Signal Sentry
GPS Interference Detection
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• **Exelis is the GPS Expert**
  – Developed Over 50 GPS satellite payloads
  – Payloads & Transmitters have been on every GPS satellite ever launched
  – Our payloads transmit the GPS signal from space
  – We have accumulated over 500 years of on-orbit life
  – No mission-related failure due to our equipment
  – Currently developing the next generation navigation payloads
Jamming

- GPS jamming does not allow receivers to lock onto the GPS signal
- GPS susceptible to outages due to intentional & unintentional jamming
- A small jammer can disrupt the GPS signal for a mile or more
- People jam because they are smuggling, stealing or trying to escape tracking
- Availability of low-cost GPS jamming devices has increased the risk
Real Risk of GPS Disruption

- November 2009
- Ground-based Augmentation Systems (GBAS) Jammed
- Took 8 months to find the source
U.S. Organizational Structure for GPS Governance

WHITE HOUSE

NATIONAL EXECUTIVE COMMITTEE FOR SPACE-BASED PNT
Executive Steering Group
Co-Chairs: Defense, Transportation

ADVISORY BOARD
Sponsor: NASA

NATIONAL COORDINATION OFFICE
Host: Commerce

GPS International Working Group
Chair: State

Engineering Forum
Co-Chairs: Defense, Transportation

Ad Hoc Working Groups

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Summary: The United States is now critically dependent on GPS. For example, cell phone towers, power grid synchronization, new aircraft landing systems, and the future FAA Air Traffic Control System (NEXGEN) cannot function without it. Yet we find increasing incidents of deliberate or inadvertent interference that render GPS inoperable for critical infrastructure operations.

Most alarming, the very recent web availability of small GPS-Jammers suggests the problem will get worse. These so-called personal protection devices (PPDs) as well as other, readily available, more powerful devices can deliberately jam the Global Positioning System (GPS) signal over tens of square miles. They also can be devastating to the other, new foreign satellite navigation systems being deployed worldwide.

PPDs are illegal to operate, but many versions are available (for as little as $30) from foreign manufacturers over the Internet. The simplest models plug in to a cigarette lighter and prevent all GPS reception within a line of sight range of 5 to 10 miles. Current penalty for operation is simply that the device is confiscated.

We currently lack sufficient capabilities to locate and mitigate GPS jamming. It literally took months to locate such a device that was interfering with a new GPS based landing system being installed at Newark Airport, NJ.

• **We must quickly develop and field systems that will rapidly locate, mitigate and shutdown the interference.**
Real Risk of GPS Disruption

Coast Guard Vice-Admiral Chuck Michel saw it happen in one Eastern Seaboard port.

“It was believed to be sort of a vandal or a person messing around, actually blocked that GPS signal from that computer’s ability to do that, and the port came to a halt,” he said.

*Maritime Cyber Security Symposium
March 2-3 2015

46 Stolen Cars and exported from LA Port Using GPS PPD
Signal Sentry®1000

Answering the risk by locating the jamming source
Signal Sentry® 1000 Overview

- Detects and locates sources of GPS signal interference
- Provides location of interference
- Presented in the form of geographical pin mapping
- Provides actionable intelligence to the user
- Leverages Exelis signal domain knowledge of GNSS
- Patented Exelis Technology
- Signal Sentry 1000 data aids Intelligence Led Policing

Assures safety, efficiency, and revenue
Signal Sentry

- Designed to protect critical infrastructure from GPS disruption jamming & spoofing
- Situational Awareness of GPS Interference
- Real time geolocation of GPS interference
- Actionable Intelligence for quick mitigation of GPS disruption

Deployed Systems

- 2014 Super Bowl at Met Life Stadium
- Southampton Port United Kingdom
- Newark N.J DHS & Essex County Sherriff

Field Tested

- Sennybridge Test Range UK
- Vidsel test range in Sweden
Southampton Port UK
Selecting histogram bar displays location of events on map below

Can select more than one bar at a time
Alerts – Provides Real-time Actionable Intelligence

- Users can sign up for text or email alerts
- Alert sent when event has exceeded the user-defined duration
- Second alert sent once event has ended
- Alert signup is found under the Admin Menu

Interference that was first detected on 2/2/2014 at 10:20:46 PM on sensor sw200455 (SuperBowl 2014: Race Track) was detected at location latitude 40.8114 degrees, longitude -74.0776 degrees on 2/2/2014 at 10:20:58 PM.
Signal Sentry 1000 Test Results

- Tested during GPS jamming trials in Sennybridge, UK in September 2014
- Trials administered by the Defence Science and Technology Laboratory
- Off-the-shelf jamming devices were used during the tests
- Located stationary & moving jammers in open & obstructed environments
- Identified jammers in moving vehicles within a 10-meter accuracy

Jammer in car at 50 mph
Target Markets

> Shipping Ports (Southampton UK)
  > $12.4B global maritime security expenditure 2011

> Law Enforcement (Newark NJ)
  > Global law enforcement equipment market to reach $6.99B in 2015

> Airports
  > $19.10B global airport security expenditure 2011

> Security (Super Bowl)
  > 2300+ municipalities are executing Safe City projects with price tags reaching $B’s (e.g. Dubai $2.3B, Guangdong Province $6B, etc.)
Additional information Available

> **Brochure** (A4 Available)
> Presentation
> **Position Paper** on the Threat
> Infographics
  - **Importance of GPS**, how it works and Exelis
  - **Signal Sentry 1000**
> **Data Sheet**
> **Video**

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Summary

> Most sectors of the economy rely on GPS

> GPS jamming devices becoming cheaper and more accessible

> Signal Sentry 1000 delivers actionable interference intelligence
  • Defends against disruption of guidance, traffic and asset control systems
  • Improves situational awareness

> Detects and Locates GPS Jamming

> Provides Actionable Intelligence

Signal Sentry 1000 – Assures safety, efficiency, and revenue
For more information visit:
www.exelisinc.com/signalsentry