

Galileo High Accuracy Services Support Through ISO 19162 Ladm Edition II

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SUMMARY

Land surveying is the process of determining the three-dimensional position of a fixed point on Earth relative to a certain reference frame. High accuracy positioning has been called for by the land mapping and surveying community ever since GPS's initial adoption to achieve centimeter level accuracies.

High Accuracy Services (HAS) are considered necessary by the Land Administration sector for implementing classical institutional services such as parcel subdivision, boundary determination, new building insertion in the map, coordinate reference systems update. In this scene, Galileo (the European Union's Global Navigation Satellite System) is expected to offer a new paradigm for HAS, through the advent of satellite corrections broadcasting (e.g. precise ephemeris, clock corrections and satellite biases) on the native triple frequency plan. These corrections enable the computation of a high-accuracy positioning solution in real time when processed by an appropriate algorithm in the users' receivers tracking the Galileo E6-B signal. Galileo began the delivery of its HAS started at the end of January 2023.

In this context, the H2020 GISCAD-OV project, has as main objective to design, develop and validate an innovative and cost-effective HAS for Cadastral Surveying applications, based on GPS+Galileo E6 HAS and Precise Point Positioning-Ambiguity Resolution (PPP-AR) quick convergence techniques. In this scene, a new model is being developed, within the context of the revision of the ISO standard 19152 Land Administration Domain Model (LADM), to enhance the surveying functionality of the standard. To validate this proposal a series of pilots have been carried out around Europe, with the active participation of local professional surveyors.

This paper aims to present the final version of the survey model of the LADM as included in the

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Committee Draft (CD) that has been submitted to the ISOTC211 committee for review; the main results from two of the GISCAD-OV pilot campaigns that have been performed and their validation. Specifically, the results from one of the pilots that took place in an urban setup in Germany from 19-22 September 2022, and the results from two sites surveyed in Estonia will be presented. For those, the cadastral survey workflows that have been followed will be documented, as well as the initial results will be presented and the conceptual survey model will be evaluate by creating the corresponding instance level diagrams for those cases. Furthermore, the system architecture for the LADM-based 3D Land Administration prototype will be described, where the results of the measurements will be loaded and tested.

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