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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

RADM RICHARD H. TRULY, USN
ASSOCIATE ADMINISTRATOR
OFFICE OF SPACE FLIGHT

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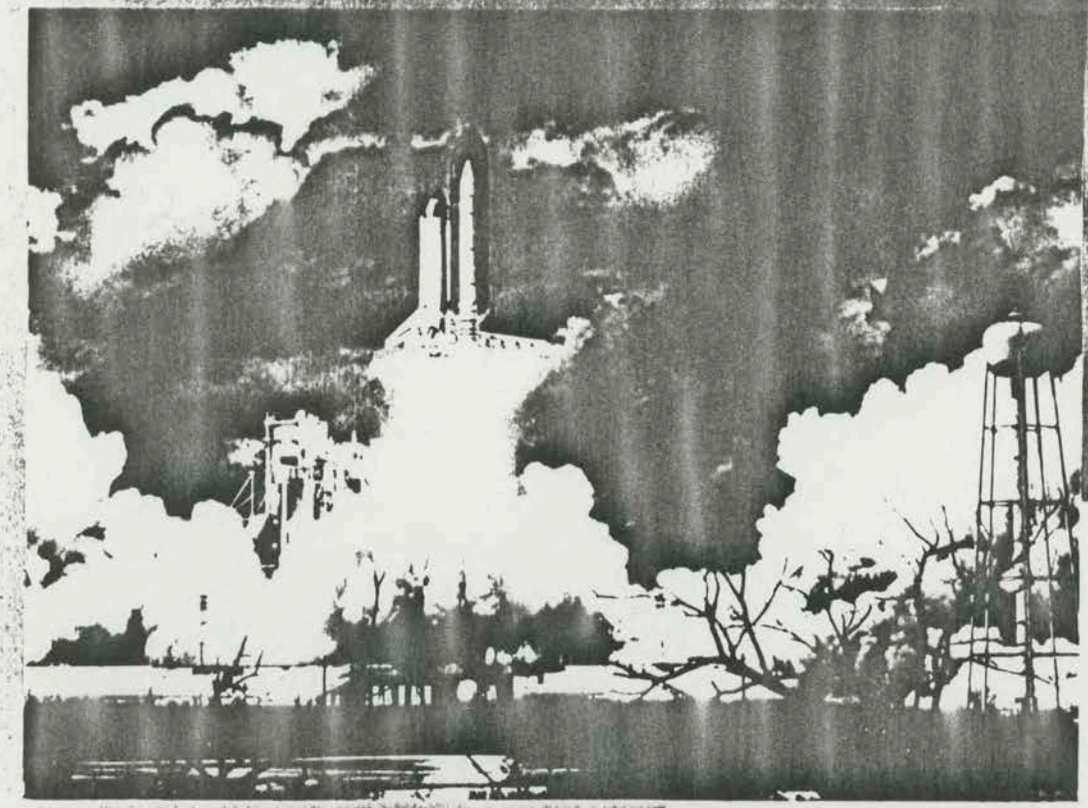
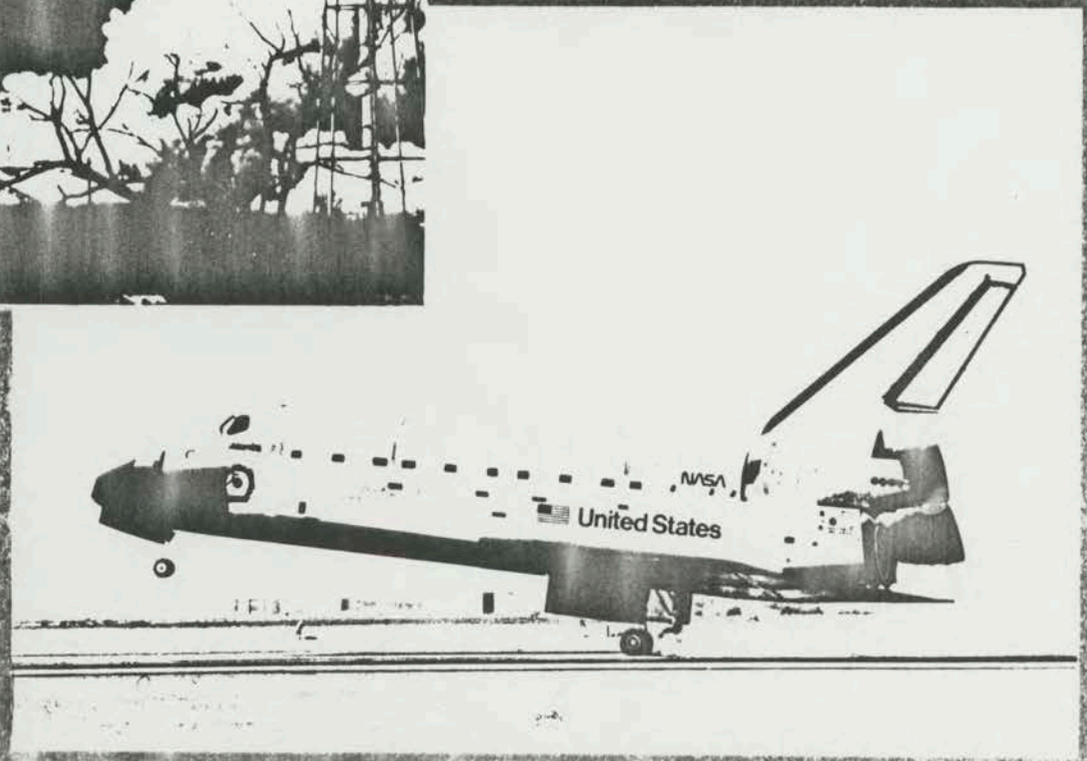


