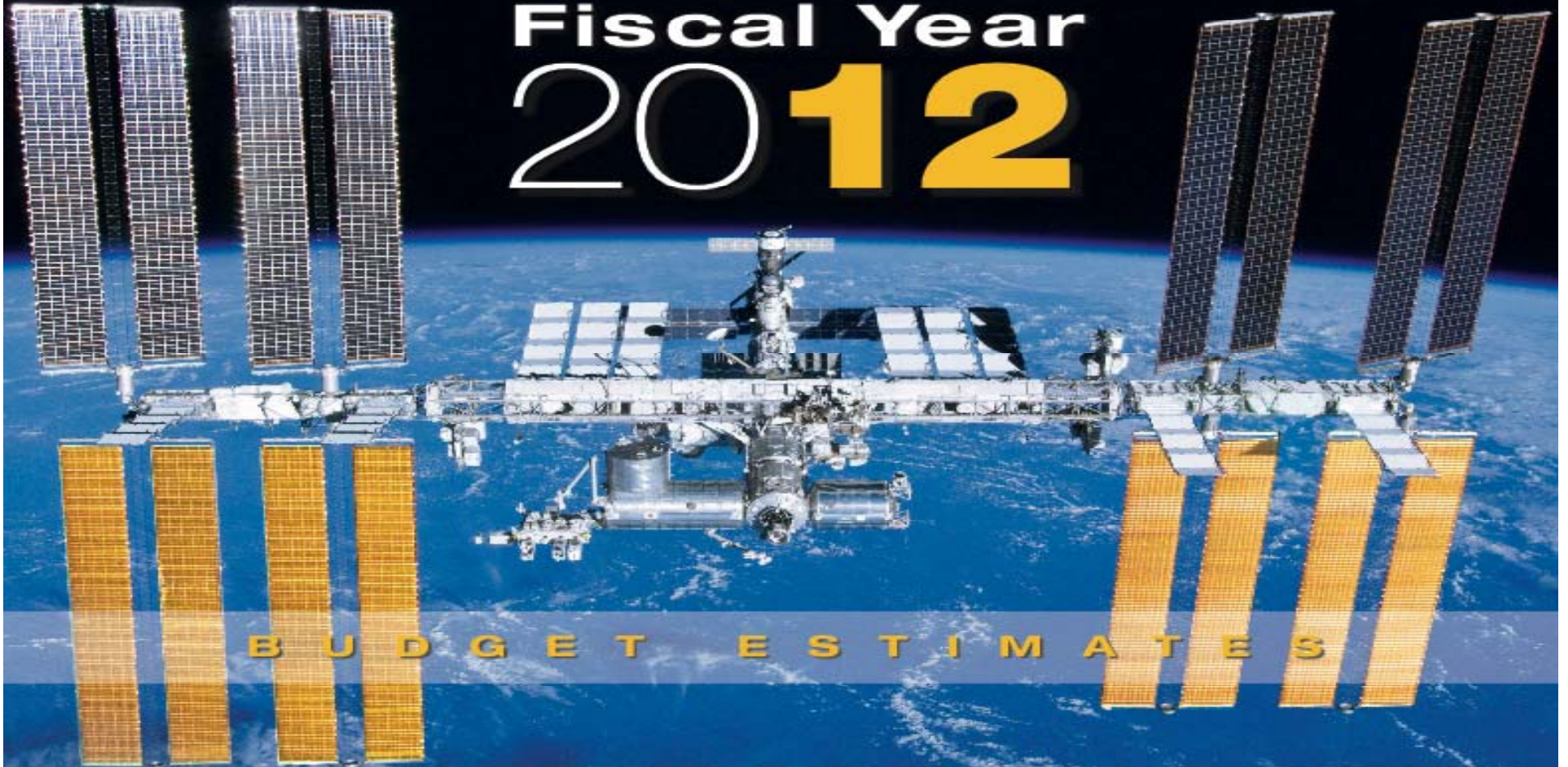




# Fiscal Year 2012

B U D G E T E S T I M A T E S





The background of the slide is a composite image. On the left side, there is a large, detailed view of a galaxy, showing its spiral arms and central core in shades of brown, tan, and white. On the right side, the background transitions into a deep blue and black space filled with numerous small, bright stars of various colors, including blue, white, and yellow.

