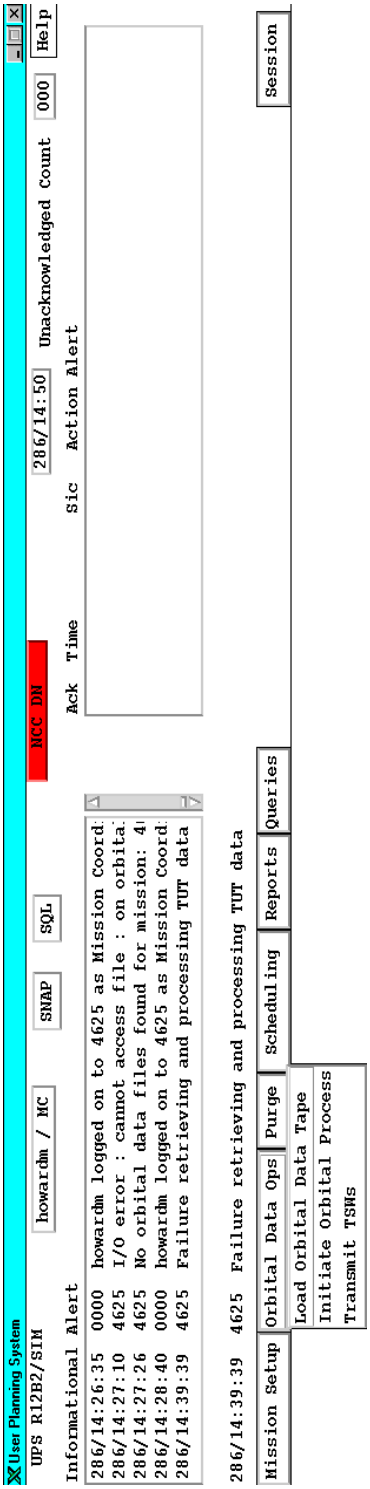


Figure 8-1. Orbital Data Operations Menu

8.2 Load Orbital Data Tape

8.2.1 General

The user selects this option from the Orbital Data Ops pulldown menu to either initiate the orbital data process (if the `Process Orbital Data Automatically` checkbox is selected on the Autoprocessing Parameters panel), or retrieves the orbital data and make it ready to process (if the checkbox is not selected). Although the menu label contains the word "tape", the orbital data may be on either tape, disk, or (as is the usual case), received electronically (via FTP) If the data is on tape, the user must mount the tape on the tape drive before selecting this option. The orbital data is processed if the auto-process flag is set in the mission setup; otherwise, the data is stored on disk, and the user must select the Initiate Orbital Process option to start the process.

8.2.2 Panel Items

No sub-panels are displayed.

8.3 Initiate Orbital Process

8.3.1 General

The user selects this option to start the orbital process for missions that do not have the `Process Orbital Data Automatically` checkbox selected in the Autoprocessing parameters panel (refer to paragraph 7.3 for details). Once this option is selected, a message should appear on the panel indicating the process has started. Any error message will be displayed during the process.

8.3.2 Panel Items

No sub-panels are displayed.

8.4 Transmit TSWs to NCC panel

8.4.1 General

a. This panel (see Figure 8-2) allows the user to transfer pre-computed TDRS Scheduling Windows (TSWs) to the NCCDS. TSWs must exist within the UPS database prior to initiation of this process.

b. The panel is displayed when the user selects this option from the Orbital Data Ops pulldown menu (see Figure 8-1).

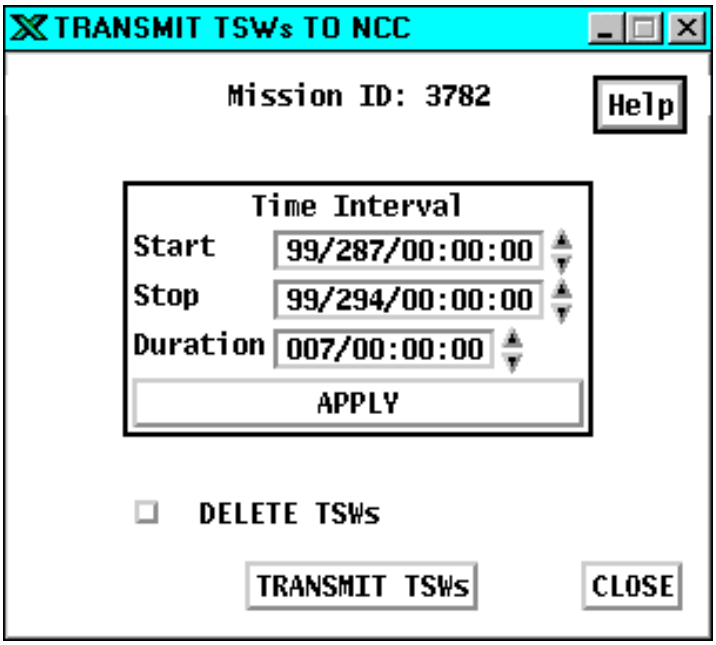


Figure 8-2. Transmit TSWs to NCC Panel

8.4.2 Panel Items

a. Time Interval. Text fields for start, stop, and duration times of the time interval for which TSW will be transmitted. The start time defaults to the current day at midnight, and the duration defaults to 7 days.

b. `Delete TSWs` Checkbox. When this checkbox is selected, TSW Messages, without any TSW information, will be sent to the NCCDS for the user selected time interval. This, in effect, removes all TSWs stored in the NCCDS for that time period.

c. `Transmit TSWs` Pushbutton. Initiates the transmission of TSW Messages to the NCCDS.

d. `Close` Pushbutton. Removes the Transmit TSWs panel from the screen.

8.4.3 Description

a. Transmitting TSWs to the NCCDS allows the NCCDS more flexibility in scheduling the user's schedule requests. Refer to paragraph 7.8 for an example of how TSWs can be used to provide the NCCDS more flexibility in ensuring a mission receives the support required.

b. This panel allows the user to specify the time period for which TSWs will be transmitted to the NCCDS. All TSWs within the specified time period for each defined TSW Set are sent to the NCCDS.

c. Note that several options must be specified for the NCCDS to be able to make use of the TSWs when scheduling a user's SAR:

   1. A SAR parameter that specifies the use of TSWs must be set.

   2. Each Service Specification Code in the SAR must reference a TSW Set ID supplied in the TSW Message sent to the NCCDS.

   3. Sufficient flexibilities must be supplied in the SAR to allow the NCCDS to shift and/or shrink each service to fit within the TSWs supplied in the TSW Message.

Section 9. Scheduling

9.1 Overview

9.1.1 General

a. The Scheduling pulldown menu (see Figure 9-1) is available from both the mission coordinator and mission scheduler information windows. It is used to create or edit schedule requests, re-create/transmit schedule messages to the electronic user, and set up user-defined/TDRS constraints and default scheduling parameters.

b. The Scheduling pulldown menu offers the following menu selections (see Figure 9-1):

   1. Recurrent Scheduling.
   2. Build Specific Request.
   3. Transmit USMs to Electronic User.
   4. Default Parameters.
   5. User-Defined / TDRS Constraints.

c. Two options for creating schedule requests are available: Recurrent Scheduling (RS) and Build Specific Request. The Recurrent Scheduling menu selection allows the user to specify a set of parameters that controls the automatic generation of a recurring series of schedule requests, the details of which are discussed in paragraph 9.2. RS has replaced the Automatic SAR Generation function available in previous UPS Releases.

d. The Build Specific Request menu selection allows the user to enter schedule request data manually, via a tabular display or a graphical display. This option enables the user to create new schedule requests and/or edit existing schedule requests individually or in bulk mode, and is discussed in paragraph 9.3.

e. The Transmit USMs to Electronic User function allows for forwarding of USMs under user control, and is described in paragraph 9.4. This feature must be used if the user has elected not to automatically forward USMs to the Electronic User (refer to paragraph 7.3 for more information on Autoprocessing).

f. The Default Parameters menu selection displays the Default Scheduling Parameters panel, which contains several options the user may specify to control aspects of the scheduling process, such as validation levels, the graphical display of day/night shading, the default schedule request priority, etc. The details of this function may be found in paragraph 9.5.

g. Users may specify periods of time that no schedule requests should be created, such as during a TDRS service outage, or spacecraft constraint. The User-Defined/TDRS Constraints function may be used to define these constrained time periods. This feature is discussed in paragraph 9.6.

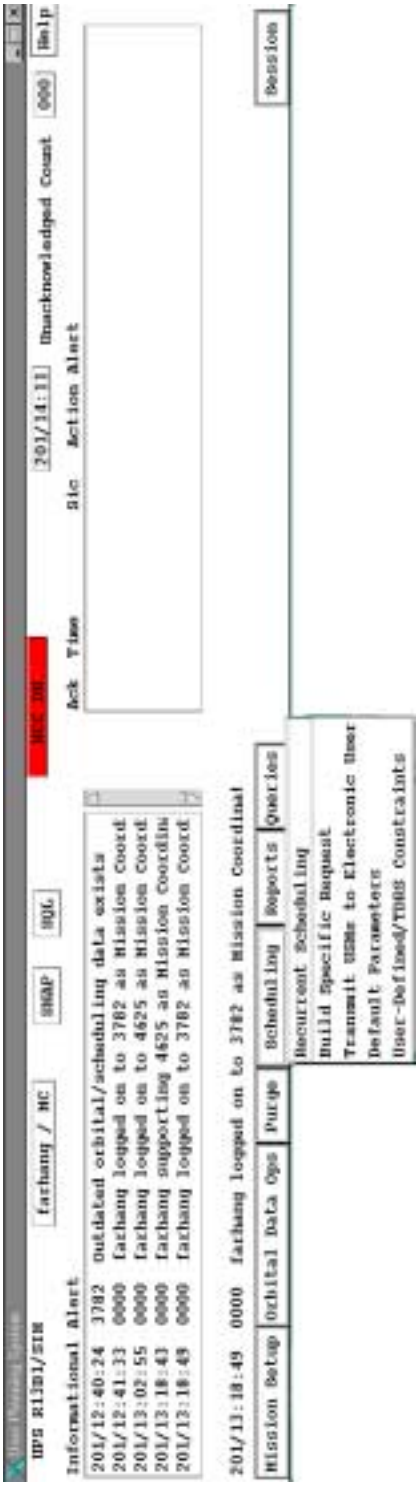


Figure 9-1. Scheduling Pulldown Menu

9.1.2 Scheduling Features New to Release 12

9.1.2.1 General

a. Several new scheduling features became available as of UPS Release 12, concurrent with the NCCDS 99.1 release. These features allow the user to specify more schedule request flexibility to the NCCDS to help it fulfill the user's schedule request. The more flexible the user can make the schedule request, the better chance that the NCCDS will be able to schedule it.

b. Among the flexible scheduling features are:

1. Service level flexibility.
2. TDRS Scheduling Window (TSW) Messages.
3. TDRS Sets.
4. Alternate Schedule Add Requests.
5. Customer-specified request priority.
6. Fixed/Flexible User Schedule Messages and Freeze Interval.
7. Wait List requests.
8. Replace requests.

c. Each of these features is discussed in more detail in the following subsections, and more information may be obtained in Appendix D of the *Interface Control Document Between the Network Control Center Data System and the Mission Operations Centers* (see reference 6).

9.1.2.2 Service Level Flexibility

a. Service level flexibility includes:

1. Service-level tolerances.
2. Bounding.
3. Coupling.
4. Minimum duration.

b. Both plus and minus tolerances may be specified for each service within a SAR. This allows scarce resource services to be given greater tolerances than abundant resource services. An example would be a SAR composed of a 10 minute MA Forward service, with 40 minute plus service tolerance, and a 50 minute MA Return service with no service tolerance. The (scarce) MA Forward service would allow the NCCDS to "slide" it anywhere within the 50 minute SAR duration, while the (abundant) MA Return service covers the mission's TDRS view.

c. Another method of accomplishing the same goal as the example above would be to use the "Bounding" parameter on the MA Forward service. Service tolerances are not used when the Bounding parameter is specified, since the NCCDS will "slide" the service specifying the Bounding parameter anywhere within the duration of the referenced service.

d. The "Coupling" flexibility parameter allows one service to be coupled to another such that, if the referenced service has plus/minus tolerance, the coupled service will be "slid" along with its associated service as the primary service is slid by the NCCDS. The coupled service's start time is specified in terms of the referenced service. For example, a coherent tracking service could be coupled to a forward service with an offset of 2 minutes. The forward service has a plus tolerance of 10 minutes. This allows the NCCDS to slide the forward service by 10 minutes (if necessary), and the coupled tracking service will be slid along with it, but maintaining a 2 minute offset from the forward service.

e. The use of the service minimum duration parameter reduces the chances of the NCCDS declining the user's schedule request, by providing the NCCDS with the flexibility to shorten the service duration, if necessary to schedule the event.

9.1.2.3 TDRS Scheduling Window (TSW) Messages

The user may optionally send TDRS Scheduling Window (TSW) Messages to the NCCDS. These messages provide the NCCDS with the time periods during which communication, using a particular service (MA, SSA, KSA, SMA, KaSA, KaSAWB), between a specific TDRS and a user's mission is physically possible. The NCCDS may use the TSW information to shift a SARs service within its user-specified tolerances.

9.1.2.4 TDRS Sets

TDRS Sets are composed of 2 or more individual TDRS satellites. A SAR may specify the use of a TDRS Set, rather than an individual TDRS. This gives the NCCDS more flexibility in fulfilling the user's schedule request. For example, if the user wants one contact per orbit, and doesn't care which TDRS it's on, the most flexibility would be achieved by submitting a SAR that specifies a TDRS Set composed of all TDRSs.

9.1.2.5 Alternate Schedule Add Requests

Users may chain schedule requests into primary, secondary, tertiary, and so on. Non-primary schedule requests are referred to as Alternate SARs. These are typically most useful when a mission submits a SAR requesting scarce resource services (e.g., Single Access (SA) or MAF services), but if the NCCDS cannot fulfill that schedule request, will accept a contact with an "abundant resource" service (MAR). For example, a user submits a SAR with SSA Forward, SSA Return, and Track, and an Alternate SAR with MAR and Track. If the NCCDS is unable to schedule the primary SAR, it will attempt to schedule the Alternate SAR, which, specifying an "abundant resource" service, should be scheduled.

9.1.2.6 Customer-Specified Request Priority

a. Although each user has a NASA assigned mission priority, the user may now specify a request's priority on a SAR or Alternate SAR. NCCDS will use the customer-assigned priority in conjunction with the mission priority when creating the schedule. The customer-assigned request priority ranges from 1 (highest) to 9 (lowest), with 5 being a "routine normal" priority (see Appendix E.6.2).

b. An example of its use might be to ensure the scheduling of a pass during a critical maneuver. The user would submit a SAR that specifies a higher than normal priority, probably a 3, which would bump the SAR ahead of other missions SARs that specify a "normal" priority.

9.1.2.7 Fixed/Flexible User Schedule Messages and Freeze Interval

a. When the NCCDS successfully creates an event for a user's SAR (or Alternate SAR), the NCCDS transmits either a fixed or flexible User Schedule Message (USM) to the user. A flexible USM is transmitted if the event is confirmed prior to the Freeze Interval. After the Freeze Interval has passed, the NCCDS will transmit a fixed USM to the user.

b. The NCCDS may shorten the duration of one or more services (using the minimum service duration parameter), which will be reflected in the flexible USM. The NCCDS will try to recover the time prior to the Freeze Interval, and will transmit the fixed USM indicating the final event duration (shortened or nominal).

c. The Freeze Interval is the latest time that the user will allow the NCCDS to transmit a fixed USM to the user. The minimum Freeze Interval is 48 hours prior to event start time, since the White Sands Complex must receive the event from the NCCDS at this time. The Freeze Interval is specified in several ways:

   1. NCCDS maintains a default Freeze Interval on a per-mission basis (never less than 48 hours).

   2. The user may specify a default Freeze Interval which will be inserted into each SAR (Alternate SAR) submitted to the NCCDS.

   3. The user may specify a particular Freeze Interval for a specific SAR (Alternate SAR).

9.1.2.8 Wait List Requests

The user may submit a Wait List request for a "declined" SAR (and chain of Alternate SARs). The NCCDS will periodically attempt to schedule the declined SAR (or a member of the chain of Alternate SARs) until the freeze interval is reached.

9.1.2.9 Replace Requests

Replace Requests combine a Delete Request and an Add Request into one, but ensure that unless the request to be replace can indeed be replaced, the original request will remain intact.

9.2 Recurrent Scheduling

9.2.1 General

a. Recurrent Scheduling (RS) is a process that allows a user to automatically create a series of SARs, and optionally, a chain of Alternate SARs used for regularly requested TDRS resources. The RS function replaces the Automatic SAR Generation feature (*autogen*) found in previous UPS releases. RS provides similar functionality to *autogen*, while supporting the generation of flexible and Alternate SARs, supported by the NCCDS 1998 release. RS generates SARs/Alternate SARs based on TSWs, using a user-defined pattern specifying specific RS prototype(s). See Appendix G for a detailed discussion of the internals of Recurrent Scheduling.

b. RS prototypes allow specification of all flexible scheduling features, including service-level tolerances, service coupling and bounding, service minimum duration, and specification of TSW Sets. These RS Prototypes must be created before using the RS generation process. See Appendix F for details on the definition of RS Prototypes. See also paragraph 7.8.19 for details on the RS Prototype Editor panel.

c. The Mission Coordinator has access to all panels described in the following subsections; the Mission Scheduler has access to only the RS panel, and the UPS RS Report panel.

9.2.2 Recurrent Scheduling Panel

9.2.2.1 General

a. The Recurrent Scheduling panel (see Figure 9-2) is initiated by selecting the Recurrent Scheduling option on the Scheduling pulldown menu (see Figure 9-1).

b. The Automatic SAR Generation and Layering functions, formerly available in previous UPS releases have been replaced by the Recurrent Scheduling function.

9.2.2.2 Panel Items

a. `Period Covered`. Text fields for start, stop, and duration times of the desired scheduling period. The start time defaults to the current day at midnight, and the duration defaults to 7 days.

b. `Time Period Offset`. Text field for the offset to be added to the start time of the period covered (refer to paragraph 9.2.2.2.a). Recurrent scheduling will begin at the start time of the period covered plus the offset. This offset time is not used in conjunction with the stop time of the period covered. The day portion of this field should always be 0.

c. Pattern Matrix. This graphic shows the selected pattern for performing an RS run, including the TDRSs used, interval type (orbit, time, TDRS view, and orbital event), and RS Prototype(s) used.

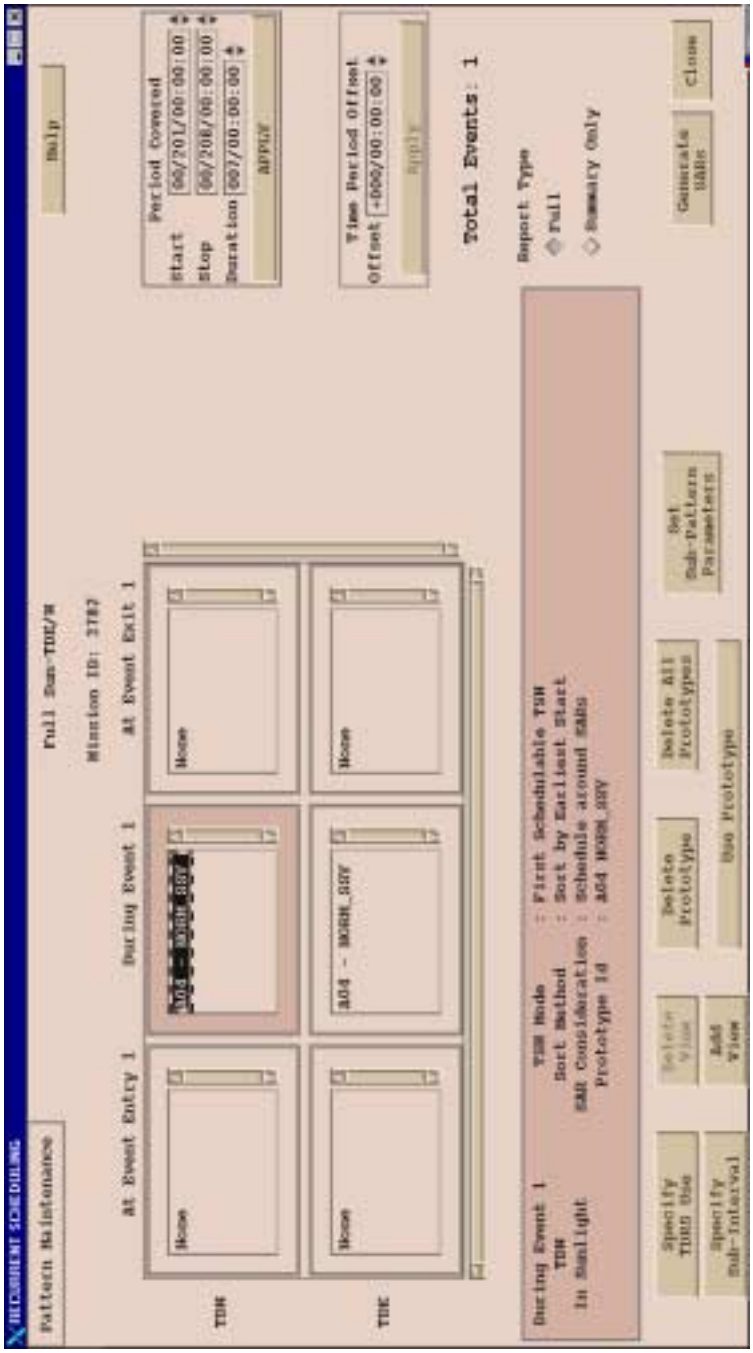


Figure 9-2. Recurrent Scheduling Panel

d. Pattern Maintenance Pulldown Menu. This menu displays the options for maintaining and printing Recurrent Scheduling patterns. The Mission Coordinator has the following options available: Save, Save As, Rename, Load, New, Default, Delete, and Print. The Mission Scheduler has the following options available: Load and Print.

e. `Report Type` Radio Buttons. Indicates the type of report to create during the RS run (which is displayed at the conclusion of RS): full or summary.

f. `Specify TDRS Use` Pushbutton. Invokes the Specify TDRS Use panel (refer to paragraph 9.2.3), which allows the user to specify which TDRSs to use during RS. This pushbutton is only visible to the Mission Coordinator position.

g. `Specify Sub-Interval` Pushbutton. Invokes the Specify Sub-Interval panel (refer to paragraph 9.2.4), which allows the user to specify the type of interval to schedule to during RS mission orbit, TDRS view, time interval, or orbital event. This pushbutton is only visible to the Mission Coordinator position.

h. `Set Sub-Pattern Parameters`. Invokes the Set RS Sub-Pattern Parameters panel (refer to paragraph 9.2.6), which allows the user to specify various strategies used during the RS process. This pushbutton is only visible to the Mission Coordinator position.

i. `Delete View` Pushbutton. Removes an interval from the pattern (if the interval is by orbital event, all three elements of the matrix are deleted: before, during, and after orbital event). This pushbutton is only visible to the Mission Coordinator position.

j. `Use Prototype` Pushbutton. Invokes the Use RS Prototype Event panel (refer to paragraph 9.2.5), which allows the user to select a previously created RS Prototype to use within a selected subinterval element. This pushbutton is only visible to the Mission Coordinator position.

k. `Delete Prototype` Pushbutton. Removes the selected prototype from the subpattern element. This pushbutton is only visible to the Mission Coordinator position.

l. `Delete All Prototypes` Pushbutton. Removes all prototypes from the subpattern element. This pushbutton is only visible to the Mission Coordinator position.

m. `Generate SARs` Pushbutton. Starts RS after input is complete.

n. `Abort` Pushbutton. Halts RS while in progress (displayed only after the Generate SARs pushbutton has been activated). Note that all SARs created by the RS run will remain in the database.

o. `Close` Pushbutton. Removes the panel from the screen.

9.2.2.3 Panels

The following panels are displayed:

a. Specify TDRS Use panel.

b. Specify Sub-Interval panel.

c. Use RS Prototype Event panel.

d. Set RS Sub-Pattern Parameters panel.

e. UPS RS SAR Generation Report panel.

9.2.2.4 Description

a. RS allows a mission to automatically create SARs (and chains of Alternate SARs) for frequently and regularly used service configurations. This process is performed by using the Recurrent Scheduling panel (see Figure 9-2) invoked from the Scheduling pulldown menu. Typically, the Recurrent Scheduling panel is used during the forecast period.

b. RS is started by selecting Recurrent Scheduling from the Scheduling pulldown menu on the System Information Window. Displayed on the Recurrent Scheduling panel is a pattern that will be used to generate SARs (see Appendix G for examples of Recurrent Scheduling patterns). When RS is actively generating SARs, either the Schedule Planning or the Tabular Scheduling panel may be used to monitor the process.

c. An Abort pushbutton is displayed on the Recurrent Scheduling panel, which allows the user to stop RS while in progress (all SARs created by RS will remain in the database). At the conclusion of RS, a panel displaying a report detailing the results of the RS run is presented.

d. A useful feature of RS is its ability to consider, and schedule around, previously created SARs as well as user-defined/TDRS constraints (refer to paragraph 9.6) that are within the time period scheduled. RS can also be directed to create SARs without regard to previously created SARs. Creating multiple overlapping SARs can be useful when the user wants to maximize flexibility (the NCCDS will ensure that minimum SAR gaps are maintained).

e. The SAR Granularity parameters (set in the Default Scheduling Parameters panel) are taken into consideration when generating SARs in the RS process. These parameters force RS to create SARs that start at the SAR Start Granularity and stop at the SAR Stop Granularity (between 1 second and 1 minute). Thus, the user may force SARs to be created at the finest granularity NCCDS supports (1 second) or permit the user to specify SARs starting and ending on the minute mark. When generating SARs to TSWs, RS will round the SAR start time "in" to the nearest TSW start time that corresponds to the SAR Start Granularity, and "in" to the nearest TSW stop time that corresponds to the SAR Stop Granularity, thus ensuring that the SAR is always within the TSW.

f. The TSW Endpoints Adjustment time fields allow the user to specify orbital uncertainty constraints to consider when SARs are generated. For example, if a user knows that in the Forecast Period (when RS is typically executed) the orbital data available are usually off by 2 minutes, the user may set the TSW Endpoints Adjustment Start and Stop Time fields to plus and minus 2 minutes, respectively. Conversely, if the user wants to expand communications coverage 2 minutes beyond the endpoints of the TSW, setting the TSW Endpoints Adjustment Start and Stop times to plus and minus 2 minutes, respectively, will generate SARs with duration beyond the TSWs.

g. RS is driven by the following mechanisms:

   1. Recurrent Scheduling prototypes specify what TDRS services are to be scheduled, and their relative time relations within a single schedule event. RS Prototypes are typically defined by the Mission Coordinator when the mission is first created on the UPS, but they can be created or modified at any time (by the Mission Coordinator).

   2. TSWs specify time periods when a user spacecraft is able to communicate with a specific TDRS, using a specific service. UPS automatically creates TSWs from orbital data that are regularly received from the Flight Dynamics Facility (FDF).

   3. Recurrent Scheduling patterns tie everything together by specifying which prototypes, TDRS(s), and therefore TSWs, are to be used to generate SARs during the time period being scheduled. Recurrent Scheduling patterns are typically defined by the Mission Coordinator when the mission is first created on the UPS but can be created or modified at any time (by the Mission Coordinator).

h. Any SAR that has been initially created by RS is displayed in graphical or tabular scheduling with *recur* for its request source (other request sources are *batch*-electronic user, *spcfc*-graphical or tabular scheduling, *bulkm*-bulk modify, and *genrc*-USM/SRM that did not match a known request).

i. TSWs are discussed in detail in Appendix D. A more detailed discussion of RS is presented in Appendix E.

9.2.3 Specify TDRS Use Panel

9.2.3.1 General

This panel (see Figure 9-3) allows the user to specify the TDRSs used when performing RS.

9.2.3.2 Panel Items

a. TDRS Use Radio Buttons. Allows user to select the manner that RS is to use TDRSs when scheduling: "Use Any TDRS" or "Use Specific TDRS."

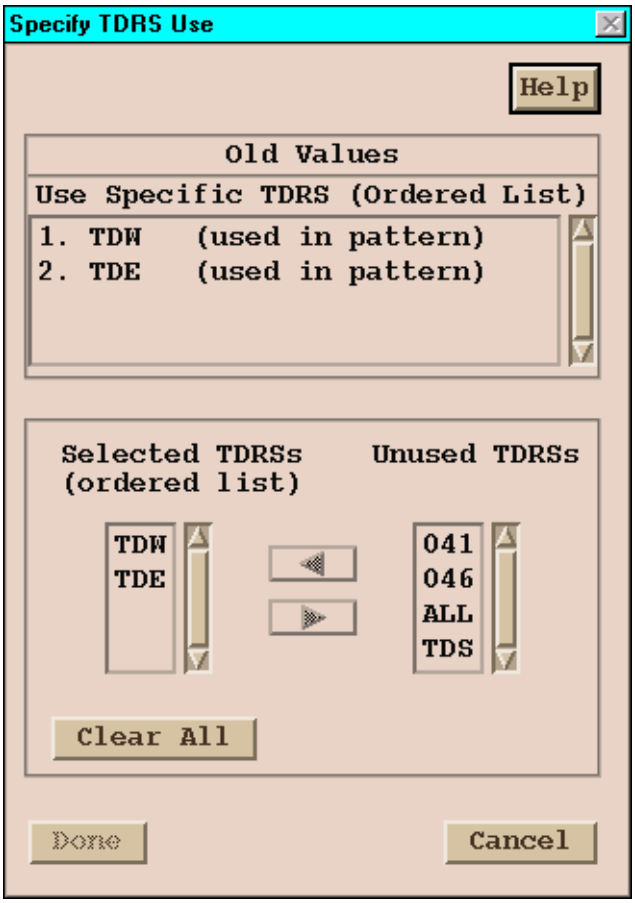


Figure 9-3. Specify TDRS Use Panel

b. Selected TDRSs Scrolling Text List. Allows user to choose which TDRSs to use when RS is scheduling. The list is ordered when the TDRS Use radio button is set to "Use Specific TDRS" and unordered when it is set to "Use Any TDRS."

c. Unused TDRSs Scrolling Text List. Allows user to choose which TDRSs not to use when RS is scheduling.

d. Clear All Pushbutton. Removes all selected TDRSs from Selected TDRSs list and puts them into Unused TDRSs list.

e. Done Pushbutton. Updates the appropriate fields on the Recurrent Scheduling panel with the user's new selections and removes the panel from the screen.

f. Cancel Pushbutton. Aborts any modifications to the panel and removes the panel from the screen.

9.2.3.3 Panels

No sub-panels are displayed.

9.2.3.4 Description

a. This panel enables the user to choose the manner in which *RS* attempts to create SARs. If the user has chosen Use Any TDRS, RS attempts to schedule SARs on any available TDRS. This becomes significant in regions where TDRS contacts overlap. This mode may be conceptualized as sorting Composite TSWs by start time, independent of TDRS, before fitting SARs to TSWs. The user has control over the "any" part of the mode by selecting which TDRSs are to be used.

b. If the user has chosen Use Specific TDRS, *RS* attempts to schedule SARs on a specific TDRS. One set of services can be requested for one TDRS and another set (or no services) can be requested on other TDRSs. All TDRSs known to the UPS are always available to be the primary TDRS. Using the Set Sub-Pattern Parameters panel (refer to paragraph 9.2.6), the user can specify an optional, ordered list of alternate TDRSs to try if nothing can be scheduled on the primary TDRS.

9.2.4 Specify Sub-Interval Panel

9.2.4.1 General

This panel allows the user to specify the type of subinterval to schedule to when using *RS*. There are four types of subintervals: Mission Orbit (see Figure 9-4), TDRS View (see Figure 9-5), Time Interval (see Figure 9-6), and Orbital Event (see Figure 9-7). Appropriate panel items are displayed according to the selected subinterval type.

9.2.4.2 Panel Items

a. Sub-Interval Type Radio Buttons. Allows user to choose the subinterval type: Mission Orbit, TDRS View, Time Interval, or Orbital Event.

b. TDRS Single-Select Scrolling Textlist. Allows user to select the TDRS used for defining the TDRS View subinterval type (displayed and applicable only for the TDRS View subinterval type).

c. Time Field. A time text field allowing the user to enter the time subinterval used (displayed and applicable only for the Time Interval subinterval type).

d. Orbital Event Single-Select Scrolling Textlist. Allows user to select the orbital event used to schedule to within the subinterval (displayed and applicable only for the Orbital Event subinterval type).

e. Done Pushbutton. Accepts the user's selections and closes the panel.

f. Cancel Pushbutton. Cancels the user selection and removes the panel from the screen.

9.2.4.3 Panels

No sub-panels are displayed.

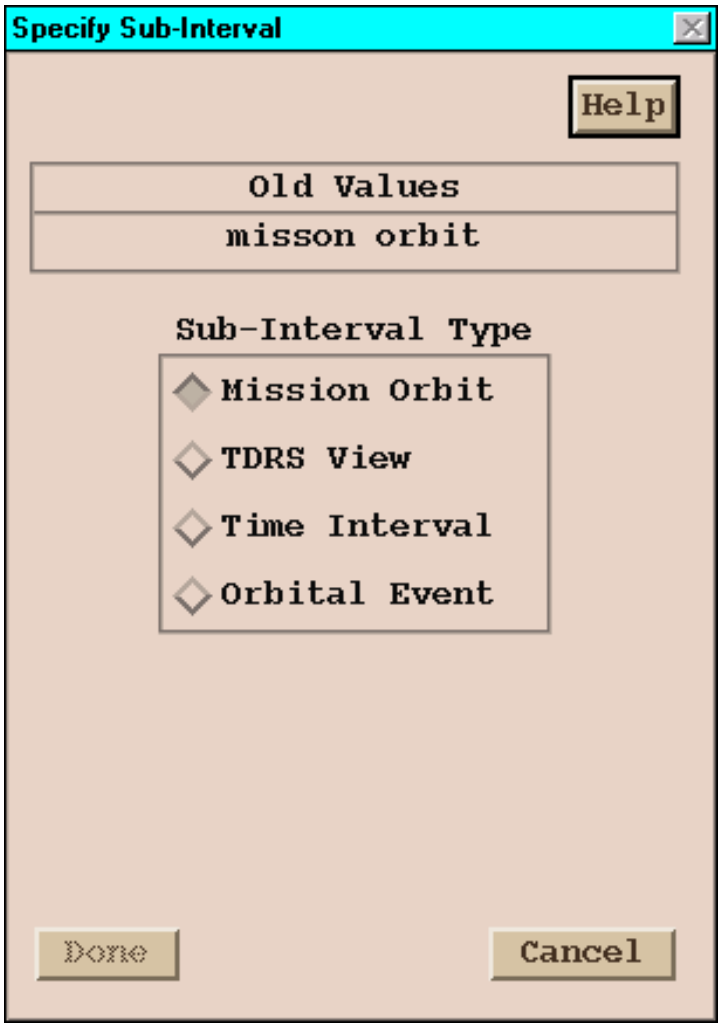


Figure 9-4. Specify Sub-Interval Panel—Mission Orbit

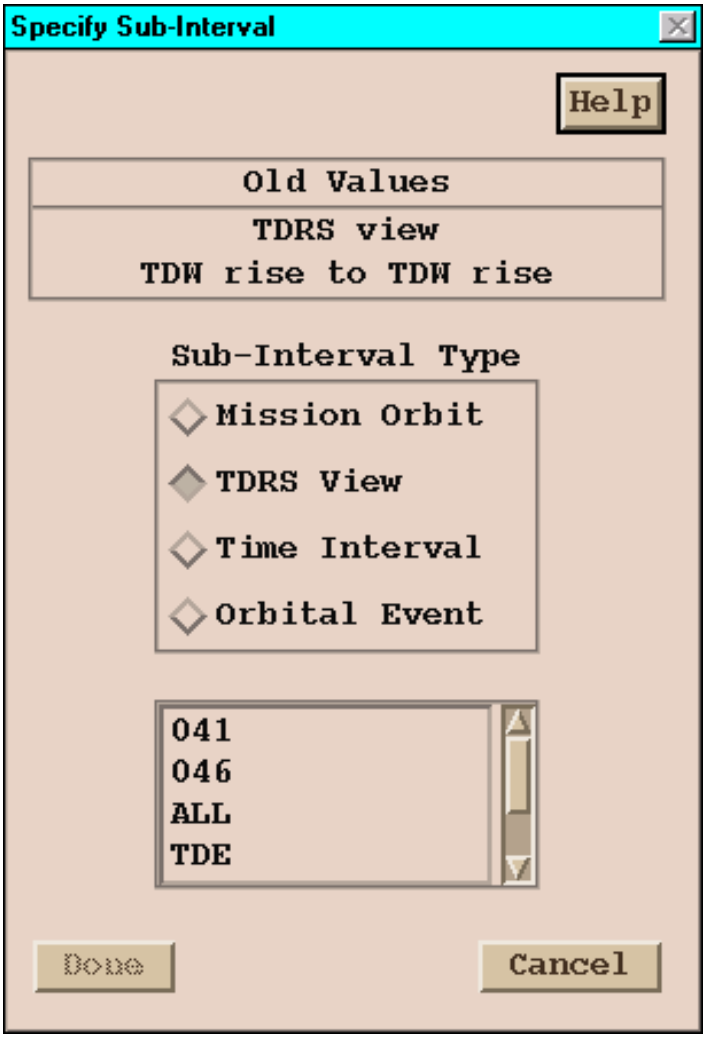


Figure 9-5. Specify Sub-Interval Panel—TDRS View

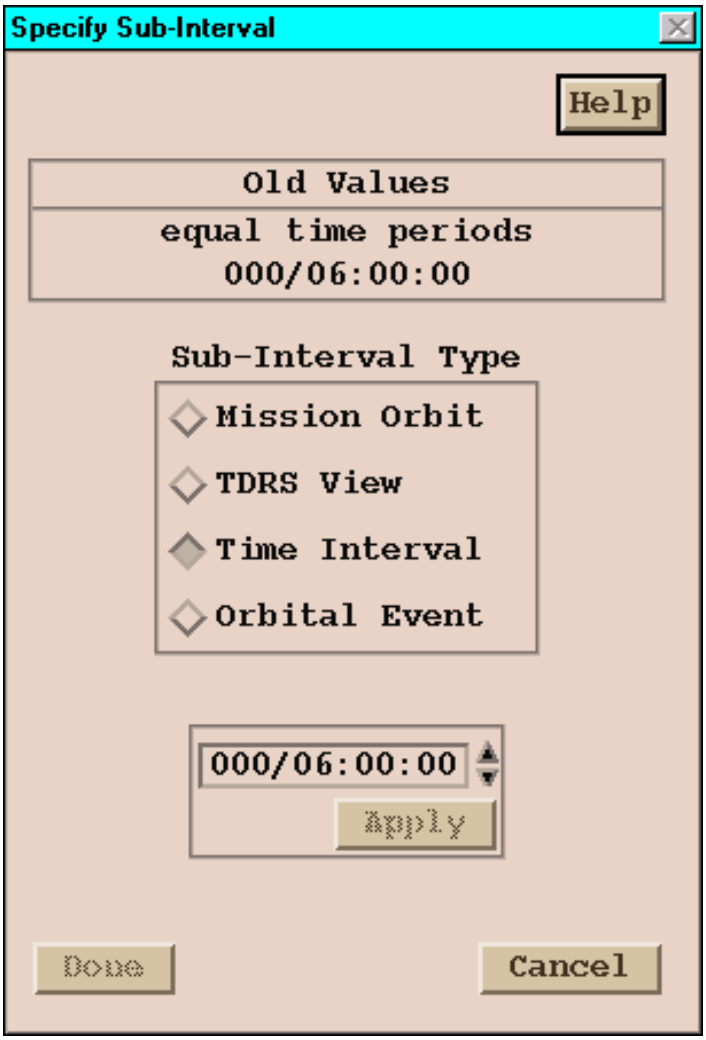


Figure 9-6. Specify Sub-Interval Panel—Time Interval

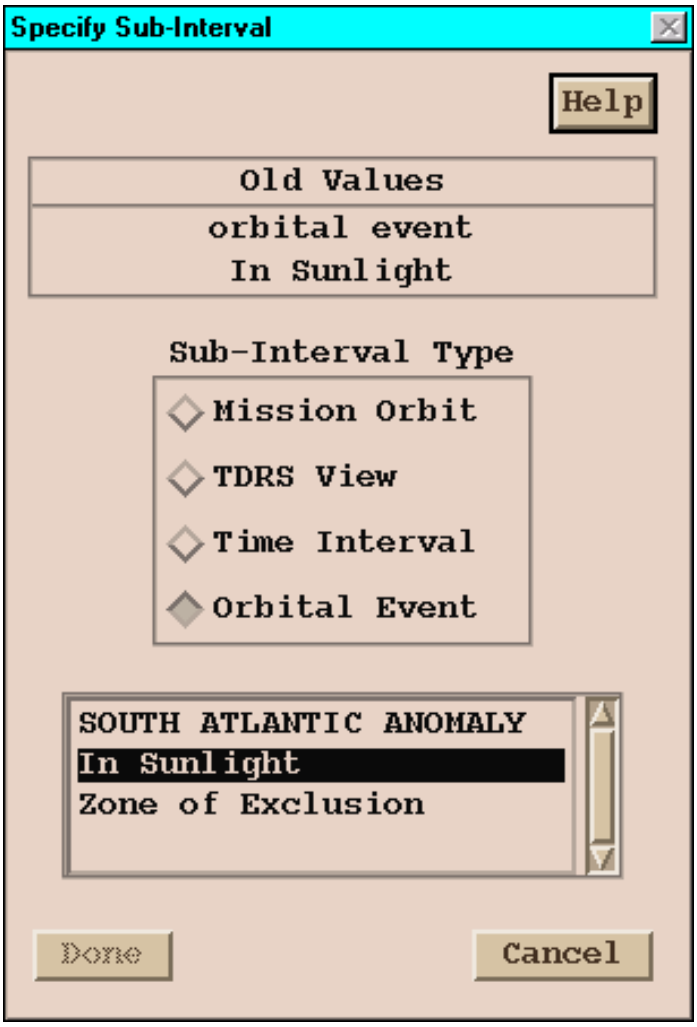


Figure 9-7. Specify Sub-Interval Panel—Orbital Event

9.2.4.4 Description

a. This panel allows the user to divide the overall interval into smaller time intervals that can be scheduled with different RS Prototypes to provide finer control over what services are generated. The following types of subintervals are supported: Orbit, TDRS View, Time Interval, and Orbital Event.

b. If the user chooses Orbit, RS divides the interval into subintervals at mission orbit boundaries occurring within the interval.

c. If the user chooses TDRS View, RS divides the interval into subintervals at the beginnings of contacts with a specified TDRS occurring within the interval.

d. If the user chooses Time Interval, RS divides the interval into arbitrary, user-specified, equal-sized subintervals.

e. If the user chooses Orbital Event, RS divides the interval into three service windows based on the occurrences of orbital events within the overall interval: up to three SARs can be scheduled before, during, and after each orbital event.

f. If the division of the interval into subintervals would split a TSW, the TSW is, instead, "tipped" into the subinterval where most of the TSW resides. For example, if 60 percent of a TSW exists in the first subinterval being created and the remaining 40 percent exists in the next subinterval, the boundary of the first subinterval will be extended to include the TSW. The net effect of this behavior will be to keep SARs from being split into two separate SARs, one in each subinterval. Note that this behavior does not affect the Schedule by TDRS View mode.

NOTE

If PSAT data are unavailable, the subinterval type will have to be Time Interval, since orbit, orbital event, and TDRS view information are only available in PSATs.

9.2.5 Use Recurrent Scheduling Prototype Event Panel

9.2.5.1 General

This panel (see Figure 9-8) enables the user to obtain a list of available Recurrent Scheduling Prototypes for the current mission (SIC), and upon selection of an RS Prototype, the appropriate information is copied to the selected pattern matrix cell of the Recurrent Scheduling panel (see Figure 9-2). This list is displayed by clicking on the Use Prototype pushbutton located on the Recurrent Scheduling panel. See Appendix F for details on the definition of RS Prototypes.

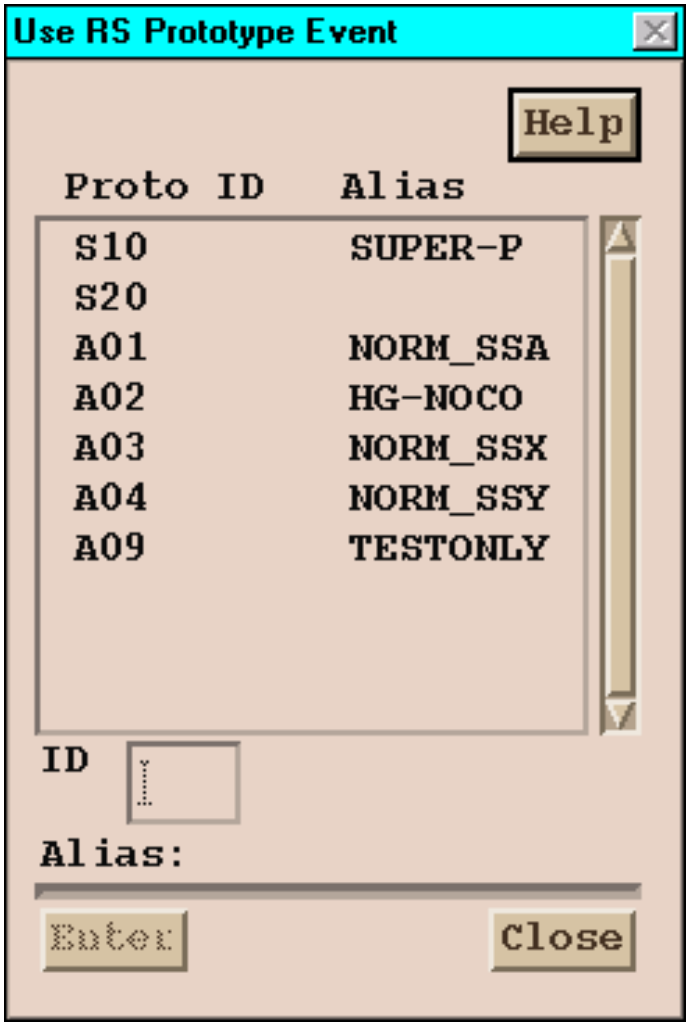


Figure 9-8. Use RS Prototype Event Panel

9.2.5.2 Panel Items

a. RS Prototype Scrolling Textlist. This scrolling textlist displays the RS Prototype IDs and aliases for the current mission. Clicking on an entry causes the RS Prototype ID to be displayed in the text entry box, and the alias to be displayed as a label. The ENTER pushbutton is then enabled for confirmation of the selection.

b. RS Prototype ID Text Field. A text entry field that allows the user to directly enter an RS Prototype ID and also displays the RS Prototype ID if selected from the RS Prototypes scrolling textlist.

c. Enter Pushbutton. The selected RS Prototype ID and alias will be copied to the selected pattern matrix cell on the Recurrent Scheduling panel.

d. Close Pushbutton. Removes the Use RS Prototype Event panel from the screen.

9.2.5.3 Panels

No sub-panels are displayed.

9.2.5.4 Description

a. A selection list of available RS Prototypes is displayed. Each entry contains the RS Prototype ID and alias. When the user makes a selection, the RS Prototype ID and alias are copied to the RS Prototype ID text field and label. When the user clicks on the Enter Pushbutton, the RS Prototype ID and alias are copied to the selected pattern matrix cell on the Recurrent Scheduling panel. Double clicking on an RS Prototype item in the selection list performs the same function as selecting the item and clicking on the Enter pushbutton.

b. The Use RS Prototype panel will remain displayed until the user clicks on the Close pushbutton or until the Recurrent Scheduling panel is closed.

9.2.6 Set RS Sub-Pattern Parameters Panel

9.2.6.1 General

The Set RS Sub-Pattern Parameters panel (see Figure 9-9) is initiated from the Recurrent Scheduling panel (see Figure 9-2) by selecting a subpattern (pattern matrix cell) and clicking on the `Set Sub-pattern Parameters` pushbutton. This panel allows the user to set RS parameters that apply specifically to one subpattern.

9.2.6.2 Panel Items

a. `Specify TSW Sort Method` Radio Button Group. Determines how usable portions (see Appendix E for a full discussion of Recurrent Scheduling concepts) of TSWs are to be sorted within a sub-pattern:

   1. `Sort By Earliest Start Time` Radio Button. Causes RS to sort all TSWs within the specified sub-pattern in descending time order.

   2. `Sort By Longest Duration` Radio Button. Causes RS to sort all TSWs within the specified sub-pattern in duration order, descending.

b. `Existing SAR Considerations` Radio Button Group. When TDRS use is "Any TDRS," permits the complete list of TDRSs, specified in the Set TDRS Use panel, to be edited further for the sub-pattern.

   1. `Schedule Thru Existing SARs` Radio Button. Causes RS to ignore any existing SARs when generating new SARs. Note that RS will always schedule around confirmed SARs (USMs).

   2. `Schedule Around Existing SARs` Radio Button. Causes RS to generate new SARs such that they do not overlap any existing SARs. RS may create SARs/Alternates that overlap existing Alternate SARs.

c. `How To Use TSWs` Radio Button Group. Determines how usable portions (see Appendix E for a full discussion of Recurrent Scheduling concepts) of TSWs are to be used within a sub-pattern:

   1. `Create One Event in Each and Every TSW for a TDRS` Radio Button. Causes RS to create the SAR specified in an RS prototype or the SARs specified in a RS superprototype in each usable portion of every TSW in the sub-pattern. If one or more Alternate SARs are specified in the sub-pattern, they will be created for each usable portion of every TSW in the sub-pattern.

   2. `Create One Event in any TSW for a TDRS Radio Button`. Causes RS to create a single SAR for the sub-pattern. The SAR start time will be based on the start time of the first TSW in the sub-pattern. The SAR stop time will be based on the stop time of the last TSW in the sub-pattern. The RS prototype should specify the SAR start time and stop time based on TSWs and not a fixed duration. If one or more Alternate SARs are specified in the sub-pattern they will be created in a similar fashion to the primary SAR.

Figure 9-9. Set RS Sub-Pattern Parameters Panel

3. `Create One Event in the First N Schedulable TSWs for a TDRS` Radio Button. Causes RS to create the SAR specified in an RS prototype or the SARs specified in an RS superprototype in each of the first N schedulable TSWs of a sub-pattern. The value of N may be from one to ninety-nine. It is specified in the text box directly below the radio button. If alternate prototypes are specified in the sub-pattern, alternate SARs will be created in a fashion similar to the primary SAR.

d. N = Text Field. If the "Create One Event in the First N Schedulable TSWs for a TDRS" radio button (see section 9.2.6.2.c.3) is selected then this text field is used to specify the value of N. The value of N may be from one to ninety-nine.

e. Done Pushbutton. Closes the panel and commits changes to the sub-pattern parameters (the pattern must still be explicitly saved to make the changes permanent between RS sessions).

f. Cancel Pushbutton. Closes the panel without committing changes to the sub-pattern parameters.

9.2.6.3 Panels

No sub-panels are displayed.

9.2.6.4 Description

a. This panel enables the user to specify scheduling parameters that apply to a specific subpattern. Changes to the parameters can be aborted by using the Cancel pushbutton. The current parameters for a subpattern can be displayed from the main RS panel by clicking on the subpattern in the pattern matrix.

b. To specify how to use TSWs for orbital point and TDRS, click on one of the mutually exclusive options in the radio button group for that purpose. The Create One Event in Each and Every TSW (usable portions) for a TDRS radio button is disabled when TDRS use is "Any TDRS."

c. When TDRS use is "Specific TDRS," the Alternative TDRSs list is used to specify alternative TDRSs to try if the primary TDRS cannot be scheduled. The list is actually two lists. The leftmost list contains TDRSs that have been selected as alternatives. The rightmost list contains TDRSs that are not being used as alternatives. To move a TDRS between the lists, the user selects the TDRS and then clicks on the arrow pushbutton pointing in the direction that he or she wishes to move the TDRS. The Clear All pushbutton can be used to move all TDRSs to the Unused list. The subpattern parameters may be committed with an empty Selected list, meaning that there are no alternative TDRSs. RS will try the alternative TDRSs in the order that they appear in the list. Once it has scheduled at least one event for one of the TDRSs, it stops processing the list.

d. When TDRS use is "Any TDRS," the Allowed TDRSs list is used to specify which TDRSs to consider. TDRSs are moved between the Selected and Unused lists, as described for the Alternative TDRS list. Constraints on the Allowed list are different, however. The Done pushbutton, which is used to commit changes, becomes disabled if the Selected list is empty. Also, the Selected list is unordered because, for "Any TDRS" scheduling, TSWs are used in time order, independent of which TDRS they are for.

e. The Scheduling Window relative time entry widget is only displayed and enabled for the Orbital Event subinterval type. It permits the subinterval start and stop to be specified relative to the beginning and end of the orbital event. A relative time has two parts: a signed offset and a description of what the time is relative to (in this case, the orbital event start and stop times). To specify a time, the user first selects an orbital event endpoint by clicking on the options list, and then enters a relative time offset in the associated time keyin widget. The options lists are different depending on the pattern matrix column from which the subpattern came:

1. At Event Entry. Both scheduling window endpoints must be relative to orbital event entry.

2. During Event. Either scheduling window endpoint may be specified relative to either orbital event entry or exit. If both scheduling window endpoints are relative to the same orbital event endpoint, the start offset must be earlier than the stop offset.

3. At Event Exit. Both scheduling window endpoints must be relative to the orbital event exit time.

9.2.7 UPS Recurrent Scheduling Report Panel

9.2.7.1 General

This panel (see Figure 9-10) displays the results of an RS run.

9.2.7.2 Panel Items

a. Results of RS Run Scrolling Textlist. Displays results of each attempted SAR generation: success or failure.

b. Print Pushbutton. Prints the contents of the scrolling textlist.

c. Close Pushbutton. Removes the panel from the screen (once the panel is closed, it may not be retrieved again).

9.2.7.3 Panels

No sub-panels are displayed.

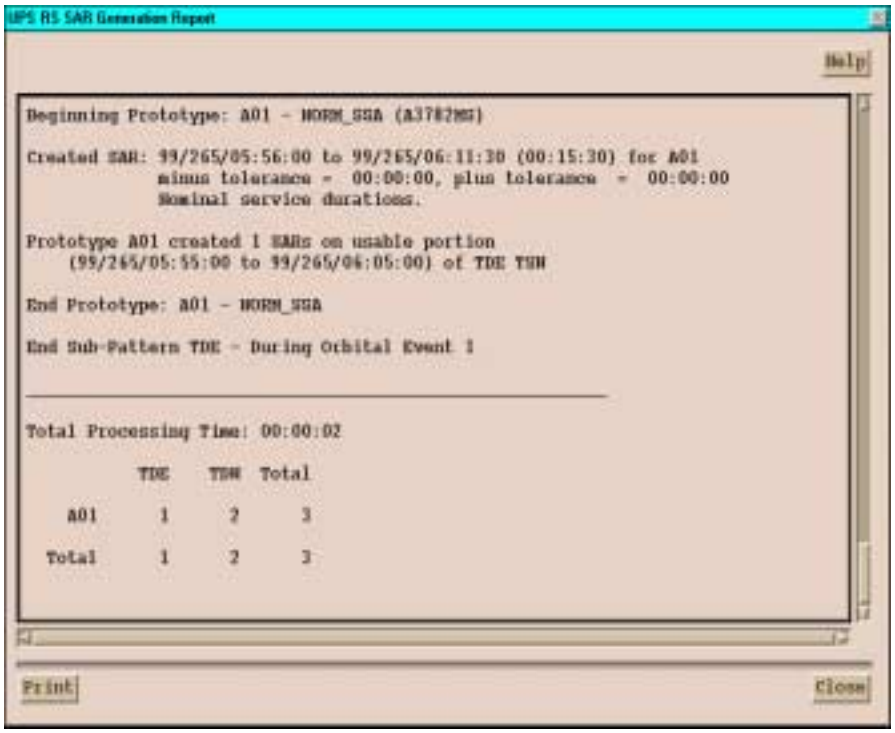


Figure 9-10. UPS Recurrent Scheduling Report Panel

9.2.7.4 Description

a. This panel displays the results of the last RS run, in either a full or summarized list, depending on the selection made on the main Recurrent Scheduling panel (see Figure 9-2).

b. If a full report is generated, each attempted SAR generation for each subinterval is displayed, along with the context (TDRS, subinterval type, etc.) and success or failure of the generation. If the SAR was successfully generated, the start, stop, TDRS, and other pertinent information is displayed. If UPS was unable to generate a SAR for that subinterval, the reason for the failure and the context are displayed.

c. If a summary report is generated, a single line is displayed for each successfully generated SAR (no context information is given), and a matrix (by prototype and TDRS) of the total SARs generated for the interval is shown at the bottom of the report. If UPS was unable to generate a SAR for any subinterval, the reason for the failure and the context are displayed, similar to the full report.

d. The user may print the report by activating the Print pushbutton. Once the panel is closed (by activating the Close pushbutton), the report is erased and may not be retrieved again.

9.3 Build Specific Request

9.3.1 General

a. The Build Specific Request menu option allows the user to create and/or edit schedule requests via either a tabular or graphical display.

b. The status of a schedule request as it runs through its "life" is displayed on both the Tabular Scheduling and Schedule Planning panels. The functions available to the user depend in large part on the status of a schedule request. For example, if a SAR has not been transmitted to the NCCDS yet, the Replace function is not available. Two status values are assigned to each schedule request - the UPS Status, and the NCCDS Status. The following enumerate the various status's a schedule request can assume, in the following format - UPS Status/NCCDS Status:

   1. Uxmt/<null>. Untransmitted.
   2. XmtP/<null>. Transmitted to the NCCDS, acknowledgement from the NCCDS "pending".
   3. XmtA/<null>. Transmitted to the NCCDS, acknowledgement received from the NCCDS.
   4. XmtS/<null>. Transmitted to the NCCDS, acknowledged, and SRM from NCCDS received.
   5. XmtS/cfmflx. Transmitted to the NCCDS, acknowledged, SRM received, flexible USM received.
   6. XmtS/cfmfix. Transmitted to the NCCDS, acknowledged, SRM received, fixed USM received.
   7. XmtS/declne. Transmitted to the NCCDS, acknowledged, SRM received indicating request was declined (due to NCCDS unable to schedule the request).
   8. XmtS/reject. Transmitted to the NCCDS, acknowledged, SRM received indicating request was rejected due to validation error.
   9. XmtS/waitls. Transmitted to the NCCDS, acknowledged, SRM received, Wait List transmitted.

c. Both the Mission Coordinator and Mission Scheduler have access to all panels described in the following subsections.

9.3.2 Select Schedule Data

9.3.2.1 General

a. This panel (see Figure 9-11) allows the user to select one or more schedule data groups within a specified timeframe.

b. This panel is initiated by selecting the Build Specific Request option on the Scheduling pulldown menu (see Figure 9-1).

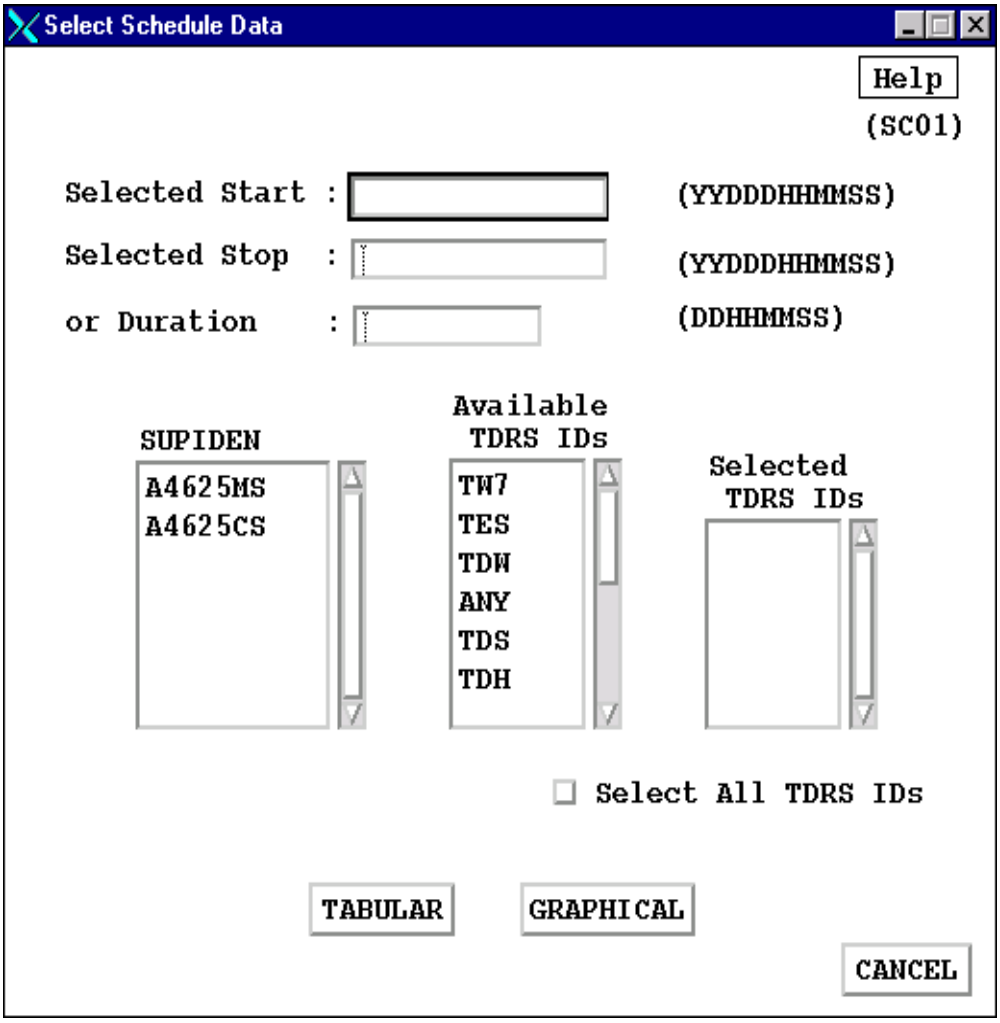


Figure 9-11. Select Schedule Data Panel

9.3.2.2 Panel Items

a. `Selected Start, Selected Stop, or Duration`. Text fields for time period in which to select schedule data. The selected start time is always required; either the selected stop time or duration must be specified. The UPS automatically computes and displays the item that is not specified. If start time is respecified while both stop time and duration have been input, the duration stop time will be used to recompute the stop time. The system automatically right justifies the duration field, if the user enters fewer characters than a complete time specification (DDHHMMSS). The user must enter a completely specified start and/or stop time (YYDDDHHMMSS). The minimum duration allowed is 10 minutes.

b. `SUPIDEN`. The textlist shows all available SUPIDENs for selected missions. One or more SUPIDENs can be selected.

c. `Available TDRS IDs`. The textlist shows all TDRS IDs and TDRS Sets defined in the UPS database (see Section 12.8 TDRS List Maintenance for information on editing TDRS IDs and TDRS Sets). When a TDRS ID is selected it is moved to the Selected TDRS IDs textlist (see 9.3.2.2.d below).

d. `Selected TDRS IDs`. The textlist shows all currently selected TDRS Ids and TDRS Sets. When one of the TDRS IDs in this textlist is selected it will be moved back to the Available TDRS IDs textlist. The order of TDRS IDs in the Selected TDRS IDs textlist controls the display order of the SUPIDEN/TDRS groups (see section 9.3.5.2.b) in the Schedule Planning Panel (Figure 9-15). This order can be changed by moving the TDRS IDs between the Available and Selected TDRS IDs textlist. Note that the order of the TDRS IDs does not affect the Tabular Scheduling display.

e. `Select All TDRS IDs` Checkbox. Selects all TDRS IDs in the TDRS ID scrolling textlist. Since a TDRS Set can be named anything, including ALL, this checkbox was added in Release 12 to eliminate confusion between names.

f. `TABULAR` Pushbutton. Invokes the Tabular Scheduling display. All required input must be made before using this button.

g. `GRAPHICAL` Pushbutton. Selects the Schedule Planning display. All required input must be made before using this button.

h. `CANCEL` Pushbutton. Terminates processing at any time before any of the other three action buttons (TABULAR, GRAPHICAL) is used.

9.3.2.3 Panels

The following panels are displayed:

a. Tabular Scheduling panel.

b. Schedule Planning panel

9.3.2.4 Description

a. This panel enables the user to select a set of schedule data groups from the database to work with.

b. After the time period, SUPIDEN(s), and TDRS ID(s) are entered, either the Tabular Scheduling or Schedule Planning panel is invoked by activating the appropriate pushbutton. All SARs overlapping the specified time period are displayed in the selected scheduling panel. An "overlapping" SAR is one that starts or stops within the selected time period. When the user activates the `CANCEL` pushbutton, a prompt is displayed to confirm the action before the panel is removed.

9.3.3 Tabular Scheduling Panel

9.3.3.1 General

a. This panel (see Figure 9-12) is used to control the schedule planning process, allowing the viewing, creating, deleting, copying, moving, transmitting, and replacing of Schedule Add Requests (SARs) and Replace Requests.

NOTE

The Schedule Planning panel provides the user with similar functionality to the Tabular Scheduling panel. The main differences being that Schedule Planning presents schedule requests graphically, as well as presenting TDRS Scheduling Windows (TSWs) and TDRS Unscheduled Time (TUT), which the Tabular Schedule panel does not present.

b. This panel is invoked buy activating the `Tabular` pushbutton located on the Select Schedule Data panel (see Figure 9-11).

9.3.3.2 Panel Items

a. `Selected Time Range Labels`. A label showing the chosen Time Period Selection fields (Start, Stop and Duration) entered on the Select Schedule Data panel is displayed centered over the Tabular Display Window.

b. `SAR and Replace Request Selection Count and Total Count Window`. Read-only window composed of two lines of text displaying the selected SARs and Replace Requests and the total number of SARs and Replace Requests in the Time Period chosen in the Select Schedule Data panel. This window is centered above the Tabular Display Window.

