

SPACE NEWS

OpEd: Exploration Without Explorers?

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A careful analysis of recent NASA spending, the 2007 NASA budget request and the accompanying projection that outlines planned spending each year through 2011 shows that at least \$980 million has been (or will be) removed from the Explorer program in the years 2005-2011 compared to the projections that accompanied the president's 2004 budget request.

This means that a highly successful and highly productive NASA program has been and will be raided -- and more to the point, decimated -- to pay for other NASA programs. Such raiding of the Explorer budget seems shortsighted and very misguided. If the present plans are allowed to stand, the one demonstrated program for university scientists and engineers to design, build and operate small spacecraft will be greatly diminished.

No new proposal opportunities will exist for several years with the present Explorer budget plan. At least as importantly, NASA will interrupt the key pipeline of training for the next generation of engineers and hardware-educated scientists who can actually work on major space programs in the future. In its extreme, it may be catastrophic for the universities remaining in space science.

In a commentary published by *Space News* two years ago ["Balancing Science and Exploration," March 1, 2004, page 13], I spoke of the significant negative consequences to the NASA space and Earth science programs if adequate resources were not provided for NASA to support the president's Vision for Space Exploration. At that time I wrote that: "The vision expressed by President Bush would take human space activity from its present state of flying around in circles (in low Earth orbit) and eventually move to exploring the surface of Mars. This is an exciting and compelling objective for America's space program and, indeed, for all of humanity. The president's vision, however, will require very substantial funding increases for NASA. Without them, the vision will wither and die. By most estimates there is not enough money in the current NASA budget (about \$15.4 billion in 2004) to complete the international space station, begin a new human exploration launch vehicle, and carry out NASA's planned science programs."

The last three annual budgets for 2005, 2006 and especially the recent 2007 NASA budget request have very much brought these dire possibilities front and center. Huge content has been removed from science mission lines in order to pay for human mission activities. As further noted in the previously mentioned March 2004 *Space News* piece: "The administration's [2005] budget plan brings into sharp focus several key points that need careful consideration and full debate. On the one hand, almost everyone would agree that giving direction and a sense of purpose to the human exploration program of NASA is long overdue. However, without adequate (or perhaps even generous) funding, the vision of lunar and martian exploration will go nowhere. It has the potential to absorb all presently available NASA resources and yet constitute a virtual dead-end as far as meaningful human exploration is concerned. On the other hand, if the human exploration vision does absorb most of NASA's budgetary resources, it will almost certainly destroy many of NASA's most successful science programs and projects..."

The president's 2007 NASA budget request and its five-year runout are calamitous for many programs and plans in astrophysics, space physics, planetary science and Earth science. The worries expressed two years ago appear to be the realities of today and they will get worse over the next several years.

It is important to note that as early as the 2005 NASA budget submission to Congress, there was particularly severe damage to space physics (the Heliophysics Division) and Earth science programs. Several-hundred-million dollars of key program content in the 2005 budget and its

runout was removed from the basic space physics science mission program, the so-called Solar-Terrestrial Probe line.

There were also large cuts in the 2005 budget (and runout) of the Explorer line that is managed by the Heliophysics Division for both space physics and astrophysics. The 2005 budget also removed several tens of millions of dollars in the Sun-Earth Mission Operations and Data Analysis (MO&DA) line (see *Space News*, April 11, 2005, page 19). This would have meant almost immediate shutdown of a significant fraction of the fleet of operating missions, which has been dubbed the 'Great Observatory' for Sun-Earth Connections.

To NASA's and Congress' credit, the 2006 budget began to repair some of the damage and significant MO&DA funding was restored. Thus, the Sun-Earth Connections Great Observatory was spared major disruption. However, no program content was restored to the Solar-Terrestrial Probe or Explorer lines last year, and the 2007 budget request wreaks further substantial damage in these essential program areas.

It is particularly worrisome -- and harmful in untold ways, in my view -- that so much new disruption has been inflicted on NASA's Explorer program in the 2007 budget. The Explorer line is, many would argue, the most successful mission category in all of NASA. Explorers are NASA's smallest class of spacecraft missions. They are selected through a highly competitive process from the entire space physics and astrophysics community.

They are developed and launched on very short time scales (a few years typically). Explorers offer the very real opportunity for the nation's universities to propose, develop, build and operate spaceflight missions. In this way, the Explorer program is one of the last genuine ways to provide hands-on training of young engineers and scientists in how to do real space programs.

Clearly NASA faces major challenges if it must live within a flat (or nearly flat) budgetary environment. However, the last thing NASA should do is pillage the Explorer budget line to pay for other programs. Explorers have rewritten the textbooks about Sun-Earth and cosmic processes and they have changed our view of the universe around us. As noted in a recent report by the National Academy of Sciences Committee on Solar and Space Physics, "The Explorer line has been much too successful and too productive to be raided in any way for resources to support other NASA programs." It is imperative that the Explorer funding line be restored to levels that were carried by NASA in 2004 and in the runout budgets. Congress and NASA should work together tirelessly to achieve this Explorer restoration.

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