



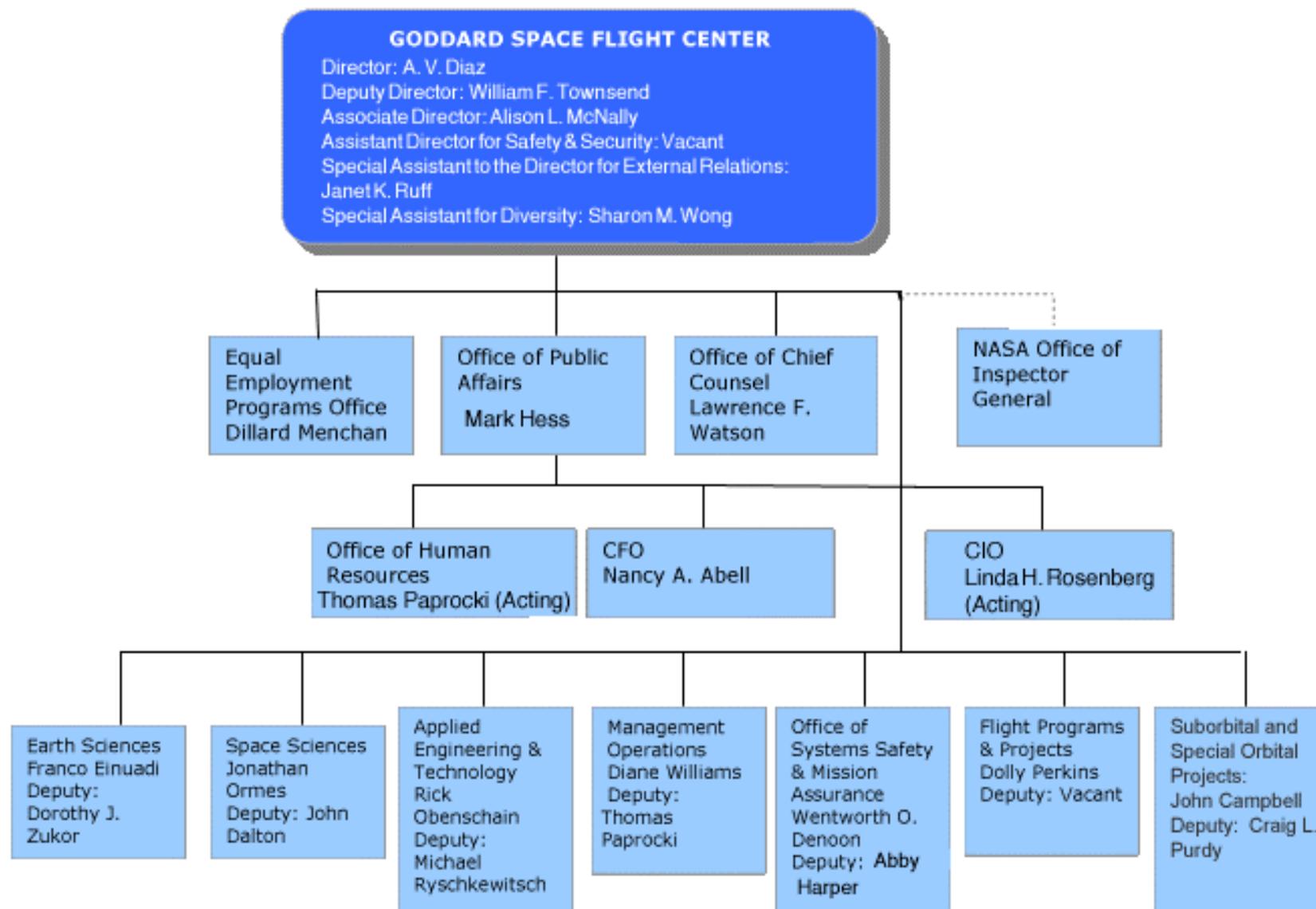
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, MD

