

# **RACE NOAA License Summary**

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## **Licensee Information**

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## **General Public Description**

The Jet Propulsion Laboratory (JPL) is developing the Radiometer Atmospheric CubeSat Experiment (RACE) payload, a water vapor radiometer integrated on a 3U CubeSat platform. RACE will measure 2 channels of the 183 GHz water vapor line utilizing 35 nm Indium Phosphide (InP) high electron mobility transistors (HEMT) for the low noise amplifiers (LNA) and a novel amplifier based internal calibration subsystem.

The radiometer utilizes a direct detect topology to reduce power draw. Each front end amplifier chip draws ~30 mW of power. The complete payload electronics draws 1.3 W, with the majority of power utilized for payload command and data handling (C&DH). Internal calibration consists of a coupled amplifier based noise-source and a Dicke switch to a matched load. During operations on orbit, cold sky and other vicarious scenes will also be utilized for calibration. This measurement technology has relevance to current missions including AMSU-B, SSMI/S, and ATMS.

The 3U spacecraft is developed by the University of Texas at Austin's Texas Spacecraft Laboratory (TSL). Mission Operations will also be run from the TSL Ground Station and Mission Operations Center. RACE was selected by the NASA CubeSat Launch Initiative (CSLI) in 2012 and will be manifested on ELANA-8, carried to the ISS on Cygnus CRS Orb-3. Launch from the ISS will be via NanoRacks and will place the spacecraft in an orbit similar to that of the ISS (51.6 degree inclination, 300-400km altitude).

While flying a payload that supports NASA Science Mission Directorate (SMD) science objectives and NASA strategic objectives, RACE provides a hands-on opportunity to develop technical, leadership, and project skills. RACE will furthermore advance the technology readiness level (TRL) of the radiometer subsystem from TRL 4 to TRL 6 and the CubeSat radiometer system from TRL 4 to TRL 7.

## **Person Upon Whom Service of all Documents May be Made**

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