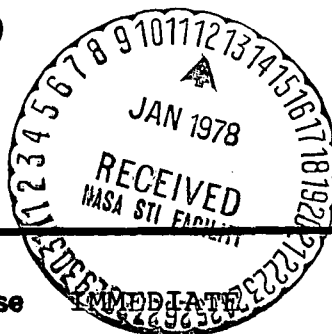


# NASA News

National Aeronautics and  
Space Administration

Washington, D.C. 20546  
AC 202 755-8370



For Release

## Press Kit

Project Intelsat IV-A (F3)

RELEASE NO: 77-251

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and Space Administration) 13 p

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N78-70818

, 1977

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RELEASE NO: 77-251

## FIFTH INTELSAT IV-A LAUNCH SCHEDULED

The fifth Intelsat IV-A commercial communications satellite will be launched by NASA aboard an Atlas Centaur rocket from Kennedy Space Center, Fla., no earlier than Jan. 6, 1978.

The satellite, which weighs 1,515 kilograms (3,340 pounds) at launch, is intended for service in the Indian Ocean region.

-more-

Intelsat IV-A(F3) satellite will be placed in geostationary orbit over the Indian Ocean at 63 degrees East longitude, where it will provide international communications services to some 40 countries in the Indian Ocean region. The satellite has a seven year design life and the capacity to relay more than 6,000 simultaneous telephone calls and two television programs.

The Intelsat satellites are owned by the International Telecommunications Satellite Organization (INTELSAT). The Communications Satellite Corp. (COMSAT), the United States member, is also the management services contractor for the satellite system. NASA is reimbursed for all costs of the Atlas Centaur and launch services by COMSAT on behalf of Intelsat, under provisions of a launch services agreement.

The Atlas Centaur AC-46 launch vehicle is expected to place the Intelsat IV-A in a highly elliptical orbit of 548 by 35,940 kilometers (341 by 22,332 miles). After reorientation of the satellite, a solid propellant rocket motor aboard the spacecraft will be fired to circularize the orbit at synchronous altitude 35,940 km (22,332 mi.) over the equator. At that altitude, because the speed of the spacecraft in orbit matches the rotational speed of the Earth, the satellite remains in position over one spot.

The launch of Intelsat spacecraft aboard Atlas Centaur rockets requires the coordinated efforts of a large government and industry team. NASA's Lewis Research Center, Cleveland, Ohio, has management responsibility for the Atlas Centaur development and operation. NASA's Kennedy Space Center, Fla., is assigned vehicle checkout and launch responsibility once the vehicle reaches Cape Canaveral.

The Intelsat IV-A satellites, built by Hughes Aircraft Co., El Segundo, Calif., are 6.98 meters tall (about 23 feet) and weigh 1,515 kg (about 3,340 lb.) at liftoff and 825.5 kg (1,820 lb.) after apogee motor firing.

The Intelsat IV-A program represents an investment by 101 nations of approximately \$295 million (U.S.). This launch costs approximately \$47 million -- \$18 million for the satellite and \$29 million for the Atlas Centaur launch vehicle and related services.

(END OF GENERAL RELEASE. BACKGROUND INFORMATION FOLLOWS.)

### SPACECRAFT DESCRIPTION

The Intelsat IV-A spacecraft has an overall height of 7 m (23 ft.) and a diameter of 2.4 m (8 ft.). The height of the solar panel is 2.8 m (9 ft.). Liftoff weight is approximately 1,511 kg (3,332 lb.), and in-orbit weight after apogee motor firing is 825.5 kg (1,820 lb.).

Although it has the same basic structural design as its predecessor, Intelsat IV, the Intelsat IV-A spacecraft incorporates new antenna technology to yield about 6,250 two-way voice circuits plus two television channels in the system configuration in which it will be used. This is two-thirds greater than the communications capacity of the of the Intelsat IV series satellite. The increased capacity is made possible by a new antenna design which provides coverage of land masses on both sides of the Atlantic basin, using shaped beams. The eastern and western beams are sufficiently isolated to allow the frequency spectrum to be used twice -- once in the east and once in the west direction -- thus doubling the use of the frequency spectrum and increasing the communications capacity of the satellite.

