

Program Executive Office Command, Control, Communications, Computers, Intelligence and Space Systems (PEO C4I and Space Systems)

PMW 160 Tactical Afloat Networks

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Deliver threat-based C4I and space capabilities to enable the Fleet to compete, deter and win – tonight





- Information Warfare
- PMW 160 Portfolio
- PMW 160 Priorities
- PMW 160 Focused Initiatives
- PMW 160 Technical Drivers
- CANES
- ADNS
- Enterprise Pier Connectivity Architecture (EPCA) / Piers
- Summary





Image: iStock

Information Warfare

The war is being fought **digitally**, whether you look at cyber ransoms, or speed of deploying tactically relevant software to get ahead of threats.

Bottom line:

Information technology no longer just "supports" warfighting!

It is **core** to naval ability to provide deterrence and project power.





The Tactical Edge



Tactical Edge: Platforms, sites, and personnel (U. S. military, allied, coalition partners, first responders) operating at lethal risk in a battle space or crisis environment characterized by

1) a dependence on information systems and connectivity for survival and mission success,

2) high threats to the operational readiness of both information systems and connectivity, and

3) users are fully engaged, highly stressed, and dependent on the availability, integrity, and transparency of their information systems





PMW 160's Portfolio-Operating at the Tactical Edge



Deliver and support innovative, agile and secure networks and IT services to enable warfighter mission success

CANES	Consolidated Afloat Networks and Enterprise Services (CANES) delivers common afloat networks to drive cyber resilience, improve operational availability and reduce total ownership costs	
ADNS	Automated Digital Network System (ADNS) provides assured tactical wide area networking between ships, submarine and shore to support full spectrum battlespace connectivity	
ACS	Agile Core Services (ACS) provides a set of commercial IT services to accelerate delivery of software, streamline integration, and improve enterprise sharing	
AI	Application Integration provides the platform governance and certification to ensure the cyber posture and interoperability of afloat networks and applications	
Piers	Pier IP communications, transitioned to PEO C4I in FY19, delivers connectivity to ships and submarines when connected to the terrestrial network	





PMW 160 Priorities

Mission Driven

- > Speed to Capability
- > Cyber Resilient and Reliable
- Enabling the Naval Operational Architecture the Navy's JADC2 implementation

Fleet Focused

- Support and secure systems in the Fleet today
- Deliver the systems that we committed to install
- Procure systems to support future installations
 - Design, Develop, Integrate, and Test future systems



Focused Initiatives



• Enhancing Sailor Self-Sufficiency:

Improving Sailor's ability to fight and defend their network through game-changing training delivery (CANES Training Virtual Environment), increased automation and improved network insight through Remote Access / Remote Monitoring distance support capabilities

• Delivering Speed to Capability - DevSecOps:

Delivering Development Security Operations (DevSecOps) pipeline including cloud-based CANES development & integration environment to enable rapid fielding of stable, cyber-secure software-based warfighting capability

Increasing System Resiliency & Agility:

- Implementing increased agility in system upgrades to provide more frequent, incremental delivery of network capability; goal to rapidly address cyber vulnerabilities, maintain operational availability and pace warfighting threats
- Fielding first Cyber Threat Upgrades in FY23





Delivering processes and technology to increase network warfighting resiliency, supportability, and installation efficiencies.

Combat Ready, Combat Resilient - Networks & Sailors



Tactical Networks Technical Drivers



Leveraging Cloud & Cloud Native



Image: VMware.com

Pacing Cybersecurity & Expanding Zero trust



Image: Caplinked.com

Evolving Agile & DevSecOps Driving Speed-to-Capability



Image: automationConsultants.com

Expanding Automation, AI & ML



Image: warontherocks.com

Increasing Network Resiliency



Image: datafoundry.com

Enabling Distributed Maritime Operations







CANES Baseline Evolution



122 CANES Systems Fielded today

Deploying 5th Generation CANES (HW2/SW4); Developing 6th Generation (HW3/SW5)

