

Subject: ISS On-Orbit Status 08/12/05

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All ISS systems continue to function nominally, except those noted previously or below.

The crew's sleep cycle shifted two hours to the right in support of medical activities required for EVA-14. Wakeup was at 4:00am EDT; sleep will start at 7:30pm tonight. The crew remains on this schedule until Tuesday, August 16.

CDR Krikalev and FE/SO Phillips pressed on in their preparations of next week's EVA on 8/18 (Thursday), preceded by the usual spacewalk dry run on 8/16 (Tuesday). Both crewmembers worked on the EVA support panels (POV) in the Russian segment (RS) to set them up and check them out for the training run and EVA, John in the Service Module Transfer Compartment (SM PkhO) and Sergei in the DC1 Docking Compartment. Preparations particularly concentrated on "degassing" the Orlan BSS water/gas separation systems at both locations, to separate water and air in the cooling system.

Orlan activities also focused on equipping the suits with their consumable ORU (orbit replaceable unit) elements, setting up communications, performing leak checks and valve functionality tests on the suits and their BSS interface units, and completing individual fit sizing (central strap, lateral strap, hip strap, calf strap, arm cable and shoulder size, front & rear). Preparations also dealt with personal gear. All Orlan activities were supported by *peregovoriy* (tagup) with ground *spets* (specialist). *[The CDR will be wearing Orlan #25 (red markings) with BRTA radio telemetry unit #13 installed, while the FE's suit will be #27 (also with red markings) with BRTA #12. Orlan consumables ORUs are LiOH canisters (LP-9), primary & backup oxygen tanks (BK-3), moisture collectors, feedwater filters (FOR), CO2 measuring unit (IK) filter, filtration & separation units (BOS), and the newly charged 825M1 storage batteries. Personal gear includes the KVO liquid cooling garment, ShL-10 comm cap, GP-10K gloves, BK-10 thermal comfort undergarment, socks, etc.]*

Russian and US EVA planners have jointly worked out a "thruster safe zone", forward of the SM large diameter (RO2) section, which would be safe for the spacewalkers in the event of temporary attitude control handover to RS thrusters caused by CMG (control moment gyro) saturation in the course of the EVA. The agreed-on procedure includes specific radio voice protocols to ensure clear communication between the crew and TsUP/Moscow regarding thruster configuration.

As a standard test requirement for Orlan EVA participants, both crewmembers completed a session of the MO-5 MedOps protocol of cardiovascular evaluation during graded exercises on the VELO cycle ergometer, each in turn assisting the other as CMO (crew medical officer). *[The assessment, supported by ground specialist tagup, uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. For the graded exercise, the crew worked the pedals after a prescribed program at load settings of 125, 150, and 175 watts for three minutes each.]*

John performed the daily routine maintenance of the SM's environment control & life support system (SOZh), including the weekly inspection of the BRPK air/liquid condensate separator apparatus.

Because of MO-5, physical exercise today was reduced for both crewmembers from the regular 2.5-hr. exercise program on the TVIS treadmill, CEVIS cycle ergometer, RED resistive machine and VELO bike with bungee cord load trainer. *[Sergei's daily protocol prescribes a strict four-day microcycle exercise with 1.5 hr on the treadmill and one hour on VELO plus load trainer (today: Day 1 of a new set).]*

Afterwards, John transferred the exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (heart rate monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~2:15pm, the crew conducted their standard weekly teleconference with the JSC Astronaut Office (Kent Rominger), via S-band S/G (space-to-ground).

This was to be followed at ~2:35pm by John's and Sergei's weekly teleconference with ISS Program Management at JSC/Houston via S-band/audio.

Yesterday at 3:20pm EDT, a recently (7/11) installed BVK-1 vacuum valve on the Russian Vozdukh CO2 (carbon dioxide) removal system failed, causing the system to shut down. As troubleshooting plans are being developed, currently there is no concern with CO2 build-up overnight, since the crew's metabolic rates are reduced during sleep and the CO2 levels are not expected to reach flight rule limits. *[The US Lab's CDRA (Carbon Dioxide Removal Assembly) is available as a backup, as are Russian LiOH canisters. According to recent consumables reports, 38 LiOH canisters are available onboard, well above the 15 required per Flight Rules.]*

Also yesterday, the crew changed out one of two failed SD1-7 light bulbs in the SM PkhO with a functioning one from the SM Working Compartment. Although this light bulb had been working in the SM, it did not work in the PkhO, and both crew and ground agreed that the failure was probably due to a faulty power supply. The crew then removed several functioning lighting assembly power supplies and replaced them in the DC1.

