

GIST demonstrates Hybrid-V2X-based connected vehicle platform development technology

- Expected to strengthen future mobility capabilities through bad weather accident prevention technology



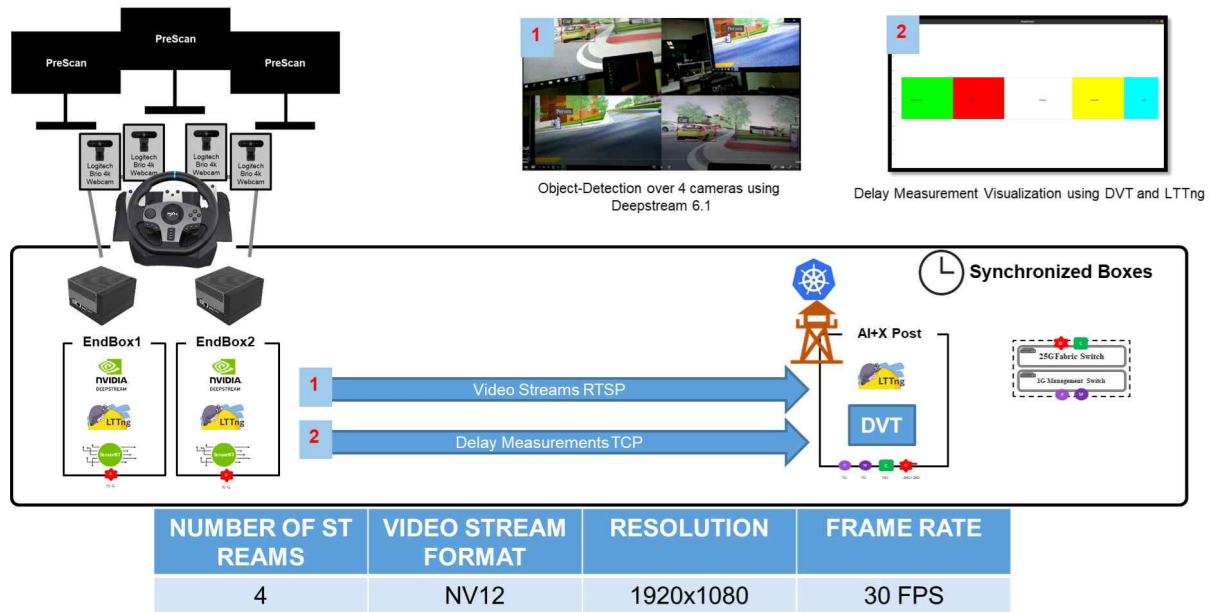
▲ Joint demonstration of Hybrid-V2X-based connected car platform development

GIST (Gwangju Institute of Science and Technology, President Kiseon Kim) AI Graduate School (Dean Jongwon Kim) unveiled a Hybrid-V2X*-based connected car platform capable of responding to external environments such as bad weather at the AI Graduate School building on November 3rd. The <2022 Hybrid V2X Demo Day> event was held to demonstrate prototypes under development.

* Hybrid V2X (Vehicle to Everything communication): A technology that connects cars and everything, enabling communication between cars and various elements in the road environment, making it a core technology for self-driving cars and next-generation intelligent transportation systems. It is mainly used to notify traffic conditions or approaching vehicles in front, communicate with traffic infrastructure such as traffic lights or speed limit sections, or provide information on nearby pedestrians. At this time, the method of simultaneously supporting DSRC (WAVE) and C-V2X (Cellular V2X) as a V2X communication standard is collectively referred to as Hybrid-V2X.

In this demonstration event held with Etiforce (CEO Yong-je Lim), Kookmin University (Professor Gu-min Jeong), and TenergySoft (CEO Chun-seok Jeon), the results of the third year of the five-year project for related technologies were revealed, and overall SiLS (Software -in-the-loop) type Hybrid-V2X Car-Edge cloud-based low-latency service demonstration environment construction demo and ToF-based vehicle positioning demo linked to Hybrid-V2X communication were conducted.

GIST and Tenergysoft prepared 'SiLS (Software-in-the-loop) Hybrid-V2X Car-Edge Cloud Low-Latency Service Demonstration Environment Construction Demo' prepared by Hybrid-V2X Car-Edge Cloud and SiLS virtual driving simulation are prepared to show the progress of the integration development.



