NAVSEA
WARFARE CENTERS
Indian Head

Systems Engineering Department

Presented to:

NSWC Indian Head Division Industry Day

Presented by:

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Systems Engineering Department Head

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Capt. Eric Correll, USN
Commanding Officer

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Technical Director

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Systems Engineering (E) Department

Warfighting Impact

- Development, support and delivery of energetic system solutions across the full acquisition cycle to provide the warfighter with a kinetic advantage
- Technical, acquisition and logistic product support across all domains (Surface, Undersea, Air, Land/Expeditionary, Space)
- Ordnance assessments leading to service life extensions

Lines of Operation

- Energetics technology
- Micro-electrical mechanical systems (MEMS), micro initiation and electronics engineering, advanced energy storage design, build and test
- Energetic applications
- Engineering for all warfighter domains
- Full spectrum ordnance system design, build and test
- Cartridge Actuated Devices/Propellant Actuated Devices (CAD/PAD) support of 2,800+ ejection system components
- System Safety
- Weapons Maintenance and Life Cycle Support

Capabilities and Facilities

- MEMS explosive-certified cleanroom, characterization and test
- Polymer and metal additive manufacturing capability (3D printing)
- CAD/PAD virtual fleet support
- High Performance Computing (HPC) for advanced modeling and simulation
- Airguns test rounds from 3” - 21”
- Energetics Solutions for development efforts and existing products
- Exploitation
- Electrostatic Discharge Test Facility

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Systems Engineering (E) Department

Products Supported Across All Domains

SURFACE DOMAIN

- Standard & Harpoon Missiles
- Mark 53 Decoy Launching System
- Tomahawk Missiles
- Mark 45 five inch Gun Weapon System
- Evolved SeaSparrow Missile

Source: https://www.monch.com/mpg/news/ew-c4i-channel/7334-saic-and-usaf-partner-for-jadc2.html

UNDERWATER DOMAIN

- Otto Fuel for Torpedoes
- AN/BST-1 Submarine Emergency Communications Transmitter Buoy
- Heavyweight & Lightweight Torpedoes
- Countermeasures Anti-Torpedo
- Mark 77 Gas Generator
- Mine Mission Packages
- Airborne & Barracuda Mine Neutralization Systems
- Clandestine Delivered Mine
- Compact Encapsulated Mine Warhead
- Vertical Launch Anti-Submarine Rocket

EXPEDITIONARY/ LAND DOMAIN

- High-Reliability Dual-Purpose Improved Conventional Munitions Replacement
- Anti-Structural Munition Grenade
- Shoulder-Launched Multipurpose Assault Weapon
- Assault Weapon Assault Breaching System
- Electronic Blasting Caps
- Tube-launched Optically-tracked Wireless-guided and Javelin Missiles
- Mine Countermeasures Systems

AIR DOMAIN

- CAD/PAD
- Sidewinder Missile
- Mark 66 Rocket
- Jet/Rocket Assisted Take-Off
- Advanced Medium-Range Air-to-Air Missile
- Hypersonic warhead vehicle

SPACE DOMAIN

- Mark 70 and Mark 11/12 Boosters

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Systems Engineering (E) Department

- E Department Contracts for:
  - Services
    - Configuration Management Support
    - System Safety Support
    - UNIX and PC (Windows OS) Information Technology Hardware Support
    - Electro Static Discharge Engineering and Project Management Support
    - General Software Engineering Support for Performance Specification and Code Analysis
    - Ordnance Assessment Test Support
  - Materials
    - Metal Parts
    - Components/Assemblies for CAD/PADs
      - Aircrew Escape Systems
      - Stores/Countermeasures Release
    - 2.75” Rocket Launchers
    - Electronics Board Assembly
    - Printed Circuit Boards

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Systems Engineering (E) Department

- E Department: Current Service/Materials Contracts (over $250K)

