Message from Tommy Holloway...

What's ahead for the International Space Station

The new star on the horizon is something to see!

It's 105 tons today–about the size of a shuttle –and when fully assembled will grow into one million pounds. When the P6 solar array unfurled its 240-foot end-to-end wings on Mission 4A, we installed the capability for power equivalent to 10-15 homes, enough to operate into Phase 3.

ISS Vision Statement

Our vision is a human outpost in space bringing nations together for the benefit of life on Earth...and beyond.

We will make revolutionary discoveries and establish the permanent international presence of humans in space to advance the exploration of our solar system and enable commerce in space.

We've been operating on orbit with a permanent crew for about two months, and already have exercised our ground and orbit teams to respond to the challenges we are encountering. The complexity and size of International Space Station integration is forcing us to learn and work together in ways only imagined. Our learning curve is growing exponentially. Much more is expected from us as the steep trek up the mountain, to build and operate the ISS, continues.

We are eleven flights into our amazing sequence. Eight flights were accomplished in 2000. In 2001, another eleven flights are planned, and the next major element and centerpiece of the U.S. segment, the laboratory Destiny, is on deck.

Year 2000 Accomplishments

In year 2000, we put three major elements on orbit. The Russian-built and launched Service Module arrived on orbit in July. The Z-1 Truss segment and first U.S. solar array (P6) were launched on shuttle flights in October and November, respectively. We launched two shuttle logistics and maintenance missions (STS-101 in May and STS-106 in September) and two Russian Progress refuel/resupply flights (in August and November). The first permanent crew (Expedition 1) launched October 31 on a Soyuz rocket, and ISS became a long-duration space flight program, with the parallel responsibility of operating and utilizing the station while continuing to build it. What's ahead for the International Space Station is an equally rigorous launch schedule and new challenges that will come along with it.

What's Ahead

In 2001, we'll launch six shuttle flights to the station, three with major elements: the U.S. Lab on ISS Flight 5A, the Canadian robot arm system on ISS Flight 6A, and the U.S. Airlock on ISS Flight 7A. Three shuttle flights will resupply, refurbish and help maintain the station: ISS 5A.1, ISS 7A.1 and ISS UF 1. Two of these flights, ISS 5A.1 in March and ISS 7A.1 in June, will rotate Expedition crews 2 and 3, respectively. The Russian docking compartment providing a docking port for the Soyuz vehicle and additional EVA capability is another major element due in 2001. Additionally, the Russians will launch Progresses and two Soyuz flights.

ISS Highlights of 2001

We kick off the year with STS 98, ISS Flight 5A—and the U.S. Lab Destiny. Once Destiny is activated several key things will happen. Prime control will switch from MCC-Moscow to MCC-Houston. The Control Moment Gyros that were installed along with the Z-1 Truss last fall on the 3A mission will be activated and take over the job of station attitude control, saving valuable propellant needed for other station maneuvers. Destiny will provide power distribution and high-rate S-band and Ku communications capability, as well as thermal and environmental control for the U.S. segment. Command and data handling will be transferred from the node Unity to Destiny.

Destiny can accommodate 24 rack locations. Five systems racks are already installed at launch. Eventually the lab will be outfitted to include materials science racks, fluids and combustion experiments and commercial materials research.

Destiny will significantly increase the habitable volume of ISS and put space station science on stage as ISS utilization begins. Next summer, a space shuttle flight will transport individual research payloads to the ISS.

The laboratory is built by our prime contractor Boeing and represents a monumental growth in ISS capability. The thousands who have brought it to the launch pad deserve a hearty pat on the back.

Enhancing Space Walking and Working

Our capability to live and work in space will be greatly enhanced by adding the robot arm and the airlock to the station. The Canadian robot arm will be launched to the station featured in the Canadian-built mobile servicing system and will assist ISS assembly tasks through its ability to "inch-worm" along the truss and modules. The arm is needed for helping loading and unloading the shuttle Orbiter cargo bay, assisting in ISS construction tasks and assisting astronauts during EVAs. It will also play a vigorous role in support of station maintenance, which will prove to be a new and exciting set of tasks on orbit. When the U.S. Airlock is brought to the station on ISS Flight 7A (STS-104) in May, astronauts and cosmonaut crewmembers will be able to perform space walks in both Russian and American spacesuits, and without the presence of the shuttle. Our ability to work in space will be greatly enhanced, as well as our versatility. The 6A flight will also bring up a UHF antenna , which will provide space-to-space communications capability for U.S.-based space walks. The Airlock flight will also bring a High Pressure Gas Assembly to support space walks and augment the existing gas resupply system in the Service Module. The Airlock on orbit will mark the end of Phase 2 of station assembly and set us up for Phase 3, the final stages of ISS assembly that will last into the year 2006. The International Space Station outfitting will continue to be a major theme of flights between now and 2006. This enormous job involves 122 Standard Racks or telephone booth-size facilities that will outfit the entire U.S. segment and several international segments. Thirty-seven racks are reserved for scientific payloads and experiments, 32 racks are used for ISS subsystems, 14 are dedicated to crew health care equipment, and the rest are for stowage. The carriers of these racks to orbit are three Italian-built Multi-Purpose Pressurized Modules (MPLMs) manufactured by Alenia Aerospazio in Turin. These modules are reusable and capable of carrying nine metric tons of cargo—up to 16 racks. The MPLMs function as both station cargo carriers and station modules as the shuttle arm will dock and undock them, returning them to Earth for the next load. Named after famous Italian scientists and artists, Leonardo, Raffaello and Donatello, ISS MPLM flights begin with 5A.1 (STS-102) in March, and on 6A and 7A.1 and each will continue to be used throughout assembly.