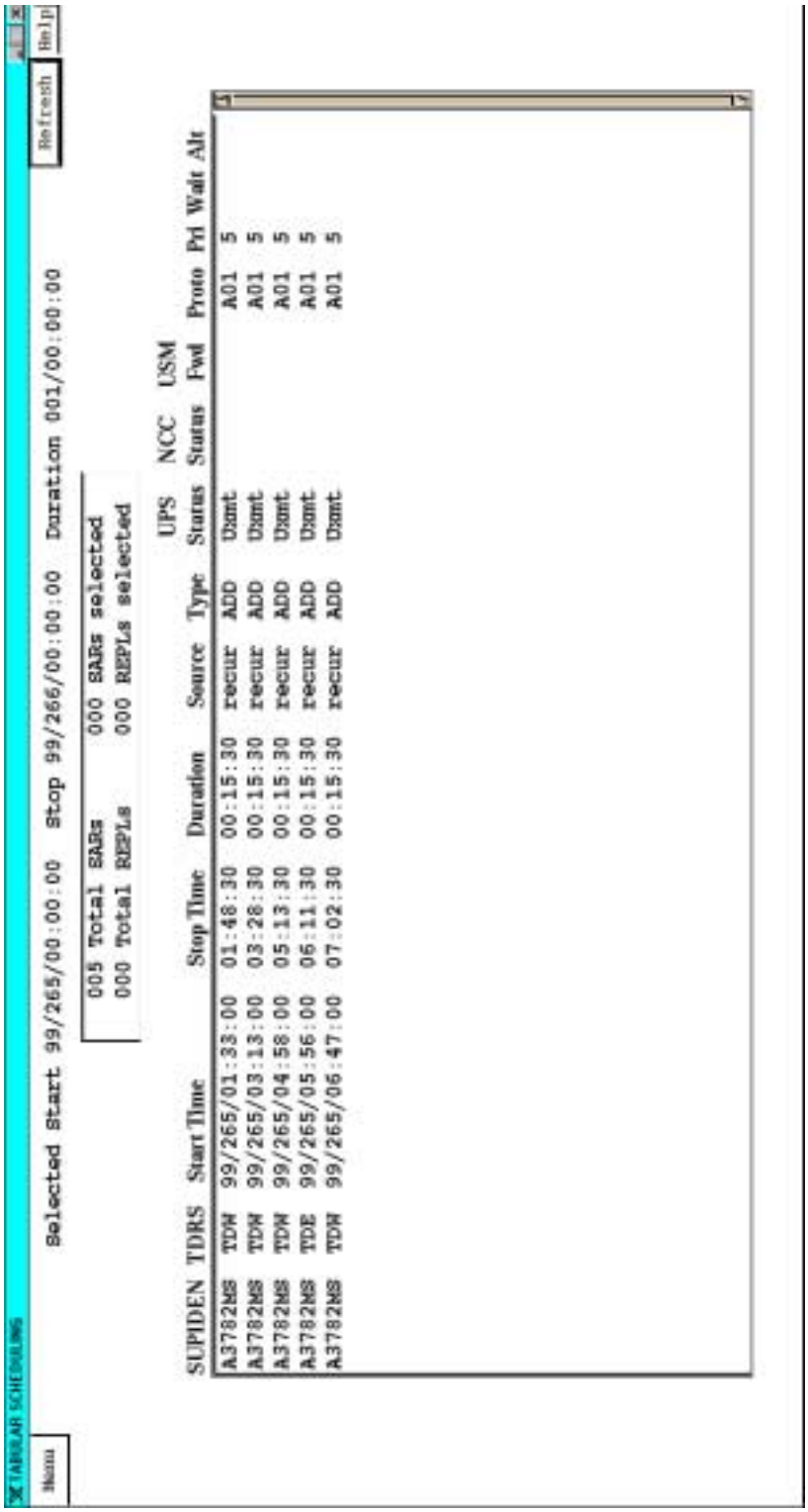


Figure 9-12. Tabular Scheduling Panel

c. Tabular Display Window. Vertically scrolling window composed of column heading labels and zero or more SAR and Replace Request text items, one line per schedule request item. Schedule request items can be multiple-selected. All schedule request items are displayed sorted in ascending SUPIDEN order first, then ascending chronological order, based on the Start Time. The column headings and information listed in this window are:

1. `SUPIDEN`.
2. `TDRS`. Either a TDRS ID or a TDRS Set name.
3. `Start Time`. yy/ddd/hh:mm:ss.
4. `Stop Time`. yy/ddd/hh:mm:ss.
5. `Duration`. hh:mm:ss.
6. `Source`. Batch, recur, spcfc, genrc, bulkm.
7. `Type`. ADD or REP.
8. `UPS Status`. Uxmt, XmtP, XmtA, XmtS.
9. `NCC Status`. Confrm, Reject, or blank.
10. `USM Fwd`. Status of USM forwarding to Electronic User.
11. `Proto`. Prototype ID (NCCDS, UPS, or RS) 1 alphabetic characters followed by 2 numerics.
12. `Pri`. SAR Priority; 1 to 9.
13. `Wait`. Wait List indicator; Y = Yes, blank = No.
14. `Alt`. Has chained Alternate SAR indicator; Y = Yes; blank = No.

NOTE

All 3 types of Prototype IDs will display: NCCDS-defined, UPS-defined, and RS.

d. Schedule Request Menu. Pop-up menu that lists actions that user is allowed to perform on schedule requests. The menu is invoked by clicking and holding down the right mouse button. The menu items displayed will be enabled or disabled depending upon which schedule request items are selected. The menu items will be:

1. Review. Display details of an existing SAR or Replace Request in read-only mode.
2. Modify. Modify an existing SAR or Replace Request.
3. Add. Create a new SAR.
4. Alternate SAR. Create or edit the chain of Alternate SARs.
5. Replace. Create a Replace Request for a transmitted, non-rejected, non-waitlisted SAR.
6. Wait List. Transmit a Wait List request for a declined SAR or Replace Request.
7. Copy. Create a new SAR using an existing SAR as a template.
8. Delete. Remove a SAR or Replace Request from the UPS and NCCDS.
9. Change TDRS. Change the TDRS of a SAR or Replace Request.
10. Erase. Remove SARs/Replace Requests from the panel and the database.
11. Change Status. Change the status of a transmitted SAR or Replace Request to untransmitted.
12. Select by Range. Invoke the Select by Range panel.
13. Bulk Modify. Invoke the Bulk Modify panel to slip SAR times, TDRS, etc.
14. Test USM. Create a “test” USM for the selected SAR(s) and transfers it to the designated EU Node(s).
15. Orbital Check. Verify the selected SARs against TSWs.
16. Print. Print the selected SARs and/or Replace Requests.
17. Transmit. Transmit one or more SARs or Replace Requests to NCCDS.

NOTE

If the user has invoked the Tabular Scheduling panel via the Queries menu (on the System Information Window panel), only the Print, Review, and Select by Range menu items are enabled.

e. Refresh Pushbutton. This pushbutton will always be enabled. It will normally be rendered with a standard background and text, and upon activation, will be rendered such that it is clear to the user that this panel is now in "refresh" mode. If not activated (not in "refresh" mode), this pushbutton will be rendered with a red background and black text when a schedule request within the Start and Stop times entered on the Select Schedule Data panel has been modified and could not be refreshed [due to selected SAR(s) being modified by an external source (Electronic User or NCCDS)]. When the user activates this pushbutton, all schedule request text items that are within these times and that have been modified (as determined by "Run Control") will be re-read from the database periodically and the Tabular Display Window will be re-rendered. If the pushbutton is rendered in red prior to activation, it will be re-rendered in the normal (activated) color upon activation. The pushbutton stays activated until the user "clicks" on it again, causing it to be rendered in its standard, non-activated colors. Activation of this pushbutton will deselect any schedule request text items that were previously selected. Selection of a SAR/Replace Request will stop the "refresh" process and de-activate the pushbutton.

f. Menu. Drop-down menu located at the top left of the panel that currently has only one item, Close. This menu item will always be enabled. Selection of the Close menu item will close the Tabular Scheduling panel and return control to the Select Scheduling Data panel.

9.3.3.3 Panels

The following panels are displayed:

a. SAR Details panel (see Figure 9-27).

b. Bulk Modify Event panel (see Figure 9-34).

c. Confirm Delete panel (see Figure 9-37).

d. Confirm Erase panel (see Figure 9-38).

e. Transmit Warning panel (see Figure 9-39).

f. Erase Warning panel (see Figure 9-40).

9.3.3.4 Description

This panel displays all schedule requests for the criteria specified on the Select Schedule Data panel and in a tabular format and lets the user perform numerous functions on the schedule requests. These functions are listed in the Schedule Request menu and are described in detail below. Whether a function can be performed depends on the status of the SAR selected. If a function can be performed, its entry in the Schedule Request menu is highlighted and selectable. If the function is not appropriate for the SAR selected, its entry in the Schedule Request menu is dimmed and not selectable.

a. Review. This menu item allows users to inspect a SAR or Replace Request's configuration: service types, times, and Service Specification Code parameters. This menu item is enabled when one or more SARs and/or Replace Requests, regardless of status, is selected. Each selected request is then displayed in turn on the SAR Details. Upon closing the SAR Details panel and returning to the Tabular Scheduling panel, the selected SARs and/or Replace Requests will remain selected.

b. Modify. This menu item allows users to modify a SAR or Replace Request's configuration: service types, times, and Service Specification Code parameters. This menu item is enabled when one or more untransmitted SARs or a single untransmitted Replace Request is selected. The SAR Details panel is displayed as a result of selecting this menu item. Upon closing the SAR Details panel and returning to this panel, the selected schedule requests will remain selected. If due to editing, the schedule request's start time was changed, it will be re-sorted into the list before displaying on the Tabular Display Window.

c. Add. This menu item allows users to create a new SAR. This menu item is enabled when either a single SAR or no SARs are selected. When this menu item is chosen, the SAR Input panel (see Figure 9-14) will be invoked basing its default time values on either the SUPIDEN, TDRS, Start, Stop, Duration, plus/minus tolerances of the selected SAR, or the first SUPIDEN in the list, the first TDRS in the list, the Start time specified in the Select Schedule Data panel, a default duration, and the mission's default plus/minus tolerances (if no SAR was selected). The user may then modify the SARs SUPIDEN, TDRS, start, stop, and duration times fields. Upon activation of the SAR Input panel's Done pushbutton, the SAR Details panel will be invoked allowing the completion of the creation of the SAR. When the user has finished creating the SAR, and closes the SAR Details panel, returning to this panel, the new SAR will be selected in the Tabular Display Window.

d. Alternate SAR. This menu item allows users to create, edit, and manage Alternate SAR(s) chained from the primary SAR. This menu item is enabled when a single unconfirmed SAR is selected. The Alternate SAR List panel is displayed as a result of selecting this menu item. Upon closing the Alternate SAR List panel and returning to this panel, the SAR shall remain selected.

e. Replace. This menu item allows a user to create a Replace Request to replace a SAR that has been transmitted to the NCCDS. This menu item is enabled when a single transmitted, non-declined, non-rejected SAR is selected. As a result of selecting this

menu item, the SAR Details panel will be displayed, showing an identical configuration to the SAR being replaced. Upon modification of the request, and activating the Done pushbutton, a new Replace Request will be displayed adjacent to the SAR being replaced. The user must transmit the Replace Request to effect the actual replacement of the SAR.

f. Wait List. This menu item allows users to create and *automatically transmit* to the NCCDS, a Wait List request for a declined SAR or declined Replace Request. This menu item is enabled when one or more transmitted, declined SARs/Replace Requests are selected. A confirmation box will be displayed as a result of selecting this option. Upon confirmation, a Wait List request will be created and transmitted to the NCCDS for each selected declined SAR/Replace Request.

g. Copy. This menu item allows a user to create a new SAR using an existing SAR as a template. This menu item will be enabled only when a single non-generic SAR is selected. A generic SAR is a SAR that gets created when a USM, received from the NCC, does not match any SARs in the UPS database. A generic SAR may contain data that violates certain UPS validation rules and cannot be copied. The Precise Move panel will be invoked, allowing the user to modify the SAR start time and/or time slip values. Activation of the Precise Move panel's DONE pushbutton will complete the operation, leaving the new SAR selected.

h. Delete. This menu allows users to delete SARs and/or Replace Requests. This menu item will be enabled when one or more SARs and/or Replace Requests are selected. All schedule requests associated with the selected SAR will also be deleted (any outstanding Wait List request, all chained Alternate SARs, any Replace Request). All selected untransmitted, declined, or rejected SARs/Replace Requests will be simply deleted from the UPS database. However, for each selected transmitted, non-declined, non-rejected SAR/Replace Request, the UPS will create *and automatically transmit* an SDR to the NCCDS. Upon receipt of an SRM from the NCCDS, the UPS will delete the SAR (and any associated schedule requests) or Replace Request from the UPS. At least one Confirm Box will be displayed to assure the user's intention to delete the selected SARs/Replace Requests. Note: The Delete menu selection is the preferred method of removing a request from the UPS database; the Erase menu selection should be used as a "last resort".

i. Change TDRS. This menu item allows the TDRS specified in a selected SAR to be changed. This menu item will be enabled when a single untransmitted SAR, or transmitted SAR which has received an SRM (but is not declined nor rejected), whose start time is in the future, is selected. If the user chose only two TDRSs on the Select Schedule Data panel, the selected request will have its TDRS changed to the other TDRS. If the user chose more than two TDRSs, the Change TDRS panel will be invoked, allowing the user to select from among the possible TDRS names. If the selected request is a transmitted, non-declined, non-rejected SAR, a Replace Request specifying the new TDRS will be generated. After transmission of the Replace Request, and upon receipt of a successful SRM status, the replaced SAR shall reflect the new TDRS. If the selected request is untransmitted, the TDRS shall simply be changed in the request.

j. Erase. This menu item allows users to remove SARs/Replace Requests from the UPS database and this panel. This menu item will be enabled when one or more SARs/Replace Requests are selected, regardless of their status. This menu item will be disabled in Query mode. Upon selection of this menu item, at least one Confirm Box will be displayed to assure the user's intention to erase the selected SARs/Replace Requests. Upon confirmation, the selected schedule requests will be removed from the Tabular Display Window and deleted from the UPS database. Note: The Delete menu selection is the preferred method of removing a request from the UPS database; the Erase menu selection should be used as a "last resort".

k. Change Status. This menu item allows users to change the status of one or more SARs and/or Replace Requests from transmitted to untransmitted. This menu item is provided as a contingency measure, should the status of one or more SARs/Replace Requests get out of "synch" with the NCCDS. This menu item will be enabled when one or more SARs/Replace Requests with a status of XmtS/Null, XmtS/Reject or XmtA/Null are selected. Selection of this menu item will display a confirmation panel. The SARs/Replace Requests will remain selected when the change status process is completed.

l. Select by Range. This menu item allows users to select schedule requests by time range, status, source, or other criteria. This menu item is always enabled. Selection of this menu item will display the Select By Range panel which is initialized with the time range specified in the Select Scheduling Data panel. The time range may not exceed the times specified in the Select Schedule Data panel.

m. Bulk Modify. This menu item allows users to modify certain key parameters of one or more SARs, such as Start Time, SUPIDEN, and TDRS. This menu item will always be enabled whether a SAR is selected or not, as long as at least one SAR is displayed in the tabular display window. Selection of this menu item will display the Bulk Modify panel. The SARs will be de-selected when the bulk modify process is completed.

n. Test USMs. This menu item allows users to create a "test" User Schedule Message (USM) and transfer the data to the selected Electronic User Node(s) for one or more SARs. This menu item will be enabled when one or more SARs are selected. Selection of this menu item will display the Select EU Nodes dialog box (see Figure 9-13), allowing selection of the EU Node(s). The SAR(s) will remain selected when the test USMs have been created and transferred.

o. Orbital Check. This menu item allows users to verify the TDRS view validity of one or more SARs. It is especially useful after SARs (future: and/or Replace Requests) have been transmitted to the NCCDS and new TDRS view data has been received. This menu item will be enabled when one or more SARs (future: and/or Replace Requests) are selected. A small non-modal panel, the Orbital Check panel, will be invoked to display all SARs that are out of orbital view from their associated TSW Set. The user may select each out-of-view request and modify it by invoking the SAR Details panel. The selected schedule requests will remain selected upon closing the Orbital Check panel.

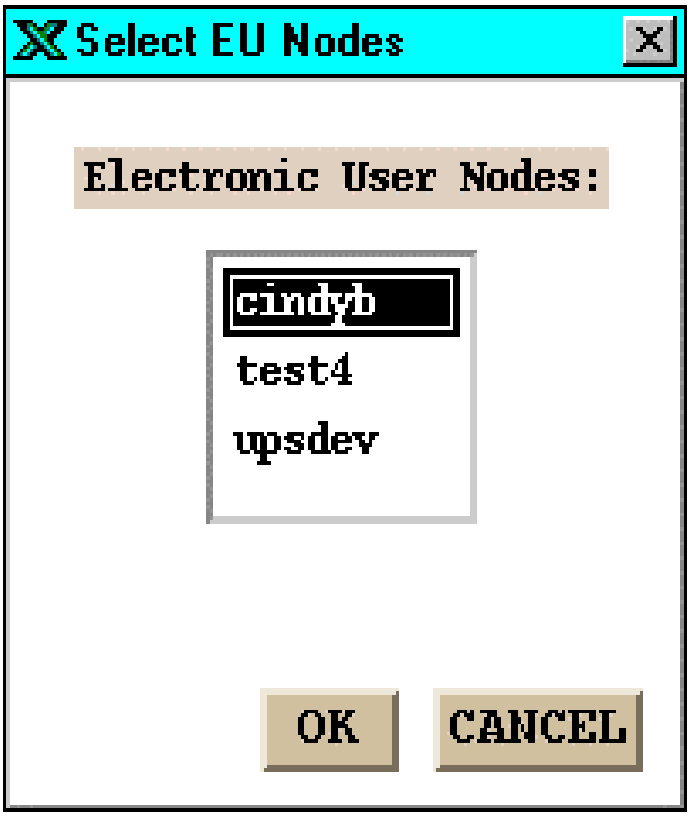


Figure 9-13. Select EU Nodes Dialog Window

p. Print. This menu item allows users to print the tabular information for all selected SARs/Replace Requests. This menu item will be enabled when one or more SARs/Replace Requests are selected. The selected SARs/Replace Requests will remain selected when the printing process is completed.

q. Transmit. This menu item allows users to transmit one or more SARs/Replace Requests to the NCCDS. This menu item will be enabled when one or more SARs/Replace Requests are selected. The Transmission process will first verify that the SARs/Replace Requests are appropriate for transmission. The SARs/Replace Requests will be de-selected when the transmit process is completed. Upon completion of the transmission process, the REFRESH pushbutton at the top of the Tabular Scheduling panel will be automatically activated, thus providing the user with status updates regarding the transmitted SARs/Replace Requests. All Alternate SARs chained to a selected primary SAR will be transmitted along with the primary SAR.

9.3.4 SAR Input Panel

9.3.4.1 General

This panel (Figure 9-14) will be invoked when ADD menu item is selected from the Tabular Scheduling pop-up menu that is invoked when the user clicks the right mouse button while in the Tabular Display window of the Tabular Scheduling panel (see Figure 9-12).

9.3.4.2 Panel Items

a. SAR Time Fields. Three time fields that allow the user to enter the start, stop and/or duration of the SAR being created. The SAR time fields are inter-related and when one is changed, the remaining field(s) that are not anchored are adjusted relative to the anchored time. The format of the SAR time fields is YY/DDD/HH:MM:SS. The times can be adjusted by keyboard entry or bump arrows. The behavior of these fields is described in the introductory section entitled Common User Interface Elements. If a SAR is selected (in the Tabular Scheduling panel), the fields in the SAR Input panel will be initialized with the values of the selected SAR, otherwise the start time will be set to the start time entered in the Select Schedule Data panel, the stop time to 1 hour after the start and the duration will be set to 1 hour.

b. SAR Time Anchors. Three radio buttons that allow user to specify which SAR time field will operate as the anchor for the other two times. The anchored time field SHOULD NOT be modified. At start of each scheduling session, start time anchor will be selected as the default. When a user changes a time field using the bump arrows, the other times will track automatically. The APPLY button will not be enabled and does not need to be selected to update the other linked time fields. When a user makes a manual entry to change a time field, the APPLY button will be enabled and must be activated to change the other linked time fields. A SAR cannot be created or modified beyond the time range originally specified on the Select Schedule Data panel.

c. SAR Tolerance Time Fields. The Plus Tolerance and Minus Tolerance time fields are defaulted to the selected mission's tolerance. The times can be adjusted by keyboard entry or bump arrows.

d. SUPIDEN List. Single-select vertical scrolling list of all SUPIDENS selected by the user in the Select Schedule Data panel. The first SUPIDEN in the list will be selected by default.

e. TDRS List. Single-select scrolling list of all TDRSs and TDRS Sets selected on the Select Schedule Data panel. The first TDRS in the list will be selected by default.

f. APPLY Pushbutton. Updates the linked time fields when the user keys in a time entry.

g. CANCEL Pushbutton. Cancels the operation and closes the panel.

h. DONE Pushbutton. Commits the operation, closes the panel and invokes the SAR Details panel.

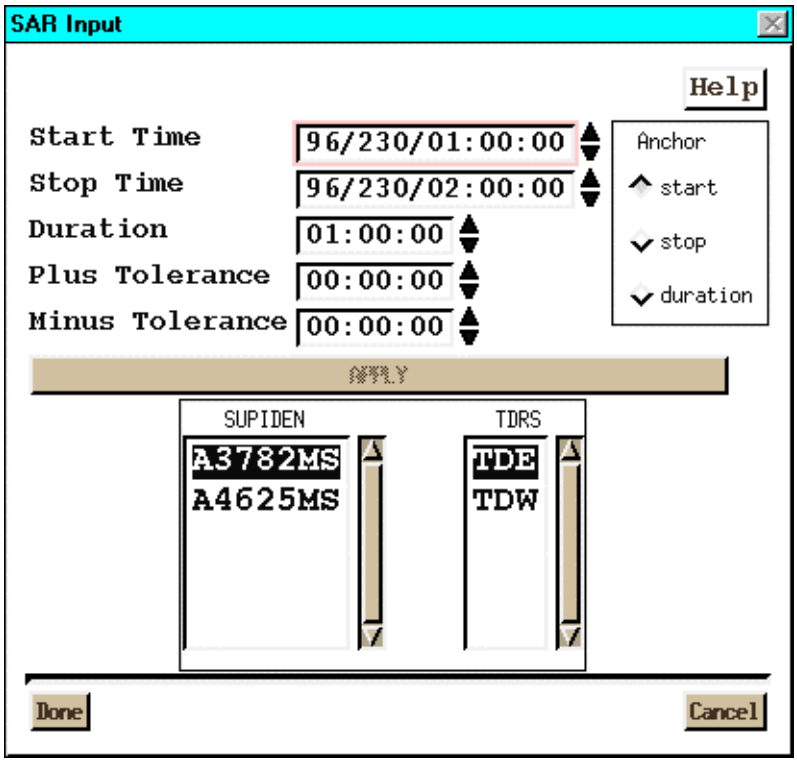


Figure 9-14. SAR Input Panel

9.3.4.3 Panels

SAR Details panel (see Figure 9-27).

9.3.4.4 Description

a. The SAR Input panel will be displayed when ADD is selected from the Tabular Schedule pop-up menu. The user can manually enter the desired start, stop, and duration or use the bump arrows to change time values. One of the times can be specified as the anchor time, which will effect how modifications to one time field effects the other two. For example, if the Start time is anchored, a modification to the Stop time will result in a change to the Duration.

b. The user must select a SUPIDEN and TDRS when creating a new SAR.

c. The SAR Input panel will be re-invoked upon closing the SAR Details panel, to allow the user to create another SAR more easily.

NOTE

The anchored time field *SHOULD NOT* be modified, since it is ambiguous which of the other two fields the UPS will update.

9.3.5 Schedule Planning Panel

9.3.5.1 General

a. This panel (see Figure 9-15) is used to control the schedule planning process, allowing the viewing, creating, deleting, copying, moving, transmitting, and replacing of schedule requests, including SARs, Alternate SARs, Replace Requests, SDRs, and Wait List Requests.

b. All schedule data is displayed in a graphical format and enables the user to view schedule requests in context with associated TSWs, TUTs, user-defined constraints, and optionally potentially conflicting SARs.

NOTE

The Tabular Scheduling panel provides the user with similar functionality to the Schedule Planning panel. The main differences being that Schedule Planning presents schedule requests graphically, as well as presenting TDRS Scheduling Windows (TSWs) and TDRS Unscheduled Time (TUT), which the Tabular Schedule panel does not present.

c. The panel is initiated by selecting `GRAPHICAL` on the Select Schedule Data panel (see Figure 9-11).

9.3.5.2 Panel Items

a. Main Menu. Drop-down menu located at the left of the panel that has the following items: Display TSW Superset, Display TSW-Filtered TUTs, Display Unfiltered TUTs, Display Potential Conflicts, SAR Color Key, and Close.

1. Display TSW Superset. This menu item allows the user to view TSW and User Constraint Timeline Objects on the TSW and User Constraints timelines. In addition, day/night shading will be displayed on the TSW timeline for each SUPIDEN/TDRS Timeline Group for which there is day/night orbital data available *and* the appropriate values set in the Default Scheduling Parameters panel (refer to paragraph 9.5). For missions using FDF orbital data products (PSATs/UAVs) this menu item causes the Select TSW Superset panel (see Figure 9-16) to be displayed. The user must select a TSW superset from this panel before the constraint Timeline Objects are displayed. For missions not using FDF orbital data, there are no supersets so the TSW and User Constraint Timeline Objects are immediately displayed. This menu item is enabled when the user has selected only one SUPIDEN from the Select Schedule Data panel.

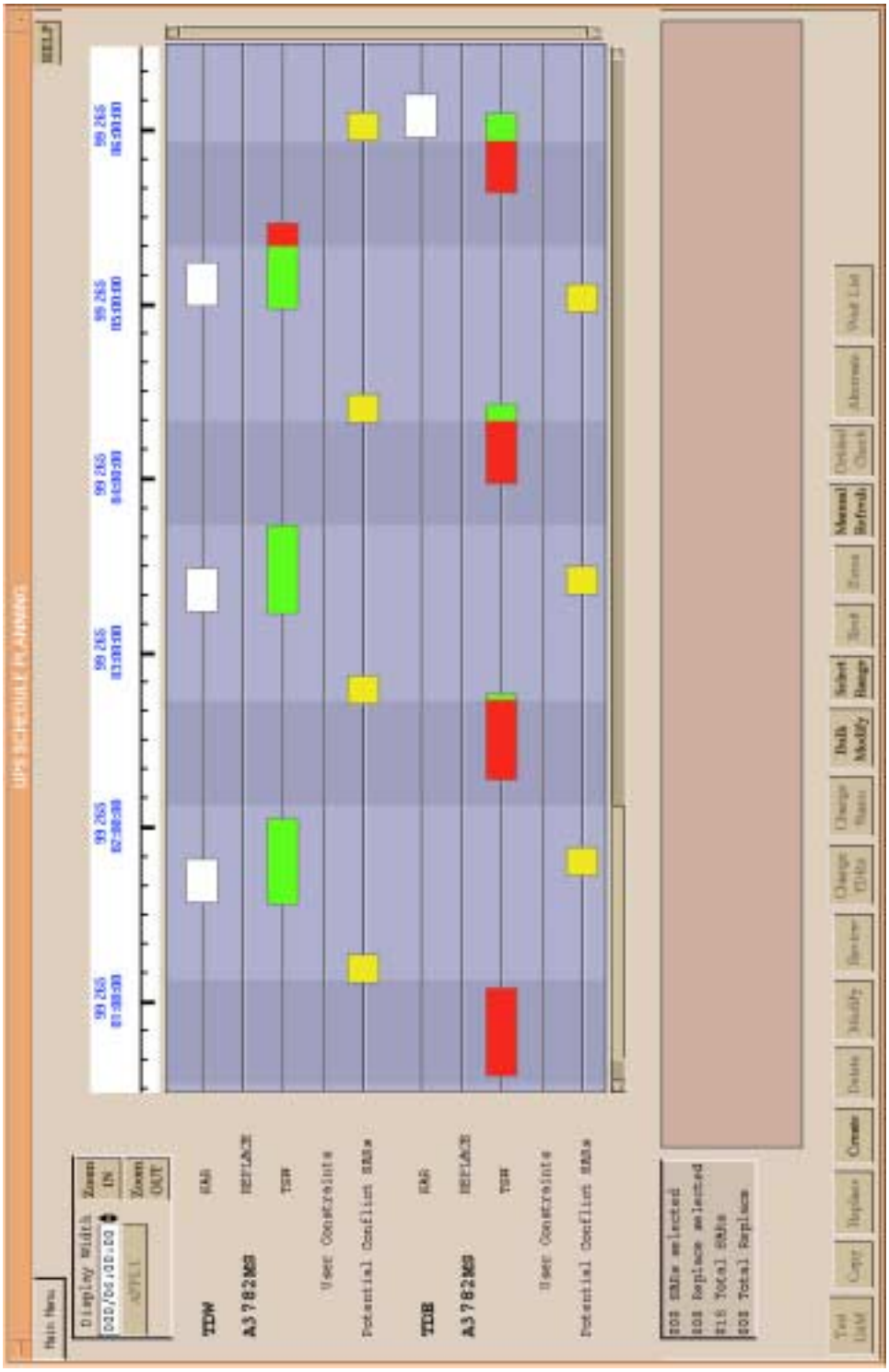


Figure 9-15. Schedule Planning Panel

2. Display TSW-Filtered TUTs. This menu item allows the user to view TUT Timeline Objects on the TSW Timelines. This menu item is only enabled after the user has selected the Select TSW Superset menu item. Selection of this menu item causes all TSWs to be removed from the TSW Timelines and to be replaced with TUTs, filtered by the chosen TSW superset.

3. Display Unfiltered TUTs. This menu item allows the user to view TUT Timeline Objects on the TSW Timelines. This menu item is always enabled. Selection of this menu item causes all TSWs to be removed from the TSW Timelines and to be replaced with TUTs.

4. Display Potential Conflicts. This menu item allows the user to view all potentially conflicting SARs of other SUPIDENs on the same TDRS. This menu item is always enabled.

5. SAR Color Key. Display a mapping of the SAR colors v.s. the SAR status' (UPS status and NCCDS status).

6. Close. Close the Schedule Planning panel and return control to the Select Scheduling Data panel.

b. Timeline Groups. There are 5 timelines displayed for each SUPIDEN/TDRS group, described as follows:

1. SAR Timeline. The topmost timeline displays the SARs for the time period chosen in the Select Schedule Data panel. All SARs for a particular SUPIDEN/TDRS within the selected time range are displayed on this timeline.

2. Replace Timeline. The timeline below the SAR timeline is the Replace timeline. All Replace Requests for a particular SUPIDEN/TDRS within the selected time range (chosen on the Select Schedule Data panel) are displayed on this timeline.

3. TSW/TUT Timeline. A single timeline is used to display either composite TSWs or composite TDRS Unscheduled Times. All TSWs/TUTs for a particular SUPIDEN/TDRS within the selected time range (chosen on the Select Schedule Data panel) are displayed on this timeline. TSWs can only be displayed if one and only one SUPIDEN has been chosen on the Select Schedule Data panel. The TSW timeline can alternately be used to display TUTs, through the use of the menu options (refer to paragraph 9.3.5.2). In addition, day/night shading will be displayed for each SUPIDEN/TDRS Timeline Group for which there is day/night orbital data available and the appropriate value is set in the Default Scheduling Parameters panel (refer to paragraph 9.5).

4. User Constraints Timelines. The fourth timeline displays all composite User Constraints for the time period chosen in the Select Schedule Data panel. User-defined constraints can only be displayed if one and only one SUPIDEN has been chosen on the Select Schedule Data panel.

5. Potential Conflict Timelines. The fifth timeline displays composites of all potentially conflicting SARs for the time period chosen in the Select Schedule Data panel. Potentially conflicting SARs of other missions are only displayed if a) the Display Potential Conflicts menu option has been selected, and b) other missions using the same UPS host allow the viewing of their SARs (refer to paragraph 7.4.2.3 for further details.

c. Display View Controls. Two methods of changing the length of time displayed graphically are available:

1. Display Width Time Field. Adjusts the timeline width to be the time shown in this field.

2. `Zoom-In` Pushbutton. Adjusts the timeline width by decreasing the time scale shown by a factor of 2.

3. `Zoom-Out` Pushbutton. Adjusts the timeline width by increasing the time scale shown by a factor of 2.

d. Pushbuttons. A row of pushbuttons along the bottom of the panel allows the user to access to features of the various Timeline Objects:

1. `Test USM`. Creates a simulated User Schedule Message (USM) and sends it to Electronic User node(s).

2. `Copy`. Creates a new SAR by using an existing SAR as a template.

3. `Replace`. Creates a Replace Request for a transmitted, non-rejected, non-waitlisted SAR.

4. `Create`. Allows user to create a new SAR (via the SAR Details panel).

5. `Delete`. Removes a SAR or Replace Request from the UPS and NCCDS.

6. `Modify`. Edits an existing SAR or Replace Request (via the SAR Details panel).

7. `Review`. Displays the details of the selected Timeline Object (SAR, TSW, TUT, User-Defined Constraint, or Potential Conflict) in read-only mode.

8. `Change TDRS`. Changes the TDRS of a SAR.

9. `Change Status`. Changes the status of a transmitted SAR or Replace Request back to untransmitted.

10. `Bulk Modify`. Invokes the Bulk Modify panel to slip SAR times, change TDRSs, or SUPIDENs for a group of SARs.

11. `Select Range`. Allows the user to select SARs and/or Replace Requests by a time range or other criteria via the Select Range panel.

12. `Xmit`. Transmits the selected SARs or Replace Requests to the NCCDS.

13. `Erase`. Removes a “deleted” schedule request from the display and the database.

14. `Manual Refresh`. Initiates a repaint of all SARs/Replace Requests, TSWs or TUTs, potentially conflicting SARs, and user-defined constraints, incorporating any changes made by external sites (e.g., the NCCDS or the electronic user), or another user (e.g., creating/modifying a SAR that will appear as a potential conflict).

15. `Orbital Check`. Validates selected SAR(s) against orbital constraints. Invokes the Orbital Check panel if one or more of the selected SAR(s) do not pass orbital validation constraints.

16. `Alternate`. Allows creation or modification of a chain of Alternate SARs.

17. `Wait List`. Creates and transmits a Wait List Request for declined SARs/Replace Requests.

NOTE

If the user has invoked Schedule Planning via the Queries menu (on the Information Window panel), only the `Review`, `Manual Refresh`, and `Orbital Check` pushbuttons are displayed.

e. "Intrinsic" Operations. The following operations may be performed on a Timeline Object:

1. Double clicking. Double-clicking on any Timeline Object performs the same action as selecting it and activating the `Review` pushbutton.

2. MOVE operation. Moves an untransmitted SAR Timeline Object. The user may move a SAR by selecting it, and dragging it along its timeline. Upon completion of the move of the SAR, the Precise Move panel is invoked.

9.3.5.3 Panels

The following panels are displayed:

a. SAR Details panel.

b. TSW Details panel.

c. TUT Details panel.

d. User Constraint Details panel.

e. Potential Conflicts Details panel.

f. Bulk Modify Event panel.

g. Precise Move panel.

h. Select Range panel.

i. Orbital Check panel.

j. Confirm Delete panel.

k. Confirm Erase panel.

l. Transmit Warning panel.

m. Erase Warning panel.

n. Validation Error panels (user can choose to ignore the errors).

o. Change TDRS panel.

p. Select TSW Superset panel.

9.3.5.4 Description

a. This panel displays all selected schedule data in a graphical format and enables the user to view, edit, or transmit the schedule requests by using the pushbuttons at the bottom of the screen.

b. The date/time scale is shown at the top of the panel. This scale is initially based on the selection criteria start and stop times entered on the Select Schedule Data panel. The date/time scale may be altered by adjusting the display width or through the use of the zoom buttons.

c. A timeline group of five horizontal timelines will be displayed for each selected TDRS/SUPIDEN. The five timelines are displayed in the following order:

   1. SARs.

   2. Replace Requests.

   3. TDRS Scheduling Windows (TSWs)/TDRS Unscheduled Times (TUTs).

   4. User-defined constraints.

   5. Potentially conflicting SARs of other missions on the same UPS database.

d. The window containing all the timeline groups is called the schedule area window.

e. Via the zoom-in, zoom-out, or display width time field, the user may select the desired view of the timeline groups. By using the horizontal scroll bar, the user may view schedule requests outside of the currently displayed timeline width, up to the start and stop times specified in the selection criteria on the Select Schedule Data panel. The user may use the vertical scroll bar to view other TDRS/SUPIDEN timeline groups.

f. The total number of SARs and Replace Requests within the selection criteria chosen from the Select Schedule Data panel is displayed in a window below and to the left of the timeline group window.

g. Each SAR/Replace Request on a timeline will be color coded according to its status, for example, green for confirmed, white for untransmitted, red for rejected, etc.

h. When one or more SARs/Replace Requests are selected, they are highlighted with thicker borders and they shrink vertically to allow the user to see any SARs/Replace Requests "behind" the selected ones. If only a single SAR or Replace Request is selected, pertinent information is displayed in the status window directly below all the timelines. The number of SARs and Replace Requests selected is displayed in a window below and to the left of the schedule area window.

i. To create a new SAR, the user clicks on the `Create` pushbutton and places the mouse cursor over the desired SAR timeline. The user then holds the mouse button down at a desired SAR end point and drags the mouse cursor toward the right or left, thus defining the duration. Upon release of the mouse button, the SAR Details panel is displayed, allowing the user to complete the SAR.

j. SARs that have been transmitted to the NCCDS, having an acknowledged status (XmtA) or SRM received status (XmtS), and are not rejected, may be "replaced", using the `Replace` pushbutton. The SAR Details panel is invoked showing the original SAR. The user may then modify it to conform to the changes desired. Upon completing the modification, the new Replace Request will be displayed on the Replace timeline.

k. As a trouble-shooting option, acknowledged SARs or SARs having received an SRM (but are not confirmed nor rejected nor declined) can be modified by first changing their status to untransmitted ("Uxmt"). This is done by selecting the SAR and then clicking on the `CHANGE STATUS` button.

l. The user may view a SAR in the context of applicable "constraints" graphic objects (Timeline Objects): TSWs/TUTs, User-Defined Constraints, and potentially conflicting SARs. The user may display the various "constraints" via the following methods:

   1. TSWs and User-Defined Constraints Timeline Objects will be displayed on the appropriate timelines when the user selects Display TSW Superset from the Main Menu followed by the selection of a Superset from the Select TSW Superset panel. In addition, day/night shading will be displayed for each Timeline Group for which the following conditions exist:

      (a) Sunlight orbital data are available.

      (b) Day/night shading is enabled (refer to paragraph 9.5, Default Scheduling for details).

      (c) The Display Width field is less than or equal to the maximum day/night displayable value (refer to paragraph 9.5, Default Scheduling for details).

   2. When the user selects the Display TSW-Filtered TUTs or Display Unfiltered TUTs menu item from the Main Menu the TSWs will be replaced by TUTs.

   3. Composite graphic objects (Timeline Objects) for potentially conflicting SARs will be displayed on the Potential Conflicts SARs timeline when the user selects the Display Potential Conflicts menu item from the Main Menu.

m. A TSW Composite Timeline Object represents a composite of all overlapping service TSWs for a contiguous time period. Notches are made in the TSW Timeline Object due to various anomalies, such as sun alignments or South Atlantic anomaly. The TSW Composite Timeline Object also shows where all TDRS services are available in the UAV and where only partial services are available via a color notching scheme.

n. Each TSW Composite Timeline Object shall be rendered according to the following legend:

   1. Green. All services available.

   2. Yellow. At least one service not available.

   3. Red. UAV present, but at least one enabled constraint is blocking that period of time.

o. A TUT Composite Timeline Object represents a composite of all overlapping service TUTs for a contiguous time period. The TUT Composite Timeline Object also shows where all TDRS services are available and where only partial services are available via a color notching scheme.

NOTE

The Display TSW-Filtered TUTs menu item is only selectable *after* the user has selected TSW Superset.

p. Each TUT Composite Timeline Object shall be rendered according to the following legend:

   1. Green. All services available.

   2. Yellow. At least one service not available.

q. A User Constraint Composite Timeline Object represents a composite of overlapping user-defined constraints for a contiguous time period, and are rendered in red. User-defined constraints are TDRS services (by resource) that are excluded from scheduling. For example, the KSA service on TDRS antenna 1 is down for preventive maintenance at WSC. The user may indicate this as a user-defined constraint to the UPS (refer to paragraph 9.3.14 for further details on User-Defined/TDRS Constraints).

r. Each Potential Conflict Composite Timeline Object represents a composite of SARs (including their tolerances) for all other SUPIDENs using a particular TDRS that are in the UPS database, where the other mission(s) allow “public viewing” of their schedule (refer to paragraph 7.4.2.3 for details). Potential conflicts are overlapping SARs for other SUPIDENs using the TDRS of the Timeline Group Window for a contiguous time period, and are rendered in yellow.

s. After selection of a constraint Timeline Object, the user may select the Review pushbutton to invoke the corresponding “constraints” details panel to view further details about the selected “constraint”.

t. A more detailed description of the functionality of the pushbuttons is shown below:

1. `Test USM`. Creates a simulated ("test") User Schedule Message (USM) from each selected SAR, and transfers it to the selected Electronic User node(s). This pushbutton will be enabled when one or more SARs are selected. Selection of this menu item will display the Select EU Nodes dialog box (see Figure 9-13), allowing selection of the EU Node(s). The SAR(s) will remain selected when the test USMs have been created and transferred.

2. `Copy`. Creates a new SAR using an existing SAR as a template. This pushbutton will be enabled only when a single non-generic SAR is selected. A generic SAR is a SAR that gets created when a USM, received from the NCC, does not match any SARs in the UPS database. A generic SAR may contain data that violates certain UPS validation rules and cannot be copied. Once the new SAR has been created, the Precise Move panel will be invoked, allowing the user to modify the SAR start time and/or time slip values. Activation of the Precise Move panel's `DONE` pushbutton will complete the operation, leaving the new SAR selected.

3. `Replace`. Allows a user to create a Replace Request to replace a SAR that has been transmitted to the NCCDS. This pushbutton is enabled when a single transmitted, non-declined, non-rejected SAR is selected. As a result of activating this pushbutton, the SAR Details panel will be displayed, showing an identical configuration to the SAR being replaced. Upon modification of the request, and activating the `Done` pushbutton, a new Replace Request will be displayed on the Replace timeline below the SAR being replaced. The user must transmit the Replace Request to effect the actual replacement of the SAR.

4. `Create`. Allows users to create a new SAR. This pushbutton is enabled when no other Timeline Objects are selected. When activated, the mouse cursor will change to a "crosshair". The user then positions the mouse cursor over the desired SAR timeline, and holds the mouse button down at a desired SAR end point. The user then drags the mouse cursor toward the right or left, thus defining the duration. Upon release of the mouse button, the SAR Details panel will be invoked, allowing the user to complete the SAR.

5. `Delete`. Allows users to delete SARs and/or Replace Requests. This pushbutton will be enabled when one or more SARs and/or Replace Requests are selected. All schedule requests associated with the selected SAR will also be deleted (any outstanding Wait List request, all chained Alternate SARs, any Replace Request). All selected untransmitted, declined, or rejected SARs/Replace Requests will simply be deleted from the UPS database. However, for each selected transmitted, non-declined, non-rejected SAR/Replace Request, the UPS will create *and automatically transmit* an SDR to the NCCDS. Upon receipt of an SRM from the NCCDS, the UPS will delete the SAR (and any associated schedule requests) or Replace Request from the UPS. At least one Confirm Box will be displayed to assure the user's intention to delete the selected SARs/Replace Requests. Note that the `Delete` pushbutton is the preferred method

of removing a request from the UPS database; the Erase pushbutton should be used as a "last resort"

6. `Modify`. Allows users to modify a SAR or Replace Request's configuration: service types, times, and Service Specification Code parameters. This pushbutton is enabled when a single untransmitted SAR or Replace Request is selected. The SAR Details panel is displayed as a result of activating this pushbutton. Upon closing the SAR Details panel and returning to this panel, the selected schedule request will remain selected.

7. `Review`. Allows users to inspect the details of the selected Timeline Object in a "read-only" mode. Depending upon the Timeline Object selected, the SAR Details, TSW Details, TUT Details, User Constraint Details, or Potential Conflicts panels will be displayed.

8. `Change TDRS`. Allows the user to change the TDRS specified in a selected SAR. This pushbutton will be enabled when a single untransmitted SAR or transmitted SAR which has received an SRM (but is not declined nor rejected), whose start time is in the future, is selected. If the user chose only two TDRSs on the Select Schedule Data panel, the selected request will have its TDRS changed to the other TDRS. If the user chose more than two TDRSs, the Change TDRS panel will be invoked, allowing the user to select from among the possible TDRS names. If the selected request is a transmitted, non-declined, non-rejected SAR, a Replace Request specifying the new TDRS will be generated. After transmission of the Replace Request, and upon receipt of a successful SRM status, the replaced SAR shall reflect the new TDRS. If the selected request is untransmitted, the TDRS shall simply be changed in the request.

9. `Change Status`. Allows users to change the status of one or more SARs and/or Replace Requests back to untransmitted. This pushbutton is provided as a contingency measure, should the status of one or more SARs/Replace Requests get out of "synch" with the NCCDS. This pushbutton will be enabled when one or more SARs/Replace Requests with a status of XmtS/Null, XmtS/Reject, or XmtA/Null are selected. The SARs/Replace Requests will remain selected when the change status process is completed.

10. `Bulk Modify`. Allows users to modify certain key parameters of one or more SARs, such as Start Time, SUPIDEN, and TDRS. This pushbutton will always be enabled whether a SAR is selected or not, as long as at least one SAR is displayed. Activation of this pushbutton will display the Bulk Modify panel. The SARs will be de-selected when the bulk modify process is completed.

11. `Select Range`. Allows users to select SARs and/or Replace Requests by time range, status, source, or other criteria. This pushbutton is always enabled. Activation of this pushbutton will display the Select By Range panel, which is initialized with the time range specified in the Select Scheduling Data panel. The time range may not exceed the times specified in the Select Schedule Data panel.

12. `Xmit`. Allows users to transmit one or more SARs/Replace Requests to the NCCDS. This pushbutton will be enabled when one or more SARs/Replace Requests are selected. The Transmission process will first verify that the SARs/Replace Requests are appropriate for transmission. The SARs/Replace Requests will be de-selected when the transmission process is completed. All Alternate SARs chained to a selected primary SAR will be transmitted along with the primary SAR.

13. `Erase`. Allows users to remove SARs/Replace Requests from the UPS database and this panel. This pushbutton will be enabled when one or more SARs/Replace Requests are selected, regardless of their status. It will be disabled in Query mode. Upon activation of this pushbutton, at least one Confirm Box will be displayed to assure the user's intention to erase the selected SARs/Replace Requests. Upon confirmation, the selected schedule requests will be removed from the Schedule Planning panel and deleted from the UPS database. Note that the Delete menu selection is the preferred method of removing a request from the UPS database; the Erase menu selection should be used as a "last resort".

14. `Manual Refresh`. Initiates a re-read of all SARs/Replace Requests, TSWs or TUTs, potential conflicting SARs, and user-defined constraints from the UPS database. Any changes made by external sites (e.g., the NCCDS or an electronic user node), or another user (e.g., creating/modifying a SAR that will appear as a potential conflict), will then be shown incorporated into the Timeline Objects.

15. `Orbital Check`. Allows users to verify the TDRS view validity of one or more SARs. It is especially useful after SARs (future: and/or Replace Requests) have been transmitted to the NCCDS and new TDRS view has been received. This pushbutton will be enabled when one or more SARs (future: and/or Replace Requests) are selected. A small non-modal panel, the Orbital Check panel, will be invoked to display all SARs that are out of orbital view from their associated TSW Set. The user may select each out-of-view request and modify it by invoking the SAR Details panel. The selected schedule requests will remain selected upon closing the Orbital Check panel

16. `Alternate`. Allows users to create, edit, and manage Alternate SAR(s) chained from the primary SAR. This pushbutton is enabled when a single unconfirmed SAR is selected. The Alternate SAR List panel is displayed as a result of activating this pushbutton. Upon closing the Alternate SAR List panel and returning to this panel, the SAR shall remain selected.

17. `Wait List`. Allows users to create and *automatically transmit* to the NCCDS, a Wait List request for a declined SAR or declined Replace Request. This pushbutton is enabled when one or more transmitted, declined SARs/Replace Requests are selected. A confirmation box will be displayed as a result of selecting this option. Upon confirmation, a Wait List request will be created and transmitted to the NCCDS for each selected declined SAR/Replace Request.

9.3.6 Select TSW Superset

9.3.6.1 General

a. This panel (see Figure 9-16) allows the user to select the TSW superset to display on the TSW timelines.

b. This panel is invoked for FDF missions when the Display TSW Superset item is selected from the Main Menu. This panel can be invoked if the user has selected only one SUPIDEN from the Select Schedule Data panel.

9.3.6.2 Panel Items

a. TSW Superset Scrolling Textlist. Displays a list of TSW supersets for the current mission.

b. DONE Pushbutton. Removes the panel and displays the TSWs for the superset that the user has selected on the Schedule Planning panel. It also causes all other constraints to be displayed.

c. CANCEL Pushbutton. Removes the panel from the screen.

9.3.6.3 Panels

No sub-panels are displayed.

9.3.6.4 Description

a. This panel is displayed when a user with FDF orbital products (UAV/PSAT) selects the Display TSW Superset menu item from the Schedule Planning panel Main Menu. This panel displays a list of TSW supersets that have been previously created by the mission.

b. Upon selection of one of the supersets, and subsequent activation of the DONE pushbutton, this panel will be removed from the screen, and all Constraint Timeline Objects will be displayed on the Schedule Planning panel.

c. If the user selects the CANCEL pushbutton, the panel is removed and the Schedule Planning panel reverts to its original state.

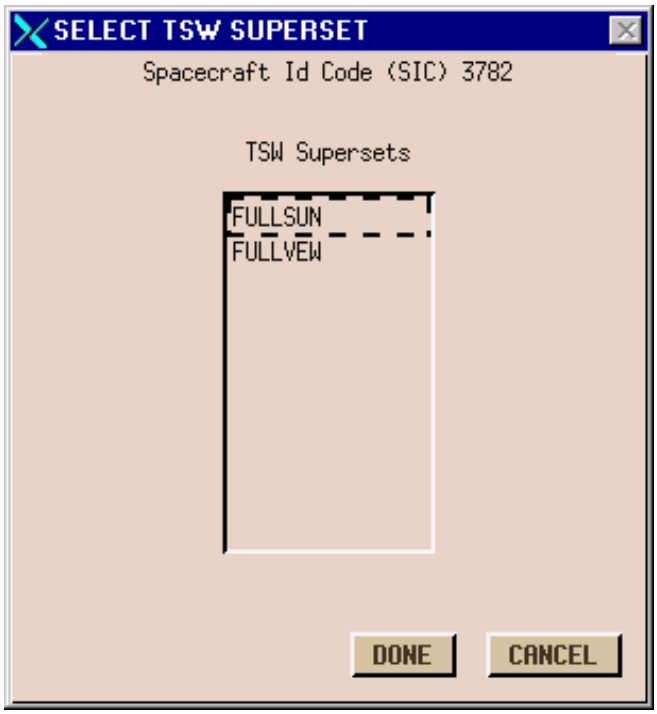


Figure 9-16. Select TSW Superset

9.3.7 Precise Move Panel

9.3.7.1 General

a. This panel (see Figure 9-17) allows the user to control precisely the temporal placement of a SAR.

b. This panel is invoked when the graphical portion of a move operation has been completed.

9.3.7.2 Panel Items

a. `Start Time` Field. A time text field reflecting the SAR start time.

b. `Stop Time` Field. A time text field reflecting the SAR stop time.

c. `Time Slip` Time Field. A time text field reflecting the delta between the original SAR location and the moved SAR location.

d. `APPLY` Pushbutton. When a user makes a manual entry to change a time field, this button will be enabled and must be activated to change the other linked time fields.

e. `Cancel` Pushbutton. Cancels the move operation and removes the panel from the screen.

f. `Done` Pushbutton. Commits the moved SAR to the database and removes the panel from the screen.

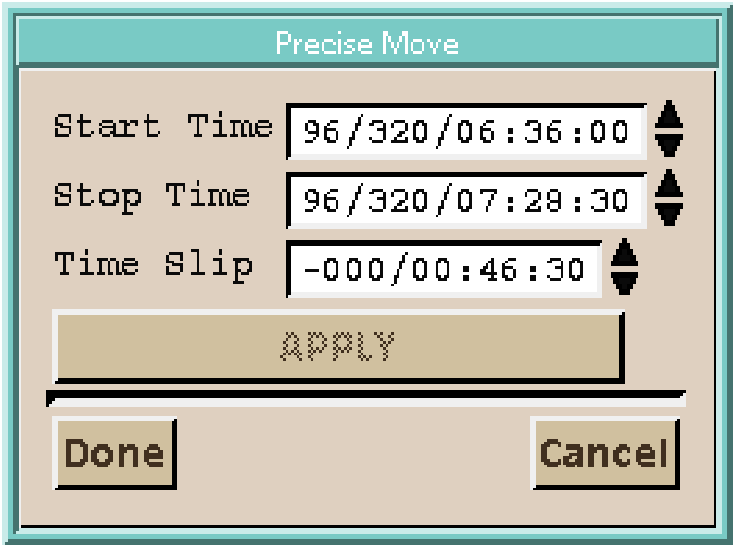


Figure 9-17. Precise Move Panel

9.3.7.3 Panels

No sub-panels are displayed.

9.3.7.4 Description

a. This panel is displayed upon completion of a graphical SAR move and allows the user to precisely control the placement of the SAR. By adjusting the `Start`, `Stop`, or `Time Slip` field, either via keyboard input or by using the bump arrows, the user may move the SAR on the timeline. The three time fields are interrelated, and when one is changed by the user, the other two are updated by the system.

b. The three time fields reflect the user's graphical move of the SAR and its time slip when the panel is first invoked.

c. When satisfied with the placement of the SAR, the user may activate the `Done` pushbutton to invoke the SAR Details panel for SAR review or editing.

d. If the user activates the `Cancel` pushbutton, the Precise Move panel is removed from the screen, and the moved SAR reverts to its original position.

9.3.8 Orbital Check Panel

9.3.8.1 General

a. This panel (see Figure 9-18) displays the SARs that do not pass orbital constraint checks.

b. This panel is invoked upon activation of the `Orbital Check` pushbutton on the Schedule Planning panel.

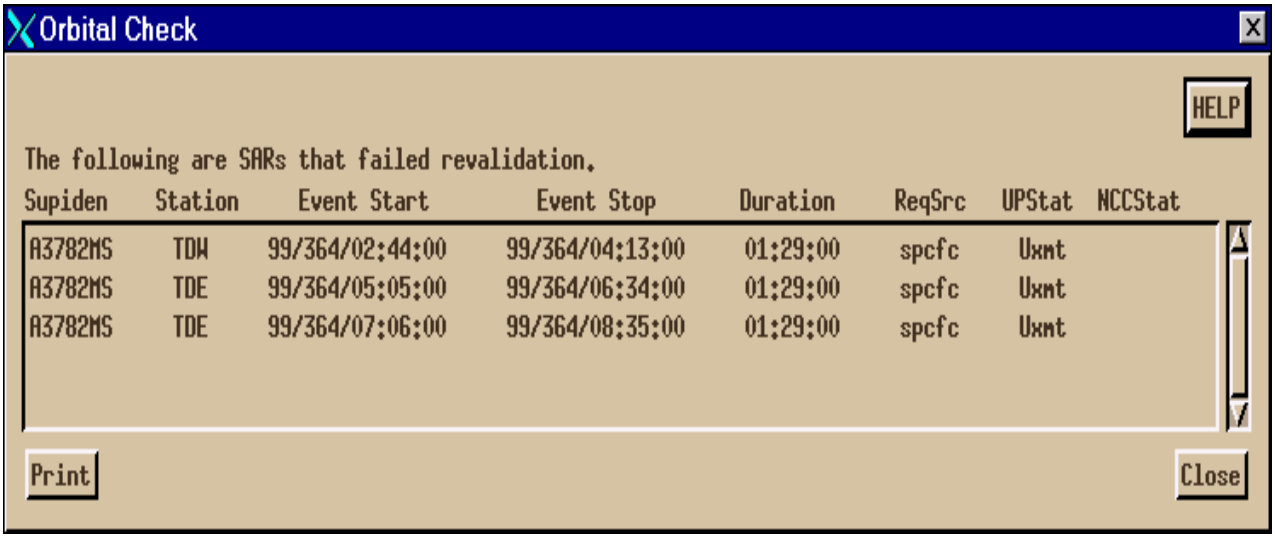


Figure 9-18. Orbital Check Panel

9.3.8.2 Panel Items

a. SARs Failing Orbital Validation scrolling textlist. Displays, in a tabular format, the SARs failing orbital validation.

b. `Print` pushbutton. Prints the SARs listed on this panel.

c. `Close` pushbutton. Removes the panel from the screen.

9.3.8.3 Panels

No sub-panels are displayed.

9.3.8.4 Description

a. This panel allows the user to view and print the SARs that do not pass orbital validation. The SARs selected for orbital validation may have any status.

b. The tabular display has the following data fields:

1. SUPIDEN. e.g., A3782MS.
2. TDRS Station. e.g., TDRS East (TDE), TDRS West (TDW), or TDRS Spare (TDS).
3. Event Start Time. Format yy/ddd/hh:mm:ss.
4. Event Stop Time. Format yy/ddd/hh:mm:ss.
5. Duration. Format hhmmss.
6. Request Source. Each SAR stored in the UPS database may originate from one of the following five sources:
   (a) batch. Batch SAR received from an Electronic User.
   (b) recur. SAR created via Recurrent Scheduling.
   (c) spcfc. Interactively-built SAR.
   (d) genrc. NCCDS-generated SAR.
   (e) bulkm. Bulk-modified SAR.
7. UPS Status. Indicates one of the following statuses from the UPS as a result of operator's action:
   (a) Uxmt. Untransmitted SAR.
   (b) XmtP. Transmitted to NCCDS pending acknowledgment.
   (c) XmtA. Transmitted to NCCDS with acknowledgment received.
   (d) XmtS. Transmitted to NCCDS with SRM received.
   (e) Blank. NCCDS-generated SAR.
8. NCC Status. Indicates one of the following statuses resulting from NCCDS-received messages, such as USM, or SRM. The result code or explanation from the messages is stored in the NCCDS status file.
   (a) cfmflx. SAR with confirmed flexible USM.
   (b) cfmfix. SAR with confirmed fixed USM.
   (c) declne. SARs that has been declined by the NCCDS.
   (d) reject. SAR that has been rejected by the NCCDS.
   (e) waitls. SAR that has waitlisted.

9.3.9 Select Range Panel

9.3.9.1 General

a. This panel (see Figure 9-19) allows the user to select certain SARs/Replace Requests by various selection criteria. The selected schedule requests may then be used for transmitting, deleting, erasing, and other actions. The user may also view the schedule requests in a tabular format (if the panel was invoked from the Schedule Planning panel).

b. This panel is invoked upon activation of the `SELECT RANGE` pushbutton in the Schedule Planning panel (see Figure 9-15) or the Tabular Scheduling panel (see Figure 9-12).

9.3.9.2 Panel Items

a. `Start` Time Field. A time text field reflecting the start time range of schedule requests to be selected.

b. `Stop` Time Field. A time text field reflecting the stop time range of schedule requests to be selected.

c. `Duration` Time Field. A time text field reflecting the duration time range of schedule requests to be selected.

d. `SIC/TDRS Group` Scrolling Textlist. A list of the SIC/TDRS groups from which the user may select as a part of the selection criteria.

e. `Accumulate Requests?` Radio Buttons. A radio button group consisting of “Yes” and “No”. When “Yes” is selected, previously selected requests remain selected during the current Select by Range operation.

f. `SAR/Replace Request Source/Status Checkbox Matrix`. A sparse 9 x 10 matrix of checkboxes that allows the user to select all schedule requests meeting a particular request source and status combination (e.g., untransmitted RS SARs). The various source/status types are the following:

   1. Request Source: Recurrently scheduled, specific, batch, bulk modified, or generic.

   2. UPS Status: Uxmt, XmtP, XmtA, XmtS (SRM received), or blank.

   3. NCCDS Status: Confirmed (flexible/fixed, forwarded/unforwarded), Wait Listed, Declined, or Rejected.

Figure 9-19. Select Range Panel

g. `SAR Source and Status` Toggle-Buttons. A group of toggle-buttons around the outside of the Source/Status Checkbox Matrix that allow the user to select or de-select all schedule requests (SARs/Replace Requests) meeting a specific source *or* status criterion (e.g., all wait-listed SARs). Upon selection of a toggle-button, all Checkboxes in the associated row or column will be checked. Similarly, upon de-selection of a toggle-button, all Checkboxes in the associated row or column will have the checks removed.

h. `List Selected SARs/Replaces` Pushbutton. Invokes the List Selected SARs/Replaces panel, displaying a scrolling list of all selected SARs/Replace Requests in a tabular format. Note that this pushbutton is not available when the panel is invoked from the Tabular Scheduling panel.

i. `Cancel` Pushbutton. Cancels the Select Range operation and removes the panel from the screen.

j. `Apply` Pushbutton. Selects the SARs/Replace Requests that match the requested selection criteria.

k. `Close` Pushbutton. Removes the panel from the screen.

9.3.9.3 Panels

The List Selected SARs/Replaces panel is displayed.

9.3.9.4 Description

a. This panel allows the user to multiple-select SARs and/or Replace Requests by using various selection criteria. SARs, Replace Requests, or both may be selected from the displayed SIC/TDRS groups. The user may select all SARs and/or Replace Requests of a particular source/status combination by using one or more checkboxes. Alternatively, the toggle-buttons may be used if only the SARs and/or Replace Requests with a particular source *or* status are desired. The panel also allows the accumulation of selected SARs/Replace Requests. Upon activation of the `Apply` pushbutton, the requested schedule requests will be selected on the invoking (Schedule Planning or Tabular Scheduling) panel for user inspection and verification. The user may then activate the `Close` pushbutton if satisfied with the selections, clear the selections and make new selections, or add to the existing selections (provided the `Accumulate Requests?` radio button is set appropriately). Activation of the `Cancel` pushbutton returns the user to the invoking panel, undoing all modifications made within this panel.

b. Any SARs/Replaces selected before invoking this panel will remain selected, and further selections may be accumulated using the `Accumulate Requests?` radio button. The `Accumulate Requests?` button is defaulted to Yes if more than one SAR/Replace is selected before invocation of the current panel.

c. The selected SARs/Replaces may be used for transmitting, deleting, erasing, and other actions. Additionally, if the user invoked this panel from the Schedule Planning panel, the user may view the selected SARs/Replaces in a tabular format similar to the Tabular Scheduling panel by activating the `List Selected SARs/Replaces` pushbutton.

d. The Start, Stop, and Duration fields are interconnected as follows:

   1. The start time remains anchored, unless the user enters a start time less than the overall start time used by the initial invoking (Schedule Planning or Tabular Scheduling) panel. In such a case, the start time will revert to the overall start time.

   2. The duration field remains anchored secondarily to the start time, thus changing the stop time, unless the user enters a duration that exceeds the overall stop time used by the initial invoking panel. In such a case, the stop time will be set to the overall stop time, and the duration will be calculated as the stop time minus the start time.

   3. The stop time field will change only in the case above, or when the user enters a stop time greater than the overall stop time used by the initial invoking panel. In such a case, the stop time will be set to the overall stop time, and the duration will be calculated as the stop time minus the start time.

9.3.10 List Selected SARs/Replaces Panel

9.3.10.1 General

a. This panel (see Figure 9-20) allows the user to view the selected SARs/Replace Requests in a tabular format, and to optionally deselect any of the SARs/Replace Requests.

b. This panel is invoked when the user activates the `List Selected SARs/Replaces` pushbutton from the Select Range panel.

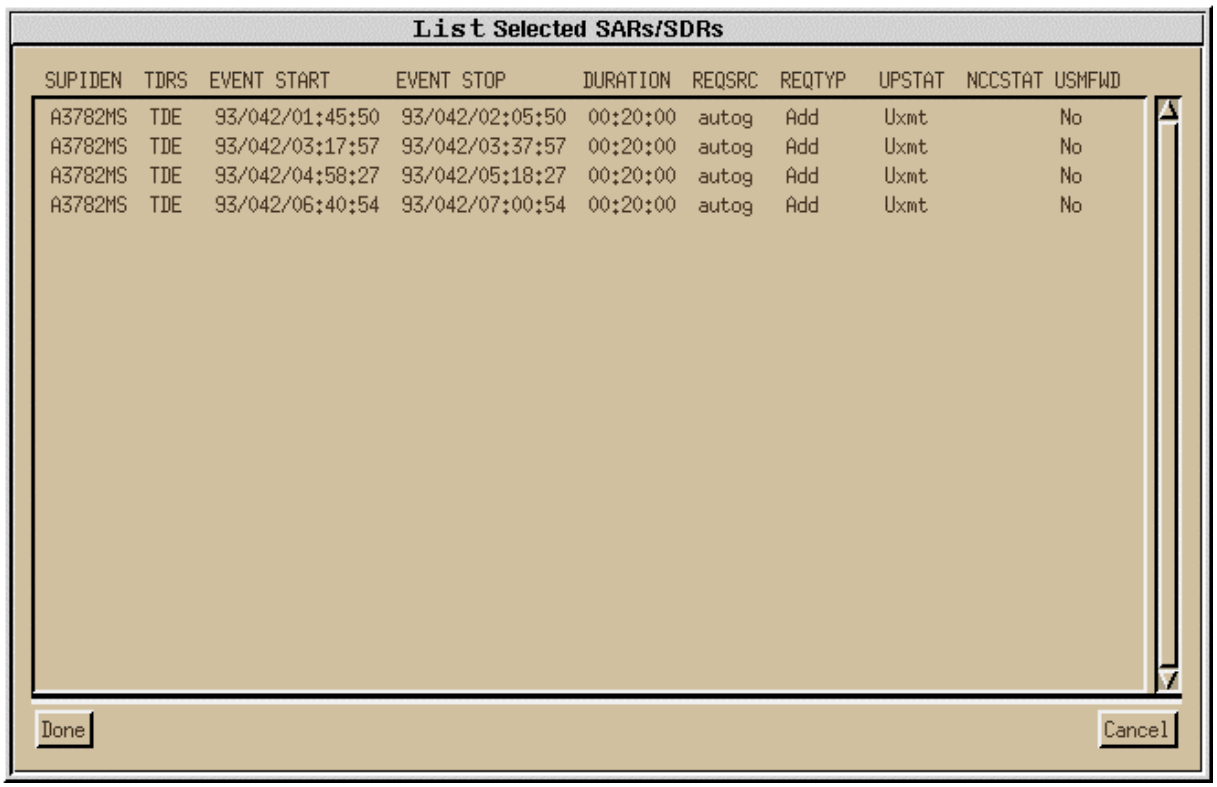


Figure 9-20. List Selected SARs/Replace Requests Panel

9.3.10.2 Panel Items

a. De-select a Request From the Tabular List. Click the mouse on the highlighted request. The request will be unhighlighted and will be de-selected from the Schedule Planning panel.

b. `Cancel` Pushbutton. Cancels the de-selection operation and removes the panel from the screen.

c. `Done` Pushbutton. Registers any de-selection of SARs/Replace Requests and removes the panel from the screen.