Mission Services Program
Customer Commitment Office

- <http://msp.gsfc.nasa.gov/cco> -

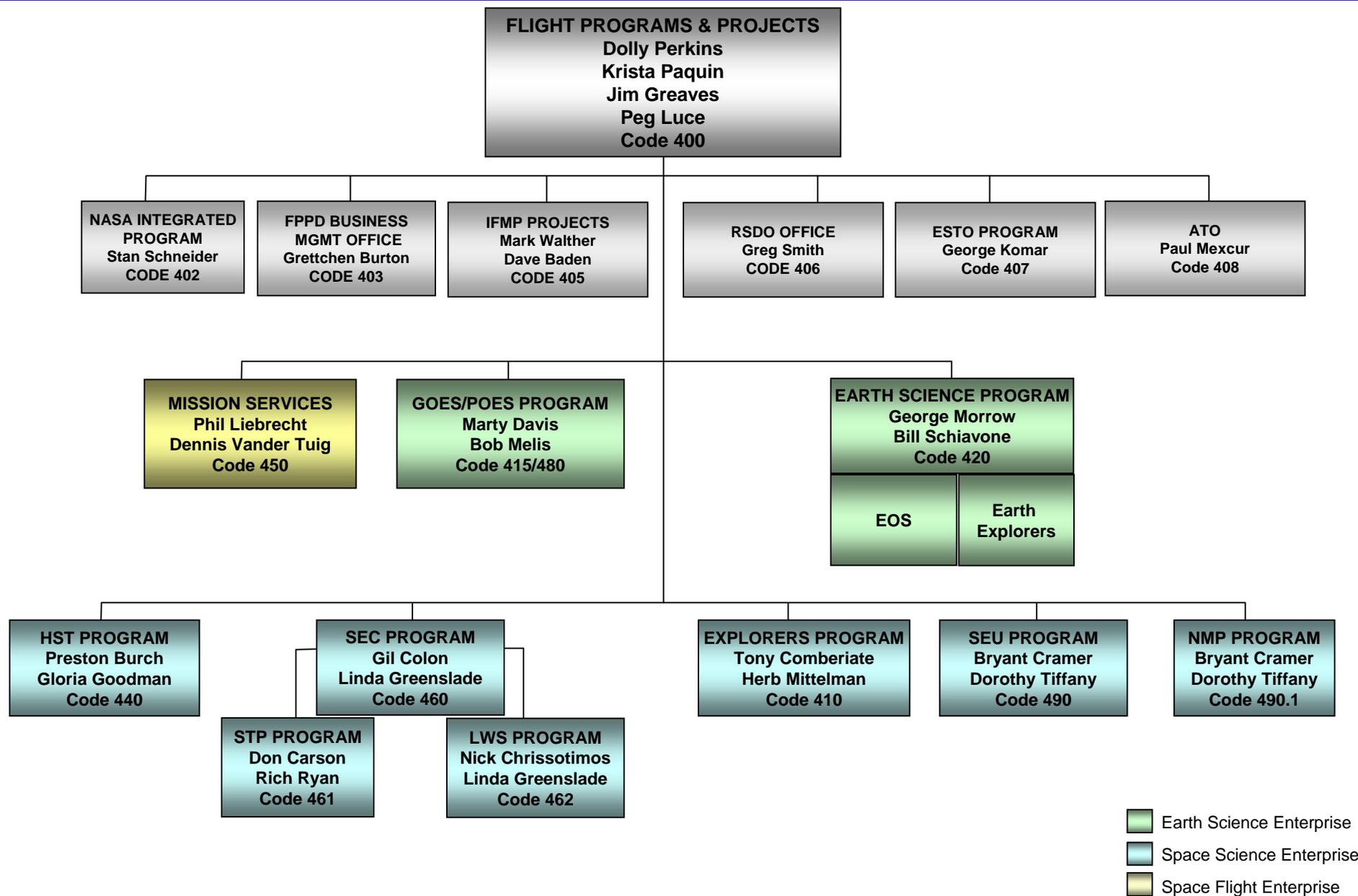


GSFC Organization





FLIGHT PROGRAMS AND PROJECTS (CODE 400)





MISSION SERVICES PROGRAM (CODE 450)

What Services Does MSP Offer, or Coordinate?

