David Plus GNSS Receiver Applied in Intelligent Forklift

With the development of intelligent shipping ports, many port-related tools — gantry cranes, loaders and forklifts — can be made autonomous and controlled automatically. These applications use GNSS to obtain positioning and orientation data for machine operators.

In traditional container-intensive terminals, forklift drivers spend a lot of time locating the designated goods; operating the forklift itself requires highly experienced drivers. Tersus GNSS offers a positioning and orientation solution that can greatly reduce the need for experienced drivers, improve the port's operational efficiency, reduce error rates and improve accuracy.

Installed on an autonomous forklift, a David Plus receiver and anti-interference GNSS dual antenna calculates positioning solutions, enabling operators to locate exactly where the target goods are and guide the forklift to them via the quickest, most convenient routes.

The David Plus's compact design can be easily installed on even small forklifts without affecting normal operation. The David Plus obtains high-precision positioning and orientation values by connecting via wireless to an Ntrip network, and then forwards corrections to the port-dispatching system as raw data.

Image: Tersus GNSS

The David Plus supports GPS L1/L2, GLONASS L1/L2 and BeiDou B1/B2 from the primary antenna, and GPS L1/GLONASS L1 or GPS L1/BeiDou B1 from the secondary antenna. Its 384 channels can capture numerous satellite signals within a short time.

With an IP67-rated enclosure, the David Plus GNSS receiver is built for outdoor environments such as shipping ports. A palm-sized unit, it can be easily integrated with various application systems. As a backup data-saving measure, 4 gigabytes of built-in memory record data for post-processing.

A manned forklift can benefit from the positioning data. When the forklift reaches the designated position in the stack, the heading antenna will calculate the correct lift height of the forklift arm. This provides a suitable height for handling the cargo, and prevents accidents such as the cargo falling.

For a fully autonomous forklift, the system will automatically analyze the orientation data and lift the

Image: Tersus GNSS

forklift arm to the corresponding height of the cargo. It will then retrieve and lower the cargo to a safe height, and automatically drive it to the new storage point. During this process, additional infrared obstacle avoidance sensors can accurately identify the distance between the forklift and the cargo, avoiding inadvertent collisions.

The positioning and orientation data obtained by the David

The system will automatically analyze the orientation data and lift the forklift arm to the height of the cargo.

Plus can be shared with third-party software and hardware. For instance, port terminal systems can configure containers to capture distribution information and instructions. By importing the positioning information of the forklift equipped with David Plus into the system in real time, it is possible to calculate the optimal driving trajectory to the final cargo delivery point.

The Tersus David Plus positioning and orientation solution can combine its own high-precision positioning and orientation data with other automation system hardware and software to form a complete forklift unmanned/manned automated driving and handling solution. 🌐