NASA AgencyReport to the CCSDS Management Council

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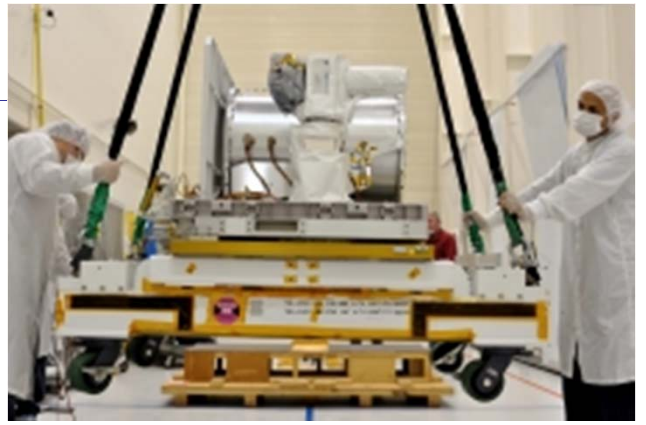
Mike Kearney
NASA MSFC
Mike.Kearney@nasa.gov
+1-256-544-2029

Consultative Committee for Space Data Systems

Agenda

- News from NASA
- Report on CCSDS activities
- Report on infusion of CCSDS standards in NASA:
  - Implementations planned by projects and in infrastructures
  - Technology effort
- Issues and proposals
- Backup Slides (optional):
  - NASA org chart
  - CMC template

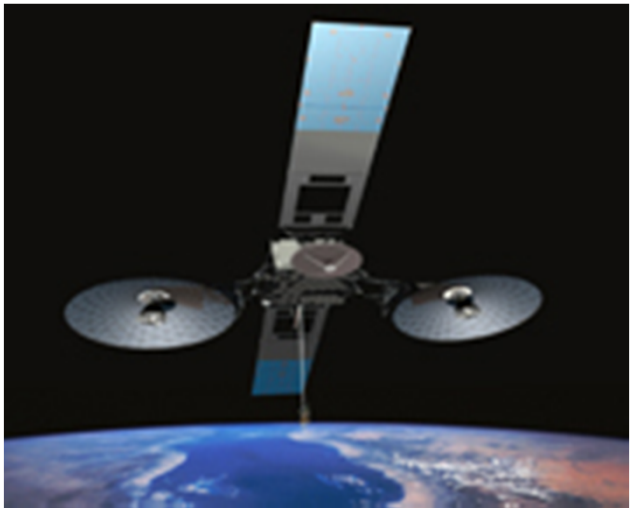
News from NASA



Optical Payload for Lasercomm Science

The Optical Payload for Lasercomm Science (OPALS) investigation, is preparing for a March 16 launch to the International Space Station aboard a SpaceX Falcon 9 rocket. The lasercomm will demonstrate up to 50 megabits per second and future deep space optical communication systems will provide over one gigabits per second from Mars. OPALS will be positioned on the station's exterior by a robotic arm and then will conduct transmission tests for a period of nearly three months, with the possibility of a longer mission.

Uses CCSDS Space Packets as defined in CCSDS 131.0-B-1 for command and data; the AOS space link protocol, CCSDS 701.0-B-2 for forward and return communications; the time code formats, CCSDS 301.0-B-2, to time tag the data; CCSDS Enhanced Forward CLTU specification, CCSDS 912.1-O-1 for the forward AOS service; SLE RAF and RCF services provide the AOS return services.



TDRS L Launch

NASA's Tracking and Data Relay Satellite L (TDRS-L) successfully launched on Jan 23 aboard an Atlas V rocket. TDRS-L is the 12th spacecraft in the agency's TDRS Project. The satellite is in good health and the manufacturer, Boeing, will conduct a three month checkout. NASA will then conduct a series of additional tests before putting TDRS-L into service.

Consultative Committee for Space Data Systems

News from NASA

Space Communication and Navigation Testbed demonstrates GPS-GNSS receiver capability

NASA's Space Communications and Navigation (SCaN) Testbed aboard the International Space Station successfully recorded a navigation signal from the European Galileo satellite constellation and the U.S. GPS constellation at the same time. The world's first flight-validated, in-space U.S. GPS-European Galileo Global Navigation Satellite System (GNSS) receiver enhances GNSS interoperability while enabling more precise and robust orbital predictions, more diverse multi-frequency GNSS capabilities and improved applications such as on-board autonomous spacecraft operations and scientific measurements. The Testbed now is helping to pave the way for greater use of international GNSS signals, to validate the new modernized GPS signals and to support future public and private sector users around the world and beyond Earth.

The New Generation of Antennas for the Deep Space Network

The construction of the first two of several 34 meter (111 foot) antennas, Deep Space Station (DSS) – 35 and 36, continues at the Canberra Deep Space Communications Complex in Australia. The 34 meter antennas will replace the aging 70 meter (230 foot) antennas at the three Deep Space Network complexes which are over 40 years old. The 34 meter (111 foot) antennas are easier to maintain and when four antennas are arrayed, they equal the performance of the 70 meter antenna.

The DSN receivers support all of the standard deep space modulation, coding, and link layer protocols. Data will be sent to the 34M from the user MOCs using SLE F-CLTU. Data will be returned to the MOCs using SLE R-AF and R-CF. The DSN is being upgraded in the next couple of years to support the CCSDS Enhanced Forward CLTU specification and Low Density Partity Check codes.

News from NASA

NASA and JAXA launch GPM

The Global Precipitation Measurement (GPM) Core Observatory, a joint Earth-observing mission between NASA and JAXA, was successfully launched on Feb. 28 from Japan. The GPM Core Observatory will map global snow and rain every three hours. The two science instruments aboard have been activated and are going through instrument checkout. The GPM Microwave Imager, provided by NASA, will estimate precipitation intensities from heavy to light rain, and snowfall. The Dual-frequency Precipitation Radar (DPR), developed by JAXA with the National Institute of Information and Communication Technology, Tokyo, will make detailed measurements of three-dimensional rainfall structure and intensity, allowing scientists to improve estimates of how much water the precipitation holds.

