NASA

SECTION 26
January 9, 2003

Flight Crew Operations Directorate

STS-107 Flight Readiness Review

NASA
AND THE SUBSEQUENT SHUTTLE FERRY OPERATIONS
OPERATIONS IS READY TO SUPPORT THE STS-107 MISSION

Pending completion of planned work, flight crew
completed certification and are current.
Completed certification and maintenance and all pilots have

All required support aircraft are current in

personnel are trained and certified for flight.

ST-S-107 crew and mission control support

To launch,

No unplanned open work or known constraints

Review actions, or CORR Exceptions,
No open DCR certifications, previous readiness

Review on December 2, 2002.
Flight crew operations level III flight readiness

<table>
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<tr>
<th>Name</th>
<th>Robert D. Cabana</th>
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NASA

Space Center
Johnson
SITE OR TRANSPORTATION OF EMCC PERSONNEL/EQUIPMENT

IF NECESSARY, NASA 931 IS AVAILABLE, IF REQUIRED FOR CREW RETURN FROM TAL

IF NECESSARY, NASA 931 WILL BE USED AS FERRY PATHFINDER.

IF NECESSARY, SCA NASA 911 WILL SUPPORT FERRY OPERATIONS.

AT KSC AND LAUNCH/LANDING WEATHER SUPPORT.

ST.5 NASA 945 AND 947 WILL SUPPORT PRELAUNCH CRYO TRAINING.

Name: Robert D. Cardona
Date: January 9, 2003

Readiness Review
STS-107 Flight

Johnson Space Center
Flight Readiness Statement

Crew Certification

Page: 4
Date: January 9, 2003
Name: Robert D. Cabana

Readiness Review
STS-107 Flight

United Space Alliance
APM Flight Operations
Charles A. Knarr

Director, Space and Life Sciences
Jeffrey R. Davis, MD

Operations (Training)
Acting Director, Mission
Jon C. Harpod

NASA Johnson Space Center
CERTIFICATION AND ARE CURRENT
FLIGHT CREW AND MAINTENANCE PERSONNEL HAVE COMPLETED
ALL AIRCRAFT ARE CURRENT IN INSPECTION AND MAINTENANCE AND ALL

FLIGHT READINESS STATEMENT
AIRCRAFT AND CREW

Page: 3
Date: January 9, 2003
Name: Robert D. Cabana

Readiness Review
STS-107 Flight

N I S I

Center
Space
Johnson
Space and Life Sciences Directorate
Flight Readiness Review
STS-107

Date: January 9, 2003

S. L. Pool
Space and Life Sciences Agenda

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<td>Space and Life Sciences Directorate</td>
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- Readiness Statement
- STS-107 Radiation Protection
- Radiation and Dosimetry Support
- Open Items and In-Flight Anomalies (IFAS)
- Crew Health
Steve Hart, M.D.
Smith Johnston, M.D.

STS-107 Deputy Crew Surgeon
STS-107 Crew Surgeon

* Applicable Flight Rules are in place
* All Crew Physicians will be completed prior to Flight

Crew Health

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</table>
STS-107 Radiation and Dosimetry Support

STS-107 Radiation: STS-107 Flight Specific Precautions

Within Acceptable Limits

Space Radiation: No open SSP, IFAs, or constraints

The L-15 sample met all specifications for water quality.

Shuttle Water Quality: L-15 day sample was collected on 1/3/03.

Exercise Countermeasures are in place

- L-3 day Space Weather Analyses
- Crew Physcials
- Open items for STS-107
- All remaining open work is planned and scheduled

STS-107 Open Items and In-Fight Anomalies (IFAS)

Date: January 9, 2003

S. L. Pool

STS-107 Flight Readiness Review
Space and Life Sciences Directorate
There are no constraints to proceeding with the planned Flight STS-107 pending completion of scheduled open work.

