

## NICT activities on radio sensing of ionosphere and its application

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When digital and unmanned device and vehicle jump into a global trend, it is foreseen that the GNSS (Global Navigation Satellite System) including GPS will play an important role in economy and society by being an indispensable social infrastructure. Such infrastructure is, however, sensitive to day-to-day variability of ionosphere and its disturbances. One of the big concerns is the plasma bubble effect on satellite communications and navigation.

NICT established and has been operating the Southeast Asia Low-latitude Ionospheric Network (SEALION) for 18 years in many Southeast Asian countries. We aim to monitor ionospheric condition and detect its disturbances that could degrade the integrity and the availability of radio communications and navigation. In January 2020, the VHF radar was installed in Chumphon, Thailand crafting to observe plasma bubbles from their initial generation stage. The VHF radar will augment the SEALION sensors to give more complete understanding of plasma bubble effect. We expect that our activities will significantly contribute to the real use of satellite-based navigation technology in unmanned device and vehicle.

In additions, to link the research to operation, we developed the high frequency (HF) radio propagation simulator, HF-START. Recently, we have prepared the service including HF-START web tool and real-time information of HF propagation. The detailed information will be introduced in this talk.

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