National Aeronautics and
Space Administration
Goddard Space Flight Center

NOAA-L

National Oceanic and
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NOAA-L is the latest in the advanced TIROS-N (ATN) series. The spacecraft will broadcast data directly to thousands of users around the world and continue to provide a polar-orbiting platform to support the environmental monitoring instruments for imaging and measurement of the Earth's atmosphere, its surface, and cloud cover. Observations include information about Earth radiation, sea and land surface temperature, atmospheric vertical temperature, water vapor, and ozone profiles in the troposphere and stratosphere.

Measurement of proton and electron flux at orbit altitude, remote platform data collection, and the Search and Rescue Satellite-aided Tracking system (SARSAT) are also supported. Additionally, NOAA-L will be the second in the series to support a new suite of dedicated microwave instruments to generate improved temperature and moisture profiles and surface, and hydrological products in cloudy regions where visible and infrared instruments have decreased capability.

Since the 1960s, NASA has developed polar-orbiting environmental observation satellites for the National Oceanic and Atmospheric Administration (NOAA). NOAA-L, the latest NOAA spacecraft, will be launched in the fall of 2000.

The NOAA satellites carry instruments that observe our Earth and provide global data for NOAA's operational user requirements including short- and long-range weather forecasts. The operational system consists of two polar-orbiting satellites. One crosses the equator at roughly 7:30 a.m. and 7:30 p.m. local solar time; the other satellite crosses the equator at roughly 2:00 a.m. and 2:00 p.m. local solar time.

These spacecraft monitor the entire Earth, providing atmospheric measurements of temperature, humidity, ozone and cloud images as they track weather patterns that affect the global weather and climate. The satellites send millions of global measurements daily to NOAA's Command and Data Acquisition stations and to its data processing center, adding valuable information to forecasting models, especially for ocean areas, where conventional ground-based data are lacking.

Currently, NOAA has two operational polar orbiters: NOAA-14, launched in December 1994, into a 1:40 p.m. local solar time orbit and NOAA-15, launched in May 1998 into a 7:30 a.m. local solar time orbit. NOAA-L will replace NOAA-14 in a 2:00 p.m. local solar time orbit.

NOAA-L will be renamed NOAA-16 after achieving orbit. The satellites receive a letter designation while under construction on the ground and are then renamed with a numerical designation after launch. This is done because the satellites are built in alphabetical order but are not necessarily launched in this same order. Therefore, to avoid confusion, they are numbered upon reaching orbit.

NASA and NOAA are actively engaged in a cooperative program to develop and launch the NOAA Polar Operational Environmental Satellites (POES). NASA's Goddard Space Flight Center in Greenbelt, Maryland, is responsible for the construction, integration, and verification testing of the spacecraft, instruments, and unique ground equipment. The Titan II launch vehicle is provided by the U.S. Air Force. NASA checks out the satellite to assure it meets its performance requirements. NASA turns operational control of the spacecraft over to NOAA after 10 days of comprehensive subsystem checkout. An on-orbit instrument performance verification period lasts approximately 35 days more.

NOAA is responsible for program requirements funding and the on-orbit operation of the multi-satellite system. NOAA also determines the need for satellite replacement. NOAA designs and develops the ground system needed to acquire, process, and disseminate the satellite data.

NOAA-L will operate in a circular, near-polar orbit of 470 nautical miles (870 kilometers) above the Earth with an inclination angle of approximately 98 degrees to the equator. The NOAA-L orbit period, which is the time it takes to complete one orbit of the Earth, will be approximately 102 minutes.

The POES spacecraft serve as complementary satellites to the geosynchronous Geostationary Operational Environmental Satellites (GOES) system. Where the GOES satellites provide near-term data from the continental United States and Hawaii to NOAA's forecasters, the polar-orbiting spacecraft provide full global data for short- and long-range forecast models, climate modeling, and various other secondary missions.

More information on the POES program can be found on the Internet at: http://poes.gsfc.nasa.gov and at http://www.2.ncdc.noaa.gov/docs/klm/index.htm.

FOR THE CLASSROOM

One of the most vital tools scientists use to study the atmosphere is remote sensing. In this "long distance seeing" that will be performed by NOAA-L, researchers will use infrared, microwave, and visible spectral data to trace weather patterns and to image cloud cover. To be effective and provide the most accurate results, remote sensing must be performed over a long period of time. NOAA-L will collect data for at least two years and probably longer.

Why must these investigations be so comprehensive and continue for a long period of time? Try this investigation to find out.

Materials Needed: notebooks, pencils, paper, graph paper, if available, an instant camera or video camera, with film or videotape

Procedure:

Count the number of students at a central location in your school cafeteria or gym for a 1-minute period several times a day. You can do this by taking a photograph of the cafeteria or gym or by stationing yourself there and counting the number of students that you see. Draw a graph with the times shown on the horizontal axis and the numbers of students on the vertical axis.

Questions:

1. Is there a noticeable difference in numbers of students at various times?

2. Could you make accurate statements about how many students use the cafeteria or gym by looking at the results of only a single observation?

3. What does this tell you about the need for long-term observations from space?

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