Safe GNSS augmentation for high-precision autonomous systems - Design and Performance Integration/Results

ABSTRACT

With the introduction of high-precision GNSS technology into the automotive industry, it has become clear that an appropriate high precision GNSS augmentation service that can serve this market sector does not exist. Such augmentation service requires accuracy, efficiency, high availability, and most importantly must be conceived and designed from the ground up under the most advanced safety standards used in the automotive market. At the same time, the diversity of applications for high precision GNSS has grown dramatically. As a result of this growth, the general requirements for GNSS positioning systems have also changed.

Sapcorda is the GNSS augmentation company that has been created with the goal of bringing high precision GNSS positioning services to automotive and other mass markets applications, in recognition that the existing solutions for GNSS positioning services do not meet the needs of emerging high precision GNSS markets. As a result, Sapcorda brings an innovative, affordable, and widely available solution for system integrators, OEM and receiver manufacturers.
Sapcorda offers GNSS corrections over L-Band and internet for safe and accurate positioning. The users have access to integrity for safety of life applications which fully meets the requirements for positioning sensors of the automotive sector, allowing the proper implementation of GNSS in automated driving.

This paper presents showcases of the Sapcorda augmentation service integration for automotive sector systems. The paper will review the customer requirements in the automotive sector and how they relate to system design and development, as well as to the final performance achieved with the augmentation service. Algorithms employed in the generation, transmission and integration of the augmentation service are also reviewed, along with aspects of the data correction format used to transmit the augmentation data to end users.

Performance results and analysis are shown for different user scenarios, receiver models and performance grades, as well for different levels of integration and system accuracy levels. Results demonstrate the level of performance that can be achieved with state-of-art, safety-compliant, GNSS augmentation systems deployed on a continental level. The analysis in this paper explores several performance metrics

including accuracy, convergence, robustness, and others. The paper also explores the outlook of the Sapcorda GNSS augmentation rollout along with its integration partners.