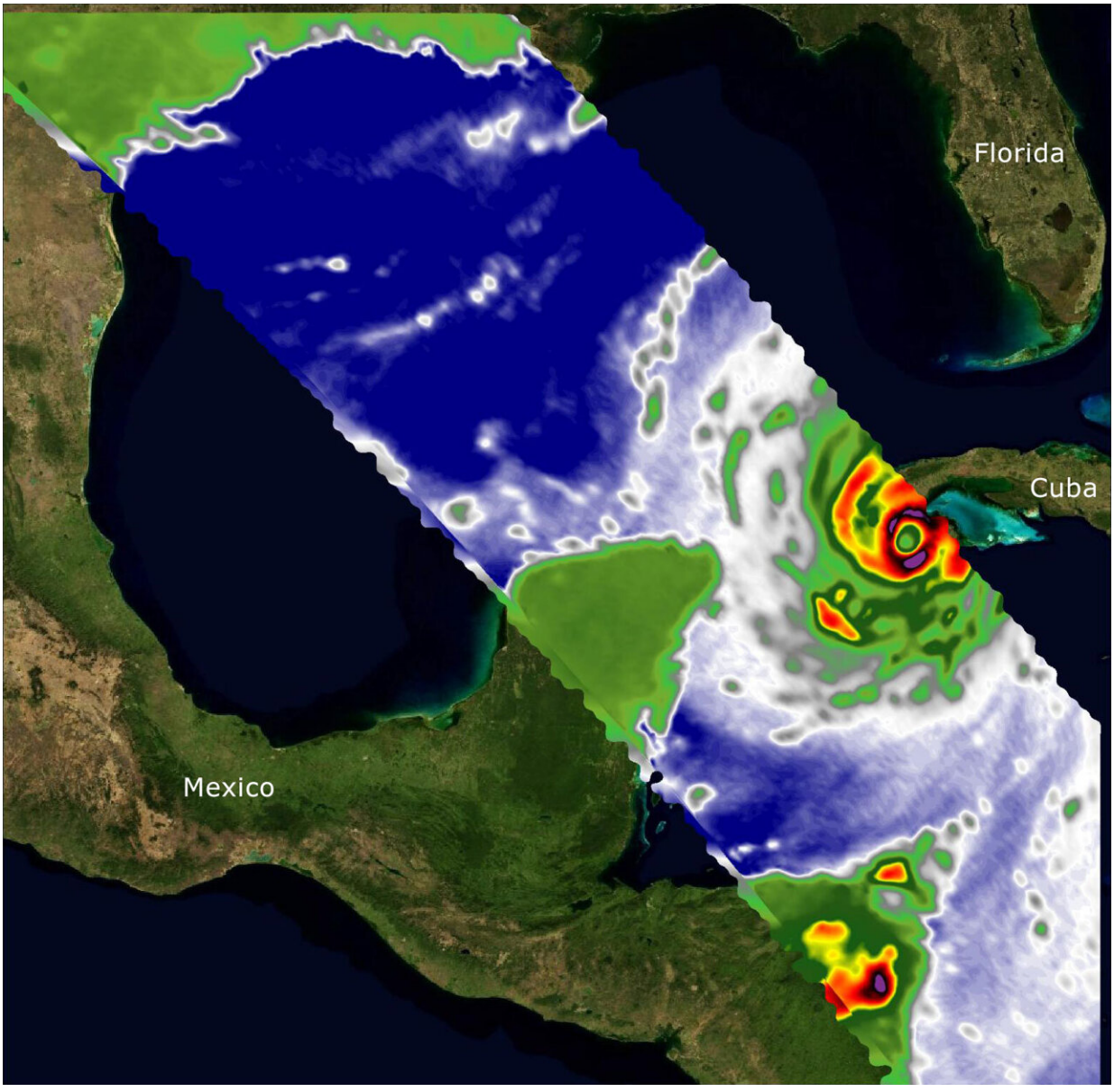
NASA-built weather sensors capture vital data on Hurricane Ian

September 29 2022



From aboard the International Space Station, NASA-built instruments Compact Ocean Wind Vector Radiometer (COWVR) and Temporal Experiment for Storms and Tropical Systems (TEMPEST) captured wind and water vapor data from Hurricane Ian as the storm neared Cuba. Credit: NASA/JPL-Caltech

A pair of microwave radiometers collected data on the storm as they passed over the Caribbean Sea aboard the International Space Station.

Two recently launched instruments that were designed and built at NASA's Jet Propulsion Laboratory in Southern California to provide forecasters data on weather over the open ocean captured images of Hurricane Ian on Tuesday, Sept. 27, 2022, as the storm approached Cuba on its way north toward the U.S. mainland.

COWVR (short for Compact Ocean Wind Vector Radiometer) and TEMPEST (Temporal Experiment for Storms and Tropical Systems) observe the planet's atmosphere and surface from aboard the International Space Station, which passed in low-Earth orbit over the Caribbean Sea at about 12:30 a.m. EDT.

Ian made landfall in Cuba's Pinar del Rio province at 4:30 a.m. EDT, according to the National Hurricane Center. At that time, it was a Category 3 hurricane, with estimated wind speeds of 125 mph (205 kph).

The image above combines microwave emissions measurements from both COWVR and TEMPEST. White sections indicate the presence of clouds. Green portions indicate rain. Yellow, red, and black indicate where air and water vapor were moving most swiftly. Ian's center is seen just off of Cuba's southern coast, and the storm is shown covering the island with rain and wind.

COWVR and TEMPEST sent the data for this image back to Earth in a direct stream via NASA's tracking and data relay satellite (TDRS) constellation. The data were processed at JPL and made available to forecasters less than two hours after collection.

About the size of a minifridge, COWVR measures natural microwave emissions over the ocean. The magnitude of the emissions increases with the amount of rain in the atmosphere, and the strongest rain produces the strongest microwave emissions. TEMPEST—comparable in size to a cereal box—tracks microwaves at a much shorter wavelength, allowing it to see ice particles within the hurricane's cloudy regions that are thrust into the upper atmosphere by the storm.

Both microwave radiometers were conceived to demonstrate that smaller, more energy-efficient, more simply designed sensors can perform most of the same measurements as current space-based weather instruments that are heavier, consume more power, and cost much more to construct.

Provided by NASA