



Advanced methodology development for Real-Time Multi-constellation (BDS, Galileo and GPS) Ionosphere Services – a bilateral project report

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Satellite-based systems, like the Global Navigation Satellite Systems (GNSS) performance can be seriously affected by the errors originated in the ionosphere. If ionospheric propagation errors are not properly corrected, performance of navigation and communication applications based on GNSS radio signals can be severely degraded. On the other hand the regional and international GNSS permanent receivers networks provides an excellent opportunity to continuously monitor the variability of ionospheric plasma density. Nowadays the number of receivers providing real-time data access grows significantly, creating a chance for even real-time ionospheric monitoring.

We hereby present the first results of the project as well as the ionospheric service, which is the main result of ARTEMIS. ARTEMIS – Advanced methodology development for Real-Time Multi-constellation (BDS, Galileo and GPS) Ionosphere Service was a bilateral project held by SRRC/UWM on the Polish side and Aerospace Information Research Institute (AIR), Chinese Academy of Sciences (CAS) on the Chinese side.

The project was dedicated to develop methodologies and approaches of real- and near real-time ionosphere monitoring, using Galileo and BeiDou systems along with GPS. Most of the current approaches incorporate GPS and GLONASS or GPS only.

Many scientific users – low frequency radioastronomy or geodesy and satellite navigation – need precise data reflecting current state of the ionosphere. However many users require the information mostly concerning the dynamics of changes and irregularities occurring in the ionosphere. Therefore within the ARTEMIS project we elaborated global and regional products covering both absolute Total Electron Content (TEC) values and temporal plasma density fluctuations based on the International GNSS Service (IGS) acclaimed Rate of TEC Index (ROTI).