



Marvels of engineering, they fly hundreds of miles above the Earth. Twenty-four hours a day and seven days a week they observe and take measurements of Earth's atmosphere and surface. For more than fifty years weather satellites have provided never before seen snapshots and unprecedented details about Earth and its atmosphere, allowing us the opportunity to study and begin to understand the complex processes at work that create our weather and affect our lives.

Today we turn on our TVs, our computers, or even use our smart phones to check the weather. The information is right there in front of us, at our fingertips. It wasn't always this way. And the road to today's weather satellite technology began here in Madison, Wisconsin more than half a century ago.

The Beginnings

Verner Suomi, a University of Wisconsin professor of meteorology, along with Robert Parent, a University of Wisconsin professor of electrical engineering, began devising experimental meteorological instruments to be launched into space in the 1950s. They, along with scientists and engineers around the world, were concentrating their efforts in advance of the first International Geophysical Year, which was to open in July 1957. One of the year's goals was to produce a "small, unmanned, earth-circling satellite vehicle to be used for basic scientific observations."

On 13 October 1959 Suomi and Parent achieved a major milestone when the first successful meteorological experiment was launched on Explorer 7. Their radiometer made it into orbit and operated as envisioned. A full scale model of the satellite and instrument is on display in this exhibit.



Today

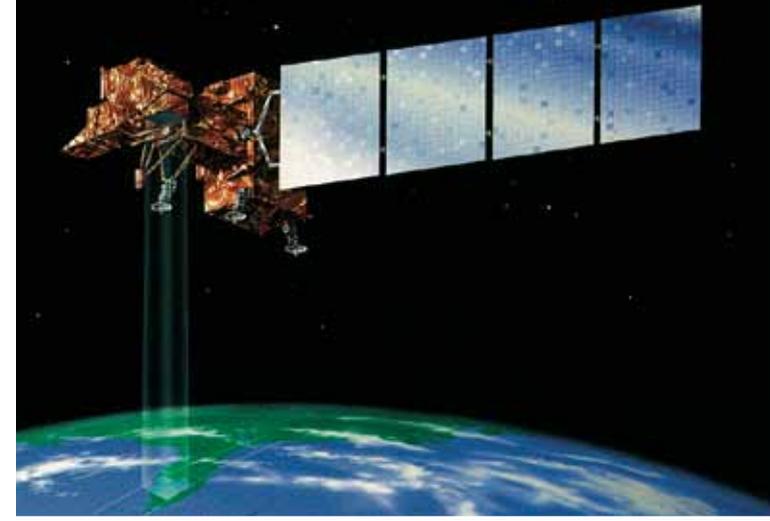
Satellite remote sensing provides scientists with observations about the Earth that are processed, parsed, and analyzed to give us a better understanding of our oceans, land and atmosphere. Scientists at the University of Wisconsin-Madison continue to be world leaders in satellite remote sensing. This exhibit provides some examples of how satellites provide information, specifically information about Wisconsin.

Wisconsin Seasons

Scientists use satellite images to monitor the changing vegetation. In addition to large seasonal changes, satellite images provide information on changes associated with the health of vegetation. We also take note of when satellite observations first show the land beginning to "green" each year, which may point to a longer growing season.

