

Patriot Watch

VIGILANCE

SAFEGUARDING AMERICA

**DHS Position, Navigation & Timing
Program Management Office
John Merrill – Program Manager**

CGSIC-ION September 2011



**Homeland
Security**

Agenda

- **Governance**
- **Patriot Watch Architecture**
 - **Sensor/Data Integration**
 - **UNITRAC, PNT Incident Portal (PNT IP), DHS Geospatial Information Infrastructure (GII) OneView**
 - **Homeland Security Information Network (HSIN)**
 - **Timing Backup R&D**
 - **Notification**
- **Conclusions**



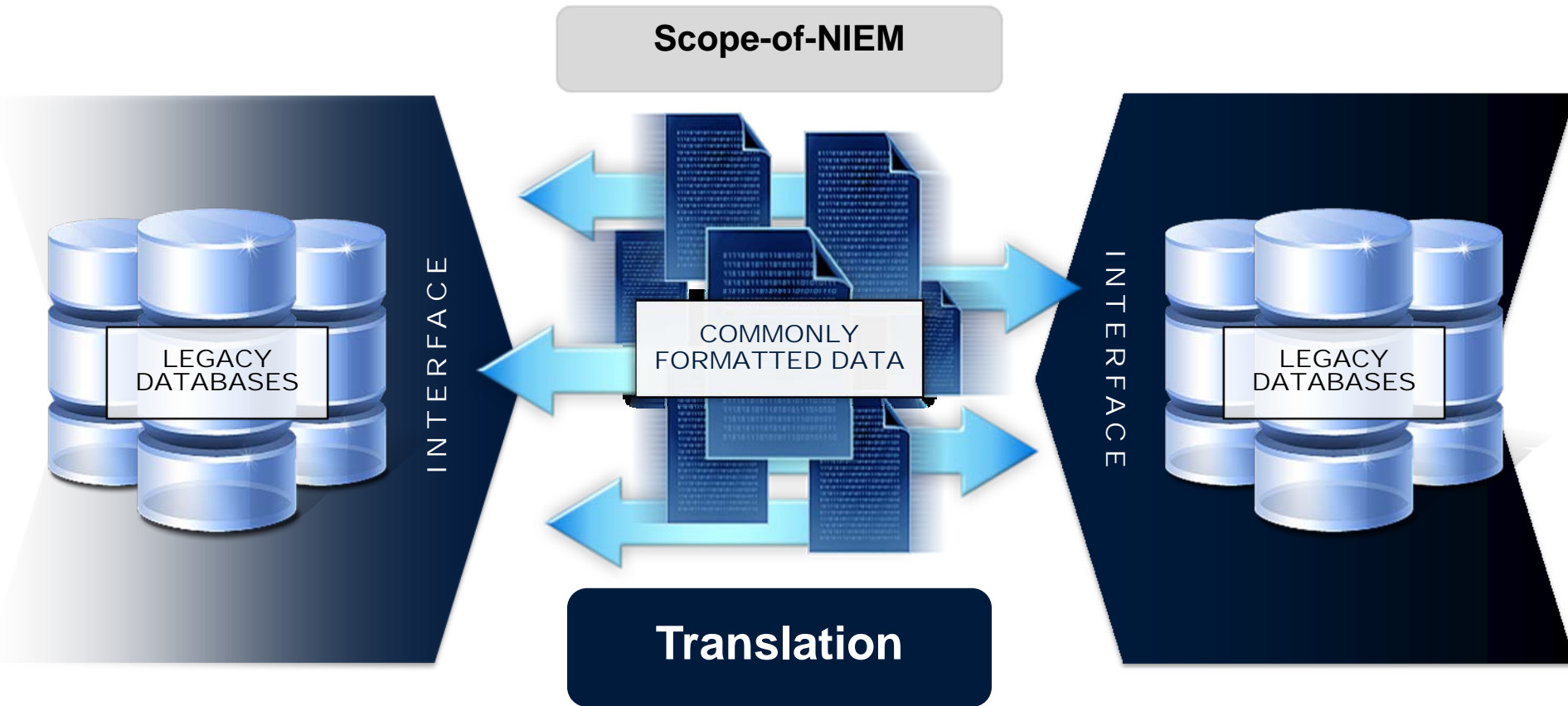
USG Roles and Responsibilities

- **U.S. Space-based PNT Policy**
 - **Identify**
 - **Analyze**
 - **Locate**
 - **Attribute**
 - **Mitigate**

Patriot Watch

- **System-of-Systems, open architecture, multi-phased approach to provide near real-time situational awareness of GPS in order to detect EMI & suspect purposeful interference to protect the Nation's 18 Critical Infrastructure & Key Resource (CIKR) Sectors.**
 - Common Data Structure for Information Sharing
 - Persistent monitoring for situational awareness
 - Sensor placement based on PNT CIKR Criticality
 - Operational when GPS system is “stressed”

Standardizing Data Moving Across Systems



NIEM intentionally does not address standardizing data inside legacy systems. NIEM serves as a translation layer (providing a common understanding) between and across disparate systems.

