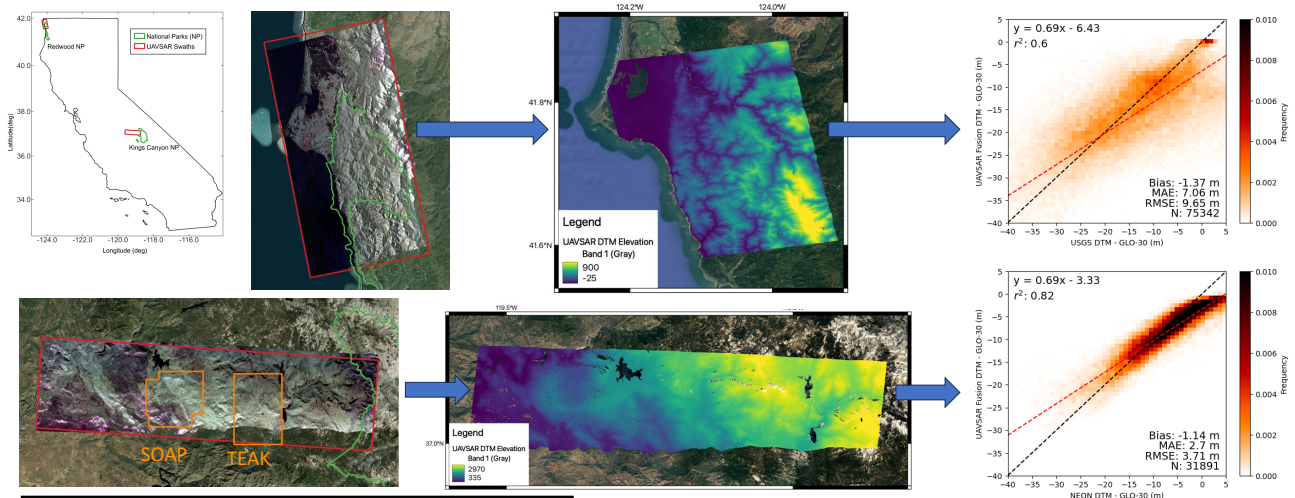
National Aeronautics and Space Administration

FY24 Strategic Initiatives Research and Technology Development (SRTD)

Improving UAVSAR PolInSAR and TomoSAR Processing and Analysis at L- and P-Bands to Address STV Observables

Principal Investigator: Michael Denbina (334)**; Co-Investigators:** Bryan Stiles (334), Richard Chen (334), Marc Simard (334), Yunling Lou (334)

Strategic Focus Area: Radar Advances to Accelerate Earth and Planetary Missions **| Strategic Initiative Leader:** Darmindra D Arumugam



Objectives:

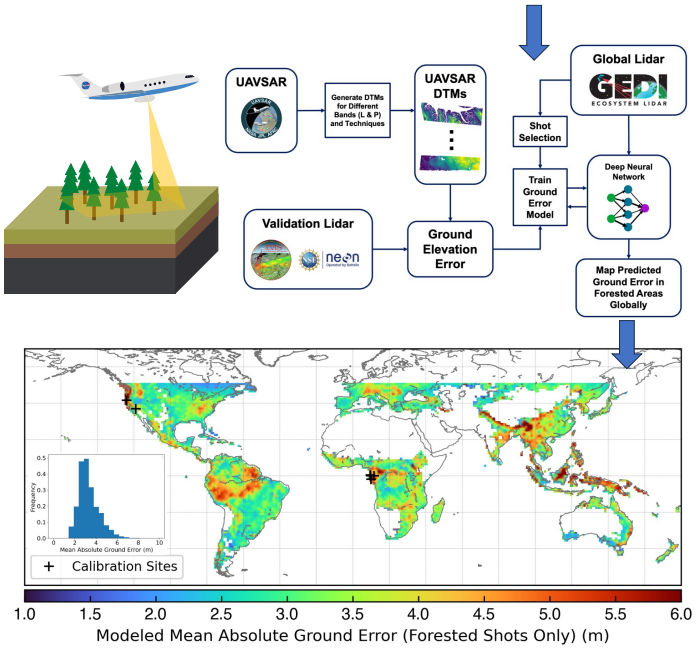
Improve processing and perform analysis of data collected by JPL's Uninhabited Aerial Vehicle Synthetic Aperture Radar (UAVSAR) instrument in preparation for a future **Surface Topography and Vegetation (STV)** mission.

Results:

- Improved UAVSAR processing and calibration algorithms (improved tomogram geolocation, and produced seamless phase calibration for long, multi-segment flight lines).
- Analyzed UAVSAR data at different frequencies (L- and P-band) over tall, dense forest using data from CAL3D airborne campaign (top left).
- Improved multi-baseline bare surface topography estimation algorithms and generated digital terrain models from UAVSAR (top right).
- Modeled estimation performance at calibration sites (middle right) and predicted performance using spaceborne lidar (bottom right, results shown are for L-band three-baseline polarimetric SAR interferometry model).

Significance/Benefits to JPL and NASA

- Position JPL to address STV observables using polarimetric SAR interferometry and tomographic SAR techniques.
- Advance technology and reduce risks in formulating the STV mission.



National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

www.nasa.gov

PI/Task Mgr. Contact Information:
(818) 354-2551
michael.w.denbina@jpl.nasa.gov

RPD-129 Clearance Number: CL#24-5878