Thank you to our Sponsors!
Thank you to our Host!
Special Thanks!

ML Mackey
and the team from
Beacon Interactive Systems!
Housekeeping Items

- Breakfast and Lunch in the kitchen down the hall to the right
- Restrooms down the hall to the right
- One-on-One Sessions in various rooms that will be labeled; sign up sheets will be available during lunch break
- Telephones and Tablets - please mute them, as we are videotaping the workshop and live-streaming it out to multiple sites across the country
Manufacturing Strategies to Scale Innovation

NEBA NAVSEA/NAVAIR SBIR Event
Dec 4th, 2019

Moderator
ML Mackey
CEO & Co-Founder
BEACON
INTERACTIVE SYSTEMS

Panelists
Joyce Sidopoulos
Co-Founder, Director of Programs & Community

Ira Moskowitz
Director, Advanced Manufacturing Programs

Mike Hunnewell
Director, Business Development

Jon Lathrop
EVP, Programs and Business Development

Joe Donovan
Managing Director
NELSON MULLINS
Public Strategies
MassRobotics is connecting the local and global robotics innovation ecosystem
More than 300 startups & corporations.
The 2019 Massachusetts Cybersecurity Forum

Lt. Governor Polito and Speaker DeLeo Tour MassRobotics

Sandbox Program Expansion with Governor Baker

The Digital Health Field in Mass
Metamagnetics supplies innovative technology that assists in protecting commercial and military communications

- Specializes in advanced RF and microwave solutions based on materials manipulation

- Applications include anti-jam components, directed energy systems, and SWAP solutions for RF subsystems
SI2 Technologies, Inc.
Contract Research and Development in RF and Sensors for DoD

Founded 2003
ISO-9001:2015

267 Boston Rd.
N. Billerica, MA
01852
978-495-5325
A deep understanding of your vision

At Nelson Mullins, we help advance our clients’ business goals through flexibility, business sense, and tireless advocacy based on a deep understanding of their business worlds. A team of more than 800 attorneys, policy advisors, e-discovery professionals and other business professionals with over 100 diversified practice areas, we work side-by-side with you towards shared goals.
Empowering the Digital Warrior

SBIR Developed Technology
Fleet Deployed Products

Q4 FY19
Manufacturing Strategies to Scale Innovation

NEBA NAVSEA/NAVAIR SBIR Event
Dec 4th, 2019
Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Program

2019 Topics Workshop
What Is SBIR?

• Established by Congress in 1982 to incorporate small business technological innovation into Government supported Research and Development programs.

• Small Business Administration manages the SBIR Program through 13 participating agencies.

• Navy has 5 major players - NAVSEA, NAVAIR, NAVWAR, MCSC, ONR

• SBIR $$ + Small Business Innovation = Better, faster, cheaper products and processes for the Navy

• Small Business Technology Transfer (STTR) is a sister program that utilizes Federally Funded Research and Development Centers (FFRDCs)
SBIR / STTR Three Phase Program

Phase I: Feasibility Study
- Concept Development / Feasibility Study
  - $140K base contract, six months
  - $100K option for six months
  - Options depend on transition interest

Phase II: Full Research, R&D to Prototype
- Technology Development for Prototype
  - $1.6M base contract ($600K for twelve months, $500K option for twelve months, $500K option for twelve months)
  - Commercialization Readiness Program depends on potential for transition

Phase III: Commercialization
- Demonstration / Implementation
  - Commercialization
    - No Limit (Non-SBIR funds)

SBIR / STTR Buys Research and Development, Not Parts and Services
Topics Align to the National Defense Strategy

• Push to Align Navy SBIR Topics to the National Defense Strategy and Navy Senior Leader Priorities
  – Priorities can be found in the NDS, the CNO’s “A Design for Maintaining Maritime Superiority v2.0 and the NAVSEA Campaign Plan
• Technical proposals are limited to 10 pages, including resumes for key personnel.

• Proposals are scored on three criteria areas:
  – Technical Merit
  – Quality of Personnel
  – Commercialization Potential

• Narratives are provided in debriefs to unsuccessful companies.
What Happens to a Proposal?

Proposal → DoD Portal → Navy Portal → Program Manager Database → AWARD
Keys to Writing Winning Proposals

1. Each Service and agency is different. Read and follow announcement instructions
2. Know your customer. Make sure your approach is relevant
3. Take advantage of the pre-release. Contact the Topic Author to ask questions
4. Emphasize your innovative approach. Articulate how it compares to the state of the art
5. Clearly and concisely answer who, what, when, where, how, and importantly, why
6. If there are technical barriers...address them!
7. Don’t underestimate commercialization. State your plan NOW!
8. Provide a detailed work plan and schedule with tasks that flow smoothly
9. Ensure that the proposed solution is reasonable, realistic, and feasible
10. Check spelling and grammar. Proposals can be difficult to read due to poor grammar

READ AND FOLLOW ANNOUNCEMENT INSTRUCTIONS
• Richard McNamara – Introduction to NAVSEA Headquarters and Directorate Topics
• Jennifer Greenwood – Introduction to PEO USC and Topics
• Emily Novak – Introduction to Team SHIPS and Topics
• Brian Quarles – Introduction to PEO SUBs and Topics
• Douglas Marker – Introduction to PEO IWS and Topics
• Tony Archer – Introduction to NAVAIR Topics
NAVSEA Headquarters and Directorates
HQ Program Offices and Directorates
- **Topic Number:** N201-045
  **Topic Title:** Development of a Debris Prediction Method for Hardened Structures
  **Technology Objective:** Develop a fast running model (FRM) for hardened structure debris prediction by using reliability analysis and adopting a stochastic procedure that can provide practical fundamentals for site planning of the hardened structures such as the magazine.
  **Technological Challenge/Risk:** Development of appropriate meshfree method with coupling effects and extraction of stochastic characteristics from deterministic results will increase the accuracy of prediction.
  **Transition Program:** Naval Ordnance Safety and Security Activity (NOSSA)
- **Topic Authors:** Dr. Hyung Jin Choi, Mr. Gary Hogue

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**Topic Number:** N201-053
**Topic Title:** Development of New Generation Earth Covered Magazine (ECM) Structure Design using Composite Materials
**Technology Objective:** Develop lightweight materials and structural components to produce a more efficient means to construct Earth Covered Magazines (ECMs) while keeping the same or higher level of protection capability, make it easier to maintain and upgrade them, and enable the military to fabricate the munition structure under the field conditions.
**Technological Challenge/Risk:** Optimal combination of the stiff and ductile materials to maximize blast resistance capacity will be pursued.
**Transition Program:** Naval Ordnance Safety and Security Activity (NOSSA)
**Topic Authors:** Dr. Hyung Jin Choi, Mr. Gary Hogue
• **Topic Number:** N20A-T010

• **Topic Title:** Ship Vibration Mitigation for Additive Manufacturing Equipment

• **Technology Objective:** Develop a process to mitigate the effects of shipboard vibration on additive manufacturing (AM) processes.

