

International Rocket Experiment on a Huge Phased Array Antenna Constructed by Furoshiki Satellite with Robots

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Huge antennas has many useful applications in space as well as on the ground, for example, Solar Power Satellite to provide electricity to the ground, telecommunication for cellular phones, radars for remote sensing, navigation and observation, and so on. A parabola antenna was mostly used for the space antenna. However, it is very difficult for the larger parabola antenna to keep accuracy of the reflectors and the beam control, because the surfaces of the reflectors are mechanically supported and controlled. The huge space antenna with flexible and ultra-light structures is essential and necessary for the future applications. An active phased array antenna is more suitable and promising for the huge flexible antenna than the parabola antenna. We are proposing to apply the Furoshiki satellite with robots on construction of the huge structures. While a web is deployed using the Furoshiki satellite in the same size of the huge antenna, all of the antenna elements crawl along the web with their own legs toward their allocated locations. We are verifying the deployment concept of the Furoshiki satellite using a sounding rocket with robots crawling on the deployed web. The robots are internationally being developed by NASA, ESTEC and Kobe University.

On the other hand, the flexible structures have a very critical issue on the distortion of the structures for the beaming control. Retrodirective antenna system is proposed here to correct the distortion of the structures. The rocket experiment has two objectives, one of which is to verify the retrodirective antenna system for correcting the distortion of the structures as well as to construct huge structures by the Furoshiki satellite. The retrodirective antenna can control the beam direction using phases of the received pilot signal transmitted from the ground. Figure 1 shows the configuration of the rocket experiment by measuring the antenna pattern radiated from the several independent antenna elements on the Furoshiki satellite. We will describe the detailed objectives and configuration of the rocket experiment in our presentation.

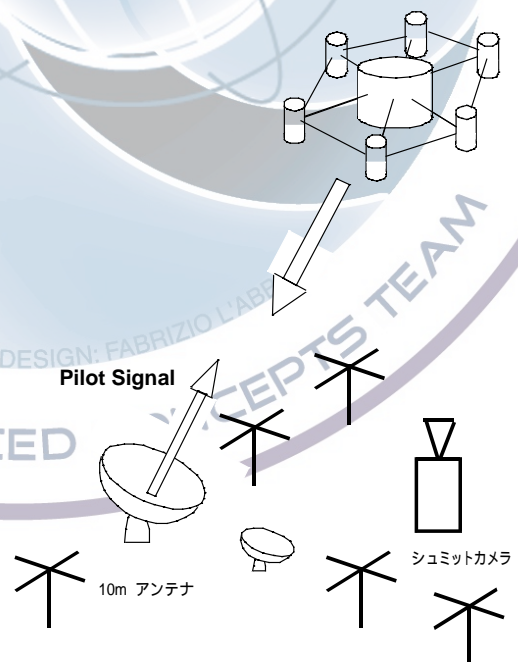


Fig. 1 Configuration of the rocket experiment