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An field test of an improved bistatic observation system with COBRA

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The bistatic Doppler velocity measurement is a useful ways to retrieve 2D wind fields with weather radars. We have examined an improved system to get over some problems of the bistatic measurement system. In this study, we will report a result of an actual experiment of this improved bistatic observation system with COBRA.

Usually the bistatic measurement uses a receiving antenna whose beam width is wide. Due to that, the low gain and false echoes by sidelobe contaminations used to be problems. In this improved system, we are planning to use an array antenna for the receiver, it leads to increase the receiving gain. In case of usual array antenna, the spacing between elements is selected short (less than one wavelength) to form only one strong main lobe and to avoid forming grating lobes. But it is difficult to form a narrow beam enough to reduce the sidelobe contamination with limited number of elements. In this study, we dare to select long spacing (e.g. 10 wavelengths) and to form many sharp grating robes (beams) simultaneously. Sidelobe contaminations near around the strong echoes are expected to be reduced with these sharp beams.

We, National Institute of Information and Communications Technology (NICT), have a full polarimetric Doppler weather radar named COBRA in Okinawa. We are planning to perform actual experiments with this radar system. Simulated results, an experimental system, and preliminary observational results will be presented.

Keywords: weather radar, bistatic, Okinawa, COBRA