Space Operations Mission Directorate (SOMD)

Fiscal Year 2012 Budget Overview

May 2011

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Space Operations Mission Directorate

Agenda

- **Overview**
- **Program Details**

SOMD OVERVIEW

SOMD Budget Priorities

05/03/2011

- **Implement within budget and meet our external commitments**
  - Delayed passage of the "Department of Defense and Full-Year Continuing Appropriations Act, 2011" created funding constraints and uncertainty for the first half of FY 2011
  - Execution consistent with the NASA Authorization Act of 2010 in all areas possible
- **Safely fly the remaining Space Shuttle manifest, including STS-135 through FY 2011 while continuing to efficiently and responsibly retire the Space Shuttle, and provide for the required pension liability for the Program's prime contractor**
- **Ensure safety and viability of astronauts on the International Space Station (ISS), which has been extended to 2020 and likely beyond,**
  - Provide for continued operations and support of full utilization for research and enhanced functionality
  - Support research, technology development, demonstration, as well as, enhancements to the ISS facility and operations
- **Support U.S. Commercial space industry to enable safe, reliable and cost effective access to low Earth orbit**

SOMD Budget Priorities (Cont.)

- **The 21st Century Space Launch Complex Program at Kennedy Space Center (KSC), will benefit current and future NASA and commercial space launch activities and other complex users**
- **Continue to provide launch services, rocket propulsion test facilities and space communications to our customers**
- **Mission Operations Sustainment provides for essential human spaceflight activities by addressing outyear space operations requirements and risk**
- **Currently planning to merge SOMD and Exploration Systems Mission Directorate (ESMD), to create a new directorate which will implement human spaceflight program content, in alignment with the goals of the NASA Authorization Act of 2010**
  - This organization will manage all human spaceflight programs including ISS, Commercial Crew and Cargo, Space Launch System (SLS), Multi-Purpose Crew Vehicle (MPCV), and Exploration Research and Development

SOMD: Program Financial Plan Full Cost View

05/03/2011

Budget Authority ($M)	FY 2010 Actual *	FY 2011 CR	FY 2012	Notional FY 2013	Notional FY 2014	Notional FY 2015	Notional FY 2016
FY 2012 President's Budget Request	**6,141.8**	**5,497.5**	**4,346.9**	**4,346.9**	**4,346.9**	**4,346.9**	**4,346.9**
Space Shuttle	3,101.4	1,606.5	664.9	79.7	0.8	0.8	0.9
Pension Liability			547.9				
Program Integration	627.2		38.8	28.3			
Flight and Ground Operations	1,115.4		40.6	23.1			
Flight Hardware	1,358.8		37.6	28.3	0.8	0.8	0.9
International Space Station	2,312.7	2,774.2	2,841.5	2,960.4	3,005.4	3,098.0	3,174.8
ISS System Operations and Maintenance	1,555.2		1,434.6	1,576.1	1,538.1	1,665.3	1,782.8
ISS Research	129.5		221.1	210.7	213.2	221.1	223.5
ISS Crew and Cargo Transportation	628.0		1,185.7	1,173.6	1,254.1	1,211.6	1,168.5
Space Flight Support	727.7	1,116.8	840.6	1,306.8	1,340.7	1,248.1	1,171.2
21st Century Space Launch Complex			168.0	175.3	168.1	54.8	42.9
Space Communications and Navigation	482.3		436.0	477.5	484.5	483.6	481.9
Space Communications Networks	*363.3*		364.5	*398.2*	*417.9*	*425.2*	*423.2*
Space Communications Support	*93.5*		66.3	*65.7*	*66.6*	*58.4*	*58.7*
TDRS Replenishment	*25.4*		5.1	*13.7*			
Human Space Flight Operations	112.7		111.4	112.5	112.6	115.8	116.4
Mission Operations Sustainment				415.2	443.8	459.1	391.4
Launch Services	89.4		81.3	80.3	84.6	87.0	90.4
Rocket Propulsion Test	43.3		43.9	46.0	47.1	47.8	48.2

