



SPACE

Meet the Men and Women of NASA



## UPDATE # 117 - April 10, 2000

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### WHAT ARE YOU DOING FOR SPACE DAY?

Space Day, May 4, 2000, is a global celebration of the extraordinary achievements, benefits, and opportunities in the exploration and use of space. The goal of Space Day is to advance science, math, and technology education, and to inspire youngsters to realize the vision of our space pioneers. The method is to get classrooms to focus on space activities for a day. We at NASA Quest have provided a listing of some of the opportunities for you to celebrate this event in your classroom or home.

See: <http://quest.nasa.gov/space/events/spaceday.html>

The spring 2000 version of the QuestChat newsletter is now online at:

<http://quest.nasa.gov/qchats>

This is a great way to become acquainted with some of the NASA Quest offerings that you may not be aware of.

'Til next time!  
Linda Conrad  
lindac@quest.nasa.gov

### UPCOMING EVENTS:

Note: Most chats require pre-registration, so please plan ahead. If you need some help with how to chat, see the NASA QuestChat Information Center at: <http://quest.arc.nasa.gov/qchats/>

Thursday, April 13, 10-11am PDT (1-2pm EDT, 5-6pm GMT)  
Learning Technologies Channel Webcast and Chat from the International Space Station Mock-Up and Training Facility at Johnson Space Center.  
Johnson Space Center is the center for manned spaceflight and headquarters for the International Space Station Program. JSC is the home of America's astronauts. In this role JSC has the responsibility for training the astronauts and flight controller teams that

support manned  
missions. See:  
<http://quest.nasa.gov/ltc/sto/tours/index99.html>

April 18, 19 and 20: A three-day forum  
Ask questions of Felix Alberto Soto Toro, Electrical  
Designs Engineer.  
Felix is currently juggling his responsibilities at the  
Kennedy Space  
Center and his doctoral studies at UCF. Post your questions  
online for him  
and he will drop in periodically and answer them for you.  
See Felix's  
profile at:  
[http://quest.nasa.gov/space/team/soto\\_toro.html](http://quest.nasa.gov/space/team/soto_toro.html)  
Pre-Register at:  
[http://quest.nasa.gov/common/events.cgi?prj\\_sto](http://quest.nasa.gov/common/events.cgi?prj_sto)

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[Editor's note: As Ops planner, David works with the group  
responsible for building and maintaining the timelines that the  
astronauts will use on board the International Space Station.]

### **"OPS PLAN, WHAT'S GOING ON?"** *by Dave Melendrez*

<http://quest.nasa.gov/space/team/melendrez.html>

April 3, 2000  
Interviewer: Lori Keith  
The assembly of the International Space Station (ISS) has  
begun.  
I worked STS-96 (ISS assembly flight 2A.1), the first  
docking  
mission to the ISS. The shuttle took up supplies, which  
were then  
stored in the Node and the FGB. A lot of soft stowage  
(goods  
stored in large bags) was brought up and stowed using  
elastic  
straps to hold them in place against the walls. An EVA  
(ExtraVehicular Activity, or spacewalk) was performed to  
attach  
parts of a manual-operated crane, to be used for future  
construction activities. The EVA went well. A few repairs  
also had  
to be made while the crew was aboard the Station. They  
fixed  
some of the Russian amp hour meters (MIRTS) that help  
regulate  
current to the FGB batteries. We have been spending a lot  
of time  
lately monitoring the FGB batteries because we have  
encountered  
some problems with them. Repairs were also made to the U.S.  
Early Comm System. (Comm stands for communication.)

During 2A.1, I worked the "Orbit 1" shift that covered the  
first  
part of the crew day. In Houston, that turned out to be  
early  
afternoon to around midnight. During that shift we were  
able to  
see the first part of the EVA. So even though we didn't get  
to see  
the completion of the EVA activities, it was still exciting  
to be a  
part of it. And of course after a long tiring shift, we  
were anxious  
to go home and rest. Watching the EVA reminded me of when I  
was a kid watching Apollo 11. I remember sitting on my  
mom's  
lap very early in the morning, watching what to me was a  
BIG  
black and white TV and seeing the Saturn V rockets head off  
for  
the Moon. In high school and college, I followed all the

shuttle missions and remember watching those guys sitting behind the consoles in Mission Control and wondering, "how do you get to do that?" It was very cool to finally feel like I had made it. Now, I am one of those guys on console during a shuttle mission. Although I had already worked something like 11 shuttle flights and many hours of Station operations on console prior to 2A.1, this was a fairly high profile mission and being in the MCC front room for it was exciting.

