

Industrial Spotlight · Multi-sensor System

Multi-sensor Registration for an Autonomous Forklift

Apply coordinate registration across sensors and connect perception to safety decisions and the vehicle system.

Period 2024 - present | Evidence state Ongoing | Portfolio tier Industrial Spotlight

Connected ToF-RGB-SAM3 registration, SICK TiM LiDAR and NAV350 3D PCD processing, robot localization, sensor fusion, safety policy, and Zenoh publication into one integration flow.

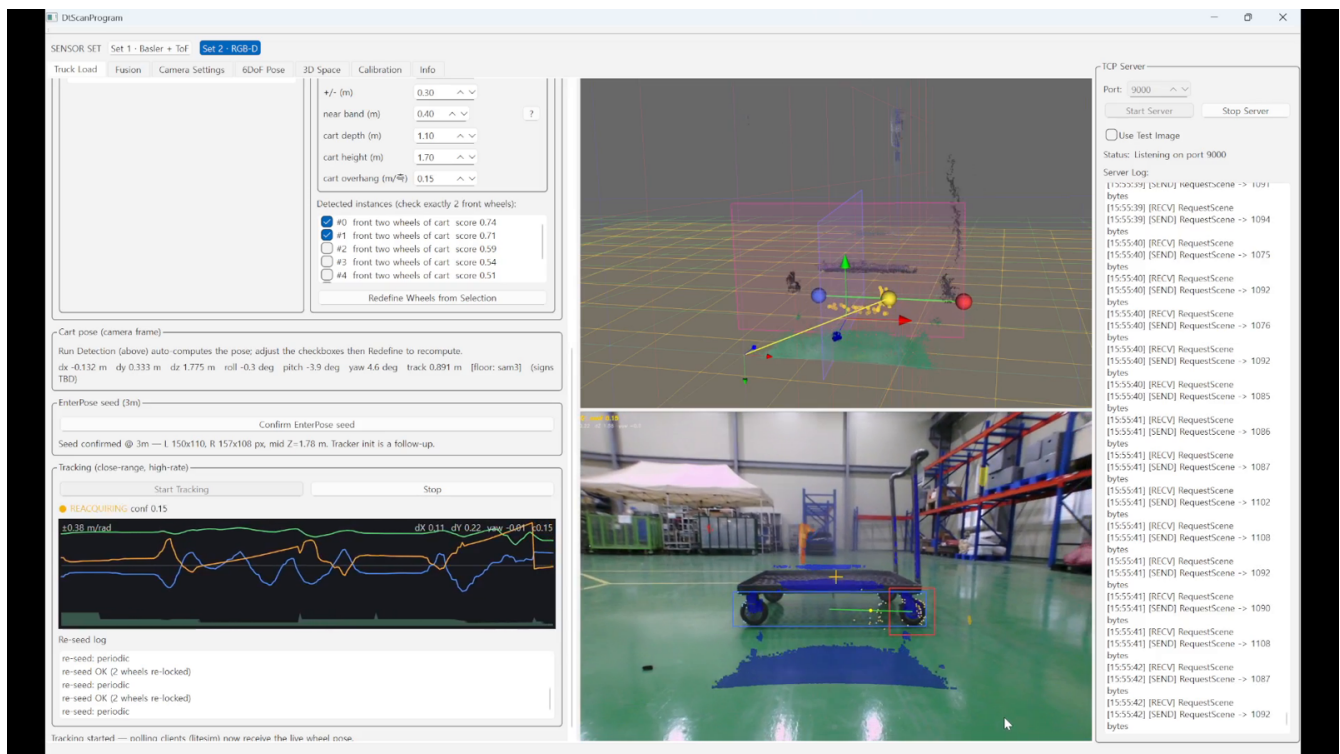


Figure 1. Screen recording of the DOTOR1 vision-servoing test (3D view, camera feed, signal plots).

Problem and system boundary

Sensor streams arrived in different coordinates and cycles and needed a common flow usable by safety decisions.

Owned decisions and implementation

My role

Owned ToF-RGB-SAM3 registration; SICK TiM LiDAR and NAV350 3D PCD processing; robot localization; sensor fusion and safety-policy decisions; and publishing results through Zenoh.

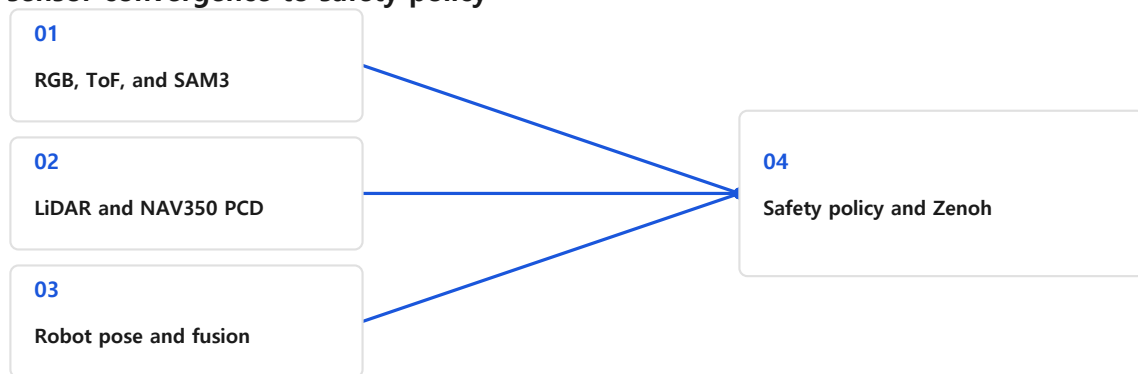
Sensor coordinate chain

Connected RGB, ToF, LiDAR, and NAV350 to vehicle coordinates and robot pose.

