

GAARDIAN

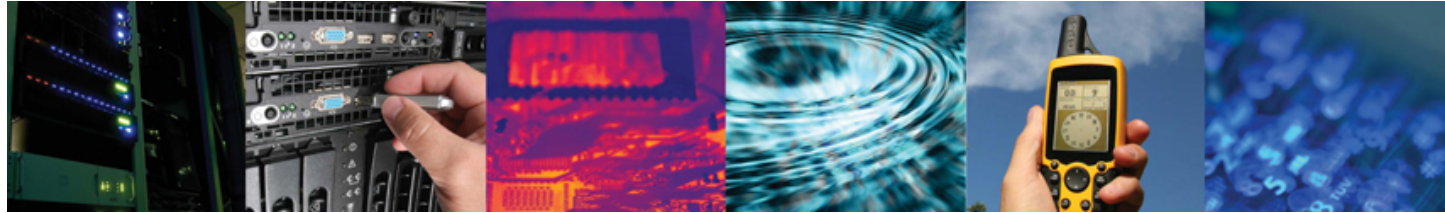
GNSS
AVAILABILITY
ACCURACY
RELIABILITY
and
INTEGRITY
ASSessment
for **T**IMING and
NAVIGATION



**A Technology Strategy Board
funded collaboration**

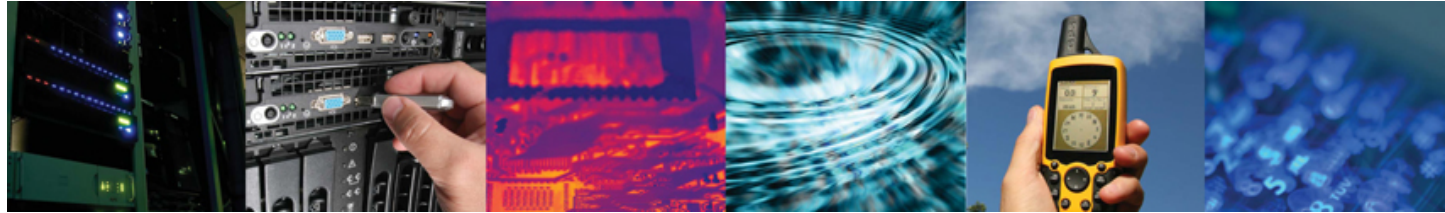
Technology Strategy Board
Driving Innovation





UK Government (TSB) Collaborative Research Grant

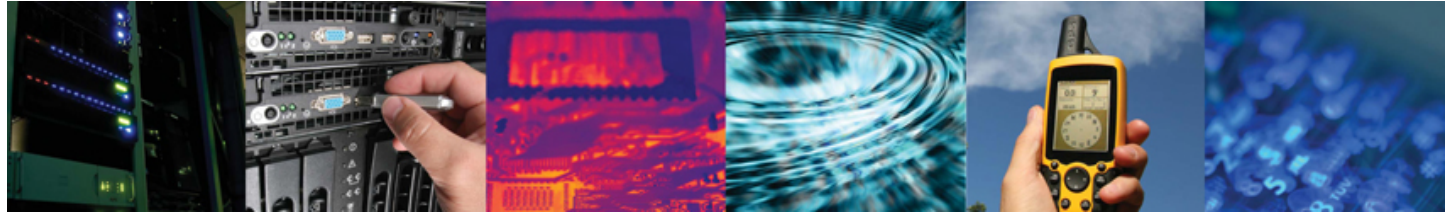
- UK Government
 - Dept of Innovation, Universities & Skills – DIUS
 - Technology Strategy Board – TSB
 - Engineering and Physical Science Research Council - EPSRC
- TSB £100m Autumn 07 Grant Call
 - **£10m - “Gathering Data in Complex Environments”**
 - £2.2m Collaborative Grant Funded Project
 - EPSRC supporting the Academics (~£800k)
 - Awarded (subject to Agreement) July 08
 - Starting now!