* FY2010 Op Plan as of 2/10/2011

SOMD: Budget Trace

5/3/2011

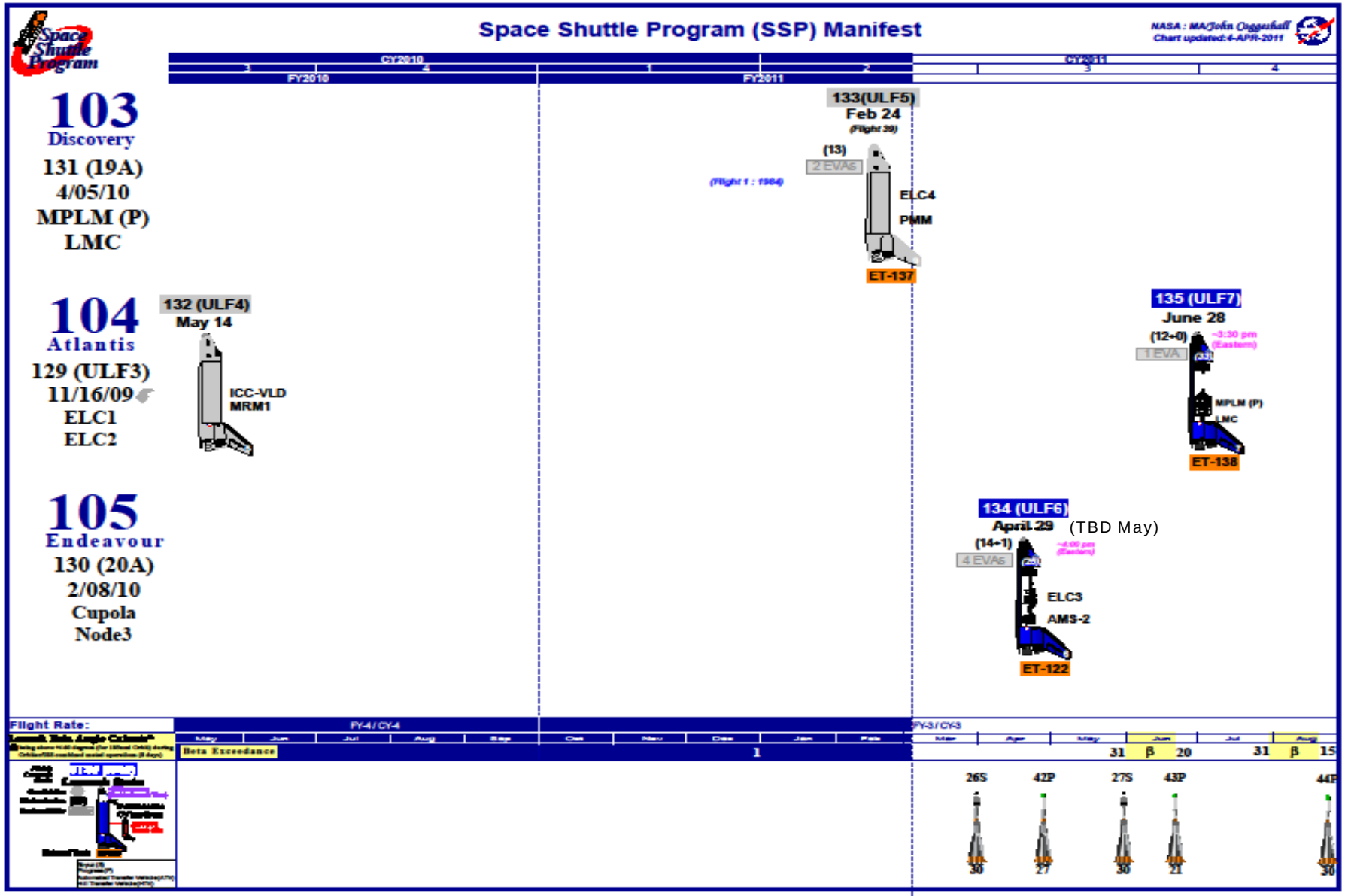
Budget Authority ($M)	FY 2010 Actual	FY 2012	Explanation For Change
FY 2011 President's Budget *	**6,141.8**	**4,290.2**	
Programmatic Content Changes			
Space Shuttle		+578.8	Add prime contractor pension liability, Rephase transition & retirement
International Space Station		-132.1	Reduce ISS ops and functionality, realign to SSP for pension liability
Space Flight Support		-361.1	Reduce 21st CSLC and TDRSS, realign to SSP for pension liability
Funding for Space Operations CSLE			Realign civil service labor to new CSLE theme
Space Shuttle		-28.1	
International Space Station		-174.5	
Space Flight Support		-140.8	
SOMD Civil Service Labor and Expenses (CSLE)		+343.4	
Transfers			
Transfer Construction Projects to CECR		-28.9	High pressure industrial water at Stennis, 34 meter antenna, minor LSP, and minor SCaN DSN project funding transferred to CECR account
FY 2012 President's Budget Request	**6,141.8**	**4,346.9**	
Change from FY 2011 Request	--	+56.7	

Space Shuttle Program (SSP)
(Including Transition & Retirement)

SSP: FY 2011 Plans

- The 2011 Appropriations Act provides funding for the remaining Space Shuttle flights
  - STS-133 launch of *Discovery* occurred on February 24, 2011
    - Flight delivered and installed the Permanent Multipurpose Module (PMM) - last pressurized element to be added to the U.S. Operating segment of the ISS
    - Flight also delivered critical ISS hardware spares
  - STS-134 (*Endeavor*) working towards a target launch date of May 10, 2011. Final decision on May 6, 2011.
    - Flight will deliver and install the Alpha Magnetic Spectrometer (AMS) payload onto the ISS
    - Flight will also deliver critical ISS hardware spares and supplies
  - An additional mission, STS-135 was authorized in the NASA Authorization Act and funded through the Appropriations Act. Mission preparations are currently underway
    - Currently preparing Space Shuttle *Atlantis*, to serve as STS-335 as the Launch on Need (LON) vehicle for STS-134
    - Target launch date is NET June 28, 2011