CCSDS 131.0 TM Synchronization and Channel Coding; CCSDS 133.0 Space Packet Protocol; CCSDS 231.0 TC Synchronization and Channel Coding; CCSDS 232.0 TC Space Data Link Protocol; CCSDS 232.1 Communication Operation Procedure-1;CCSDS 727.0 CCSDS File Delivery Protocol (CFDP); CCSDS 732.0 AOS Space Data Link Protocol

News from NASA

Facilitating Commercial Transportation To Space

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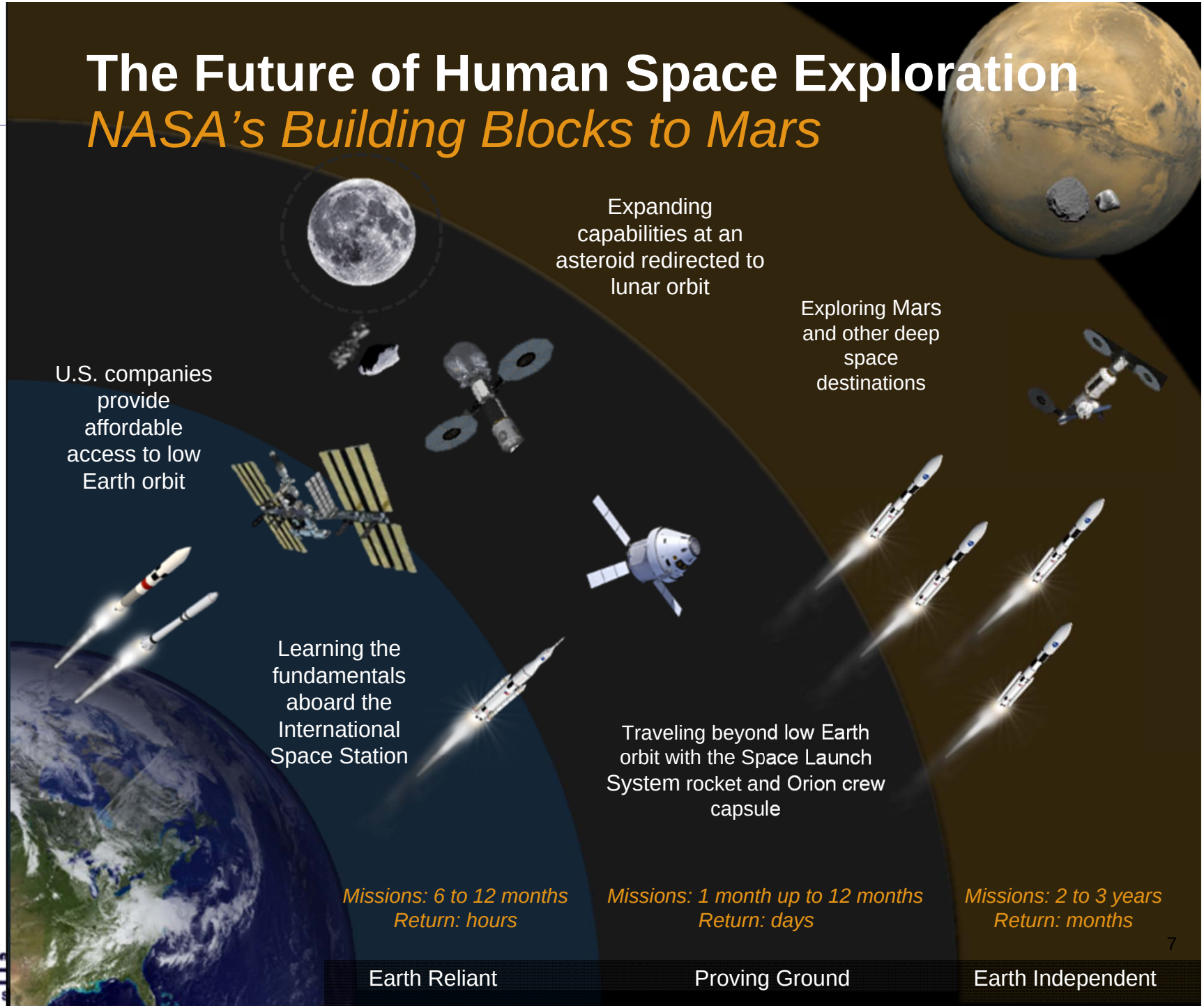
The Future of Human Space Exploration

NASA's Building Blocks to Mars

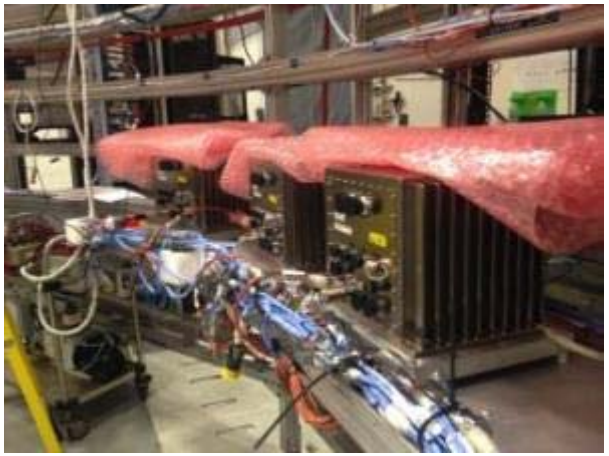


News from NASA

SLS is the rocket and launch system capable of transporting humans, habitats and support systems directly to deep space.

Powerful – High-Capacity – Flexible – Manufacturable

Three Successful Ground Tests of Booster Developmental Motors



Core Stage Flight Computers
Installed and almost ready for testing

Barrel Section Complete at MAF

Wind Tunnel Test

Barrel Weld Center

News from NASA

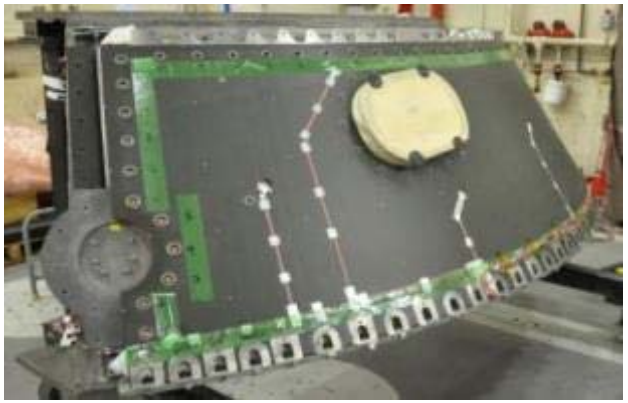
Orion is the first spacecraft in history capable of taking humans to multiple destinations in deep space.
Long Duration – Adaptable – Life Sustaining