STS-26
DISCOVERY
September 29-October 2, 1988



STS-27
ATLANTIS
December 2-6, 1988

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NASA

1988: EIGHT FOR EIGHT

Launch Vehicle	Mission	Date
Delta	DOD-2	2/8
Scout	U.S./Italy	3/25
Scout	SOOS-3	4/25
Scout	NOVA-II	6/16
Scout	SOOS-4	8/25
Atlas	NOAA-H	9/24
Discovery	TDRS-C	9/29
Atlantis	DoD	12/2

ALL NASA LAUNCHES SCHEDULED FOR 1988 WERE SUCCESSFUL

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NASA

NATIONAL PRIORITIES

- Return safely to flight
- Maintain Space Station schedule
- Replace the Challenger
- Support a strong science/technology program
- Revitalize ELV's

A293.041

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NASA

STRATEGY FOR RETURN-TO-FLIGHT

- Improve Shuttle safety
  - Redesign solid rocket motor
  - Test Space Shuttle main engines
  - Devise crew escape system
  - Conduct hazard analysis/recertification
- Strengthen NASA organization
  - Establish central authority
  - Define more clearly responsibilities
  - Improve communications
- Increase safety awareness
  - Elevate Office of Safety, Reliability, Maintainability and Quality Assurance (SRM&QA)
  - Increase SRM&QA manpower
  - Establish FAA approach to safety reporting

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STS-26
DISCOVERY
Sept. 29-Oct. 3, 1988

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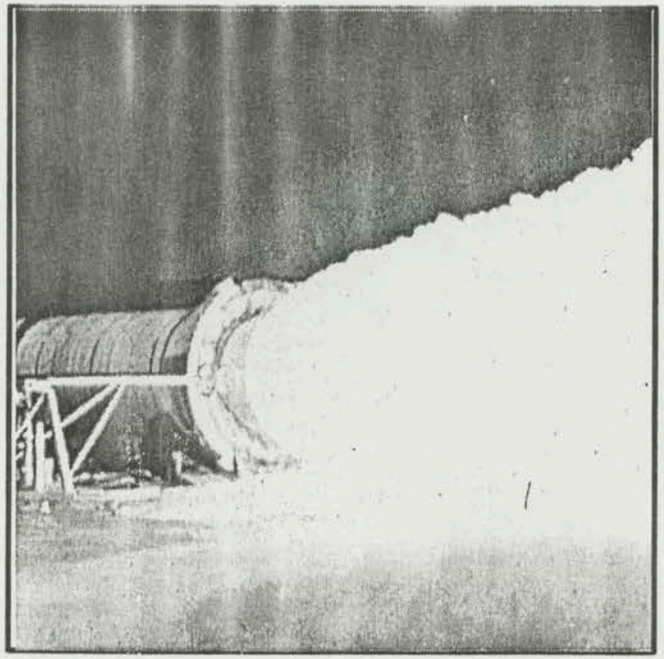
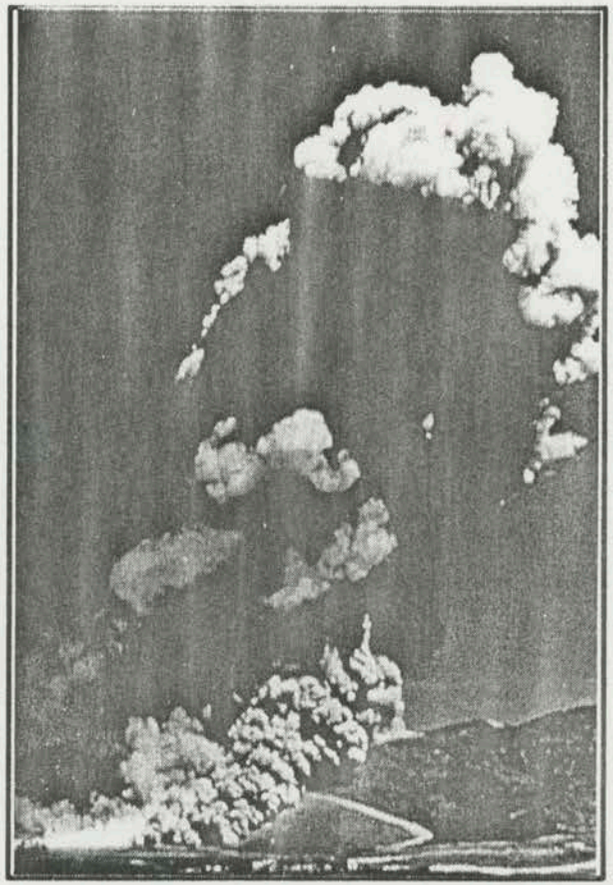
NASA

