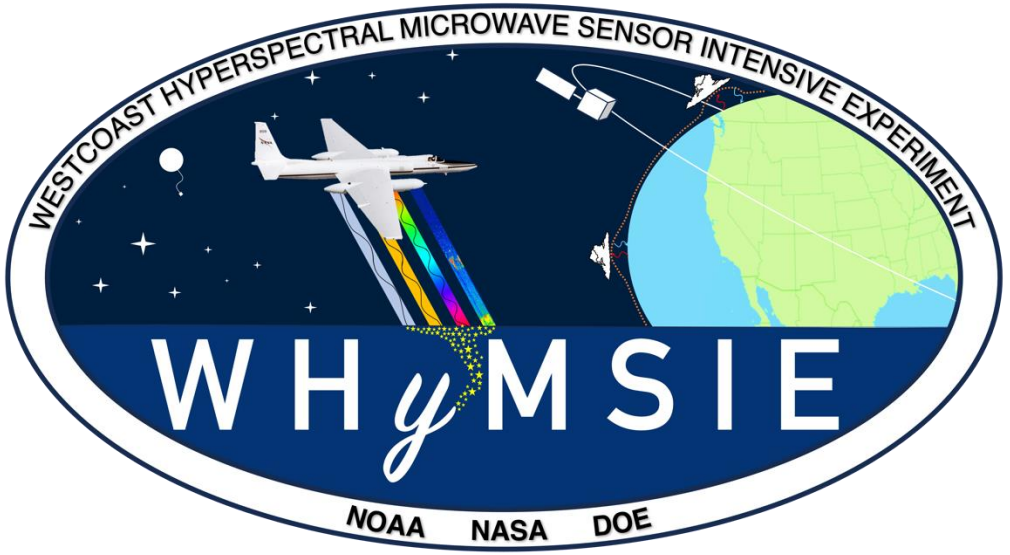
West-coast Hyperspectral Microwave Sensor Intensive Experiment