Orion Propulsion and Life Support System Assembly

Parachute Drop Tests

Orion Post Landing Recovery Test

Orion Heat Shield



Thermal Protection System Thermal and Backshell

Successful Fairing Separation Test

News from NASA

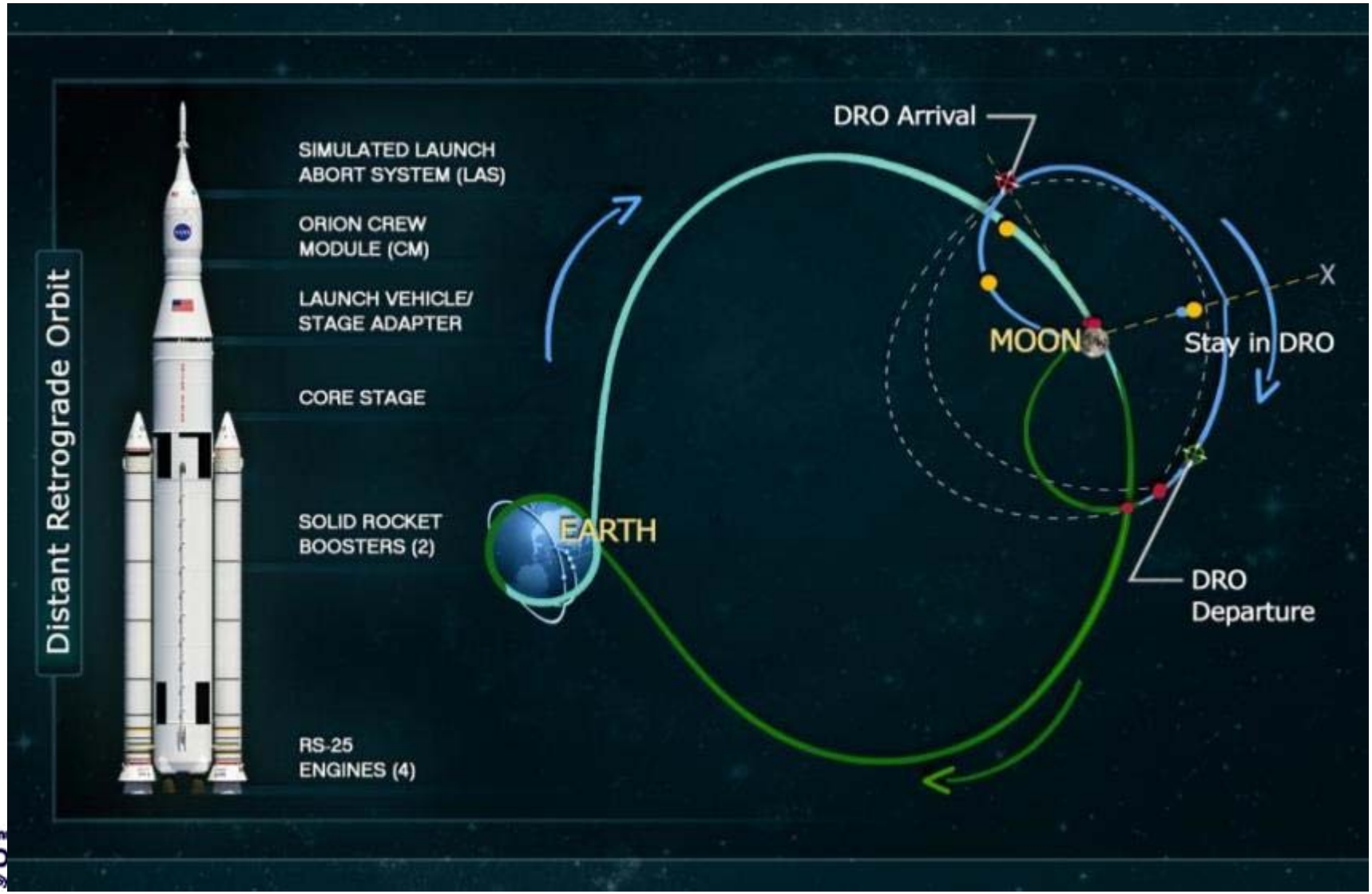
Orion Fully Powered at KSC

News from NASA

Coming This Fall…

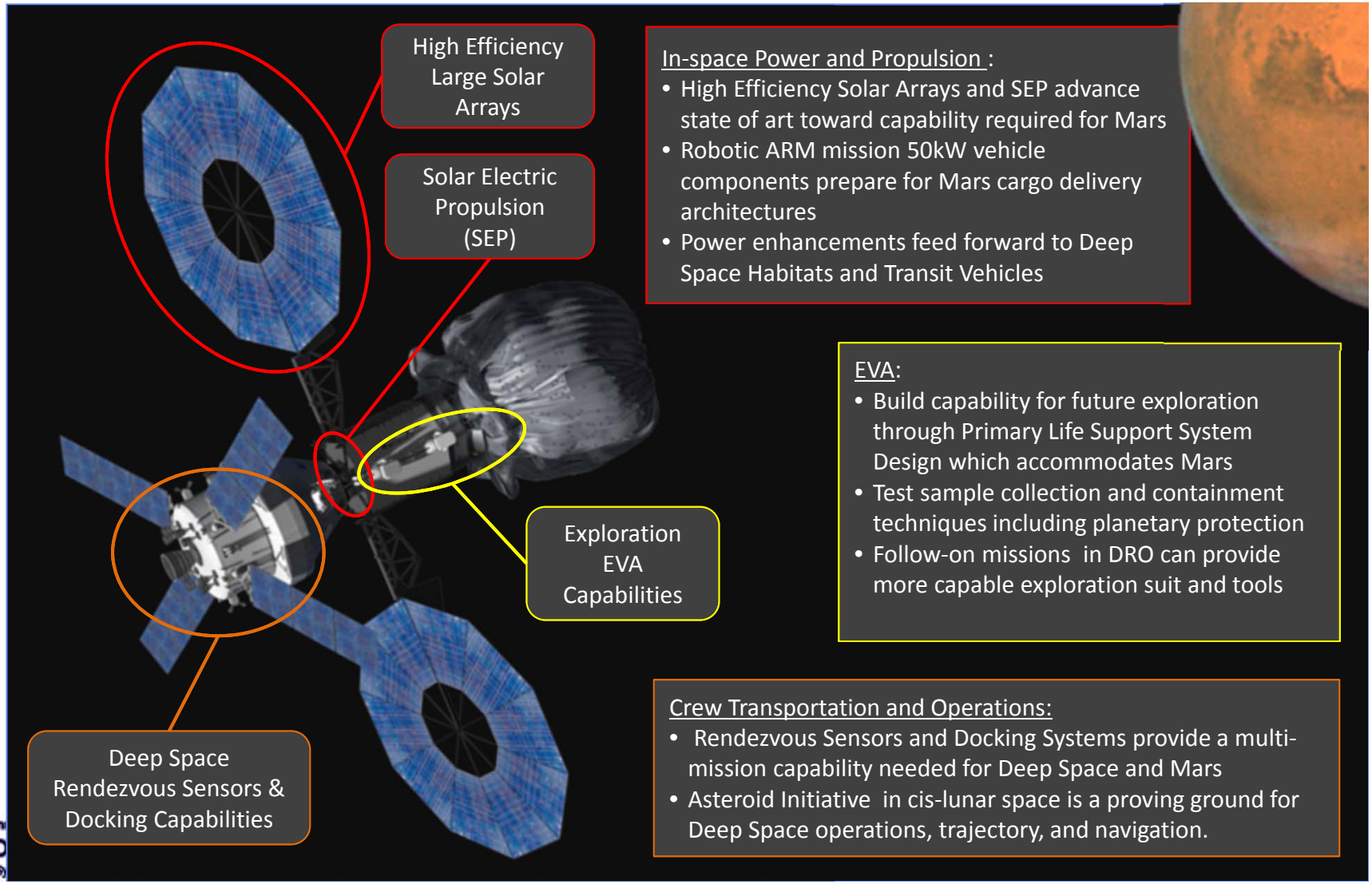
News from NASA

Exploration Mission One (EM–1)



News from NASA

Asteroid Redirect Mission Provides Capabilities For Deep Space/Mars Missions



In-space Power and Propulsion :

- High Efficiency Solar Arrays and SEP advance state of art toward capability required for Mars
- Robotic ARM mission 50kW vehicle components prepare for Mars cargo delivery architectures
- Power enhancements feed forward to Deep Space Habitats and Transit Vehicles

EVA:

- Build capability for future exploration through Primary Life Support System Design which accommodates Mars
- Test sample collection and containment techniques including planetary protection
- Follow-on missions in DRO can provide more capable exploration suit and tools

Crew Transportation and Operations:

- Rendezvous Sensors and Docking Systems provide a multi-mission capability needed for Deep Space and Mars
- Asteroid Initiative in cis-lunar space is a proving ground for Deep Space operations, trajectory, and navigation.

NASA support to CCSDS WGs

- 105 Document Projects in the Framework
- 89 have NASA participation in some way (Green areas)
- Most without NASA participation are simply in the formulation stage.