SSP: Budget Manifest



SSP: FY2012 Plans

05/03/2011

- **Ramp up transition and retirement activities**
- **Fund United Space Alliance (USA) Pension Liability**
  - USA notified NASA that it wished to terminate all defined pension benefit plans as of December 31, 2010
    - USA has consistently incorporated and billed the maximum allowable costs into their indirect rates, but the recent deterioration of the equities and credit markets has caused the plan to be underfunded by an estimated $500M-600M
    - Space Program Operations Contract (SPOC) is a cost-type contract covered by the Cost Accounting Standards (CAS). In accordance with CAS 413.50(c) (12), any costs of terminating plans are a contractual obligation of the Government (if deemed allowable, allocable, and reasonable)
    - Almost all of USA business base (96%) is the NASA SPOC
  - Under an Advanced Agreement, USA deferred formal pension plan termination until after December 31, 2011, allowing NASA to use FY 2012 funding to cover this liability
    - USA has filed a notice of intent to terminate with the Pension Benefit Guaranty Corporation
  - Based on the latest actuarial estimates, the agency has budgeted $547M for this liability
    - Agency is monitoring this liability and will update estimate based on final assumptions when the Space Shuttle manifest is complete
      - If funding remains after the pension plan termination, it will be used to defray Space Shuttle closeout costs that would otherwise require FY 2013 funding;
      - If there is a shortfall, it will reduce available Space Shuttle funds for closeout and some activity could move later than planned

International Space Station (ISS)

ISS: FY 2011 and FY 2012 Plans

05/03/2011

- **Complete research outfitting, deliver hardware, and pre-position critical system spares**
  - Add two remaining ExPrESS Logistics Carriers (ELCs)
  - Add Permanent Multipurpose Module (PMM)
  - Install the Alpha Magnetic Spectrometer (AMS)
- **Maximize utilization of 6 crew to increase ISS research time availability and ramp up for full research operations**
  - Complete the transfer of research grants management to an independent non-profit organization
- **Demonstrate Commercial Cargo transport systems**
  - SpaceX Demo 2 (ISS flyby) – September 2011 (NET)
  - SpaceX Demo 3 (berthing to ISS) – January 2012 (NET) (Under Review)
  - OSC Demo – December 2011
- **Continue stable crew/cargo flight plan while moving toward domestic transportation capabilities for US responsibilities**
  - Roscosmos crew and cargo flights:
    - 4 Soyuz crew exchanges per year (6 Russian/6 non-Russian crew) and 4-5 Progress resupply flights per year (primarily Russian logistics)
  - Continue Japanese Aerospace Exploration Agency (JAXA) H-II Transfer Vehicle (HTV) and European Space Agency (ESA) Automated Transfer Vehicle (ATV) flights
  - Begin Space Exploration Technologies (SpaceX) and Orbital Sciences Corporation (OSC) Commercial Resupply Services (CRS) flights

