

EGU22-10052, updated on 19 Aug 2022
<https://doi.org/10.5194/egusphere-egu22-10052>
EGU General Assembly 2022
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Ionospheric sounding experiment IONO onboard CubeSat INSPIRE-SAT 7

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INSPIRE-SAT 7 is a French 2 Unit CubeSat weighting approximately 3 kg, very similar to the satellite UVSQ-SAT which was launched on 24 January 2021. Its main purpose is the measurement of the Earth's radiation budget at the top of the atmosphere and the sounding of the ionosphere. 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.