Sergei's transfer of water from the Progress tanks to the SM Rodnik tanks amounted to approximately 210 liters.

Today's CEO (crew earth observations) photo targets, in the current LVLH attitude not limited by flight rule constraints on the use of the Lab nadir/science window, were **Internal waves, Azores, Atlantic** (*there finally appeared to be a break in the weather over this target area. With the islands to the left of track, the crew was to shoot southward and just ahead for glint enhanced features in the sea surface, using either the 180mm lens for context or the 400mm for details*), **Yellowstone National Park, Wyoming** (*this should have been a good pass over the Yellowstone area. Using the long lens settings for detailed mapping. Concentrating on near-nadir views of the areas just west and north of Yellowstone Lake*), **Sao Paulo, Brazil** (*the crew had a nadir pass with fair weather and lighting over this Brazilian mega city. Using the long lens setting for a detailed mapping of this sprawling urban area surrounded by forested mountains and numerous reservoirs*), and **Palmyra Atoll, Central Pacific** (*the crew sleep shift provided an excellent, high sun, nadir pass over this 2 by 5-miles atoll. Using the long lens for mapping details of the coral reef structures*).

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov>

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

See also the website "Space Station Challenge" at

<http://voyager.cet.edu/iss>.

ISS Orbit (*as of this morning, 7:54am EDT [= epoch]*):

Mean altitude -- 354.1 km

Apogee height -- 354.8 km

Perigee height -- 353.4 km

Period -- 91.62 min.

Inclination (to Equator) -- 51.65 deg

Eccentricity -- 0.0001042

Solar Beta Angle -- 0.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.72

Mean altitude loss in last 24 hours -- 53 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 38454

For more on ISS orbit and worldwide ISS naked-eye visibility dates/times, see

<http://www.hq.nasa.gov/osf/station/viewing/issvis.html>

Today's weekend "bonus" image:

Telling the Story: After attending the STS-114 launch as an invited guest of NASA/HQ, Eileen Collins-inspired Yvonne Blaese from the former (Communist Russia-oriented) East Germany briefs hometown media on Discovery's return.





STATUS REPORT

Date Released: Thursday, October 20, 2005

All ISS systems continue to function nominally, except those noted previously or below.

FE Valery Tokarev assembled gear required for processing condensate water for the Elektron oxygen generator, using the electric condensate pumping unit (BPK) of the Russian water processing system (SRV-K2) behind Service Module (SM) panels 433, 435, and 436 and U.S.-collected water in CWC (collapsible water container) #1027.

The crew completed the third and final day for the current renal (kidney) stone experiment session (the first of three for Expedition 12), by collecting one final urine sample in the morning and finishing their dietary/metabolic log entries. The FE then stowed all equipment. [This long-range preventive medicine investigation features daily ingestion of either potassium citrate or placebo tablets. It is a double-blind research study by NASA/JSC, investigating statistically whether potassium citrate is as effective in zero-G in preventing formation of kidney stones as it is on the ground. The experiment requires keeping a metabolic diet log (food & fluid intake), followed by collection of urine samples several times per day during the three-day session, with collections ending today.]

After setting up the video hardware for recording the activity, McArthur and Tokarev performed their first general MedOps PFE (periodic fitness evaluation), a 1.5-hr. procedure that checks up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (cycle ergometer with vibration isolation) in the Lab. Readings were taken with the BP/ECG (blood pressure/ECG) and the HRM (heart rate monitor) watch, with each crewmember assisting his crewmate in turn to initiate the BP measurements. The video equipment was then stowed again. [BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise. Besides the regular fitness monitoring function, PFE also checks out the subject for EVA. The video showing the pedaling on the ergometer bike is required for biomechanical evaluation of subject and equipment setup during data collection.]

Afterwards, Bill McArthur broke out and set up the equipment for tomorrow's planned Russian "Urolux" biochemical urine test (PZE MO-9) and U.S. PHS (periodic health status) assessment.

The CDR completed the monthly PEP (portable emergency provisions) safety inspection. [The inspection involves verification that PFEs (portable fire extinguishers), PBAs (portable breathing apparatus), QDMAs (quick-don mask assemblies) and EHTKs (extension hose/tee kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. There are a total of 5 PBAs in the U.S. segment (USOS). There is only one EHTK, in the Lab.]

