

Vol. 197 · Issue 1

al-online.com • autoindustry.us • peace

Chinese supercar powering into production DOWRLOAD THE MAPP

Brazil's automotive strategy gains traction

The future (and present) of **connectivity** and **autonomous** driving

Intelligent multipart cleaning of electronic sensors

Autonomy requires ACCURATE localization AT ALL TIMES

SUBSCRIBE • RENEW visit ai.com.ai



"GNSS-inertial positioning and orientation has always been our pedigree, but now we are using GNSS-inertial along with new forms of aiding to deliver the same high-standard of innovation and expertise to autonomous vehicle systems with a completely customizable solution" – Louis Nastro, Director, Land Products, Applanix Corporation, Page 38



New **development platform** for **autonomous** vehicles

By: Clifford Parish

Developers of systems for autonomous or semi-autonomous vehicles are faced with the challenge of reducing cost through standardization across platforms, while at the same time having to design systems for vehicles operating in very different environments.

Automotive Industries (AI) asked Louis Nastro, Director, Land Products, Applanix Corporation, how the company's new Autonomy Development Platform addresses this challenge.

Nastro: Whether a manufacturer is starting their program or wishes to qualify new equipment for testing, customization is a salient factor in

Louis Nastro, Director, Land Products, Applanix Corporation

choosing which partner to work with. An example is OEMs which develop on and off-road equipment. On-road you have a truck which goes several hundreds of miles on highway, but an off-road truck has to operate in a deep open pit mine or even underground. With our new platform, manufacturers have the option of standardizing their designs while optimizing performance with sensors they already have on the vehicle. For example, taking LIDAR and camera data and utilizing it as a source of data to aid positioning so the system works with the same accuracy

across a number of different use cases. With respect to GNSS, customers have a choice of using Trimble RTX with our equipment or their own base stations in a mining environment.

> Al: What feedback had you received from these manufacturers while developing the platform?

Nastro: In advance of developing the requirements we spoke to manufacturers that were already using our POS LV equipment, and through that we collaborated to take a deep dive into price/performance characteristics for other phases of their development, all the way to what will ultimately be put in an autonomous vehicle. Through

that analysis it was clear that since operating environments would be vastly different, standardized hardware would be required. Flexibility in how we approach our solution was the key and providing access to our Engineering and Product Professionals to aid in this critical task is another core differentiator in what we are doing.



36

Customization is everything and we could not do this effectively without dedicated personnel working at a deep technical level with our clients."

Al: How is the latest version of the Applanix POS LVX system an improvement on the previous avatar?

Nastro: In a word I would say, "flexibility". Even though all of our systems can now take advantage of alternate forms of aiding discussed above, LVX provides that as a turnkey system which can be deployed in volume for any application (real time positioning and orientation for autonomous vehicles, dedicated mapping vehicles, ability to log data for crowdsourced maps, ADAS testing, etc.). Another difference is the modular nature of the system and ease of use with a simple web GUI which allows users to integrate quickly and all of the bespoke modifications we assist OEMs with can be configured and changed during their test programs. When testing and validation are completed,



The Applanix development platform stages.

the same components are available in a board level version of the product, so performance has already been validated, the components used in the long duration testing are identical but for very large quantity orders we can meet the price/performance targets of the customer.

Al: How accurate is the Applanix POS LVX system, compared to other similar systems?

Nastro: Accuracy is one of many considerations in selecting a system, so if we compare strictly on specifications, the LVX provides class-leading capability. When we look at the practical realities of how the system performs in field, that is where the real differences emerge in terms of performance in moderate or severe multi-path and the integration of other forms of aiding we are able to perform with this product. Repeatability and reliability are what clients are looking for and the only way you can achieve both is by having an excellent platform upon which to build, and by tailoring the solution to the operating environment based on detailed requirements from the OEM.

Al: What needs to be done to further improve the navigational safety of driverless vehicles?

Nastro: GNSS and inertial are one part of a layered approach to navigating an autonomous vehicle successfully. The more sensors on a vehicle that provide true 360 coverage and in all weather conditions, the better that sensor fused approach can contribute to the navigation task. In providing perception data to a GNSS/inertial system and using it correctly it can be a valuable source of aiding data and that is a critical part of our product strategy moving forward.

In real time, the LIDAR and camera data can be used for aiding, in near real time and post-processing, perception data from the vehicles can be used to crowdsource maps critical for the navigation task. In this scenario you would use the georeferenced point cloud or camera data and run it through our POSPac software to align scans from multiple vehicles to create and update existing maps. The entire workflow to do so is available today. This becomes salient when autonomous vehicles move beyond testing and operating in very favorable conditions as they are today, to operating 24/7 in adverse and constantly changing weather. For example, you can start the day with no snow on the ground, and on the way home there may be lanes closed due to snow banks or other obstacles. Therefore, continual updating of the map being used by the vehicle is critical.

Al: How closely does Applanix work with automotive manufacturers?

Nastro: In all industries we serve, customer feedback and continuous product improvement is critically important. Equally as important is our customers sharing their development roadmaps so we can anticipate what they will require and present solutions quickly. For example, the whole concept of an autonomy development platform was the result of numerous conversations we had with manufacturers who were looking to aid their positioning more effectively. Since companies are developing various ways of localizing and perceiving the environment around an autonomous vehicle, our approach had to be flexible enough to incorporate each customer's specific requirements.

Al: What makes Applanix' engineering services so vital to the success of your positioning technologies used in driverless vehicles?

Nastro: Customization is everything and we could not do this effectively without dedicated personnel working at a deep technical level with our clients. During the product development process we can cover many different critical requirements for customers. However, in order to truly offer bespoke solutions there is a deep level of knowledge required about a particular customer's vehicle, sensors and operating environment. For example, we are working with one of our clients on crowdsourced approaches to mapping using their vehicles, our POS LVX and POSPac software. While they are using standard equipment, their implementation requires modifications to their workflow and both teams need to work seamlessly to ensure functionality and performance. Another client required significant modifications to our hardware and software for off-road applications in order to meet compliance regulations in their operating environment. All of this cannot happen without a core engineering team which can act quickly and provide long-term onsite support.

