

BOS1: Technology and Desirable Capabilities of mmWave PAR for Science Application.

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Place: Auditorium

This breakout session focuses on the technological advancements and desirable capabilities of millimeter-wave profiling and imaging phased array radars for scientific applications. mmWave PAR have emerged as a powerful tool for studying the atmosphere, offering a unique insight into cloud, precipitation, and aerosol dynamics.

During this session, experts will discuss the latest developments in mmWave technology (IC's, amplifiers, LNA's, etc), including advancements in array and radar architectures, including MIMO and virtual arrays. This also include discussion on signal processing, and data analysis techniques. Participants will gain an understanding of the key features that make mmWave PARs ideal for scientific research, such as high spatial and temporal resolution, volumetric imaging, polarization diversity, and Doppler capabilities.

The session will also explore the desirable capabilities that researchers seek in mmWave radars for various scientific applications. These include improved sensitivity to small particles, enhanced range resolution, and the ability to operate in challenging environments. This session aims to provide recommendations and a roadmap to advance the Technology Readiness Level (TRL) of mmWave PAR for scientific applications.

Discussion on suggested topics and questions (55 min)

- 1) What is the frequency bands in mmWave region that fits better for atmospheric science?
- 2) Define the most important features and capabilities of mmWave technology can be beneficial for mmWave PAR for Atmospheric science?
- 3) Can Virtual array configuration used in automobile radars can provide used in mmWave PAR for atmospheric science?
- 4) What are the key challenges in adapting commercial off-the-shelf mmWave technologies for scientific applications in atmospheric research?
- 5) Are there specific regulatory or licensing considerations that need to be addressed for deploying mmWave PAR systems in atmospheric science?
- 6) How can collaborative efforts between industry and academia accelerate the development and adoption of mmWave PAR technology for scientific applications?
- 7) What are the potential future advancements in mmWave technology that could further benefit atmospheric science research?
- 8) Additional comments of topics member of BOS1 want to add.

Summarize discussion on Jamboard (30 min)

Use Jamboard for summaries key answers and followed priority items selection.