

SESSION VIII
INSTRUMENTATION TECHNOLOGY
OVERVIEW

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The objective of the Instrumentation Technology program is to advance the state of the art of instrumentation associated with the SSME to improve service life and performance by providing increased measurement capability.

There are two broad categories of instrumentation technology being sought in this program. The first category includes sensors and systems destined to be used in and on the operational engine either during operation or between operations. The purpose of these measurements is to supply information necessary for engine control and/or diagnostics throughout the life of the engine. The second category includes measurement systems and techniques whose application will be to engine component test stands and possibly to the test bed engine but probably never to an operational engine. The primary purpose of these measurements is to provide the detailed information necessary to verify computer models of the performance of the various engine subsystems.

The accompanying charts show all of the elements of this program along with the schedules to the extent they are now known. Those elements for which progress is reported herein are denoted by an arrow on the right.

INSTRUMENTATION
WORKING GROUP PLAN
-KEY EVENTS-

ELEMENTS	FISCAL YEARS										
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
J1. REUSABLE ENGINE MAINTENANCE & INSTRUMENTATION		DESIGN START	DESIGN REVIEW		DESIGN COMPLETE						←
J3. CRYOGENIC MASS FLOWMETER RESEARCH		TECHNIQUE STUDY	FLOW STAND MOD.			SSME MODEL		SSME TESTING			←
J4. NON-INTRUSIVE SPEED MEASUREMENT FOR TURBOPUMPS			STUDY METHOD			LABORATORY TESTING		SSME TESTING			←
J5. RESEARCH & DEVELOPMENT OF BEARING INSTRUMENTATION	METHOD SELECTION		CRYO-SENSOR	PROTOTYPE							
J6. POSITION SENSOR RESEARCH							PROTOTYPE				
J7. RESEARCH OF PRESSURE INSTRUMENTATION		STUDY METHOD	BREADBOARD	BREADBOARD			SSME TESTING		SSME TESTING		←
J9. SPECTRAL SCANNER FOR EXHAUST PLUME ANALYSIS					STUDY METHOD		BREADBOARD		PROTOTYPE		
J11. PREBURNER GAS TEMPERATURE MEASUREMENT		STUDY		METHOD RESEARCH				PROTOTYPE			←

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ELEMENT	FISCAL YEARS									
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
J19. DISPLACEMENT INSTRUMENTATION INVESTIGATION							DESIGN & TEST	FAB		
J20. NON-INTRUSIVE TORQUE METER SENSOR TECHNOLOGY						FEASIBILITY STUDY		FAB		
J21. STATIC/DYNAMIC HIGH TEMPERATURE PRESSURE TRANSDUCER						FEASIBILITY STUDY	DESIGN	FAB	TEST	
J22. TRIBO ELECTRIC MASS FLOW SENSOR						FEASIBILITY STUDY	DESIGN	FAB	TEST	
J23. EXO ELECTRON FATIGUE TESTER						FEASIBILITY STUDY	DESIGN	FAB	TEST	
J24. INOBTRUSIVE DIAGNOSTIC SYSTEM				DEFINITION		LDV SYSTEM	CARS		VERIFICATION	

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ELEMENTS	FISCAL YEARS									
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
J12. THIN FILM SENSORS FOR SPACE PROPULSION TECHNOLOGY				▽ SENSOR STUDY	△ EQUIPMENT ACQUISITION			SENSOR DEVELOPMENT		
J13. HEAT FLUX SENSORS CALIBRATOR				PROCUREMENT		▽ SYSTEM DELIVERY				
J14. OPTICAL FLOW MEASUREMENT						▽ EXPERIMENT VERIFICATION				
J15. OPTICAL STRAIN MEASUREMENT SYSTEM DEVELOPMENT						▽ ONE DIMENSIONAL SYSTEM		△ TWO DIMENSIONAL SYSTEM	△ APPLICATIONS	
J16. HIGH TEMPERATURE HEAT FLUX SENSORS						SENSOR FAB		▽ SENSOR AVAILABLE	△ SENSOR TESTING	
J17. HIGH TEMPERATURE/HIGH STRAIN GAGES					GAGE CONCEPT			▽ GAGE TESTING	△ SENSOR TESTING	
J18. TRANSIENT GAS TEMPERATURE PROBE								▽ DEVELOPMENT	△ DEMONSTRATION	

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