

Big budget, big changes



IN FEBRUARY, THE NATION'S CAPITAL WAS humming with debate about NASA's human spaceflight program after release of the Obama administration's FY11 budget request.

The NASA request would add \$6 billion over five years, far less than the amount recommended in the Augustine commission report on the future of human spaceflight. The administration has been focusing on deficit reduction, even though polls show Americans favor government spending as a source of employment in today's jobless economy.

The plan would kill the Constellation program, including the Ares I and Ares V launch vehicles and, while allotting R&D funds for future heavy-lift development, transport of astronauts to the ISS after retirement of the shuttle would fall to commercial ventures. The additional \$6 billion will be used to "spur the devel-



ESA Director General Jean-Jacques Dordain

opment of American commercial human spaceflight vehicles."

In January, the *New York Times* has quoted NASA Administrator Charles Bolden, speaking in Israel, as saying, "What NASA will focus on is facilitating the success of—I like to use the term 'entrepreneurial interests.'"

Robotic precursor missions would be sent to the Moon, Mars, and various asteroids and Lagrange points to scout targets for future manned activities.

Critics on Capitol Hill are uncomfortable with what they call the "outsourcing" of human spaceflight, and the cancellation of a program that has already cost billions of dollars.

Last year a blue-ribbon panel headed by former aerospace executive Norman Augustine concluded that NASA would need an increase of \$3 billion to sustain the human spaceflight program (known as the "vision") that it has been pursuing. "That kind of money was never going to be there," says a NASA insider, citing growing concern over this year's \$1.42-trillion federal deficit. Space enthusiasts fear the public is no longer inspired by journeys beyond the atmosphere. Social critics question whether a debt-burdened federal government should finance any space program at all.

In Washington and in the capitals of other participating nations, experts are preparing to meet in Japan later this

year to debate the future of the ISS. U.S. funding for the space station had been due to expire at the end of FY15. In a worst-case scenario, that would require deorbiting the ISS and destroying the result of many years of work aimed at establishing a permanent presence in space. Obama's budget request, however, calls for station funding to continue through 2020.

ESA boss Jean-Jacques Dordain said in a January statement that participating nations will have to decide the future of the space station together—a rebuff to the idea that the U.S. can decide unilaterally—and that future planning requires the U.S. human spaceflight policy to be clearly defined.

"The decision must be made early enough to put the budget in place, to build the hardware necessary and to decide on which transportation policy we shall use between 2015 and 2020," said Dordain. "There are a lot of aspects to be discussed, and if decisions are not made by the end of this year [or the] beginning of next year, it will become more and more difficult to have the approach under which we will exploit the space station."

Dordain acknowledged that measures can be taken to make ISS operations more economical. He questioned whether participating nations need four control centers, and whether six astronauts must staff the station, arguing that during some periods a smaller crew might suffice.



The budget commits additional funding to extend the lifetime of the ISS to at least 2020.



The Ares I-X rocket was a test platform in the Constellation program that was canceled in the administration's budget request.

As if to punctuate the decline in public enthusiasm for spaceflight, NASA has lowered its prices in what amounts to a yard sale of shuttle vehicles and support equipment. The agency is offering two shuttles to approved purchasers—almost certainly museums—for \$28.8 million each, or about 40% less than it once sought. NASA already plans to transfer the shuttle Discovery to the Smithsonian Institution's National Air and Space Museum but is offering Atlantis and Endeavour to any buyer who can assure they will be "displayed in the broadest interest of the American public."

Under the proposed deal, NASA will retain ownership while the shuttles stay on permanent display. The agency also wants to dispose of surplus main engines from the shuttle and other memorabilia from the soon-to-end program, including spacesuits and wind tunnel models.

Global positioning problem

The U.S. has become so reliant on satellite technology that it could be vulnerable to attacks on key nodes of the global positioning system, Air Force chief of staff Gen. Norton Schwartz warned at a January 20 conference in Washington. Military officers have long called for an alternative to GPS to give the U.S. a fallback method of navigation in time of crisis.

"Global positioning has transformed [our] war-fighting capability," Schwartz said. "Our dependence on precision navigation in time will continue to grow." But he said U.S. military service branches must find a way to reduce, rather than increase, their reliance on GPS.

Schwartz said he worries that an enemy might find a way to attack the GPS datalink or might hack into and program U.S. satellites to send inaccurate coordinates. He noted that the military now relies heavily not just on GPS but on other space-based capabilities, including satellite imagery and communications.



