Rising Cost of Shuttle and Hubble Could Break NASA Budget

Science may have to pay a steep price for putting the space shuttle back in business. Last week, NASA science chief Al Diaz ordered his managers to find at least $400 million in cuts to space and earth science efforts so that the space shuttle could resume flying in 2005, according to NASA officials. Billions of dollars in unexpected shuttle costs also threaten aeronautics and the nascent exploration effort.

The crunch comes only 7 months after President George W. Bush proposed an ambitious new trajectory for the space agency that officials said would not strain NASA's budget. Finishing the space station and closing down the shuttle program early in the next decade would free up money for lunar and martian robotic and human missions, they explained. Under that plan, spending on science would grow from $4 billion in 2004 to $5.6 billion in 2009, while shuttle spending would drop from $4 billion to $3 billion.

But the expected cost of fixing the shuttle fleet, grounded since the loss of Columbia over Texas on 1 February 2003, has soared to at least $2.2 billion. At the same time, NASA is also scrambling to find a similar amount for a robotic mission to the ailing Hubble Space Telescope. Worst of all, neither the White House nor Congress seems willing or able to rescue the agency.

The White House rebuffed a recent plea by NASA Administrator Sean O'Keefe for additional funding to cope with the agency's fiscal crisis, Administration sources say. And the president's 2005 request has received a rocky reception from a Congress faced with a massive budget deficit and the war in Iraq. “There isn’t the money to mount an aggressive exploration program,” says Malcolm Peterson, former NASA comptroller. “And if there isn’t budgetary relief, I don’t know where else you go [for funding] except science.”

To fly the shuttle safely again, NASA will need as much as $760 million for next year alone, says Steven Isakowitz, NASA's current comptroller. Privately, agency managers expect the figure to rise to $1 billion for the 2005 fiscal year that begins next week and remain at that level for the next few years. To cope, NASA managers are being told that science must pony up approximately half of that shortfall, with the rest coming from aeronautics and exploration. Diaz, who assumed the job in August as part of an agency reorganization, declined to be interviewed. Agency spokesperson Donald Savage said Diaz was “uncomfortable” discussing budget matters.

The agency already wants $866 million more to start the exploration program in the coming year. That effort includes work on a lunar orbiter, a sophisticated nuclear electric system for interplanetary trips, and a large launcher to replace the shuttle. The Senate funding panel that oversees NASA this week approved $15.6 billion for the agency in 2005, only $200 million more than this year's figure and far short of the Administration's request of $16.2 billion. Still, that tops the House level of $15.2 billion, and some senators were hoping to add another $800 million when the bill reached the Senate floor this week.

“There is no doubt whatsoever that whatever we choose, we'll have to make difficult decisions,” says Isakowitz. “And that includes science, aeronautics, and exploration” programs. Anything short of the president's request, he says, would have a “negative” impact on science.

But even if Congress obliges, NASA will remain in a deep budget hole. O'Keefe was clear at an 8 September Senate hearing that science and exploration for now must take a back seat to human space flight. “Agenda number one is return to flight and complete the station,” he said.

Many lawmakers are impatient with the ballooning shuttle costs. Senator Sam Brownback (R-KS), who chairs the Senate panel that oversees NASA's programs, insists that the answer is to phase out the shuttle as soon as possible. He told Science that “the Administration has just got to walk away from the shuttle more quickly.” Proposals to do that include using cheaper, expendable launchers or reducing the number of solar panels and reorienting the station's current position in orbit. Those options would not sit well with NASA's international partners, however, and O'Keefe told the Senate committee that “I don't see a really significant diminution of the flight rate.”

The second huge and unplanned price tag facing NASA is for robotic servicing of Hubble. O'Keefe has rejected sending astronauts to conduct the mission. A recent study by the Aerospace Corp. for NASA put the cost of a “Cadillac” mission to replace drying batteries and critical instruments at $2.2 billion. That figure is far higher than an earlier estimate by NASA's Goddard Space Flight Center in Greenbelt, Maryland, which put the price tag at $1.3 billion. Other NASA officials say privately that at least $2.4 billion is needed.

