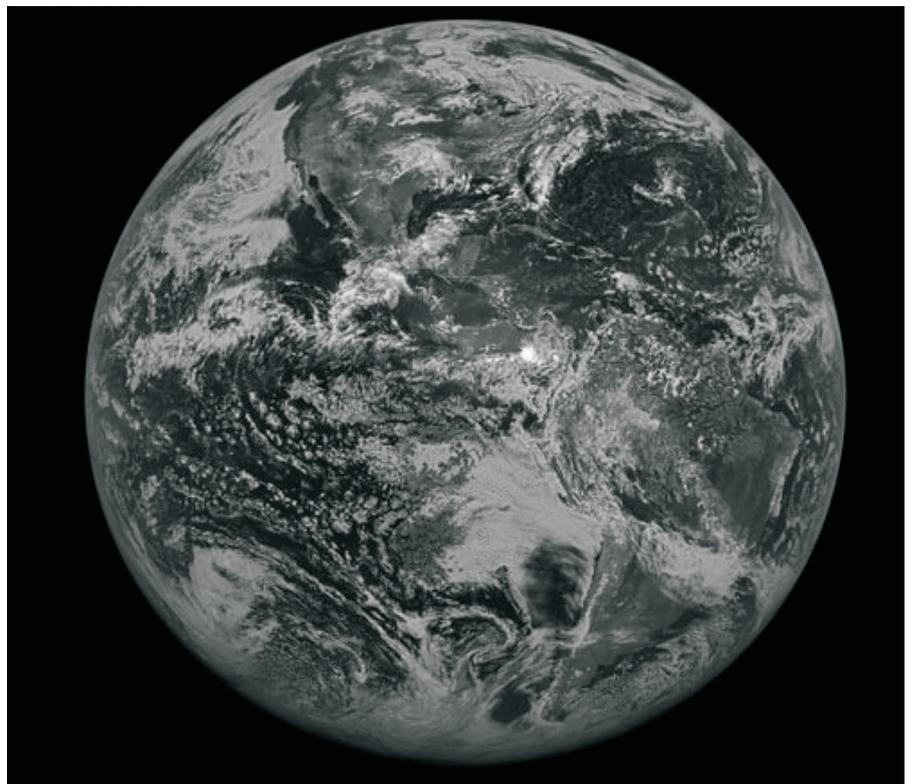


# NOAA

## -has the World's Longest Experience with Environmental Data from Space

Having President Obama's vision about a better and more environmentally friendly world in mind, the question remains; what will the USA do to prevent climate changes caused by human activities? Universities and governmental organisations keep monitoring the situation, looking for answers to weather, climate and environmental challenges. Politicians, however, seem unwilling to make politically unpopular decisions, besides; generally speaking, Americans so far, have not been particularly willing to change their lifestyles. Unquestionable, no country has collected so much data about the environment on earth and spent so much resources on earth programmes as the USA.



*The first picture from the new GOES 14. Picture credit: NASA*

The main operative organisation for climate and environment in the USA is the governmental organisation National Oceanic and Atmospheric Administration, better known as NOAA. The organisation is responsible for the daily forecasting; forecasting hurricanes, floods, and algae etc. In close cooperation with universities and research institutes, they also carry out the necessary research connected to weather and climate. Developing, building and operating the necessary infrastructure such as satellites, buoys etc., are carried out by other organisations, among others NASA. However, NOAA is the major player in terms of meteorological and environmental issues

### NOAA's Mission

NOAA has the very ambitious mission "To understand and predict changes in the environment, as well as to conserve and manage coastal and marine resources to meet our nation's economic, social and environmental needs".

The NOAA research infrastructure includes a system of federal laboratories and science centres together with satellites, ships, aircrafts and other observatory systems and platforms. The main infrastructure is divided in the following main fields;

- National Environmental Satellite Data and Information Service (NESDIS)
- National Marine Fisheries Service
- National Ocean Service
- National Weather Service
- Office of Oceanic and Atmospheric Research