9.3.10.3 Panels

None.

9.3.10.4 Description

a. This panel is displayed upon activation of the `List Selected SARs/Replaces` pushbutton on the Select Range panel (when invoked from the Schedule Planning panel) and allows the user to view the SARs/Replace Requests in a tabular format.

b. The user may de-select one or more SARs/Replace Requests by clicking on each one to be de-selected. Upon activation of the Done pushbutton the remaining SARs/Replace Requests will remain part of the selected set as control returns to the Select Range panel.

c. If the user activates the `Cancel` pushbutton, any de-selections will be ignored, and the panel will be removed from the screen.

9.3.11 Change TDRS Panel

9.3.11.1 General

a. This panel (see Figure 9-21) allows the user to change the TDRS specified in a SAR.

b. This panel is invoked when the user activates the CHANGE TDRS pushbutton from the Schedule Planning panel.

NOTE

If there are only two TDRSs specified (from the Select Schedule Data panel), the selected SAR is moved to the other TDRS without user confirmation. If there is only one TDRS specified, this operation is not permitted.

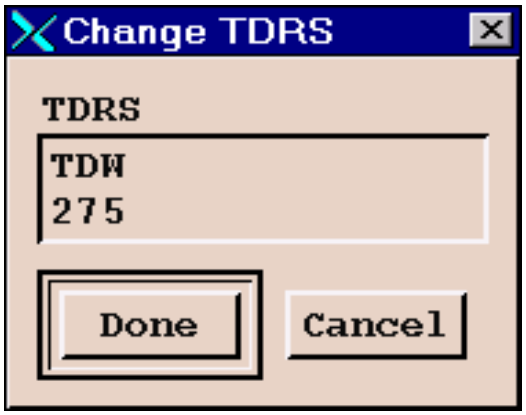


Figure 9-21. Change TDRS Panel

9.3.11.2 Panel Items

a. TDRS Textlist. A scrolling list of selectable TDRSs (these are the same as those selected in the Select Schedule Data panel). Clicking on a TDRS causes the TDRS ID to be displayed in the TDRS text field.

b. `CANCEL` Pushbutton. Cancels the Change TDRS operation and removes the panel from the screen.

c. `DONE` Pushbutton. Validates the modified SAR and, upon successful validation, commits it to the database, removes this panel from the screen, then visually moves the SAR to the timeline group with the new TDRS.

9.3.11.3 Panels

None.

9.3.11.4 Description

a. This panel is displayed upon activation of the CHANGE TDRS pushbutton and allows the user to change the TDRS specified within the SAR. The user may select a different TDRS from a scrolling list. Upon confirmation of the user's selection, the SAR is validated and, if successful, committed to the database. At the conclusion of the move, the SAR will be graphically moved from its original SUPIDEN/TDRS timeline group to the new one.

b. If the user activates the CANCEL pushbutton, the Change TDRS panel is removed from the screen, and the SAR retains its original TDRS.

9.3.12 TSW Details Panel

9.3.12.1 General

a. This panel (see Figure 9-22) allows the user to select a TSW service component and view its start, stop, and duration, both graphically and textually.

b. This panel is invoked upon activation of the REVIEW pushbutton on the Schedule Planning panel (see Figure 9-15) or the REVIEW pushbutton on the SAR Details panel (refer to paragraph 9.3.17). Double-clicking on a TSW Timeline Object performs the same action as selecting the Timeline Object and activating the REVIEW pushbutton.

9.3.12.2 Panel Items

a. TSW Composite Timeline. A single timeline displaying the TSW Composite Timeline Object selected from the parent panel.

b. TSW Service Component Scrolling List. There is one timeline for each service TSW that composes the TSW Composite.

c. Start Time Field. A time text field reflecting the start time of the selected TSW Timeline Object.

d. Stop Time Field. A time text field reflecting the stop time range of the selected TSW Timeline Object.

e. Duration Time Field. A time text field reflecting the duration of the selected TSW Timeline Object.

f. Orbit Number Field. A numeric field reflecting the orbit number of the selected TSW Timeline Object. This field is only displayed for FDF missions.

g. Superset Field. A text field reflecting the TSW superset of the selected TSW Timeline Object. This field is only displayed for FDF missions.

h. CLOSE Pushbutton. Removes the panel from the screen.

9.3.12.3 Panels

None.

9.3.12.4 Description

This panel allows the user to view the TSW service components composing the selected TSW composite. For FDF missions, each component TSW service type is displayed by service and user antenna (high or low gain), rendered in green, with anomalies rendered in red. For non-FDF missions, each component TSW service is displayed by TSW SET ID and rendered in green. The start time, stop time, and duration of each selected Timeline Object are displayed in a status window at the bottom of the panel.

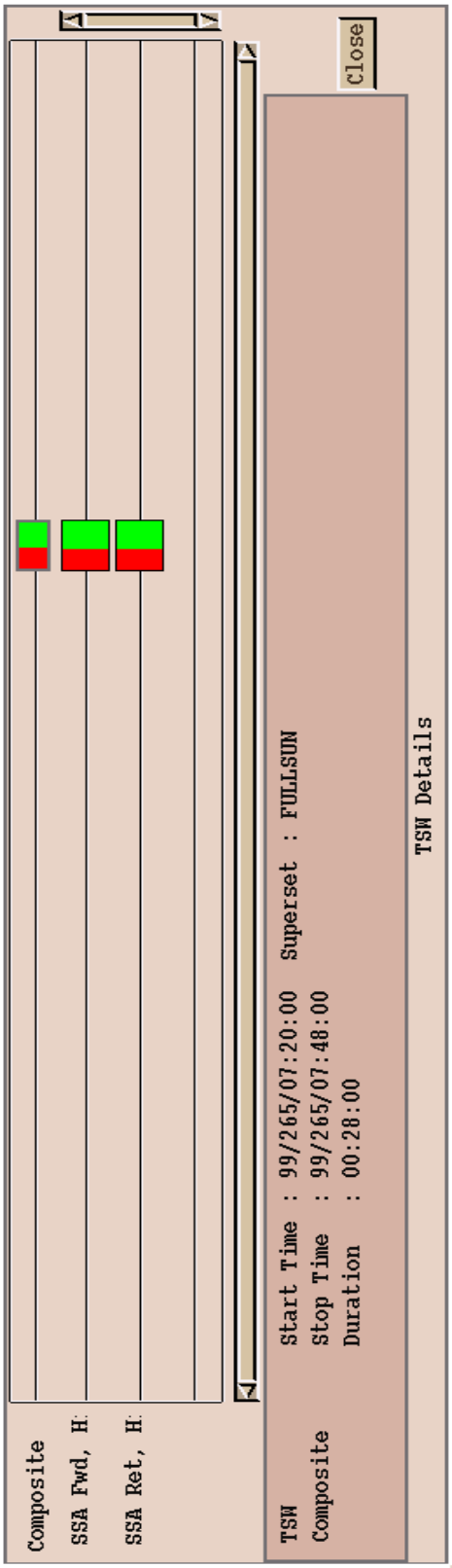


Figure 9-22. TSW Details Panel

9.3.13 TUT Details Panel

9.3.13.1 General

a. This panel (see Figure 9-23) allows the user to select a TUT service component and view its start, stop, and duration, both graphically and textually.

b. This panel is invoked upon activation of the REVIEW pushbutton on the Schedule Planning panel (see Figure 9-15) or the REVIEW pushbutton on the SAR Details panel (refer to paragraph 9.3.17). Double-clicking on a TUT Timeline Object performs the same action as selecting the Timeline Object and activating the REVIEW pushbutton.

9.3.13.2 Panel Items

a. TUT Composite Timeline. A single timeline displaying the TUT Composite Timeline Object selected from the parent panel.

b. TUT Service Component Scrolling List. There is one timeline for each service TUT that composes the TUT Composite.

c. Start Time Field. A time text field reflecting the start time of the selected TUT Timeline Object.

d. Stop Time Field. A time text field reflecting the stop time range of the selected TUT Timeline Object.

e. Duration Time Field. A time text field reflecting the duration of the selected TUT Timeline Object.

f. CLOSE Pushbutton. Removes the panel from the screen.

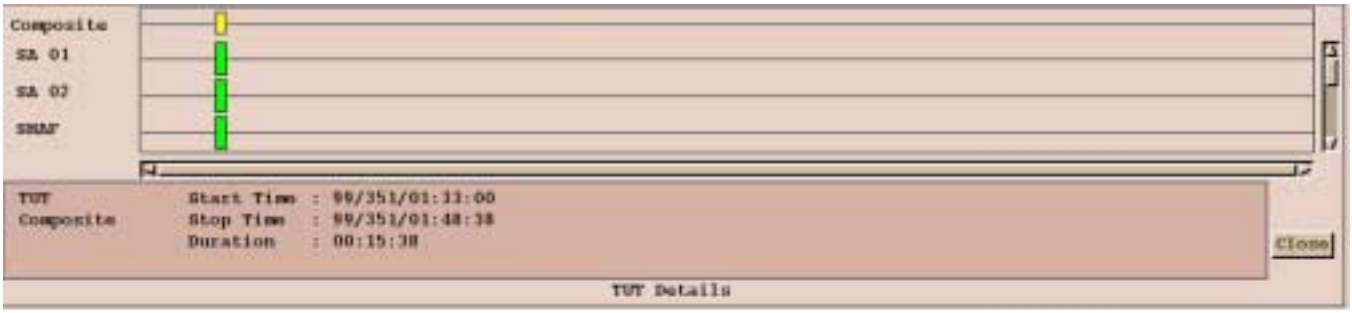


Figure 9-23. TUT Details Panel

9.3.13.3 Panels

None.

9.3.13.4 Description

This panel allows the user to view the TUT service components composing the selected TUT composite. Each component TUT service type is displayed by service and user antenna ID and rendered in green. The start time, stop time, and duration of each selected Timeline Object are displayed in a status window at the bottom of the panel.

9.3.14 User Constraint Details Panel

9.3.14.1 General

a. This panel (see Figure 9-24) allows the user to select a user-defined constraint component and view its start, stop, and duration, both graphically and textually.

b. This panel is invoked upon selection of a User Constraint Timeline Object and subsequent activation of the REVIEW pushbutton on the Schedule Planning panel (see Figure 9-15) or the REVIEW pushbutton on the SAR Details panel (refer to paragraph 9.3.17). Double-clicking on a User Constraint Timeline Object performs the same action as selecting the Timeline Object and activating the `Review` pushbutton.

9.3.14.2 Panel Items

a. User Constraint Composite Timeline. A single timeline displaying the User Constraint Composite Timeline Object selected from the parent panel.

b. User Constraint Service/Resource Component Scrolling List. There is one timeline for each service/resource constraint that composes the User Constraint Composite.

c. Start Time Field. A time text field reflecting the start time of the selected user constraint Timeline Object.

d. Stop Time Field. A time text field reflecting the stop time range of the selected user constraint Timeline Object.

e. Duration Time Field. A time text field reflecting the duration of the selected user constraint Timeline Object.

f. CLOSE Pushbutton. Removes the panel from the screen.

9.3.14.3 Panels

None.

9.3.14.4 Description

This panel allows the user to view the (previously defined) user-defined constraint components composing the selected User Constraint composite. Each component is displayed by TDRS service and resource (e.g., KSA Antenna 1 or MA Link 10), and is rendered in black. The start time, stop time, and duration of each selected Timeline Object are displayed in a status window at the bottom of the panel. Refer to paragraph 9.6 for further details on User-Defined/TDRS Constraints.

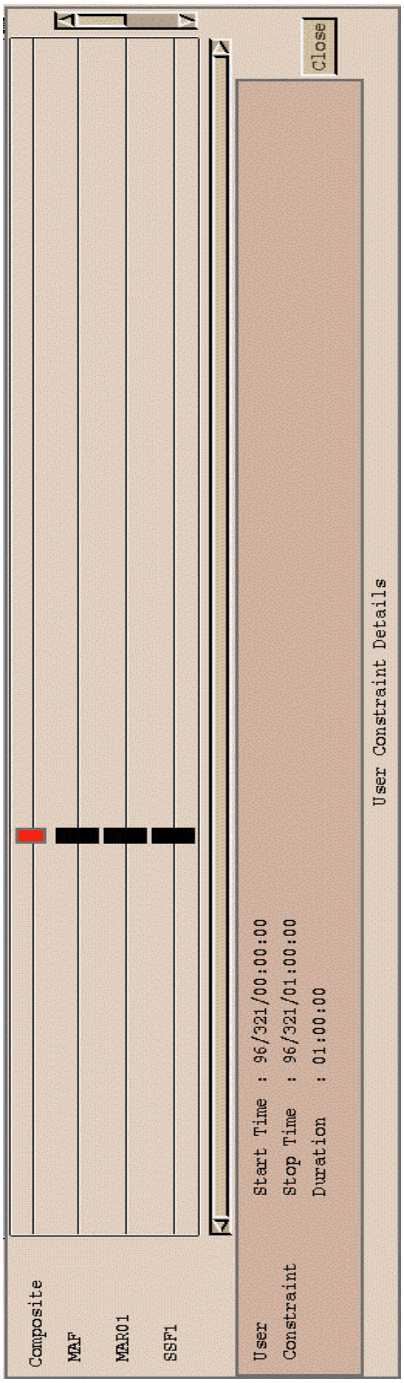


Figure 9-24. User Constraint Details Panel

9.3.15 Potential Conflicts Details Panel

9.3.15.1 General

a. This panel (see Figure 9-25) allows the user to select a potentially conflicting SAR composite and its component SARs and view its start, stop, and duration, both graphically and textually.

b. This panel is invoked upon selection of a Potential Conflict Timeline Object and subsequent activation of the `Review` pushbutton on the Schedule Planning panel (see Figure 9-15) or the `Review` pushbutton on the SAR Details panel (refer to paragraph 9.3.17). Double-clicking on a User Constraint Timeline Object performs the same action as selecting the Timeline Object and activating the `Review` pushbutton.

9.3.15.2 Panel Items

a. Potential Conflicts Composite Timeline. A single timeline displaying the User Constraint Composite Timeline Object selected from the parent panel.

b. Potential Conflicts Service/Resource Component Scrolling List. There is one timeline for each service/resource constraint that composes the User Constraint Composite.

c. Start Time Field. A time text field reflecting the start time of the selected user constraint Timeline Object.

d. Stop Time Field. A time text field reflecting the stop time range of the selected user constraint Timeline Object.

e. Duration Time Field. A time text field reflecting the duration of the selected user constraint Timeline Object.

f. CLOSE pushbutton. Removes the panel from the screen.

9.3.15.3 Panels

None.

9.3.15.4 Description

This panel allows the user to view the SAR components composing the selected Potential Conflict composite. Each component SAR is rendered in the color appropriate to its status. The details of each component SAR may be displayed in a status window at the bottom of the panel by selecting the component SAR.

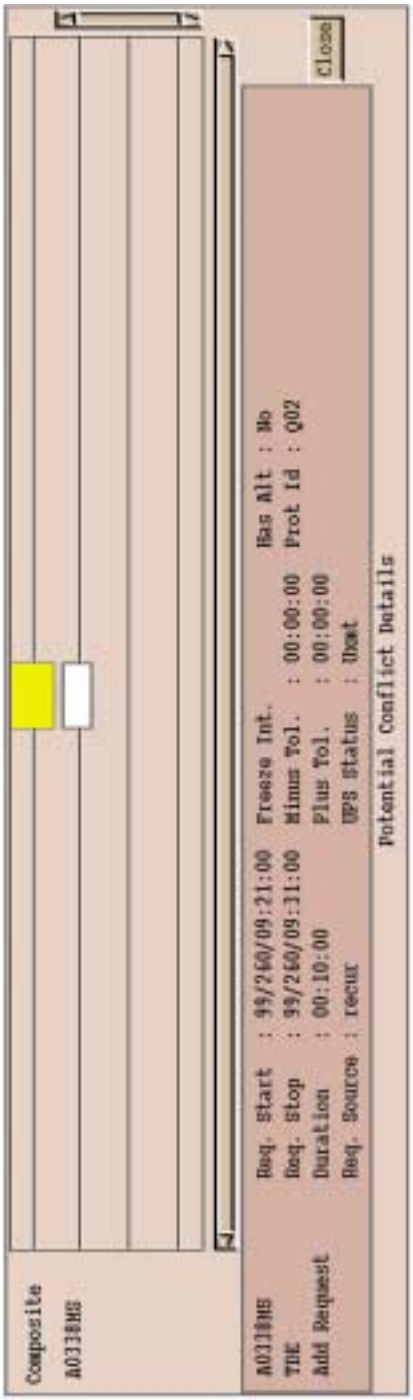


Figure 9-25. Potential Conflicts Details Panel

9.3.16 Alternate SAR Panel

9.3.16.1 General

a. This panel (see Figure 9-26) allows the user to control alternate SARs attached to a primary SAR. The user may create, view, edit, and transmit alternate SARs using this panel.

b. The panel is started by selecting the Alternate pushbutton on the Schedule Planning panel or by selecting the Alternate item from the popup menu on the Tabular Scheduling panel.

9.3.16.2 Panel Items

a. `Column Headings`. Column headings used to understand the information displayed in the Primary SAR and the Alternate SAR list.

b. `Primary SAR`. A single-line, non-selectable, tabular list of the primary SAR information. The information list is static and may not be modified.

c. `Alternate SAR List`. Vertically scrolling window composed of zero or more Alternate SARs and Replace Request test items. Alternate SARs are displayed as a "chain" with the top Alternate SAR being chained to the primary SAR. A replace request appears directly below the Alternate SAR that it is replacing. The column headings and information listed in this window, as well as for the primary SAR are:

1. `SUPIDEN`.
2. `TDRS`. Either a TDRS ID or a TDRS Set name.
3. `Start Time`. yy/ddd/hh:mm:ss.
4. `Stop Time`. hh:mm:ss.
5. `Duration`. hh:mm:ss.
6. `Source`. batch, recur, spcfc, genrc, bulkm.
7. `Type`. ALT, ADD or REP.
8. `UPS Sta`tus. Uxmt, XmtP, XmtA, XmtS.
9. `NCC Status`. cfmfrz, cfmflx, declne, reject, waitls, or blank.
10. `USM Fwd`. Status of USM forwarding to Electronic User.
11. `Proto`. Prototype ID (NCCDS, UPS, or RS) 1 alphabetic characters followed by 2 numeric characters.

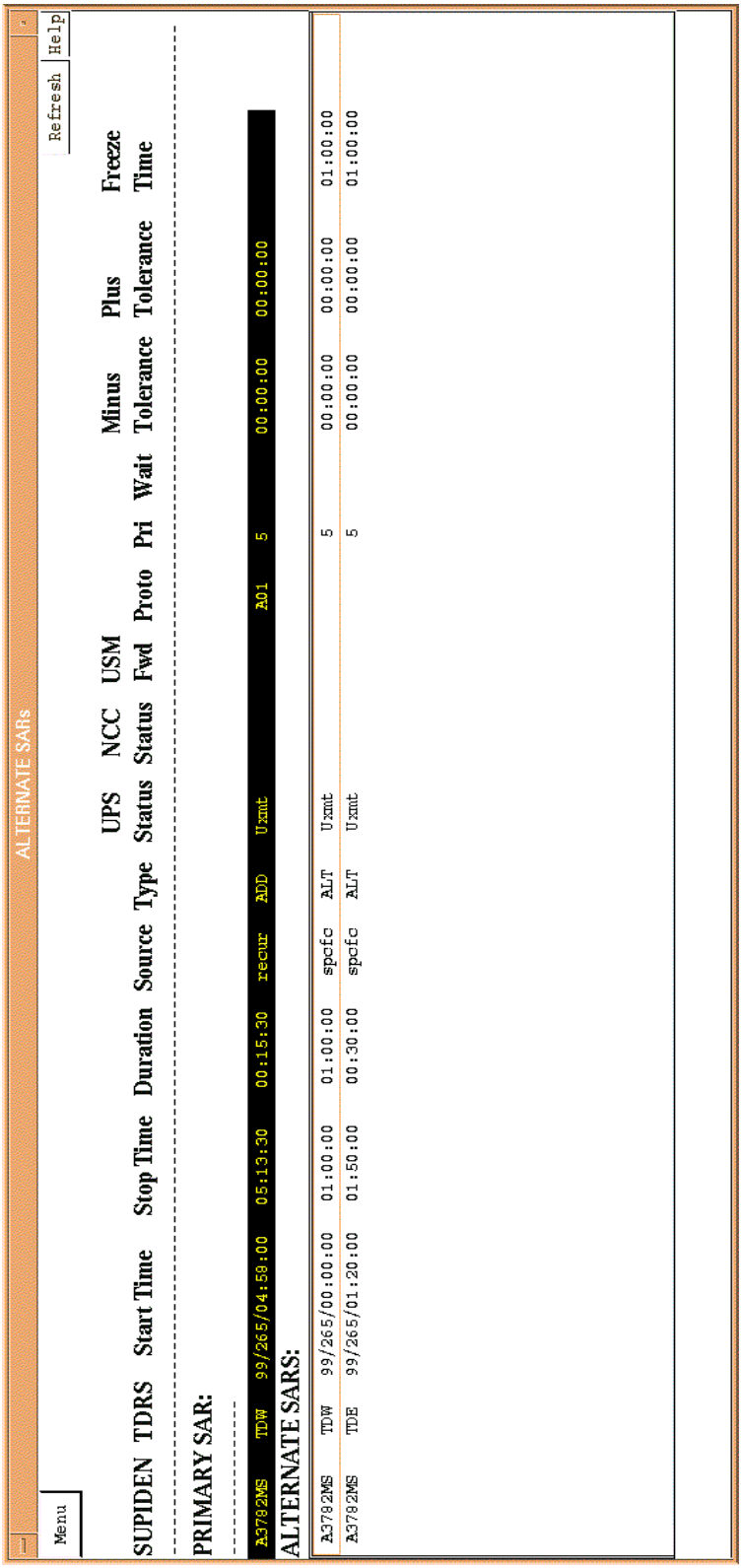


Figure 9-26. Alternate SAR Panel

12. `Pri`. SAR Priority: 1 to 9.

13. `Wait`. Wait List indicator; Y = Yes, blank = No.

14. Minus Tolerance. hh:mm:ss.

15. Plus Tolerance. hh:mm:ss.

16. Freeze Time. hh:mm:ss.

d. `Alternate SAR Menu`. Pop-up menu that lists actions that user is allowed to perform on alternate SARs and replace requests. The menu is invoked by clicking and holding down the right mouse button. The menu items displayed will be enabled or disabled depending upon which requests are selected. The menu items will be:

1. Review. Display details of an existing Alternate or Replace Request in read-only mode.

2. Add. Create a new Alternate SAR.

3. Modify. Modify an existing Alternate SAR or Replace Request.

4. Erase. Removes Alternate SARs or Replace Requests from the panel and the database.

5. Delete. Remove an Alternate SAR or Replace Request from the UPS and NCCDS.

6. Wait List. Transmit a Wait List request for a declined Alternate SAR or Replace Request.

7. Transmit. Transmit one or more Alternate SARs or a single Replace Request to NCCDS.

8. Change Status. Change the status of one or more transmitted Alternate SARs or Replace Requests, and all lower ranking Alternates to untransmitted.

9. Replace. Create a Replace Request for a transmitted, Alternate SAR.

e. `Refresh Pushbutton`. This pushbutton will always be enabled. It will normally be rendered with a standard background and text, and upon activation, will be rendered such that it is clear to the user that this panel is now in “refresh” mode. If not activated (not in “refresh” mode), this pushbutton will be rendered with a red background and black text when an alternate or replace request within the “chain” on the Alternate Panel has been modified and could not be refreshed. When the user activates this pushbutton, all request text items on the Alternate SAR Panel will be re-read from the database periodically and the Alternate SAR Panel will be re-rendered. If the pushbutton is rendered in red prior to activation, it will be re-rendered in the normal (activated) color upon activation. The pushbutton stays activated until the user “clicks” on it again, causing it to be rendered in its standard, non-activated colors. Activation of this pushbutton will deselect any schedule request text items that were previously selected.

f. Menu. A drop-down menu located at the left of the panel that has only one item. This item is CLOSE, which closes the Alternate SAR panel and returns control to the previous panel.

9.3.16.3 Panels

The following panels are displayed:

a. SAR Input Panel (see Figure 9-14).

b. SAR Details panel (see Figure 9-27).

c. Confirm Delete panel (see Figure 9-37).

d. Confirm Erase panel (see Figure 9-38).

e. Transmit Warning panel (see Figure 9-39).

f. Erase Warning panel (see Figure 9-40).

9.3.16.4 Description

This panel displays all Alternate schedule requests and their replace requests for a single SAR, selected from the Schedule Planning panel or the Tabular Scheduling panel, and lets the user perform numerous functions on the alternate schedule requests. These functions are listed in the Alternate SAR menu and are described in detail below. Whether a function can be performed depends on the status of the alternate SAR selected. If a function can be performed, its entry in the Alternate SAR menu is highlighted and selectable. If the function is not appropriate for the alternate SAR selected, its entry in the Alternate SAR menu is dimmed and not selectable.

a. Review. This menu item allows users to inspect an alternate SARs or Replace Request's configuration: service types, times, and Service Specification Code parameters. This menu item is enabled when one or more alternate SARs and/or Replace Requests, regardless of status, is selected. Each selected request is then displayed in turn on the SAR Details. Upon closing the SAR Details panel and returning to the Tabular Scheduling panel, the selected alternate SARs and/or Replace Requests will remain selected. If the alternate SAR or replace request has not been transmitted, the user may change to modify mode within the SAR Details panel.

b. Add. This menu item allows users to create a new alternate SAR.

1. This menu item is enabled in any of the following cases:

(a) There are no alternate SARs in the Alternate SAR List.

(b) The selected alternate SAR is untransmitted, and the one below it is untransmitted.

(c) The selected alternate SAR is untransmitted, and there is no alternate SAR below it.

(d) The selected alternate SAR is transmitted, its NCCDS status is NULL, and there are no alternate SARs below it.

(e) There are one or more untransmitted alternate SARs in the Alternate SAR List, and none are selected.

(f) There are one or more untransmitted alternate SARS in the Alternate SAR List, and one of these is selected.

2. When this menu item is chosen, the SAR Input panel (see Figure 9-14), will be invoked basing its default time values on either the SUPIDEN, TDRS, Start, Stop, Duration, plus/minus tolerances of the selected alternate SAR. If no alternate SAR has been selected, the default values for the SAR Input panel are based on the first SUPIDEN in the list, the first TDRS in the list, the Start time specified in the Select Schedule Data panel, a default duration, and the mission's default plus/minus tolerances. The user may then modify the alternate SARs SUPIDEN, TDRS, start, stop, and duration times fields. Upon activation of the SAR Input panel's Done pushbutton, the SAR Details panel will be invoked allowing the completion of the creation of the alternate SAR. When the user has finished creating the alternate SAR, and closes the SAR Details panel, returning to this panel, the new SAR will be selected in the Alternate SAR List. If the user aborts creation of the alternate SAR, the previously selected alternate SAR (if any) will be selected.

3. The newly created alternate SAR may be added to the Alternate SAR list in several different positions. If there were no alternate SARs in the list prior to creating the new alternate, it will be linked to the primary SAR. If alternate SARs already exists and none are selected, the newly created alternate SAR will be linked to the primary SAR and the alternate SAR previously linked to the primary SAR will be linked to the newly created alternate SAR. If alternate SARs already exists and one is selected, the newly created alternate SAR will be linked to the selected SAR and the alternate SAR previously linked to the selected SAR will be linked to the newly created alternate SAR.

c. Modify. This menu item allows users to modify alternate SARs or Replace Request's configuration: service types, times, and Service Specification Code parameters. This menu item is enabled when one or more untransmitted alternate SARs or a single untransmitted Replace Request is selected. The SAR Details panel is displayed as a result of selecting this menu item. Upon closing the SAR Details panel and returning to this panel, the selected requests will remain selected.

d. Erase. This menu item allows users to remove alternate SARs and Replace Requests from the UPS database and this panel without regard to there deletion at the NCCDS. This menu item will be enabled when one or more alternate SARs and or Replace Requests are selected, regardless of their status. Upon selection of this menu item, at least one Confirm Box will be displayed to assure the user's intention to erase the selected requests. Upon confirmation, the selected requests will be removed as follows:

1. If a selected request is a replace request, is will be erased from the Alternate SAR List and the UPS database. All requests referencing the erased request (i.e. Wait List or SDR) will also be deleted from the database.

2. If a selected alternate SAR is untransmitted, the request will be removed from the database and the Alternate SAR List. If an alternate SAR was linked to the erased alternate SAR it will be linked to the SAR that the erased alternate had been linked. All requests referencing each erased request (i.e. Wait List, SDR, or Replace) will also be deleted from the database.

3. If a selected alternate SAR has been transmitted, the alternate SAR and all lower ranking alternate SARs will be removed from the Alternate SAR list and the database. All requests referencing each erased request (i.e. Wait List, SDR, or Replace) will also be deleted from the database.

e. Delete. This menu item allows users to delete alternate SARs and/or Replace Requests from the NCCDS and the UPS database. This menu item will be enabled when one or more alternate SARs and/or Replace Requests are selected. Upon selection of this menu item, at least one Confirm Box will be displayed to assure the user's intention to erase the selected requests. Upon confirmation, the selected requests will be removed as follows:

1. If a selected alternate SAR is untransmitted, the request will be removed from the database and the Alternate SAR List. If an alternate SAR was linked to the deleted alternate SAR it will be linked to the SAR that the deleted alternate had been linked. All requests referencing each deleted request (i.e. Wait List, SDR, or Replace) will also be deleted from the database.

2. If a selected replace request is untransmitted, the request will be removed from the database and the Alternate SAR List. All requests referencing each deleted replace request (i.e. Wait List or SDR) will also be deleted from the database.

3. If a selected alternate SAR has been transmitted, an SDR will be generated and transmitted to the NCCDS.

4. If a selected replace request has been transmitted and has not been rejected or declined, an SDR will be generated and transmitted to the NCCDS.

5. If a selected replace request has been transmitted and has been rejected or declined, the request will be removed from the database and the Alternate SAR List. All requests referencing each deleted replace request (i.e. Wait List or SDR) will also be deleted from the database.

f. Wait List. This menu item allows users to create and *automatically transmit* to the NCCDS, a Wait List request for a declined alternate SAR or declined Replace Request. This menu item is enabled when a single declined alternate SAR or declined Replace Request has been selected. A confirmation box will be displayed as a result of selecting this option. Upon confirmation, a Wait List request will be created and transmitted to the NCCDS for the selected declined request.

g. Transmit. This menu item allows users to transmit one or more alternate SARs or Replace Requests to the NCCDS. This menu item will be enabled when one or more alternate SARs or Replace Requests are selected. Also, the request that the first selected request is linked to must have been transmitted. A confirmation box will be displayed as a result of selecting this option. Upon confirmation, the requests will be transmitted and de-selected. The REFRESH pushbutton at the top of the Alternate SAR panel will be automatically activated to provide the user with status updates regarding the transmitted requests.

h. Change Status. This menu item allows users to change the status of one or more alternate SARs and/or Replace Requests from transmitted to untransmitted. This menu item is provided as a contingency measure, should the status of these requests get out of "synch" with the NCCDS. This menu item will be enabled when one or more alternate SARs and/or Replace Requests, which have been transmitted but not confirmed, are selected. Selection of this menu item will display a confirmation panel. The requests will remain selected when the change status process is completed.

i. Replace. This menu item allows a user to create a Replace Request to replace an alternate SAR that has been transmitted to the NCCDS. This menu item is enabled when a single transmitted, non-declined, non-rejected SAR is selected. As a result of selecting this menu item, the SAR Details panel will be displayed, showing an identical configuration to the SAR being replaced. Upon modification of the request, and activating the Done pushbutton, a new Replace Request will be displayed beneath the alternate SAR being replaced. The user must transmit the Replace Request to effect the actual replacement of the SAR.

9.3.17 SAR Details Panel

9.3.17.1 General

a. This panel (see Figure 9-27) allows the user to create a new SAR or modify or review an existing SAR.

b. This panel is invoked by the user performing one of the following actions:

1. Completion of the ADD procedure begun on the Schedule Planning panel (refer to paragraph 9.3.19).
2. Selecting a SAR and activating the MODIFY pushbutton on the Schedule Planning panel (see Figure 9-15).
3. Selecting a SAR and activating the REVIEW pushbutton on the Schedule Planning panel (see Figure 9-15).
4. Double-clicking on a SAR (performs the same action as selecting a SAR and activating the REVIEW pushbutton) (refer to paragraph 9.3.5).
5. Activating the DONE pushbutton on the SAR Input panel, which is the resulting panel from the ADD procedure begun on the Tabular Scheduling panel.
6. Selecting a SAR and selecting the MODIFY menu item on the Tabular Scheduling popup menu.
7. Selecting a SAR and selecting the REVIEW menu item on the Tabular Scheduling popup menu.

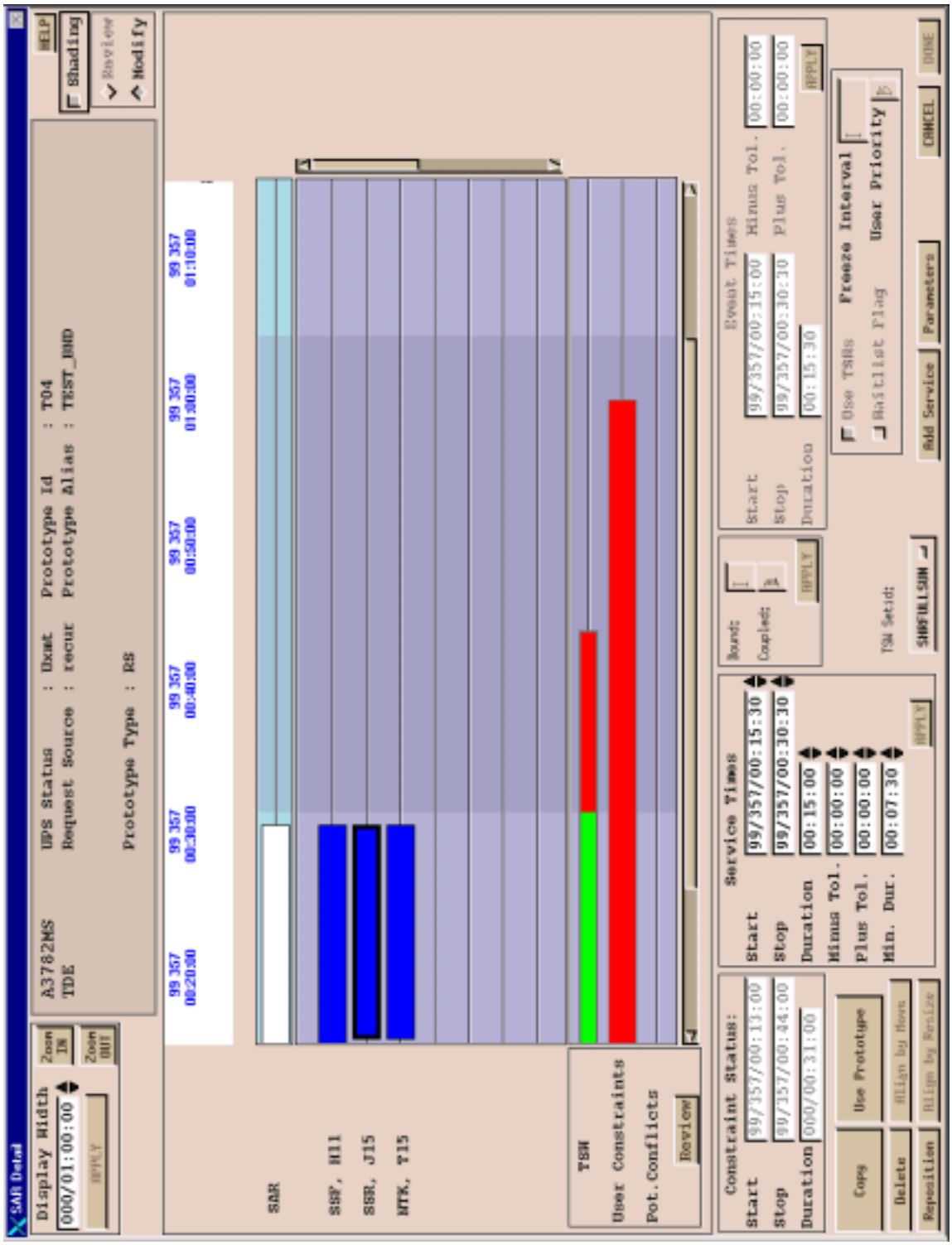


Figure 9-27. SAR Details Panel

9.3.17.2 Panel Items

a. Display Width Time Field. Adjusts the timeline width to be the time shown in this field.

b. Zoom-In Pushbutton. Adjusts the timeline width by decreasing the shown time scale by a factor of 2.

c. Zoom-Out Pushbutton. Adjusts the timeline width by increasing the shown time scale by a factor of 2.

d. Shading Checkbox. Controls the display of day/night shading (if "in-sun" orbital information is available). This item is not visible if the "Show Day/Night Shading Scheduling" checkbox of the Default Scheduling Parameters Panel (refer to paragraph 9.5) is not checked.

e. Review/Modify Radio Buttons. A pair of radio buttons that displays the current mode of the panel. The panel may be changed from Review to Modify if the SAR has a status of untransmitted or confirmed; once changed to Modify, the mode may not be changed back to Review.

f. SAR Envelope Timeline. One timeline at the top of the panel displays a graphic depicting the duration and any tolerance "wings" of the displayed SAR. The graphic always envelops all composite services.

g. Service Timeline Scrolling List. There is one timeline for each possible service of a SAR. A Timeline Object depicting the service duration will be displayed for each service within the SAR. Each service is labeled with the service type and service specification code ID.

h. SAR/Service Constraints List. Three timelines are displayed directly under the Service Timeline scrolling list: TSWs/TUTs, User Constraints, and Potential Conflicts.

NOTE

These are not available when this panel is invoked from Tabular Scheduling.

i. REVIEW (constraint) Pushbutton. Invokes a detail panel depicting the components of a selected TSW/TUT, User Constraint, or Potential Conflict Timeline Object.

NOTE

These are not available when this panel is invoked from Tabular Scheduling.

j. Constraint Start Time Field. A time text field reflecting the start time of the selected constraint (TSW or User Constraint).

k. Constraint Stop Time Field. A time text field reflecting the stop time of the selected constraint.

l. Constraint Duration Time Field. A time text field reflecting the difference between the selected constraint's stop time and start time.

m. Service Start Time Field. A time text field reflecting the start time of the selected service.

n. Service Stop Time Field. A time text field reflecting the stop time of the selected service.

o. Service Duration Time Field. A time text field reflecting the difference between the selected service's stop time and start time.

p. Event Start Time Field. A time text field reflecting the SAR start time.

q. Event Stop Time Field. A time text field reflecting the SAR stop time.

r. Event Duration Time Field. A time text field reflecting the difference between the event stop time and the event start time.

s. Minus Tolerance Time Field. A time text field reflecting the SARs minus tolerance.

t. Plus Tolerance Time Field. A time text field reflecting the SARs plus tolerance.

u. COPY SERVICE Pushbutton. Creates (adds) a new service of the same type as the selected one to the SAR.

v. DELETE SERVICE Pushbutton. Removes the selected service from the SAR. If the service is a "normal" service and has an associated simulation service, both will be removed.

w. REPOSITION SERVICE Pushbutton. Visually rearranges the order of the displayed services.

x. ALIGN BY MOVE Pushbutton. Aligns the end point (start or stop time) of a selected service with the end point of another service within the SAR, by moving the first service.

y. ALIGN BY RESIZE Pushbutton. Aligns the end point (start or stop time) of a selected service with the end point of another service within the SAR by stretching or shrinking the first service.

z. ADD SERVICE Pushbutton. Allows a service to be added to the SAR. Invokes the Add Service panel.

aa. USE PROTOTYPE Pushbutton. Allows a prototype event to be specified for the SAR. Invokes the Use Prototype Event panel.

bb. PARAMETERS Pushbutton. Invokes the service parameters panel for the selected service for review or modification.

cc. CANCEL Pushbutton. Aborts any modifications to the displayed SAR and removes the SAR Details panel from the screen.

dd. DONE Pushbutton. Validates the modified SAR and, upon successful validation, commits it to the database, and then removes this panel from the screen.

9.3.17.3 Panels

The following panels are displayed:

a. Add Service panel (to add services to a SAR).

b. Use Prototype Event panel (to use a prototype event ID for a SAR).

c. Service Parameter Input panels (for respecifying parameters).

d. TSW Details panel.

e. TUT Details panel.

f. User Constraint Details panel.

g. Potential Conflict Details panel.

h. TSW Service Type Details panel.

i. TUT Service Type Details panel.

j. User-Defined Resource Constraint Details panel.

k. Potential Resource Conflict Details panel.

l. Validation error panels.

9.3.17.4 Description

a. This panel enables the user to edit new SARs or modify or review existing SARs.

b. The SUPIDEN, TDRS, source, prototype ID (if applicable), and UPS and NCCDS statuses of the SAR are shown in a status window at the top of the panel. A graphic reflecting the start, stop, and duration of the SAR, as well as any tolerances, is displayed in the SAR Envelope window near the top of the panel. If the user has the "Show Day/Night Shading Scheduling" checkbox of the Default Scheduling Parameters Panel (refer to paragraph 9.5) checked, "in sun" orbital information is available, and the Shading checkbox is checked (on this panel), day/night shading will be displayed in the SAR Envelope and Services windows. The Shading checkbox will always be unchecked upon each invocation of the SAR Details panel. The SAR times are shown in the event and tolerance time fields below the service timelines. The SAR color displayed is the same as that shown on the Schedule Planning panel. Below the SAR Envelope is a scrolling list of service timelines that display a service graphic, one per timeline.

c. Clicking on the SAR Envelope highlights and enables the event and tolerance times fields for modification if in modify mode. Clicking on a service highlights it and displays the service times in the service times fields. The service times fields are enabled for modification if in modify mode.

d. If the user has entered the SAR Details panel in the review mode, no SAR or service editing is allowed. Service parameters may be reviewed but not modified by activating the PARAMETERS pushbutton or double-clicking on the service Timeline Object. The user may switch to modify mode, if the SARs status supports this operation (e.g., untransmitted SAR) by clicking on the Modify radio button. Once the panel is in modify mode, the user may not switch back to review mode.

e. If the SAR Details panel is in modify mode, the user may modify the SAR by clicking on an end point of the SAR Envelope graphic and stretching or shrinking the start or end time. Similar operations are allowed on a service graphic. The digital values of the SAR or service times reflect the graphic representation. Modifying the SAR or service times updates the graphic to reflect the modifications.

f. If the user has entered the SAR Details panel by adding a new SAR (refer to paragraph 9.3.19 for details), a SAR graphic reflecting the duration is shown on the SAR Envelope timeline, and no services are displayed in the service timelines. The user must either add services to complete the SAR or choose a prototype event ID. The panel is in modify mode when adding a new SAR.

g. The SAR Granularity parameters (accessed from the Default Scheduling Parameters panel) are taken into consideration when moving or modifying a SAR. These parameters force the SAR to move, shrink, or expand using these granularities. The following example assumes the SAR Start Time Granularity is set to 1 minute and the SAR Stop Time Granularity is set to 30 seconds. Thus, if the SAR has a start time of 00:00:02 (HH:MM:SS) and a stop time of 00:20:05, as the user moves the SAR forward in time, stretches the start time of the SAR, or stretches the minus tolerance, these fields change 1 minute at a time. The SAR Stop Granularity of 30 seconds is used as the user stretches the stop time of the SAR or the plus tolerance.

h. The relationship between the SAR Envelope and its constituent services is as follows:

   1. When new services are added to the SAR, the service duration inherits the current SAR event times.

   2. Whenever a service is added or deleted or an existing service time is altered, the SAR event times will be adjusted (if necessary) such that it envelops all of the services.

   3. When a service period extends before the start time of the encompassing SAR, the SAR start time (and duration) will be extended to match the service start time.

   4. When a service period extends beyond the end of the encompassing SAR, the SAR stop time (and duration) will be extended to match the service end time.

5. If the entire SAR event is moved by grabbing the SAR body or by modifying the SAR start time via the keyboard, all services will be moved in relation to the SAR.

6. If the SAR is expanded by grabbing and dragging the SAR start time, all services move with respect to the SAR start time, and the service(s) whose stop time is coincident with the stationary SAR stop time will be expanded.

7. If the SAR is expanded by grabbing and dragging the SAR stop time, only the service(s) whose stop time is coincident with the SAR stop time will be expanded. All other services will remain stationary.

8. If the SAR is compressed by grabbing and dragging the SAR stop time, the stop time of the service(s) - as each service becomes coincident with the SAR stop time - will be compressed. The SAR duration will not be compressed beyond the point where the trailing service duration is less than 1 minute.

9. If the SAR time is compressed by modifying the SAR stop time or duration via the keyboard, only the service(s) whose stop time is coincident with the SAR stop time will be compressed. The SAR stop time and duration will not be allowed to be truncated below the minimum trailing service duration or the minimum SAR duration.

10. If the SAR is compressed by grabbing and dragging the SAR start time, then all services, as their start time becomes coincident with the SAR start time, will be compressed along with the SAR. The SAR duration will not be compressed beyond the point where the earliest service duration is less than 1 minute.

11. A simulation service is always associated with the existing Forward or Return service that precedes it in the service timeline list (hereafter referred to as the host service). This association will be established when the simulation service is initially added.

12. If a simulation service's host service is moved (either by dragging or by align-moving), then the simulation service also moves with the host service and maintains the relative timing relationship with the host.

13. If a simulation service's host service is deleted, the simulation service will also be deleted.

14. When a simulation service is created, its times shall be the same as its host service times.

15. A simulation service time may be changed provided the entire service is within the period covered by its host service.

16. If the host service time is altered by being stretched or shrunk by dragging an end point, then one of the following apply:

    (a) If the simulation service time was coincident with its host before the change, then the simulation service time will track the host's change.

    (b) If the simulation service time was not coincident, then the simulation service will not be altered (unless the host time is moved beyond the Simulation service time, at which time the above rule will then apply.)

i. During mission setup, prototype service start, stop, and duration times can be left empty (blank, not all zeros). In this case, when this panel is used to create a SAR using the prototype, service times will default to the event times.

j. Three "constraints" timelines appear directly beneath the service timelines: TSWs/ TUTs, User Constraints, and Potential Conflicts. If the user has selected a TSW Superset (on the Schedule Planning panel/TSW Superset panel), Timeline Objects will be displayed and the associated REVIEW pushbutton will be active.

k. The constraints timelines display two different types of constraints depending upon whether the SAR (in the SAR Envelope Window) is selected or a service is selected. If the SAR is selected, the constraints Timeline Objects displayed are of a composite by SAR, equivalent to those Timeline Objects shown on the Schedule Planning panel's TSW/TUT, User Constraints, and Potential Conflicts timelines. When the user selects a service, the constraints Timeline Objects displayed are of a composite by service.

l. Note that neither TSWs nor TUTs are shown when a simulation or tracking service is selected (TSWs and TUTs are inapplicable for simulation and tracking services). Note also that no Potential Conflicts are shown when a tracking service is selected (there are no potential conflicts for tracking services).

m. If a non-tracking, non-simulation service was selected the TSW Timeline Object displayed is the TSW Service Type Composite Timeline Object, which represents a composite of all the components that compose a TSW service type. The colors shown for a TSW Service Composite Timeline Object are according to the following legend:

    1. Green. Service is available.

    2. Red. UAV present, but at least one enabled constraint is blocking.

n. If the user has selected the Display TUTs menu item on the Schedule Planning panel and a non-tracking, non-simulation service was selected, the TUT Timeline Object displayed is the TUT Service Type Composite Timeline Object, which represents a composite of all the components that compose a TUT service type. There will be only one component for TUTs and it is rendered in green.

o. The User Constraints displayed when a service is selected are those that are appropriate for the selected service, and are rendered in red. (For example, if the selected service is a KSAF open service, any constraints for KSAF antenna 1 or 2 would be displayed.)

p. When the user selects a single constraint Timeline Object (multiple selection is not supported), the REVIEW pushbutton is enabled.

q. Activating the REVIEW pushbutton while a constraint Timeline Object is selected results in the invocation of the appropriate constraint details panel (TSW Details panel, TUT Details panel, TSW Service Type Details panel, TUT Service Type Details panel, User Constraint Details panel, User-Defined Resource Constraint Details panel, Potential Conflicts Details panel, or Potential Resource Conflicts Details panel).

r. Double-clicking on a constraint Timeline Object is equivalent to selecting the constraint Timeline Object and activating the REVIEW pushbutton.

s. To save any SAR/service modifications, the user activates the DONE pushbutton. The UPS will validate the modified SAR. If successful and if the user modified a confirmed SAR, a Replace Request will be generated. The generated or modified SAR will be validated against the TSWs and overlapping/separation rules (refer to paragraph 9.3.27.4 Consistency Validation). The SAR will be stored in the database with the service field set to “specfc”. The SAR Details panel will be removed from the screen, and control will be returned to the Schedule Planning panel.

9.3.18 Use Prototype Event Panel

9.3.18.1 General

This panel (see Figure 9-28) enables the user to obtain a list of available prototype events for the current SUPIDEN, and upon selection of a prototype event, the appropriate information is copied to the SAR Details panel. This list is displayed by clicking on the USE PROTOTYPE pushbutton located on the SAR Details panel.

9.3.18.2 Panel Items

a. Prototype Events. A scrolling textlist displaying the prototype IDs, aliases, and generation type (NCCDS-defined or UPS-defined) for the current SUPIDEN. Clicking on an entry causes the prototype ID to be displayed in the text entry box, and the alias to be displayed as a label. The ENTER pushbutton is then enabled for confirmation of the selection.

b. Prototype ID Text Field. A text entry field that allows the user to directly enter a prototype ID and also displays the prototype ID if selected from the prototype events scrolling textlist.

c. ENTER Pushbutton. The selected prototype event ID, alias, and related service specification codes will be copied to the appropriate areas on the SAR Details panel.

d. CLOSE Pushbutton. Removes the Use Prototype Event panel from the screen.

9.3.18.3 Panels

No sub-panels are displayed.

9.3.18.4 Description

a. A single selection list of available prototype events is displayed. Each entry contains the prototype event ID, alias, and generation type (NCCDS-defined or UPS-defined). When the user makes a selection, the prototype ID and alias are copied to the Prototype ID text field and label. Upon activation of the ENTER pushbutton, the prototype ID, alias, and related service specification codes are copied to the appropriate areas on the SAR Details panel. Double clicking on a prototype event item in the selection list performs the same function as selecting the item and activating the ENTER pushbutton.

b. The Use Prototype Event panel will remain displayed until the user clicks on the CLOSE pushbutton or until the SAR Details panel is closed.

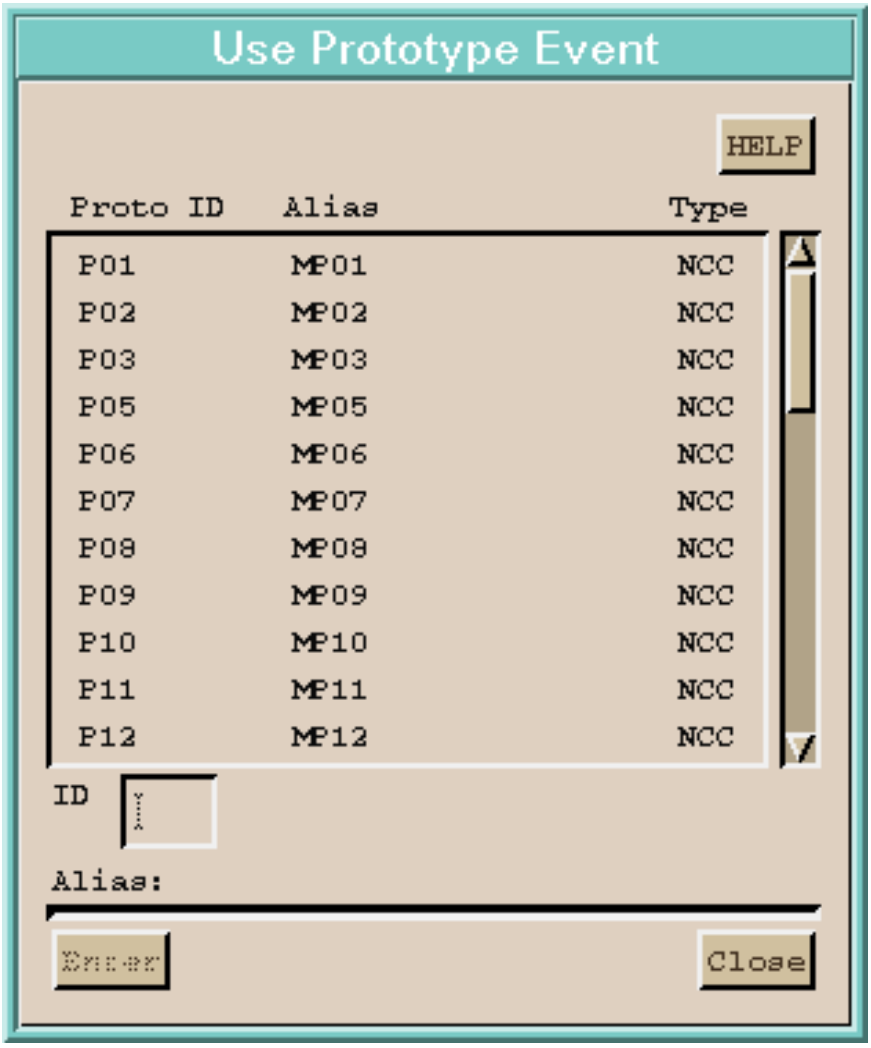


Figure 9-28. Use Prototype Event Panel

9.3.19 Add Service Panel

9.3.19.1 General

This panel (see Figure 9-29) enables the user to obtain a list of available service specification codes for the current mission (SIC). A selection from this list will be automatically copied to the appropriate area on the SAR Details panel. This list is displayed by clicking on the Add Service pushbutton located on the SAR Details panel.

9.3.19.2 Panel Items

a. Service Specification Codes Scrolling Textlist. A list displaying the service specification codes, aliases, and service types for the current mission (SIC). Clicking on an entry causes the service specification code to be displayed in the CC text entry box and the alias and service type to be displayed as labels. The ENTER pushbutton is then enabled for confirmation of the selection.

b. Service Type Radio Buttons. A series of radio buttons that allow the user to specify the service type of the service specification codes (e.g., MA Return, SSA Forward, etc.) to be displayed in the Service Specification Codes scrolling textlist.

c. CC Text Field. A text entry field that allows the user to directly enter a service specification code ID and also displays the service specification code ID if selected from the service specification codes scrolling textlist

d. ENTER Pushbutton. The selected service specification code ID, alias, service type, and associated information will be copied to the appropriate areas on the SAR Details panel.

e. CLOSE Pushbutton. Removes the Add Service panel from the screen.

9.3.19.3 Panels

None.

9.3.19.4 Description

a. A single selection list of available service specification codes is displayed. Each entry contains the service specification code ID, alias, and service type. When the user makes a selection, the service specification code ID, alias, and service type are copied to the CC text field and associated labels. Upon activation of the ENTER pushbutton, the service specification code ID, alias, service type, and related information are copied to the appropriate areas on the SAR Details panel. Double clicking on a service specification code entry in the selection list performs the same function as selecting the item and activating the ENTER pushbutton.

b. The Add Service panel will remain displayed until the user clicks on the CLOSE pushbutton or until the SAR Details panel is closed.

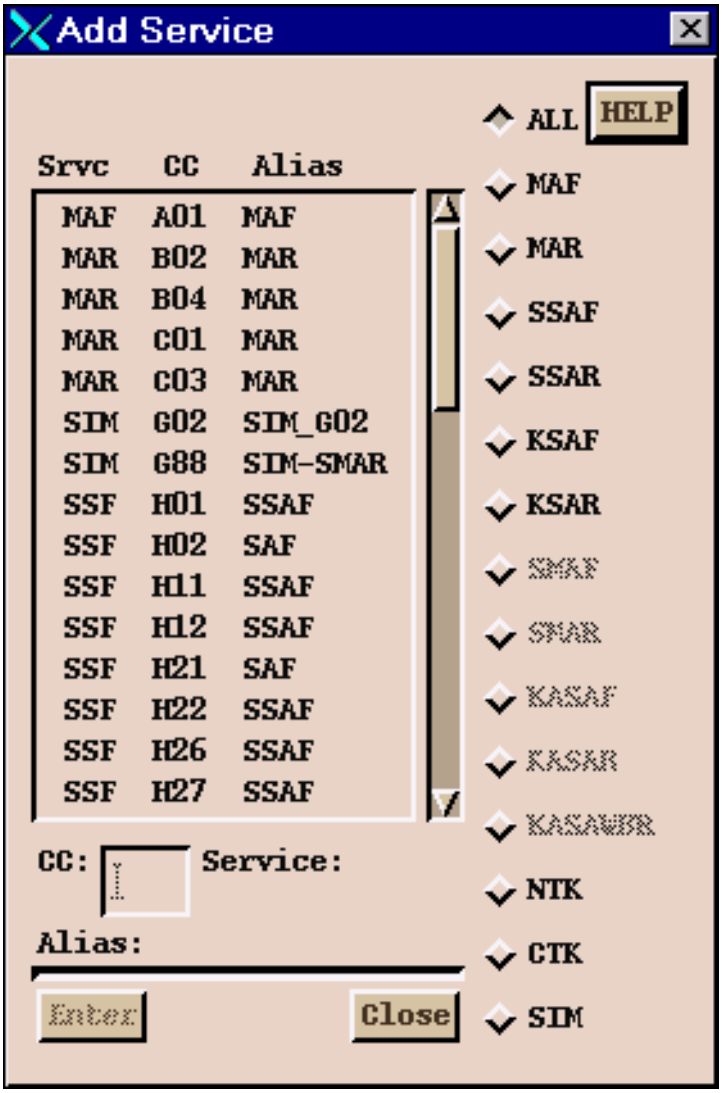


Figure 9-29. Add Service Panel

9.3.20 TSW Service Type Details Panel

9.3.20.1 General

a. This panel (see Figure 9-30) allows the user to select a component of the TSW service appropriate to the selected service, and view its start, stop, and duration, both graphically and textually.

b. This panel is invoked upon activation of the REVIEW pushbutton on the SAR Details panel (see Figure 9-27). Double-clicking on a TSW Timeline Object performs the same action as selecting the Timeline Object and activating the REVIEW pushbutton.

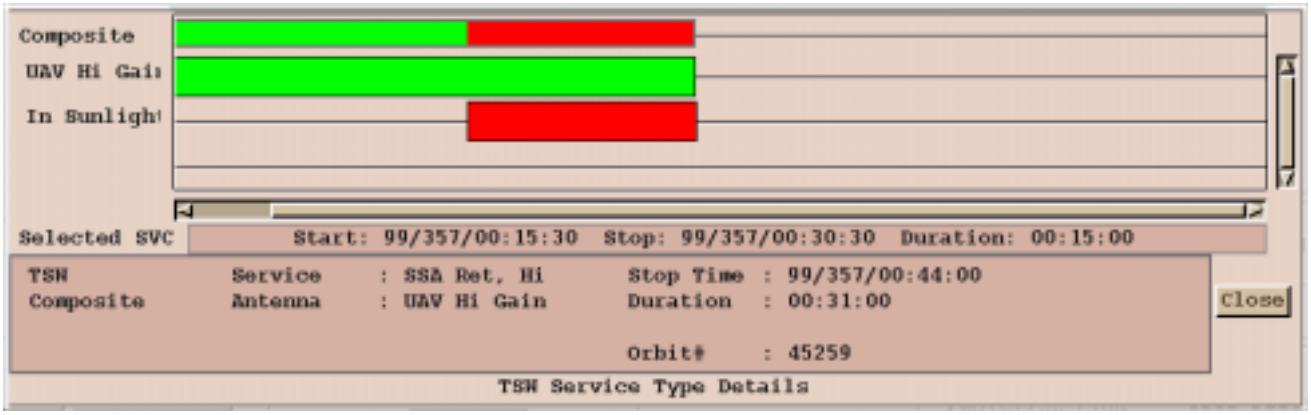


Figure 9-30. TSW Service Type Details Panel

9.3.20.2 Panel Items

a. TSW Service Type Composite Timeline. A single timeline displaying the TSW Service Type Composite Timeline Object selected from the parent panel.

b. TSW Service Component Scrolling List. There is one timeline for each component that composes the TSW Service Type Composite.

c. TSW Start Time Field. A time text field reflecting the start time of the selected TSW Timeline Object.

d. TSW Stop Time Field. A time text field reflecting the stop time range of the selected TSW Timeline Object.

e. TSW Duration Time Field. A time text field reflecting the duration of the selected TSW Timeline Object.

f. Orbit Number Field. A numeric field reflecting the orbit number of the TSW.

g. Service Type Field. This field is only displayed when the TSW Service Type Timeline Object is selected, and reflects the service type and antenna gain (high or low).

h. Antenna Field. This field is only displayed when the TSW Service Type Timeline Object is selected, and reflects the SA antenna number ("Open" if open scheduled) or MA antenna type and link ("Open" if open scheduled).

i. Selected Service Start Time Field. A time text field reflecting the start time of the selected service.

j. Selected Service Stop Time Field. A time text field reflecting the stop time range of the selected service.

k. Selected Service Duration Time Field. A time text field reflecting the duration of the selected service.

l. CLOSE Pushbutton. Removes the panel from the screen.

9.3.20.3 Panels

None.

9.3.20.4 Description

a. This panel allows the user to view the TSW Service Type components composing the selected TSW Service Type composite.

b. For FDF missions, the composite consists of the UAV and PSAT data for a service TSW (KH, KL, SH, SL, MH, or ML), notched out by anomalies. The main body of the TSW Service Type Composite Timeline Object is rendered in green, with anomalies rendered in red. It is identical to one of the Timeline Objects shown in the TSW Details Service Type Timelines Window.

c. The UAV will be displayed as the first component Timeline Object, and is rendered in green. All anomalies are displayed below the UAV as component Timeline Objects, and are rendered in red.

d. For non-FDF missions, the composite consists of TCW data for one service. The main body of the TSW Service Type Composite Timeline Object is rendered in green. It is identical to one of the Timeline Objects shown in the TSW Details Service Type Timelines Window. The composite's service will be displayed as the first and only component Timeline Object, and is rendered in green. No orbital points (anomalies) are displayed.

e. The start time, stop time, duration, and other pertinent information of a selected Timeline Object are displayed in a status window at the bottom of the panel.

f. Additionally, the start time, stop time, and duration of the selected (non-tracking, non-simulation) service from the SAR Details Service timelines will be displayed for reference.

9.3.21 TUT Service Type Details Panel

9.3.21.1 General

a. This panel (see Figure 9-31) allows the user to select a component of the TUT service appropriate to the selected service, and view its start, stop, and duration, both graphically and textually.

b. This panel is invoked upon activation of the `REVIEW` pushbutton on the SAR Details panel (see Figure 9-27). Double-clicking on a TUT Timeline Object performs the same action as selecting the Timeline Object and activating the `REVIEW` pushbutton.

9.3.21.2 Panel Items

a. TUT Service Type Composite Timeline. A single timeline displaying the TUT Service Type Composite Timeline Object selected from the parent panel.

b. TUT Service Component Scrolling List. There is one timeline for each component that composes the TUT Service Type Composite.

c. TUT Start Time Field. A time text field reflecting the start time of the selected TUT Timeline Object.

d. TUT Stop Time Field. A time text field reflecting the stop time range of the selected TUT Timeline Object.

e. TUT Duration Time Field. A time text field reflecting the duration of the selected TUT Timeline Object.

f. Orbit Number Field. A numeric field reflecting the orbit number of the TUT.

g. Service Type Field. This field is only displayed when the TUT Service Type Timeline Object is selected, and reflects the service type and antenna gain (high or low).

h. Antenna Field. This field is only displayed when the TSW Service Type Timeline Object is selected, and reflects the SA antenna number (“Open” if open scheduled) or MA antenna type and link (“Open” if open scheduled).

i. Selected Service Start Time Field. A time text field reflecting the start time of the selected service.

j. Selected Service Stop Time Field. A time text field reflecting the stop time range of the selected service.

k. Selected Service Duration Time Field. A time text field reflecting the duration of the selected service.

l. CLOSE Pushbutton. Removes the panel from the screen.

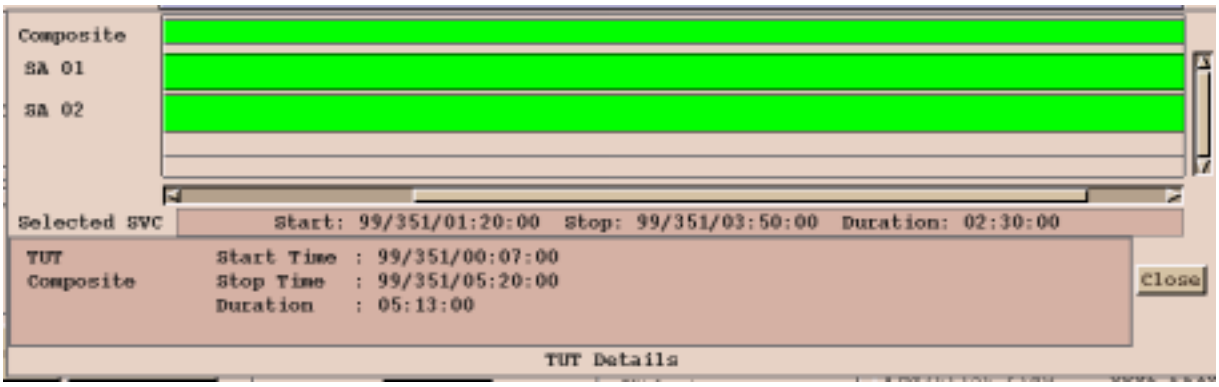


Figure 9-31. TUT Service Type Details Panel

9.3.21.3 Panels

None.

