National Aeronautics and Space Administration

Astrophysics

NASA Current and Future Activities: FY13 and Beyond

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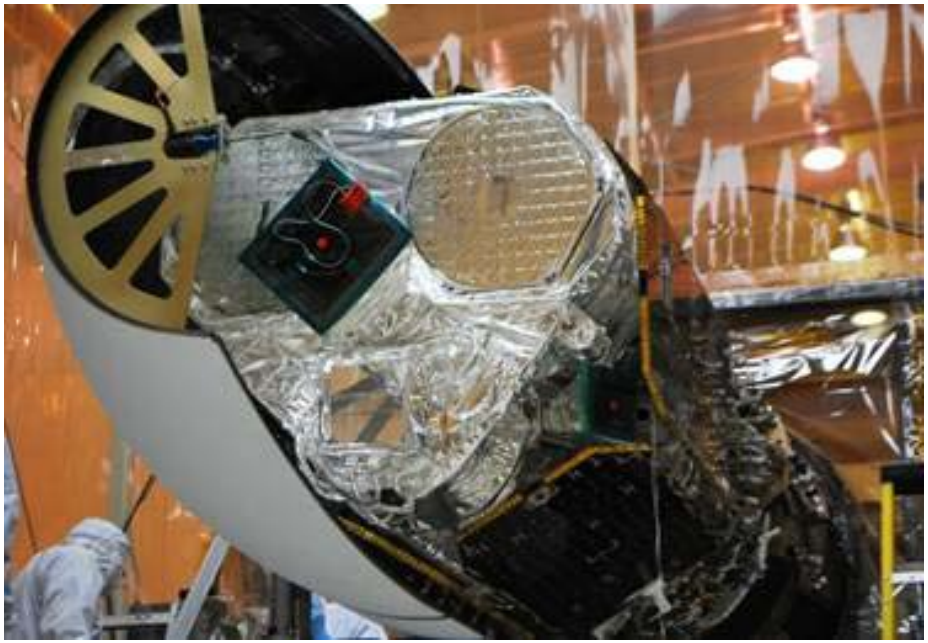
Committee on Astronomy and Astrophysics

June 4, 2012

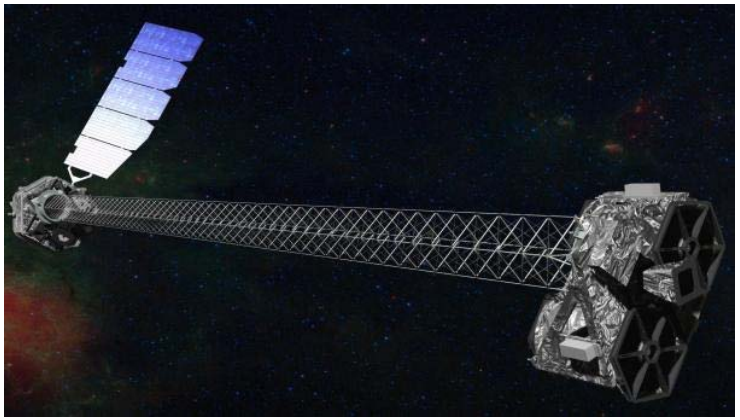
NuSTAR – Next Launch

NuSTAR

- Pegasus payload fairing reinstalled on May 22, 2012 at Vandenberg Air Force Base.
- L-14 news conference held on May 30, 2012 at NASA HQ.
- Flight Readiness Review successfully held on June 1, 2012 at VAFB.
- Ferry flight from VAFB to Kwajalein Test Range is June 5-6, 2012.
- Launch readiness review is June 11, 2012.
- Launch readiness date is June 13 from Kwajalein.

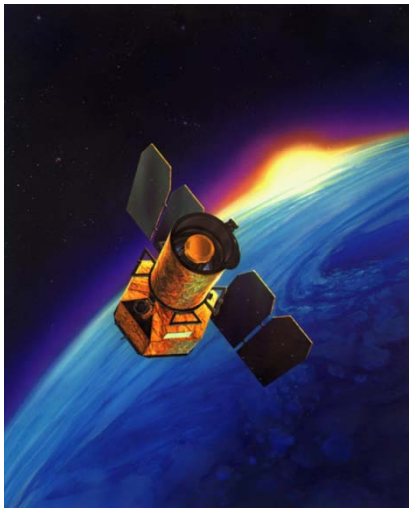


NuSTAR in fairing



GALEX - A New Paradigm

- A Space Act Agreement was signed on May 15, 2012 between NASA and Caltech which loans the spacecraft to Caltech.
- Caltech will operate GALEX with private funds and continue the science mission for as long as three years (extendable).
  - Caltech currently has funds for 5 months of operations from Keck Institute, Weizmann Institute, Cornell University, International consortium (GAMA/Herschel-Atlas/DINGO).
  - No change in data access for the community collected during the Caltech mission:Aall data will continue to be made publicly available after a 12 month period of exclusivity.
- NASA holds long term liability and is responsible for decommissioning and re-entry.



GEMS

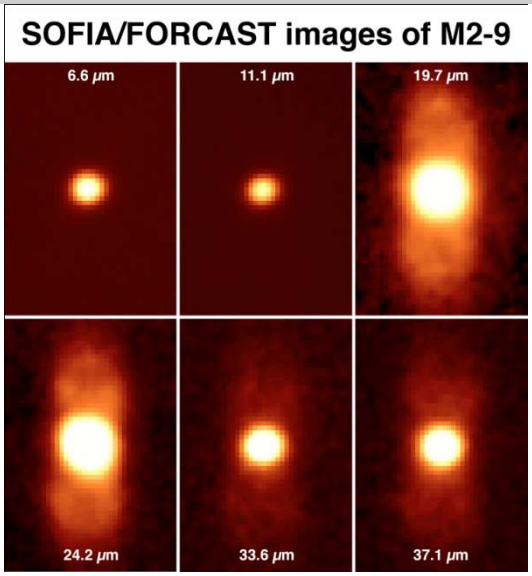
- The NASA Science Mission Directorate Program Management Council met on May 10, 2012 and evaluated the GEMS Key Decision Point C (Confirmation Review).
- Based on this review and the project's readiness documents, the Decision Authority for the GEMS project has non-confirmed the GEMS project to enter implementation, thereby terminating the mission.
- The primary rationale for non-confirmation is as follows:
  - Unacceptable pre-Confirmation cost and schedule growth of an AO-selected, cost capped mission. The GEMS 50% confidence cost estimate has grown by ~26% over the AO-set PI cost cap at which the project was proposed and selected.
  - Violation of the AO cost cap is contrary to the basis of GEMS selection over competing proposals, where proposals whose cost was assessed to be as high as $150M were not considered for selection because their expected cost exceeded the cost cap.
  - GEMS science was reduced from proposed baseline to proposed threshold level during Phase B for cost savings and no further descopes of science are available.

SOFIA Instrument Selection

First generation HAWC instrument.

- The SOFIA Second Generation Instrument selection was announced on April 17, 2012. The selected proposals were judged to have the best science value and feasible development plans.
  - **The High-resolution Airborne Wideband Camera Polarization (HAWC-Pol)**, Charles Dowell, JPL. Upgrades the HAWC instrument to include the capability to make polarimetric observations at far-infrared wavelengths.
  - **HAWC++**, Johannes Staguhn, Johns Hopkins University. Provides a sensitive, large-format detector array to the HAWC-Pol investigation, increasing its observing efficiency.
- Upgraded HAWC will deliver second generation capabilities on a first generation schedule – no delay in HAWC commissioning.
- Next SOFIA instrument AO in 2014.