The FE collected the periodic reading of the cabin air's current CO₂ concentrations in the SM and Lab, using the U.S. CDMK (Carbon Dioxide Monitoring Kit, #1015), for calldown, along with its battery status, taken after pump start-up, for use in trending analyses.

Valery also collected the weekly air data with the new Real-Time Harmful Contaminant Gas Analyzer (GANK-4M) system of the SM's pressure control & atmospheric monitoring system (SOGS).

Bill prepared the regular daily IMS (Inventory Management System) "delta"/update file for automated export/import to the three IMS databases (MCC-H, TsUP, Baikonur).

Shuttle		
Processing		Status
News		
Daily		Mission
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ISS		
Weekly		Status
Weekly		Science
Daily	On-Orbit	Status
Daily	Crew	Timeline
Soyuz		Progress
ISS News ATV		

Both crewmembers had another 90 minutes today for reviewing the timeline of the next U.S. spacewalk, EVA-4, scheduled for 11/7. Afterwards (~1:55pm EDT), they tagged up with ground specialists at MCC-Houston to discuss specifics. There will be two more EVA timeline reviews, on 11/1 and 11/4. [The spacewalk, from the "Quest" Airlock (A/L) in EMU (Extravehicular Mobility Unit) suits, is estimated to last 5h 25m. Primary objectives: installation of an external video camera assembly (CP9 ETVCG, External TV Camera Group) on a stanchion on the P1 segment (lower outboard), and the removal and subsequent jettisoning/throwing of the FPP (Floating Potential Probe) with its solar arrays and extended probes from the top of the Z1 truss (portside), it in retrograde direction (about 30 deg zenith and 10 deg port of the ISS minus X-axis) with a velocity of at least 0.15 m/s, while the station is in XVV TEA attitude. There are also three get-ahead tasks, if time permits: retrieval of the S1-1 RJMC (Rotary Joint Motor Controller), removal & replacement of an RPCM (Remote Power Controller Module on the MT (Mobile Transporter), and installation of a clamp from the MISSE 4 (Materials on the ISS Experiment #4) on the A/L starboard endcone zenith/aft handrail.]

The crew again had one hour each set aside on today's schedule for ISS familiarization and adaptation, to help in adjusting to their new surroundings and activities. [This "free" session has become a valuable standard requirement for new station occupants for the first two weeks.]

Bill and Valery completed their regular 2.5-hr. physical exercise program on the CEVIS cycle ergometer, TVIS treadmill, RED resistive machine and VELO bike with bungee cord load trainer. [Valery's daily protocol prescribes a strict four-day microcycle exercise with 1.5 hr on the treadmill and one hour on VELO plus load trainer (today: Day 2 of the first set).]

Later, McArthur transferred the TVIS treadmill and RED exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of his RED workout, followed by their erasure on the HRM storage medium (done six times a week).

At ~9:15am EDT, the crew engaged in a TV (downlink only) PAO/educational teleconference with a group of German exchange students touring TsUP with MAI (Moscow Aviation Institute) professors, organized and led by Ralf Heckel and Yvonne Blaese from the City of Leipzig (in the former East Germany).

Russian investigation of the aborted ISS reboost of 10/18 continues. According to Moscow, it appears that four (out of eight) attitude control system thrusters of the Progress 19 failed, causing shutdown of the remaining jets by the SM GNC (guidance, navigation & control) system. There is no issue with ISS attitude control at present.

Yesterday's R&R (removal & replacement) of the thermal replaceable pump panel (PAS) in the Docking Compartment, part of DC-1's thermal control system (SOTR), was successfully completed by Valery Tokarev. [As a minor anomaly, the ground had to activate the DC-1 main program in the laptop via S-band in order for the FE to be able to turn off the old PAS. In addition, there were some clearance issues with the tools used at the worksite.]

The software reload of the IBM 760XD currently used as MEC by the Science Officer yesterday was successful.

The Elektron remains off line. Troubleshooting will continue tomorrow and Saturday, in two stages: testing of the system under various power modes, and attempting to push a possible air bubble in the backup micropump through, using an external flush tank.

Prior to the aborted reboost on 10/18, ISS state vectors had been sent to the TDRSS (Tracking and Data Relay Satellite System) assuming a successful reboost. Without the full reboost, these vectors were incorrect. Houston ground teams worked with Goddard and White Sands to uplink new TDRSS vectors. After the issue was resolved, S-band was swapped to string 1 to support P6 2B1 battery reconditioning per the timeline.