***NASA's Vision from the 2011 Strategic  
Plan:***

***To reach for new heights  
and  
reveal the unknown  
so that  
what we do and learn  
will  
benefit all humankind***



# Overview

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The FY 2012 Budget provides \$18.7 billion in 2012 for NASA to support a diverse portfolio of programs even in austere times. It funds:

- All major elements of the NASA Authorization Act of 2010, including development of a heavy-lift launch vehicle and deep-space crew vehicle, in an affordable and sustainable manner.
- Key components of the Nation's priorities
  - **Innovate.** Supports long-term job growth and a vibrant economy by increasing investment in research, technology, and development.
  - **Educate.** Uses NASA content to educate and inspire America's future workforce.
  - **Build.** Invests in American industry and lessens our reliance on foreign providers by facilitating development of US-provided commercial access to low Earth orbit and the International Space Station, our long-term platform for human space flight.
- To fund key priorities, tough choices were made, including reductions to Earth science and administrative costs, elimination of exploration focused robotic precursors, and maintaining the heavy-lift vehicle and crew capsule at approximately the 2011 authorized level.



# 2012 Highlights

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- Maintains the Nation's commitment to our national laboratory and exploration platform in space—the International Space Station—bringing nations together in a common pursuit of knowledge and experience to enable future exploration.
- Embraces partnership with the U.S. commercial space industry to enable safe, reliable, and cost effective access to low Earth orbit for crew and cargo as soon as possible and to lessen our reliance on foreign services.
- Develops a heavy-lift rocket and crew capsule to carry explorers beyond Earth orbit, and invests in the research and technology to enable deep space exploration.
- Exploration beyond Earth orbit will be driven by the capabilities we develop over time – destinations include cis-Lunar space, the Moon, asteroids and Mars and its environs.



# 2012 Highlights

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- Follows national and science community priorities: leverages robotic missions to explore the solar system, supports space-based observatories, and studies the Earth, including monitoring the Earth's climate.
- Invests in high payoff, high-risk technology that industry cannot tackle today to transform the Nation's capabilities for exploring and utilizing space.
- Conducts cutting edge aeronautics research with increased focus on enhancing aviation safety and airspace efficiency, and reducing environmental impacts.
- Develops and inspires the next generation through focus on STEM education.
- Focuses on long-term affordability and efficiency through rightsizing and renewing NASA capabilities and infrastructure and protects the pensions of those who have devoted their careers to the space shuttle program.



# Important Considerations

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- ***FY11 is still an unknown.*** Commitments to life-cycle costs and launch dates are likely to be impacted depending on final appropriation.
- ***Reorganization:***
  - The Administrator intends to merge the Space Operations and Exploration Systems Directorates over the next few months, but will maintain the current account structure.
  - To improve effectiveness and focus, the major portion of the Exploration Technology Program is transferred to Space Technology.
- ***Out-year Funding Assumptions.*** In this time of national fiscal austerity, NASA has accepted the challenge to manage to a flat out-year top-line budget amount. At this time, funding lines beyond FY12 should be considered notional.
- ***Funding for Federal Employees.*** The budget assumes consolidation of labor funding into one program element per account in order to:
  - Efficiently assign labor to projects,
  - Focus on strategic workforce issues, rather than tactical management of project labor funding, and
  - Provide funding stability for workforce during period of programmatic transition.





