National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia
23665-5225

Mowery

NASA

Reply to Attn of 446

OCT 15 1986

TO: NASA Headquarters
Attn: RI/Director for Institutions

FROM: 103A/Deputy Director

SUBJECT: Summary Preliminary Langley Research Center FY'89 Major CoF Submittal

Enclosed are advance copies of the standardized formats of LaRC's FY'89 Preliminary Major CoF Submittal, as requested in your September 12, 1986, letter. LaRC is proposing that five Major CoF Projects be funded in FY'89:

1.	Construction of Supersonic Low-Disturbance Tunnel (1247D)	$ 5.2M
2.	Modifications to Upgrade Hypersonic Aerothermal Complex (1247, 1251, 1275)	9.4M
3.	Modifications for Electromagnetics Scattering Laboratory (1299)	16.2M
4.	Modifications to 4- By 7-Meter Low-Speed Tunnel for Aeroacoustic Research (1212C)	10.5M
5.	Modifications for Space Flight Experiment Development Facility (1250)	6.0M
		$47.3M

The first project is a high-priority carry over from FY'88. The second project complies with your September 12, 1986, emphasis on improving the reliability and productivity of those existing facilities which are of great programmatic interest. The third project, "Modifications to Upgrade Electromagnetics Scattering Laboratory (1299)", provides an exciting new opportunity for NASA. The remaining two projects provide new capability to allow LaRC to meet major Agency and National research objectives.

Copies of the package for the fifth project are also being sent to OSS and OSSA since this project also supports missions for these codes.

Paul F. Holloway

5 Enclosures

cc:
NASA - NX/B. J. McGarvey
NASA - NXF/F. X. Durso
NASA - NXF/A. L. Farrow
NASA - E/B. I. Edelson
NASA - S/A. J. Stofan
NASA - EPI/H. H. Ellis, Jr.
LeRC - 3-8/J. W. Gregory
ARC - 213/C. R. Castellano
101/General Files
106/Director
103/Director Assistant
117/W. D. Mace
118/C. R. Blankenship
116/R. V. Harris
107/R. R. Nunamaker
111/J. F. Stokes
113/J. F. Creedon
112/R. L. Swain
112/R. T. Wingate
112/J. R. Dinkins
436/J. E. Knemeyer
104/A. C. Massey
104/A. C. Fitzgerald
104/T. E. Caldwell
446/FPDO Files

KRC446/KRCredeur:jrn 10-15-86 (3467)

446/CRS KRC for CRS
MD
112/RLS 10/15/86

MODIFICATIONS TO UPGRADE HYPERSONIC FACILITIES COMPLEX

FY 1989 - LaRC

REQUIREMENT:

- ENSURE ADEQUATE FACILITIES FOR CONTINUING HYPERSONIC AERODYNAMIC AND AEROTHERMODYNAMIC RESEARCH CAPABILITY TO SUPPORT DEVELOPMENT OF NATION'S AEROSPACE VEHICLES (NASP, AOTV, TAV, BGV, SHUTTLE II)

WHY NOW:

- RENEWED INTEREST IN HYPERSONICS BECAUSE OF NEWLY INITIATED MAJOR PROGRAMS
- STEADY DECLINE IN NUMBER AND OPERATION OF NATIONAL HYPERSONIC WIND TUNNELS SINCE LATE 1960's
- ONLY NASA ACTIVE COMPLEX PERFORMING HYPERSONIC AERODYNAMIC AND AEROTHERMODYNAMIC RESEARCH ON ADVANCED AEROSPACE CONFIGURATIONS
- 25-YEAR-OLD AVERAGE AGE OF WIND TUNNELS IN COMPLEX
- IMPROVED FLOW QUALITY, RELIABILITY, PRODUCTIVITY, AND CAPABILITY TO PROVIDE UNINTERRUPTED HYPERSONIC TEST SUPPORT

DESCRIPTION:

- MODIFICATIONS FOR NEW TUNNEL NOZZLES, MODEL ACCESS AND SUPPORT SYSTEM, AND VACUUM SYSTEM
- REPLACEMENT/RENOVATION OF HEATERS/HEATER BUNDLES AND MODEL INJECTION SYSTEMS
- REHABILITATION OF FLOW CONTROL VALVES, PANELS, CONTROL ROOMS, AND REFRIGERATION SYSTEM
- INSTALLATION OF IN-LINE FILTERS