SOFIA & Astro-H



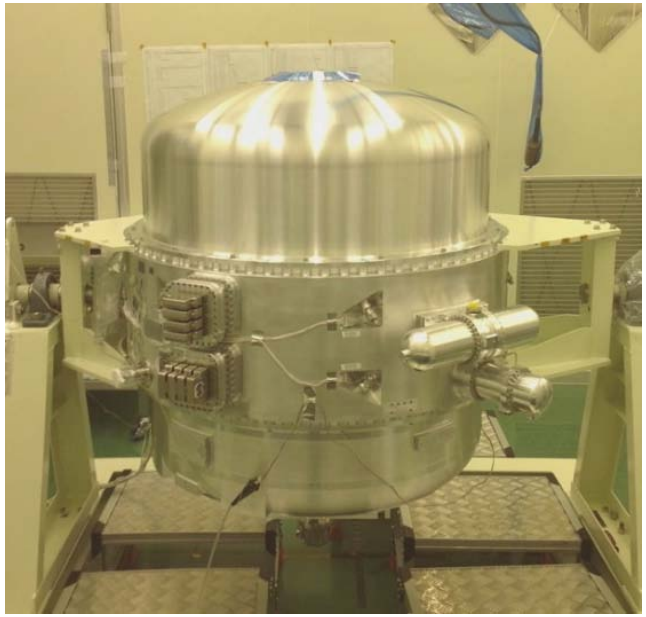
SOFIA

- Telescope Assembly completed Line Operations to verify updated software. Verified that most telescope operational issues seen during early science have likely been resolved.
- Updated instrument commissioning timeline estimates will delay achievement of full ops capability.
- Pete Zell (ARC) named as new Science Project Manager.

- Eight papers published in Astrophysical Journal Letters, mostly related to FORCAST results
- Twenty-two papers published in special edition of Astronomy and Astrophysics on GREAT results

Astro-H

- The engineering model (EM) Calorimeter Spectrometer Insert (CSI) to begin cryo functional test Aug 7, 2012.
- All other EM testing will be complete by May 31, 2012.
- Launch date continues to be under review by JAXA; NASA is prepared to support launch date change.



JAXA EM dewar after EM CSI installation

Euclid – NASA Contribution

- NASA's contribution will be Near Infrared Spectrograph and Photometer (NISP) flight subassemblies (detector + ASIC+ cryo-cable = 'triplet') that meet ESA's requirements for testing and characterization.
  - This contribution will include manufacture of the flight subassemblies by Teledyne followed by characterization and testing of the flight subassemblies by NASA.
  - After delivery, ESA will be responsible for integrating the subassemblies into the NISP focal plane. ESA will be responsible for solving any problems that arise.
- NASA risk for cost overrun is low.
  - ESA has agreed to not have any flight requirements for the triplets that are not already demonstrated by the prototype triplets developed by ESA. This lowers cost risk for the flight triplets.
  - The cost of characterization and testing is reduced through bringing that work in-house at NASA.
  - The cost risk of problems during I&T is minimized by ending NASA's obligations at delivery of the characterized and tested subassemblies.
- This division of responsibilities is the same as NASA and ESA agreed for Planck.

Euclid – NASA Science Return

- ESA will appoint a NASA-selected member to the Euclid Science Team.
- The Euclid Consortium (EC) will appoint a NASA-selected member to the Euclid Consortium Board and up to 40 NASA-selected members to the Euclid Consortium, commensurate with NASA's hardware contribution to the mission.
- NASA-appointed EC members will have the same data rights as European EC members and will be fully integrated into the Science Working Groups of the EC. The roles and responsibilities of the NASA-appointed EC members will be consistent with ESA's Euclid Science Management Plan and with the Euclid Consortium Science Policies.
- Solicitation for NASA-selected members issued May 23, 2012 as a ROSES amendment.

2012 Senior Review Results

Mission	Result
Chandra	- Fully fund as budgeted thru FY16 - Augment Guest Observer Program at ½ Project request
Fermi	- Mission extension thru FY16 - Reduced budget starting in FY14
Hubble	- Fully fund as budgeted
Kepler	- Extend mission operations thru FY16 - Augment Guest Observer and Participating Science Program at 1/2 Project request
Planck	- Fund US Support of 1-year extension of Low Frequency Instrument operations
Spitzer	- Extend ops thru FY14 - Closeout in FY15
Suzaku	- Extend US Science support through March 2015 (Astro-H launch +1 year)
Swift	- Extend mission operations thru FY16 - Augment Guest Observer Program per Project request
XMM-Newton	- Extend US support through March 2015

Note: All FY15 and FY16 decisions will be revisited in the 2014 Senior Review.

WFIRST

- Science Definition Team delivered its interim report in July 2011.
  - The report is at: *http://wfirst.gsfc.nasa.gov/science/WFIRST_Interim_Report.pdf*
  - The first Design Reference Mission is a proof of concept that a mission can be constructed that is compliant with the Astro2010 recommendation.
  - Updated guidance given to Science Definition Team December 2011.
  - Second Design Reference Mission will not duplicate capabilities of Euclid, LSST, and JWST in advancing science objectives of WFIRST. Look for cost savings.
  - Final report due June 2012.
- Astro2010 recommended WFIRST as the highest priority large mission.
  - The President's FY13 NASA budget request includes no new large missions; Astrophysics expects none before JWST is successfully completed.
  - FY13 budget request does not support originally planned WFIRST technology development and includes no funding identified for WFIRST.
  - WFIRST will not launch in this decade (2018 + 7 yrs = 2025).
  - Astrophysics does not anticipate budget growth in the foreseeable future.
- NASA is proceeding as follows:
  - Through the Science Definition Team and Design Reference Missions, establish a basis for WFIRST planning.
  - Partner on ESA's Euclid to advance some of the science of Astro2010 and WFIRST.
  - Advance the technology and planning required for WFIRST as the budget allows.
  - Contemplate the use of the NRO telescopes for advancing WFIRST scientific priorities.