• **Technological Challenge/Risk:** Performance of additive manufacturing equipment installed shipboard can be impacted by shipboard vibration resulting in reduced AM component quality.

• **Transition Program:** NAVSEA Technology Office (SEA 05T), Cross Platform System Development (CPSD) R&D Program

• **Topic Authors:** Mr. Ryan Hayleck, Mr. Nathan Desloover
TEAM SHIPS
Technology Transition

Technology Insertion into Acquisition Programs

Technology Assessment

ID Changes to Navy Policies & Operating Procedures

Test & Evaluation

Rapid Prototyping at-Sea Demonstrations

Program Office

Push

Needs Identification

Pull

OSD - DARPA
ONR - NRL
Industry
Academia
National Labs
Other Services
PEOs & SYSCOMs
Warfare Centers
Allied Navies

Technology Development

Program Executive Office, Ships
NAVSEA SBIR/STTR
Team Ships

**Topic Number:** N201-025
**Topic Title:** Ship Rapid Damage Assessment System
**Technology Objective:** Develop a Ship Rapid Damage Assessment System utilizing Artificial Intelligence (AI) to rapidly determine actionable information after a damage event occurs that will reduce the time and cost to effect repairs on that vessel. The system should enable repairs to get a surface ship back in a combat readiness status and out of a repair availability fast and on time.
**Transition Program:** PMS 407, Surface Ship Modernization
**Topic Author:** Mr. Michael Kaminski and Mr. Adam Baylor

**Topic Number:** N201-031
**Topic Title:** Digital Mission Planning Tool for Air Cushioned Vehicles
**Technology Objective:** Develop a more portable and easier to use mission-planning tool implementing Artificial Intelligence (AI) and machine learning (ML) for afloat mission data collection and analysis. The tool should be able to provide a means to conduct off-craft mission planning, accommodate underway mission changes, and to perform post mission analysis of craft recorded data.
**Transition Program:** PMS 377, Amphibious Warfare Program Office, Ship-to-Shore Connector
**Topic Author:** Mr. Joseph Bray and Mr. Leonard Maxwell

**Topic Number:** N201-035
**Topic Title:** Compact Superconducting Cable Termination
**Technology Objective:** Develop a High Temperature Superconducting (HTS) power cable termination suitable for shipboard applications. The HTS termination must be significantly more compact for the adoption of superconducting power cable technology for future ships.
**Transition Program:** PMS 320, Electric Ships Office
**Topic Author:** Dr. Jacob Kephart and Mr. Jason Miller
NAVSEA SBIR/STTR
Team Ships

• **Topic Number:** N201-039
  • **Topic Title:** Power Dense Single Core Three Phase Transformer
  • **Technology Objective:** Develop a single core three phase transformer that reduces the size and weight of current transformers used in Navy shipboard power distribution systems. An updated transformer design is needed to replace the current system onboard DDG 51 class ships.

  • **Transition Program:** PMS 400D, DDG 51
  • **Topic Author:** Mr. Charlie Boucher and Mr. Christopher Strater

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**Topic Number:** N201-055
**Topic Title:** Coaxial Insulated Bus Pipe for High Energy Applications

**Technology Objective:** Develop a Medium Voltage Direct Current (MVDC) coaxial Insulated Bus Pipe (IBP) and associated components for integration onto U.S. Navy ships. Higher transmission capacities are desired to support advanced system power distribution without the need to install and maintain multiple parallel cables and associated terminations.

**Transition Program:** PMS 407, Surface Ship Modernization
**Topic Author:** Mr. Nadif Bracey and Mr. David Santosusso

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**Topic Number:** N20A-T008
**Topic Title:** Innovative Sea Chest Water Treatment System

**Technology Objective:** Develop technology required to reduce or remove ingested air and debris from sea chests of new ship designs. The current seawater intake system is problematic due to a non-conventional intake design driven by signature requirements. A new design is needed to reduce system noise levels and increase the service life of pumps.

**Transition Program:** PMS 500, DDG 1000
**Topic Author:** Mr. Andrew Rogers and Mr. Michael Lutkenhouse
Program Executive Office
Unmanned and Small Combatants
PEO USC Portfolio

LCS delivers mission-focused capability to the Fleet

As of March 2019

In-Service Support (Ships & Mission Packages)

LCS Training

ASW Mission Pkg

Comms

Software

Fire Scout

MH-60 Helo

SUW Mission Pkg

MCM Mission Pkg

Hammerhead

MH-53 AMCM

QUICKSTRIKE

ALMDS

MCM 1 Ship Systems

BARRACUDA

AMNS

MCM USV

GHOST FLEET

AN/AQS-20

COBRA

C2

MCM 1 Ship Systems

KNIFEFISH

XLUV/AUP

Razorback

LUUV

LLSV

MUSV

MHUs

UISS

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AN/AQS-20

Quickstrike

Hammerhead

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MH-53 AMCM
N201-028 – Surfzone Optical Imaging
Transition Program - PMS 495, Mine Warfare Systems Program Office, Coastal Battlefield and Reconnaissance Analysis (COBRA) program
Develop a capability to image through waves and ocean turbulence in shallow coastal waters from small surface ships and/or airborne platforms.

N201-041 – Bridge-to-Bridge Radio for Unmanned Surface Vehicles
Transition Program - PMS 406, Unmanned Maritime Systems Program Office
Create a system that converts VHF Bridge-to-Bridge radio transmissions from voice to text to meaning and integrates them into a COLREGS reasoning engine; and generates an intelligent reply to a proposed maneuver.

N201-059 – Automated Management of Maritime Navigation Safety
Transition Program - PMS 406, Unmanned Maritime Systems Program Office
Develop software or a combination of software and hardware that enable an Unmanned Surface Vehicle (USV) to tailor its navigation safety active emissions and passive signatures to the current situation based on broad guidance given days earlier by a distant controlling station.
N201-060 – Unmanned Passive Navigation without GPS
Transition Program - PMS 406, Unmanned Maritime Systems Program Office
Develop a passive device or system that allows an unmanned vehicles/vessels to develop and maintain awareness of its location on the earth’s surface without using the Global Positioning System (GPS).

