

a combination — probably an antiviral drug in concert with an immunomodulator — may be necessary.

Before a vaccine is possible, proof is needed that the body can successfully mount a battle against AIDS infection. Several laboratories reported evidence of effective antibodies, but there was some disagreement about the best substance to provoke the response. In preparing the vaccine, special care needs to be taken not to include whatever part of the virus is suppressing the immune system.

One problem with an AIDS vaccine is that, as one researcher noted, the "sloppy replication mechanism [of the virus] allows for a lot of mutational error to occur."

The virus, much like influenza virus, changes over time, so that the "prepped," vaccinated person's immune system might not recognize it.

As economists are wont to do, they have come up with a dollar cost for the disease. CDC researchers reported that: The average cost for hospital care per patient is \$140,000; the cases thus far have run up \$1.3 billion in hospitalization bills and \$2.9 million in outpatient visits. Indirect costs include \$4.2 billion in lost earnings and \$162 million in disability payments. Total cost to date: \$5.6 billion.

Researchers have yet to agree on a name for the virus associated with the disease. At the conference, the players could

be identified largely by what they called it. The French researchers and the CDC referred to it as lymphadenopathy-AIDS virus (LAV), though the A previously stood for associated. Most U.S. East Coasters were calling it HTLV-III, for human T cell lymphotropic virus, though the L used to stand for leukemia. And some of the Californians called it ARV, for AIDS-related virus.

Meanwhile, the disease continues into uncharted waters. "We've seen the epidemic for only a few years," said UCSF's Volberding. "What happens 10 or 15 years down the line is really anyone's guess."

Said Gallo, "This is a problem for the world."
— J. Silberner

The shuttle and the satellite: The great flyswatter caper

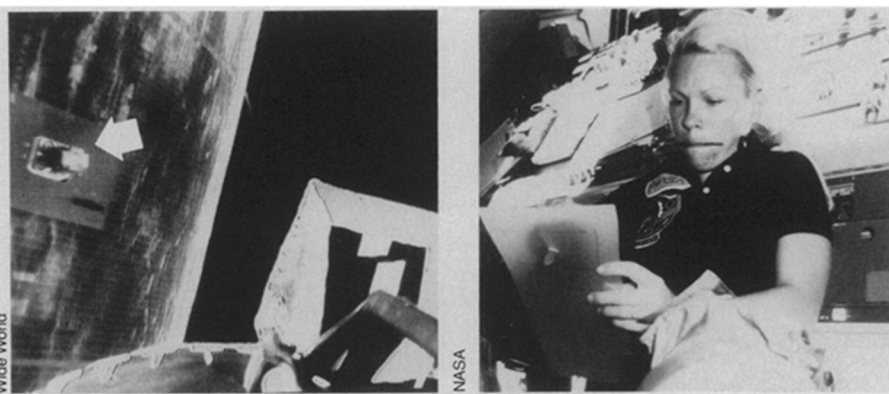
On Launchpad 39A at NASA's Kennedy Space Center in Florida this week, engineers and technicians were at work on the space shuttle Challenger, preparing for its planned April 29 launching of the Spacelab 3 research module. This will place the event only 17 days after the lift-off, from the same pad, of the shuttlecraft Discovery (and only 10 days after Discovery's landing), making it the shortest time between launchings in the shuttle program's history.

The preparations have been going fine, according to space center officials, who express optimism even though there are no extra days built in to accommodate possible problems that might interfere with the tight schedule. Meanwhile, however, work is under way on some of the consequences of Discovery's flight, which left an inoperative satellite in orbit (as well as another in working order), made a U.S. senator sick (as planned) and melted a hole in Discovery itself.

The mission's first main item of business was the deployment of Canada's Anik C-1 communications satellite, which went without a hitch. So did the deployment of LEASAT 3, also known as Syncom IV-3, which was to be leased to the U.S. Navy by Hughes to replace older satellites providing communications between ships, planes and ground installations.

It was after LEASAT's deployment that the trouble appeared.

Several previous shuttle-deployed satellites (one each for Western Union and the Indonesian government, and NASA's own Tracking and Data Relay Satellite) had been sent into the wrong orbits, not by the shuttle but by the auxiliary rocket stages that were supposed to lift each satellite from the shuttle's altitude to their much higher duty stations. Unlike the earlier satellites, LEASAT's rocket motor was built-in rather than separately purchased, but when the time came for a built-in timer to ignite the rocket, 45 minutes after deployment, nothing happened. Hughes officials concluded that a lever that should have automatically activated the timer



The "flyswatter" at the end of the shuttle's remote arm is manipulated toward a switch (arrow) on the LEASAT 3 satellite by astronaut Rhea Seddon. Previously, Seddon had helped improvise the flyswatter from a plastic document cover (right).

during deployment had for some reason not been moved far enough, and NASA and Hughes' officials set about working out a way to nudge the lever the rest of the way.

No spacewalks had been scheduled for the mission, and shuttle officials were reluctant anyway to send an astronaut across to hand-flip a lever that would ignite a rocket motor, particularly if the presumably faulty timer might set it off with no 45-minute getaway time. Instead, planners at NASA's Johnson Space Center in Houston (the mission's ground-control center) proposed using the shuttle's remote-control arm to reach out and flip the switch, even though neither the arm nor the switch had been designed with such a task in mind.

The task was made more difficult by the fact that LEASAT 3 was spinning slowly, and that special equipment would have to be constructed by the astronauts aboard the shuttle and installed — via spacewalk — on the end of the arm. After a great deal of consultation and test runs by engineers and astronauts on the ground (including rehearsals in water tanks to simulate the near-weightless environment of space), Discovery crew members David Griggs and Jeffrey Hoffman went out into the shuttle's open cargo bay and installed the "flyswatter." Jerry-rigged from a plastic

document cover and other such items, the flyswatter was to be held out toward the satellite, where it would hook the switch and administer a slight tug. With Griggs and Hoffman back inside, astronaut Rhea Seddon gingerly extended the arm toward LEASAT 3, and apparently snagged the switch at least twice.

Nothing happened. Hughes engineers decided that something else must be wrong, and NASA this week was studying the possibility of retrieving the satellite on a later shuttle flight for return to earth—a potentially tricky matter, since the rocket motor's full fuel load is still aboard.

The crew member drawing the most public interest, however, was probably Sen. E.J. "Jake" Garn (R-Utah), head of a Senate committee that votes each year on NASA's funding. Garn served as a research subject in several tests relating to "space sickness," which has affected about half of the astronauts in past U.S. spaceflights. Also aboard was a repeat of the electrophoresis experiment being conducted by McDonnell Douglas Corp. to study production of biological materials in weightlessness. And several simple toys such as jacks were filmed in use by the crew for future audiovisual materials to aid schoolchildren studying such concepts as "zero-gee."
— J. Eberhart