The **GAARDIAN** Partners

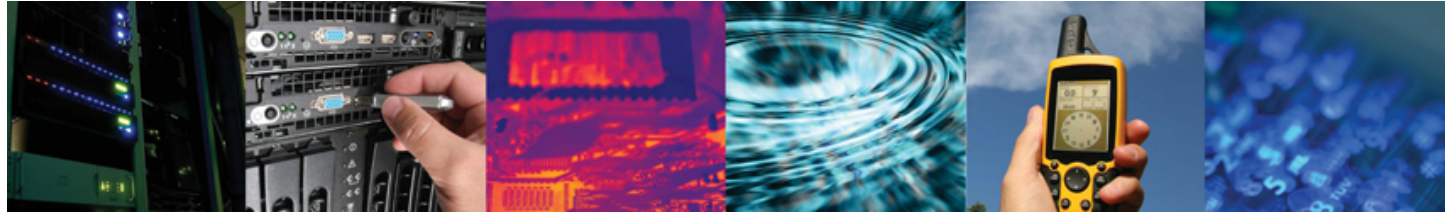
- GLA
 - User Community - Maritime
 - eLoran
- Imperial College London
 - User Community - Transport
 - Integrity Monitoring Algorithms
- University of Bath
 - GPS & Space Weather
- BT
 - User Community – Telecoms
- Ordnance Survey
 - User Community – Land Geolocation
- NPL
 - Time, UTC Traceability
- Chronos
 - Real time Timing measurement to ns granularity
 - GPS products, components & system integration
 - GAARDIAN Project Leader





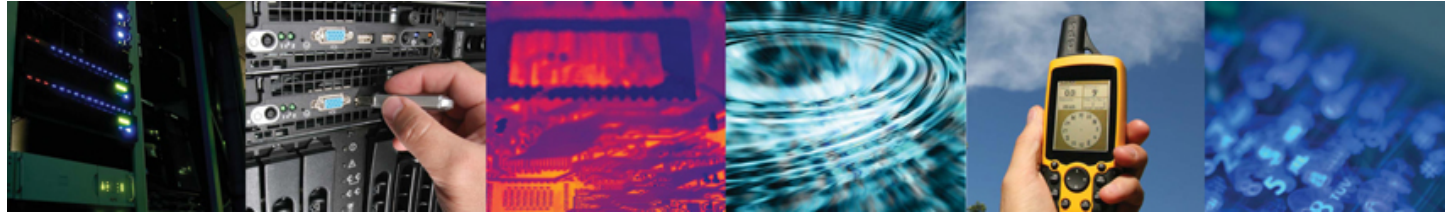
Real Time GNSS & eLoran Integrity Monitoring at Point of Use

- **GAARDIAN** - Challenges
 - Manage vast amounts of data
 - In real time
 - Report unambiguous integrity
 - On different parameters
 - In all environments
 - Verify the new Anthorn Loran signal
- **GAARDIAN** - What, How, Who ???
 - What are the causes?
 - How will PNT systems be affected?
 - Who is concerned?
- **GAARDIAN** - Deliverables
 - 24x7 Web enabled sensor network
 - Locally deployed in the vicinity of the user
 - Deploy trial sensors to both analyse data
 - & Test integrity monitoring thresholds



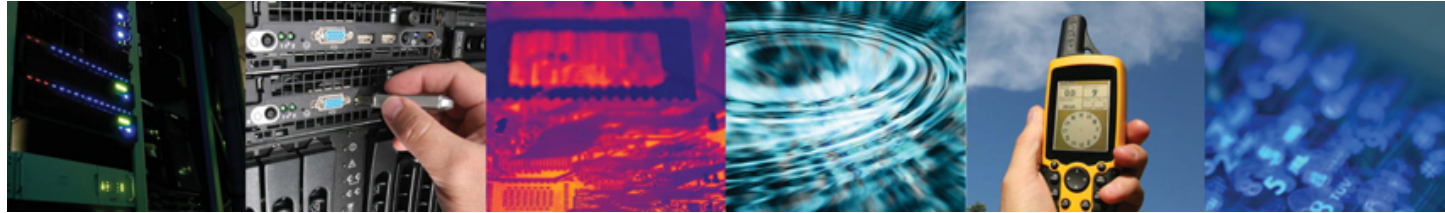
GAARDIAN – What are the Causes?

- All known failure modes including
 - Interference
 - Scintillation
 - Multipath
 - Jamming
 - Meaconing
 - Space Weather
 - Additional Secondary Factors (eLoran)



GAARDIAN – How will PNT Systems be affected?

- Different systems will exhibit different vulnerabilities
- Different user groups will be susceptible to different vulnerabilities
- Vulnerabilities will be evident at different times
 - Environmental impact – weather & space weather
 - Sensor Location
- Will problems be systematic or non-deterministic?
- What new applications will real time 24x7 monitoring enable?



GAARDIAN – Who is Concerned?

- Mission & Safety Critical Users
 - Emergency Services
 - Military
 - Homeland Security
 - Transport
 - Government
 - Communications
 - Power Utilities
 - ???
- **If you are one of these – please contact GAARDIAN**
 - GLA Booth – Sally Basker, Martin Bransby, Paul Williams
 - Chronos Booth – Charles Curry, Calum Dalmeny, Peter Dumbell
 - Imperial College London - Washington Ochieng
 - Ordnance Survey – Paul Cruddace
 - Location & Timing KTN Booth – Bob Cockshott