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PERFORMANCE CHARACTERISTICS OF THE SMALL OPTICAL TRANSPONDER (SOTA) ONBOARD MICRO-SATELLITE

Abstract

After successful laser communication demonstration between the optical ground station at the National Institute of Information and Communications Technology (NICT) and an optical terminal onboard a low earth orbit satellite, NICT has initiated R&D activities of Small Optical TrAnsponder (SOTA) for micro-satellites to demonstrate attractive features of optical technology. The project is called the Space Optical Communications Research Advanced TEchnology Satellite (SOCRATES). In this project, main missions are 1) demonstrate 1.5 micron technology in space, 2) propagation data acquisition using 980nm, 1064nm and 1550nm, and 3) basic measurements for quantum key distribution (QKD).Conceptual design was conducted including bread board model evaluation. Based on the results of the conceptual design, an evaluation model for critical technologies, such as small 2-axis gimbal, optical bench etc., was manufactured and evaluated. The design of the SOTA was finalized with some design modification as the results of the evaluation model. Production of the model for flight demonstration has started and final assembly is underway. The performance verification campaign will start very soon. This paper describes the performance characteristics test results of the SOTA onboard a 50-kg micro-satellite.