CONCEPTUAL STATUS:

- $76K PRELIMINARY ENGINEERING REPORT (PER) NEEDED FOR INCREASED VACUUM PUMPING CAPABILITY ($1.6M) AND TUNNEL MODIFICATIONS ($2.2M) PROPOSED SINCE 1984; PER ON REMAINING PROJECT COMPLETED 7/84

ESTIMATED COST: $9.6M

R&D FUNDING: NONE

O&M REQUIREMENTS:

CIVIL SERVICE	FTE	0
SUPPORT CONT.	MYE	0
UTILITY COSTS		$12K/YR
MAINT. COSTS		0

OCTOBER 10, 1986

BACK-UP INFORMATION

LaRC MODIFICATIONS TO UPGRADE HYPERSONICS FACILITIES COMPLEX

PRIOR BUDGET STATUS: SUBMITTED FY'87 WITH $2.7M PHASE I IN FY'87 AND $3.9M PHASE II IN FY'88

SCHEDULES:	BEGIN	END		BEGIN	END		BEGIN	END
REMAINING PER:	2Q FY'87	4Q FY'87	DESIGN:	2Q FY'88	1Q FY'89	CONST:	2Q FY'89	2Q FY'91

CRITICAL PROGRAMMATIC MILESTONES:

NASP, AOTV

ALTERNATIVES:

- DELAY NASP, AOTV, AND OTHER MAJOR HYPERSONICS PROGRAMS
- BUILD NEW FACILITIES AT MANY TIMES UPGRADE COST

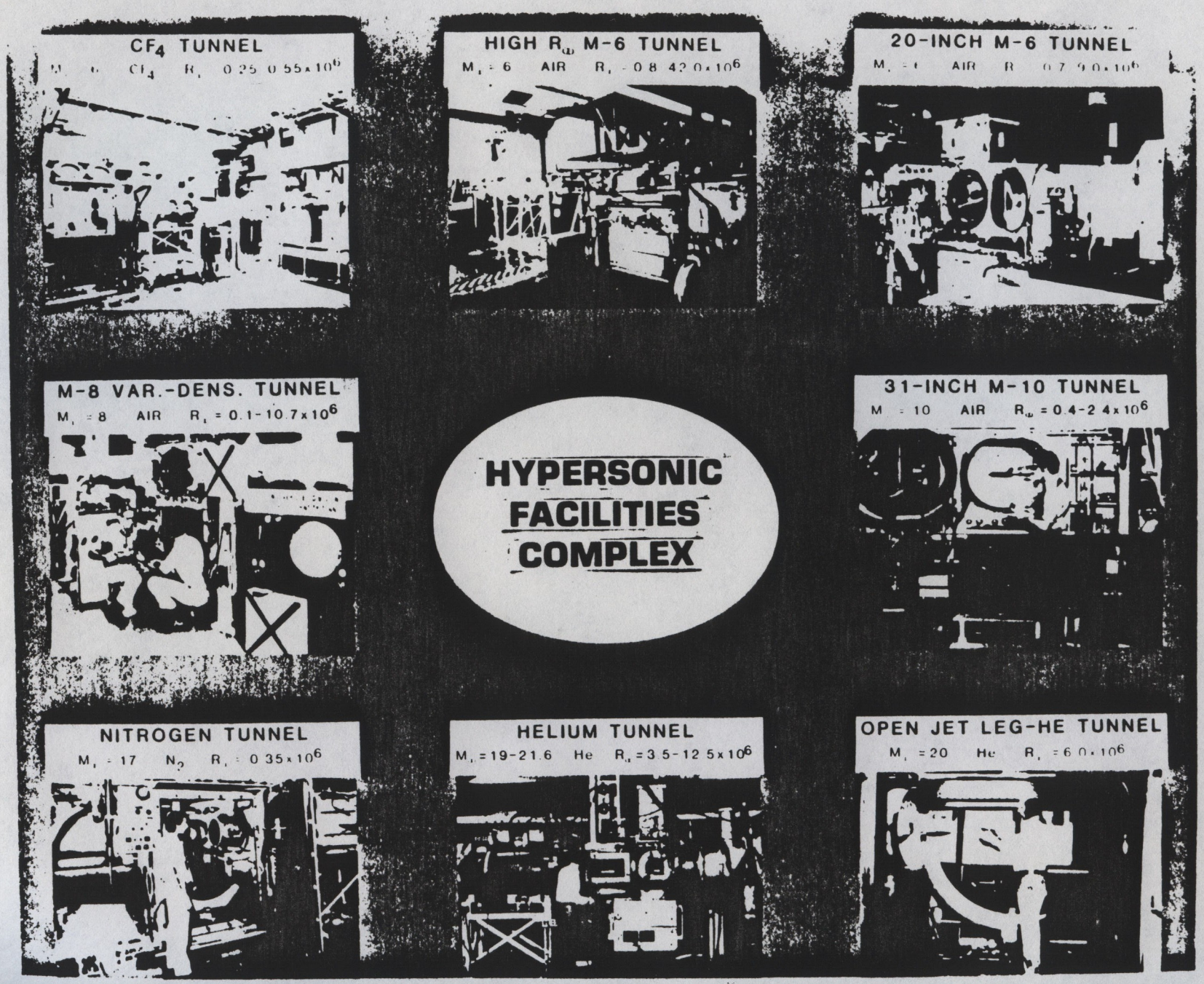
FUTURE REQUIREMENTS/FOLLOW-ON ACTIONS: NONE ANTICIPATED

CoF PROJECT MANAGER: J. E. COUTTS

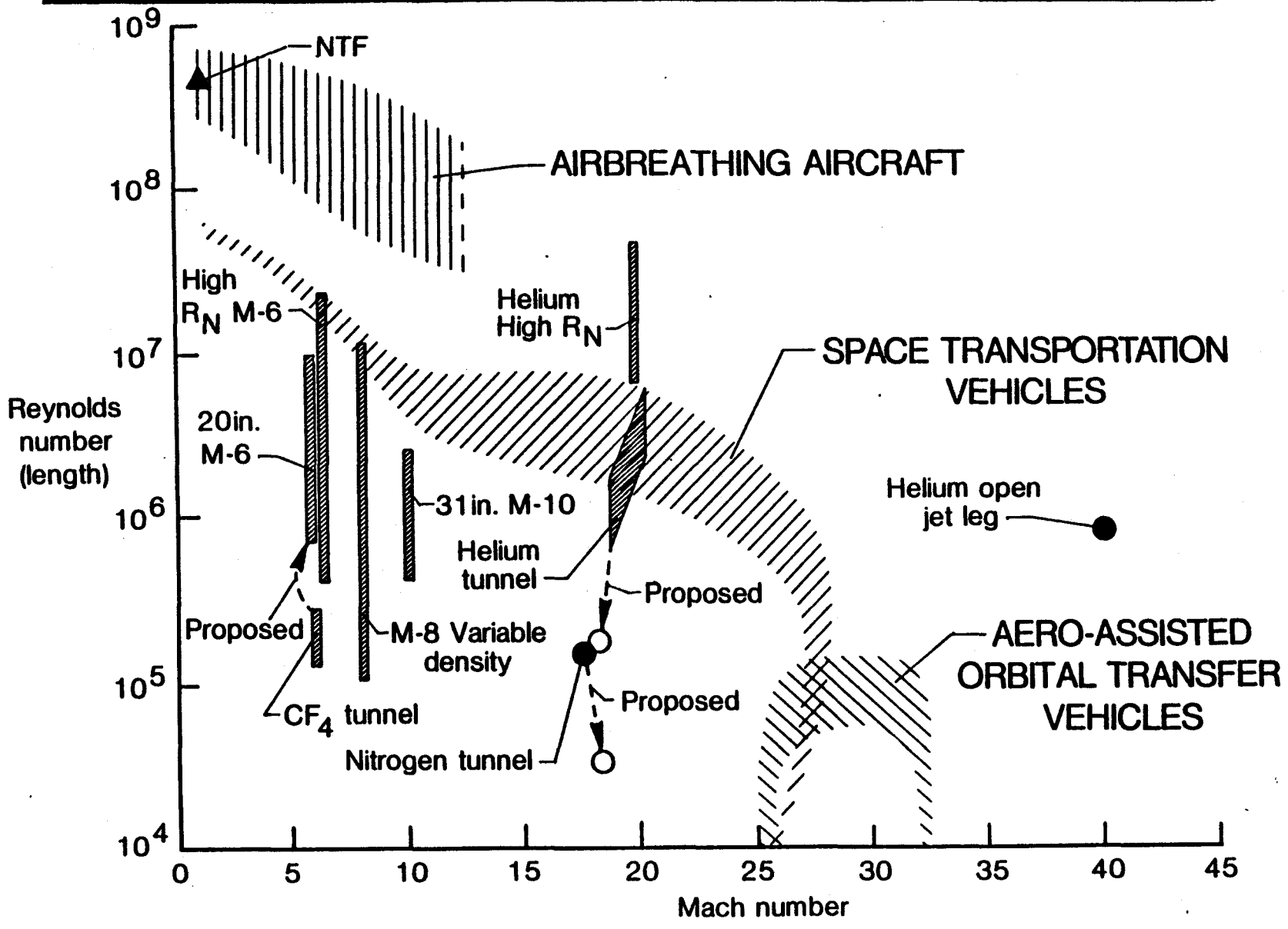
ADVOCATES/STATUS
- CENTER: C. L. W. EDWARDS
- HQS: R. A. GRAVES, JR.
- OTHER: NATIONAL AERO-SPACE PLANE, AIRFRAME CONTRACTORS, AIR FORCE