WHyMSIE

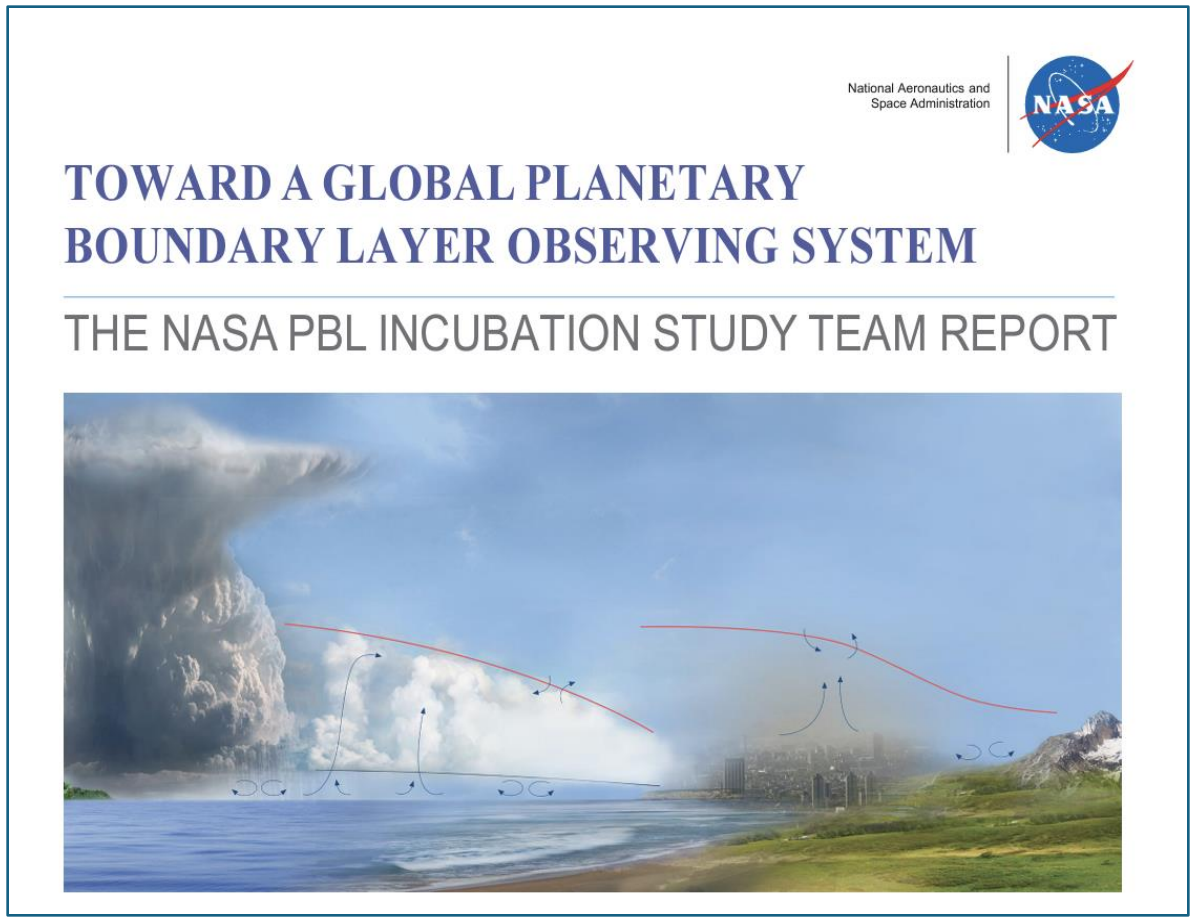


Antonia Gambacorta, NASA GSFC

Harnessing The Hearthland Workshop - Lincoln, NE

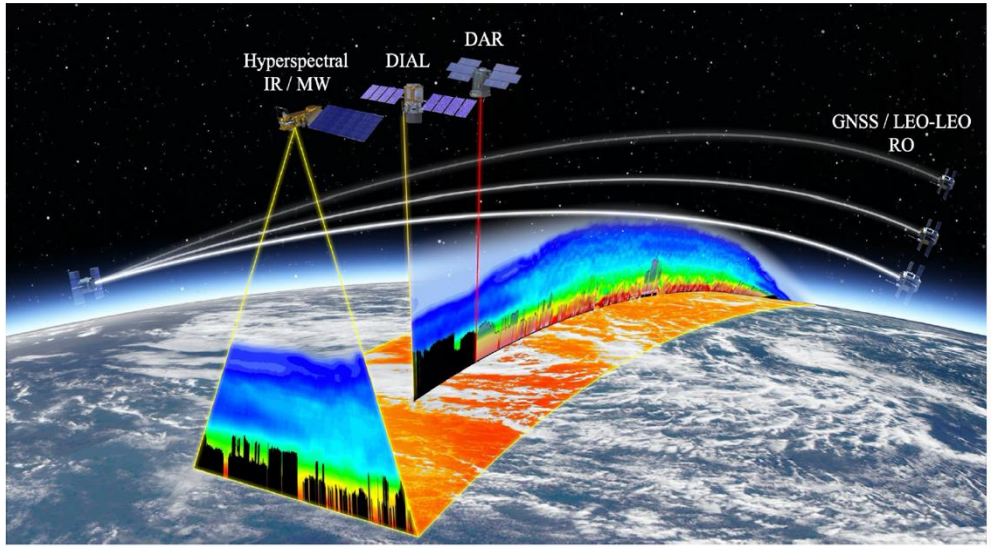
02 – 28 - 2024

WHyMSIE: To Demonstrate New Technology and Sounding Approaches for Improved Planetary Boundary Layer Sounding



