Target launch of Russian star brightens space station future

The International Space Station Program received a new shot of optimism with the announcement of target launch dates for Russia's Zvezda service module.

Zvezda (Russian for "Star") is scheduled to launch between July 8 and 14 from the Baikonur Cosmodrome in Kazakhstan, NASA and the Russian Aviation and Space Agency announced.

"The service module launch will continue the creation of the ISS and will kick off the 3A through 7A flight sequence," said Tommy Holloway, manager of the International Space Station Program. "Phase II is within our grasp!"

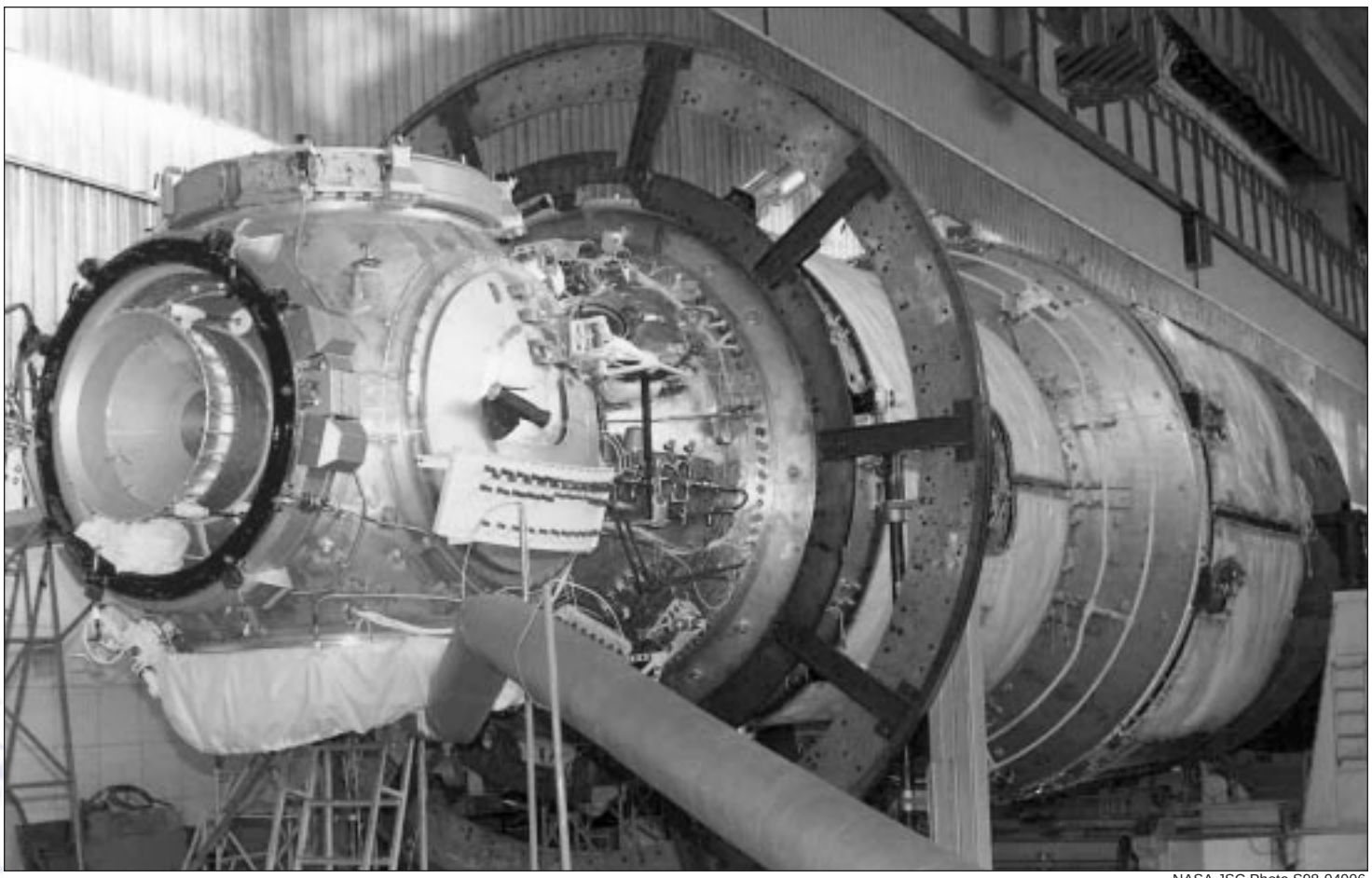
Zvezda – the early living quarters for crews aboard the station – will be launched on a Proton rocket with second and third stage engines modified to increase reliability.