REDESIGNED SOLID ROCKET MOTOR TESTING





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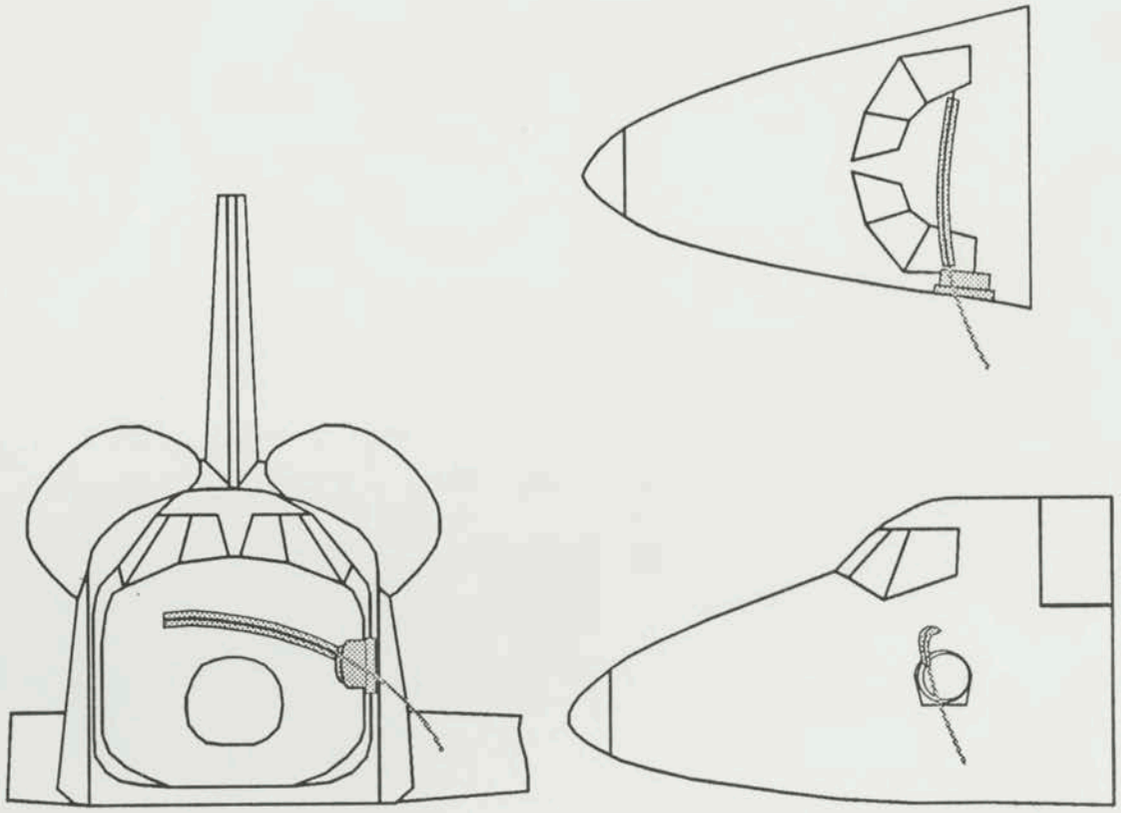
NASA

CREW ESCAPE POLE



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NASA

SBUV

RETURN TO SPACE

Flight	Orbiter	Payload	Commander	Date
STS-26	Discovery	TDRS-C	Frederick H. Hauck	Sept., 1988
STS-27	Atlantis	DoD	Robert L. Gibson	Dec., 1988
STS-29	Discovery	TDRS-D communications satellites #3	Michael A. Coats	March, 11-18 1989
STS-30	Atlantis	Magellan	David M. Walker	April, 28 1989
STS-28	Columbia	DoD	Brewster H. Shaw	July, 1 1989
STS-33	Discovery	DoD	Frederick D. Gregory	Aug., 10 1989
STS-34	Atlantis	Galileo	Donald E. Williams	Oct., 12 1989

Columbia Syncom communication for U.S. gov't Nov. 13

Discover 3 turbo pumps changed Dec. 11

Hubble Telescope

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NASA

SPACE FLIGHT SCHEDULE
- JANUARY 1989 -

CY 1987	CY 1989				CY 1990				CY 1991			
SPACE SHUTTLE	FY 1989				FY 1990				FY 1991			
	1	2	3	4	1	2	3	4	1	2	3	4
OV-102				28	32	35	40		42	45		
OV-103	26	29		33	31	37		39	43	46		48
OV-104	27		30		34	36	38		41	44	47	49
OV-105												
EXPENDABLE LAUNCH VEHICLES												
SMALL				◇ ◇						◇		
MEDIUM			◇		◇	◇					◇	◇
INTERMEDIATE				◇			◇	◇				
LARGE												

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NASA

SPACE FLIGHT SCHEDULE
- JANUARY 1989 -

	CY 1992				CY 1993				CY 1994				SPACE SHUTTLE
	FY 1992				FY 1993				FY 1994				
	1	2	3	4	1	2	3	4	1	2	3	4	
	52	54		58	62		69	73	77	81	85	88	OV-102
	50		55	59	63	66	70	74	78	82			OV-103
	51		56	60	64	67	71	75	79		83	86	OV-104
		53	57	61	65	68	72		76	80	84	87	OV-105
													EXPENDABLE LAUNCH VEHICLES
	◇		◇	◇	◇		◇		◇		◇		SMALL
				◇◇	◇	◇	◇		◇		◇	◇	MEDIUM
	◇		◇	◇									INTERMEDIATE
													LARGE

