Development of a high-resolution 1.3 GHz wind profiler radar

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We have been developing a high-resolution 1.3 GHz wind profiler radar (WPR). The high-resolution WPR has capability of range imaging (RIM), oversampling (OS), and adaptive clutter suppression (ACS). RIM, which uses frequency diversity, is a technique for enhancing range resolution. The high-resolution WPR is able to use five transmitted frequencies. OS contributes to reduce range weighting effect of RIM (Yamamoto et al. 2014). The high-resolution WPR is able to collect oversampled received signals with a maximum sample rate of 10 mega samples per second. ACS, which uses subarrays, is a technique for mitigating clutter contamination. In order to implement ACS capability, auxiliary subarrays, which collect echoes from clutters, were additionally installed. A unique digital receiver composed of Universal Software Radio Peripheral (USRP) and a workstation was developed. The digital receiver processes oversampled signals from the main antenna of LQ-13 and from the auxiliary subarrays simultaneously.

In the presentation, we present the system of the high-resolution WPR.

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Reference

M. K. Yamamoto, et al., Development of a digital receiver for range imaging atmospheric radar, *J. Atmos. Sol.-Terr. Phys.*, 118, pp. 35-44, 2014, doi:10.1016/j.jastp.2013.08.023.