9.3.21.4 Description

a. This panel allows the user to view the TSW Service Type components composing the selected TSW Service Type composite.

b. For FDF missions, the composite consists of the UAV and PSAT data for a service TSW (KH, KL, SH, SL, MH, or ML), notched out by anomalies. The main body of the TSW Service Type Composite Timeline Object is rendered in green, with anomalies rendered in red. It is identical to one of the Timeline Objects shown in the TSW Details Service Type Timelines Window.

c. The UAV will be displayed as the first component Timeline Object, and is rendered in green. All anomalies are displayed below the UAV as component Timeline Objects, and are rendered in red.

d. For non-FDF missions, the composite consists of TCW data for one service. The main body of the TSW Service Type Composite Timeline Object is rendered in green. It is identical to one of the Timeline Objects shown in the TSW Details Service Type Timelines Window. The composite's service will be displayed as the first and only component Timeline Object, and is rendered in green. No anomalies are displayed.

e. The start time, stop time, duration, and other pertinent information of a selected Timeline Object are displayed in a status window at the bottom of the panel.

f. Additionally, the start time, stop time, and duration of the selected (non-tracking, non-simulation) service from the SAR Details Service timelines will be displayed for reference.

9.3.22 User-Defined Resource Constraint Details Panel

9.3.22.1 General

a. This panel (see Figure 9-32) allows the user to select a user-defined resource constraint component and view its start, stop, and duration, both graphically and textually.

b. This panel is invoked upon activation of the REVIEW pushbutton on the SAR Details panel (see Figure 9-27). Double-clicking on a User Constraint Timeline Object performs the same action as selecting the Timeline Object and activating the REVIEW pushbutton.

9.3.22.2 Panel Items

a. User Constraint Composite Timeline. A single timeline displaying the User Constraint Composite Timeline Object selected from the parent panel.

b. User Constraint Service/Resource Component Scrolling List. There is one timeline for each service/resource constraint that composes the User Constraint Composite (KSA SIM, KSF1, KSF2, KSR1, KSR2, MAF, MAR01-MAR19, SSA/MA SIM, SSF1, SSF2, SSR1, SSR2).

c. User Constraint Start Time Field. A time text field reflecting the start time of the selected user constraint Timeline Object.

d. User Constraint Stop Time Field. A time text field reflecting the stop time range of the selected user constraint Timeline Object.

e. User Constraint Duration Time Field. A time text field reflecting the duration of the selected user constraint Timeline Object.

f. Selected Service Start Time Field. A time text field reflecting the start time of the selected service.

g. Selected Service Stop Time Field. A time text field reflecting the stop time range of the selected service.

h. Selected Service Duration Time Field. A time text field reflecting the duration of the selected service.

i. Selected Service Resource Field. A text field reflecting the SA antenna number (“Open” if open scheduled) or MA antenna type and link (“Open” if open scheduled).

j. CLOSE Pushbutton. Removes the panel from the screen.

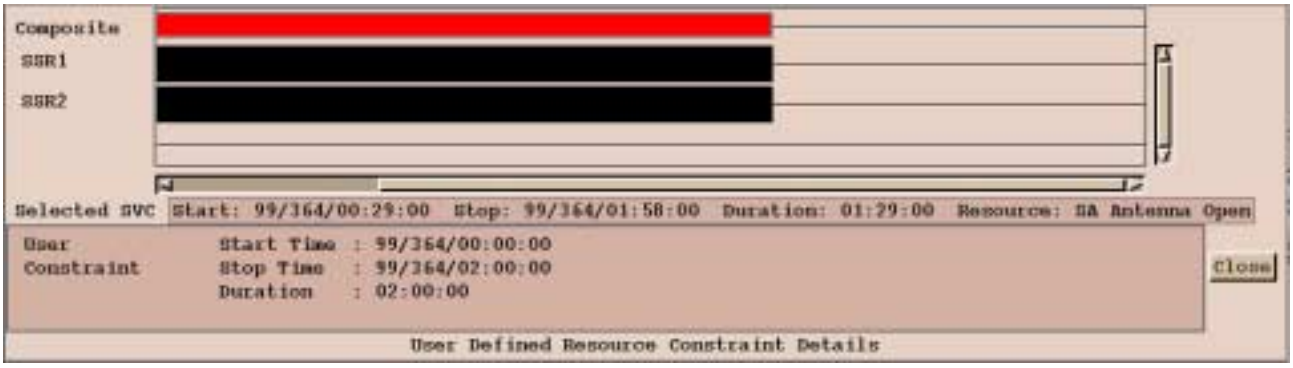


Figure 9-32. User-Defined Resource Constraint Details Panel

9.3.22.3 Panels

None.

9.3.22.4 Description

a. This panel allows the user to view the service/resource constraint components composing the selected User-Defined Resource Constraint composite. Each component that is pertinent to the selected service on the SAR Details panel is displayed by TDRS service and resource (e.g., KSA Antenna 1 or MA Link 10), and is rendered in black.

b. Additionally, the start time, stop time, duration, and resource (e.g., SA Antenna 1 or MAR Antenna 5 or SA Antenna "Open" if open scheduled) of the selected non-tracking service from the SAR Details Service timelines will also be displayed for reference.

c. The start time, stop time, and duration of each selected Timeline Object is displayed in a status window at the bottom of the panel.

9.3.23 Potential Resource Conflict Details Panel

9.3.23.1 General

a. This panel (see Figure 9-33) allows the user to select a potential resource conflict and view its start, stop, and duration, both graphically and textually.

b. This panel is invoked upon activation of the REVIEW pushbutton on the SAR Details panel (see Figure 9-27). Double-clicking on a potentially conflicting Timeline Object performs the same action as selecting the Timeline Object and activating the REVIEW pushbutton.

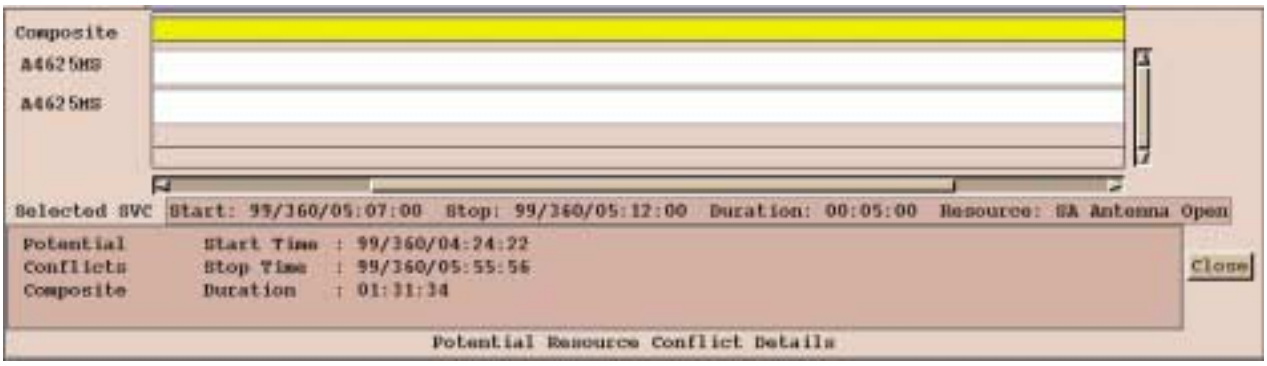


Figure 9-33. Potential Resource Conflict Details Panel

9.3.23.2 Panel Items

a. Potential Resource Conflict Composite Timeline. A single timeline displaying the Potential Resource Composite Timeline Object selected from the parent panel.

b. Potential Resource Conflict Component Scrolling List. There is one timeline for each potentially conflicting service (by resource) that composes the Potential Conflict Composite.

c. Start Time Field. A time text field reflecting the start time of the selected potential resource conflict service or composite Timeline Object.

d. Stop Time Field. A time text field reflecting the stop time range of the selected potential resource conflict service or composite Timeline Object.

e. Duration Time Field. A time text field reflecting the duration of the selected potential resource conflict service or composite Timeline Object.

f. SUPIDEN Field. A text field reflecting the SUPIDEN of the selected potential resource conflict service Timeline Object.

g. Service Type Field. A text field reflecting the service type (e.g., KSAR) of the selected potential resource conflict service Timeline Object.

h. Resource Field. A text field reflecting the resource type (e.g., Single Access [SA] Antenna 2 or K-band Single Access [KSA] Simulator) of the selected potential resource conflict service Timeline Object.

i. UPS Status Field. A text field reflecting the UPS status of the selected potential resource conflict service Timeline Object.

j. NCC Status Field. A text field reflecting the NCCDS status of the selected potential resource conflict service Timeline Object.

k. Minus Tolerance Time Field. A time text field reflecting the minus tolerance of the selected potential resource conflict service Timeline Object.

l. Plus Tolerance Time Field. A time text field reflecting the plus tolerance of the selected potential resource conflict service Timeline Object.

m. Selected Service Start Time Field. A time text field reflecting the start time of the selected service.

n. Selected Service Stop Time Field. A time text field reflecting the stop time range of the selected service.

o. Selected Service Duration Time Field. A time text field reflecting the duration of the selected service.

p. Selected Service Resource Field. A text field reflecting the SA antenna number (“Open” if open scheduled) or MA antenna type and link (“Open” if open scheduled).

q. CLOSE Pushbutton. Removes the panel from the screen.

9.3.23.3 Panels

None.

9.3.23.4 Description

a. This panel allows the user to view the times and NCCDS/UPS status of potentially conflicting services of SARs composing the selected Potential Resource Conflict Composite Timeline Object. The Potential Resource Conflict Composite Timeline Object is a composite of services using a TDRS resource (i.e., SA 1, SA 2, MAR links, SMAR links, MAF, and SMAF) or, for a simulation service, using an SGLT simulator resource (i.e., KSA simulator, SSA/MA/SMA simulator) for all other SUPIDENs using this TDRS in the UPS database where the mission allows other missions to view their SARs. The Timeline Object includes the tolerances (if any) of each SAR containing a potentially conflicting service resource in its graphic size calculation, as the tolerance would apply to the service.

b. Each component potential resource conflict is displayed one per timeline, rendered using the same color(s) as the SAR in which the service is a constituent.

c. Additionally, the start time, stop time, duration, and resource (e.g., SA Antenna 1 or MAR Antenna 5 or SA Antenna "Open" if open scheduled) of the selected non-tracking service from the SAR Details Service timelines will also be displayed for reference.

d. The start time, stop time, duration, and other pertinent information about the selected Timeline Object are displayed in a status window at the bottom of the panel.

9.3.24 Service Parameter Input

9.3.24.1 General

a. These panels enable the user to respecify the respecifiable parameters of different services. They are the same as the service parameter panels discussed in paragraphs 7.8.6 through 7.8.14, except that the fixed parameter portions and the DELETE buttons are disabled.

b. These panels are initiated by selecting the Parameters button on the SAR Details panel.

9.3.24.2 Panel Items

Refer to paragraph 7.8 for respecifiable parameters data fields and action buttons (except DELETE) of related service.

9.3.24.3 Panels

No sub-panels are displayed.

9.3.24.4 Description

These panels enable the user to respecify the respecifiable parameters of different services. Each service type has different service parameter input screens, which are the same as those for defining the service specification codes when initially setting up the mission. When performing scheduling tasks, the fixed parameter portion will be disabled because the user is not allowed to change any fixed parameter. Only the respecifiable parameters can be modified. DELETE is also disabled during scheduling sessions.

9.3.25 Bulk Modify Event

9.3.25.1 General

This panel (see Figure 9-34) allows the user to change a single data field across events in bulk mode. It is initiated by either of the following:

a. Bulk Modify menu item on the Tabular Scheduling panel (Figure 9-12).

b. `Bulk Modify` button on the Schedule Planning panel (Figure 9-15).

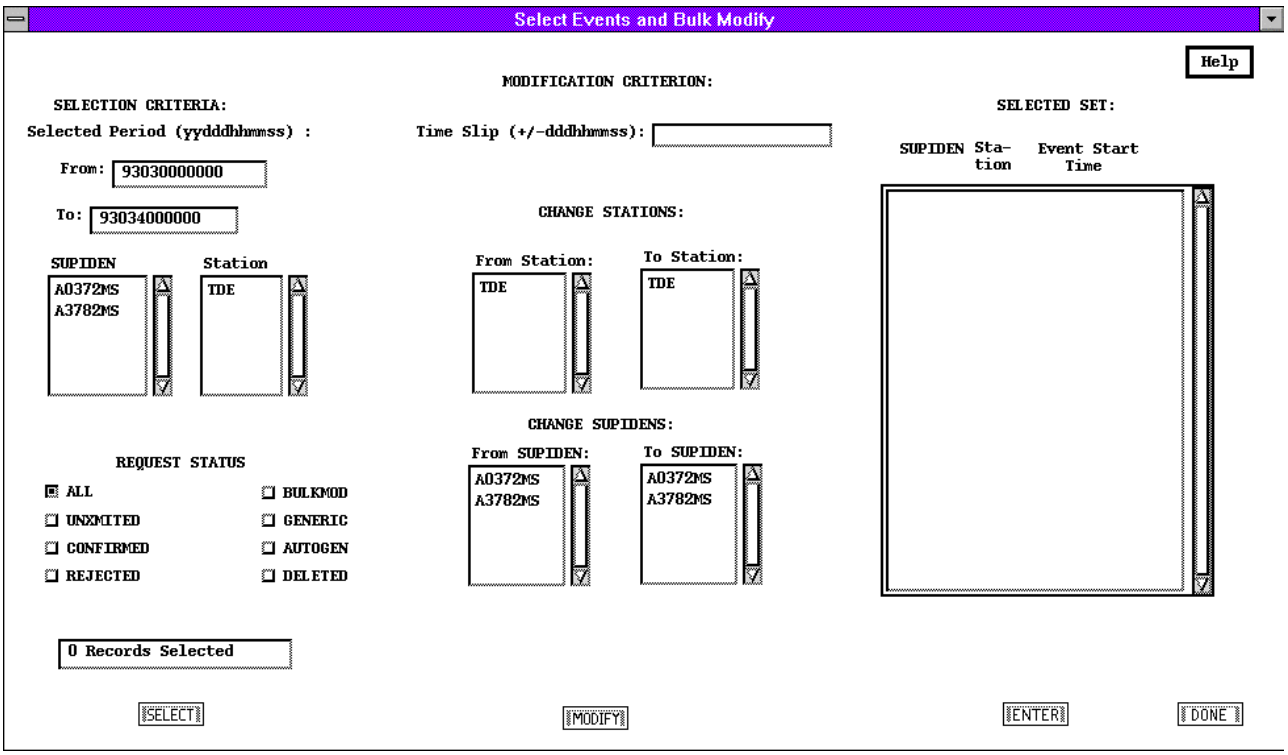


Figure 9-34. Bulk Modify Event Panel

9.3.25.2 Panel Items

a. Selection Criteria (optional). Criteria to select schedule requests to be bulk modified:

   1. Selected Period-Text fields. Both start (From) and stop (To) times are required.

   2. Request Status-Checkboxes. At least one must be checked.

   3. SUPIDEN. A textlist shows all SUPIDENs that you specified in the Select Schedule Data panel (Figure 9-11). At least one must be selected.

   4. STATION. A textlist shows all TDRS stations that you specified in the Select Schedule Data panel (Figure 9-11). At least one must be selected.

b. Modification Criterion (required). One of three possible modification criteria may be chosen:

   1. Time Slip. Slips the absolute event time by the specified interval.

   2. Change Station. Changes TDRS station. Select a FROM station and a TO station. All instances of the FROM station in the Selected Set will be changed to the TO station.

   3. Change SUPIDENS. Select a FROM SUPIDEN and a TO SUPIDEN. All instances of the FROM SUPIDEN in the Selected Set will be changed to the TO SUPIDEN.

c. Selected Set. The SUPIDENs, Stations, and Event Start Times of the selected events are displayed here in a scrolling text list. This list is for display only.

d. SELECT Button. After choosing Selection Criteria, push the Select button to fetch the records from the database and display them in the Selected Set list.

e. MODIFY Button. After specifying a Modification Criterion, push this button to apply the modification to the Selected Set in the local buffer. Pushing this button does not modify the database. You can loop through the process of selecting and applying a modification criterion as often as you need to.

f. ENTER Button. Updates the database.

g. DONE. Exits from the panel.

9.3.25.3 Panels

The following panels may be displayed:

a. Bulk Modify Validation Warning panel (Figure 9-35).

b. Validation Messages panel (Figure 9-36).

9.3.25.4 Description

a. This panel allows the user to slip an event schedule, change a TDRS station, or change a SUPIDEN for multiple events in bulk mode. Users may select the set to be modified by specifying selection criteria on this panel or by selecting the set on an ancestor panel (Tabular Scheduling or Graphic Scheduling). If the user selects the set on an ancestor panel, the selection criteria section of the Bulk Modify Panel will not be displayed.

b. Upon activation of the ENTER pushbutton, UPS saves the newly modified SARs. Each SAR is validated in accordance with the validation level set by the Mission Coordinator. Bulk Modify does not check for service conflicts within individual SARs. Such conflicts will have been reported when the original SAR was built. For SARs which have been transmitted to the NCCDS, UPS will generate a Replace Request to replace the original request. For SARs which have not yet been transmitted, UPS deletes the old SAR from the database and adds the new one.

c. All generated SARs and Replace Requests are stored in the database with source BULKMOD for later retrieval.

9.3.26 Bulk Modify Validation Warning Panel

9.3.26.1 General

This panel (Figure 9-35) is raised if UPS detects validity violations in Bulk-Modified SARs.

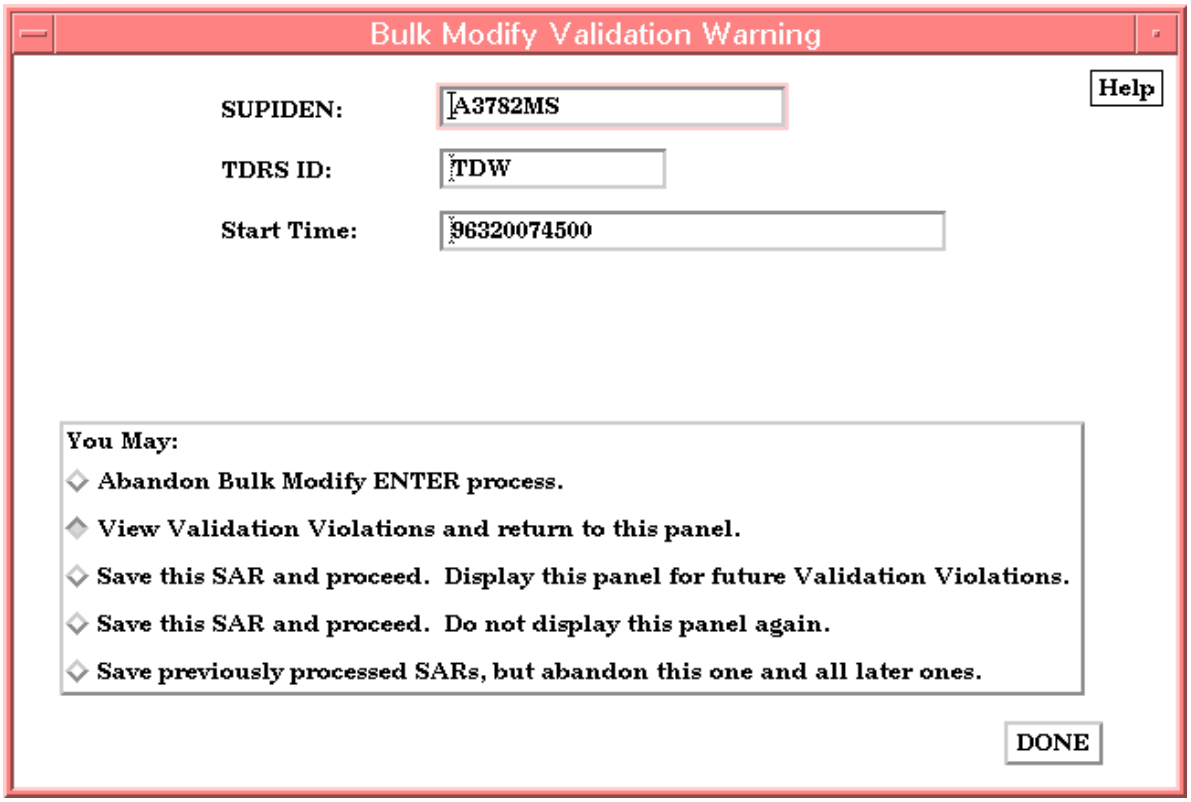


Figure 9-35. Bulk Modify Validation Warning Panel

9.3.26.2 Panel Items

a. SUPIDEN-Display only. The SUPIDEN from the offending SAR is displayed.

b. TDRS ID-Display only. The TDRS ID from the offending SAR is displayed.

c. Start Time-Display only. The event start time from the offending SAR is displayed.

d. Abandon Bulk Modify Enter Process. If you choose this, no database update whatsoever will occur. You will be returned to the Bulk Modify panel.

e. View Validation Violations and return to this panel. The Validation Messages panel will be raised, displaying specific validity warning(s).

f. Save this SAR and proceed. Display this panel for future Validation Violations. UPS updates the database with the current SAR, and proceeds with the ENTER process. If subsequent SARS provoke validity warnings, the Bulk Modify Validation Warning panel is displayed again.

g. Save this SAR and proceed. Do not display this panel again. This choice is like the previous one, except that the Bulk Modify Validation Warning panel is not displayed again for the rest of the ENTER process, event if validity violations are detected. At the end of the ENTER process UPS will show you a summary list of all of the validation warnings. You will have another opportunity to abort the database update process at that time.

h. Save previously processed SARs, but abandon this one and all later ones. SARs already processed are saved to the database. The ENTER process is terminated.

9.3.26.3 Panels

The Validation Messages panel (Figure 9-36) may be displayed.

9.3.26.4 Description

If UPS detects a validity violation during the Bulk Modify ENTER process this panel is raised. It allows you to take any one of several actions (described above) in response to the validity violation.

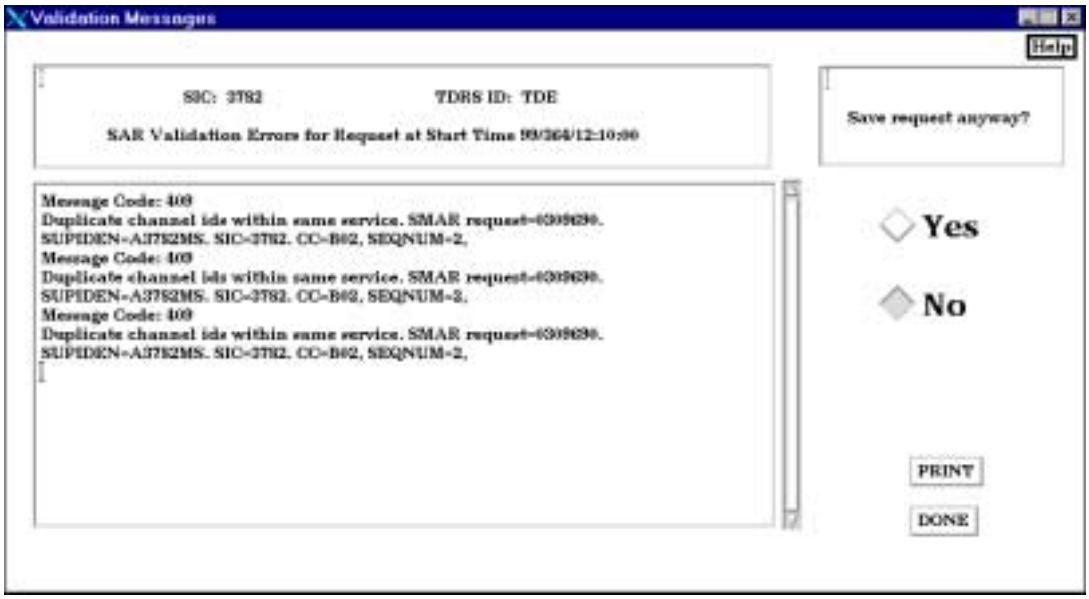


Figure 9-36. Validation Messages Panel

9.3.27 SAR Validation

9.3.27.1 General

a. The UPS performs four types of validations on received or input SARs: rudimentary checks, orbital checks, interservice constraint checks, and consistency checks. To allow users to turn on or off all or part of the SAR validation, the UPS splits the validation (except orbital constraint checking which has a separate menu selection) into four levels. Validation at any level indicates that the SAR has successfully passed the previous lower levels of validation. The four levels are as follows:

   1. Syntax and range checking (level 1).
   2. Cross-field checking (level 2).
   3. Interservice constraint checking (level 3).
   4. Consistency checking (level 4).

b. In addition, a validation option (level 0) is provided for turning off all types of SAR validation (except orbital validation).

c. Select validation level from the Default Scheduling Parameters (refer to paragraph 9.5) panel in the mission setup session before starting the scheduling process. Validation of the SAR will proceed through each level up to the level specified by the user, provided the SAR passes each previous validation level and the total error count does not exceed the maximum number allowed.

d. The SAR validation rules used by the UPS are subject to current SN (Space Network) resource capabilities and constraints as well as ground rules associated with different ground stations. The SAR validation rules that the UPS follows are detailed in Appendix C.

e. UPS validation is based on the STGT numbers rather than the WSGT numbers. When support is from the WSGT, the user should ignore the UPS error message if it is only valid for the STGT and transmit the SAR to the NCCDS anyway. UPS validation is primarily an assistance tool for users to identify any potentially invalid SAR which may be rejected by the NCCDS. In addition, the validation numbers are stored in the UPS database and are easily changed if needed.

f. The following subsections provide more detailed information on each type of validation.

9.3.27.2 Rudimentary Validation

There are two types of rudimentary validation: syntax/range and cross-field checking.

a. Syntax/range checks are performed on individual fields. As the name implies, they validate that the value of each field is syntactically correct and that it is in the allowed range of values, as specified in the POCC/NCCDS Data Format Control Document (formerly STDN 230.1). Certain fields such as service specification codes and user interface channel IDs are also validated against the UPS database to ensure that the values have been specified by the user during mission setup.

b. Cross-field checks fall into two general classes: inappropriate field checks and more general cross-field checking.

   1. Inappropriate field checks ensure that certain fields are empty for a given service configuration. A frequently occurring example is that when a service is defined to be a non-shuttle service, fields specifically identified as shuttle related are inappropriate.

   2. The more general validation rules verify such things as channel IDs used within a service must all be unique, and initial data rates must not exceed maximum data rates.

NOTE

Specific rudimentary checks, beyond simple syntax checking, are described in Appendix C.

9.3.27.3 Interservice Constraint Validation

a. Once a schedule request has passed rudimentary validation, each service in the request will be compared against the other services in the request to ensure the parameters specified do not conflict with another service. Appendix C describes the rules against which the schedule request is checked. Additionally, each service in the request will be validated against any user-defined constraints that may be set, indicating a particular service is not accessible at a particular time (refer to paragraph 9.6 regarding User-Defined/TDRS Constraints).

b. When violation of any of these rules is detected, the UPS displays an appropriate error message along with identifying service information of the offending service(s).

NOTE

Each of the above error messages is followed by text identifying the offending service(s) within the SAR.

9.3.27.4 Consistency Validation

a. The consistency checks mainly focus on resource usage to ensure that services within and amongst SARs for the same mission and the same TDRS are free of resource conflicts in the UPS database. The resources subject to UPS conflict checking include MA and SA antennas and tracking and simulation equipment.

b. The consistency checks use two sets of consistency rules: one for services within the same SAR, and another for services in different SARs (see Appendix C). When violation of any of these rules is detected, the UPS displays, on the validation message panel, an appropriate error message, and the minimum separation time required between the two services. The minimum separation time is the setup time or interval required between consecutive usage of a resource. The resource setup times are currently input directly to the UPS database via SQL commands. If the setup time of a resource is not found in the UPS database, a zero value is assumed.

c. In the inter-SAR consistency check, the SARs retrieved from the database for comparison may contain unwanted or unmatched SARs, which will affect the accuracy of the consistency validation. UPS cannot detect unmatched SARs, so the effectiveness of the consistency check between SARs depends on the frequency of UPS database cleanup for unwanted or unmatched SARs by the users. The users can remove any unwanted SARs from the UPS database via the ERASE button on the Schedule Data Tabular (or Graphic) display.

NOTE

1. Note the following explanatory inclusions:

   a. When the message is for services within a SAR, the message includes the following explanation:

      <service specification code> with relative start <hhmmss> and <service specification code> with relative start <hhmmss> (in SAR with <SUPIDEN>, <TDRS ID>, <event start time>) should be separated by at least <dd> seconds.

   b. When the message is for services between SARs, it includes the following explanation:

      <service specification code><sequence no.> with relative start <hhmmss> (in SAR with <SUPIDEN>, <TDRS ID>, <event start time>) and <service specification code><sequence no.> with relative start <hhmmss> (in SAR with <SUPIDEN>, <TDRS ID>, <event start time>) should be separated by at least <dd> seconds.

c. If conflicting SARs have the same SUPIDEN, the message also includes the following text:

Both SARs have same SUPIDEN and should be combined into one event.

2. The < > in the messages above denotes variable text that will be inserted by the UPS software.

9.3.27.5 Orbital Validation

a. Independent of rudimentary, constraint, and consistency checking, UPS performs validation of a requested event against orbital data. The default choice for interactive-user orbital validation is selected on the Default Scheduling Parameters panel (see Figure 9-42). The default choice for electronic-user orbital validation is made on the Autoprocessing Parameters panel (see Figure 7-3) and is not selectable on a SAR-by-SAR basis.

b. This section contains a description of the algorithm used to perform the validation of an event against orbital data. The orbital data used is a preprocessed form called TSWs, which are formed from data describing the UAVs and PSATs. A more complete description of TSWs and their generation can be found in Appendix D. A TSW represents a window of time where communication is possible using a given service.

c. Orbital validation takes place in two stages. First, an event is checked 'as is'. Events fail TSW validation when they cannot be scheduled 'as is'. No attempt is made to shift an event in order to fit it into available TSWs. This is because NCCDS currently does no orbital validation and will not shift an event for that reason.

d. When an event fails TSW validation, a further check is made to see if any solution exists within the event's scheduling tolerance window. If one is found, the user is advised (in the validation report) of a time shift that will get the event to validate.

e. The algorithm used to find a scheduling solution does not attempt to find the "best" possible schedule, it merely determines if one exists. It works as follows:

Within the tolerance limits there are a number of candidate TSWs for each service in the event. There is some "shift" time that will make a single service start at the same time as one of its candidate TSWs. Thus, there is a set of candidate shifts, one for each candidate TSW. If a set of scheduling solutions exists, it MUST contain at least one of these candidate shifts. If the entire event is shifted to the earliest time permitted (i.e., the minus tolerance), some of the services will fall within TSWs and some will not. If the event is shifted slowly forward in time, some of the services will fall into a TSW and some will fall out. A solution must have all services dropping into a TSW and at least one service starting at the exact beginning of a TSW.

9.3.28 Validation Messages Panel

9.3.28.1 General

This panel is raised when validity violations are detected (see Figure 9-36).

9.3.28.2 Panel Items

a. Header (Display only). A description of the origin of the validity violations (SAR validation, service specification code validation, etc.).

b. Messages (Display only). A scrolling text display of the validation messages.

c. Query Box (Display only). If UPS needs a Yes/No answer from you, the question is displayed here.

d. Response Buttons. Radio buttons to select Yes or No*.

e. PRINT Button. Generates a hardcopy listing of the validation messages.

f. DONE Button. Exits from the panel.

9.3.28.3 Panels

None.

9.3.28.4 Description

This panel is raised when validity violations are detected. In some cases, it serves simply as a display, and the only active panel items are the DONE and PRINT buttons. In this mode, the query box and the response radio buttons are not displayed. In other cases, the UPS module raising the panel will query the user as to whether to accept the offending item in spite of the validity warning. The query box and response buttons will be displayed.

9.3.29 Confirm Delete of SAR

9.3.29.1 General

This panel (see Figure 9-37) appears when the user attempts to delete a SAR.

9.3.29.2 Panel Items

a. SAR Information. Text box to display information specific to the current SAR.

b. Delete Request. Button to confirm deletion of the current SAR.

c. Delete This Request, Rest Of Batch; No More Confirmation. Button to confirm the deletion of current SAR; signals system to delete all other selected SARs without prompting user for confirmation.

d. Do Not Delete This Request. Button to cancel the deletion of the current SAR.

e. Do Not Delete This Request or Any of the Rest of the Batch. Button to cancel the deletion of the current SAR and any remaining scheduled SARs.

9.3.29.3 Panels

None.

9.3.29.4 Description

This panel allows the user to delete selectively from a batch or to abort the delete operation. The user may select only one button.

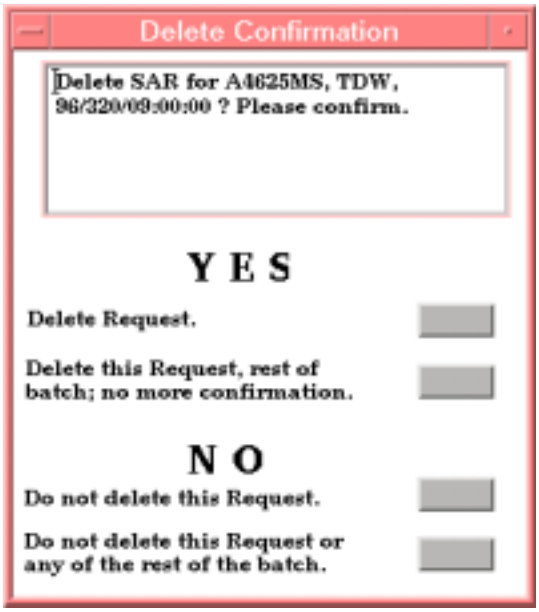


Figure 9-37. Confirm Delete of SAR Panel

9.3.30 Confirm Erase of SAR

9.3.30.1 General

This panel (see Figure 9-38) appears when the user attempts to erase multiple SARs using the Schedule Planning panel.

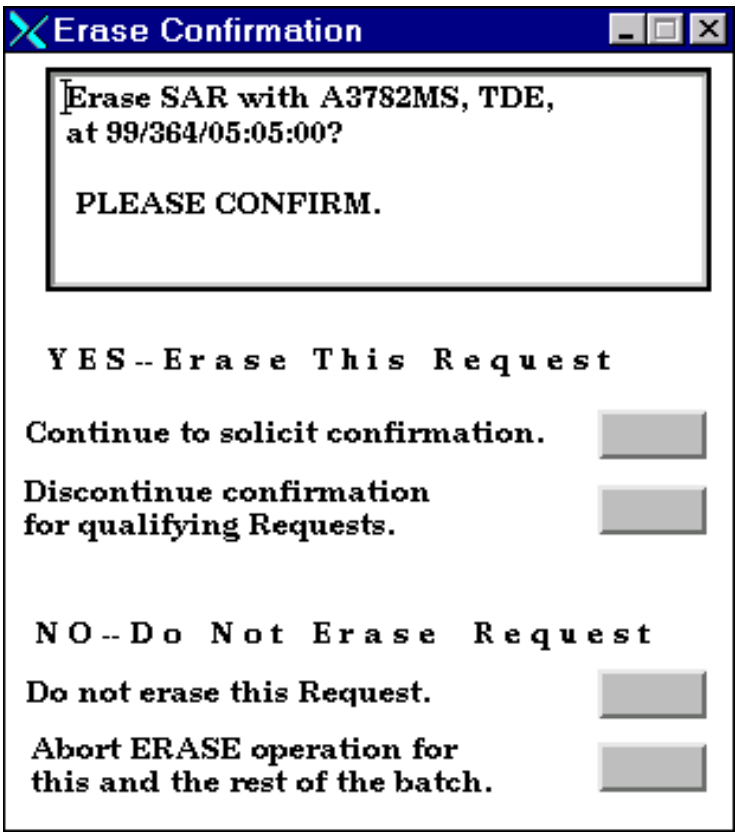


Figure 9-38. Confirm Erase of SAR Panel

9.3.30.2 Panel Items

a. SAR Information. Text box to display information specific to the current SAR.

b. Continue to Solicit Confirmation. Button to confirm erase of current SAR. User will be prompted to confirm erase of remaining SARs.

c. Discontinue Confirmation for Qualifying Requests. Button to confirm erase of current SAR and all remaining selected SARs.

d. Do Not Erase This Request. Button to cancel erase of the current SAR.

e. Abort Erase Operation for This and the Rest of the Batch. Button to cancel erase for the current SAR and all remaining selected SARs.

9.3.30.3 Panels

None.

9.3.30.4 Description

This panel allows the user to erase SARs selectively from a batch or to abort the operation. The user may select only one button.

9.3.31 Transmit Warning

9.3.31.1 General

This panel (see Figure 9-39) appears if the status of a schedule request selected for transmission is other than untransmitted.

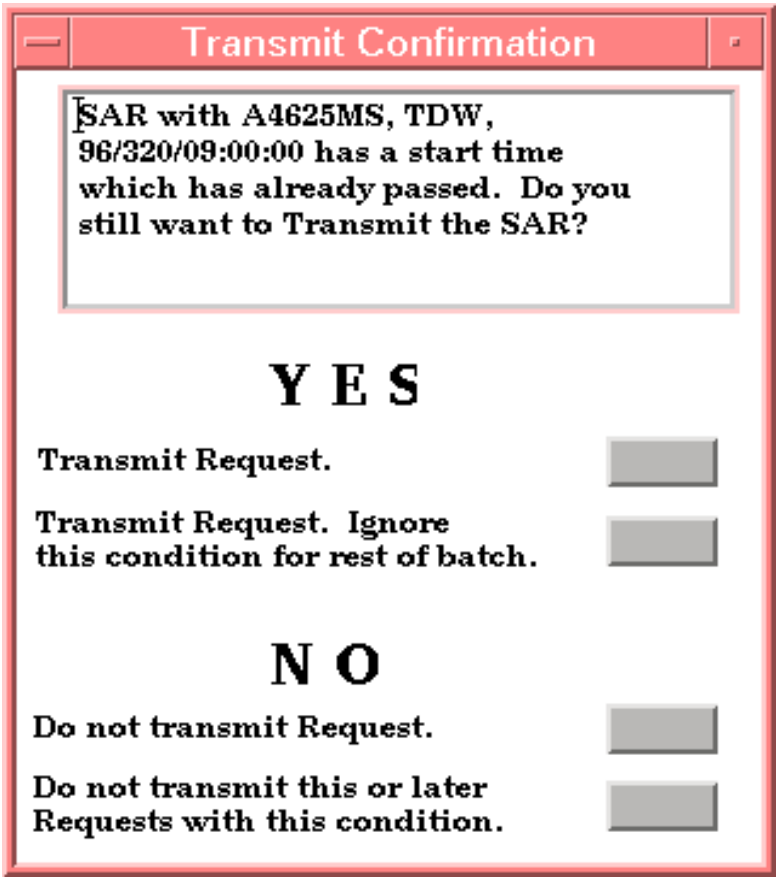


Figure 9-39. Transmit Warning Panel

9.3.31.2 Panel Items

a. SAR Information. Text box to display information specific to the current SAR.

b. Transmit Request. Button to confirm transmission of the current SAR.

c. Transmit Request-Ignore This Condition for Rest of Batch. Button to confirm transmission of the current SAR and any remaining SARs with same condition. No prompt for confirmation of the remaining SARs will be displayed.

d. Do Not Transmit Request. Button to cancel transmission of current SAR.

e. Do Not Transmit This or Later Requests With This Condition. Button to cancel transmission of current SAR and any remaining SARs having the same condition.

9.3.31.3 Panels

None.

9.3.31.4 Description

This panel allows the user to override selectively the confirmation warnings that are issued when an attempt is made to transmit a SAR with status other than untransmitted. The user may select only one button.

9.3.32 Erase Warning

9.3.32.1 General

This panel (see Figure 9-40) appears when an attempt is made to erase multiple SARs with status other than deleted, using the Schedule Planning panel.

9.3.32.2 Panel Items

a. SAR Information. Text box to display information specific to the current SAR.

b. Erase Request. Button to confirm erase of current SAR.

c. Erase this Request and the rest of the batch regardless of status. Button to confirm erase of current SAR and any remaining SARs.

d. Do not erase this Request. Button to cancel erase of the current SAR.

e. Do not erase this Request or any others with improper status. Button to cancel erase of current SAR and any remaining SARs with a UPS status other than deleted.

9.3.32.3 Panels

None.

9.3.32.4 Description

This panel allows SARs with status other than deleted to be selectively erased. The user may select only one button.

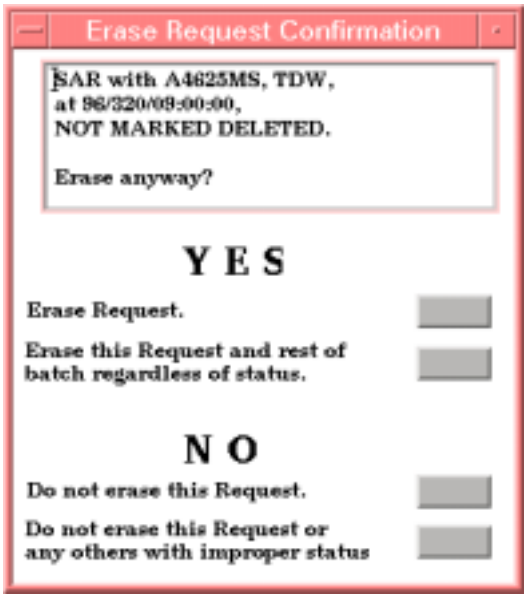


Figure 9-40. Erase Warning Panel

9.4 Re-Create USMs and Transmit to Electronic User

9.4.1 General

This panel (see Figure 9-41) is used to select SARs for which USMs will be re-created from the UPS database and transmitted to the electronic user. This panel is displayed by selecting Transmit USMs to Electronic User from the Scheduling pulldown menu of the System Information Window (Figure 9-1). Before this panel is displayed, the user will be required to select the desired mission from the Mission Selection panel.

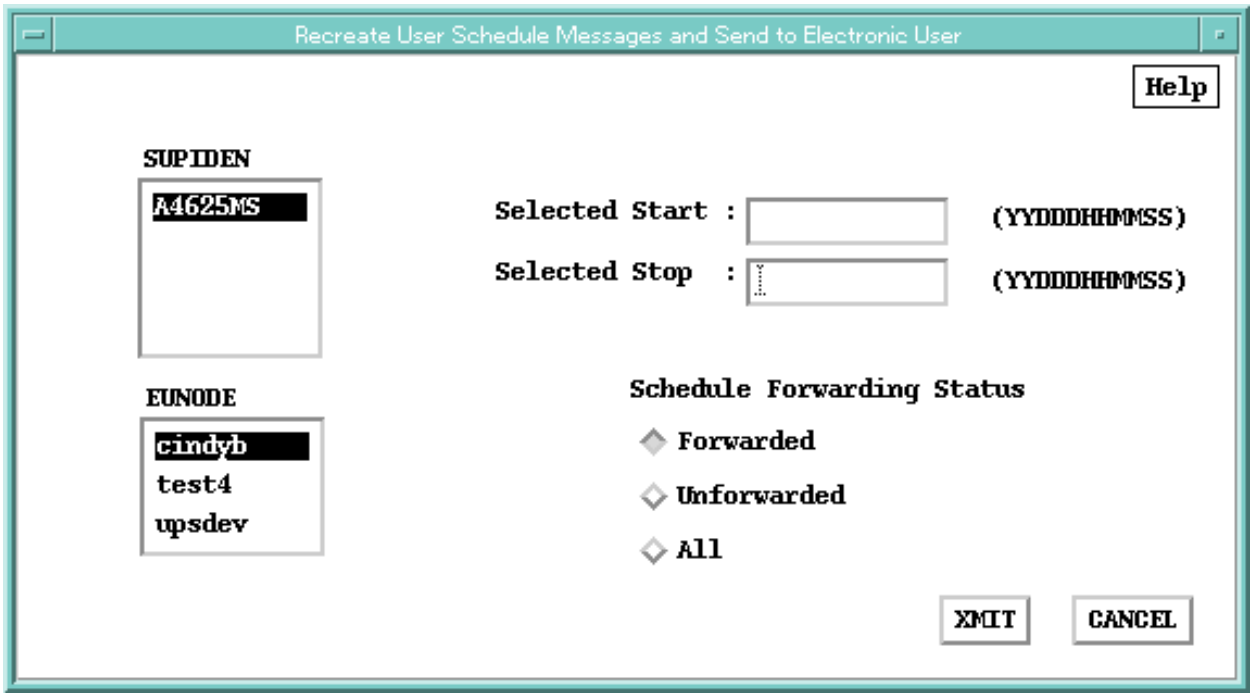


Figure 9-41. Re-Create USMs and Send to Electronic User Panel

9.4.2 Panel Items

a. SUPIDEN List. A multiple select scrolling textlist of all SUPIDENs (maximum of 20) associated with the selected SIC.

b. EUNODE. A multiple select scrolling textlist of all Electronic User (EU) Nodes associated with the selected SIC.

c. Selected Start. A user-enterable time entry field (YYDDDHHMMSS) that is used to select SARs with event start times greater than or equal to this time.

d. Selected Stop. A user-enterable time entry field (YYDDDHHMMSS) that is used to select SARs with event start times less than or equal to this time.

e. Schedule Forwarding Status. A three-item radio button field used to select SARs with various types of schedule forwarding status:

   1. Forwarded (SARs already forwarded).

   2. Unforwarded (SARs that have not been forwarded), or

   3. All.

f. XMIT Button. Re-create and transmit selected USMs.

g. CANCEL Button. Exit from the panel.

9.4.3 Panels

No sub-panels are displayed.

9.4.4 Description

a. To recreate and transmit USMs, the user must select one or more SUPIDENs, one or more EU Nodes, enter the start and stop times, and select a forwarding status type. The values can be entered or selected in any order.

b. Once the desired values are entered, activate the XMIT button to select SARs from the database for the selected SUPIDENs, recreate USMs for them, and transmit them to the selected EU Nodes. After the USMs have been transmitted, the selection criteria can be modified and new USMs transmitted. This cycle can be repeated any number of times. Click on the CANCEL button before or between transmissions to exit the panel with no further processing.

c. When the XMIT button is activated, the UPS queries the database, and displays a confirmation box with the number of SARs matching the user's criteria. Select Yes to continue processing and No to return to the Recreate & Send USMs panel.

d. For the most part, USMs are recreated from the information that was extracted from the original USM sent by the NCCDS and stored in the UPS database. The following items, all found in the Schedule Data Message Header, are exceptions:

   1. 7-digit message ID.

   2. PN code assignment for non-Shuttle user.

   3. PN code assignment for Shuttle user.

   4. PN code assignment for Shuttle S-band forward link services.

e. UPS uses its own internally generated and maintained 7-digit request ID. The PN code values are read from the UPS database, and are originally supplied by the mission coordinator during mission setup, using the Mission/Spacecraft Characteristics panel.

f. While USMs are being re-created, the hourglass cursor appears and all panel inputs are disabled until processing is completed. At that time a bother box is displayed, announcing that all USMs were transmitted or that an error was encountered and processing was aborted.

9.5 Default Scheduling Parameters

9.5.1 General

a. This panel (see Figure 9-42) is used to assign default values to certain parameters used on various scheduling screens.

b. This panel is initiated by selecting Default Parameters from the Scheduling pulldown menu (see Figure 9-1).

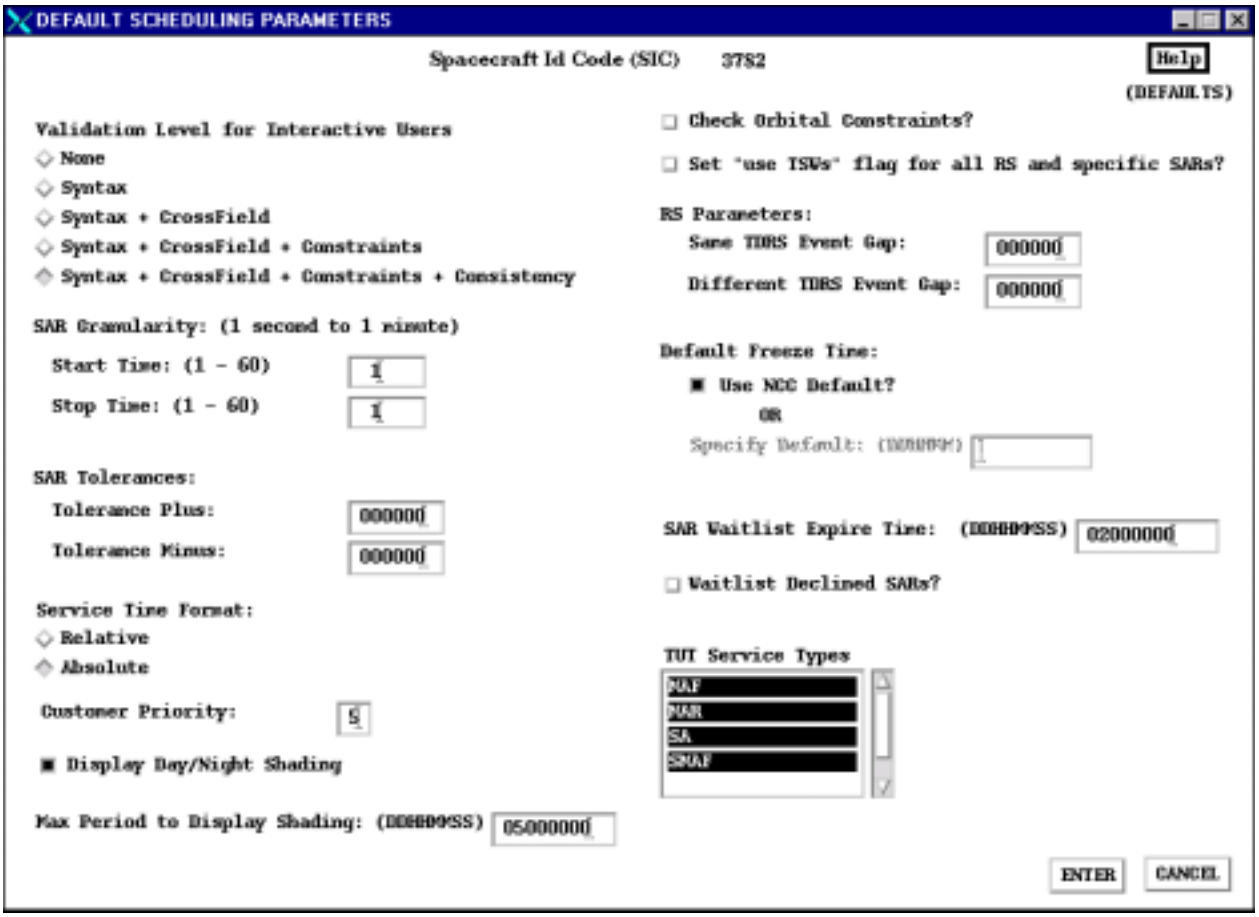


Figure 9-42. Default Scheduling Parameters Panel

9.5.2 Panel Items

a. `Validation Level for Interactive Users`. Sets the default level for validation of SARs (refer to paragraph 9.3.27).

b. `SAR Granularity`. Two text entry fields used to specify the granularity, between 1 second (default) and 60 seconds, that should be applied to the start and stop times of every SAR. For example, if the granularity is 60 seconds (1 minute), when creating a SAR, it will always start on the minute mark, and when moving or stretching a SAR, it will always increase or decrease by a minute. This behavior also applies when copying a SAR or when rescheduling a confirmed SAR.

c. `SAR Tolerances`. Two text entry fields used to set the default plus and minus tolerances (HHMMSS).

d. `Service Time Format`. A set of radio buttons used to set the default format in which the service times will be displayed (relative time or absolute time).

e. `Customer Priority`. A numerical text entry field used to set the default customer priority of each SAR created (1 - 9, where 1 is the highest priority).

f. `Display Day/Night Shading`. Checkbox used to indicate if day/night shading will be displayed on the Schedule Planning panel (applicable only if orbital data is supplied containing sunlight information).

g. `Max Time Period to Display Shading`. Time entry field used to indicate the maximum Display Width (refer to paragraph 9.3.17) where day/night will be shown (applicable only if above checkbox is checked and sunlight orbital data are supplied).

h. `Check Orbital Constraints`. Checkbox that sets the default value determining whether SARs should be validated against orbital constraints.

i. `Should NCCDS Use TSWs to Validate SARs`. Checkbox that sets the default value determining if the “Use TSW” flag will be set in each SAR that is created.

j. RS Parameters. Two text entry fields (Same TDRS Event Gap and Different TDRS Event Gap) that allow the user to specify a minimum gap between SARs being created via Recurrent Scheduling (refer to paragraph 9.1).

k. Request NCCDS to Employ TSWs. Checkbox that specifies whether the mission wants the NCCDS to use TSWs to constrain the scheduling of each event. If the checkbox is selected, a flag will be set in each SAR that instructs the NCCDS to use the TSWs from the TSW set specified by each SSC to schedule the service specified by that SSC. If the checkbox is not selected, the NCCDS will not consider TSWs when scheduling an event. NOTE: If a mission wants the NCCDS to consider TSWs when scheduling events, the mission must transmit the TSWs to the NCCDS prior to scheduling.

l. `Default Freeze Time`. Checkbox that specifies whether the mission wants the NCCDS to use the NCCDS default freeze interval to determine when to convert a flexible confirmed event to a fixed confirmed event. If the checkbox is selected, each SAR will indicate to the NCCDS that it should use its own default interval when freezing event. In addition, the Specify Freeze Interval text field will be disabled. If the checkbox is not selected , the Specify Freeze Interval text field will be enabled and user may specify the freeze interval that the NCCDS should use when freezing events.

m. `SAR Waitlist Expire Time`. Time text entry field that allows the user to set the default waitlist expiration time.

n. `Waitlist Declined SARs`. Checkbox that specifies whether the mission wants the NCCDS to place declined SARs on the wait list.

o. ENTER Pushbutton. Saves the default scheduling parameters into the UPS database. The Default Scheduling Parameters panel is also erased from the screen. The ENTER pushbutton is not visible in query mode.

p. CANCEL Pushbutton. Cancels processing without saving to the database and erases the Default Scheduling Parameters panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

9.5.3 Panels

No sub-panels are displayed.

9.5.4 Description

9.5.4.1 General

a. This panel is used to assign default values to some items that appear when schedule requests are created using the SAR Details and Recurrent Scheduling panels. The initial values assigned to these items (normally done during mission setup) will be displayed when these scheduling panels are initially displayed. Assigning these default values is not required; they are simply an additional feature designed to help streamline the scheduling process for the user.

b. If the user logged on with multiple missions, the service time format should be the same for all missions.

c. The SAR granularity fields will be used when:

   1. Graphically editing a SAR (creating, moving, copying, or rescheduling)

   2. Generating SARs via Recurrent Scheduling.

9.5.4.2 SAR Granularity Considerations When Editing SARs Graphically

a. When a SAR is created, the start time is rounded up from the user-selected ("graphical") start time to the next integral SAR granularity start time, and the stop time is truncated down to the previous integral SAR granularity stop time.

b. Example: the SAR granularity start time is set to 1:00 (1 minute) and the SAR granularity stop time is set to 0:30 (30 seconds). From the Schedule Planning panel (refer to paragraph 9.3.19), the user clicks on the SAR timeline (to set the start time of the SAR) at the graphical point 12:10:03. The UPS will set the SAR start time to 12:11:00. As the user stretches the SAR, the stop time is updated by 30 seconds at a time. So, in this example, if the user stops stretching the SAR at 12:22:59 graphically, the UPS will set the SAR stop time to 12:22:30.

c. When a SAR is moved, copied, or rescheduled, the SAR will move in increments of an integral multiple of the SAR granularity start time. The SAR granularity stop time value is not applicable. The SAR granularity start time multiple depends on the resolution of the SAR on the screen. If the panel is zoomed-in sufficiently, the SAR granularity start time multiple will be one (1). The user may override the SAR granularity start time via the use of the digital SAR time fields (e.g., the Precise Move panel or the time keyin boxes on the bottom of the SAR Details panel).

d. Example: the panel is zoomed-in to 1 hour, the SAR duration is 45 minutes, the SAR start time is 02:30:00, and the SAR granularity start time is 60 (one minute). As the user moves the SAR to the right, the SAR start time will increment from 02:30:00 to 02:31:00 to 02:32:00, etc.

e. Example: the panel is zoomed-in to 1 day, the SAR duration is 45 minutes, the SAR start time is 02:30:00, and the SAR granularity start time is 60 (one minute). As the user moves the SAR to the right, the SAR start time will increment from 02:30:00 to 02:33:00 to 02:35:00, etc.

f. If the SAR start time is a non-integral multiple of the SAR granularity start time, when the SAR is moved, it will first "snap" to the next integral multiple of the SAR granularity start time, and then continue changing to an integral multiple of the SAR granularity start time.

g. Example: the panel is zoomed-in to 1 hour, the SAR duration is 45 minutes, the SAR start time is 02:30:05, and the SAR granularity start time is 60 (one minute). As the user moves the SAR to the right, the SAR start time will change from 02:30:05 to 02:31:00, then increment to 02:32:00, 02:33:00, etc.

9.5.4.3 SAR Granularity Considerations When Creating SARs via RS

When a SAR is created using Recurrent Scheduling (refer to paragraph 9.2), the start time is rounded *up* to the next integral SAR granularity start time, if the SARs start point is a non-integral SAR granularity start time. The stop time is truncated *down* to the previous integral SAR granularity stop time, if the SARs end point is a non-integral SAR granularity stop time.

9.6 User-Defined/TDRS Constraints

9.6.1 General

a. This panel (see Figure 9-43) allows users to set up blackout periods for certain time periods, stations, and services to be used when validating SARs against constraints and when creating, modifying, or using the Recurrent Scheduling process (refer to paragraph 9.2).

b. This panel is initiated by selecting User-Defined/TDRS Constraints from the Scheduling pulldown menu (see Figure 9-1).

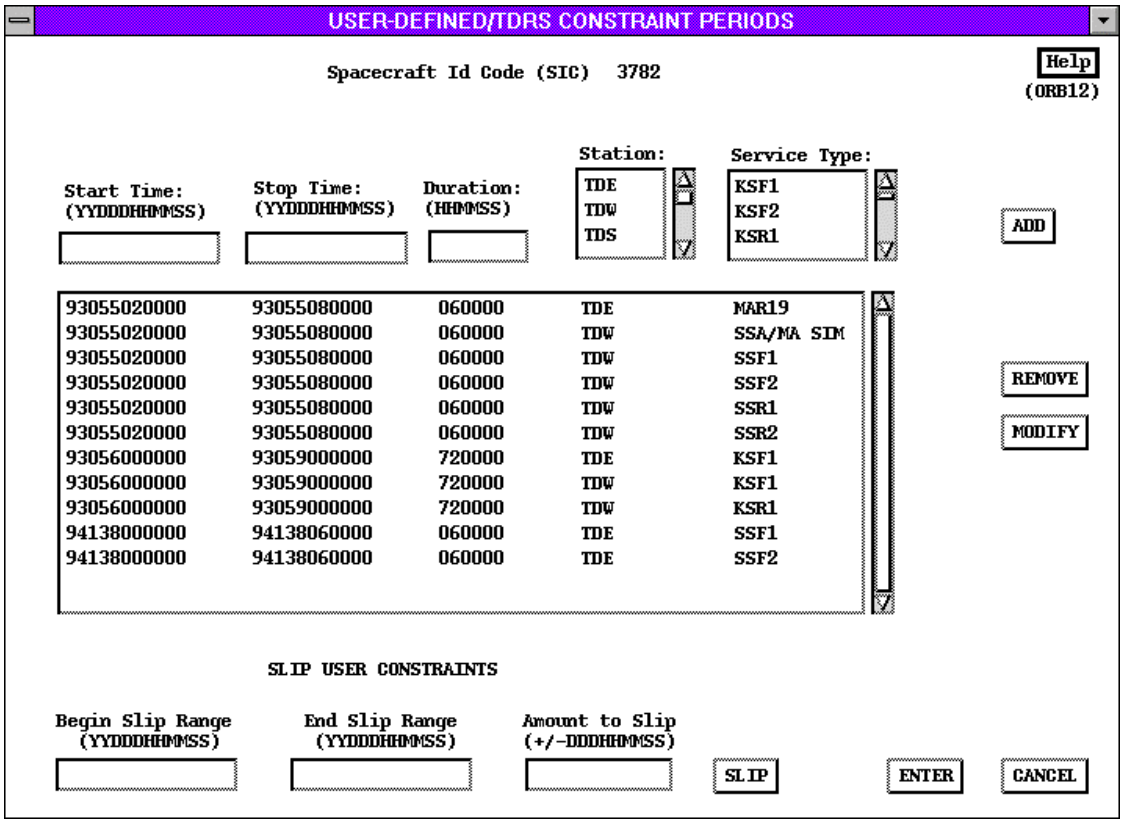


Figure 9-43. User-Defined/TDRS Constraint Periods Panel

9.6.2 Panel Items

a. Start, Stop, and Duration Time Period Fields. Text entry fields used to specify the constraint period. The start time and either the stop time or the duration are required. The third field will be filled in automatically after the first two are entered.

b. Station Multiple Select Textlist. Select the ALL keyword or one or more TDRSs to which the constraint period will be applied.

c. Service Type Multiple Select Textlist. Select the ALL keyword or one or more services to which the constraint period will be applied. For SA and MAR services, the service type will also include a resource type (SA antenna, MAR ID). Simulation services will include an S-band Single Access/Multiple Access (SSA/MA) or K-band Single Access (KSA) resource designation.

d. Text Display. Area in which both previously defined constraint periods and those currently being added/removed are displayed.

e. ADD Pushbutton. Adds the constraint period items (time period, station, service type) to the text display. The ADD pushbutton is not visible in query mode.

f. REMOVE Pushbutton. Removes the selected constraint period from the text display. (A row must be selected from the text display; otherwise, this button will not function.) The REMOVE pushbutton is not visible in query mode.

g. MODIFY Pushbutton. Transfers the constraint period items from the text field and textlists above the text display to the text display, replacing the previously selected text display entry. (A row must be selected from the text display; otherwise, this button will not function.) The MODIFY pushbutton is not visible in query mode.

h. BEGIN SLIP, END SLIP, AMOUNT TO SLIP Time Entry Fields. Text entry fields used to specify the constraints that the user wishes apply to time slip and the amount of the slip. These fields are enabled when the panel is first invoked; the fields are disabled if the user adds, removes, or modifies any constraints. These fields are not visible in query mode.

i. SLIP Pushbutton. Modifies all constraints within the time period specified by the Begin Slip and End Slip time fields to reflect the time slip specified in the Amount To Slip field. Upon activation of the Enter pushbutton, the modified constraints will be written to the UPS database.

j. ENTER Pushbutton. Saves the user-defined constraint periods to the UPS database. The User-Defined Constraint Periods panel is also erased from the screen. The ENTER pushbutton is not visible in query mode.

k. CANCEL Pushbutton. Cancels processing without saving to the database and erases the User-Defined Constraint Periods panel. If changes have been made on the screen, the user will be asked to confirm the cancel action.

9.6.3 Panels

No sub-panels are displayed.

9.6.4 Description

This panel can be used to designate time periods during which SARs using particular services (or any service) should not be scheduled. These blackout time periods can be based on actual downtimes or failures of a TDRS antenna(s) or ground simulator to avoid wasting time scheduling events that (because of mechanical failure) will be rejected by the NCCDS. Because the *Recurrent Scheduling* process considers these user-defined constraints when generating SARs, another use of this panel may be to specify time periods when a mission spacecraft requires no SAR to be scheduled. In addition, the constraints can be slipped by a specified amount of time in either direction. To slip constraints, enter begin and end slip times and the amount to be slipped and activate the SLIP pushbutton. The amount to slip must be prepended with a '+' or '-' sign. The panel is designed to allow only the Add/Modify/Remove constraint capability OR the Slip constraint capability during each invocation of the panel. If any of the Add/Modify/Remove pushbuttons are activated, all slip-related fields are disabled, and vice-versa.

Section 10. Reports

10.1 Overview

The Report pulldown menu (see Figure 10-1 and Figure 10-2), which is displayed on all user information windows, is used to generate various UPS reports. The user reports are for the schedule data, mission data, or activities. The system administrator has only a report for system activities for all missions. One report at a time can be selected from the pulldown menu; however, more than one report can be processed simultaneously. See Appendix B for report formats.

10.2 Reports With No Selection Criteria

10.2.1 General

This panel (see Figure 10-3) displays reports that require the user to select a mission. This panel is initiated by selecting one of the following reports from the Report pulldown menu:

a. Prototype Events.

b. Spacecraft Characteristics Parameters.

c. Service Specification Codes.

NOTE

None of the above reports are currently implemented.

10.2.2 Panel Items

a. `Mission SIC` Single Selection List. The user must select a mission for which a report is to be created.

b. `View Report`. This textlist field shows the report being generated. Vertical and horizontal scrolling is enabled.

c. `EXECUTE` Pushbutton. Run the program to generate report output file.

d. `EU-XMIT` Pushbutton. Send report output file to electronic user(s).

e. `PRINT` Pushbutton. Print report output file to the predefined printer.

f. `CANCEL` Pushbutton. Exit the process and remove the panel from the screen.

10.2.3 Panels

An electronic users selection dialog (see Figure 10-4 and Figure 10-5) is displayed when `EU-XMIT` is pressed if more than one EU node is defined for the current mission.