Publically Releasable







_		NEAR-TERM	MID-TERM	LONG-TERM
RESILIENCY ("PORT & STBD")		Toule Tolescent Naturals	Service Clustering/Hot Standby	Dynamic / Isolated Network Domains
	RESILIENCY	Built-in Failure Testing	Fault Prediction via ML	
	("PORT & STBD")	Robust Shutdown and Restoral Backup/Restoral Redundancy	Phased Migration to Critical Power	Degraded Failure Mode Operations and Recovery "Battleshort"
		INOCCS Alignment	INOCCS Framework	Zero Trust Architecture
\odot	CYBERSECURITY	Continuous Monitoring	Continuous Monitoring Optimized SIEM Correlation Rules Virtua	Virtual Cybersecurity Scenario
$\overline{}$		Cyber Threat Upgrades (CTUs)	Virtual Desktops Expansion	Training
		Best Value Common Computing Environment (CCE)	Multi-Enclave Secret Releasable Hosting	CCE QoS and SLA Optimization
(Q)	EFFICIENCY	Simplify / Deprecate Software and Services	Database Driven Design	Best Value Network Infrastructure
		Virtual Development and Integration Environments	DevSecOps Production	Staging and Digital Twin
	SPEED TO	Streamlined DevSecOps Pipeline	Speed-to-Install through DevSecOps Staging and Digital Twin	Microservices-Based Design
3	CAPABILITY	Phased Deployment Releases "Early Adopters"	Institutionalized C2C Release Process	Modular/Containerized Updates
		Expand Remote Support	Automated Warfighter Feedback	Sailor-Driven Technology Adoption
F	WARFIGHTER	Proactive Problem Detection	Automated Configuration Auditing	
5		Operations-Driven Dashboards	Mobility Expansion	

ADNS Baseline Evolution



Transitioning to Software Defined Network architecture; leveraging DevSecOps for future modernization and sustainment of ADNS capabilities

Publically Releasable







_		HW Centr	ic > SW (Centric	
œ	RESILIENCY	Support in degrad Shore / Ship broadcast resiliency within AORs	ed environments Improved reconstitution with virtualization	Survivable; self healing; rapid reconstitution	
		Alternate V Additional Sho	VAN links pre Backhaul	Support Autonomous Operations Inter-Platform Communications	
Ø	CYBERSECURITY	OS and	STIG upgrades	Continuous Monitoring Rapid detection, prevention and	
			SDN Improved Cyber Protections	reaction to adverse activity INOCCS Framework Zero Trust principles	
				Bevond INC III	
(Q)	OPERATIONALLY EFFICIENT	Real Time Services	Modem Compatibility	Multi-Mission Architecture	
		Increased capacity and connectivity Full motion video and COP	New mission architecture	Adaptable, Optimized and Selectable QoS	
		HW upgrades	Virtualized routing solution	Detects Delays and Adapts to Dynamic Environments	
	SPEED TO CAPABILITY	Feature Set and Service Pack development Independent development		Virtual Development, Modular Scalable Design and Integration	
		Non-Permanent Change development		Automated testing	
			DevSecOps Foundations	Streamlined DevSecOps Pipeline	
			Phased Deployment Release	Modular/Containerized Updates	
			Tier 3/4 & CASREP response		
5	WARFIGHTER EXPERIENCE AND SUPPORTABILITY	QoS improvements		Proactive Problem Detection	
		EXPERIENCE AND			Max automation of key functions
		Increased enclave BW	Expand Remote Support	E2E Virtual Networks Capability Training	



Piers - EPCA



- Enterprise Piers Connectivity Architecture (EPCA) is the shore transport network for ADNS from pier side ships & submarines to connect to servicing NOCs
- Program delivers multiple products providing high speed pier connectivity. Delivery methods vary and are site appropriate

Today's Delivery Model

- Government Designed and Integrated
- Operational support migrating to NGEN-R
- Up to 1 Gbps via EPCA 2.0



Future Technology Adoption:

- Wireless Pier Connectivity System (WPCS) 3.0 roll-out in FY23
- Wireless Connectivity Bridge (WCB) for adjacent sites leveraging WPCS
- Possible 4G/5G technology incorporation
- Enhancements to ADNS to increase bandwidth routing
- Integration with commercial SATCOM solutions for increased bandwidth to support QoW/QoL







- PMW 160's Imperatives:
 - Delivering the Tactical Edge
 - Enabling the Kill Chain through Information Warfare
 - Operating continuously from Competition to Conflict
- Industry's Challenge is to develop solutions that:
 - > Operate in austere, tactical environment
 - Contribute to Fleet self-sufficiency
 - Simplify complexity, increase automation
 - Increase hardening and resiliency
 - Enable speed to capability

Combat Ready, Combat Resilient - Networks and Sailors



Accelerated delivery of required capability that is affordable, integrated and interoperable