Certification of Flight Readiness Statement
**Space Weather Forecast**

- BepiColombo/FO-2 BONES (32) -- CA-45 => 0.13 µCi!
- Operatinal TEC (1) -- CM-244 => 1.0 µCi!
- Operatinal TEC (4) -- CM-244 => 2.00 µCi!
- Spacelab 1 Fire detectors -- Spacelab (4) => 6.12 µCi!
- Orbiter Fire detectors (all flight) -- orbiter (18) => 6.12 µCi!
- Onboard Radioactivity (experient name (# sources) -- Isotope -- activity)

**STS-107 Flight Specific Information**

- Daily Average Exposure: 111 mrem/day (37 mrem)
- Mission Exposure: 7 mrem/day (19 mrem/day)
- Nominal mission (15 d 22 hr 11 m) IY crew exposure projection

**Radiation Analyses and Dosimetry Support Backup Charts**

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<td>Space and Life Sciences Directorate</td>
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</table>
January 9, 2003
STS-107 Flight Readiness Review
**Agenda**

**Flight Readiness Statement**
- Requirements Waiver
- System Integration TMR
  - Boeing Integration
  - USA Program Integration
- Launch Commit Criteria
- Payload In-Flight Anomalies
- Orbital Debris Status
- Payload & System Safety
- Key Program Considerations
- Payload Overview
- Program Integration - Flight Manager
Payload Overview

Presented by Vanessa Ellebre

Date: 01/09/03

RAMBO - DOD Sponsored
• Low Power Transceiver (LPT)
• Space Experiment Module (SEM)
• Solar Constant Experiment-3 (SOLCON-3)
• Critical Viscosity of Xenon-2 (CVX-2)
• Shuttle Ozone Limb Soundings Experiment (SOLSE-2)
• FreeStar - 6 Earth, Space, & Microgravity Experiments
• NASA Code U Sponsored
• NASA ISS Risk Mitigation Experiment
• European Space Agency
• Commercial (SpaceHab, Inc. customers)
• SpaceHab Complement - 30 Microgravity, Space, and Life Sciences Payloads

International Science/Research Mission

Space Shuttle Program Integration
Rack Layout of Experiments

Space Shuttle Program Integration

NASA Johnson Space Center, Houston, Texas

Presented: Vanessa Ellebe

Page 9

Date: 07/09/03
(Prime and back-up) landing sites

Early payload retrieval available starting at launch +48 hours

1.5-minute hold is 10 minutes (40 minutes for ISS flights)

Launch window 2.5 hrs (crew on back constraint)

13 payload LCC's; 3 safety and 10 mission success

(April 17, 1998)

First Extended Duration Orbiter (EDO) Mission since STS-90

First Flight Items

6-hour Scrub/Turnaround

96-hour Scrub/Turnaround

Two Launch Attempts; Must Refurbish Module Payloads

Dual Shift; 16 day mission; 39° Inclination

Key Program Considerations

NASA Johnson Space Center, Houston, Texas

Space Shuttle Program Integration
PSRP approval received 1/8/03

PSRP analysis

Approved at January 7 Special PRCB, pending completion of

No payload integration issues

No crew activity required

Late addition of 6 passive sample canisters (previously flown hardware) to BRIC Middelkirk locker per Code U Request

BRIC Sample Canisters

Signature: Vanessa Ellebre

NASA Johnson Space Center, Houston, Texas

Space Shuttle Program Integration

Space Shuttle Program
No Non-compliance Reports (NCR's)

Payload Safety Review Process - Complete

Verification 2: Standard open work for late load items

Verification 1: Complete

Toxicology Process

Integrated Experiment Hazards Assessment - Complete
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<tbody>
<tr>
<td>01/09/03</td>
<td>16</td>
<td>Rod Wallace</td>
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</tbody>
</table>

### Requirements Waiver

Systems Integration

**Waiver approved (Change Request 50504525AD) for STS-107:**


- For STS-107 is necessary.