Teixeira et al., 2021

https://science.nasa.gov/earth-science/decadal-surveys/decadal-pbl/



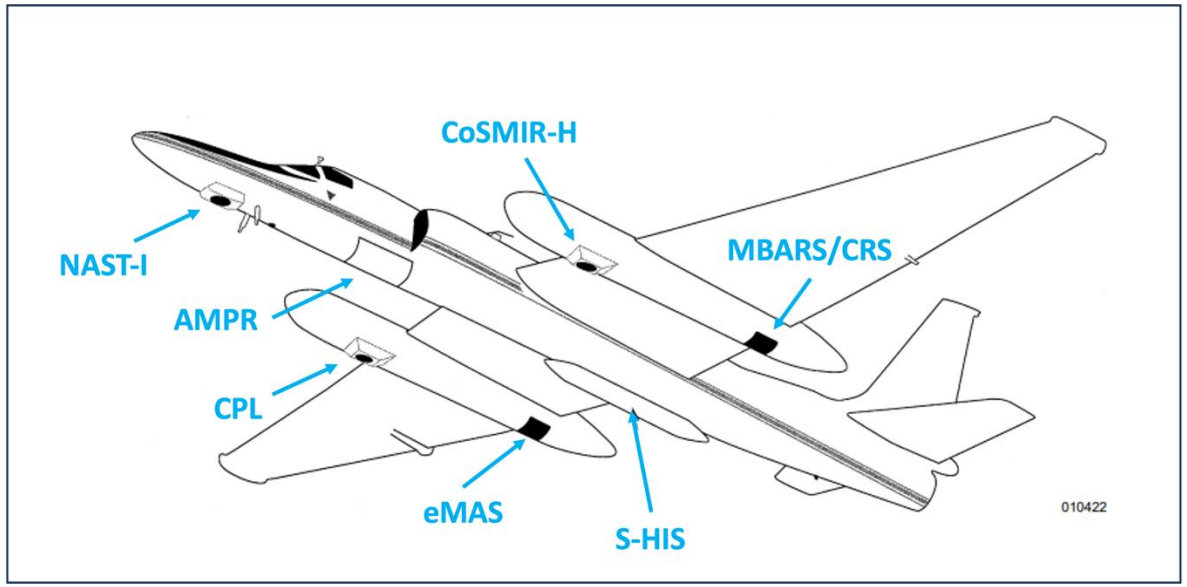
Next Presentation:

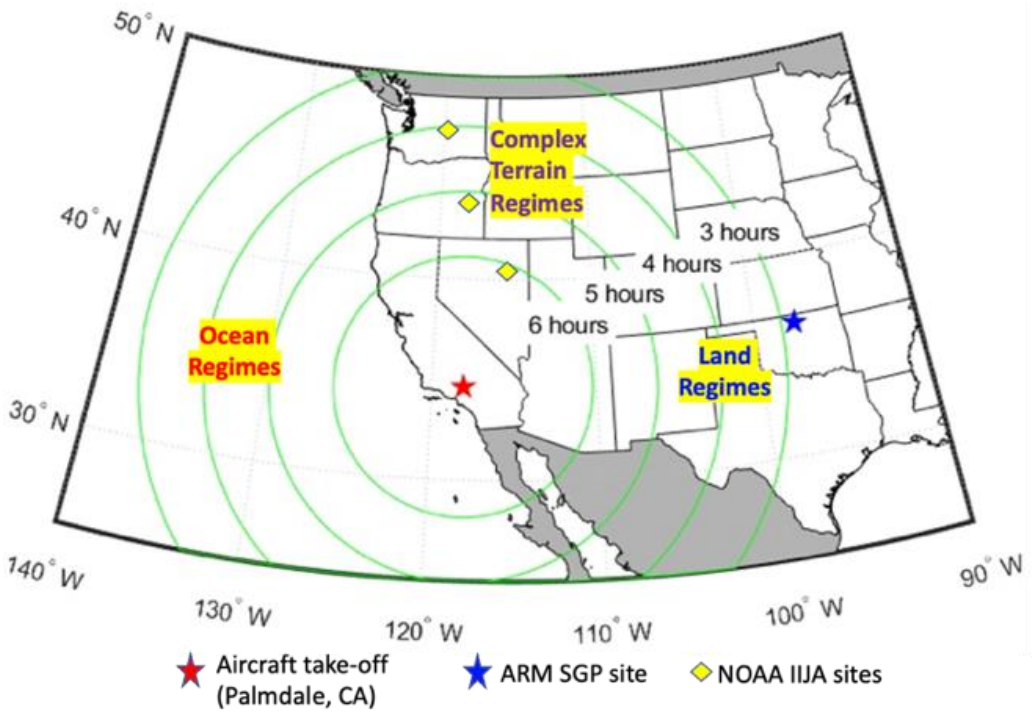
- 9:30 – 9: 40

"Intro to NASA Earth Science Technology Office"

