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NASA Budget Up in Senate Plan

AAAS R&D Funding Update on NASA R&D in FY 2009 Senate Appropriations

Highlights

- The Senate Appropriations Committee has drafted a 2009 spending bill that would give the National Aeronautics and Space Administration (NASA) $17.8 billion next year (see Table), an increase of $635 million or 3.7 percent, with the entire increase and more going to two big-ticket human space programs. The Constellation Systems program to develop the next generation of human spacecraft would receive $3.1 billion, an increase of 24.5 percent or $606 million. The International Space Station would receive $2.1 billion, a $247 million or 13.6 percent increase, as construction ramps up toward completion in 2010.

- Although the Senate would add funding to the request for earth science, planetary science, and aeronautics research programs, NASA's research-oriented programs would still see funding cuts in 2009. NASA support of basic and applied research would fall for the fifth year in a row, down 2.5 percent in the Senate plan. The Science portfolio would fall 3.9 percent to $4.5 billion, with especially steep cuts in Astrophysics and Heliophysics.

- The NASA R&D portfolio would increase 5.5 percent or $675 million to $12.9 billion in the Senate appropriation (see Table), with the entire increase and more coming from Constellation Systems and the Space Station.

NASA R&D in FY 2009 Senate Appropriations

On June 19, the Senate Appropriations Committee approved its version of the FY 2009 Commerce-Justice-Science appropriations bill (S 3182) providing funding for the Department of Commerce, the National Science Foundation (NSF), and the National Aeronautics and Space Administration (NASA), for consideration by the full Senate in July. The House approved its own version of the bill on June 25; full details of the House version will be available shortly. Both the House and Senate bills contain close to $57 billion in 2009 discretionary spending, $5 to $6 billion more than the current year and between $3 and $4 billion more than the President's request for these programs.

The National Aeronautics and Space Administration (NASA) continues to forge ahead with its full program of flying the Space Shuttle, building the Space Station, funding research across a broad range of disciplines, and developing the next generation of space vehicles, but tight budget constraints in the overall federal budget and a long-term budget plan of doing everything within a budget rising no faster than the rate of inflation are forcing tough choices in the agency's priorities. Although the House and the Senate are both considering NASA authorization bills that would authorize more than $19 billion for the agency in 2009, in the world of appropriations boosting NASA's budget is proving to be much tougher. The Senate would give NASA $17.8 billion in FY 2009, $200 million more than the request and $635 million or 3.7 percent more than the current year (see Table) but far short of the proposed authorizations. (NASA recently received $62.5 million in 2008 funding as part of the 2008 supplemental appropriations bill. The Table includes these supplementals in the 2008 column.)

NASA's R&D funding would climb $675 million or 5.5 percent to $12.9 billion in the Senate plan (see Table). **But efforts to develop next-generation human space vehicles to replace the Shuttle and ramped-up construction of the International Space Station (ISS) would take up the entire R&D increase and more, leaving all other NASA R&D programs combined with declining funding.**

NASA's Constellation Systems program aims to develop a new Orion Crew Exploration Vehicle (CEV) and Ares 1 Crew Launch Vehicle (CLV) to replace the Space Shuttle as the primary means of getting humans into space. This large program to fund development of the CEV, CLV, and related technologies is part of the President's Vision for Space Exploration, announced in 2004, to get humans back to the moon and onward to Mars. Funding for this effort has exploded in recent years. NASA and now the Senate would boost funding by a remarkable 24.5 percent or $606 million to $3.1 billion, with the CEV and CLV receiving a billion dollars each. Although the longstanding goal has been to launch these vehicles in 2014, the current project timetable is working toward a launch date of 2015, with a mission to the moon by 2020. The Senate would allocate a little more than the request to keep the project on track for these targets.

Unfortunately, the current timetable would leave a gap of 5 years between the 2010 planned retirement of the Space Shuttle and the 2015 CLV launch when the U.S. will not have the capability to launch humans into space. During this time, NASA will have to rely on other nations, notably Russia, to transport astronauts to and from the International Space Station (ISS). The International Space Station (ISS) budget would climb 13.6 percent or $247 million to $2.1 billion in 2009 for a ramped-up construction schedule aiming for final assembly of the Station in 2010, followed by full operations through 2016 sustained by the purchase of Russian space flights to and from the Station after the Space Shuttle retires in 2010. The Space Shuttle, a non-R&D NASA program, is almost exclusively in operation to finish assembly of the Space Station with a $3.0 billion request and Senate appropriation in 2009, down 8.7 percent. The current NASA plan is to have another $3.0 billion Shuttle request in 2010 to finish Station assembly, but then retire the craft with less than $100 million in 2011 for close-out costs. The Shuttle savings in 2011 and later would then be transferred to other NASA programs, primarily Constellation Systems. But Congress may have other ideas; the NASA authorizations under consideration would explore options to keep the Space Shuttle flying after 2010 or accelerate development of the Constellation Systems craft to narrow the gap.

