



# Telemetries

Bytes of Information From TeraScan®

## New Trends in TeraScan®

The increasing availability of low-cost direct broadcast terminals has continued to drive both the research and the operational communities towards a “must have” mindset when it comes to satellite data. Last year alone we delivered eight new MODIS systems -- more than any other organization in the world -- from Sardinia to Antarctica. This is a good thing! SeaSpace’s user base expands as the community itself grows, and this influx of new users with new applications continues to influence the growth of the TeraScan family of products. Indeed, it is our collaboration with SeaSpace users that keeps us up to date on trends in the community and user requirements for TeraScan. A number of these important collaborations came to fruition in the past year. Two of note are our research partnership with the University of New Mexico’s Center for Rapid Environmental Assessment and Terrain Evaluation (CREATE), and our charter affiliation with the Sino-American Cooperative Laboratory for Remote Sensing, based at the Nanjing Institute for Earth and Information Sciences.

### Open Architecture is Your Gateway

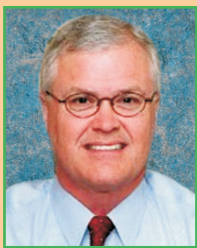
One of the important new trends evident to everyone in the industry is the drive towards “open architecture” systems. That’s a broad term that can mean anything from “open source” (e.g., Linux itself) to published interfaces. But the underlying philosophy is the same: to give users the flexibility and control they need to meet their needs. Earth science researchers in particular want to be able to write their own algorithms and data viewers, exchange data sets, and so forth. TeraScan has made a big step in this direction with its current release: for the first time ever, we are making the TDF file specification publicly available, as well as releasing source code for the TDF libraries. Now, users everywhere, even those who do not currently own TeraScan systems, can create TDF applications. TDF, has, of course, been emerging for years as a de facto major standard for remote sensing data, and we believe that by opening it up in this way, we can accelerate that trend.

In the same vein, we want TeraScan to “play well with others” in an even broader set of disciplines than it currently supports. It’s for that reason that we are significantly broadening TeraScan’s import/export capabilities to include a very broad array of file formats.

Finally, emphasizing our “openness” trend once again, we encourage all our users, and the community as a whole, to take advantage of SeaSpace’s new Web Forum. Point your browser to <http://forums.seaspace.com> and start interacting online with the worldwide base of hundreds of TeraScan® users, as well as SeaSpace staff itself. You can post information, exchange data, and even request new features. We look forward to seeing you there. ▶

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Bruce Waddell  
President, CEO

## The SeaSpace Spotlight

SeaSpace is entering its third year as a member of the Allied Defense Group family. We are continuing to refine our position as the world leader of ground stations (systems) to receive and process data from weather and environmental satellites. Our mission is: "Empowering our customers to improve the understanding, safety, security, and enjoyment of our global environment."

We underwent some major developments in 2004. We established an Antenna Division to manufacture our own antennas, enabling us to support our traditional core ground station market and allowing us to penetrate other markets. SeaSpace's Antenna Division will offer a complete line of new TeraScan® antenna products employing SeaSpace's new AXYOM technology (patent applied for). AXYOM technology represents lower acquisition cost, increased performance and reduced life-cycle costs for SeaSpace customers.

We also continued to improve and expand our core TeraScan® product line. We continue to receive and process data from a greater number of satellites than any of our competitors. We added data acquisition and processing capabilities for three new satellites and expanded TeraScan to incorporate new capabilities such as a web-based data browser. The market responded, favoring us with major systems sales around the globe.

Finally, we achieved ISO Space 9001:2000 certification in 2004 — an accomplishment that improves our competitive posture throughout the world. These developments set the stage for an exciting 2005.

# Sea Surface Temperatures from Geostationary Operational Environmental Satellites

## Real-Time Images Provide Critical Data for the Navy

The Naval Oceanographic Office (NAVOCEANO), located at Stennis Space Center MS, began generating Sea Surface Temperature (SST) from Geostationary Operational Environmental Satellites (GOES) in January 2002. Two local SeaSpace GEO TeraScan Systems allow for the real-time ingest of GOES East and West Imager data. These data supplemented the SST retrievals already being generated operationally from the Polar Operational

Environmental Satellites (POES) global Advanced Very High-Resolution Radiometer (AVHRR) data.

Although the coverage of GOES data is not global, like that of AVHRR, its temporal sampling is much more frequent. Clouds can obstruct the satellite infrared

radiometer's view

of the ocean surface, making it impossible to calculate SST. However, GOES can view a location as often as once every 15 minutes, increasing the likelihood of viewing that scene when it is unobstructed by clouds.

NAVOCEANO processes all but the CONUS sector from GOES East and the PACUS sector from GOES West. The spatial resolution of the GOES data is nominally 4 km. The SST algorithm uses a 3 x 3 array to generate a 12-km SST retrieval. In

one day, more than 4 million SST retrievals are generated from the combined coverage of GOES East and West (Figure 1).