Brief Description	Dollar value	Incumbent	Concludes (QTR, FY)
Engineering / Technical / Analytical / Logistic / Testing / Management Support	$23M $3.7M $8M $1.9M	Advanced Tech & Research EHS Technologies Exodynamics Tech Inc National Technical Systems	4th QTR FY27 2nd QTR FY26 1st QTR FY25 1st QTR FY26
CAD/PAD Technology Development and Ordnance Assessment	$22M $22M $8M $30M $22M $11.7M $6M $22M $11.7M $22M $30M	Ametek Ameron Argent Energetics Tech Eastern Research Group Ensign-Bickford A&D General Dynamics OTS Innovative Mat'ls & Process Martin Baker Nammo Defense Systems Networks Electronic Systems Stratus Systems UPCO	4th QTR FY26 3rd QTR FY26 1st QTR FY27 3rd QTR FY26 2nd QTR FY27 2nd QTR FY26 2nd QTR FY26 3rd QTR FY26 4th QTR FY26 4th QTR FY26 2nd QTR FY26

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Systems Engineering (E) Department

- E Department: Current Service/Materials Contracts (over $250K)

Brief Description	Dollar value	Incumbent	Concludes (QTR, FY)
Information Technology (IT) Systems	$8M $2.4M	Garcia Information Systems SAIC Gemini	2nd QTR FY26 3rd QTR FY27
2.75” Rocket Launchers	$8.5M	Arnold Defense & Electronics	4th QTR FY23
Unmanned Aerial Vehicle	$302k	Agentase	3rd QTR FY27
Explosive Bolt	$2.2M	Chemring Energetic Devices	4th QTR 2025
MK70 Booster Initiator	$602k	PacSci	2nd QTR 2023
Fuzing Technology Develop’t	$838k	Energetics Technology Center	3rd QTR FY24

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Systems Engineering (E) Department

- E Department: Projected Contracts (FY23-FY25)

Brief Description	Anticipated Announcement Date (QTR / FY)	Estimated Dollar Value
Propellant and liner ingredients (multiple contracts)	4th QTR, FY 23	~3.4M
Hydrogen Generator Development and Construction	3rd QTR FY23	~ $1M
High Reliability Cluster Munition (HRCM) engineering services, material, design integration support	3rd QTR FY23	~$2M+
MK 68 MOD 0 and 1 Long Lead Safe & Arm Components	1st QTR FY24	~1.2M
UAS Flight Range net and construction (Code D led effort)	FY24	~$1.3M

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BACKUP SLIDES
Organizational Posters

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Systems Engineering Department (E)

MISSION

Development, support and delivery of energetic system solutions across the full acquisition cycle to provide the warfighter with kinetic advantage

VISION

Strengthen the Arsenal as the Nation's resource for energetic systems by providing unparalleled technical, acquisition and logistical products.

Manage Project → *Design / Develop* → *Product Improvement* → *Verify Design / Test* → *Qualify* → *Acq Mgmt* → *In-Service Engineer'g* → *Logistics* → *Ordnance Assessment* → *Fleet Support* → *Config Mgmt* → *Investigate Failure*

CAPABILITIES AND FACILITIES

- MEMS explosive-certified cleanroom, characterization and test
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LINES OF OPERATION

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Energetic Systems Division (E1)

E1 MISSION

Provide creative, relevant and skilled life-cycle engineering and logistics services for fielded conventional weapon systems so our Armed Services and allies are ready to fight and win.

