

STS-107

JSC MER Daily Reports

STS-107

LAUNCH REPORT

016:18:00 G.m.t.

The STS-107 mission was launched at 016:15:38:59.994 G.m.t. on January 16, 2003. The primary payload is the Spacehab Research double module that is accommodating a variety of multi-discipline payloads for science and research. The countdown was satisfactory with no unplanned holds, and the ascent was nominal with no problems identified.

An orbital maneuvering subsystem (OMS) assist maneuver was performed following Solid Rocket Booster (SRB) separation. The maneuver was initiated at 016:15:41:16.736 G.m.t. (00:00:02:16.742 MET) and was 102.2 seconds in duration. The orbital maneuvering subsystem (OMS) performed satisfactorily throughout the maneuver.

The OMS 2 maneuver was performed at 016:16:20:23.8 G.m.t. (0,0:00:57:01.8 MET). The OMS performed satisfactorily throughout the maneuver.

The payload bay doors were opened as planned at 016:17:36:01 G.m.t.(00: 01:58:01 MET). All voltages were nominal and the motors opened the doors in nominal dual-motor time.

/s/ Don L. McCormack 016:18:00 Gmt

Don L. McCormack, Jr.
STS-107 Lead MER Manager

STS-107

FIRST DAILY REPORT

017:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. Two Orbiter issues that have arisen in the first 20 hours of the mission are discussed in this report. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

During the pre-launch/post-insertion time period, AC2 phase B exhibited sluggish current increase during motor operation on three motors. The first occurrence of the sluggish performance was noted at T-31 seconds, and the second and third occurrences were noted during the post-insertion activities. AC2 phases A and C would increase to their expected values, but phase B would increase only to about half of expected value, then recover to the expected value within about a second. The affected motors are: vent doors 8 and 9, Ku-band deploy motor 2, and port payload bay door open motor 2. There was no impact to motor drive times. There is no common circuit breaker/motor control assembly. All other motor signatures analyzed were nominal, some of which are powered from the same circuit breaker/motor control assemblies as the affected motors.

During Spacehab activation, the crew reported that transmissions from the Orbiter on the intercommunications (ICOM) B loop were not being heard in the Spacehab module. Communications on the ICOM A loop were satisfactory. This loss of redundancy should not affect the continuing mission operations.

/s/Don L. McCormack, Jr. 017:12:16 G.m.t.

Don L. McCormack, Jr.

STS-107 Lead MER Manager

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SECOND DAILY REPORT

018:13:00 G.m.t.

The STS-107 mission is progressing nominally and-all Orbiter subsystems are performing satisfactorily. One Orbiter issue has arisen in the previous 24 hours and it is discussed' in this report. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

During performance of the oxygen (O2) tank current-level detector checkout, it was noted that the O2 tank 7 heater A1 and AZ 'on' discretes did not come on. This checkout procedure calls for the tank heaters to be turned on manually and then verifying that the current-limiting sensor turns off the heater. Main bus current verified that the O2 tank 7 A heaters did not come on. Subsequently, the crew was asked to enable the O2 tank 7 A heaters in the AUTO mode to determine if the heaters would operate in that mode. The 'on' discretes were received and a full cycle of the A heaters were observed; thus verifying satisfactory operation in the AUTO mode. There is no mission impact.

At approximately 81 seconds mission elapsed time (MET), a large light-colored piece of debris was seen to originate from an area near the ET/Orbiter forward attach bipod. The debris appeared to move outboard and then fall aft along the left side of the Orbiter fuselage, striking the leading edge of the left wing. The strike appears to have occurred on or relatively close to the wing glove near the Orbiter fuselage. After striking the left wing the debris broke into a spray of white-colored particles that fell aft along the underside of the Orbiter left wing. The spray of particles was last seen near the left Solid Rocket Booster (SRB) exhaust plume. Further screening of the high speed and high-resolution long-range tracking films that may show more detail of this event will begin this morning.

/s/ Don L. McCormack Jr. 018:12:50 Gmt

Don L. McCormack, Jr.
STS-107 Lead MER Manager

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THIRD DAILY REPORT

019:13:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. Two Orbiter issues have arisen in the previous 24 hours and these are discussed in this report. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

The crew reported that on one of the 70mm Hasselblad cameras, the motor drive binds or jams up after approximately three exposures. The crew changed the camera-body batteries, motor-drive batteries, and the film magazine. However, the motor drive still jammed. Manual advance of the film worked nominally. The film magazine was attached to a different 70mm Hasselblad camera assembly and it worked fine. The remaining 70mm Hasselblad is being used and further troubleshooting is planned.