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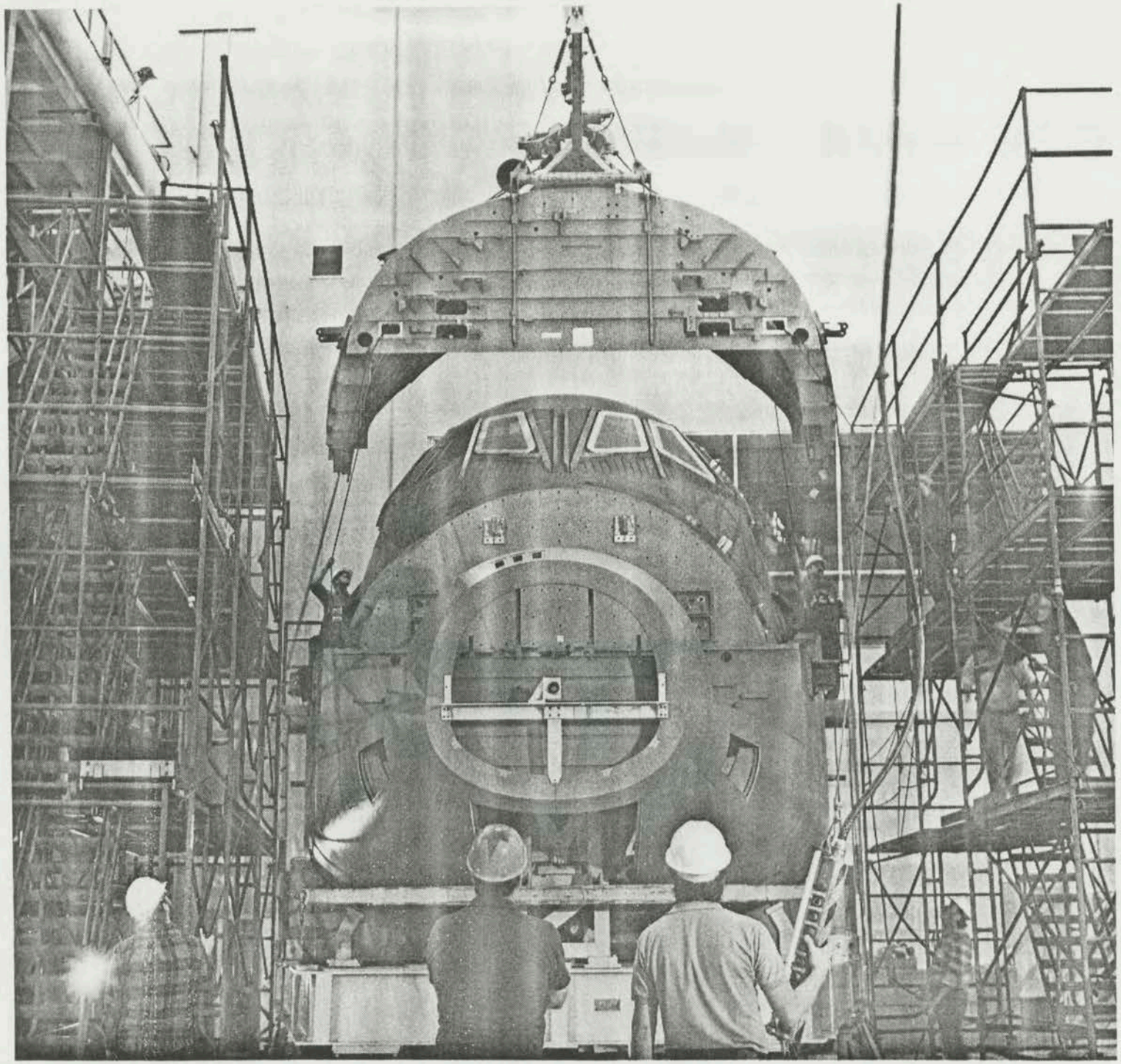

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NASA

REPLACEMENT ORBITER ASSEMBLY STATUS

DOWNEY

FORWARD RCS MODULE

AFT FUSELAGE

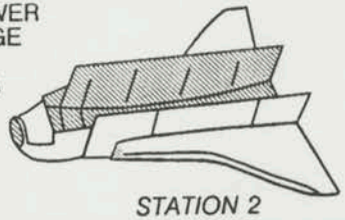
CREW MODULE

UPPER FORWARD FUSELAGE

BUILDING 290

PALMDALE

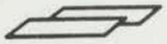
MID & LOWER FUSELAGE + WINGS



STATION 2

OMS PODS

VERTICLE TAIL



LANDING GEAR DOORS

BODY FLAP

ON FLOOR

CARGO DOORS - RI, TULSA

STATUS:

- 40-45 PERCENT COMPLETE WITH STRUCTURAL SPARES
- CAPTURING PREVIOUS ORBITER-SKILLED WORKFORCE
- LOWER FORWARD FUSELAGE MATING COMPLETE
- WING MATING COMPLETE
- FIT CHECK (CREW MODULE, FWD RCS MODULE, UPPER & LOWER FUSELAGE) COMPLETE WITH GOOD ALIGNMENTS
- DELIVERY SCHEDULED MAY 1991