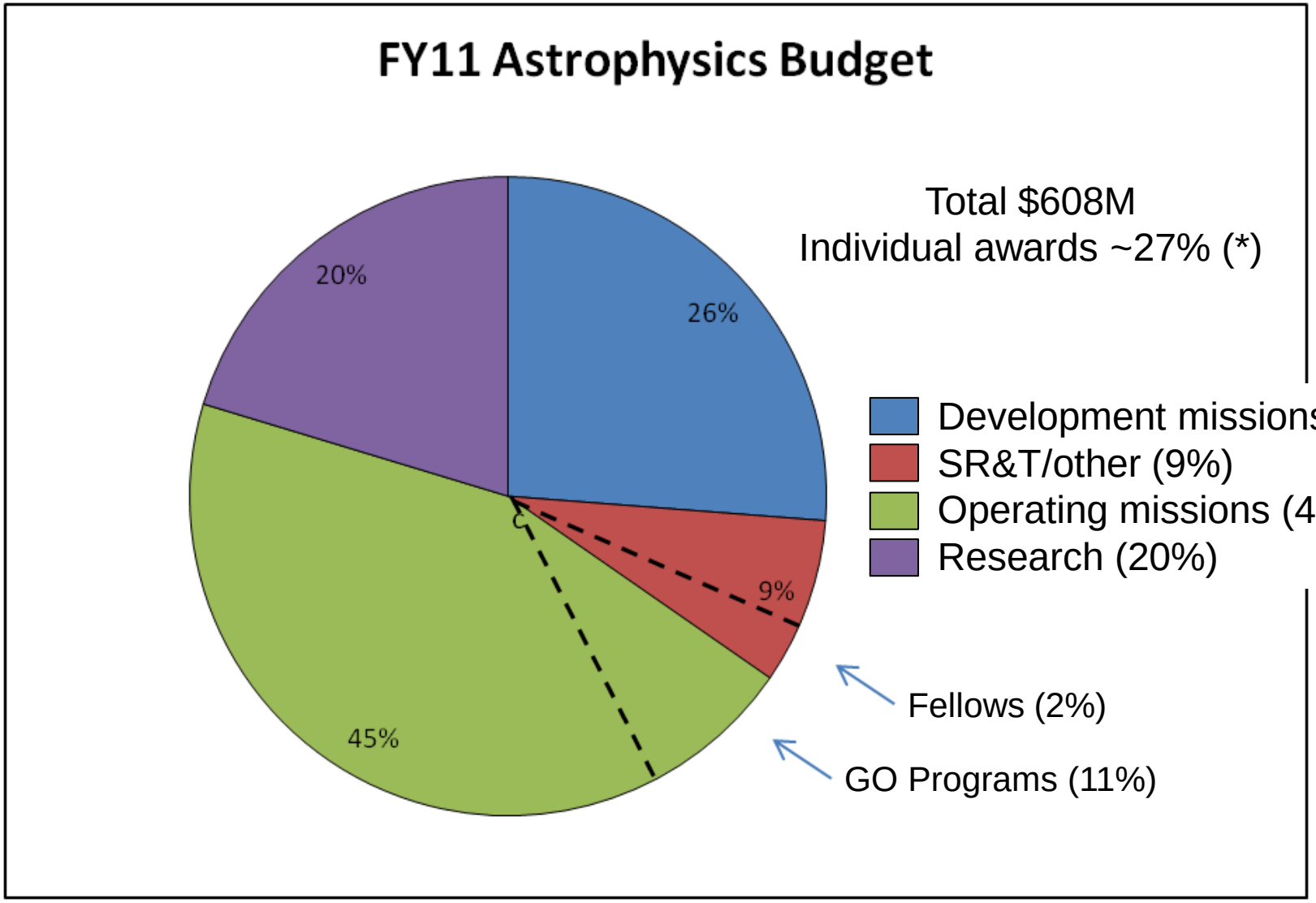
Explorer Program

- FY13 budget request does not support an AO for both missions and missions of opportunity (MOs) in late CY12.
  - First priority in the Explorer program is to complete Explorers in development: NuSTAR, SXS/Astro-H.
  - Second priority is to downselect and fund the development of one mission and one MO from the projects currently conducting Phase A studies (FINESSE/TESS, GUSSTO/NICER).
  - Third priority is to issue new AOs leading to the development of new missions.
- Funding planned for GEMS will remain in the Explorer Program.
  - Immediately begin the new projects when they are downselected in Spring 2013.
  - Advance the next mission AO.
- The Astro2010 Decadal Survey said to “Enable rapid response to science opportunities; augments current plan by 2 MIDEXs, 2 SMEXs, and 4 MoOs.”
  - “This survey recommends that the annual budget of the astrophysics component of the Explorer program be increased from $40 million to $100 million by 2015.”
  - The notional Astrophysics Explorer budget is $134M in FY15 and $166M in FY17.
- Astrophysics Division is planning a series of AOs (subject to budget):
  - An AO for a MO with a $50-60M cost cap in Sep/Oct 2012.
  - An AO for a SMEX in late-2013 with the cost caps and dates TBD by summer 2012.
  - An AO for a EX and MO in 2015.

SMD FY 2013 Program/Budget Strategy

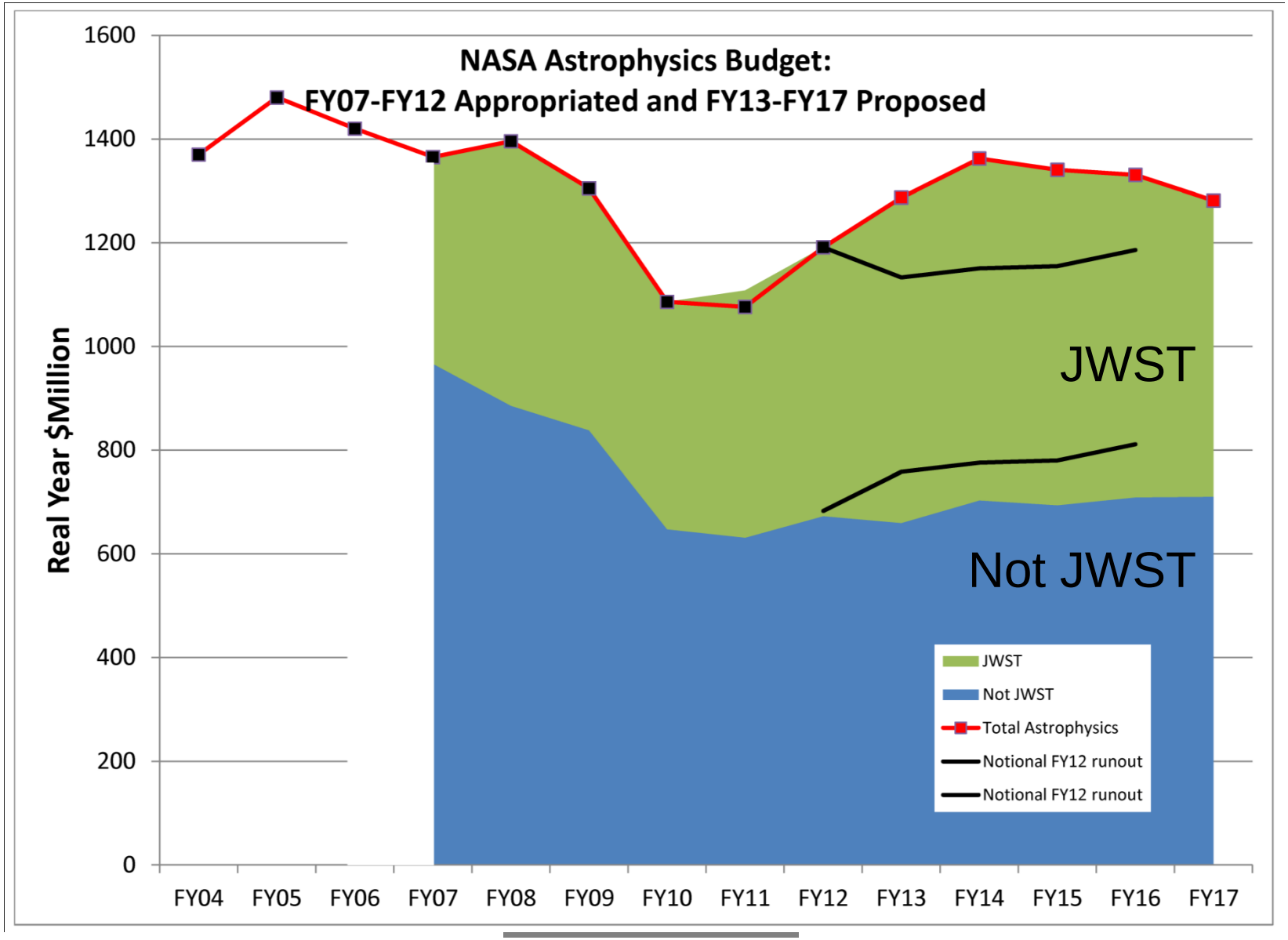
- Continue to provide the most productive Earth & space science program for the available resources.
  - Guided by national priorities.
  - Informed by NRC Decadal Surveys recommendations.
- Continue to responsibly manage the national investment in robotic space missions.
  - Confirm new missions only after sufficient technology maturation and budgets at an appropriate confidence level.
  - Closely manage JWST to the new cost and schedule baseline.
- Plan and conduct a new Mars program with other NASA organizations to meet both human exploration and science goals.
- Adequately budget for launch services acquired for SMD by NASA's Launch Services Program (LSP):
  - Availability and reliability for medium class.
  - Encourage cost constraining measures for intermediate/large class.

