

Potential SmallSat GNSS-Reflectometry Flood Inundation Mapping Applications

Nai-Yu Wang¹, Michael Maddox², Ralph Ferraro², Michael Maddox³

1. NOAA NESDIS OPPA; 2. University of Maryland/ESSIC; 3. NOAA NESDIS STAR

NASA's Cyclone Global Navigation Satellite System (CYGNSS), launched in 2016, is a GNSS-Reflectometry (GNSS-R) small satellite constellation mission designed to measure ocean surface wind speed in hurricanes and tropical cyclones. As part of NOAA/NESDIS/Office of Projects, Planning and Analysis (OPPA) Technology Maturation Program (TMP), this project explores additional capabilities for GNSS-R CYGNSS applications over land surface. The objective is to investigate the capabilities and limitations of using CYGNSS data to map flood inundation, which could be potentially useful in NOAA National Weather Service's hydrologic predictions.

We will report results from evaluating the sensitivity of CYGNSS-measured signal to noise ratio (SNR) to flood inundation extent mapping from recent flooding events in the US. We will discuss our assessment of the capability and limitation of using CYGNSS data to detect standing surface water in the events of heavy and/or persistent precipitation for different land surface and vegetation types. In situ and satellite measurements of precipitation and soil moisture will be used to assist the verification for flood inundation mapping.