The final service module launch date will be dependent on several factors, most importantly, lighting conditions over Russian ground stations at docking. RSC-Energia wants to ensure ideal lighting conditions for the external video cameras on both modules during the critical activity as well as optimum ground station and Early Communication System data for the Kurs automatic docking system while over Russian ground sites and through the TDRS S-band system.

Failures of the Russian's Proton rockets last year added to setbacks in the service module's schedule; however, Russian investigators have concluded that the failures were the result of a second stage turbopump fire caused by engine contamination introduced during manufacturing.

According to Holloway, two major steps have been undertaken to increase the reliability of the Proton scheduled for the service module launch. First, inspection and cleaning procedures have been implemented. Second, design changes that increase resistance to ignition have been implemented.

"Russian Proton engine experts have thoroughly briefed us and we believe that the steps they have taken increase the Proton engine reliability," said Holloway. "We concur with their plan."



NASA JSC Photo S98-04906

The first fully functional Russian contribution to the International Space Station, the service module will provide early power, propulsion, life support, communications and living quarters for the station.

The 42,000-pound Zvezda will not only provide early living quarters for astronauts and cosmonauts, but also the life support system, electrical power distribution, data processing system, flight control system, and propulsion. While many of these systems will be supplemented or replaced by later U.S. station components, Zvezda always will remain the structural and functional center of the Russian segment of the International Space Station.

Zvezda has a solar-array wingspan of 97.5 feet tip to tip, and is 43 feet long from end to end. The module contains three pressurized compartments and four docking ports.

Following Zvezda's launch and about 15 days of free flight, the ISS will rendezvous and dock with its newest module.

Launch of Zvezda sets the stage for the launch of other ISS components undergoing final testing at NASA's Kennedy Space Center in Florida.

These components include a small truss segment that will serve as the support structure for other station hardware; the first set of solar arrays; the United States Destiny laboratory; the Canadian-built space station robot arm; and several truss segments that will serve as the station's backbone for external hardware, experiments and solar arrays.

"Today, more than 85 percent of the U.S. hardware is down in Florida," said Holloway. "We have ten flights of hardware in preparation at KSC. Five of those flights are in the final preparation with margin in the schedule."