Standard Services

- Mission Services
 - Flight Operations
 - NENS/MOMS provides the support to 428 & 444
 - Data Processing
 - Flight Dynamics
 - Simulation & Testing
- Data Services
 - Ground Network
 - » NASA & Commercial Networks
 - Space Network
 - Deep Space Network*
 - NASA Integrated Services Network*

Service Integration & Management

- Radio Frequency Licensing and consultation
- Standards Development
- End-to-end Mission Integration
 - Mission Operations Integration
 - Network Scheduling
 - Data delivery
 - Quality of Service levels
 - Experience and proven performance
 - User service metrics
- Customer-centric Approach
 - One-stop shop (Service Catalog)
 - Standard Services
 - Single point of contact

*Supplied by JPL and MSFC

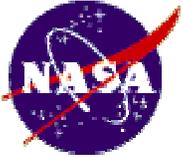


MSP Organization

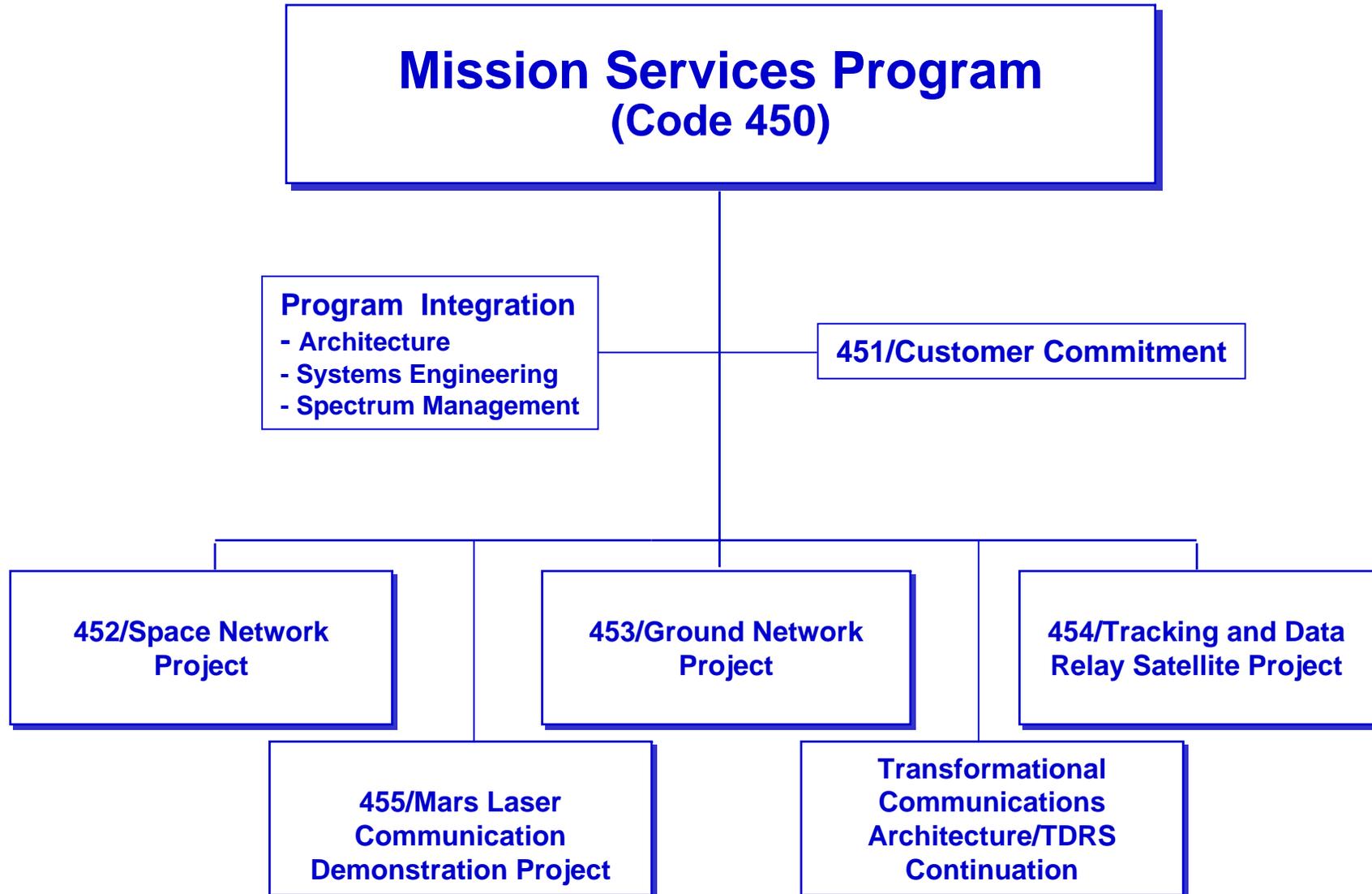
Program Manager
Philip Liebrecht
Deputy Program Manager
Roger Flaherty
Program Business Manager
Dennis Vander Tuig
Deputy Project Manager/Resources
Linda Price
Secretaries, J. Walton, J. Gallant (Service Source)