Reconditioning of nickel-hydrogen (NiH) battery of the P6 solar array continued today nominally. [NiH batteries can develop and display "loss of memory" (of their state of charge), resulting in a temporary decline in capacity. This loss can be periodically erased by cycling all cells by fully discharging and recharging them (reconditioning). Ground teams are executing and continuously monitoring this activity, and no actions are required of the crew. This activity is scheduled to continue through next Tuesday, 10/25.]

Viewing opportunities for Hurricane Wilma were uplinked to the ISS crew, for using the Lab ETVCG (external TV camera group).

Today's CEO (crew earth observations) photo targets, limited in the current XPOP attitude by flight rule constraints on the use of the Lab nadir/science window, which is available for only ~1/4 of each orbit when not facing forward (in ram), were Puerto Rico, Caribbean Sea (weather has cleared over Puerto Rico, providing an opportunity for context photography of the island. These images are useful for location of higher resolution nadir images of other targets such as reefs and long-term ecological monitoring sites), Amazon River Delta, South America (Dynamic Event. Weather and lighting conditions were predicted to be ideal for photography of the Amazon River delta. Looking to the left of track for the delta itself; water and landforms should be visible in sharp contrast due to sunglint. These images are useful for mapping small waterways and changes to delta and island morphology), and Hurricane Wilma, Caribbean Sea (lighting conditions were becoming less favorable, but the crew should still have had an opportunity to capture this rapidly strengthening storm. Looking to the left of track near the Straits of Yucatan for cloud banding and the storm eye).

To date, over 177,000 of CEO images have been taken in the first five years of the ISS.

CEO photography can be viewed and studied at the websites:

- <http://eol.jsc.nasa.gov>
- <http://earthobservatory.nasa.gov>

- <http://earthobservatory.nasa.gov/Study/AstronautPhotography/>

See also the website "Space Station Challenge" at:

- <http://voyager.cet.edu/iss/>

To view the latest photos taken by the expedition 12 crew visit:

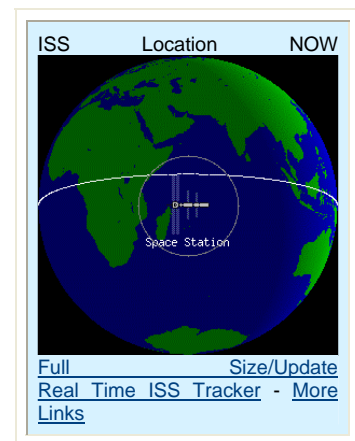
- <http://spaceflight.nasa.gov/gallery/images/station/crew-12/ndxpage1.html> at NASA's Human Spaceflight website.

Expedition 12 Flight Crew Plans can be found at <http://spaceflight.nasa.gov/station/timelines/>

Previous NASA ISS On-orbit Status Reports can be found [here](#). Previous NASA Space Station Status Reports can be found [here](#). Previous NASA Space Shuttle Processing Status Reports can be found [here](#). A collection of all of these reports and other materials relating to Return to Flight for the Space Shuttle fleet can be found [here](#).

ISS Orbit (as of this morning, 8:13am EDT [= epoch]):

- Mean altitude -- 347.0 km
- Apogee height -- 347.8 km
- Perigee height -- 346.3 km
- Period -- 91.48 min.
- Inclination (to Equator) -- 51.64 deg
- Eccentricity -- 0.0001144
- Solar Beta Angle -- 25.0 deg (magnitude increasing)
- Orbits per 24-hr. day -- 15.74
- Mean altitude loss in last 24 hours -- 85 m
- Revolutions since FGB/Zarya launch (Nov. 98) -- 39540



Upcoming Events (all times EDT):

- TBD -- ISS Reboost (two burns, to set up phasing for Progress 20P launch & circularize;)
- 10/27/05 – EVA-04 Dry Run
- 11/07/05 -- EVA-4 (U.S.)
- 11/18/05 -- Soyuz TMA-7/11S relocation (from DC-1 to FGB nadir port)
- 12/20/05 - Progress M-54/19P undocking & reentry
- 12/21/05 - Progress M-55/20P launch
- 12/23/05 -- Progress M-55/20P docking
- 01/09/06 -- 100 days for Expedition 12.

ISS Altitude History

Apogee height -- Mean Altitude -- Perigee height

