



Nationwide Integration of Time Resiliency for Operations (NITRO)

Information Brief

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Version 1



NITRO Information Brief

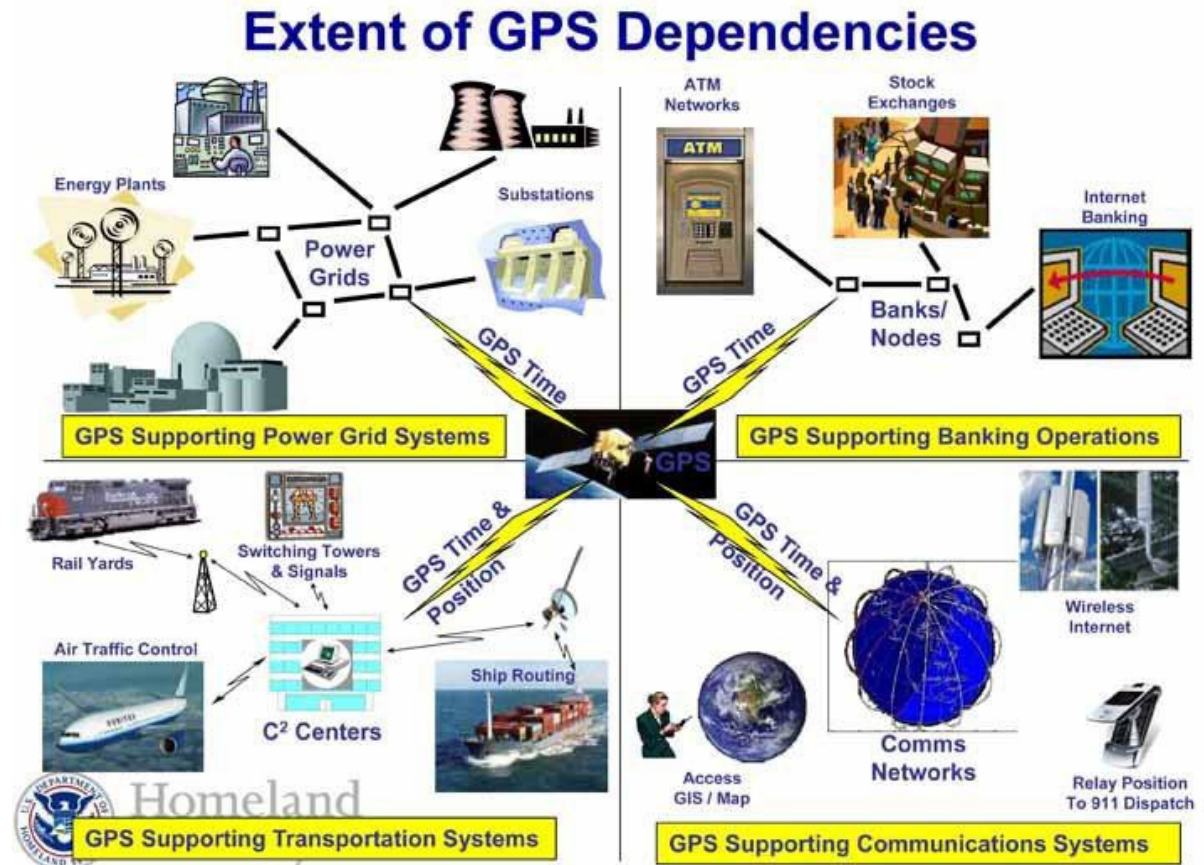
Purpose/Agenda

- Purpose: Informational brief on NITRO
- Agenda
 - Scene Setter: War in Space and GPS Dependencies
 - State Infrastructure Threats
 - National Guard and Emergency Management Impact Time Resiliency Thru Redundancy
 - NITRO Technical Capabilities
 - NITRO Benefits
 - Discussion



Scene Setter: War In Space and GPS Dependencies

- CNN media clip, “War in Space”,
[CNN War In Space - What would happen to America if GPS was attacked - YouTube](https://www.youtube.com/watch?v=cBZIR6RLVzQ)
- DHS Extent of GPS Dependencies
- Impact from a GPS outage indiscriminately traverses across the interconnected operational environment; same holds true if GPS data are manipulated
- Interconnected operational environment includes national, state and defense critical infrastructures – cascading consequences of infrastructure failures