Amber Emory

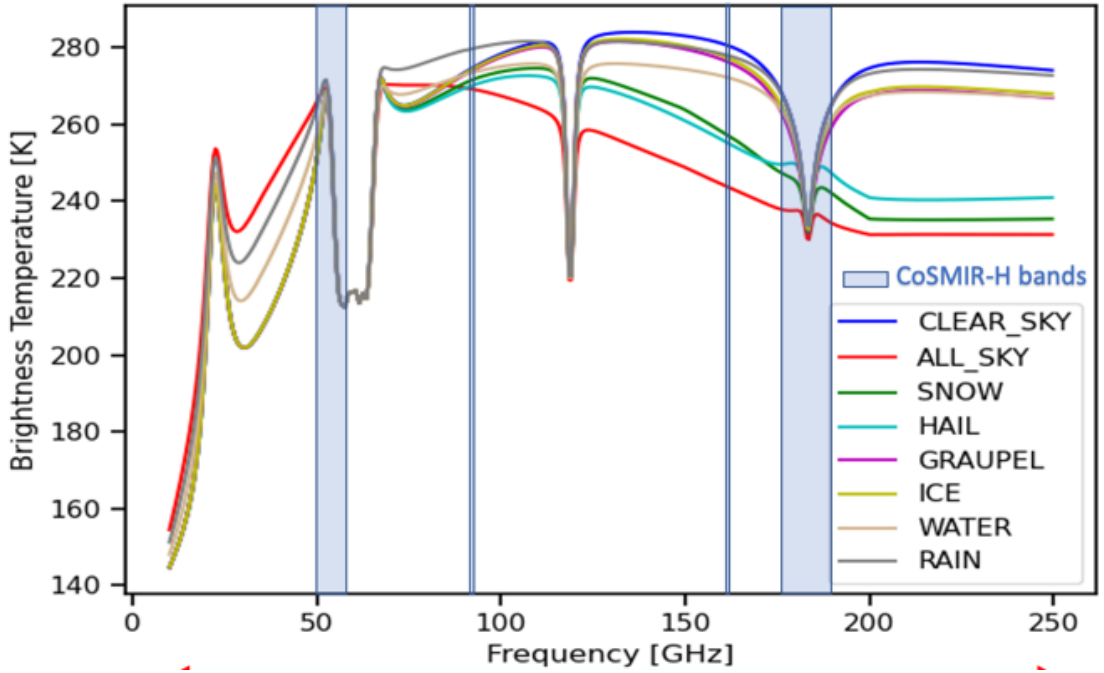
West-coast **Hy**perspectral **M**icrowave **S**ensor **I**ntensive **E**xperiment - **WHyMSIE**

