Internally-Calibrated Wide-Band Airborne Microwave Radiometer to demonstrate Wet-Tropospheric Path Delay Measurements for SWOT
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Objective
- Design, fabricate and demonstrate an internally-calibrated, wide-band airborne microwave radiometer to reduce risks associated with wet-path delay correction for the SWOT mission
  - Assess variability of wet-tropospheric path delay over oceans, coastal areas and land on 10-km and smaller scales
  - Demonstrate high-frequency (90, 130 and 168 GHz) millimeter-wave radiometry using integrated window channels and sounding channels
  - Verify performance of radiometer instrument through remote sensing test flight campaigns

Accomplishments
- Designed, fabricated, and tested the High-Frequency Airborne Microwave and Millimeter-wave Radiometer (HAMMR) instrument
- Demonstrated internally-calibrated (integrated in front end) millimeter-wave radiometers above 37 GHz
- Demonstrated on-chip ASIC spectrometer for sounding of atmospheric water vapor and temperature
- Validated HAMMR instrument for 68 flight hours in Twin-Otter over 7 states and nearly entire West coast of U.S.
- Performed coordinated flights with JPL’s AirSWOT radar, designed and built to perform cal/val for SWOT mission
- Measured atmospheric water vapor and cloud liquid water on sub-km spatial scales under clear skies, partly cloudy and cloudy conditions
- Demonstrated retrievals of wet-path delay at 2-mm precision with 1-km spatial resolution, applicable over the spatial scales of SWOT’s 60-km swath width

Co-Is/Partners:
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TRL\textsubscript{in} = 3 \quad TRL\textsubscript{out} = 5