Program Integration
NENS/GSFC COTR – K. Mc Carthy
GSFC Spectrum Manager - Roger Porter
Policy & Plans - K. McCarthy
Architecture/Systems Mgmt - Frank Stocklin
•**Standards Management** (500)
•**Technology Coordination** (500)

Deputy Business Manager
Rosemary Bruner
Project Support Specialist
John Daniels



MSP Functional Organization





MSP Support During Project Formulation

- **Support to the Integrated Design Capability (was Integrated Mission Design Center) and Mission Concept Studies**
- **Radio Frequency Licensing (GPG 2570.1)**
- **Assignment of MSP civil servants, Mission Commitment Managers, to Projects in Formulation**
- **Single Point-of-Contact for PSLA development and space communications services**
- **Project Service Level Agreement & product planning (for new developments)**
- **Detailed Mission Requirements development**
- **GSFC Service Catalog, “450-Catalog-Services” on the CCMS**
- **Contractor support**



Deputy Program Manager for Customer Commitment

Jon Z. Walker

Secretary

J. Burd (Stay-in-School)

Business Management

M. Ambrose – Reimbursables Manager
T. Wang – Resource Analyst

Customer Support Analysis

A. Levine – Service Planning & Analysis
B. Lorenz (567) – User/RF Analysis
R. Vento (567) – User/RF Analysis
Y. Wong (567) – User/RF Analysis

Customer Agreements
Mission Commitment Managers

L. Ambrose – Code S
J. Bangerter – Code M
E. Conwell – International/Reimbursable
C. L. Myers – Code Y
R. Schonbachler – Special Projects & Missions

Other Customer Management

P. Garza – GN Orbital Management
R. Harris – SODA & SSEO Factory Manager
P. McCeney – Ops Assurance Engineer
J. Martin – IMDC Team Lead
L. Phillips – IMDC Team Member

NENS Support

- Mission Commitment Engineers
- Customer Integration and Test
- Customer Support Analysis
- Loading (GN & SN) Analysis Group

PAAC Support

- Configuration Management
- Data Management
- Planning and Scheduling
- General Business

Civil Service
Personnel (Code)

