PNT Program & Conformance Framework

PNT Advisory Board

November 20, 2019

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PNT Program Overview

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Program Thrust Areas

Mitigation via Diversity

- Multiple sources & technologies
- Applied standards & Best Practices

Integrated Solutions

Component & System Enhancements

- Hardware & Software
- Cybersecurity & Firmware

Mitigation via Improved Technologies

Mitigation via Engagement & Education

Issue Socialization & Collaboration

- End Users & Device Manufacturers
- Best Practices & Voluntary Standards

Mitigation via Performance & Vulnerability Assessment

Source Characterization

- Characterize all PNT sources (lab & live-sky)
- Understand system-level dependencies & effects

Increasing Resiliency
Stakeholder Engagement & Collaboration

Intra-component:
- CISA / NRMC
- PLCY
- USCG
- Ops
- CIACC

Inter-agency:
- DOD
- NCO
- DOT
- DOE
- FAA
- NASA
- Treasury
- NIST
- Commerce
- State

Transition Stakeholders
- GPS Equipment Manufacturers
- PNT Technology Providers

Adoption Stakeholders
- Critical Infrastructure Owners & Operators
- Industry Groups
- Federal Civil Agencies

Diverse Perspectives + Shared Goals = Powerful Solutions
Resilient PNT Conformance Framework

November 20, 2019

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Overview

- Problem Statement
- Conformance Framework Vision
- Approach
- Framework Principles & Concepts
- Status
- Review Objectives

Presentation Objectives

- Solicit board feedback
- Raise awareness of this activity within industry
- Solicit more participation from critical infrastructure owners & operators
**Problem Statement**

**Issue:** “Resilient” PNT equipment becoming available, but what does it mean?

- DHS Best Practices document cited by some manufacturers, but it’s not a requirements or standards document. Not designed for classifying receivers.
**Vision**: Develop common language for defining resilient PNT equipment

- Accomplished through defining multiple levels of resilience.

**Will enable**:

- Product differentiation for vendors
- Improved risk management and decision making by CI operators when acquiring new PNT equipment (or updating existing deployments).

**Initial Focus**: GNSS-based timing equipment

- To address most pressing PNT attack surface in critical infrastructure.
- Framework concepts applicable to non-GNSS sources and P/N.
- Intending to expand to position & navigation later.
Approach

Phases:
- Phase 1: Guidance documentation (targeting Spring 2020)
- Phase 2: Standards development (starting by 2021)

Reference Architecture:
- Reference Architecture documentation (FY20)
- Reference Implementation Demo (FY21)

Industry Participation:
- Most major system integrators are part of working group (WG)
  - DOT and FAA also part of WG (to ensure extensibility to P/N)
- Looking for more end-user participation and input
Principles & Concepts (1)

- **Guiding Priorities:**
  - Must be comprehensive
  - Must be simple
  - Must be consistent
  - Must NOT be prescriptive

- **Challenge:** Iterative process to distill framework into something that fits this “quadruple constraint.”
**Principles & Concepts (2)**

**Key Concepts:**
- Defense-in-Depth (*2 dimensions*)
- Resilience Levels
- Core Functions

**Core Functions**
Blends NIST Cybersecurity Framework & PPD-21 National Preparedness System for Resilience

**Resilience Levels (Preview)**
- **Level 1:** Robust Recovery
  - Have working definitions, but needs some refinement to better satisfy the four guiding priorities.
- **Level 4:** Operate through Threats
Status

Resilience Levels:
- Conceptual definitions defined.
- Expect they will be refined as WG moves forward on details.

Scopes of Applicability:
- Defined to allow flexibility through the supply chain and deployment chain (chipset → receiver → deployed system-of-systems)

Phase 2 Expected Challenges:
- Identifying most appropriate SDO and committee/subcommittee.
- Reducing timelines on standards process.
Presentation Objectives

- Solicit board feedback
- Raise awareness of this activity within industry
- Solicit more participation from critical infrastructure owners & operators
  - If interested, please email gps4critical-infrastructure@hq.dhs.gov