A205.014

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NASA

PLANNED IMPROVEMENTS TO THE SPACE SHUTTLE

- Space Shuttle Main Engine (SSME)
  - Alternate turbopump program
  - Technology test bed
  - Diagnostics health monitoring
- Advanced Solid Rocket Motor (ASRM)
  - Safety
  - Enhanced performance
- Extended Duration Orbiter (EDO)
  - Sixteen day mission instead of seven
  - 45 month development program
  - New and more scientific payloads

A293.028

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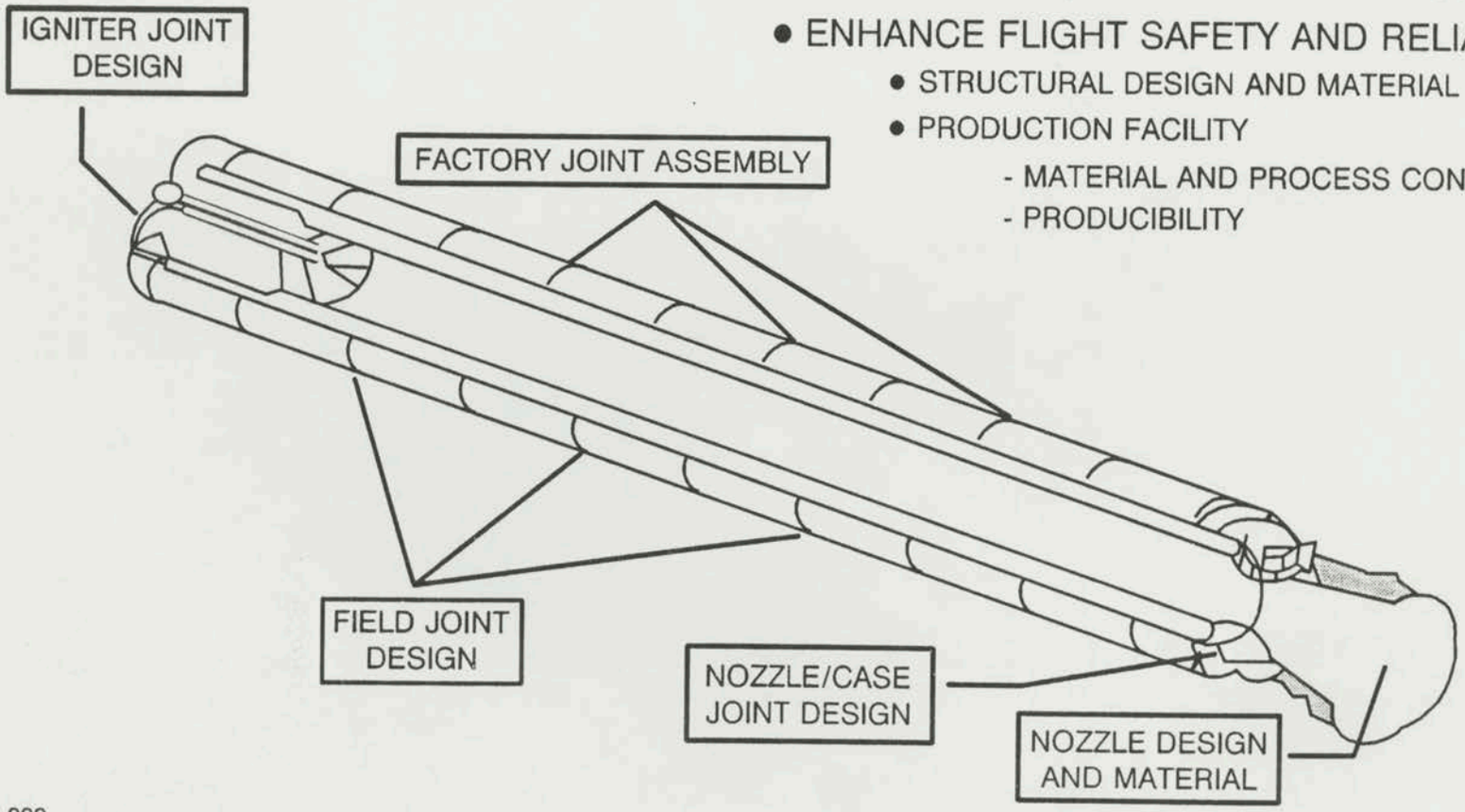
NASA

ADVANCED SOLID ROCKET MOTOR (ASRM)

- IMPROVED PERFORMANCE
  - GOAL - 12,000 LB PAYLOAD INCREASE
- ENHANCE FLIGHT SAFETY AND RELIABILITY
  - STRUCTURAL DESIGN AND MATERIAL SELECTION
  - PRODUCTION FACILITY
    - MATERIAL AND PROCESS CONTROLS
    - PRODUCIBILITY



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NASA

MIXED FLEET

- National space policy mandates a "mixed fleet" of expendable launch vehicles (ELVs) and the Space Shuttle
- Shuttle to be used for
  - critical programs requiring manned presence
  - its unique capabilities
  - national security or foreign policy objectives
- NASA competitively procures launch services from the private sector
- ELVs provide a flexible, well-used space transportation capability

