

Director's Note

Suomi NPP is the first Earth science or weather satellite named for an individual. Professor Verner E. Suomi was a true pioneer, an enthusiastic scientist and educator, and a champion for international cooperation in atmospheric exploration. This edition of *Through the Atmosphere* examines the wide-ranging efforts that SSEC, the institution that he co-founded, is making to insure Suomi NPP's success, along with a bit of historical context.

The Suomi NPP spacecraft introduces the first truly new NOAA operational satellite series since the 3-axis stabilized GOES series began in 1994. The first U.S. element of the Joint Polar Satellite System (JPSS), Suomi NPP/JPSS offers many advances compared to the current NOAA series that debuted in 1978 on TIROS-N.

The connection between NPP capabilities and Vern's legacy is outlined below:

1. In 1959, Verner Suomi's instrument on Explorer 7 made the first measurements of the

2. The Applications Technology Satellites (ATS), launched into geostationary orbit in 1965 and 1966, carried the spin-scan camera conceptualized by Suomi to make movies from which cloud motion winds could be measured. The Visible Infrared Imager Radiometer Suite (VIIRS) on Suomi NPP will add to the long record of atmospheric winds with high latitude observations of cloud motions between consecutive polar orbits. Vern's drive to provide wind measurements for improving weather forecasts motivated SSEC's Man-computer Interactive Data Access System (McIDAS), the first serious computer system for processing satellite data.
3. Suomi's pioneering efforts in sounding temperature and water

vapor profiles using infrared emitted radiation were realized in 1980, with the VISSR Atmospheric Sounder, the first sounder to fly in geosynchronous orbit. Suomi NPP includes the Cross-track Infrared Sounder (CrIS) sounder, its higher spectral resolution advancing the capabilities of heritage sounding instruments. Much of the development for CrIS was done at SSEC. Suomi NPP also carries the Advanced Technology Microwave Sounder (ATMS) that uses microwave emissions from the Earth to sound the atmosphere.

A fifth instrument, the Ozone Mapper Profiler Suite, extends the 25-plus year record of total-ozone and ozone-profiles and also monitors aerosol properties. Vern would be pleased by this, too.

We have years of interesting work ahead to make sure that the data, results, and impact of this new satellite live up to its new name.

Hank Revercomb
Director, SSEC

INSIDE THIS ISSUE

SUMMER 2012

Satellite Meteorology History: A View from Madison.....	1
The Suomi National Polar-orbiting Partnership - NASA's Newest Earth Observing Satellite	2
VIIRS - A Better Look at Clouds	4
Highlights of Recent Publications	7
Honors and Awards	7
VIIRS - A Better Look at Polar Winds	8
Early Checkout of the Cross-track Infrared Sounder (CrIS) on Suomi-NPP	10
SSEC Satellite Meteorology History.....	Centerfold
Sounding the Atmosphere - from TIROS to Suomi NPP	14
Community Satellite Processing Package Transforms Data from Suomi NPP	17
SSEC Partners with NWS to Support AWIPS.....	19
McIDAS-V - Suomi NPP ATMS, VIIRS, and CrIS Analysis and Visualization	20

University of Wisconsin-Madison
Space Science and Engineering Center
Cooperative Institute for Meteorological Satellite Studies



Cover image: The Suomi NPP satellite and an image of the Earth, taken from the Visible Infrared Imager Radiometer Suite instrument aboard Suomi NPP.
Image Credits: NASA/NOAA/GSFC/Suomi NPP/VIIRS/Norman Kuring.

Satellite Meteorology History: A View from Madison

For more than 50 years, the University of Wisconsin-Madison has been a leader in devising ways to view our planet through the eyes of a satellite. In particular, scientists at the UW-Madison Space Science and Engineering Center (SSEC) have been at the forefront of developing the satellite technology that makes it possible to measure and study the intricate processes occurring on the Earth's surface and in the atmosphere. Some of the earliest experiments, beginning in the 1950s, were led by Professor Verner E. Suomi and Professor Robert J. Parent, co-founders of SSEC.

The world's fascination with space exploration followed quickly on the heels of the 1957 International Geophysical Year (IGY) and the Soviet Union's successful launch of Sputnik later that same year. The National Aeronautics and Space Administration (NASA), founded in 1958, paved the way for 'peaceful and scientific' exploration of space in the United States - not only funding scientific research programs, but providing funding to establish research centers like SSEC.



Thematically, the evolution of satellite meteorology at SSEC is characterized by eras of specific scientific needs and objectives realized by focused scientific programs and technologies. With the advantage of hindsight, one scientific achievement appears to lead seamlessly and logically to the next:

- solving the problem of how to measure the Earth's radiation budget from a satellite platform in the 1950s with the Suomi/Parent bolometer, and later, the low-resolution-omni directional radiometer that was to fly on the TIROS series of satellites; led to
- observing cloud dynamics and global wind distribution in the 1960s with the Spin Scan Cloud Camera on the Applications Technology Satellite; was followed by
- temperature and water vapor profiling and forecasting improvements in the 1970s with the development of the VISSR Atmospheric Sounder (VAS) and global-scale weather experiments like FGGE; this fostered
- the earliest Man computer Interactive Data Access System (McIDAS) in the 1970s and 1980s invented to measure cloud motion winds and to visualize and analyze the volumes of data; then
- forecasting improvements and the next generation high-resolution interferometric sounders in the 1990s and into the 21st century, including hyperspectral sounders and continued advancements with the GOES series of satellites and the naming of Suomi NPP.



Continuous observations of the Earth's atmosphere from space revolutionized scientists' understanding of the motions of the atmosphere, paving the way for more accurate weather forecasts and more timely and precise warnings for severe weather. Suomi's contributions set the foundation for the technologies that made the routine observing of the Earth's weather from space possible. For those contributions, he is widely considered to be the "father of satellite meteorology."

With the establishment at the UW-Madison of the Cooperative Institute for Meteorological Satellite Studies (CIMSS) in 1980, environmental satellite research was bolstered through a more formal working relationship with the National Oceanic and Atmospheric Administration (NOAA) and NASA. NOAA stations scientists at CIMSS to work side-by-side with Wisconsin researchers to continue the pioneering research begun by Suomi. But the work and innovation did not end with Suomi's passing in 1995. On the contrary, his vision set the stage for the next generation of advancement and innovation in the science of understanding our weather and climate.

The timeline in the center of this publication, captures significant events of SSEC's half century of milestones in satellite studies of the Earth in a visual and interactive format. In sum, these great achievements and advances made the case for renaming the NPOESS Preparatory Project (NPP) Suomi NPP, in honor of the late Verner E. Suomi.

Jean Phillips
Leanne Avila

Professor Verner Suomi, 1915 - 1995