



Endeavour STS-113

Space Shuttle Program

SSME Flight Readiness Review

October 31, 2002



Endeavour STS-113

Agenda

- **Major Components**
- **Engine Performance**
- **First Flight ECPs - None**
- **Material Review Reassessment**



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SSME Major Components

Engine	ME-1 / 2050 <i>Block II</i>	ME-2 / 2044 <i>Block II</i>	ME-3 / 2045 <i>Block II</i>
Last Hot-Fire	STS-111	STS-111	STS-110
Powerhead	6006	6010	6008
Main Injector	2032	4029	4026
MCC	6023	6007	6008
Nozzle	5007	2035	2031
Controller	F53	F59	F34
HPFTP	8017	8021R1	8022R1
LPFTP	6104	2133 (1)	6003
HPOTP	8025R1	8026 (1)	8023R2
LPOTP	2325	2229	4506

(1) Changes after last hot-fire.



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Predicted SSME Ignition Confirm Margins

Parameter	Margin Sigma		
	ME-1 (2050)	ME-2 (2044)	ME-3 (2045)
HPFTP Minimum Speed	4.0	3.7	3.9
Min/Max Ignition Pc	5.3	4.3	5.4
Antiflood Valve Min Open	23.8	26.0	24.7
HPFTP Max Turbine Temp	5.1	4.5	5.2
HPOTP Max Turbine Temp	5.9	6.0	9.1
HPOTP Min Turbine Temp	7.0	8.0	6.2
Preburner Max Purge Pressure	30.7	29.3	30.0
POGO GOX Min/Max Pressure	3.7	4.3	4.0



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Predicted SSME Performance at 104.5% P.L.

At Engine Start + 200 seconds

Parameter	ME-1 (2050)	ME-2 (2044)	ME-3 (2045)
	Sigma	Sigma	Sigma
HPFT Disch Temp A, Deg R	-0.6	0.0	-0.3
HPFT Disch Temp B, Deg R	-0.7	-1.1	-1.0
HPOT Disch Temp A, Deg R	-0.6	0.8	-2.0
HPOT Disch Temp B, Deg R	-0.5	0.6	^a [-2.1]
HEX Interface Temp, Deg R	-1.2	-0.1	-1.6
HPFTP Speed, rpm	-0.1	0.6	-0.1
LPFTP Speed, rpm	-0.8	1.2	-0.8
HPOTP Speed, rpm	0.2	-0.6	-0.4
LPOTP Speed, rpm	0.2	-0.3	0.6
OPOV Position, %	-0.3	0.1	-1.0
FPOV Position, %	-0.8	-0.2	-0.6
PBP Disch Pressure, psia	0.2	0.8	0.7
HPFTP Disch Pressure, psia	-0.6	0.9	-1.2
HPOTP Disch Pressure, psia	0.4	-0.4	-0.1
HPFTP U/N	8017	8021R1	8022R1
LPFTP U/N	6104	* 2133	6003
HPOTP U/N	8025R1	* 8026	8023R2
LPOTP U/N	2325	2229	4506

* Change from last flight / acceptance test

[] Exceeds database two sigma

^a Low HPFT efficiency; cool OPB; consistent with engine history



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Predicted Redline Margins at 104.5% P.L.

Parameter	Margin Sigma		
	ME-1 (2050)	ME-2 (2044)	ME-3 (2045)
HPFT Discharge Temp ChA, Deg R	7.2	6.7	7.2
HPFT Discharge Temp ChB, Deg R	7.4	7.8	7.5
HPOT Discharge Temp ChA, Deg R	7.8	6.9	8.9
HPOT Discharge Temp ChB, Deg R	9.0	8.2	10.3
HPOT Discharge Temp ChA, Deg R	5.5	4.4	4.4
HPOT Discharge Temp ChB, Deg R	5.7	4.7	4.2
HPOTP IMSL Purge Pr, psia	7.2	3.4	5.3
Low MCC Pc, psid			
Command-ChA Avg	22.8	21.5	20.5
Command-ChB Avg	25.7	24.6	23.6
FASCOS			
HPFTP	9.0	8.2	8.2
HPOTP	33.2	32.1	32.3



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Material Review and Problem Report Reassessment

- **All Material Reviews and Problem Reports Reassessed**
 - Encompasses entire part / component histories
 - Fabrication
 - Assembly
 - Test
 - Flight
 - Recycle
 - Verified proper dispositions in light of current program sensitivities, knowledge and experience

- **All dispositions evaluated and judged acceptable for flight**



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SSME Certification of Flight Readiness

- **CoFR Exceptions**
 - None



Endeavour STS-113

SSME Readiness Statement

- **The Endeavour Main Engines are in a ready condition for STS-113**

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