FY2011 Astrophysics Budget by Function



(*) Corrected 6/7/12. Fraction on earlier version included infrastructure costs of the balloon program and the data archives.

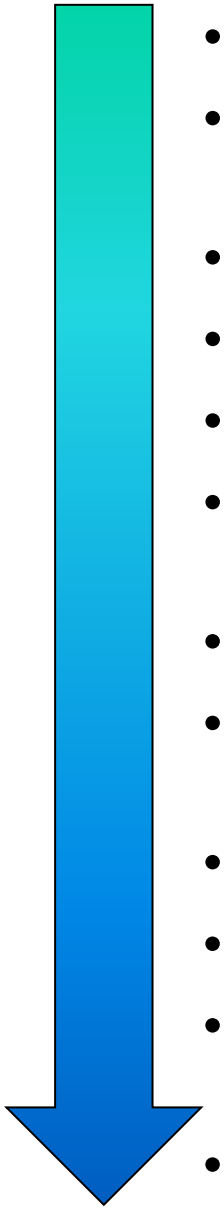
President's FY13 Budget Request for Astrophysics



Astrophysics Budget Strategy

- Use the scientific priorities of the Astro2010 Decadal Survey to guide strategy
  - Due to budget constraints, no new missions other than Explorers can enter formulation before FY17.
- In the absence of new missions, progress against decadal priorities is maintained through the core research program, through continued operation of existing missions and their GO programs, through the suborbital programs, and through frequent Explorer opportunities.
- In order to prepare for a new mission starting in FY17, a near term program of mission concept studies and technology development will be undertaken, with the goal of making a mid-decade decision on which mission(s) will begin formulation starting in FY17
  - Currently there are no new starts for large missions. Moderate missions must be considered for start in FY17, possibly in addition to a large mission (WFIRST).
  - Use of the NRO telescopes must be considered for WFIRST and possibly other mission concepts.
- New strategic missions in the future are possible only if the Astrophysics budget recovers a large portion of the SMD funds freed up as the JWST budget begins to decrease in FY18 and out.

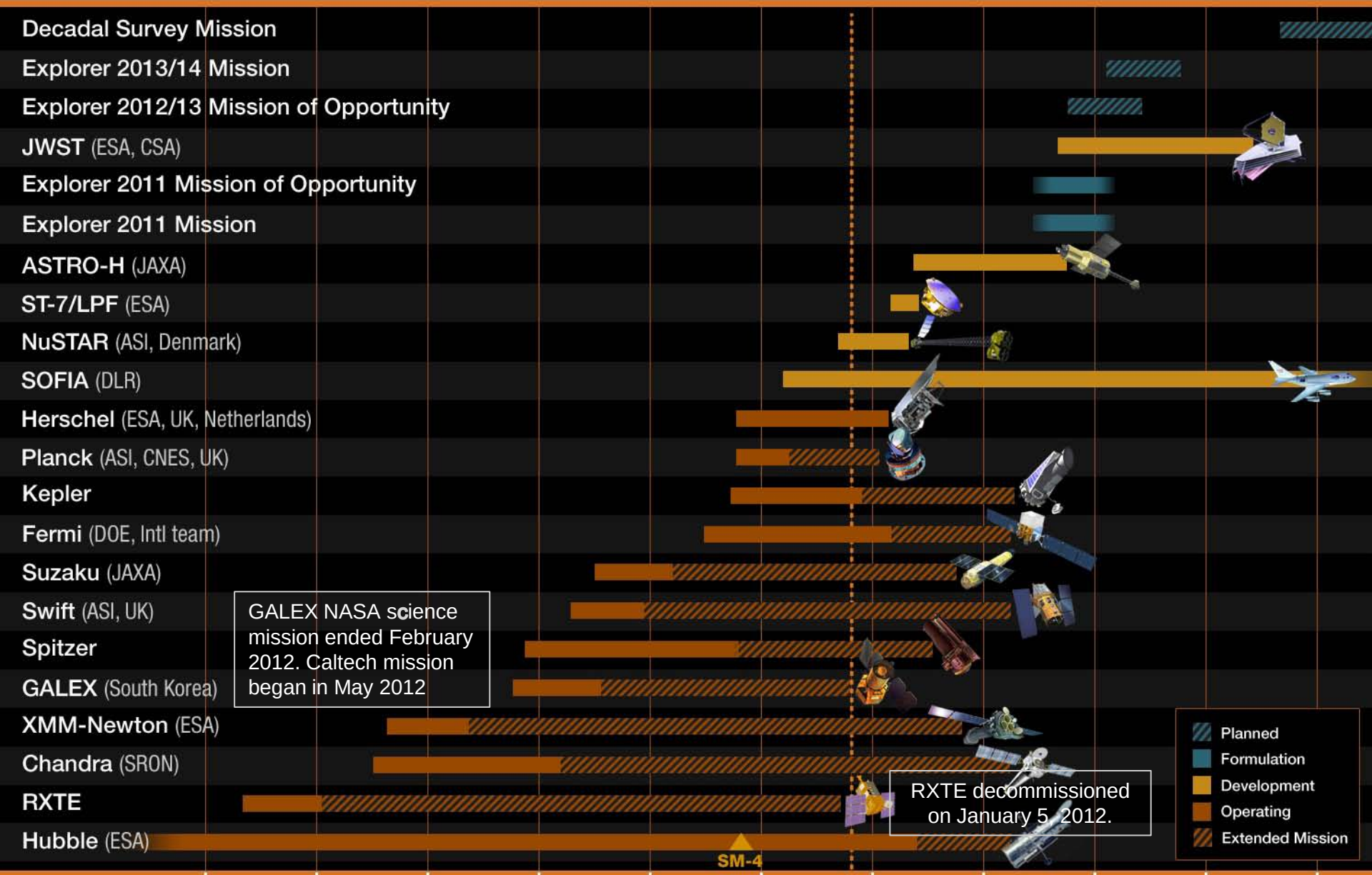
Astrophysics Budget Strategy



2012	• Study WFIRST options.
	• Solicit ideas from the community for studies of moderate missions that address DS priorities.
	• Establish community study teams for mission concepts.
	• Initiate mission concept studies within the programs.
	• Use community analysis groups to inform process.
2013	• Use competed and directed technology programs to develop enabling technology and mission concepts.
2014	• Continue
2015	• Using community input, conduct prioritization and decision process for identifying FY17 new start.
	• Start pre-formulation for new FY17 strategic mission.
	• Start NRC mid-decade review.
2016	• Complete mid-decade review. Revise plans as necessary in response to report.
2017	• New start for strategic mission.

