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January 31, 1975

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PRESS KIT

PROJECT: INTELSAT IV

contents

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington, D. C. 20546
(Phone: 202/755-8370)

FOR RELEASE:

FRIDAY,
January 31, 1975

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RELEASE NO: 75-7

SEVENTH INTELSAT IV PREPARED FOR LAUNCH

The seventh in the series of INTELSAT IV commercial communications satellites will be launched by NASA aboard an Atlas-Centaur rocket from Cape Canaveral, Fla., about Feb. 6.

The 1,400-kilogram (3,100-pound) satellite will be positioned on the equator over the Indian Ocean. This will be the second INTELSAT IV over the Indian Ocean and completes the world-wide network orginally planned. When the satellite is launched, there will be three INTELSAT IVs over the Atlantic Ocean, two over the Pacific and two over the Indian Ocean.

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January 17, 1975

Each INTELSAT IV is able to carry approximately 3,500 two-way telephone conversations under average conditions. Each satellite also can carry 12 television channels.

Despite the growth already experienced, the pressure of rapidly growing demands for international telephone, television and data transmission has led to the development of even larger communications satellites. The first of a new series designated INTELSAT IV-A, with twice the capacity of INTELSAT IV, is scheduled for launch in the summer of 1975.

Both the INTELSAT IV, ready for launch, and the new series, like others in the global communications system, are owned by the International Telecommunications Satellite Organization (INTELSAT). The Communications Satellite Corp. (COMSAT), the United States member, acts as manager on behalf of the other 86 nations in the organization. NASA is reimbursed for all costs of the Atlas-Centaur and launch services by COMSAT on behalf of INTELSAT, under provisions of the Communications Satellite Act of 1962.

The Atlas-Centaur launch vehicle will place the satellite in a highly elliptical orbit ranging frm approximately 537 to 35,880 kilometers (334 to 22,300 miles). After checkout and orientation of the satellite, a solid propellant rocket motor aboard the spacecraft will be fired to circularize the orbit at synchronous altitude 35,880 km (22,300 mi.) over the equator. At that altitude, because the speed of the spacecraft in orbit matches the rotational speed of Earth, it appears to hover 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 John F. Kennedy Space Center, Fla., is assigned checkout and launch responsibility once the vehicle reaches Cape Canaveral, Fla. Contractors including General Dynamics/Convair, San Diego, Calif.; Pratt and Whitney, West Palm Beach, Fla.; Hughes Aircraft Co., Sunnyvale, Calif.; Honeywell Aerospace Division, St. Petersburg, Fla.; and Teledyne, Northridge, Calif., perform the actual manufacturing, integration, testing and launch activities.

(END OF GENERAL RELEASE; BACKGROUND INFORMATION FOLLOWS.)

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, Cleveland, Ohio, 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 4,530 kilograms (10,000 pounds) in low Earth orbit, 1,880 kg (4,150 lbs.) in a synchronous transfer orbit, and 900 kg (2,000 lbs.) on an interplanetary trajectory.

The Atlas-Centaur, standing approximately 39.9 meters (131 feet) high, consists of an Atlas SLV-3D booster and Centaur D-1A second stage. The Atlas booster develops 1,920 kilonewtons (431,300 lbs.) of thrust at liftoff using two 822,920 newton (185,000 lbs.) thrust booster engines, one 266,890 N (60,000 lb.) thrust sustainer engine and two vernier engines developing 2,890 N (650 lbs.) thrust each. The two RL-10 engines on Centaur produce a total of 133,450 N (30,000 lbs.) thrust. Both the Atlas and Centaur are 3.048 m (10 ft.) in diameter.

Until early 1974, Centaur was used exclusively in combination with the Atlas booster. Now it is also 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. The thrust of the Atlas engines has been increased about 222,400 N (50,000 lbs.) since its debut in the space program in the early 1960s when it launched the nation's first communications satellite carrying former President Dwight D. Eisenhower's Christmas message to the world.

The Centaur D-1A 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, guidance tasks, controls pressurization, propellant management and 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	147,750 kg (325,732 lbs.)
Liftoff height	39.9 m (131 ft.)
Launch Complex	36A

	Atlas Booster	Centaur Stage
Weight (with propellants)	128,639 kg (283,600 lbs.)	17,708 kg (39,040 lbs.)
Height	21.3 m (70 ft.)	18.6 m (61 ft. with payload fairing)
Thrust	1,919 kn (431,300 lbs.) at sea level	133,447 N (30,000 lbs.) in vacuum
Propellants	Liquid oxygen and RP-1	Liquid oxygen and liquid hydrogen
Propulsion	MA-5 system (two 822,921 N (185,000-lbs.) 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 lbs.) thrust RL-10 engines 14 small hydrogen peroxide thrusters
Velocity	9,004 km per hour (5,596 mph) at BECO; 13,029 km per hour (8,096 mph) at SECO.	33,191 km per hour (20,624 mph) at spacecraft separation
Guidance	Pre-programmed profile through BECO. Switch to inertial guidance for sustainer phase.	Inertial guidance

