25th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)

Small Space Science Missions (2)

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IONOSPHERE IRREGULARITY OBSERVATION USING REFERENCE SIGNALS FROM CUBESAT CONSTELLATION

Abstract

Ionosphere is a complex region which rapidly change over the time. This rapid fluctuation in the total electron content (TEC) of Ionosphere leads to the communication problem from the space to the ground. The quality of communication depends on the Ionosphere condition which is especially hard to predict in the lower to mid-latitude (15^0 - 30^0) region of the Earth. The error range of this area associated with the navigation signal can vary from 15 to 35 meters in accuracy which start to fluctuate after the sunset in the local time. Global Navigation Satellite System provides the information to be used as ionosphere density monitoring. This information, generally in TEC value is necessary to map the ionosphere condition in global scale. Recently small satellite constellation become an alternative for the ionosphere monitoring due to the lower cost and faster development time. Kyushu Institute of Technology is developing a 2U CubeSat, SPATIUM-I, in collaboration with Nanyang Technological University in Singapore. This satellite will do on-orbit demonstration of Chip Scale Atomic Clock (CSAC) as well as the evaluation of signal time delay. This paper will present the basic algorithm to derive the electron density 3D distribution from the SPATIUM Observation data. This concept will then be implemented for the evaluation of Ionosphere Observation