Astrophysics Missions timeline

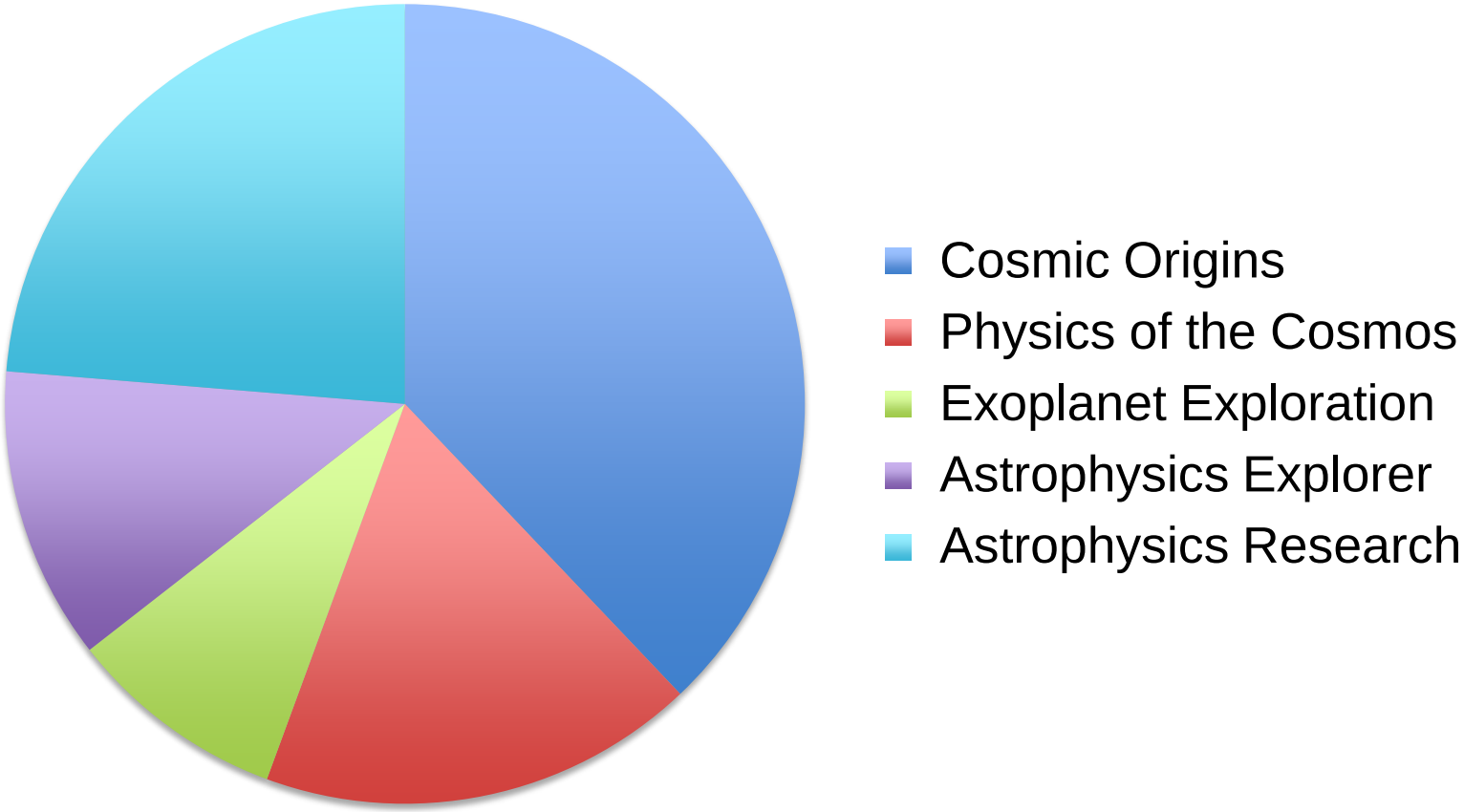
Last updated: May 30, 2012



Backup Slides

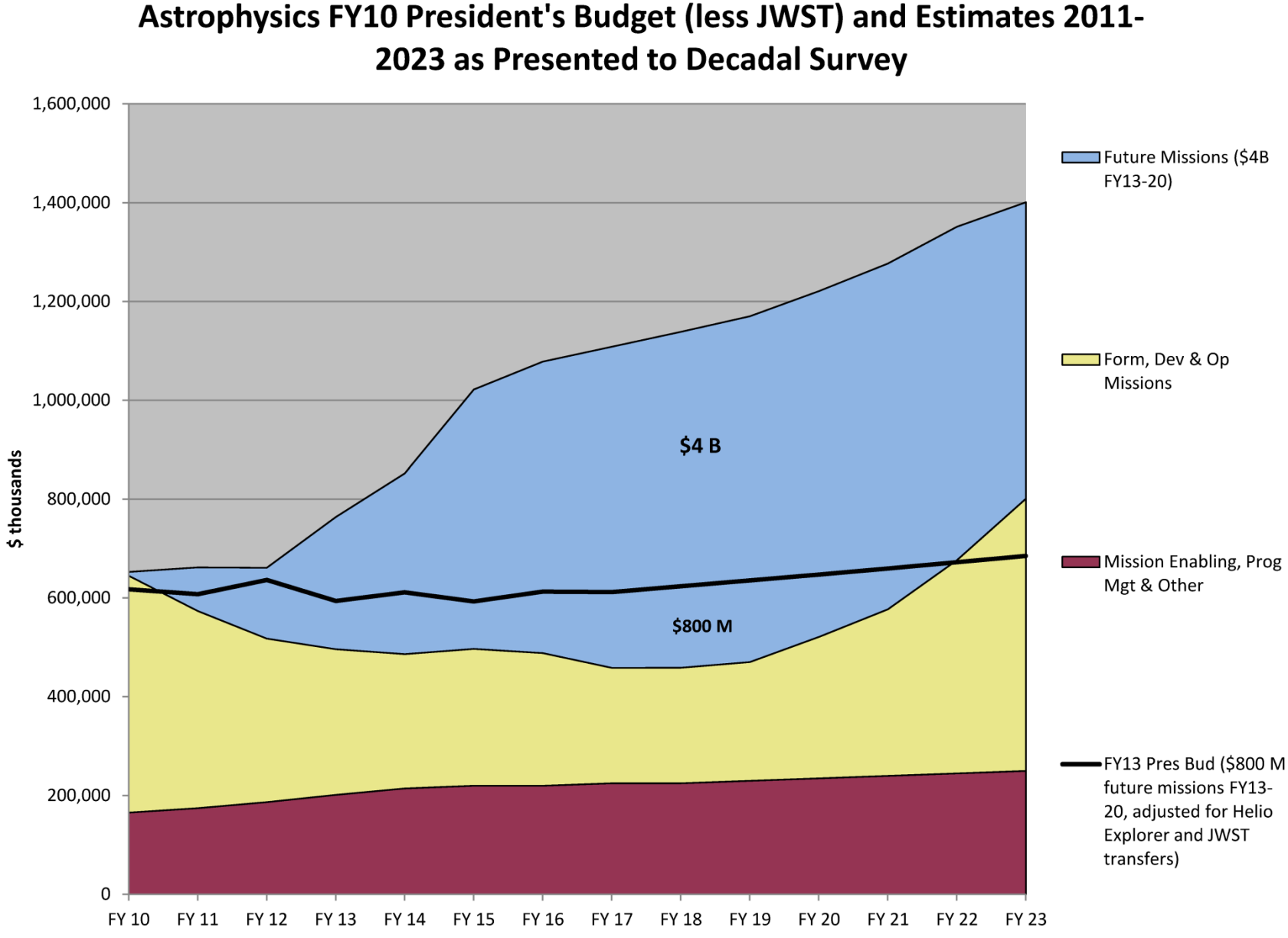
FY2013 President's Request for NASA Astrophysics