## Data Available to the Public

NAVOCEANO's GOES SST data have been publicly available on the U.S. Global Ocean Data Assimilation Experiment (GODAE) Monterey server at <http://www.usgodae.org> since February 2002. GODAE is a practical demonstration of near-real-time, global ocean data assimilation that provides regular, complete descriptions of the

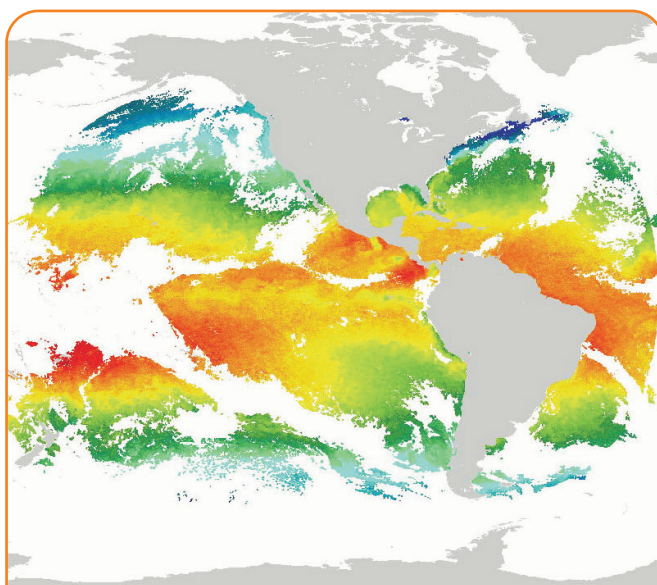


FIGURE 1: 24-hour SST coverage from GOES East and West

temperature, salinity, and velocity structures of the ocean in support of operational oceanography.

The main operational use for GOES SST data at NAVOCEANO is for the Shallow Water Analysis and Forecast System (SWAFS). SWAFS runs daily at NAVOCEANO and produces forecasts of ocean temperature, salinity, 3-dimensional ocean currents, and sea surface heights for various regions.

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## Sea Surface Temperatures (cont.)

### Composite Images Aid Forecast Ability

Warmest SST composites are also generated from the GOES Imager data. SSTs are calculated for each 4-km pixel of GOES Imager data available for selected regions. Data for 24 to 48 hours are collected, and the warmest SST pixel at each location is used to generate the final composite. This technique provides a generally cloud-free image at moderate resolution.

Figure 2 is an example of a 48-hour composite of the Gulf of Mexico showing detailed structure of the loop current. These images can be looped to provide an animation of surface current flow dynamics based on SST. The Navy uses these composites along the East Coast to overlay hurricane forecast tracks to see when a storm is approaching warmer surface waters, which might intensify the storm.

The SeaSpace GEO TeraScan Systems have provided NAVOCEANO with another data source for SST processing in support of Navy operations. ▶

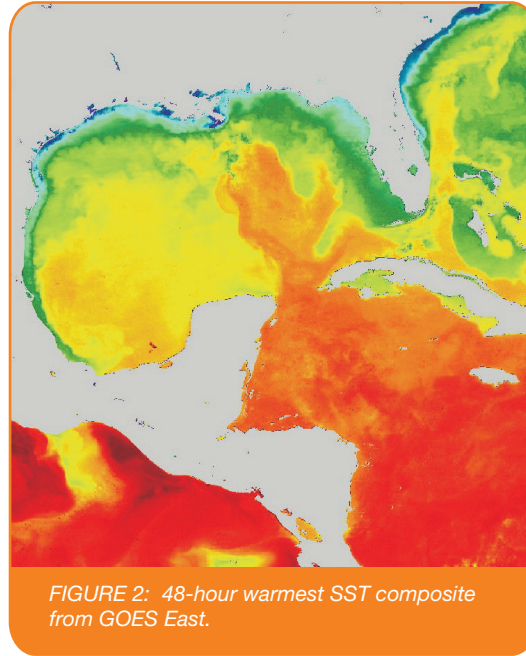


FIGURE 2: 48-hour warmest SST composite from GOES East.

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## Inside SeaSpace

### 15th International SeaSpace Remote Sensing Conference

SeaSpace Corporation is pleased to invite you to our 15th International SeaSpace Remote Sensing Conference. This conference, co-sponsored by The University of Texas at Austin, Center of Space Research (CSR), and SeaSpace Corporation, will be held in Austin, Texas April 11-14, 2005. We are currently seeking attendees interested in submitting a paper or poster. This meeting will focus on satellite remote sensing for meteorology, oceanography, and land-use applications in academic and government research, as well as civil and military operations. Anyone with an interest in remote sensing is welcome! If you plan on attending, contact Kirsten Anderson at (858) 746-1116 or by e-mail kanderson@seaspace.com. For more information, please visit our web site at <http://www.seaspace.com/news/15thtscan.htm>.