Together, the Constellation Systems increases for development and ISS increases for R&D facilities would take up the entire increase for NASA R&D, leaving all other NASA R&D programs combined with cuts, following similar cuts in each of the last five years. **NASA's basic and applied research support would fall 2.5 percent in the Senate appropriation down to $3.2 billion, the fifth year in a row the NASA research portfolio would fall.** Despite $54 million in additional Senate funding, aeronautics research funding would still fall 2.3 percent down to $500 million in 2009 following steeper cuts in previous years.

The Science portfolio of earth observations, astronomy, and robotic exploration of the solar system and universe would fall in 2009 after a slight increase in 2008. The Science portfolio would fall 3.9 percent to $4.5 billion, with especially steep cuts in Astrophysics (down 14 percent) and Heliophysics (down 27 percent). The Senate would add funding to Planetary Science (up 10 percent) and Earth Science (up 9 percent), however, with a special emphasis on new earth science missions.

In the Earth Science portfolio (up 8.9 percent to $1.4 billion), the 2009 request and the Senate appropriation would attempt to rebuild a robust earth-observing capability after sharp cuts in earlier years. Last year, a National Academy of Sciences decadal survey of earth science expressed concern that the number of earth-observing sensors on NASA spacecraft could decrease by 40 percent during this decade if recent trends had continued. In response, NASA would add at least three new missions by 2013 compared to previous plans, and would boost funding for Earth Systematic Missions by 28 percent to $678 million. The Senate would go further by boosting mission funding to $742 million to accelerate development of these new missions. The account funds costs for future missions such as the multi-agency NPOESS satellites, the Global Precipitation Measurement (GPM) mission, the Glory mission to measure aerosols, and the Landsat Data Continuity Mission. The account also funds operating costs for current missions such as Terra, Aqua, Aura, and the Tropical Rainfall Measuring Mission (TRIMM). The Senate would also add $15 million to the request to fund competitively selected research projects using these satellite data.

The Planetary Science portfolio would also receive a boost on top of a requested increase, for a Senate total of $1.4 billion (up 9.6 percent). The Senate would add $76 million to the request for Mars Exploration for a total of $463 million, including $300 million for the 2009 Mars Science Lab. Astrophysics funding would fall 14.3 percent down to $1.1 billion. Projected costs for the existing Hubble Space Telescope and

the James Webb Space Telescope scheduled for a 2013 launch would fall. And Heliophysics funding would fall 27 percent down to $615 million, but primarily because the Senate would agree with NASA's proposal to transfer funding for Deep Space Mission Systems and Near Earth Networks out of Science and into Space Operations. Heliophysics Research would begin to recover from past budget cuts with an $18 million increase to $199 million in the Senate appropriation.

Elsewhere in the Senate appropriation, the Senate would add $80 million for congressionally designated projects (earmarks). These earmarks are no longer classified as R&D.

Outlook and Next Steps

The full Senate is expected to debate and approve the Commerce-Justice-Science bill in July, while the House is also expected to consider its version in July. But there is increasing doubt as to whether Congress will try to send a final version of the bill to President Bush before the October 1 start of FY 2009. The President has threatened to veto any 2009 appropriations bill that exceeds his request; since both the House and Senate versions of the bill do so and since Congress is not inclined to do the heavy lifting of negotiating a House-Senate compromise bill only to see it vetoed, the bill may have a long way to go before its funding levels become final. As was the case last year, the final funding outcome for NASA will depend on whether the higher congressional bill total will prevail or whether, as was the case in 2008, Congress will rewrite the bill with lower funding levels to fit the President's budget totals. Although Congress is willing to authorize generous funding increases in NASA authorization bills to enable the agency to carry out its many missions, the problem in appropriations is finding the actual dollars to spend within a very tight budgetary framework.

