

## NETWORK OF SATELLITE BEACON EXPERIMENT FOR THE STUDY OF EQUATORIAL SPREAD-F FROM ASIA AND PACIFIC REGIONS

Mamoru Ymamamoto\*, Smitha V. Thampi\*, Tsutomu Nagatsuma<sup>†</sup>, Mamoru  
Ishii<sup>†</sup>, Yuichi Otsuka<sup>‡</sup>, Kazuo Shiokawa<sup>‡</sup> and Roland Tsunoda<sup>°</sup>

\*Research Institute for Sustainable Humanosphere (RISH), Kyoto University  
Uji, Kyoto 611-0011, Japan

<sup>†</sup>National Institute of Information and Communications Technology (NICT)  
Koganei, Tokyo 184-8795, Japan

<sup>‡</sup>Solar Terrestrial Environment Laboratory (STEL), Nagoya University  
Nagoya, Aichi 464-8601, Japan

<sup>°</sup>SRI International  
333 Ravenswood Ave., Menlo Park, CA 94025, U.S.A.

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**Abstract.** Equatorial spread F (ESF) is intense ionospheric irregularity that occurs around the geomagnetic equator. It can cause intense scintillation to satellite-ground communications, and serious error in the GPS measurements. ESF itself is known as a Rayleigh-Taylor instability starting from the bottom side of the equatorial F-region normally after the local sunset period. In the ESF event, plasma depleted region rapidly enhance, and shows fast upwelling to 1000km height or more. The ESF has been a hot research topic of the equatorial/low-latitude ionosphere for long time. However, day-to-day variability and large longitudinal variation is not well understood. The C/NOFS (Communications/Navigation Outage Forecasting System) satellite was launched in 2008 into the low-inclination orbit to study these aspects of the ESF. We, Japanese researchers, have developed a large network of ground-based observations of the ionosphere in the south-east Asian region. It includes the Equatorial Atmosphere Radar (EAR) of RISH, Kyoto University, the ionosonde network SEALION (SouthEast Asia Low-latitude IONospheric Network) of NICT, and optical instrument network OMTI (Optical Mesosphere Thermosphere Imager) of STEL, Nagoya University. We have developed the digital satellite beacon receiver named GNU Radio Beacon Receiver (GRBR), and started observations in southeast Asia. From TEC results in these regions with C/NOFS, we successfully showed that longitudinal large-scale wave structure of the ionosphere is in good relationship to the ESF occurrence. In other countries there are many research activities for the ESF. Among them, SRI International (USA) started radar and beacon receiver network on

Pacific islands, and Indian scientists study the ESF for long time. In this research program we try to collaborate with scientists from these groups, and widen our observation network from India to Pacific mainly by enhancing GRBR observations. Also we hope to locate a GRBR in the African region to tackle yet-unknown longitudinal variation of the ESF.