N201-061 – Mine Countermeasures Unmanned Surface Vehicle Common Deploy and Retrieve System
Transition Program - PMS 406, Unmanned Maritime Systems Program Office, MCMUSV
Currently, a common deploy and retrieve system does not exist for towed systems; existing deploy and retrieve systems are specific to the towed body. This SBIR effort aims to develop a common, robust, maintainable, and reliable deploy and retrieve system for Mine Countermeasures Unmanned Surface Vehicle (MCM USV) to deploy, stream, tow, retrieve, and stow similarly sized (diameter 10.29” to 15.5”) towed systems that may be towed by connection at the nose of mid-body
DoN SBIR Technology Accelerator

- New DoN pilot program designed to enable technology development to the pace of innovation
- Broad topics enabling more innovative solutions from small businesses
- Rapid contracting process with a Phase III contract vehicle available
  - Proposal deadline - 24 October
  - All contracts awarded - 21 November
  - Contract Vehicle is Basic Ordering Agreement (BOA)
- In-person presentation of Phase I feasibility for same-day Phase II award
OBJECTIVE: Develop autonomous behaviors so that an Unmanned Surface Vehicle (USV) and/or an Unmanned Undersea Vehicle (UUV) can respond to a given situation like a manned surface ship or submarine.

- Storm Avoidance and In-storm Maneuvering (USV only)
- Perception
- In-stride Detection of Sensor Degradation
- Automated Pattern and Anomaly Recognition
- Classification of Surface and Subsurface Vessels

67 Proposals down-selected into 20 Phase I Awards
PEO SUBS
FY20.1/A SBIR/STTR Topics
Team Submarine Portfolio

- VIRGINIA Class SSN
- COLUMBIA Class
- Torpedo Defense Systems (Surface Ship and Submarine)
- Periscopes, Photonics, Imaging Systems
- Integrated Undersea Surveillance System
- Electronic Warfare Systems and Antennas
- Sonar Systems and Sensors (A-RCI)

- MK 48 Heavyweight Torpedo
- MK 54 Lightweight Torpedo
- Advanced Undersea Systems
- In-service Dry Deck Shelters
- Submarine Safety and Quality Assurance
- Submarine Trainers
- Submarine Rescue
- Undersea Technologies
- Combat and Weapons Control System (AN/BYG-1)
**Topic Number:** N201-026  
**Topic Title:** Manufacturing Composite External Volumes with Enhanced Underwater Collapse Performance  
**Technology Objective:** Identify filament winding manufacturing methods that result in external volume (EV) composite pressure housings with a safer catastrophic collapse response.  
**Technological Challenge/Risk:** Need to better understand how manufacturing methods effect released collapse pressure pulse. Wrapping methods, flaw size/distribution, shape quality and materials could impact the response.  
**Transition Program:** PMS397  
**Topic Author:** Jessica Dibelka, 301-227-8181, jessica.dibelka@navy.mil

**Topic Number:** N201-034  
**Topic Title:** Low-cost, Expendable Surface Ship Threat Countermeasure  
**Technology Objective:** Provide a combined, compact, multi-function, lightweight, expendable, extremely low-cost surface ship countermeasure capable of countering ever-increasing adversarial threats.  
**Technological Challenge/Risk:** Primary risk to the development effort is being able to provide existing capabilities in an extremely low-cost packaging that is easily single-handed for rapid over the side launch. Secondary risk is providing additional capabilities without growing the device envelope and/or weight significantly.  
**Transition Program:** PMS415  
**Topic Author:** Michael Zarnetske, 401-832-3838, michael.zarnetske@navy.mil
Topic Number: N201-038

Topic Title: Multi-aperture Active Metrological Sensor for Submarines

Technology Objective: Design an advance metrological sensor based on multi beam and multi wave length image motion analysis for the purpose of atmospheric turbulence by using multi aperture differential image motion (DIM), marine boundary layer temperature, pressure, atmospheric particle contents. The proposed technology shall base on multiband pico-second laser, LIDAR technology in time domain and FPA for image and intensity mapping.

Technological Challenge/Risk: Existing submarine based Metrological sensor is not capable to do multi tasking to characterize the Marine atmosphere from single system. NUWC has submitted the patent application on this innovative technology

Transition Program: SUB073

Topic Author: Tariq Manzur, 401-832-6887, tariq.manzur@navy.mil

Topic Number: N201-054

Topic Title: Coordinated, Layered Defense Capabilities of Multiple Torpedo Countermeasures

Technology Objective: Provide a capability for acoustic torpedo countermeasures to coordinate focused defense strategies against incoming advanced threat torpedoes.

Technological Challenge/Risk: Primary risk to the development effort is in providing coordination communication capabilities amongst multiple torpedo countermeasures in a cluttered acoustic environment. Secondary risk is in providing these additional capabilities in a manner that does not significantly drive increased cost or form factor deviations/changes of individual devices.

Transition Program: PMS415

Topic Author: Michael Zarnetske, 401-832-3838, michael.zarnetske@navy.mil
**Topic Number:** N201-042  
**Topic Title:** Rolling Shutter and Fast Panning Effects Mitigation  
**Technology Objective:** Restore image degradation caused by a rolling shutter and correct for motion blur during fast periscope panning.

**Technological Challenge/Risk:** The Low Profile Photonics Mast Extended Resolution Camera (ERC), has a rolling shutter and may blur during panning. It is desired to use this camera and additional future cameras for target detection and tracking algorithms given it has almost twice the resolution of the primary search camera.

**Transition Program:** PMS435  
**Topic Author:** Jose Barbosa, 401-832-7032, jose.g.barbosa@navy.mil

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**Topic Number:** N201-044  
**Topic Title:** 2 micron Wavelength Kilowatt Class High Energy Laser/Amplifier  
**Technology Objective:** Develop a high energy laser operating at 2 um (micron) wavelength, kW class amplifier design based on NDA for Next Generation Submarine Warfare and Battle Space supremacy using non kinetic energy.

**Technological Challenge/Risk:** Achieving eye safe kW class laser system as a substitute for current 1 micron laser systems is challenging with high risk and high payoff.