(This analysis is one of a series of AAAS R&D Funding Updates on FY 2009 congressional appropriations. The complete series of AAAS R&D Funding Updates, including continually updated analyses of R&D in FY 2009 appropriations, is available on the AAAS R&D Web Site (http://www.aaas.org/spp/rd) in the "FY 2009 R&D" or the "What's New" sections.)

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Table. National Aeronautics and Space Administration
Senate Appropriations Committee Action on R&D in the FY 2009 Budget
(budget authority in millions of dollars)

			Action by Senate				
	FY 2008	FY 2009	**FY 2009**	Chg. from Request		Chg. from FY 2008	
	Estimate	Request	**Senate**	Amount	Percent	Amount	Percent
1. **Space Operations**							
International Space Station	1,813	2,060	**2,060**	0	0.0%	247	13.6%
Space Shuttle	3,267	2,982	**2,982**	0	0.0%	-285	-8.7%
Space and Flight Support	446	733	**733**	0	0.0%	287	64.2%
Total Space Operations	5,526	5,775	**5,775**	0	0.0%	249	4.5%
2. **Science**							
Earth Science	1,280	1,368	**1,395**	27	2.0%	115	8.9%
Heliophysics	841	577	**615**	37	6.4%	-226	-26.9%
Planetary Science	1,248	1,334	**1,367**	33	2.5%	120	9.6%
Astrophysics	1,338	1,163	**1,146**	-16	-1.4%	-191	-14.3%
Total Science	4,706	4,442	**4,523**	81	1.8%	-183	-3.9%
3. Exploration							
Constellation Systems	2,472	3,048	**3,078**	30	1.0%	606	24.5%
Advanced Capabilities	671	452	**452**	0	0.0%	-219	-32.6%
Total Exploration	3,143	3,501	**3,530**	30	0.9%	387	12.3%
4. Aeronautics	512	447	**500**	54	12.0%	-12	-2.3%
5. Education	147	116	**130**	14	12.5%	-17	-11.4%
6. Cross-Agency Support							
Center Mngmt. & Ops.	2,013	2,046	**2,026**	-19	-0.9%	13	0.7%
Agency Mngmt. & Ops.	830	946	**905**	-40	-4.3%	75	9.0%
Institutional Investments	320	309	**309**	0	0.0%	-11	-3.5%
Congressional Projects	80	0	**80**	80	- -	0	0.0%
Total Cross-Agency Support	3,243	3,300	**3,320**	21	0.6%	78	2.4%
7. Inspector General	33	36	**36**	0	0.0%	3	8.9%
undistributed rescission and supp. 1/	-130	0	**0**	0	- -	130	-100.0%
Total NASA Budget	17,179	17,614	**17,814**	200	1.1%	635	3.7%
minus non-R&D Activities:							
Space Shuttle	*-3,267*	*-2,982*	***-2,982***	*0*	*0.0%*	*285*	*-8.7%*
Space and Flight Support	*-446*	*-733*	***-733***	*0*	*0.0%*	*-287*	*64.2%*
Inspector General	*-33*	*-36*	***-36***	*0*	*0.0%*	*-3*	*8.9%*
Education	*-147*	*-116*	***-130***	*-14*	*12.5%*	*17*	*-11.4%*
Other education and training	*-24*	*-20*	***-20***	*0*	*0.0%*	*3*	*-13.8%*
Cross-Agency Support for non-R&D	*-1,013*	*-948*	***-988***	*-40*	*4.2%*	*25*	*-2.4%*
Total NASA Non-R&D Activities	*-4,929*	*-4,834*	***-4,889***	*-54*	*1.1%*	*40*	*-0.8%*
TOTAL NASA R&D	12,251	12,780	**12,925**	145	1.1%	675	5.5%

AAAS estimates based on FY 2009 appropriations bills. Includes conduct of R&D and R&D facilities.

FY 2008 and FY 2009 request figures based on OMB R&D data and supplemental agency budget data.

Figures are rounded to the nearest million. Changes calculated from unrounded figures.

1/ Includes 2008 rescissions and recently enacted 2008 supplemental (Public Law 110-252).

NASA has proposed to restructure its programs in FY 2009. Figures for all years have been adjusted to reflect the proposed structure. Most program budgets are significantly less than in previous years because of the transfer of costs to Cross-Agency Support.

These data have been adjusted by AAAS to include R&D support costs in Cross-Agency Support as R&D funding, in line with historical trends.

June 30, 2008 - AAAS estimates of Senate Appropriations Committee-approved appropriations. These figures may be amended or rejected by the full Senate.