E1 VISION

Enable energetic weapons to dominate any battle space domain

E1 LINES OF OPERATION

- Energetics:
  - Propellants
  - Explosives
  - Pyrotechnics
  - Fuels
  - Powders
- Engineering:
  - System Engineering
  - Product Improvements
  - Technical Design Agent
  - In Service engineering
  - Ordnance Assessment
- Logistics:
  - Configuration Management
  - Inventory Management
  - Maintenance
- Treaty Support

E1 PRIORITIES

- Identify and communicate predominant challenges and needed capabilities in each domain
- Accelerate the delivery of energetic weapon systems to the field to enable and expand a competitive advantage
- Invest in developing personnel, information & knowledge management, and building collaborative relationships within the DOD and Industry

CORE VALUES

- Mission First: One Team, One Fight across all DoD
- Informed Engineering Decisions
- Provide relevant solutions to the warfighter

CAPABILITIES

- Subject matter expertise engineering principles related to rocket motor and warhead production, operation, safety, and ordnance assessment to support Air, Surface, Land and Underwater energetic systems
- Service life planning, analysis and reporting
- Ability to investigate energetic failures across multiple product lines
- Ordnance assessment planning, testing and coordination
- Project Management
- Logistics: depot, training, shipping, cataloging, demilitarization, integrated product support, acquisition and sustainment logistics
- Knowledge of rocket motor principles: propulsion, production, test/qualification
- Warhead development, effects, and product integration
- Exploitation, reverse engineering of materials –construction, reproduction and characterization
- Systems engineering
- Weapon specification management
- Configuration and Data management
- Technical Data Package (TDP) creation and revision

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CAD/PAD Division (E2)

E2 MISSION

Develop, deliver, and sustain Cartridge Actuated and Propellant Actuated Devices (CAD/PAD) through collaborative solutions and engineering excellence in support of the warfighter throughout the full life cycle

E2 VISION

Provide safe, reliable, innovative CAD/PAD that accomplish our defined strategic goals to outpace our adversaries

E2 LINES OF OPERATION

- Technical execution
  - Creative and practical solutions to resolve engineering issues
  - Expanding technical capability
  - Improve response through decisive actions
  - Expand, improve, and utilize past designs and current designs with improvements to meet future needs
  - Improve methodologies in evaluating Ordnance Assessment (OA) to better predict the reliability of our CAD/PAD devices
  - Support Mishap Investigations (MIST)
  - Improve the efficiency in our configuration and data management of all CAD/PAD devices
- Acquisition strategy to reduce program risk
  - Diversify the contractor portfolio for contact awards
  - Award and execute contracts in a timely manner
  - Improve contracting timelines for realistic delivery schedules
- Forward thinking Logistical strategy
  - Address future demands to avoid backlogs
  - Run what-if scenarios with a Plan A/B mitigation strategy that will be at the ready
  - Improve response time for supporting change-outs

E2 PRIORITIES

- Meet the demands of the Warfighter
- Control an unexpected surge in demand
- Expand the CAD/PAD portfolio

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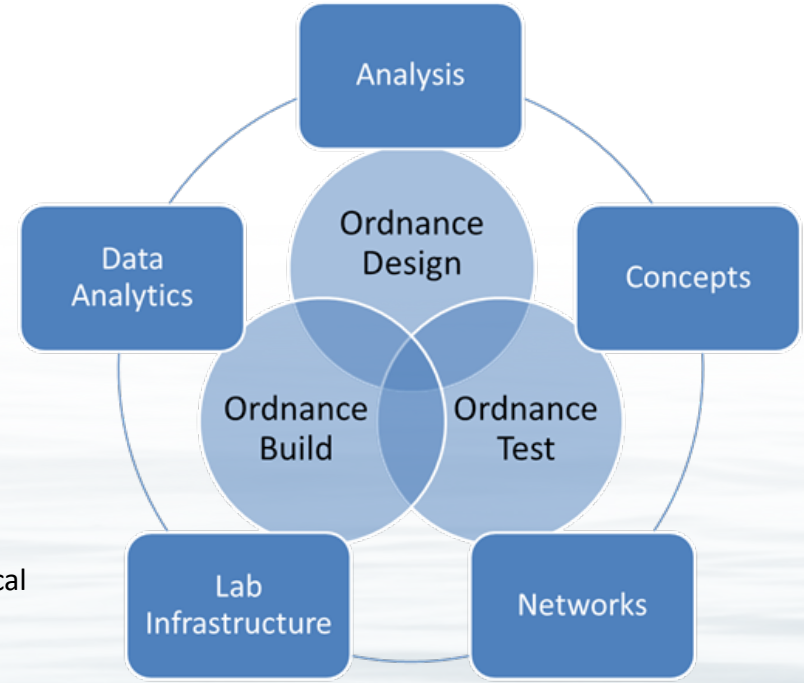
Energetics Technology Division (E3)