**Transition Program:** SEA073  
**Topic Author:** Dr. Tariq Manzur, 401-832-6887, tariq.manzur@navy.mil
**Topic Number:** N201-048  
**Topic Title:** MK 48 Torpedo Composite Fuel Tank  
**Technology Objective:** Develop composite fuel tank that improves MK 48 torpedo fuel management and reduces corrosion.  
**Technological Challenge/Risk:** The challenge is to design a composite fuel that that decreases weight, increases internal volume, improves Otto fuel/seawater separation, and reduce corrosion of fuel tank hardware while meeting existing MK 48 torpedo requirements.  
**Transition Program:** PMS404  
**Topic Author:** Roderic Bragg, 202-781-4957, roderic.bragg@navy.mil

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**Topic Number:** N201-046  
**Topic Title:** Through-Hull Underwater Submarine Communications  
**Technology Objective:** Develop external means to provide real-time externally mounted communications through the hull of a DISSUB.  
**Technological Challenge/Risk:** Provide real time externally mounted digital communications with measurement of internal DISSUB conditions and provide increased capabilities by providing a secondary means of digital communications in the event of a loss of the underwater telephone.  
**Transition Program:** PMS391  
**Topic Author:** Stephanie Mohundro, 202-781-1425, stephanie.mohundro@navy.mil

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**Distribution Statement A: Approved for public release; Distribution unlimited.**
**Topic Number:** N201-052  
**Topic Title:** Wide Band Large Aperture Beam Director Head Window  
**Technology Objective:** Develop an optical emulator of complex electromagnetic maneuverability (EM) systems with nanophotonic structures that can be 3D printed within a few hours and the electromagnetic cross section characterized within a few minutes.  
**Technological Challenge/Risk:** Wide spectral low loss, high strength optical materials development  
**Transition Program:** SUB073  
**Topic Author:** Dr. Tariq Manzur, 401-832-6887, tariq.manzur@navy.mil

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**Topic Number:** N201-063  
**Topic Title:** SUBSAFE Electrical Hull Penetrator Connectors for Directed Energy (DE) Weapon Systems  
**Technology Objective:** Develop submarine Subsafe electrical hull penetrators/ and connectors, which can transfer high currents or high voltages in the order of 100’s of kW through the submarine’s pressure hull.  
**Technological Challenge/Risk:** Under Marine environment transmit high power electrical from inboard to outboard system through Subsafe condition. Under the proposed topic the technology has high risk but payoff is also greater and cost savings.  
**Transition Program:** SUB073  
**Topic Author:** Dr. Tariq Manzur, 401-832-6887, tariq.manzur@navy.mil
**Topic Number:** N201-068  
**Topic Title:** Compact High-energy Efficient System for Removing Carbon Monoxide from Ambient Air on Submarines and Other Closed Manned Environments  
**Technology Objective:** Compact and portable system for Carbon Monoxide (CO) removal from isolated spaces on Submarines  
**Technological Challenge/Risk:** Stable (~10,000 hrs) materials that can remove hazardous levels of Carbon Monoxide (CO) from air at room temperature do not exist. A suitable material would enable the design of a highly energy efficient removal system without requiring heaters.  
**Transition Program:** PMS 397  
**Topic Author:** Franklin Gulian, 215-897-1957, franklin.Gulian@navy.mil

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**Topic Number:** N20A-T011  
**Topic Title:** Cyber Resilience of Condition Based Monitoring Capabilities (STTR)  
**Technology Objective:** Develop computational data analyzer tool sets that processes machinery condition information evaluating patterns that can cause cyber security vulnerabilities.  
**Technological Challenge/Risk:** Sensor nodes have the potential to serve as targets for cybersecurity attacks or be susceptible to corruption through accidental or malicious events. Cyber resilience technology seeks to look for patterns in data that can potentially cause high risk security vulnerabilities leading towards erroneous shipboard system maintenance actions. Existing strategies can be adopted to minimize vulnerabilities and improve cyber resiliency of CBM+ systems that monitor hull, mechanical and electrical (HM&E) equipment.  
**Transition Program:** PMS450  
**Topic Author:** Sherwood Polter, 215-897-8358, sherwood.polter@navy.mil
**Topic Number:** N20A-T012  
**Topic Title:** Electromagnetic Interference (EMI) Resilient, Low Noise Figure, Wide Dynamic Range of Radio Frequency to Photonic (RF Photonic) Link (STTR)  
**Technology Objective:** Develop a EMI resilient, low noise figure (<3dB) and wide dynamic range RF Photonic Link (>120 dB∙Hz^2/3) with less than 10mA detector photocurrent  
**Technological Challenge/Risk:** A linear optical modulator with low $V_{pi}$ with an integrated RF preamplification and bias control circuitry free of EMI signatures.  
**Transition Program:** SUB073  
**Topic Author:** Dr. Tariq Manzur, 401-832-6887, tariq.manzur@navy.mil
SBIR Management and Opportunities

• Communication: Internal and external flow of communication
  ▪ Ensure focus remains on open communication
    • Government to Government
    • Government to Small Business
  ▪ PEO-SUB SBIR Brown Bag Training
  ▪ Attend Industry Outreach events

• Successful Transition: Transition from Phase I through Phase II.5
  ▪ Respond to NAVSEA SBIR PM policy and procedure changes
  ▪ Measure and improve metrics
    • Time to award Phase I and Phase II Contracts

• Topic Sharing: Developing Topics with cross platform application:
  ▪ Engage Warfare Centers, PARMS and SHAPMs early on to develop cross platform topics
  ▪ Initiate “reach back” efforts from prior topics to award new contracts

• Management: Resides at Sponsor and TM level
  ▪ Track and provide status of topics, DoD Solicitations, Phase I, II and II.5 contract awards
  ▪ Navy PM Database
  ▪ iNAVSEA
  ▪ Internal tools and detailed tracking systems (redefining when necessary)

• Phase III Transitions: Tracking at Sponsor and TM level
  ▪ Work directly with acquisition office COR to track contract status
  ▪ Provide monthly input to PEO SUB ED

Communication and persistence are keys to Success
NAVSEA Program Executive Office
Integrated Warfare Systems
**Topic Number:** N201-033  
**Topic Title:** Real-Time Adaptive Data Model and Dynamically Extensible Markup Language for Distributed Common Operational Picture  
**Technology Objective:** Develop a real-time extensible and evolvable Distributed Common Operational Picture (DCOP) battlespace data model and associated descriptive battlespace data model markup language to improve command and control.  
**Technological Challenge/Risk:** Development of a dynamic, on-the-fly run-time extensible data model capable of representing all the relevant operational, tactical and environmental attributes of any future unknown battlespace entities, sensor suites and weapons systems.  
**Transition Program:** AEGIS Integrated Combat System BL 10 or later  
**Topic Author:** Brian Womble

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**Topic Number:** N201-036  
**Topic Title:** Dynamic Loadable Module Architecture and API for a Distributed Common Operational Picture Subsystem  
**Technology Objective:** Develop a real-time extensible and evolvable architectural model, software framework and Applications Program Interface (API), for a modular software execution environment capable of supporting dynamic run-time installation and control of new capabilities via the use of dynamically installable and reconfigurable software modules.  
**Technological Challenge/Risk:** Technical risks involve developing a set of low-impact runtime installation and removal algorithms and software safeguards which do not cause runtime system instability.  
**Transition Program:** AEGIS Integrated Combat System BL 10 or later  
**Topic Author:** Brian Womble
**Topic Number:** N201-037  
**Topic Title:** Multi-platform Real-time Synchronization and Coherency Algorithms & Architecture for a Distributed Common Operational Picture Subsystem

**Technology Objective:** Develop a set of real-time multi-platform data synchronization and coherency algorithms to support an extensible and evolvable Distributed (i.e., multi-platform/joint) Common Operational Picture (DCOP) subsystem.

