



Our GNSS Tight-Coupling Update



OVERVIEW

We've released our next-generation GNSS tight-coupling engine (gx/ix) that improves positioning performance where GNSS is most difficult. By making better use of available satellite data, it delivers more accurate and reliable navigation in dense urban environments.

Unlike loosely-coupled systems, which require a complete GNSS position fix before aiding the INS, tight-coupling works directly with raw satellite measurements. This allows even one or two satellites to contribute to the solution, maintaining performance when satellite visibility is poor.

At the lane-level 0.3 m mark, the proportion of usable data rose by:

GNSS INS ONLY

+17%

in real-time

+18%

in post-process

GNSS INS + LIDAR ODOMETRY

+43%

in real-time

+23%

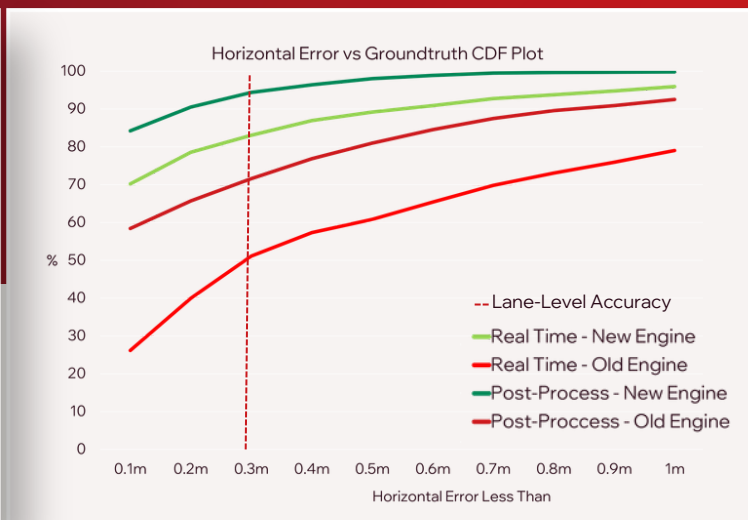
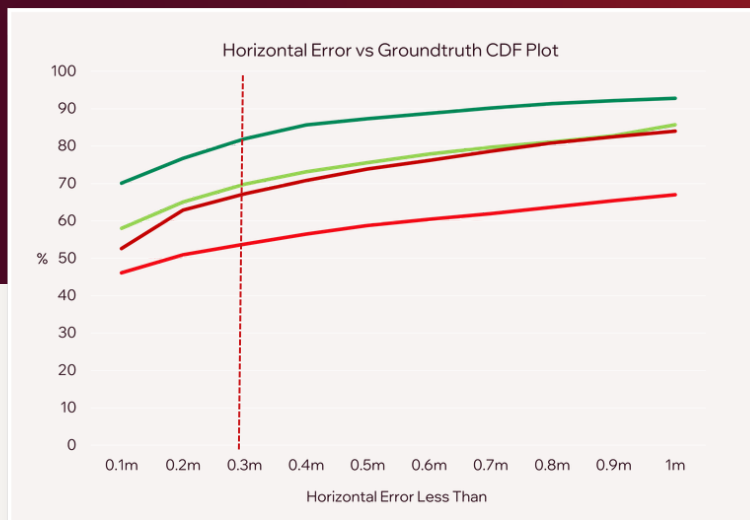
in post-process



KEY BENEFITS

- Higher position availability in urban canyons
- Better heading availability in degraded GNSS conditions
- Fixed-ambiguity, centimetre-level positioning with base stations up to 60 km away

The Results



METHOD

The engine was tested in the City of London, using both real-time and post-processed data, and compared against a SLAM-aided GNSS/INS ground-truth solution.

Two configurations were evaluated:

- GNSS/INS only (RT3000 v4)
- GNSS/INS + LiDAR Boost odometry

Performance was measured by the proportion of time the solution remained within a given error threshold, with 0.3 m lane-level accuracy as a key benchmark.

HOW TO BUY

Get in touch with us to discuss trading in your current devices at a discount, to ensure you are getting the best data with our newest firmware release.

Call: +44 (0)1869 814 253
Email: info@oxts.com

RESULTS

The new engine delivers a consistent 15-20% uplift across every error threshold. At the lane-level 0.3 m mark, usable data rose 17% in real time and 18% in post-processing - a steady gain whether you need decimetre or metre-level accuracy, so the benefit carries through to whatever precision your application requires.

Adding LiDAR odometry produces far larger gains at tight thresholds - a 43% increase in usable data at lane level in real time. LiDAR odometry excels at relative motion: it holds you on your current path. But that cuts both ways - it preserves whatever accuracy you give it, keeping you on point at a centimetre or a metre off.

That's why a better GNSS engine lifts the whole system: it gives the odometry a stronger starting point, which the odometry then protects through the gaps. The 43% gain is the compound result - and the clearest sign that GNSS quality is foundational to everything built on top of it.