JAXA HTV

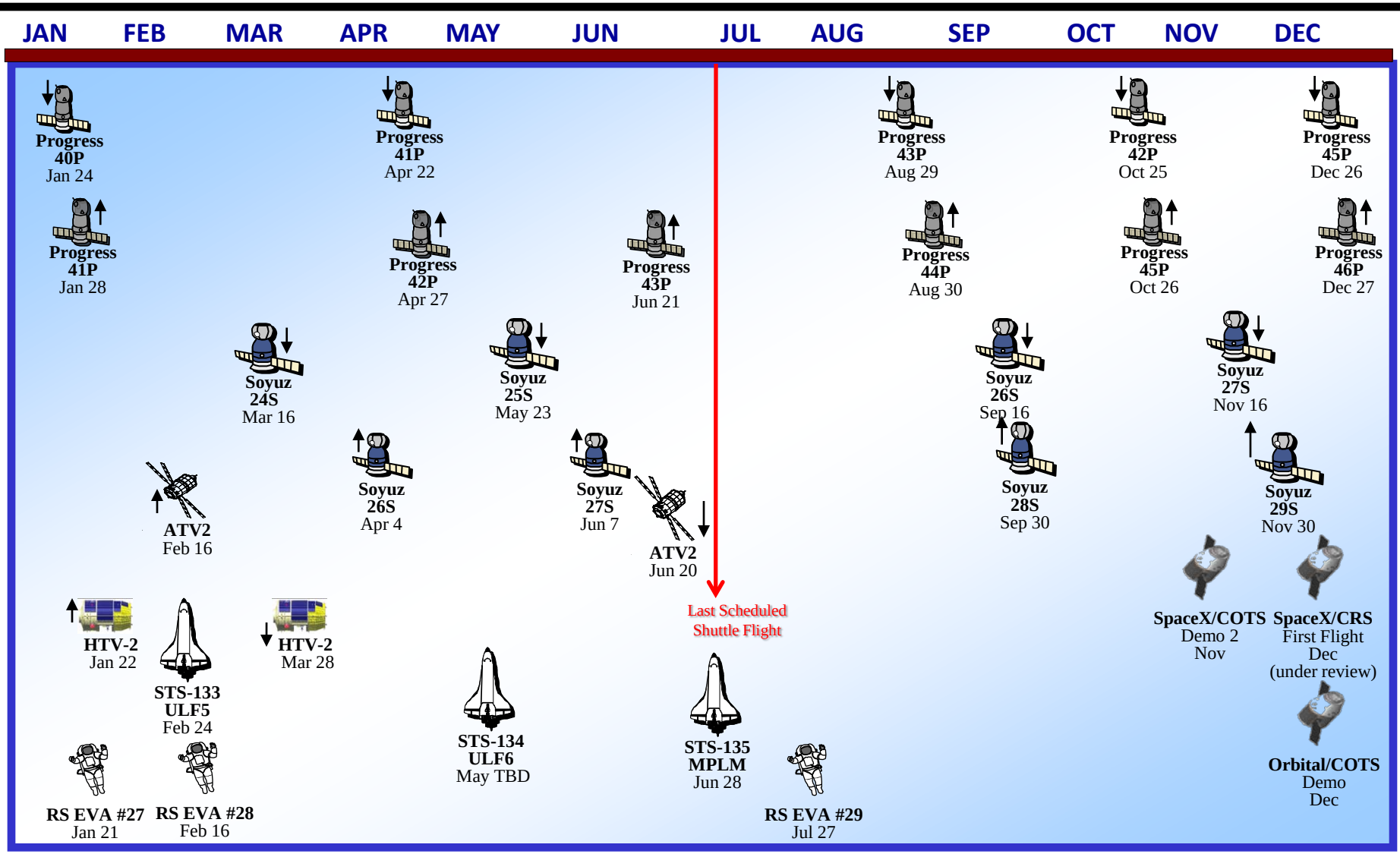
Space Shuttle

Russian Progress

ESA ATV

ISS: CY 2011 Visiting Vehicle Plans

05/03/2011



Launches: RS = 10 US = 3 JAXA = 1 ESA = 1 SpaceX = 3 Orbital = 1

ISS: Crew Transportation Services

5/3/2011

- **ESMD budget provides funds to facilitate development of US commercial crew transportation capability to ISS**
- **ISS plans to utilize US commercial crew transportation services as soon as they become available**
- **ISS will need to budget for crew transportation in the out year budgets for services beyond spring 2016 and will work the estimate as part of the FY 2013 budget development**
  - The Mission Operations Sustainment notional budget line beginning in FY 2013 in Space Flight Support will be a source of funding for the crew transportation services

ISS: Research

05/03/2011

- **ISS Research Statistics:**

	ISS Expeditions 21/22 Oct 2009 - Mar 2010	ISS Expeditions 23/24 Mar 2010 - Sept 2010	ISS Expeditions0-24 Dec 1998- Sept 2010
Total Investigations	218	195	1149
New Investigations	56	35	--
Completed Investigations	25	16	454
Scientists	496	385	1673
Countries	26	29	59

Investigations by Discipline	ISS Expeditions 21/22	ISS Expeditions 23/24	ISS Expeditions 0-24
Biology and Biotechnology	70	60	567
Earth and Space Science	21	19	39
Educational Activities	18	16	162
Human Research	39	30	146
Physical Sciences	42	43	126
Technology	28	27	109

- **ISS Research Budget:**

RY $ in Millions*	FY 11	FY12	FY13	FY14	FY15	FY16
Biological & Physical Research (including NPO) **	65.0	66.5	67.0	66.3	66.8	67.2
Multi-User System Support (MUSS) (Including Enabling)***	156.1	154.6	143.8	146.9	154.2	156.2
Total ISS Research	221.1	221.1	210.7	213.2	221.1	223.5

* Budget in Full Cost (includes Labor)

** Includes $15 million for the NPO

*** MUSS is the infrastructure required to support Research

ISS Research: National Laboratory Update

- **Existing work**
  - NASA currently has Memoranda of Understanding with five federal agencies and nine Space Act Agreements (SAAs) with companies and universities
  - National Institutes of Health (NIH) issued 3-yr rolling Funding Opportunity Announcement for ISS-based investigations March 2009 to include two-phase awards up to $2.5M per grant over 5 years
    - 1st three NIH grants awarded August 2010 to study how bones and the immune system weaken in space
    - Second set of NIH proposals received September 2010 and currently under review
  - National Science Foundation funded a study using ISS as a platform for deploying CubeSats to study the upper atmosphere
  - Continued progress at Astrogenetix on vaccine development project
  - The Committee for the Decadal Survey on Biological and Physical Sciences in Space; National Research Council issued a report "*Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era*" on April 5, 2011. NASA is currently reviewing this report
- **Management of future biological and physical research grants**
  - Making progress on implementing a non-profit organization (NPO) to stimulate, develop and manage the U.S. national uses of the ISS National Lab
    - Cooperative Agreement Notice (CAN) for soliciting proposals for an ISS National Lab Management Entity posted on February 14, 2011
    - Notices of intent were received March 4, 2011
    - Proposals were received April 1, 2011
    - Award planned for July 1, 2011