**Technological Challenge/Risk:** Technical risks involve developing an architecture capable of reliably supporting data synchronization and cache coherency across multiple communications pathways in real-time.

**Transition Program:** AEGIS Integrated Combat System BL 10 or later.

**Topic Author:** Brian Womble

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**Topic Number:** N201-047  
**Topic Title:** Modular Architecture Framework Model and Application Program Interface for Common Core Combat System

**Technology Objective:** Develop a Common Core Combat System (CCCS) modular architecture framework and software component API capable of serving as a core combat system architectural upgrade within the current AEGIS system, and the basis for a new platform-agnostic combat system core implementation for Future Surface Combatant (FSC) platforms.

**Technological Challenge/Risk:** Technical risks involve developing a modular and efficient framework that allows for rapid cost-effective addition of new capabilities such as multi-platform sensor and weapons coordination, off-board and organic on-the-fly sensor and weapons integration, built-in cyber resilience, and real-time fault recovery.

**Transition Program:** AEGIS Integrated Combat System BL 10 or later.

**Topic Author:** Brian Womble
**Topic Number:** N201-056  
**Topic Title:** Data Exchange Subsystem Architectural framework, Algorithm Set and Applications Program Interface for Common Core Combat System  
**Technology Objective:** Develop a Common Core Combat System (CCCS) Modular Multi-platform integration and coordination data exchange subsystem architectural framework, algorithm set, and Applications Program Interface.  
**Technological Challenge/Risk:** Technical risks involve developing an architecture capable of reliably supporting data synchronization and cache coherency across multiple communications pathways in real-time.  
**Transition Program:** AEGIS Integrated Combat System BL 10 or later.  
**Topic Author:** Brian Womble

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**Topic Number:** N201-057  
**Topic Title:** Software Ecosystem Architectural Model and Application Program Interface for Common Core Combat System  
**Technology Objective:** Develop a Common Core Combat System (CCCS) software application execution and cross-application coordination environment (Ecosystem) and associated Application Program Interface (API) capable of serving as a core combat system architectural enhancement within the current AEGIS system and a primary modular component within a newly proposed CCCS platform-agnostic combat system core intended for implementation on Future Surface Combatant (FSC) platforms  
**Technological Challenge/Risk:** Technical risks involve developing an architecture supporting low-impact runtime installation/removal of applications, and which protects the CCCS from premature application termination and/or failure.  
**Transition Program:** AEGIS Integrated Combat System BL 10 or later.  
**Topic Author:** Brian Womble
**Topic Number:** N201-027

**Topic Title:** Artificial Intelligence-Based Autonomous Software Agent Battlespace Monitor for a Distributed Common Operational Picture Software Subsystem

**Technology Objective:** Develop an Artificial Intelligence (AI) Software-based Autonomous Battlespace Monitoring Agent (SABM) with the capability to augment or assist combat systems console operators in maintaining situational awareness of tactically relevant changes occurring within the ownship’s Area of Responsibility (AOR).

**Technical Challenge/Risk:** Technical risks involve developing a set of AI-based algorithms capable of identifying problematic behavior of an unknown target/track.

**Transition Program:** AEGIS Integrated Combat System BL 10 or later.

**Topic Author:** Brian Womble
PEO IWS 2.0
**Topic Number:** N201-021

**Topic Title:** Affordable Radar Antenna with Electronic Elevation Scan and Multiple Beams

**Technology Objective:** Develop a new antenna for the AN/SPS-49 radar that incorporates electronic beam steering in elevation, provides for multiple elevation beams, and incorporates the means for shaping of both transmit and receive beams to improve high elevation radar coverage while providing an affordable replacement to the existing SPS-49 radar antenna.

**Technological Challenge/Risk:** Achieving electrical performance (gain, side lobe levels) comparable to the existing SPS-49 antenna in the required size and weight and at an acceptable cost.

**Transition Program:** SPS-49 Radar Upgrade Program

**Topic Author:** Lawrence Dressman

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**Topic Number:** N201-058

**Topic Title:** Affordable and Efficient High Power Long Wavelength Infrared Quantum Cascade Lasers

**Technology Objective:** Develop and demonstrate an affordable, high power, highly efficient, quantum cascade laser technology for operation in the long wavelength infrared (LWIR) spectrum.

**Technological Challenge/Risk:** Achieving the required power across the full extent of the usable LWIR spectrum.

**Transition Program:** SEWIP Block 4b future Program of Record

**Topic Author:** Lawrence Dressman
Topic Number: N20A-T015
Topic Title: Compact and Efficient Magnetron Source for Continuous Wave Microwave Power Generation
Technology Objective: Develop and demonstrate a highly efficient and compact continuous wave S-band magnetron source with a stabilized output capable of frequency shift keying over a narrow bandwidth.
Technological Challenge/Risk: The primary risk is in achieving the required efficiency and simplicity of operation in the desired size, weight, power and cost (SWaP-C).
Transition Program: ONR program developing the fundamental technology demonstration
Topic Author: Lawrence Dressman

Topic Number: N20A-T013
Topic Title: Precision Alignment Techniques for Affordable Manufacture of Millimeter Wave Vacuum Devices
Technology Objective: Develop a high precision alignment technology for affordable manufacture of high power millimeter wave vacuum electron devices.
Technological Challenge/Risk: Achieving repeatable alignment across multiple structures with a minimum of tooling cost.
Transition Program: Multiple future S&T programs feeding future EW and countermeasures systems.
Topic Author: Lawrence Dressman
PEO IWS 5.0
**NAVSEA SBIR/STTR**
**PEO IWS**

**Topic Number:** N201-030
**Topic Title:** Automated Configuration Deployment and Auditing
**Technology Objective:** Develop an architecture that automates capabilities within Naval Control Systems (NCS) to minimize operator-associated cybersecurity vulnerabilities and streamline rapid fielding of modular capability updates.
**Technological Challenge/Risk:** Combat systems represent complex infrastructure that often must be installed and maintained using operator-intensive processes. These operator-intensive processes can result in cybersecurity vulnerability due to inadvertent operator error or risk injected vulnerability due to relaxation of security permissions when admin tasks are performed.
**Transition Program:** AN/SQQ-89 Advanced Capability Build (ACB) 23/25, as well as the Littoral Combat Ship (LCS).
**Topic Author:** Robert McNeal

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**Topic Number:** N201-043
**Topic Title:** Holistic integration of Air Anti-Submarine Warfare Capability for Effective Theater Undersea Warfare

**Technology Objective:** Develop a toolset to integrate aviation assets into Theater Undersea Warfare (TUSW) operations through data and information exchange and sharing between air platforms, ground support Command and Control (C2) nodes, and shore-based Theater USW C2 systems.

