

# AFCEA Luncheon MILCOM & PNT

17 March 2026



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## »»» PEO Mission Area

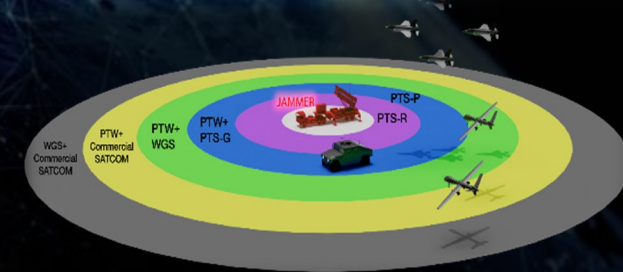
- The Military Communications (MILCOM) & Positioning, Navigation, and Timing (PNT) Program Executive Office (PEO) is the Space Systems Command (SSC) organization focused on developing, producing, delivering, and maintaining critical and innovative Satellite Communications & PNT systems
- The Program Executive Officer for MILCOM & PNT has acquisition authority and accountability within the mission area and manages all points of the acquisition life cycle, including:
  - Acquisition Planning & Innovation
  - Prototyping & Development
  - Integration & Testing
  - Transition to Ops & Sustainment





# ➤➤➤ SATCOM Mission Area

- Narrowband:
  - Keeps warfighters connected via ultra-high frequency (UHF) that cuts through weather, dense foliage, and urban canyons for continual battlespace awareness and targeting
- Tactical:
  - Moves data into the fight with high-capacity X- and Ka-band for video, targeting, logistics and Command & Control (C2) plus modern anti-jam capabilities to fight interference, denial, and deception
- Strategic:
  - Guarantees secure, survivable, and endurable global Nuclear Command, Control & Communications (NC3) through all phases of conflict





## Evolved Strategic SATCOM (ESS) Joint Mission



**The ESS System** is key to Nuclear Deterrence and the Nation's survival in, through, and after war

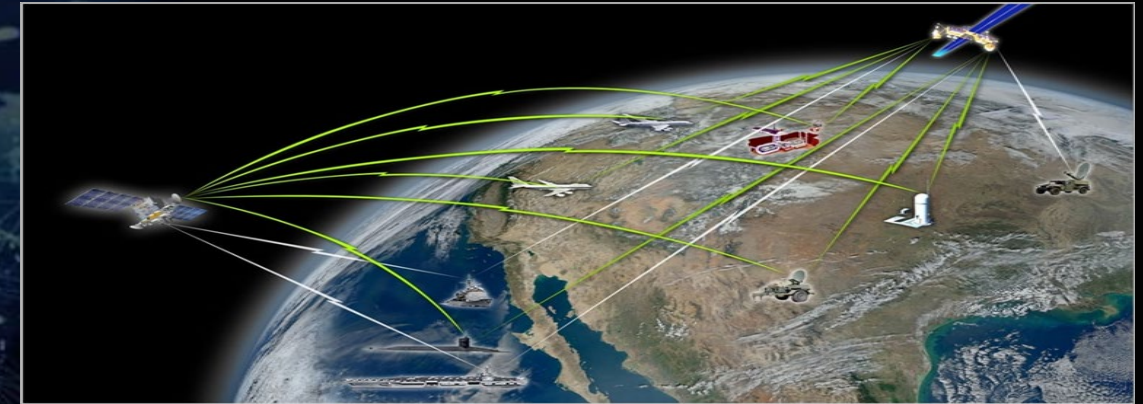
- AEHF is not optimized for a high-end fight in a contested space environment
- In response to the threat, ESS is on pace to deliver Strategic SATCOM & NC3 by FY32



China's nuclear breakout has fundamentally transformed the security landscape, and Russia's nuclear stockpiles continue to grow. This new tripolar environment is less stable and more competitive



We must adapt to these new challenges and supplement our modernization plans with tailored capabilities that address the changing threat environment



**The ESS Joint Mission advances two SecWar Priorities:**  
 Priority 4: Nuclear Modernization (includes NC3) | Priority 8: Homeland Missile Defense



# »»» NAVWAR & PNT Mission Area

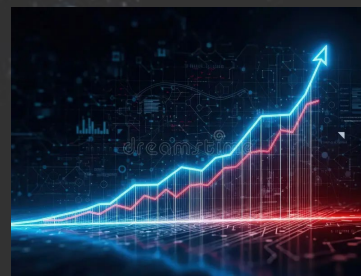
- Delivering **Gold Standard** PNT service to Joint Force, allies, and 6 billion worldwide civil users
- Providing **20X force multiplier** to US military operations
- Enabling **\$1B per day** in US economic value



