

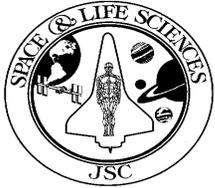
**Space and Life Sciences Directorate  
Flight Readiness Review  
STS-104/7A**

**C. L. Fischer**

**Date: June 28, 2001**

**STS-104/ISS-7A  
Flight Readiness Review  
Space and Life Sciences Directorate**





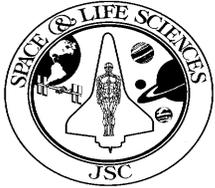
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**STS-104/ISS-7A Space and Life Sciences Activities**

- **STS-104 Crew Health**
- **STS-104 DSO's**
- **STS-104 Open Items and In-flight Anomalies**
- **Radiation and Dosimetry Support**
- **Increment 2 Status**
- **ISS EVA Prebreathe Protocols**
- **Readiness Statement**



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**STS-104 Crew Health**

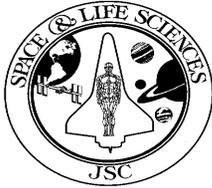
- **Crew ready for flight**
- **All Crew Physicals will be completed prior to flight**
  - **Applicable flight rules are in place**

**US Crew Surgeon**

**Joe Dervay, M.D.**

**US Deputy Flight Surgeon**

**J. Mike Duncan, M.D.**



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**STS-104 DSO's**

**The following SLSD DSO's have been manifested or scheduled  
for STS-104/ ISS 7A:**

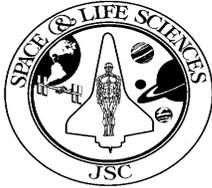
**DSO 493 – Monitoring Latent Virus Reactivation and Shedding in  
Astronauts**

**DSO 496 - Individual Susceptibility to Post-Spaceflight Orthostatic  
Intolerance (pre/postflight only)**

**DSO 498 - Spaceflight and Immune Function (pre/postflight only)**

**DSO 634 - Sleep-Wake Actigraphy and Light Exposure During Spaceflight**

**DSO 635 - Spatial Reorientation Following Spaceflight (pre/postflight only)**



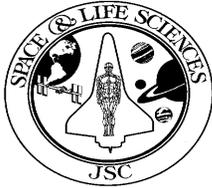
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**STS-104 Open Items and Inflight Anomalies (IFA's)**

- **All remaining open work is planned and scheduled**
- **No open SSP IFA's or constraints**



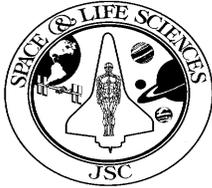
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**STS-104 RADIATION ANALYSIS & DOSIMETRY SUPPORT**

- **STS-104 FLIGHT SPECIFIC (July 12 – July 22)**
  - Nominal mission (10 d 20 hr) crew exposure projection (AP-8 SOLMAX MODEL/USGS70(EPOCH 70) & GCR Model, 5.6 mrad/d; Q=3.0])
  
  - Mission Exposure                      165 mrad                      (302 mrem)
  
  - Daily Average Exposure:      16 mrad/day                      (29 mrem/day)
  
  - Onboard Radioactivity (device (# sources) – isotope – activity)**
    - » Fire detectors (all flights) -- orbiter (9) -- Am-241 → 6.12  $\mu$ Ci
    - » Operational TEPC (1) -- Cs-244 → 1.0  $\mu$ Ci
  
  - No radiation related experiments/payloads on this flight



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## STS-104/7A RADIATION ANALYSIS & DOSIMETRY SUPPORT cont.

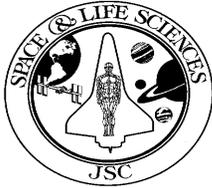
- **EVA EXPOSURES (additional skin exposure)**
  - Additional exposure due to protons in SAA and electrons in outer electron belt
  - Shuttle EVA1 (start MET 002/16:55)
    - Nominal **8 mrad/12 mrem**
    - 1 hr late start **38 mrad/38 mrem**
    - 1 hr early start **39 mrad/48 mrem**
    - 2 hr late start **63 mrad/63 mrem**
  - Shuttle EVA2 (start MET 005/17:00)
    - Nominal **.2 mrad/.2 mrem**
    - 1 hr late start **38 mrad/38 mrem**
    - 1 hr early start **3 mrad/6 mrem**
    - 2 hr late start **38 mrad/38 mrem**
  - ISS EVA3 (start MET 007/18:15)
    - Nominal **47 mrad/47 mrem**
    - 1 hr late start **68 mrad/68 mrem**
    - 1 hr early start **9 mrad/9 mrem**
    - 2 hr late start **91 mrad/91 mrem**

