



Ground Systems Department

Overview

for the

DFRC CCM Meeting

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NASA Marshall Space Flight Center
Flight Projects Directorate
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Organization Charter



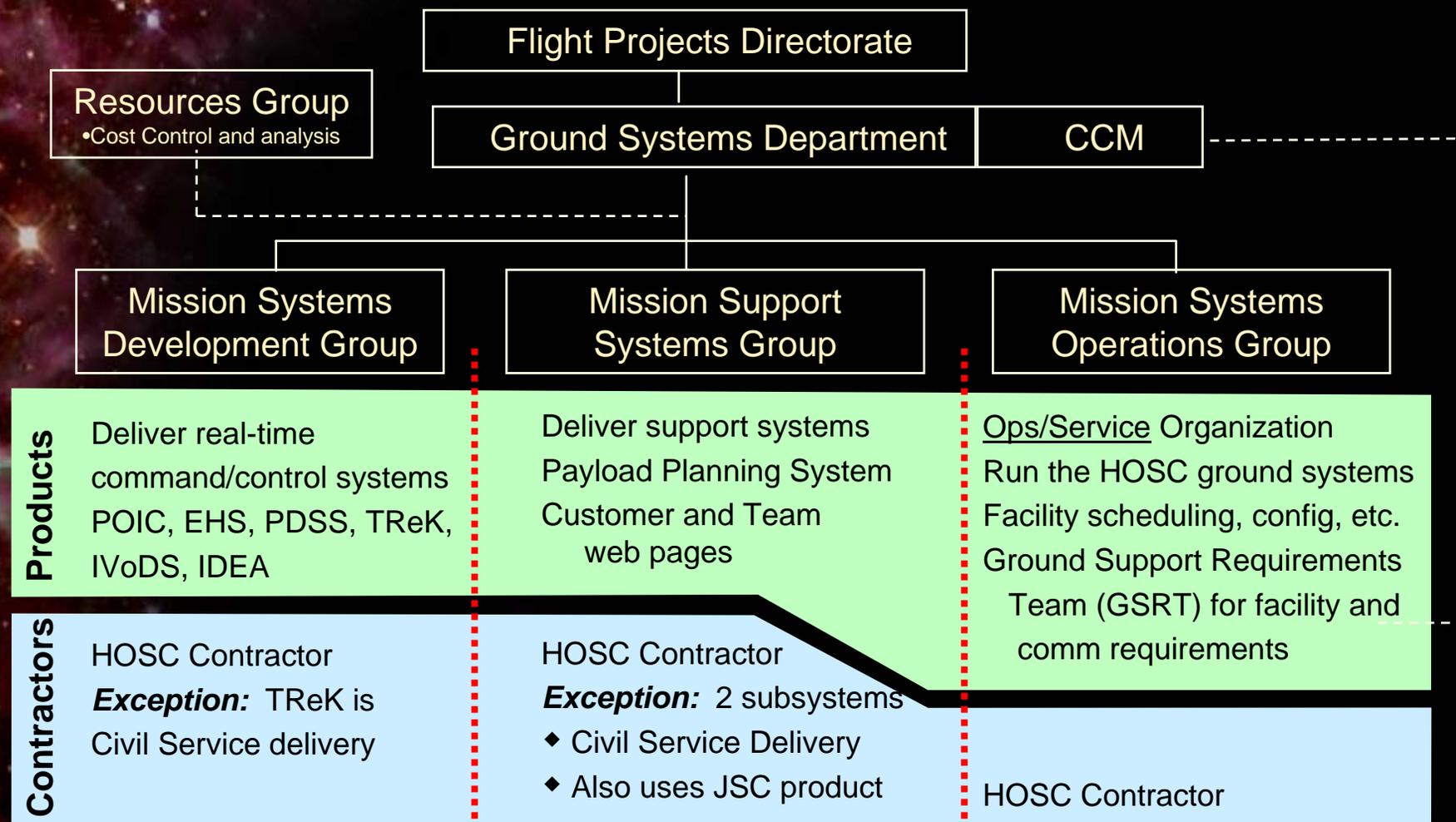
- ◆ “This is what our job is”
 - ❖ The Ground Systems Department is the MSFC organization which is chartered to provide ground systems that support space flight systems
 - ❖ Includes entire life cycle of system delivery: Conceptualization, requirements, prototyping, design, development, test, delivery, verification, operations, maintenance and sustaining engineering.
 - ❖ This is a core competency for MSFC