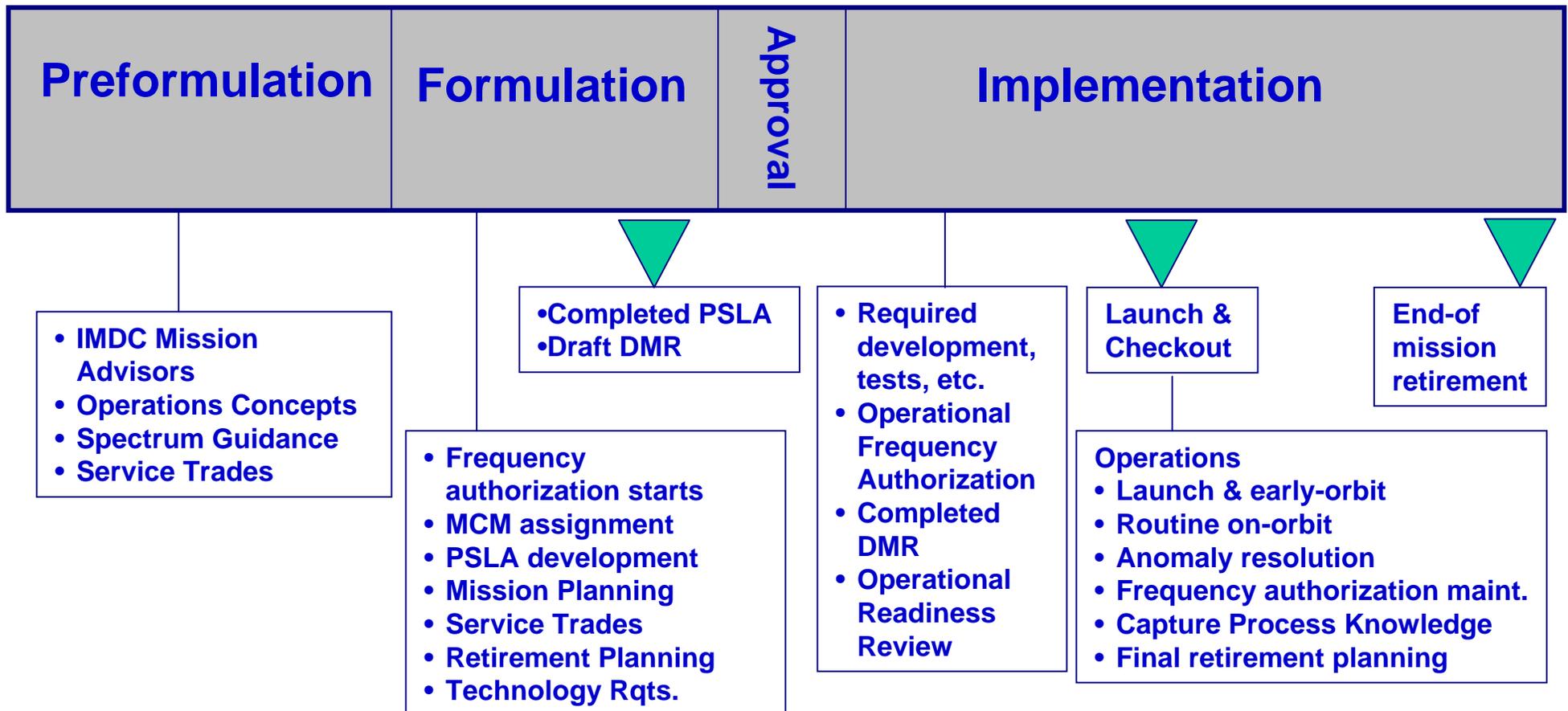
Support Personnel
(Contractor)

LEGEND



MSP Involvement in the Project Life-cycle

Operations →





MSP Points of Contact