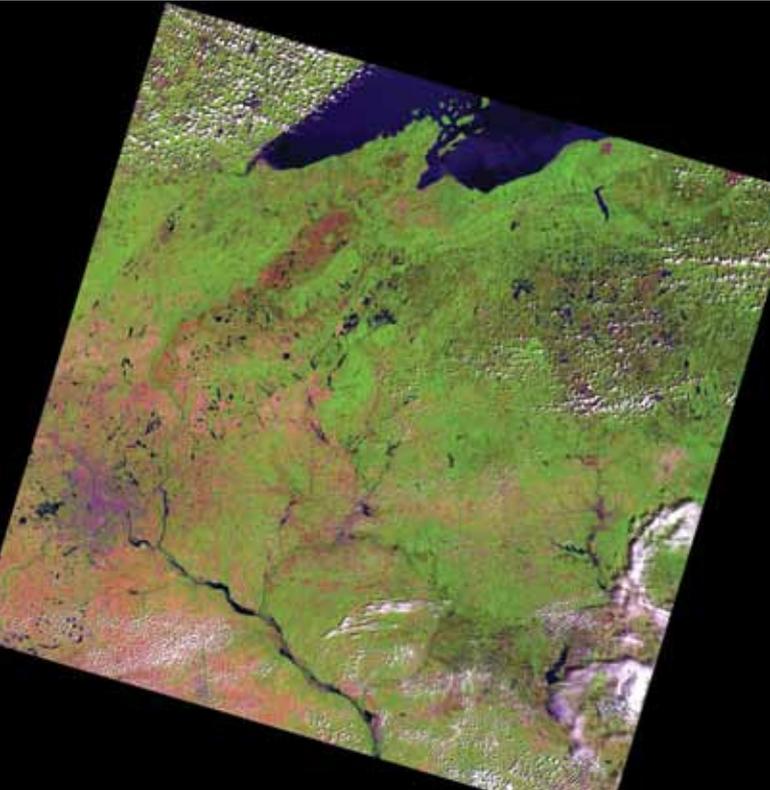
3-D Images

Satellite images of WI in 3-D are from a radar flying on the space shuttle while in orbit. Glasses are provided for viewing this exhibit case. There is also an animated globe on display that provides satellite and weather observations around the world.



Wisconsin Weather

Weather satellite animations shown on evening news and internet sites are based on an instrument and computer software first designed at UW-Madison. This exhibit shows some interesting cloud features caught by satellite instruments. Notice the fog over Lake Michigan and how it interacts with the WI shoreline. Airplanes make linear clouds called contrails, but they also punch holes through some clouds, leaving behind wormy looking structures in the cloud field.





Quickbird Satellite Madison

Wisconsin Landscapes

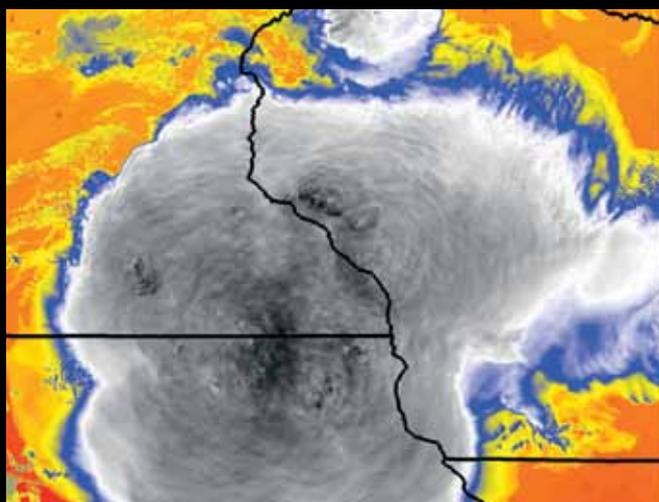
Agriculture fields and city boundaries are seen in high spatial resolution images. The impact of cities on the regional temperature and precipitation are studied with satellite observations. Changes in the landscape due to natural phenomena, such as tornadoes and flooding, are also observed and measured with satellites.

Wisconsin Lakes

Wisconsin has more than 10,000 lakes. We can use satellites to assess the chlorophyll concentration in the lakes, the lake water temperatures and the amount of ice on a lake.



Ice on Lake Superior



Severe Thunderstorm

The Future

UW-Madison scientists are also preparing for future Earth observing satellites, from helping to determine the type of instruments and the capabilities that will fly onboard to conducting research on the impact of their new and improved measurements. One such next generation weather satellite is known as GOES-R. In addition to monitoring cloud patterns, this satellite will also report lightning flashes. Scientists are also working on a future climate satellite known as the Climate Absolute Radiance and Refractivity Observatory (or CLARREO). Learn about these, and other uses of satellite observations at our web site:

www.ssec.wisc.edu/airportexhibit



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Tandem Press, a self supporting entity, is affiliated to the Department of Art in the School of Education at the UW-Madison. It shares the university mission by teaching, undertaking research into new and old printmaking techniques, and by conducting outreach programs to help educate the public about art in general, and printmaking in particular.

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Satellites See Wisconsin