Efficiently Allocating Resources

Market-Based Systems

A Three Phased Development Approach for the Web-Based DSN Resource Allocation Tool

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Agenda

I. Web-Based DSN Tool- Functional Description
II. Flow Chart (Phases 1, 2, & 3)
III. Possible Implementation Approach
IV. DSN Scheduling Input Format

Web-Based DSN Resource Allocation Tool Task

Functional Description

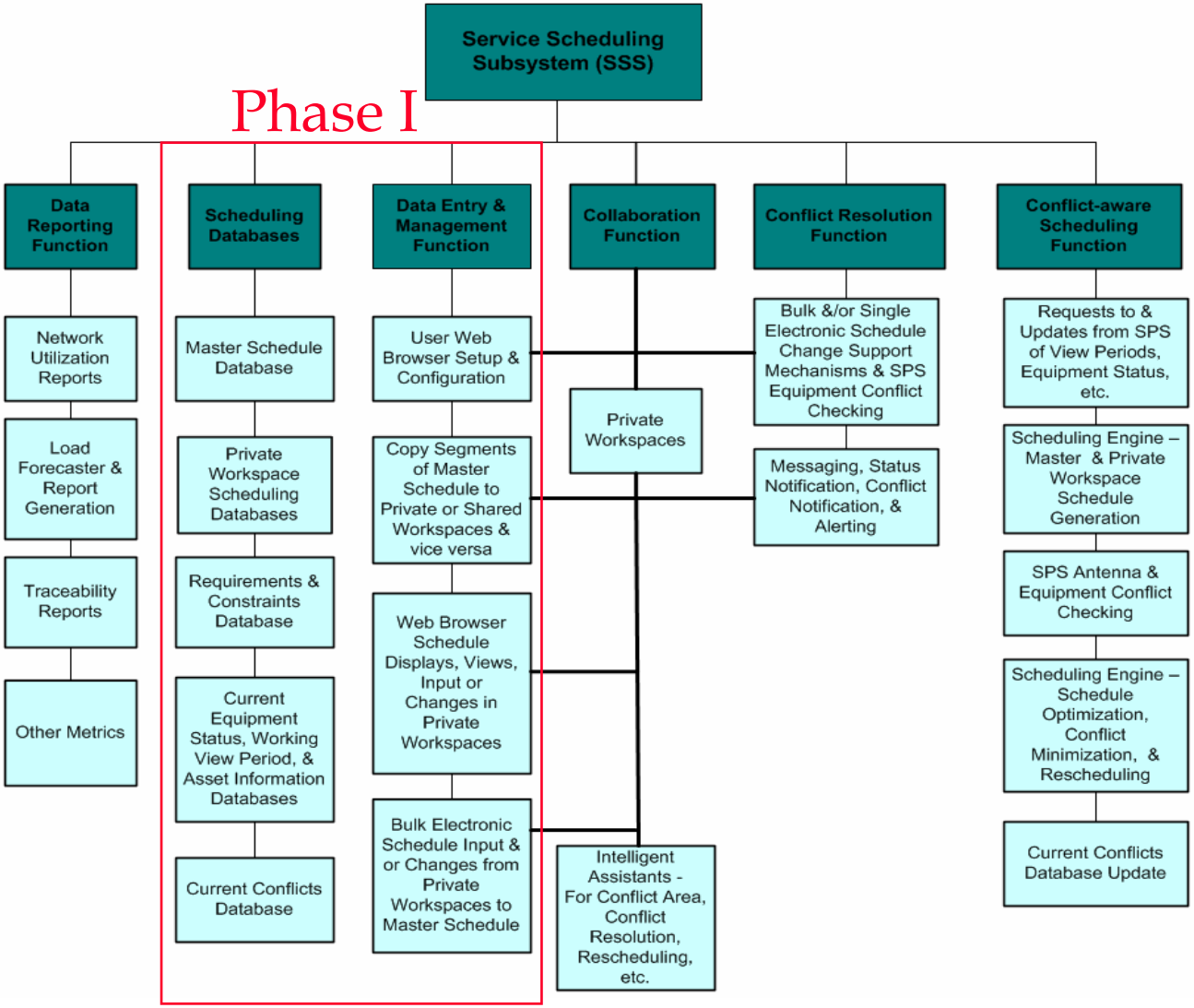

Figure 4-1 from 827-114 SSS Ops Concept Draft

Web-Based DSN Resource Allocation Tool Task

Functional Description

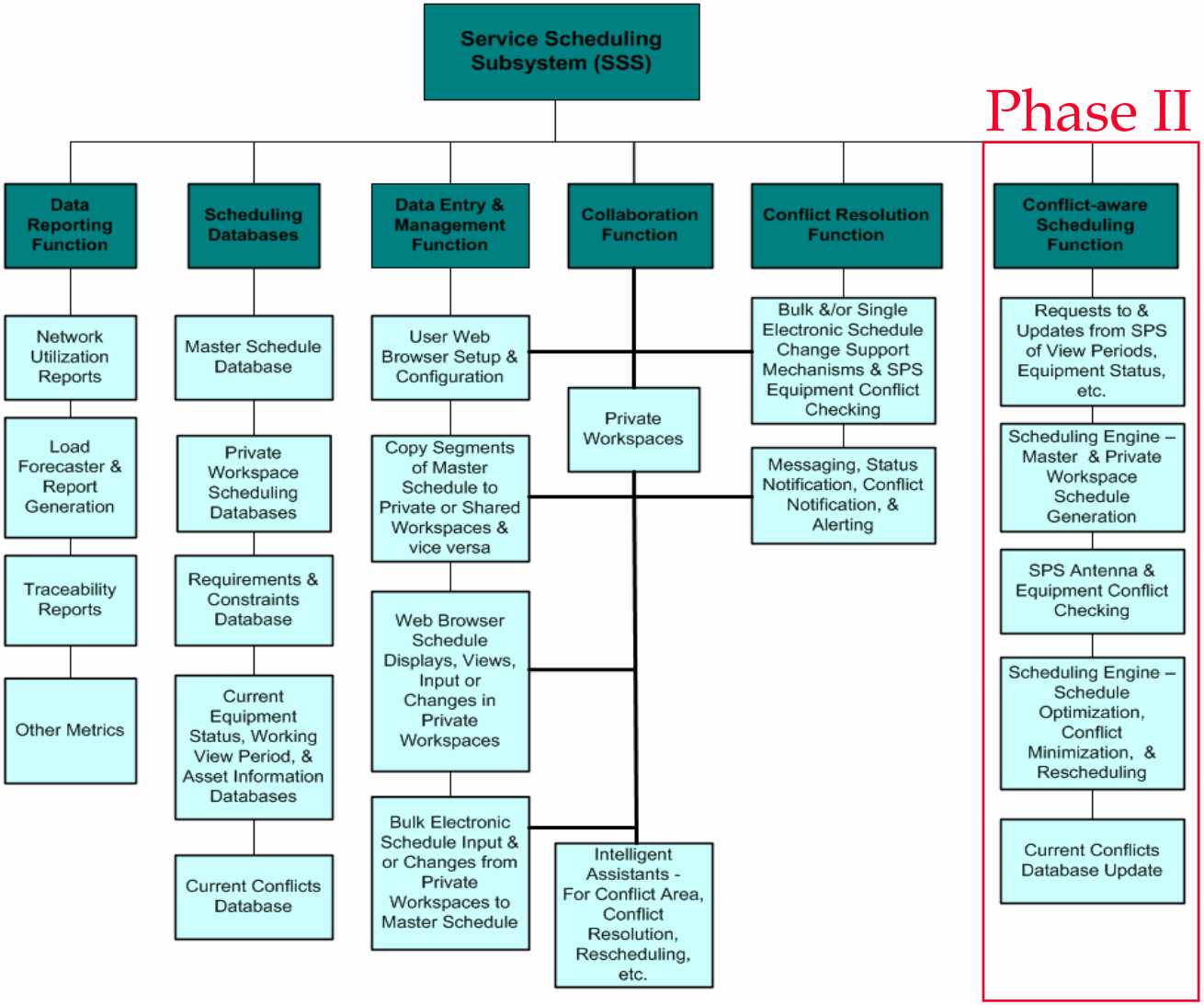

Figure 4-1 from 827-114 SSS Ops Concept Draft

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Web-Based DSN Resource Allocation Tool Task