▲ Conceptual diagram of object recognition demo composition using simulator test drive and Car-Edge cloud

First, a Car-Edge cloud environment including multiple XAI-DCUs (eXplainable AI-Data Concentration Units) operated in a cloud-native manner is established and demonstrated safe integrated control based on MultiSec DevOps (Development Operation Parallel System) that is being developed. Through this, it was confirmed that the state of all Car-Edge cloud resources, including XAI-DCU, was visualized in three dimensions to respond to external network attacks.

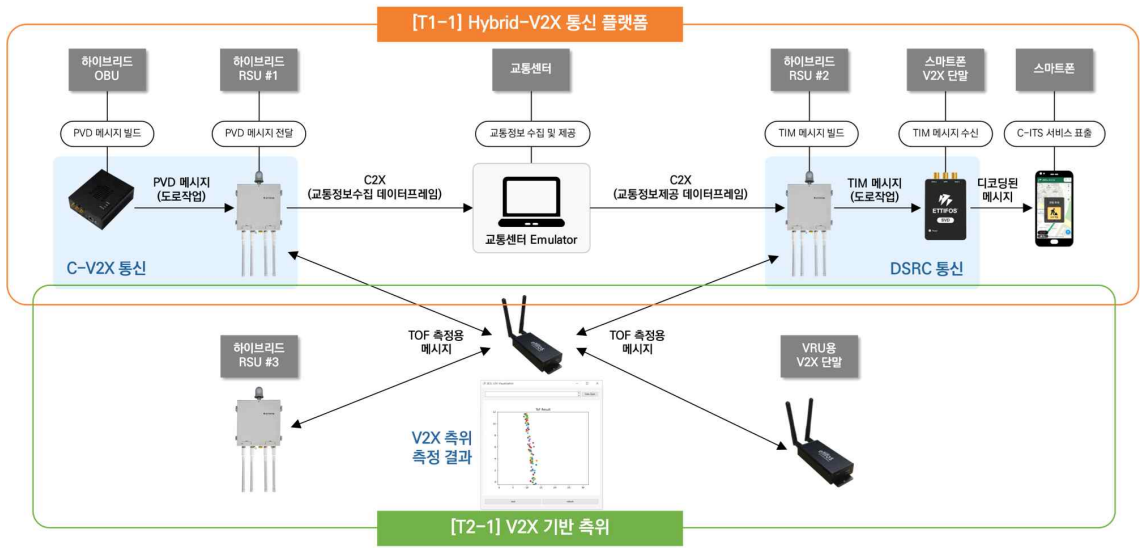


▲ Object recognition using Car-Edge cloud including XAI-DCU for simulator test drive

In addition, the GIST campus test driving video screen, which virtually creates virtual driving of the SiLS method directly connected to the built Car-Edge cloud in the Prescan simulator, is transmitted and recognized in real time from the redundant box to which 4 cameras are connected to the XAI-DCU. At this time, a Linux kernel-linked tool that can continuously monitor delays occurring in the process from image acquisition to recognition was applied to establish a foundation for attributing the development of low-latency services.

In the 'ToF-based Vehicle Positioning Demo Linked to Hybrid-V2X Communication' prepared by Etiforce and Kookmin University, Etiforce, which operates DSRC (WAVE), the Korean C-ITS V2X standard, and C-V2X (LTE-V2X) communication in parallel

Prometheus (model name: Prometheus), a joint demonstration was conducted to correct the error to within 2.0m level through the positioning error correction algorithm based on the Kalman filter on the Hybrid-V2X communication platform.



▲ Conceptual diagram of Hybrid-V2X ToF-based positioning demonstration configuration



▲ Hybrid-V2X ToF-based positioning verification scene using RSU (3 locations) and OBU (Motor Vehicle)

In this automotive AI convergence project, a total of 2.38 billion won is supported for 5 years (May 1, 2020 ~ December 31, 2024) in the research and development of the artificial intelligence-centered industrial convergence cluster development project hosted by the Ministry of Science and ICT and the National IT Industry Promotion Agency. Research and development on Hybrid-V2X communication platform, high-precision positioning, distributed XAI-DCU prototype, and driving simulator SiLS & HILS linkage are being conducted.

In the future, the research team will conduct public demonstrations every year and continue joint collaboration efforts to secure the base technology in connection

with the automobile (autonomous driving) demonstration part that will be created in the cluster in the future.

