



## Applanix Corporation

Enabling Dynamic Geospatial Solutions

Since the company's inception in 1991, Applanix has set the standard for position and orientation technology in land, marine, and airborne applications worldwide. The Position and Orientation System for Land Vehicles (POS LV) is specifically designed for applications that require robust positioning and orientation combined with high dynamic accuracy even during prolonged GPS outages. The system integrates precision GPS with advanced inertial technology to provide uninterrupted measurement of position, roll, pitch, and true heading. By merging these two complementary technologies, the Applanix POS LV provides a fully integrated, turnkey solution.

A true pioneer in enabling dynamic geospatial solutions, Applanix has applied its unique expertise to autonomous vehicle navigation in all previous DARPA Grand Challenge events since 2004. In 2007, Applanix was proud to announce its selection by the Stanford Racing Team to integrate the POS LV into their new vehicle, named "Junior." The navigation challenges presented in an urban setting will not only illustrate the need for robust positioning but also the flexibility of the POS LV system to provide a multitude of critical information necessary to navigate confidently and sense vehicle dynamics at very high data rates.

The Stanford Racing Team utilizes the Applanix POS LV 420, a system that represents the state of the art in its ability to navigate through the toughest environments accurately and reliably. This ability is achieved in part by the way inertial and GPS data are blended in real time. Raw GPS observables are utilized by the navigator in what is defined as a *tightly-coupled* system. During periods of GPS signal outage, usable observables continue to be incorporated into the navigation solution, providing an uninterrupted computation of position. This capability is further augmented by the system's dual antenna GPS Azimuth Heading Measurement Subsystem (GAMS) array, which provides very accurate heading calibration of the inertial measurement unit (IMU) regardless of vehicle dynamics. The POS LV also uses a distance measurement instrument (DMI) to assist in navigating during extended outages.

For high precision dynamic spatial data acquisition that has been proven in everyday mobile mapping applications and in autonomous vehicle development, the Applanix POS LV is the most adaptable position and orientation solution commercially available.

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# STANFORD RACING TEAM

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