Gen. Norton Schwartz



Discovery will head off to the National Air and Space Museum after its final mission; the other shuttles will be on the auction block.

The general wants the military to field a more diverse range of weapons. He is especially enamored of advanced targeting pods (ATPs) that increase the intelligence, surveillance and reconnaissance capabilities of existing platforms and can also assist with navigation.

Almost unnoticed, the Air Force has installed 448 Northrop Grumman Litening and Lockheed Martin Sniper ATPs on A-10, F-15, F-16, B-1 and other warplanes and has established a requirement for 1,230 ATPs altogether. A modest \$160 million in the FY10 defense appropriations law will underwrite ongoing ATP development, including a new competition between Litening and Sniper for further purchase orders.

Schwartz offered a B-52 Stratofortress with a Sniper ATP to take pictures of the damage inflicted by the January 12 earthquake in Haiti. The offer was not taken up, but ATPs are in increasingly widespread use and offer an alternative to space-based technology. The general said Air Force scientists are developing other technologies to augment GPS. Some high-tech alternatives to space-based systems are thought to be included among the Pentagon's "black" programs—those not publicly disclosed in budgeting documents.

Army aviation

When President Obama decided to increase U.S. troop strength by 30,000 in Afghanistan—a process to be completed by late autumn—U.S. Army aviation found itself facing unexpected challenges.

"We carry out air assault and medical evacuation missions," says Lt. Col. William C. George, an Army spokesman. "A large part of our duty consists of simply hauling people and equipment around the country." Vertical lift offers a way of circumventing the improvised explosive devices, or roadside bombs, that insurgents regularly plant on Afghanistan's few passable roads.

Altogether, the Army has 19 Combat Aviation Brigades (CABs), including eight in the National Guard. A "heavy" CAB consists of four battalions each with 48 AH-64D Apache, 38 UH-60M Black Hawk, 12 HH-60M Black Hawk and 12 CH-47F Chinook helicopters. The Army has maintained three to four CABs in Iraq, a country two-thirds the



A U.S. CH-47 Chinook resupplies Charlie Company at its outpost in the Kandahar province of Afghanistan on Dec. 12, 2009. DOD photo by Master Sgt. Juan Valdes, USAF.

size of Afghanistan, but kept only one in Afghanistan until recently.

Notorious for its lofty mountain elevations and scattered special operations outposts, Afghanistan has always needed—and tested—military helicopters. During the period June to September, the country experiences harsh atmospheric winds that create high clouds of dust amidst very hot temperatures. Only the twin-tandem Chinook has consistently coped with “high and hot” conditions in the Hindu Kush.

At the start of this year, the Army had two CABs in Afghanistan, one each from the 3rd Infantry and 82nd Airborne Divisions. At press time, the CAB of the 4th Infantry Division (Mechanized) was departing Fort Hood, Texas, to join them. The 159th CAB, associated with the 101st Airborne Division, completed a one-year stint last December but was expected almost immediately to turn



The Army canceled the RQ-8B because of limits on funding for aviation.

around and deploy again. At least two other CABs are expected in Afghanistan by late autumn.

An upsurge in the need for military helicopters is a boon to industry. As ana-

lyst Richard Aboulafia noted (see “Aircraft industry rides out the recession...so far,” January, page 21), the rotary-wing market grew by 30.1% in 2009. This year, growth could reach 40%. The FY10 defense appropriations law devoted \$3.34 billion to the largest recent increase in U.S. military helicopters: The Obama administration got its request for \$1.26 billion for 79 Black Hawks, \$882 million for 27 Chinooks, and \$326 million for 54 remarkably economical UH-72 Lakota light utility helicopters.

Still, Pentagon staff officers are talking about an Army “helicopter shortage” similar to the “fighter gap” being predicted in the Air Force and Navy. The service hopes to compensate, in part, with unmanned aerial systems.

