

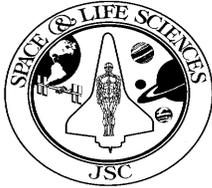
**Space and Life Sciences Directorate
Flight Readiness Review
STS-110**

C. L. Fischer

Date: March 26, 2002

**STS-110
Flight Readiness Review
Space and Life Sciences Directorate**





**Space and Life Sciences Directorate
Flight Readiness Review
STS-110**

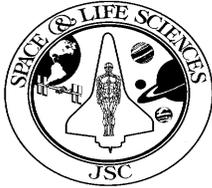
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Space and Life Sciences Mission Activities

- **Crew Health**
- **DSO's**
- **Open Items and In-flight Anomalies**
- **STS-110 EVA Pre-Breathe Considerations**
- **Radiation and Dosimetry Support**
 - **STS-110 Radiation Prediction**
- **Readiness Statement**

SLSD has no constraints to the STS-110 launch



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Crew Health

- **All Crew Physicals will be completed prior to flight**
 - **Applicable flight rules are in place**

STS-110 Crew Surgeon

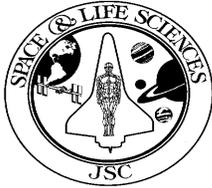
Phil Stepaniak, M.D.

STS-110 Deputy Crew Surgeon

Jim Locke, M.D.

ISS Exp 4 Crew Surgeon

Chris Flynn, M.D.



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STS-110 DSO's

The following SLSD DSO's have been manifested or scheduled for STS-110

Inflight

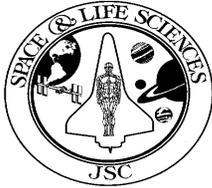
DSO 493: Monitoring Latent Virus Reactivation and Shedding in Astronauts (2/7)

Pre/Postflight Only

DSO 498: Space Flight and Immune Function (7/7)

DSO 500: Space Flight-Induced Reactivation of Latent Epstein-Barr Virus (3/7)

DSO 503S: Test of Midodrine as a Countermeasure Against Postflight Orthostatic Hypotension (1/7)



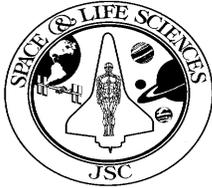
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STS-110 Open Items and Inflight Anomalies (IFA's)

- **All remaining open work is planned and scheduled**
 - **Open items for STS-110**
 - **Crew Physicals**
 - **L-3 day Space Weather Analysis**
- **No open SSP IFA's or constraints**
- **Exercise Countermeasures are in place**
- **Work/Rest Cycle Considerations**
 - **Mission Objectives have resulted in violations to accepted crew work/rest requirements**
 - **Waivers have been approved for each violation**
- **Shuttle Water Quality is within specifications**



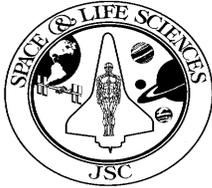
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STS-110 EVA Pre-Breathe Considerations

- **The four planned EVAs from the ISS Airlock will require use of the Exercise Pre-Breathe Protocol**
- **The Exercise Pre-Breathe Protocol requires operational medical hardware to meet these requirements (e.g. CEVIS, CSA-CP, HRM, and PHA).**
- **Failure(s) could prevent the successful performance of the Exercise Pre-Breathe Protocol; with default to the 4-hour In-Suit Pre-Breathe Protocol.**
- **Work-arounds for hardware failures are documented in the STS-110/ISS-8A Flight Rules Annex, section 13.**



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Radiation Analysis and Dosimetry Support

STS-110 Flight Specific Predictions

• Nominal mission (10 d 19 hr 30 m) crew exposure projection

- Mission Exposure 196.5 mrad (372.7 mrem)
- Daily Average Exposure: 18.2 mrad/day (34.4 mrem/day)

EVA EXPOSURES (additional skin exposure)

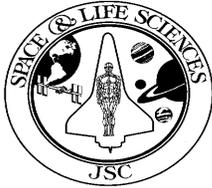
	<u>1 hour early</u>	<u>Nominal</u>	<u>1 Hour late</u>
EVA1 (start MET 002/17:46)	2 mrad/2 mrem	0.2 mrad/0.2 mrem	42 mrad/42 mrem
EVA2 (start MET 004/17:50)	7 mrad/8 mrem	47.7 mrad/47.7 mrem	47 mrad/47 mrem
EVA3 (start MET 005/17:49)	39 mrad/39 mrem	40.0 mrad/40.0 mrem	74 mrad/74 mrem
EVA4 (start MET 007/18:20)	44 mrad/44 mrem	53.3mrad/53.3 mrem	83 mrad/83 mrem

▪ Onboard Radioactivity (experiment name (# sources) – isotope – activity)

- Fire detectors (all flights) -- orbiter (9) -- Am-241 ==> 6.12 μ Ci
- Operational TEPC (1) -- Cm-244 ==> 1.0 μ C

• Worst case EVA additional skin exposure:

- 4 hr EVA 348 mrad/392 mrem
- 6.5 hr EVA 384 mrad/436 mrem



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Space Weather Activity Summary and Forecast

SPACE WEATHER ACTIVITY SUMMARY

- **Solar activity generally low, but has reached periods of high levels in the past 30 days (from 18 FEB 02).**
 - **Major solar activity**
 - **No X class (major) x-ray flare**
 - **Two solar particle events (>10 MeV, minimal additional exposure)**
 - **No major-severe geomagnetic storm (three hour) periods**
 - **28/30 days with x-ray flares, no affect on mission**
- **No mission impacts.**

SPACE WEATHER FORECAST

- **Any risk of additional exposure would be from solar events and trapped outer electron belt enhancements**



Certification of Flight Readiness Statement

The activities required to support Flight 8A/STS-110 have been accomplished except open work identified (Attachment 1). Space and Life Sciences Directorate (SLSD) is ready to support Flight 8A/STS-110.

There are no constraints to proceeding with the planned Flight 8A/STS-110 pending completion of scheduled open work.



**David R. Williams, M.D., Director
Space and Life Sciences Directorate**