**Technological Challenge/Risk:** Incorporation of relevant acoustic and non-acoustic data from multiple disparate sources into one easily manageable tool for TUSW capability improvements.

**Transition Program:** Undersea Warfare Decision Support System (USW-DSS) Fleet Capability Release 3.

**Topic Author:** Chidambar Ganesh

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Distribution Statement A: Approved for public release; Distribution unlimited.
**Topic Number:** N201-062  
**Topic Title:** Hydrophone Incorporating Open Architecture Telemetry  
**Technology Objective:** Develop a hydrophone (Acoustic Channel Assembly (ACA)) with embedded electronics that comply with the Open Architecture Telemetry (OAT) standard to support receive arrays with increased numbers of hydrophones and telemetry channels per unit length.  
**Technological Challenge/Risk:** Increasing the sensor count will result in higher data rates for these oversampled arrays, requiring innovative approaches to accommodate the resulting increased data bandwidth. Fitting a sensing element and telemetry electronics into the required form factor will require innovative packaging and wiring solutions.  
**Transition Program:** Next Generation Towed Array System  
**Topic Author:** Michael Williams

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**Topic Number:** N201-064  
**Topic Title:** Digital Theater-level System Model for Cyber Security Analysis  
**Technology Objective:** Develop a tool to represent attributes of a complex system of combat systems to conduct theatre-level cyber security analysis quickly and easily.  
**Technological Challenge/Risk:** Physical architecture, data flows, performance requirements, and operating environments will need to be modeled in order to properly assess the true cyber security state of a fielded system of systems.  
**Transition Program:** Undersea Warfare Decision Support System (USW-DSS) Fleet Capability Release 3, as well as the Frigate program, and Networked Architecture for Undersea Theater Integrated C2 Advantage (NAUTICA)  
**Topic Author:** Meg Stout
**Topic Number:** N201-067  
**Topic Title:** Kinematic Contact Tracking Using Hybrid Features  
**Technology Objective:** Develop modular feature-aided tracking algorithms to track and correctly classify multiple targets in noisy, cluttered environments, leveraging extended feature processing and kinematic association to enhance tracking and classification techniques.  
**Technological Challenge/Risk:** Tracking techniques which rely primarily on kinematic information can perform poorly in noisy operational settings against multiple targets. Novel feature processing as well as association and tracking-classification techniques are needed to fuse kinematic and feature information.  
**Transition Program:** AN/SQQ-89 Advanced Capability Build (ACB) 23/25, as well as the Littoral Combat Ship (LCS).  
**Topic Author:** Meg Stout

**Topic Number:** N201-066  
**Topic Title:** Acoustically Transparent Mid-Frequency SONAR Projector  
**Technology Objective:** Develop an innovative acoustically transparent mid-frequency SONAR projector to add active capability to traditionally passive sensor arrays and reduce life-cycle costs  
**Technological Challenge/Risk:** Deployed SONAR projectors require large volumes to create high acoustic source levels. Emerging materials that could be acoustically transparent and effective are not fully mature.  
**Transition Program:** BCA Advanced Development Model or follow-on Engineering Development Model to test and transition to SONARs on submarines.  
**Topic Author:** Robert White
**Topic Number:** N201-049  
**Topic Title:** Towed Array Position Estimation System  
**Technology Objective:** Develop a system for determining the position of the headline of the towed array relative to some fixed point on the towing platform for incorporation into future towed arrays.  
**Technological Challenge/Risk:** Developing a means to locate the array headline without increasing complexity, detectability, or reducing reliability.  
**Transition Program:** developmental towed arrays, followed by incorporation into the TB-34A and TB-29X programs.  
**Topic Author:** Robert Cutler

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**Topic Number:** N201-050  
**Topic Title:** Real-time Insights for Combat System Integration and Testing  
**Technology Objective:** Develop an innovative rapid, iterative capability to monitor, visualize, and assess combat system interface traffic in real-time during integration and testing of combat systems to facilitate agile, modular capability improvements and to provide insight into the cause of errors related to internal interfaces between systems or modules of systems.  
**Technological Challenge/Risk:** Providing correct understanding of combat system of systems interface requirements to provide real-time understanding of the internal interface status at the time of integration in the deployed environment.  
**Transition Program:** SQQ-89 Advanced Capability Build process  
**Topic Author:** Meg Stout
**Topic Number:** N20A-T007  
**Topic Title:** Cross Platform Reinforcement and Transfer Learning for Periscope Imagery  
**Technology Objective:** Develop a suite of video processing algorithms utilizing the machine learning techniques of artificial intelligence reinforcement learning, deep learning, and transfer learning to process submarine imagery obtained by means of periscope cameras.  
**Technological Challenge/Risk:** Navy platforms produces huge amounts of data to process, and requires efficient, high performing tools to extract information that will reduce the amount of effort needed by human operators to assess the data.  
**Transition Program:** Shore-based submarine periscope training associated with Advanced Processing Build (APB).  
**Topic Author:** Alan Van Nevel

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**Topic Number:** N20A-T014  
**Topic Title:** Machine Learning for Simulation Environments  
**Technology Objective:** Develop machine learning approaches using artificial intelligence to create realistic synthetic video sequences suitable for use in training simulators for periscope operators and as training data for other machine learning exploitation tools to enable rapid approaches to capability fielding.  
**Technological Challenge/Risk:** Training is constrained by limited measured data. Machine learning approaches to imagery data synthesis are required.  
**Transition Program:** Shore-based submarine periscope training associated with Advanced Processing Build (APB) 23/25.  
**Topic Author:** Alan Van Nevel
PEO IWS 6.0
**Topic Number:** N201-065  
**Topic Title:** Element-Level Digital Communications Array  
**Technology Objective:** Develop a digital, C-Band Transmit (Tx) and Receive (Rx) array antenna that transmits and receives multiple spatially and spectrally diverse narrowband signals.  
**Technological Challenge/Risk:** Expanded mission areas and the implementation of additional data routing resulting from future warfighting capabilities places more demand on data distribution services in the form of higher data bandwidths and reduced latencies. The Navy must overcome the development of digital array technology that can operate at certain bandwidths and frequencies while in complex RF environments.  
**Transition Program:** Command & Control (C2) systems  
**Topic Author:** Onekki Montgomery