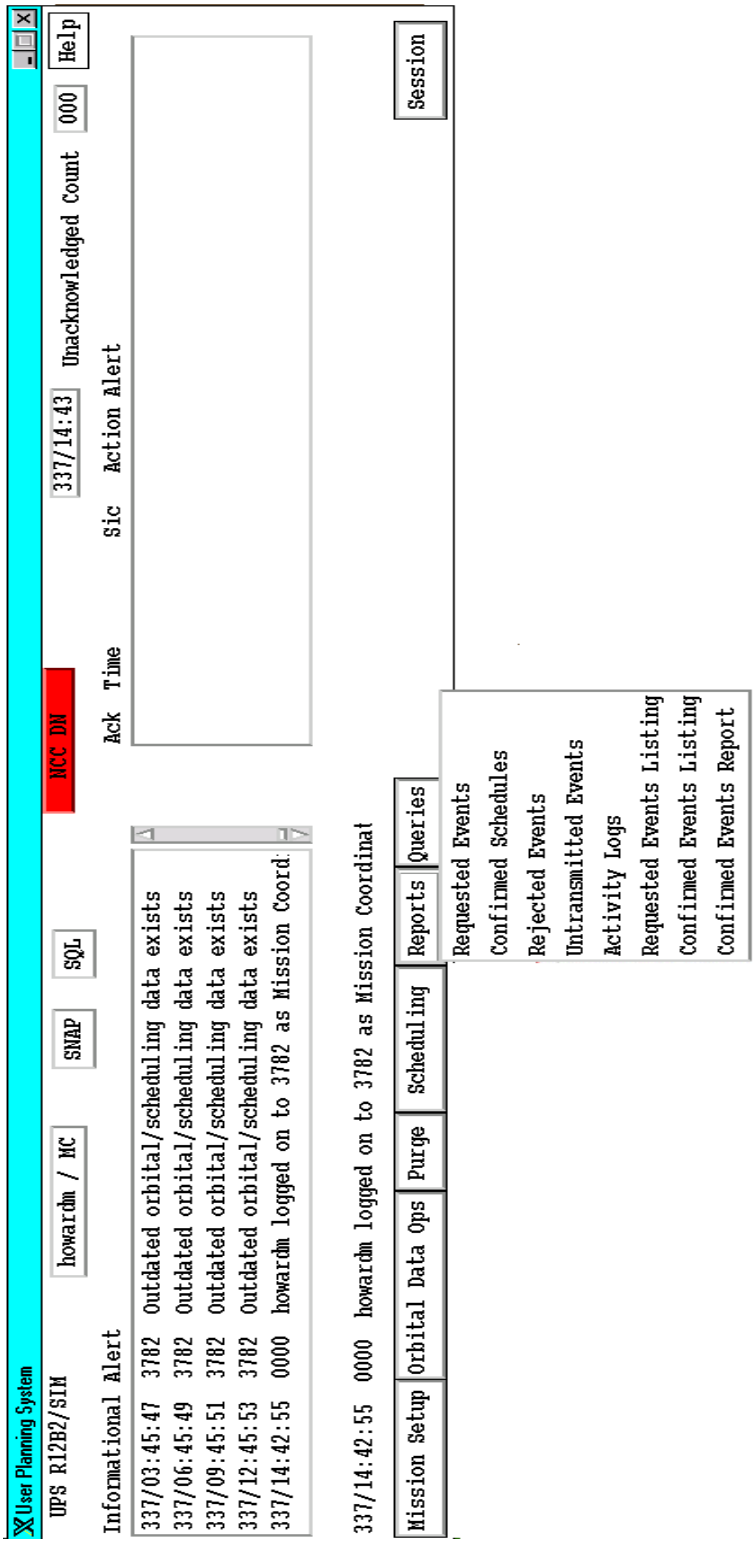


Figure 10-1. Report Pulldown Menu in Mission Scheduler Information Window

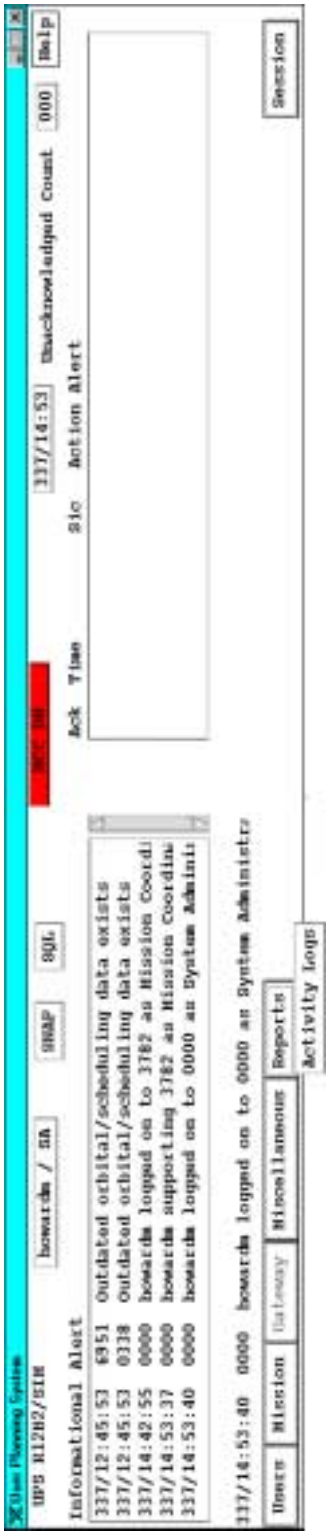


Figure 10-2. Report Pulldown Menu in System Administrator Information Window

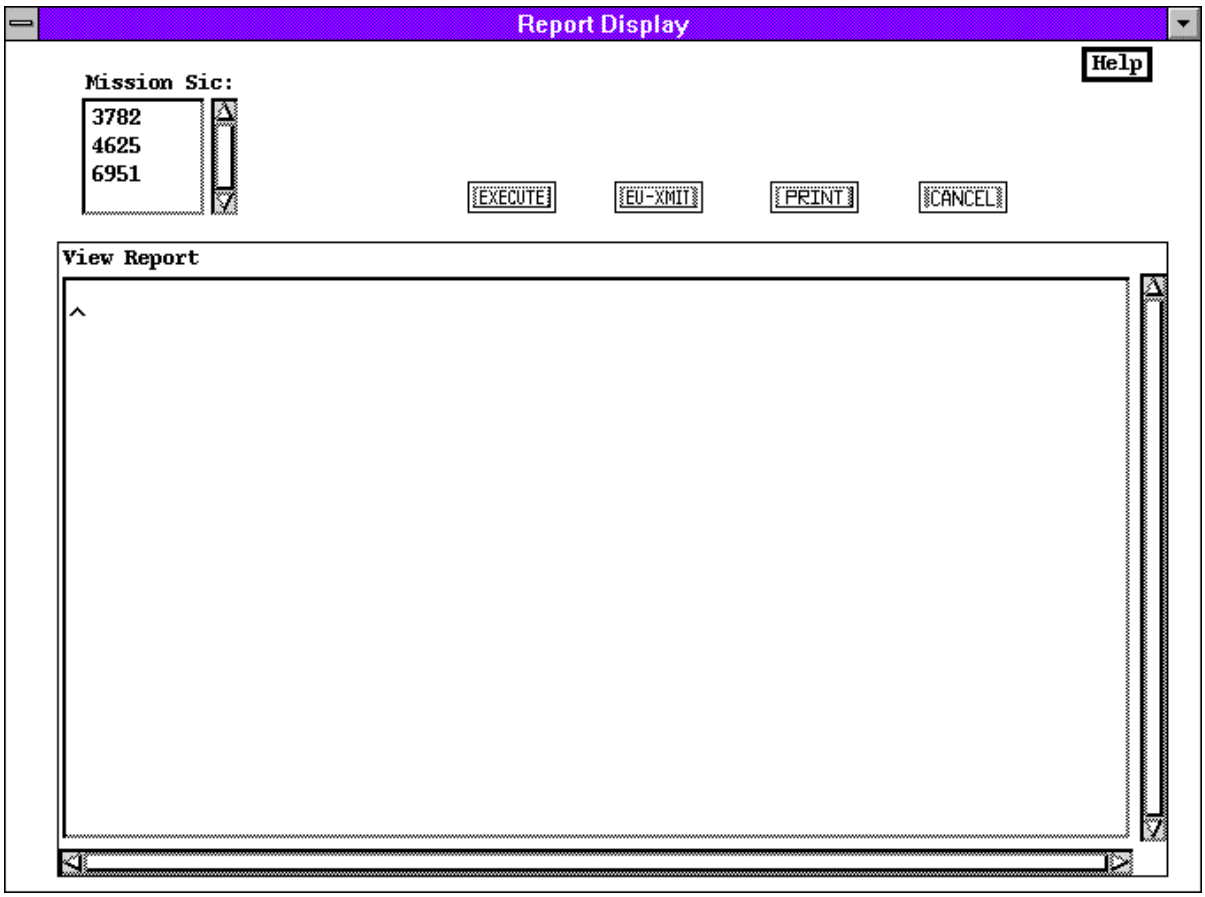


Figure 10-3. Report Selection Criteria Panel

10.2.4 Description

This panel (see Figure 10-3) requires the user to select a SIC from the `Mission SIC` list. After the user activates the `EXECUTE` pushbutton, the report being generated will be displayed to the textlist field, and the `EU-XMIT` and `PRINT` pushbuttons will be enabled. The `CANCEL` pushbutton can be selected anytime to exit the process.

10.3 Reports With Time Selection Criteria

10.3.1 General

This panel (see Figure 10-4 and Figure 10-5) requires the user to select a SIC from the `Mission SIC` list and enter the from/to time period. This panel is initiated by selecting one of the following reports from the Report pulldown menu:

a. Requested Events.

b. Confirmed Schedules.

c. Rejected Events.

d. Untransmitted Events.

e. Activity Log.

f. Requested Events Listing.

g. Confirmed Events Listing.

h. Confirmed Events Report.

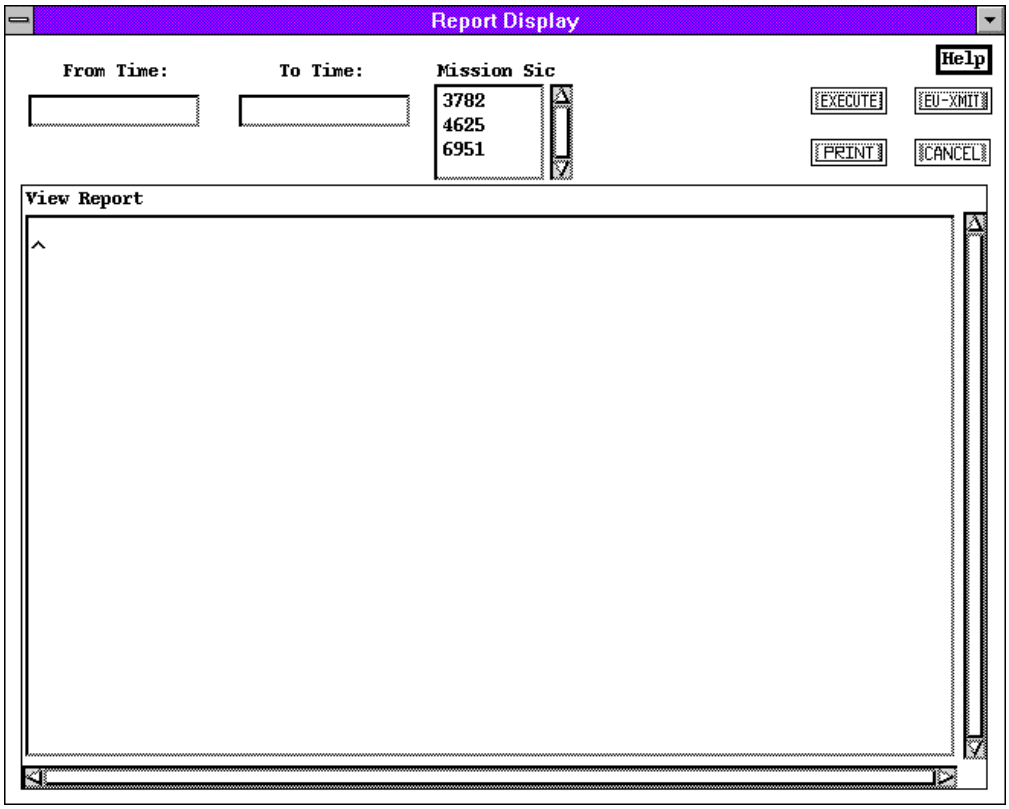


Figure 10-4. Reports With Time Selection Criteria Display Panel (1 of 2)

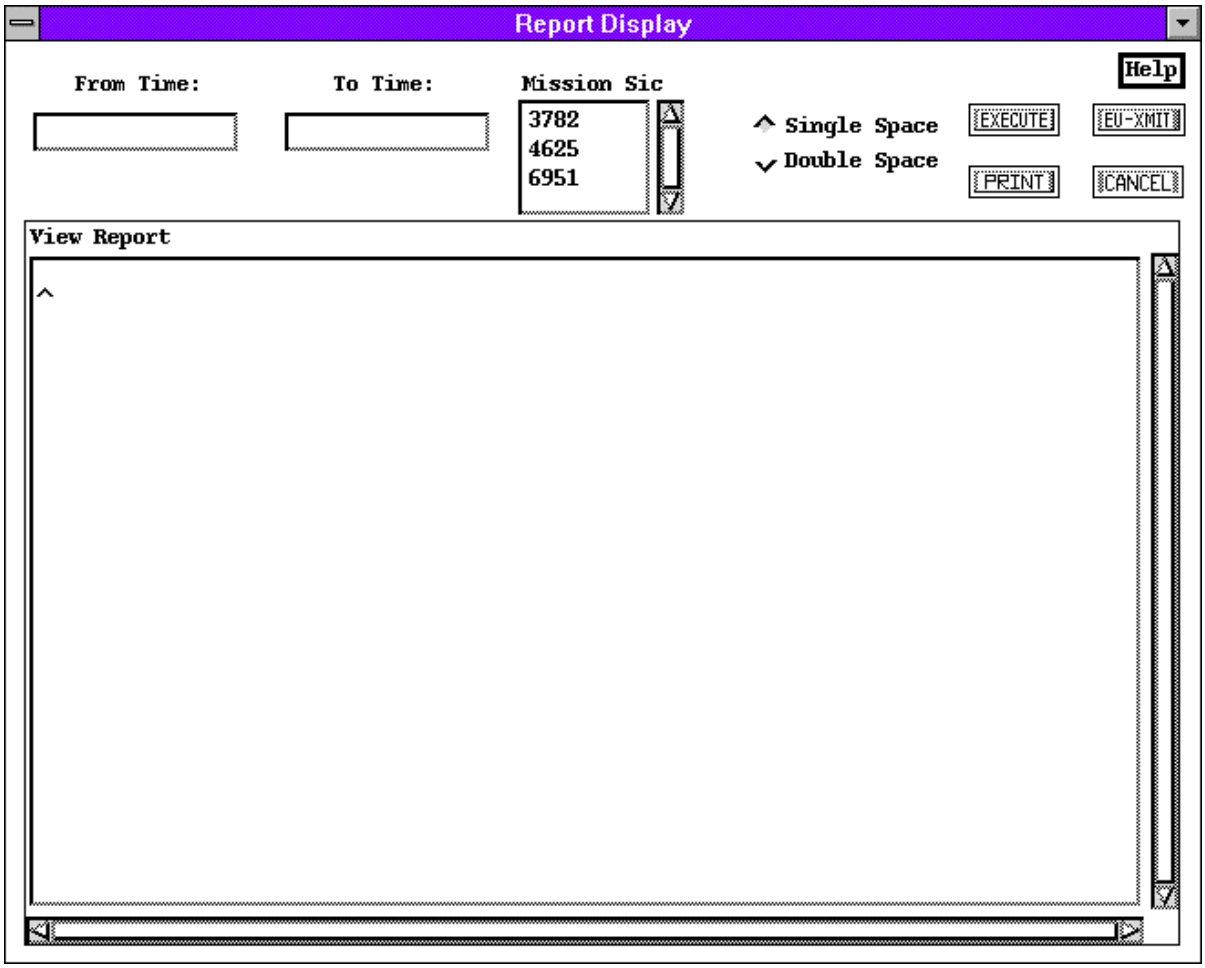


Figure 10-5. Reports With Time Selection Criteria Display Panel (2 of 2)

10.3.2 Panel Items

a. `Mission SIC` Single Selection List. The user must select a mission for which a report is to be created.

b. `From Time`. Start time in NCCDS absolute time format.

c. `To Time`. Stop time in NCCDS absolute time format.

d. `View Report`. This textlist field shows the report being generated. Vertical and horizontal scrolling is enabled.

e. `Single Space`. Only displayed for Requested/Confirmed Events Listing. Generate a single-spaced listing.

f. `Double Space`. Only displayed for Requested/Confirmed Events Listing. Generate a double-spaced listing.

g. `EXECUTE` Pushbutton. Run the program to generate report output file.

h. `EU-XMIT` Pushbutton. Send report output file to electronic user(s).

i. `PRINT` Pushbutton. Print report output file to the predefined printer.

j. `CANCEL` Pushbutton. Exit the process and remove the panel from the screen.

10.3.3 Panels

An electronic users selection dialog (see Figure 10-6) is displayed when `EU-XMIT` is pressed if more than one EU node is defined for the current mission.

10.3.4 Description

This panel requires the user to select a SIC from the `Mission SIC` list and enter the from/to time period. After user clicks the `EXECUTE` pushbutton, the report being generated will be displayed to the textlist field, and the `EU-XMIT` and `PRINT` pushbuttons will be enabled. The `CANCEL` pushbutton can be selected anytime to exit the process.

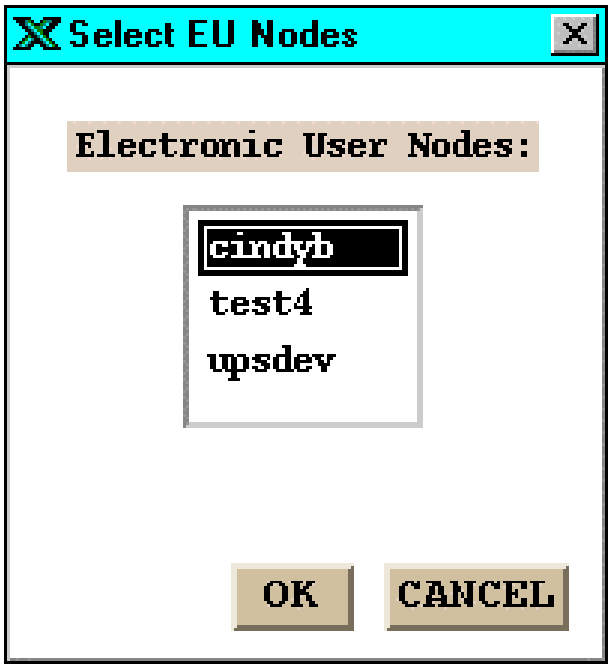


Figure 10-6. EU Nodes Dialog Window

Section 11. Queries

11.1 Overview

The interactive user can query the database information by selecting from the Query pulldown menu (see Figure 11-1). Eight types of queries are available to the interactive user: schedule data, service type, prototype event, service specification code, user environment, TSW and the activity log. A specific query response panel is available for each type of query. (The user can select queries one at a time from the Query pulldown menu.)

11.2 Select Schedule Data Query

11.2.1 General

a. This panel (see Figure 11-2) enables the user to query a specific set of schedule data.

b. This panel is initiated by selecting the Schedule Data option on the Query pulldown menu (see Figure 11-1).

11.2.2 Panel Items

Refer to paragraph 9.3.2 for input data fields and action buttons (except XMIT button).

11.2.3 Panels

The following panels are displayed:

a. Tabular Scheduling panel.

b. Schedule Planning panel.

11.2.4 Description

This panel enables the user to select specific schedule data groups to query. Although this panel is used primarily for scheduling, it provides functions similar to the query request, except that all editing and transmission functions are disabled. From this panel, the user specifies the time frame, SUPIDEN, station, the group of schedule data to be queried, and the type of display (tabular or graphic) to view the data. When TABLE or GRAPHIC is selected, the Tabular Scheduling panel or the Schedule Planning panel is displayed.

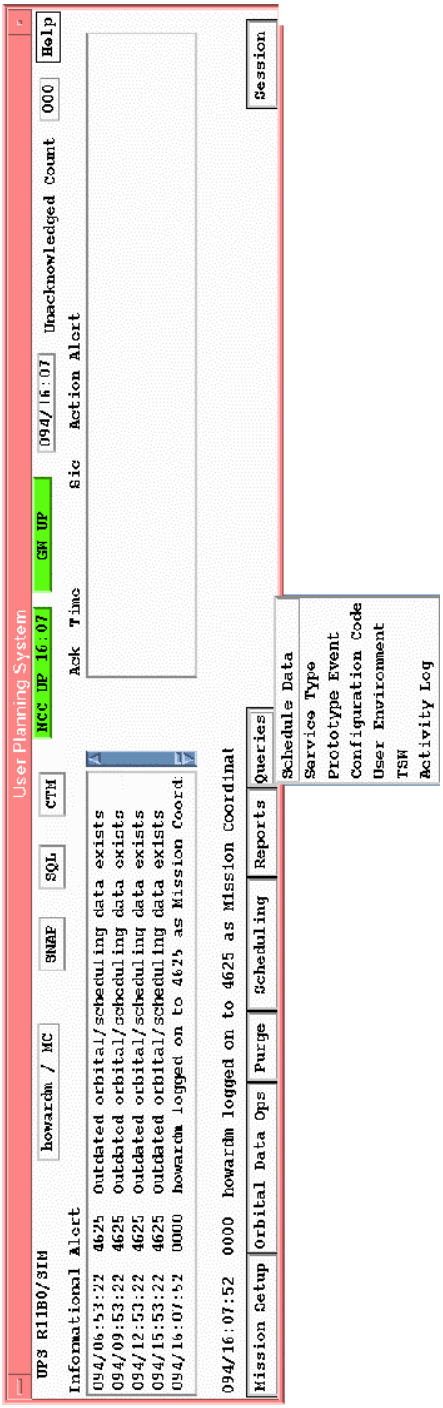


Figure 11-1. Query Pulldown Menu in Mission Coordinator Information Window

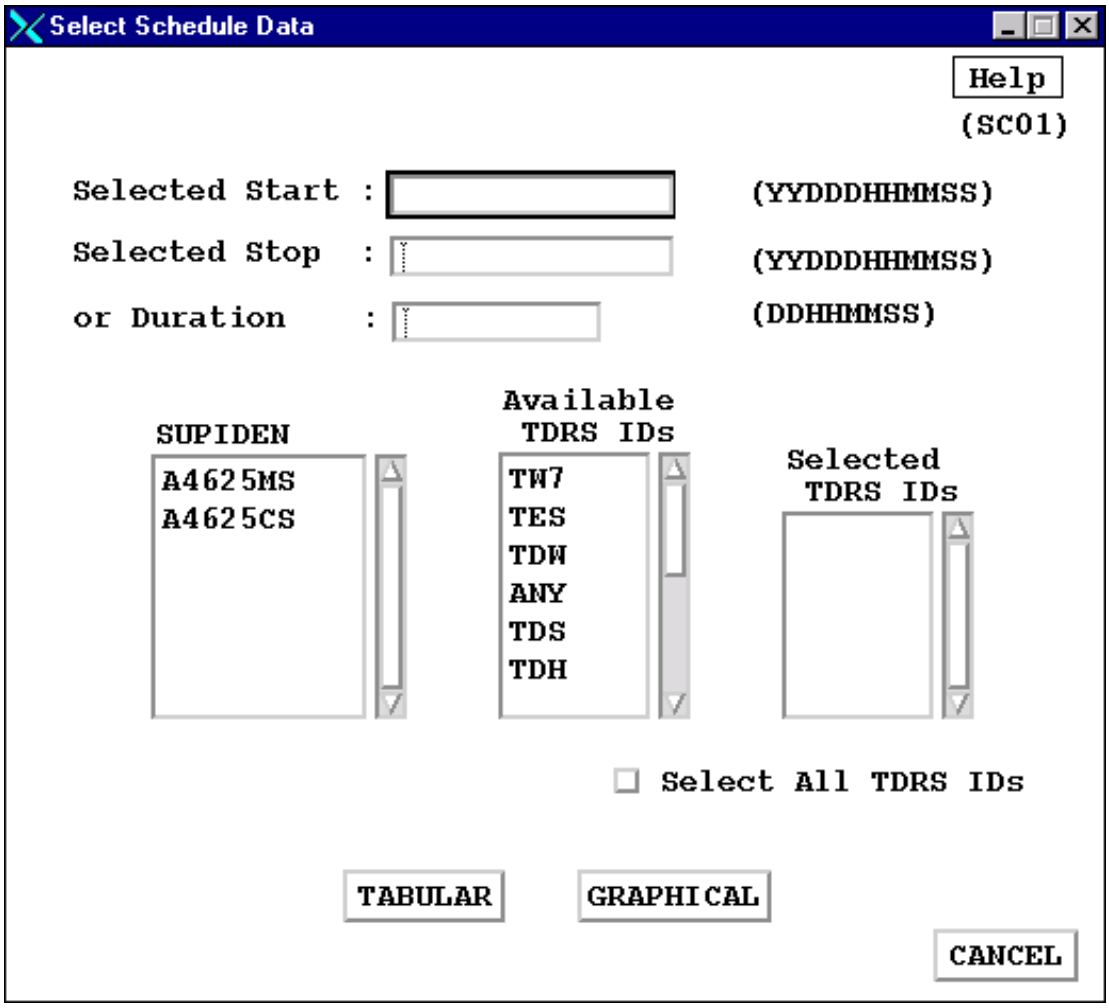


Figure 11-2. Select Schedule Data Panel

11.3 Service Type Query

11.3.1 General

a. This panel (see Figure 11-3) lists available service types and enables the user to query available service specification codes for different service types.

b. This panel is initiated by selecting the Service Type option on the Query pulldown menu (see Figure 11-1).

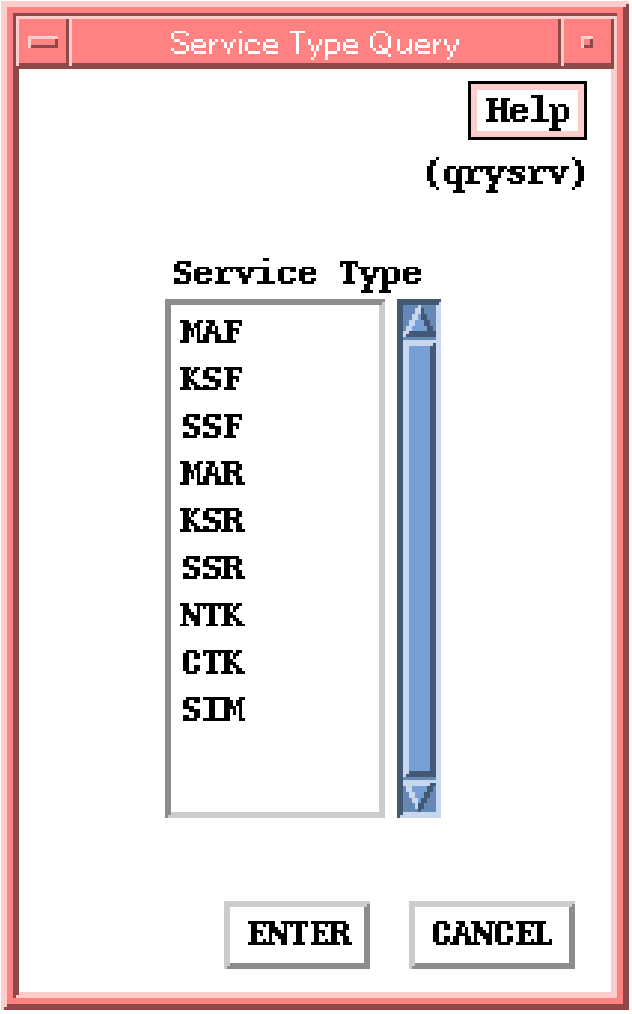


Figure 11-3. Service Type Query Panel

11.3.2 Panel Items

a. Service Type. To select a service from the textlist, click the mouse on the specific service type. Additional services can be selected. To deselect a service from the textlist, click the mouse on a selected service type.

b. ENTER Button. Starts processing.

c. CANCEL Button. Terminates processing at any time before clicking on ENTER.

11.3.3 Panels

The Service Specification Code Query panel is displayed.

11.3.4 Description

This panel lists available service types and waits for the user to select one or more service types from the textlist. As soon as the user clicks on ENTER, the UPS checks that at least one service type is selected and then retrieves the available service specification codes and aliases and displays the Service Specification Code Query panel. From this response panel, the user can further query service data on each individual service (refer to paragraph 11.5).

11.4 Prototype Event Query

11.4.1 General

a. This panel (see Figure 11-4) lists available prototype events for the selected missions and allows the user to query the information on any of the prototype events listed.

b. This panel is initiated by selecting the Prototype Event option on Query pulldown menu (see Figure 11-1).

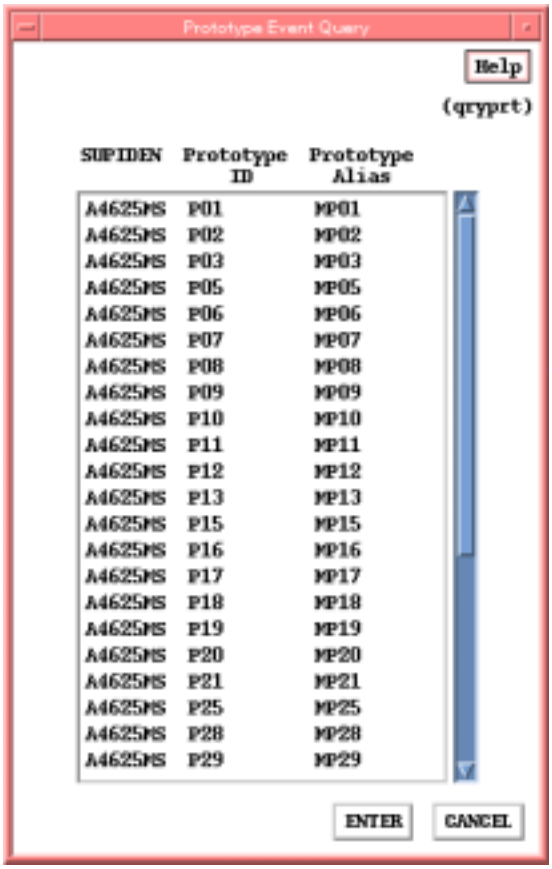


Figure 11-4. Prototype Event Query Panel

11.4.2 Panel Items

a. Prototype ID. To select a prototype event from the textlist, click the mouse on a specific prototype event.

b. ENTER Button. Starts processing.

c. CANCEL Button. Terminates processing at any time before clicking on ENTER.

11.4.3 Panels

The Prototype Event panel is displayed.

11.4.4 Description

This panel lists available prototype events for selected missions and enables the user to query information about each prototype event. The user is allowed to select one prototype event from the textlist of available events. The response panel is same as the one used for defining prototype events during mission setup. However, all editing capabilities will be disabled.

11.5 Service Specification Code Query

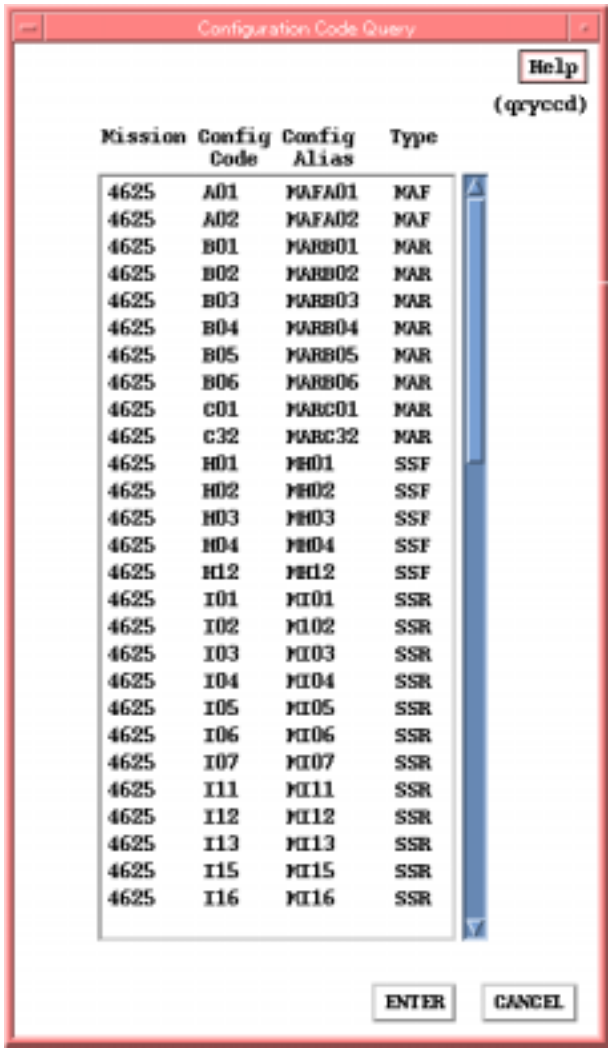
11.5.1 General

a. This panel (see Figure 11-5) displays a list of available service specification codes and allows the user to query the information on different prototype events.

b. This panel is initiated by:

1. Selecting the Service Specification Code option on the Query pulldown menu (see Figure 11-1).

2. Selecting the Service Type Query panel (see Figure 11-3).



Mission	Config Code	Config Alias	Type
4625	A01	MAFA01	MAF
4625	A02	MAFA02	MAF
4625	B01	MARB01	MAR
4625	B02	MARB02	MAR
4625	B03	MARB03	MAR
4625	B04	MARB04	MAR
4625	B05	MARB05	MAR
4625	B06	MARB06	MAR
4625	C01	MARC01	MAR
4625	C32	MARC32	MAR
4625	H01	MH01	SSF
4625	H02	MH02	SSF
4625	H03	MH03	SSF
4625	H04	MH04	SSF
4625	H12	MH12	SSF
4625	I01	MI01	SSR
4625	I02	MI02	SSR
4625	I03	MI03	SSR
4625	I04	MI04	SSR
4625	I05	MI05	SSR
4625	I06	MI06	SSR
4625	I07	MI07	SSR
4625	I11	MI11	SSR
4625	I12	MI12	SSR
4625	I13	MI13	SSR
4625	I15	MI15	SSR
4625	I16	MI16	SSR

Figure 11-5. Service Specification Code Query Panel

11.5.2 Panel Items

a. Service Specification code. To select a service specification code from the textlist, click the mouse on the specific service specification code.

b. ENTER button. Starts processing.

c. CANCEL button. Terminates processing at any time before clicking on ENTER.

11.5.3 Panels

The Service Parameter Input panel for the specified service specification code is displayed.

11.5.4 Description

This panel lists available service specification codes based on the selected missions or service types, and allows the user to query details on a specific service specification code. The response panels vary on the basis of the service type of the selected service specification codes. These panels are the same as those for defining service specification codes during mission setup (refer to paragraph 7.8). However, all editing capabilities will be disabled.

11.6 User Environment Query

11.6.1 General

a. This panel (see Figure 11-6) enables the user to query the UPS for information about user environment files.

b. This panel is initiated by selecting the User Environment option on Query pulldown menu (see Figure 11-1).

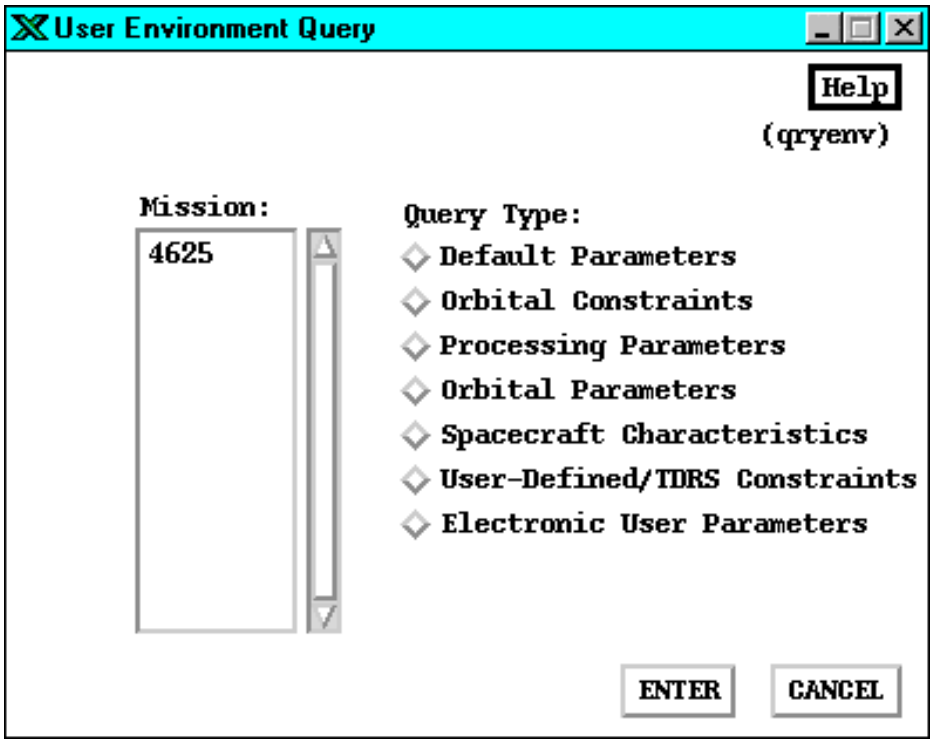


Figure 11-6. User Environment Query Panel

11.6.2 Panel Items

a. Mission (required). This textlist shows all selected missions at logon. Only one can be selected.

b. Selection (required). These radio buttons are for six different data groups in the user environment file. Data groups can be selected only one at a time. (See Section 7 for details on the six data groups.)

   1. Default Parameters.
   2. Orbital Constraints.
   3. Processing parameters.
   4. Orbital Parameters.
   5. Spacecraft Characteristics.
   6. User Defined Constraints.
   7. Electronic User Parameters.

c. ENTER button. Starts processing.

d. CANCEL button. Terminates processing at any time before clicking on ENTER.

11.6.3 Panels

a. Query Response panel.

b. Electronic User Parameters panel.

11.6.4 Description

This panel enables the user to query the UPS for information about different data groups in the user environment. Six types of query options are available, as shown in the previous panel items list (refer to paragraph 11.6.2). One query type and one mission must be selected to start processing. The response panel is the one used for the information during mission setup. However, all editing capabilities will be disabled.

11.7 TSW Query

11.7.1 General

a. This panel (see Figure 11-7) enables the user to query on TSW orbital data information.

b. This panel is initiated by selecting the TSW option on Query pulldown menu (See Figure 11-1) or by selecting the Query TSW button on the Build Specific Schedule Request panel through scheduling.

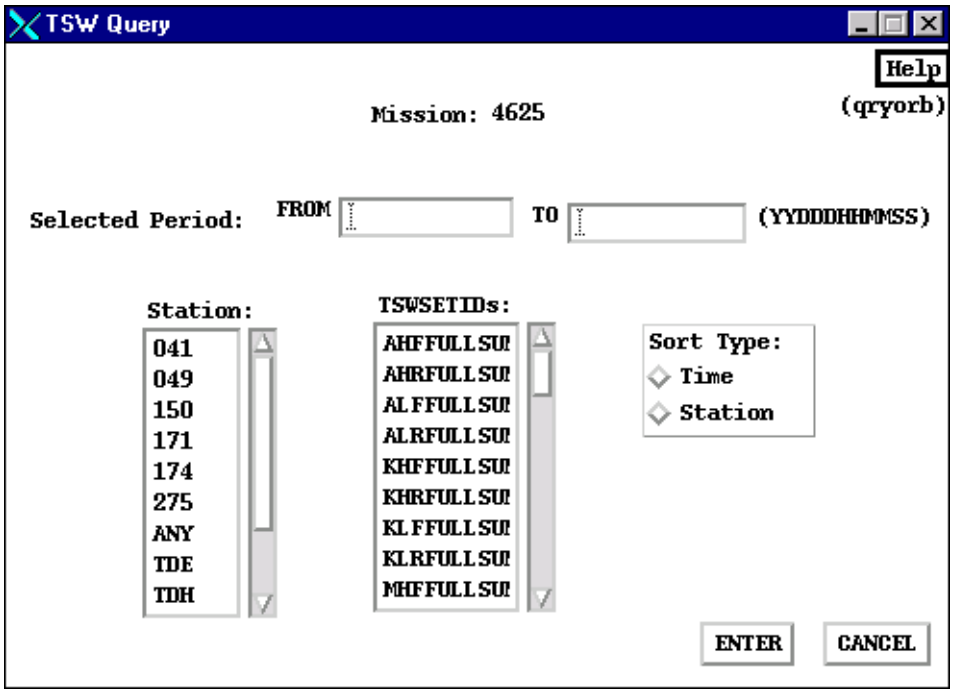


Figure 11-7. TSW Query Pane

11.7.2 Panel Items

a. Selected period (required). This Text field is used to specify the time interval of the query.

b. Station (required). This textlist shows all currently available TDRS stations. One or more can be selected.

c. TSW Set IDs (required). This textlist shows all the TSWs for a mission. One or more can be selected.

d. Sort Type (required). These radio buttons specify how the report will be sorted. Only one can be selected.

e. ENTER Button. Start processing.

f. CANCEL Button. Terminates processing at any time before clicking on ENTER.

11.7.3 Panels

The Query Response panel is displayed.

11.7.4 Description

a. This panel enables the user to query the UPS about TSW orbital data. The UPS validates the data input when the related input group is completed. When the user clicks on ENTER, the UPS ensures that all required data (selected period, mission, station, service type, and the antenna option) is selected. The response panel is the Query Response panel (refer to paragraph 11.9).

b. An orbit number of '-1' indicates that there were no PSAT or UAV data available for that time period.

11.8 Activity Log Query

11.8.1 General

a. This panel (see Figure 11-8) enables the user to query the UPS for information about different types of activity.

b. This panel is initiated by selecting the Activity Log option on the Query pulldown menu (see Figure 11-1).

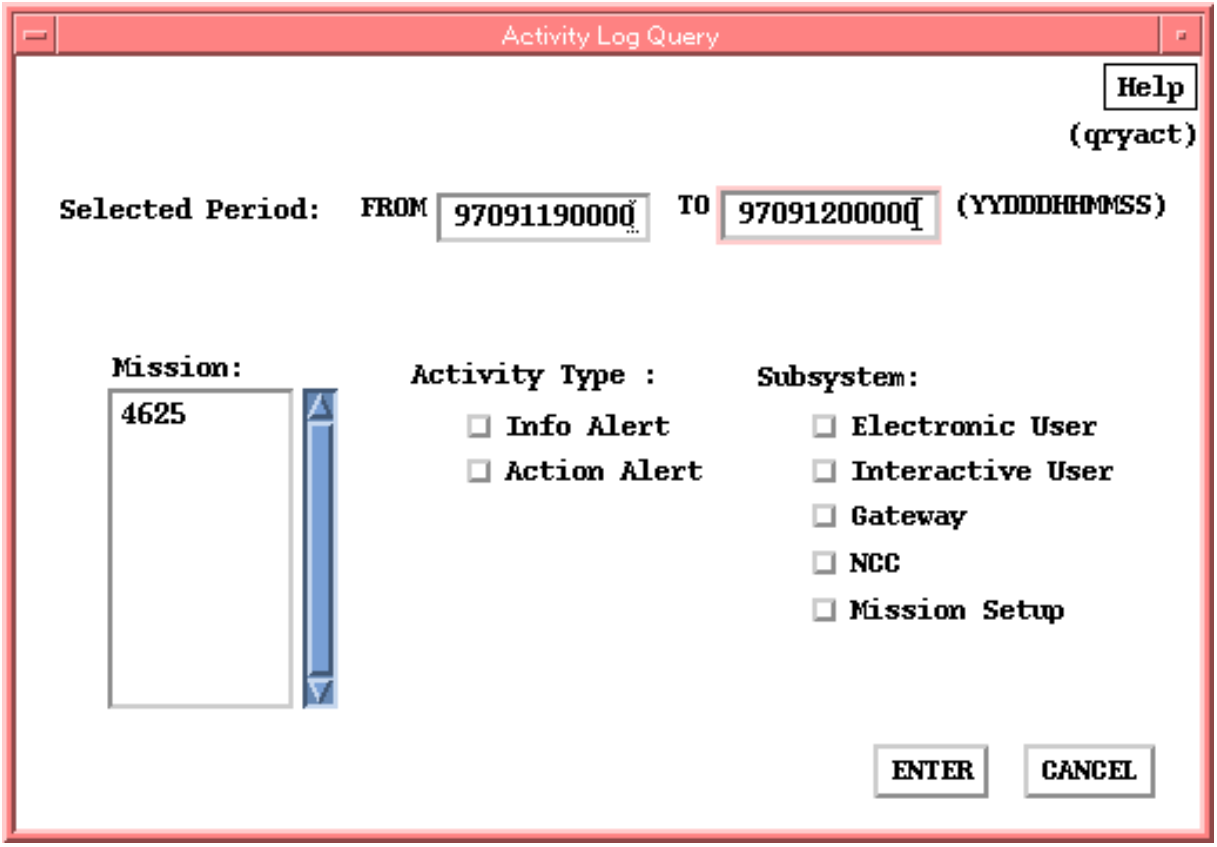


Figure 11-8. Activity Log Query Panel

11.8.2 Panel Items

a. Selected Period (required). Text fields.

b. Activity Type (required). These checkboxes list two activity types for user selection: info alert and action alert. More than one can be selected.

c. Mission/SIC (required). This textlist shows all selected missions at logon. Only one can be selected.

d. Subsystem Types (optional). These checkboxes list five subsystems for user selection: Electronic User, Interactive User, Gateway, NCCDS, and Mission Setup. More than one can be selected.

e. ENTER Button. Starts processing.

f. CANCEL Button. Removes the panel from the screen.

11.8.3 Panels

The Query Response panel is displayed.

11.8.4 Description

This panel enables the user to query the UPS for information about the activity log. The user can query two types of activities and five types of subsystems as discussed previously in paragraph 11.8.2. The user can query more than one activity and more than one subsystem simultaneously. The UPS checks that all required data are entered, and then displays the query response with the information retrieved from the database (refer to paragraph 11.9).

11.9 Query Response Panel

11.9.1 General

This panel enables the user to view the results of the following queries:

a. TSW query (see Figure 11-9).

b. Activity log query (see Figure 11-10).

11.9.2 Panel Items

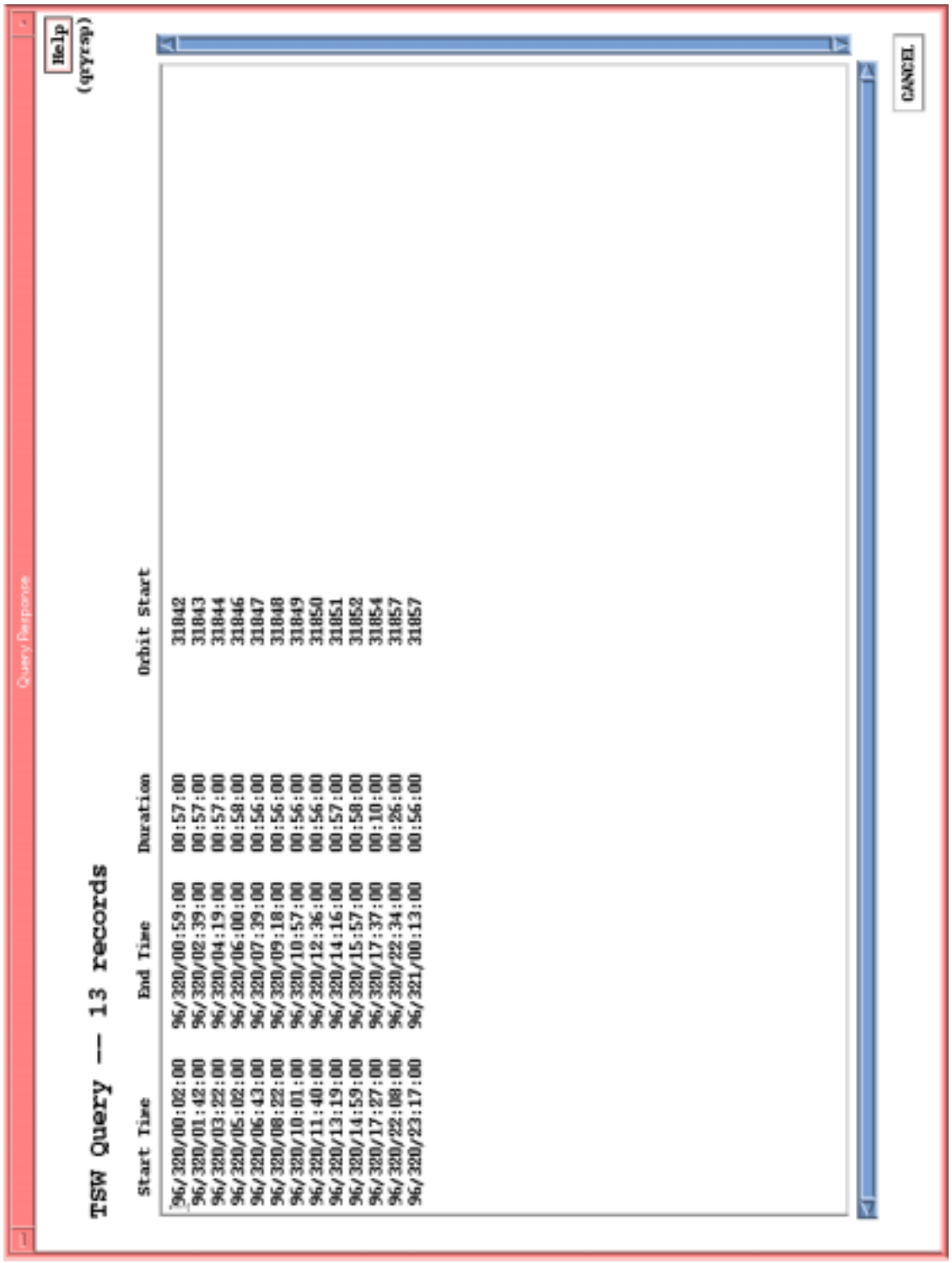
`CANCEL` pushbutton. Terminates processing.

11.9.3 Panels

No sub-panels are displayed.

11.9.4 Description

The Query Response panel enables the user to view the results of a TSW query or an activity log query. The records displayed in this panel are determined by the selection criteria entered by the user in the TSW query panel or the activity log query panel. After viewing, the user selects the CANCEL button to terminate the process.



Start Time	End Time	Duration	Orbit Start
96/320/00:02:00	96/320/00:59:00	00:57:00	31842
96/320/01:42:00	96/320/02:39:00	00:57:00	31843
96/320/03:22:00	96/320/04:19:00	00:57:00	31844
96/320/05:02:00	96/320/06:00:00	00:58:00	31846
96/320/06:43:00	96/320/07:39:00	00:56:00	31847
96/320/08:22:00	96/320/09:18:00	00:56:00	31848
96/320/10:01:00	96/320/10:57:00	00:56:00	31849
96/320/11:40:00	96/320/12:36:00	00:56:00	31850
96/320/13:19:00	96/320/14:16:00	00:57:00	31851
96/320/14:59:00	96/320/15:57:00	00:58:00	31852
96/320/17:27:00	96/320/17:37:00	00:10:00	31854
96/320/22:08:00	96/320/22:34:00	00:26:00	31857
96/320/23:17:00	96/321/00:13:00	00:56:00	31857

Figure 11-9. TSW Query Response Panel

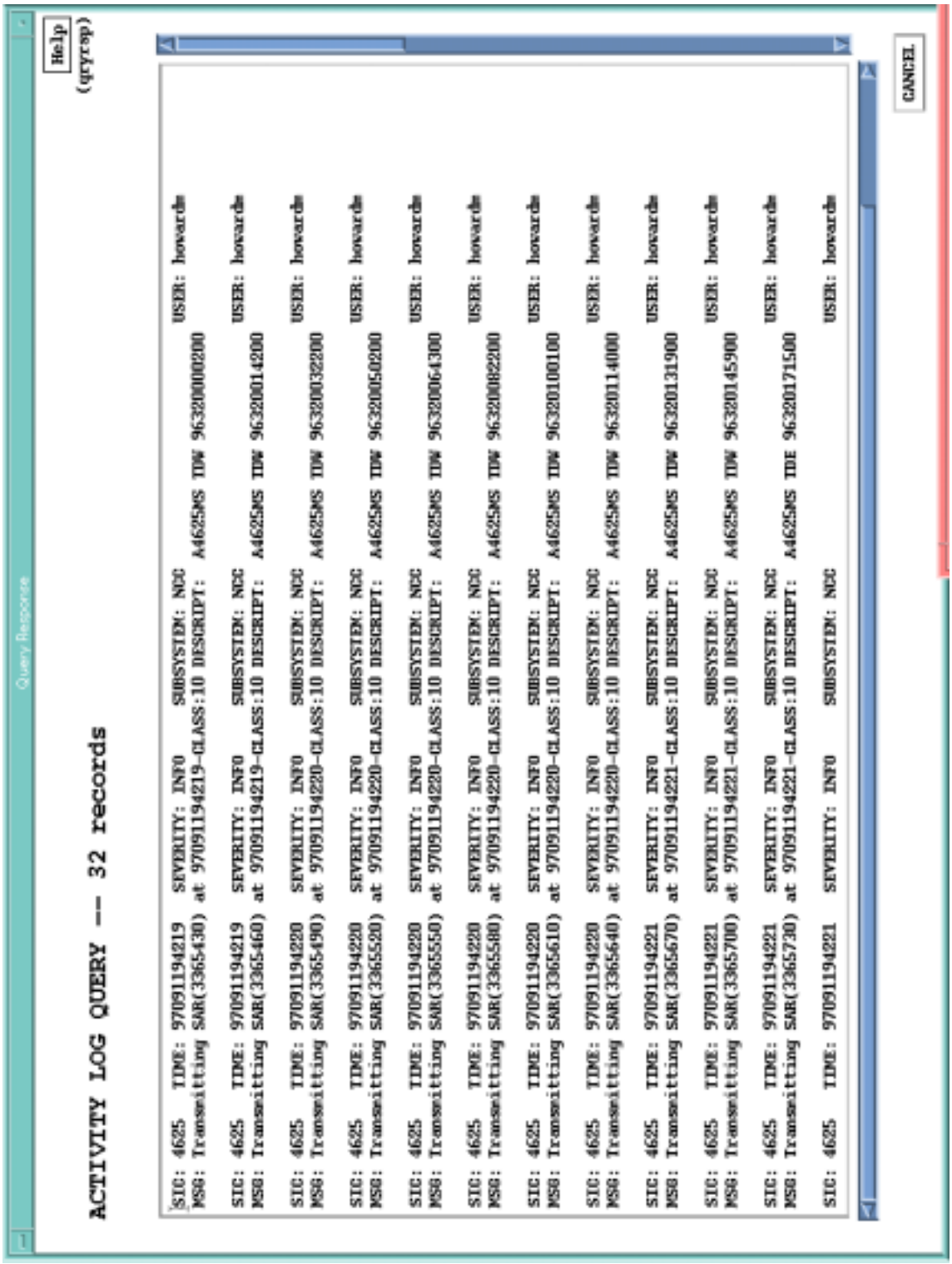


Figure 11-10. Activity Log Query Response Panel

Section 12. System Administration

12.1 Overview

The UPS system administrator can perform routine system administrative functions and initialize specific UPS-wide information at UPS startup. Each system administrator can add and delete system administrators. Each system administrator can set the state of communications logging (dumping incoming and outgoing blocks to an editable file). In addition, the system administrator can set up specific parameters for the system alert messages in the database at startup time. All system administration functions are initiated via the pulldown menus available from the System Administrator Information Window (see Figure 12-1 and Figure 12-2).

12.2 Add System Administrator

12.2.1 General

a. The Add System Administrator panel (see Figure 12-3) enables the system administrator to give other users the ability to log in as system administrator.

b. This panel is initiated by selecting the Add System Administrator option on the Users pulldown menu (see Figure 12-1).

12.2.2 Panel Items

a. Name. Enter the username of the user to be given system administrator privileges. The name will be checked to ensure that it is an existing user.

b. ENTER Button. Adds the new system administrator.

c. CANCEL Button. Exits the Add System Administrator panel without adding a new system administrator.

12.2.3 Panels

No sub-panels are displayed.

12.2.4 Description

The Add System Administrator panel enables the system administrator to add new system administrators to the UPS. The system administrator enters the username of the user to be given system administrator privileges. The system administrator then clicks on ENTER to add the new system administrator to the UPS. CANCEL can be selected at any time to cancel the process and exit the window.

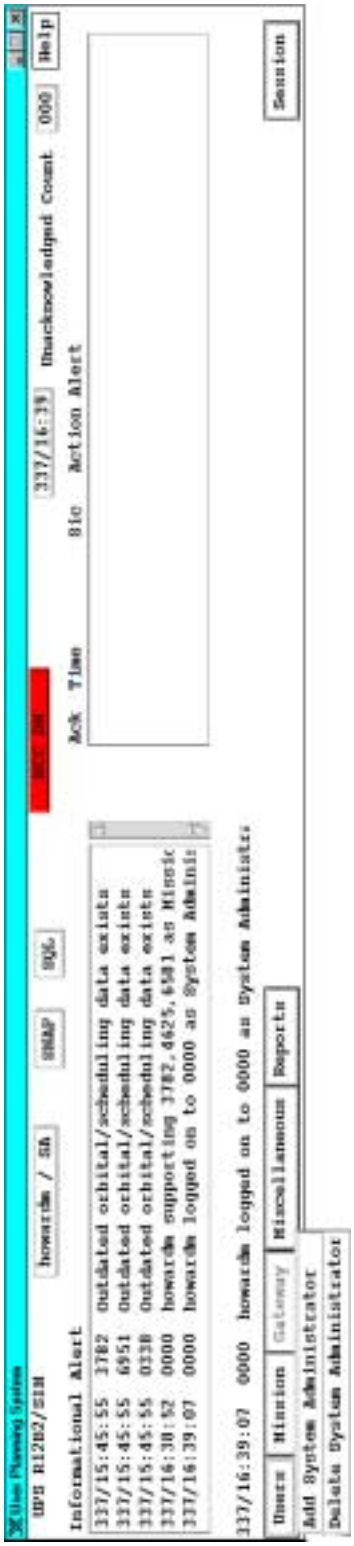


Figure 12-1. User's Pulldown Menu

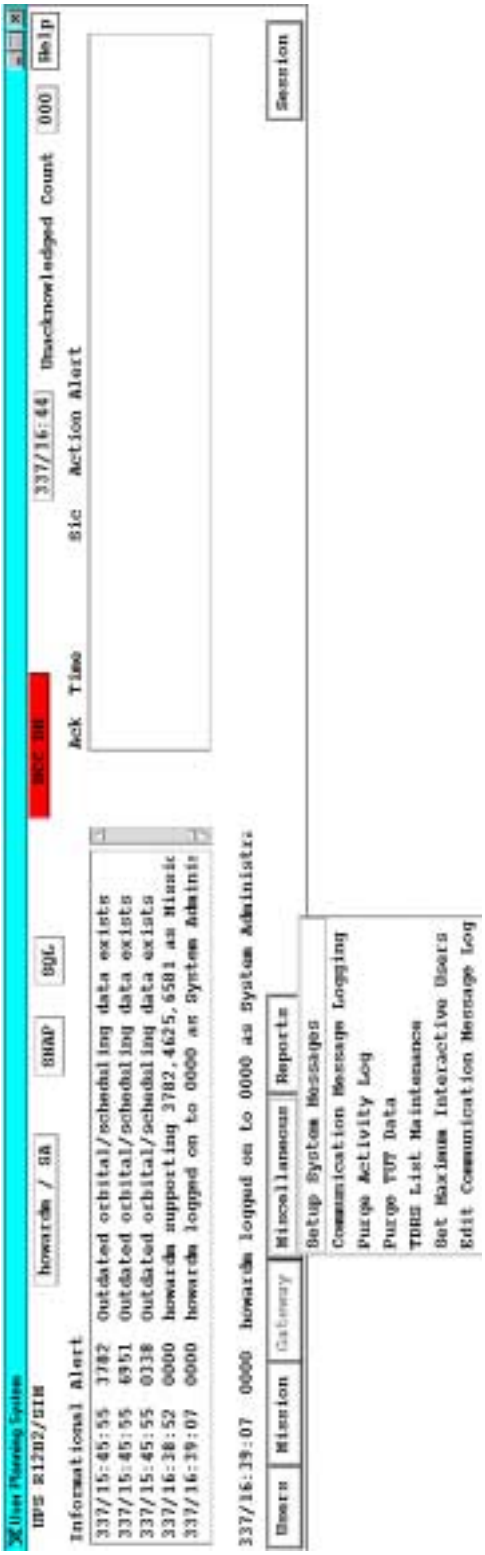


Figure 12-2. Miscellaneous Pulldown Menu

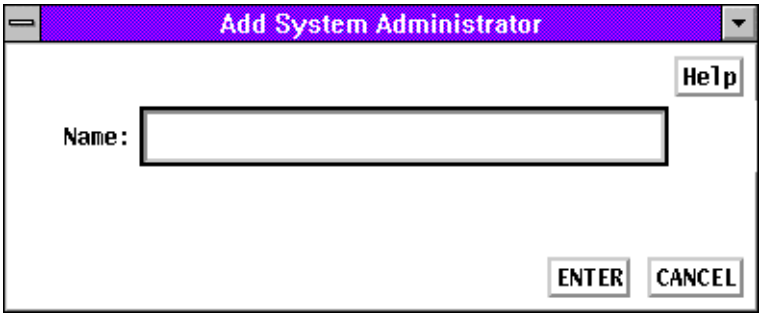


Figure 12-3. Add System Administrator Panel

12.3 Delete System Administrator

12.3.1 General

a. The Delete System Administrator panel (see Figure 12-4) enables the system administrator to delete another system administrator from the UPS. All system administrators have the same UPS privileges; therefore, any one can delete any other. Because at least one system administrator must be authorized to access these functions on the UPS, the user's attempts to delete himself/herself as system administrator will fail.

b. This panel is initiated by selecting the Delete System Administrator option on the Users pulldown menu (see Figure 12-1).

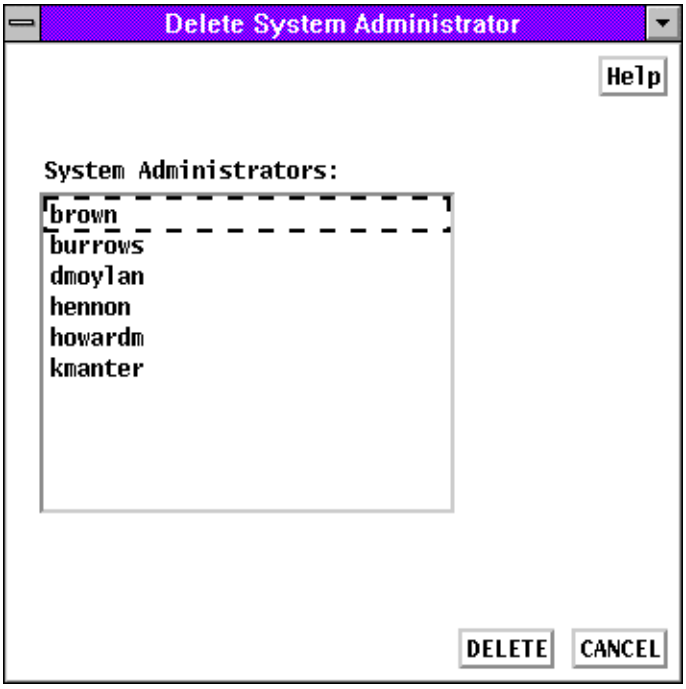


Figure 12-4. Delete System Administrator Panel

12.3.2 Panel Items

a. `System Administrators` Textlist. Select one or more system administrators to be deleted from the UPS.

b. `DELETE` Button. Deletes the selected system administrators. A window will pop up for the user to confirm the deletion.

c. `CANCEL` Button. Exits the Delete System Administrator panel without performing the deletions.

12.3.3 Panels

No sub-panels are displayed.

12.3.4 Description

The Delete System Administrator panel enables the system administrator to delete other UPS system administrators. The system administrator selects one (or more) to be deleted, and then clicks on `DELETE`. A confirmation message is then displayed to confirm the deletion. `CANCEL` can be chosen at any time to cancel the process and exit the window.

12.4 Set Up System Messages

12.4.1 General

a. The Set Up System Messages panel (see Figure 12-5) enables the system administrator to change specific parameters associated with the system alert messages stored in the database. Although the UPS is delivered with default parameters for the alert messages, this panel enables the system administrator to change those default settings. The system administrator can set the severity of the message (whether it is to be displayed as an informational alert, as an action alert, or not displayed at all); whether it is to be saved in the activity log; and, if it is to be displayed, which user positions will receive it.

b. This panel is initiated by selecting the Set Up System Messages option of the Miscellaneous pulldown menu (see Figure 12-2).

