



## **Modeling of the travelling ionospheric disturbances. Case study of ASG-EUPOS network**

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Traveling ionospheric disturbances (TIDs) - this is quite established term for a relatively stable spatial structures, which are characterized by a certain distribution of the electron concentration and are moved as a whole, especially in the horizontal direction. In most cases TIDs are associated with atmospheric gravity waves (AGW) and are expected to be a quasi-plane wave. Effective modern method of studying TIDs is the sounding of ionosphere by GNSS signals received by the dense regional network.

Method of the orthogonal projection of the ionosphere electronic content variations for the total electron content (TEC) mapping allows visualizing the ionospheric irregularities (Zanimonskiy et. al. 2016). Such maps can be used to detect TIDs, their modeling and determination of model parameters, such as: direction and speed of movement, spatial period and the height of the ionosphere layer, in which TIDs are localized. In this paper traveling ionospheric disturbances detected over Poland are presented for the day of St. Patrick (March 2015). Into the calculation process observational data from dense regional network deployed in Poland (ASG-EUPOS) were used. Estimated TIDs were characterized by relative frequent occurrence, up to several times a day, and were observed from a few tens of minutes to hour. The direction of detected TIDs movement in most cases was opposite to the horizontal wind calculated by Horizontal Wind Model 07 at the height of TID. Furthermore, the amplitudes of estimated TEC variations during the TID passage were proportional to the background TEC values and consequently to the higher level of the geomagnetic activity. The extremely high TEC variations and speed of TIDs were registered during the severe geomagnetic storm are discussed in this paper.

Further works are carried out to the investigation of quantitative relation between the parameters of TIDs and horizontal winds, as well as to accumulation of statistics and characteristics of TIDs appearance, depending on the season and the level of geomagnetic activity.

Zanimonskiy Y.M., Nykiel G., Paznukhov A.V., Figurski M. (2016) "Modeling of TEC Variations Based on Signals from Near Zenith GNSS Satellite Observed by Dense Regional Network". Proceedings of the 2016 International Technical Meeting of the Institute of Navigation. Monterey, California, January 2016.