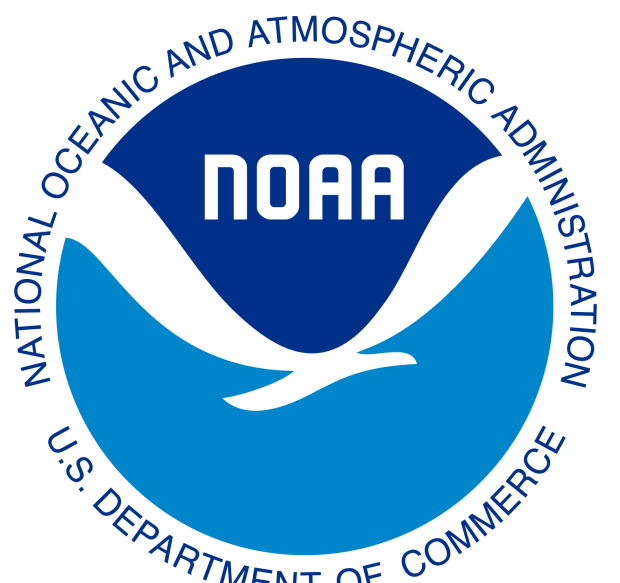




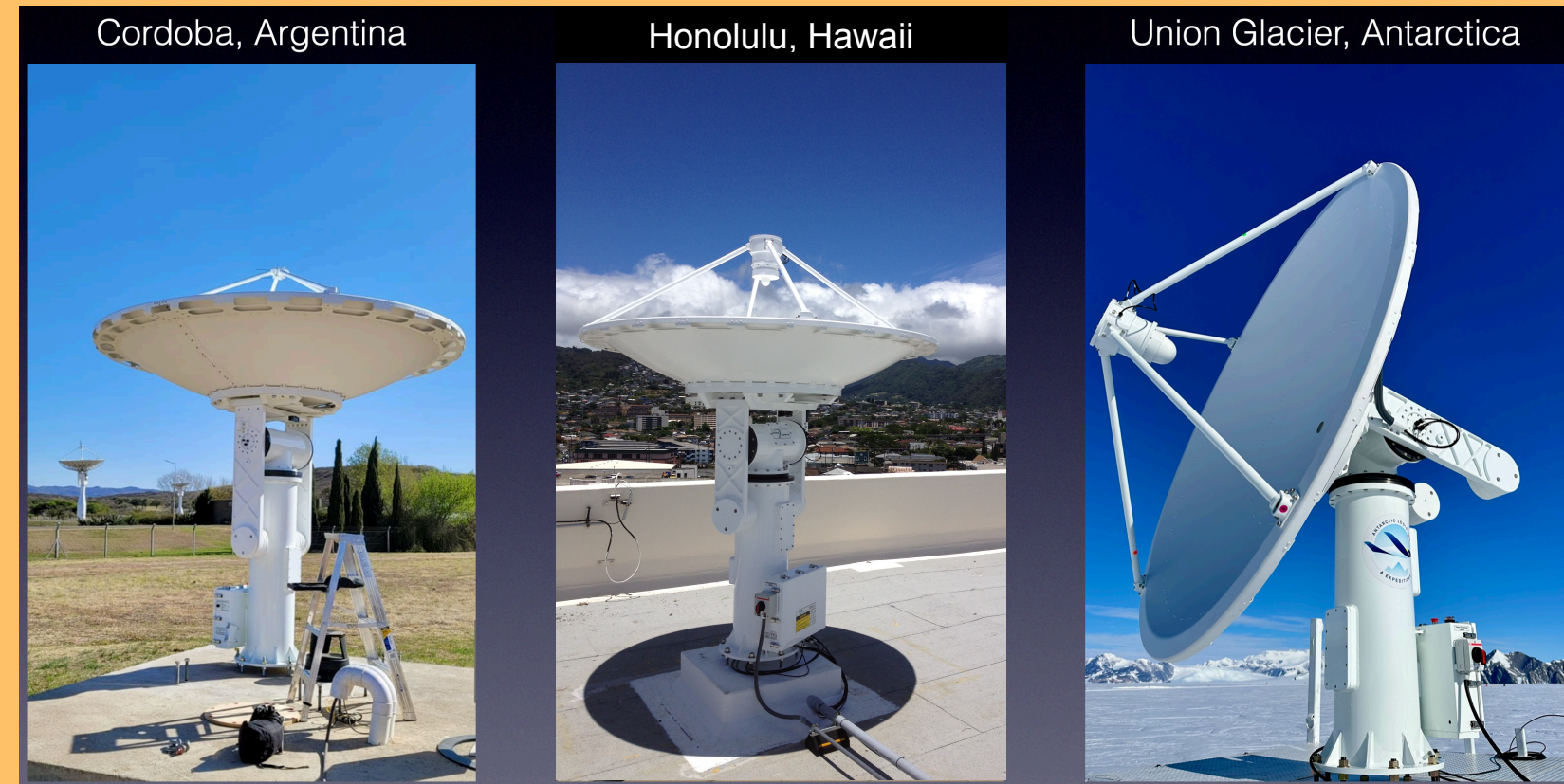
# Community Satellite Processing Package (CSPP) for LEO Satellites: Status and Plans