# FY 2012 Budget Request

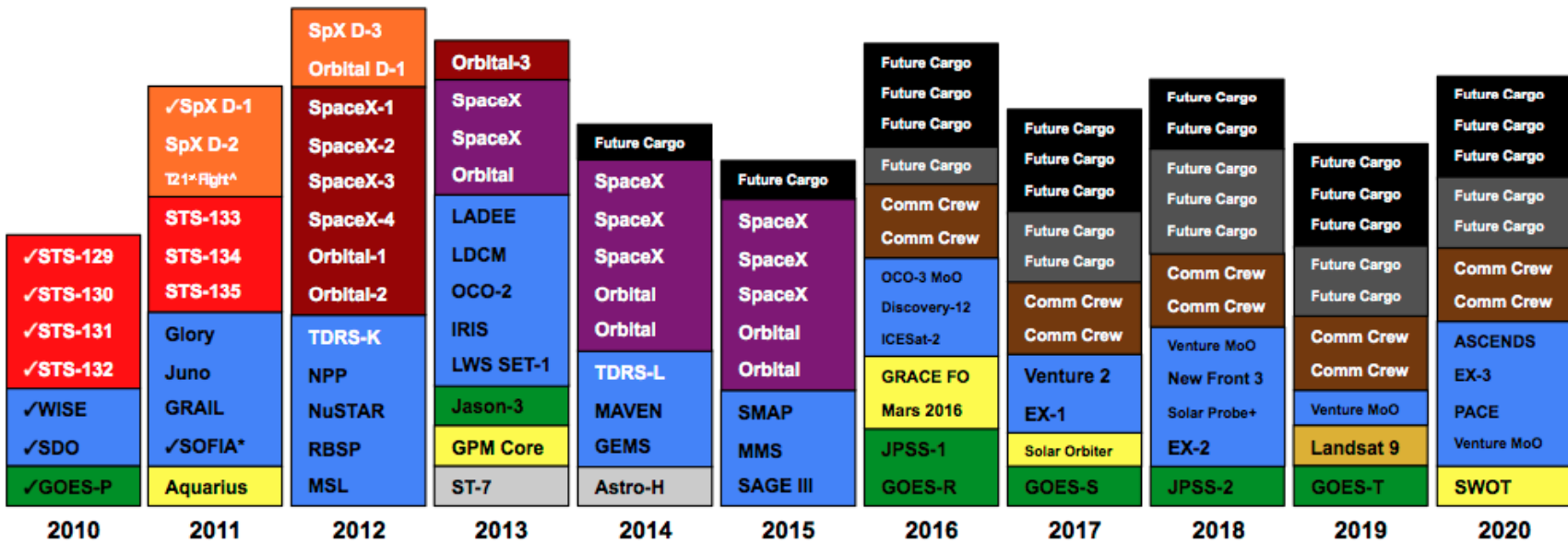
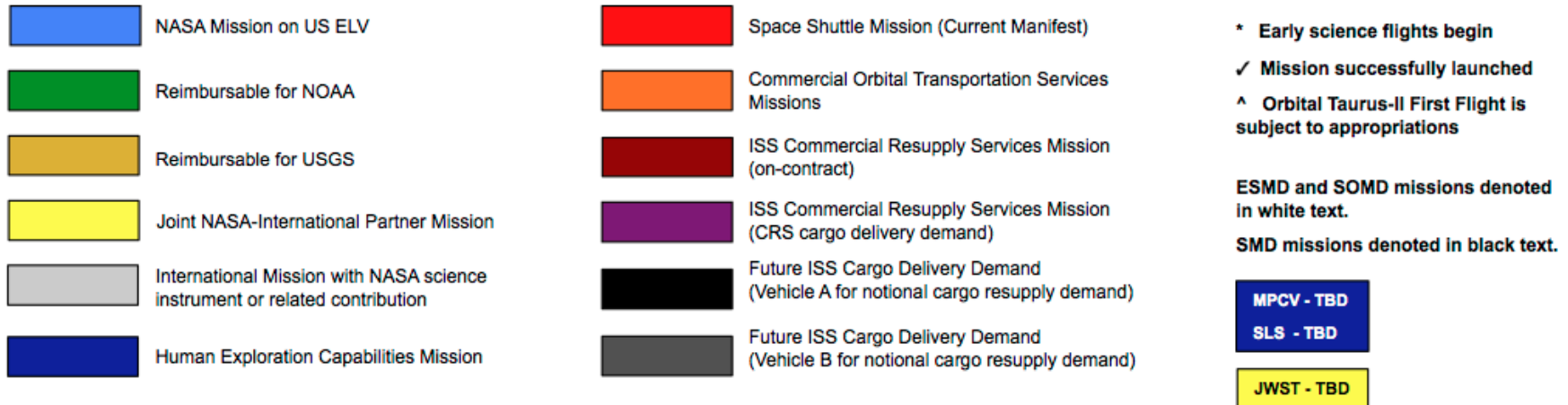
Budget Authority (\$M)	FY 2010	FY 2011 Annualized CR	FY 2011 Authorization Act	FY 2012	Outyears are notional			
					FY 2013	FY 2014	FY 2015	FY 2016
<b>Science</b>	<b>4,498</b>	<b>4,469</b>	<b>5,006</b>	<b>5,017</b>	<b>5,017</b>	<b>5,017</b>	<b>5,017</b>	<b>5,017</b>
Earth Science	1,439		1,802	1,797	1,822	1,819	1,858	1,915
Planetary Science	1,364		1,486	1,540	1,429	1,395	1,344	1,257
Astrophysics	647		1,076	683	758	775	780	811
James Webb Space Telescope	439			375	375	375	375	375
Heliophysics	608		642	622	634	653	660	659
<b>Aeronautics</b>	<b>497</b>	<b>501</b>	<b>580</b>	<b>569</b>	<b>569</b>	<b>569</b>	<b>569</b>	<b>569</b>
<b>Space Technology</b>	<b>275</b>	<b>327</b>	<b>512</b>	<b>1,024</b>	<b>1,024</b>	<b>1,024</b>	<b>1,024</b>	<b>1,024</b>
<b>Exploration Systems</b>	<b>3,626</b>	<b>3,594</b>	<b>3,706</b>	<b>3,949</b>	<b>3,949</b>	<b>3,949</b>	<b>3,949</b>	<b>3,949</b>
Human Exploration Capabilities	3,288		2,751	2,810	2,810	2,810	2,810	2,810
Commercial Spaceflight	39		612	850	850	850	850	850
Exploration Research and Development	299		343	289	289	289	289	289
<b>Space Operations</b>	<b>6,142</b>	<b>6,147</b>	<b>5,508</b>	<b>4,347</b>	<b>4,347</b>	<b>4,347</b>	<b>4,347</b>	<b>4,347</b>
Space Shuttle	3,101		1,610	665	80	1	1	1
International Space Station	2,313		2,780	2,841	2,960	3,005	3,098	3,175
Space and Flight Support	728		1,119	841	1,307	1,341	1,248	1,172
<b>Education</b>	<b>180</b>	<b>183</b>	<b>146</b>	<b>138</b>	<b>138</b>	<b>138</b>	<b>138</b>	<b>138</b>
<b>Cross-Agency Support</b>	<b>3,018</b>	<b>3,019</b>	<b>3,111</b>	<b>3,192</b>	<b>3,192</b>	<b>3,192</b>	<b>3,192</b>	<b>3,192</b>
<b>CoF and ECR</b>	<b>453</b>	<b>448</b>	<b>394</b>	<b>450</b>	<b>450</b>	<b>450</b>	<b>450</b>	<b>450</b>
<b>Inspector General</b>	<b>36</b>	<b>36</b>	<b>37</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>
<b>NASA FY 2012</b>	<b>18,724</b>	<b>18,724</b>	<b>19,000</b>	<b>18,724</b>	<b>18,724</b>	<b>18,724</b>	<b>18,724</b>	<b>18,724</b>