ISS Research: Management Structure

- **During FY 2011, NASA will award a cooperative agreement to an independent non-profit organization (NPO) with responsibility to further develop national uses of the ISS. This organization will:**
  - Act as a single entry point for non-NASA users to interface efficiently with the ISS;
  - Assist researchers in developing experiments, meeting safety and integration rules, and acting as an ombudsman on behalf of researchers;
  - Perform outreach to researchers and disseminate the results of ISS research activities; and
  - Provide easily accessed communication materials with details about laboratory facilities, available research hardware, resource constraints, and more
- **The NPO will oversee all research involving organizations other than NASA and transfer current NASA biological and physical research to the NPO in future years**
- **An independent assessment was performed to inform the structure and process of the NPO via reference model**

ISS: Functionality/Enabling

5/3/2011

- **"Functionality/Enabling" funding provided to support upgrade activities that have the potential to lower costs or increase the efficiency of ISS operations in space or on the ground; reduce demand on crew time; improve ISS safety; or benefit future exploration programs or capabilities**
  - Functionality content is budgeted in ISS Operations and Maintenance and includes: NASA Docking System; common S band communication system; integration for commercial crew vehicles; a common radio frequency/attached audio/video/command/telemetry system; EVA shock hazard improvements; and solar array modifications to decrease sensitivities to visiting vehicles flight attitudes and longeron shadowing
  - Current National Lab Enabling content is budgeted in ISS Research and includes: mission integration tool enhancements and throughput increases; research results tracking; increased payload integration and verification support; restoration of Payload Operations and Integration Center systems, Payload Operations Integration Function services, and cell culturing and crystal growth equipment; upgrades to Microgravity Science Glovebox for biotech handling; and biotech sample analysis instruments

	FY 11	FY12	FY13	FY14	FY15	FY16
Enabling	**18.2**	**15.2**	**17.0**	**18.6**	**18.6**	**18.6**
Functionality	**81.8**	**132.2**	**148.7**	**147.7**	**136.8**	**128.9**
Total Functionality/Enabling	**100.0**	**147.4**	**165.7**	**166.3**	**155.4**	**147.5**

ISS: International Docking Standard

5/3/2011

- **The International Docking System Standard (IDSS) Interface Definition Document (IDD) is the result of a working group established in 2009 by the ISS partners**

- **The IDD defines the interface characteristics and requirements of the IDSS, which is intended for uses ranging from crewed to autonomous space vehicles, and from Low Earth Orbit to deep-space exploration missions. It defines the docking system interface definitions supporting the following missions:**
  - ISS
  - Lunar mission
  - Crew rescue
  - International cooperative demonstration
- **IDSS working group is nearing the finalization of the standard**
  - Should be complete by April 2011

NASA Low Impact Docking System conceptual computer aided design (CAD) model (retracted configuration)

ISS: Robotic Demonstration Testbeds

5/3/2011

- **Special Purpose Dexterous Manipulator (SPDM, aka Dextre) completed checkout and activation**
  - Canadian 11-ft tall, two-armed robot will support ISS logistics (reducing EVA requirements) and utilization
  - Orbital Replacement Unit (ORU) relocation demo completed December 22, 2010; External Pallet relocation and cargo transfer demo completed February 8, 2011
  - Ready to support unpressurized cargo operations for any spacecraft
- **Robonaut 2**
  - Launched on STS-133
  - Humanoid robot developed in partnership with General Motors (GM) will demonstrate robot tasks internally on ISS
- **Spacecraft Servicing Demonstration Project**
  - Recently released Goddard Space Flight Center (GSFC) Satellite Servicing Study
    - Request for Information released December 2009; ~70 responses received
    - International Workshop on On-Orbit Satellite Servicing conducted March 2010
    - Notional Mission Studies completed to identify requisite capabilities and technology gaps
  - Robotic Refueling Mission technology demonstration
    - Being prepared for launch on STS-135 (planned June 2011)
    - Will use Dextre to demonstrate capability for on-orbit servicing of legacy spacecraft

RY $ in Millions	FY 10	FY 11	FY12	FY13*	FY14*	FY15*	FY16*
Spacecraft Servicing Demonstrations	59.0	12.7	10.0	10.0	10.0	10.0	10.0

* Notional Budget

February 1, 2011 - The Japanese Kounotori2 H-II Transfer Vehicle (HTV2), docked to the Earth-facing port of the Harmony node and in the grapple of the Candarm2, is featured in this image photographed by an Expedition 26 crew member on the International Space Station. The thin line of Earth's atmosphere and the blackness of space provide the backdrop for the scene

Robotic Refueling Mission hardware being integrated and tested at GSFC

Space Communications and Navigation (SCaN)