NASA UTILIZES BOTH ELVs AND SHUTTLE

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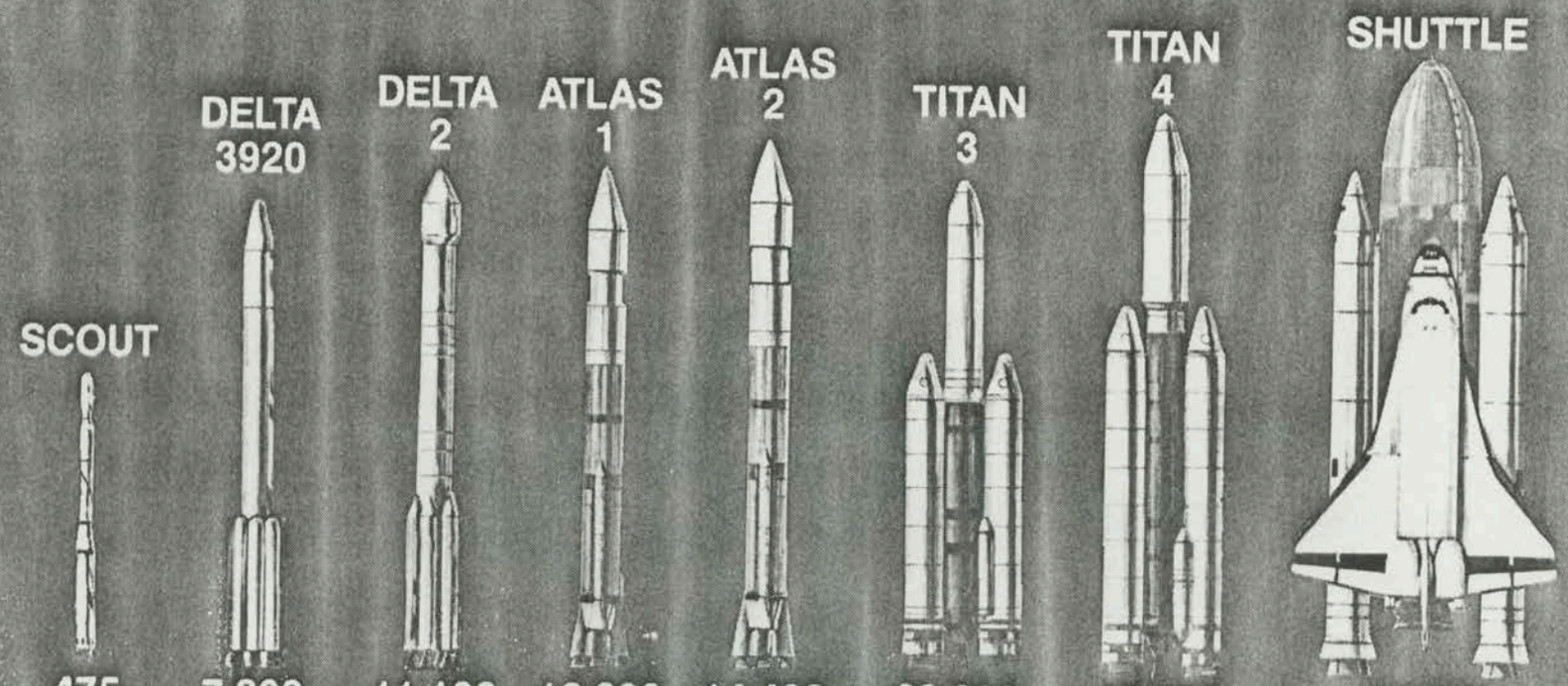
U.S. LAUNCH VEHICLES



POUNDS TO LOW EARTH ORBIT

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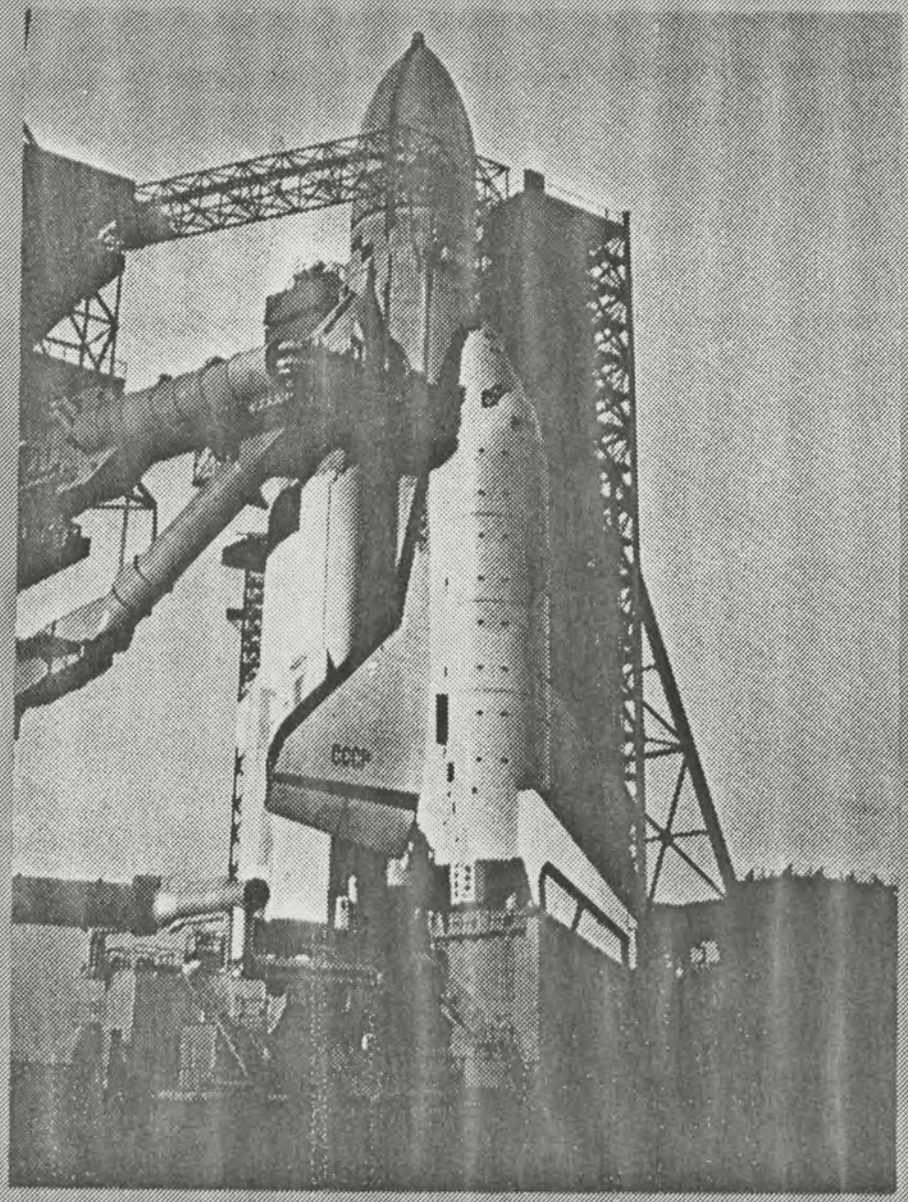