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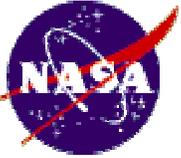
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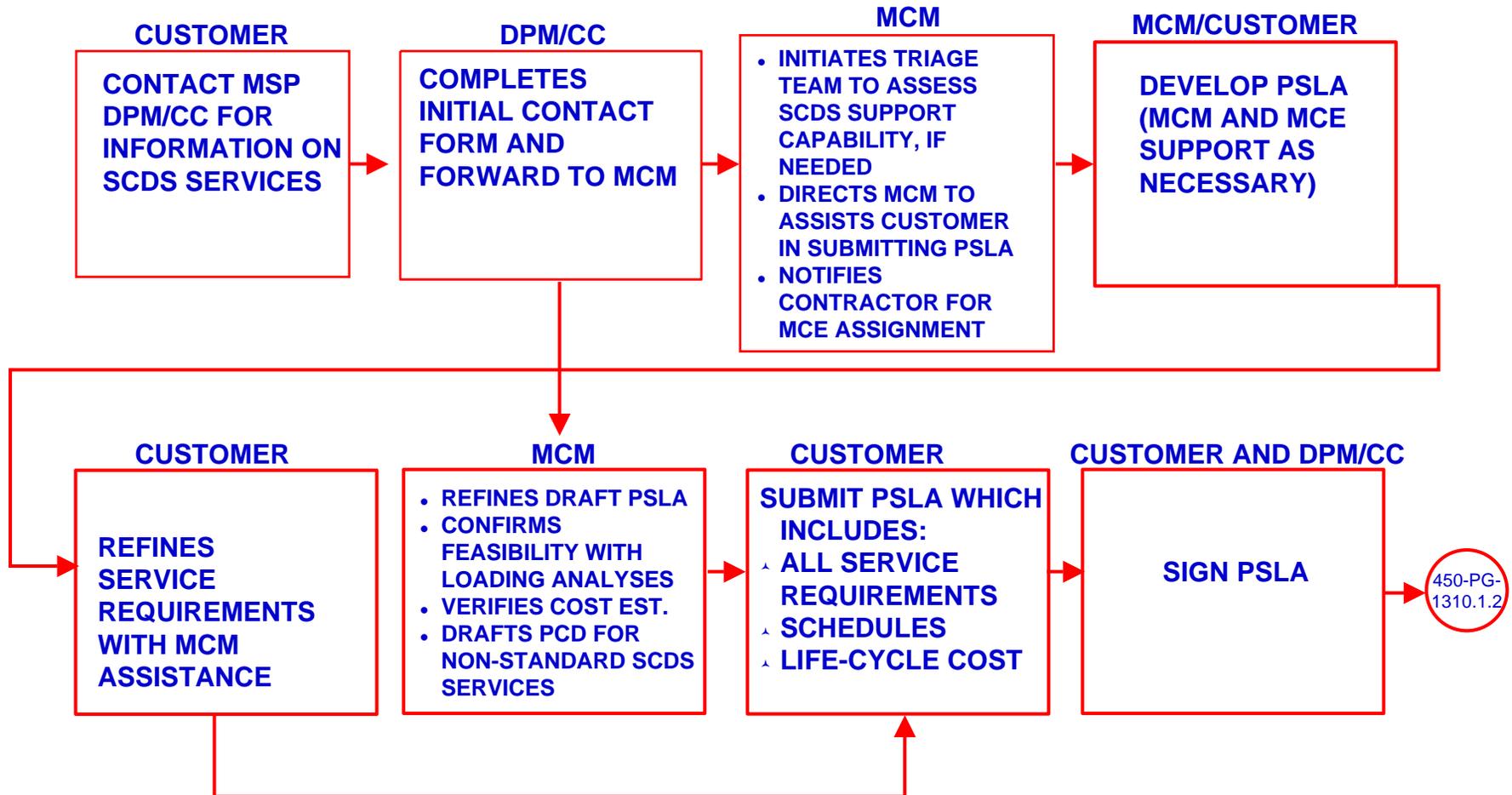