Project Title	Charter	Color	Book Ed	Prototype 1	Prototype 2	Contribute	Monitor
CCSDS Cryptographic Algorithms Green Book	1.01 Security Working Group	Green	NASA	Not Required	Not Required	DLR, ESA, NASA, UKSA	CNES
CCSDS Symmetric Key Management Recommendations	1.02 Security Working Group	Blue	ESA	TBD	TBD	ESA, NASA	CNES, DLR, ESA, NASA, UKSA
Network Layer Security Adaptation Profile	1.01 Security Working Group	Blue	NASA	TBD	TBD		CNES, DLR, ESA, UKSA
Security Threats against Space Missions Revision	1.01 Security Working Group	Green	NASA	Not Required	Not Required	UKSA	CNES, DLR, ESA
Symmetric Key Management Rationale	1.02 Security Working Group	Green	ESA	Not Required	Not Required	ESA, NASA	CNES, DLR, ESA, JAXA, NASA, UKSA
Delta-DOR operations - Issue 2	1.06 Delta-DOR Working Group	Magenta	ESA	Not Required	Not Required	JAXA, NASA	ESA
Delta-DOR Quasar Catalogue development	1.06 Delta-DOR Working Group	Magenta	NASA	Not Required	Not Required	ESA, JAXA	ESA
Delta-DOR technical Characterization and performance - Issue 2	1.06 Delta-DOR Working Group	Green	NASA			ESA, JAXA, NASA	ESA
Control Authority Data Structures - XML Format	2.01 Data Archive Ingestion Working G	Blue	NASA	NASA	TBD	NASA	CNES, ESA
Data Entity Dictionary Specification Language (DEDSL) - XML Schema	2.01 Data Archive Ingestion Working G	Blue	TBD	TBD	TBD	CNES, NASA	ESA, UKSA
Data Preservation Process	2.01 Data Archive Ingestion Working G	Magenta	CNES			CNES, ESA	NASA, UKSA
Producer Archive Interface Specification Tutorial	2.01 Data Archive Ingestion Working G	Green	CNES	Not Required	Not Required	CNES, ESA, NASA	
Producer-Archive Interface Specification (PAIS)	2.01 Data Archive Ingestion Working G	Blue	CNES	CNES	ESA	CNES, ESA, NASA	UKSA
Navigation Green Book (Version 4.500.0-G-4)	2.02 Navigation Working Group	Green	NASA	Not Required	Not Required	NASA	CNES, DLR, ESA, JAXA
Navigation Hardware Message	2.02 Navigation Working Group	Blue	NASA	NASA	TBD	NASA	CNES, DLR, ESA, JAXA, NASA
Pointing Requests Message	2.02 Navigation Working Group	Blue	ESA	ESA	TBD	CNES, DLR, ESA, NASA	CNES, DLR, ESA, JAXA, NASA
Spacecraft Maneuver Message (SMM)	2.02 Navigation Working Group	Blue	NASA	NASA	TBD	CNES, DLR, ESA, NASA	CNES, DLR, ESA, JAXA, NASA
Tracking Data Message (TDM) 5 Year Review Revision	2.01 Navigation Working Group	Blue	NASA	TBD	TBD	ESA, NASA	CNES, DLR, JAXA
MO Common Object Model	2.04 Spacecraft Monitoring and Contr	Blue	ESA	ESA	CNES	CNES, DLR, NASA, UKSA	ASI, CSA, FSA, INPE, JAXA
MO Common Services	2.04 Spacecraft Monitoring and Contr	Blue	ESA	ESA	CNES	CNES, DLR, NASA, UKSA	ASI, CSA, FSA, INPE, JAXA
MO Service: Automation	2.04 Spacecraft Monitoring and Contr	Blue					
MO Service: Data Product Management	2.04 Spacecraft Monitoring and Contr	Blue					
MO Service: Flight Dynamics	2.04 Spacecraft Monitoring and Contr	Blue					
MO Service: Location	2.04 Spacecraft Monitoring and Contr	Blue					
MO Service: M&C	2.04 Spacecraft Monitoring and Contr	Blue	ESA	ESA	DLR	CNES, DLR, NASA, UKSA	ASI, CSA, FSA, INPE, JAXA
MO Service: Planning	2.04 Spacecraft Monitoring and Contr	Blue					
MO Service: Remote Buffer Management	2.04 Spacecraft Monitoring and Contr	Blue					
MO Service: Scheduling	2.04 Spacecraft Monitoring and Contr	Blue					
MO Service: Software Management	2.04 Spacecraft Monitoring and Contr	Blue					
MO Service: Time	2.04 Spacecraft Monitoring and Contr	Blue					
MO Technology Mapping: CCSDS Space Packet	2.04 Spacecraft Monitoring and Contr	Blue	CNES	CNES	DLR	DLR, ESA, NASA, UKSA	ASI, CSA, FSA, INPE, JAXA
XML Telemetry and Command Exchange (XTCE) Pink Sheets	2.04 Spacecraft Monitoring and Contr	Blue	NASA	Not Required	Not Required	CNES, DLR, ESA, UKSA	ASI, CSA, FSA, INPE, JAXA
Examples of best practice for auditors	2.05 Digital Repository Audit and Cer	Green	UKSA			CNES, NASA, UKSA	
Telerobotic Standard (Blue Book)	2.06 Telerobotics Working Group	Blue	NASA	NASA	TBD		CSA, DLR, ESA
Telerobotics Standard Roadmap (Green Book)	2.06 Telerobotics Working Group	Green	NASA	Not Required			CSA, DLR, ESA
Cross-Support Specification Framework	3.06 Cross Support Transfer Services	Blue	ESA	ESA	NASA	CNES, DLR, ESA, NASA	CNES, DLR, ESA, NASA
Cross-Support Transfer Service Specification Framework Concept	3.06 Cross Support Transfer Services	Green	DLR	Not Required	Not Required	CNES, DLR, ESA, NASA	
Guidelines for Specification of Cross Support Transfer Services	3.06 Cross Support Transfer Services	Magenta	DLR	Not Required	Not Required	CNES, DLR, ESA, NASA	
Monitored Data - Cross Support Transfer Services	3.06 Cross Support Transfer Services	Blue	NASA	CNES	NASA	CNES, DLR, ESA, NASA	
SLE Application Program Interface for Return All Frames Service, Magenta Bo	3.06 Cross Support Transfer Services	Magenta	DLR	Not Required	Not Required	CNES, DLR, ESA, NASA	CNES, DLR, ESA, NASA
