Fact Sheet

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Aura

NASA's Earth Observing System Atmospheric Chemistry Spacecraft

System Description:

Aura is the second Northrop Grumman-built Earth Observing System (EOS) satellite built for NASA to study the environment and climate change; it is the third in NASA's EOS series and follows Terra and Aqua, which are performing successfully on orbit.

Aura is based on Northrop Grumman's modular, standardized T-330 spacecraft bus. The spacecraft bus design is the same as Aqua's, its sister ship, with identical subsystems such as electrical power and attitude control. About 80 percent of the software code on Aura and Aqua is the same. Mechanical and electrical interfaces for accommodating the science payloads are tailored for Aura's mission specific needs. Northrop Grumman applied lessons learned on Aqua to Aura, realizing lower cost/manpower levels, shorter span times, and fewer test discrepancies.

Weighing 6,542 pounds and equipped with 4.4 kilowatts of electric power, Aura is built of lightweight composite materials that allow for increased payload weight and reduced launch costs. The design features a single solar array for maximum visibility, an extremely stable optical bench and anti-jitter technology. Aura will be launched from a Delta II launch vehicle into a low-Earth, sun-synchronous polar orbit from Vandenberg Air Force Base, California.

Designed to study the Earth's ozone, air quality and climate, Aura will conduct research exclusively on the composition, chemistry and dynamics of the Earth's upper and lower atmosphere with four science instruments. The satellite's orbit will allow measurements to be taken at all latitudes; instruments will make continuous scans at altitudes ranging from the stratosphere down through the troposphere.

Aura's instruments include the Microwave Limb Sounder, built by NASA's Jet Propulsion Laboratory; the Tropospheric Emission Spectrometer, also built by the Jet Propulsion Laboratory; High Resolution Dynamics Limb Sounder, built jointly by NASA and the United Kingdom; and the Ozone Monitoring Instrument, being developed by the Netherlands Space Agency and the Finnish Meteorological Institute.

Customer:

- NASA Goddard Space Flight Center, Greenbelt, Maryland

- Contract Details and Requirements:
  -Design and build two remote sensing spacecraft, Aura and Aqua.
  -Integrate instruments furnished by NASA
  -Launch spacecraft from Delta II

Background Data:

From the stratosphere, through the troposphere and down to the Earth's surface, Aura will measure gases such as ozone, nitrous oxide, bromine oxide, volcanic sulfur dioxide and aerosols as well as ultraviolet radiation, water vapor and special products such as CFCs. Some of these are suspected of promoting global warming.

Aura's scientific instruments will help supply the answers to three important questions:

1. Is the Earth's ozone layer recovering?
2. Is air quality getting worse?
3. How is Earth's climate changing?

Three of Aura's four instruments will scan the horizon, providing data on the vertical distribution of gases. This data will is important because a gas such as ozone can protect or harm life on Earth, depending on where it resides in the atmosphere. High in the atmosphere, ozone acts as a shield to protect Earth's surface from the sun's harmful ultraviolet radiation. Closer to Earth, in the air we breathe, ozone is a harmful pollutant that causes damage to lung tissue and plants.

Aura will also have the ability to probe the Earth's upper troposphere, which is the region of the atmosphere just below the stratosphere, covering heights between about 5 and 10-15 km. This is an important region of the atmosphere for processes affecting climate change, but has previously been difficult or impossible to observe adequately from satellites. Aura will provide global data on the upper troposphere that is needed by scientists.

In addition, Aura will continue the observations made by NASA's Upper Atmosphere Research Satellite, which uncovered key processes that result in ozone depletion and the Total Ozone Mapping Spectrometer series of measurements, which accurately tracked global scale ozone changes over the last 22 years.

Following its launch, Aura will join the "A Train" on orbit, a constellation of satellites now flying or set to fly in formation to coordinate observations on clouds, upper tropospheric water vapor, and tropospheric and stratospheric temperatures and aerosols. Each satellite carries instruments that will measure these parameters in different ways, providing more comprehensive measurements and also a means of cross validating the accuracy of the data products

Aqua leads the A Train, followed by Cloudsat, Calipso, Parasol and finally, Aura. Aura orbits about 15 minutes behind Aqua. Aura's limb viewing instruments will measure the same portion of the Earth as Aqua's nadir viewing instruments to within eight minutes.

There will also be an ambitious validation program for Aura's data, which will employ ground, balloon, aircraft and other satellite data. Data from Aura's instrument will be compared to or correlated with measurements from other instruments whose performance is well known.

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