

Development and Observation of the Phased Array Radar

Tomoo Ushio^{1*}, Koichi Maruo¹, Shigeharu Shimamura¹, Satoru Yoshida¹, Fumihiko Mizutani², Shinsuke Satoh³

¹Osaka University, ²Toshiba, ³NICT

A new phased array radar system for meteorological application has been developed by Toshiba Corporation and Osaka University under the grant of NICT. It is now well known that the rapidly evolving severe weather phenomena (e.g., microbursts, severe thunderstorms, tornadoes) is a threat to our lives particularly in densely populated area and the number of the phenomena tends to increase as the result of the global warming. Over the past decade, mechanically rotating radar systems at C-band or S-band have been proved to be effective for weather surveillance especially in wide area more than 100 km in range. However, the rapidly evolving weather phenomena has the temporal and spatial scales comparable to the resolution limit (-10 min. and -500m) of the S-band or C-band radar systems, and cannot be fully resolved with these radar systems. In order to understand the fundamental process and dynamics of such fast changing weather phenomena, volumetric observation with both high temporal and spatial resolution are required.

The phased array radar system developed has the unique capability of scanning the whole sky with 100m and 10 or 30 second resolution up to 60 km in a cost effective manner. The system adopts the digital beam forming technique for elevation scanning and mechanically rotates the array antenna in azimuth direction within 10 or 30 seconds. The radar transmits a broad beam of several degrees with 24 elements and receives the back scattered signal with 128 elements digitizing at each elements. Then by digitally forming the beam in signal processor, the fast scanning is realized.

The system was installed at the top of the building in Osaka University in May 2012, and has been operated continuously since then. In this presentation, the system and the initial observation results will be talked.

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