SLE Application Program Interface for Return Channel Frames Service: M-1-1	3.06 Cross Support Transfer Services	Magenta	DLR	Not Required	Not Required	CNES, DLR, ESA, NASA	CNES, DLR, ESA, NASA
SLE Application Program Interface for Return Operational Control Fields: M-1	3.06 Cross Support Transfer Services	Magenta	DLR	Not Required	Not Required	CNES, DLR, ESA, NASA	CNES, DLR, ESA, NASA
SLE Application Program Interface for the Forward CLTU Service, Magenta Bo	3.06 Cross Support Transfer Services	Magenta	DLR	Not Required	Not Required	CNES, DLR, ESA, NASA	CNES, DLR, ESA, NASA
SLE Application Program Interface for the Forward Space Packet Service, M-1	3.06 Cross Support Transfer Services	Magenta	DLR	Not Required	Not Required	CNES, DLR, ESA, NASA	CNES, DLR, ESA, NASA
SLE Application Program Interface for Transfer Services—Core Specification	3.06 Cross Support Transfer Services	Magenta	DLR	Not Required	Not Required	CNES, DLR, ESA, NASA	CNES, DLR, ESA, NASA
Tracking Data Cross Support Transfer Service	3.06 Cross Support Transfer Services	Blue	NASA	TBD	TBD	CNES, DLR, ESA, NASA	
Space Communications Cross Support Architecture Requirements Document	3.07 Cross Support Space Communica	Magenta	NASA			JAXA, NASA	ESA, JAXA, NASA, UKSA
Cross Support Service Management--Service Agreements and Service Configu	3.08 Cross Support Service Managem	Blue	TBD	TBD	TBD	NASA, UKSA	CNES, DLR, ESA, JAXA
Cross Support Service Management: Simple Schedule Format Specification	3.08 Cross Support Service Managem	Blue	ESA	DLR	NASA	CNES, DLR, ESA, NASA	JAXA, UKSA
Cross Support Service Management: Event Sequence Data Format	3.08 Cross Support Service Managem	Blue	TBD	TBD	TBD		
Cross Support Service Management - Management Services (Automation)	3.08 Cross Support Service Managem	Blue					
Cross Support Service Management - Planning Data Formats	3.08 Cross Support Service Managem	Blue	ESA	NASA	ESA	DLR, ESA, JAXA, NASA	CNES, UKSA
Cross Support Service Management - Service Accounting	3.08 Cross Support Service Managem	Blue	TBD	TBD	TBD		
Cross Support Service Management: Service Catalog	3.08 Cross Support Service Managem	Blue	TBD	TBD	TBD		
Cross Support Service Management: Service Request and Service Package Dat	3.08 Cross Support Service Managem	Blue	NASA	DLR		NASA	CNES, DLR, ESA, JAXA, UKSA
Cross Support Service Management: Trajectory Prediction Data Format	3.08 Cross Support Service Managem	Blue	NASA			NASA	CNES, DLR, ESA, JAXA, UKSA
Extensible Space Communication Cross Support Service Management--Core	3.08 Cross Support Service Managem	Green	NASA	Not Required	Not Required	ESA, NASA	CNES, DLR, JAXA, UKSA
Common Dictionary of Terms for Onboard Devices and Software Components	4.02 Application Support Services Wo	Blue	Other	ESA	NASA	ESA, NASA, UKSA	CNES, DLR, ESA, NASA, UKSA
Device Enumeration Service	4.02 Application Support Services Wo	Magenta	UKSA	Not Required	Not Required	ESA, NASA, UKSA	
Device Virtualization Service	4.02 Application Support Services Wo	Magenta	UKSA	Not Required	Not Required	ESA, NASA, UKSA	
Electronic Data Sheets	4.02 Application Support Services Wo	Green	UKSA	Not Required	Not Required	ESA, NASA, UKSA	
XML Specification for Electronic Data Sheets for Onboard Devices and Softwa	4.02 Application Support Services Wo	Blue	ESA	ESA	NASA	ESA, NASA, UKSA	CNES, ESA, NASA, UKSA
RFID Tag Encoding Standard for Space Applications	4.03 Onboard Wireless Working Group	Blue	NASA	NASA	TBD	NASA	ESA
SDIS-WIE High data-rate wireless communications for spacecraft monitoring	4.03 Onboard Wireless Working Group	Magenta	NASA			CSA, ESA, NASA	
Wireless Network Communications Overview for Space Mission Operations	4.03 Onboard Wireless Working Group	Green	NASA	Not Required	Not Required	CSA, ESA, NASA	CSA, ESA, NASA
Evaluations of CCSDS recommendations for RF & Modulation systems, part 1	5.01 RF and Modulation Working Grou	Blue	ESA	ESA	NASA	CNES, DLR, ESA, FSA, NASA	JAXA
Planetary Communications System	5.01 RF and Modulation Working Grou	Green	CNES	Not Required	Not Required	CNES	ESA
Proximity-1 Space Link Protocol—Physical Layer, Issue 4	5.01 RF and Modulation Working Grou	Blue	ESA	Not Required	Not Required	ESA, FSA, NASA	
Pseudo-Noise (PN) Ranging Systems (Review of Issue 1 GREEN BOOK)	5.01 RF and Modulation Working Grou	Green	ESA	Not Required	Not Required	ESA, NASA	CNES, ESA, NASA
Pseudo-Noise (PN) Ranging Systems (Review of Issue 1)	5.01 RF and Modulation Working Grou	Blue	ESA	Not Required	Not Required	ESA, NASA	CNES, ESA, NASA
Erasure Correcting Codes for Near-Earth and Deep-Space Communications	5.01 Space Link Coding and Synchron	Orange	DLR	Not Required	Not Required	DLR	
Improved Coding Schemes for the Proximity Link	5.02 Space Link Coding and Synchron	Blue	ESA	NASA	NASA	NASA	CNES, DLR, ESA, NASA, UKSA