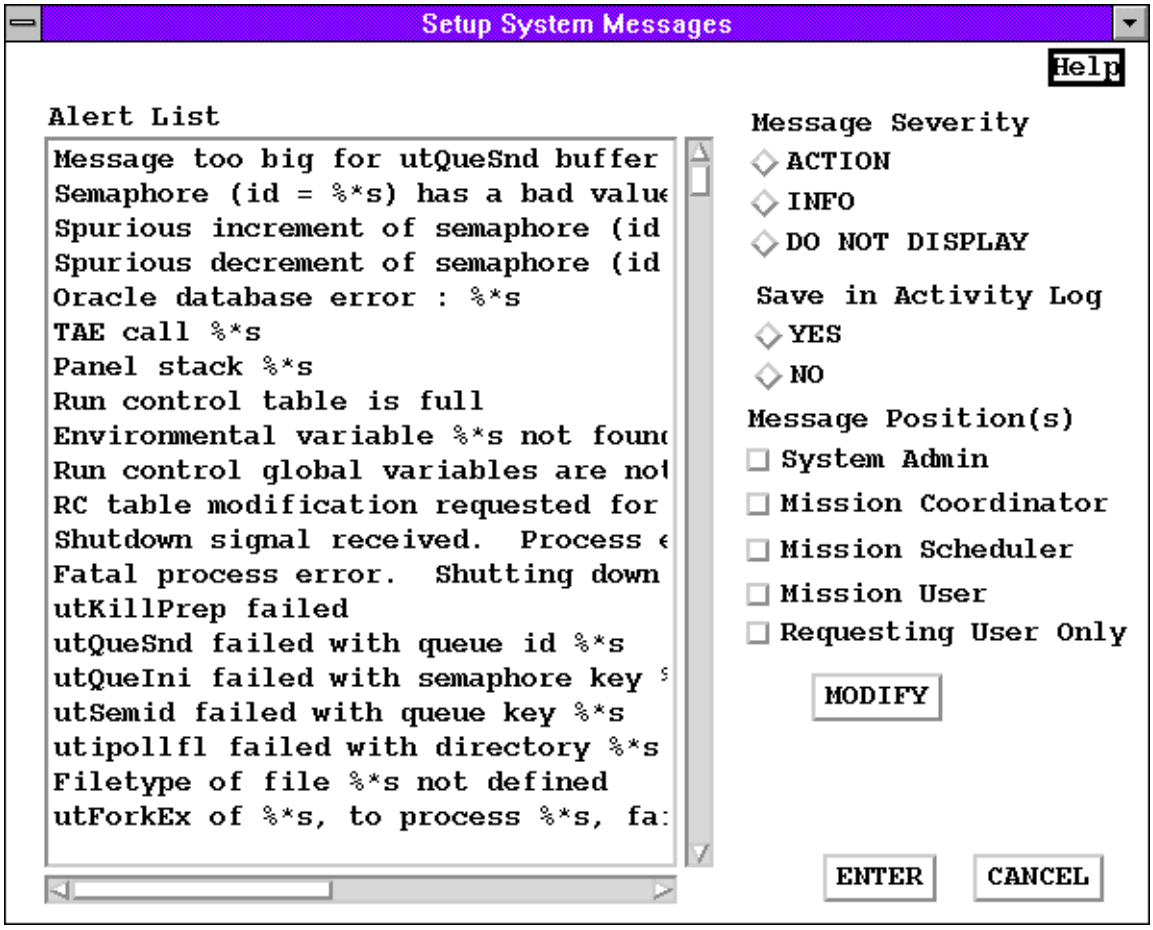


Figure 12-5. Set Up System Messages Panel

12.4.2 Panel Items

a. `Alert List` Textlist. Select an alert message to be modified. The current parameters will be displayed on the screen.

b. `Message Severity`. Select the new severity to be given to the alert.

c. `Save in Activity Log`. Select whether the alert is to be saved in the activity log.

d. `Message Position(s)`. Select the position or positions to which the message should be displayed. Selecting 'Requesting User Only' automatically deselects all other positions. Selecting any other position automatically deselects 'Requesting User Only.'

e. `MODIFY` Button. Applies changes to the currently selected message. Changes are not stored in the database until the ENTER button is selected.

f. `ENTER` Button. Saves the changes to the system alert message parameters in the database.

g. `CANCEL` Button. Exits the panel without saving the changes in the database.

12.4.3 Panels

No sub-panels are displayed.

12.4.4 Description

a. The Set Up System Messages panel enables the system administrator to change specific parameters associated with the system alert messages that are stored in the database. The system administrator selects an alert to be modified from the alert list. The default parameters will be displayed in the selection areas. The parameters can then be modified by selecting new severities or by designating other characteristics of the alert and then selecting `MODIFY`. When `ENTER` is selected, the UPS saves the changes to the database. `CANCEL` can be selected at any time to cancel the process and exit the window.

b. Not all system messages are associated with a specific mission when they are generated in the code. Since the SIC is needed to deliver the message to certain positions, if a message is generated without a SIC, it cannot be sent to the mission coordinator, scheduler, or user, even though these positions are selected. These messages will only reach the system administrator and the requesting user, if indicated in the message setup.

c. Any message not always associated with a SIC will have the system administrator and requesting user positions preselected, and will not permit position settings to be modified. The position settings will still be displayed, but they will be dimmed, and a message will appear notifying the user that the positions for this message cannot be changed. Any message that is always associated with a SIC will allow its position settings to be updated and will not display the above warning.

d. The system alert messages are not intended to be modified on a regular basis. Due to performance considerations, they are read from the database once at system startup; therefore, when the list of messages in the database is modified, the UPS must be brought down and back up to reinitialize the messages (refer to paragraphs 3.2 and 3.3 for instructions on shutting down and restarting the UPS). Some alert messages on the UPS are not stored in the database. The system administrator cannot modify them.

12.5 Communication Message Logging

12.5.1 General

a. The Message Logging panel (see Figure 12-6) enables the system administrator to start and stop dumping of incoming and outgoing messages to an editable file. Messages to and from the NCCDS, and to and from the electronic user can be captured and viewed as they are received or transmitted.

b. This panel is initiated by selecting the Communication Message Logging option on the Miscellaneous pulldown menu (see Figure 12-2).

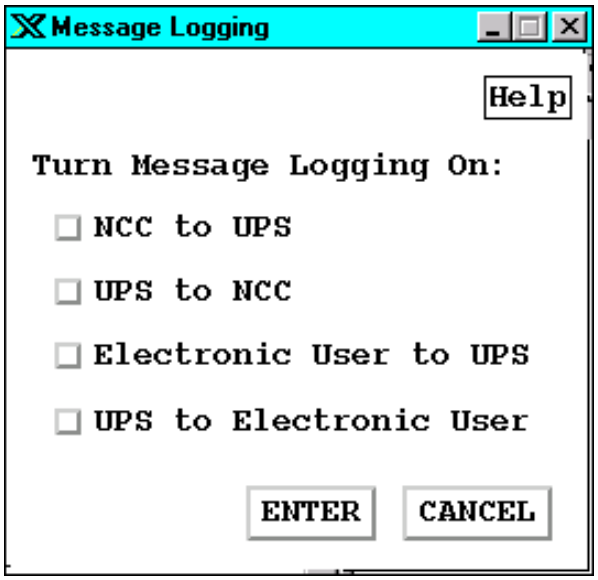


Figure 12-6. Message Logging Panel

12.5.2 Panel Items

a. Turn message logging on. These checkboxes are selected to toggle the state of the message logging.

   1. NCC to UPS. Incoming from NCCDS.
   2. UPS to NCC. Outgoing to NCCDS.
   3. Electronic User to UPS. Incoming from the electronic users.
   4. UPS to Electronic User. Outgoing to the electronic users.

b. ENTER button. Changes the state of the message logging.

c. CANCEL button. Exits the panel without changing the state of the message logging.

12.5.3 Panels

No sub-panels are displayed.

12.5.4 Description

When the system administrator displays the Message Logging panel, the current state of message logging is shown. The logging is turned on for any checkbox that is selected or highlighted. The checkboxes can then be de-selected to toggle the state of the message logging. If none of the logging checkboxes were selected when the panel was displayed initially, and at least one was selected before ENTER was pressed, the existing log file is removed and a new one created. When ENTER is selected, the new message logging state goes into effect. CANCEL can be selected at any time to cancel the process and exit the window. The contents of the current log file can be reviewed by selecting Edit Communication Message Log from the Miscellaneous pulldown.

12.6 Purge Activity Log

12.6.1 General

The Purge Time panel (Figure 12-7) enables the system administrator to remove obsolete alerts from the activity log. This function is initiated from the Purge Activity Log option of the Miscellaneous pulldown menu (see Figure 12-2).

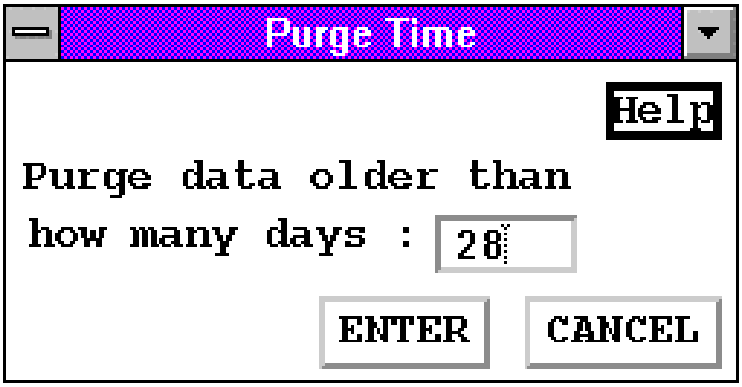


Figure 12-7. Purge Time Panel

12.6.2 Panel Items

a. `Purge Data Older Than How Many Days`. Enter a number of days worth of alerts to save. Defaults to the activity log purge age.

b. `ENTER` Button. Purge all alerts older than the Days to Save entry.

c. `CANCEL` Button. Exit the panel without purging the activity log.

12.6.3 Panels

No sub-panels are displayed.

12.6.4 Description

Purging the activity log removes messages from the database, but not from the displays. Currently active displays of alert messages are not affected by purging the messages. The purged messages remain on the displays and may be acknowledged or viewed in detail. Users who sign on after the purge, however, do not see the purged messages in their information windows.

12.7 Purge TUT Data

12.7.1 General

The Purge TUT Data panel (Figure 12-8) enables the system administrator to remove obsolete TDRS Unused Time (TUT) data from the database. This function is initiated from the Purge TUT Data option of the Miscellaneous pulldown menu (see Figure 12-2).

12.7.2 Panel Items

a. `Days (relative)`. Enter a relative number of days worth of TUTs to purge. Defaults to the seven (7).

b. `Date/Time (absolute)`. Enter an absolute date/time (DDDHHMMSS) for which all TUTs prior to that date/time will be purged. Defaults to blank.

c. `ENTER` Button. Purge all TUT data older than the Days to Save entry.

d. `CANCEL` Button. Exit the panel without purging any TUT data.

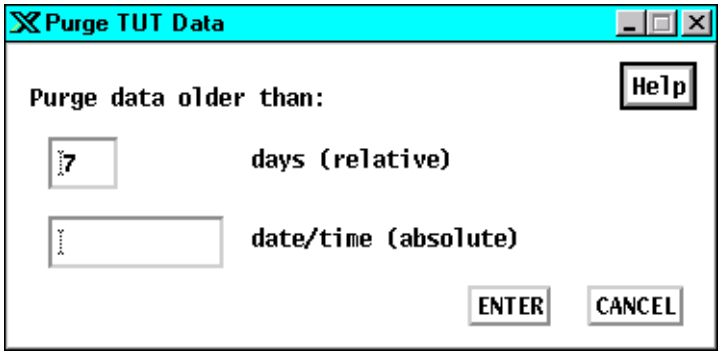


Figure 12-8. Purge TUT Data Panel

12.7.3 Panels

No sub-panels are displayed.

12.7.4 Description

Purging TUTs removes old TUT data from the database. Since the process that ingests new TUT data always deletes all TUTs from the database, it is not necessary to purge TUTs on a regular basis.

12.8 TDRS List Maintenance

12.8.1 General

The TDRS List Maintenance Panel (see Figure 12-9) enables the System Administrator to add, modify, and delete TDRS IDs and TDRS Sets (see the Description for more information) from the UPS database. The panel is initiated by selecting the TDRS List Maintenance option on the Miscellaneous pulldown.

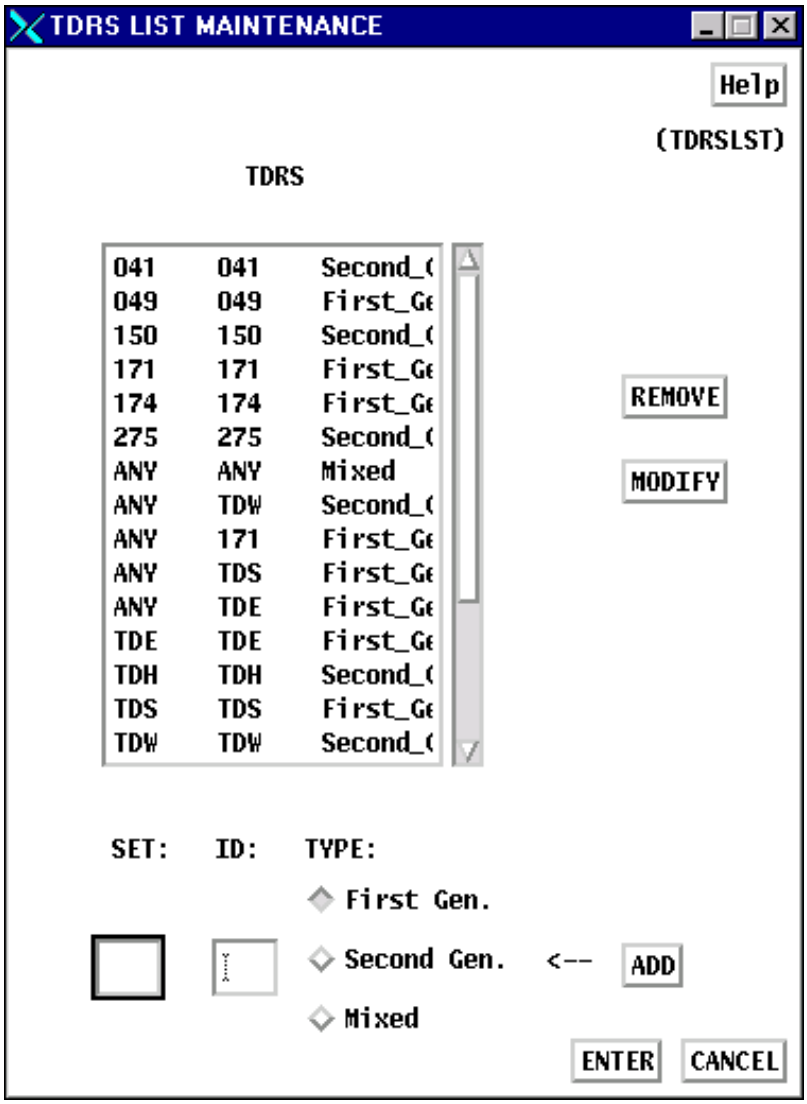


Figure 12-9. TDRS List Maintenance Panel

12.8.2 Panel Items

a. `TDRS ID` List. Displays current TDRS IDs in the database. IDs to be modified or deleted must first be selected from this list.

b. `TDRS Set`. Text entry field used to enter the TDRS set name. Uppercase and lowercase alpha characters as well as digits (0-9) are valid. In addition, TDRS set names from the TDRS ID list are displayed and modified in this field.

c. `TDRS ID`. Text entry field used to enter a new TDRS ID. Uppercase and lowercase alpha characters as well as digits (0-9) are valid. In addition, TDRS IDs selected from the TDRS ID list are displayed and modified in this field.

d. `First Generation Button`. This button is used to specify that the TDRS ID or TDRS Set is of the first generation type. (Has MA, SSA and KSA services.)

e. `Second Generation Button`. This button is used to specify that the TDRS ID or TDRS Set is of the second generation type. (Has SSA, KSA, SMA, KaSA and KaSA wideband services.)

f. `Mixed Button`. This button is used to specify that the TDRS Set contains TDRS's of both first and second generation.

g. `ADD` Button. Adds the TDRS ID entered in the TDRS ID field to the database and the TDRS ID list. The ADD button will not function if a TDRS ID has been selected from the list, if the TDRS ID entered has an invalid format, if the addition of another TDRS ID will exceed the system maximum, or if the new TDRS ID will duplicate an existing TDRS ID.

h. `REMOVE` Button. Removes the TDRS ID that was selected from the list and is currently displayed in the TDRS ID field. This button will not function if a TDRS ID has not been selected from the list or if the TDRS ID selected from the list is used by any currently scheduled events.

i. `MODIFY` Button. Modifies the TDRS ID selected from the list to the value in the TDRS ID field. This button will not function if a TDRS ID has not been selected from the list, if the TDRS ID selected from the list has not been changed, if the modified TDRS ID will duplicate an existing ID, if the TDRS ID selected from the list is used by any currently scheduled events, or if the modified TDRS ID is invalid (not three characters in length or invalid characters).

j. `ENTER` Button. Commits all changes to the database and removes the panel.

k. `CANCEL` Button. Cancels all changes made during this session and removes the panel. If changes were made, the user is asked to confirm the cancel action.

12.8.3 Panels

Only bother boxes and confirm panels are displayed.

12.8.4 Description

a. The concept of a TDRS has changed in Release 12, in conjunction with the NCCDS 1998 Full Support concepts. In addition to the familiar TDRS operational names, a TDRS Set Name must now be defined. The set name is 3 characters long and may be used to indicate all available TDRSs, a subset of TDRSs, a single TDRS, or other TDRS sets. The purpose of the TDRS set name is to allow the user more flexibility when specifying a TDRS in a scheduling request. For example, TDE could be designated to mean "041" or "046". A request that contains TDE indicates that the user wished to schedule on either 041 or 046 and leaves the final choice to the NCCDS. Note that the TDRS set must be defined at the NCCDS and the NCCDS and UPS databases must agree on what the TDRS set name represents.

b. Each entry in the TDRS ID list now contains 2 fields; the TDRS set name and the TDRS ID. An entry for an operational TDRS name will have the same value for TDRS set name and TDRS ID. Each TDRS set will have the same value in both fields too, and must be defined prior to the definition of any set members. For example, if there were 2 operational TDRSs, 041 and 046, you must enter them first as 041/041 and 046/046. Then, if you wanted to use TDE to indicate 041 OR 046, first create a TDRS entry of TDE/TDE for the set and then create TDE/041 and TDE/046 for each set member. If you scheduled an event using TDE, the NCCDS will determine which TDRS (041 or 046) to use. Note that you cannot use the name of an operational TDRS as a TDRS set name.

c. To add a TDRS record, the user enters three valid digits in the TDRS Set box, three valid digits in the TDRS ID box and clicks on `ADD`. To modify a TDRS ID, user selects an ID from the list, makes the desired changes, and clicks on `MODIFY`. To delete a TDRS ID, the user selects the ID from the list and clicks on REMOVE. To commit all changes to the database, the user clicks on `ENTER`. The `CANCEL` button erases all changes made during this session.

12.9 Set Maximum Interactive Users

12.9.1 General

The Set Maximum Interactive Users Panel (see Figure 12-10) enables the System Administrator to set the maximum number of interactive users at his site up to a maximum of 15. This limits the number of interactive users that can be logged on to the UPS concurrently. This function is accessed by selecting Set Maximum Interactive Users option on the Miscellaneous pulldown.

12.9.2 Panel Items

a. MAXIMUM NUMBER OF INTERACTIVE USERS. Text entry field used to display the current maximum number of interactive users value and enter the new value. The value must be between 1 and 15. If an invalid number is entered, the previous value will be restored. TDRS ID List-Displays current TDRS IDs in the database. IDs to be modified or deleted must first be selected from this list.

b. ENTER Button. Stores the new value for maximum number of interactive users in the database and closes the panel. The new value takes effect immediately and new user logins are checked against it.

c. CANCEL Button. Cancels all changes made during this session and closes the panel.

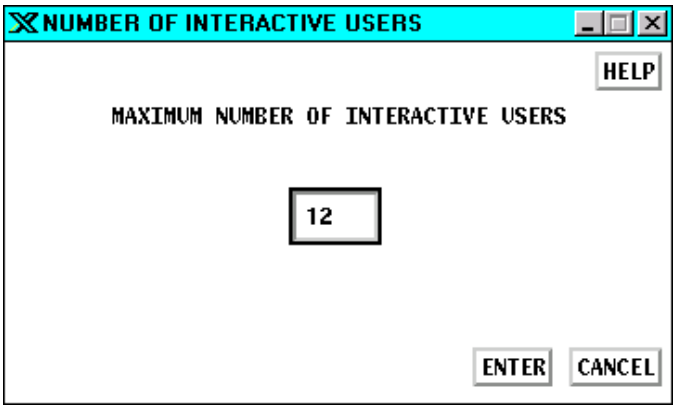


Figure 12-10. Number of Interactive Users Panel

12.9.3 Panels

Only bother boxes and confirm panels are displayed.

12.9.4 Description

To change the maximum number of interactive users, enter the desired quantity in the text box and click on ENTER. To cancel a change, click on CANCEL.

12.10 Edit Communication Message Log

12.10.1 General

The Edit Communication Message Log Panel (see Figure 12-11) enables the System Administrator to edit the communication log file. The logging process was initiated when the System Administrator selected Communication Message Logging from the Miscellaneous pulldown and captures all messages to and from the NCCDS and the EU in a file. This file can be viewed with a standard text editor by clicking on Edit Communication Log in the Miscellaneous pulldown. The file will be displayed in a full service editor window and can be printed.

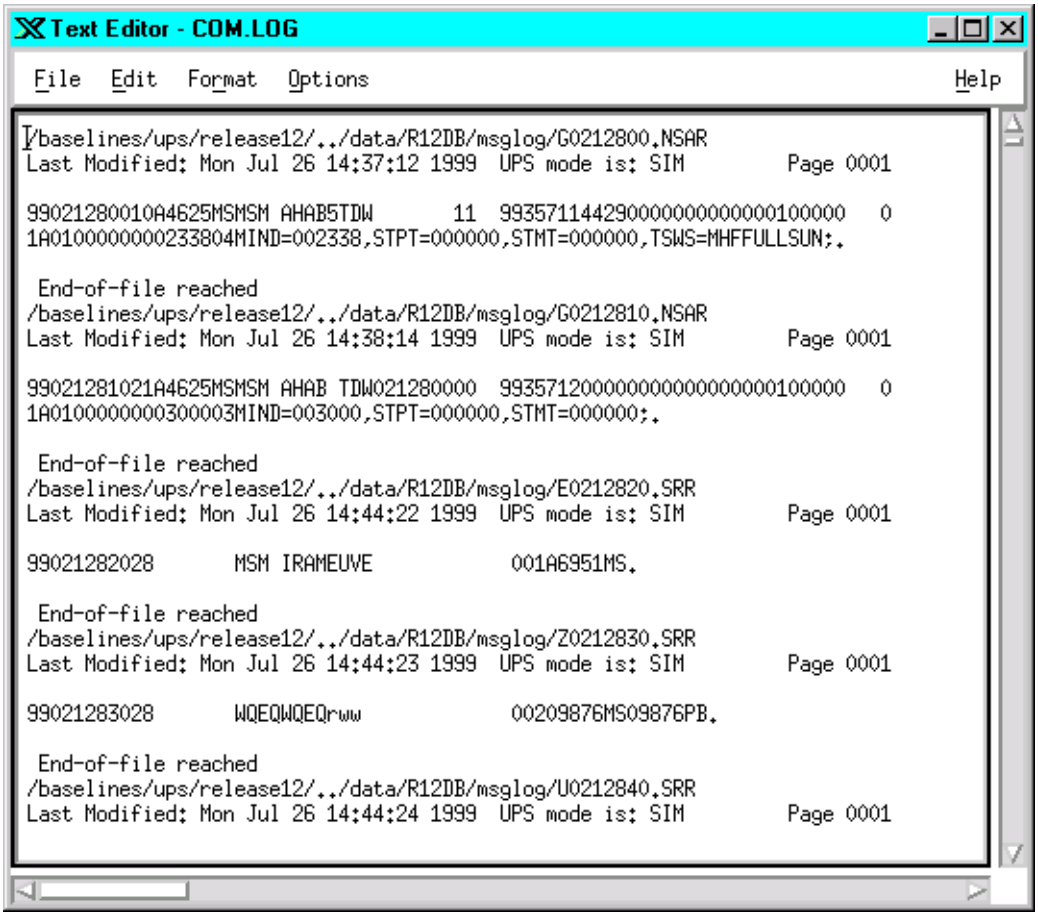


Figure 12-11. Edit Communication Message Log Panel

12.10.2 Panel Items

a. File Menu. Stores the new value for maximum number of interactive users in the database and closes the panel. The new value takes effect immediately and new user logins are checked against it.

b. Edit Menu. The usual cut, copy, paste functions are available.

c. Format Menu. Several text format options are available.

d. Options menu. Various display options are available.

e. `Logged Message Text`. Text display field showing the logged messages.

12.10.3 Panels

No sub-panels are displayed.

12.10.4 Description

a. The panel displayed is the X-windows standard text editor panel. The logged message is displayed within the text editor. Although many usual text editor options are available, it is recommended that only the Print and Save As uses text functions be used, as any text editing/formatting may not preserve the integrity of the logged data being displayed.

b. To print to a locally-defined printer, select File then Print. To save a logged file, select File, then Save As. To close this panel, select File, and then Close. The logged data will be saved in the COM.LOG file until overwritten by another logging session or deleted by the user.

12.11 Database Backup and Recovery Environment

12.11.1 General

This section explains the environment needed to run the database backup and recovery procedures. Specific backup and recovery procedures are provided in paragraphs 12.9 and 12.10.

12.11.2 Restrictions

a. For the backup/recovery procedures to succeed, the following restrictions must be observed:

1. All dba's must have a umask of 2. Each UNIX user who is a dba should have the command "umask 2" in the .cshrc file.

2. In order to run any of the backup/recovery routines, a UNIX user must be in the UNIX group "dba" and must be a dba in the Oracle database. The UNIX system administrator should add the UNIX user to the group "dba." An account must exist in the database for user name OPS$ userid, where userid is the UNIX user name. The Oracle account must have connect, resource, and dba privileges.

3. The init.ora file for the database must contain log_archive_dest and online_log_files settings. The createUPSdata base program automatically writes these lines. If you create a UPS database without the dbcreate program or if you modify the database, these parameters must be set in the init.ora file.

(a) An example of a log_archive_dest setting in an init.ora file follows:

log_archive_dest = /logs/DEV3/archive

where /logs/DEV3 is the pathname of the archive logging directory, and "archive" is the filename root. The UPS application requires that "archive" is used as the root. Even if you are not using archive logging at this time, the UPS application requires that you set the log_archive_dest parameter to an actual directory so that you do not have to change the database structure to write an archive log in the future.

(b) Following is an example of online_log_file settings in an init.ora file:

online_log_file = /oradata1/oradata/<ORACLE SID>/redo1.log

online_log_file = /oradata1/oradata/<ORACLE SID>/redo2.log

online_log_file = /oradata2/oradata/<ORACLE SID>/redo1.log

online_log_file = /oradata2/oradata/<ORACLE SID>/redo2.log

(c) <ORACLE SID> is the name of the database associated with the log files. Note that there are redundant sets of log files. Refer tot he UPS installation notes for more information on file placement and architecture. Notice that there is a # character at the beginning of the line because the line is not used by the Oracle program directly, but by the UPS application. There must be one such line for each online log file.

4. To use dbbackup and dbrecover, the database must be run in archivelog mode and must have permanent automatic archiving turned on. This can be accomplished during the initial database creation (see the UPS installation notes) or it can be turned on later using the svrmgrl program (see the Oracle DBAs Guide for explanation). To turn on permanent automatic archiving, the init.ora parameter log_archive_start must be set to TRUE (see the comment that the dbcreate program writes in the init.ora file).

5. The following files and directories must have group privileges of "dba" and have, at least, read and write permissions for user and group.

   (a) All database files (ls -l 'dbfiles')

   (b) All online database logs (ls -l 'dblogfiles')

   (c) All offline archive logs
   (ls -1 /DIRECTORY/ARCHIVE_LOGGING_DIRECTORY)

   (d) All control and init.ora files
   (ls -l $ORACLE_HOME/dbs/init* $ORACLE_HOME/dbs/cntrl*)

   (e) All files in the database's temporary directory
   (ls -l ORACLE_HOME/dbs/<ORACLE_SID>)

   (f) Every directory which contains any of the above files
   (ls -ld $ORACLE_HOME/dbs/<ORACLE_SID>$ORACLE_HOME/dbs/
   DIRECTORY/ARCHIVE_LOGGING_DIRECTORY)

   (g) Parent directory of the archive logging directory
   (ls -ld /DIRECTORY/ARCHIVE_LOGGING_DIRECTORY/...)

b. When files and directories are created, they inherit the group of their parent directory. Therefore, before creating (or copying in) a database, you should set the group of all above-listed directories to "dba," and all the files will automatically be created with group "dba."

c. When file/directories are created, read and write permissions are defined for user, group, and world. These permissions are restricted by the file/directory creator's umask. If you have an umask of 2 when you create any files in the list above, they will be created with read and write permissions for user and group.

d. Backups created on one machine can be used by recovery procedures on a different machine. If hardware fails, you can recover the database on a different machine so that the failed hardware can be repaired. The same method can be used for moving a database onto new hardware or for updating the backup database on a dual-redundant hardware system. Before you recover a database on different hardware, make sure that ALL directories used by the database on the original hardware system exist with the exact absolute pathnames and have the correct groups and permissions. These directories include each one that contains database file(s); ~oracle/dbs (which contains control and init.ora files); and any other directories that Oracle is using for archive logging, auditing, or anything else. To use dbrecover to recover any time other than Point-of-Failure, you will need to bring the archive logs from the original machine to the new machine's archive logging directory. Backups and/or archive logs can be moved from one machine to another by using network copy programs (such as ftp or dcp), NFS mounted disks, removable disks, or tapes.

12.11.3 Logging On to UNIX for Database Backup/Recovery

The database backup/recovery procedures may be run by anyone who is in the UNIX group 'dba' and who has the Oracle DBA privilege for this database.

a. If you are in the UPS application, you must exit it. You must log onto the UNIX system as a user in the 'dba' group. UPS uses C-shell commands to set the environment. If you are not in the C-shell, at the operating system prompt ($), run the program chsh and request the shell /bin/csh, as in the following example:

```
$  chsh
Changing login shell for simpson
Shell [/bin/sh]: /bin/csh
```

b. Then log off the system and log on again.

12.11.4 Setting UPS Environmental Variables

The UPS environmental variables should be set before these programs are run. Any user who runs any of these programs will have to configure the account as follows:

a. Copy the file login.upsuser from the parent directory of the root directory of the UPS baseline into your home directory.

b. Enter the line "source ~/login.upsuser" into your .login file.

12.11.5 Modifying Variables Values

a. The variables used by the backup and recovery procedures are listed in Table 12-1.

b. If DB_ONLINE_DEV or DB_OFFLINE_DEV are set to the path of a tape device, it must be a 'no rewind' tape device.

c. For each variable you want to modify, insert a line at the end of the file $UPSROOT/../login.site, as in the following example:

setenv DB_ONLINE_DEV /usr/users/frank/online_backup

d. DB_ONLINE_DEV should be replaced with the variable you want to modify, and the filepath should be replaced with the new variable value.

e. The backup and recovery procedures are interactive programs that can be executed at the UNIX command line operating system prompt (%), as in the following example: % dbbackup.

f. They can also be executed from the captive DBA account. Refer to the UPS Installation notes for further details.

Table 12-1. Variables used by Backup and Recovery Procedures

Variable	Default Value	Explanation
DB_ONLINE_DEV	/dev/rmt/0mn	Default filepath to read/write online backup from/to.
DB_OFFLINE_DEV	/dev/rmt/0mn	Default filepath to read/write offline backup from/to.
DB_CUT_START	300	Time to allow for database to start up. If the database takes longer than this, it will be assumed to be stuck and the startup will be terminated.
DB_CUT_STOP	120	Time to allow for database to shut down gracefully. If the database takes longer than this, it will be assumed to be stuck and a forced shutdown will be initiated.

12.12 Database Backup Procedures

12.12.1 General

a. This section explains the database backup procedures. First, a brief explanation is given of how these procedures are run, and the differences between the online and offline backup methods. The specific procedures are provided in paragraphs 12.9.2 and 12.9.3.

b. Whenever a physical change is made to the database structure (e.g., a file added to a tablespace, an online log added, a tablespace removed), the database is no longer protected by previous backups, so new backups should be made.

c. When asked for user input, do not use any white space (e.g., space, tab, carriage return). When asked a yes or no question, the default answer (given in square brackets) is assumed unless you fully spell out the other answer. For example, if you are asked, "Do you wish to continue [yes]?" and you want to override the default, you must enter "no" (any case combination).

d. If you interrupt an I/O operation during backup or recovery, the program cannot respond to the interrupt until the operating system checks for interrupts. Repeatedly hitting the interrupt key will cause the program to terminate once it receives the interrupts. Similarly, if you are asked to enter something at the terminal, a user interrupt cannot be processed until you hit RETURN.

e. An online backup is created while the database is open and available for use. An offline backup is created while the database is closed and not available to users.

f. Both backup procedures prompt the user for the filepath where the backup will be written. The filepath can be the path to a directory name (to be overwritten or created) or to a nonrewind device (e.g., /dev/nrmt0h). The directory should be named, or the tape labeled to identify the database name and whether it is an online or offline backup. If you are storing the backup on tape, label the tape with the date and time, so you can identify it if it is ever needed for recovery. (If you are storing the backup on disk, the directory modification time is sufficient.)

12.12.2 Online Backup

To make an online backup, enter 'dbbackup' on the UNIX command line. To do an online recovery (refer to paragraph 12.13.2) to a specific point in time, there must exist an online backup and all database archive logs created between the backup creation time and the target recovery time. Therefore, the archive logs are only removed by the program dbbackup. The system activity monitor is notified when the archive logs are filling up the disk. The log files should not be removed manually. When you are running out of space in the logging disk partition, it is time to run dbbackup.

12.12.3 Offline Backup

First, make sure that the background processes are down. To make an offline backup, enter 'dboffline' on the UNIX command line. It is never necessary for the user to run the program dboffline, since the online backup routine fully protects the database. The online recovery procedure, dbrecover, can recover to any point in time since the last backup, whereas the offline recovery procedure, dbfailovr, can only recover to the point at which the backup was created. In addition, the dboffline procedure closes the database, so the database will not be available while the backup is being written. The offline procedure is provided for those users who do not need to recover past the point of backup creation, and who do not need the database to be available for use during the backup. Making an offline backup will <u>not</u> free up space in the logging directory, only making an online backup will.

12.13 Database Recovery Procedures

12.13.1 General

a. This section explains the database recovery procedures. Some general instructions for using the programs are given, and the differences between online and offline recovery are discussed. The specific recovery procedures are explained in paragraphs 12.13.2 and 12.13.3. Regardless of the type of recovery performed, always baring down the background processes first.

b. These procedures are not necessarily required when the operating system crashes, or the database locks up. If you have trouble with the database, first shut down (forced if necessary) and start up the database. One of these database recovery procedures should be run if the database cannot be restarted or the data in the database have been corrupted and you have a backup of the database at a time when the data were not corrupted.

c. When asked for user input, do not use any white space (e.g., space, tab, carriage return). When asked a yes or no question, the default answer (given in square brackets) is assumed unless you fully spell out the other answer. For example, if you are asked, “Do you wish to continue [yes]?” and you want to override the default, you must enter “no” (any case combination).

d. If you interrupt an I/O operation during backup or recovery, the program cannot respond to the interrupt until the operating system checks for interrupts. Repeatedly hitting the interrupt key will cause the program to terminate once it receives the interrupts. Similarly, if you are asked to enter something at the terminal, a user interrupt cannot be processed until you hit RETURN.

e. An online recovery uses an online backup. An offline recovery uses an offline backup. (An online backup is created with the program dbbackup; an offline backup is created with the program dboffline).

12.13.2 Online Recovery

a. To recover using an online backup, enter ‘dbrecover’ on the UNIX command line. If you do not have an online backup, do not run this procedure. The recovery modes are explained below.

   1. Point-of-Backup. Database will be recovered to the point where the online backup was created.

   2. Point-of-Failure. Database will be recovered as far as possible.

   3. Specific-Time. Database will be recovered to the time specified.

b. If you are using the last online backup created, you can choose any recovery mode.

c. If the database is in a salvageable state, you will be asked if you wish to make an offline backup before recovering. Use the criteria below to decide whether to have the online recovery procedure make an offline backup before recovering.

   1. Make Offline Backup. Backing up takes a long time. If the recovery fails you can run the dbfailover program, then you can run this procedure again (perhaps using a different backup).

   2. Do Not Make Offline Backup. If the recovery fails (e.g., if the operating system fails while running dbrecover, or the backup you are using is corrupted), you can reattempt to recover to Point-of-Backup. If a subsequent attempt fails, you will have to run dbfailovr (if you have an offline backup) or reload the database from scratch.

12.13.3 Offline Recovery

To recover using an offline backup, enter ‘dbfailovr’ on the UNIX command line. If you do not have an offline backup, do not run this procedure. The offline recovery procedure will recover the database to the time at which the offline backup was created.

Appendix A. Alert Messages

A.1 General

The following messages are issued by various UPS processes and utilities. All possible alert messages generated by each subsystem are listed in Table A-1 through Table A-11.

A.2 Parameterization

Some messages allow for parameterization of more detailed information. These messages contain one or more "%*s" strings to be replaced by specific information. For example, the message "Data base %*s error on Table %*s, status = %*s" might appear as "Database update error on table spacecraft_characteristics, status = 0072" when actually issued.

A.3 Designating Alert Messages to Different Positions

The system administrator can designate for each message the destination(s) (i.e., activity log, system information window, and/or system acknowledgment window) to which each message should be sent. In addition to specifying the destination(s), the system administrator can specify the particular UPS position(s) (i.e., mission coordinator, mission scheduler, mission user, and/or system administrator) to which the messages should be sent.

Table A-1. Utility Alert Message Numbers (1 of 2)

Message Number	Messages Description
0	Message too big for utQueSnd buffer (%*s > %*s).
1	Semaphore (id = %*s) has a bad value (%*s).
2	Spurious increment of semaphore (id = %*s).
3	Spurious decrement of semaphore (id = %*s).
4	Oracle data base error: %*s
5	TAE call %*s
6	Panel stack %*s
7	Run control table is full
8	Environmental variable %*s not found
9	Run control global variables are not set
10	RC table modification requested for nonexistent records
11	Shutdown signal received. Process exiting.
12	Fatal process error. Shutting down UPS.
13	utKillPrep failed
14	utQueSnd failed with queue id %*s
15	utQueIni failed with semaphore key %*s
16	utSemid failed with queue key %*s
17	utipollfl failed with directory %*s
18	Filetype of file %*s not defined
19	utForkEx of %*s, to process %*s, failed
20	Failure redirecting file descriptor %*s to /dev/null
21	utQueRcv failed with queue id %*s
22	dbopen failed
23	Query of table %*s failed
24	dbclose failed
25	utiflechk failed with queue id %*s, directory %*s
26	uteumkfn failed
27	Error return from utQueIni
28	Error return from utQueSnd
29	Value of environment variable %*s not within limits
30	Illegal value in db table %*s, field %*s
31	No record returned from dbSelect of table %*s, returned value %*s
32	dbDelete of table %*s failed, returned value %*s
33	dbCount of table %*s failed, returned value %*s
34	No privilege for attempted operation. Must be %*s.
35	Process called with illegal arguments
36	utCallAbt called by function %*s, calling utAbort now
37	Error running df for data base %*s's logging partition
38	Message would require %*s UPS/EU blocks. Maximum supported is %*s.
39	Could not update the %*s field on panel %*s.

Table A-1. Utility Alert Message Numbers (2 of 2)

Message Number	Messages Description
40	Error %*s panel %*s.
41	Attempt to print file %*s on printer %*s failed.
42	Printer environment variable %*s undefined.
43	Cannot exceed maximum supported User Resident Processes.
44	Call utMURP_register before calling this unit.
45	User Resident Process '%*s' has stopped and will NOT be restarted.
46	User Resident Process '%*s' stopped and has been restarted.
47	The shared memory copy of the SARVAL record is corrupted.
48	SIC %*s not found in shared memory.
49	Error converting time %*s.
50	Environmental variable %*s not defined. Using default of %*s seconds.
51	Unknown User Resident Process %*s
52	Error running PS for tracking %*s process memory usage
53	Memory usage of %*s process is %*s K

Table A-2. NCC Message Subsystem Message Numbers

Message Number	Message Description
54	Error converting UPS status code
55	Error converting NCC status code
75	Unable to access %*s.
76	Unable to get message from queue %*s
77	Unable to send message to queue %*s
78	Error opening file %*s
79	Error reading file %*s
80	Schedule delete explanation: %*s
81	Error linking to file
82	Error unlinking file
83	Unknown action
84	Data base connect error
85	Data base disconnect error
86	Data base fetch error table %*s
87	Error updating data base table %*s
88	Data base commit error
89	No associated SAR record deleted from data base table %*s
90	NCC Message: %*s
91	Unknown mission
92	Unknown service
93	Error calling utGenRid
94	No information stored in the specified memory
95	(Unused error code)
96	Error storing data base table %*s
97	Error closing file %*s
98	Error creating file %*s
99	Could not get directory name for %*s
100	Unable to %*s run control record for schedule data update
101	Message %*s, descript = %*s %*s %*s sent to EU
102	Received %*s at %*s-%*s
103	Transmitted %*s at %*s-%*s
104	Msgid: %*s, RCVD: %*s, %*s
105	Process started with bad command line arguments.
106	Invalid schedule request type. Type must be Add or Delete.
107	Transmitting %*s at %*s-%*s
108	Request ID #%*s was not sent
109	Input power ratio value %*s incorrect
110	SAR %*s was not acknowledged
111	Invalid message on queue (%*s)
112	Unused error code

Table A-3. Information Window Process Message Numbers

Message Number	Message Description
125	Error connecting to the data base
126	Error disconnecting from data base
127	Error fetching data base table %*s
128	Error initializing message queue %*s
129	Error initializing the information window
130	Error retrieving user position mission list
131	Error registering X timeout event
132	Error building info window update for %*s
133	Error retrieving alert list
134	Error converting seconds to GMT
135	Error displaying panel %*s
136	Error reading the dynamic message queue
137	Error adding alert to the alert list
138	Error displaying detailed alert information
139	Error updating alert list in the info window
140	Error setting the acknowledge alert flag
141	Error on fork of process %*s
142	Error committing to the data base
143	Error on message queue initialization
144	Error sending a message to System Activity Monitor
145	Error selecting a specific mission sic
146	Error confirming the logoff
147	Invalid message received from message queue
148	Error sending communication test to NCC
149	All unacknowledged alerts are not displayed
150	%*s logged on to %*s as %*s
151	%*s supporting %*s as %*s logged off the UPS
152	Unable to create PostScript file for Snap
153	Screen snapshot being printed
154	Screen snapshot print failed
155	Screen snapshot image could not be retrieved
156	Unable to connect to X display

Table A-4. Electronic User Message Numbers (1 of 2)

Message Number	Message Description
175	Error opening the data base
176	Error closing the data base
177	Data base operation (%*s) error
178	Error initializing queue %*s
179	Error receiving file from %*s queue
180	%*s process has started
181	Invalid %*s
182	Invalid password %*s
183	%*s process has finished
184	I/O error: cannot %*s file: %*s
185	Error sending files to %*s
186	Invalid file extension
187	Error forking Electronic User process
188	Error generating request ID
189	Sending %*s at %*s-%*s
190	Error finding unique corresponding SAR for %*s-%*s
191	(%*s) defined for the message prefix: (%*s)
192	Error read (%*s)
193	Message header error: %*s; %*s
194	Error seeking position in file %*s
195	%*s for mission : %*s
196	No orbital data files found for mission: %*s
197	Error in auto-forward flag setup for mission: %*s
198	Orbital data has been received and processing can be initiated for mission: %*s
199	Data base access error while building TSW list
200	Error building TSW list: %*s
201	(Unused error code)
202	TSW Info: %*s
203	TSW Error: bad service type received
204	Bad orbital constraint mask: \”%*s\”
205	Mission has no orbital constraint mask
206	Maximum number of validation error messages has been exceeded
207	PSAT smoothing not performed due to lack of old data
208	PSAT data base smoothing: %*s orbit point time changed in orbit %*s
209	PSAT data base smoothing: %*s orbit point removed from orbit %*s

Table A-4. Electronic User Message Numbers (2 of 2)

Message Number	Message Description
210	PSAT smoothing: orbit %*s end time changed to be same as next orbit start
211	PSAT smoothing: a %*s orbit point was removed from orbits %*s and %*s
212	PSAT smoothing: %*s orbit point added in orbit %*s
213	Request for report %*s received from mission %*s
727	An attempted transfer to electronic user XXX has failed
728	Connection to electronic user XXX has been reestablished

Table A-5. Interactive User Message Numbers (1 of 2)

Message Number	Message Description
225	Data base open error
226	DB error fetching from table %*s, status = %*s
227	Data base close error
228	Unable to erase panel %*s
229	Unable to display panel %*s
230	Invalid start/stop times in selected criteria
231	Could not %*s run control record
232	Unable to %*s scroll list %*s
233	Error forking process %*s
234	Process started with invalid command line arguments.
235	Max no. of %*s (%*s) fetched. No more allowed.
236	Invalid request type (%*s). Only ADD or DEL accepted.
237	Unable to %*s file %*s, status = %*s
238	Unable to get directory name for %*s
239	Failure searching %*s
240	Invalid TAE event name %*s
241	Error adding mission %*s to data base
242	Unable to get environment variable %*s
243	Error changing the process group id
244	System Administrator %*s created mission %*s
245	No %*s exist for %*s
246	Parameters for %*s system alerts were modified by (%*s).
247	System alert setup initialization failed.
248	Unable to save system alert message setup params to database.
249	Error reading system alert message setup parameters.
250	Unable to display AlertSetup Panel, utDsPnl call failed.
251	System alert parameters update error (ACTDEF table, err=%*s).
252	System alert parameters commit error (ACTDEF table, err=%*s).
253	Error writing SARCON record, config=%*s, reqid=%*s
254	Error reading %*s sched service record, config=%*s, reqid=%*s
255	Proto Event count records error, protoId=%*s, supidn=%*s
256	Too many services, %*s in proto event, protoId=%*s, supidn=%*s
257	Prototype event read error, protoId=%*s, supidn=%*s
258	Error reading %*s default service record, config=%*s, sic=%*s
259	Error disabling edit for %*s
260	Service type %*s is invalid
261	Error disabling the DELETE button
262	Error assigning values to panel %*s
263	Error changing to panel %*s
264	Error storing the value for %*s

Table A-5. Interactive User Message Numbers (2 of 2)

Message Number	Message Description
265	Error writing %*s sched service record, config=%*s, reqid=%*s
266	Unable to %*s run control record, process exiting
267	Error creating SDR from SAR data
268	Error creating new SAR from old SAR data
269	iuXmtSar failed to send requested SAR(s) to NCC
270	Mission has been deleted by %*s.
271	Delete mission failed %*s.
272	Insert mission failed %*s.
273	Could not update panel item %*s.
274	Error with panel stack %*s.
275	Could not close %*s item
276	Query error: %*s
277	No records counted in table %*s
278	Error deleting Administrator “%*s”: %*s
279	Report ‘%*s’ sent to Electronic User by ‘%*s’
280	Recreated/sent %*s USM(s) for %*s %*s events between %*s and %*s
281	Error %*s for table %*s, status = %*s.
282	Error %*s panel %*s.
283	Could not get the bounding value %*s.
284	Start queuing SARs/SDRs for xmit: batch %*s of %*s has %*s requests of %*s total.

Table A-6. Incoming Electronic User Message Numbers

Message Number	Message Description
300	Message prefix of file %*s is not defined
301	Node %*s in SPCHAR table has no entry in EUIN table
302	Electronic user node %*s has timed out
303	Unsupported protocol %*s requested for eu node %*s
304	DCP cannot access local file %*s
305	DCP transfer of %*s failed with status %*s. DCP output is in output files
306	Transfer attempt returned unknown value
307	EU_FIL_PER_EU files in queue has been exceeded for node %*s
308	An attempted transfer to electronic user %*s has failed
309	Connection to electronic user %*s has been reestablished
310	Abnormal returns from child in attempt to send %*s to %*s via %*s
311	FTP cannot access local file %*s
312	FTP transfer of %*s failed. Output redirected to stderr
313	See output files for DCP output. Failed to transfer %*s to %*s
314	See output files for FTP output. Failed to transfer %*s to %*s
315	Severe error occurred while attempting to transfer %*s. Shutting down.

Table A-7. Mission Setup Message Numbers

Message Number	Message Description
325	Data base open error, status = %*s
326	Data base close error, status = %*s
327	Unable to erase panel %*s
328	Unable to display panel %*s
329	Unable to %*s run control record
330	Unable to %*s scroll list %*s
331	Data base %*s error on table %*s, status = %*s
332	%*s has been updated
333	Data base rollback error, status = %*s
334	Data base commit error, status = %*s
335	No mission user list exists for this mission
336	Data base error on %*s. %*s status %*s
337	Data base error %*s User %*s status %*s
338	Data base error fetching %*s User %*s status %*s
339	Coordinator %*s has deleted User %*s Position %*s
340	Coordinator %*s has added User %*s Position %*s
341	Data base error deleting %*s %*s status %*s
342	Data base error adding users status %*s
343	No Users added/deleted for mission %*s
344	%*s of User %*s Position %*s cancelled
345	Invalid mission setup menu item selected
346	Input parameters to mssetup are invalid
347	Service name from TAE or db is invalid
348	Data base table %*s corrupt. Multiple records found.
349	Internal error in %*s, invalid %*s mode.
350	Data base error adding %*s %*s status %*s
351	Internal error return on call to %*s, status=%*s
352	Internal error in %*s, %*s.
353	Data base error. Invalid data
354	Not valid input data
355	%*s

Table A-8. Communication Message Numbers

Message Number	Message Description
375	Timeout handler installation failed
376	Alarm handler restoration failed
377	Error return from utQueIni
378	Error return from utQueRcv
379	Illegal filename retrieved from queue
380	Illegal or nonexistent LOG_DIR
381	Error return from utPrnFil
382	Exiting cmcomlog
383	Message with bad src/dest field received on gateway port and discarded
384	Gateway reports receipt of bad message from NCC
385	Gateway reports that it is shutting down
386	Gateway reports that it is starting up
387	Gateway reports receipt of bad message from UPS
388	Gateway reports unknown value for link-status
389	Gateway has sent a file of unknown type: %*s
390	Gateway could not find requested error or log file
391	MCB from gateway not received properly
392	Gateway reports problem writing NCC dump file
393	Gateway sent an unknown value for service response
394	Gateway sent an unknown value for message type
395	Gateway error/log file %*s has been received
396	MCB to gateway for file %*s could not be sent
397	Pathname too long
398	Header string too short
399	Failed to get logging semaphore id for %*s
400	Failed to get logging semaphore value for %*s
401	Failed to set %*s logging semaphore
402	Failed attempting read on resource file %*s
403	Failed attempting to extract view handle %*s
404	Failed attempting to extract target handle %*s
405	Error return from GetLogSems
406	Error return from utDisPnl
407	Gethostbyname call could not locate %*s hostent
408	Ugiincpro process quiting because of fatal error
409	File %*s from gateway not received properly
410	File %*s could not be sent to the gateway
411	Gateway reports problem writing error log file

Table A-9. Database Error Message Numbers

Message Number	Message Description
425	Error opening database connection. Status = %*s
426	Error closing database connection. Status = %*s
427	Error committing changes to database. Status = %*s
428	Error selecting records from %*s table. Status = %*s
429	Error inserting records into %*s table. Status = %*s
430	Error updating records to %*s table. Status = %*s
431	Error deleting records from %*s table. Status = %*s
432	Error retrieving count from %*s table. Status = %*s
433	Error attempting database rollback. Status = %*s
434	Data base rollback successfully completed
435	Couldn't obtain arch dest from init.ora for db %*s
436	DB logging partition is %*s percent full, shutting down in %*s seconds
437	DB logging partition is %*s%% full
438	dbdskdaem shutting down, init%*s.ora does not have auto logging turned on
439	dbmodprivs could not access data base to modify privileges

Table A-10. System Activity Monitor to Information Window Messages

Message Number	Message Description
450	Environment variable %*s not defined
451	%*s has illegal numeric format
452	%*s outdated alerts need to be purged from the activity log
453	Outdated orbital/scheduling data exists
454	Mission (%*s) does not exist in mission/spacecraft characteristics table
455	Unable to initialize panel
456	Orbital/Scheduling data older than %*s purged. %*s SARs deleted.
457	%*s outdated alerts deleted from activity log.
458	Internal error return on call to %*s, status=%*s
459	Unable to erase panel %*s
460	Unknown service request
461	Error return from utQueini
462	Error return from utQueSnd
463	Input parameters to syLogServ are invalid
464	Error in using xterm system command
465	Error sending file %*s to printer
466	File %*s was sent to printer successfully
467	Failure opening file %*s
498	Error: Out of memory
499	Traceback
509	Invalid activity (%*s) discarded
510	System activity monitor shutting down now
511	%*s
550	(Unused error code)
551	Error counting records in %*s.
552	Error reading from %*s.
553	No records found in %*s.
554	%*s id %*s not in validation table.
555	Invalid consistency rule %*s
556	Invalid service type %*s
557	Time conversion error for %*s

Table A-11. Bulk Modify Messages

Message Number	Message Description
600	SCHADD format error detected by function %*s; SUPIDEN: %*s; EvtStrt: %*s
601	Cannot bulk modify SAR %*s because %*s

Appendix B. Report Formats

This appendix provides Figures B-1 through B-8, each of which is a sample of the report formats generated by UPS, including:

a. Requested Events report. See Figure B-1.

b. Confirmed Schedules report. See Figure B-2.

c. Rejected Events report. See Figure B-3.

d. Untransmitted Events report. See Figure B-4

e. Activity Log report. See Figure B-5.

f. Requested Events listing. See Figure B-6.

g. Confirmed Events listing. See Figure B-7.

h. Confirmed Events report. See Figure B-8.

```
REPORT COVERAGE        REQUESTED EVENTS REPORT          REPORT GENERATED
FROM: 99/364/000000                                     DATE: 00/237/191845
TO:   99/364/050000                                     PAGE 1

                         FOR UARS    SIC: 3782


TYPE         ADD            NCC STATUS                 STATION:   TDE
TOLERANCES: + 000000        REQUEST ID: 0309330        UPS_STATUS: Uxmt
            - 000000        SOURCE:     spcfc          SUPIDEN:    A3782MS
EVENT START:  99364002900          PROTOTYPE ID:  N/A

       ABSOLUTE      RELATIVE                 TOLERANCE
SSC START   STOP  START   STOP   TSWSETID   PLUS  MINUS  MINDUR CPL BND
--- ------ ------ ------ ------ ---------- ------ ------ ------ --- ---
V04 002900 015800 000000 012900 NHRFULLSUN 000000 000000 012900

-----------------------------------------------------------------------

TYPE         ADD            NCC STATUS                 STATION:   TDW
TOLERANCES: + 000000        REQUEST ID: 0309460        UPS_STATUS: Uxmt
            - 000000        SOURCE:     spcfc          SUPIDEN:    A3782LS
EVENT START:  99364015600          PROTOTYPE ID:  N/A

       ABSOLUTE      RELATIVE                 TOLERANCE
SSC START   STOP  START   STOP   TSWSETID   PLUS  MINUS  MINDUR CPL BND
--- ------ ------ ------ ------ ---------- ------ ------ ------ --- ---
H01 015600 034100 000000 014500 SHFFULLSUN 000000 000000 014500

-----------------------------------------------------------------------

TYPE         ADD            NCC STATUS                 STATION:   TDE
TOLERANCES: + 000000        REQUEST ID: 0309380        UPS_STATUS: Uxmt
            - 000000        SOURCE:     spcfc          SUPIDEN:    A3782CS
EVENT START:  99364040000          PROTOTYPE ID:  N/A

       ABSOLUTE      RELATIVE                 TOLERANCE
SSC START   STOP  START   STOP   TSWSETID   PLUS  MINUS  MINDUR CPL BND
--- ------ ------ ------ ------ ---------- ------ ------ ------ --- ---
H01 040000 045500 000000 005500 SHFFULLSUN 000000 000000 005500

-----------------------------------------------------------------------

      ---------------------------  END OF REPORT  ------------------------
```

Figure B-1. Requested Events Report Format

```
                    CONFIRMED SCHEDULES REPORT
REPORT COVERAGE                                  REPORT GENERATED
FROM: 99054000000                                DATE : 97/211/15:05
TO  : 99054060000                                PAGE : 1
                                                 TOTAL: 2

                                       FOR: XTE       SIC: 6581

REQUESTED: 99054000000       PROT EVENT:         STATION: 041
CONFIRMED: 99054000000       SOURCE    : genrc

CON      RELATIVE
COD   START     STOP
---   ------   ------

N01   000000   001000
      SA ANTENNA: 2
      SA ANTENNA: 2
P01   000000   001000
      SA ANTENNA: 2
      SA ANTENNA: 2

REQUESTED: 99054010000       PROT EVENT:         STATION: 041
CONFIRMED: 99054010000       SOURCE    : genrc

CON      RELATIVE
COD   START     STOP
---   ------   ------

N01   000000   001000
      SA ANTENNA: 2
      SA ANTENNA: 2
P01   000000   001000
      SA ANTENNA: 2
      SA ANTENNA: 2

REQUESTED: 99054020000       PROT EVENT:         STATION: 041
CONFIRMED: 99054020000       SOURCE    : genrc

CON      RELATIVE
COD   START     STOP
---   ------   ------

N01   000000   001000
      SA ANTENNA: 2
      SA ANTENNA: 2
P01   000000   001000
      SA ANTENNA: 2
      SA ANTENNA: 2
```

Figure B-2. Confirmed Schedules Report Format

```
REPORT COVERAGE        REJECTED EVENTS REPORT         REPORT GENERATED
FROM: 90001000000                                     DATE: 97/211/15:18
TO:   99365000000                                     TOTAL: 1
                                                      PAGE 1

                        FOR  XTE       SIC:  6581

  SUPIDEN  EVENT START  STATION   REQ ID   RESULT  EXPLAIN
                                           -CODE-  -CODE-
  -------  -----------  -------   -------  ------  -------
  A6581MS  99355003526  TDE       4832400    15      1

         -----------------------  END OF REPORT  ---------------------
```

Figure B-3. Rejected Events Report Format

```
REPORT COVERAGE        UNTRANSMITTED EVENTS REPORT      REPORT GENERATED
FROM: 99/364/100000                                     DATE: 00/237/185743
TO:   99/365/000000                                     PAGE 1

                         FOR UARS    SIC: 3782


TYPE         ADD                                        STATION:      TDE
TOLERANCES: + 000000                                    EVENT START:  99364121000
            - 000000                                    SOURCE:       spcfc
PROTOTYPE ID:  N/A

       ABSOLUTE      RELATIVE                 TOLERANCE
SSC START   STOP  START   STOP   TSWSETID   PLUS  MINUS  MINDUR CPL BND
--- ------ ------ ------ ------ ---------- ------ ------ ------ --- ---
A01 121000 124300 000000 003300 MLFFULLSUN 000000 000000 003300
B02 121000 124300 000000 003300 MLRFULLSUN 000000 000000 003300
T88 121000 124300 000000 003300            000000 000000 003300

-----------------------------------------------------------------------

TYPE         ADD                                        STATION:      TDE
TOLERANCES: + 000000                                    EVENT START:  99364130000
            - 000000                                    SOURCE:       spcfc
PROTOTYPE ID:  N/A

       ABSOLUTE      RELATIVE                 TOLERANCE
SSC START   STOP  START   STOP   TSWSETID   PLUS  MINUS  MINDUR CPL BND
--- ------ ------ ------ ------ ---------- ------ ------ ------ --- ---
A01 130000 133300 000000 003300 MLFFULLSUN 000000 000000 003300
B02 130000 133300 000000 003300 MLRFULLSUN 000000 000000 003300
T88 130000 133300 000000 003300            000000 000000 003300

-----------------------------------------------------------------------

      ---------------------------  END OF REPORT  ------------------------
```

Figure B-4. Untransmitted Events Report Format

```
REPORT COVERAGE            ACTIVITY LOG REPORT            REPORT GENERATED
FROM: 00/001/000000                                       DATE: 00/237/193259
TO:   00/033/200000                                       PAGE 1

     TIME    SIC      USER                          MESSAGE
----------- ---- ------------ ---------------------------------------------

00033142019 3782              Received SRM(A3782MS) at
                              00033142019-RESULT/EXPL:26/66
00033142020 3782              NCC Message : SRM:Placed in valid request
                              queue; Use of TSWs not requested or N/A
00033142020 3782              Database fetch error : table SCHADD: No
                              record where REQID='0271130'
00033142020 3782              Received SRM(A3782MS) at 00033142020-RESULT/E
                              XPL:00/62e
00033142021 3782              NCC Message : SRM:Granted; Request from
                              customer
00033142021 3782              Database fetch error : table SCHADD: No
                              record where REQID='0271130'
00033142038 3782              Outdated orbital/scheduling data exists
00033142116 3782              Failure retrieving and processing TUT data
00033143701 3782              Failure retrieving and processing TUT data
00033145247 3782              Failure retrieving and processing TUT data
00033150832 3782              Failure retrieving and processing TUT data
00033152417 3782              Failure retrieving and processing TUT data
00033154003 3782              Failure retrieving and processing TUT data
00033155448 3782              Received SRM(A3782MS) at 00033155448-RESULT/E
                              XPL:26/66e
00033155449 3782              NCC Message : SRM:Placed in valid request
                              queue; Use of TSWs not requested or N/A
00033155449 3782              Database fetch error : table SCHADD: No
                              record where REQID='0271130'
00033155449 3782              Received SRM(A3782MS) at 00033155449-RESULT/E
                              XPL:00/62e
00033155450 3782              NCC Message : SRM:Granted; Request from
                              customer
00033155450 3782              Database fetch error : table SCHADD: No
                              record where REQID='0271130'
00033155456 3782              Outdated orbital/scheduling data exists
00033185502 3782              Outdated orbital/scheduling data exists

      --------------------------  END OF REPORT  ------------------------
```

Figure B-5. Activity Log Report Format

```
                        REQUESTED EVENTS LISTING      Page 1     of 1

       REPORT           REPORT            DATE
     START TIME        STOP TIME         GENERATED
   00/229/000000     00/231/000000     00/339/164630

SUP UPS  STA  EVENT START  EVENT  DUR-   PE  PE   SERVICE SPECIFICATION CODES
ID  STAT                    STOP   ATION ID  TYP
--- ---- --- ------------- ------ ------ --- --- ----------------------------
CS  Uxmt TDW 00/230/023336 033409 010033         H05
MS  XmtA TDW 00/230/051137 064334 013157         A01
CS  Uxmt TDS 00/230/090627 104653 014026         A01
CS  Uxmt TDW 00/230/121104 131732 010628         H08

      --------------------------  END OF REPORT  ------------------------
```

Figure B-6. Requested Events Listing Format

```
                        CONFIRMED EVENTS LISTING             Page 1

       REPORT           REPORT            DATE
     START TIME        STOP TIME         GENERATED
   00/229/000000     00/231/000000     00/339/164336

SUP UPS STA  EVENT START  EVENT  DUR-   PE  PE  SERVICE SPEC CODES   ANT MAR
ID  FWD                    STOP   ATION ID  TYP                        LNK
--- --- --- ------------- ------ ------ --- --- -------------------- --- ---
CS   N  TDW 00/230/051306 064609 013303 --- --- H05                    1
CS   N  TDW 00/230/090756 104227 013431 --- --- V01                       01

      --------------------------  END OF REPORT  ------------------------
```

Figure B-7. Confirmed Events Listing Format

```
                        CONFIRMED EVENTS REPORT
REPORT COVERAGE                                          REPORT GENERATED
FROM:  99/364/000000                                     DATE: 00/237/200913
TO:    99/364/200000                                     PAGE 1

                        FOR: UARS     SIC: 3782

 EVENT START     EVENT STOP     STATION   PROTOTYPE   SUPIDEN
  DATE/TIME       DATE/TIME       ID          ID
-------------   -------------   -------   ---------   -------
99/364/000700   99/364/002200     TDW                 A3782MS

SMA RETURN
SERVICE START: 99/364/000700       STOP: 99/364/002200      DURATION: 001500
CONFIGURATION CODE: V04            SERVICE SUBTYPE: 5       ANTENNA GAIN: SH

-------------------- FIXED ------------------------

SERVICE CONFIGURATION: 1                 SMA COMBINING          :
DG1 CONFIGURATION    :                   RECEIVER CONFIGURATION:
DATA CHANNEL CONFIG  :                   TDRSS IF SERVICE       :
DG2 MODULATION       :                   CROSS-SUPPORT FWD LINK:
RETURN CH. TIME DELAY:

                           CHANNEL I  CHANNEL Q  SHUTTLE

DATA CODING              :
TDRSS INT. CH. ID        :
SYMBOL FORMAT CONVERSION:
DESTINATION 1 INT.CH.ID :
DESTINATION 2 INT.CH.ID :
DESTINATION 3 INT.CH.ID :
USER INTERFACE CH. ID.  :
SM PORT                  :
MAXIMUM DATA RATE        :

--------------------- RESPECIFIABLES ---------------------

DESPUN ANTENNA           :                        DATA GROUP:
I/Q CHANNEL POWER RATIO  :                        DG1 MODE  :
SHUTTLE DATA CONF. MODE  :                        DG2 TYPE  :
TSW SET ID               :  MHRFULLSUN

                           NORMAL       SHUTTLE

TRANSMIT FREQUENCY       :
POLARIZATION             :  0
MAXIMUM EIRP             :
MINIMUM EIRP             :
DATA BIT JITTER          :
DATA STREAM ID           :

                           CHANNEL I    CHANNEL Q

DATA RATE                :
DATA FORMAT              :
DATA BIT JITTER          :
G2 INVERSION             :
DATA STREAM ID           :

                        CONFIRMED EVENTS REPORT
REPORT COVERAGE                                          REPORT GENERATED
FROM:  99/364/000000                                     DATE: 00/237/200913
TO:    99/364/200000                                     PAGE 2

                        FOR: UARS     SIC: 3782

       --------------------------  END OF REPORT  -----------------------
```

Figure B-8. Confirmed Events Report Format

Appendix C. SAR Validation Rules

C.1 Syntax and Crossfield Checks

C.1.1

Many validation checks involve changeable but relatively static parameters defined in the SARVAL table of the UPS database. The system is delivered with a set of values already loaded into the table. Although no UPS function manages the SARVAL table, display and maintenance of this table can be accomplished through direct use of ORACLE database management software.

C.1.2

In this appendix, SARVAL values are referred to by their ORACLE database field ID.

a. MA and SMA forward service:

   1. Basic syntax/range checks.
   2. The initial data rate must be ≤ the maximum rate.

b. MA and SMA return service:

   1. Basic syntax/range checks.
   2. The following fields are inappropriate when using only the I channel:

SYCONQ,	TDCHNQ,	MAXQRATE,	D1QCHAN,
D2QCHAN,	D3QCHAN,	DTRATQ,	IQPRAT,
DTFORQ,	DBJITQ,	G2INVQ,	DTSTRQ

   3. The following fields are inappropriate when using only the Q channel:

SYCONI,	TDCHNI,	MAXIRATE,	D1ICHAN,
D2ICHAN,	D3ICHAN,	DTRATI,	IQPRAT,
DTFORI,	DBJITI,	G2INVI,	DTSTRI

   4. The initial I channel data rate must be ≤ the maximum I channel data rate.
   5. The initial Q channel data rate must be ≤ the maximum Q channel data rate.
   6. All user channel IDs must be unique.
   7. All TDRS channel IDs must be unique.

c. KSA and KAS forward service:

1. Basic syntax/range checks.

2. In general, shuttle-specific fields are inappropriate for a non-shuttle service. In particular, the following fields are inappropriate:

PWRSHUT,	SHUTMAXRATE,	USSHUT,	TDSHUT,
DTRATSHUT,	RCFRQSHUT,	POLSHUT,	DCMPSHUT

3. In general, non-shuttle fields are inappropriate for a shuttle service. In particular, the following fields are inappropriate:

PWRNORM,	NORMMAXRATE,	USNORM,	TDNORM,
DTRATNORM,	RCFRQNORM,	POLNORM,	DCMPNORM

4. The initial rate must be ≤ maximum rate. These values are specified by different fields depending on whether the mission is shuttle or non-shuttle, so these are actually two separate rules.

