

26th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
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THREE DIMENSIONAL PHASED ARRAY ANTENNA FOR COMMUNICATIONS WITH SATELLITE
CONSTELLATION

Abstract

An Indian Polar Satellite Launch Vehicle successfully lifted off on February 14, 2017, carrying 104 satellites on a single rocket. All the 104 satellites must be communicated with the ground stations for the control and data acquisition. Many companies have the projects to launch a lot of small satellites into the low Earth orbit in order to build the worldwide internet services. The ground stations are required to communicate simultaneously with several satellites. It is impossible for the parabolic antenna to track simultaneously several satellites. Therefore, we are newly developing a ground receiving station using the Phased Array Antenna and the Digital Beam Forming technologies. The purpose of this study is to realize a worldwide receiving antenna network to communicate simultaneously with several satellites and to get information in real-time through the internet anytime and anywhere. We already built the first pilot model of the receiving antenna at the frequency of X-band and succeeded in receiving the signal from the satellites. In this paper, we are developing the next phased array antenna for the S-band communications, which has quite different configuration from X-band antenna, and are performing a demonstration to receive simultaneously the signals of the THREE satellites using Digital Beam Forming technology. We will explain this newly developed pilot receiving antenna for S-band communications and the demonstration receiving from the satellites in my presentation. We have also many projects to develop the new Phased Array Antennas for communications between satellite and satellite, between drones and satellites, and for UHF communications. We will also present the future applications of the new Phased Array Antenna in detail.