Patriot Watch Standard Data Set

CIVIL GPS MONITOR SYSTEM Version 1.0

SERVER REPORT MESSAGE - Event Data XML Message (Non- Proprietary)

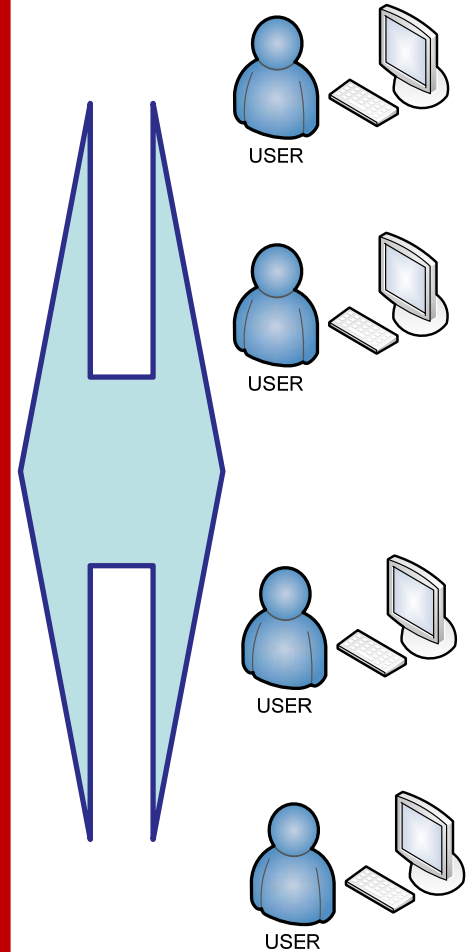
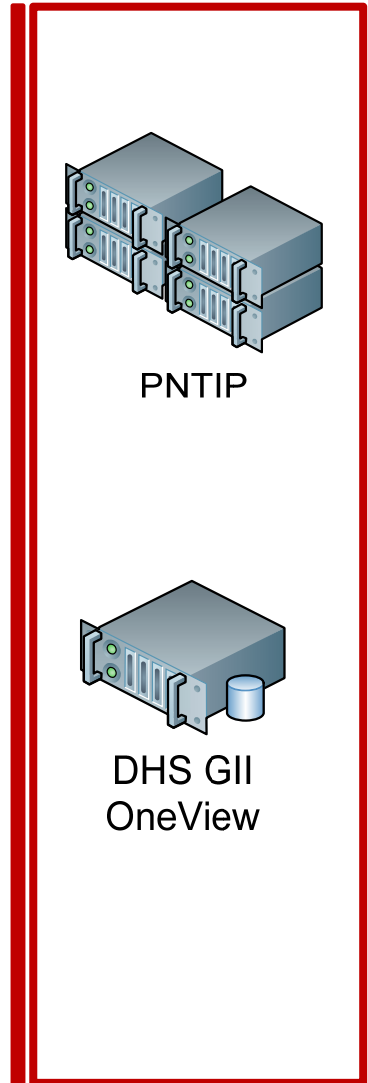
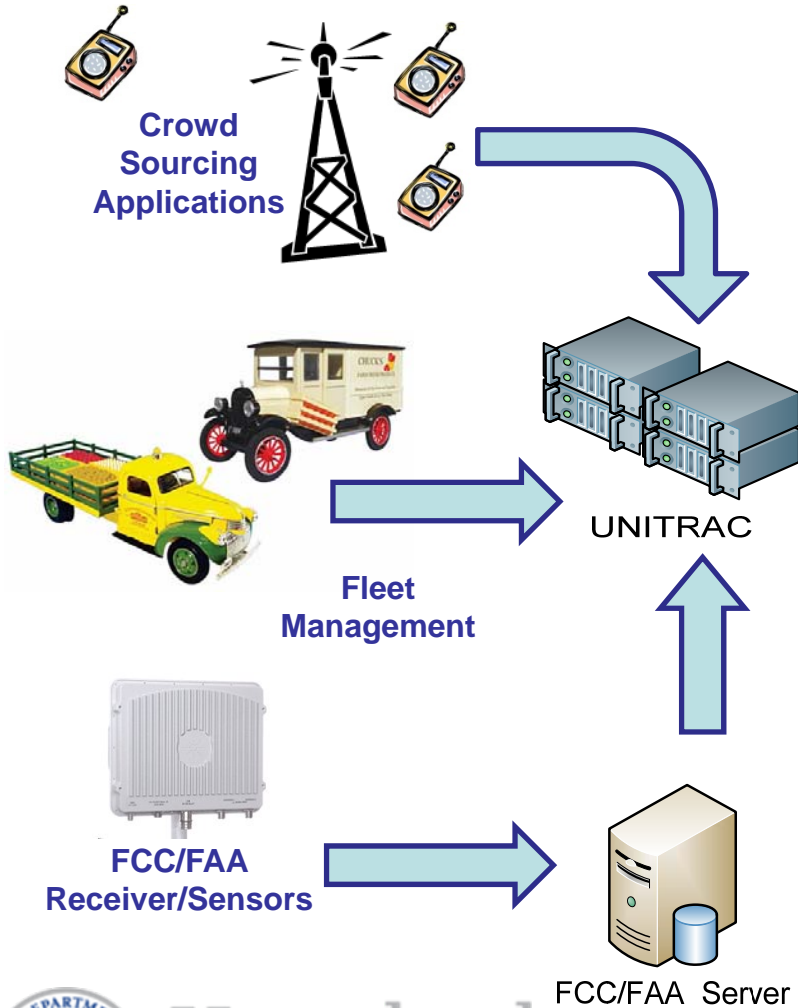
Item	Req/Opt	Data Field	Schema	Example(s)
1	Required	Report Type	Constant	GPS disruption
2	Required	version	Mask: #.#a	1.0a
3	Required	Source	enum: TelcoGPS, CORS, WAAS	WAAS
4	Required	Report time	Date/Time: Zulu	01152010.0915Z
5	Required	Event ID	Mask: ####.#####.###	Series.event.sequence 0000.000001.001
6	Required	Event Type	enum: Real, Test, Exercise	Exercises
7	Required	Classification	enum: Unclassified, Secret, Top Secret	Unclassified
8	Required	Signal Affected	enum: L1, L2C, L5, E5a, E5b, E6, Glonass	L1
9	Required	Signal Status	enum: Signal Loss, Time fault, Location Fault, Maint, Mixed	Signal Loss
10	Optional	Region	String	Region/Area affected: City, State, CONUS
