

Mir crew overcomes obstacles in space station repair

by Marsha Freeman

For the cosmonauts of the Mir 24 crew, there were a number of obstacles that had to be overcome in order to perform an internal spacewalk into the Mir's damaged Spektr module, which they carried out successfully on Aug. 22. To prepare, they rehearsed the mission before their flight in the large water tank at the Star City cosmonaut training center, which simulates the microgravity of space.

They did not know if they would encounter floating hazardous debris when they opened the sealed hatch to the Spektr, which might have been created when the module depressurized, after being struck by an unmanned Progress supply spacecraft on June 25. They did not know if there would be loose cables that could entangle them, or sharp objects that could puncture their spacesuits. They knew the module would be dark, and possibly cluttered with equipment and experiments that could have become unhinged or exploded when the atmosphere leaked out of the laboratory.

Commander Anatoly Solovyev and flight engineer Pavel Vinogradov, faced all of these obstacles with confidence. They were well trained, and knew that cosmonauts had demonstrated, since the first Soviet space stations were in orbit in the early 1970s, that with man "in the loop," more difficult repair missions in the past had been successful.

An ungrateful nation?

The greatest obstacle faced by the intrepid Mir 24, and the Mir 23 crew before them, was not in space, but back on the ground. For the past six months, and especially since the June 25 accident with the Progress ship, the Russian press, the U.S. media, British wire services, and the Russian government, have expressed virtually no confidence in the ability of the cosmonauts, although it is that corps of cosmonauts that has been solely responsible for keeping Mir functioning six years past its design life.

In articles and cartoons, the media have likened the Mir to a junk-heap car, and insisted that there is no reason to keep the station manned. American congressmen have arrogantly gotten on television, or gone onto the floor of the Congress, to proclaim that the Mir is not safe, regardless of what the Russian and NASA space experts, or Russian cosmonauts and American astronauts, state publicly.

In an ill-advised statement on Aug. 8, Russian President Boris Yeltsin made the accusation, before the Mir 23 crew had even returned to Earth, that the collision with the Progress supply ship was not due to "technical failure," but that "the human factor played a part." This was taken by all to mean that the cosmonauts were to blame for the accident; it was all the more irritating because the investigation of the accident being carried out by the Russian Space Agency had not even been completed yet. Although statements by subsequent spokesmen for Yeltsin have attempted to backtrack, the cosmonauts were certainly not going to sit idly by and watch their heroic efforts be tarnished by political opportunism.

The problem lies with the economy

Although Mir 23 commander Vasily Tsibliyev was not told about Yeltsin's remarks during the mission, because it was rightly felt that this would demoralize the crew, it did not take him long to respond to the accusations after he returned to Earth.

At a press conference on Aug. 16, two days after landing, Tsibliyev said, "It is a long tradition here in Russia to look for scapegoats. Of course, it is easier to put all the blame on the crew." He angrily said that as far as the Mir accident was concerned, "the cause lies with problems on Earth. It's connected with the economy, with our affairs in general. Even the equipment we needed to live aboard the station and that we requested to be sent—and we're not talking about coffee, tea, and milk—they just don't exist." He continued, "The factories don't work, or have insufficient supplies, or they ask for, excuse me, crazy prices."

The lack of support by the Russian government has not only been in words, but in deeds. The budget for the civilian space program is a fraction of what it was five years ago when the Russian Space Agency was formed. The Mir space station has been kept in business, even at its reduced level, not primarily through government allocations, but largely through the flights of "guest cosmonauts," whose nations pay to be able to use the unique orbital facility for scientific experiments, and to develop experienced space flyers. Over the past two years, the more than \$100 million per year being paid to the

Russian Space Agency by NASA to fly U.S. astronauts has equalled almost half what the Russian government is investing in Mir.

On Aug. 20, two days before Solovyev and Vinogradov were to perform the internal spacewalk to reconnect severed electric cables in the damaged Spektr laboratory to the rest of Mir, Russia's first deputy finance minister, Vladimir Petrov, stated that money to operate Mir would not be available and that "we must remove Mir from orbit. This will be done next year." Petrov said, "You see, there have already been a series of breakdowns, one failure, another failure."

