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# NASA News

National Aeronautics and  
Space Administration

Washington, D.C. 20546  
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## Press Kit

Project NATO III-C

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COMMUNICATIONS SATELLITE SET (National  
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## Contents

|   |     |
|---|-----|
| GENERAL RELEASE.....                      | 1-3 |
| DELTA LAUNCH VEHICLE 2914 STATISTICS..... | 4-5 |
| NATO III-C SEQUENCE OF EVENTS.....        | 6   |
| NASA/NATO/USAF LAUNCH TEAM.....           | 7-8 |
| CONTRACTORS.....                          | 8   |

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For Release:

TUESDAY,  
November 7, 1978

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RELEASE NO: 78-171

## LAUNCH OF NATO COMMUNICATIONS SATELLITE SET

The launching of NATO III-C, the third and final communications satellite in a new series to serve the North American Treaty Organization (NATO), is scheduled Wednesday, Nov. 15, at NASA's Kennedy Space Center, Cape Canaveral, Fla. The launch window that day extends from 8:25 to 8:45 p.m. EST.

Under terms of a United States-NATO agreement, the satellite will be launched by a Delta rocket. NATO will reimburse NASA \$8.9 million for the launch vehicle and launch services.

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The satellite will provide an in-orbit backup to the NATO III-A and B satellites in the NATO Integrated Communications System (NICS).

The Delta launch vehicle will boost the satellite into an elliptical transfer orbit with altitudes ranging from 185 kilometers (115 miles) to 35,787 km (22,234 mi.). The flight path will take the NATO III-C across the equator at a 27-degree angle of inclination.

About two days after launch, a solid propellant rocket on the satellite will be fired when the NATO III-C reaches the high point of its orbit. This maneuver will circularize the orbit at 35,787 km (22,234 mi.) and remove its inclination by diverting the satellite to travel along the plane of the equator.

The NATO III-C will be allowed to drift eastward until it reaches its planned station above the equator. There, its movement will be stopped by firing a hydrazine-fueled jet system which will drive the satellite up to the geosynchronous orbital altitude of 35,900 km (22,300 mi.).

At the geosynchronous altitude, NATO III-C will orbit the Earth once every 24 hours "synchronized" with the 24-hour rotation period of the planet. This will keep the satellite on station over the same spot above the equator.

On behalf of NATO, the U.S. Air Force Satellite Control Facility (SCF) network will assume control of NATO III-C once it is in its transfer orbit. The U.S. Air Force Space and Missile Systems Organization (SAMSO) serves as the satellite contracting agency for the NATO Integrated Communications System Management Agency.

The Delta project is managed by the Goddard Space Flight Center, Greenbelt, Md., for NASA's Office of Space Transportation Systems. Kennedy Space Center is responsible for launch operations. Prime contractor for Delta is McDonnell Douglas Astronautics Co., Huntington Beach, Calif.

Four previous NATO satellites were launched successfully by Delta. These include the NATO II-A and B spacecraft in March 1970 and February 1971; the NATO III-A in April 1976; and the NATO III-B in January 1977.

Funded entirely by NATO, the NATO III spacecraft were built by Ford Aeronutronic and Communications Corp., Palo Alto, Calif.

(END OF GENERAL RELEASE. BACKGROUND INFORMATION FOLLOWS.)

DELTA LAUNCH VEHICLE 2914 STATISTICS

The NATO III-C spacecraft will be launched by a three-stage Delta 2914 launch vehicle. This launching will mark the 140th for the Delta rocket which has achieved an impressive performance record of more than 90 per cent. The launch vehicle has the following general characteristics:

Height: 35.4 m (116 ft.) including shroud  
Maximum Diameter: 2.4 m (8 ft.) without attached solids  
Liftoff Weight: 131,895 kg (293,100 lb.)  
Liftoff Thrust: 1,765,315 newtons (396,700 lb.) including strap-on solids

First Stage

An extended long-tank Thor, produced by McDonnell Douglas has RS-27 engines produced by the Rocketdyne Division of Rockwell International. This stage has the following characteristics:

Height: 21.3 m (70 ft.)  
Diameter: 2.4 m (8 ft.)  
Propellants: RJ-1 kerosene as the fuel and liquid oxygen (LOX) as the oxidizer  
Thrust: 912,000 N (205,000 lb.)

Strap-on solids consist of 9 TMX-354-5 Castor II solid-propellant rockets produced by the Thiokol Chemical Corp. with the following features:

Height: 7 m (23 ft.)  
Diameter: 0.8 m (31 in.)  
Propellants: Solid  
Thrust: 2,083,000 N (468,000 lb.) for nine  
231,400 N (52,000 lb.) for each

### Second Stage

Produced by McDonnell Douglas Astronautics Co., this uses a TRW TR-201 rocket engine; major contractors for the vehicle inertial guidance system located on the second stage are Hamilton Standard, Teledyne and Delco. The second stage has the following characteristics:

Height: 6.4 m (21 ft.)