11	Required	Sites Reporting	Integer: 0 - 300,000	15
12	Required	Spatial Profile	enum: Ground, Air, Space, Unknown	ground
13	Required	Spatial Status	enum: Static, Moving, Growing, Shrinking, Unknown	Static
14	Required	Temporal Profile	enum: Simultaneous, Random, Intermittent, Unknown	Simultaneous
15	Required	Temporal Status	enum: In Progress, Ended	In Progress
16	Required	pattern	enum: Omni, Directional, Unknown	Omni
17	Required	Estimated ERP (dBm)	Single: 0 - 10,000	100
18	Required	Icon	Bitmap(Blob)	x by x bitmap
19	Required	Centroid Latitude	Single: -90 to +90 Degrees	+/- xx.xxxx
20	Required	Centroid Longitude	Single: -180 to +180 Degrees	+/- xxx.xxxx
21	Optional	Impact Area Polygon	List: Lat, Long	+/-xx.xxxx, +/- xxx.xxxx
22	Optional	Source Area Polygon	List: Lat, Long	+/-xx.xxxx, +/- xxx.xxxx
23	Optional	Event Start Time	Date/Time: Zulu	01152010.0911Z
24	Optional	Event Stop Time	Date/Time: Zulu	01152010.0911Z
25	Optional	Note / Details	Text Blob	Extra Details