SCaN: FY 2011 and FY 2012 Plans

05/03/2011

- **FY 2011 Plans**
  - Awarded Contract of the first set of antennas to replace the Deep Space Network (DSN) 70m - December 2010
  - System Requirement Review for SGSS – 4th Quarter FY 2011
  - Tracking and Data Relay Satellite (TDRS) K and L
    - Mission Operations Review - November 2010
    - TDRS K: Begin Spacecraft Integration and Test ; Pre-Environmental Review - June 2011
    - TDRS L: Complete Bus Module Design and Development – March 2011
  - Turnover of Communications, Navigation, and Networking reConfigurable Test Bed (CoNNeCT) to JAXA – Summer 2011
- **FY 2012 Plans**
  - Delivery of the TDRS-K spacecraft
    - Launch of TDRS-K in December 2012 (or possibly as early as June 2012) via Atlas V
  - Implementation of infrastructure upgrades
    - Space Network Ground Segment Sustainment
    - Deep Space Network Canberra Deep Space Communications Complex 34 meter Beam Wave Guide
  - Continued development of enabling capabilities and technology
    - Planned Launch of CoNNeCT on HTV-3
    - Integration and testing for Lunar Laser Communications Demonstration
  - Completion of the integrated Network Architecture Review

21st Century Space Launch Complex (21CSLC)

21CSLC: FY 2011 and FY 2012 Plans

- **21st Century Space Launch Complex will focus on upgrades to the Florida launch range, expanding capabilities to support SLS, MPCV, commercial cargo/launch services providers, and transforming KSC into a modern facility that benefits all range users, in line with the NASA Authorization Act of 2010**
- **SOMD has been working closely with KSC, the United States Air Force (USAF), the Federal Aviation Administration, and the space user community to refine requirements and develop a unified strategy**
- **Program has organized into five product lines to review requirements and select projects:**
  - Modernization Mission Focused Capabilities
  - Florida Launch Modernization and Infrastructure
  - Range Interface and Control Services
  - Environmental Remediation and Technologies Capability Development
  - Off-Line Manufacturing, Processing and Recovery Capabilities

Human Space Flight Operations (HSFO)

HSFO: FY 2011 and FY 2012 Plans

- **Space Flight Crew Operations (SFCO)**
  - SFCO supports the planned Space Shuttle manifest and U.S. crew rotations on the ISS
    - Provides trained crews for ISS
    - Provides crew expertise for future human space flight development
  - SFCO aircraft inventory
    - Maintains 20 T-38 aircraft in order to provide astronauts with spaceflight readiness training
  - NASA has enlisted the National Research Council to conduct an independent study of the activities funded within NASA's HSFO program
    - Study will focus on the role and size of the human spaceflight office after Space Shuttle retirement and Space Station assembly completion;
    - Crew-related training facilities, in addition to their aircraft and training requirements to support the Astronaut Corps for the requirements of NASA's new human spaceflight program, and the more cost-effective means of meeting these requirements.
    - The SFCO will also provide support and training for astronauts preparing for future flights to the ISS as well as provide technical and safety panel support to development of future human space systems
    - Study has commenced, with the goal of being completed in time to inform the FY 2013 budget process

HSFO: FY 2011 and FY 2012 Plans (Cont.)

05/03/2011

- **Crew Health and Safety (CHS)**
  - Implement the revised Lifetime Surveillance of Astronaut Health (LSAH)
    - Responding to recommendation by the Institute of Medicine to convert to an occupational health model for tracking and mitigating the effects of spaceflight humans
    - Continue to examine the incidence of acute and chronic morbidity and mortality of astronauts, and define the risks of morbidity and mortality associated with the occupational exposures encountered by astronauts
      - All astronauts selected into the U.S. Space Program will be monitored
    - Goals were established:
      - Develop and Provide a Comprehensive Annual Medical Exam for each LSAH Participant
      - Conduct Occupational Surveillance
      - Improve Communication, Data Accessibility, Integrity and Storage
      - Support Operational and Health Care Analyses
      - Support NASA Research Objectives
  - Maintain the health of astronauts
  - Maintain skills retention/proficiency of space medicine specialists post Space Shuttle
  - Identifies and tracks threats to human health as a result of long duration space flight

- **SOMD is continuing to study other activities for inclusion in HSFO**

Launch Services Program (LSP)

LSP: FY 2011 – FY 2012 Plans

05/03/2011

- **NASA has assigned responsibility for understanding the full range of civil space launch needs to the Launch Services Program**
- **LSP's focus is to:**
  - Provide safe, reliable, cost effective and on-time launch services for NASA and NASA-sponsored payloads using expendable launch vehicles
  - Work with other government agencies and the launch industry to ensure launch opportunities are available on a range of launch systems
  - Work with launch service providers on emerging vehicles for future use
- **Provides for the core NASA government and contractor workforce supporting the upcoming NASA launches this fiscal year, along with conducting the engineering analysis and integration support for ~35 NASA missions in various phases of development**
- **Conduct nine planned launches of NASA payloads in FY 2011 and FY 2012:**
  - Glory – Taurus XL, Vandenberg AFB, CA: Unsuccessful launch on 3/4/2011; Mishap Investigation Board established
  - Aquarius – Delta II, Vandenberg AFB, CA : 6/2011
  - Juno – Atlas V, Cape Canaveral AFS, FL: 8/2011
  - Gravity Recovery and Interior Laboratory (GRAIL) – Delta II, Cape Canaveral AFS, FL 9/2011
  - National Polar-Orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP) – Delta II, Vandenberg AFB, CA : 10/2011
  - Mars Science Laboratory (MSL) – Atlas V, Cape Canaveral AFS, FL: 11/2011
  - Nuclear Spectroscopic Telescope Array (NuSTAR) – Pegasus XL, Kwajalein Atoll: 2/2012
  - Radiation Belt Storm Probes (RBSP) – Atlas V, Cape Canaveral AFS, FL: 5/2012
  - TDRS-K – Atlas V, Cape Canaveral AFS, FL: NET 6/2012

LSP: FY 2011 – 2012 Plans (Cont.)