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**Topic Number:** N201-032  
**Topic Title:** High-Efficiency Wideband Linear Power Amplifier  
**Technology Objective:** Develop a high-powered Radio Frequency (RF) linear power amplifier that enables efficient, linear operation with multiple simultaneous signals across a wide instantaneous bandwidth capable of operating in an active antenna array.  
**Technological Challenge/Risk:** Current Navy directional, tactical communication networks operate in a one beam at a time fashion with each message exchange assigned separate time slots. Current state of the art amplifier designs are challenged to achieve acceptable levels of linearity performance without significant reductions in RF power, bandwidth, and power added efficiency.  
**Transition Program:** Command & Control (C2) systems  
**Topic Author:** Onekki Montgomery
NAVAIR Potential 20.1/A Topics

Topic Workshop

4 Dec 2019

Presented to: New England Business Association

Presented by: Tony Archer, Mark Beranek, Petra Branthoover
## Potential 20.1/A Topics

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<td>N20A-T003</td>
<td>Fully Automated Quantum Cascade Laser Design Aided by Machine Learning with up to 100X Design Cycle Time Reduction</td>
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<td>N20A-T005</td>
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<td>N20A-T006</td>
<td>High Efficiency Propeller for Small Unmanned X Systems (UxS)</td>
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**Topic Title:** Wireless In-Ear Sensors for Warfighter Monitoring

**Description:** As a means to monitor factors contributing to warfighter readiness, develop wireless sensors that can be integrated into commercial off-the-shelf (COTS) earplugs to enable continuous in-ear monitoring of warfighter noise exposure and physiological status.

**Sponsoring PMAs:** PMA-202
N201-006

**Topic Title:** Inclusion Detection in Steel for Bar Stock, Gears, and Bearing Components

**Description:** Accurately determine the inclusion content of steel bar stock, gear, and bearing components in finished or semi-finished states by non-destructive means i.e., without the use of traditional destructive method of cross-sectioned specimens.

**Sponsoring PMAs:** PMA-231

Source: Navy.mil
**Topic Title:** Long-Range Maritime Battle Damage Assessment

**Description:** Develop innovative radar-based imaging approaches to perform long-range battle damage assessments of ships.

**Sponsoring PMAs:** PMA-290

Source: Navy.mil
**Topic Title:** Augmented Reality and Aircraft Wiring

**Description:** Design and develop the enabling technology to allow universal tagging/marking and database architecture for aircraft wiring identification, visualization, and comparison via a hardware agnostic Augmented Reality (AR) solution.

**Sponsoring PMAs:** PMA-260, PMA-275, and PMA-276

Source: Navy.mil
**Topic Title:** Software Framework for Integrated Human Modeling

**Description:** Design and develop an open Application Programming Interface (API) and data fusion framework for the integration of current and future commercial human modeling software; and that has the ability to incorporate the output of commercial off-the-shelf (COTS) digital human modeling and medical modeling software to create a whole-body simulation of a human.

**Sponsoring PMAs:** JSF, PMA-202, PMA-276, and PMA-290

Source: Navy.mil
Topic Title: Compact Source for Focused and Tunable Narrowband Radio Frequency

Description: Develop a compact source outputting a very high power burst of energy in a narrowband and tunable frequency region, which can be carried by a rotary wing aircraft in a small pod and can be utilized for such applications as directed energy high power microwave and electronic attack tactical jamming to disturb, deny, and damage. Perform spectrum agile high-power and short-interval transmissions to advance emerging electronic attack and directed energy weapons through benefits in size, weight, and power (SWaP).

Sponsoring PMAs: PMA-263 (interest)
**Topic Title:** Minimization of Chronic Neck Pain in Military Aircrew and Vehicle Occupants

**Description:** Design and develop computational models to understand and analyze acute and chronic neck pain for combat air vehicle pilots and occupants taking into consideration the interaction between seating systems, posture, and body-borne equipment and the generation of neck pain. Included in this effort is the requirement to develop an aircrew specific neck pain scale.

**Sponsoring PMAs:** PMA-202 and PMA-276

Source: Navy.mil
Topic Title: Multi-Octave, High Power Efficiency Active Electronically Scanned Array (AESA)

Description: Develop electronically steerable radio frequency (RF) transmitters over multi-octave bandwidth yet with optimum power efficiency to achieve simultaneous multi-octave bandwidth high-efficiency performance.

Sponsoring PMAs: PMA-263 (interest)
**Topic Title:** High Power Quantum Cascade Lasers in the Spectral Range between 3.8 and 4.1 Microns

**Description:** Develop quantum cascade lasers in the 3.8-4.1 micron wavelength range with high output power and brightness.

**Sponsoring PMAs:** JSF and PMA-272
**Topic Title:** Compact Long-Wave Infrared Hyperspectral Imager with Monolithically Integrated Tunable Optical Filter

**Description:** Develop and demonstrate a battery operated ultra-compact long-wave infrared hyperspectral imager (HSI) with monolithically integrated tunable optical filter for detecting targets and threats in cluttered environments.

**Sponsoring PMAs:** JSF, PMA-263, and PMA-276
N201-015

**Topic Title:** Autonomous and Intelligent Aircraft Maintenance Technologies

**Description:** Develop autonomous Artificial Intelligence (AI)-based systems to work with or alongside aircraft maintainers to reduce manning and/or to augment the abilities of aircraft maintainers.

**Sponsoring PMAs:** PMA-202, PMA-263, & PMA-276

Source: Navy.mil
Topic Title: Mid-Wave Infrared Fiber Amplifier

Description: Develop and demonstrate a high-power mid-wave infrared (MWIR) fiber amplifier for quantum cascade lasers (QCLs) capable of output power scaling up to 1 kilowatt (kW).

Sponsoring PMAs: JSF and PMA-272
**Topic Title**: Modernization of the Laser Event Recorder

**Description**: Design an aircraft or aircrew-mounted device to detect and alert when targeted/irradiated by a laser, and record laser-strike characteristics (e.g., wavelength, power, pulse duration, etc.), as well as the global positioning system (GPS) location at the time of detection.

