



Contribution of IONO experiment onboard CubeSat INSPIRE-SAT 7 to the study of the Earth's ionosphere

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Extended Abstract

INSPIRE-SAT 7 is a French 2U CubeSat, the purpose of which is the measurement of the Earth's radiation budget at the top of the atmosphere and the sounding of the ionosphere [1]. It is very similar to the satellite UVSQ-SAT [2] which was launched on 24 January 2021. Its total mass will be 3.0 kg and its averaged power consumption 3 W. It will orbit at a maximum altitude of 600 km on a Sun-synchronous orbit with a descending node at ~0930 LT. The IONO experiment embarked on the CubeSat is dedicated to the sounding of the Earth's ionosphere. The latter results from the ionization of the upper atmosphere due to UV radiations and X-rays coming from the Sun. The electron density in the ionosphere depends on the local time, the season, and the solar activity. The propagation of the radio waves is affected by the electron density and also by refraction and reflection phenomena. We consider the following goals for the IONO instrument: improving ionosphere models, in particular the IRI (International Reference Ionosphere); study of the propagation of electromagnetic waves in the ionosphere and the factors which can disturb it (e.g., thunderstorms); analysis of temporal and spatial variability at different scales; study of the coupling between ionosphere and magnetosphere, and the electrical circuit between ionosphere and lithosphere. The observations collected by IONO will be compared to those produced by a VLF-LF antenna network designed for investigating the perturbations of the ionosphere, and the wave propagation, by seismic phenomena [3].

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