- **Execute six Launch Services Task Orders (LSTOs) via NASA Launch Services (NLS)-II Contract:**
  - Mars Atmosphere and Volatile Evolution (MAVEN) – negotiations completed 10/21/2011
  - Jason-3
  - Soil Moisture Active-Passive (SMAP)
  - Geostationary Operational Environmental Satellite (GOES-R and GOES-S)
  - ExoMars
  - Gravity and Extreme Magnetism Small Explorer Mission (GEMS)

- **Award Expendable Launch Vehicle Integrated Support (ELVIS) follow-on contract**
  - Award planned for December 2011 / January 2012 timeframe; ~$35M
  - Provides critical engineering analysis and integration support to LSP

- **LSP also providing support to:**
  - ISS CRS Program in an advisory capacity in FY 2011 and FY 2012,
  - Other Commercial/Department of Defense (DoD) launches

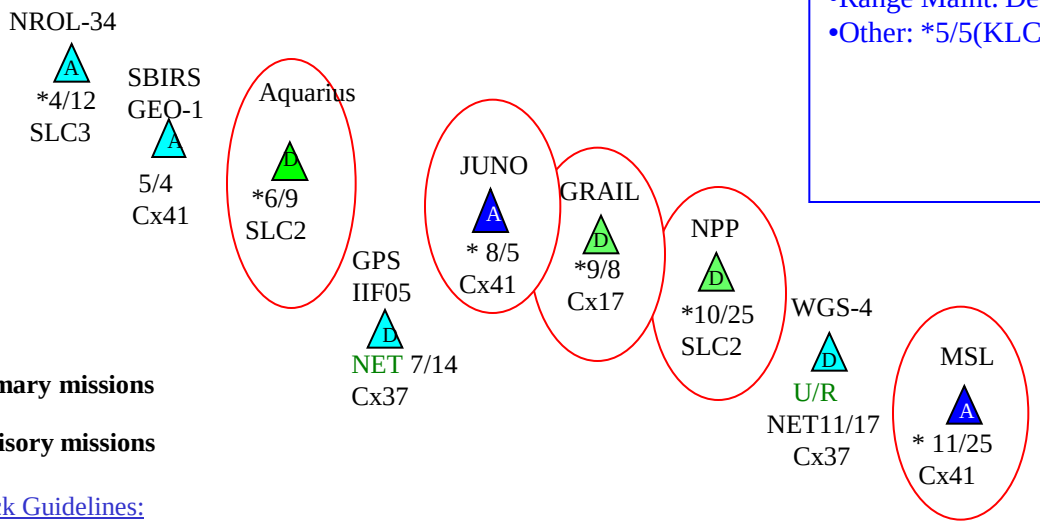
2011 Launch Manifest

-NASA LSP Planning Only-

05/03/2011

Other
ER Ops:
•STS-134 4/29
•STS-135 6/28

WR Ops:
•MDA: , 11/15
•MM: , *6/22, *7/27,*9/21
•Range Maint. Dec-Feb 2012
•Other: *5/5(KLC) *8/10,



T **NASA/LSP Taurus**
A **NASA/LSP Atlas**
D **NASA/LSP Delta II**

USAF/DoD/NRO
Commercial
Other
M **Minotaur**

* **RANGE DATE**
U/R Under Review
NET No Earlier Than

LSP primary missions
LSP advisory missions

Standard Setback Guidelines:

