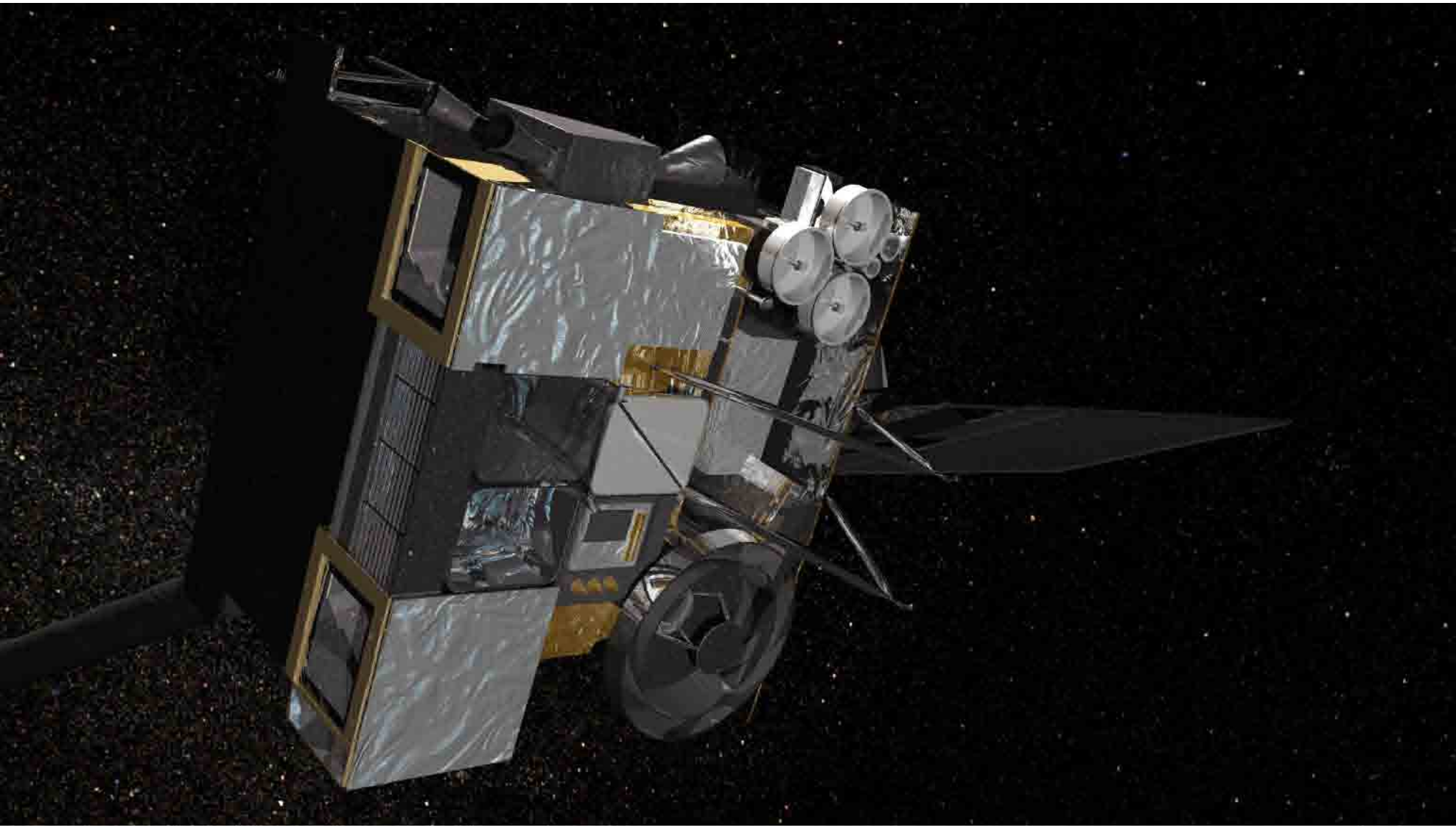
