



**BUENAVENTURA IPS
CHAPTER**



CubeSat Infrared Atmospheric Sounder (CIRAS)

By Thomas S. Pagano

August 25, 2016

6:30 pm (pizza and networking), 7 pm talk

California State University Channel Islands

One University Drive, Camarillo, CA 93012, Del Norte Hall, Room 1500

Meetings are free and open to the public

RSVP at [this link](#) or <http://cubesat-ciras.eventbrite.com>

The CubeSat Infrared Atmospheric Sounder (CIRAS) will measure upwelling infrared radiation of the Earth in the MWIR region of the spectrum from space on a CubeSat. The observed radiances can be assimilated into weather forecast models and be used to retrieve lower tropospheric temperature and water vapor for climate studies. Multiple units can be flown to improve temporal coverage or information to provide new data products including 3D motion vector winds.

CIRAS incorporates three new instrument technologies. The first is a 2D array of High Operating Temperature Barrier Infrared Detector (HOT-BIRD) material, selected for its high uniformity, low cost, low noise and higher operating temperatures than traditional materials. The detectors are hybridized to a commercial ROIC and commercial camera electronics. The second technology is a black silicon blackbody calibration source, with surface emissivity better than carbon nanotubes and more robust to surface contact. The third technology is an MWIR Grating Spectrometer (MGS) designed to provide imaging spectroscopy for atmospheric sounding in a CubeSat volume. The MGS has no moving parts and is based on heritage spectrometers including the OCO-2. The spacecraft will be a commercially available CubeSat. The integrated system will be a complete 6U CubeSat capable of measuring temperature and water vapor profiles with good lower tropospheric sensitivity. The CIRAS is the first step towards the development of science instruments requiring infrared measurements while reducing the cost of the payload, spacecraft and launch. Examples of science results and imagery obtained from NASA satellites as they relate to weather forecasting, and research in climate and atmospheric composition will be presented.

Mr. Thomas S. Pagano is the Project Manager for the AIRS/AMSU/HSB Suite of instruments on the EOS Aqua Spacecraft. He was the lead engineer responsible for the calibration of the AIRS instrument in orbit. Prior to joining JPL in 1997, he was the Chief Systems Engineer on the MODIS instrument development program at Raytheon SBRS since 1985.

He has a BS in Physics from UC Santa Barbara, and an MS in Physics from Montana State University. He holds 2 US patents and is author of numerous papers on space remote sensing systems.