Functional Description

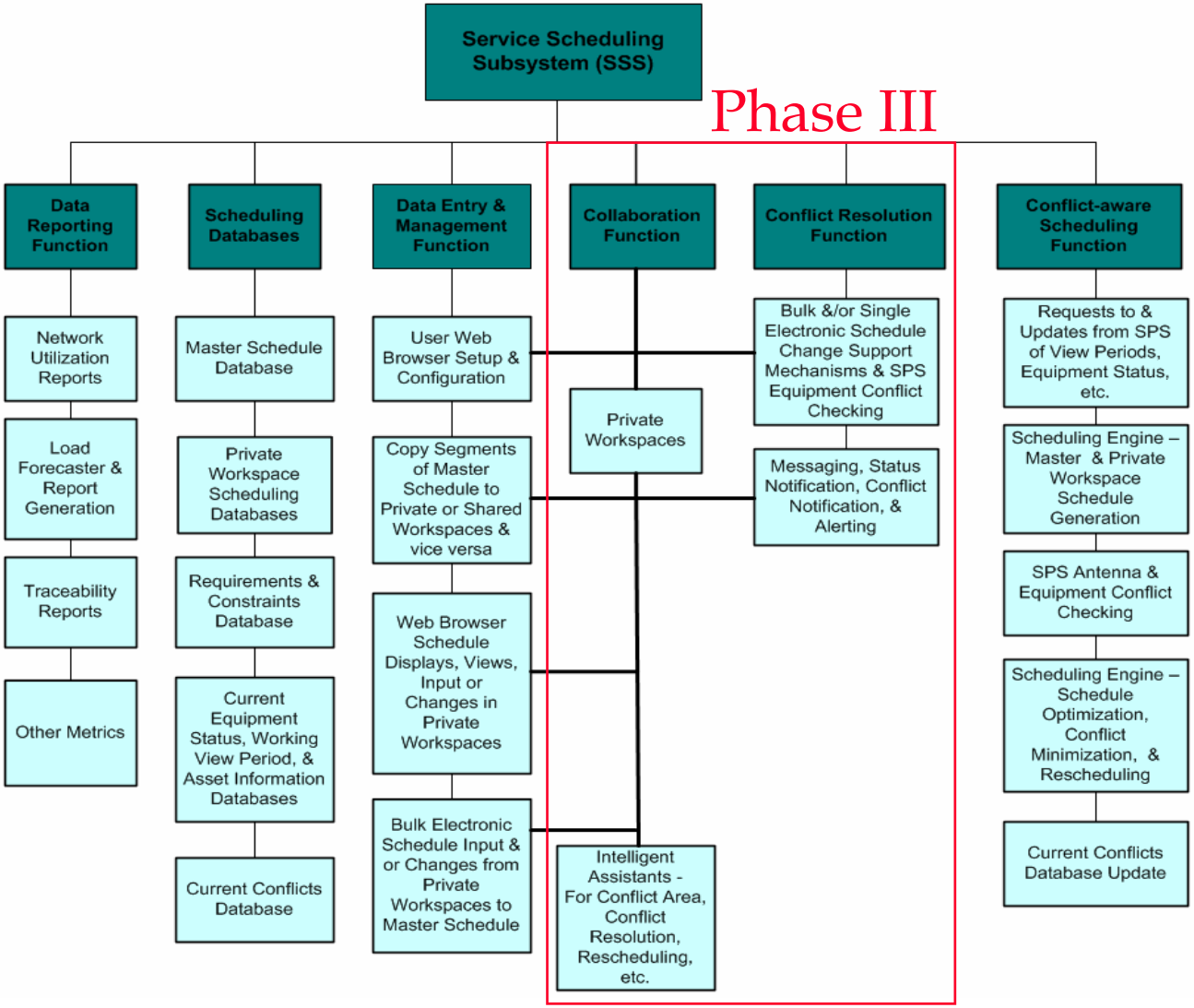
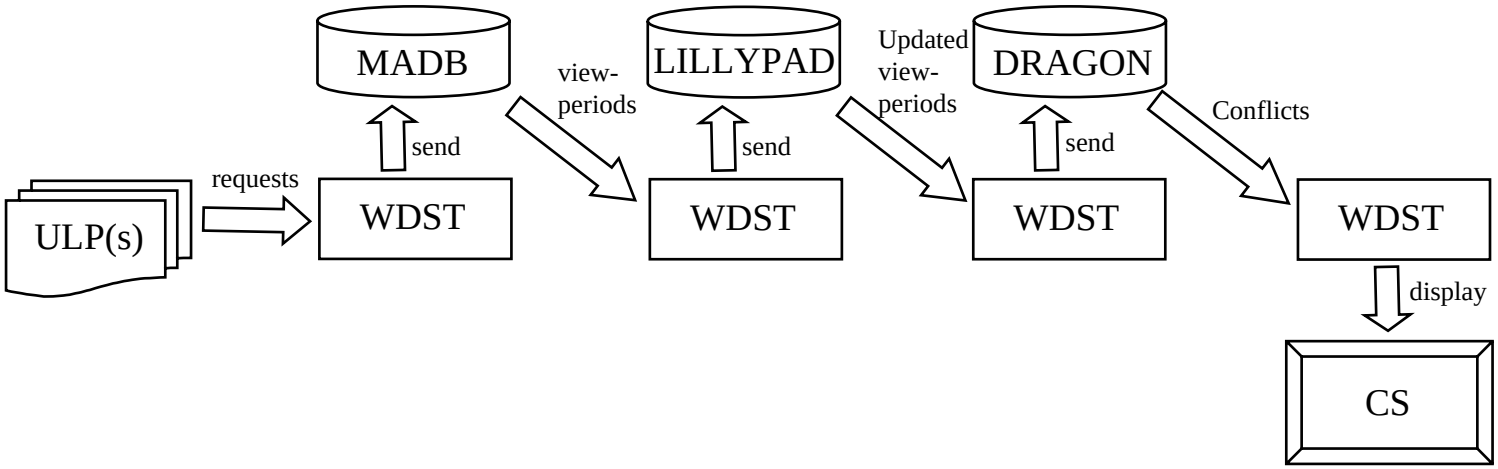


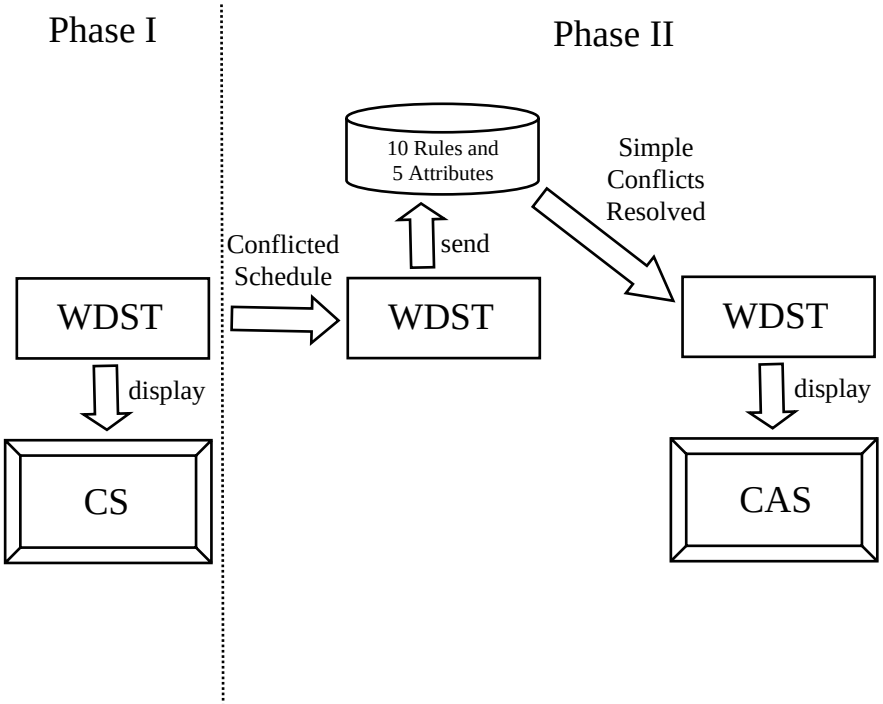
Figure 4-1 from 827-114 SSS Ops Concept Draft

Phase I:
Electronic Display of Conflicted Schedule



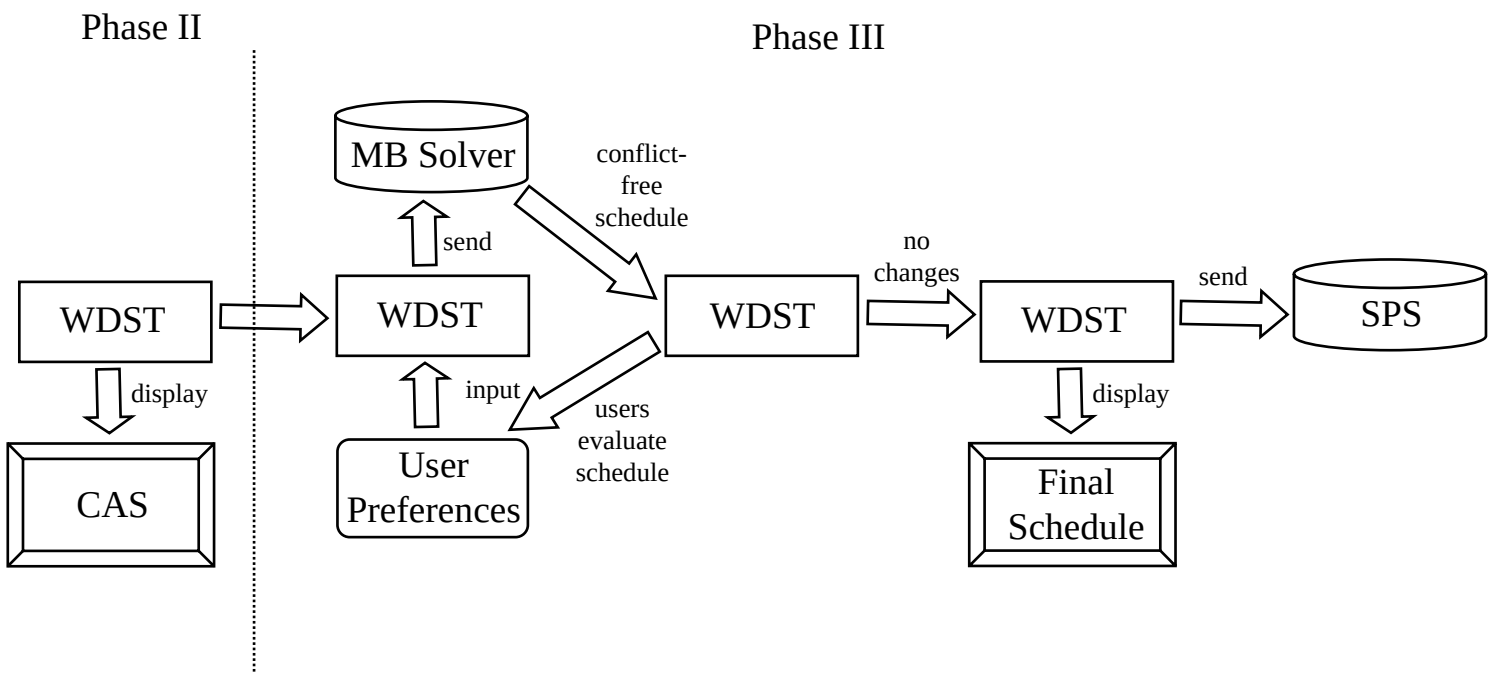
CS - Conflicted Schedule
DRAGON - DSMS S/W Tool for Identifying Conflicts
LILLYPAD - DSMS S/W Tool for Obtaining Higher Fidelity View-Periods
MADB - Mission Asset Database (DSMS S/W Tool for Obtaining View-Periods)
ULP - User Loading Profile
WDST - Web-Based DSN Scheduling Tool