~$633M Total *



* Does not include SMD budgets that are bookkept in the Astrophysics budget line

Changes since the Astro2010 Decadal Survey



Astrophysics - Missions in Formulation & Implementation

Project	Overall previous months				This Month					Comments
	-4	-3	-2	-1	O	T	C	S	P	
Physics of the Cosmos	G	G	G	G	G	G	G	G	G	
ST-7 (NET Apr 2014)	G	G	G	G	G	G	G	G	G	NGO not selected for ESA L1. LISA Pathfinder still moving forward.
Explorer Program										
NuSTAR (Jun 13, 2012)	Y	Y	Y	Y	G	G	Y	G	G	Jun 13, 2012 LRD pending resolution of Pegasus S/W prior to Jun 1 FRR.
Astro-H (Aug 2014)	Y	Y	Y	Y	Y	G	Y	Y	G	No update on JAXA LRD. EM begins Ops test Aug 8. FM fabrication on track
GEMS (Nov 2014)	Y	G	G/Y	Y						KDP-C held, Project terminated. Closeout plan due from project Jun 30.
FINESSE, TESS, NICER, GUSSTO	G	G	G	G	G	G	G	G	G	Phase A reports due Sep 21, 2012.
Cosmic Origins	G	G	G	G	G	G	G	G	G	
SOFIA (ongoing)	G	G/Y	G/Y	Y	Y	G/Y	G	Y	G/Y	Updated instrument commissioning timeline estimates will delay achievement of full ops capability.
Exoplanet Exploration	G	G	G	G	G	G	G	G	G	
Balloon Prog (ongoing)	G	G	G	G	G	G	G	G	Y	Sweden campaign in late June with Superpressure balloon test flight.

O: Overall, C: Cost, S: Schedule, T: Technical, P: Programmatic

G On plan, adequate margin

Y Problems, working to resolve within planned margin

R Problems, not enough margin to recover

Astrophysics – Operating Missions

Mission	Launch	End Date	Phase	-4	-3	-2	-1	This Month	Comments
Hubble	1990-04-24	2016-09-30	Prime	G	G	G	G	G	COS FUV high signal event. FUV recovery underway.
RXTE	1995-12-30	2012-01-05	Ext	G					Sci Ops ended Jan 3, spacecraft decommissioned on Jan 5 after 16 years of operations.
Chandra	1999-07-23	2016-09-30	Ext	G	G	G	G	G	Chandra in safemode due to trip of the Sun Position Monitor; second safemode entry in 12 years.
XMM-Newton	1999-12-10	2015-03-31	Ext	G	G	G	G	G	
GALEX	2003-04-28	2012-02-07	Ext	G	G			●	Space Act Agreement signed on May 15, 2012. GALEX on loan to Caltech for 3 years.
Spitzer	2003-08-25	2014-09-30	Ext	G	G	G	G	G	
Swift	2004-11-20	2016-09-30	Ext	G	G	G	G	G	
Suzaku	2005-07-10	2015-03-31	Ext	G	G	G	G	G	
Fermi	2008-06-11	2016-09-30	Prime	G	G	G	G	G	
Kepler	2009-03-07	2016-09-30	Prime	G	G	G	G	G	
Herschel	2009-05-14	2013-05-14	Prime	G	G	G	G	G	
Planck	2009-05-14	2013-01-31	Ext	G	G	G	G	G	

G On plan, adequate margin

Y Problems, working to resolve within planned margin

R Problems, not enough margin to recover

Astrophysics Mission Events

CY2012 | 2013 | 2014 | Last Updated: May 30, 2012

Mission Launches etc.

- Jun 13 **NuSTAR**
- Spring **Explorer** Downselect
- Ship Flt to JAXA **Astro-H**
- CSI **LPF/ST-7**
- NET April **Astro-H**
- TBD 2014

Suborbital

Rocket Program.

- Mar CIBER 1-3
- Aug IMAGER 1
- Aug FORTIS 1
- Oct SLICE
- Nov MicroX
- Dec ACCESS 1
- Dec DXL 1
- Jan XACT 1
- Jun XACT 2
- Sep ACCESS 2
- Oct XQC 5
- TBD EXOS 3
- TBD FORTIS 2
- Feb ACCESS 3
- TBD EXOS 4
- Aug ACCESS 4

Balloon Campaigns

- Antarctica: D/J (*STO, CREST*); D/J; (3 flights planned); D/J; D/J
- Sweden: J/J (Superpressure)
- Ft. Sumner (spr): Jun
- Palestine: A/M
- Ft. Sumner (fall): A/M (No astrophysics flights); J/J; J/J
- Australia: A/S (PROTOEXIST, WASP); A/S; A/S
- New Zealand: M/A
- Apr (under review)

Opportunities

- Sept/Oct **MoO AO**
- Late **SMEX AO**

Astrophysics Research Program

	FY04 Final $k	FY05 Final $k	FY06 Final $k	FY07 Final $k	FY08 Final $k	FY09 Final $k	FY10 Final $k	FY11 Final $k	FY12 Projected
Particle Astro	$ 8,248	$ 7,671	$ 8,544	$ 7,631	$ 6,672	$ 8,201	$ 8,260	$ 8,243	$ 8,585
High Energy	$ 14,548	$ 13,693	$ 14,779	$ 12,782	$ 12,406	$ 13,886	$ 14,110	$ 13,911	$ 14,548
UV/Opt/IR/ Sub-mm	$ 20,409	$ 18,742	$ 21,851	$ 17,442	$ 19,094	$ 22,353	$ 21,534	$ 21,295	$ 23,032
Other	$ 1,019	$ 854	$ 338	$ 394	$ 594	$ 670	$ 673	$ 641	$ 1,627
APRA Total	$ 44,224	$ 40,960	$ 45,511	$ 38,250	$ 38,765	$ 45,110	$ 44,577	$ 44,090	$ 47,791
Orig Solar Systems	$ 4,209	$ 3,872	$ 4,150	$ 3,673	$ 2,965	$ 3,000	$ 2,807	$ 2,944	$ 2,978
Astro Theory Program	$ 7,860	$ 7,363	$ 10,245	$ 10,227	$ 11,696	$ 11,890	$ 12,262	$ 12,577	$ 13,226
R&A (399131)	$ 56,293	$ 52,195	$ 59,906	$ 52,150	$ 53,426	$ 60,000	$ 59,646	$ 59,611	$ 63,995
ADAP/LTSA	$ 16,986	$ 15,700	$ 15,189	$ 12,641	$ 12,013	$ 14,384	$ 13,258	$ 14,132	$ 16,320
Core Research	$ 73,279	$ 67,895	$ 75,095	$ 64,791	$ 65,439	$ 74,384	$ 72,904	$ 73,743	$ 80,315
TPF/FS	$ 2,000	$ 2,000		(Foundation Science; now in ATP)					
Beyond Einstein FS	$ 4,000	$ 3,000	$ 2,000						
ASMCS (399131)	Mission concept studies				$ 3,452	$ 442			
PCOS SR&T				(Fundamental Physics; now in APRA)			$ 968	$ 184	
Technology Fellows									$ 600
TOTAL	$ 79.3M	$ 72.9M	$ 77.1M	$ 64.8M	$ 68.9M	$ 74.8M	$ 73.9M	$ 73.9M	$ 80.9M
		$7M cut	smaller cut	15% cut	partial recovery	more recovery	flat	flat	growth!

