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

Randii R. Wessen
Jet Propulsion Laboratory
California Institute of Technology
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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

Phase I

Service Scheduling Subsystem (SSS)

- Data Reporting Function
  - Network Utilization Reports
  - Load Forecaster & Report Generation
  - Traceability Reports
  - Other Metrics

- Scheduling Databases
  - Master Schedule Database
  - Private Workspace Scheduling Databases
  - Requirements & Constraints Database
  - Current Equipment Status, Working View Period, & Asset Information Databases
  - Current Conflicts Database

- Data Entry & Management Function
  - User Web Browser Setup & Configuration
  - Copy Segments of Master Schedule to Private or Shared Workspaces & vice versa
  - Web Browser Schedule Displays, Views, Input or Changes in Private Workspaces
  - Bulk Electronic Schedule Input & or Changes from Private Workspaces to Master Schedule

- Collaboration Function
  - Private Workspaces

- Conflict Resolution Function
  - Bulk & for Single Electronic Schedule Change Support Mechanisms & SPS Equipment Conflict Checking
  - Messaging, Status Notification, Conflict Notification, & Alerting

- Conflict-aware Scheduling Function
  - Requests to & Updates from SPS of View Periods, Equipment Status, etc.
  - Scheduling Engine – Master & Private Workspace Schedule Generation
  - SPS Antenna & Equipment Conflict Checking
  - Scheduling Engine – Schedule Optimization, Conflict Minimization, & Rescheduling
  - Current Conflicts Database Update

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

R. Wessen
Web-Based DSN Resource Allocation Tool Task
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Phase III

Figure 4-1 from 827-114 SSS Ops Concept Draft
Efficiently Allocating Resources

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
Possible Implementation Approach

Step 3: Configure Mission Constraints (page-1)
Possible Implementation Approach

Step 4: Configure Mission Constraints (page-2)

![Image of a software interface for configuring mission constraints.](image-url)
Possible Implementation Approach

Step 5: Define A Single Mission User Loading Profile

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

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

[Image of a computer interface showing a scheduling system with a focus on editing a ULP.]

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

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

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.

A Cassini conflict with another mission.

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

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.

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

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