Phase II: Electronic Display of Conflict-Aware Schedule



CAS - Conflict-Aware Schedule
CS - Conflicted Schedule
ULP - User Loading Profile
WDST - Web-Based DSN Scheduling Tool

Phase III: Electronic Display of Conflict-Free Schedule



CAS - Conflict-Aware Schedule
MB Solver - Market-Based Solving for Producing Conflict-Free Schedules
SPS - Service Preparation Subsystem (DSMS S/W Tool)
ULP - User Loading Profile
WDST - Web-Based DSN Scheduling Tool

Possible Implementation Approach

Step 1: Add a Mission

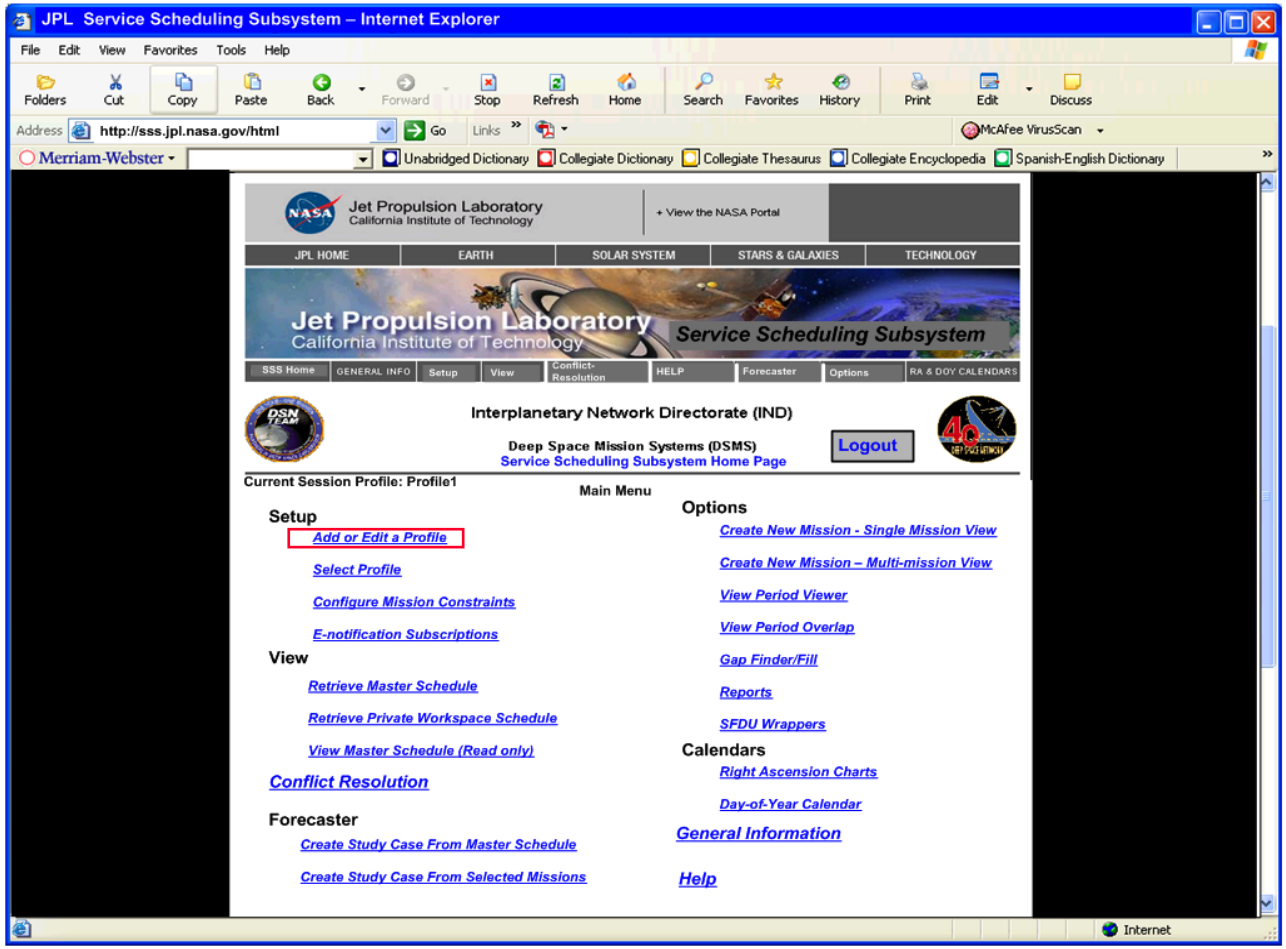


Figure 6-14 from A Straw Man Deep Space Network (DSN) Scheduling System page 6-14

Possible Implementation Approach

Step 2: Input Mission Name

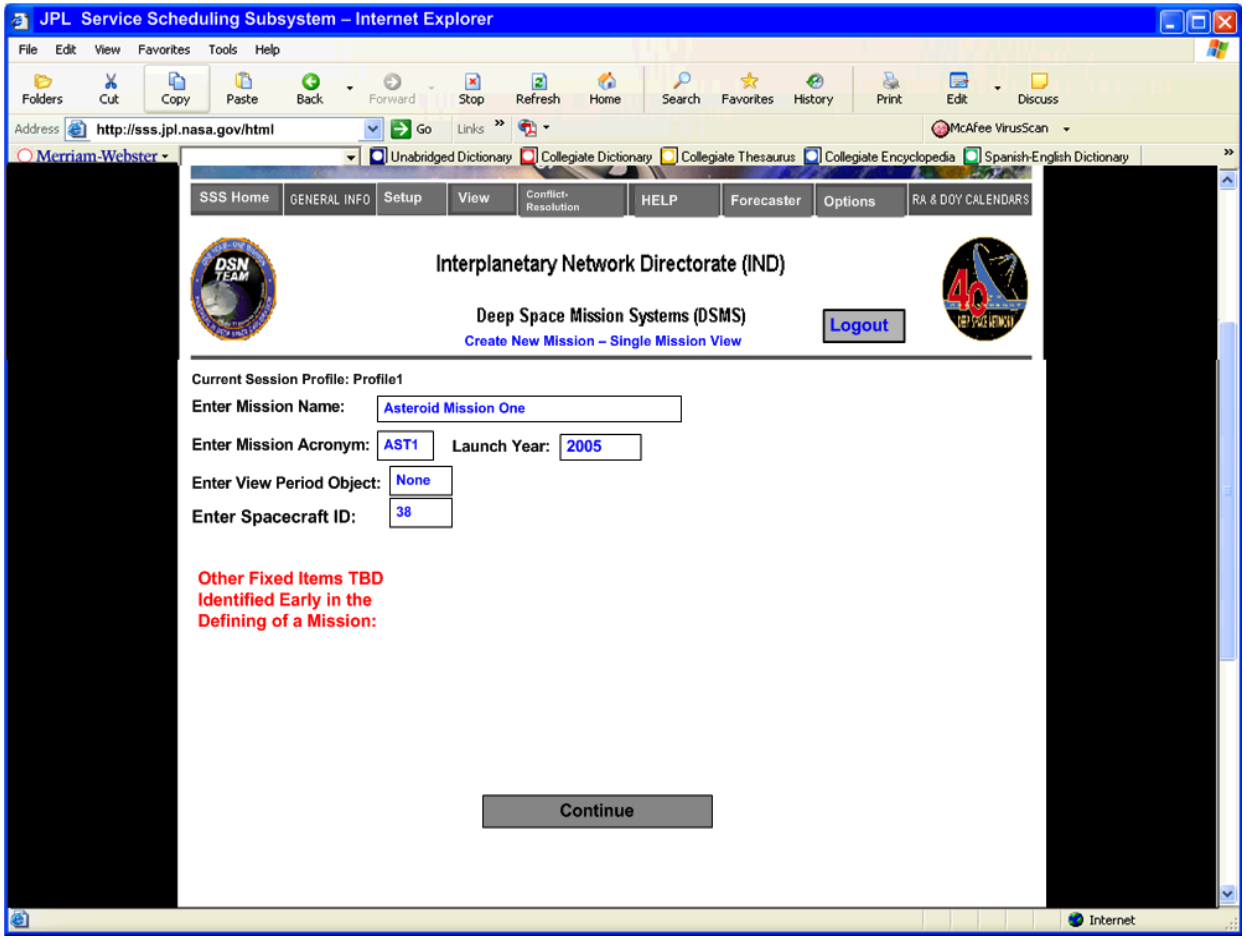


Figure 6-15 from A Straw Man Deep Space Network (DSN) Scheduling System page 6-15

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Possible Implementation Approach

Step 3: Configure Mission Constraints (page-1)

JPL Service Scheduling Subsystem – Internet Explorer

File Edit View Favorites Tools Help

Folders Cut Copy Paste Back Forward Stop Refresh Home Search Favorites History Print Edit Discuss

Address http://sss.jpl.nasa.gov/html Go Links McAfee VirusScan

Merriam-Webster Unabridged Dictionary Collegiate Dictionary Collegiate Thesaurus Collegiate Encyclopedia Spanish-English Dictionary

SSS Home | GENERAL INFO | Setup | View | Conflict-Resolution | HELP | Forecaster | Options | RA & DOY CALENDARS

Interplanetary Network Directorate (IND)

Deep Space Mission Systems (DSMS)

Configure Mission Constraints

Logout

Current Session Profile: Profile1

Mission Name: Asteroid Mission One

Mission Acronym: AST1 Launch Year: 2005

Valid Dates of Constraints

Start Date & Time (UTC): 06/27/2009 00:00:00

End Date & Time (UTC): 07/25/2009 00:00:00

Antenna Use Constraints

	Complex	Station	Subnet	D/L	U/L
GOLDSTONE	10	DSS-14	70M	●	●
	10	DSS-15	34HEF	●	○
	10	DSS-24	34B1	○	●
	10	DSS-25	34B2	●	●
	10	DSS-26	34B2	●	●
	10	DSS-16	26M	○	○
CANBERRA	40	DSS-43	70M	●	●
	40	DSS-45	34HEF	●	○
	40	DSS-34	34B1	●	●
	40	DSS-46	26M	●	●
MADRID	60	DSS-63	70M	●	●
	60	DSS-65	34HEF	●	○
	60	DSS-54	34B1	●	●
	60	DSS-55	34B2	●	●
	60	DSS-66	26M	○	○

