Shuttle Faces Tough Schedule in 1989

The space shuttle got out from under the Challenger's shadow last year, proving with successful trips in September and December that it is ready to fly. Now in 1989 the National Aeronautics and Space Administration (NASA) faces another ordeal, a test of its ability to keep the flagship running smoothly.

Already, 7 weeks into the year, there are signs of strain. The shuttle's main engines have pump troubles. Insulating tiles need extra repairs. Flexibility in the schedule is slipping, turning goals into hard deadlines.

It would disrupt things in a major way to change the lineup of flights this year, says George Diller, a spokesman at the Kennedy Space Flight Center. But NASA officials at headquarters say they will not compromise an inch on safety or quality, even if it means scrubbing a flight. Speaking before a Senate subcommittee on 9 February, the director of the shuttle program, Admiral Richard Truly, said he had already dropped a flight from the 1990 budget because he did not want to risk stretching NASA's resources too thin.

The schedule calls for seven flights in 1989, all of them critical. Scientific projects have been given top priority, receiving four of the seven slots. The first of these is Magellan, a radar device that will travel to Venus and survey its surface, sending back images starting in 1990. The launch is set for 28 April. The next science payload, Galileo, a probe destined for Jupiter, is scheduled to take off on 12 October.

On 13 November, the shuttle will take a communications satellite to space and bring back a large scientific lab that has been orbiting since 1984—the Long Duration Exposure Facility or LDEF. Of the 57 experiments on board about one-third, according to NASA's John Loria, may be "degraded or useless." LDEF was supposed to get a ride back to Earth in 1985, but many problems delayed its return. The $15-million facility was sold to Congress as being reusable, but NASA now considers its design out of date.

On 11 December, the shuttle will launch the centerpiece of the astronomy program, the Hubble Space Telescope. This is a must.

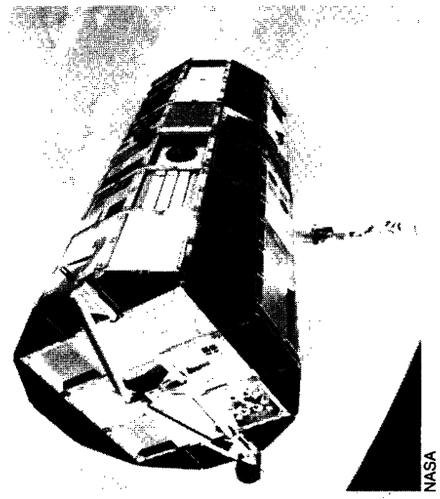
In addition, the manifest includes two secret military payloads, one on 1 July and the other on 10 August. The remaining payload, a tracking and data relay satellite, will help in managing NASA's space network and is scheduled for launch as soon as the shuttle is ready. NASA hopes this will be no later than mid-March. Here is where the trouble begins.

When the orbiter Atlantis returned from its trip in December, technicians found cracks in a high-pressure oxygen pump, a critical part of the engine. Discovery, the orbiter now waiting to lift off, uses pumps of the same type and vintage. To be safe, NASA decided to replace the pumps on both vehicles. The manufacturer is rushing new parts to Florida by mid-February so they can be fitted into Discovery as it sits on the launch pad.

Because of the pump trouble, Discovery's launch has been allowed to slip from 23 February. A hard deadline has been set for 18 March. Each day of postponement after that point will delay the next shuttle, Atlantis, which is to carry Magellan. Diller says there are still 3 or 4 days' worth of "soft" time before engine repairs for the first launch of 1989 begin to impact the second.

The second payload, Magellan, must depart between 28 April and 27 May or lose a "window" of planetary alignment that makes its trip possible. The window will not open again until May 1991. In the same way, Galileo must use a window in October or wait 2 years.

The defense payloads this summer also have a high priority and cannot be delayed. Nor does NASA consider the flight to collect LDEF optional. LDEF, half the size of the shuttle payload bay and 240 nautical miles out in space, is falling to Earth more rapidly than NASA expected. Over the last year, solar activity has driven it earthward. At present, NASA predicts that atmospheric drag could begin to tug at it next January, perhaps sending it into a tumble. Once



The LDEF. *If the shuttle does not bring it back, it will return as a fireball.*

LDEF becomes unstable, says a NASA official, the astronauts might not be able to "shag it" into the payload bay. NASA wants to get the experiments back down, and it also wants to avoid having LDEF return to Earth as an unguided fireball.

Meanwhile, as engine experts are working on the oxygen pumps, a crew of about 200 tile specialists are crawling over the Atlantis and the Columbia orbiters, repairing the insulation. Columbia simply needs an overhaul after 3 years on the sidelines. But something unusual happened to Atlantis on its flight last December, causing excessive tile damage. NASA investigators think they have pinned down the culprit: loose insulating material from the solid rocket nose cone. It has been eliminated from future flights. The 175 or so damaged tiles on Atlantis should be repaired ahead of the 28 April deadline.

Diller says, "The tiles are not the long pole in the tent." The big problem is getting Discovery off the pad in March.

■ ELIOT MARSHALL

Bahcall to Head New Astronomy Survey

Astrophysicist John N. Bahcall of the Institute for Advanced Study in Princeton has been asked by the National Academy of Sciences to head a new Astronomy Survey Committee, which will make recommendations to the federal funding agencies as to astronomy's needs and priorities for the 1990s.

The new committee is currently scheduled to make its final report in 1991 or 1992. It thus will continue the academy's 10-year cycle of astronomy studies established by the Whitford report (1964), the Greenstein report (1972), and the Field report (1982).

In the past these surveys have had considerably more influence in Washington than most other academy reports, largely because the astronomers have been willing to take their wish lists and prioritize them.

Within the astronomical community the choice of the 54-year-old Bahcall as leader of the committee has been widely hailed as an excellent one. In addition to his research work in theoretical astrophysics, he has had a long involvement in the politics of science. Most notably, he played a key role in winning federal funding for the Hubble Space Telescope in the 1970s. The new committee will not be completely official until its funding is formally approved by its sponsors, the National Science Foundation and the National Aeronautics and Space Administration. However, that approval is expected shortly.

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