Patriot Watch

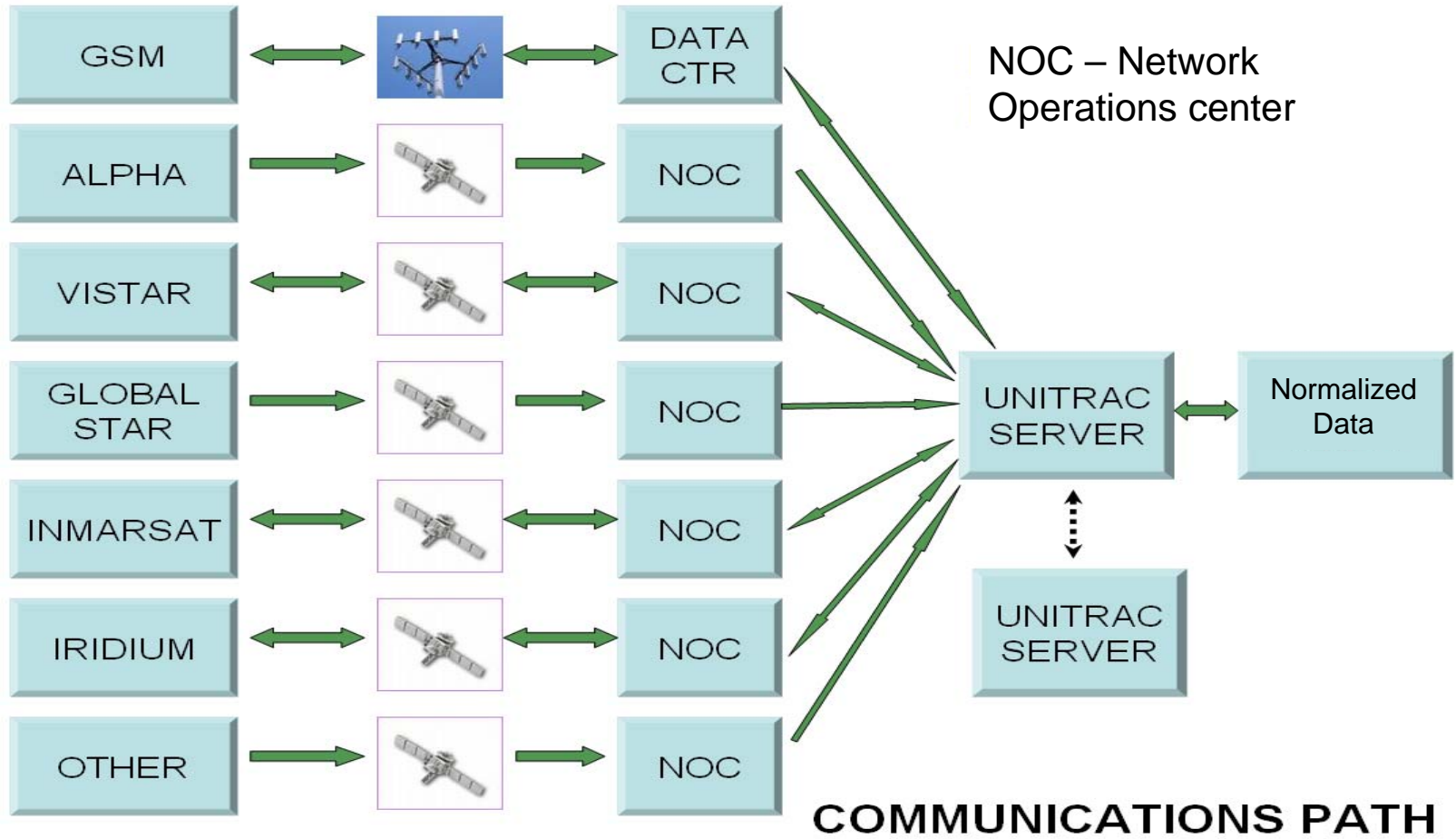
Monitoring & Data Collection

Processing

Analysis & Evaluation



UNITRAC ARCHITECTURE



PNTIP -> Login



Login Email:

Password:

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Sys Admin

Warning: This is a Department of Homeland Security (DHS) computer system. This system is hosted by the Federal Aviation Administration (FAA) under FAA Order 1370.79a

This computer system, including all the related equipment, networks and network devices (specifically including Internet access) are provided only for authorized U.S. Government use. DHS computer systems may be monitored for all lawful purposes, to ensure that their use is authorized, for management of the system, to facilitate protection against unauthorized access, and to verify the security of this system.

During monitoring, information may be examined, recorded, copied, and used for authorized purposes. All information, including personal information, placed on or sent over this system may be monitored. Use of this DHS computer, authorized or unauthorized, constitutes consent to monitoring of this system.

Unauthorized use may subject you to criminal prosecution. Evidence of unauthorized use collected during monitoring may be used for administrative, criminal or adverse action. Use of this system constitutes consent to monitoring for these purposes.



Homeland
Security

PNTIP -> Ticket List -> Active/Open Tickets

SERIAL #	EVENT	CITY	STATE	EVENT START	SUSPENSE	FREQ	SUMMARY	Search
FAA-11-16		ALAMOGORDO	NM	08/01/2011 02:00			White Sands Missile Range (WSMR) GPS 11-10	
FAA-11-15		TONOPAH	NV	07/12/2011 05:00			Air Combat Command (ACC) GPS 11-09	
FAA-11-14		ST LOUIS	MO	07/08/2011 11:30			Boeing GPS 11-02	
FAA-11-13		NEWMAN	TX	07/06/2011 14:47				
FAA-11-12		BEATTY	NV	07/05/2011 15:00			China Lake (CHLK) GPS 11-010	
FAA-11-11		FIRE IS	AK	06/13/2011 14:30			ALCOM GPS 11-01 3A/3B/3C	
FAA-11-10		COCOA BEACH	FL	06/11/2011 05:06				
FAA-11-9		TRUTH OR CONS	NM	05/30/2011 19:00			WSMR GPS 11-09	
FAA-11-8		PATUXENT RIVR	MD	05/30/2011 13:00			PAXR GPS 11-05	
FAA-11-7		ALAMOGORDO	NM	05/23/2011 13:00			WSMR GPS 11-08	
FAA-11-6	OTHER	ALEXANDRIA	LA	05/17/2011 00:00			Fort Polk, LA (FTPK) GPS 11-01	
FAA-11-4	OTHER	LAS VEGAS	NV	05/16/2011 07:00			LSQ-LAS	
FAA-11-5	OTHER	BOULDER CITY	NV	05/16/2011 07:00			LSQ-BVU	
FAA-11-3	OTHER	PATUXENT RIVR	MD	04/21/2011 13:00			Patuxent River (PAXR) GPS 11-04	
FAA-11-2	OTHER	TOBE	CO	04/08/2011 19:00			Air Combat Command (ACC) GPS 11-03	

Record Count: 15

[Back to Search Form](#)