L. Gumley, K. Strabala, M. Odle, G. Cureton, T. Rink, B. Flynn, D. Schumacher, J. Braun, G. Martin  
Cooperative Institute for Meteorological Satellite Studies (CIMSS)  
Space Science and Engineering Center, University of Wisconsin-Madison



## 1. CSPP LEO Overview

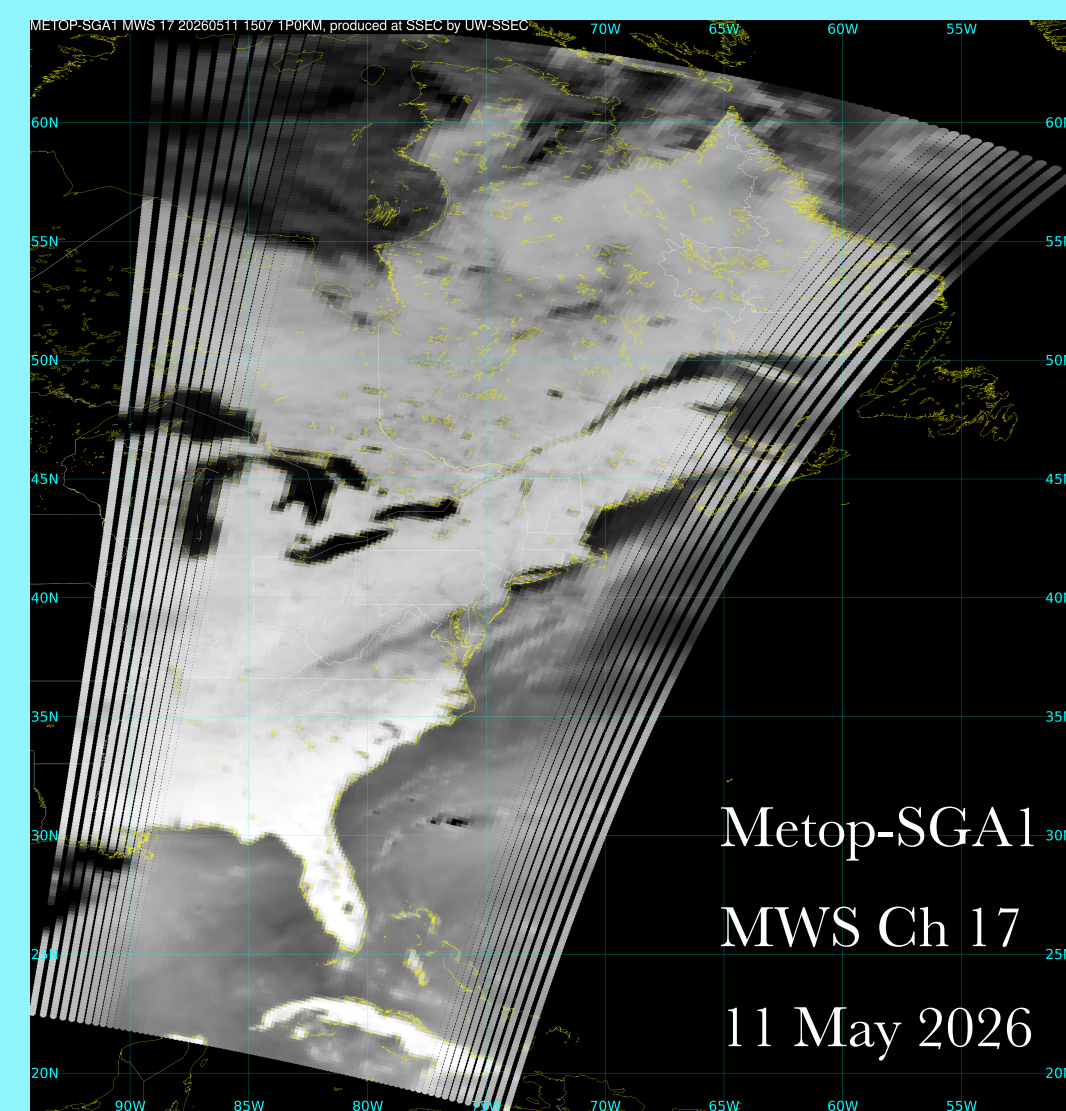
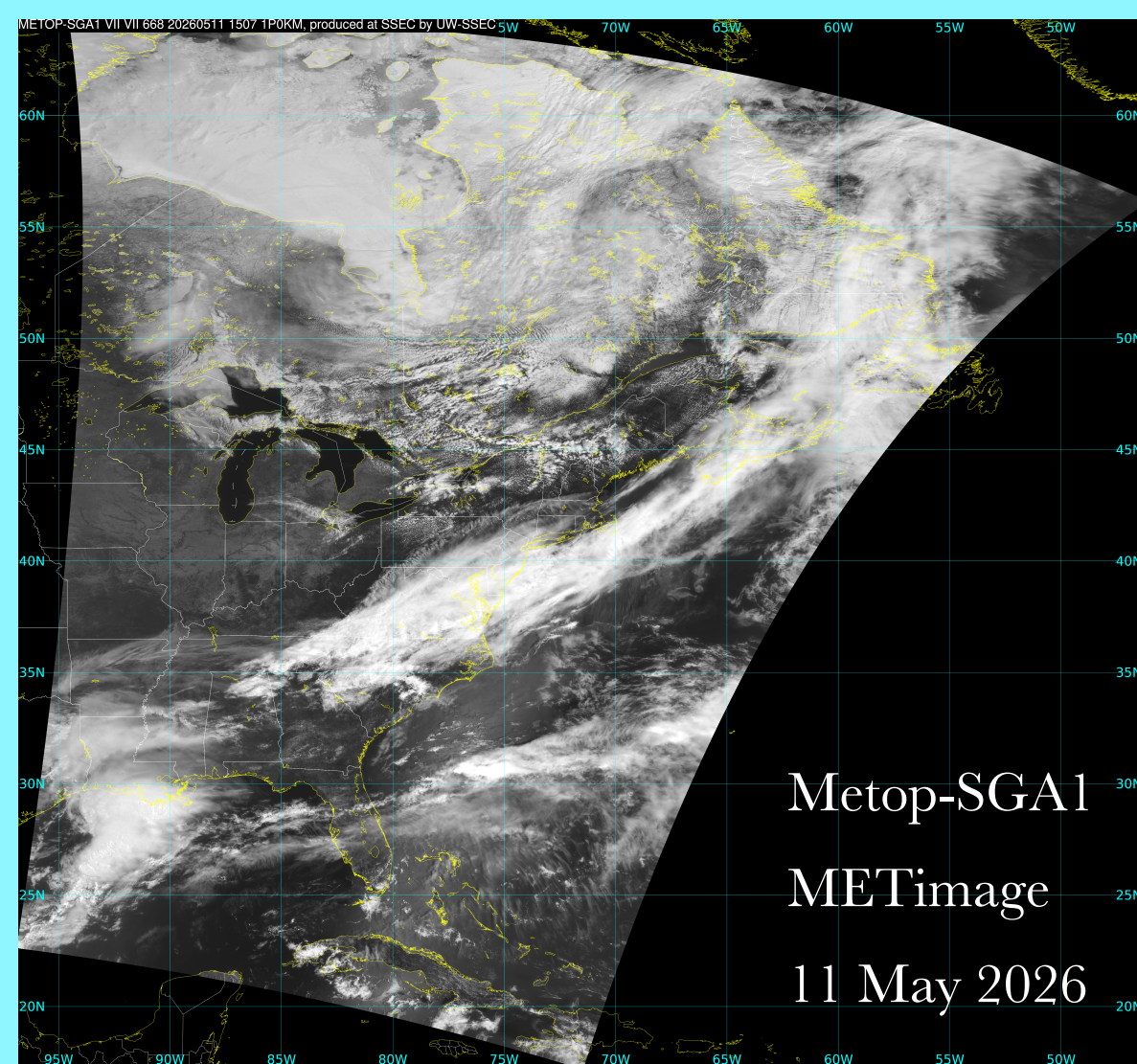
- The Community Satellite Processing Package (CSPP) for Low Earth Orbit (LEO) Satellites is a suite of freely available software for processing data received via direct broadcast from the JPSS, Metop, Metop-SG, EOS, GCOM, FY-3, and other satellite constellations.
- CSPP LEO supports (a) decoding of CCSDS packets to create Level 0 data; geolocation and calibration of sensor observations to create Level 1B data; image processing to create high quality imagery; and retrieval of atmosphere, land, and ocean parameters to create Level 2 products.
- CSPP LEO is funded by the NOAA JPSS program.