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ATLAS-CENTAUR FLIGHT HISTORY

TYPE	NUMBER	YEAR
R & D	8	1962 - 1966
OPERATIONAL	25	
7 Surveyor		1966 - 1968
3 OAO		1968 - 1972
2 ATS		1968 - 1969
2 Mariner Mars Fly-By		1969
6 INTELSAT IV		1971 - 1974
2 Mariner Mars Orbiter		1971
2 Pioneer		1972 - 1973
1 Mariner Venus - Mercury Fly-By		1973

LAUNCH PREPARATIONS

NASA's John F. Kennedy Space Center and its Unmanned Launch Operations Directorate (ULO) play key roles in the preparation and launch of Atlas-Centaur 33 carrying the INTELSAT IV F-6 spacecraft into orbit.

The INTELSAT IV spacecraft was received last June 24 and placed in Hangar AM at Cape Canaveral Air Force Station to await call-up and prelaunch checkout.

The Atlas and Centaur stages were erected on Pad A at Launch Complex 36 at Cape Canaveral Air Force Station Dec. 5.

In addition to providing necessary spacecraft support services during final launch preparations, ULO is responsible for mating the spacecraft and payload fairing with the launch vehicle. Mating of the spacecraft with Atlas-Centaur 33 is scheduled for late January.

In providing launch operations, KSC handles scheduling of test milestones and review of data to assure that the launch vehicle has met all its test requirements and is ready for launch.

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

INTELSAT LAUNCH WINDOWS

The primary factor determining the launch window for INTELSAT spacecraft is the angle of the Sun. It is desirable for the solar cells on the spacecraft to receive maximum possible exposure during the transfer orbit. The Sun angle is at its best twice a day at noon and midnight GMT or 7:00 a.m. and 7:00 p.m. EST. Because of the greater convenience for launch crews and tracking operations, the 7:00 p.m. period generally is chosen.

TYPICAL LAUNCH SEQUENCE FOR INTELSAT IV

Flight Events	Program Time	Earth Relative Velocity		Range		Altitude	
	Seconds	MPH	KM/HR	Miles	Kilometers	Miles	Kilometers
BECO	138.9	5,595	9,004	49.6	79.9	35.4	57
Booster jettison	142.0	5,656	9,103	52.9	85.1	37.3	60.1
Insulation panel jettison	183.9	6,407	10,311	118.7	191.0	60.9	98.0
SECO/VECO	247.1	8,096	13,029	238.3	383.5	90.8	146.2
Centaur separation	249.1	8,091	13,021	242.6	390.5	91.7	147.6
Centaur MES (1)	258.6	8,024	12,915	263	423.3	95.6	153.9
Nose fairing jettison	270.6	8,152	13,119	289	465	100.1	161.1
Centaur MECO (1)	621.5	17,632	28,376	1,420.7	2,286.4	117.5	189.1
Centaur MES (2)	1,501.9	16,659	26,810	5,444	8,761.3	364.6	586.8
Centaur MECO (2)	1,578.9	21,011	33,814	5,803.5	9,339.9	411	661.4
Spacecraft separation	1,713.9	20,624	33,191	6,490.4	10,445.3	542.3	872.7
Reorient Centaur	1,718.9						
Start blowdown	1,883.9						
End blowdown	2,133.9						

INTELSAT TEAM

NASA Headquarters

Charles W. Mathews	Associate Administrator for Applications
Dr. Richard B. Marsten	Director of Communications Programs
Jerome Freibaum	Manager, Technical Consultation Services
Noel W. Hinners	Associate Administrator for Space Science
Joseph B. Mahon	Director of Launch Vehicle and Propulsion Programs
F. R. Schmidt	Manager, Atlas-Centaur

Lewis Research, Cleveland, Ohio

Bruce T. Lundin	Director
Dr. Seymour C. Himmel	Associate Director for Flight Programs
Andrew J. Stofan	Director of Launch Vehicles
Henry O. Slone	Atlas-Centaur Project Manager
Vernon J. Weyers	INTELSAT Mission Project Engineer
Frank L. Manning	Launch Vehicle Project Engineer

Kennedy Space Center, Fla.

Lee R. Scherer	Director
John J. Neilon	Director, Unmanned Launch Operations
John Gossett	Manager, Centaur Operations, ULO
Ralph Lotspeich	Space Operations, ULO

COMSAT

Dr. Joseph V. Charyk	President
George P. Sampson	Senior Vice President, Communication System Management
Martin J. Votaw	Assistant Vice President, Engineering

Industry Team

Prime Contractors	Responsibility
Hughes Aircraft Co. Sunnyvale, Calif.	INTELSAT IV spacecraft
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 Northridge, Calif.	Digital computer unit/PCM telemetry

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