In response to the Astro2010 Decadal Survey recommendations:

-- The budget for research awards increased by 10% in FY12

-- Theory and Computation Networks: AAAC studying NASA-NSF program

-- Suborbital program (payloads, balloons) growth deferred

Astrophysics ROSES Selection Statistics

	Due Date	Notification	Days from due date	Weeks past review	Rec'd		Selected	Success
ROSES-2012								
Origins of Solar Systems	25-May-12	22-Oct-12	-4					
Astrophysics Data Analysis	18-May-12	15-Oct-12	3		295	→		
ROSES-2011								
Strategic Astrophysics Technology	23-Mar-12	3-Aug-12	59	-2.4	49			
Astrophysics Research and Analysis	23-Mar-12	3-Aug-12	59	-2.4	162	→		
Elements with NEW STARTS IN FY13					506			
Fermi Guest Investigator -- Cycle 5	20-Jan-12	1-May-12	102	4.6	224	→	67	30%
Kepler Guest Observer - Cycle 4	20-Jan-12	27-Apr-12	98	3.1	61	↑	21	34%
Roman Technology Fellowships	18-Nov-11	7-Mar-12	110	7.5	16		3	19%
Swift Guest Investigator -- Cycle 8	28-Sep-11	21-Dec-11	84	1.6	152	→	32	21%
Astrophysics Theory	3-Jun-11	28-Oct-11	147	6.2	197	→	33	17%
Origins of Solar Systems	27-May-11	7-Oct-11	133	7.1	36	→	5	14%
Astrophysics Data Analysis	20-May-11	29-Sep-11	132	6.1	278	↑↑	60	22%
ROSES-2010								
Strategic Astrophysics Technology	25-Mar-11	31-Aug-11	159	9.0	56	↑↑	18	32%
Astrophysics Research and Analysis	25-Mar-11	31-Aug-11	159	9.0	166	↑↑	40	24%
Elements with NEW STARTS IN FY12		weighted mean =	126	5.6	1186		279	**24%**
Core (Non-GO) solicitations			144		749		159	**21%**
Guest Observer solicitations			95		437		120	**27%**

Astrophysics Program Content

	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17
				(FY14-17 estimates are notional)			
Astrophysics	**631.1**	**672.7**	**659.4**	**703.0**	**693.7**	**708.9**	**710.2**
Astrophysics Research	146.9	164.1	176.2	189.1	205.1	211.5	218.7
Astrophysics Research and Analysis	59.6	64.6	64.2	65.5	66.8	68.2	69.5
Balloon Project	26.8	31.6	31.3	31.2	32.8	34.2	34.3
Other Missions and Data Analysis	60.5	67.9	80.6	92.3	105.4	109.2	114.8
Keck Single Aperture	2.2	2.3	2.4	2.4	2.5	2.5	2.5
Astrophysics Data Analysis Program	14.1	16.3	18.3	18.5	18.5	19.1	19.1
Astrophysics Data Curation and Archival	20.8	20.1	20.0	19.6	21.7	22.1	22.2
Astrophysics Senior Review			16.3	24.5	33.5	35.2	40.0
Education and Public Outreach	13.2	15.4	10.1	10.1	10.1	10.1	10.1
Directorate Support - Space Science	10.1	13.7	13.5	13.9	14.0	14.5	14.5
Directed Research and Technology				3.3	5.2	5.6	6.4
Cosmic Origins	229.1	237.3	240.4	228.5	215.1	205.3	205.7
Hubble Space Telescope (HST)	91.7	95.7	98.3	98.3	94.3	90.2	90.5
SOFIA	79.9	84.2	85.5	88.0	88.0	86.0	85.9
Other Missions And Data Analysis	57.6	57.4	56.6	42.2	32.8	29.1	29.3
Spitzer Space Telescope	22.7	17.8	9.8				
Herschel	24.6	24.0	20.8	15.8	5.8		
Cosmic Origins SR&T	7.9	10.6	19.4	19.5	20.7	21.7	21.8
Cosmic Origins Future Missions	0.7	1.0	1.7	1.7	1.0	2.0	2.0
Cosmic Origins Program Management	1.7	4.0	4.9	5.2	5.3	5.4	5.5

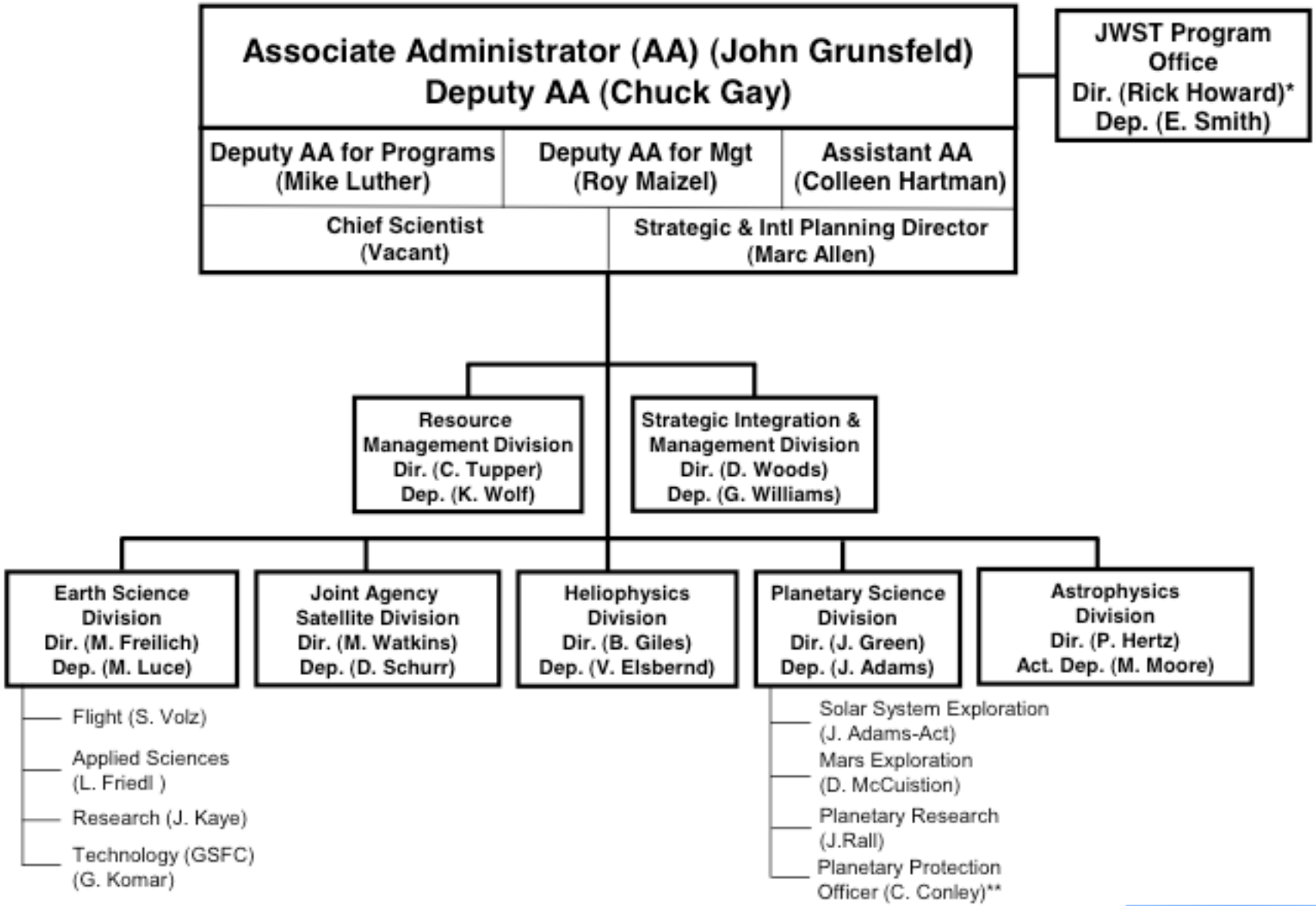
Astrophysics Program Content (cont'd)