### MetOp Capable Systems

SeaSpace is pleased to announce that our TeraScan® product family will support all of the heritage sensors on board the upcoming MetOp family of satellites in addition to the current NOAA series, SeaWiFS, and FY1-D. In addition, you can upgrade your system to acquire the X-band data from the current Terra and Aqua missions, as well as the NPP and NPOESS missions. For more information, contact sales@seaspace.com.

### Upcoming Events

**15th International SeaSpace Remote Sensing Conference**  
 ..... April 11 - 14  
 (Austin, Texas)

**ALTARUM** ..... May 17 - 19  
 (Halifax, Nova Scotia, Canada)

**ETTC 2005** ..... June 7 - 9  
 (Toulouse, France)

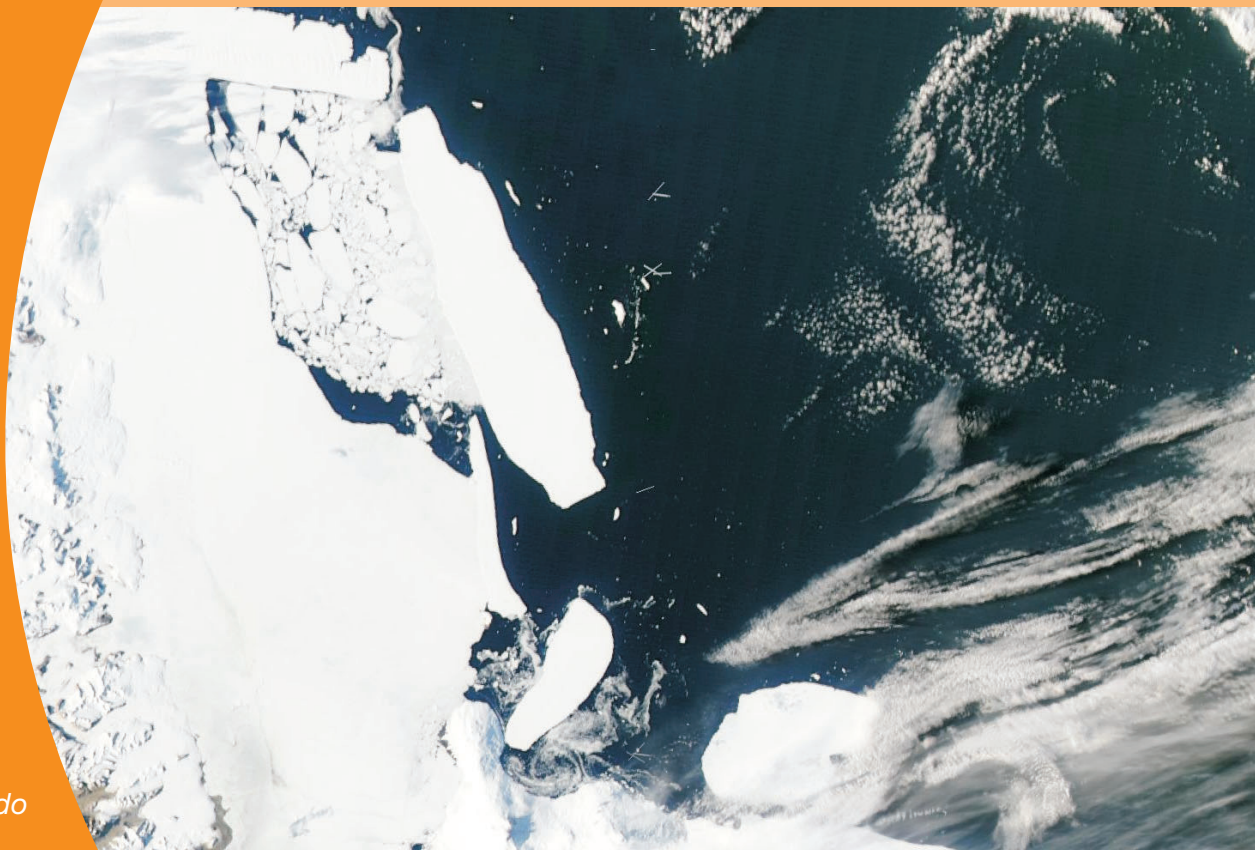
# Antarctic Ice Jam

## Cool Image

*This true color MODIS image is the first direct broadcast MODIS image obtained in Antarctica.*

*It was acquired and processed by Raytheon's new SeaSpace X-band system located at McMurdo Station, Antarctica (installed January, 2005)*

*MODIS image of B-15a iceberg as captured on January 27, 2005, by TeraScan EOS satellite ground station at McMurdo Station, Antarctica.*



*Image Submitted by: National Science Foundation, Raytheon Polar System, McMurdo Station. For information about this image, or to view the gallery of past images, visit us at our website at [www.seaspace.com/imagegallery](http://www.seaspace.com/imagegallery).*



Empowering our customers to improve the understanding, safety, security, and enjoyment of our global environment.

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