**RF Design of Deployable, Rectangular Feed Slot Array Antenna for MicroXSAR Mission**

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**Abstract**

The design of an X-band array antenna for small SAR sensor onboard a 100kg small satellite will be explained. The antenna system consists of waveguide feeder as the bottom layer and the skin with radiation slots and honeycomb core as the top layer. Simple array analysis of feeder tournament with uniform amplitude and Taylor distribution for side-lobe suppression, waveguide power divider, honeycomb core permittivity measurement and the recent design result of one antenna panel will be discussed.

**Keywords**: small SAR sensor, Rectangular Feed Slot Array Antenna, X-band antenna

1. **Antenna Configuration**

   **Figure 1** Illustration of top and bottom view of the deployed-SAR antenna

   **Figure 2** Illustration of (a) signal flow inside the feeder waveguide and (b) signal flow in the top layer

   **Figure 3** The designed antenna layer structure

2. **Research Result**

   **Figure 4** Simple antenna analysis using (a) continuous and (b) discrete model for \(N = 5, \Delta \phi = \pi / 4\)

   **Figure 5** Antenna pattern for 8 panels antenna with feeder tournament configuration that employing 8 Taylor distribution coefficients, side lobe level -25 dB, \(N = 4\), BW = 50 MHz, \(\phi = 0^\circ\) and \(\delta = 0.5\phi\)

3. **Conclusion and Future Research**

   An X-band two layer slot array antenna is currently developed for small SAR on board a small satellite application. One antenna panel is designed and simulated. Further fabrication, measurement and optimization of the antenna system will be conducted.

**References**

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