SPACE DEBRIS SYMPOSIUM (A6)
Measurements (1)

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REQUIREMENTS OF INDIAN SPACE RESEARCH ORGANISATION FOR A MULTI OBJECT TRACKING RADAR

Abstract

Spaceport of India, SDSC SHAR range is being augmented to meet the requirements of ISRO future advanced missions like Reusable Launch Vehicles (RLV), TSTO and Space Recovery Capsule etc. For these missions the SHAR range requires state of the art Multiple Object Tracking Radar, particularly where multiple objects are dispensed or many objects are in the air at the same time. Also, the other important requirement is tracking of Space Debris. ISRO has a number of Remote Sensing Satellites in Low Earth Orbit (LEO), which face sometimes the danger of close approach by the Space Debris. Space Debris tracking and predictions of close approach are necessary to plan collision avoidance manoeuvres for the satellites. Hence, it was felt necessary to develop an active phased array for Multiple Object Tracking Radar (MOTR) with electronic beam steering for future missions requiring both high Pulse Repetition Frequencies (PRF) and long pulse widths. It uses rapid electronic phasing of the individual array antenna elements to steer the radar beam with the flexibility and speed of electronics rather than with much slower and less flexible mechanical steering.

MOTR finds wide applications in space research, defence and aerospace areas. The conical scan, mono pulse Radars with mechanical steerable antenna are used for single object tracking applications where as phased array Radars with electronic beam steering are essential for tracking multiple objects.

While realizing the MOTR various aspects are to be considered carefully as this is a complex system involving different sub systems like Micro strip patch antenna, TR modules, Beam forming network, Cooling system, Receiver, Data processing etc. All the interfaces shall be properly defined and simulations need to be carried out to arrive at the desired specifications. In this paper, requirements, design considerations, system configuration and specifications are discussed.