*Note: FY10 and FY11 figures have been adjusted to show comparable Exploration technology content within the Space Technology account consistent with the FY12 Budget. FY11 CR column does not include 51M SBIR payback transfer from Science/ESMD to Space Technology and will be communicated via future op plan.*



# NASA Mission Launches

(Fiscal Years 2010-20)



As of 2/11/2011





# Earth Science

Outyears are notional

	2012	2013	2014	2015	2016
Earth Science	\$1,797	\$1,822	\$1,819	\$1,858	\$1,915

- Supports launch of NPP, critical to NOAA weather monitoring, in early FY12, and completion and launch of remaining foundational missions: LDCM and GPM.
- Continues development of OCO-2, which is critical to our understanding of the Earth's carbon cycle and its effect on the Earth's climate.
- Formulates and develops SMAP and ICESat-2.
- Continues pre-formulation studies of DESDynI, CLARREO and Climate Continuity missions: SAGE-III/ISS, GRACE-follow on, OCO-3. Funding reduced from authorized level to support lower NASA top line.
- Maintains climate change modeling capabilities to enhance forecasts of regional and other effects. Continues working with NOAA/OSTP to address approaches for providing sustained space-borne climate measurements.
- Operates 16 Earth-observing spacecraft.



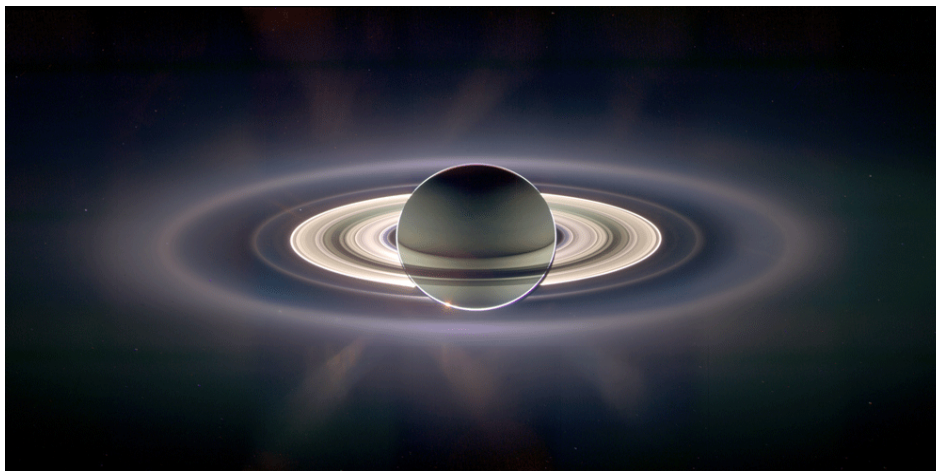


# Planetary Science

Outyears are notional

	2012	2013	2014	2015	2016
Planetary Science	\$1,540	\$1,429	\$1,395	\$1,344	\$1,257