Valid Equipment Configuration Codes

	XHMT		XHWM	
	MCD2	MCD3	MCD2	MCD3
Ranging	N058	N057	N060	N059
No Ranging	N050	N049	N052	N051
D/L Only	N007	N008	N011	N012
U/L Only	None	None	None	None

Valid Calibration Times

	Minutes
Pre-cal U/L (No Ranging)	45
Pre-cal U/L (Ranging)	60
Pre-cal D/L	30
Post cal (all antennas)	15

Continue

Internet

Possible Implementation Approach

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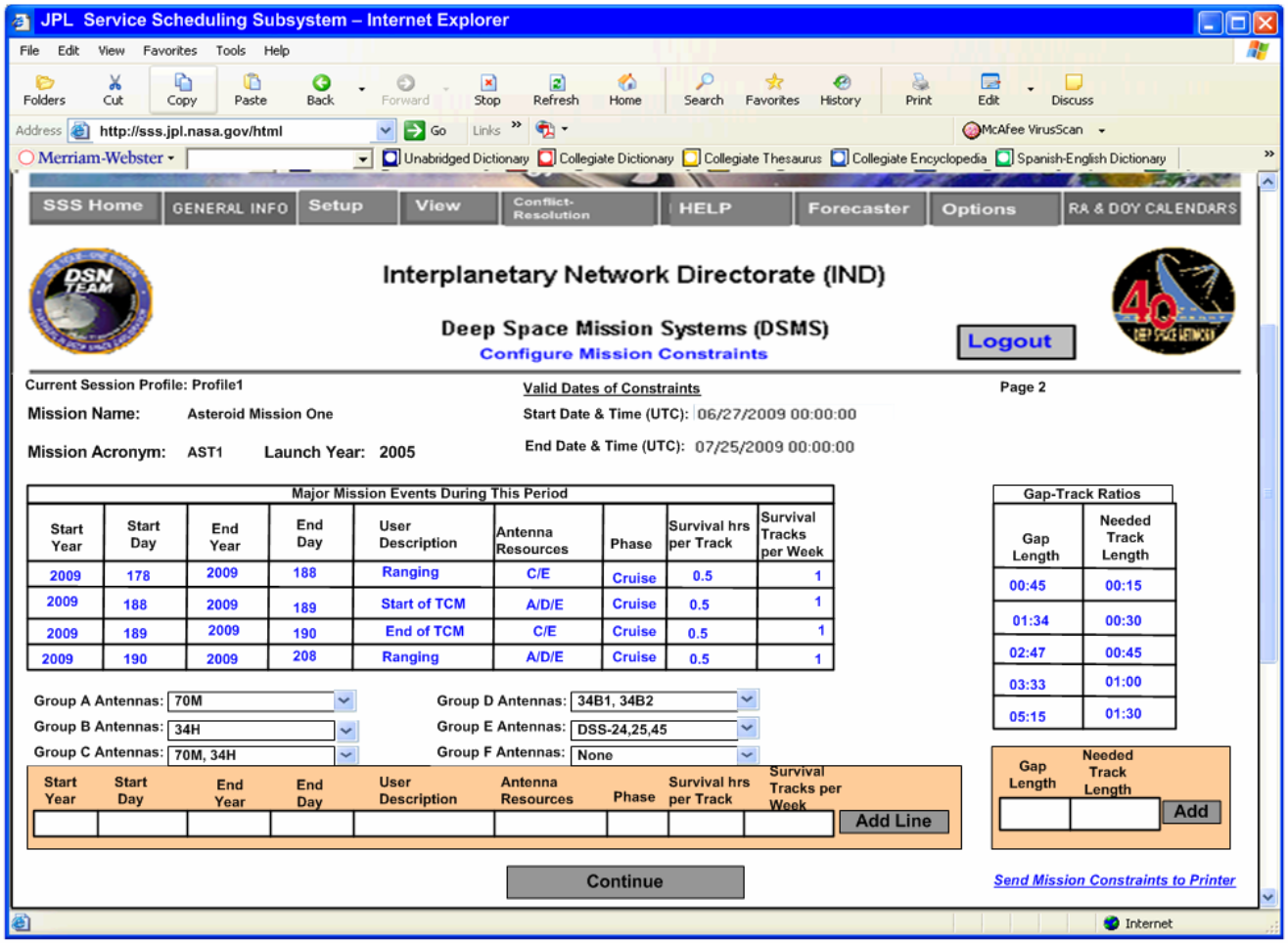
Step 4: Configure Mission Constraints (page-2)



Possible Implementation Approach

Step 5: Define A Single Mission User Loading Profile

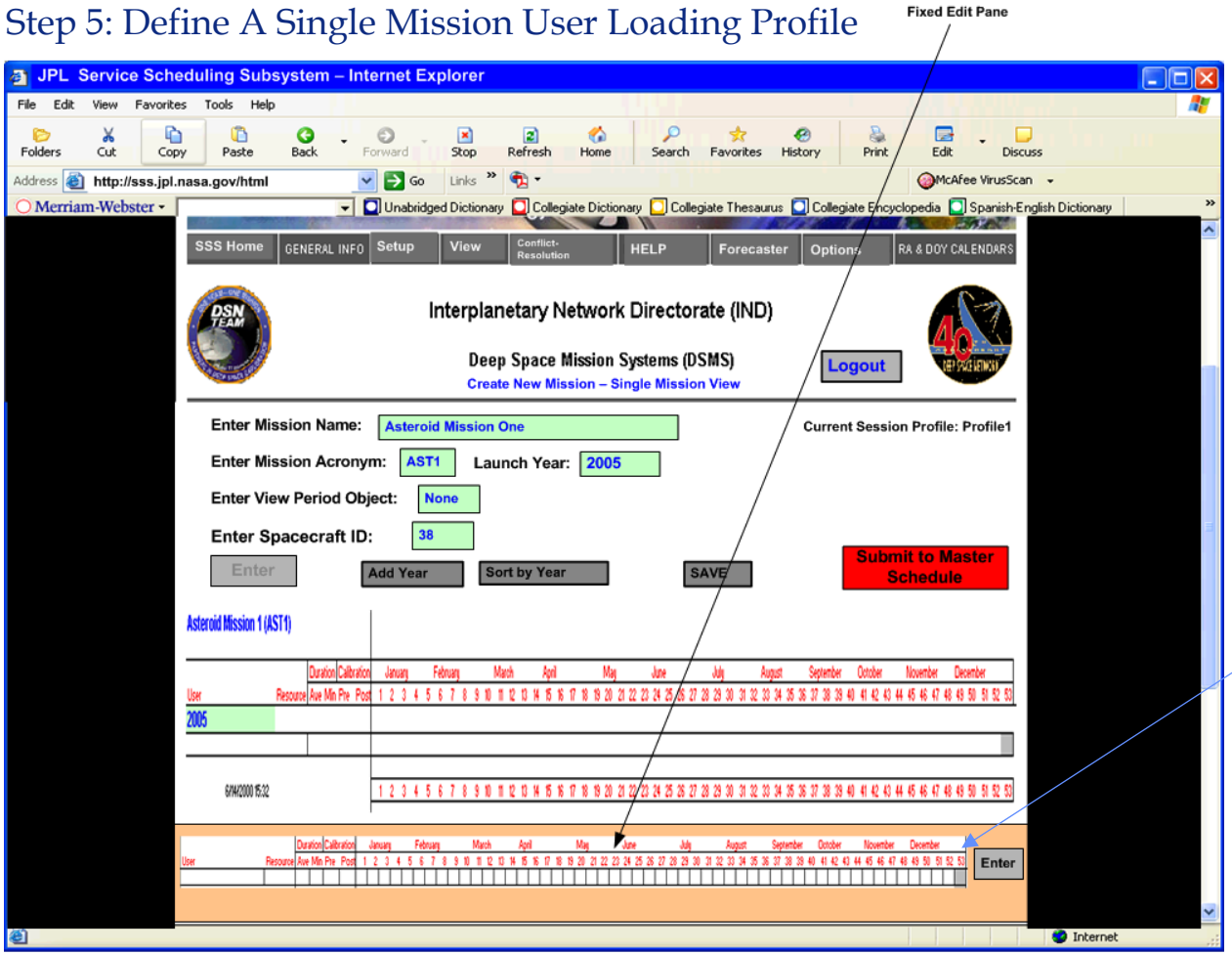
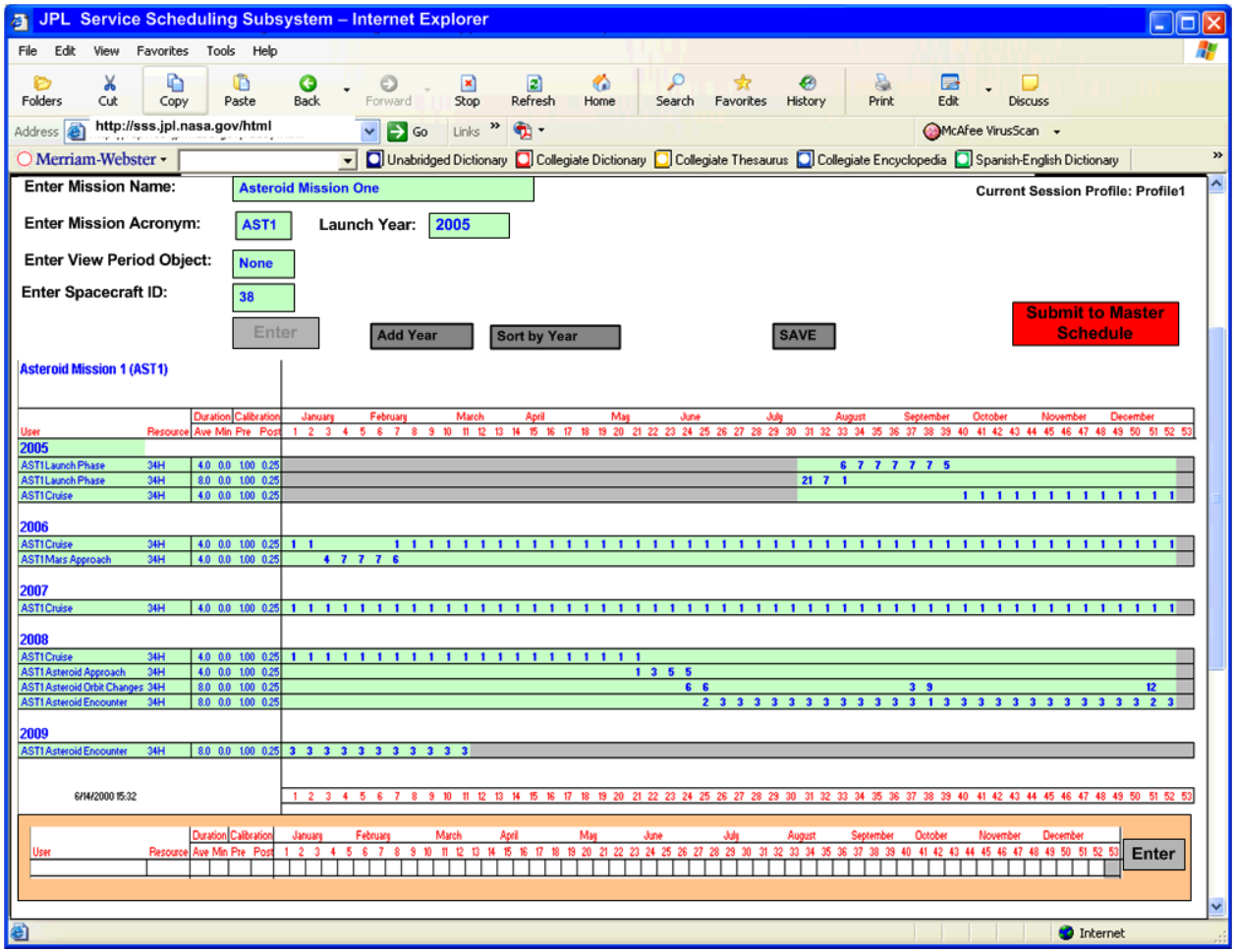


