SEALION: An Observation Network for Nowcast and Forecast of Equatorial Ionospheric Disturbances Causing Degradation of GNSS Positioning

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The ionosphere surrounding the earth affects propagation of radio waves for broadcast and telecommunications, or it degrades positioning accuracy of GNSS. Equatorial ionospheric disturbances, especially equatorial plasma bubbles (EPB), can induce large fluctuation in delay of the radio waves from the GNSS satellite to ground receivers, and sometimes cause cycle slips or signal loss-of-lock on GNSS receivers. The EPB usually occurs around magnetic equator in the evening, propagates to the east, and sometimes expand higher latitude region.

For the purpose of monitoring and forecasting equatorial ionospheric disturbances, SEALION (SouthEast Asia Low-latitude IOnospheric Network) has been developed since 2003 by National Institute of Information and Communications Technology (NICT), Japan, , in cooperation with the following institutes,

- King Mongkut's Institute of Technology Ladkrabang (KMITL), Thailand,
- Chiang Mai University (CMU), Thailand,
- National Institute of Aeronautics and Space (LAPAN), Indonesia,
- Hanoi Institute of Geophysics (HIG), Vietnamese Academy of Science and Technology, Vietnum,
- Center for Space Science and Applied Research (CSSAR), Chinese Academy of Sciences, China,
- Kyoto University, Japan,
- Solar-Terrestrial Environment Laboratory (STEL), Nagoya University, Japan.

SEALION consists of five ionosondes, four GPS receivers, two GPS scintillation monitors, and a magnetometer. As a part of this project, we newly installed an all-sky imager (ASI) at Sirindhorn observatory in Chiang Mai, Thailand. One of main targets of the ASI observation is the large-scale wave structure (LSWS) with wavelengths of 100-1000 km. The LSWS is thought to be connected to the generation mechanism of EPB.

In this presentation, we will show the first observational result of the ASI installed at Sirindhorn observatory, and discuss the relationship between the LSWS and EPB.