



# Space Shuttle Program (SSP)

## Summary of Waiver Review

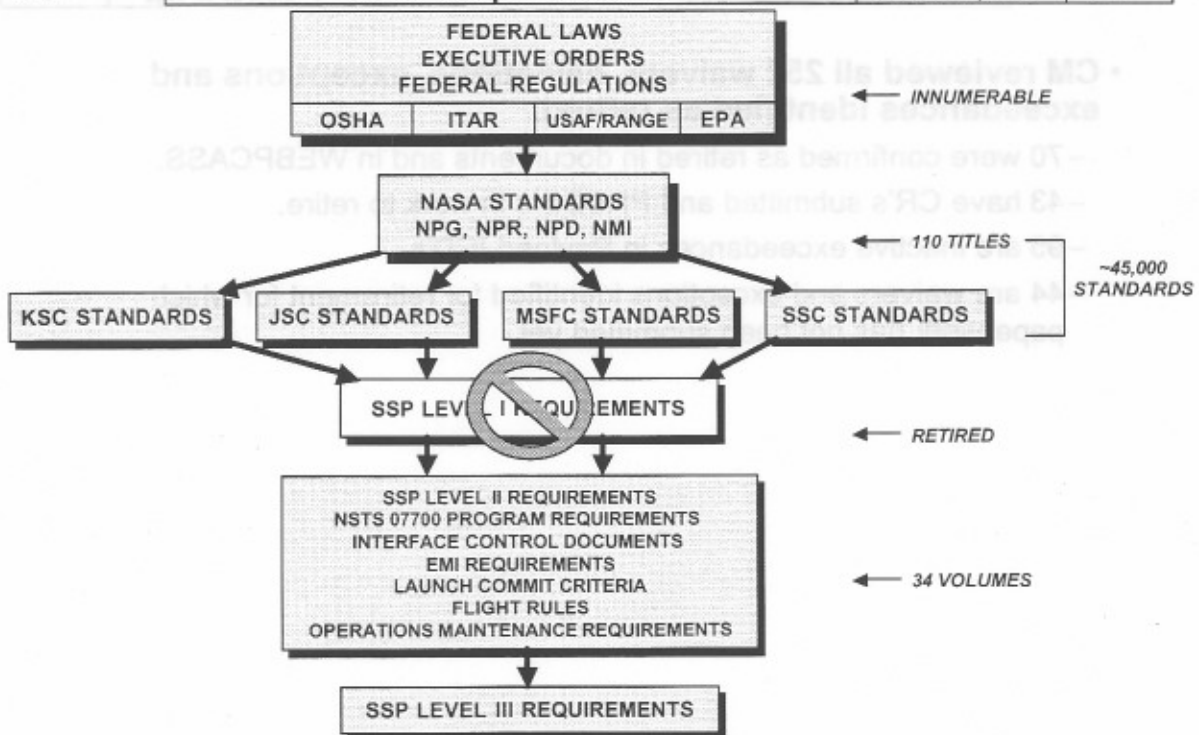
### STS-114 Flight Readiness Review

N. Wayne Hale, SSP Deputy Manager  
Gregory C. Johnson, Manager, Launch Integration  
June 29-30, 2005



### Origins of Standards and Requirements

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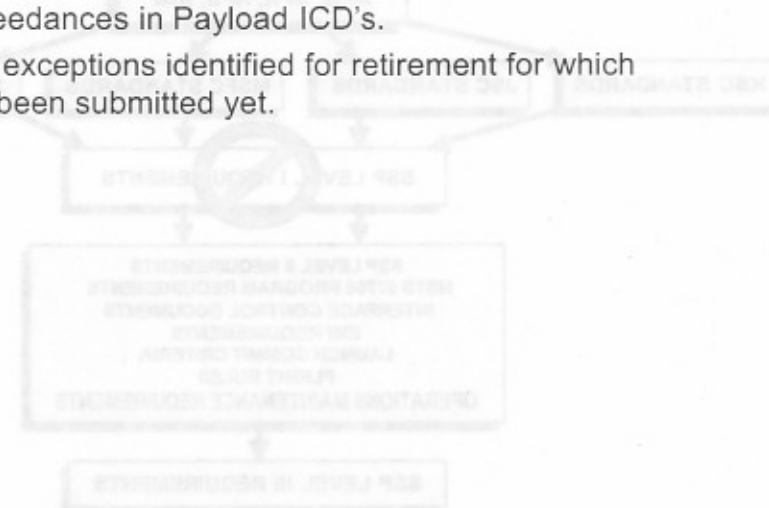
- Total pre STS-107 waivers/deviations/exceptions: 6467
  - Of this total, 5812 were CIL waivers (not included in review)
- The waiver review began with 655 waivers
- Of this total, 313 waivers were EMI (SL-E-0002) waivers which were reviewed by the Engineering Directorate
- As of 6/27/05, 342 waivers have been reviewed at the Daily PRCB
  - Retained: 81
  - Identified for retirement/inactive: 261

Gregory C. Johnson, Manager, Launch Integration  
 2005-06-29



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- **CM reviewed all 252 waivers, deviations, exceptions and exceedances identified as retired.**
  - 70 were confirmed as retired in documents and in WEBPCASS.
  - 43 have CR's submitted and PRCBD's in work to retire.
  - 95 are inactive exceedances in Payload ICD's.
  - 44 are waivers and exceptions identified for retirement for which paperwork has not been submitted yet.