THE SOVIET UNION'S *SPACE SHUTTLE*

Mated to the *Energia* Heavy-Lift Launch Vehicle

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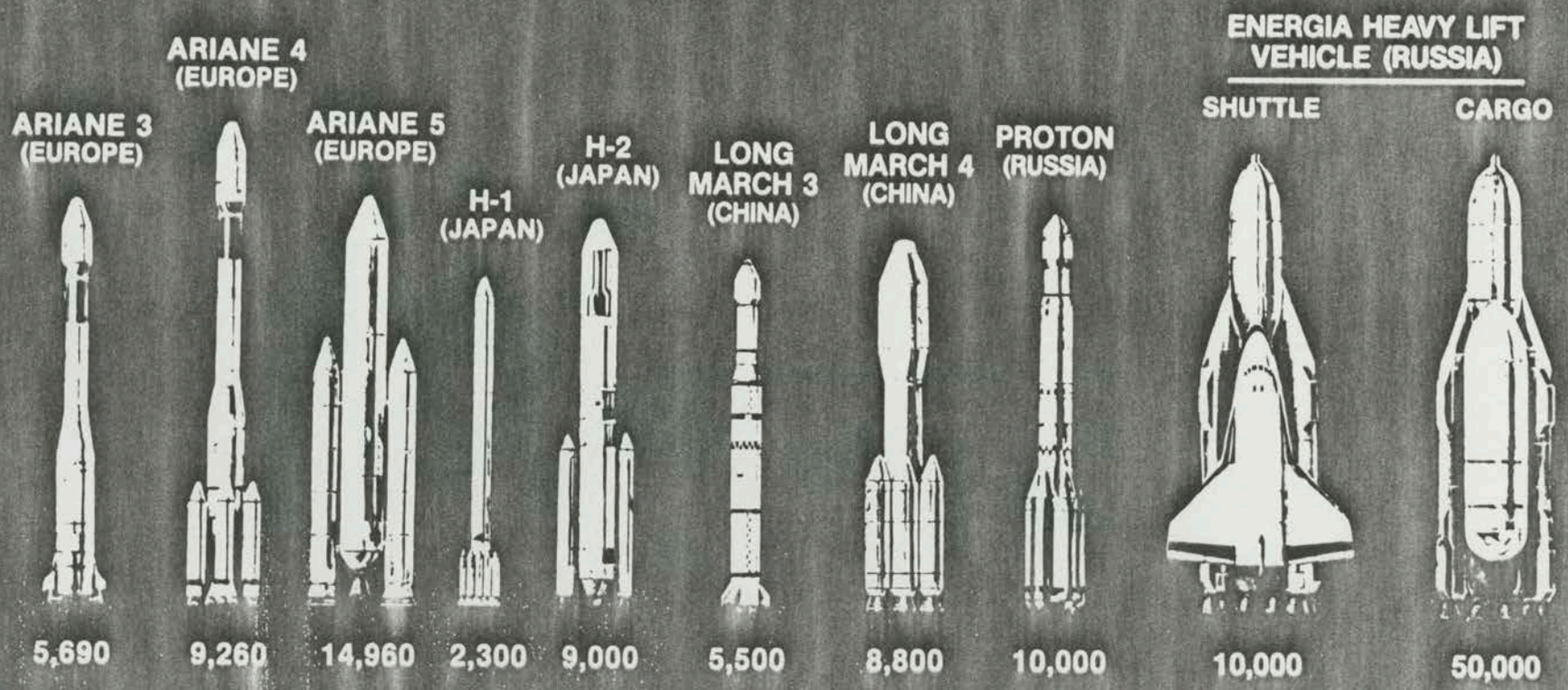
INTERNATIONAL LAUNCH VEHICLES



