Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

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Case ID:M17-224P
Published: 7/20/2018

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Low-Power, Compact Microwave Radiometer for Earth Observing and Planetary Science

Earth has seen a dramatic discrepancy in climate patterns in recent years, driving professionals to use climate and weather satellites to collect information for future predictions and analysis. Microwave sounding instruments in weather and climate satellites have been the primary source of measuring atmosphere traits, surface and/or cloud temperatures to predict climate patterns. Current instruments that are capable of picking up information in this field are large in size, expensive, and energy-consuming. In recent years, several space companies have been eager to take advantage of advancements in technology for earth observation that is smaller, cheaper and consumes less power.

Researchers at Arizona State University have developed a system that allows satellite and space apparatus manufacturers a compact and low-power microwave instrument solution for satellite architecture. The system consists of a novel receiver design for a microwave radiometer. A cutting-edge receiver system is composed of millimeter-wave amplifiers and a custom designed millimeter-wave waveguide filter bank that selects distributed frequencies across different atmospheric sections. Furthermore, as opposed to current instruments, the system does not require a local oscillator, reducing power requirements, system complexity, and eliminates frequency drift. A forward-thinking design allows for powerful features from a compact device.

Potential Applications

- Weather and Climate Observation
- Planetary Science
- Medical Imaging
- Millimeter Wave Communication (5G)

Benefits and Advantages

- Innovative - System allows for the next generation of small satellite design and architecture
- Efficient - Low-power and minimalist design with dynamic features and capabilities
- Powerful - High instantaneous sensitivity, single-dish-class angular resolution, and moderate resolving power all from a compact design
- Simple - The system can be easily manufactured with current methods and

commercial products

For more information about the inventor(s) and their research, please see

Philip Masukopf's Directory Page

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