INTERNATIONAL COLLABORATION

Joint Station Leaves Science Up in the Air

One for all. The space station's latest redesign may pose problems for some scientists.

For years, one thing U.S. space scientists could count on was uncertainty—about the launch vehicles and platforms available for their payloads, about congressional support for their projects, and about the type of science they could conduct. Last week the United States and Russia announced plans for a joint space station, and U.S. researchers found themselves in the uncomfortably familiar position of rethinking the next decade of space science.

The early reaction is mixed: While life sciences research may benefit from Russia's extensive experience with long-duration flights, questions about the physical environment of Russia's orbiting space station cloud the future for such microgravity research as growing protein crystals and forging semiconducting materials. And the collaboration itself seems likely to steal time and payloads away from projects using the space shuttle that are already on the drawing boards.

After a year of negotiations, the National Aeronautics and Space Administration (NASA) and the Russian Space Agency (RSA) agreed last week to a "new relationship" that calls for a joint station called "Alpha." It also expands a program for cosmonauts to fly on the U.S. shuttle and for astronauts to work aboard Mir, the orbiting Russian space station. John Logsdon, director of the Space Policy Institute at George Washington University and a longtime NASA watcher, thinks that move "saves both space programs." That assertion could be tested as early as next week as Congress votes on a series of additional cuts to the recently approved 1994 federal budget (see p. 979).

The first phase of the collaboration calls for the shuttle to dock with Mir 10 times from 1995 to 1997 as part of a program to upgrade the Russian station and conduct some scientific experiments on it. In the next step, between 1997 and 2001, the two countries will launch a total of 31 missions to build the joint space station.

The latest schedule leaves space scientists with the difficult task of choosing which experiments to fly on which vehicle, as well as defining the scope of research aboard Alpha. The increased number of trips to outfit Mir has forced NASA to cancel four flights of the Spacelab research module, which would have accommodated research on the biological effects of space flight, protein crystal growth studies, and materials science experiments. Nevertheless, Robert Phillips, NASA's chief space station scientist, says NASA is not revising "the kinds of science we plan to do."

An increase in the number of experiments aboard Mir should benefit research on human health in space and give scientists a better idea about life on the space station, says Robert Rhome, director of NASA's microgravity science and applications division. But Mir's reputation for temperature fluctuations and vibrations (*Science*, 28 May, p. 1230) leaves protein crystallographers and materials scientists worried. After listening last week to a briefing by NASA Administrator Dan Goldin to the Space Studies Board of the National Research Council (NRC), chair Louis Lanzerotti, a space physicist at AT&T's Bell Labs, says "it was clear that we need to have a much better understanding of conditions on Mir before we know what sorts of research will work aboard the station."

NASA's first step will be to find out more about Mir's environment. In March 1995 the shuttle will drop off a device called the Space Acceleration Measurement System to measure vibrations aboard Mir. "This will allow us to optimize experiments, rather than just put something we only think may work aboard Mir or the space station," says Roger Crouch, chief scientist at NASA's microgravity science and applications division. During the same trip, NASA has plans to send up a liquid-diffusion experiment designed by a team of protein crystallographers led by the University of California, Riverside's Alex McPherson, as well as an experiment to try to solidify samples of gallium-doped germanium, a semiconductor, in a Mir furnace.

In the meantime, scientists are fretting over some nontechnical issues. "It's the worst of all possible situations—NASA's unreliable schedule coupled with a launch site 6000 miles away [Russia's launch pad in Central Asia]," laments Penn State crystallographer Gregory Farber, who's conducting a crystallization experiment on Mir. The NRC, meanwhile, is exploring how to set up a process to choose which experiments will be allowed aboard Alpha. There's also the need for improved language skills. Says NASA crystallographer Daniel Carter, "I'm boning up on my Russian."

–Richard Stone

MEDICAL ETHICS

A Tough Line on Genetic Screening

Today, every child born in the state of Pennsylvania is screened at birth for a battery of diseases including Duchenne muscular dystrophy—an inherited muscle disorder that leads to death in the teens or twenties and for which there is currently no cure. Because of this screening, parents of a Duchenne baby are likely to learn of their child's fate in the first days of its life, whether they want to know it or not. But last week, a panel of experts assembled by the Institute of Medicine (IOM) argued that Pennsylvania's policy—and those of states that have similar involuntary screening programs—is misguided.

In a report* that has generated controversy within the IOM group itself, the panel of geneticists, genetic counselors, pediatricians, ethicists, and lawyers recommended that widespread testing for incurable diseases such as Duchenne's be avoided because it will not benefit those being screened. The report, intended to lay out guidelines for genetic testing in the next decade, put forward two other principles that could have a major impact on newborn screening: Parental permission should be required for all genetic tests, and initial results should always be followed by confirmatory tests, counseling, and treatment. The IOM panel also focused on the need to preserve the confidentiality of genetic tests and the growing need for genetic education and counseling. But its recommendations on newborn screening, established after hours of debate, are likely to be the most controversial.

According to the chairman, geneticist Arno Motulsky of the University of Washington, Seattle, the panel came down in favor of voluntary testing rather than mandatory screening for most genetic diseases because the majority believed that "voluntary participation was the best way to ensure that children would be screened and parental autonomy maintained." Panel member Lori Andrews, a fellow of the American Bar Foundation in Chicago, adds that parents are more likely to follow up on screening

*"Assessing Genetic Risks: Implications for Health and Social Policy," Institute of Medicine, National Academy of Sciences, 1993.