- Launches Mars Science Laboratory in fall of 2011.
- Continues work toward LADEE and MAVEN launches in 2013.
- Pursues formulation of Mars 2016 Trace Gas Orbiter with ESA.
- Pending results of the National Research Council's Decadal Survey, continues funding outer planet missions concept development.
- Supports ongoing Near Earth Object identification and study.
- Enables restart of Plutonium-238 production with Dept. of Energy.



- Continues flight development of the Advanced Stirling Radioisotope Generator for 2014/15 launch readiness.
- Operates 13 Planetary missions.



# Astrophysics

Outyears are notional

	2012	2013	2014	2015	2016
Astrophysics	\$683	\$758	\$775	\$780	\$811

- Reflects the scientific priorities of the National Research Council's Decadal Survey for Astrophysics, including technology funding for strategic missions beyond JWST, core research support, and increased funding for Explorer missions.
- Works toward Nuclear Spectroscopic Telescope Array launch in 2012 and Astro-H launch in 2014.
- Terminates work on the Joint Dark Energy Mission. This effort will evolve to respond to the priorities in the Astrophysics Decadal Survey for dark energy.
- Completes open door flight testing and the first competed science observations by the Stratospheric Observatory For Infrared Astronomy (SOFIA).
- Operates 10 Astrophysics missions.



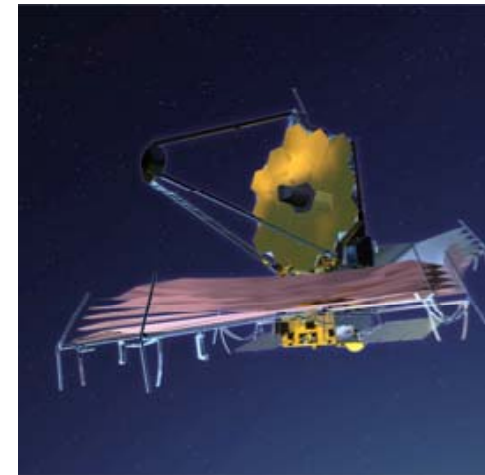


# James Webb Space Telescope

Outyears are notional

	2012	2013	2014	2015	2016
JWST	\$375	\$375	\$375	\$375	\$375

- Independent review completed in November 2010 concluded additional funds would be needed to complete the project, and has resulted in a significant change in the JWST management approach.
- The budget provides stability to JWST in FY 2012 that continues fabrication, integration, and testing of JWST while protecting the budgets of other science missions in FY 2012.
- NASA is developing a revised program plan that includes a realistic assessment of schedule and lifecycle cost.
  - The revised schedule and lifecycle cost will be reflected in the 2013 Budget request.
- The Program's technical achievements are substantial, and progress continues during the replanning process.



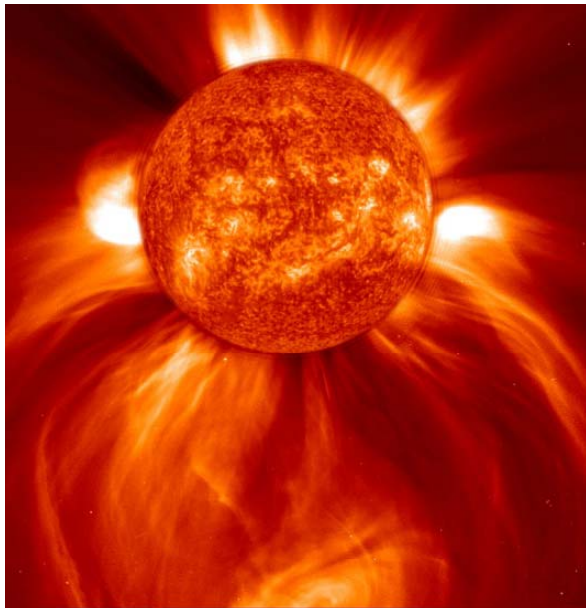




# Heliophysics

Outyears are notional

	2012	2013	2014	2015	2016
Heliophysics	\$622	\$634	\$653	\$660	\$659



- Works toward launch of the strategic RBSP and MMS missions in 2012 and 2015, respectively.
  - Continues development of the IRIS Small Explorer mission for launch in 2012.
  - Funds the next Heliophysics Explorer mission selection, planned for 2012.
  - Continues formulation of the highest priority “large” mission, Solar Probe Plus.
- 
- Maintains commitments to international partners and continues the formulation of the Solar Orbiter Collaboration mission.
  - Operates 16 Heliophysics missions.