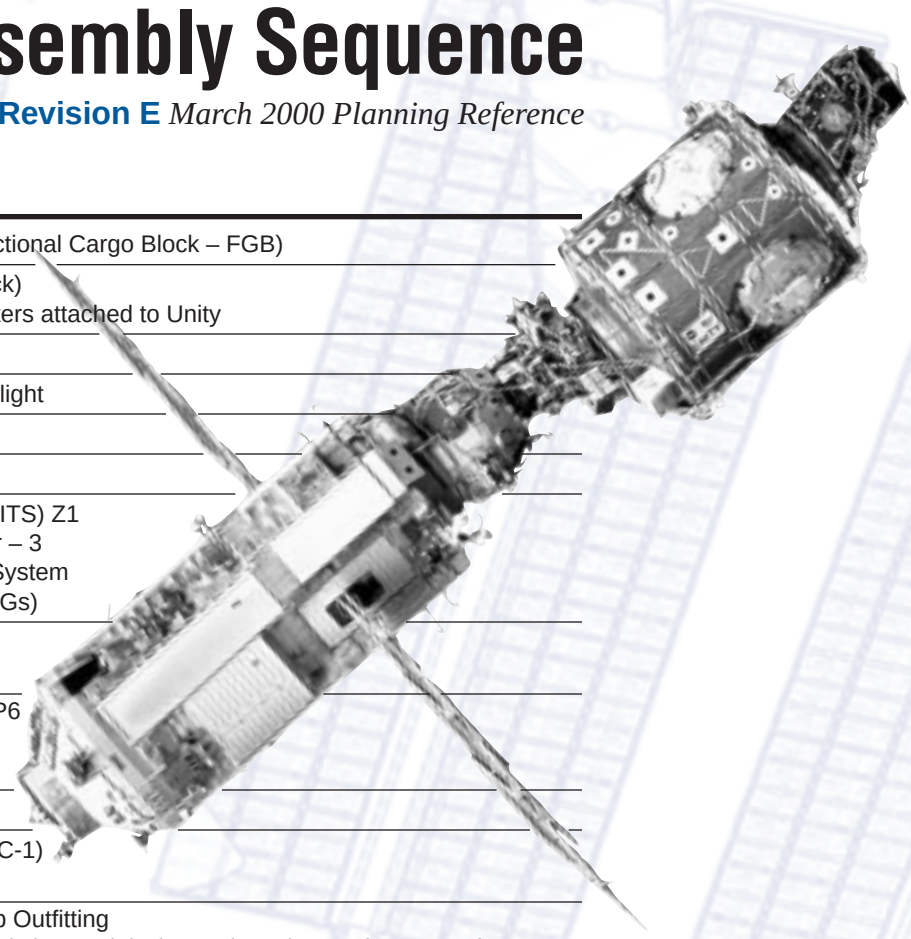
Holloway added that the Multi-Element Integration Test for 3A, 4A and 5A has also been successfully concluded.

Other key station components are under development and testing in Europe and Japan.

"At this point, we are ready to get on with the creation of the International Space Station," said Holloway. "The challenges are huge but the opportunities are greater." ■

International Space Station Assembly Sequence

Revision E *March 2000 Planning Reference*



Date	Flight	Launch Vehicle	Element(s)
November 20, 1998	1A/R	Russian Proton	◆ Zarya Control Module (Functional Cargo Block – FGB)
December 4, 1998	2A	US Orbiter STS-88	◆ Unity Node (1 Stowage Rack) ◆ 2 Pressurized Mating Adapters attached to Unity
May 27, 1999	2A.1	US Orbiter STS-96	◆ Spacehab – Logistics Flight
April 24, 2000	2A.2a	US Orbiter STS-101	◆ Spacehab – Maintenance Flight
July 8-14, 2000	1R	Russian Proton	◆ Zvezda Service Module
August 19, 2000	2A.2b	US Orbiter STS-106	◆ Spacehab – Logistics Flight
September 21, 2000	3A	US Orbiter STS-92	◆ Integrated Truss Structure (ITS) Z1 ◆ Pressurized Mating Adapter – 3 ◆ Ku-band Communications System ◆ Control Moment Gyros (CMGs)
October 30, 2000	2R	Russian Soyuz	◆ Soyuz ◆ Expedition 1 Crew
November 30, 2000	4A	US Orbiter STS-97	◆ Integrated Truss Structure P6 ◆ Photovoltaic Module ◆ Radiators
January 18, 2001	5A	US Orbiter STS-98	◆ Destiny Laboratory Module
February 9, 2001	4R	Russian Soyuz	◆ Docking Compartment 1 (DC-1) ◆ Strela Boom
February 15, 2001	5A.1	US Orbiter STS-102	◆ Logistics and Resupply; Lab Outfitting ◆ Leonardo Multi-Purpose Logistics Module (MPLM) carries equipment racks
April 19, 2001	6A	US Orbiter STS-100	◆ Rafaello Multi-Purpose Logistics Module (MPLM) (Lab outfitting) ◆ Ultra High Frequency (UHF) antenna ◆ Space Station Remote Manipulator System (SSRMS)
May 17, 2001	7A	US Orbiter STS-104	◆ Joint Airlock ◆ High Pressure Gas Assembly
June 21, 2001	7A.1	US Orbiter STS-105	◆ Donatello Multi-Purpose Logistics Module (MPLM)
August 23, 2001	UF-1	US Orbiter STS-109	◆ Multi-Purpose Logistics Module (MPLM) ◆ Photovoltaic Module batteries