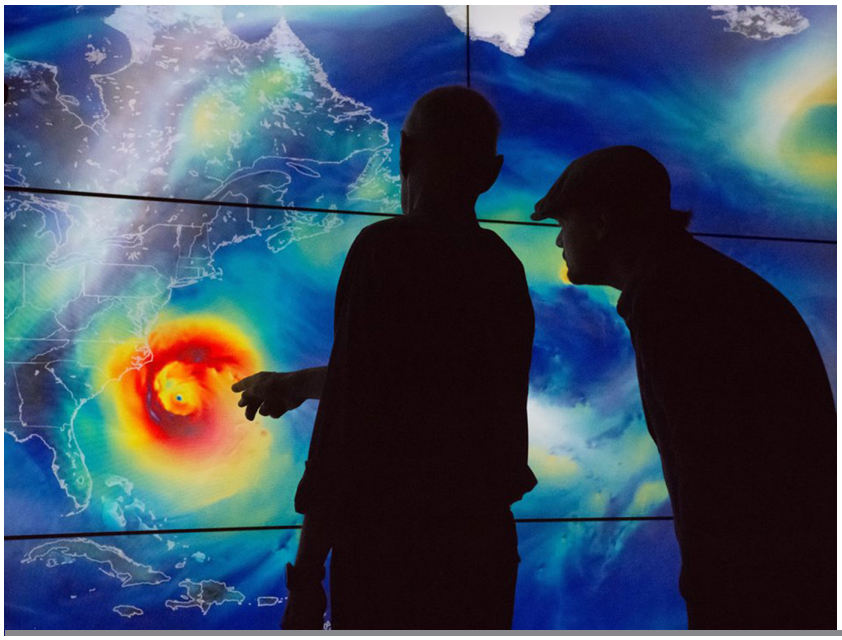

National Aeronautics and Space Administration

TECHNOLOGY SOLUTION

Instrumentation

A Broadband, Compact Low-Power microwave Radiometer Down Converter for Small Satellite Applications

A RF downconverter for a cube-sat microwave radiometer provides state-of-the-art mass, volume, and DC power reductions while providing continuous RF frequency coverage

CubeRRT (CubeSat Radiometer Radio Frequency Interface Technology) is designed for remote earth sensing. The CubeRRT payload has three critical pieces of technology, a wideband antenna unit, a radiometer front-end (RFE) unit, and a radiometer digital back-end (RDB). In order to accommodate these components, Goddard innovated the CubeRRT (CubeSat Radiometer Radio Frequency radiometer) to be compact and operate at a low-power.

BENEFITS

- Reduced mass, volume and power
- Broad Band Receiver Coverage

THE TECHNOLOGY

The system includes a fundamental local oscillator (LO) source composed of a broad-band tunable frequency synthesizer as well as a crystal oscillator. The synthesizer employs a harmonic doubler to expand frequency coverage. The CubeRRT system uses a series of RF switches and band-pass filters, to select the desired harmonic while suppressing unwanted harmonics. The CubeRRT system uniquely combines several technologies to minimize the number of frequency banks and thus reduce mass, volume and power requirements. The CubeRRT system uses four frequency banks in order to provide continuous microwave receiver coverage from 6GHz to 40GHz.

APPLICATIONS

The technology has several potential applications:

- Earth Observation / Remote Sensing
- Analytics and decision making services

PUBLICATIONS

Patent No: 10659094

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NASA's Technology Transfer Program pursues the widest possible applications of agency technology to benefit US citizens. Through partnerships and licensing agreements with industry, the program ensures that NASA's investments in pioneering research find secondary uses that benefit the economy, create jobs, and improve quality of life.

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More Information

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