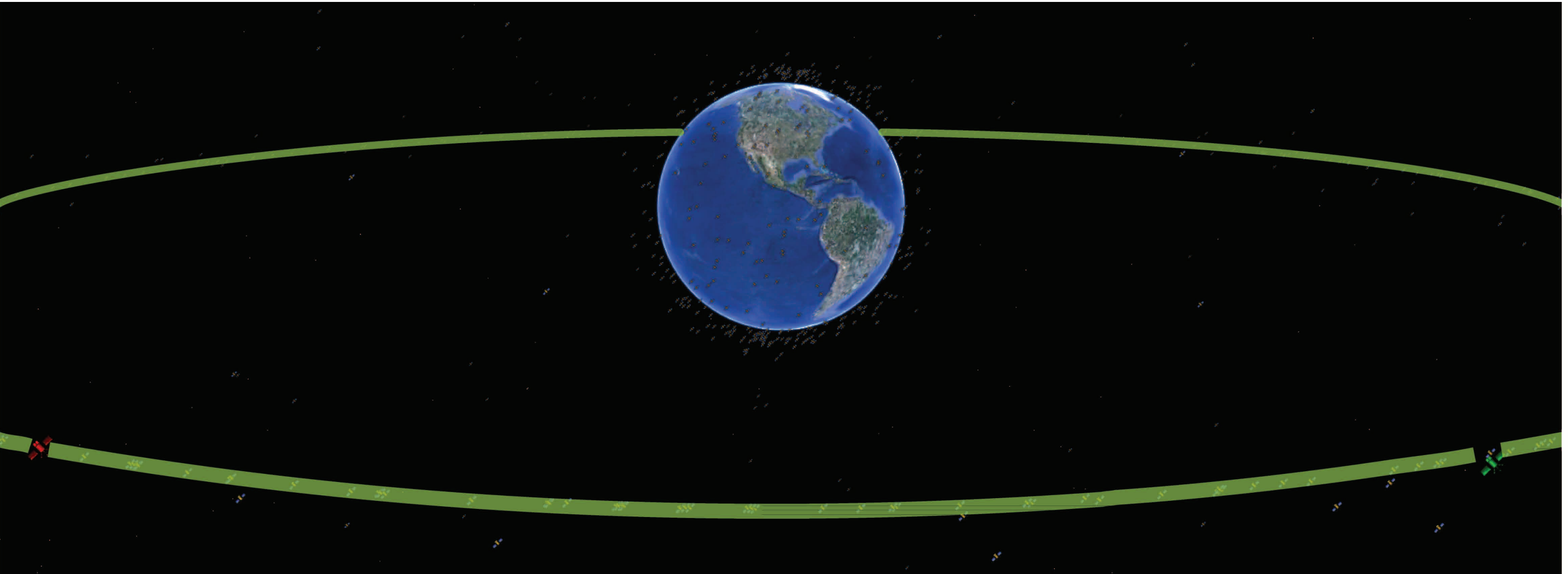