Examples of Direct Broadcast Antenna Sites where CSPP LEO is operational

## 2. CSPP LEO Antenna Infrastructure

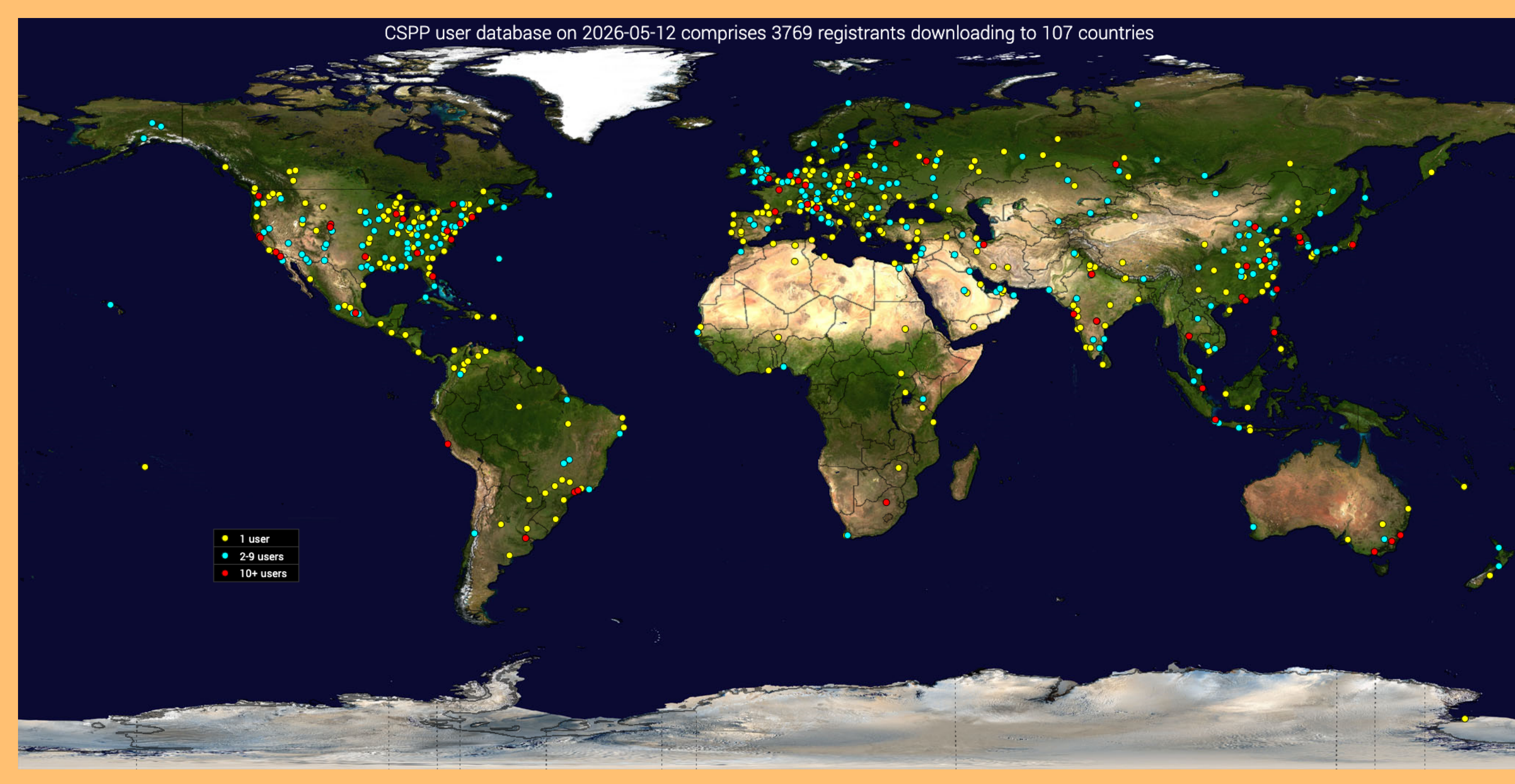
- CIMSS operates a network of X/L-band direct broadcast antennas with funding support from NOAA. Current operational antenna sites include Madison WI, Honolulu HI, Miami FL, Mayaguez PR, Monterey CA, and Barrigada, Guam.
- Antennas support reception of NOAA-21, NOAA-20, SNPP, Metop-B, Metop-C, Aqua, FY-3D, FY-3E, SARAL, HOPS, and Oceansat-3.
- Madison WI antenna supports Metop-SGA1 (see below) and AWS.



