

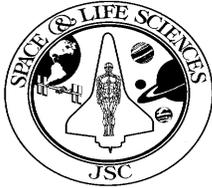
**Space and Life Sciences Directorate
Flight Readiness Review
STS-109**

C. L. Fischer

Date: February 14, 2002

**STS-109
Flight Readiness Review
Space and Life Sciences Directorate**





**Space and Life Sciences Directorate
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STS-109**

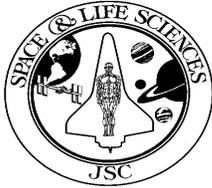
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Space and Life Sciences Mission Activities

- **Crew Health**
- **DSO's**
- **Open Items and In-flight Anomalies**
- **Radiation and Dosimetry Support**
 - **STS-109 Radiation Prediction**
- **Readiness Statement**

SLSD has no constraints to the STS-109 launch



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Crew Health

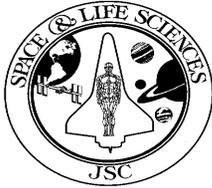
- **All Crew Physicals will be completed prior to flight**
 - Applicable flight rules are in place

Crew Surgeon

Smith Johnston, M.D.

Deputy Crew Surgeon

Rainer Effenhauser, M.D.



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STS-109 DSO's

The following SLSD DSO's have been manifested or scheduled for STS-109

Inflight

DSO 490: Bioavailability and Performance Effects of Promethazine During Space Flight, Protocol B (1/7)

DSO 493: Monitoring Latent Virus Reactivation and Shedding in Astronauts (5/7)

DSO 634: Sleep-Wake Actigraphy and Light Exposure During Space Flight (1/7)

Pre/Postflight Only

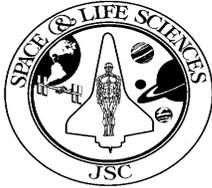
DSO 496: Individual Susceptibility to Post Spaceflight Orthostatic Intolerance (2/7)

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

DSO 500: Space Flight-Induced Reactivation of Latent Epstein-Barr Virus (5/7)

DSO 635: Spatial Reorientation Following Space Flight (1/7)

MR 001S: Operational Tilt Test (data from DSO 496)



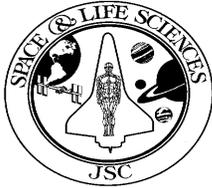
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STS-109 Open Items and Inflight Anomalies (IFA's)

- **All remaining open work is planned and scheduled**
 - Open items for STS-109**
 - **Crew Physicals**
 - **L-3 day Space Weather Analysis**
- **No open SSP IFA's or constraints**
- **Exercise Countermeasures are in place**
 - Shuttle Cycle Ergometer is operational**
- **Shuttle Water Quality is within specifications**



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Radiation Analysis and Dosimetry Support

STS-109 Flight Specific Predictions

- Nominal mission (10 d 22 hr 10 m) crew exposure projection
 - **Mission Exposure** 2475 mrad (3685 mrem)
 - **Daily Average Exposure:** 225 mrad/day (335 mrem/day)

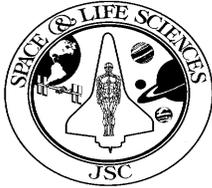
Shuttle Exposure History (through STS-104)	
Max:	4310 mrad
Min:	6 mrad
Avg:	232 mrad
Median:	131 mrad

EVA EXPOSURES (additional skin exposure)

- Additional exposure due to protons and electrons in SAA
- Note: Final EVA numbers will be assessed at L-3 days
- Early start maintains exposures ALARA

	1 Hr early	Nominal	1 Hr late start
EVA1 (start MET 002/19:07)	0 mrad/0 mrem	0 mrad/0 mrem	0 mrad/0 mrem
EVA2 (start MET 003/19:05)	0 mrad/0 mrem	0 mrad/0 mrem	0 mrad/0 mrem
EVA3 (start MET 004/18:05)	0 mrad/0 mrem	0 mrad/0 mrem	0 mrad/0 mrem
EVA4 (start MET 005/19:05)	0 mrad/0 mrem	1 mrad/1 mrem	1 mrad/2 mrem
EVA5 (start MET 006/19:05)	0 mrad/0 mrem	7 mrad/8 mrem	54 mrad/71 mrem

- Worst case EVA additional skin exposure:
 - 4 hr **354 mrad / 500 mrem**
 - 6.5 hr **404 mrad / 575 mrem**



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Space Weather Activity Summary and Forecast

SPACE WEATHER ACTIVITY SUMMARY (Dec 29 – Jan 29)

- **Solar activity has been Moderate in the past 30 days. One X class flare, 3 enhanced low energy proton levels events, and no severe geomagnetic storm periods have characterized the last 4 weeks.**
- **No mission impacts.**

SPACE WEATHER FORECAST

- **Risk of solar events is high due to Solar Max. Proton events can be expected during the period, however, they can not be predicted ahead of time.**
- **Low risk of additional exposure from solar particle events and trapped outer electron belt enhancements due to low inclination flight.**



Certification of Flight Readiness Statement

The activities required to support Flight STS-109 have been accomplished except open work identified (Attachment 1). Space and Life Sciences Directorate (SLSD) is ready to support Flight STS-109.

There are no constraints to proceeding with the planned Flight STS-109 pending completion of scheduled open work.

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