Project Organization

Team Structure and Functions





The HOSC

Huntsville Operations
Support Center



- ◆ The HOSC is a **multi-program** MSFC infrastructure resource for supporting flight programs
 - ❖ Resources:
 - ◆ Certified spacecraft command/control
 - ◆ Innovation in IT applications for flight
 - ◆ One-stop shop for Operations
 - ❖ History of major programs:
 - ◆ Explorer orbit determination ('58-)
 - ◆ Early boosters through Saturn 5
 - ◆ Skylab, Spacelab, Shuttle
 - ❖ Current major programs:
 - ◆ Hub for ISS Science operations (POIC)
 - ◆ Shuttle Propulsion ESR and Data Reduction Center





The Services and Products



- ◆ GSD is a customer-oriented product building organization moving into collaborative projects
- ◆ GSD operates the HOSC to meet the ops requirements of flight control customers, scientists and programs
 - ❖ Maintenance and operation of data systems within the HOSC
 - ❖ Help desk for local HOSC users and remote science users
 - ❖ Responsible for ISS program communications requirements definition, integration, delivery
- ◆ Primary product is the innovative data systems produced for the ISS payloads program.
 - ❖ Enhanced HOSC System (EHS), Payload Operations & Integration Center (POIC), Payload Data Service System (PDSS)
 - ◆ Provide command and control and support functions
 - ◆ For flight control Cadre in the HOSC, and for remote scientists
 - ◆ Also distributes science data to ISS International Partners, and allows flight control “connection” for them to work with Cadre
 - ❖ TReK, IVoDS
 - ◆ “Package” for scientists that enables true low cost remote science operations
 - ◆ Provides science data processing on inexpensive PC platform
 - ◆ Provides scientist’s an mission voice to internet voice I/f with Cadre, Crew
- ◆ Other products distributed remotely:
 - ◆ EHS copy at KSC in Payload Test & Checkout System (PTCS)
 - ◆ Entire Chandra Ops Control Center derived from EHS and delivered to contractor.
 - ◆ Contacts in progress for using our products for other programs, other locations including Internationals





The Current Collaborations



- ◆ The IDEA Project
 - ❖ Increase ISS Ku-band data distribution (from 50Mbps to 150Mbps)
 - ❖ Upgrade White Sands front-end processing, work comm upgrades across program (collaboration project between JSC, MSFC and WSC)
- ◆ Mission Operations Voice Enhancement (MOVE)
 - ❖ Collaboration among many centers but started with GSFC, MSFC, JSC and KSC
 - ❖ Replace all mission voice switches over time
- ◆ Space-based Operations Science Grid (SOSG) Prototype
 - ❖ Collaboration between MSFC/GSD, ARC/NAS, JSC/MOD and academia
 - ❖ Objective: determine feasibility of applying Grid technologies to space flight systems by developing a quasi-operational prototype
 - ❖ Enhance current user services and add new services e.g. Web/Grid enable TReK, GViDS, CVoDS, Video Auditorium, high order processing and others





The People



- ◆ Major delivery team manages the HOSC contract
 - ❖ C.S. manages the delivery of systems and products by the HOSC Contractor
 - ❖ Initiates innovation (Internet Voice Distribution System (IVoDS) today, GRIDS tomorrow)
 - ❖ C.S. and Contractor Experience and Expertise: project management, systems engineering, systems testing, software development, operations, security management, telemetry management, command management, planning systems, data distribution management, voice and video systems, test management among others
 - ❖ Across international boundaries and organizations
- ◆ Hands-On Civil Service technical team delivers in-house products
 - ❖ Telescience Resource Kit (TReK) is an overwhelmingly successful PC based command/telemetry system
 - ❖ Deployed to ISS science sites around the globe
 - ❖ Starting to nurture the next generation of hands-on innovations namely Grid technologies e.g. cluster processing





ACRONYMS



- ◆ CVoDS Collaboration Voice Distribution System
- ◆ EHS Enhanced HOSC System
- ◆ GViDS Grid Video Distribution System
- ◆ HOSC Huntsville Operations Support Center
- ◆ IDEA ISS Downlink Enhancement Architecture
- ◆ IVoDs Internet Voice Distribution System
- ◆ PDSS Payload Data Service System
- ◆ POIC Payload Operations & Integration Center
- ◆ PTCS Payload Test & Checkout System
- ◆ SOSG Space-based Operations Science Grid
- ◆ TReK Telescience Resource Kit