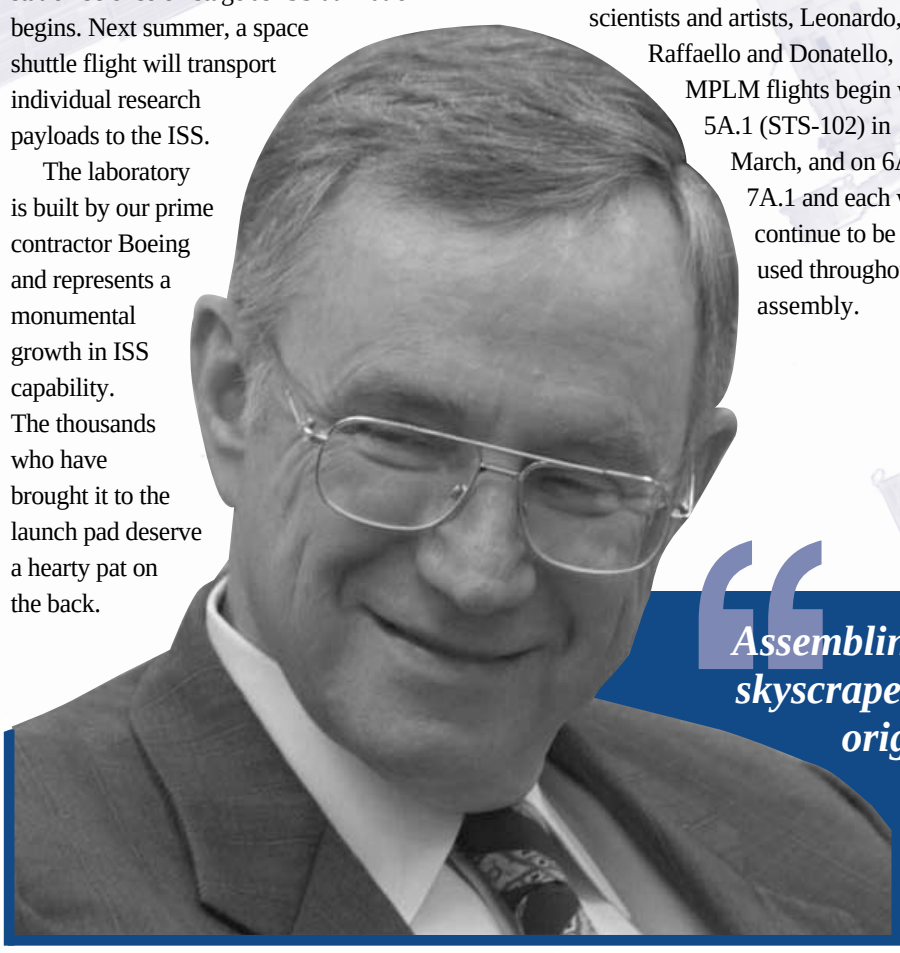
What's Ahead?

Every subsequent year an equally aggressive pace of 11-plus space flights is planned. Our Russian partner is slated to launch every year. Two flights of the manned Soyuz vehicles which continue to function as the ISS lifeboat, and 5-6 unmanned Progress flights to refuel and resupply the station are expected per year. In 2002, another six shuttle flights are planned with focus on building the Integrated Truss Structure. Named "the power bloc," major pieces of the station backbone such as the centerpiece (SO), first starboard (S1), first port (P1), and second port (P3/P4) will be flown on ISS Flights 8A, 9A, 11A and 12A. The UF2 flight continues the science outfitting.

In 2003, we will finish the truss structure, enhance station operations with a Canadian-built robot hand for the arm on UF4, add another node built by Europe under barter arrangement to the U.S. and anticipate growth of the Russian segment with docking and stowage modules/ compartments. Major features of 2004 include shuttle launches of the Japanese Experimental Module "Kibo" and the European Laboratory "Columbus." The UF4 flight will add the Express Pallet to the station for mounting external experimental equipment. In 2005 and 2006 we will continue to enhance the international segments with modules and habitation space so that when the ISS is assembled, it will have six functioning research laboratories, the interior volume of two 747 jumbo jets, power enough for about 50 homes, and 52 laptops interfacing with computers to control ISS subsystems. These computers will also be able to monitor the station's vital systems, an activity requiring several million lines of computer codes. The computer system will also be able to receive and use the latest software updates and innovations so our crews and scientists can take advantage of this growing capability. Assembling this one-million-pound space skyscraper, with world-class laboratories, originating from 100 locations and 100,000 people all over the world, is just the beginning.

This huge international team, representing five space agencies, involving 16 countries, and stretching across oceans and cultures, is succeeding with our mission to safely build, operate and utilize a continuously inhabited orbital research facility through an international partnership of governments, industries and academia. ■

Stay with us as this incredible story unfolds even more in 2001.



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–Tommy Holloway