10 days in between missions for LSP

15 days in between DII ER to WR for ULA

60 days off of SLC-2 for ULA

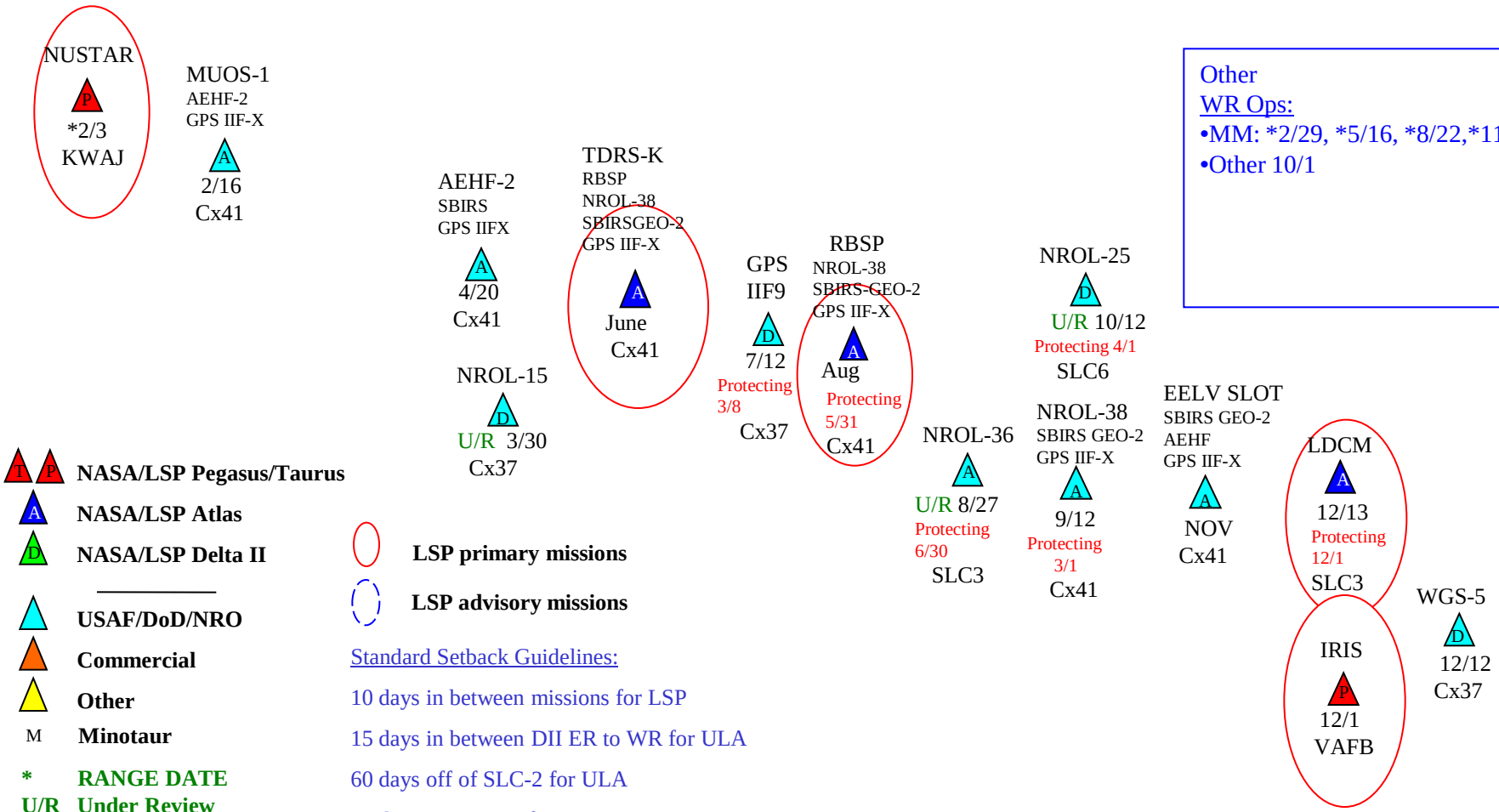
60 days AV on ER for ULA

(6 Apr 2011)

2012 Launch Manifest

-NASA LSP Planning Only-

05/03/2011



LSP: Alpha Magnetic Spectrometer (AMS)
FY 2011 Plan

05/03/2011

- **AMS is a Department of Energy (DOE) - sponsored, 16-nation international cosmic-ray particle physics experiment planned for the ISS that will search for dark matter, anti-matter, and strange matter**
- **AMS was delivered to KSC in August 2010**
- **AMS schedule to be launched to the ISS via the Shuttle flight STS-134**
- **AMS will be installed on the exterior of the ISS and will begin a 10 year or more science mission**
- **After initial AMS operations controlled from Johnson Space Center (JSC) for ~ 2 months, AMS science operations control will be transferred to the European Organization for Nuclear Research (CERN), Switzerland for the remainder of the AMS science mission on ISS**
- **NASA will continue to provide low-level AMS housekeeping flight operations support to the DOE/International-funded AMS science operations at CERN**

Rocket Propulsion Test (RPT) Program

RPT: FY 2011 & FY 2012 Plans

05/03/2011

- **Maximize use of Rocket Propulsion Test Program (RPT) resources by implementing, and keeping current the RPT Master Plan to merge current and future requirements, existing budget horizon, and capabilities to assure proper Agency propulsion test portfolio is maintained**
  - FY 2011 - 2012 plan is to transition from 29 active test positions across 19 test stands to 25 active test positions across 15 test stands (33 test positions across 22 test stands total inventory)
  - Implementation of White Sands Test Facility (WSTF) Right-Sizing Study rocket propulsion testing recommendations
  - Further right-sizing plans will closely follow development of future Agency plans to allow further right-sizing plans based on final decisions
- **Continue to support commercial rocket propulsion testing through utilization of NASA test facilities**
  - Continued testing of AJ-26 engine at SSC for Orbital Taurus II
  - Continued testing of RS-68 engine at SSC for Pratt & Whitney Rocketdyne & USAF