- Previously approved waiver; 50504525AB, for STS-107 has expired—a waiver

- WB

- For STS-113

- Failure at T-0" was dispositioned with mission-specific flight rationale

- STS-112 in-flight anomaly, IF NASA STS-112-K-01, "Ground PIC System A"

**Hazard Report INRG-164 update will be submitted prior to 30 days before:**

- Extends the STS-113 waiver for one more flight

- Failed to meet requirements of updates to Hazard Reports due prior to 30 days before FRK

**RCB**

- Anomaly investigation has been completed – results scheduled to 1/16/03

- Path A of SRB hold down posts pyros, and ETF vent Arm System pyros failed:

**Reasons:**

- Items 1 & 2 in-flight anomaly, IF NASA STS-112-K-01, "Ground PIC System A"
OF THE DEFINED OPEN WORK AND NOTED EXCEPTION
SPACE SHUTTLE INTEGRATION IS READY FOR FLIGHT, PENDING COMPLETION
THIS CERTIFIES THAT ALL MISSION REQUIREMENTS HAVE BEEN MET AND

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<th>01/09/03</th>
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Space Shuttle Program
NASA Johnson Space Center, Houston, Texas

STS-107 Flight Readiness Statement

BOEING HUMAN SPACE FLIGHT &
SPACE SHUTTLE INTEGRATION
UNITED SPACE ALLIANCE

R. N. Richards, Program Director
H. N. Hammond, Assoc. Program Mgr

R. L. Segert, Manager
A. M. Larsen, Manager

R. J. Wallace, Manager
L. D. Austin, Jr., Manager

R. R. Geller, for:
S/ R. Kunkel for:
S/ A. M. Larsen
S/ R. Harrison for:
S/ L. Miller for:
S/ A. M. Segert

12/18/02
12/18/02
12/18/02
12/18/02
12/18/02
12/18/02
12/18/02
12/18/02
12/18/02
No Issues
No Issues
No Issues
No Issues

Vanessa Ellebe

Boeing Integration
USA Program Integration
Launch Commit Criteria
Payload In-Flight Anomalies
Orbital Debris Status
Program Integration - Flight Manager

Agenda

01/09/03
Presenter

NASA Johnson Space Center, Houston, Texas
Space Shuttle Program Integration
Payload Summary

Presenter: Vanessa Ellebre

NASA Johnson Space Center, Houston, Texas

Space Shuttle Program Integration

Space Shuttle Program

Student Experiment Module (SEM)
Biological Research in Canisters (BRIC)
Cratering and Response of Planetary Surfaces (Biotube/MFA)
Fundamental Rodent Experiments Supporting Health-2 (FRESH-2)
Sleep
Microbial Physiology Flight Experiment (MPFE)
Director Demonstration System (DD) (BDS-05)
Biox
BioPack

Phyloscience and Biotechnology 4 (P4BA)
European Research in Space and Terrestrial Osteoporosis (ERISTO)
Osteopontin Experiment in Orbit (OSTEO)
Closed Equilibrium Biological Aquatic System (CEBAS)
Advanced Respiratory Monitoring System (ARMs)

Biology, Physiology, and Biomedical
<table>
<thead>
<tr>
<th>Payload Summary (Cont.)</th>
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<tbody>
<tr>
<td><strong>• Critical Viscosity of Xenon-2 (CVX-2)</strong></td>
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<tr>
<td><strong>• Shuttle Ozone Limb Soundning Experiment (SOLSE-02)</strong></td>
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<tr>
<td><strong>• Solar Constant Experiment-3 (SOLCON-3)</strong></td>
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<tr>
<td><strong>• Mediterranean Dust Experiment (MIDEX)</strong></td>
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<tr>
<td><strong>• Mechanics of Granular Materials (MGM)</strong></td>
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<tr>
<td><strong>• Combustion Module 2 (CM2)</strong></td>
</tr>
<tr>
<td><strong>• Facility for Adsorption and Surface Tension (FAST)</strong></td>
</tr>
<tr>
<td><strong>• Physical, Earth, and Space Sciences</strong></td>
</tr>
</tbody>
</table>

**Presenter:** Vanessa Ellerbe

**NASA Johnson Space Center, Houston, Texas**

**Space Shuttle Program Integration**

**Space Shuttle Program**
Space Product and Technology Development

Payload Summary (Concl)

Space Shuttle Program

Miniature Satellite Threat Reporting System (MSTRS)
Combined Macromolecular Protein Crystal Growth (CMPCG)
Low Power Transceiver (LPT)

Presented
Vanessa Ellerbe
Date
01/09/03
Average number of expected window replacements = 2.1