Quality Management Responsibilities

- **The following directives have the most impact on MCMs:**
 - **450-PG-1310.1 – Customer Commitment**
 - **450-PG-1310.2 – Detailed Requirements Generation**
 - **450-PG-1410.2.1 – Configuration Management Procedure**
 - **450-PG-9090.1.1 – Non-classified Reimbursable Mission Support**
- **All directives are available at the Goddard Directives Management System website located at the following URL:
http://gdms.gsfc.nasa.gov/gdms/pls/menu_guest**

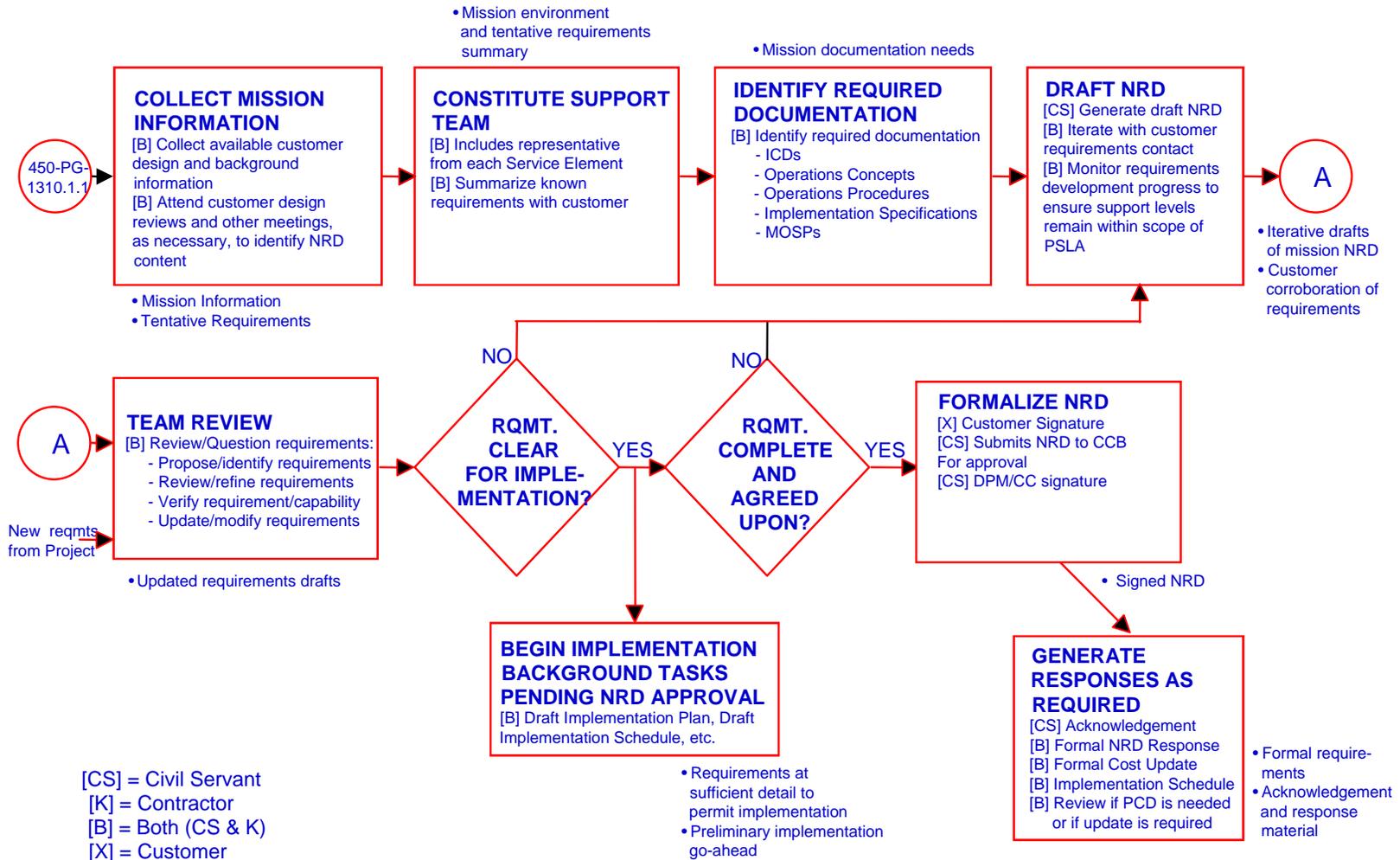


Customer Commitment Process





Detailed Requirements Generation Process





PLANNING TOOLS

- Network Planning and Analysis System -

- The Network Planning and Analysis System (NPAS) consists of an integrated set of software tools operating on HP-UNIX workstations. (<http://msp.gsfc.nasa.gov/npas>)
- Through varied deterministic simulations of future satellite telecommunication scenarios, the modeling analyst assists NASA Space Network (SN) management in performing capacity planning/loading studies, trade-off analyses and architectural assessments.
 - This tool has been key in supplying needed data for critical decisions in SN fleet management.
- Assists Customer Commitment Process by providing future, and current, customers with quick-response feasibility assessments due to new, or modified, support requirements.
- NPAS is designed to generate an operationally valid 'snapshot' of TT&C/science data flow over an interval up to 2 months in duration.
- Analysis is typically performed for multiple future times chosen by expected peak loading, or other significant events, and based on current, or expected, customer telecommunication support commitments.
- Through the construction, simulation and analysis of a series of possible support scenarios, the NPAS analyst is able to perform the types investigations necessary to estimate impacts on the network's infrastructure or the customer's support profile and to understand the driving parameters.
- The application includes orbital coverage/phasing, schedule simulation and post-scheduling analysis tools with the capability to perform 'spacecraft to delivery point' ('end-to-end') data loading/latency evaluations.
- Customer's internal mission operation processes are typically not evaluated, however, the effects of such can typically be modeled through various 'constraint' options available.
- The system design allows the analyst to leverage from baseline models and to quickly add or modify requirements or station resource configurations.



PLANNING TOOLS

- Communications Link Analysis and Simulation System -

- **The Communications Link Analysis and Simulation System (CLASS) is NASA's main asset to provide RF systems engineering, design and analysis expertise for evaluating end-to-end communications and tracking performance for missions supported via the Space Network, Ground Network, Deep Space Network and customer dedicated terminals.**
- **CLASS provides RF systems engineering, design and analysis support to customers using the Space Network and Ground Network.**
 - **Customers include:**
 - **Launch vehicles (Atlas/Centaur, Titan/Centaur, etc.)**
 - **Sub-orbit (Long Duration Balloon Program, SR-71, etc.)**
 - **Space missions (STS, HST, XTE, TRMM, Space Station, etc.)**
- **CLASS supports customer's missions from concept definition, to design, and through all phases of a customer's mission. This support includes:**
 - **Compatibility and performance analyses**
 - **Customer RF terminal design assessments and optimization analyses**
 - **Interference assessments including mutual, ground and self**
 - **Pre-mission planning analysis including coverage & link evaluations**
 - **Real-time mission scheduling and support analyses**
 - **Post-mission evaluations and anomaly assessments**
 - **Communication and tracking technology assessments**