Figure 6-16 from A Straw Man Deep Space Network (DSN) Scheduling System page 6-16

This is known as an "event line." A User Loading Profile is made up of event lines.

Possible Implementation Approach

Step 6: Display of Single Mission "Bulk" User Loading Profile (ULP) Requirements



One mission has multiple event lines.

Figure 6-17 from A Straw Man Deep Space Network (DSN) Scheduling System page 6-17

Possible Implementation Approach

Step 7: Choose a Particular Interval of the Master Schedule to Edit

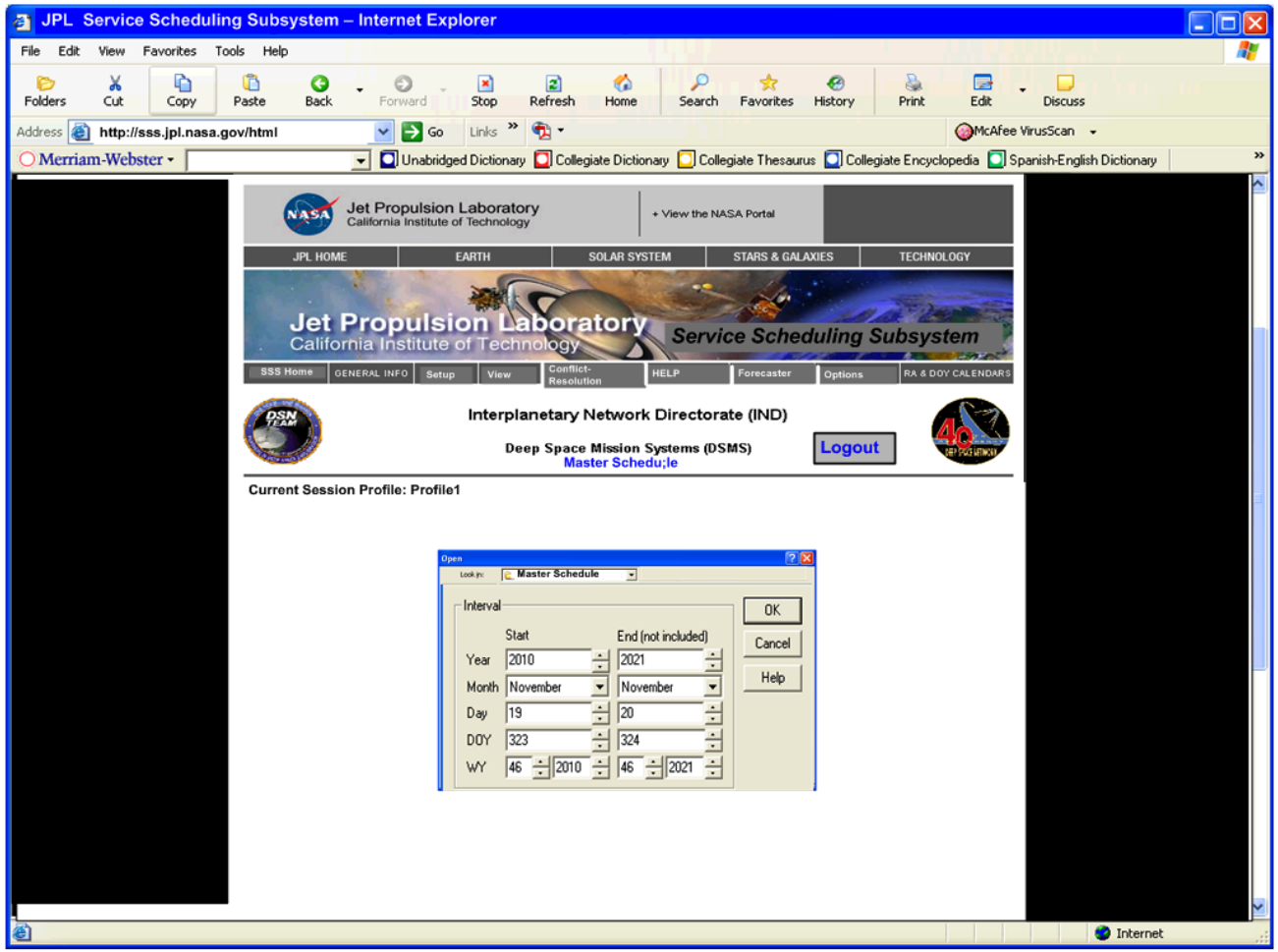


Figure 6-19 from A Straw Man Deep Space Network (DSN) Scheduling System page 6-19

