Proposed Planning & Scheduling Services for the SNC in the CDOS Era

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Agenda

- Introduction
- Proposed SNC data flow for CDOS era customers
- Generic Scheduling Concept
- P&S services SNC could provide in the CDOS era
  - Provide security
  - Maintain a data base
  - Generate universal time interval sets
  - Process queries
  - Process a robust generic request language

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Introduction

Motivation for this presentation

- **Studies indicate that the current NCC mode of operation needs to be enhanced to meet the needs of the mid to late 1990s.**
  - ***CDOS Operations Management Service (COMS) Planning and Scheduling Concept Assessment*** **(DSTL-90-010, CSC/TM-90/6079)**
  - ***EOS Planning/Scheduling/Command Management Study*** **(CSC/TM-90/6054)**
- **There is a need to simplify the request interface for SN services**
  - **More complex missions**
  - **More flexible spacecraft operations**
  - **More scheduling data volume**
  - **Events per spacecraft and scheduling period**

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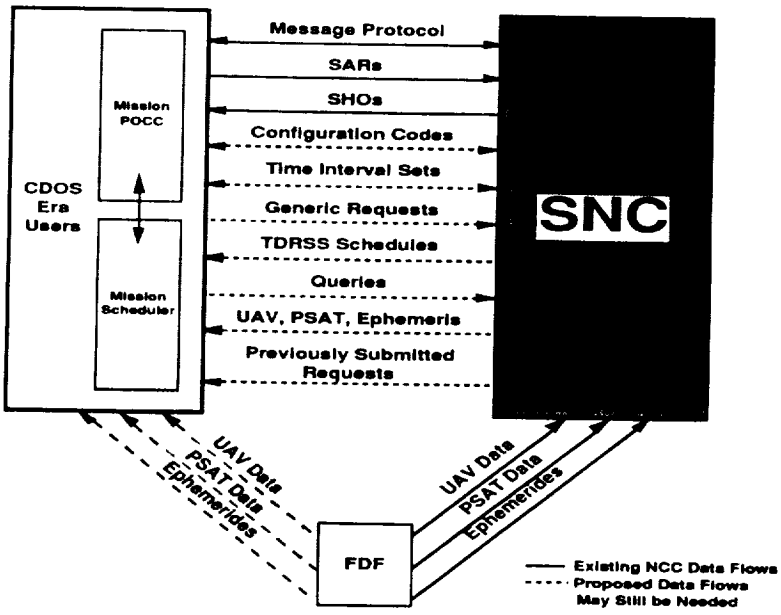
Proposed SNC data flow for CDOS era customers



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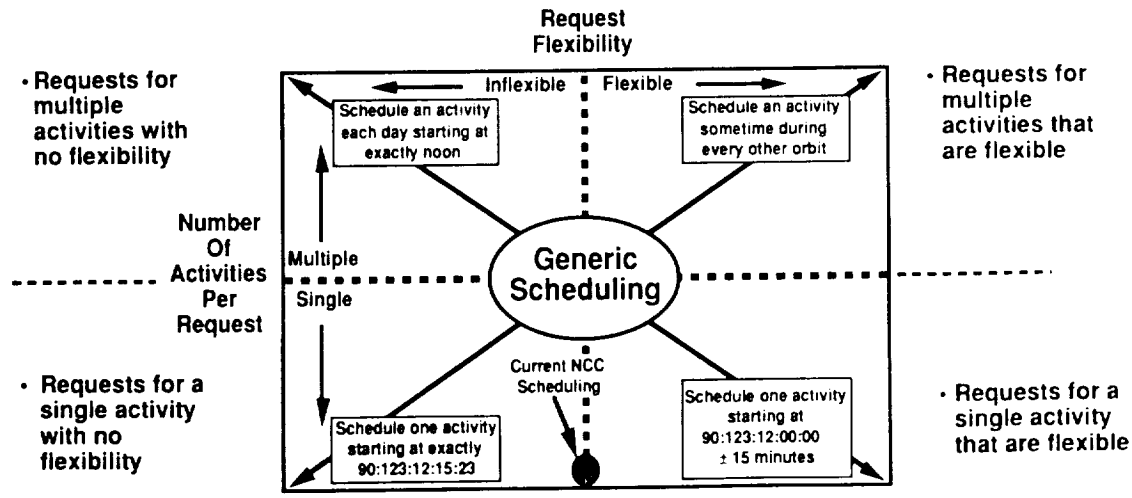
Motivation for Generic Scheduling Use