5. Command channel PN modulation can be 0 only when data rate is >300. When data rate is ≤300, command channel PN modulation is 1.

d. KSA, KAS and KAWB return service:

1. Basic syntax/range checks.

2. In general, fields specific to Data Group 2 (DG2) are inappropriate for a Data Group 1 (DG1) service. Specifically, the following fields are inappropriate:

DG2MOD DG2TYP

3. In general, fields specific to DG1 are inappropriate for a DG2 service. Specifically, the following fields are inappropriate:

DG1CON DG1MOD

4. The following fields are inappropriate for a non-shuttle service:

TDCHN1,	TDCHN2,	TDCHN3,	SHUTSUB,
MAX2RATE,	MAX3RATE,	POLSHUT,	MXESHUT,
MNESHUT,	TXFRQSHUT,	SHUTMODE,	AUTOBAND,
D1CHN1,	D2CHN1,	D3CHN1,	D1CHN2,
D2CHN2,	D3CHN2,	D1CHN3,	D2CHN3,
D3CHN3,	DTFOR1,	DTFOR2,	DTFOR3,
DBJIT1,	DBJIT2,	DBJIT3,	DTRAT2,
DTRAT3,	DTSTR1,	DTSTR2,	DTSTR3

5. The following fields are inappropriate for a shuttle service:

MNENORM,	MXENORM,	POLNORM,	DG1CON,
TXFRQNORM,	MAXIRATE,	MAXQRATE,	DTCODI,
DTCODQ,	TDCHNI,	TDCHNQ,	SYCONI,
SYCONQ,	DTSTRI,	DTSTRQ,	G2INVI,
G2INVQ,	DTFORI,	DTFORQ,	DBJITI,
DBJITQ,	DATGRP,	DG1MOD,	DG2TYP,
IQPRAT,	DTRATI,	DTRATQ,	D1CHNI,
D1CHNQ,	D2CHNI,	D2CHNQ,	D3CHNI,
D3CHNQ			

6. The following fields are inappropriate for a non-shuttle DG1 service using only the I channel:

DCHNCON,	DTCODQ,	SYCONQ,	TDCHNQ,
MAXQRATE,	D1CHNQ,	D1CHN1,	D1CHN2,
D2CHNQ,	D2CHN1,	D2CHN2,	D3CHNQ,
D3CHN1,	D3CHN2,	DTRATQ,	DTRAT2,
DTFORQ,	DTFOR1,	DTFOR2,	DBJITQ,
DBJIT1,	DBJIT2,	G2INVQ,	DTSTRQ,
DTSTR1,	DTSTR2		

7. The following fields are inappropriate for a non-shuttle DG1 service using only the Q channel:

DCHNCON,	DTCODI,	SYCONI,	TDCHNI,
MAXIRATE,	D1CHNI,	D1CHN1,	D1CHN2,
D2CHNI,	D2CHN1,	D2CHN2,	D3CHNI,
D3CHN1,	D3CHN2,	DTRATI,	DTRAT2,
DTFORI,	DTFOR1,	DTFOR2,	DBJITI,
DBJIT1,	DBJIT2,	G2INVI,	DTSTRI,
DTSTR1,	DTSTR2		

8. The following fields are inappropriate for a non-shuttle DG2 service using BPSK:

DCHNCON,	DTCODQ,	SYCONQ,	TDCHNQ,
MAXQRATE,	D1CHNQ,	D1CHN1,	D1CHN2,
D2CHNQ,	D2CHN1,	D2CHN2,	D3CHNQ,
D3CHN1,	D3CHN2,	DTRATQ,	DTRAT2,
DTFORQ,	DTFOR1,	DTFOR2,	DBJITQ,
DBJIT1,	DBJIT2,	G2INVQ,	DTSTRQ,
DTSTR1,	DTSTR2		

9. The initial data rate must be ≤ maximum data rate. Different fields define these rates for shuttle and non-shuttle services.
10. The non-shuttle, DG1, Mode 1, I (Q) channel absolute maximum data rate is as specified in the SARVAL table, KND11IRT and KND11QRT.
11. The non-shuttle, DG1, Mode 2, I (Q) channel absolute maximum data rate is as specified in the SARVAL table, KND12IRT and KND12QRT.
12. The non-shuttle, DG1, Mode 3, I channel absolute maximum data rate is as specified in the SARVAL table, KND13IRT.
13. The non-shuttle, DG1, Mode 3, Q channel absolute maximum data rate is as specified in the SARVAL table, KND13QRT.
14. The non-shuttle, DG2, I (Q) channel absolute maximum data rate is as specified in the SARVAL table, KND23IRT and KND23QRT.
15. The non-shuttle, DG1, I/Q power ratio cannot be 1:2 or 1:4.
16. Data format, channel 1 for STGT must be 3.
17. Data format, channel 3 can be 3, 4, or 5 only for STGT, mode 2.
18. All user channel IDs must be unique.
19. All TDRS channel IDs must be unique.

e. SSA forward service:

1. Basic syntax/range checks.
2. The following fields are inappropriate for a non-shuttle service:

PWRSHUT,	USSHUT,	TDSHUT,	POLSHUT,
RCFRQSHUT,	SHUTPN,	SCDOPCOMP,	SPDOPCOMP,
SPNMOD,	SHUTMODE		

3. The following fields are inappropriate for a shuttle service:

   PWRNORM, USNORM, TDNORM, POLNORM,
   DTRATNORM, RCFRQNORM, DOPCOMP

4. The non-shuttle initial data rate must be < the maximum rate.

f. SSA return service:

1. Basic syntax/range checks.
2. The following fields are inappropriate for a DG1 service:

   DG2MOD, DG2TYP

3. The following fields are inappropriate for a DG2 service:

   DG1CON, DG1MOD

4. The following fields are inappropriate for a non-shuttle service:

   TDSHUT, D1SHUT, D2SHUT, D3SHUT,
   POLSHUT, MXESHUT, MNESHUT, DBJITSHUT,
   TXFRQSHUT, SHUTMODE, DTSTRSHUT

5. The following fields are inappropriate for a Shuttle service:

   DTCODI, DTCODQ, TDCHNI, TDCHNQ,
   SYCONI, SYCONQ, MAXIRATE, MAXQRATE,
   D1CHNI, D1CHNQ, D2CHNI, D2CHNQ,
   D3CHNI, D3CHNQ, DTRATI, DTRATQ,
   TXFRQNORM, POLNORM, MXENORM, MNENORM,
   IQPRAT, DF12I, DF12Q, DBJITI,
   DBJITQ, G2INVI, G2INVQ, DTSTRI,
   DTSTRQ

6. The following fields are inappropriate for a DG1 service using only the I channel:

   DCHNCON, DTCODQ, TDCHNQ, SYCONQ,
   MAXQRATE, D1CHNQ, D2CHNQ, D3CHNQ,
   DTRATQ, IQPRAT, DF12Q, DBJITQ,
   G2INVQ, DTSTRQ

7. The following fields are inappropriate for a DG1 service using only the Q channel:

DCHNCON,	DTCODI,	TDCHNI,	SYCONI,
MAXIRATE,	D1CHNI,	D2CHNI,	D3CHNI,
DTRATI,	IQPRAT,	DF12I,	DBJITI,
G2INVI,	DTSTRI		

8. The following fields are inappropriate for a DG2 service using BPSK service:

DCHNCON,	DTCODQ,	TDCHNQ,	SYCONQ,
MAXQRATE,	D1CHNQ,	D2CHNQ,	D3CHNQ,
DTRATQ,	IQPRAT,	DF12Q,	DBJITQ,
G2INVQ,	DTSTRQ		

9. G2 inversion only allowed for uncoded data on I (Q) channel.
10. Initial I (Q) channel data rate must not be > the maximum I (Q) channel data rate.
11. Maximum I (Q) channel data rate for DG1, Mode 1 is as specified in the SARVAL table.
12. Maximum I (Q) channel data rate for DG1, Mode 2 is as specified in the SARVAL table.
13. Maximum I (Q) channel data rate for DG1, Mode 3 is as specified in the SARVAL table.
14. Maximum I (Q) channel data rate for DG2 is as specified in the SARVAL table.
15. The I (Q) channel maximum data rate with return delay enabled is as specified in the SARVAL table.
16. All user channel IDs must be unique.

g. Normal tracking service:

1. Basic syntax/range checks.
2. A return link service specification code is required for one-way Doppler tracking.
3. Forward and return link service specification codes are required for two-way Doppler tracking.
4. All user interface channel IDs must be unique.
5. A return service service specification code field must contain a return service service specification code (i.e., not a forward, tracking, or simulation service).

h. Cross-tracking service:

1. Basic syntax/range checks.
2. Both forward and return link service specification codes are required fields.
3. All user interface channels must have unique IDs.

i. Simulation service (also called end-to-end test):

Basic syntax/range checks only.

C.2 Interevent Constraint Checks

Interevent constraint checks validate services within a single SAR and consist of service constraint checks and resource constraint checks.

C.3 Service Constraint Checks

The following validation rules will be checked:

a. MA services:

1. If an MA return service is in coherent mode (Mode 1), and uses normal support, check that there is an MA forward service that starts no later than the MA return service.
2. If an MA return service is in coherent mode (Mode 1), and uses cross-support, check that there is an SSA forward service that starts no later than the MA return service.

b. SSA services:

1. If an SSA return service uses cross-support, check that there is an MA forward service that starts no later than the SSA return service.
2. If an SSA return service is in coherent mode (DG1, Mode 1 or Mode 3) and uses normal support, check that there is an SSA forward service that starts no later than the SSA return service. Also check that the polarization of the forward and return service is the same, and that the service subtype (antenna) is the same for both services.

c. KSA services:

If a KSA return service is in coherent mode (DG1, Mode 1 or Mode 3, or DG2 coherent) and uses normal configuration, check that there is a KSA forward service that starts no later than the KSA return service. Also check that the service subtype (antenna) is the same for both services.

d. SMA services:

1. If an SMA return service uses cross-support, check that there is an SSA forward service that starts no later than the SMA return service.

2. If an SMA return service is in coherent mode (DG1, Mode 1 or Mode 3) and uses normal support, check that there is an SMA forward service that starts no later than the SMA return service. Also check that the polarization of the forward and return service is the same, and that the service subtype (antenna) is the same for both services.

e. KaS services:

If a KaS return service is in coherent mode (DG1, Mode 1 or Mode 3, or DG2 coherent) and uses normal configuration, check that there is a KaS forward service that starts no later than the KaS return service. Also check that the service subtype (antenna) is the same for both services.

f. KaWB services:

If a KaWB return service is in coherent mode (DG1, Mode 1 or Mode 3, or DG2 coherent) and uses normal configuration, check that there is a KaS forward service that starts no later than the KaWB return service. Also check that the service subtype (antenna) is the same for both services.

g. Tracking services:

1. If a normal tracking service uses MA and Doppler of two-way, check that there is both an MA forward and MA return service which the tracking service does not overlap (the start and stop time of the tracking service may not be longer than nor shorter than the MA forward service). Additionally, check that the MA return service uses DG1, Mode 1.

2. If normal tracking service uses MA and Doppler of one-way, check that there is an MA return service which the tracking service does not overlap, and check that the MA return service uses DG1, Mode 2.

3. If normal tracking service uses SSA and two-way Doppler and range tracking, check that there is an SSA forward and an SSA return service (the return service must use DG1, Mode 1 or Mode 3) which the tracking service does not overlap.

4. If normal tracking service uses SSA and Doppler of one-way, check that there is an SSA return service which the tracking service does not overlap, and check that the SSA return service uses DG1, Mode 2 or DG2, Type 0, 1, 4, or 5.

5. If normal tracking service uses KSA and two-way Doppler and range tracking, check that there is a KSA forward and a KSA return service (the return service must use DG1, Mode 1 or Mode 3) which the tracking service may not overlap.

6. If normal tracking service uses KSA and Doppler of one-way, check that there is a KSA return service which the tracking service does not overlap, and check that the KSA return service uses DG1, Mode 2 or DG2.

7. If there is a cross-tracking service, check that the return service type field is MA or SSA and that the return link service specification code field specifies a corresponding service specification code that exists within the SAR. Also check that the forward link service specification code field specifies a valid MA forward or SSA forward service specification code.

8. If normal tracking service uses shuttle Ku-band or shuttle S-band, check that there is an associated KSA or SSA service (forward or return), and that the tracking service start time is $\geq$ the start time of the associated KSA or SSA service, and that the tracking service stop time is $\leq$ the stop time of the associated KSA or SSA service.

h. Simulation services (also called end-to-end test):

1. If there is a simulation service, check the service specification code and the service type. If the service specification code is G01-G99 (MA), and service type is forward, check to be sure there is an MA forward in the SAR. If the service type is return, check for an MA return.

2. If the service specification code is M01-M99 (SSA), and the service type is forward, check to be sure there is an SSA forward in the SAR. If the service type is return, check for an SSA return.

3. If the service specification code is S01-S99 (KSA), and the service type is forward, check to be sure there is a KSA forward in the SAR. If the service type is return, check for a KSA return.

4. If there are two simulation services in the SAR that overlap in time, and if the referenced normal services are KSA (forward or return), check that the referenced normal services have opposite polarizations.

5. If there is a simulation service, check that the referenced normal service start time is $\leq$ the simulation service's start time, and that the referenced service stop time is $\geq$ the simulation service's stop time.

6. In addition, interevent consistency checks are performed at this level. Refer to paragraph C.3 for details of these validation rules.

NOTE

1. The above rules are collected from existing NCCDS documents, as well as telephone conversations with NCCDS personnel.

2. Reference documents for the interservice constraint check rules:

   a. STDN No. 203.13, *NCCDS Detailed Requirements.*

   b. STDN No. 101.2, *Space Network Users' Guide (Revision 6) (see Reference 9).*

   c. STDN No. 1153.4, *TDRSS Constraints and Scheduling Procedures* (January 1990).

C.4 Resource Constraint Checks

Validation checks are made for resource usage conflict for services within a SAR. See Appendix B of the NCC ICD.

NOTE

The consistency rules are compiled based on the STGT resource constraints.

a. Two MA/SMA forward services cannot overlap and should be separated by at least MA-to-MA setup time within event.

b. Two MA/SMA return services using same MA/SMA return link IDs cannot overlap and should be separated by at least MA-to-MA setup time within event. (Since users may have NCCDS to select the MAR/SMAR link for them, a blank field shall be treated as having different MAR/SMAR link IDs).

c. Only one SA antenna may be used in an event. SA services (SSA, KSA, KaSA) may specify which SA antenna to use or may allow NCCDS to select the SA antenna by not specifying any antenna. SA services with the same direction (Forward or Return) cannot overlap and must be separated by at least the SA-to-SA setup time.

d. Two MA/SMA two-way tracking services cannot overlap and should be separated by at least tracking-to-tracking setup time within event.

e. Two simulation services (also called end-to-end test) in the same band frequencies (either S-band or K-band) using same link (either forward or return) cannot overlap and should be separated by at least simulation-to-simulation setup time within event.

f. The setup times required for different antenna or service type within event are as follows:

Service	WSC
MA/SMA	15 seconds
SA	15 seconds
Tracking	15 seconds
Simulation	15 seconds

C.5 Interevent Consistency Check

Validation checks are made for resource usage conflicts for services in different SARs using the same TDRS.

NOTE

The consistency rules are compiled based on the STGT resource constraints.

a. All related services for one SUPIDEN for one TDRS station for one contiguous time interval should be contained in one event unless different antennas or MA return link IDs are used. (The antenna or link option can be left blank to let the NCCDS make the selection).

b. Two MA/SMA forward services cannot overlap and should be separated by at least MA-to-MA setup time between events.

c. Two MA/SMA return services using same MA/SMA return link IDs cannot overlap and should be separated by at least MA-to-MA setup time between events. (Because users may have NCCDS to select the MAR/SMAR link for them, a blank field shall be treated as having different MAR/SMAR link IDs).

d. Two SA services using the same SA antenna cannot overlap and should be separated by at least the SA-to-SA setup time between events. This is because whenever an SSAF, SSAR, KSAF, or KSAR service is scheduled, the associated SA antenna is reserved by the NCCDS exclusively for that event. SSAF, SSAR, KSAF, KSAR, KaSAF, KaSAR and KaWBR services in different events may not share the same SA antenna. (Users may elect to have NCCDS select the SA antenna for them by not specifying any antenna. In this case, the “open-scheduled” event shall be treated as having different SA antennas). If both SA antennas are in use at the same time by two different events (regardless of whether SA antennas are specified or are open-scheduled), another SA service (open-scheduled or not) cannot be scheduled that will overlap the other two SA services.

e. Two MA/SMA two-way tracking services cannot overlap and should be separated by at least tracking-to-tracking setup time between events.

f. Two simulation services (also called end-to-end test) in the same band frequencies (either S-band or K-band) using same link (either forward or return) cannot overlap and should be separated by at least simulation-to-simulation setup time between events.

g. The setup times required for different antenna or service type between events are as follows:

Service	1st Generation TDRS	2nd Generation TDRS
MA/SMA	30 seconds	30 seconds
SA	90 seconds	120 seconds
Tracking MA/SMA	30 seconds	30 seconds
Tracking SA	90 seconds	120 seconds
Simulation	210 seconds	210 seconds

NOTE

1. The above rules are collected from the current NCCDS resource model study and existing NCCDS documents (listed below), as well as telephone conversations with NCCDS personnel. These rules are also subject to the current SN resource limitation. Since the NCCDS has not completed the resource model, and the SN resource capability may be changed in the future, the rules may need to be modified later.

2. The UPS validation is initially set up based on the STGT number. However, any change on the input number can be made easily via the database table.

3. Reference documents for the SAR consistency check rules:

   a. STDN No. 203.13, *NCCDS Detailed Requirements (Revision 3).*

   b. CSC, *NCCDS Resource Model* (draft).

   c. STDN No. 101.2, *Space Network User's Guide (Revision 6).*

   d. STDN No. 1153.4, *TDRSS Constraints and Scheduling Procedures* (January 1990).

C.6 User-Defined/TDRS Constraint Period Validation

C.6.1

User-defined/TDRS constraint periods can be set up by the User-Defined/TDRS Constraint Periods panel described in paragraph 9.6. User-defined/TDRS constraint periods define times when specific network resources have been disabled for a mission. The disabled resources are keyed on TDRS and service type (MA Forward, MA Return, SSA Forward, SSA Return, KSA Forward, KSA Return, and Simulation). SMA and KAS services presently cannot be specified. The following resources can be disabled:

a. MA Forward service.

b. Individual MA Return links (01-05, 06-19 are meaningless).

c. Individual Single Access Antennas (1-2).

d. MA/SSA Simulation Equipment.

e. KSA Simulation Equipment.

NOTE

Tracking service resources cannot be explicitly disabled.

C.6.2

User-defined/TDRS constraint period validation is enabled when the validation level is set to at least “Syntax + Crossfield + Constraints” in the Default Scheduling Parameters panel (refer to paragraph 9.5). The validation level is separately settable for batch SARs and interactively created SARs. The validation attempts to match resources, requested by individual service configurations in a SAR, to disabled resources.

C.6.3

MA Return links can be “open” scheduled. “Open” scheduled MA Return service configurations will fail validation if all return links are disabled. An explicit return link request will fail validation only if the requested link has been disabled.

C.6.4

Single Access Antennas can be “open” scheduled. “Open” scheduled KSA and SSA service configurations (either forward or return) will fail validation if both antennas are disabled. An explicit Single Access Antenna request will fail validation only if the requested antenna has been disabled.

C.6.5

The following validation messages may be displayed:

a. SIC=<mission_id>. TDRS=<tdrs_id>. <service_type> service < service specification _code>.

b. All MA Return links are disabled for the requested TDRS. SUPIDEN=<supiden>. SIC=<mission_id>. TDRS=<tdrs_id>. <service_type> service < service specification _code>. “open” scheduled return link.

c. The requested MA Return link is disabled for the requested TDRS. SUPIDEN=<supiden>. SIC=<mission_id>. TDRS=<tdrs_id>. <service_type> service < service specification _code>. return link is <return_link_id>.

d. Both Single Access antennas are disabled for the requested TDRS. SUPIDEN=<supiden>. SIC=<mission_id>. TDRS=<tdrs_id>. <service_type> service < service specification _code>. “open” scheduled antenna.

e. The requested Single Access Antenna is disabled for the requested TDRS. SUPIDEN=<supiden>. SIC=<mission_id>. TDRS=<tdrs_id>. <service_type> service < service specification _code>. antenna is .

f. The required simulation equipment is disabled for the requested TDRS. SUPIDEN=<supiden>. SIC=<mission_id>. TDRS=<tdrs_id>. <service_type> service < service specification _code>. Simulation of <simulated_service>.

g. NOTES: <service_type> is one of “MAF”, “MAR”, “SSAF”, “SSAR”, “KSAF”, or KSAR”. <simulated_service> is one of “MA”, “SSA”, or “KSA”.

Appendix D. TDRS Scheduling Window

D.1 TSW Types

A TDRS Scheduling Window (TSW) represents a time period in which communication using a specified service between a specific TDRS and a user spacecraft is possible. A mission must know exactly when these contact periods are to successfully communicate with a TDRS. TSWs are based on orbital products received from the Flight Dynamics Facility (FDF) or TDRS Communication Windows (TCW) which are generic views generated by a third-party COTS product.

D.2 TSWs Based On FDF Products

D.2.1

Orbital data received by UPS in the form of UAVs and PSATs are the basis for TSWs. UAVs represent time periods when the spacecraft orientation is such that a particular TDRS service is usable based on orbit, attitude, and antenna characteristics. The PSAT data employed by UPS defines the periods in a user spacecraft orbit that are either of interest or potentially unusable and are referred to as “anomaly zones”. These anomaly zones are defined within the PSAT data as “orbit points” that give the entrance and exit times of each of the anomaly zones applicable to the mission. Therefore, the TSWs represent the UAV periods for a specific service and TDRS, (usually) exclusive of these unusable anomaly zone periods. One notable exception is the “in sunlight” orbital points used by some missions for scheduling.

D.2.2

Each mission defines the anomaly zones applicable to that mission. An anomaly zone represents a closed area (polygon) mapped to the surface of the Earth. When the user spacecraft crosses into an anomaly zone boundary, it is represented in the PSAT data by an “entrance” orbit point for that zone. Conversely, an “exit” orbit point represents the time the spacecraft is leaving the zone. A spacecraft can theoretically enter and exit one zone more than once per orbit.

D.2.3

Anomaly zones typically include but are not limited to:

a. Zone of Exclusion (ZOE) (although this is accounted for in the UAV data).

b. South Atlantic Anomaly.

c. Van Allen Belt.

d. Radio Frequency (RF) interference zones.

e. Sunlight entry-exit (this is actually a “moving” zone with respect to the Earth’s surface).

D.2.4

These zones, as well as any others applicable to a mission, are defined during mission setup. Each zone is defined as either an “inclusive” or an “exclusive” type. An exclusive zone is one in which the blackout period represents the time when the spacecraft is physically over the defined zone area. An inclusive zone is one in which communication is permitted only while the spacecraft is within the zone. Typically, anomaly zones will be exclusive. The sunlight entry/exit is an example of an inclusive zone.

D.2.5

Other PSAT-related time periods that affect TSW generation include:

a. Multipath Fringe. The period when the line-of-sight between the user spacecraft and the TDRS station forms a tangent too close to the Earth’s surface to ensure reliable communications.

b. Sun Alignment. The periods when orientation of the user spacecraft to the TDRS or the TDRS to the ground terminal would result in the Sun being within a critical angle to one of these receiver antennae. The critical angle is dependent upon each platform’s antenna characteristics; UPS permits individual angle selection for each. A forward service is potentially interfered with by a spacecraft-to-TDRS Sun alignment only, whereas a return service is affected by either a TDRS-to-spacecraft or White-Sands-to-TDRS Sun alignment. There is no possible TDRS-spacecraft orientation that will cause a Sun alignment to block both forward and return services simultaneously.

c. TDRS Sun intrusion.

D.3 TSWs Based on TCWs

More recent missions employ COTS products to generate their orbital products in the form of TCWs and transmit them to the UPS. Refer to the *Interface Control Document Between the Network Control Center (NCC) User Planning System (UPS) and the Electronic User* (see reference 4) for a description of the TCW format. When the UPS receives the TCW file, it stores the TCW records directly into the TSW database table and subsequently deletes the TCW file.

NOTE

LandSat-7 uses an earlier format TCW file, commonly known as a Generic TDRS View (GTV).

D.4 TSW Supersets and TSW Set IDs

D.4.1

A TSW Superset is a set of TSWs for the services selected in the Orbital Parameter Panel. TSW Superset names are 1 to 7 characters long. For missions using PSATs/UAVs (not employing TCWs), TSW Supersets are used to define what constraints apply when creating TSWs. In this case, sets of TSWs are created for each TSW Superset, service type (MA, SMA, KSA, SSA, KaSA and KaSAWB), gain (high and low) and direction (forward and return). These sets of TSWs are identified by TSW Set IDs composed of discriminators for the service type, gain and direction followed by the TSW Superset name. Since the discriminators are each one character the TSW Set IDs are 4 to 10 characters long.

D.4.2

For missions employing TCWs, TSW Supersets are not used. In this case TSW Set IDs are completely user defined and need not follow the above convention using the service type, gain and direction discriminators.

D.4.3

Paragraph 7.6 contains the example of a mission that would prefer to have as many contacts in sunlight as possible, because the spacecraft's batteries are weakening, and the solar array panels are needed to provide power. The mission would, if all contacts cannot be in full sunlight, prefer to have its contacts with no more than 5 minutes of darkness. Finally, since the mission requires at least one contact every 3 hours, it may be forced to have a contact in complete darkness.

D.4.4

The mission would define the primary Superset to contain only the sunlight portion of a TDRS view (call it "Fullsun"). The secondary Superset would be defined such that each TDRS view would be "notched out" by those periods of darkness that are greater than 5 minutes (call it "Partsun"). Finally, the tertiary Superset would not be constrained by the sunlight requirement at all (call it "Nosun").

D.4.5

Upon initiation of TSW generation (refer to paragraph 8.3), each service specified in the FDF Service Types Used by Mission list (refer to paragraph 7.7) will have a set of TSWs generated for each Superset. Obviously, the views generated for the tertiary Superset are going to be longer than the views from the first two but will include undesirable scheduling periods where onboard batteries might be drained (darkness). The mission will send all three sets of TSWs to the NCCDS using the Transmit TSWs to NCCDS process (refer to paragraph 8.4).

D.4.6

The user would then, in this example, create 3 schedule requests; one primary and 2 alternates, for each TDRS View, throughout the scheduling period. The primary SAR would specify the use of the Fullsun TSW Set, the first alternate would specify the Partsun TSW Set, and the second alternate would specify Nosun. The NCCDS will try to satisfy the mission's desires by attempting to schedule the primary request first, followed by the each alternate request in turn.

D.4.7

The below example is illustrated (Figure D-1) with the services Highgain SSA Forward and Highgain SSA Return. Perions of darkness are shown as dotted regions and the portions "notched out" of a TSW are shown crosshatched. The TSW Set IDs “SHFFULLSUN”, “SHRFULLSUN”, “SHFPARTSUN”, “SHRPARTSUN”, “SHFNOSUN” and “SHRNOSUN” are shown to the left of their TSWs.

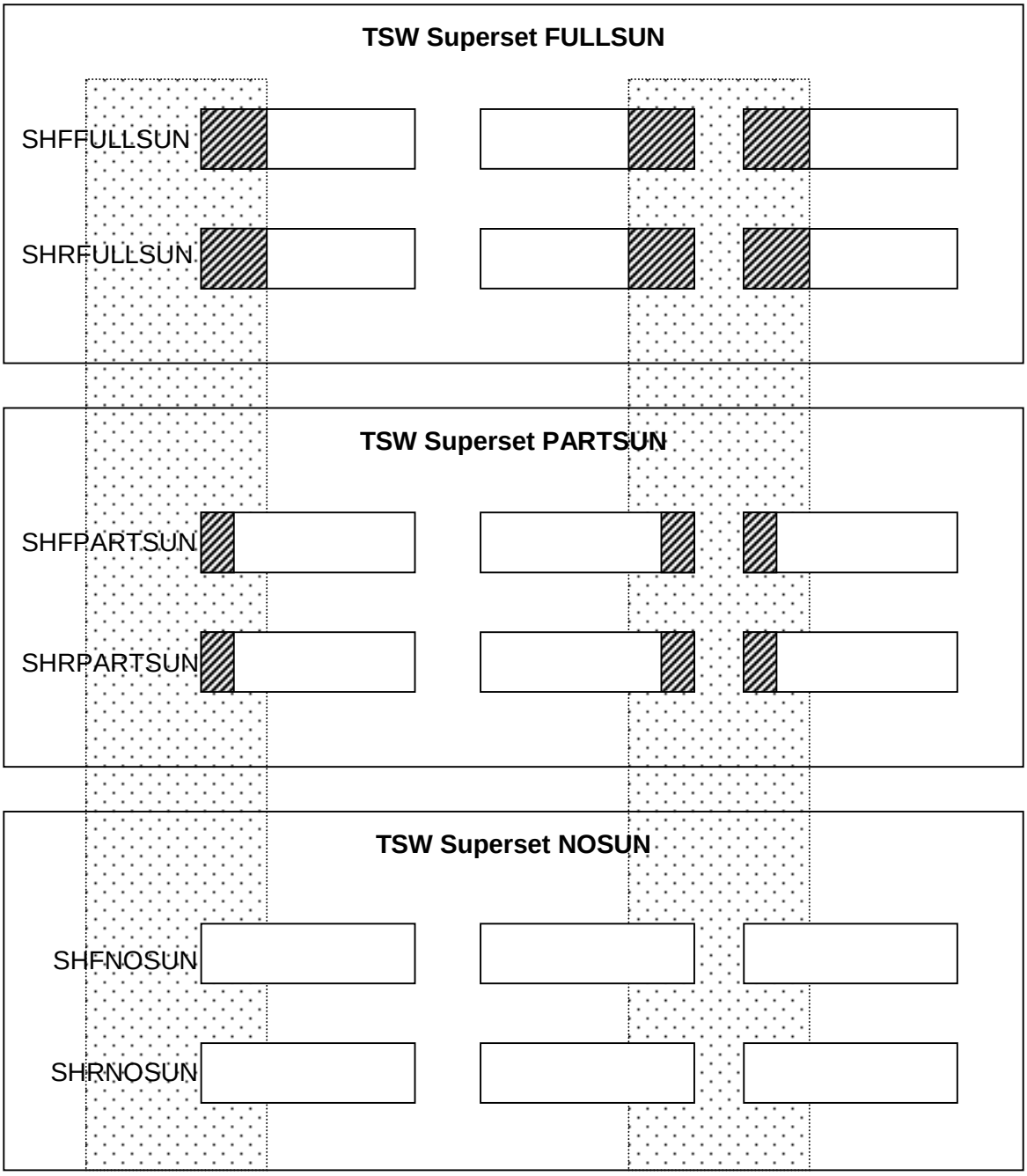


Figure D-1. TSW Supersets and TSW Set Ids

Appendix E. Recurrent Scheduling Concepts

E.1 Introduction

E.1.1

The UPS Recurrent Scheduling (RS) capability was developed to replace the Automatic SAR Generation capability. It was first available in UPS Release 12.

E.1.2

The following paragraphs summarize the concepts employed in UPS Recurrent Scheduling (RS). Appendices F and G should be referred to as well, which discuss the RS Prototype Language, and RS Prototype Examples respectively.

E.2 RS Prototyping Language

E.2.1 General

The RS prototype language has a similar syntax as the AG language. However, a number of extensions have been added to support and take advantage of NCCDS ’98 flexible scheduling and TSW processing. Features of the RS prototype language are summarized in the following paragraphs.

E.2.2 Prototype Language Description

E.2.2.1 Tolerance Type

In AG, service tolerances were calculated and constrained to only one TSW. In RS, the language supports tolerances constrained to a TSW and tolerances stretched to cover the entire subinterval. This feature combined with NCCDS ’98's TDRS Set and TSW matching flexibilities, defers "any TDRS" and/or "one in any TSW" scheduling to NCCDS ’98's control.

E.2.2.2 Minimum and Nominal Service Duration

AG supported nominal and minimum durations in a prototype, but because NCCDS didn't, AG only used them internally to limit the size of a SAR it would generate. Once a SAR was generated, fixed sized services had to be sent to NCCDS. In Release 12, the user specifies both the nominal and minimum service durations in the RS Prototype, which are then passed on the NCCDS via the flexible SAR.

E.2.2.3 Superprototypes

The RS prototype language supports “superprototypes” that can generate two or more SARs with user-desired timing dependencies, rather than just a single SAR as in AG. This feature can simplify mission operations by eliminating the need for the "layering" step required in the AG era. This feature is made possible by the fact that NCCDS ’98 will schedule to TSWs, and supports same-mission priorities and service duration flexibility.

E.2.2.4 Fixed and Variable Services

As in the AG era, RS supports service times that are expressed either as a relative start time and a duration (fixed service) or both the start and stop times could be relative times (variable). In AG, the distinction between fixed and variable was necessary. In RS, it remains as a convenience to the prototype writer and for clarity. RS prototypes can calculate offsets and durations (AG allowed only constants) using hard coded constants, and/or previously resolved TSW, service and maximum event envelope (event resulting from application of maximum service durations and tolerances) endpoint times.

E.2.2.5 Consistency Validation

In addition to the unavoidable syntax checking that the AG parser performed, there was application-oriented consistency checking. Some of these checks may still be valid but others may not make sense. An RS-era goal is to not overly constrain the user and, therefore, stifle creative use of UPS to solve scheduling problems. RS prototype rules may be less necessary given the greater smarts (TSW processing) and flexibility in the new NCCDS ’98 vs. the old NCCDS scheduling. In short, the user is given the flexibility to generate multiple SARs for the same SUPIDEN that may overlap each other, and expect NCCDS '98 to separate the requests such that they meet White Sands rules. The service gap values stored in NCCDS '98's database (specifiable on a per mission basis) will be used to determine the SAR separation.

E.2.2.6 Relative Service Endpoints

a. As in the AG era, RS prototypes allow the user specify service start and/or stop times in terms of offsets from TSWs, other services, other events (super prototypes only), etc. RS prototypes extend this idea with more detailed qualifiers, particularly for TSW-relative times, which can have any of the following formats:

   1. < tsw-spec> . <endpoint> ± <relative-time>

   2. <service> . <tsw-spec> . <endpoint> ± <relative-time>

   3. <event> . <service> . <tsw-spec> . <endpoint> ± <relative-time>

b. The first implies the current event and service ("my TSW"). The second names another service in "my" event. The third explicitly specifies the event and service. RS would go to the UPS database to determine the TSW associated with the service (TSW set ID, antenna type—MA vs. SSA, direction—forward vs. return, and antenna gain—high vs. low).

c. The TSW specification can either be "tsw" meaning the next TSW in the order encountered, or "tsw [<tdrs-id>]" meaning a TSW for the specified TDRS from a TSW-tuple called out in the superprototype parameter list (see GRO example).

d. In the XTE example note that the MAR service starts are relative to the SSAF service TSW start since that is what affects the start of the SSAF service around which the MAR services must be scheduled.

E.2.2.7 Customer priority

A SAR can contain a customer priority parameter supported by NCCDS ’98. RS does nothing with this priority except pass it through to NCCDS ’98 via the generated SAR. However, customer priority is key to the XTE "schedule around" prototype (an example is found in Appendix G), which wants a SSA event scheduled first and then MAR/TRK fit around it to fill the unused portions of the TSW. This parameter may be specified in the RS prototype language or, if not, a default value stored in the Default Scheduling Parameters database table should be used.

E.2.2.8 Freeze Interval

A SAR can contain a freeze time interval parameter that specifies the period of time prior to event start time where the user wishes to receive the Fixed USM. If the SAR does not contain this parameter, the NCCDS will use the value stored in its database. The UPS should also have a copy of this value, stored in the Mission Setup database table.

E.2.2.9 TSW set override on a per-service basis

Service Specification Codes (SSCs) allow the user to specify a TSW Set ID. NCCDS stores a default in its database. The user should store the same default TSW Set ID in the UPS database. The RS prototype language supports optional specification of a non-default TSW Set ID on a per-service basis.

E.2.3 Superprototypes

a. The language supports the concept of a superprototype that is able to generate two or more SARs at the same time scheduled to one or more TSWs within the current sub-interval. The default is to use one TSW. The TDRS_IDS parameter to the superprototype can be used to introduce the list of TDRS IDs whose TSW endpoints may be explicitly called out in time calculations.

b. In the language, two or more prototype definitions can be bracketed by a "superprototype" statement. The basic idea is that endpoints of an event or service, specified by one prototype can be referenced to perform offset calculations inside of another prototype. This feature can be used, for example, to schedule a crucial hard to get set of services as one event and then schedule additional less-crucial events around it with maximal use of the TSW. Relative to AG, RS relaxes normal non-overlapping request rules and takes full advantage of NCCDS ’98 flexibility to create requests that achieve the desired results. This feature does **not** dovetail exactly with NCCDS ’98 capabilities but something close to the desired set of events can be generated.

E.3 Generating Flexible SARs

a. The RS prototype, described above, has features for specifying minimum and maximum service durations, and service start time tolerances, all of which will end up in the flexible SAR. RS in general will support virtual (mnemonic) TDRS IDs, formally known as TDRS Set Names, as defined for the flexible SAR.

b. Currently, AG always schedules around existing SARs regardless of their status. This includes SARs from the current AG run. In the RS era, users may take full advantage of flexible scheduling by allowing RS to generate overlapping SARs, and require NCCDS ’98 to resolve create non-conflicting events.

E.4 RS Patterns

E.4.1 General

a. Recurrent Scheduling Patterns (RS Patterns) support the following types of control over SAR generation:

   1. Multiple-contact patterns of TDRS use:

      (a) Alternating tracking services among available TDRSs to eliminate biases in the resulting tracking data.

      (b) Periodically scheduling routine activities.

      (c) Scheduling harder to arrange, or more expensive, services with reduced frequency.

   2. Alternate, fallback services (typically a different set of service types or the same services specifying different TSW Set IDs) when desired configurations are unavailable.

   3. Scheduling a user-defined set of TDRSs.

b. RS Patterns are used for the initial automatic scheduling of recurrent events only. Patterns are not used for one-shot application of RS prototypes. Patterns are created, modified, or reviewed using the Recurrent Scheduling panel (see Figure 9-2). Patterns are saved for future use, selected for use, or deleted using the Manage RS Patterns panel that can be called up from the Recurrent Scheduling panel. Patterns cannot be saved unless there is at least one prototype specified in at least one subinterval. RS will produce reports similar to the former AG reports.

c. A new parameter that will be used and stored with the pattern is the Time Period Offset, with a format of HH:MM:SS. The time offset contained in this field will be applied to the Time Period Start time when Recurrent Scheduling is invoked. This field will be most useful for time interval based patterns that need to be offset from the normal "all balls" Time Period Start time. This field will be located on the Automatic SAR Generation panel under the "Period Covered" triple time key-in widget box.

E.4.2 Alternate Prototypes

AG supported an ordered list of alternate prototypes to try until at least one event could be generated in a sub-interval. Now that chains of alternate SARs can be sent to NCCDS ’98, RS handling of alternate prototypes will differ markedly from AG. Specifically, RS will create possibly overlapping SARs for all of the prototypes in a sub-pattern (scrolling list in a pattern matrix cell) and chain them together for NCCDS ’98 to resolve.

E.4.3 Sub-Intervals

a. The following paragraphs are extracted (and lightly edited) from the NCCDS UPS User’s Guide, Appendix E. RS sub-intervals are essentially the same as AG sub-intervals with a few enhancements.

b. RS supports dividing the overall interval ("Time Period" -- typically 7 days) into smaller time intervals that can be scheduled with different Autogenerate Prototypes to provide finer control over what services are generated. The following types of subintervals are supported:

   1. Schedule by Mission Orbit. Divide the interval into subintervals at mission orbit boundaries occurring within the interval. New for RS, sub-interval durations can be positive integer multiples of an orbit.

   2. Schedule by TDRS View. Divide the interval into subintervals at the beginnings of contacts with a specified TDRS occurring within the interval.

   3. Schedule by Time Interval. Divide the interval into arbitrary, equal-sized subintervals. New for RS, the start and end times of the overall interval may be offset by a user defined time: "Time Period Offset", which will be stored with the pattern. This will allow patterns to be run that overlap a day boundary. For example, EUVE wants to schedule a SAR between the hours of 2300 and 0400. The EUVE user would enter an Offset value of 23:00:00, and start the run for the normal week, e.g., 100/00:00:00 to 107/00:00:00. The sub-pattern would be "by time interval" for 1 day sub-intervals, and create an Exclusionary Period of 04:00:00 to 22:59:59 (see last bullet). At the start of the run, the Offset will be added to the time period start and end, making the run start at 100/23:00:00 to 107:23:00:00, and RS will consider all TSWs within the 24 hour sub-interval, notched out by all TSWs within the hours of 04:00:00 to 22:59:59, thus scheduling only the desired 5 hour block of time.

   4. Schedule by Orbital Event. Specify desired service windows based on orbital events occurring within the overall interval.

5. New for RS, is the ability to filter sub-intervals by orbital event relative time periods (e.g., once per orbit, but only in sunlight). This capability is done through the use of TSW Set IDs. For example, UARS wants to schedule a 15.5 minute event once per orbit in full sunlight. As an alternate, they will take the same event in up to 5 minutes out of sunlight. Refer to Paragraph G.8 for an example of the prototypes used. UARS would use a "by orbit" pattern (once per orbit), specifying both prototypes in the cell. UARS must previously create 2 TSW Set IDs, the first removing the Multi-path Fringe, but including all sunlight, while the second TSW Set removes the MPF, and includes the sunlight and 5 minutes on either side of the sunlight endpoints. The services in the primary prototype will specify the default TSW Set ID (full sun), and the same services will be included in the alternate prototype, but with a Prototype Language parameter specifying the partial sun TSW Set ID. RS will create a primary SAR with tolerances within sunlight only, but outside the MPF. An alternate SAR will also be created extending the tolerances to those specified in the second TSW Set.

6. New for RS, is the ability to filter sub-intervals by operations oriented exclusionary periods (e.g., once per orbit but don't schedule anything ½ hour before the end of a shift to one hour into the next shift). Figure 2 shows a panel for specifying operational exclusion periods. Although this capability is redundant, and the User Constraint feature supports a similar capability, the "Filter by Exclusionary Periods" values will be stored with the pattern, reducing the workload on the user by not forcing the user to enter and remember the exclusionary periods for each pattern.

NOTE

In all cases, the only valid subinterval type is: "Time Interval", if:

1. TDRS PSATs data are unavailable (if this type of data is received by the UPS), or

2. TCW data is received (if this type of data is received by the UPS).

E.4.4 TDRS Use

a. The following paragraphs are based on the NCCDS UPS User's Guide, Appendix E. RS TDRS use is essentially the same as in AG except that TDRS Set Names will be supported.

b. The following text discusses TDRS use modes. In the RS era, there will not really be separate modes due to TDRS flexibility in SARs and TDRS Set Names. Basically, a list of exactly one TDRS implies "specific" mode and two or more implies "any" mode. RS supports two TDRS use modes:

1. Schedule Any TDRS. In this mode, RS attempts to schedule events on any available TDRS. This becomes significant in regions where TDRS contacts overlap. Conceptually, this mode can be though of as sorting Composite TSWs by start time, independent of TDRS, before fitting events. The user has control over the "any" part of the mode by selecting which TDRSs are to be used. In RS, when TDRS Set Names are used (e.g., TDE really means 041 and 046), any TDRS scheduling is the same except that the allowed TDRS list is automatically expanded to include the real TDRSs named by the TDRS Set Name. Note: the actual SAR generated will specify the TDRS Set Name (e.g., TDW or TDE).

2. Schedule Specific TDRS. In this mode, RS attempts to schedule events on a specific TDRS. Across a pattern, one set of services can be requested for one TDRS, and another set (or no services) can be requested on other TDRSs. In RS, when TDRS Set Names are used (e.g., TDE really means 041 and 046), "specific TDRS" scheduling becomes like "any TDRS" except that the list is limited to the TDRSs specified by the TDRS Set Name. For example, if the "TDE" TDRS Set Name were specified when scheduling by "specific TDRS", RS would use the TSWs for 041 and 046.

E.4.5 TSW Use

a. The following paragraphs are extracted (and lightly edited) from the NCCDS UPS User's Guide, Appendix E. RS TSW use is essentially the same as in AG with a few enhancements such as the selecting different TSWs using the TSW Set ID stored in the SSC.

b. TSWs occurring within a subinterval determine which services can be scheduled and when. The subintervals, described in Paragraph E.4.3, will contain candidate TSWs for RS to use for generating SARs. Previously, AG arbitrarily truncated TSWs that spanned sub-interval boundaries. However, in early 1996, AG was modified to modify the subinterval boundary such that no TSW would be truncated by including in the subinterval only those TSWs <u>starting</u> in the subinterval. RS will behave similarly to AG, and will also include a TSW in its entirety if it starts in the sub-interval and exclude it if starts before the sub-interval. Patterns specify how TSWs occurring in a subinterval are to be used:

1. Create one SAR in each TSW (usable portions) in the subinterval.

2. Create one SAR in the first schedulable TSW (usable portions) in the subinterval.

NOTE

1. The TSW Set ID specified in each SSC in an RS Prototype refers to a set of TSWs that have been defined and created using the Define TSW Set ID panel. This panel controls the TSW filtering process that is discussed below, except for the operational exclusion period filtering, which must still be done in RS.

2. Note that the capabilities referred to in the following paragraphs (E.4.5 c. and d.) have not yet been implemented.

c. Once TSWs are selected, they will be notched by orbital event and operational exclusion periods. The orbital event filters specify time periods that are to be included or excluded depending on the accompanying Boolean formula. The operational exclusion periods define periods in which not to schedule SARs.

d. The following Boolean operators are supported for orbital event filtering:

a *AND* b	Select TSWs that are in both a and b. There is an implied *AND* operation between the basic sub-interval and the remaining terms in the expression. There is an implied *AND NOT* between the operational exclusion periods and the other terms. Therefore all formulas have the general form: basic-sub-int *AND NOT* op-excl-period *AND* (Boolean-expression-of-remaining-terms)
a *OR* b	Select TSWs that are either in a or in b or in both a and b
a *XOR* b	Select TSWs that are either in a or in b but not in both
NOT a	*NOT* is a unary operator applied to a single term in a Boolean expression. *NOT* cannot be applied to the basic sub-interval. a *AND NOT* b = select TSWs that are in a but not in b.

e. Note that RS prototypes support override expansion of SAR tolerances to cover the entire sub-interval instead of being limited to an individual TSW. Choosing this override expansion would appear to make little sense combined with “Schedule a SAR in each and every” TSW use mode, since NCCDS would not be able to shift SARs around (since they use the same services) if there is one for each TSW. However, a user might want to apply an extra "slippage" to the end of a sub-interval. Therefore, RS will add any user-specified tolerances to the stretch-to-subinterval tolerances.

f. In 1996, a SAR granularity capability was added to the UPS, including the AG process, which allowed the user to specify the SARs start and stop granularity between 1 second and 1 minute. This capability will be kept in RS, and although flexible scheduling allows service-level tolerance and duration, adding service granularity will not be necessary, since the services within a prototype are specified as an offset from a TSW or another service, and the offset may specify any time value, regardless of granularity.

g. Note that the TSW used will be a function of the TDRS Set specified: if a single TDRS is specified, the TSW used will be the actual start and stop of that TDRSs TSW, but if a TDRS set is used contained multiple TSWs (e.g., TDE which is 041 and 046), the TSW used will be the earliest start time of all the TDRSs in the set, and the latest stop time of all the TDRSs in the set. For example, consider the case where the TDRS Set "All" is used, which includes 041, 046, 171, 174, and the TDRS over Guam. Since there is no period when there is not coverage, the earliest start time would be 171's TSW start time, and the stop time would be the latest stop time for the last TDRS in the *sub-interval*.

E.5 Pattern Management

Patterns can be defined from scratch using the Recurrent Scheduling Pattern panel. A pattern thus created can be named, saved to the database, and recalled for use at a later time. When a pattern is recalled from the database, all parameters are filled in except the overall time interval to be scheduled. One pattern may be designated as the default pattern to be recalled when RS is first started.

E.6 RS Processing Flow

E.6.1 Distilling The RS Panel

a. The first major step is to map pattern matrix columns to subinterval time ranges:

Schedule By Mission Orbit	First, find all orbits in the database that start within the overall period being scheduled. Order the orbits by their start times. Map the columns of the pattern matrix to orbit list entries modulo the number of pattern matrix columns. Typically, there are more orbits covered by the scheduling interval than there are pattern matrix columns. For example, if there are four columns, the first column would map to the first, fifth, ninth… orbits. A subinterval will be the start of an orbit to the start of the next orbit, minus 1 second.
Schedule By TDRS View	This is handled much like orbits, except that the rise time of the user-specified TDRS defines the start of the subinterval, and the end of the subinterval is the next rise time, minus 1 second.
Schedule By Time Interval	This is handled much like orbits except that the overall interval is arbitrarily divided into subperiods that have the user-specified duration. The last interval is truncated if it would extend beyond the end of the overall interval.
Schedule By Orbital Event	First, locate all data base entries for the orbital events that start during the overall scheduling interval, ordered by event entry time. Unlike in the other modes, it takes three columns of the pattern matrix to satisfy the scheduling of one orbital event. That is, the user can schedule up to three activities associated with each occurrence of the orbital event. The first column, of the three, specifies what to do at event entry (i.e., a single time). Each individual sub-pattern (defined by one pattern matrix row/column pair) defines its own arbitrary subperiod, with times relative to event entry (e.g., ENTRY-00:03:00 to ENTRY+00:00:33). The second column, of the three maps to a subperiod defined by the event entry and exit times. The user can specify a portion of the event using dependent times (e.g., ENTRY-00:03:00 to EXIT+00:00:33). The third column, of the three, is handled similarly to the first, except that event exit is used instead of event entry (e.g., EXIT+00:00:00 to EXIT+00:00:33).

b. The second major step is to process each sub-pattern (pattern-matrix cell) independently, in column major order. For example:

	Orbit 1	Orbit 2	Orbit 3	Orbit 4
170	sub-pattern 1	sub-pattern 4	sub-pattern 7	sub-pattern 10
174	sub-pattern 2	sub-pattern 5	sub-pattern 8	sub-pattern 11
TDE	sub-pattern 3	sub-pattern 6	sub-pattern 9	sub-pattern 12

c. The parameters to sub-pattern processing are:

Parameter	Source
An ordered list of prototypes to be scheduled, a primary and optional alternates	From pattern matrix; if the sub-pattern has no prototypes specified, the sub-pattern will not be processed
Subinterval start and stop times optionally filtered by orbital events and operational exclusion periods.	Defined by the column to subinterval mapping described earlier, filters are edited by sub-panels and stored with the pattern
A specific TDRS or a list of TDRSs per prototype	From the sub-pattern prototype list, the TDRS(s) default to the pattern matrix row label but can be overridden.
TSW use	Defined by sub-pattern parameters -- first schedulable TSW, each and every TSW)
SARs, both pre-existing and newly generated by earlier sub-patterns, for the same mission, that need to be scheduled around	Read from the UPS scheduling data base
TSWs within the subinterval	Read from the UPS orbital data base, based on the TSW Set ID (either specified in the RS Prototype or the default stored with the SSC)
Operational exclusion periods used to notch TSWs	Edited by new panel and stored with the pattern (not yet implemented)
SARs and Alternate SARs, newly generated for the same mission, in the current sub-pattern that need to be schedule around	Defined by sub-pattern parameters -- Schedule Thru, Schedule Around. If Schedule Around, SARs are read from database
User constraints that need to be scheduled around	Read from the UPS mission setup database

E.6.2 Scheduling Around Existing SARs

Currently, AG always schedules around existing SARs. This includes SARs from the current AG run. Generating XTE-style “schedule around” events depended on this mode. In the RS era, we want to take full advantage of flexible scheduling that will be done by NCCDS ’98. As a result, RS is likely to create SARs having a great deal of overlap and it will expect NCCDS ’98 to resolve conflicts. Consequently, <u>for nominal RS runs</u>, it makes sense to have one simple overlap rule that says:

New SARs will be generated around fixed events, and only fixed events.

However, many missions currently work in a mode where they Autogen their nominal coverage events in one run and special events (e.g., once per day or once every six hours) in a separate run (or by specific scheduling). The order of the special run relative to the normal run implied a priority as a result of the blanket scheduling around all existing SARs. Events generated by the earlier run might prevent AG from creating events in the second run, thus giving higher priority to the earlier events.

To continue supporting this concept, RS will add a new Boolean sub-pattern parameter, that says whether to schedule around any SAR rather than just fixed events which it always schedules around. The risk of this approach is that RS is likely to generate events in the first run with so much tolerance that nothing can be scheduled by the second run, if using "Schedule-Around" in the second run.

A possible alternative method is for a mission to specify explicit priorities in their RS prototypes. NCCDS ’98 will handle customer and mission priorities in the manner described below. Since NCCDS 1998 will treat customer priorities 4, 5, and 6 within the mission (vs. global priority across all missions), the alternative method works just fine.

From the viewpoint of the NCCDS, all full support customers will always have 9 customer request priority levels. The system attaches no meaning to any particular level --- e.g., "3" is simply the level that is one lower than "2" and one level higher than "4". However operational procedures will be developed that attach the following meanings to each level:

1 -- Emergency
2 -- Critical Operations
3 -- Critical Science
4 -- High Normal
5 -- Routine Normal
6 -- Low Normal
7 -- Supplemental
8 -- Undefined
9 -- Undefined

Assume that there are 3 missions: A, B and C, with respective mission priorities 1, 2 and 3. Operations will merge the above customer priority list with the mission priority list to create a scheduling priorities list. The following shows both the default order for the scheduling priorities list and the "manipulated" order that will be used operationally. In the "manipulated" order, each customer can place relative priorities on its own normal requests w/o changing the relationship to other customers.

DEFAULT	OPERATIONAL
Emergency	
1. 1 - A	1 - A
2. 1 - B	1 - B
3. 1 - C	1 - C
Critical	
4. 2 - A	2 - A
5. 2 - B	2 - B
6. 2 - C	2 - C
7. 3 - A	3 - A
8. 3 - B	3 - B
9. 3 - C	3 - C
Normal	
10. 4 - A	4 - A
11. 4 - B	5 - A
12. 4 - C	6 - A
13. 5 - A	4 - B
14. 5 - B	5 - B
15. 5 - C	6 - B
16. 6 - A	4 - C
17. 6 - B	5 - C
18. 6 - C	6 - C
Supplemental/Undefined	
19. 7 - A	7 - A
20. 7 - B	7 - B
21. 7 - C	7 - C
22. 8 - A	8 - A
23. 8 - B	8 - B
24. 8 - C	8 - C
25. 9 - A	9 - A
26. 9 - B	9 - B
27. 9 - C	9 - C

E.6.3 Fitting RS Prototype Services to TSWs

a. The main purpose of the RS software is to allow the user interface to determine which TSWs to select from the database and which RS Prototypes to try to fit to the TSWs.

b. As noted, one TSW defines available resources for one service type (MA low gain, MA high gain, SSA low gain, SSA high gain, KSA low gain, or KSA high gain; tracking and simulation services do not have TSWs).

c. Subpattern parameters include several items that specify or influence alternative strategies to be taken by the software when trying to automatically schedule events. They include the following ordered by their global effect on processing:

   1. An unordered list of allowable TDRSs if scheduling by any TDRS or a single TDRS if scheduling to a specific TDRS. In the RS era, alternate TDRS processing is handled by declaring an alternate prototype on a different TDRS.

   2. TSW use flag (i.e., one in each TSW vs. one in first schedulable TSW).

   3. Nominal and minimum service durations defined in an RS prototype.

NOTE

Consider the following example of alternate TDRS processing, where the user wants the primary scheduled on TDW, and the alternate on TDE:

> The user specifies a two row pattern, using a single "by TDRS view" subinterval. The top row specifies "TDW" (which consists of 171, 174), and the bottom row specifies "TDE" (which consists of 041, 046). The first cell specifies a primary prototype, P01, and an alternate, P02. P01 does not use the <TSW- spec> in its prototype, thus allowing RS to use the default TSW set of TDW. The alternate P02 must specify a <TSW-spec> of TDE, which forces RS to not use the row specification "TDW", and instead use the <TSW-spec>.

d. In RS, prototype list in a sub-pattern cell represents a primary prototype and a list of alternates but unlike in the old AG, NCCDS ’98 determines when to go to an alternate. Therefore, SARs are generated for the primary and as many alternates as are schedulable (AG worked its way through the list until it could schedule one prototype or no prototypes). RS will generate alternate SARs if the primary SAR cannot be generated, but the first alternate schedulable in the list will be generated as the primary, not as an alternate. If a second alternate is specified in the list, it will become the first alternate (if schedulable). If, in the list of SARs, one or more alternates cannot be generated, RS will skip the unschedulable ones and generate (and link) the ones that can

be generated. For example, RS will generate the third (second alternate) or subsequent SARs even if the second (first alternate) cannot be scheduled.

NOTE

If a Superprototype is specified in a sub-pattern, it must be the ***only*** entry in that pattern. Neither alternate superprototypes nor alternate prototypes are allowed in the sub-pattern. This is because RS has no way of knowing which of the primary SARs generated in the (primary) superprototype should be used to link an alternate SAR to TDRS use and TSW use are the pivotal RS scheduling strategies. They affect not only lower level strategies, but also more global strategies. As it turns out, "Specific TDRS" processing is just a special case of "Any TDRS" processing (i.e., with a list of exactly one TDRS). The Program Design Language (PDL) fragment shown in Figure E-1 describes the basic control logic for matching up TSWs and prototypes. The low level logic for fitting a SAR to the composite TSW is omitted and addressed in a separate document.

e. RS works with composite TSWs that are slightly different from the composite TSWs that are displayed on the Schedule Planning screen. See Figure E-2 for an example of the breakdown of components that make up a composite TSW. This is both literally true (different anomalies may be in effect for RS vs. display), and in the way they are handled. RS composite TSWs have the following characteristics:

1. TSWs that start inside the subpattern time period are included and may extend beyond the subpattern time period. TSWs that start before the sub-pattern time period and extend into it are not considered

2. TSWs with durations less than the minimum allowed service length (1 minute) are deleted before merging TSWs into composites.

3. RS composite TSWs have EXACTLY ONE "all services available" region. This is the main difference from the Schedule Planning Screen composites, which represent TDRS view periods with anomalies overlaid onto them. Figure 4 is an example of how a Schedule Planning Composite TSW would be divided into the "usable parts" that RS treats as separate and distinct composite TSWs. Each usable part is the composite TSW used by RS for scheduling and is created by the start of the next all services available region.

4. CTSWs are, by default, sorted so as to give long duration CTSWs that start at approximately the same time as shorter CTSWs a higher processing priority. If Sort-by-Earliest-TSW-Start-Time is specified (on the main RS panel), CTSWs will instead be sorted based on earliest TSW start time. For sorting purposes, CTSWs with start times that are within some small delta of one another are treated as having the same start time and therefore a descending order. When fitting services (defined in the prototype) to a composite TSW, it is important to remember that the composite TSW may have "ragged" edges. That is, all component TSWs do not begin and end at exactly the same time. Even though there is room for one service in its TSW, there may not be room for other services in their respective TSWs. Time periods when some (but not all), of the services required by the prototype are available are called "partial services" periods. Time periods when all services are available are called "all services" periods. Subsort by duration will cause the longer CTSW to appear earlier in the list.

5. The composite TSWs are notched by existing fixed events or, optionally, by any SAR, disregarding plus/minus tolerances. The size and location of a notch are the same as the overall fixed event size and location, or the event envelope (includes tolerances and maximum duration) for flexible SARs. NCCDS ’98 will take care of minimum gaps between services.

6. The composite TSWs are notched by orbital event and operation exclusion period filters.

7. The composite TSWs are notched by any specified user constraints.

8. In AG there was effectively one TSW set for all scheduling. In the NCCDS ’98 era, several TSW sets can be defined for a mission, and sets are associated to schedules at the service level (i.e., it is permissible for each and every service in the same event to use a different TSW set). Service level association of TSWs and schedules is also reflected in the RS prototype. Therefore, composite TSW construction must also do so.

```
DO for each Pattern Matrix column
    DO for each Pattern Matrix row
        DO for each prototype
            get list of TDRSs for current prototype
            expand any TDRS Set Names to get complete TDRS list
            get composite TSWs for all TDRSs
            IF superprototype and TDRS list THEN
                keep composite TSW sets distinct
            ELSE
                merge composite TSW sets for all TDRSs
            ENDIF
            DO for all composite TSW sets
                IF sort by duration THEN
                    sort composite TSWs by duration
                ELSE
                    sort composite TSWs by start time
                ENDIF
            ENDDO
            IF user wants to notch around any SAR THEN
                notch composite TSWs by any SAR
            ELSE
                notch composite TSWs by fixed events only
            ENDIF
            notch composite TSWs by orbital event filter
            notch composite TSWs by operational exclusion periods
            notch composite TSWs by user (network) constraints
            DO for all composite TSWs
                try to generate SAR(s)
                IF  "first schedulable" and something scheduled THEN
                    BREAK from composite TSW loop
                ENDIF
            ENDDO
            IF primary prototype and nothing was scheduled then
                BREAK from prototype loop
            ENDIF
        ENDDO
    ENDDO
ENDDO
```

Figure E-1. PDL for Matching Prototypes to TSWs

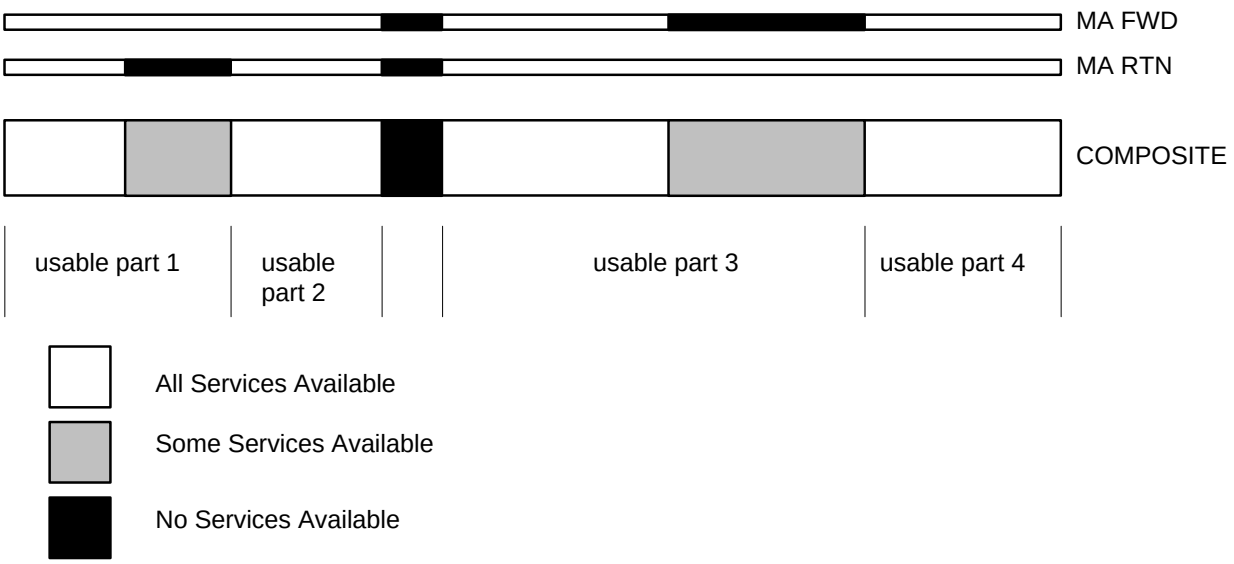


Figure E-2. Composite TSW Breakdown

E.7 One Shot Scheduling

A future design goal will be to implement a capability to allow RS prototypes to be harnessed for "one shot" special events that normally wouldn't warrant the overhead needed to create a whole RS pattern. Recurrent scheduling at its essence is selecting a TSW and applying a prototype to it to generate a SAR. It will be possible to click on TSW timeline object(s), specify a prototype and have UPS generate reasonable default parameters to cause one or more SARs to be created

E.8 Comparison of AG and RS

E.8.1 Similarities

a. The RS user interface is very similar to the AG user interface. The main screen still presents the user with a pattern for editing. The pattern matrix looks the same except that the prototype lists are interpreted differently. The status window on the main panel is very similar as well, but with some new information for combining patterns with orbital events.

b. The "Specify Sub-Interval Type" panel will be virtually the same.

c. The RS prototype language is grammatically similar to the AG prototype language but with several important extensions. The users should be able to easily migrate to the RS language.

E.8.2 Differences

a. The sub-pattern parameters panel will be considerably reduced in scope due to flexible TDRS specification and the elimination of options never used in the current AG.

b. The "Specify TDRS Use" panel will only support "specific TDRS" since TDRS Set names are functionally equivalent to "any TDRSs" modes in the current AG. Also, TDRS IDs are associated with individual prototypes. The pattern matrix row label now only identifies the default TDRS ID to use if the user doesn't specifically request another TDRS for a prototype.

c. The TSWs selected by a sub-interval can be further filtered by orbital events and operational exclusion periods.

d. There are big differences in the low-level code for actually generating SARs. The differences are due primarily to the new flexible SAR capabilities and format. AG had to generate real concrete SARs while RS has to preserve flexibility and let NCCDS '98 worry about making concrete events. Rules concerning overlap with previously generated SARs are relaxed, minimum gaps between events are now handled by NCCDS '98, and major enhancements were done to the prototype language.

e. The AG Layering program has been eliminated.

f. Table E-1 summarizes functions that are new to RS that were not part of AG. Table E-2 summarizes functions that are currently part of AG that will not be part of RS. Table E-3 summarizes functions that are currently part of AG but will be different in RS. In all of the tables, there is a column that calls out whether the function involves user interface changes.