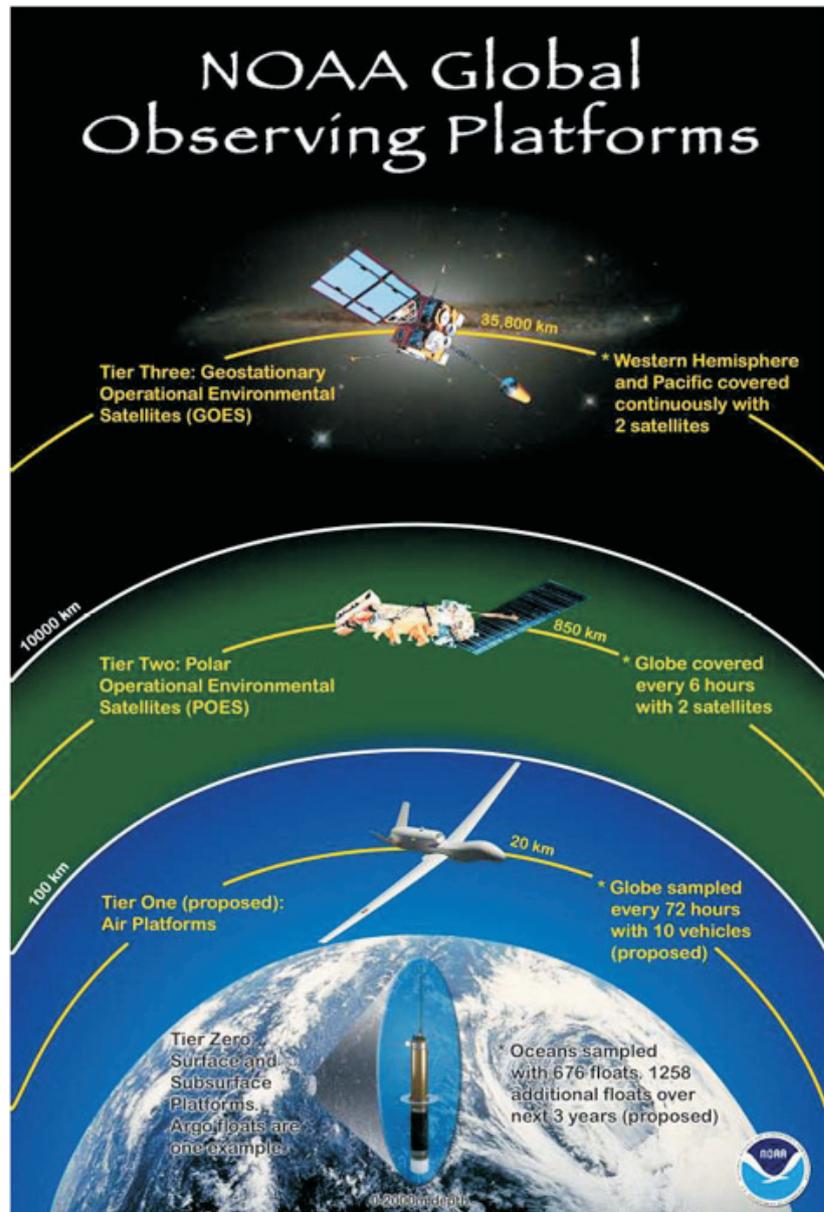
National Environmental Satellite, Data and Information Service (NESDIS) is dedicated to providing timely access to global environmental data from satellites and other sources, thus, the organisation's functions are close to those of NOAA's, as well as those Eumetsat has for the European states.

The service provides operational information to the different parts of the American society, while the research division carries out the necessary research to provide the best possible forecast for the American public. To support these services, NOAA cooperates with a series of laboratories and cooperative institutes around the USA. Additionally, NOAA cooperates with several international institutes and organisations, such as Eumetsat when it comes to the polar orbiting satellites, not to mention the cooperation with Norway regarding the receiving station on Svalbard.

## NOAA's Research Organisation

The observing systems make up a critical part of NOAA's infrastructure, and they support the outcome in all of goals of the mission within ecosystems, climate, weather and water, as well as commerce and transportation. These observation systems measure more than 500 environmental parameters via platforms including geostationary operational environmental satellites (GOES), polar orbiting satellites (POES), ground based weather and climate monitoring systems, ocean and coastal buoys, submersibles, ships and aircrafts. Sensors on operational observing systems provide a diverse and large quantity of data used in research studies.

NOAA's satellite observation systems provide a significant portion of the Earth observation data used by NOAA as well as users around the globe, including NOAA's international partners, commercial users, defence agencies and the academic research community.



## Further Development

To meet expanding demands for new types of Earth measurements, as well as for greater data accuracy in addition to spatial and temporal coverage, NOAA is planning to deploy major new observing systems such as National Polar-Orbiting Operational Environmental Satellite System (NPOESS), Geostationary Operational Earth Observation Satellites (GOES-R) and an enhanced Climate Reference Network.