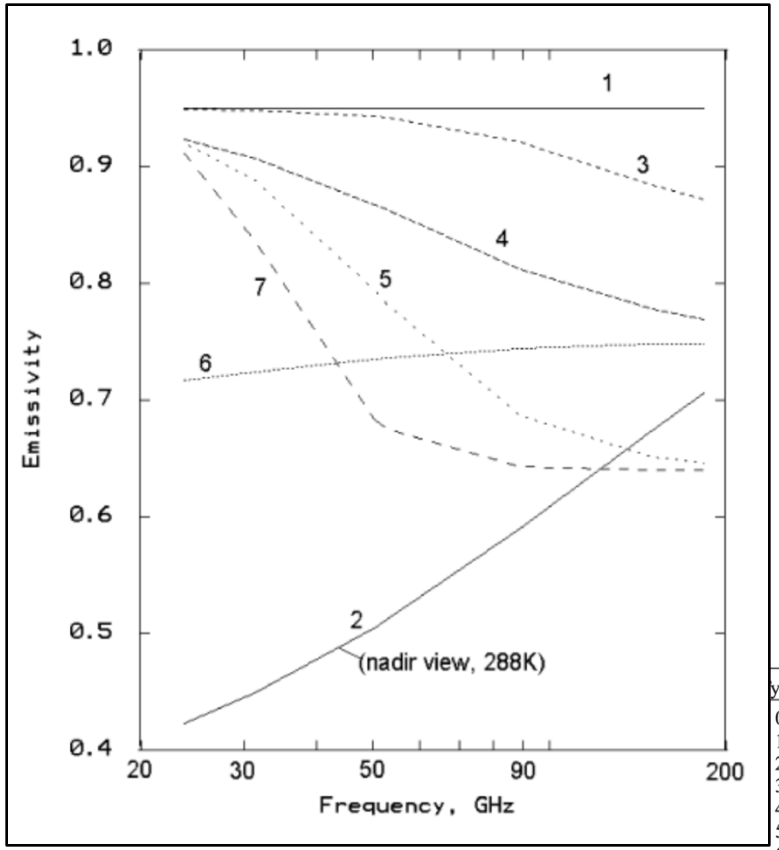




July 2024; October – November 2024

Measuring unexplored information about, above and below the PBL

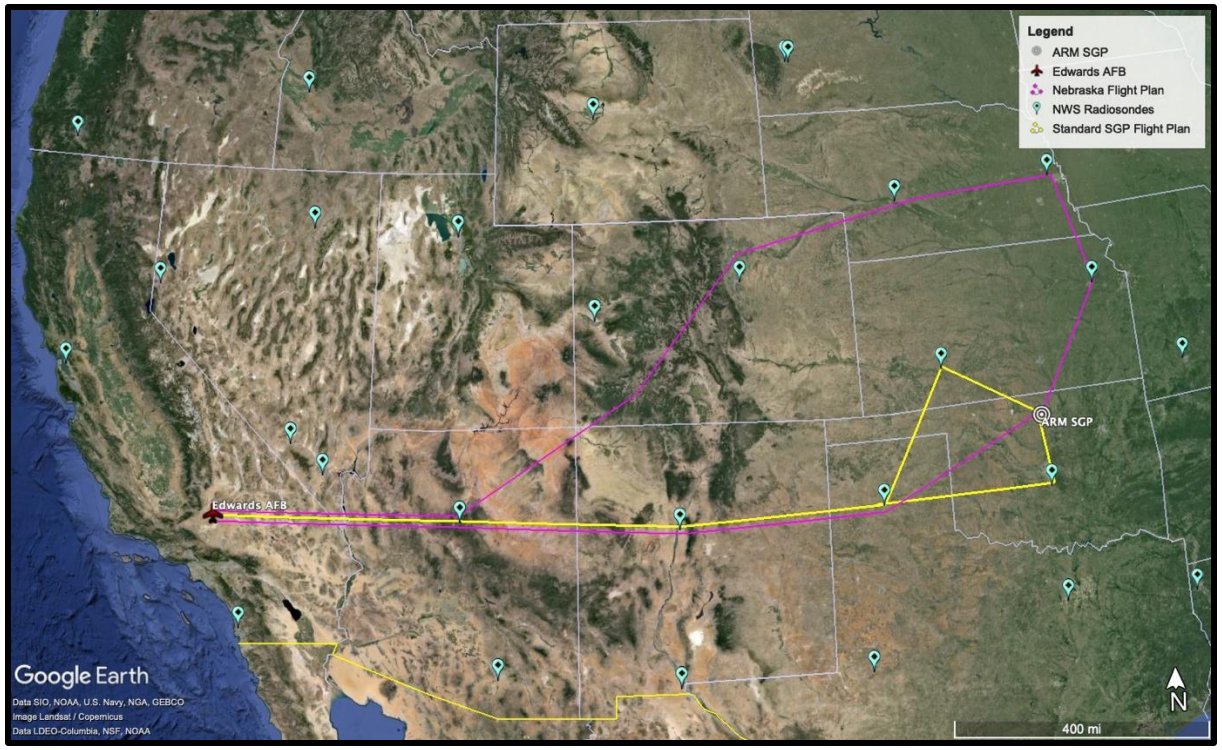




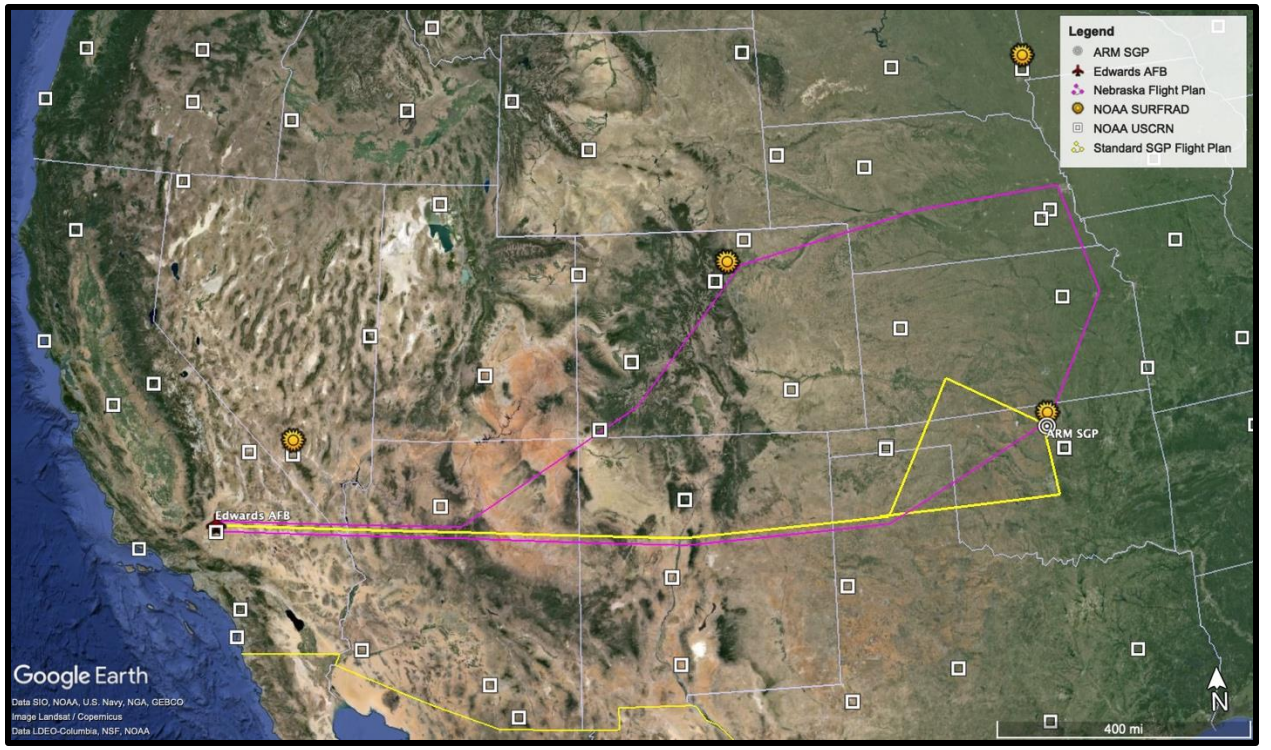
ype	Surface
0	coastline[a]
1	land
2	water[a]
3	high-emissivity sea ice
4	low-emissivity sea ice
5	snow (high-frequency scattering)
6	glacier/snow (very low frequency scattering)
7	snow (low-frequency scattering)

Over Land T/q Validation and Other Retrieval Information

Radiosondes



Surface Information



National Weather Service

In coordination with the NWS (POC: Jordan Gerth), supplemental radiosondes will be provided at specific sites along flight path

SURFRAD (Surface Radiation Budget) Network

Radiation measurements (IRT, AERI) can provide skin temperature and other retrieved products (T,q,LWP)

