

## Spacewalkers restore some power to Mir

In another installment of the world's longest-running space drama, cosmonaut Anatoly Solovyev and astronaut Mike Foale took a 6-hour walk outside Mir late last week, realigning two solar arrays on the beleaguered Russian space station. The new orientation enables the arrays to capture more sunlight and convert it into electricity for the power-starved craft.

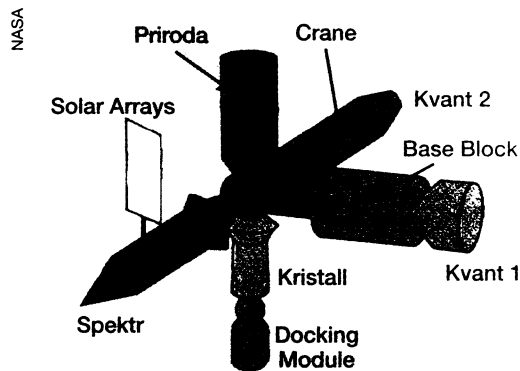
During the remainder of their time outside Mir, however, Foale and Solovyev were unable to locate holes or tears in the craft's Spektr module, which suffered heavy damage when a resupply vehicle rammed into it on June 25 (SN: 7/5/97, p. 6).

One of a string of mishaps that has beset Mir since February, the June collision was a potentially life-threatening event that bent solar arrays and crumpled radiators attached to Spektr and punctured the module's skin. The entire craft lost pressure until the crew managed to seal off the module, a maneuver that severed electric cables from the arrays and halved the

amount of power available to the craft. On Aug. 22, Solovyev and Pavel Vinogradov crawled through Spektr's hatch and reconnected the cables, restoring about 25 percent of the lost power.

The Sept. 6 realignment of two of the three solar arrays still working on Spektr recouped another 15 percent of the power, estimates James Van Laak, deputy director of the Mir-space shuttle program at NASA's Johnson Space Center in Houston. A day later, that success was tempered by another, albeit temporary, malfunction. For the third time since mid-July, Mir's main computer shut down, causing the craft to disconnect its automatic navigation system and go into free drift, a mode in which the arrays can gather sunlight only intermittently.

By Sept. 8, the crew had replaced a central processing unit in the computer and solved the problem, but the malfunction prompted once again questions that have been raised repeatedly all summer: Is it time for Mir to retire or at least for



*On Sept. 6, two Mir crew members emerged from an airlock on the Kvant 2 module. Foale operated a crane that moved Solovyev to Spektr, where he rotated solar arrays.*

NASA to curtail its involvement with the 11-year-old craft?

"At what point do you leave a marriage?" asks John M. Logsdon, a space policy analyst at George Washington University in Washington, D.C. "Nothing has happened in the last month that significantly diminishes my belief that it's worth moving forward with a very prudent and careful recognition of all the problems."

NASA has taken crew and supplies to Mir since 1995, in part to gain experience the agency predicts will prove invaluable aboard the international space station, whose construction is scheduled to begin in mid-1998. According to the current plan, a space shuttle will dock with Mir on Sept. 27, carrying repair equipment for Spektr along with astronaut David Wolf, who will replace Foale for a 4-month stay.

"The bottom line is very simple," says Charles P. Vick, an analyst at the Federation of American Scientists in Washington, D.C. "We've got to learn this technology before the international space station or before we do lunar and Mars missions in the future. What if you're halfway to Mars and you have a [puncture]—what are you going to do then? You're going to have to deal with it right then and there, and it's better to learn it now than later."

Says Marcia S. Smith of the Congressional Research Service in Washington, D.C., "If they have to keep powering down because a computer blows up . . . obviously that further reduces the science yield, so you end up justifying the astronaut's presence on Mir really on the basis of operational experience and these intangibles of building better relationships with the Russians and living up to our commitments.

"It's not clear to me what the direct relationship will be between [the experience] an astronaut gets on Mir versus the international space station." Smith notes that Russia plans to contribute a core module resembling that of Mir, "but the rest of the international space station is based on very different technology." —R. Cowen

## Toxic landfill may cause babies to be tiny

The Lipari landfill in southwestern New Jersey once headed the Environmental Protection Agency's national list of Superfund sites needing cleanup. Unlined, this 15-acre burial ground was supposed to accept only municipal refuse. During the landfill's 13 years of operation, however, it illegally accepted 2.9 million gallons of liquid industrial chemical wastes and considerable solid hazardous wastes.

In response to a growing outcry in 1971 over the site's stench—and the neighbors' headaches, nausea, and respiratory problems—officials closed the landfill. A new study suggests that noxious vapors from the site affected even the unborn, reducing their growth.

Michael Berry of New Jersey's Department of Health in Trenton and Frank Bove of the federal Agency for Toxic Substances and Disease Registry in Atlanta poured over the birth records of roughly 9,000 children born between 1961 and 1985 in towns neighboring Lipari. The researchers grouped the data in 5-year periods according to where the mothers had lived.

In the just-published August ENVIRONMENTAL HEALTH PERSPECTIVES, the epidemiologists report unusually low birth weights of newborns between 1971 and 1975, the landfill's peak period of leaching into nearby surface waters and emitting gases into the air. The babies' mothers lived in a middle-class neighborhood downwind and within 1 kilometer of the landfill.

Before 1966, newborns in that neigh-

borhood had averaged 100 to 200 grams (3.5 to 7.0 ounces) more than babies in adjacent areas. However, birth weights began falling between 1966 and 1970, the period of heaviest chemical dumping, and bottomed out over the next 5 years at 195 grams below those of newborns whose mothers lived more than a kilometer away. Indeed, from 1970 to 1975, low birth weights (less than 2,500 grams, or 5.5 pounds) occurred more than five times as frequently in the affected group as in neighboring areas.

After 1975, birth weights of babies near the landfill rebounded. Elsewhere, birth weights had held steady throughout the 25 years.

"Studies like this are few and far between," says Martin Kharrazi of California's Environmental Health Investigations Branch in Emeryville. Moreover, its finding of a change over time and area that corresponds to probable toxic exposures, he says, "gives strength" to the argument that the landfill was responsible for the low birth weights, which put newborns at heightened risk of medical problems.

During fetal life, "the common detoxification mechanisms are not in place yet," Kharrazi observes, adding that "we can't yet rule out some indirect mechanism"—such as a mother's stress over the landfill brouhaha or a loss of appetite from its unpleasant odors.

Today, after a \$125-million cleanup, Lipari appears to present little health risk, says Rich Cahill of EPA's regional office in New York. —J. Raloff