

New digital beacon receiver for the study of equatorial ionosphere with satellites TBEx and FORMOSAT-7/COSMIC-2

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We have successfully conducted observations of total-electron content (TEC) of the ionosphere using a satellite-to-ground beacon experiment. A unique dual-band (150/400MHz) digital receiver GRBR (GNU Radio Beacon Receiver) was developed for this purpose, which is based on the recent digital-signal processing technologies. The GRBR network was deployed into the southeast Asian and Pacific regions. By using beacon signals from the low-inclination satellite C/NOFS, we studied longitudinal "large-scale wave structures (LSWS)" in detail as a possible source of equatorial Spread-F (ESF) events. Now there are 2 new beacon-satellite plans. One is TBEx (Tandem Beacon Explorer), a project by SRI International, to fly a constellation of two 3U cubesats with triband beacon transmitters. Another one is a constellation of FORMOSAT-7/COSMIC-2 satellites, also with triband (or quad-band) beacon transmitters. All of these satellites will be placed into low-inclination orbits by the same launch vehicle in late 2016. This launch will provide great opportunities to enhance studies of the low-latitude ionosphere. Kyoto University, Ehime University and Hsing Wu University are now developing the new GRBR system that is expected to be used for the TBEx and FORMOSAT-7/COSMIC-2 beacon experiments. In the presentation we will show development of the new beacon receiver together with plan of observations.

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