<table>
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<tr>
<th>N/A</th>
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<tr>
<td>1 in 61</td>
<td>1 in 315</td>
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<tr>
<td>1 in 200</td>
<td>1 in 370</td>
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Guideline Risk

Radiator Tube Penetration

Critical Penetration

Criteria

- Orbital Debris / Micrometeoroid Risk is Acceptable

<table>
<thead>
<tr>
<th>Date</th>
<th>Vanessa Ellebre</th>
<th>STS-107 Orbital Debris Status</th>
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NASA Johnson Space Center, Houston, Texas
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<tr>
<th>Customer from NASA/SC console</th>
<th>Mission Success</th>
<th>CEWP Fluid Pressure Anomaly</th>
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<tbody>
<tr>
<td>1-6 hrs to 3-1 sec</td>
<td>Mission Success</td>
<td>CEWP Fluid Pressure Anomaly</td>
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<tr>
<td>1-6 hrs to 1-6 sec</td>
<td>CEWP Accumulator Fill Anomaly</td>
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<tr>
<td>1-6 hrs to 1-5 min</td>
<td>Mission Success</td>
<td>CEWP Wet Leak Pressure Anomaly</td>
</tr>
<tr>
<td>1-6 hrs to 1-5 min</td>
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**Spacehab LCC**

STS-107 Minimum Equipment List (MEL) Mission Dependent (LCN 1100)

Launch Commit Criteria for STS-107

Approved Payload

NASA Johnson Space Center, Houston, Texas

Space Shuttle Program Integration

Page 7 of 63
Completion Date: 12/06/02

- Address Multiple Failure modes.
- Modify procedures for RV Nozzle Temperature controller violations to
  - Nozzle, Alternate Product H2O line and H2O Relief Nozzle Temperatures.
- Update of Instrumentation functionally requirements for H2O Relief

FCP RV Nozzle Heater Control Anomaly (LCN 1110)

Approved LCNS Continued

STS-107

Approved Launch Commit Criteria for

NASA Johnson Space Center, Houston, Texas

Space Shuttle Program Integration

SPACE SHUTTLE PROGRAM
Approved LCNs Continued

- APU Scrub Beyond Go/No Go (LCN 1082)
- Scrub of the APU section of the LCC
- Completion Date: 12/12/02

- New Requirements for ET/ORB Propellant Leak Visual Monitoring (LCN 1109)
- Creates new ICE-04 SSID requirements for visual monitoring of cryogenic propellant leakage at critical locations.
- Deletes existing requirement in HAZ-12 to visually monitor ET/Orbiter disconnect for cryogenic leakage (now contained in new ICE-04).
- Completion Date: 12/16/02
Program Integration Is Ready to Support Flight

- Lightweight external tank (LWT) required mission-specific analyses to complete program certification (reference next page)
- Payload bay clearance assessment
- Reconfiguration / installation of Payload Integration Hardware
- Documentation of vehicle and cargo requirements
- Mission-specific analyses
- Verification of compliance with generally certified requirements

Completed tasks include:

- No issues identified, except for planned open work

All the systems and cargo integration flight preparation systems integration

Date 01/09/03 Page 10
Preparer Bob White
Certification Completed - No Constraints to Flight

- GO2 Ullage Pressure ICD exceedance cleared by ET Project ICD waiver approved
- Integrated MPS pressurization analysis with Block II
- Thermal analysis for O-ring TAL and 2-second mated coast
- Launch probability with Ops High-9 target
- RTLS ET separation with 2-second mated coast extension

Completed Successfully

STS-107 mission specific analyses with LWT have been successfully performed.

Mission Specific analyses from post-PE generic certification activities and therefore required.

Due to a limited number of LWTs in the inventory, the LWT was excluded.

VII. Section 8.0

Approved via PROCDE 59.233CH & 59.2189A and documented in NTS 08209 Volume 4.

PE) Certification Activity

The Light Weight Tank was included in the Performance Enhancement.

Systems Integration

Date: 01/09/03
Presenter: Bob White

Space Shuttle Program Integration

NASA JSC Houston, Texas

Space Shuttle Program Integration
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**System Integration**

**Cargo Integration**

Last Updated: 12/04/02