IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advanced Space Communications and Navigation Systems (2)

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PRELIMINARY DESIGN RESULTS OF ENGINEERING TEST SATELLITE 9 COMMUNICATIONS MISSION: FOR VERIFICATION OF NEXT GENERATION HTS COMMUNICATIONS TECHNOLOGY

Abstract

Communication capacity of satellite communications is increasing by the introduction of the High Throughput Satellite (HTS). Recently, demand for broadband communications are more and more increasing for mobile applications. Additionally, new potential satellite applications such as Machine-to-Machine (M2M)/Internet of Things (IoT) are expected. Therefore, a key technological challenge for next generation HTS is to enhance the flexibility of transponder of HTS in order to utilize communications capacity efficiently (e.g. digital channelizer, Digital Beam Former (DBF), and beam hopping). Moreover, filings for satellite networks for ITU in Ka-band or even higher frequency bands (Q/V-band) are increasing, which will cause the potential radio resource depletion. Therefore, another key technological challenge for next generation HTS is to realize optical communications especially in the feeder link, which potentially enables extremely large capacity compared with radio frequency (RF). To prove part of these technologies by the in-orbit verification by the Engineering Test Satellite 9 (ETS-IX) project, the RD has been conducted to enhance the flexibility of HTS payload, to establish the optical satellite communications technology with transmission speed of 10 Gbps between Geosynchronous orbit and earth station, and to establish the integrated network control technology to efficiently operate and control the hybrid and flexible payload. In ETS-IX, planned to be launched in the fiscal year 2021, Ministry of Internal Affairs and Communications (MIC)/NICT conduct the RD of the next generation communications mission. The RD of wideband digital channelizer/multi-beam feeder technology, wideband DBF technology, and 10-Gbps class optical feeder link technology has been conducted as the fixed-beam mission, variable-beam mission, and the optical feeder link mission, respectively. Currently, preliminary design of theses missions has been completed as the planned schedule and critical design is being conducted. In the future, we plan to continue the RD and development of the mission equipment toward the in-orbit verification by the ETS-IX.