MetOp-B launches with NASA Goddard-developed instruments

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MetOp-B during testing in Europe. Credit: ESA

(Phys.org)—A new European meteorological satellite soared into space today, Sept. 17, with five environmental instruments aboard that were

developed by the Polar Operational Environmental Satellites (POES) Project at NASA's Goddard Space Flight Center in Greenbelt, Md. These instruments were developed under a reimbursable agreement with the National Oceanic and Atmospheric Administration (NOAA).

"This launch is exciting not only because of the engineering accomplishment of building and launching complex instruments and satellites, but equally rewarding for the multinational cooperation and teamwork that got us there," remarked Karen Halterman, POES Project manager at Goddard.

The European Meteorological Operational (MetOp)-B spacecraft was aboard a Soyuz launch vehicle that launched from Baikonur Cosmodrome in Kazakhstan. MetOp-B is the second of three European Space Agency (ESA) and European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) weather satellites.

The five NASA-developed, NOAA-provided instruments, include: the Advanced Microwave Sounding Unit (AMSU)-A1 and AMSU-A2; the Advanced Very High Resolution Radiometer (AVHRR); the High Resolution Infrared Radiation Sounder (HIRS); and the Space Environment Monitor (SEM).

The Goddard-developed instruments will gather data that includes remotely sensed vertical profiles of atmospheric temperature and moisture, and visible and infrared imagery of cloud cover and surface conditions such as vegetation, snow and ice. These are input into short-, medium- and long-range weather forecast models by the National Weather Service. The data are also used for climate models and to improve understanding of Earth's atmospheric and ocean processes. Measurements of charged particles in situ are used to determine levels of aurora activity and to monitor the intensities of energetic particles in Earth's radiation belts and during solar storms. NOAA provides the data

from these instruments to users around the world.

Goddard's POES Project developed the same instruments for the previous NOAA environmental satellites, NOAA-15 through NOAA-19, and for MetOp-A, which was launched in 2006. These instruments have provided reliable global environmental measurements of Earth continuously since 1998.

The AMSU–A1 and AMSU-A2 instruments are cross-track scanning total power radiometers that measure scene radiance (temperature) in the microwave spectrum. The data from these instruments is used in conjunction with the HIRS to calculate the global atmospheric temperature and humidity profiles from Earth's surface to the upper stratosphere. The data are used to provide precipitation and surface measurements including snow cover, sea ice concentration, and soil moisture. AMSU data is even used to characterize the internal structure of hurricanes. The AMSU-A1 and AMSU-A2 were designed and manufactured by Aerojet (now Northrop Grumman Electronics Systems) in Azusa, Calif.

The AVHRR is a six-channel imaging radiometer that detects energy in the visible, near infrared and infrared portions of the electromagnetic spectrum. The instrument measures reflected solar (visible and near-IR) energy and radiated thermal energy from land, sea, clouds and the intervening atmosphere. Data from the AVHRR are used to produce numerous science products including imagery, cloud cover, snow and ice cover, sea surface temperatures, vegetation, smoke plumes, volcanic ash, aerosols and absorbed incoming solar radiation to Earth and outgoing radiation from Earth. It was developed and manufactured by ITT (now Exelis) in Ft. Wayne, Ind.

The HIRS was also developed and manufactured by ITT (now Exelis). The HIRS measures the atmosphere in 20 spectral regions and its data

are used together with data from the AMSU-A1 and AMSU-A2 to produce global atmospheric temperature and humidity profiles. The HIRS data are also used to determine ocean surface temperatures, total atmospheric ozone levels, precipitable water, cloud height and coverage, surface radiance and outgoing long-wave radiation.

The Space Environment Monitor was developed and manufactured by Panametrics in Waltham, Mass., and is now maintained by ATC in Chelmsford, Mass. It measures the charged particle environment at satellite altitude including the intensities of energetic particles in Earth's radiation belts and the solar wind. The SEM contributes to space weather forecasting by providing warnings of solar wind occurrences that may impair long-range communications, cause damage to satellite circuits and solar panels, or cause changes in drag and magnetic torque on satellites.

"These crucial instruments will be used for weather forecasting and to help us all gain a better understanding of the Earth's systems," stated Gene Martin, POES Project instrument manager. "We have received outstanding support and dedication from our staff and the instrument contractors Northrop Grumman Electronics Systems, Exelis and Assurance Technology Corporation."

NOAA and EUMETSAT are partners in the European Initial Joint Polar System (IJPS) with the agreement to fly their partner's sensors on their own polar satellites and to exchange data from the POES and MetOp satellites. The MetOp satellites carry the sensors in the morning orbit, and NOAA's polar-orbiting environmental satellites, which are the U.S. contribution to the IJPS agreement, circle Earth in the afternoon orbit. NASA's POES project manages the development, testing and integration of the five U.S. instruments for the MetOp satellites under a reimbursable agreement with NOAA.

Goddard worked closely with NOAA and a sizeable international team

throughout the multiyear effort to prepare for the MetOp-B launch. The Goddard instrument team delivered the instruments to Astrium in Friedrichshafen, Germany, and supported their integration into the MetOp-B Payload Module. Thermal vacuum testing of the Payload Module was conducted at ESA's Technical Center in Noordwijk, Holland. The Payload Module was integrated with the spacecraft bus in Toulouse, France. The spacecraft arrived in Baikonur, Kazakhstan, in March 2012 and was readied for launch.

More information: For more information about the Goddard-developed instruments on MetOp-B and the MetOp-B program, please visit:

poes.gsfc.nasa.gov/
www.nesdis.noaa.gov/SatInformation.html
www.eumetsat.int
www.esa.int

Provided by NASA

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