### CONTINGENCY EVA EXPOSURES (additional skin exposure)

- Worst case 6.5 EVA additional skin exposures:
  - 4 hr **303 mrad / 336 mrem** - **green** - preferred
  - 6.5 hr **431 mrad/ 528 mrem** - **yellow** - acceptable

### NOMINAL IVA EXPOSURES

- Daily **16 mrad / 29 mrem**



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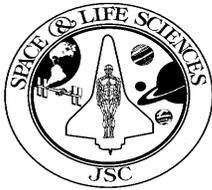
**Increment 2 Status**

**Treadmill Vibration Isolation System (TVIS)**

- **TVIS Operation: presently operational in passive mode.**
- **Additional backup to treadmill exercise is provided by the Contingency Exercise Surface (CES).**
- **Exercise capability on orbit is acceptable for the remainder of Increment 2.**
- **Plans in place to return TVIS to active mode for Increment 3.**
- **In case of contingency, a passive TVIS is acceptable for Increment 3.**

**Radiation exposure for Increment 2 (124 day nominal mission)**

- **1860 mrad/ 3720 mrem (3.72 rem)**
- **Daily Average Exposure 16 mrad/day (29 mrem/day)**
- **Additional Radiation Protection Items manifested on 7A (6 flat bricks, 8 corners)**



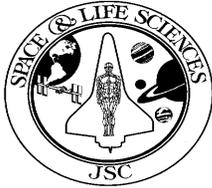
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**ISS EVA Prebreathe Protocols**

Risk Mitigation Category	Tasks	Status 7A	Comment
DCS Prevention	ISS prebreathe flight rules (2hr, Overnight Campout, 4 hr In suit)	Green	US and Russian Approval
	ISS 2 hr. prebreathe procedure	Green	Considered prime protocol by HQ MPB
	DCS cuff classification checklist	Green	Approved
	ISS 2 hr. prebreathe hardware	Green	CSA-CP certification complete
DCS Treatment On Orbit	DCS EVA MAL without BTA procedure upgrade	Green	Approved
	DCS EVA MAL with BTA procedure upgrades	Green	Approved
	Post in-suit treatment	Green	Approved
	BTA re-certification	Green	Approved
	Crew DCS self-evaluation training	Green	Approved
	STS and ISS CMO DCS training	Green	Approved
	STS and ISS flight control team training	Green	Approved
	DCS disposition and return-to-duty criteria	Green	Approved
	Terrestrial standard of hyperbaric care on-orbit		Not an ISS program requirement
DCS Treatment On Earth	STS emergency medical system	Green	CONUS and ELS within 12-hr. limit
	STS DCS emergency medical system	Green	CONUS and hyperbaric ELS sites evaluated



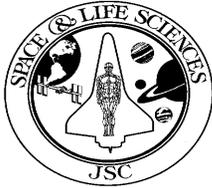
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**ISS 7A CEVIS Check Out Procedure**

- **Ground based, pre flight determination of each crew person's heart rate at 75%  $VO_2$  max.**
- **EVA crew person uses CEVIS to verify heart rate comparability with ground base data (acceptable variability is 20% of baseline).**
- **If comparability is verified, CEVIS is O.K. for EVA 2 hour prebreathe operations.**
- **If heart rate on CEVIS is not comparable, Shuttle ergometer will be used to check comparability.**
- **If Shuttle ergometer data is comparable to ground based data, pulse rate will be used to verify exercise work load on CEVIS.**
- **If CEVIS and Shuttle ergometer data are not comparable, another prebreathe protocol will be used.**



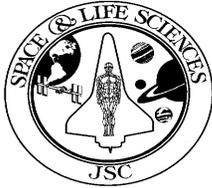
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**Increment 2 Status, concluded**

- **All prebreathe protocols (2 hr, 2 hr 20 min; 10-2 campout, 4 hr) have been medically reviewed and approved.**
- **The 2 hr 20 min protocol is the preferred option.**



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**Readiness Statement**

- **Space and Life Sciences Directorate is ready to support STS-104/ISS-7A.**