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• **Waiver Retirements by Category:**

- 20 Requirement Change
- 17 Requirement Met
- 10 Hardware Redesign
- 29 Hardware No Longer in Service
- 4 Waivers retired and rewritten
- 15 Expired Effectivity
- 95 Inactive P/L ICD waivers
- 1 Equipment Certified



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• **Categories of Waivers Retained after Program Review:**

- Hardware/software not built to specification - 16
- Soldering requirements not met - 5
- Parts traceability (EEE/non-EEE) - 5
- Requirements changed - 8
- Platform clearance - 5
- Factor of Safety, GSE Structures - 2
- Requirement met via alternate method - 6
- Wiring/Electrical - 14
- Configuration waiver - 2
- Requirements cannot be met - 4
- Procurement specification violation - 2
- Government Source Inspection (GSI) missed - 3
- Lack of documentation - 3
- Certification - 1



<b>Waiver Review</b>		Presenter	W. Hale/G. Johnson
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- A total of 313 waivers are open EMI (SL-E-0002) waivers which were reviewed by the Engineering Directorate and the E3 Panel.
  - 201 waivers identified for retirement
  - 112 waivers recommended for retention, subsequent to the planned process change
- The EMI community is proposing a change to the SL-E-0002 document that would allow most of these waivers to be retired.



<b>Change to CIL Waiver Process</b>		Presenter	W. Hale/G. Johnson
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- CIL waiver evaluation by Program in 2004 resulted in the elimination of CIL waivers from Program documentation.
- Benchmark against other high-reliability organizations (e.g., ISS, DoD) found that CIL waivers were not used.
- PRCB determined that CIL waivers only duplicated the CIL retention rationale and added little value to Program risk management.
- Elimination of CIL waivers enhanced overall technical waiver process by not obscuring remainder of technical risks with well defined and controlled risks as captured in the CILs.



<b>Current Waiver Status</b>		Presenter <b>W. Hale/G. Johnson</b>
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- 51 new Program-issued waivers since STS-107



<b>RTF WAIVER/EXCEPTION REVIEW</b>		Presenter <b>W. Hale/G. Johnson</b>
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- 48 New RTF Waivers/Exceptions Approved
- 2 Waivers Pending Approval

Hardware/Software not built to specification - 4  
 Soldering requirements not met - 3  
 Requirement changed - 6  
 Factor of Safety, GSE Hardware - 5  
 Factor of Safety-Flight Hardware - 7  
 EMI - 1  
 Requirement met via alternate methods - 5  
 Configuration waiver - 1  
 Requirement cannot be met - 3  
 Government Source Inspection (GSI) missed - 1  
 Lack of proper documentation - 1  
 Uncertified GSE - 10  
 ESDS markings problems - 2  
 Other - 1



<b>Summary – Why Waivers Matter</b>		Presenter	W. Hale/G. Johnson
		Date	June 29-30, 2005

- If a departure from the requirements has occurred and it is impractical for whatever reason to return to the requirements, then it is imperative that good technical rationale for safety be understood.
- A consistent, rigorous program for creating, managing, and dispositioning waivers is critical for the Program to understand the risk it is accepting when deviating from requirements.
- In all, the total number of active, current waivers in the space shuttle program has been decreased by about 90% - from over 5,000 to less than 500.
- Unlike the previous large number, the smaller number of active waivers is one that program management can effectively review, periodically status, and provide resources to eliminate.
- The result is a better insight into the risk present in the Space Shuttle system



RTF WAIVER EXCEPTION REVIEW
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- 45 New RTF Waiver Exceptions Approved
- 2 Waivers Pending Approval
- Hardware/Software not built to specification - 4
- Soldering requirements not met - 3
- Requirement changed - 2
- Factor of Safety, GSE Hardware - 2
- Factor of Safety/Flight Hardware - 1
- EMI - 1
- Requirement not via alternate methods - 2
- Configuration waiver - 1
- Requirement cannot be met - 2
- Government source inspection (GSI) missed - 1
- Lack of proper documentation - 1
- Unclassified GSE - 10
- ESDS markings problems - 2
- Other - 1