# Geostationary Satellites



Artist's depiction of GOES-O, launched June 27, 2009, renamed GOES-14.  
Credit: NASA

Engineers choose a geostationary orbit when the purpose of a satellite is to monitor a particular part of the earth every few minutes, or relay communications from one part of the earth to another. The orbit places a satellite in equilibrium with the rotation of the earth and its gravitational pull. A geostationary satellite is effectively parked 22,236 miles (35,790 km) above the Earth's equator at a fixed longitude relative to the Earth's surface.



There are about 300 geostationary satellites forming a ring around the Earth. This diagram shows GOES-West (front left, colored red) parked above longitude 135W, and NOAA GOES-East (front right, colored green) parked above longitude 75W. Transmissions from these two satellites and others are received at the Space Science and Engineering Center on the campus of the University of Wisconsin-Madison.  
Credit: Google Earth, AGI, and Sam Batzli, Space Science and Engineering Center, UW-Madison.

## The GOES System

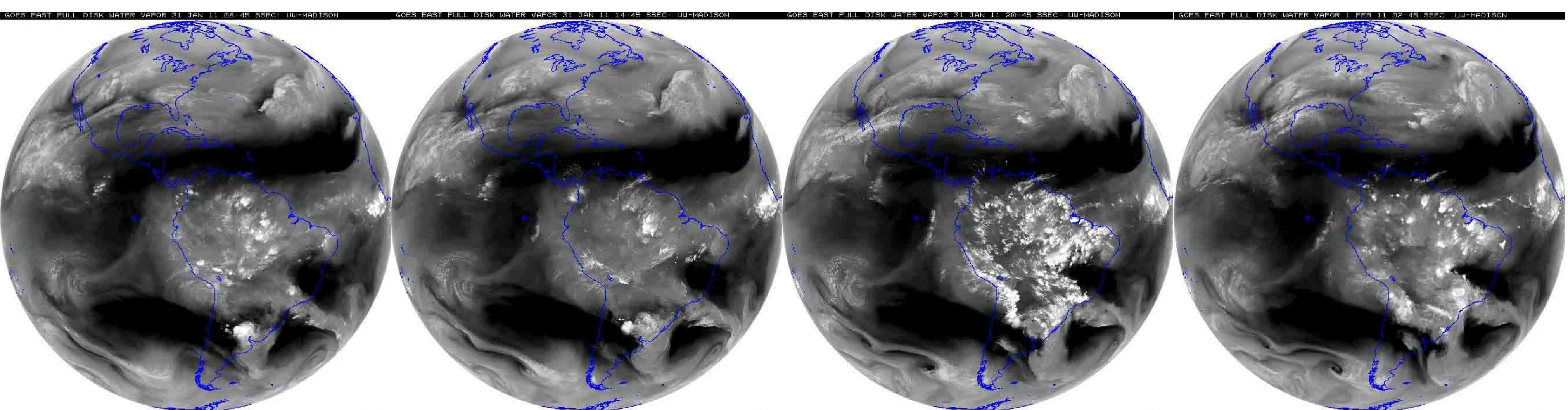
The Geostationary Operational Environmental Satellite (GOES) system is operated by NOAA-NESDIS (The National Oceanic and Atmospheric Administration - National Environmental Satellite Data and Information Service). The system supports weather forecasting, severe storm tracking, and meteorology research. Spacecraft and ground-based elements of the system work together to provide a continuous stream of environmental data. The National Weather Service (NWS) uses the GOES system for its United States weather monitoring and forecasting operations. Scientific researchers use the data to better understand land, atmosphere, ocean, and climate interactions. Since the launch of SMS-1 in 1974, GOES satellites have been a basic element of US weather monitoring and forecasting.



The Space Science and Engineering Center (SSEC) is housed in the Atmospheric Oceanic and Space Sciences Building. The rooftop instrumentation cluster to the right includes satellite dishes for receiving GOES transmissions. Credit: Maciej Smuga-Otto

## GOES and SSEC

The University of Wisconsin-Madison Space Science and Engineering Center (SSEC) has a unique relationship with the GOES program. The very first geostationary satellite carried an instrument developed by Dr. Verner E. Suomi of UW-Madison. Today scientists from the NOAA's Advanced Satellite Products Branch (ASPB) work on-site with SSEC researchers to develop and test processing algorithms that use GOES data. In addition to monitoring severe weather, GOES observations have proven helpful in monitoring dust storms, volcanic eruptions, sea surface temperatures, and forest fires.



The NOAA GOES-East satellite monitors Earth from its geostationary position at longitude 75W. These images of water vapor were captured six hours apart. Real time animations are available at: <http://www.ssec.wisc.edu> or by use of the QR code in this exhibit case.