Space Station, Part 1
Big Project, Big Worries
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The launch of the first piece of the International Space Station today marks a new course for the U.S. manned space program. Assembling and operating the massive structure will dominate NASA's attention for decades to come.

Partnering With Russia

The first module shows Russia's space industry at its best. It has adapted a tried-and-true design, efficiently used generous U.S. funding, and built the robust and reliable vehicle on schedule.

Sadly, this may be the last time such a performance is seen. Growing Russian financial difficulties and a swelling sentiment to preserve the old Mir space station have led to a diminishing commitment to fulfill earlier promises for the ISS.

But for now, this mission is at center stage. The Zarya (Russian for "sunrise") has a number of intriguing features.

First, and unlike all ISS components to follow, Zarya is an active spacecraft, not merely a passive module. After it's linked to the U.S. module next month, it will be the controlling vehicle that seeks out and docks to the long-awaited service module, which is to arrive in orbit late next year and will provide the initial living quarters and life-support systems.

Because of its specialized mission, Zarya is a "short term" component, unlike all other station modules, which are designed to last 15 years. Once the service module is linked to it, Zarya will permanently shut down its control systems and become another passive piece of the station, where fuel and cargo will be stored.

This limited lifetime is critical in the first year of ISS assembly. Zarya was originally only intended for independent flight for three or four months at most, followed by service module docking. This free-flight interval has now been stretched to eight months at least.

In anticipation, Zarya was modified to allow refueling by a Progress drone. (It carries more than a year's worth of fuel to begin with.) Still, flying unmanned for much longer than originally planned is a risk.

Further Assembly Required

Once Zarya and Unity are connected, further assembly must await the service module.

Five years ago, it seemed that the best assembly sequence for ISS was to launch the Russian-built service module first. A permanent crew would go aboard immediately, while other sections were hooked up one after the other. But NASA rejected this because of the appearance of the

U.S. attaching its hardware to a pre-existing Russian space station, which NASA figured would be hard to sell to the White House and to Congress.

The Zarya project – costing us $250 million and the Russians another $150 million – was designed to circumvent this. The result is the awkward situation with the service module diminished in importance, and hence less priority to keep it on schedule.

Keeping Mir Alive

Meanwhile, there's been a groundswell of opinion in Russia that it should keep Mir – revitalized with nine U.S. shuttle-loads of new equipment – well past the formerly agreed-on date of termination, July 1999.

Many Russians – cosmonauts, space engineers, scientists, journalists – have voiced their willingness to sacrifice their partnership in the ISS to preserve Mir. Russia sees diminishing value in participating in ISS.

NASA's recent purchase of Russian research time and stowage space reinforced the widespread Russian view that Russia's only role on ISS is to support American needs.

So these first two launchings are truly a voyage into the unknown for NASA, for the Russian space program, and for the rest of the international partners on the project.

Space workers have spent years readying themselves for the technical challenges, which will be immense and intimidating.

The station may be able to overcome the daunting political challenges and move toward a usable space laboratory, but much later and more expensive than promised. Or the Russians may choose to drop out and return to their own program, leaving these first two modules to orbit as symbols of over-ambitious hopes.

[Hindsight ten years later – the program toughed it out, spent the extra time and money, and prevailed over all in-space and on-the-ground threats, but all preliminary promises for cost, schedule, and productivity fell by the space wayside in lessons that current space officials seem to prefer to forget, with their eyes now on new projects, new goals, new schedules, and new budgets]