NASA May Cut Shuttle Flights And Reduce Science on Station

All eyes were on the Florida coast this week as NASA struggled to end a two-and-a-half year hiatus in human space flight by launching the space shuttle Discovery. But behind the scenes, NASA’s space transportation system is facing an even bigger challenge. On the table is a plan that could mean as few as a dozen more shuttle flights, even less science on the international space station, and a reengineered shuttle system to carry humans and cargo to the moon by the end of the next decade.

NASA chief Michael Griffin is betting that the plan, which has yet to be approved by the White House and made public, will square with the exploration goals set by U.S. President George W. Bush in 2004 without busting the agency’s budget or raiding unrelated science programs. He’s also hoping for support from politicians fiercely protective of shuttle-related jobs in their states. But he’s constrained by the still-rising costs of returning the shuttle to orbit. And he knows that NASA’s European and Japanese partners will almost certainly balk at any attempt to reduce the station’s capabilities yet again. “There’s going to be a lot of kicking and screaming” over the station’s future, predicts “There’s going to be a lot of kicking and screaming” over the station’s future, predicts one official involved in the discussions.

The transportation report, due out later this month, is one of two internal studies that Griffin requested shortly after taking office in March (Science, 18 March, p. 1709). The other, due out late next month, will examine how to assemble the space station using as few shuttle flights as possible.

At the heart of the transportation report, according to officials familiar with it, is a redesigned solid rocket booster that carries the orbiter into space. By adding an upper stage and a capsule, NASA could turn the booster into three distinct vehicles: one to carry a crew of three or so, another to orbit equipment requiring a pressurized cabin, and a third to carry cargo that could withstand the vacuum of space. This “single-stick” option could be ready in 2011, providing crew and cargo services to the space station, according to sources familiar with the study.

The retirement of the shuttle no later than 2010 would shift attention to a heavy-lift vehicle capable of launching a whopping 100 tons—an order of magnitude more than the single stick. That design also would draw on the shuttle system, essentially replacing the orbiter with a cargo carrier. The uncrewed vehicle would be used later in the decade to launch the pieces of a lunar outpost.

A shuttle-derived vehicle, rather than one based on an existing expendable launcher, has political as well as engineering advantages. Lawmakers in Texas, California, Alabama, and Florida—the site of thousands of shuttle-related jobs—have been reluctant to pull the plug on the shuttle. For them, the single-stick and heavy-lift options promise to keep assembly lines humming after the orbiters are retired. And although Pentagon officials prefer a new launch system based on the department’s Atlas or Delta launchers, Griffin won them over by assuring that plenty of science missions would be launched on Delta rockets.

The estimated cost of these new vehicles is from $10 billion to $15 billion through 2015. Operating costs for the single-stick series would run about $3 billion a year—approximately $1 billion less than the shuttle cost before Columbia’s failure. NASA hopes to pay the tab from its scheduled modest budget increases and savings from falling shuttle return-to-flight costs. But one official says that those return-to-flight costs will climb as high as $7 billion over 5 years—$2 billion more than previously estimated. That figure would leave little room for new ventures, the cost of which have traditionally been underestimated.

That gloomy budget picture is forcing NASA to consider even more radical cuts to the number of flights needed to finish the space station. NASA had planned 28 more shuttle flights, but the team reexamining the station is officially working to find a way to finish up after 18 to 24. Sources close to the second study say that Griffin and the White House are pressing for as few as a dozen more flights. Last month, Griffin warned his European and Japanese counterparts that the agency may propose other ways to put their laboratory modules into space, such as using expendable launchers, on an extended schedule. “He is softening the beachhead by warning that there may be some deferral,” says one source. Japan and Europe have resisted any alternative plan to launch the labs, their primary contribution to the station, because that would force expensive modifications and delays. “The reaction was quite adamantly,” the official adds.