On 2A.1, one of the things we wanted to be careful about while the crew was inside the Station was atmosphere monitoring. Basically, the Station right now (which just consists of the FGB and Node 1) has very limited air circulation. We won't have full atmospheric life support capability until the Service Module arrives. So during crew ingress, we wanted to make sure the CO2 and humidity didn't build up to unwanted or dangerous levels. However, at one point as the crew was unloading the supplies onto the station, we were taking live video downlink and suddenly noticed there were too many people in the FGB. Naturally the ECLSS ("ecliss", Environmental Control and Life Support System officer) guy got upset. As the Ops Planner, I am responsible for planning and monitoring crew activities so when he saw we had something like 4 or 5 people where there should have only been 1 or 2, ECLSS spun around on me and asked, "OPS PLAN, what the heck are they doing in there??" So at that point, we sent a quick message up to the crew asking them to limit the person-hours spent in the FGB. From the crew's perspective, they were just doing transfer ops as you would any place else. (Remember, Ops means operations.) If you need to move something, you're just going to move it without necessarily thinking about the air around you or CO2 levels. So, people ended up inadvertently collecting in the FGB.

An interesting phenomenon of a free-fall state ("zero"-G) is there is no convection. That is, with no "up" or "down", hot air does not rise. We get around this by pumping the air through the modules using fans and good ventilation. Without air circulation, exhaled CO2 will just collect in a bubble around a person's head or in pockets throughout the module. Excess CO2 can make a person feel bad, cause headaches, nausea, or in high enough levels can be lethal. This is going to be a concern again on the next flight, STS-101/ISS 2A.2A. We will need to monitor the Station atmosphere carefully during maintenance and transfer ops to make sure the crew doesn't suffer any ill effects.

This next flight, STS-101/2A.2A, is an ISS servicing and outfitting flight designed to prepare the vehicle for the arrival of the Russian Service Module (SM). It was originally going to be a single flight called 2A.2 but it was recently split into two flights,

2A.2A and 2A.2B. 2A.2A is currently scheduled for late April and the SM should be launched in July, but I think we've all become so accustomed to delays and launch slips we'll just wait and see when things actually get off the ground. After the Service Module is docked to the Station, 2A.2B will fly up to help outfit the SM and prepare for the first crew arrival later this year. If it becomes necessary, we may even fly a 2A.3, to take up the Interim Control Module (ICM). The ICM would be necessary in the event of Service Module failure to reboot the ISS and control its attitude. NASA always likes to have a back-up plan, just in case.

As far as I know, I have not yet been scheduled to work any of these flights. I have been keeping very busy working Station "steady state" or standalone ops. Since there is no crew up there yet, we basically monitor systems, make sure they're healthy, and manage our daily command plans through close coordination with the Russians. Last time I wrote, I was working two-week shift rotations, but those have been changed to one-week rotations. That doesn't mean we're on console every week, just that when we do console ops, we have it for a week at a time instead of two. It's a bit less stressful this way. Then we do other things for several weeks before going back in the Control Center for another week. Right now we have eight certified Ops Planners to work in the MCC front room. Hopefully we'll get more soon to ease the rotation schedule. During the weeks off console, we also take turns as Long Range Planners (LRPs). The LRP prepares plans several weeks in advance. The Ops Planners take care of the immediate plans for the current week and any changes that must be made during real-time ops.

As before, when I'm not on console, I spend most of my time helping to maintain the UNIX web servers we have in our office. I'm also one of our division's lead web administrators. I manage several websites and generally help people put out their little HTML fires. Two of our workstations are a bit older and were not Y2K compliant, so we have spent some time bringing them up to date. As we are working on them, we still have to use them, so we have had to roll the clocks back on two of them to the year 1971. This was done to avoid any potential problems with the computer clock rollover to 2000. 1971 was chosen because its calendar is exactly the same as 1999. We have replaced one of the non Y2K-compliant machines but one remains to be upgraded and it's quietly humming along still thinking it's now 1972.