# Joint Agency Satellite Programs

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**NASA established a Joint Agency Satellite Division within the Science Mission Directorate at Headquarters, to manage NASA work conducted for other agencies on a fully-reimbursable basis. This Division:**

- Builds on NASA's history of successfully executing a number of programs such as POES and GOES on behalf of other agencies.
- Implements requirements from our reimbursable customers – NOAA and USGS.
  - Continues development of JPSS, GOES-R, and Jason 3 for NOAA.
  - Initiates Landsat 9 and 10 for USGS.
- Applies standard NASA project management processes to ensure mission success for our customers with a focus on efficiently managing operational satellite acquisitions.



# Aeronautics

	2012	2013	2014	2015	2016
Aeronautics	\$569	\$569	\$569	\$569	\$569

Outyears are notional

- Increases research in:
  - The utilization of advanced ground-based and flight deck technologies and automation for efficient and safe airport surface operations.
  - The effects of high altitude ice crystal on aircraft.
  - Composite structures and materials.
  - Utilization and understanding of alternative fuels for fuel-flexible engine development.
- Continues support for new FY 2011 initiatives into the integration of unmanned aircraft systems into the National Airspace System and the validation and verification of complex aviation systems in support of the multi-agency NextGen initiative.
- Refocuses a smaller Hypersonics project on foundational research in which NASA has unique competencies.



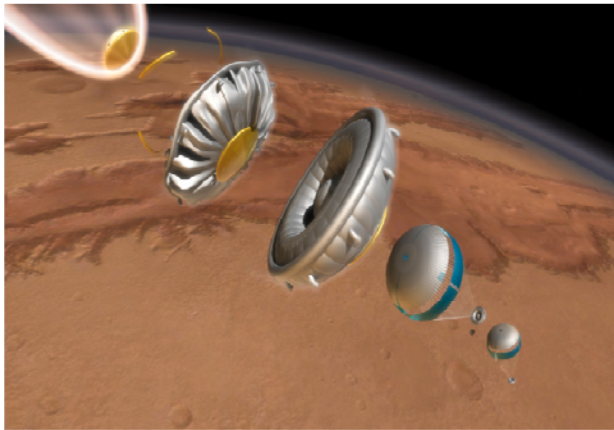


# Space Technology

Outyears are notional

	2012	2013	2014	2015	2016
Space Technology	\$1,024	\$1,024	\$1,024	\$1,024	\$1,024

- The central NASA contribution to a revitalized research, technology and innovation agenda for our Nation. Includes SBIR/STTR (\$184M) and exploration technology (\$310M).
- Funds advancements and innovations in next-generation technologies, to make NASA, other government and commercial space activities more capable and affordable.
- Develops long-range technologies to enable human exploration, and demonstrate critical in-space capabilities such as cryogenic propellant storage and solar electric propulsion.
- Focuses on priority areas, such as communications, sensors, robotics, materials, and propulsion.
- Uses grants, prizes and alternative funding mechanisms to spur innovation.
- Funds technology fellowships for graduate students to develop solutions to space technology grand challenges.







# Human Exploration Capabilities

	2012	2013	2014	2015	2016
HEC	\$2,810	\$2,810	\$2,810	\$2,810	\$2,810

Outyears are notional

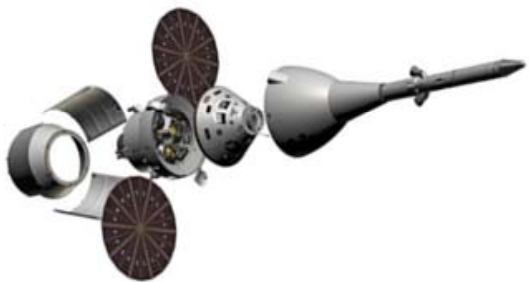
- ❑ Provides steady funding for the Space Launch System (SLS) and the Multi Purpose Crew Vehicle (MPCV).
- ❑ Tough choices – kept MPCV and SLS at approximately the 2011 Authorized level for 2012. This level provides a solid foundation from which to advance the development of these important systems.
- Develops the heavy-lift vehicle (\$1.8B in FY12) that will launch the crew vehicle, other modules, and cargo for missions beyond low Earth orbit.
  - Reference Vehicle Design is an Ares/Shuttle-derived solution.
  - NASA is committed to creating a plan that meets available funding.
- Uses recently-awarded BAA study contracts and Government Requirements Analysis Cycle to evaluate design decisions.
- In parallel with SLS acquisition activities, NASA is prioritizing work on existing contracts to maintain progress and minimize workforce disruptions.



