

## Digital Beam Forming methods on Observation Result of Phased Array Radar

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We have been developing the Phased Array Radar (PAR) which detects small scale weather phenomena. We adopt Beam Former method (BF) in the way of adaptive digital beam forming (DBF) to sharpen fan beam of elevation angle to about 1 degree. In BF, an antenna pattern is uniform in the radar system, and sidelobe level is high. As a result, a fake echo appears in the observation result in consequence of high building or heavy rain in near region.

On the other hand, in Minimum Mean Square Error method (MMSE), we can turn the null-point to inference signal direction and the mainlobe to desired signal direction. As a result, we can decrease a fake echo. However, a calculation cost of MMSE is about 200 times more expensive than this of BF.

Therefore, we propose faster MMSE method. In this presentation, we show and compare the PAR observation results of radar reflectivity and calculation time with BF, MMSE, and our proposed method.

Keywords: Phased Array Radar, Digital Beam Forming, Minimum Mean Square Error method, severe phenomena