CONNECTED VEHICLES and their positioning accuracy investigation

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The **Cooperative Intelligent Transport Initiative (CITI)** is a project being conducted by Transport for NSW (TfNSW) in partnership with Data61 and the Federal Government's Heavy Vehicle Safety Productivity Program under the Nation Building Program. It is meant to be Australia's first semi-permanent test bed site for testing Cooperative Intelligent Transport Systems.

A 42km Cooperative - Intelligent Transport System (C-ITS) test bed will operate from Port Kembla to Picton in NSW.

Freight vehicles 'talking' to each other and with roadside infrastructure.

Figure 1: CITI area with an example of daily trips

Main objectives of CITI:

- Equip heavy-truck vehicles with radio technology known as DSRC (Dedicated Short Range Communications).
- Ensure road safety by sending alerts for potential collisions and curve speed warnings using V2V (vehicle to vehicles) and V2I (vehicle to infrastructure) communication.
- Provide incident detection and driver assistance.

Challenges:

- Errors in transmitted GPS positioning can lead to false collision alert messages.
- Identify the risks that divers face when exposed to false alarms or when false and correct alarms cannot be distinguished.
- Understand how the positioning accuracy of DSRC equipped vehicles changes over time and how much the GPS positioning error varies relatively to previously reported locations.
- Large amounts of messages are transmitted everyday between the connected vehicles.

Analytics for GPS accuracy investigation:

- Map matching algorithms to identify the correct path of the connected vehicles.
- GPS error computation and jitter analysis.
- Identify "noise-prone" road sections.
- Apply gradient boosted decision trees for identifying the factors which may influence positioning error.

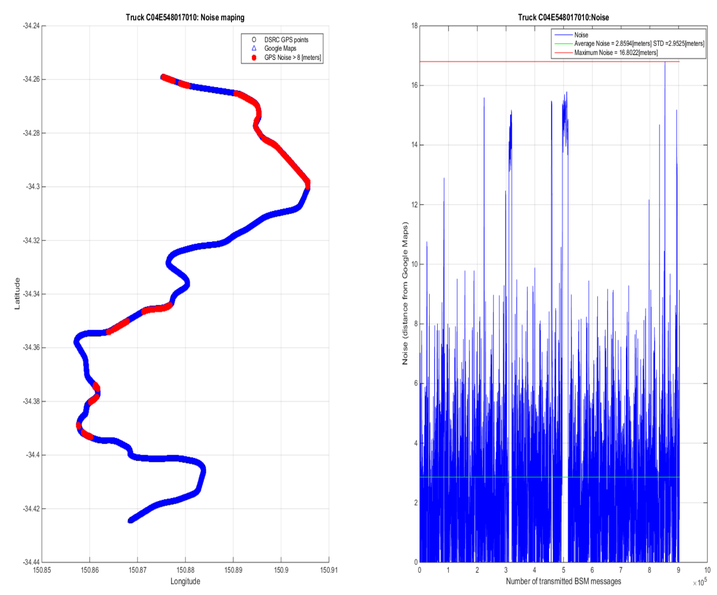

Figure 2: "Noise-prone" areas and noise evolution.

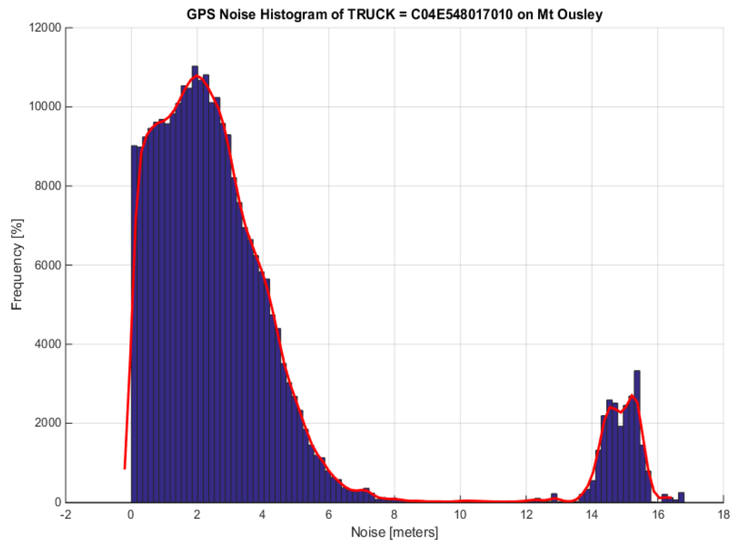

Figure 3: Noise distribution along the investigated road section.

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