DOE Atmospheric Radiation Measurement Climate Research Facility

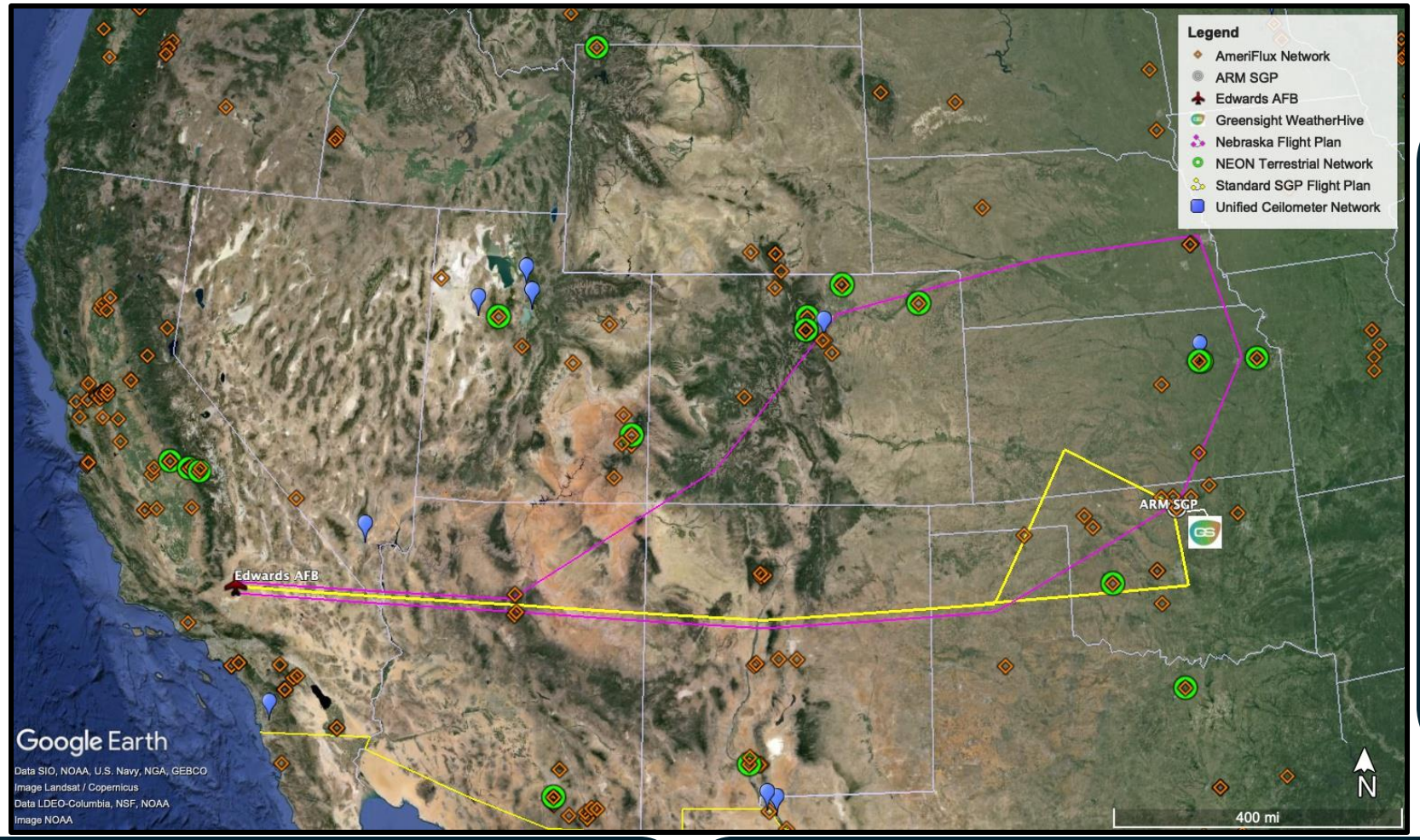
- DOE ARM will launch 30+ radiosondes during WHyMSIE, coinciding with ER-2 overpasses of the Southern Great Plains (SGP) site and surrounding facilities
- We will work with the JPSS validation team out of U Wisc./SSEC (Lori Borg) to coordinate launches during JPSS overpasses at SGP

U.S. Climate Reference Network (USCRN)

Network provides comprehensive surface information critical for more accurate near surface T/q retrievals. Skin temperature, soil moisture, and soil temperature are measured at all sites.

Over Land Planetary Boundary Layer (PBL) Relevant Measurements

AmeriFlux
Network of PI-managed sites measuring ecosystem, water, and energy fluxes. Water vapor fluxes, radiation measurements, and PBLH measurements key for future PBL analyses



National Ecological Observatory Network (NEON)
Network of terrestrial ecology sites that collects eddy-covariance (EC) flux data alongside meteorological and atmospheric composition data at each terrestrial field site

