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Delays Threaten Space Station -- Analysis

By James Oberg // Special to ABCNEWS.com

At this moment, a slow, heavily guarded rail convoy is rolling through southern Russia, crossing the snowy, windswept steppes where Cossacks and Tatars once rode. On board the rail cars are the keys to the 21st Century in space, the so-called "First Element" (and the literal cornerstone) of the International Space Station.

Once called the FGB (after a Russian phrase meaning "Functional Cargo Block"), the railway-riding space vehicle is now known as the Control Module. Built at a Moscow spaceship factory and funded by NASA payments (\$200 million worth), the module is headed for the Baykonur Cosmodrome, the Russian space center in Central Asia.

Launch Schedule

Official schedules call for blastoff on June 30; it's now officially called FEL, for First Element Launch, in the NASA passion for acronyms. Russia is paying for the launch on a powerful and reliable booster called the Proton. Ten days later, an American space shuttle, STS 88, will carry a matching NASA module called Node 1 into space and link the two units together.

But the carefully orchestrated space station assembly sequence, involving dozens of coordinated and interlocking missions over the next three years, is under serious threat right at the beginning. The nominal third element, a Russian-built (and this time, fully Russian-financed) component called the Service Module, is slipping farther and farther "to the right" on the calendar.

This module is crucial to the station because it carries all the life-support equipment that allows astronauts and cosmonauts to remain aboard the station after the shuttles have departed. It also contains the major maneuvering and pointing control rockets for the station, although the initial Control Module can provide some of these services for the first year or two. It is really a mini-station in its own right—in fact the Russians once called it Mir 2 and had originally planned to launch it as a replacement for the current Mir station.

Delay's Domino Effect

This delay is cascading down the flight plans for years ahead, driving up costs, postponing promised capabilities, and raising disturbing questions about the long-term reliability of the U.S./Russian space partnership. Since the Russian hardware is "in the critical path" of space station construction (a strategy which Congress explicitly told NASA to avoid), all attempts to develop workarounds and replacements have failed. Now officially slated for mid-December (eight months later than the

Russians originally promised), the launch of the Service Module is already at least five months behind that schedule, even by official Russian admission. Although there is bold talk of “making up half of the slip” through round-the-clock work and increased funding, most outside observers see no prospect for such rescue money.

Substitute Module

A year ago, when NASA officials realized that the sincere but unrealistic Russian schedule promises weren't going to be met, they started a search for a substitute American-built module. NASA settled in on a time-tested Navy booster design, renamed the vehicle the Interim Control Module and announced with great fanfare that the threat of Service Module delay had been eliminated.

Sadly, within a few months it became clear within NASA that this “ICM” was no solution to the problem. Its true capability and reliability were much too limited to provide a real substitute for the Russian vehicle. Worse, even the most optimistic development schedule couldn't get the ICM into space sooner than a year or so after the promised Service Module launch date.

NASA had already added an extra shuttle mission for December to carry the ICM in case it was tagged to stand in for the Service Module. Even as it became clear that wouldn't happen, the shuttle mission (dubbed Flight 2A.1) was quickly filling up with spare parts and supplies for the two-piece ISS (the Control Module and Node 1) which by then would be in orbit. The Russian vehicles were so overweight that major systems were going to have to be shipped up inside shuttle flights such as 2A.1, and then installed in flight.

Leverage Lost

NASA realized it had absolutely no alternative to Russia's Service Module. The Russians couldn't be threatened with exclusion if they didn't show up on time, since they knew the train wasn't leaving the platform without them. The Russian government repeated its promises to find enough money to build the module more or less on time, but in actual fact never delivered any hard cash to the Russian Space Agency. Instead, it merely authorized the agency to take out bank loans in the amounts needed, while promising to guarantee future repayment. Several loans were in fact negotiated in 1997, but the cash that was obtained soon vanished into the financial labyrinth of the Russian space industry.

Stacking up

There was more bad news as NASA engineers studied the assembly sequence. When the Service Module was supposed to be the third launch of the assembly sequence, it would have been easy to get it hooked up to the previous units. The Control Module (the ex-FGB) itself had its own

guidance radar and rocket thrusters, and would have been able to approach the passively orbiting Service Module and dock itself (and the attached US Node 1) to it.

But if the Control Module goes up this June and then has to wait a year or more for the tardy Service Module, it's much too expensive to have all subsequent U.S. modules sit in hangars down at Cape Canaveral. NASA therefore plans to skip over the missing Service Module and hook the next three or four shuttle loads of space station modules onto the orbiting core, forming a bigger and bigger "stack". The Control Module now on its train ride to the future was modified in recent months to give it enough computer and rocket power to stabilize the bigger-than-expected stack, a job that had originally been assigned to the Service Module.

However, the space station stack will now be too big to chase down and dock to the Service Module, whenever it finally gets into orbit.

Instead, the Service Module must be launched into a parking orbit, and an American space shuttle must be sent up to chase it, grapple it, and then tow it over to the waiting ISS stack to be connected. That's another extra shuttle mission, at a cost of half a billion dollars.

The Waiting Game

Meanwhile, waiting on the ground are the astronauts and cosmonauts assigned to be the first permanent crews aboard the ISS. Until the Service Module with its life support hardware is in place, the long-duration station crews have to wait, train, and wait some more. It could be the middle of 1999, or even later, before they are able to blast off in their Soyuz capsule and begin the first tour of duty aboard ISS.

Important decisions are needed at NASA and the Russian Space Agency during the days and weeks ahead. Perhaps the FEL will be put off several months, into the fall, so the lonely wait for the overdue Service Module won't be quite so long. Or perhaps the political and diplomatic pressure to get something, anything, into orbit as soon as possible will prevail, even if it does nothing useful for a year after it gets there. But at least for the next few days, the "first element" is still on a leisurely, uneventful train ride into the future.

Photo: Russian technicians work on the almost completed forward portion of the U.S.-funded and Russian-built Functional Cargo Block (NASA)