Downloads:  

PNTIP -> Ticket Insert

Ticket Information

TIX Opened: 08/20/2011 01:05 Z
 TIX Closed: [] [] Z

Event Start: 08/20/2011 01:00 Z
 Event End: [] [] Z

Suspense: 09/15/2011 23:00 Z

Private

Reporting Source

Name: James Aviles
 Phone: 540-422-4436

FAA Information

Ident: ZDC Equip: WRS
 Svc Area: ESA ARTCC: ZDC
 Delays: 0 Cost: 3049
 Impact: IN Platform: PIMDS

Event Information

City: LEESBURG State: VA Priority: 4
 Event: NAS RFI Freq: L1-1575.42 JSIR: []
 User Rcvr: NOVATEL Alt: 109 ft. AGL USNG: 18STJ8009331124
 Rel. Tix1: FAA367561402 Source: GPS Events Lat: 39.101542
 Rel. Tix2: FAA332729004 Sub Src: RF Device Long: -77.543049

Event Summary 1833 chars remaining

Washington ARTCC WAAS Reference Station (WRS) is experiencing receiver carrier to noise degradation due to external signal interference. The WAAS Operations notified.

Event Notes 3665 chars remaining

Wide Area Augmentation System (WAAS) Operator at the FAA Technical Center report that the Washington ARTCC WAAS Reference Station (WRS) is experiencing receiver carrier to noise degradation due to external signal interference. The WAAS Operations Team has been notified and will contact Spectrum Engineering for investigation support.

Log Entry

[Empty text area for log entry]

Insert Email Reset

PNTIP EVENT REPORT (FAA-11-16)

TIX Opened: 08/01/2011 00:13	Event Start: 08/01/2011 02:00	Suspense:	Name:
TIX Closed:	Event End:	Private: <input type="checkbox"/>	Phone:
TIX Created: 08/01/2011 00:13			

Ident: BWS	Equip: GPS	Svc Area: SA	ARTCC:
Delays: 0	Cost:	Impact: OTHER	Platform:

City: ALAMOGORDO	State: NM	Priority:	Attachments:
Event:	Freq:	JSIR:	
User Rcvr:	Alt:	USNG:	
Rel Tix1:	Source:	Lat:	
Rel Tix2: 1565671001	Sub Source:	Long:	

Summary: White Sands Missile Range (WSMR) GPS 11-10

Notes:

Log: 08/01/2011 00:13 (Auto-Import) Due to scheduled testing, the Global Positioning System (GPS) is unreliable and may be unavailable within a radius of 350 NM and centered at N33 13 06/W106 30 05 or a location also known as the Alamogordo, NM (BWS) Very High Frequency Omni Range (VOR) 314.3 degree radial at 34 NM at FL400 and above; decreasing in area with decrease in altitude to a radius 300 NM at FL 250; a radius of 225 NM at 10,000 ft Mean Sea Level (MSL); a radius of 225 NM at 4,000ft Above Ground Level (AGL); and a radius of 175 NM at 50 FT AGL.

WSMR GPS 11-10.

Dates and times: (Dates based on GMT start time:).

August 01, 2011 thru August 20, 2011, 0200-1200Z & 1900-2300Z.

Duration: Each event may be intermittent during the test.

AFFECTED CENTERS: ZAB, ZDV, ZFW, ZHU, ZLA and ZKC.

The impact area also extends into the Mexican Flight Information Region (FIR).





Homeland Security Information Network

Welcome to HSIN

User Name:

Password:

You are accessing a U.S. Government information system, which includes (1) this computer, (2) this computer network, (3) all computers connected to this network, and (4) all devices and storage media attached to this network or to a computer on this network. This information system is provided for U.S. Government-authorized use only. Unauthorized or improper use or access of this system may result in disciplinary action, as well as civil and criminal penalties. By using this information system, you understand and consent to the following: You have no reasonable expectation of privacy when you use this information system; this includes any communications or data transiting or stored on this information system. At any time, and for any lawful government purpose, the government may, without notice, monitor, intercept, search and seize any communication or data transiting or stored on this information system. The government may disclose or use any communications or data transiting or stored on this information system for any lawful government purpose, including but not limited to law enforcement purposes. You are NOT authorized to process classified information on this system.

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U.S. Department of Homeland Security



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Useful Links

- USCG Navigation Center
- United States Naval Observatory (USNO)
- OneView
- FAA National Satellite Test Bed Monitor GPS/WAAS performance.
- NCO Internal Library User name & password Required.
- ION Meeting Page** View upcoming Conferences/Meetings
- IDCT Page** Information Dissemination Coordination Team - Members Only
- PNT Incident Portal Page Available - Link to Portal Not Available Yet
- PNT LE

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- Federal Operations
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- HSIN Government Home
- Positioning, Navigation, & Timing (PNT)

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Announcements

New Item | Filter

There are currently no active announcements. To add a new announcement, click "Add new announcement" below.