Possible Implementation Approach

Step 8: Display of a Particular Interval of the Master Schedule

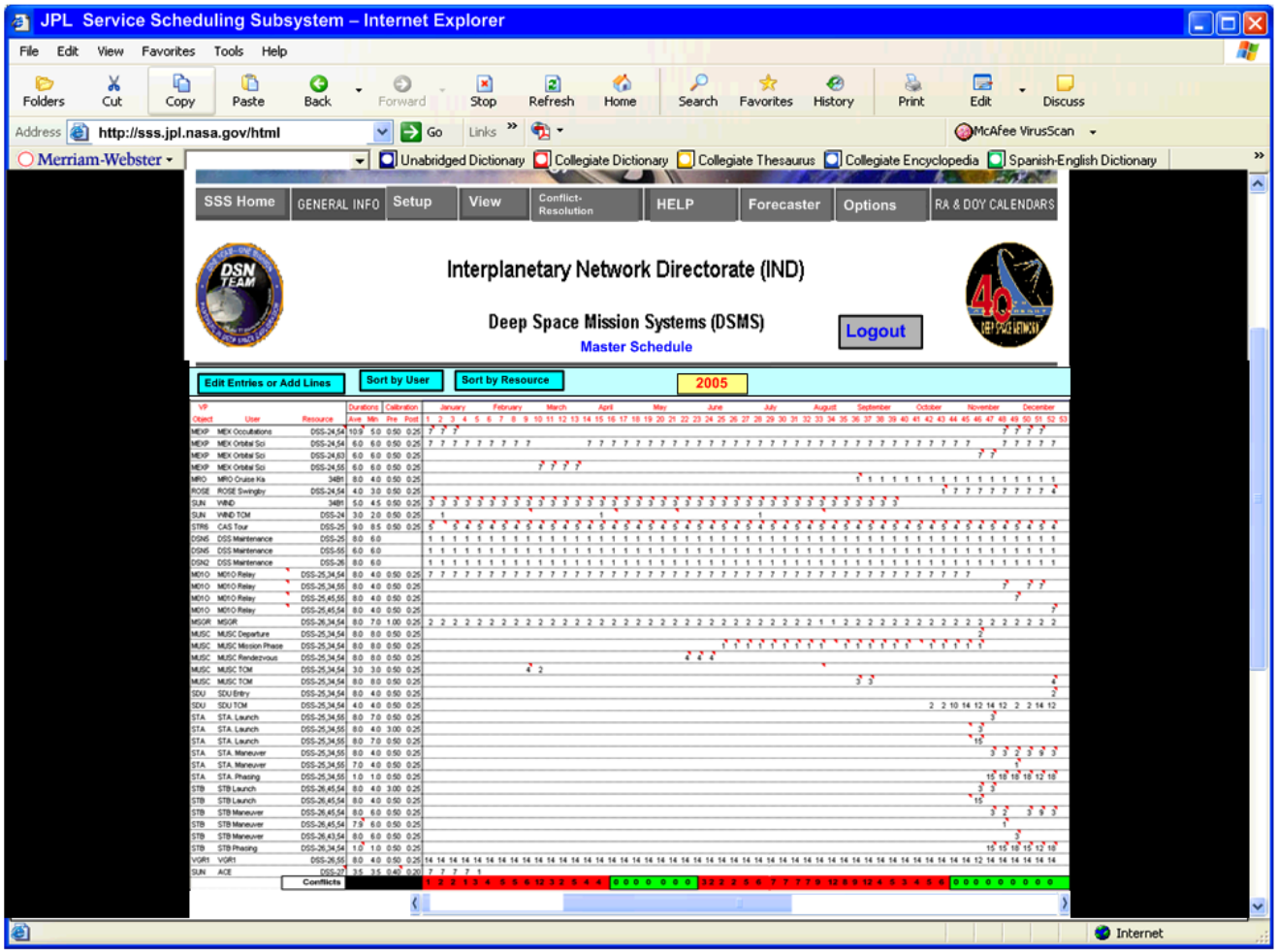
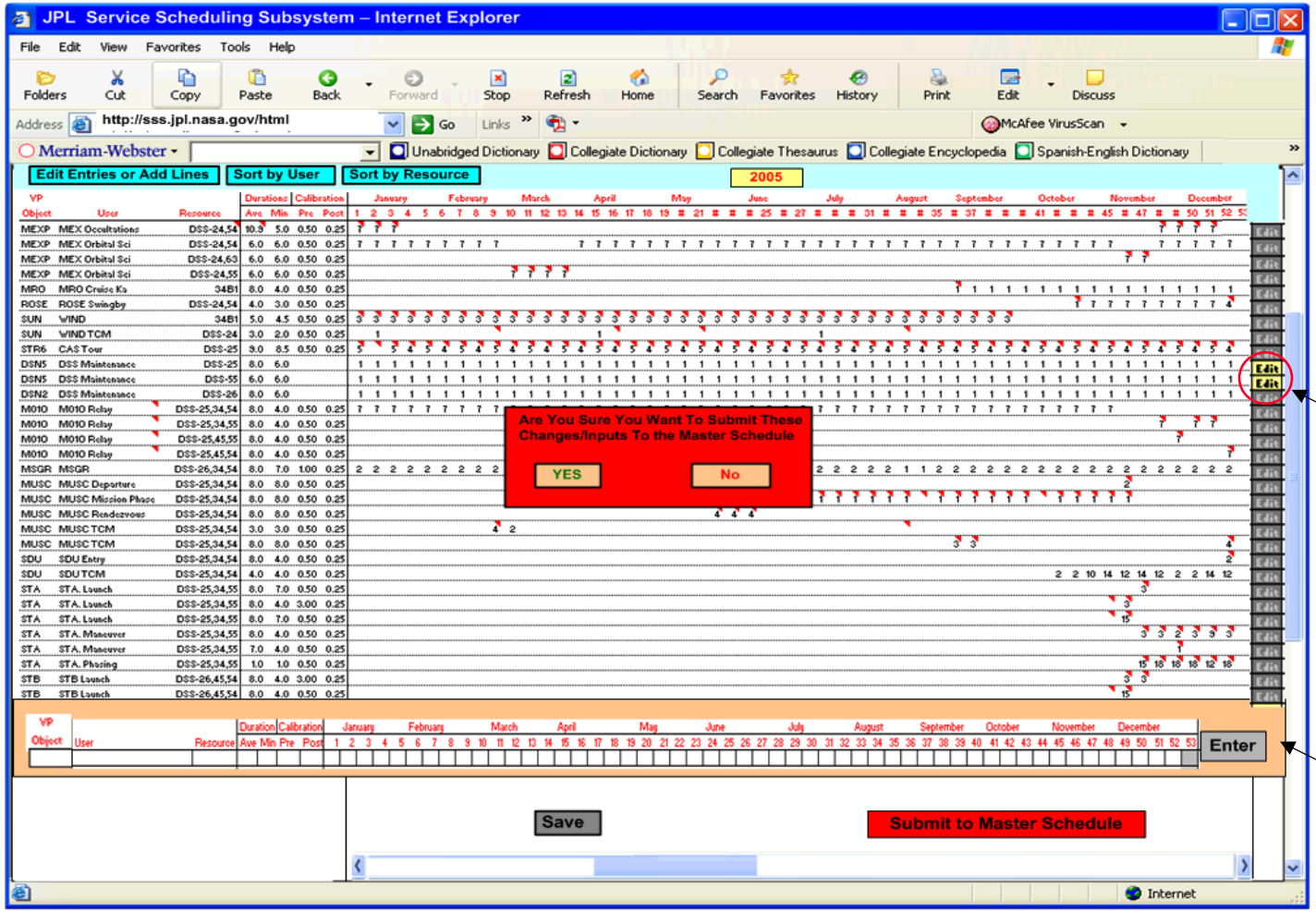


Figure 6-20 from A Straw Man Deep Space Network (DSN) Scheduling System page 6-19

Possible Implementation Approach

Step 9: Editing a ULP on a Particular Interval of the Master Schedule



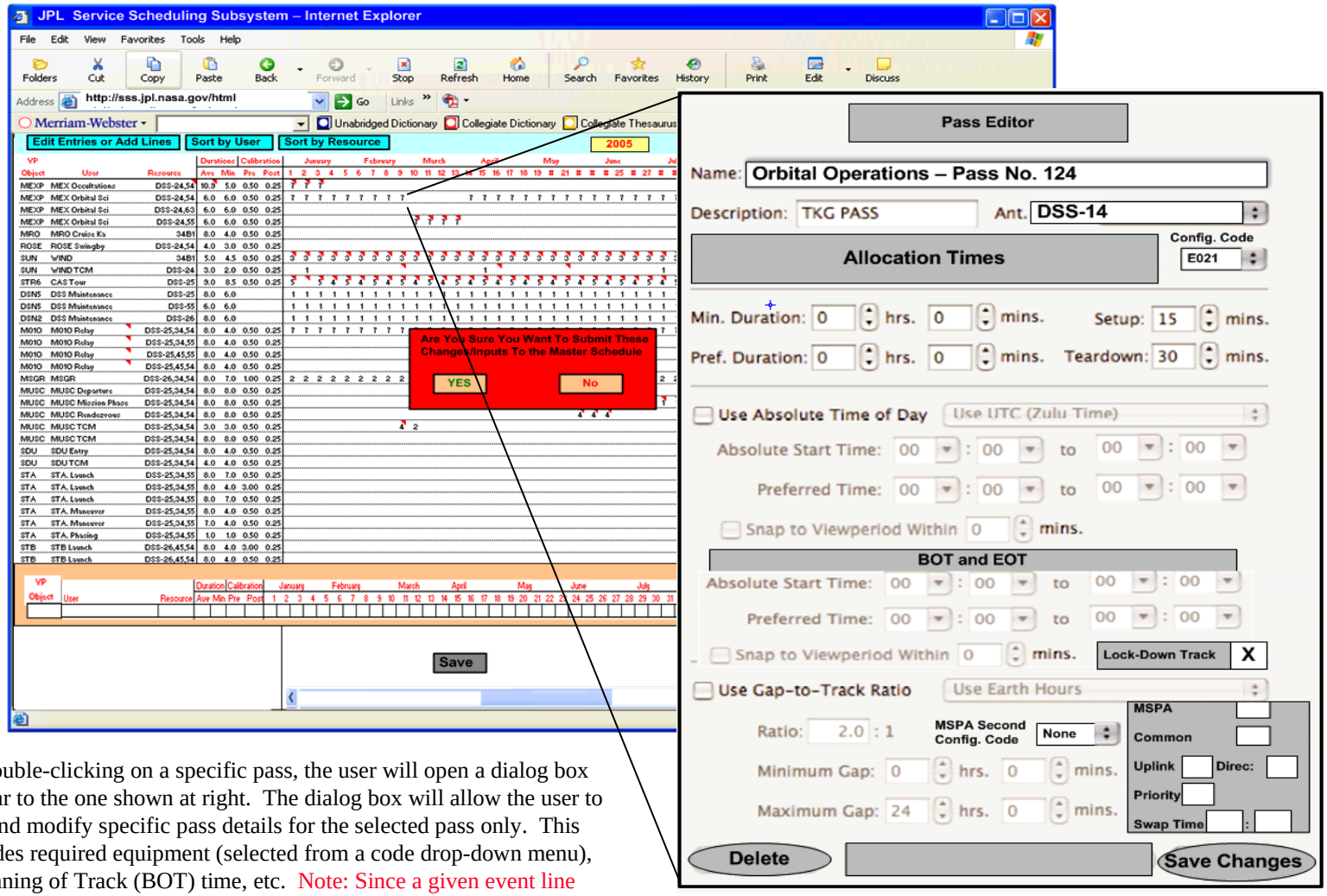
User can only edit their ULPs

Fixed Edit Pane

Figure 6-23 from A Straw Man Deep Space Network (DSN) Scheduling System page 6-21