	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17
				(FY14-17 estimates are notional)			
Physics of the Cosmos	108.7	108.3	111.8	109.6	96.3	92.7	74.6
Chandra X-Ray Observatory	60.6	54.7	56.6	56.6	56.6	56.7	51.2
Fermi Gamma-ray Space Telescope	22.3	25.3	25.0	24.5	17.5	12.9	
Planck	8.1	7.2	6.8	4.6	0.8		
XMM-Newton	1.2	2.1	1.9	1.9			
Physics of the Cosmos SR&T	13.9	15.0	14.9	15.3	15.3	16.0	16.2
Physics of the Cosmos Program Management	2.3	3.1	4.7	5.0	5.1	5.2	5.3
Physics of the Cosmos Future Missions	0.3	1.0	1.8	1.7	1.0	2.0	2.0
Exoplanet Exploration	46.4	50.8	56.0	41.6	43.3	42.4	45.6
Kepler	16.8	19.6	13.6	0.2			
Large Binocular Telescope Interferometer	1.5	2.0	3.8	2.9	2.0	0.5	0.5
Keck Operations	3.6	3.2	3.3	3.4	3.5	3.5	3.5
Keck Interferometer	0.1	0.4					
Wide Field Infrared Space Telescope	3.6						
Exoplanet Exploration SR&T	14.9	18.1	28.0	28.2	30.8	31.1	34.3
Exoplanet Exploration Program Management	4.8	6.0	6.1	5.7	5.9	6.0	6.0
Exoplanet Exploration Future Missions	1.2	1.5	1.2	1.2	1.2	1.2	1.2

Astrophysics Program Content (cont'd)

	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17
				(FY14-17 estimates are notional)			
Astrophysics Explorer	100.0	112.2	75.1	134.3	133.9	157.0	165.6
Nuclear Spectroscopic Telescope Array (NuSTAR)	36.1	11.8	4.7	4.4			
Gravity and Extreme Magnetism	23.0	63.2	46.4	32.9	2.7	0.2	
Other Missions and Data Analysis	41.0	37.2	24.1	97.1	131.2	156.8	165.6
Astro-H (SXS)	16.9	16.2	4.4	1.8	1.0	0.9	
SWIFT	6.3	4.3	4.4	4.4			
Wide-Field Infrared Survey Explorer	7.3	4.5	0.2				
Suzaku (ASTRO-E II)	1.8	0.3	0.3				
GALEX	6.2	0.6					
Wilkinson Microwave Anistropy Pro (WMAP)	1.6	1.0					
Rossi X-Ray Timing Explorer (RXTE)	0.9						
Astrophysics Explorer Future Missions		3.1	10.6	85.6	124.0	149.6	159.3
Astrophysics Explorer Program Management		7.3	4.1	5.3	6.2	6.3	6.4

SMD Organization Chart



* Direct report to NASA Associate Administrator
** Co-located from the Front Office

March 2012

Astrophysics Division Organization Chart

May 9, 2012

Resource Management
Holly Degn +
Peifen Anawalt +

Director
Paul Hertz
Deputy Director (Acting)
Michael Moore

Lead Secretary: Kelly Johnson
Secretary: Leslie Allen
Program Support Specialist: Sheila Gorham

Asst Dir for Innovation & Technology: Michael Moore (acting)
PE for Tech & Ops Missions: William (Billy) Lightsey *
NASA Postdoctoral Mgmt Fellow: Raymond Kinzer, Jr. *

Communications
Division E/PO POC: Hashima Hasan (Lead)
Division PAO POC: Ilana Harrus *
Information Manager: Lisa Wainio *

Astrophysics Research

Program Manager: Linda Sparke
Astrophysics Data Analysis: Doug Hudgins
Astrophysics Theory: Linda Sparke
Origins of Solar Systems: Mario Perez *
APRA lead: Ilana Harrus *
Cosmic Rays, Fundamental Physics: Vernon Jones
Gamma Ray/X-ray: Ilana Harrus *, Wilt Sanders *
Lou Kaluzienski
Optical/Ultraviolet: Mario Perez *
Hashima Hasan
IR/Submillimeter/Radio: Chris Davis *, Doug Hudgins
Glenn Wahlgren *
Lab Astro: Glenn Wahlgren *
ADCAR Archives: Hashima Hasan
Astrophysics POC for Sounding rockets: Wilt Sanders *
Balloons Program: Vernon Jones (PS), Mark Sistilli (PE)

Programs / Missions

	Program Scientist	Program Executive
Exoplanet Exploration (EXEP)		
LEADS	**Doug Hudgins**	**Lia LaPiana**
Keck	Mario Perez *	Mario Perez *
Kepler	Doug Hudgins	Jaya Bajpayee *
LBTI	Mario Perez *	Michael Moore
NExScI	Mario Perez *	Lia LaPiana
Cosmic Origins (COR)		
LEADS	**Mario Perez ***	**John Gagosian** (acting)
Herschel	Glenn Wahlgren *	Jaya Bajpayee *
Hubble	Richard Griffiths *	John Gagosian
JWST	Hashima Hasan	N/A
SOFIA	Chris Davis *	John Gagosian
Spitzer	Glenn Wahlgren *	Jaya Bajpayee *
Physics of the Cosmos (PCOS)		
LEADS	**Rita Sambruna**	**Jaya Bajpayee ***
Chandra	Wilt Sanders *	Jaya Bajpayee *
Fermi	Ilana Harrus *	Jaya Bajpayee *
Planck	Rita Sambruna	Jaya Bajpayee *
ST-7/LPF	Wilt Sanders *	Anne-Marie Novo-Gradac
XMM-Newton	Lou Kaluzienski	Jaya Bajpayee *
Astrophysics Explorers (APEX)		
LEADS	**Wilt Sanders ***	**Anne-Marie Novo-Gradac**
Astro-H	Lou Kaluzienski	Anne-Marie Novo-Gradac
GALEX	Mario Perez *	Jaya Bajpayee *
GEMS	Richard Griffiths *	Lia LaPiana
NuSTAR	Lou Kaluzienski	Mark Sistilli
RXTE	Ilana Harrus *	Jaya Bajpayee *
Suzaku	Lou Kaluzienski	Jaya Bajpayee *
Swift	Ilana Harrus *	Jaya Bajpayee *
WISE	Hashima Hasan	Jaya Bajpayee *
WMAP	Rita Sambruna	Jaya Bajpayee *

\+ *Member of the Resources Mgmt Division*
* *Detailee, IPA, contractor, or NASA Postdoctoral Mgmt Fellow*
JWST now part of the JWST Program Office.