“War in Space” URL: <https://www.youtube.com/watch?v=cBZIR6RLVzQ>

“Ubiquitous cutting-edge technologies, economic and political instability, and our globalized economy have erased borders and increasingly bring threats and challenges directly into our communities—to our schools, hospitals, small businesses, local governments, and critical infrastructure.” DHS Secretary Mayorkas Remarks at the Center for Strategic and International Studies, December 5, 2022

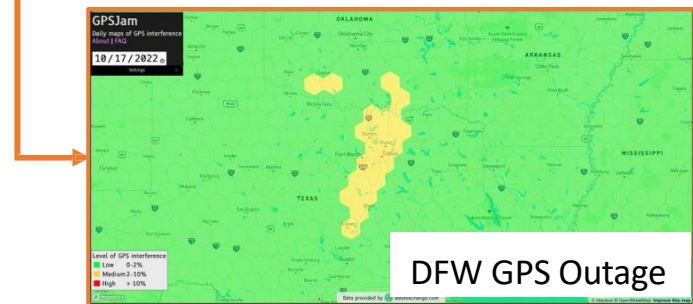
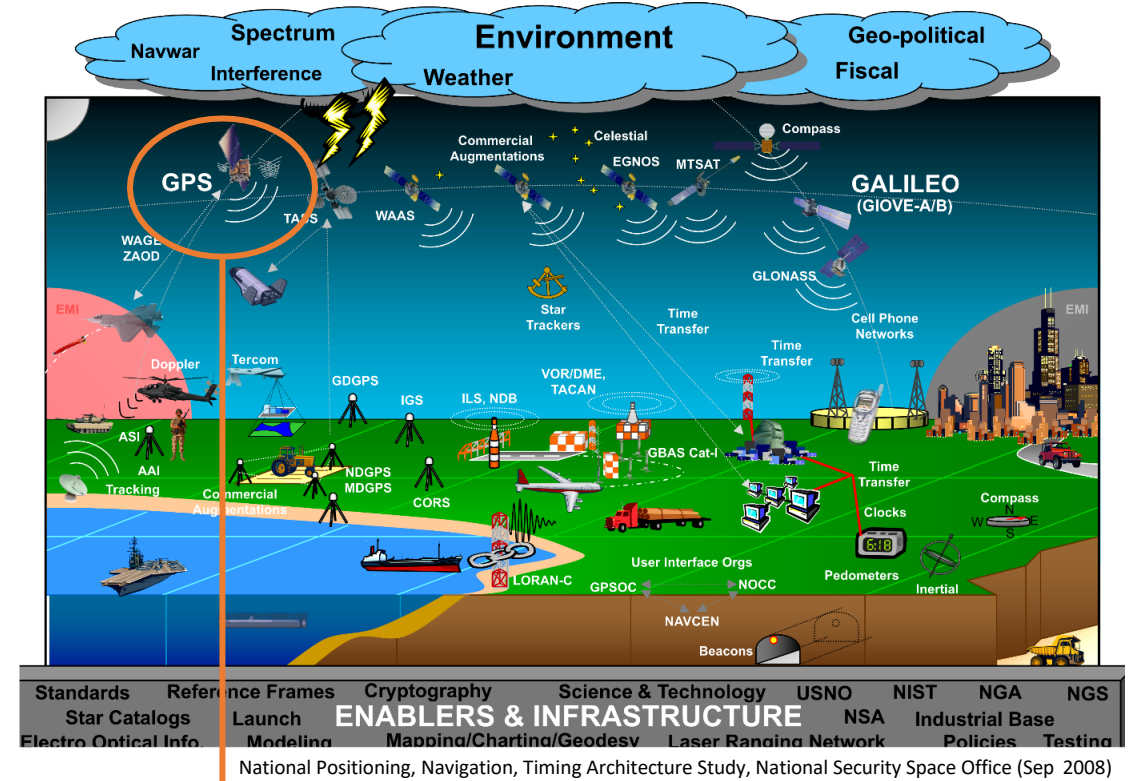


National Guard

State Infrastructure Threats

- Natural and manmade disasters
 - Floods, hurricanes, earthquakes, fires
 - Riots, accidents, cyber and kinetic attacks
- Impact of GPS interference event
 - Economic impacts
 - Health and safety
 - Communication
 - Disruption in transportation
- Examples of recent domestic GPS interference events
 - Dallas Fort Worth (DFW) GPS outage
 - Denver GPS outage
- National Guard under the orders of state governors respond to threats
- The National Guard, government and critical infrastructure all require the availability and integrity of time

PNT As-Is Architecture



GPSJam.org



National Guard & Emergency Management Impact

Time Resiliency Thru Redundancy

Why is time important?