**Sponsoring PMAs**: PMA-202
**N201-018**

**Topic Title:** Dynamic Digital Spatial Nulling Algorithms for Tactical Data Links

**Description:** Develop and/or innovate new or current algorithms including derivatives of space-time adaptive processing (STAP), space-frequency adaptive processing (SFAP), and key elements for nulling-aware routing for application on tactical data links to improve the communication range, interconnectivity and anti-jamming resistance. Document, assess, rank, recommend and report any algorithms based on applicability, performance and integration complexity to military communications and data terminals. Pursue feasible candidate(s) for a potential transition into Multifunctional Information Distribution System Joint Tactical Radio System (MIDS JTRS) terminals during Phase II prototyping efforts.

**Sponsoring PMAs:** PMA-231, PMA-263, and PMA-265

Source: Navy.mil
**Topic Title:** Spatial Data Comparison for Markerless Augmented Reality (AR) Anchoring

**Description:** Develop a software solution to localize an augmented reality (AR) headset user within a space by making a comparison between spatial mapping data collected live from the headset and scanned/modeled data collected at an earlier time and stored on the device. The proposed solution should work with an existing, commercially available AR headset.

**Sponsoring PMAs:** PMA-251, PMA-257, and PMA-260
**Topic Title:** Development of Agile Laser Eye Protection (LEP)

**Description:** Design and develop “agile” laser eye protective filters that operate independent of the incident wavelength in real time. Additionally, optical transition technologies, such as photochromic or electrochromic sun protection, may be developed.

**Sponsoring PMAs:** PMA-202
**Topic Title:** Cargo Handling Software for Navy and Marine Aircraft

**Description:** Develop innovative software to assist aircrew in loadmaster duties and generate cargo configurations to achieve sufficient cargo restraint for Navy and United States Marine Corps (USMC) aircraft using handheld devices.

**Sponsoring PMAs:** PMA-261
**N201-022**

**Topic Title:** Big Data Mining for Maritime Situational Awareness

**Description:** Develop innovative techniques to mine big data sources for information to use as reference knowledge by Situational Awareness (SA) applications for improving Maritime Situational Awareness (MSA).

**Sponsoring PMAs:** PMA-263 and PMA-264
**Topic Title:** Alternate Sled Track Braking Mechanism

**Description:** Develop a replacement sled braking mechanism for Supersonic Naval Ordnance Research Tracking (SNORT) that requires less setup time, and does not have the associated regulatory compliance and recurring cost issues as the existing SNORT water brake system.

**Sponsoring PMAs:** PMA-280
**N201-024**

**Topic Title:** Augmented Reality Headset for Maintainers

**Description:** Design and develop an augmented/mixed reality headset device able to integrate with current Navy Information Assurance (IA) infrastructure and can be usable at the Organizational (O-), Intermediate (I-), and Depot (D-) levels of maintenance aviation activities for the Navy and Marine Corps.

**Sponsoring PMAs:** PMA-251 and PMA-260

Source: Navy.mil
**Topic Title:** Machine Learning Tools to Optimize Metal Additive Manufacturing Process Parameters to Enhance Fatigue Performance of Aircraft Components

**Description:** Develop an advanced machine learning (ML) tool capable of optimizing process parameters for metal laser powder-based additively manufactured components to achieve enhanced fatigue performance for aircraft components.

**Sponsoring PMAs:** JSF

Source: Navy.mil
Topic Title: Fully Automated Quantum Cascade Laser Design Aided by Machine Learning with up to 100X Design Cycle Time Reduction

Description: Develop a fully automated Quantum Cascade Laser (QCL) design process by using neural networks and machine learning (ML) algorithms that will result in up to 100 times reduction in design cycle time compared to the conventional “manual” QCL design process.

Sponsor: PEO (A)
**Topic Title:** Hexahedral Dominant Auto-Mesh Generator

**Description:** Develop an automated interactive mesh generator using predominately Hexahedral Finite Elements to support finite element analysis of naval aviation structural components and weapons systems.

**Sponsor:** NAVAIR
Topic Title: Quantum Optical Semiconductor Chip and its Application to Quantum Communication

Description: Develop a quantum optical semiconductor chip and demonstrate its application to efficient photonic entanglement, efficient logic gates such as Hadamard and CNOT, and quantum communication protocols through fiber optical channels.

Sponsoring PMAs: JSF

Source: Navy.mil
**Topic Title**: High Efficiency Propeller for Small Unmanned X Systems (UxS)

**Description**: Develop a radically new lightweight polymer or ceramic composite propeller for use in small unmanned X systems (UxS).

**Sponsor**: PEO (A)
Questions?
Backup Slides
NAVAIR Products

Fixed Wing

Rotorcraft

Weapons

Unmanned Air Systems

Aviation Systems
PEO(T) Programs

- **PMW/A-101**
  Multifunctional Information Distribution System

- **PMA-231**
  E-2 / C-2

- **PMA-234**
  Airborne Electronic Attack Systems & EA-6B Prowler

- **PMA-251**
  Aircraft Launch and Recovery Equipment

- **PMA-257**
  AV-8B Harrier

- **PMA-259**
  Air-to-Air Missile Systems

- **PMA-272**
  Advanced Tactical Aircraft Protection Systems

- **PMA-265**
  F/A-18 / EA-18G

- **PMA-298**
  Air Warfare Mission Area

- **PMA-213**
  Naval Air Traffic Management Systems

- **PMA-273**
  Naval Undergraduate Flight Training Systems
PEO(U&W) Programs

- PMA-281 Strike Planning and Execution Systems
- PMA-201 Precision Strike Weapons
- PMA-263 Small Tactical UAS
- PMA-208 Navy Aerial Targets and Decoys
- PMA-262 Persistent Maritime UAS
- PMA-242 Direct and Time Sensitive Strike
- PMA-266 Multi-Mission Tactical UAS
- PMA-268 Unmanned Carrier Aviation
- PMA-280 Tomahawk Weapons System
NAVAIR Programs

**PMA-260**
Aviation Support Equipment

**PMA-226**
Specialized and Proven Aircraft

**PMA-209**
Air Combat Electronics

**PMA-205**
Aviation Training Systems

**PMA-202**
Aircrew Systems

**PMW/A-170**
Communication and GPS Navigation
**Mission**

The Joint Strike Fighter (JSF) Program is the Department of Defense's focal point for defining affordable next generation strike aircraft weapon systems for the Navy, Air Force, Marines, and our allies. The focus of the program is affordability -- reducing the development cost, production cost, and cost of ownership of the JSF family of aircraft.

| Survivable Against World’s Most Sophisticated Threats Now and in the Future |
| Critical to US and Allied Air Dominance for the Next 50 Years |