POUNDS TO GEOSYNCHRONOUS TRANSFER ORBIT

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NASA

LOOKING AHEAD: UNMANNED VEHICLES

Shuttle-C

- Unmanned, cargo version of the Space Shuttle
- Low risk, near term option for heavy lift launch capability
- Definition study underway

Advanced Launch System (ALS)

- Joint Air Force - NASA effort
- NASA lead on liquid engine systems and focused technology
- Potentially, a family of vehicles with emphasis upon reducing cost to orbit

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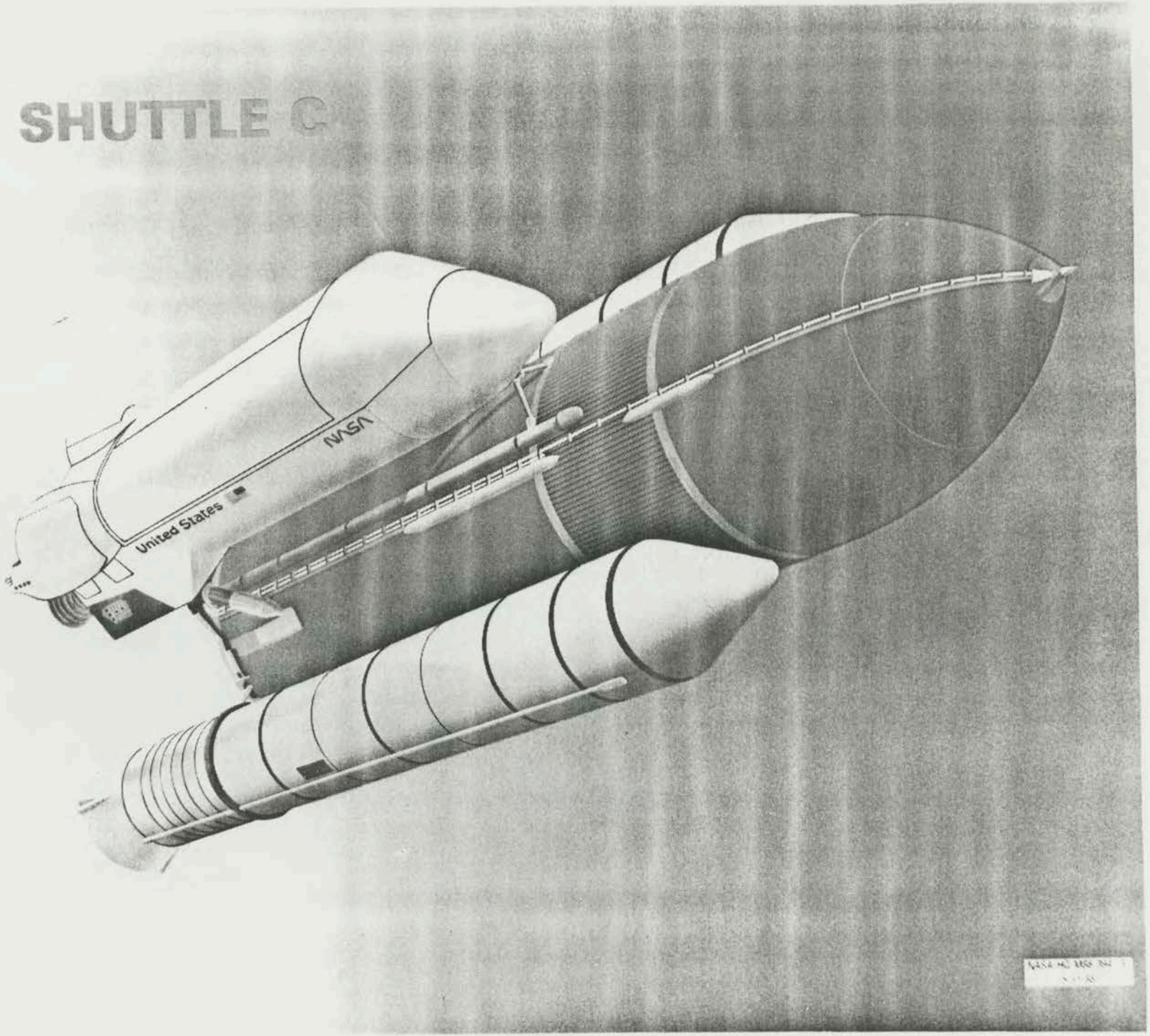

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NASA

THE NEXT MANNED SPACECRAFT

- A new manned spacecraft will be needed in the 2005-2010 timeframe as the Shuttle ends its operational life
- The new vehicle must satisfy people/payload requirements, improve cost effectiveness and increase system reliability and performance margins
- NASA is examining three possible paths:
  - STS Evolution
  - Personnel Launch System
  - Advanced Manned Launch System
- The selection of the best option, its futher definition, then design, development and testing will take over 10 years

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NASA

KEY CONSIDERATIONS

- U.S. launch vehicle fleet is technically superb and back on track
  - Only Shuttle provides a capability for the United States to expand human presence in space
- International competition in launch vehicles is stiff
- The development of space transportation systems pushes technology, supports science, and encourages commerce
- A strong space transportation infrastructure is essential to space leadership

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