- GPS is used as a primary time source and is vulnerable
- Networks and communications systems need precise synchronized time to operate
- The Adjutants General rely on these networks when supporting civil authorities and other DOMOPS

What happens if time is interrupted?

- The National Guard's ability to coordinate and communicate with first informers, responders and receivers in their support to civil authorities will be interrupted
- No near real-time situational awareness across varied 54 state, territory and District of Columbia operational environments and underlying infrastructures to enable event identification, protection, detection, response and recovery

Time Resiliency thru redundancy

- Maintain availability of uncorrupted and non-degraded timing signal
- Maintain integrity of timing data
- Reliable back-up time source
- Reducing dependency and reliance on single system for timing signal

**Supports EO 13636, Improving
Critical Infrastructure
Cybersecurity, and PPD-21**



NITRO Technical Capabilities

- NITRO provides validated time resiliency to the 54 US states, territories and District of Columbia
- NITRO capabilities
 - Monitor and verify all existing time sources, including GPS
 - Derive authoritative time from space and terrestrial sources
 - Deliver authoritative time synchronized to GPS
 - Highly redundant, self-repairing network of systems
 - Near real-time situational awareness of received signals and related spectrum
- NITRO is extensible to additional and future time sources and technologies (e.g., over-the-air radio & TV broadcasts, Signals of Opportunity, planned ELORAN solution)

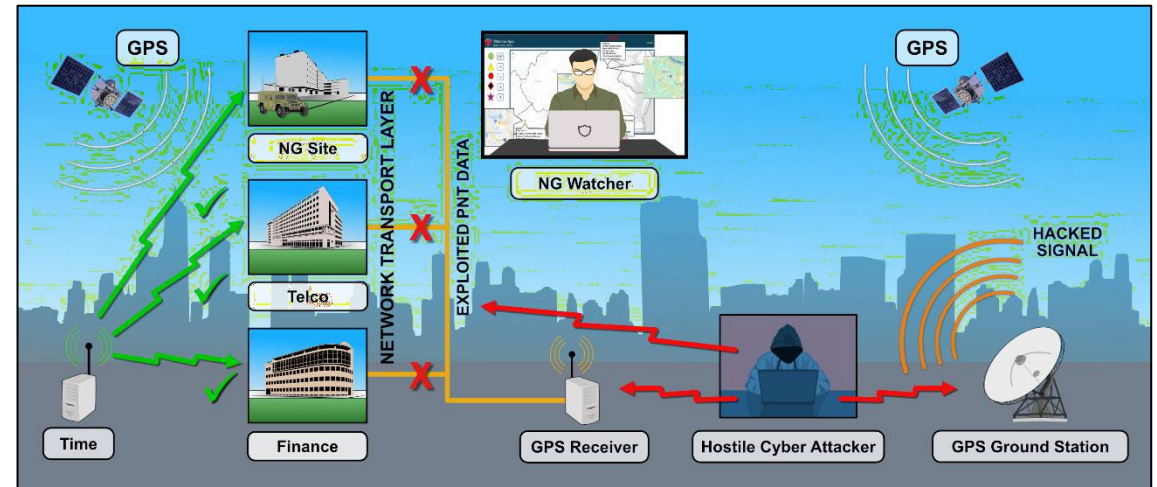


NITRO Benefits

- Maintains synchronization and communication for National Guard, and first responders and receivers
- Continuously provides accurate and verifiable time
- Alerts state operation centers of any time disturbances
 - Common operating picture enables ability to “see” and understand the situation
 - Monitors and updates end-users on anomalies using existing notification capabilities



Signal Interference



Cyber Interference



Discussion

Questions



References

- Page 2, PNT ecosystem graphic National Positioning, Navigation, Timing Architecture Study, National Security Space Office, Sep 2008
- Page 2, Dallas Fort Worth (DFW) GPS outage
<https://www.bloomberg.com/news/articles/2022-10-18/faa-warns-airline-pilots-as-gps-signals-disrupted-around-dallas?leadSource=uverify%20wall>
- Page 2, Denver Int'l Airport GPS outage
[What happened to GPS in Denver? - GPS World : GPSWorld](#)