- Proposed for all missions in the CDOS era, in some form
  - COBE is using a customized "generic" request interface for user requests
  - ERBS is using a customized "generic" request interface for user requests
  - UARS will be using generic scheduling
  - EOS plans to use generic scheduling

Generic Scheduling Concept

Encompasses four major classifications of requests



Generic Scheduling

- Generic scheduling is a viable mode of operation for the SNC
  - Supports specific / inflexible requests
  - Allows a great deal of customer flexibility
  - Allows customers to symbolically define and reference constraints
  - Allows the expression of complex relationships
  - Allows single requests for multiple instances of the same activities
  - Allows flexible resource requirements
  - Allows requests with flexible durations
  - Allows the scheduler more flexibility when scheduling
  - Leads to less impact when rescheduling or adding new events

P&S services SNC could provide in the CDOS era

Provide Security

Motivation:
- Access to mission data must be restricted to only the owner

Service:
- Access to mission data only by owner
- Current NCC restrictions are adequate

P&S services SNC could provide in the CDOS era

Maintain a Data Base

Motivation:

- SNC is always on-line
- Missions require the same type of data maintained by SNC
- Provides a centralized repository for data
- Ensures data compatibility between customers and SNC
- Reduces redundancy of data flows

Service:

- Maintain a data base of
  - Configuration codes
  - UAV data
  - PSAT data
  - Ephemeris data
  - Previously submitted requests
  - Time interval sets

P&S services SNC could provide in the CDOS era

Generate Universal Time Interval Sets

Motivation:

- All customers will need the universal time interval sets
- Standardizes format and contents
- Leads to a standardized mode of operation with SNC

Service:

- Generate time interval sets from UAV, PSAT, Ephemeris data for:
  - TDRS contacts
  - Orbit starts/stops
  - Spacecraft days/nights

P&S services SNC could provide in the CDOS era

Process Queries

Motivation:

- Reduces customer and SNC asynchronous data traffic
- Provides customers with correct and current information

Service:

- Send to the customer
  - TDRSS schedules
  - Configuration codes
  - UAV data
  - PSAT data
  - Ephemeris data
  - Previously submitted requests
  - Time interval sets

P&S services SNC could provide in the CDOS era

Process a Robust Generic Scheduling Language

Motivation:

- Allows all missions to use the same flexible, robust language
- Standardizes the scheduling language and SNC interface
- Most CDOS era missions will have their own scheduler for mission activities
- Leads to standardization of the scheduling engine core
- Leads to a standard scheduling language for
  - Mission scheduling
  - Investigator to mission interface
- Allows customers to specify multiple options for support
- Allows the scheduler flexibility in the scheduling of the requests
- Allows the scheduler to produce a schedule that retains as much of the flexibility as possible based on the final resource usage
- Allows schedule modification with minimal perturbation
- Rescheduling causes less impact and can be mostly automated

P&S services SNC could provide in the CDOS era

Process a Robust Generic Scheduling Language

Service:

- Allow additions, deletions, and replacements of:
  - Generic and specific requests
  - Individual request instances (events)
  - Pending (i.e. not yet scheduled) events
  - Scheduled events
  - Customer-defined time interval sets
- Allow one generic request to generate multiple events
- Allow flexible time intervals (time tolerance / windows)
- Allow flexible request durations
- Allow preferred and alternate sets of resource requirements
- Allow a "wildcard" TDRS ID and antenna ID