That will not include the RQ-8B Fire Scout unmanned minihelicopter, which only six years ago was touted as a key component of the Future Combat Sys-

Intelligent Light

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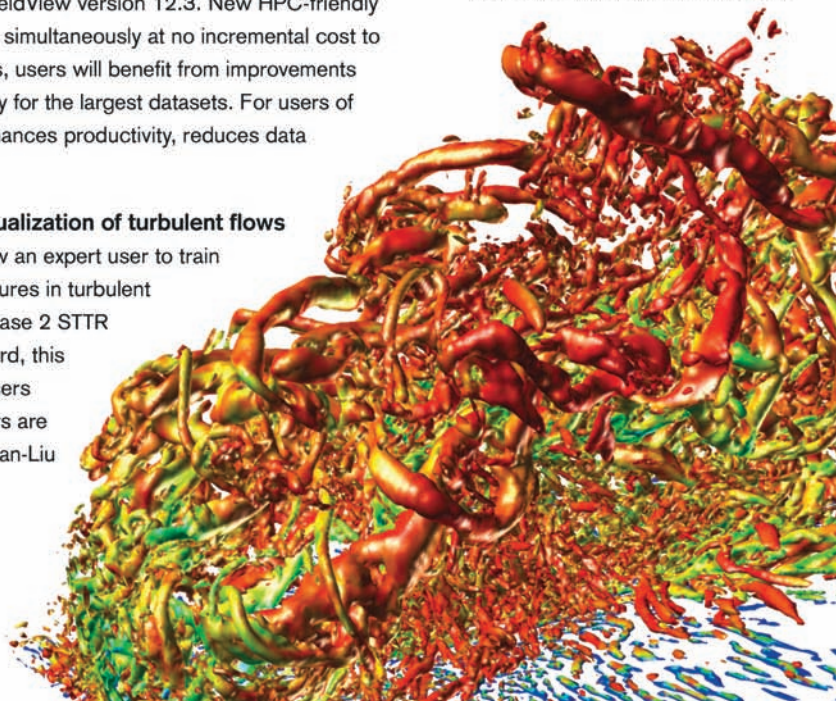
Automatic feature detection, tracking, and visualization of turbulent flows

Development continues on technology that will allow an expert user to train a system to automatically detect and track flow features in turbulent flow simulations. Supported by a U.S. Air Force Phase 2 STTR (Small Business Technology Transfer) contract award, this technology holds significant promise for all CFD users who work with turbulent flows. Principal researchers are Dr. Earl P.N. Duque from Intelligent Light and Dr. Kwan-Liu Ma from the University of California at Davis.

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FieldView image from research on intelligent feature detection and tracking in large scale LES simulations.



tem net-centric weapons program. In January, the Army canceled the RQ-8B, saying it did not improve on existing systems. The problem was not with the vehicle itself but with limits on overall funding for Army aviation programs. "This was a handy thing to have," says one officer, "but we have other systems that perform as well or better."

Although little noted in the press, the Army's largest unmanned flyer is the General Atomics MQ-1C Sky Warrior, often described as a Predator on steroids. The MQ-1C has a wingspan of 56 ft (25 ft more than an F-16 and 9 ft more than a Predator) and can carry AGM-114 Hellfire air-to-ground missiles. This UAS has been quietly under development with support from Congress. The program has proceeded on schedule and on budget.

The 1st Air Cavalry Brigade became first to deploy with the Sky Warrior in

January when it moved to Taji, Iraq. Although still in the test phase, the Sky Warrior will now support soldiers on the ground, including troops in combat with insurgents. If the deployment and field use of the Sky Warrior prove successful, it will move into full-rate production and emerge as one of the most prominent Army aerospace programs. The Iraq deployment will enable the Army to scrutinize the system's strengths and limitations, and to develop a concept of operations for wider use of the MQ-1C. Army chief of staff Gen. George W. Casey Jr. says his service hopes to give every CAB a Sky Warrior capability starting in 2012.

While the Army continues to sort out



After completing a 24-hour mission, an MQ-1C Sky Warrior aircraft makes a landing on January 11.

its aviation needs and tries to accommodate the Afghanistan buildup, it may catch some flak from a sister service over the nagging question of who should operate a UAS in flight. The Air Force has just unveiled a separate career field for UAS pilots, separating them from pilots of manned aircraft—and they are all officers. The Army allows enlisted soldiers to pilot the MQ-1C and other UASs.

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Early Bird Deadline: 22 March 2010
Late Registration Deadline: 15 April 2010

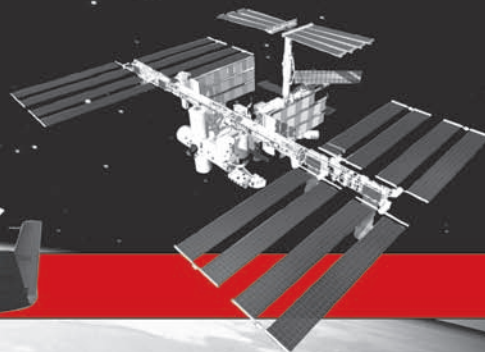
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