The crew experienced problems when attempting to accomplish the fuel cell monitoring system (FCMS) data take. The crew reported that an error message was received on the Windecom Payload and General Support Computer (PGSC) indicating that the Windecom connection could not be made. The crew rebooted the PGSC and retried the data take with the same results. The crew verified the PGSC was configured correctly and then replaced the FCMS cable with a backup cable. With the backup cable installed, the FCMS data take was completed successfully.

/s/ Don L. McCormack 019:12:54 Gmt

Don L. McCormack, Jr.
STS-107 Lead MER Manager

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FOURTH .DAILY REPORT

020:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. No Orbiter issues have been reported in the previous 24 hours. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

Regarding the debris hit on the left wing leading edge discussed in the Second Daily Report, JSC image analysis personnel have completed their review of the high-speed and high-resolution long-range tracking films. Comparison views of what can be seen of the strike area immediately before and after the event were examined for indications of damage to the wing. The resolution on the films and videos is insufficient to see individual tiles. However, no indications of larger scale damage were noted as indicated by the lack of changes in the brightness of the port lower wing surface.

/s/Don L. McCormack 020:11:51 G.m.t.

Don L. McCormack, Jr.

STS-107 Lead MER Manager

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FIFTH DAILY REPORT

021:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. One Orbiter issue has been reported in the previous 24 hours and is discussed in this report. The Orbiter consumables remaining are above the levels' required for completion of the planned mission.

The crew reported that the DSR20 video tape recorder (VTR) tapes were not incrementing and an error code "C32" was displayed on the front of the VTR. The crew worked the photo/television (TV) malfunction procedure for this error message. This ejected the micro-tape that was in the VTR. Power cycles of VTR and digital television (DTV) system were performed with no effect. A visual inspection and cleaning of the VTR was performed; however, the VTR would not accept tapes and place the tapes into the correct configuration inside the VTR. Standard-sized tapes were also rejected. Ground testing has been able to recreate this problem by failing parts of the tape transport. The workaround will be to use a V10 recorder to record the payload video and a Camcorder for playback.

/s/Don L. McCormack, Jr. 021:11:52 G.m.t.

Don L. McCormack, Jr.

STS-107 Lead MER Manager

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SIXTH-DAILY-REPORT

022:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. One Orbiter issue has been reported in the previous 24 hours and is discussed in this report. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

One item that is currently being investigated is the Space Shuttle Main Engine (SSME) 3 liquid hydrogen (LH2) pre valve (PV6) open indicator "A" that initially failed to the off state at 016:17:25 G.m.t (00:01:46 MET). Four additional data dropouts of this same measurement have been observed in the last five days. The measurement in question is provided to the general purpose computer (GPC) via multiplexeridemultiplexer (MDM) flight aft (FA) 4 Card 08 Channel 00. Review of all measurements routed through the same MDM card and .channel revealed four liquid oxygen (L02) Pogo Valve Open indications that had also failed to the off state. Of the nine measurements that indicated a failed off state, only one L02 and one LH2 indication occurred at the exact same time. The investigation; of the cause of these indications is underway.

/s/ David S. Moyer for 022:12:57 Gmt

Don L. McCormack, Jr.
STS-107 Lead MER Manager

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SEVENTH DAILY REPORT

023:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. No Orbiter issues have been reported in the previous 24 hours. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

/s/ David S. Moyer for 023:12:46 Gmt

Don L. McCormack, Jr.
STS-107 Lead MER Manager

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EIGHTH-DAILY REPORT

024:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. No Orbiter issues have been reported in the previous 24 hours. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

/s/David S. Moyer for 024:11:58 G.m.t.

Don L. McCormack, Jr.

STS-107 Lead MER Manager

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NINTH DAILY REPORT

025:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. One Orbiter issue has been reported in the previous 24 hours. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

A second 70mm Hasselblad camera has experienced a series of motor-drive jams similar to the problems experienced earlier in the flight with the other 70mm Hasselblad camera. Initial troubleshooting was unsuccessful, but the problem was cleared by replacement of the batteries.

Further review has been conducted of the Space Shuttle Main Engine (SSME) 3 liquid hydrogen (LH2) pre-vent valve (PVS) open indicator "A" that was reported in the Sixth Daily Report. Additional data evaluation revealed multiple data dropouts in various Orbiter systems. A data integrity evaluation was performed which determined that all of the observed dropouts are actually data hits. There are no Orbiter anomalies associated with this issue, and the issue has been closed as an explained condition.

/s/ David S. Moyer for 025:12:49 Gmt

Don L. McCormack, Jr.
STS-107 Lead MER Manager

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TENTH-DAILY REPORT

026:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. No Orbiter issues have been reported in the previous 24 hours. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

/s/ Don L. McCormack Jr. 026:12:53 G.m.t.

Don L. McCormack, Jr.