Proximity-1 Space Link Protocol—Coding and Synchronization Sublayer - Iss	5.02 Space Link Coding and Synchron	Blue	ESA	Not Required	Not Required	CNES, DLR, ESA, NASA, UKSA	CNES, DLR, ESA, NASA, UKSA
Short (64, 128, 256 bit) LDPC codes for uplink	5.02 Space Link Coding and Synchron	Orange	NASA	Not Required	Not Required	DLR, NASA	
TM Channel Coding for DVB-S2, Green Book	5.02 Space Link Coding and Synchron	Green	CNES	Not Required	Not Required	CNES	DLR, ESA, FSA, NASA, UKSA
TM Channel Coding for SCCC, Green Book	5.02 Space Link Coding and Synchron	Green	ESA	Not Required	Not Required	ESA	CNES, DLR, ESA, FSA, NASA, UKSA
Image Data Compression, Issue 2	5.03 Multispectral and Hyperspectral	Blue	NASA	CNES	NASA	CNES, NASA	ESA
Lossless Multispectral & Hyperspectral Image Compression	5.03 Multispectral and Hyperspectral	Green	NASA	Not Required	Not Required	CNES, ESA, NASA	
Spectral Pre-Processing Transform for Multispectral & Hyperspectral Image	5.03 Multispectral and Hyperspectral	Blue	NASA	NASA	CNES	CNES, NASA	
AOS Space Data Link Protocol Issue 3: 5 year Review + SDLS Rqmt	5.04 Space Link Protocols Working Gr	Blue	NASA	Not Required	Not Required	CNES, ESA, NASA, UKSA	CSA, DLR, ESA
Next Generation Space Data Link Protocol Blue Book	5.04 Space Link Protocols Working Gr	Blue	NASA	DLR	NASA	CNES, ESA, NASA, UKSA	CNES, ESA, NASA, UKSA
Next Generation Space Data Link Protocol Green Book	5.04 Space Link Protocols Working Gr	Green	NASA	Not Required	Not Required	NASA, UKSA	DLR
Proximity-1 Green Book Issue 2	5.04 Space Link Protocols Working Gr	Green	UKSA	Not Required	Not Required	ESA, NASA, UKSA	CNES, ESA, NASA, UKSA
Proximity-1 Space Link Protocol—Data Link Layer - Issue 5	5.04 Space Link Protocols Working Gr	Blue	NASA	Not Required	Not Required	ESA, NASA, UKSA	CNES, ESA, NASA, UKSA
TC Space Data Link Protocol Issue 3: SDLS Rqmt	5.04 Space Link Protocols Working Gr	Blue	NASA	Not Required	Not Required	CNES, ESA, NASA, UKSA	CNES, ESA, NASA, UKSA
TM Space Data Link Protocol Issue 2: 5 year Review + SDLS Rqmt	5.04 Space Link Protocols Working Gr	Blue	NASA	Not Required	Not Required	CNES, ESA, NASA, UKSA	CNES, ESA, NASA, UKSA
Update of Overview of Space Communications Protocols 130.0-G Green Book	5.04 Space Link Protocols Working Gr	Green	NASA	Not Required	Not Required	CNES, ESA, NASA, UKSA	CNES, ESA, NASA, UKSA
Next Generation Uplink Application Profiles	5.08 Next Generation Uplink Working	Green	NASA	Not Required	Not Required	CNES, DLR, ESA, NASA, UKSA	CNES, DLR, ESA, NASA, UKSA
Space Data Link Security (SDLS) protocol - extended procedures	5.09 Space Data Link Security WG	Blue	NASA	CNES	TBD	CNES, DLR, ESA, NASA	FSA, UKSA
Space Data Link Security Concept of Operation, Issue 1	5.09 Space Data Link Security WG	Green	ESA	Not Required	Not Required	CNES, DLR, ESA, NASA	FSA, UKSA
Space Data Link Security Concept of Operation, Issue 2	5.09 Space Data Link Security WG	Green	TBD	Not Required	Not Required	CNES, DLR, ESA, NASA	FSA, UKSA
Space Data Link Security Protocol	5.09 Space Data Link Security WG	Blue	NASA	CNES	TBD	CNES, DLR, ESA, NASA	FSA, UKSA
Digital Motion Imagery Applications	6.08 Motion Imagery and Applications	Blue	NASA	NASA	DLR	DLR, ESA, JAXA	CSA, CNES, FSA
BP Network Management	6.09 Delay Tolerant Networking Work	Blue	TBD	TBD	TBD		
Bundle Protocol for CCSDS (was DTN Protocol)	6.09 Delay Tolerant Networking Work	Blue	NASA	Other	NASA	NASA, UKSA	CSA, DLR, INPE, JAXA, NASA, UKSA
Bundle Security Protocol for CCSDS	6.09 Delay Tolerant Networking Work	Blue	TBD	Not Required	TBD	NASA	CNES, ESA, JAXA
Contact Graph Routing (CGR) for CCSDS	6.09 Delay Tolerant Networking Work	Blue	TBD	TBD	TBD	ESA, JAXA, NASA	CNES
Licklider Transmission Protocol for CCSDS	6.09 Delay Tolerant Networking Work	Blue	NASA	Other	NASA	ESA, NASA	CSA, DLR, ESA, JAXA, NASA, UKSA
Single-Hop-to-Any Network Management Requirements for BP	6.09 Delay Tolerant Networking Work	Green					
Solar System Internetwork Architecture Document	6.09 Delay Tolerant Networking Work	Green	NASA			ESA, JAXA, NASA	ESA, JAXA, NASA
Voice and Audio Communications	6.10 Voice Working Group	Blue	DLR	DLR	NASA	CNSA, DLR, ESA, FSA, NASA	CNSA, DLR, ESA, FSA, NASA
Operation of CFDP over Encapsulation Service	6.11 CFDP over the CCSDS Encapsulat	Magenta	ESA			ESA, NASA	ESA, NASA
CCSDS File Delivery Protocol (CFDP) Update -- Blue Book	6.12 CFDP Revisions Working Group	Blue	NASA	NASA	ESA	ESA, JAXA	
CCSDS File Delivery Protocol (CFDP) Update -- Implementer's Guide	6.12 CFDP Revisions Working Group	Green	NASA	Not Required	Not Required		ESA, JAXA
CCSDS File Delivery Protocol (CFDP) Update -- Interoperability Test Plan	6.12 CFDP Revisions Working Group	Green	NASA	Not Required	Not Required		ESA, JAXA
CCSDS File Delivery Protocol (CFDP) Update -- Introduction and Overview	6.12 CFDP Revisions Working Group	Green	ESA	Not Required	Not Required	JAXA, NASA	

