Expeditionary Warfare

CAPT Duncan McKay, USN
Commanding Officer

NAVSEA
WARFARE CENTERS
CRANE

Dr. Angela Lewis, SES
Technical Director

Our mission is to provide intelligent systems solutions for all domains that enhance detection, decision-making, maneuver, and kinetic and non-kinetic engagement capabilities for the Expeditionary warfighter. We utilize open architecture designs to integrate multi-platform advanced sensors and specialized weapons systems.

- ## **Systems of Systems approach across our areas of expertise:**
  - **Small Arms Weapon Systems Engineering**
  - **Specialized Munitions Systems Engineering**
  - **Electro-Optic Technology Systems Engineering**
  - **C2, Cybersecurity; and Surveillance, Reconnaissance & Intelligence Collection Systems Engineering**
  - **Expeditionary Systems Integration & Engineering**
  - **Mission Engineering and MBSE**
  - **Power Systems and Interconnect Technology Engineering**
  - **System Test and Evaluation**

Technology Focus Area Alignment
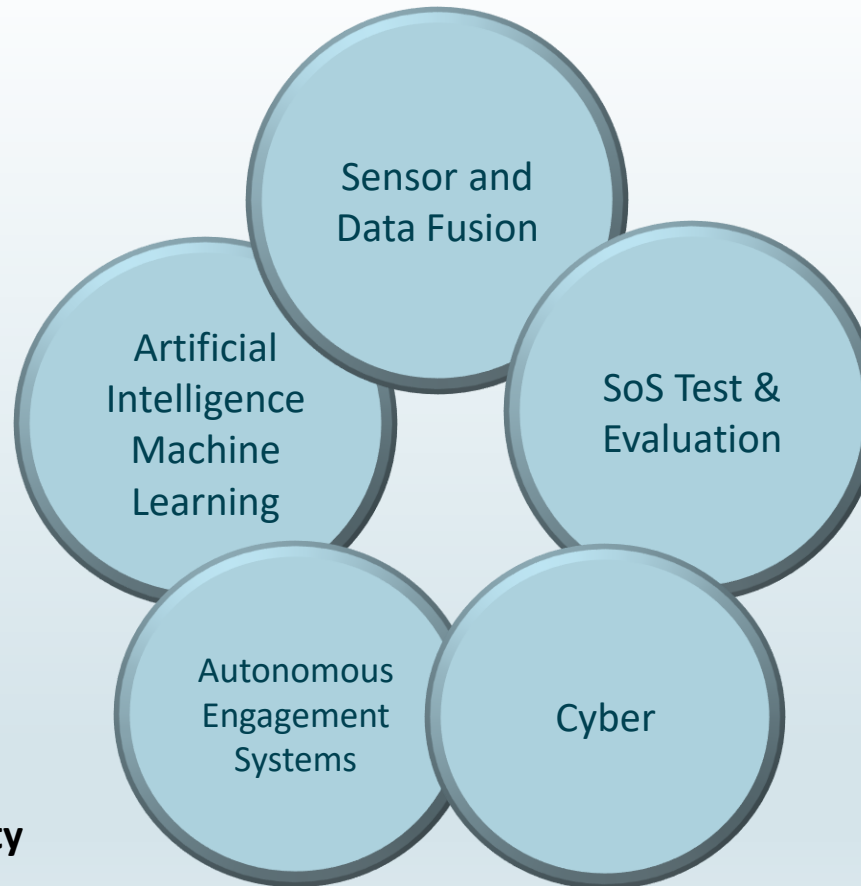
Unmanned Systems

Hyper Enabled Operator

Next Generation ISR/Tactically Relevant Situational Awareness

Network & Data Management

Next Generation Effects/Precision Strike

Next Generation Mobility

Sensor and Data Fusion

Artificial Intelligence Machine Learning

SoS Test & Evaluation

Autonomous Engagement Systems

Cyber

Air and Missile Defense Counter Precision Guided Munitions Ground Based Air Defense

Ground-Based Long-Range Precision Fires

C2 in a Degraded Environment

Artificial Intelligence, Data Science, and Emerging Technology

Human Interface

Relevance through National Leadership

Established Expeditionary Warfare Prototyping Lead SSTM, Mr. Andy Brough

Lead NAVSEA efforts for ExW advancement and transformation
Enhance WC's as the nation's technical partner of choice for resolution of ExW issues

Established Battery Technologies SSTM, Dr. Joseph Fontaine

Nationally recognized expert in engineering, R&D, S&T, and T&E related to electrochemical energy storage and emerging energy storage technology used in U.S. Strategic, DoD Platforms, Space Based, Grid Storage, and Cyber Systems
Serves as Senior Advisor to DASN RDT&E and the DASN RDT&E Director of Prototyping and Transition for all matters related to Prototyping of Battery Technologies

