

## Case Study Precise Positioning



At Auve Tech, we're building the world's most flexible last-mile transportation ecosystem with our autonomous shuttles. The Swift Navigation GNSS module was installed on our shuttle to improve our autonomous mobility system. The intense testing with our system allows us to make our navigation safer with Precise Positioning."

Jorma Hiie, Project Lead, Auve Tech



### Self-Driving Vehicles and Autonomous Transportation Systems

Auve Tech was founded in Estonia in 2019. Specializing in the development and deployment of driverless vehicles and autonomous systems, their goal is to build the world's most flexible, last-mile transportation system with their shuttles.

#### The Challenge

Currently Auve Tech's shuttles—like many other driverless vehicles—uses highly advanced and expensive LiDAR technology. With LiDAR, the shuttle recognizes its surroundings, calculates its position with reference to other physical objects, obstacles, and hindrances. Using the resulting high-definition map, it then navigates accordingly.

To have a backup plan for instances when LiDAR fails, for example when bad weather conditions prevail, Auve Tech decided to utilize GNSS Precise Positioning, since it is largely independent of LiDAR with regards to potential sources of error, while at the same time being one of the most affordable sensors used within the spectrum of autonomous navigation technology.

#### The Solution Tested with PGM and Skylark Cloud Services

Auve Tech integrated an Evaluation Kit featuring the Precise Positioning GNSS Module (PGM) developed by Swift Navigation into their shuttles to test the positioning accuracy achievable while navigating without LiDAR. The Evaluation Kit is running the Starling positioning engine, which uses GNSS corrections from the Skylark cloud-based, Precise Positioning service to improve GNSS accuracy.



Figure 1: PGM Receiver, 50.95 x 30 mm Mini PCIe



Figure 2: PGM Evaluation Hardware 115 x 82 x 34 mm



Auve Tech mounting PGM on a driverless shuttle



Comparison: Precise Positioning and LiDAR

#### The Result and Next Steps

The test showed that the PGM device and the Skylark Precise Positioning service provides safe and accurate positioning while navigating autonomously. The same test drive was conducted once using only LiDAR and then repeated with Precise Positioning. The monitoring system revealed that the results were identical: the same plot was defined by both LiDAR and Precise Positioning, which proves Precise Positioning can be used as a stand-alone solution for autonomous driving. The next step for Auve Tech is to work on some minor discrepancies experienced during the test and optimize the solution towards production usage.