## Human Exploration Capability (cont)

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- Develops the Multi-Purpose Crew Vehicle (\$1.0B in FY12) to carry crew to orbit, provide emergency abort capability, sustain the crew while in space, and provide safe re-entry from deep space return velocities.
- NASA has selected the beyond-LEO version of Orion (“block 2”) as the MPCV Reference Vehicle Design, and will pace funding so the vehicle will be available in tandem with SLS.
- NASA is committed to creating a plan that meets available funding and will pace MPCV development to best optimize with SLS activities.



- Final decisions on plans for the SLS and MPCV will be made during the Acquisition Strategy review process this Spring or summer.



# Commercial Spaceflight

Outyears are notional

	2012	2013	2014	2015	2016
Commercial Crew	\$850	\$850	\$850	\$850	\$850

- Leverages significant private sector investments to spur the development of U.S. commercial human spaceflight systems and end our dependence on Russian spaceflight capabilities.
- Facilitates the development of U.S. commercial crew space transportation capability with the goal of achieving safe, reliable, and cost effective access to and from low Earth orbit and the International Space Station.
- Builds off successful progress in the development of commercial cargo capabilities and the Commercial Crew Development (CCDev) activity.
- Supports award of multiple, competitive, fixed-price, milestone-based agreements that support the development, testing, and demonstration of multiple commercial crew systems.
- Ensures that eventual contracted services meet the Agency's stringent crew transportation system certification requirements.



# Exploration Research and Development

Outyears are notional

	2012	2013	2014	2015	2016
ERD	\$289	\$289	\$289	\$289	\$289

- Expands fundamental knowledge and develops advanced human spaceflight capabilities required to explore space in a more sustainable and affordable way.
- Comprises the Human Research Program (HRP) and the Advanced Exploration Systems (AES) program.
  - HRP conducts fundamental and applied research on the human system to provide countermeasures, knowledge, technologies, and tools to enable safe, reliable, and productive human missions.
  - AES develops and demonstrates prototype systems for life support, habitation, and extra-vehicular activity.
- Transfers the Enabling Technology Development and Demonstration (ETDD) program to the Space Technology program.
- Tough choices – eliminated funding for exploration focused robotic precursors. Supports Joint effort with Science to identify and prioritize robotic data collection to enable future human exploration beyond low Earth orbit.





# Space Shuttle

Outyears are notional

	2012	2013	2014	2015	2016
Shuttle	\$665	\$80	--	--	--

- Continues disposition of property and capabilities no longer required culminating in disposition of most Space Shuttle assets by FY 2013.
- Supports Shuttle workforce and facility transition efforts including funding contractually required (\$548M) pension costs related to Shuttle retirement.





# International Space Station

Outyears are notional

	2012	2013	2014	2015	2016
ISS	\$2,841	\$2,960	\$3,005	\$3,098	\$3,175

➤ Supports:

- Extension of ISS lifetime to 2020 or beyond in concert with our international partners.
- Expanded utilization of ISS research capabilities, including National Laboratory activities and plans for research oversight by a non-profit organization.
- Enhanced functionality to lower costs or increase efficiency, reduce demands on crew time, improve safety, benefit future exploration programs or capabilities.
- Crew and cargo transportation including the Commercial Resupply Services (CRS) contracts.

➤ The goal is to fully use the Station's R&D capabilities to conduct scientific research, improve our ability to operate in space, and demonstrate new technologies.





# Space and Flight Support

	2012	2013	2014	Outyears are notional	
				2015	2016
Space and Flight Support	\$841	\$1,307	\$1,341	\$1,248	\$1,172

- Support modernization plans for a 21<sup>st</sup> Century Launch Complex to improve capabilities and infrastructure for a low-cost space transportation facility at KSC.
- Provides space communication and navigation capabilities to all missions.
- Provides crew expertise for future missions by maintaining a sufficient number of astronauts with appropriate skills and experience.
- Provides safe, reliable, and cost effective launch services for NASA and NASA-sponsored payloads using ELVs.
  - In FY 2012, includes up to 5 NASA launches and support of 8 DOD launches
  - Provides advisory support for the NASA COTS demonstrations
  - Certifies new and emerging launch vehicles
- Supports commercial rocket propulsion testing at NASA test facilities.
  - Improves coordination with DoD through successful execution of the National Rocket Propulsion Test Alliance
  - Continues work on SSC's High Pressure Industrial Water System project
- Supports future ISS transportation and space communication needs, including future purchases of commercial seats and crew services.