Established 21 Program Office On-site Support Positions

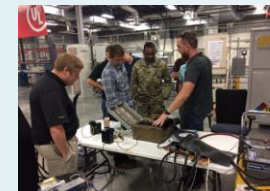**Expeditionary "Warfighter Driven Challenges"** *(11 events resulting in over 15 prototypes)*

Innovation skills & processes developed & refined
Rapid input solving real world problems
Government owned intellectual property
Government Innovation Team, government technical data package and design
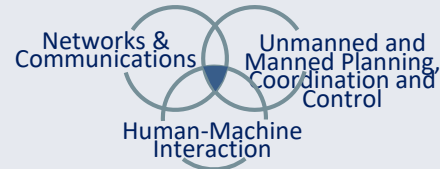*Rapid turnaround prototype solutions for the Warfighter*

Technology Focus of Expeditionary Warfare

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Detect

Multi-source Observation/Sensor fusion

Multi-Platform Strat to Tactical Distributed Battlespace COP

RT Simulation to Reachback

Control

Networks & Communications

Unmanned and Manned Planning, Coordination and Control

Human-Machine Interaction

Engage

Scalable Multi-Domain Weapons

Weapon as Platform, Platform as Weapon

RT Autonomous Battle Damage Assessment

Technology Focus Areas

Detect
- System of Systems Performance Analysis
- Controllable Weapon Effects
- Threat Monitoring and Prediction
- Novel Sensor & Weapon Stabilization Methodologies
- Efficient Power & Energy Systems
- Automated Threat Characterization
- Machine Augmented Cognition
- Threat Resistant Networks
- High Performance Computing
- Secure/Resilient Datalinks
- Machine Augmented Human Performance
- Multispectral/Multimodal Sensors
- AI/Machine Learning

Control
- Sensor Accuracy Assessment Algorithms
- Environmental Monitoring and Prediction
- Novel Platform Sensor Integration Methodologies
- Power Transmission to Distributed Sensors
- Automated Threat Characterization
- Autonomous Battlespace Awareness
- Threat Resistant Networks
- Sensor Networks
- Secure/Resilient Datalinks
- Holistic Battlespace Immersion
- Multispectral/Multimodal Sensors
- Lightweight Sensors
- Advanced Fabrication of Multi-Scale & Complex Designs
- Sensor Fusion

Engage
- Weapon Effects Analysis
- Target Dependent Weapon Effects
- BDA Prediction
- Novel Platform Weapon Integration Methodologies
- Power Transmission to Distributed Weapons
- BDA Analysis
- Holistic Battlespace Viewers
- Threat Resistant Networks
- Sensor Networks
- Secure/Resilient Datalinks
- Holistic Battlespace Immersion
- Multispectral/Multimodal Sensors
- Lightweight Weapons
- Advanced Fabrication of Multi-Scale & Complex Designs
- Scalable Effects Weapons
- Adaptive/Cognitive Reasoning Assessment

- Artificial Intelligence/Machine Learning
- Sensor Fusion Experience
  - Including Advanced Sensor development
- Data Science
  - Big Data Analytics
  - Data analytics (predictive & prescriptive)
  - Data science
  - Data forensics
  - Mathematicians/Statisticians
- Modeling & Simulation
  - Traditional
  - MBSE
- Mission Engineering – System of Systems Engineering
  - Model Based Systems Engineering
  - LVC
  - Threat Analysis and Solution Formulation
- Cyber Experience
  - Degree in Computer Science, IT, Systems Engineering, or a similar field.
  - 2 years experience in Cyber Security related duties such as incident detection and response, and forensics.
  - Knowledge Cyber Security trends and hacker tactics
- Command and Control SMEs
  - Specifically in Marine Corp, SOCOM and Air force Systems
- Quantum Science
- Material science/metamaterials
- Electrochemical Expertise
- Signal Processing

- Engineering - Electrical, Mechanical, Computer/Software
  - Communications and digital signal processing experience
  - Systems Engineers - Working knowledge of the Systems Engineering Technical Review (SETR) process.
  - Journey-level engineering support, specifically design and Finite Element Analysis (FEA) support.
  - CAD Experience.
  - Experience with engineering policies, processes, and procedures, particularly pertaining to NAVAIR systems and/or Crew Served Weapon Systems.
  - Platform and sensor integration support
  - Software Engineering, Software Development, FPGA, Networks
- Scientists
  - Optical
  - Physicists
- Technical
  - Electronics Technicians
  - Welders
  - Drafting
  - CNC Operators
- Test and Evaluation Experience
  - Optical and laser systems
  - General
- Program Management
- Field Service Reps (FSR) CONUS and OCONUS
- Operational Experts – former military experience