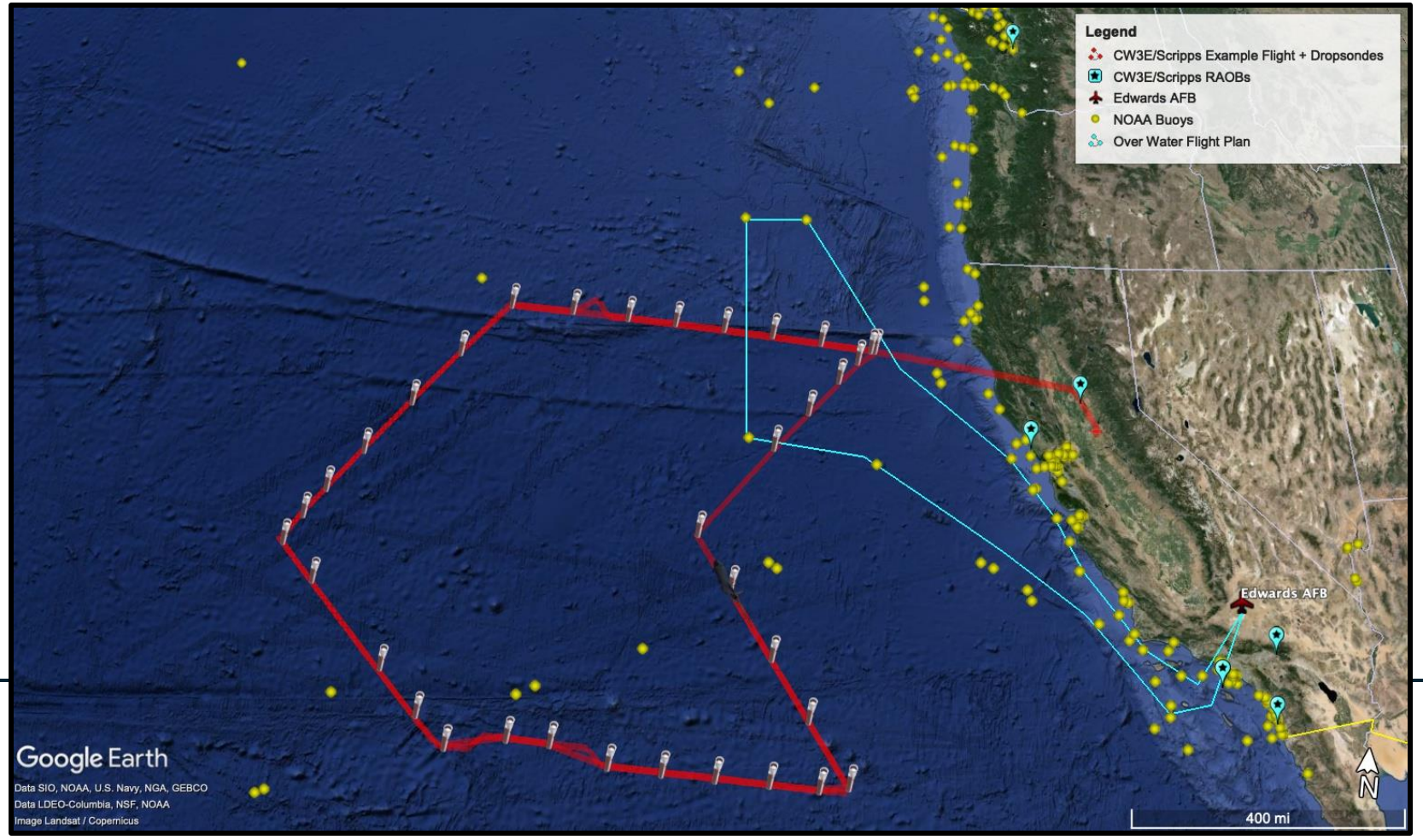
GreenSight WeatherHive

GreenSight will deploy their WeatherHive UAV system at ARM SGP to provide valuable boundary layer T/q profiling. Vertical profiling over a large spatial area will allow for future PBL analyses

Unified Ceilometer Network
A ground-based ceilometer network to support activities that will provide a comprehensive three-dimensional assessment of the chemical and dynamical processes in the lower atmosphere

Over Water T/q Validation and Other Retrieval Information

National Data Buoy Center (NDBC)
NOAA operated network of buoys that measure temperature, dew point, wind speed and direction. Measurements will be key for future CoSMIR-H and MBARS retrievals



NASA G-III
The G-III will fly under the ER-2. HALO and AWP will provide remote sensing profiles of water vapor, aerosols, and wind. Dropsondes will also be available for additional T/q validation.

Center for Western Weather and Water Extremes

Center for Western Weather and Water Extremes (CW3E) @ Scripps

- With our POC (Anna Wilson), we are developing a strategy for potential observation overlap with their dropsonde equipped aircraft, which provide highly valuable T/q profile information for retrieval validation
- Lagrangian Drifter Laboratory at Scripps operates a drifter buoy program, providing valuable surface information such as surface pressure, sea surface temperature, etc.
- Coastal and island radiosonde launch locations offer other opportunities for T/q validation

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