Even with ensured funding, however, a complex robotic mission is a race against time. The Aerospace Corp. study predicts that the Cadillac effort would take 5.4 years, and NASA engineers fear that Hubble could shut down as early as 2009. Goddard managers believe they could launch such a mission by December 2007, but an internal NASA study found that date too optimistic by 2 years. A shuttle mission could be ready in 2.5 years, says Michael Moore, a Hubble program executive. But that, NASA insists, would cost $200 million more than the Cadillac robotic mission.

Cheaper options include a simpler ef-
President Reverses Course, Taps Bement as Director

For most scientists, agreeing to become the next director of the $5.5 billion U.S. National Science Foundation (NSF) would mean accepting a heavier workload. However, for Arden Bement, last week’s nomination by President George W. Bush could eventually mean a shorter workday.

For the past 7 months, Bement, a materials engineer with a track record in both academic and industrial research, has headed two agencies. He has been director of the National Institute of Standards and Technology (NIST) since December 2001 and assumed the additional title of acting NSF director in February, when microbiologist Rita Colwell left abruptly before her term was due to end in August (Science, 20 February, p. 1116). When he agreed to take on responsibility for NSF, Bement and the president’s science adviser, John Marburger, agreed that it would only be a temporary gig.

But the NSF job, which comes with a 6-year term, proved harder to fill than expected. Uncertainty over the outcome of the November election, combined with a gloomy federal budget outlook, scared some away. Last month, “after a few other candidates had dropped out,” Bement says that White House officials surprised him by asking if he would be interested. “At some point we realized that his credentials were as strong or stronger than [those of] the other people on our list,” says Marburger.

Bement, meanwhile, was piling up plaudits from members of Congress and the scientific community as well as his overseers at the National Science Board. “It would be hard to think of a better person for the job,” says Representative Sherwood Boehlert (R–NY), chair of the House Science Committee. “I was taking it one day at a time,” says the unassuming Bement, and it was a long day: getting to NIST at sunrise, putting in 10 hours at NSF, and returning to NIST in the evening. Bement plans to remain NIST director until confirmed for the NSF job.

At 72, Bement insists that he’s got “plenty of juice” left in him, and science board chair Warren Washington agrees that “doing two jobs doesn’t seem to be a problem for [Bement].” But physicist Neal Lane, who held the NSF post during the Clinton Administration, thinks that the twin assignments are a bad idea, even if they may be about to end. “It’s too much for one person,” says Lane, now a university professor at Rice University in Houston, Texas.

Bement says he can wear two hats because of “outstanding backup” at NIST, in particular, acting director Hratc Semerjian. And he says that, although he’ll miss running an agency that performs research (NIST operates labs but NSF does not), his interim assignment at NSF has whetted his appetite. In addition to the chance to follow NSF’s 2006 budget request, which he prepared and shipped to the White House this month, Bement says he’s hoping to fill three vacancies for assistant NSF directors—overseeing the education, biology, and social and behavioral sciences directorates—by the end of the year. “I like the challenge,” he says about running an agency whose reputation for excellence won it a 2001 promise from Congress of a doubled budget but whose low profile hinders its ability to turn that promise into hard cash. “I also feel a strong duty to serve the community.”

Bement’s legion of supporters hopes that he’ll win quick confirmation from the Senate, which could take up his nomination as early as this week. But if the Senate fails to act before it adjourns next month, Bement’s status will enter a complex bureaucratic limbo.

Although NSF officials had erroneously concluded that a 1998 law on filling federal vacancies prohibited Bement from being offered the top job, the same law does set boundaries on his tenure as acting director. Bement came within 3 days of reaching a salary cap in 2005. One likely target is the multi-billion-dollar Prometheus program to build a new nuclear electric power system (Science, 30 January, p. 614). The scrapping of the Prometheus program would be a big blow to planetary scientists, who are depending on that system to power the Jupiter Icy Moons Orbiter in the next decade. “I don’t think we’re facing cancellation,” says Craig Steidle, chief of NASA’s new exploration effort. But he acknowledges that reductions could force changes to Prometheus. There are no plans to cut work in the biological and physical sciences, says Steidle, who also oversees those programs.

Scientists inside and outside the agency will be watching closely to see whether O’Keefe can convince Bush and Congress to provide relief or whether research must be sacrificed for the shuttle and Hubble. “It’s all very difficult and confusing,” says one NASA manager. “How the heck is the agency going to fix this?”

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