European activities on Jammers, Repeaters, Pseudolites and Interference Detection

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Navigation solutions powered by Europe

Interference

- ★ Currently monitored on an individual basis by each EU country – civil/military
- ★ Well established ad-hoc cooperation between national frequency administrations to resolve cross-border interference
- ★ No dedicated procedure for GNSS cases
- ★ National sovereignty on spectrum is a sensitive issue

GNSS Jammers

European Union - GNSS Programme Committee

- EC outlined the potential jammer problem
- Highlighted that member states should be aware
- Some MS had strong views that no new regulation was required
- Others thought it was!
- Agreed that a questionnaire be circulated to collect views
- However, only four responses so far
- A way forward will be discussed at a future GNSS PC

GNSS Repeaters

- Work within CEPT - 'European ITU'
- ECC Report 129 details technical studies
- ECC Report 145 details regulatory issues
- ECC (not EC) Directive being debated
- Proposes only indoor use and with power restrictions (eg, max eirp -77 dBm)
  - Covered in ECC Recommendation 10(02)
- Note: Germany dealing with unauthorised outdoor use causing problems at Hannover

GNSS Pseudolites

- EC research body (JRC) carried out tests
  - Shows significant potential for interference to non-participating receivers
  - Shows very dependant on receiver design
  - Good agreement with developed simulation model
  - Study input to the CEPT process (SE40)
  - ECC Report 128 currently in public consultation
  - Split into indoor and outdoor use (pulsed)
- ECC will then work on appropriate regulations

Common Minimum Standards

- Aims to establish EU wide framework for securing GNSS use (especially for the PRS signal)
- Initially focussing on PRS users and applications
  - Including PRS use in critical infrastructure
- Includes elements on spectrum protection
  - Reporting interference
  - Classifying threat levels
- CMS still being developed by the EU Member States, led by the European Commission

DETECTOR Project

- ★ Design, develop and validate a low-cost GNSS interference detection and characterisation solution for road transport
- ★ Early work has **detected** many disturbance events at sites across Europe, but they can have various causes, hence the need to **characterise**
- ★ Capturing and analyzing RF data has allowed clear jammer signatures to be isolated
- ★ Main elements of the solution exist. Plan to get robust operational units deployed and further automate back-office services

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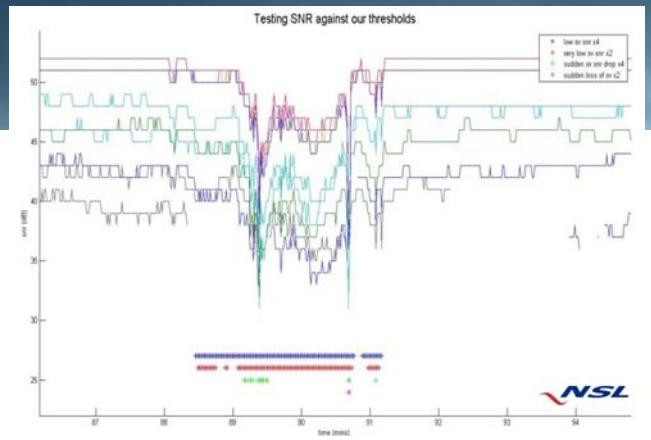
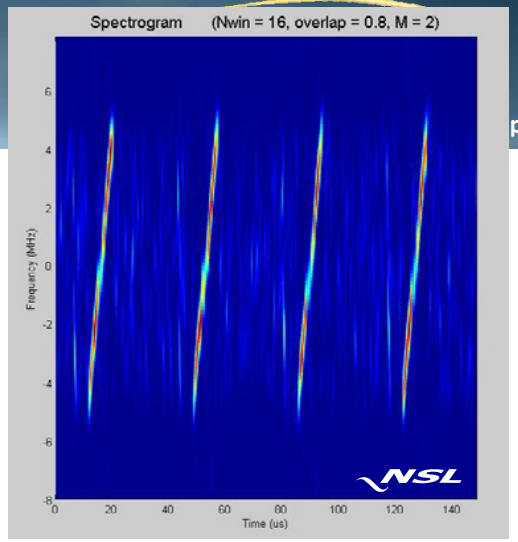
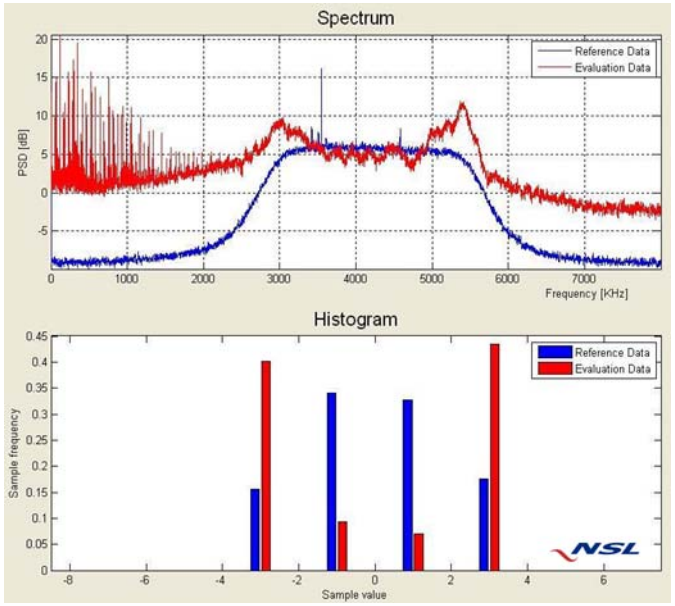
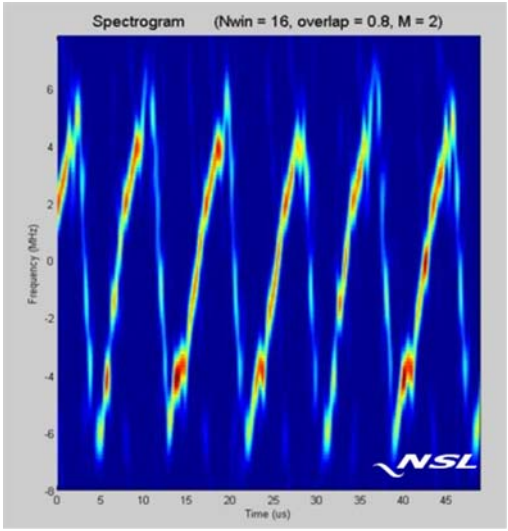


Drop in Signal/Noise of GNSS signals





Disturbed RF Power



Deploy roadside units

Detect interference

Characterise interference