



## **Potential synergy between the Ionospheric Disturbance Flag and NeQuick-G for single frequency users**

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The document describing the particular ionospheric model developed for the Galileo satellite navigation system has been very recently released, the official Ionospheric Correction Algorithm for Galileo Single Frequency Users document (from here on-wards named Galileo-Iono), available at [www.gsc-europa.eu/system/files/galileo\\_documents/Galileo\\_Ionospheric\\_Model.pdf](http://www.gsc-europa.eu/system/files/galileo_documents/Galileo_Ionospheric_Model.pdf). This publication allows GNSS receiver manufacturers to start the implementation of the specific algorithm targeted for their Galileo related products in order to be compliant with the Galileo system.

As indicated in the Galileo OS SIS ICD, among the parameters that are broadcast in the Galileo navigation message, parameters that are sent within both F/NAV and I/NAV, one can find five Ionospheric Disturbance Flags for Regions 1 to 5 (SF1, SF2, SF3, SF4 and SF5). Nevertheless, in the current version of the model presented in the Galileo-Iono document, the Ionospheric Disturbance flags are “not used” within the Galileo ionospheric correction calculation.

In this work, a potential approach to account for this information is being investigated. This plan includes the update of the Galileo ionospheric, NeQuick-G, correction model by specifying the use of these flags. Hence a customized version of the NeQuick-G model has been developed and tested. Specific scenarios will be considered to test whether this approach of considering the added value information of the Ionospheric Disturbance Flags is translated into the positioning domain.

In order to assess the improvement obtained using the proposed approach five stations displaced in the five regions are used. Different days of data have been collected in nominal and disturbed conditions; the evaluation is carried out comparing the performance of the proposed approach with respect to the classical approach. The benefits of the use of the disturbance flags information are evaluated comparing the performance in similar geometry conditions.