To honor pledges from the White House to meet its obligations to the station partners, the redesign team is looking at alternatives to reducing shuttle flights. One strong possibility is to minimize the science aboard the U.S. laboratory module. Griffin has already issued...
such a warning (Science, 29 April, p. 610), but fewer shuttle flights could lead to even more dramatic reductions in science equipment and racks. “There isn’t a lot of science that could be done on the space station that can’t be done later” or on the moon, explains another official familiar with the study.

Not true, says Ian Pryke, a senior fellow at George Mason University in Fairfax, Virginia, and former head of the Washington, D.C., office of the European Space Agency. A centrifuge, he notes, could provide important data on the long-term effect of lunar—or Mars-style—gravity on mammals. Japan is building the centrifuge for NASA, but Griffin already has stated that it likely must be abandoned given space and budgetary constraints.

The station itself seems safe for now. But Griffin’s job over the next several months will be to satisfy a White House eager to move beyond the station, placate foreign partners frustrated by delays, and convince lawmakers that he isn’t ignoring station science. “With a radically reduced [shuttle] flight rate, the change is going to be traumatic,” warns one official. “We’re in a mess.” That mess may well prove more daunting than a successful return to flight aboard Discovery.

---ANDREW LAWLER

**IMMUNOLOGY**

**New Virtual Center Aims to Speed AIDS Vaccine Progress**

A star-studded team of AIDS researchers from four universities, led by Barton Haynes of Duke, has won a huge award to explore some of the deepest immunologic mysteries confronting the field—part of a bold new effort to speed the search for an HIV vaccine. Haynes will direct the so-called Center for HIV/AIDS Vaccine Immunology (CHAVI), which could receive more than $300 million over the next 7 years from the U.S. National Institute of Allergy and Infectious Diseases (NIAID). “It’s big science in the way that the Human Genome Project was,” says Peggy Johnston, the top AIDS vaccine official at NIAID, which announced the award last week.

The CHAVI award marks the start of the Global HIV/AIDS Vaccine Enterprise, an ambitious public-private effort spearheaded by the Bill and Melinda Gates Foundation and other wealthy countries—sponsoring several CHAVI-like consortia. The push for these consortia grows out of the deep frustration about the limits of investigator-initiated research. The enterprise attempts to address those by hewing to a strategic plan to guide the field, standardizing assays so labs can easily compare results, and avoiding unnecessary duplication. CHAVI itself will intensively examine immune responses and the genetic factors that give some people an upper hand against the AIDS virus. In particular, CHAVI antibodies that work best, and why some vaccines work in monkey experiments.

The intensely competitive CHAVI application process has been the talk of the field for months. “Everybody who’s very active was on one of the applications,” says Walker. His group may attempt to fund the projects they proposed through other sources, and Walker’s already planning to meet with other also-rans. “My sense is a lot of these groups will continue to pursue the goals that they outlined,” he says. Haynes stresses that as CHAVI expands, it might invite researchers from the other teams to join the virtual center. “Our group is just one group,” says Haynes. “We don’t have all the ideas.”

Because money for CHAVI comes solely from NIAID’s budget, some basic researchers worry that the institute may cut back on investigator-initiated grants. Anthony Fauci, NIAID’s director, says he “can’t predict funding from one year to another” but notes that current CHAVI funding taps new money and that NIAID makes it “the highest priority” to protect investigator-initiated research funds. “The field was screaming for some bold new approach,” Fauci says.

The CHAVI grant will pay the full amount allocated ($49 million per year) only if the investigators will study people who are repeatedly exposed to HIV but remain uninfected, and they will try to unravel why newly infected people vary in their ability to keep the virus in check. Haynes and his collaborators will also explore why some HIV isolates transmit more readily, the structure of anti-HIV

---JON COHEN

**Dream team.** Duke’s Barton Haynes formed a winning AIDS vaccine consortium, part of the ambitious new Global HIV/AIDS Vaccine Enterprise.