Possible Implementation Approach

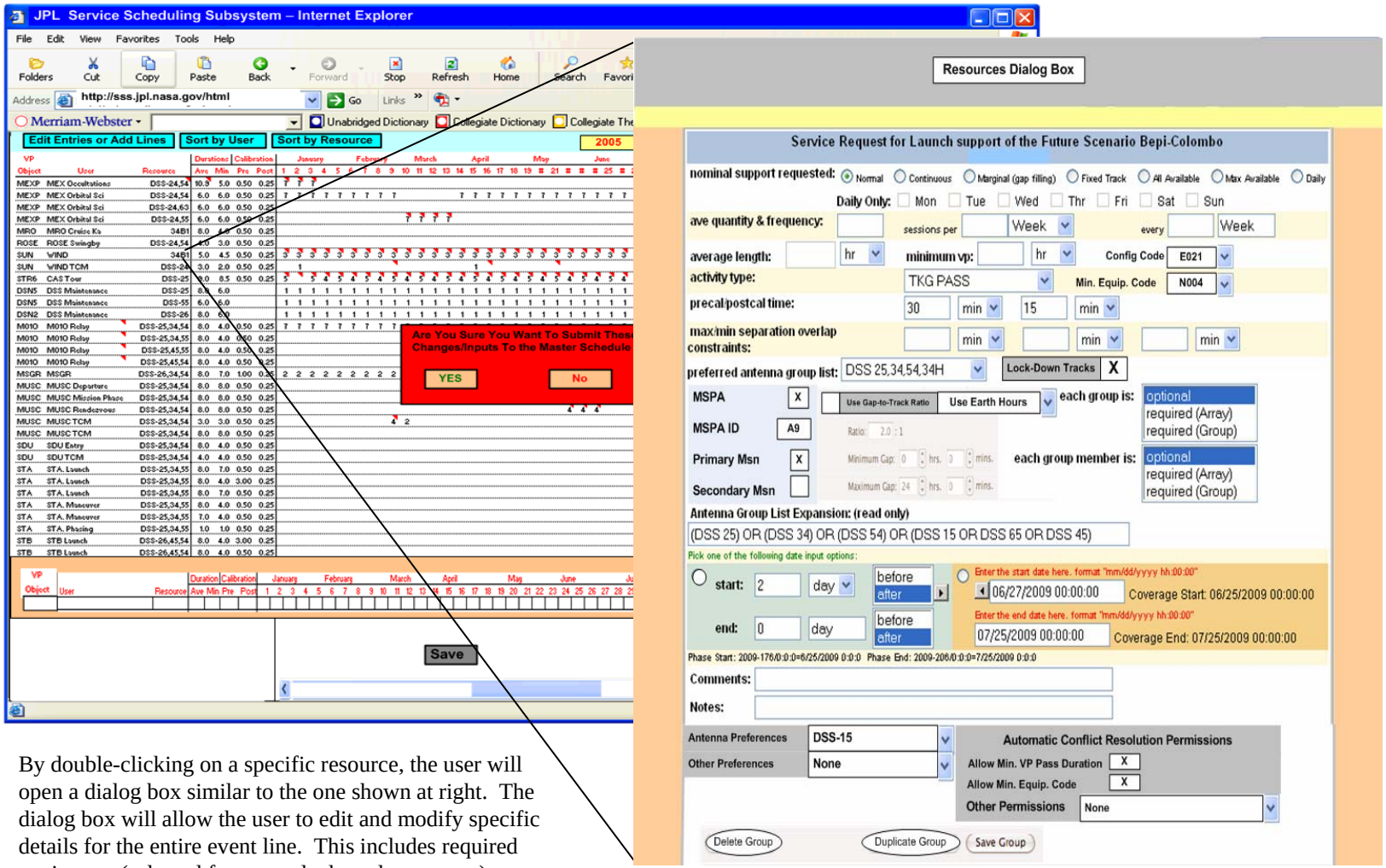
Step 10: Editing the Configuration of a Single Track on the User Loading Profile



By double-clicking on a specific pass, the user will open a dialog box similar to the one shown at right. The dialog box will allow the user to edit and modify specific pass details for the selected pass only. This includes required equipment (selected from a code drop-down menu), Beginning of Track (BOT) time, etc. Note: Since a given event line represent a particular configuration, would expect the editing of a particular pass to result in moving the edited pass to a new event line.

Possible Implementation Approach

Step 11: Editing the Configuration of a Single Track on the User Loading Profile

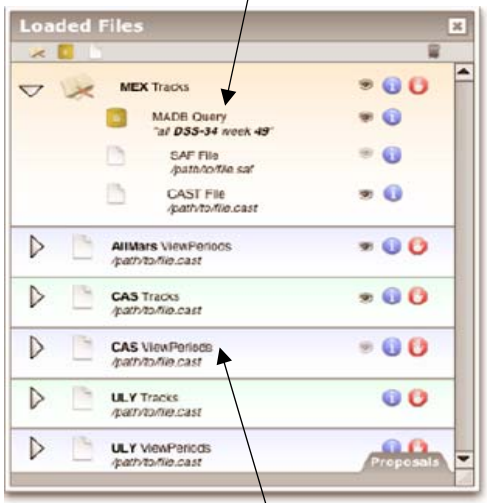


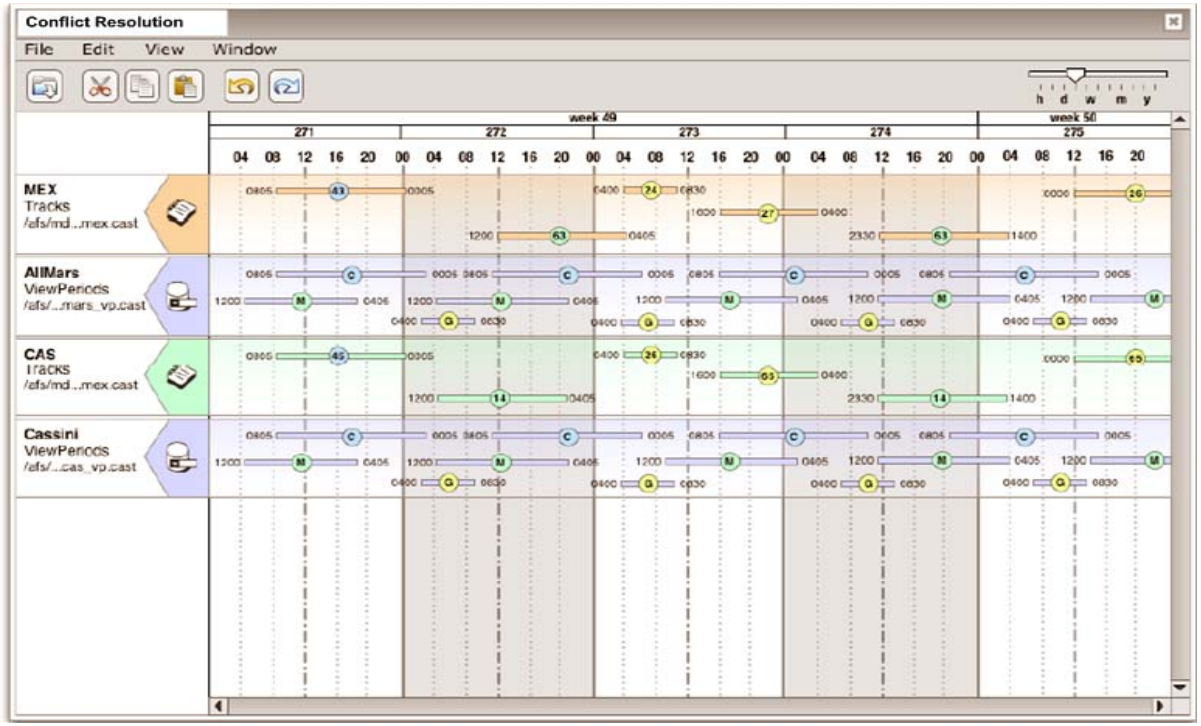
By double-clicking on a specific resource, the user will open a dialog box similar to the one shown at right. The dialog box will allow the user to edit and modify specific details for the entire event line. This includes required equipment (selected from a code drop-down menu), Beginning of Track (BOT) time, etc.

Possible Implementation Approach

Available database information

Step 12: Concept of a Schedule Display





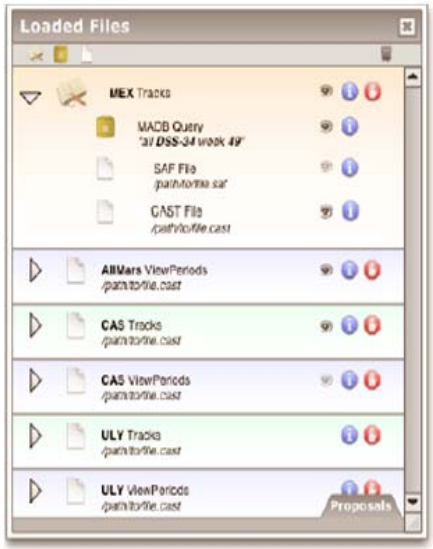
User defines display by selecting the desired projects and view periods. Drag to schedule to display.

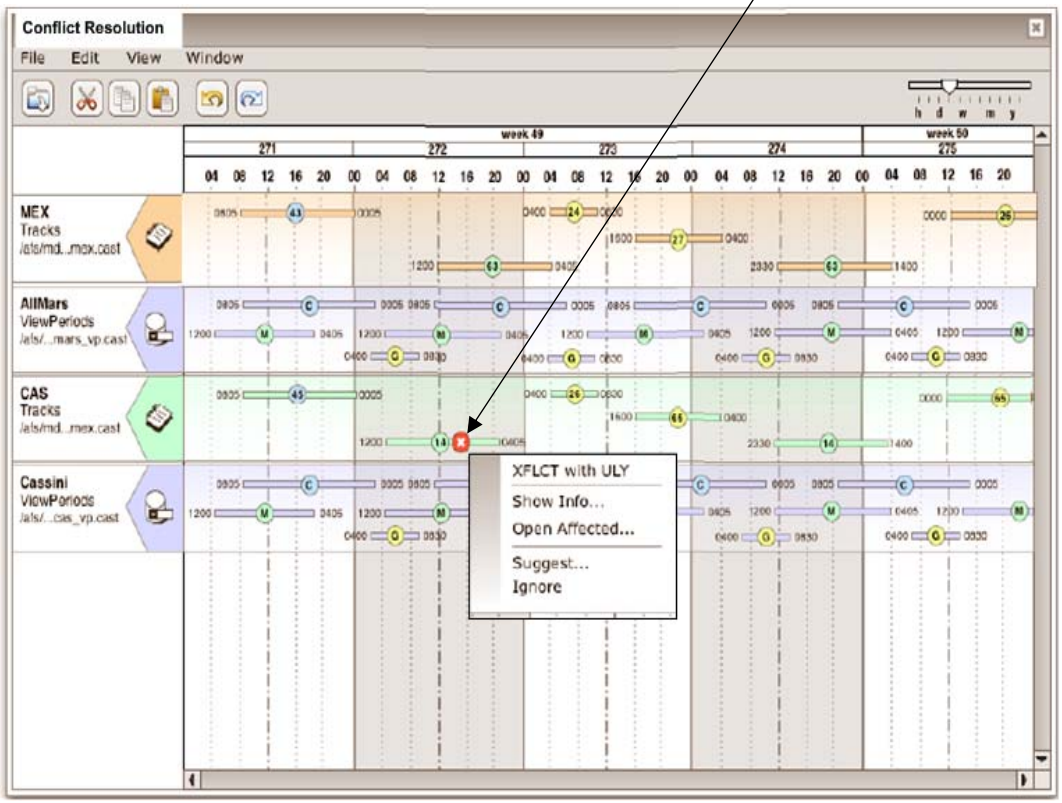
Figure 7-4 from A Straw Man Deep Space Network (DSN) Scheduling System page 7-25

Possible Implementation Approach

A Cassini conflict with another mission.