Perception to policy

Connected registration and pose outputs to safety-policy decisions and Zenoh messages.

Multi-sensor convergence to safety policy



Explanatory system relationship diagram; it is not photographic or experimental evidence.

Verification and evidence ledger

Registration outputs, 3D point clouds, robot pose, safety decisions, and Zenoh messages were checked through integration and field validation.

Integration evidence

Compared sensor alignment, point clouds, pose, and policy output in integration and field tests.

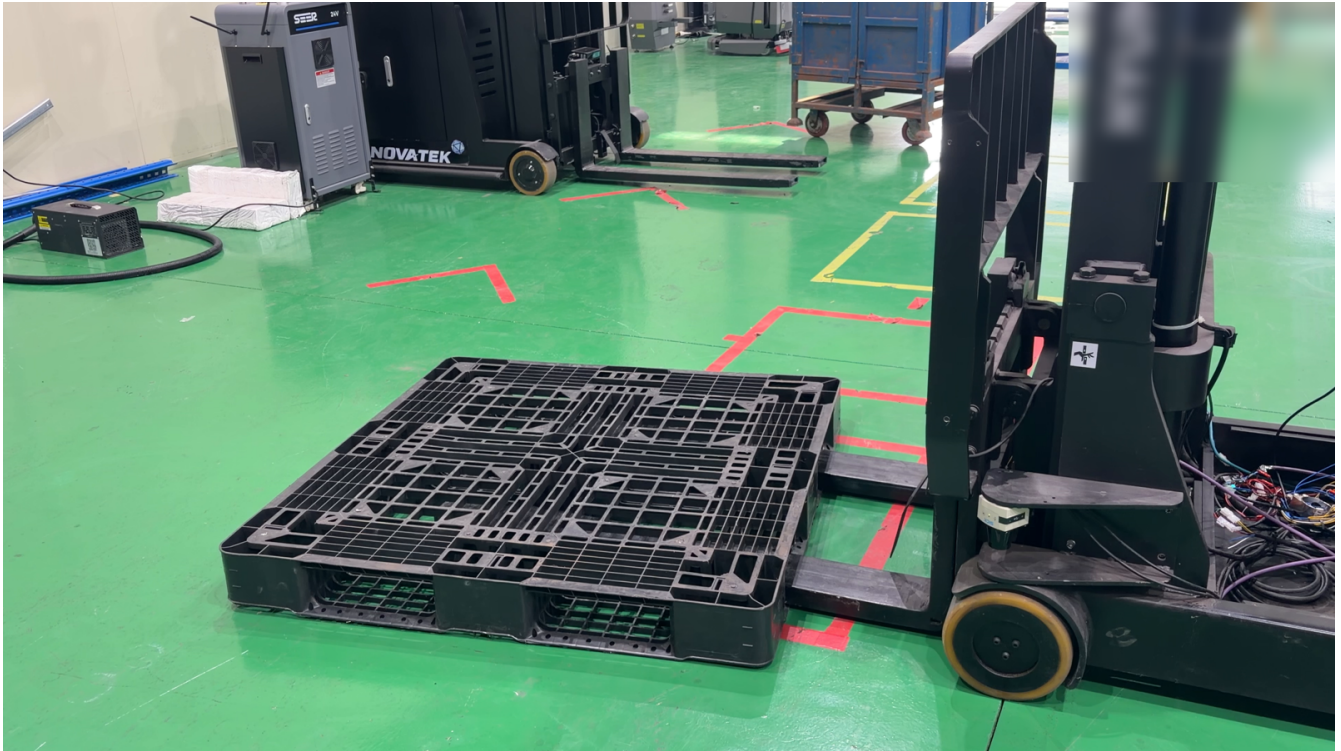


Figure 2. Fork alignment just before pallet entry during the full-scenario test



Figure 3. Trajectory-following drive test, wide view of the test site



Figure 4. Fork-lift test lifting a cart

Role, team result, and limits

Team result

The team performed system integration and field validation. This is not presented as production operation, deployment success, or customer outcomes.

Limitations

The public clip and photos are test-site runs; they do not claim production or customer outcomes.

Field boundary

Field validation is not production operation, deployment success, or a customer outcome.

Collaboration boundary

Vehicle control, sensing, safety, and field-validation owners integrate the system jointly.

Implementation technologies

C++23 · ROS 2 · Zenoh · ToF · RGB · SAM3 · SICK TiM LiDAR · NAV350

Primary capability

Sensor Fusion & Localization · 3D Geometry & Registration

Registered public evidence

No external public link is currently registered.

What to bring

Share the problem, data or sensors, target validation, and schedule. We can define coordinate and evidence boundaries together.

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