OCTOBER 5, 1986

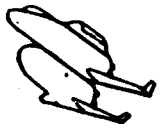
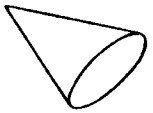
NASA
L-85-340


CF4 TUNNEL
M = 6 CF4 R = 0.25-0.55x10^6
HIGH R∞ M-6 TUNNEL
M = 6 AIR R = 0.8-42.0x10^6
20-INCH M-6 TUNNEL
M = 6 AIR R = 0.7-9.0x10^6
M-8 VAR.-DENS. TUNNEL
M = 8 AIR R = 0.1-10.7x10^6
HYPERSONIC FACILITIES COMPLEX
31-INCH M-10 TUNNEL
M = 10 AIR R∞ = 0.4-2.4x10^6
NITROGEN TUNNEL
M = 17 N2 R = 0.35x10^6
HELIUM TUNNEL
M = 19-21.6 He R = 3.5-12.5x10^6
OPEN JET LEG-HE TUNNEL
M = 20 He R = 6.0x10^6

HYPERSONIC FACILITIES COMPLEX CAPABILITY



SAMPLE TEST MATRIX
SUPPORTED BY LARC HFC

AOTV	 AFE/JSC	ARC BRAKE 	AMOOS/RAKED CYLINDER 	 BENT BICONIC	GRUMMAN DERIVATIVE 	 DEPLOYABLE GD/MMC	BOEING BALLUTES 
ADVANCED STS	 SHUTTLE II	CIRCULAR FUSELAGE SSTO 	BOEING - RASV 	 R.I. TAV	 IN-HOUSE GENERIC NASP	BOEING ROCKWELL CLASSIFIED CONTRACTOR NASP	CLASSIFIED DARPA BASELINE
BGV ERV SRV	 LARC ERV	CLASSIFIED SWERVE	 SRV PARAMETRICS	AFWAL MRRV 	 AFWAL BGV	CLASSIFIED GD - BGV	CLASSIFIED MMC - BGV
SHUTTLE	BASE DRAG 	 FUSELAGE HEATING	 REAL GAS BODY FLAP	 SEADS CALIBRATION	 RCS INTERACTION	ASCENT LOADS 	SEPARATION AERO 
CODE VERIFI-CATION	 HALIS ORBITER	ELLIPTIC CONE 	 AFE/JSC	ARC BRAKE 	NASP FOREBODIES 	CONTROL EFFECTIVENESS 	AIRBREATHING PROPULSION INTEGRATION