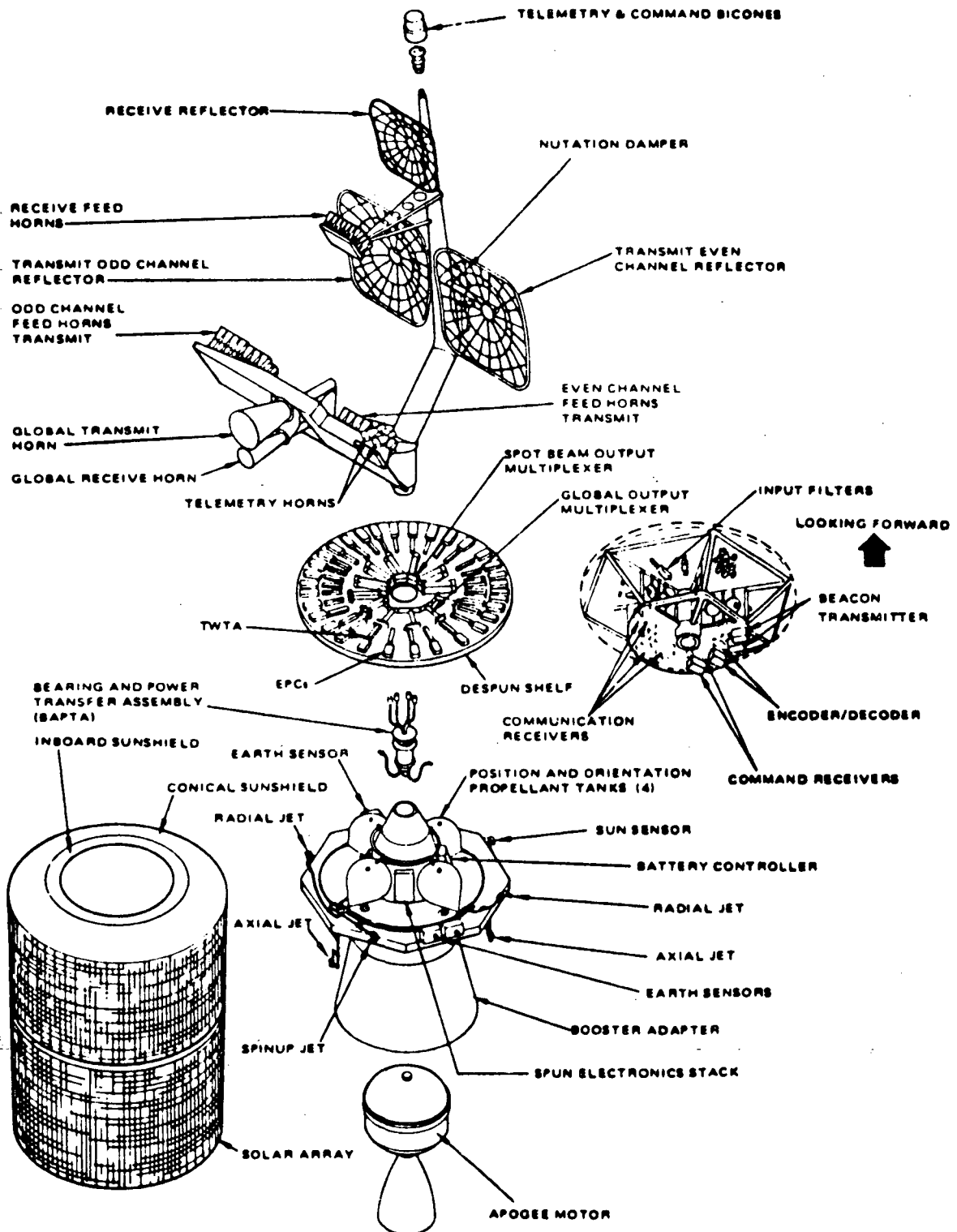
### ATLAS CENTAUR LAUNCH VEHICLE

The Atlas Centaur is NASA's standard launch vehicle for intermediate weight payloads. It is used for the launch of Earth orbital, Earth synchronous and interplanetary missions.

