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THE DESIGN AND IMPLEMENTATION OF GNSS-R OCEAN MICROWAVE REMOTE SENSOR
BASED ON SATELLITE BORNE DOUBLE-FACE MULTI-WAVE BEAM PHASED ARRAY
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Abstract

GNSS-R(Global Navigation Satellite System-Reflection)microwave remote sensing technology utilizes L band signal of navigation satellites, receives and processes the reflected signals from ocean, land or targets on platforms such as shore-based, aerial-based and satellite borne, and implements the extraction of characteristic element or target sensing. This is one of the hotspot in the remote sensing and navigation research areas. The research goal of GNSS-R technology fulfills the space-borne observation, and achieves global coverage through multi-satellites networking technology. Besides mesoscale ocean altimetry and sea surface wind field measurement, satellite borne GNSS-R ocean microwave remote sensing technology can also be utilized in sea ice detection, tsunami warning and typhoon detection, etc. In order to achieve coverage of multiple sea surface areas, satellite borne GNSS-R ocean microwave remote sensor implements the stacked double-face multi-wave beams phased array antenna with high gain, and receives direct signals from BD or GPS system and reflected signals from ocean by applying the algorithm of fast scan of specular point in orbit and beam scheduling, and provides time sensitive microwave sensing data for global sea surface wind field inversion and ocean altimetry after original signal sampling and calculation of time delay-Doppler correlation power. The difficulty points of satellite borne phased array antenna for GNSS-R technology is below: 1. the prediction of specular point in orbit; 2. the stacked double-face multi-wave beam phased array antenna with high gain. This paper describes the principle, system design and implementation of GNSS-R ocean microwave remote sensor based on satellite borne double-face multi-wave beam phased array antenna.