Diameter: 1.5 m (5 ft.)

Propellants: Liquid, consisting of Aerozene 50 for the fuel and nitrogen tetroxide ( $N_2O_4$ ) for the oxidizer

Thrust: About 42,943 N (9,650 lb.)

### Third Stage

A TE-364-4 motor produced by Thiokol Chemical Co., with the following characteristics:

Height: 1.4 m (4.5 ft.)

Diameter: 1 m (3 ft.)

Propellants: Solid

Thrust: 61,855 N (13,900 lb.)

NATO III-C SEQUENCE OF EVENTS

| Event                               | Time            | Altitude   |        | Velocity |        |
|-------------------------------------|-----------------|------------|--------|----------|--------|
|                                     |                 | Kilometers | Miles  | Km/Hr    | Mph    |
| Liftoff                             | 0 sec.          | 0          | 0      | 0        | 0      |
| Six solid motor burnout             | 38 sec.         | 5.9        | 3.7    | 1,407    | 874    |
| Three solid motor ignition          | 39 sec.         | 6.2        | 3.8    | 1,400    | 870    |
| Three solid motor burnout           | 1 min. 17 sec.  | 21.4       | 13.3   | 2,975    | 1,848  |
| Nine solid motor jettison           | 1 min. 27 sec.  | 25.9       | 16     | 3,269    | 2,031  |
| Main engine cutoff (MECO)           | 3 min. 43 sec.  | 92.2       | 57.3   | 17,928   | 11,140 |
| First/second stage separation       | 3 min. 51 sec.  | 98.4       | 61.2   | 17,901   | 11,123 |
| Second stage ignition               | 3 min. 56 sec.  | 101        | 63     | 17,903   | 11,124 |
| Fairing jettison                    | 4 min. 37 sec.  | 124.7      | 78     | 18,592   | 11,552 |
| Second stage first cutoff (SECO-1)  | 8 min. 51 sec.  | 160        | 100    | 26,802   | 16,654 |
| Second stage restart                | 21 min. 39 sec. | 177        | 110    | 26,728   | 16,607 |
| Second stage second cutoff (SECO-2) | 21 min. 49 sec. | 178        | 110    | 27,161   | 16,877 |
| Third stage spin up                 | 22 min. 39 sec. | 181        | 112    | 27,148   | 16,868 |
| Second/third stage separation       | 22 min. 41 sec. | 181        | 112    | 27,147   | 16,868 |
| Third stage ignition                | 23 min. 22 sec. | 184        | 114    | 27,133   | 16,859 |
| Third stage burnout                 | 24 min. 46 sec. | 190        | 118    | 35,377   | 21,981 |
| Third stage/spacecraft separation   | 25 min. 15 sec. | 225        | 140    | 35,260   | 21,900 |
| Transfer orbit apogee               | 5 hours 39 min. | 35,796     | 22,237 | 6,462    | 4,015  |

NASA/NATO/USAF LAUNCH TEAM

NASA Headquarters

|                 |  |
|-----------------|--|
| John F. Yardley | Associate Administrator<br>Office of Space Transportation<br>Systems |
| Joseph B. Mahon | Director of Expendable Launch<br>Vehicle Systems, OSTS               |
| Peter T. Eaton  | Manager, Delta Program, OSTS   |

Goddard Space Flight Center

|                      |  |
|----------------------|--|
| Dr. Robert S. Cooper | Director   |
| Robert E. Smylie     | Deputy Director                                    |
| Robert Baumann       | Associate Director for Space<br>Transportation     |
| David W. Gimes       | Delta Project Manager                              |
| William R. Russell   | Deputy Delta Project Manager,<br>Technical         |
| Robert Goss          | Manager, Delta Mission<br>Analysis and Integration |
| Philip Frustace      | NATO III-C Mission<br>Integration Manager          |
| William Hawkins      | Mission Operations and Network<br>Support Manager  |
| Ray Mazur            | Mission Support                                    |

Kennedy Space Center

|                       |  |
|-----------------------|--|
| Lee R. Scherer        | Director                                 |
| Gerald D. Griffin     | Deputy Director                          |
| Dr. Walter J. Kapryan | Director of Space Vehicles<br>Operations |

KSC (cont'd.)

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CONTRACTORS

Ford Aeronutronic and  
Communications Corp.  
Palo Alto, Calif.

Spacecraft

McDonnell Douglas  
Astronautics Co.  
Huntington Beach, Calif.

Delta Launch Vehicle

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