One of the web tools I've developed lately is what we call the Ops Planning TUT Compiler. TUT is TDRS ("teedriss")

Unscheduled Time and is basically just a listing of the daily availabilities in the Tracking and Data Relay Satellite (TDRS) system. We use the TDRS satellites to communicate with the Shuttle and Station, but in order to do so we have to schedule fixed blocks of time, or "events", for their use. The Goddard Space Flight Center (GSFC), in Maryland, coordinates all the TDRS scheduling and de-conflicts the use of the satellites with us and other users including the military, the Hubble Space Telescope, and Gamma Ray Observatory. Each TDRS satellite has two big dishes, and only one user can use these "single-access" dishes at a time. The program I have written uses the TUT file and Station trajectory data to generate a list of available events that we can schedule. This needs to be done from time to time because we like to have as much comm with the vehicle as possible and when we have gaps or dropouts, we use the TUT to see what's available to fill in the holes. The trajectory data is required because we need to know where the Station is in its orbit relative to a given TDRS satellite (there are 6). It would do us no good if we scheduled service on, for example, TDRS 275 when the Station is on the opposite side of the Earth and can't see the satellite. The TDRS satellites are parked out in geostationary orbit above the equator where they circle the Earth at the same rate the planet rotates so they remain fixed above a set longitude. We label them by that longitude, so when I say "TDRS 275" I mean the TDRS satellite that is positioned above 275( W. longitude. Our initial TDRS requests go out to GSFC weeks in advance but with all the other users sharing the system, we don't always get everything we ask for. This is where the TUT compiler comes in handy because it's a very tedious and complicated process to schedule TDRS time manually. Automating the process has saved us a lot of time and trouble in the control center.

A regular thing I do about every six months is give the Ops Planning overview course to the students at the United Space Alliance Training Academy. It usually takes about an hour and is just a high-level summary of what Ops Planning is all about. I explain how it's a very big job being the designated ops "integrators" for the program. The Training Academy is located offsite and is about a six-week program that serves as an orientation/overview for new hires. It covers things like the overall workings of NASA, JSC's function, shuttle ops and systems, Station assembly and systems, international coordination and cooperation, etc. It's like a crash course on what's going on out here. I recently gave my presentation to the newest group of astronaut candidates, also called ASCANs. Barbara Morgan, the backup for Christa McAuliffe on Challenger's last flight, was in one of the classes I spoke to. She was very personable and excited about finally preparing to fly. I think it's nice that she

brings a teacher's perspective to the program.

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## STATUS OF ORBITER PROCESSING

RE: MISSION: STS-101, 3rd ISS Flight (2A.2a) - carrying SPACEHAB  
 Last Wednesday, NASA managers completed a thorough review of Space Shuttle and International Space Station readiness and confirmed an April 24 launch date. The STS-101 flight crew arrived at KSC that same day at about noon and participated in Terminal Countdown Demonstration Test activities through Friday morning.

Following a hydraulic system test last Tuesday, system engineers identified a higher than normal pressure reading in a power drive unit (PDU). Shuttle managers today decided to replace the PDU for Shuttle Atlantis'9 rudder/speed brake at the launch pad. KSC workers will begin preparations for the job tonight, and final approval of the PDU replacement plan is expected by midday tomorrow. The replacement PDU arrives from Palmdale, CA, tomorrow and installation is expected to occur Wednesday.

Over the weekend, workers replaced the leaky quick disconnect on auxiliary power unit (APU) No. 3. Engineers were to begin hot fire tests of Atlantis'9 three APUs this afternoon. Any work required on the rudder speed brake will follow that operation.

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### *SUBSCRIBING & UNSUBSCRIBING: HOW TO DO IT!*

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 To catch up on back issues, please visit the following Internet URL:

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SPACE



AEROSPACE



ASTROBIOLOGY



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