Consultative Committee for Space Data Systems

Report on infusion of CCSDS standards
DTN Technology efforts

- Work is proceeding to implement the DTN-for-ISS change request. The plan is to allocate laptops to serve as 'border DTN routers' for ISS.
- Three projects from the crowdsourcing approach are completed / underway:
  - LTP Authentication – TopCoder implemented the LTP authentication mechanisms from the LTP Red Book for the ION Open Source BP implementation. The code produced will be part of the interoperability test for the LTP Blue Book.
  - Delay-Tolerant Payload Conditioning for DTN2 – TopCoder teams, starting with the MSFC DTPC implementation, will do some modifications, integration and testing in support of the interoperability testing for the BP-for-CCSDS Blue Book.
  - Security Key Management – TopCoder is investigating ways to perform key management in Delayed / Disrupted environments.
- NASA MSFC is working with DLR's Col-CC team to pursue a ground DTN prototype to deliver science and support data to Col-CC users.
- NASA is working to integrate DTN capabilities into its Core Flight Software (CFS) suite of avionics software. This will make DTN services available for spacecraft avionics to missions that choose to use CFS.

Items of concern to NASA

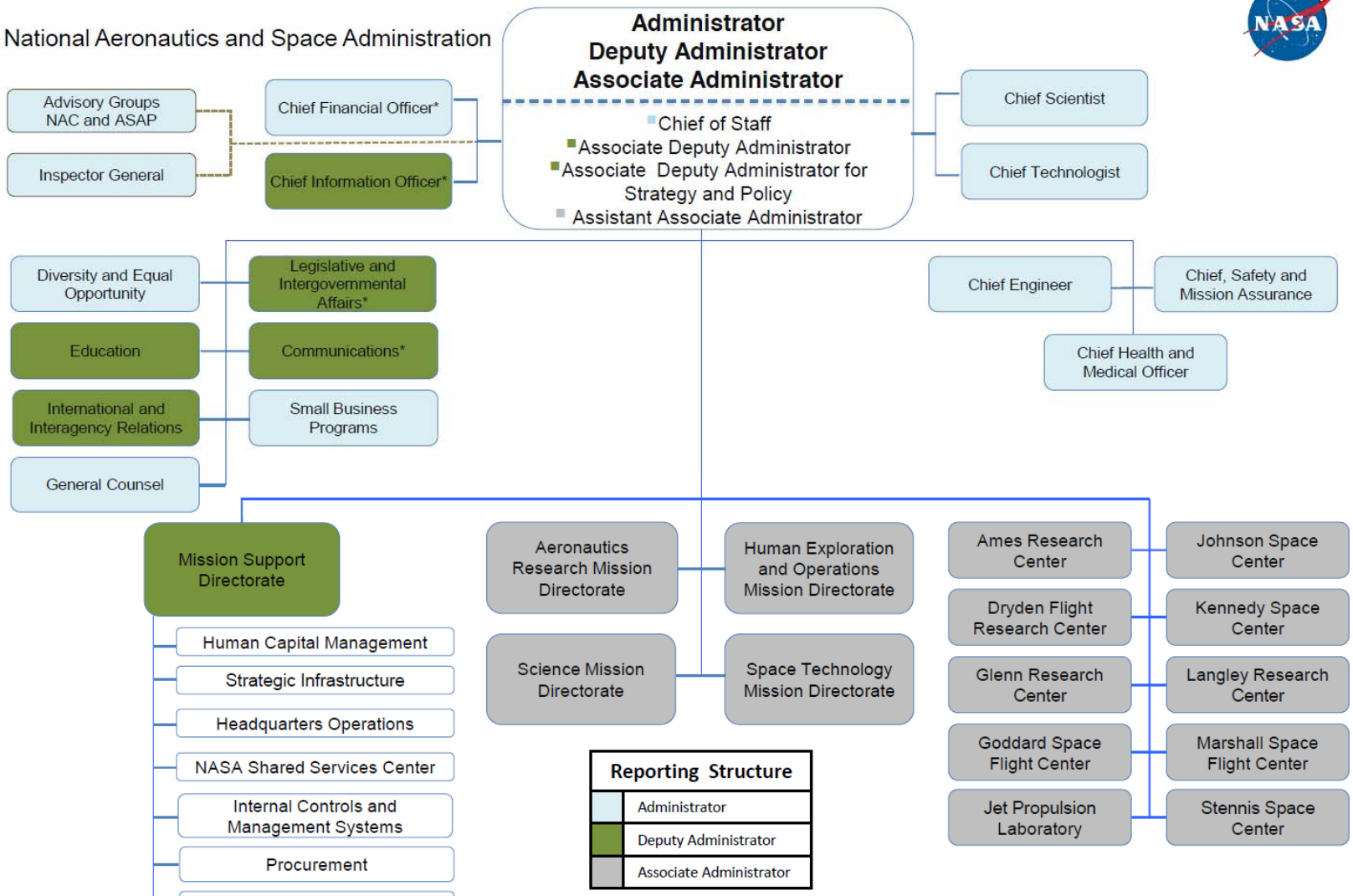
- Next Gen Space Link Protocols, while not broadly accepted by SLS teams, is critical to future human spaceflight programs. NASA strongly promotes further work in this area.
- Participation of commercial spaceflight providers needs to be increased.
  - Text in the Procedures manual should reflect this, but that is not the critical question.
  - The critical question is what do we *do* to recruit interest from SpaceX, Sierra Nevada, Virgin Galactic, etc.
  - No quick answers for this.
- In general, because of reductions to NASA's budget for the Secretariat (in 2010), outreach for CCSDS has suffered. More effort and projects by other agencies is encouraged.
  - Can some other agency take on the role of "outreach lead", and organize/produce things like press reports, conference booths,
  - Suggestion: When a CCSDS Agency is hosting the next SpaceOps or IAC conference, they should produce/execute a CCSDS booth with giveaways, brochures, etc.