Civil



Advanced  
Civil



Finance



Military



Critical  
Infrastructure



## Industry Opportunities

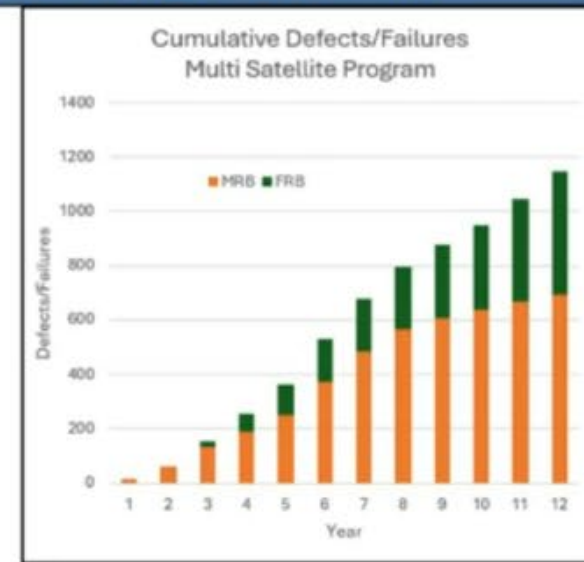
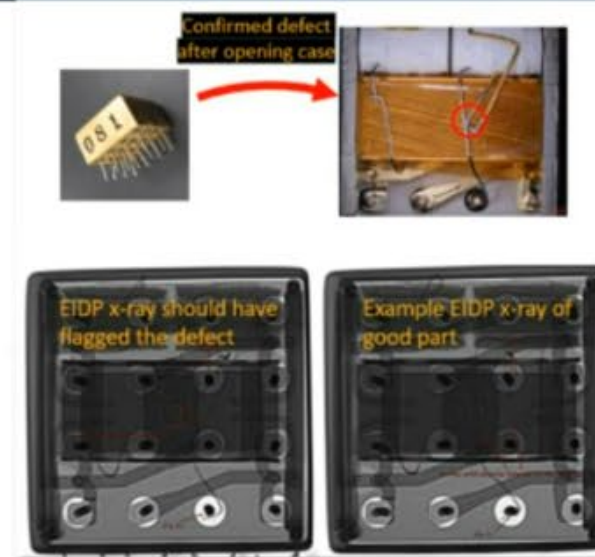
- **Advanced Waveforms & Signals:** How can we develop new signals that are more jam-resistant and secure?
- **System-of-Systems Integration:** GPS Gen IV won't exist in a vacuum. We need your help designing systems that can integrate with other PNT sources across multiple orbits.
- We continue to have a strong need for low SWaP-C M-Code receivers and high-stability atomic clocks that are essential for this future architecture.



# ▶▶▶ PNT: Parts, Materials, and Processes

**Mission Issue:** Failures of space systems at each level of the system design hierarchy (parts/units/systems) are very expensive and time consuming. Increasing system complexity, increasing numbers of piece-parts, and incomplete supply chain monitoring w/ reduced manpower results in failures. Recent pivot towards proliferated constellations with many more vehicles increases the need to rapidly assess individual units and payloads on the ground and in space, exacerbating the manpower review shortage, resulting in more increased risk and more failures. Additionally, new reusable launch vehicles increase the need for condition-based monitoring to ensure the “Next Launch” is not a failure.

- Each failure costs time and money
- Errors are currently caught at test events resulting in costly failure reviews, root-cause investigations, rework, and retest
- Learning improve error rate, but 100s of errors persist, many into operations or shortened life
- Detecting and avoiding PM&P as well as workmanship assembly errors before they are integrated into systems saves time and money



Operational Requirement	Current Impact	Success look like...	Point(s) of Contact
Develop AI/ML tools to screen SV development data and workmanship images to preemptively identify PMP failures and alert developers, operators and decision makers	+1000s of errors and part failures occur during typical SV development and deployment. Results in costly failure reviews, lost time, and outages.	<ul style="list-style-type: none"> <li>• Reduced PMP related anomalies and FRBs</li> <li>• Reduced workmanship anomalies and FRBs</li> <li>• Improved SV development schedules</li> <li>• Lower cost and outages, better performance</li> </ul>	<ul style="list-style-type: none"> <li>• Nico Hargreaves-Heald</li> <li>• Alfred Jung</li> <li>• Nate Ristoff</li> <li>• Jon Osborn</li> </ul>



# Quantum Computing & The Future of Cryptography



## The Quantum Threat

- A sufficiently powerful quantum computer will break current public-key encryption (e.g., RSA, Diffie-Hellman).
- This is not a question of if, but when.
- The National Security Agency has mandated a transition to quantum-resistant algorithms.



## The "Harvest Now, Decrypt Later" Vulnerability

- Adversaries can collect and store encrypted data today.
- They can decrypt this stored data years from now once a quantum computer is available.
- Long-lifespan systems, like satellites, are especially vulnerable to this threat.



## The Industry Opportunity: QKD

- **Quantum Key Distribution (QKD)** offers a way to securely distribute encryption keys with tamper-evident properties.
- This is a critical technology for "future-proofing" our communications.
- **We Need Industry's Help To:**
  - Improve performance (speed and distance).
  - Develop and mature standards for certification.
  - Harden systems for operational use.



# Questions?