RSS Feeds

Public releases at PNT.gov

- Presentation from FGCS Meeting
- News Release: Executive Branch Position on LightSquared Issue
- NTIA Letter to FCC on LightSquared Interference Concerns
- NPEF Report on LightSquared Interference to GPS
- Request for Public Comments on LightSquared Issue

Inside GNSS News

- Launch Failures Plague Russian Space Program, Delay GLONASS Schedule
- House Science Committee Reschedules LightSquared GPS Interference Hearing
- Trimble Launches New OEM GNSS Modules, Enclosure
- Full Series of Kai Borre's EasySuite II Available for Download
- 2SOPS Takes Over IIF-2, Moves to Replace SVN-30 with Spare

Inside GNSS Events

- China Satellite Conference 2011
- Berlin GNSS Symposium 2011
- SIRGAS 2011
- 2011 East Coast Seminars: NavtechGPS
- ESA International Summer School on Navigation Satellite Systems 2011

last update on: 9/2/2011 9:57:58 AM





FCC Jammer Enforcement

<http://www.fcc.gov/encyclopedia/jammer-enforcement>

*****ALERT*****

Federal law prohibits the operation, marketing, or sale of any type of jamming equipment, including devices that interfere with cellular and Personal Communication Services (PCS), police radar, Global Positioning Systems (GPS), and wireless networking services (Wi-Fi).

"Jamming devices create serious safety risks. In the coming weeks and months, we'll be intensifying our efforts through partnerships with law enforcement agencies to crack down on those who continue to violate the law. Through education, outreach, and aggressive enforcement, we're tackling this problem head on."

-- P. Michele Ellison, Chief, Enforcement Bureau



Homeland
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PUBLIC NOTICE

Federal Communications Commission
445 12th St., S.W.
Washington, D.C. 20554

News Media Information 202 / 418-0500
Internet: <http://www.fcc.gov>
TTY: 1-888-835-5322

DA 11-250
February 9, 2011
Enforcement Advisory No. 2011-04

FCC ENFORCEMENT ADVISORY

http://fialfoss.fcc.gov/edocs_public/attachmatch/DA-11-250A1.pdf

CELL JAMMERS, GPS JAMMERS, and OTHER JAMMING DEVICES

CONSUMERS BEWARE: It is Unlawful to Use “Cell Jammers” and Other Equipment that Blocks, Jams, or Interferes with Authorized Radio Communications in the U.S.

-
-
-



Homeland
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Information Dissemination Coordination Team (IDCT) Home

This site

Modify Shared Page

- Documents**
- Shared Documents
- Pictures**
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Information Dissemination Coordination Team (IDCT)

Announcements

There are currently no active announcements. To add a new announcement, click "Add new announcement" below.

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Events

There are no items to show in this view of the "Events" list. To create a new item, click "New item" above.

Refresh	Icons	Title	Location	Begin	End
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Shared Documents

Type	Name	Modified By
	IDCT_Minutes_27 June 2011_Final (FOUO)	Michael Bergman
	IDCT and Ops Summit Action Items_AUG 2011_Rev 2 (FOUO)	Michael Bergman
	2008 IDM Implementation Strategy (Signed)	Samuel Coker
	2007 DHS_PNT IDM Plan Final WH Version w memo	Samuel Coker
	PIRT Charter signed (2008)	Samuel Coker
	EMI Common Checklist V3	Samuel Coker
	Memorandums Of Agreement (MOA)	Samuel Coker
	Presentations from 1-2 June 2011 IDCT	Samuel Coker

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Links

- [NAVCEN Webpage](#)
- [FAA Contact Webpage](#)
- [GPSOC Homepage](#)
- [FCC Contact List](#)
- [JNWC IDCT Wiki](#)

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OneView

Geospatial Information Infrastructure (GII)

Road Aerial Bird's eye Streetside

Layers Query Conus Find

Map navigation and tool icons including zoom in/out, pan, and various drawing tools.

Map Layers

- FEMA Flood Hazards
- NOAA/NOS nowCOAST Observations
- NOAA/NOS nowCOAST Watch & Warnings
- HSIP
- DHS
- GeoRSS
- WMS
- KML