In the next decade there will be a wealth of new global Earth observations available, operational with the geostationary GOES-R, the polar orbiting satellites NPOESS and the

European polar meteorological operational satellites METOP. The new generation of operational environmental satellites to be flown in the years to come, will have sensors that are much more advanced than the current operational models. In addition, a series of experimental satellites will be launched to provide new measurements. Several satellites will be developed and launched in cooperation with other countries, like COSMIC together with Taiwan, and Atmospheric Dynamic Mission (ADM) in collaboration with European Space Agency.

### The Data Supplier

The part of NOAA that is most interesting, seen from our point of view, with regard to space utilisation, is the National Environmental Satellite Data and Information Service (NESDIS). This department supplies all types of data the users ask for. In the 2008 Accomplishment Report, the Assistant Administrator Mary E. Kicza wrote; "NESDIS is dedicated to enhancing public safety, economic vitality, and environmental sustainability by gathering, processing, archiving and distribution vast amounts of environmental data. These data are essential to everyone from research scientists to weather forecasters to the public. Through this mission, we touch the lives of millions of peoples every day."

### Securing Recruiting

Recruiting young people with regard to working within organisations like NOAA, different types of actions have been carried out, some aimed at raising an interest as early as at high school levels, others again are aimed at college level, however, they are all aimed at creating an interests in science, and ultimately aimed at making young people choose a career within space research.

One such programme, The NOAA Ernest F. Holdings scholarship programme, is designed to increase undergraduate training in oceanic and atmospheric science, research, technology and education; foster multidisciplinary training opportunities; increase public understanding and support for stewardship of the ocean and atmosphere. The intention, obviously, is to increase the number of students who undertake course work and graduate with degrees in targeted academic fields integral to NOAA's mission.

Another institution with the same goal is the Cooperative Remote Sensing Science and Technology Center (CREST). One of their major goals is to recruit, mentor and train graduate students in science, engineering and technology areas of relevance to NOAA, with special emphasis on traditionally underrepresented groups.

One initiative, especially designed for the general public, is the Smithsonian National Museum of Natural History. It is the largest museum exhibit dedicated to ocean science, and it uses major datasets from the NOAA satellite and Information

Service. Here the public can view how oceans circulate and transport heat, and how the atmosphere interacts with the ocean to form hurricanes etc. For young people, a visit here may create a growing interest for the field of natural science.

### NOAA's satellites

NOAA currently operates 16 meteorological satellites in 3 separate constellations. The future NPOESS constellation will merge the two polar orbiting constellations into a single programme, and there will only be two constellations, the geostationary and the polar orbiting.

#### **Geostationary Operational Environmental Satellites (GOES).**

The GOES system maintains a continuous data stream from two-GOES systems in support of the National Weather Service requirements. NOAA has two operational GOES satellites hovering 36,000 km above the equator – GOES-12, in the east, and GOES-11, in the west – each provide continuous observations of environmental conditions of North, Central and South America and surrounding oceans. These two satellites are now completed with the GOES-13 and 14, preliminary in spare positions.

#### **Polar Operational Environmental Satellite (POES).**

The POES satellite system offers the advantage of daily global coverage, with morning and afternoon orbits that deliver global data, for improvement of weather forecasting. The information received includes cloud cover, storm location, temperature, and heat balance in the earth's atmosphere.

Through the Joint Polar System, the satellite system is completed with the operational European Metop Satellite as a morning satellite. The POES satellite system offers the advantage of daily global coverage, by making close polar orbits roughly 14.1 times daily. Since the number of orbits per day is not an integer the sub orbital tracks do not repeat on a daily basis, although the local solar time of each satellite's passage is essentially unchanged for any latitude.

#### **Defence Meteorological Satellite Program (DMSP)**

The Defence Meteorological Satellite Program (DMSP) is a Department of Defense (DoD) program run by the Air Force Space and Missile Systems Center (SMC). This system is now incorporated in the new NPOESS.

#### **The National Polar-orbiting Operational Environmental Satellite System (NPOESS)**

The National Polar-orbiting Operational Environmental Satellite System (NPOESS) and its managing Integrated Program Office (IPO) were established in 1994 to converge existing Air Force, NASA & NOAA polar-orbiting satellites into an integrated national program. The National Polar-orbiting Operational Environmental Satellite System (NPOESS) is the next generation of low earth orbiting environmental satellites. The NPOESS will circle the Earth approximately once every 100 minutes. During these rotations, the NPOESS will be providing global coverage, monitoring environmental conditions, collecting, disseminating and processing data about the Earth's weather, atmosphere, oceans, land, and near-space environment.