E3 MISSION
To research, develop, and deliver ordnance systems to improve our Navy's lethality

E3 VISION
To be our nation's resource for the agile development and fielding of ordnance systems leveraging sophisticated energetics tools and concepts

E3 LINES OF OPERATION

- Design, Build, Test and Qualification of:
  - Warheads
  - Fuzing and Initiation Systems
  - Ordnance Electronics
- Advanced Modeling and Simulation:
  - Lethal Effects and Platform Response
  - High Performance Computing
  - Computational Methods
- Ordnance Component Technology Development:
  - Novel Warhead Concepts
  - Fuzing and Initiation Systems
  - Micro Systems Concepts and Micro-Electro-Mechanical Systems (MEMS)
  - Mechanical System Concepts
  - Machine Learning / Artificial Intelligence



E3 PRIORITIES

- Product Line Focus Areas
  - Electro-Static Discharge (ESD)
  - Joint Counter RCIED Electronic Warfare
  - Safe & Arm
  - Target Sensing & Fuzing
  - Warhead Development
  - Propulsion Engineering
  - Novel Component Technology
  - Naval Gun Systems
  - USMC Ground Support / Launchers
  - Target Sensing
- 6.2-6.3 Product Development Focus Areas
  - Future Naval Capabilities (FNC)
  - Innovative Naval Prototype (INP)
  - Joint Enhanced Munitions Technology Program (JEMTP)
- 6.4 Transition Focus Areas (examples)
  - Lucky Charms
  - Goalkeeper
  - High Reliability Cluster Munition (HRCM)

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System Safety Division (E4)

E4 MISSION

Maximize combat capabilities through the assessment and reduction of risk to prevent mishaps to the warfighter, weapon systems and platforms.

E4 VISION

Be the nationally recognized leader in the development and application of system safety practices for the Warfighter

E4 LINES OF OPERATION

- System Safety Program Execution
  - Surface System Safety
    - Weapons & Explosives Integration
    - USSOCOM/Naval Special Warfare
    - Foreign Military Sales
    - S&T
  - Maritime System Safety
    - Joint Counter RCIED Electronic Warfare (JCREW)
    - Joint Service Explosive Ordnance Disposal (JSEOD)
    - Maritime Unmanned systems
    - Maritime countermeasures
  - MAGTF System Safety
    - Electronic Warfare
  - Vehicles
  - Weapons systems and ordnance
- System Safety Policy Development
  - Joint Weapon Safety Working Group
  - Fuze Engineering Standardization Working Group
  - Warfare Center System Safety Enterprise
  - Acquisition Safety Steering Committee
  - NATO AC 326 S/G B
- System Safety Technical Oversight
  - Weapons Systems and Explosives Safety Review Board member (WSESRB)
  - Fuze and Initiation Systems Technical Review Panel member (FISTRP)
  - Software System Safety Technical Review Panel member (SSSTRP)

E4 PRIORITIES

- Develop system safety workforce development training path to enhance current and continuing education.
- Leverage safety board membership and include system safety personnel in WSESRB/SSSTRP/FISTRP meetings to develop their understanding of the review process.
- Update and finalize system safety practitioner workbook with new SEA 05S requirements and implement documenting experience/training in pursuit of Principal for Safety (PFS)/Principal for Environment Safety and Occupational Health (PESOH) qualification.
- Address Fleet requirements by having sufficient staff available to meet programmatic needs.