Step 13: Concept of a Schedule Display with Conflict and Conflict Information Window





Note: Conflicts will be checked against all Users. If not selected for display, may want to automatically display the other project that is in conflict with current User.

Figure 7-8 from A Straw Man Deep Space Network (DSN) Scheduling System page 7-27

Possible Implementation Approach

Step 14: Concept of a Schedule Display with Conflicted Missions

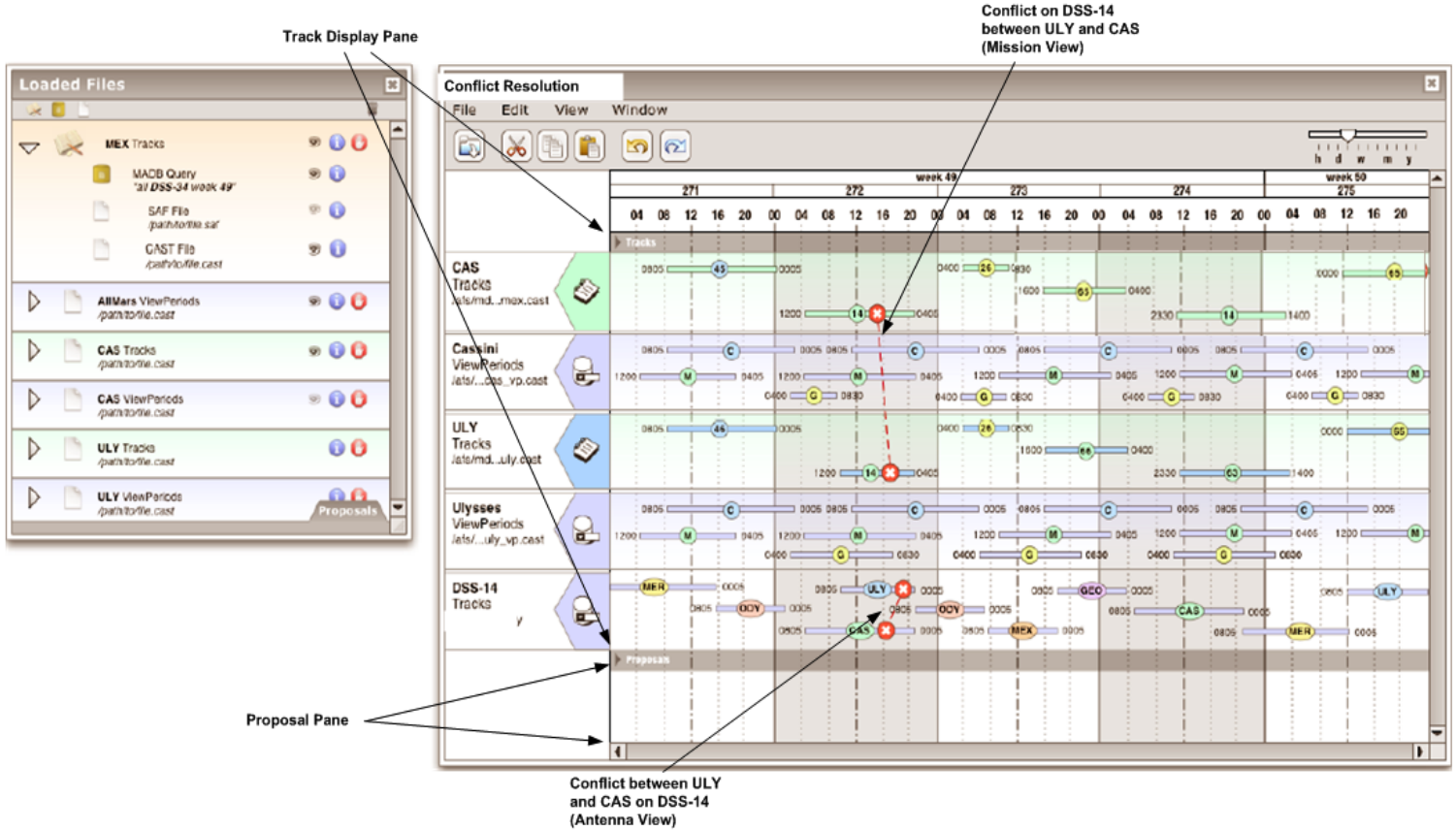
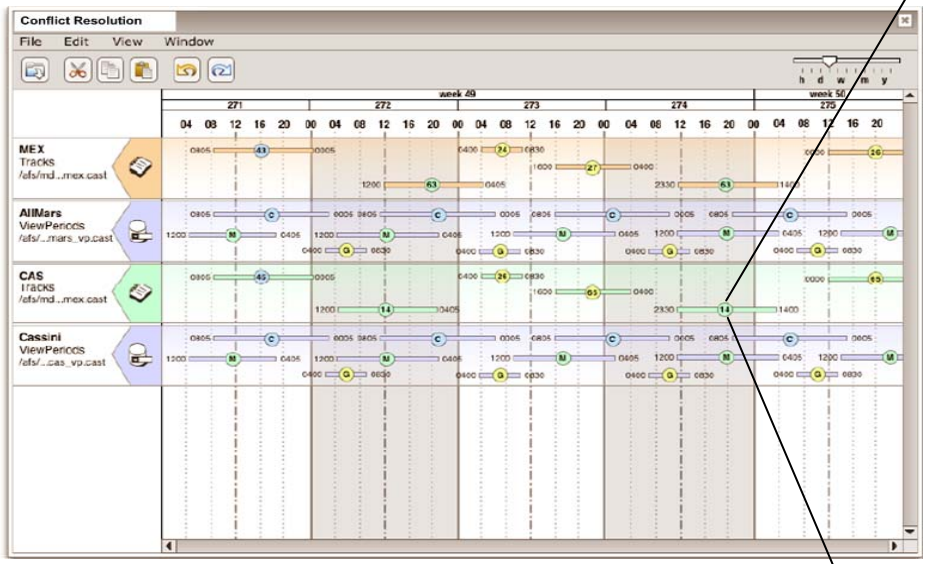


Figure 7-10 from A Straw Man Deep Space Network (DSN) Scheduling System page 7-28

Possible Implementation Approach

Step 15: Editing the Configuration of a Single Track on the Schedule Display



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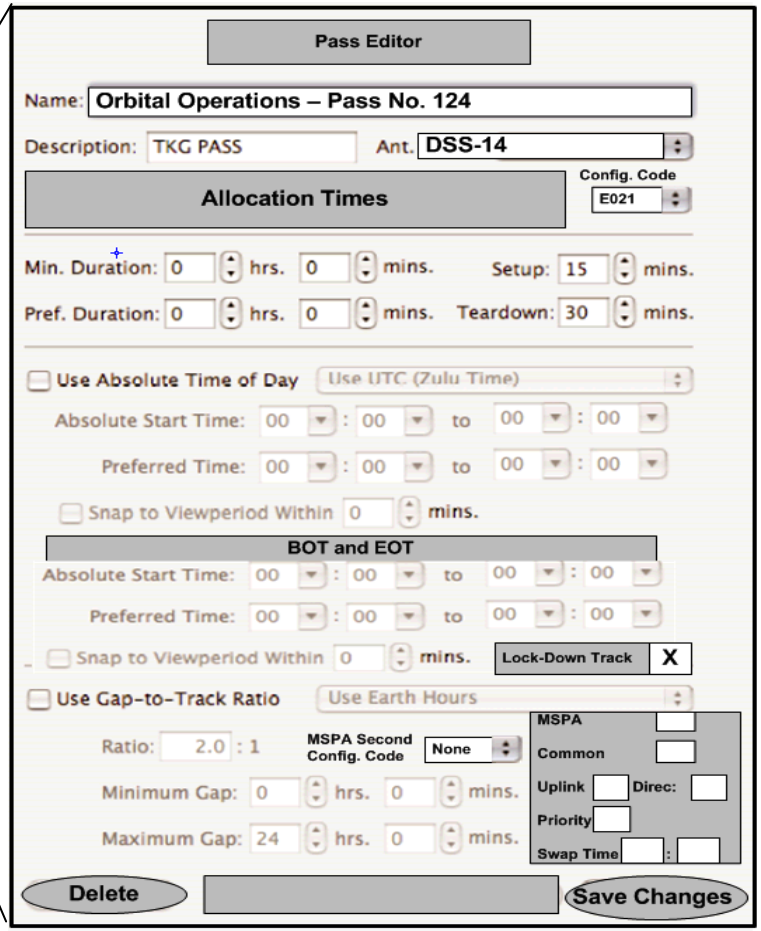

Figure 6-12 & 7-4 from A Straw Man Deep Space Network (DSN) Scheduling System pages 6-12 & 7-25

Sample DSN Scheduling Input Format - 1

Currently, the TIGRESS program produces an output file known as the "DSN RAW DATA FILE" which is used as an input file to the DSN Scheduling Subsystem.

This is an example only. Format may change in the future. Column definitions are listed on next page.

QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.

Figure 2 - Sample Partial Listing of a TIGRAS-to-DSN RAW DATA FILE from 01740-Service_Mngt, Rev. C

Sample DSN Scheduling Input Format - 2

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QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.

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TIFF (LZW) decompressor
are needed to see this picture.

Table 3.3 - TIGRAS-to-DSN RAW DATA FILE format from 01740-Service_Mngt, Rev. C