Table E-1. New Recurrent Scheduling Functions

Function	UIF Support?
Combine one or more orbital events with current AG-style patterns	Yes (not yet implemented)
Combine operational exclusion periods with current AG-style patterns	Yes (not yet implemented)
By-orbit mode to support multiple orbit subintervals	Yes
NCCDS ’98 alternate prototypes (multiple SARs generated)	Yes
Support for new SAR flexibilities in SCHADD table	No
TDRS Set Names (e.g., TDW means either 191 or 195)	Yes
One-shot manual creation of SAR(s) using RS prototype	Yes
Embedded comments in prototype	No
Tolerances to cover entire sub-interval (vs. TSW limited)	No
Enhanced relative endpoint specification (to other events, to services in other events, to TSWs of other services, TSWs of specific TDRS) in prototype	No
Maximum duration in prototype	~~No~~
Superprototype	No
Scheduling method: Schedule Through vs. Schedule-Around. Add 2 radio button item in sub-pattern parameter panel	Yes
Optional sort TSWs by duration when scheduling "ANY TDRS". Sorting by duration is, in general, the best way. It is useful to JSCs early handoff support, HSTs 8 hour subinterval reqts, and XTEs pattern). Note: this is a whole pattern parameter. Suggestion: replace "Perform Conflict Validation" item on the Pattern panel with a 2 radio button item "Sort TSWs by Duration [defaulted], and Sort by Earliest TSW Start Time".	Yes

Table E-2. Deleted AG Functions

Function	UIF Support?
Orbital uncertainty pattern parameters (now supported by prototype and enhanced SAR creation functionality)	Yes
Other mission conflict validation	Yes
Orbital constraint checking since NCCDS ’98 has TSWs to work with and some expected operational scenarios (e.g., GRO) expect to generate SARs with tolerances that extend beyond TSW boundaries	No
Schedule Many SARs in All TSWs	Yes
“Try next sub-interval” flag in sub-pattern parameters	Yes
Alternate or allowable TDRS lists in sub-pattern parameters	Yes
SAR layering	Whole program scrapped so no need to modify panels

Table E-3. AG Functions Modified for RS

Function	UIF Support?
Alternate prototype use and high level SAR generation processing flow (NCCDS alternates vs. AG-Style alternates)	No
TDRS Set Name use and high level SAR generation processing flow (specific-TDRS may be handled like any TDRS when a TDRS Set Name is specified)	No
Disposable services are now handled through the MIN_DUR parameter rather than an explicit designation and are really handled by NCCDS ’98	No
TBD: verify that abort button handling is compatible with one shot use of prototypes	No
Always schedule around fixed events, or optionally schedule around all SARs	Yes

Appendix F. Recurrent Scheduling Prototype Language

F.1 General

A simple structured language can unambiguously define an RS superprototype/prototype. Paragraph F.2.2 specifies the grammar for such a language. Paragraph F.2.3 specifies additional rules and constraints on use of the language. Figure F-1 through Figure F-3 are examples of RS superprototype/prototype definitions.

F.2 Specification

F.2.1 General

The Bachus-Naur Format (BNF) is used to describe the grammar specification for the Recurrent Scheduling "language". Either an RS superprototype, consisting of one or more RS prototypes, or a single RS prototype may be created using the RS prototype editor. If an RS superprototype is created, it shall be identified by a 3 character ID beginning with 'S'. An RS prototype may be identified by any 3 character ID beginning with a letter *other* than an 'S' or an 'X' (the latter being a quirk of the implementation).

F.2.2 BNF Grammar

```
sprototype-def:
      SUPERPROTOTYPE sproto-params '{' prototype-def-list '}'
  |   prototype-def
sproto-params:
      '(' sproto-param-list ')'
sproto-param-list:
      sproto-param
  |   sproto-param-list ',' sproto-param
sproto-param:
      ID '=' rs-super-id
|     ALIAS '=' alias-string              /* optional */
|     TDRS_IDS '=' '(' tdrs-list ')'      /* optional */
rs-super-id:
      S(0[1-9] | [1-9]digit)
alias-string:
      '"' [a-zA-Z0-9_ -/]{1-8} '"'        /* AT LEAST 1 NON-BLANK */
tdrs-list:
      tdrs-id                             /* TDRS Sets are not allowed */
  |   tdrs-list ',' tdrs-id
tdrs-id:
      [A-Z0-9]{3}
```

```
prototype-def-list:
      prototype-def
  |   prototype-def prototype-def-list
prototype-def:
      PROTOTYPE proto-tag proto-params '{' service-def-list '}'
svc-tag:                                  /* service tag */
      [0-9A-Z_]{1-16}
proto-tag:                                /* prototype tag */
      [0-9A-Z_]{1-16}
proto-params:
      '(' proto-param-list ')'
proto-param-list:
      proto-param
  |   proto-param-list ',' proto-param
proto-param:
      ID '=' rs-prot-id                   /* required */
  |   ALIAS '=' alias-string              /* required */
  |   SUPIDEN '=' supiden                 /* required */
  |   PRIORITY '=' digit[1]               /* optional */
  |   TOLERANCE '=' tol-type              /* optional, default is TSW_Limited
*/
  |   FREEZEINT '=' freeze-time-const[1]  /* optional */
rs-prot-id:
      [A-RT-WY-Z](0[1-9] | [1-9]digit)
supiden:
      [A-Z]digit{4}[A-Z]{2}
digit:
      [0-9]
tol-type:
      TSW_LIMITED
  |   SUB_INT_LIMITED
freeze-time-const:                 /* format is DD/HH:MM */
      digit{2} '/' ([0-1]digit | 2[0-3]) ':' [0-5]digit
service-def-list:
      service-def
  |   service-def-list service-def
service-def:
      fixed-def
  |   var-def
fixed-def:
      FIXED svc-tag fserv-params
var-def:
      VARIABLE svc-tag vserv-params
```

[1] Default is specified in the Default Parameters panel.

```
fserv-params:
      '(' fserv-param-list ')'
vserv-params:
      '(' vserv-param-list ')'
fserv-param-list:
      fserv-param
  |   fserv-param-list ',' fserv-param
vserv-param-list:
      vserv-param
  |   vserv-param-list ',' vserv-param
fserv-param:         /* FIXED service parameters */
      ssc            /* required */
   |  nom-dur        /* required */
   |  min-dur        /* optional, default is nominal duration */
   |  start          /* required if not BOUND; disallowed if BOUND is
                        specified */
   |  plus           /* optional if not BOUND, default is 00:00:00 */
   |  minus          /* optional if not BOUND, default is 00:00:00 */
   |  tsw-set        /* optional[2] */
   |  bound          /* optional; default is not bound; if specified, START,
                        PLUS, and MINUS are not allowed */
 vserv-param:        /* VARIABLE service parameters */
      ssc            /* required */
   |  min-dur        /* optional, default is calculated nominal duration */
   |  start          /* required[3] */
   |  plus           /* optional, default is 00:00:00 */
   |  minus          /* optional, default is 00:00:00 */
   |  tsw-set        /* optional2 */
   |  stop           /* required */
   |  coupled        /* optional, default is uncoupled */
ssc:
      SSC '=' ssc-code
ssc-code:
      [A-Z](0[1-9] | [1-9]digit)
nom-dur:
      NOM_DUR '=' rel-time-expr
min-dur:
      MIN_DUR '=' rel-time-expr
start:
      START '=' abs-time-expr
```

[2] The **TSW_SET** parameter may only be specified if the SSC specifies a "real" service (i.e., MA, SSA, KSA, KaSA, SMA); it is not allowed if the SSC specifies a "parasitic" service (i.e., tracking or simulation).

[3] If the **COUPLED** parameter is also specified , the **START** parameter must be in terms of the referenced service's start time.
Note: the value of the **START** parameter must be greater than the referenced service's start time.

```
plus:
      PLUS '=' rel-time-expr
minus:
      MINUS '=' rel-time-expr
tsw-set:
      TSW_SET '=' tsw-set-id
tsw-set-id:
      '"' [a-zA-Z0-9_]{1-10} '"'    [4]
bound:
      BOUND '=' svc-tag
stop:
      STOP '=' abs-time-expr
coupled:
      COUPLED '=' svc-tag
rel-time-expr:                          /* relative time expression */
      rel-time-term
  |   rel-time-expr '-' rel-time-term
  |   rel-time-expr '+' rel-time-term
rel-time-term:
      rel-time-factor
  |   rel-time-term '/' int-const-term
  |   rel-time-term '*' int-const-term
rel-time-factor:
      rel-time-const
  |   end-pt-spec '-' end-pt-spec
  |   dur-ref
  |   '(' rel-time-expr ')'
abs-time-expr:                          /* absolute time expression */
      end-pt-spec
  |   end-pt-spec '-' rel-time-expr
  |   end-pt-spec '+' rel-time-expr
int-const-term:
      integer-const
  |   digit
integer-const:
      digit{2}
rel-time-const:                         /* format: 00:00:00 to 23:59:59 */
      ([0-1]digit | 2[0-3]) ':' [0-5]digit ':' [0-5]digit
```

[4] The creation of TSW Sets is controlled by the `Create TSWs from`: parameter in the Orbital Parameters panel. If the user has specified TSWs be created from TCW files, a TSW Set ID may be specified by the user (1 - 10 characters, left justified); it will override the default stored in the SSC. If the user has specified TSWs be created from UAVs/PSATs, a TSW SuperSet (***not*** a TSW Set ID) may be specified by the user (1 - 7 characters, left justified). The service type, direction, and antenna gain (total of 3 characters), will automatically be prepended to the specified TSW SuperSet, which will override any default TSW Set ID stored in the SSC.

```
end-pt-spec:
      svc-tag '.' end-pt
  |   proto-tag '.' svc-tag '.' end-pt
  |   tsw-spec '.' end-pt
  |   svc-tag '.' tsw-spec '.' end-pt
  |   proto-tag '.' svc-tag '.' tsw-spec '.' end-pt
dur-ref:                                  /* duration reference */
      svc-tag '.' dur-var
  |   proto-tag '.' svc-tag '.' dur-var
end-pt:
      START
  |   STOP
dur-var:
      NOM_DUR
  |   MIN_DUR
tsw-spec:
      TSW
  |   TSW '[' tdrs-id ']'
comment-type:
      /*... */
```

F.2.3 Additional Language Rules

1. Simulation start and stop times must be wholely contained within the service being simulated.
2. Simulation services must be bound or coupled to a "normal" service.
3. Forward references are not allowed.
4. The minimum duration cannot be greater than the nominal duration.
5. The nominal duration must be at least one minute.
6. If a minimum duration is not specified, it will be set to the nominal duration (whether specified or calculated).
7. RS superprototype IDs and prototype IDs must be unique across the mission; this restriction includes prototype IDs contained within a superprototype as well.
8. Superprototypes will have IDs of S01 thru S99 and X01 thru X99. The Xnn IDs are generated internally when a user creates an RS prototype (not a superprototype). Regular RS prototypes can use any letter except S or X.
9. All SICs, SUPIDENs, TDRS IDs, etc. appearing in the language will be checked against the Mission Setup database for validity. TSW Set IDs should be validated as well. The TSW Set Name parameter is not allowed for parasitic services (simulation, tracking).
10. Despite what is shown in the following examples, the language is case insensitive. Except within quoted strings, all text will be converted to upper case prior to parsing.
11. The “TDRS_IDS” super prototype parameter, cannot reference TDRS Set Names.
12. The referenced and referencing coupled OR bound service must be part of the same prototype.
13. The Nominal Service Start parameter in the SAR will be ignored by the NCCDS if a service is "Bound". If the RS prototype specifies BOUND, the NOMINAL START parameter is not allowed, and will cause the compiler to flag it as an error.
14. If the BOUND parameter is specified, the START, PLUS, and MINUS parameters must not be specified, and will cause the compiler to flag it as an error.
15. If neither the COUPLED nor BOUND parameters are specified in the prototype, when the RSSERVDEFS record is created (by the parser), the DataBase must have a DEFAULT = NOT_BOUND or NOT_COUPLED clause which indicates that the parameter is not used. This is because service indexes stored in the database start at 0. The NOT_BOUND and NOT_COUPLED flags are defined in RsSuperProto.h, and are (currently) set to be a (-1).
16. The value of the START parameter in a service that has the COUPLED parameter specified shall not be earlier than the referenced coupled service. Consider the following example:

FIXED ssafServ (**SSC**=H01, **NOM_DUR**=00:15:30,

START=**TSW.START)**

VARIABLE trkLeft (**SSC**=T01, **COUPLED=**ssafServ,

START=ssafServ.**START** + 00:00:30,

STOP=ssafServ.**STOP,**

MIN_DUR=ssafServ**.MIN_DUR -** 00:00:30)

The second service's start time is valid. However, this stmt is invalid, and should be flagged as an error: **START**=ssafServ.**START** - 00:00:30.

Notes Regarding RS Processing

A. If specified, Plus and Minus tolerance apply to the SAR tolerance type specified (TSW Limited or Sub-Interval limited). Note that TSW_Limited is the default, if nothing is specified.

B. If a prototype specifies a SAR tolerance type of "Sub-Interval Limited", and the TSW Use Mode sub-pattern parameter specifies " Schedule a SAR in each and every TSW", all SARs in the sub-interval will be generated with tolerances of: plus = start time of first TSW in sub-int, and minus = stop time of last TSW in sub-int. See note 14 above for extra plus and minus tolerance values that will be added to the sub-int values.

C. The user must specify the following parameters in the SSC, prior to an RS run, but *not* prior to creating the RS Prototype: the Antenna Gain (Hi or Lo), and the TSW Set ID. These parameters are read from the SSC during the RS run. The full TSW Set ID is expected to be stored in the SSC, not merely the TSW SuperSet (as may be specified in the RS Prototype).

   The TSW SuperSet may contain no more than 7 characters, and is defined in the Define TSW Super Set panel. If the user has indicated PSATs/UAVs will be used to create TSWs (using the Orbital Parameters Panel), either the user or the system (automatically) must propend 3 characters to the TSW SuperSet, and store the entire TSW Set ID into the SSC. The 3 characters are: the service type (e.g., S=SSA, M=MA, K=KSA), antenna gain (e.g., H=high, L=low), and direction (F=fwd, R=rtn). If the user has indicated a TCW file will be used to create TSWs, the user must enter a TSW Set ID that matches with one in the incoming TCW file, into the TSW Set ID field of the SSC.

   Therefore, if the TSW Set Name is specified in the RS Prototype, RS must check the SPCHAR table to see if the TSW Set Name is a TSW Set ID or a TSW SuperSet, and if a SuperSet, add the service type, and direction, then get the gain from the appropriate SSC table (dmaf, dmar, dssf, dssr, etc.).

D. When the COUPLED parameter is specified, the START parameter should be in terms of an offset from the referenced (coupled) service. Since the START parm is required, the user must, **at least**, set it to the start time of the referenced service (e.g., ssafServ.START). Additional time offsets from this may be added or subtracted, multiplied or divided.

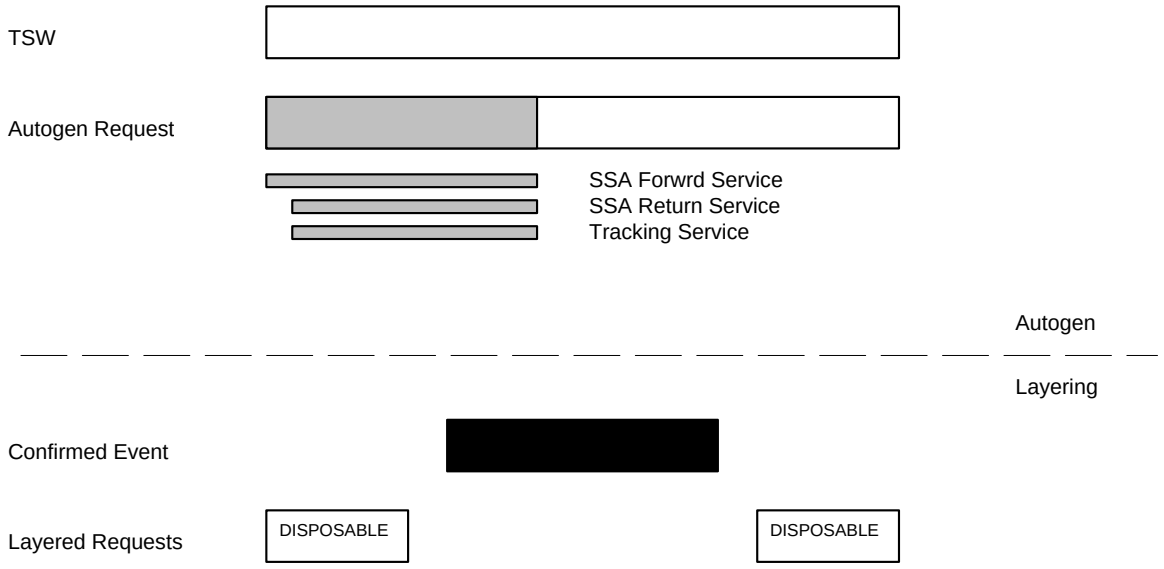


Figure F-1. Example From XTE: SSA Event With MAR Event Scheduled Around the SSA Event

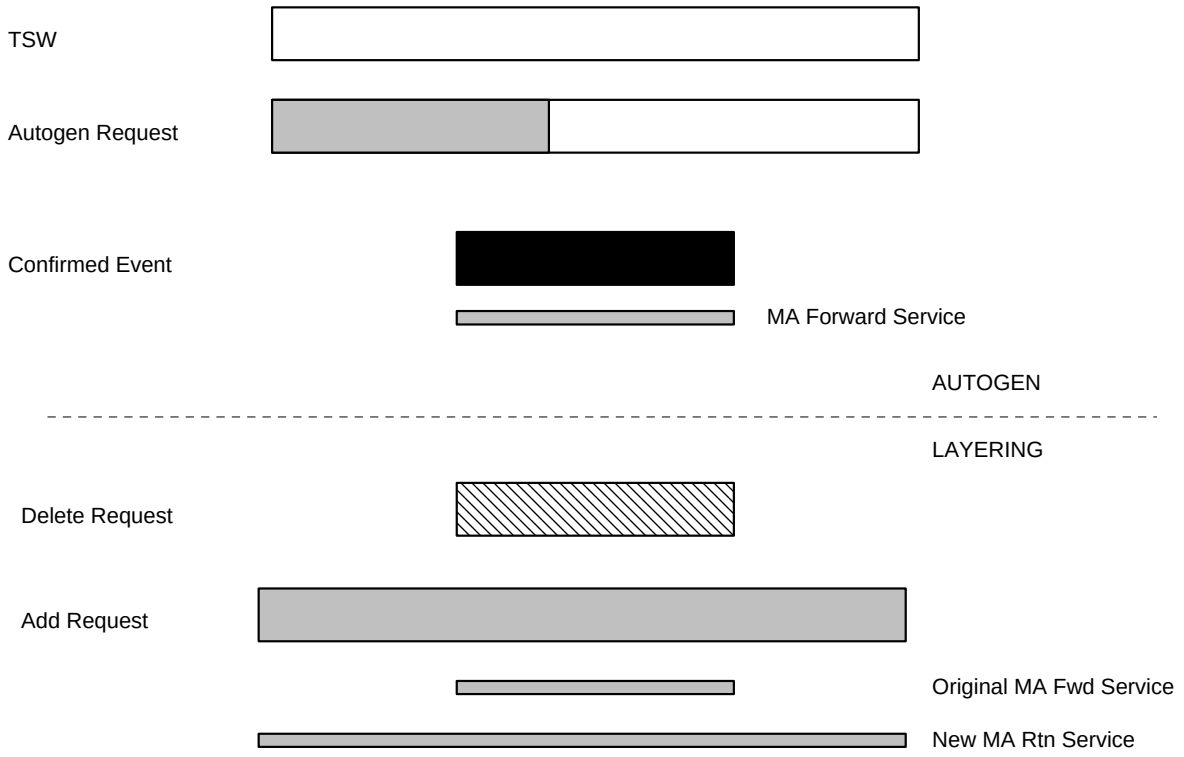


Figure F-2. Example From XTE: MAF Event with MAR Event Scheduled Coincident with the MAF Even

```
prototype (id=P22, alias="xte maf", supiden=A0372MS, type=UPS-AUTOGEN)
{
   variable mar_1 (cc = B01, start = tsw.start + 00:03:00,
                   stop = tsw.stop - 00:03:00, min_duration = 00:05:00)

   variable nrm_1 (cc = T01, start = mar_1.start, stop = mar_1.stop - 00:00:30,
                   min_duration = none)
}
```

Figure F-3. Example From XTE: MAR Event

Appendix G. Recurrent Scheduling Prototype Examples

G.1 General

Following are several RS prototype examples that various missions are using operationally.

G.2 XTE "Schedule Around" Example

```
/* NOTEs:
 *  1. The MA to SA Gap, SA to SA gap, and MA to MA gap specified in NCCDSs
       database is: 10 minutes.
 *  2. The SSA services are specified with a higher customer priority level than the
 *     MAR services, forcing NCCDS to schedule the SSAs first.  If NCCDS schedules
 *     the SSA to either end of the TSW, the MAR minimum duration will force
 *     NCCDS to drop one MAR, and the MA to SA gap will offset the MAR from
 *     the SSAs by the correct amount.
 *  3. If both MARs were requested with the same customer priority, and the SSAs
 *     were scheduled all the way to either end of the TSW, the NCCDS might
 *     schedule both MARs with the MA-to-MA gap between them rather than
 *     scheduling one of them and declining the other, hence one MAR is
 *     requested with a lower customer priority than the other. */

SUPERPROTOTYPE (ID=S01, ALIAS=“super-p”)

{
        PROTOTYPE ssaEvent (ID=R34, ALIAS=“Norm_SSA”,
                                    SUPIDEN=A6581MS,
                                    PRIORITY=4,
                                    FREEZEINT=02/00:00,
                                    TOLERANCE=TSW_LIMITED)
        {
                FIXED ssafServ (SSC = H21,
                        NOM_DUR = 00:20:00,
                        MIN_DUR = 00:15:00,
                        START = TSW.START,
                        PLUS=(TSW.STOP - TSW.START) - ssafServ.MIN_DIR,
                        MINUS = 00:15:00,
                        TSW_SET = "XTEHIGAIN")   /* TSW is from TCW file */

                FIXED ssarServ (SSC = J21, COUPLED=ssafServ,
                        START = ssafServ.START + 00:00:30,
                        NOM_DUR = ssafServ.NOM_DUR - 00:00:30,
                        MIN_DUR = ssafServ.MIN_DUR - 00:00:30,
                        TSW_SET = "XTELOGAIN")   /* TSW is from TCW file */

                FIXED ssaTRK (SSC = T21, BOUND=ssarServ,
                        NOM_DUR = ssarServ.NOM_DUR,
                        MIN_DUR = ssarServ.MIN_DUR)
        }
```

```
    PROTOTYPE marEvent_1 (ID=R35, ALIAS="MARArnd1",
                                SUPIDEN=A6581MS, PRIORITY=5,
                                TOLERANCE=TSW_LIMITED)
    {
        VARIABLE marServ (SSC = B21
            START = TSW.START,
            STOP = TSW.STOP,
            MIN_DUR = 00:10:00,
            PLUS=(TSW.STOP - TSW.START) - marServ.MIN_DUR,
            MINUS = 00:00:00,
            TSW_SET = "XTEMALO")   /* TSW is from TCW file */

        FIXED trk (SSC=T21, BOUND=marServ,
                    NOM_DUR = (marServ.STOP- marServ.START )
                    MIN_DUR = 00:10:00)
    }

    PROTOTYPE marEvent_2 (ID=R36, ALIAS="MARArnd2",
                                SUPIDEN=A6581MS, PRIORITY=6,
                                TOLERANCE=TSW_LIMITED)
    {
        VARIABLE marServ (SSC = B21
            START = TSW.START,
            STOP = TSW.STOP,
            MIN_DUR = 00:10:00,
            PLUS=(TSW.STOP - TSW.START) - marServ.MIN_DUR,
            MINUS = 00:00:00,
            TSW_SET = "XTEMALO")   /* TSW is from TCW file */

        FIXED trk (SSC=T21, BOUND=marServ,
                    NOM_DUR = (marServ.STOP- marServ.START )
                    MIN_DUR = 00:10:00)
    }
}
```

G.3 XTE “Fixed Duration” Example

This prototype is used by the XTE pattern "normops" (see Figure G-1).

```
/*  This is first of two prototypes.  The 2nd is the same, except that

 *  the last tracking service is left out, in case NCC reduces the duration

 *  to below what a 3rd tracking svc could be scheduled. Michelsen 16/11/00

 */

prototype P11nom (id=P11, alias="SSA-norm", supiden=A6581MS)

{
        fixed SSAF (ssc=H01,
                        start=tsw.start + 00:01:00,
                        nom_dur=00:20:00,
                        min_dur=00:15:00,
                        plus = tsw.stop - tsw.start - ssaf.min_dur
                          - 00:01:00)


        variable SSAR (ssc=K01,
                        start=SSAF.start + 00:00:30,
                        stop=SSAF.stop,
                        min_dur=00:14:30,
                        coupled = SSAF)

        variable TRK1 (ssc=T03,
                        start=SSAR.start + 00:00:30,
                        stop =SSAR.start + 00:05:30,
                        coupled = SSAR)

            variable TRK2 (ssc=T03,
                        start=TRK1.start + 00:06:00,
                        stop =TRK1.start + 00:11:00,
                        coupled = TRK1)

        variable TRK3 (ssc=T03,
                        start=TRK2.start + 00:06:00,
                        stop =TRK2.start + 00:11:00,
                        coupled = TRK2)

}
```

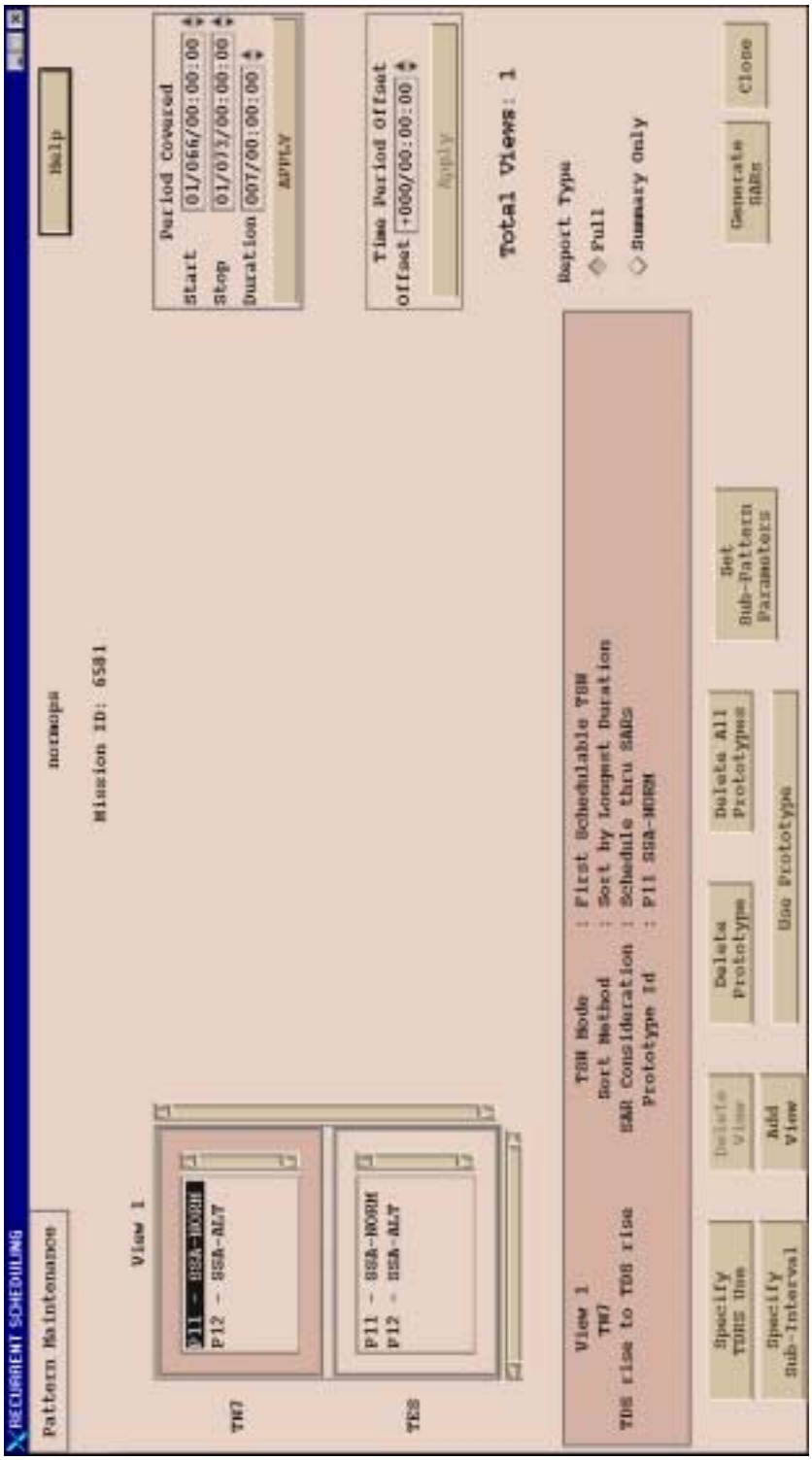


Figure G-1. XTE Recurrent Scheduling Pattern Example

G.4 XTE "Fixed Duration Alternate" Example

This prototype is used by the XTE pattern "normops" (see Figure G-1).

```
/*  This is second of two prototypes.  The 1st is the same, except that

 *  a third tracking service is included as a nominal event.

 *  This prototype assumes that the minimum duration will be used, and hence

 *  only enough time for 2 tracking services.       Michelsen 16/11/00

 */

prototype P11alt (id=P12, alias="SSA-alt", supiden=A6581MS)
{
    fixed    SSAF (ssc=H01,
                    start=tsw.start + 00:01:00,
                    nom_dur=00:20:00,
                    min_dur=00:15:00,
                    plus = tsw.stop - tsw.start - ssaf.min_dur
                      - 00:01:00)

    variable SSAR (ssc=K01,
                    start=SSAF.start + 00:00:30,
                    stop=SSAF.stop,
                    min_dur=00:14:30,
                    coupled = SSAF)

    variable TRK1 (ssc=T03,
                    start=SSAR.start + 00:00:30,
                    stop =SSAR.start + 00:05:30,
                    coupled = SSAR)

    variable TRK2 (ssc=T03,
                    start=TRK1.start + 00:06:00,
                    stop =TRK1.start + 00:11:00,
                    coupled = TRK1)


}
```

G.5 GRO Continuous Coverage Example

```
/* NOTE: NCCDS will handle minimum gap between events.
 *        There is no need to handle here.
          orbUncert="00:01:00"/* can go either way */
*/


SUPERPROTOTYPE (ID=S02,
                    TDRS_IDS=(171, 041))  /* ordered and specific TDRS IDs */
{
    PROTOTYPE marEvent_1 (ID=P34, ALIAS=“MAR-TDW”,
                          SUPIDEN=A1234MS PRIORITY=1,
                          TOLERANCE=TSW_LIMITED)
    {
        VARIABLE marServ(SSC = B21
                    START = TSW[171].START - 00:01:00,
                    STOP = TSW[171].STOP + 00:01:00,
                    MIN_DUR =
                        (TSW[041].START - 00:01:00) - TSW[171].START
    }

    PROTOTYPE marEvent_2 (ID=P35, ALIAS=“MAR-TDE”,
                          SUPIDEN=A1234MS, PRIORITY=1,
                          TOLERANCE=TSW_LIMITED)
    {
        VARIABLE marServ(SSC = B21
                          START = TSW[041].START-orbUncert,
                          PLUS = TSW[171].STOP - TSW[041].START
                          STOP = TSW[171].STOP + 00:01:00,
                          MIN_DUR =    (TSW[041].STOP + 00:01:00)
                                        - (TSW[171].STOP - 00:01:00)
    }
}
```

G.6 Space Shuttle "Early Hand-off" Example

Schedule to TDRS View on 171
Schedule on ANY TDRS = {171, 041}
Stretch to fill
Schedule One In Each TSW (assumes one prototype fits all)
Start tolerances of ±1 minute
Minimum Duration is calculated nominal minus 2 minutes
Select option to sort CTSWs by duration rather than start time
Select option to schedule around all SARs rather than just fixed SARs

G.7 EOS "Nominal and Expanded Alternate" Example

```
/* Assume pattern is "Any TDRS" and "TDRS View (on TDW)".
 * Both may be scheduled, the backup would have to be deleted
 * if and when the primary is confirmed.
 *
 * constants
 * high priority="1"
 * avgOrbDur="00:90:00"
 * primaryTOLERANCE="00:15:00"
 * fallbackTOLERANCE="00:10:00"
*/


SUPERPROTOTYPE (ID=S03)
{
        PROTOTYPE primaryEvent (ID=Q34, ALIAS=“Prim_SSA”,
                        SUPIDEN=A1234MS, PRIORITY=1,
        TOLERANCE=TSW_LIMITED)
        {
                FIXED ssafServ (SSC = H21,
                        NOM_DUR = 00:15:00,
                        MIN_DUR = 00:12:00,
                        START = TSW.START,
                        PLUS=00:05:00, MINUS = 00:00:00
        }
        PROTOTYPE backupEvent (ID=Q35, ALIAS=“Back-SSA”,
                                        SUPIDEN=A1234MS, PRIORITY=1,
                        TOLERANCE=TSW_LIMITED)
        {
                FIXED ssafServ (SSC = H21,
                        NOM_DUR = 00:30:00,
                        MIN_DUR = 00:25:00,
                        START =  (00:90:00 / 2) - (NOM_DUR  / 2),
                        PLUS = 00:30:00 - 00:25:00 /* NOM_DUR - MIN_DUR */,
                        MINUS = 00:45:00 - 00:30:00 /* MAX_DUR - NOM_DUR */
        }

}
```

G.8 UARS "15.5 Minute Any TDRS" Example

One goal is to get a 15.5 minute event in sun if possible with an alternate in up to 5 minutes in shade. The other goal is to have a maximum of 90 mins. between events.

```
/* The two prototypes would be in the "ANY"/"Orbit 1" cell of the
 * normal operations pattern (really the only in the pattern matrix) as a
 * primary and an alternate.
 * Constant   ssaInwardTol = 00:05:00
 */
SUPERPROTOTYPE (ID=S05)
{
        PROTOTYPE Primary (ID=Z34, ALIAS="In Sun", SUPIDEN=A1234MS,
                PRIORITY=1,TOLERANCE=SUB_INT_LIMITED)
        {
                FIXED ssafServ (SSC=H01, NOM_DUR=00:15:30,
                                MIN_DUR=00:15:30,
                                START=TSW.START,
                                MINUS=00:00:00,
                                PLUS=00:05:00,
                                TSW_SET="All Sun")

                VARIABLE trkLeft (SSC=T01, COUPLED=ssafServ,
                                START=ssafServ.START + 00:00:30,
                                STOP=ssafServ.STOP,
                                MIN_DUR=ssafServ.MIN_DUR-00:00:30)
        }

        PROTOTYPE Alternate (ID=Z35, ALIAS="Part Sun",
                        SUPIDEN=A1234MS, PRIORITY=1,
                        TOLERANCE=SUB_INT_LIMITED)
        {
                FIXED ssafServ (SSC=H01, NOM_DUR=00:15:30,
                                MIN_DUR=00:15:30,
                                START=TSW.START,
                                MINUS=00:00:00,
                                PLUS=00:05:00,
                                TSW_SET="Some Sun")

                VARIABLE trkLeft (SSC=T01, COUPLED=ssafServ,
                                START=ssafServ.START + 00:00:30,
                                STOP=ssafServ.STOP,
                                MIN_DUR=ssafServ.MIN_DUR-00:00:30)
        }
}
```

G.9 UARS “MA Full View” Example

This prototype is used by the UARS pattern "MA Full View" (see Figure G-2).

```
prototype A01evt (id=A01, alias="ma-norm", supiden=A3782MS)

{
 variable MAF (ssc=A01,
                    start=tsw.start + 00:00:00,
                    stop =tsw.stop,
                    min_dur=00:10:00)

      variable MAR (ssc=B04,
                    start=MAF.start + 00:00:30,
                    stop= MAF.stop,
                    min_dur=00:09:30)

      variable TRK (ssc=T04,
                    start=MAR.start + 00:00:01,
                    stop= MAR.stop,
                    min_dur=00:09:29)
```

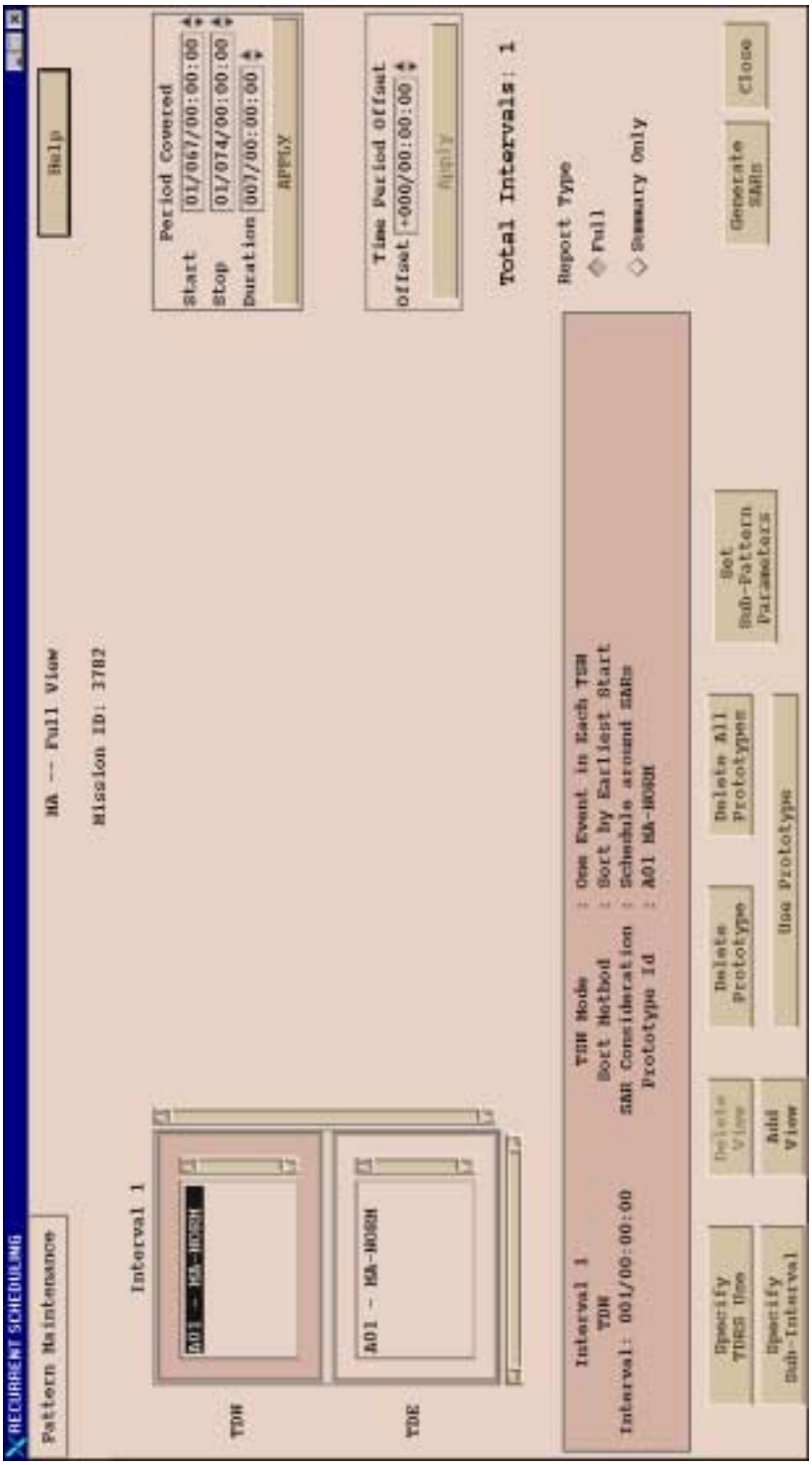


Figure G-2. TRMM Recurrent Scheduling Pattern Example

G.10 HST "SSA At Start and End of Continuous MAR" Example

```
/*  CONSTANT
 *   high="1"
 *   ssaInwardTol="00:05:00"
 *   ssaNomDur="00:15:00"   ssaMinDur="00:12:00"   marMinDur="00:20:00"
 *   ssaFwdRetOffset="00:00:30"
*/


PROTOTYPE Event1 (ID=Y34, ALIAS=“MAR-TDW”,
                                SUPIDEN=A1446, PRIORITY=1,
                                TOLERANCE=TSW_LIMITED)
{
                FIXED ssafLeft (SSC=H01, NOM_DUR=00:15:00, /* ssaNomDur */
                                MIN_DUR=00:12:00,          /* ssaMinDur */
                                START=TSW.START,
                                MINUS=00:00:00,
                                PLUS=00:05:00)                /* ssaInwardTol */
                VARIABLE ssarLeft (SSC=J01, COUPLED= ssafLeft,
                                START=ssafLeft.START+00:00:30,
                                STOP=ssafLeft.STOP, MIN_DUR=00:15:00)
                VARIABLE trkLeft (SSC=T01, COUPLED=ssarLeft,
                                START=ssarLeft.START, STOP=ssarLeft.STOP,
                                MIN_DUR=ssaMinDur)
                FIXED ssafRight (SSC=H02, NOM_DUR=00:15:00,
                                MIN_DUR=00:12:00,
                                START= TSW.STOP-00:15:00 /*ssaNomDur */,
                                MINUS=00:05:00 /* ssaInwardTol */,
                        PLUS=(00:15:00-00:12:00)  /*ssaNomDur - ssaMinDur */
                VARIABLE ssarRight (SSC=J01, COUPLED= ssafRight,
                                  START=ssafRight.START+00:00:30,
                                  STOP=ssafRight.STOP,MIN_DUR=00:12:00)
                VARIABLE trkRight (SSC=T01, COUPLED= ssarRight,
                                 START=ssarRight. STOP=ssarRight.STOP,
                                MIN_DUR=00:12:00  /* ssaMinDur */)
                VARIABLE marServ (SSC = B21,
                                 START = TSW.START, STOP = TSW.STOP,
                                MIN_DUR=00:20:00   /* marMinDur */)
}
```

G.11 HST "Vision 2000" Example

Vision 2000 has the following requirements for each 8 hour period:

1. One High-gain antenna 20 minute SSA event combined with a full-view MAR service.
2. One Low-gain antenna 20 minute SSA event combined with a full-view MAR service.
3. A full-view MAR event for all the rest of the TDRS views for the entire 8 hour period.
4. It doesn't matter where the events are scheduled within the 8 hour time period.

The patterns below correspond to the SARs described above, numbers 1-3:

1. By Time, 8 hours, Any TDRS, First schedulable TSW, Schedule Around (doesn't really matter), Prototype uses tolerances stretching to subinterval.
2. By Time, 8 hours, Any TDRS, First schedulable TSW, Schedule Through (does matter, since we want to allow NCCDS to slide this or above SAR anywhere within 8 hour period), Prototype uses tolerances stretching to subinterval.
3. By Time, 8 hours, Any TDRS, Each and Every TSW, Schedule Through (we want to allow NCCDS to slide these SARs anywhere within 8 hour period), Prototype uses tolerances to TSW only.

```
/*
* CONSTANT
*    high="1"
*    ssaInwardTol="00:05:00"
*    ssaNomDur="00:20:00"        ssaMinDur="00:15:00"   marMinDur="00:20:00"
*    ssaFwdRetOffset="00:00:30"
*/

PROTOTYPE Event1 (ID=K01, ALIAS=“HGA-1”,
                  SUPIDEN=A1446MS, PRIORITY=1,
                  TOLERANCE=SUB_INT_LIMITED)
{
        FIXED ssafServ (SSC=H01, NOM_DUR=00:20:00 /* ssaNomDur */,
                        MIN_DUR=00:15:00 /* ssaMinDur */,
                        START=TSW.START,
                        PLUS=00:05:00 /* ssaInwardTol */)
        VARIABLE ssarServ (SSC=J01, COUPLED= ssafLeft,
                        START=ssafLeft.START+00:00:30,
                        STOP=ssafLeft.STOP, MIN_DUR=00:15:00)
        VARIABLE trkServ (SSC=T01, COUPLED=ssarLeft,
                        START=ssarLeft.START, STOP=ssarLeft.STOP,
                        MIN_DUR=00:15:00)

        VARIABLE marServ (SSC = B21,
                         START = TSW.START,
                         STOP = TSW.STOP,
                        MIN_DUR=00:20:00 /* marMinDur */)
```

G.12 TRMM “Fixed Duration” Example

This prototype is used by the TRMM pattern "normops" (see Figure G-3).

```
prototype Q01evt (id=Q01, alias = "NmSA_Co" ,supiden=A0338MS)
{


        fixed ssaf (ssc=H01, start = tsw.start + 00:07:00,
                nom_dur = 00:20:00,
                        min_dur= 00:14:00,
                plus = (tsw.stop - tsw.start) - ssaf.nom_dur
                  - 00:07:00,  /* minus the Plus offset */
                minus = 00:04:00)

        variable ssar (ssc=J01, start = ssaf.start + 00:00:30,
                        stop = ssaf.stop,
                        min_dur = 00:13:30,
                 coupled = ssaf)

        variable trk (ssc=T01, start = ssar.start + 00:00:30,
                      stop = ssaf.stop,
                 coupled = ssar,
                        min_dur = 00:13:00)

}
```

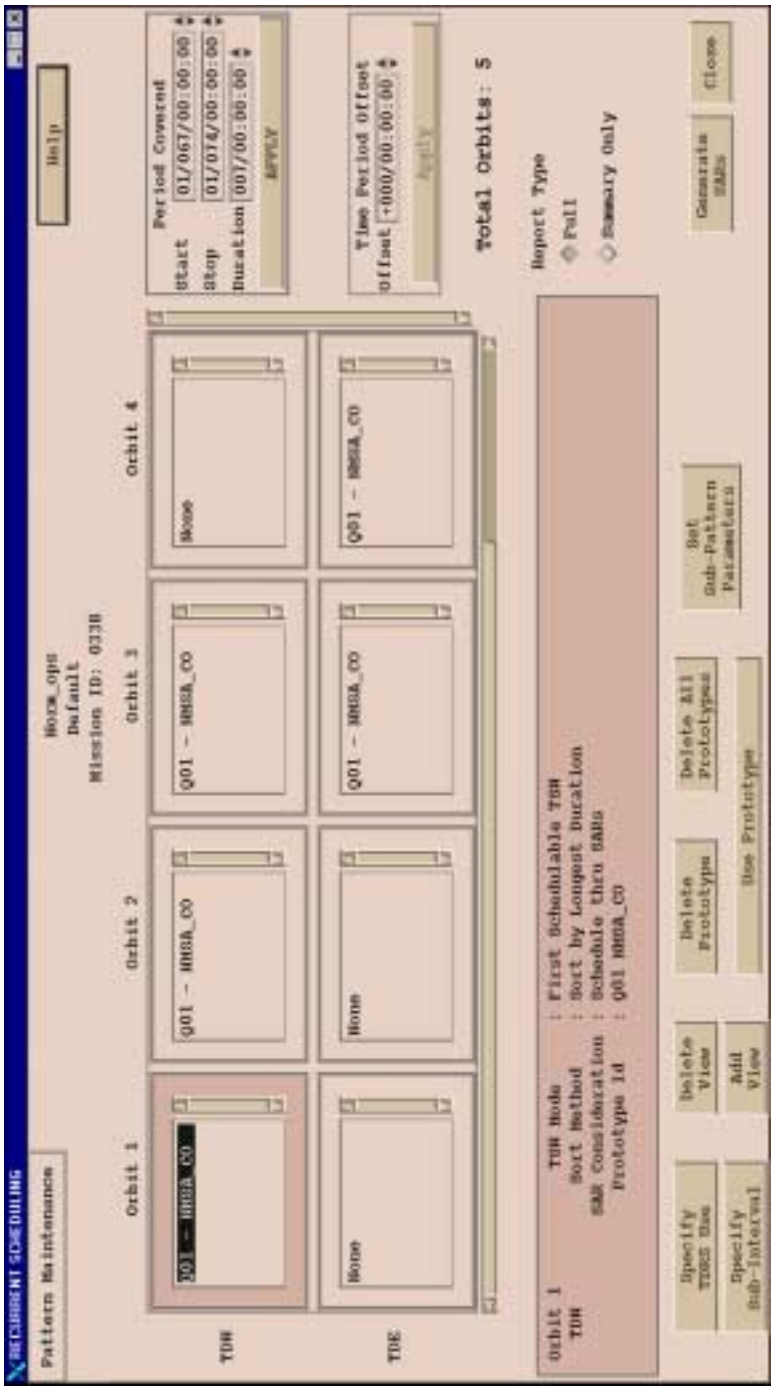


Figure G-3. TRMM Recurrent Scheduling Pattern Example

G.13 ERBS "Coherent MA" Example

This prototype is used by the ERBS pattern "AM Coherent" (see Figure G-4) and the ERBS pattern "PM Coherent" (see Figure G-5).

```
/*  The freeze interval is required to work around a problem with NCC
 *  reducing only some of the service times.
 */

PROTOTYPE CohMA (ID=B10, ALIAS="MA-Coh", SUPIDEN=A1398MS,
  TOLERANCE=TSW_LIMITED, FREEZEINT=12/00:00)
{
    FIXED     MAF (SSC=A01,
              START=TSW.START + 00:00:00,
              NOM_DUR = 00:30:00,
              MIN_DUR = 00:12:00,
              PLUS = TSW.STOP - TSW.START - MAF.MIN_DUR)

    VARIABLE  MAR (SSC=B10,
              START=MAF.START + 00:00:30,
              STOP=MAF.STOP,
              MIN_DUR = 00:11:30,
              COUPLED = MAF)

    VARIABLE  TRK (SSC=T88,
              start=MAR.START + 00:00:10,
              stop = MAR.STOP,
              min_dur = 00:11:20,
              coupled = MAR)

}
```

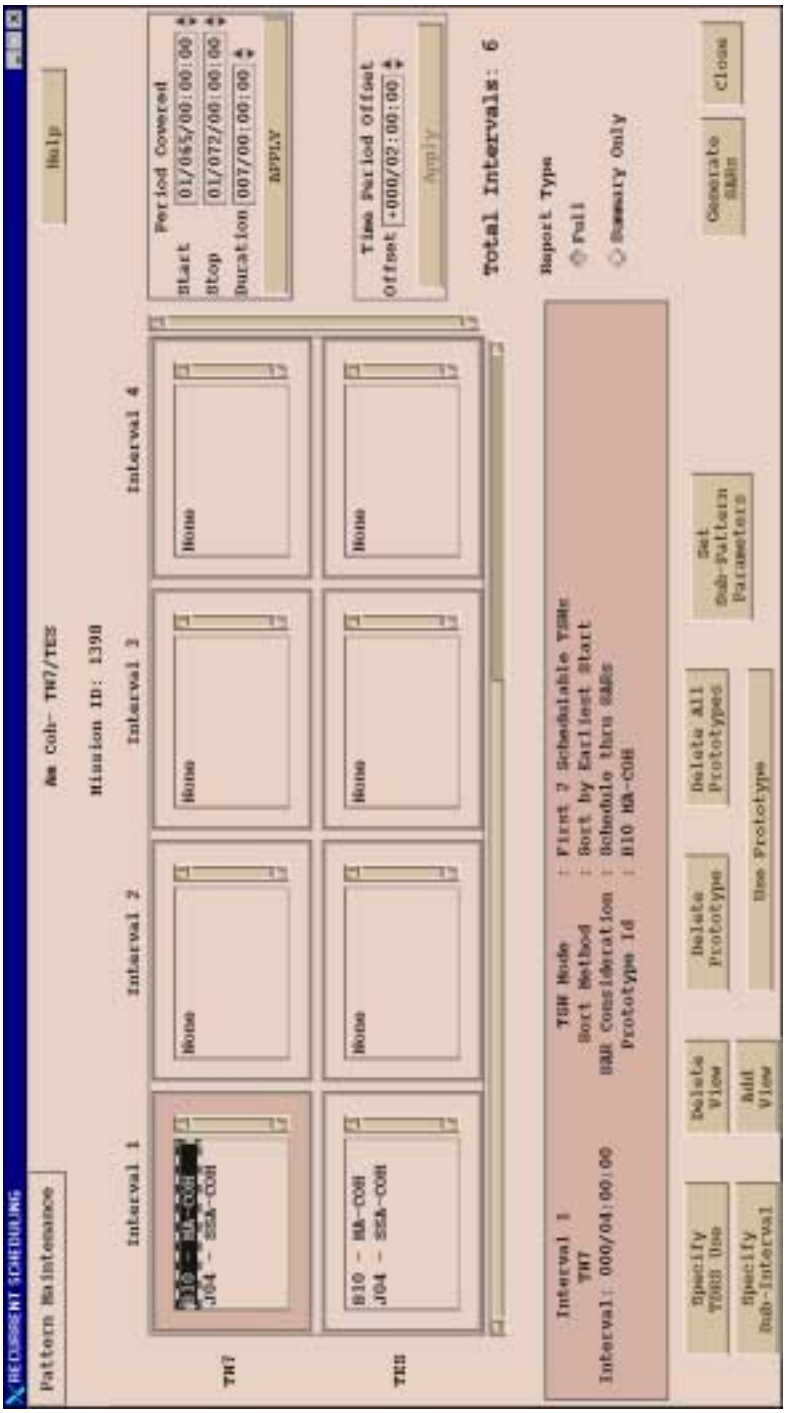


Figure G-4. ERBS AM Coherent Recurrent Scheduling Pattern Example

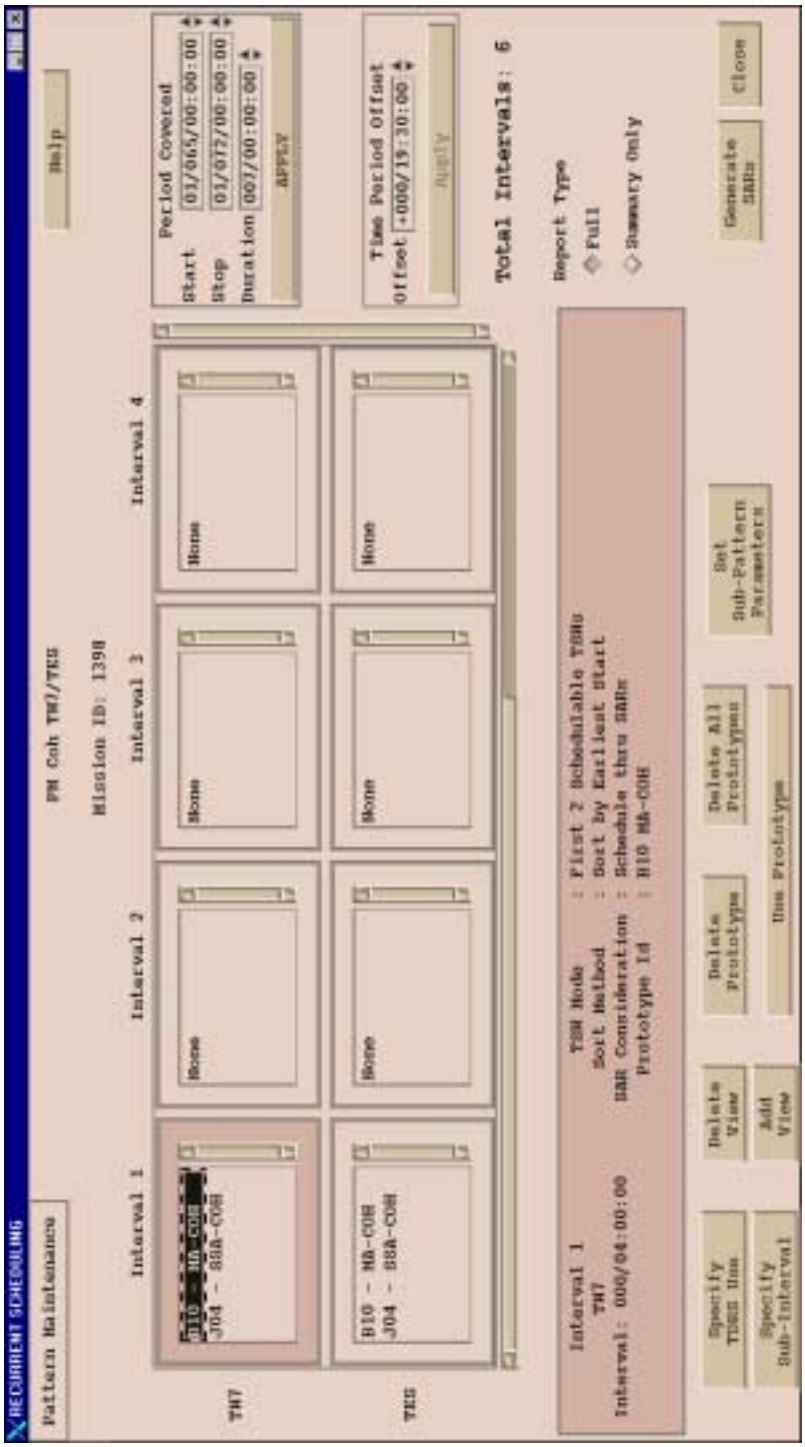


Figure G-5. ERBS PM Coherent Recurrent Scheduling Pattern Example

G.14 ERBS "Coherent SSA" Example

This prototype is used by the ERBS pattern "AM Coherent" (see Figure G-4) and the ERBS pattern "PM Coherent" (see Figure G-5).

```
/*  The freeze interval is required to work around a problem with NCC
 *  reducing only some of the service times.
 *
 *  This prototype is used as an alternate.
 */

PROTOTYPE CohSSA (ID=J04, ALIAS="SSA-Coh", SUPIDEN=A1398MS,
  TOLERANCE=TSW_LIMITED, FREEZEINT=12/00:00)
{
    FIXED    SSAF (SSC=H01,
                START=TSW.START + 00:00:00,
                NOM_DUR = 00:30:00,
                MIN_DUR = 00:12:00,
                PLUS = TSW.STOP - TSW.START - SSAF.MIN_DUR)

    VARIABLE SSAR (SSC=J04,
                START=SSAF.START + 00:00:30,
                STOP=SSAF.STOP,
                MIN_DUR = 00:11:30,
                COUPLED = SSAF)

    VARIABLE  TRK (SSC=T35,
                start=SSAR.START + 00:00:10,
                stop = SSAR.STOP,
                min_dur = 00:11:20,
                coupled = SSAR)

}
```

G.15 ERBS "NonCoherent MA" Example

This prototype is used by the ERBS pattern "NonCoherent" (see Figure G-6).

```
/*  The freeze interval is required to work around a problem with NCC
 *  reducing only some of the service times.
 */

PROTOTYPE NonCohMA (ID=B20, ALIAS="MA-NCoh", SUPIDEN=A1398MS,
  TOLERANCE=TSW_LIMITED, FREEZEINT=12/00:00)
{
     FIXED     MAF (SSC=A01,
                START=TSW.START + 00:00:00,
                NOM_DUR = 00:30:00,
                MIN_DUR = 00:12:00,
                PLUS = TSW.STOP - TSW.START - MAF.MIN_DUR)

     VARIABLE  MAR (SSC=B20,
                START=MAF.START + 00:00:30,
                STOP=MAF.STOP,
                MIN_DUR = 00:11:30,
                COUPLED = MAF)

     VARIABLE  TRK (SSC=T89,
                start=MAR.START + 00:00:10,
                stop = MAR.STOP,
                min_dur = 00:11:20,
                coupled = MAR)

}
```

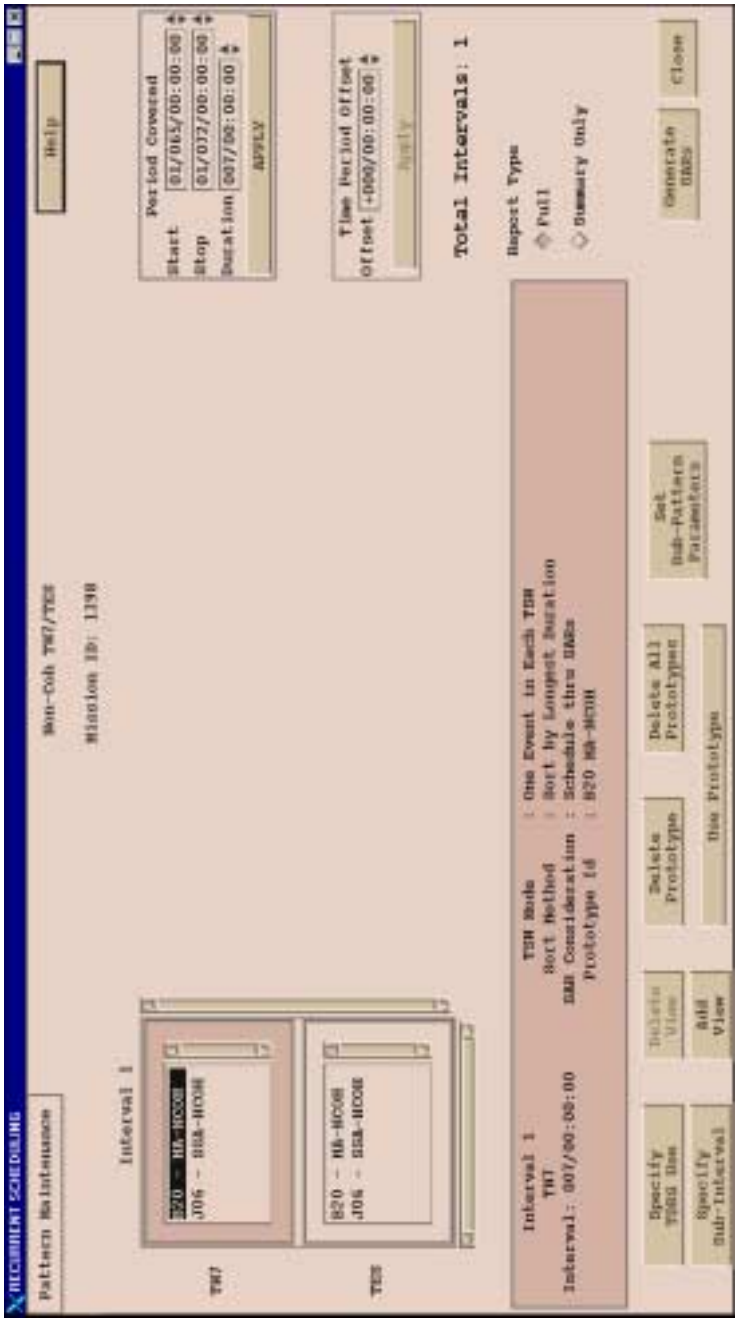


Figure G-6. ERBS Non Coherent Recurrent Scheduling Pattern Example

G.16 ERBS "NonCoherent SSA" Example

This prototype is used by the ERBS pattern "NonCoherent" (see Figure G-6).

```
/*  The freeze interval is required to work around a problem with NCC
 *  reducing only some of the service times.
 *
 *  This prototype is used as an alternate.
 */

PROTOTYPE NonCohSSA (ID=J06, ALIAS="SSA-NCoh", SUPIDEN=A1398MS,
  TOLERANCE=TSW_LIMITED, FREEZEINT=12/00:00)
{
    FIXED    SSAF (SSC=H01,
              START=TSW.START + 00:00:00,
              NOM_DUR = 00:30:00,
              MIN_DUR = 00:12:00,
              PLUS = TSW.STOP - TSW.START - SSAF.MIN_DUR)

    VARIABLE SSAR (SSC=J06,
              START=SSAF.START + 00:00:30,
              STOP=SSAF.STOP,
              MIN_DUR = 00:11:30,
              COUPLED = SSAF)

    VARIABLE  TRK (SSC=T37,
              start=SSAR.START + 00:00:10,
              stop = SSAR.STOP,
              min_dur = 00:11:20,
              coupled = SSAR)

}
```

Appendix H. Abbreviations and Acronyms

Acronym	Definition
ANSI	American National Standards Institute
BNF	Bachus-Naur format
BSD	Berkeley Software Distribution
CC	configuration code
CMS	Command Management System
COBE	Cosmic Background Explorer
CTM	communication test message
DCN	documentation change notice
DG	data group
DOD	Department of Defense
EIRP	effective isotropic radioactive power
ESC	escape
FDD	Flight Dynamics Division
FDF	Flight Dynamics Facility
FTP	file transfer protocol
GSFC	Goddard Space Flight Center
GUI	graphical user interface
G/T	gain temperature
GTV	generic TDRS views
ICD	interface control document
ID	identification
IEEE	Institute of Electrical and Electronics Engineers
KH	Ku-band single access high frequency
KL	Ku-band single access low frequency
KSA	K-band single access
LAN	local area network
MA	multiple access (antenna)

MAF	multiple access forward
MAR	multiple access return
MH	S-band multiple access high frequency
MIT	Massachusetts Institute of Technology
ML	S-band multiple access low frequency
MO&DSD	Mission Operations and Data Systems Directorate
MODNET	MO&DSD Operational/Development Network
MPF	multipath fringe
MWM	Motif window manager
NASA	National Aeronautics and Space Administration
Nascom	NASA Communications
NCC	Network Control Center Data System
NCCDS	Network Control Center Data System
OSF	Open Software Foundation
PDL	Program Design Language
PE	prototype events
PN	pseudorandom noise
POCC	Payload Operations Control Center
PSAT	predicted site acquisition table
RDBMS	relational database management system
RF	radio frequency
RFI	radio frequency interference
RS	recurrent scheduling
SA	single access
SAA	South Atlantic Anomaly
SAR	schedule add request
SDN	schedule delete notification
SDR	schedule delete request
SH	S-band single access high frequency
SIC	spacecraft identification code

SL	S-band single access low frequency
SN	Space Network
SQL	structured query language
SRM	schedule result message
SSA	S-band single access
SSC	service specification code
STDN	Spaceflight Tracking and Data Network
STGT	Second TDRSS Ground Terminal
SUPIDEN	support identification code
SVID	System V Interface Definition
TAE	transportable applications environment
TCP/IP	Transmission Control Protocol/Internet Protocol
TCW	TDRS communication window
TDE	TDRS East
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System
TDS	TDRS Spare
TDW	TDRS West
TSW	TDRS scheduling window
TUT	TDRS unscheduled time
UARS	Upper Atmosphere Research Satellite
UAV	user antenna view
UPS	User Planning System
USM	user schedule message
VIC	vehicle identification code
VID	vehicle identification
WSGT	White Sands Ground Terminal
ZOE	zone of exclusion

Appendix I. References

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