

## **Current Status and Recent Progress of NICT's Ionospheric Observations in the Southeast Asia by GNSS-TEC and SEALION**

Takuya TSUGAWA<sup>1#+</sup>, Michi NISHIOKA<sup>1</sup>, Hiromitsu ISHIBASHI<sup>1</sup>, Takashi MARUYAMA<sup>1</sup>, Pornchai SUPNITHI<sup>2</sup>,  
Buldan MUSLIM<sup>3</sup>, A. SAITO<sup>4</sup>, Y.OTSUKA<sup>5</sup>, Mamoru YAMAMOTO<sup>4</sup>, Tsutomu NAGATSUMA<sup>1</sup>, Ken T. MURATA<sup>1</sup>

<sup>1</sup>National Institute of Information and Communications Technology, Japan,

<sup>2</sup>King Mongkut's Institute of Technology Ladkrabang, Thailand,

<sup>3</sup>National Institute of Aeronautics and Space (LAPAN), Indonesia, <sup>4</sup>Kyoto University, Japan, <sup>5</sup>Nagoya University, Japan

<sup>#</sup>Corresponding author: tsugawa@nict.go.jp <sup>+</sup>Presenter

National Institute of Information and Communications Technology (NICT), Japan has developed the Southeast Asia low-latitude ionospheric network (SEALION) and ionospheric observation system using GNSS receiver networks in the Southeast Asia for the purpose of monitoring and researching severe ionospheric disturbances, such as plasma bubble. These ionospheric disturbances can affect satellite-to-ground radio propagation, degrade GNSS navigations, and cause loss-of-lock on GNSS signals. SEALION consists of six ionosondes, four GPS receivers, two GPS scintillation monitors, and two magnetometers, and one all-sky imager in Indonesia, Thailand, Vietnam, Philippines, and China. SEALION is a unique ionospheric observation network in having the conjugate observational points in the northern and southern hemispheres and around the magnetic equator. Developing dense GNSS receiver networks in the Southeast Asia would make it possible to reveal spatial structures and temporal evolutions of the several 100 km scale ionospheric disturbances in the wide area of 2,000-3,000 km in latitude and longitude in this Southeast Asia. We will introduce the current status of the SEALION and the GNSS-TEC observations and present some recent researches related with plasma bubbles, mid-night ionospheric irregularities, and late-afternoon periodic TEC fluctuations. Recent progress of GNSS-TEC data sharing in this region will be also presented.