Centaur was the nation's first high-energy, liquid-hydrogen/liquid-oxygen propelled rocket. Developed and launched under the direction of NASA's Lewis Research Center, it became operational in 1966 with the launch of Surveyor 1, the first U.S. spacecraft to soft-land on the Moon's surface.

Since that time, both the Atlas booster and Centaur second stage have undergone many improvements. At present, the vehicle combination can place 4,536 kg (10,000 lb.) in low Earth orbit, 1,882 kg (4,150 lb.) in a synchronous transfer orbit and 907 kg (2,000 lb.) on an interplanetary trajectory.

# CUTAWAY VIEW OF AN INTELSAT IV-A SATELLITE



The Atlas Centaur, standing approximately 40.8 m (134 ft.) high, consists of an Atlas SLV-3D booster and Centaur D-1AR second stage. The Atlas booster develops 1,920 kilonewtons (431,300 lb.) of thrust at liftoff using two 822,920-newton (185,000-lb.) thrust booster engines, one 266,890-N (60,000-lb.) thrust sustainer engine and two vernier engines developing 2,890 N (650 lb.) thrust each. The two RL-10 engines on Centaur produce a total of 133,450 N (30,000 lb.) thrust. Both the Atlas and the Centaur are 3.048 m (10 ft.) in diameter.

Until early 1974, Centaur was used exclusively in combination with the Atlas booster. It was subsequently used with a Titan III booster to launch heavier payloads into Earth orbit and interplanetary trajectories.

The Atlas and the Centaur vehicles have been updated over the years. Thrust of the Atlas engines has been increased about 222,400 N (50,000 lb.) since its debut in the space program in the early 1960s.

The Centaur D-1AR has an integrated electronic system that performs a major role in checking itself and other vehicle systems before launch and also maintains control of major events after liftoff. The new Centaur system handles navigation and guidance tasks, controls pressurization and venting, propellant management, telemetry formats and transmission and initiates vehicle events. Most operational needs can be met by changing the computer software.

TYPICAL LAUNCH VEHICLE CHARACTERISTICS

Liftoff weight including spacecraft: 148,060 kg  
(326,419 lb.)  
Liftoff height: 40.8 m (134 ft.)  
Launch Complex: 36B

	<u>Atlas Booster</u>	<u>Centaur Stage</u>
Weight (with propellants)	130,317 kg (287,300 lb.)	17,781 kg (39,200 lb.)
Height	21.3 m (70 ft.)	19.5 m (64 ft.) with payload fairing
Thrust	1,919 kn (431,300 lb.) at sea level	133,447 N (30,000 lb.) in vacuum
Propellants	Liquid oxygen and RP-1	Liquid oxygen Liquid hydrogen
Propulsion	MA-5 system two 822,921-N (185,000 lb.) thrust booster engines, one 266,893-N (60,000 lb.) thrust sustainer engine, two 2,891-N (650-lb.) thrust vernier engines.	Two 66,723-N (15,000-lb.) thrust RL-10 engines, 12 hydrogen peroxide thrusters.
Velocity	9,205 km/hr (5,720 mph) at booster engine cutoff (BECO) 13,061 km/hr (8,116 mph) at sustainer engine cutoff (SECO).	33,345 km/hr (20,720 mph) at spacecraft separation.
Guidance	Preprogrammed profile through BECO, switch to inertial guidance for sustainer phase.	Inertial guidance



LAUNCH OPERATIONS

NASA's John F. Kennedy Space Center and its Expendable Vehicles Directorate play key roles in the preparation and launch of Atlas Centaur AC-46 carrying the Intelsat IV-A spacecraft into orbit.