Once again, others in the Russian government were put in the position of contradicting a public utterance. During his Friday radio address on Aug. 22, President Yeltsin said that "recently, we have become somehow more indifferent toward space. Either we got tired of the fanfare, ceremonial speeches, and applause, or we decided that earthly problems are closer to us." He announced that there would be more money put into space and aviation, reviewed some Russian space accomplishments, and said, "Russia must not leave the ground it won dear, must not relinquish its leading position. We must not forget that the state of our aerospace complex largely determines the status of Russia as a great power."

On Aug. 25, Deputy Prime Minister Yakov Urinson concurred, stating at a news briefing, "The government will do everything to finance fully the [Russian work on the] international space station program, and everything connected with the continued operation of Mir. I have no doubt that's how it will be."

The cosmonauts, and everyone else, must be trying to figure out whom to believe.

A job well done

It will be a few more days until the team aboard Mir and those on the ground can assess how much more electrical power will be available to the space station, after the internal repair was completed. Flight engineer Vinogradov is reconnecting equipment that had been powered down since the June 25 accident. Four days after the repair, following a two-day, well-earned, rest for the crew, the engineers reported that some additional electricity was flowing through the new cables that had been installed. Mission Control hopes to be able to power up the Kristal and Priroda science laboratories, for the first time since the June accident.

Mission control has not been able, however, to get any response from commands sent to the motor that keeps Spektr's solar arrays pointed toward the Sun. If the motor was damaged in the collision, as some believe, and cannot be reactivated, the amount of useful power produced by the arrays will be very limited, because it will only be produced when the arrays are pointed toward the Sun—a relatively small portion of each orbit of the Mir.

Flight engineers had hoped that the three undamaged

Spektr solar arrays would be able to perform normally after the repair, to enable a return to the science experiments that U.S. astronaut Mike Foale and others after him were scheduled to carry out. It seems likely that an external Extra Vehicular Activity (EVA), or space walk, that can provide a close look at the damage, may be the only way that that will become possible.

On Sept. 3, or thereabouts, the Mir crew is planning to go outside Spektr for the first in a series of external EVAs. U.S. astronaut Foale is training for that mission, which will focus on the installation of handrails on the outside of Spektr, to make it easier to do patch work there at a future time. At the end of September, NASA astronaut David Wolf, who is an experienced spacewalker, will take Foale's place aboard Mir, and further EVAs will be planned.

Will flights to Mir continue?

The U.S. space agency has never flinched in supporting its Russian colleagues' efforts to keep Mir operational. As Shuttle-Mir manager and astronaut Frank Culbertson has insisted since the joint program began, the primary objectives are to learn how to run a space station, and to develop a working relationship with the world's only other manned space power, both to benefit the international space station. Therefore, equipment and operational problems on Mir are seen by NASA as a "learning experience."

This was stressed again during a post-EVA press briefing by Jim Van Laak, deputy program manager for Shuttle-Mir, on Aug. 22.

The public does not yet realize, Van Laak said, that concerning the international space station, which will start assembly next year, "when we first begin to fly, there will always be problems. There will be hardware failures on a weekly, if not daily, basis. There will be various kinds of health anomalies for crew members. . . . When you fly 365 days a year, you're going to encounter a lot of opportunities to be surprised."

During the day of the Mir repair, Norm Thagard, the first astronaut to live and work on Mir, stressed repeatedly during interviews with hostile reporters, that even when there were problems, he never felt unsafe on Mir. First, he explained, there is no failure aboard a spacecraft of that size that presents a danger to the crew quickly. Second, he reminded people, there is always a Soyuz spacecraft docked to the Mir, which can bring back a crew at any time.

Van Laak told the press that people must be prepared for what operations on the international space station will require. Decisions will have to be made frequently, he said, on questions like, "Should we continue? Should we slow down?" The answers to those questions will hopefully be made on the basis of a technical evaluation, not the emotional state of arm-chair space critics, who do not have the training, much less the courage, to try to do what the Mir cosmonauts have been doing for more than a decade.