Navigation Technology
Current State, Future Possibilities, Gaps and Barriers

U.S. Navy Perspective

“Sea Power to the Hands of Our Sailors”

Captain Joe Reason
Major Program Manager, PEO IWS 6.0
08 June 2016
Current State: Navigation Wholeness
Navigation Wholeness
A Systems of Systems Approach to Navigation

- Is an initiative employing a systems of systems approach to centralize navigation systems and program offices to rectify, maintain and field Fleet navigation readiness in the areas of Equipment, Requirements & Training.

- Is the response to the SEA21 Surface Navigation Systems Task Force findings published in 2012 executed at the request of COMNAVSURFOR:
  - Fleet provided revised priorities based on the report
  - Resulted in $482M increase for navigation through FY21

- Established Navigation Senior Steering Group (NAVSSG) co-chaired by N2N6E and PEO IWS and comprised of three working groups:
  - Equipment Commonality (PEO IWS 6.0)
  - Requirements (OPNAV N2/N6E)
  - Training (Surface Warfare Officer School (SWOS))
  - All three continue to work the Fleet priorities to restore the Fleet’s navigation health

- Ultimate goal to bring navigation as a system under a single programmatic construct

DISTRIBUTION STATEMENT D: Distribution authorized to DOD and DOD contractors only; Other requests must be referred to PEO IWS.
Surface Navigation – System Wholeness
Where We’re Going

Just Getting Started In Restoring Navigation Health
# Path to Paperless Navigation

**End of FY14**

- **ECDIS-N Auth:** 196
  - Crew Cert Required: 4
  - Scheduled Installs: 32
  - Not Planned: 14

**End of FY16**

- **ECDIS-N Auth:** 225
  - Sched Installs: 4, (LSD 41, LPD-17, 24, 25)

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**Fleet Paperless by September 2017 (except LPD-25)**

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Future Possibilities: Assured Positioning Navigation & Timing (PNT)
Notional Assured PNT Roadmap

- Spoofing resiliency by FY20
- Non-GPS position by FY21
- Enhanced Navigation proficiency by FY22
- Assured Navigation System Suite by FY25

Maximum utilization of existing PORs to close the requirement gaps

- FY16: WSN-12
- FY17: GPNTS
- FY18: Flywheel Implementation (P&T)
- FY19: Signals of Opportunity (P&T)
- FY20: Doppler Velocity (V)
- FY21: Geophysical Nav (UNCLASSIFIED) (P)
- FY22: NoGAPPS FNC
- FY23: Automated Celestial Navigation (P)
- FY24: Gravimetric Navigation (P)
- FY25: Navigation Top Gun (PNT)
- FY26: Future INS (P)

P – Position
N – Navigation
T – Time
V – Velocity

Uncontested
Spoofed Environment Continuum
Denied

Future INS (P)
The Fleet may experience weeks without reliable GPS information. NoGAPSS will provide GPS-denied robust PNT via:
- Networked collaborative navigation & timing for improved integrity and reduced drift
- Shared, accurate non-GPS position fixing from a subset of advantaged units
Gaps and Barriers: Cyber & Requirements
**ECDIS Operating System Migration**

- **FY15 0% on supportable OS**
- **FY19 86% on supportable OS**

**FY19 All Ships On VMS 9.3/9.4/9.5 Except For 5 Year Decommissioning Window**

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Challenges

- Systems acquisition spread across multiple SYSCOMs and codes
- Historically certification occurs only after systems installed on platform
  - COMNAVSEA recently directed the establishment of a land-based test and certification process called Navigation Suite Certification
- Navigation supports more than safety of life at sea
  - Support of Combat Systems drives additional requirements
- Formal documentation of mission requirements is not complete
  - Most systems pre-date JCIDS process
  - Consumers use what current systems provide
- How good is good enough?
  - Working to define and fill warfighter capability gaps

Navigation Essential To All Mission Areas; Though Few Mission Requirements
Questions?
“Sea Power to the Hands of Our Sailors”