Scale 1:29139589

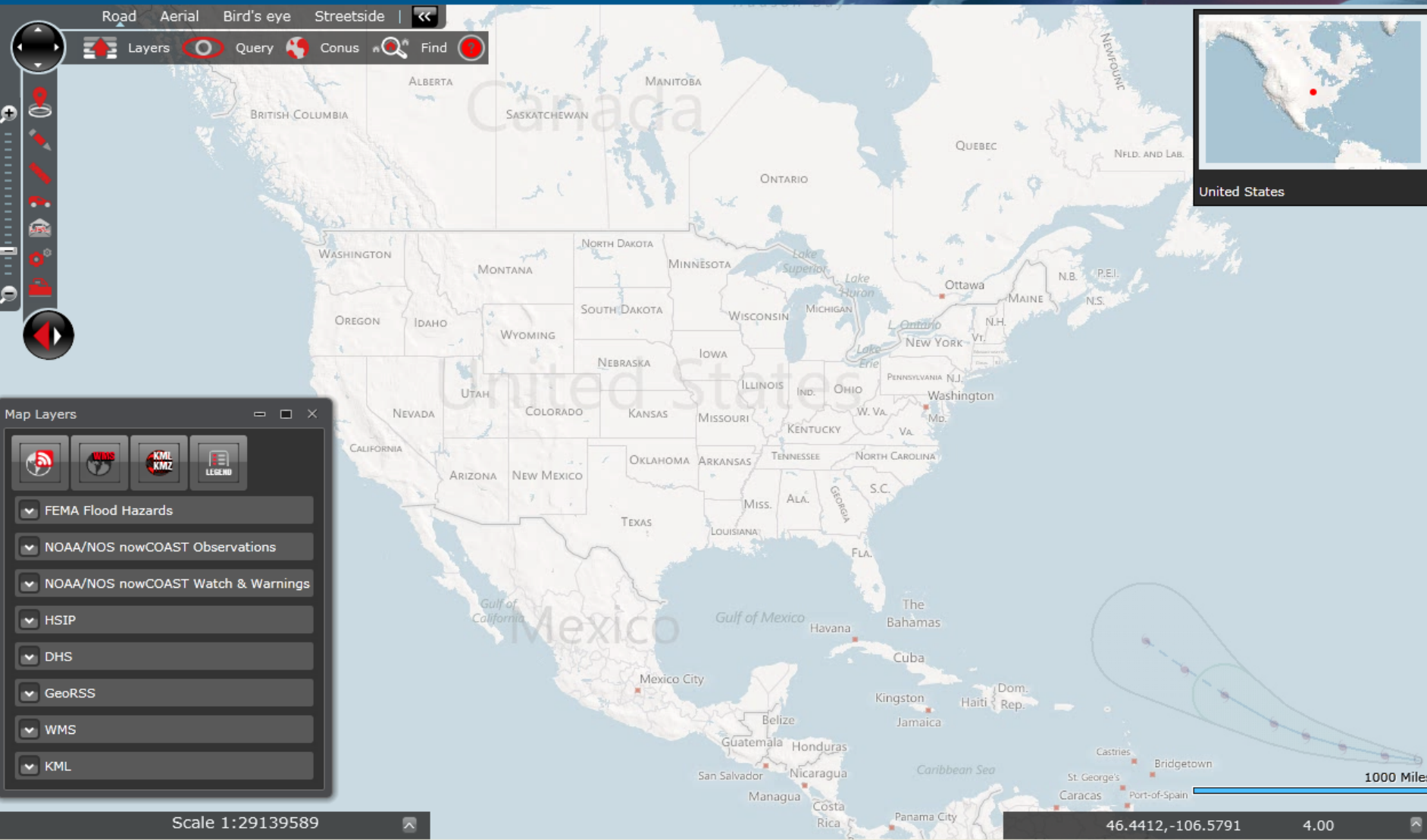
Done



Homeland Security

Local intranet

100%



46.4412, -106.5791 4.00



Road Aerial Bird's eye Streetside Labels

Layers Query Conus Find

Field	Value
CALLSIGN	WQIV897
OBJECTID	567457
LICENSEE	Port Authority of New York and New
LOCNUM	3
LAT_DMS	40,41,52
LATDIR	N
LON_DMS	74,9,28
LONDIR	W
LOCADD	Pole 14, N. side of guard post 1, New
LOCCITY	Newark
LOCCOUNTY	ESSEX
LOCSTATE	NJ
NEPA	N
OZONE	