The Atlas and Centaur stages of the AC-46 launch vehicle arrived at Cape Canaveral Air Force Station in August 1977 and were erected on Pad B, Complex 36, later that month. Following completion of electrical, pneumatic, hydraulic, propulsion and guidance system checkout and testing, a Terminal Countdown Demonstration Test (TCD) was performed Oct. 21. The TCD demonstrated the integrity of the vehicle-to-ground systems interface in a cryogenic environment which duplicated launch countdown conditions.

The Intelsat IV-A spacecraft was received Sept. 21 and underwent systems checkout in Hangar AM. The spacecraft was moved to the Spacecraft Assembly and Encapsulation Facility Dec. 14 where hydrazine loading and encapsulation in the payload fairing were completed.

The spacecraft/payload fairing assembly was mated to the launch vehicle Dec. 20 in support of the Combined Readiness Test Dec. 22. Final countdown preparations for the planned Jan. 6, 1978, launch are to be initiated Jan. 3.

All launch vehicle and pad operations during the launch countdown are conducted from the blockhouse at Complex 36 by a joint government-industry team.

TYPICAL LAUNCH SEQUENCE FOR INTELSAT IV-A

Flight Events	Earth Relative Velocity		Range		Altitude	
	Program Time (Seconds)	(Km/Hr Mph)	Kilometers/Miles	Kilometers/Miles	Kilometers/Miles	Miles
Liftoff	0	0	0	0	0	0
BECO	140.4	9,205	82.2	51.1	57.8	36.0
Booster Jettison	143.5	9,306	89.5	55.6	61.0	37.9
Insulation Panel Jettison	185.4	10,363	194.8	121.1	98.7	61.4
SECO/VECO	242.5	13,061	386.5	240.2	144.9	90.1
Centaur Separation	249.5	13,059	393.4	244.4	146.3	90.9
Centaur MES (1)	259.0	12,997	426.4	265.0	152.3	94.6
Nose Fairing Jettison	271.0	13,205	468.5	291.1	159.2	98.9
Centaur MECO (1)	620.2	28,029	2,278.0	1,415.5	189.2	117.5
Centaur MES (2)	1,493.0	26,531	8,611.8	5,351.1	558.9	347.3
Centaur MECO (2)	1,529.0	33,862	9,256.9	5,751.9	627.5	389.3
Spacecraft Separation	1,714.0	33,329	10,371.2	6,444.4	806.9	501.4
Reorient Centaur	1,719.0					
Start Blowdown	1,824.0					
End Blowdown	2,134.0					

ATLAS CENTAUR/INTELSAT IV-A TEAM

NASA Headquarters

John F. Yardley	Associate Administrator for Space Flight
Joseph B. Mahon	Director of Launch Vehicle and Propulsion Programs
F. R. Schmidt	Manager, Atlas Centaur

Lewis Research Center

Dr. Bernard Lubarsky	Acting Director
Dr. Seymour C. Himmel	Associate Director
Andrew J. Stofan	Director of Launch Vehicles
Richard E. Orzechowski	Intelsat Mission Project Engineer

Kennedy Space Center

Lee R. Scherer	Director
Dr. Walter J. Kapryan	Director, Space Vehicles Operations
George F. Page	Director, Expendable Vehicles
John D. Gossett	Chief, Centaur Operations
Creighton A. Terhune	Chief Engineer, Atlas Centaur
Floyd Currington	Spacecraft Coordinator

COMSAT

Dr. Joseph V. Charyk	President
Eugene T. Jilg	Assistant Vice President Engineering
Allen M. McCaskill	Manager, Launch Vehicles

Hughes Aircraft Co.

A. T. Owens	Intelsat IV-A Project Manager
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CONTRACTORS

General Dynamics/Convair San Diego, Calif.	Atlas Centaur launch vehicle
Honeywell Aerospace Division St. Petersburg, Fla.	Centaur guidance inertial measurement group
Pratt and Whitney West Palm Beach, Fla.	Centaur RL-10 engines
Teledyne Industries, Inc. Northridge, Calif.	Digital computer unit/PCM telemetry
Rocketdyne Division Rockwell International Corp. Canoga Park, Calif.	MA-5 propulsion systems

INTELSAT IV-A COVERAGE FOR INDIAN OCEAN REGION