STS-107 Lead MER Manager

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ELEVENTH DAILY REPORT

027:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. No Orbiter issues have been reported in the previous 24 hours. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

/s/Don L. McCormack, Jr. 027:11:55 G.m.t.

Don L. McCormack, Jr.

STS-107 Lead MER Manager

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TWELFTH-DAILY REPORT

028:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. No Orbiter issues have been reported in the previous 24 hours. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

Regarding the debris hit on the left wing last discussed in the Fourth Daily Report; systems integration personnel performed a debris trajectory analysis to estimate the debris impact conditions and locations. This analysis was performed utilizing the reported observations from the ascent video and film. It was assumed that the debris was foam from the external tank. Based on the results of the trajectory analysis, an impact analysis was performed to assess the potential damage to the tile and reinforced carbon carbon (RCC). The impact analysis indicates the potential for a large damage area to the tile. Damage to the RCC should be limited to coating only and, have no mission impact. Additionally, thermal analyses were performed for different locations and damage conditions. The damage conditions included one tile missing down to the densified layer of the tile and multiple tiles missing over an area of about 7 in by 30 in. These thermal analyses indicate possible localized structural damage but no burn-through, and no safety of flight issue.

/s/Don L. McCormack, Jr. 028:12:51 G.m.t.

Don L. McCormack, Jr.
STS-107 Lead MER Manager

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THIRTEENTH DAILY REPORT

029:12:00 G.m.t.

The STS-1 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. No Orbiter issues have been reported in the previous 24 hours. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

/s/ Kenneth L. Brown for 029:12:42 Gmt

Don L. McCormack, Jr.
STS-107 Lead MER Manager

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FOURTEENTH DAILY REPORT

030:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. No Orbiter issues have been reported in the previous 24 hours. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

In reference to the intercommunications (ICOM) B problem discussed in the First Daily Report, the crew was asked to troubleshoot the problem by reconfiguring the ICOM system to ICOM B and performing a communications check. The crew reported that ICOM B worked satisfactorily and that the earlier problem was probably caused by a configuration error.

Don L. McCormack, Jr.
STS-107 Lead MER Manager

STS-107

FIFTEENTH DAILY REPORT

31:12:00 G.m.t.

The STS-107 mission is progressing nominally and all Orbiter subsystems are performing satisfactorily. One Orbiter issue has been reported in the previous 24 hours and is discussed in this report. The Orbiter flight control system (FCS) checkout and reaction control system (RCS) hot-fire test have been completed in preparation for tomorrow morning's landing. The Orbiter consumables remaining are above the levels required for completion of the planned mission.

The FCS checkout was performed satisfactorily using auxiliary power unit (APU) 1 to support the checkout with a start time of 031:10:41:19 G.m.t. (014:19:02:19 MET). The run time was 5 minutes, 27 seconds, and 16 pounds of fuel were used during the APU 1 operation. The total run time was too short to require spray cooling from the water spray boiler (WSB). The FCS, APU, and hydraulics systems performance was nominal.

Following FCS checkout, the RCS hot-fire was performed nominally. The hot-fire began at 031:11:48 G.m.t. (14:20:09 MET) and ended at 031:11:56 G.m.t. (14:20:17 MET). All thrusters were fired at least once for a duration of at least 240-milliseconds. A review of thruster chamber-pressure data confirmed that all of the thruster firings were satisfactory.

Contact A of the forward digital autopilot (DAP) auto pushbutton switch has been deselected by redundancy management (RM). A switch tease, which has been observed in the past on switches of this type, is suspected to be the cause of the deselection. The anomaly was not immediately seen since it occurred while in a Spacehab-dedicated downlist format. The failed measurement was observed after switching to the normal on-orbit format at 030:12:10 G.m.t. (13:20:31 MET). A review of the data indicates that when the forward DAP auto push button switch was used at 029:20:28 G.m.t. (13:04:49 MET), contact A did not close. This same signature was seen on the subsequent use of this switch at 029:21:32 G.m.t. (13:05:53 MET). Prior to and following these occurrences, the forward DAP auto push button switch performed nominally every time it was used. Contact A remains deselected and no mission impact is expected.

The payload heat exchanger and total flow rates for the Spacehab water loop have been steadily decreasing throughout the mission. It has also been noted that the Spacehab water pump outlet pressure is decreasing. Pump 2 was used early in the mission and at approximately 018:13:00 G.m.t. (01:21:21 MET), the switch to pump 1 was made. Postlanding troubleshooting will be performed on the Orbiter side of the interface to determine if Orbiter hardware either caused the problem or had in any way been impacted by the problem. This hardware consists of the payload heat exchanger and the water lines leading to and from the interface panel.

/s/ Don L. McCormack Jr. 031:13:13 G.m.t.

Don McCormack, Jr.
STS-107 Lead MER Manager