Map Layers

- Land Mobile Commercial Service
- Land Mobile Private Service

Scale 1:27382

40.6973, -74.1577 14.00

1 Miles

NJ, United States

Urban Environment

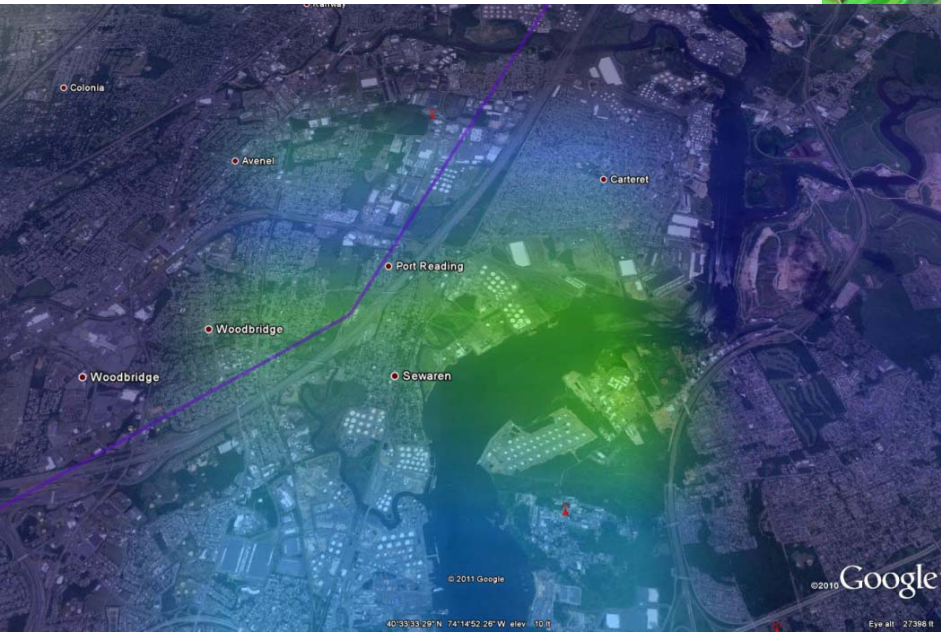
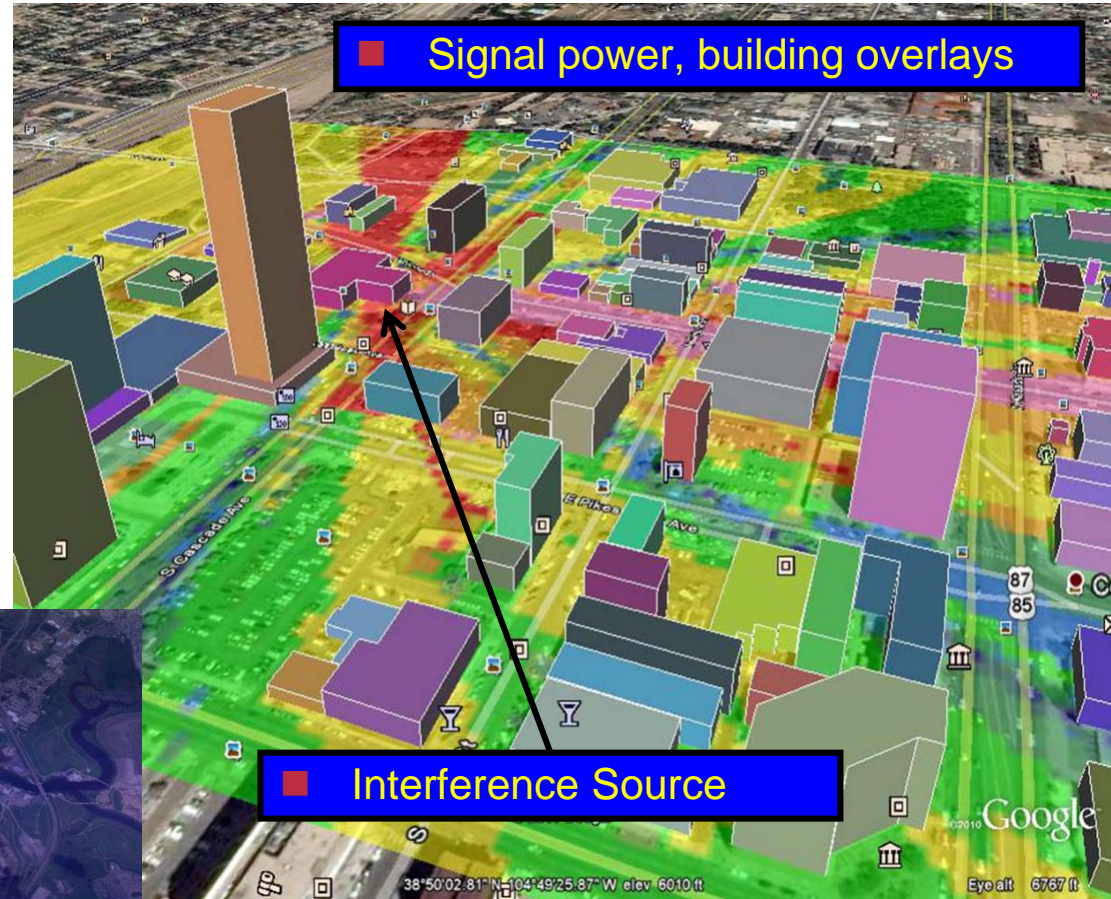
Signal / Blockage / Google Export

Interference effects on civilian receivers in urban environment

- Building blockage
- Line-of-sight to SVs & jammers
- GPS + other frequencies

High res. Terrain ... down to 1/8m

Google import/export



- Moving Jammers on road
- Effects on cell phone towers
 - Airports
 - DGPS sites

Mitigation -- Resiliency

- **Master Clock Distribution via Optical Networks**
 - Utilize existing fiber infrastructure
 - Successful prototype
 - Long-haul test between pre-determined sites to evaluate physical capabilities, baseline
 - Distribution of Master Clock to specific demarcation



Conclusion

- PNT Internet Portal – Central data repository complete
- UNITRAC TAG under development
- NLE type exercise to test utility of Patriot Watch capabilities
- Conduct long-haul fiber test
- Improve notification procedures



QUESTIONS?

John.Merrill@dhs.gov

202-447-3731 (O)

202-731-9628 (M)