Ontologies – New area to consider or not?

- Ontologies (data dictionaries with relationships to build an ontological system).
  - Important to automation; e.g. management of autonomous planetary surface rovers, etc.
- NASA has a NASA-internal proposed standard on ontologies.
  - It seems to have a scope larger than spaceflight… physics and scientific dictionary and relationships, etc.
- OMG also has work in this area, not exactly compatible with the NASA approach.
- ISO may be the most appropriate forum for the broadest standard including scope outside of spaceflight. (spaceflight terms are a subset)
- Options are:
  1. CCSDS does nothing.
  2. CCSDS develops a proposal for a CCSDS standard.
  3. CCSDS develops a proposal for an ISO standard.
  4. CCSDS develops a proposal for an OMG standard (cover-sheets it?).
- NASA thoughts:
  - NASA suggests anything but #1.
  - If CCSD ever expects to need this, it's better to start early.
  - Resources are always a problem. We should decide what's best and then address resources.

BACKUP MATERIAL

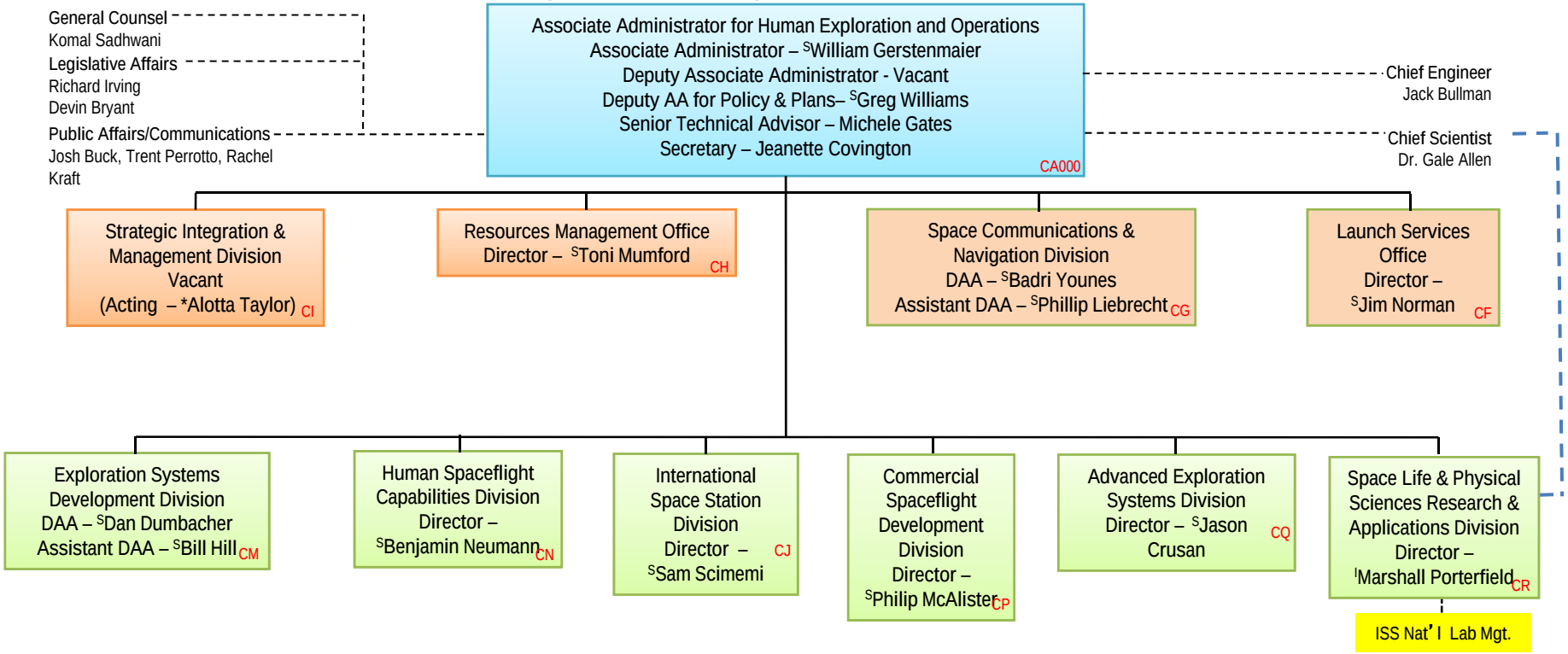
NASA Org Chart



Note:
* Center functional office directors report to Agency functional AA. Deputy and below report to Center leadership.

HEOMD Organization

Human Exploration and Operations Mission Directorate



Eracenia Kennedy (Sec)

CMC Template Outline (as agreed in CMC Spring 2010)

- News from the Agency (brief): Organization changes, next launches…
- Report on CCSDS activities:
  - Areas of interest and manpower / personnel involved
  - Statements on the activities conducted in the areas of interest
- Report on infusion of CCSDS standards in Agencies :
  - Implementations planned by projects and in infrastructures
  - Technology effort
- Issues and proposals
- Spare Slides : Agency references
  - Organization
  - Mission model
  - In-flight missions

Consultative Committee for Space Data Systems