PLANNING TOOLS - COMPATIBILITY TESTING -

- **Independent testing to ensure that RF and data systems meet specifications.**
- **Verify that Customer and supporting Network(s) meet RF interface specifications.**
- **Identify potential in-flight RF interference with other Customers.**
- **Determine margins of Network parameters and range of nominal operating conditions and overall robustness of RF interface.**
- **Testing conducted either at Compatibility Test Laboratory (CTL) at GSFC or at Customer's field location.**
- **Testing normally accomplished with engineering model or qualification model transmitter, transceiver or transponder.**
- **Testing preferably accomplished with Customer-provided data system(s) to emulate in-flight configuration as close as possible.**
- **Local RF testing with Compatibility Test Van (CTV) via coaxial cable interface to determine compatibility with the Space Network (SN).**
- **RF testing thru the Tracking and Data Relay Satellite System (TDRSS) using the CTV roof-top antenna.**



COMPATIBILITY TESTING

TEST PROCESS

- Establish dialogue with Customer for test planning.
- Review RF ICD / other applicable documents.
- Define all applicable technical interfaces.
- Prepare RF Compatibility Test Plan.
- Conduct the test.
- Perform test results analysis.
- Write test report.

COMPATIBILITY TESTS IN GENERAL

- **Command Tests**
 - Thresholds
 - Commanding with interference
- **Telemetry Tests**
 - Signal margins & bit error rates
 - Spectrum analysis
 - Transmitter power output
 - Frequency stability and offset
 - Modulation index
- **Ranging Tests**
 - Delays
 - Variation of range delay with changing parameters



MSP Functional Overview

The Mission Services Program Office (Code 450) is responsible for the management, acquisition, and implementation of end-to-end network architectures and space operations, including mission operations and tracking and data acquisition services for all missions supported by GSFC.

Deputy Program Manager/Customer Commitment (DPM/CC)

The point-of-contact for customers of SCDS services:

- coordinates requests for services in the areas of Advanced Mission Planning, Customer Commitment, and direct project support
- responsible for management of all mission PSLAs and related metrics reporting
- coordinates SCDS commitment, issue resolution, and non-SCDS support with the Code 451 MCM and respective Project Managers
- Assigns and manages the Code 451 MCMs, and initiates request to assign contractor support to MCMs

Mission Commitment Manager (Code 451)

The primary NASA point-of-contact for GSFC-unique and SCDS data services:

- oversees the development of feasibility analyses, loading studies, radio frequency analysis, requirements documentation that address mission objectives, and other assistance to develop a network support configuration
- supports the mission throughout the life-cycle for its communications, flight operations, and data processing needs (including trade studies and cost analysis during the formulation phase)
- negotiates development of requirements through all mission phases (e.g., PSLA, DMRs, NRDs)
- coordinates with mission/project managers to address operational requirements for non-SCDS T&DA, use of other U.S. government agencies' resources (e.g., DoD), and resources operated by foreign space agencies
- supports design and operational readiness reviews
- maintains insight into contractor reporting, technical integration of all communications requirements and documentation activities, as required, and ensures completion in a timely manner



MSP CONTRACTOR

Near Earth Networks Services (NENS) Contract

Manages NASA's data collection, telemetry, and communication operations that support earth-orbiting satellites, planetary exploration, and human space flight activities, including data acquisition from spacecraft, data transmission to end-users, data processing and storage, ground and space communications, and mission control center operations.

NENS Customer Service Director

DPM/CCs primary point-of-contact:

- manages the PSLA process
- supports the DPM/CC in the SCDS POP cycles
- manages all NENS contractor customer service/support activities
- supports CCO activities, meetings, and working groups
- coordinates Work Authorization Directives (authorizes the “factory” to perform the work)

NENS Support Team

The “factories” that provide the operational elements of mission support, including:

- flight dynamics support
- flight operations team members
- communications managers
- test and mission event scheduling
- tracking and data acquisition personnel
- science data processing
- software development and implementation
- engineering personnel