# Education

Outyears are notional

	2012	2013	2014	2015	2016
Education	\$138	\$138	\$138	\$138	\$138

- Continues the Summer of Innovation pilot project by partnering with education organizations.
- Incorporates the recent design team recommendations to leverage NASA's strengths to address national STEM education needs.
- Pursues innovative approaches that enable additional student launch initiatives and other hands-on payload development and engineering opportunities for NASA missions.
- Expands educator professional development and pre-service preparation related to NASA missions.
- Increases community college involvement in NASA research and prepares students for jobs in the twenty-first century.
- Continues MUREP, EPSCoR and Space Grants.





## Cross-Agency Support and Construction

	2012	2013	2014	Outyears are notional	
	2015	2016			
Cross-Agency	\$3,192	\$3,192	\$3,192	\$3,192	\$3,192
Construction & ECR	\$450	\$450	\$450	\$450	\$450

- Cross-Agency Support
  - Continues to fund operations and maintenance of NASA’s 9 field centers, component facilities and headquarters
  - Funds agency-wide management functions
  - Conducts safety and reliability activities to assure safety and mission success
  - Works to find efficiencies and drive down operating costs, including HQ and Human Space Flight center hiring slow downs to realign workforce skills and capabilities.
- Construction and Environmental Compliance and Restoration
  - Implements multi-decadal strategy to reduce and renew NASA’s infrastructure to be more efficient and sustainable
  - Funds major repairs of NASA’s facilities and constructs new or modified facilities as required to conduct NASA’s program missions, and manages NASA’s environmental clean-up responsibilities





# Summary

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- NASA is pursuing a reinvigorated path of exploration, innovation, technology and scientific discovery that engages the public with a fiscally responsible budget and pursues the strategies laid out in the NASA Authorization Act of 2010.
- NASA's strategic approach will enable exciting developments that will make future aeronautics and spaceflight more affordable and sustainable, narrow the U.S. spaceflight gap, inspire a new generation of Americans, and increase our knowledge of the Earth, solar system and the universe.
- In this era of fiscal constraint, NASA will challenge itself to implement new approaches to acquisition management, oversight and teaming with industry, and administrative efficiencies.
- NASA's investment will ensure that the aerospace and aeronautics workforce, space explorers, and legacy and new industries, will have the tools, capabilities and knowledge to sustain U.S. leadership and competitiveness.
- The Agency looks forward to working with the Congress and others to further the Nation's goals for the Agency.



# Acronyms

- 
- **BAA: Broad Area Announcement**
  - **Clarreo: Climate Absolute Radiance and Refractivity Observatory**
  - **CRS: cargo resupply Services**
  - **DESDynI: Deformation, Ecosystem structure and Dynamics of Ice mission**
  - **ELV: Expendable Launch Vehicle**
  - **EPSCoR: Experimental Program to Stimulate Competitive Research**
  - **ESA: European Space Agency**
  - **GOES: Geostationary Operational Environmental Satellite**
  - **GPM: Global Precipitation Mission**
  - **GRACE: Gravity Recovery and Climate Experiment**
  - **ICESat: Ice Cloud and Land Elevation Satellite**
  - **ISS: International Space Station**
  - **JPSS: Joint Polar Satellite System**
  - **LADEE: Lunar Atmosphere Dust Environment Explorer**
  - **LDCM: Landsat Data Continuity Mission**
  - **MAVEN: Mars Atmosphere and Volatile EvolutionN**
  - **MMS: Magnetospheric Multiscale Mission**
  - **MPCV: Multi-Purpose Crew Vehicle**
  - **MUREP: Minority University research and Education Program**
  - **NOAA: National Oceanographic and Atmospheric Administration**
  - **NPP: NPOESS Preparatory Project**
  - **OCO: Orbiting Carbon Observatory**
  - **POES: Polar Operational Environmental Satellite**
  - **RBSP: Radiation belt Storm Probes**
  - **SAGE: Stratospheric Aerosol and Gas Experiment**
  - **SLS: Space Launch System**
  - **SMAP: Soil Moisture Active-Passive Mission**
  - **STEM: Science, Technology, Engineering and Mathematics**
  - **USGS: U.S. Geological Survey**