## 3. Who Uses CSPP LEO?

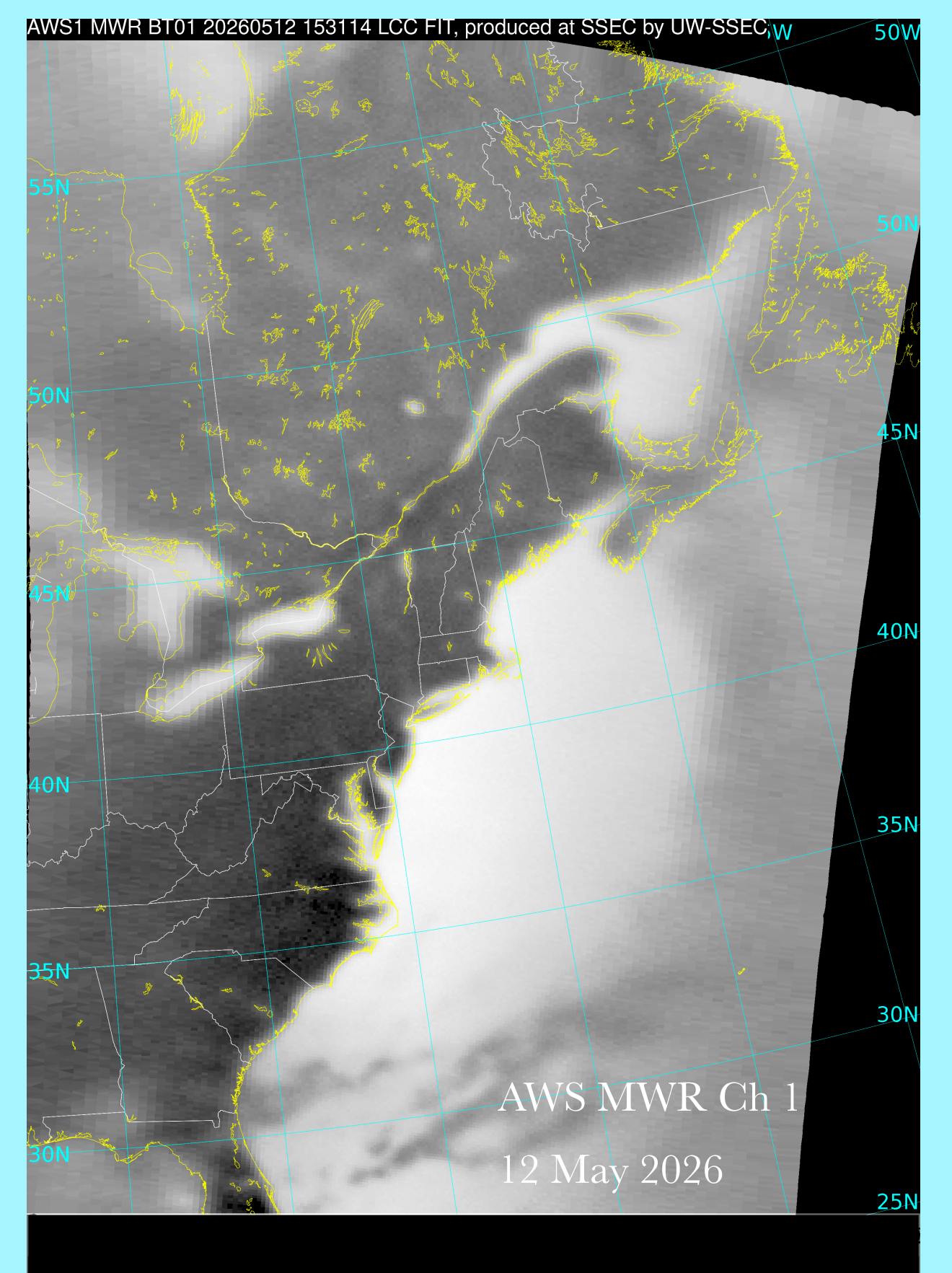
Examples of CSPP LEO users:

- US National Weather Service Forecast Offices in Guam and Honolulu create imagery (e.g., AMSR2, VIIRS) for tropical storm forecasting;
- NOAA, EUMETSAT, Meteo France, and other agencies create low-latency infrared and microwave sounder data for WMO DBNet;
- NOAA, NASA, GINA, SMHI, and GISTDA detect wildfires;
- IMD and ROFFS monitor sea surface temperature.



## 4. Supported Satellites & Products

- JPSS:** VIIRS, CrIS, ATMS, OMPS SDR, Imagery and Geophysical Products
- Metop:** AVHRR, AMSU, and IASI Imagery and Geophysical Products
- EOS:** MODIS and AIRS Imagery and Geophysical Products
- GCOM-W1:** AMSR2 Imagery and Geophysical Products
- FY-3:** MERSI Imagery
- AWS:** MWR Imagery



## 5. CSPP LEO Recent Progress

### SDR v4.1.1 (Mar 2026)

- Updated geolocation for ATMS

### Polar2Grid v3.2 (Mar 2026)

- New CSPP VIIRS Level 2 products; supports JPSS AWS Marketplace; added readers for Weather Satellite and CSPP GAASP Level 2.

### VIIRS EDR Cryosphere v1.0 (Jan 2026)

- Added support for NOAA-21; algorithms updated.

### VIIRS Surface Reflectance and Vegetation Index v2.0 (Dec 2025)

- Added support for NOAA-21.

### HEAP/NUCAPS v3.0 (Dec 2025)

- Added support for NOAA-21; algorithms updated.

### VIIRS Radiance Clusters v1.0 (Aug 2025)

- Creates BUFR product files containing CrIS radiances and collocated VIIRS radiance cluster statistics. Supports NOAA-20 and NOAA-21.

### VIIRS Flood Detection v2.0 (Jul 2025)

- Added support for NOAA-21; algorithms updated; run time improved.

### Advanced Clear-Sky Processor for Oceans v3.0 (Jun 2025)

- Added support for NOAA-21; algorithms updated; run time improved.

### VIIRS Atmosphere EDRs v1.0 (Mar 2025)

- Added support for NOAA-21; replaces VIIRS ASCII.

### SDR v4.1 (Dec 2024)

- Updated ADL version to Block 2.3 Mx10.

## 6. CSPP LEO Future Plans

### Software Updates

1. OMPS Ozone and Aerosol: Jul 2026
2. ATMS/AMSU Microwave Snowfall Rate: Aug 2026
3. VIIRS Land Surface Temperature and Emissivity: Sep 2026
4. OMPS Sulfur Dioxide: Oct 2026
5. Polar2Grid support for Metop-SGA1: Oct 2026
6. AMSR3 GAASP: Nov 2026
7. VIIRS Cloud, Aerosol, Volcanic Ash: Q1 2027
8. VIIRS ACSPO: Q1 2027
9. VIIRS Next Generation Fire System (NGFS): Q2 2027
10. RT-STPS support for JPSS-4: Q2 2027

### CSPP LEO Antenna Infrastructure

- Monterey CA upgrade to support Metop-SGA1 and AWS: Q2 2026
- Fort Collins CO commissioning: Q3 2026
- Mayaguez PR upgrade to support Metop-SGA1 and AWS: Q3 2026
- Honolulu HI upgrade to support Metop-SGA1 and AWS: Q3 2026
- Barrigada Guam upgrade to support Metop-SGA1 and AWS: Q4 2026