NAVAIR SBIR / STTR PROGRAM

Dec 11 2024

Presented To:

25.1/A Topic Launch

Presented By:

Kristi DePriest
NAVAIR SBIR / STTR
Program Manager

What is the NAVAIR SBIR/STTR Program?

- **SBIR** = **S**mall **B**usiness **I**nnovation **R**esearch
- **STTR** = **S**mall **B**usiness **T**echnology **T**ransfe**R**
  - Small business must partner with a research institution
    - A university
    - A nonprofit institution
    - A contractor operated federally funded research and development center
- Highly competitive programs
- Three phased award system
- Primary vehicle through which DoD funds small companies to perform innovative Research (R) and Research & Development (R&D) projects.

Equipping tomorrow's fleet with the technological advantage today

Small Business Proposer Eligibility

- What qualifies as a small business…
  - Less than 500 employees
  - Independently owned and operated
  - Organized for profit
  - Principal place of business must be in the USA
- **SBIR:** Small business must perform a minimum of 66% research and/or analytical work in Phase I and 50% research and/or analytical work in Phase II.
- **STTR:** Small Business must perform minimum of 40% of research and/or analytical work and non-profit research institute must perform a minimum of 30%.
- Primary employment of Principal Investigator (PI) must be with small business (i.e. more than ½ of his time is with small business).
- All Research & Development (R&D) work must be performed in U.S.

Three-Phase Program

- **Phase I – Feasibility**
  - Establish the technical merit, feasibility, and commercial potential of the proposed R/R&D efforts
  - Determine the quality of performance of the small business awardee prior to providing further Federal support in Phase II
- **Phase II – Development**
  - Continue the R/R&D efforts initiated in Phase I
  - Funding based on the results achieved in Phase I and the scientific and technical merit and commercial potential of the project proposed in Phase II
- **Phase III – Commercialization**
  - The process of developing and delivering products, processes, technologies, or services for sale to or use by the Federal Government or commercial markets.
  - Ability to pursue research, research and development, services, products, production, or any combination thereof

Program Starts with a Topic

- **Focused**
  - Identifies a specific problem for which a solution is sought
  - Basic and applied research

Avg ~15 proposals per topic

- **Open**
  - Generalized mission requirements or specific technology areas
  - Adapt commercial products or solutions to close capability gaps, improve performance, or provide technological advancements in existing capabilities
  - May be broad or focus on a specific technology area/mission priority

Avg ~135 proposals per topic

- **Direct to Phase II**
  - Seeks a solution with a higher technology readiness level
  - Awardee must not have received a Phase I award for research and development for the same project

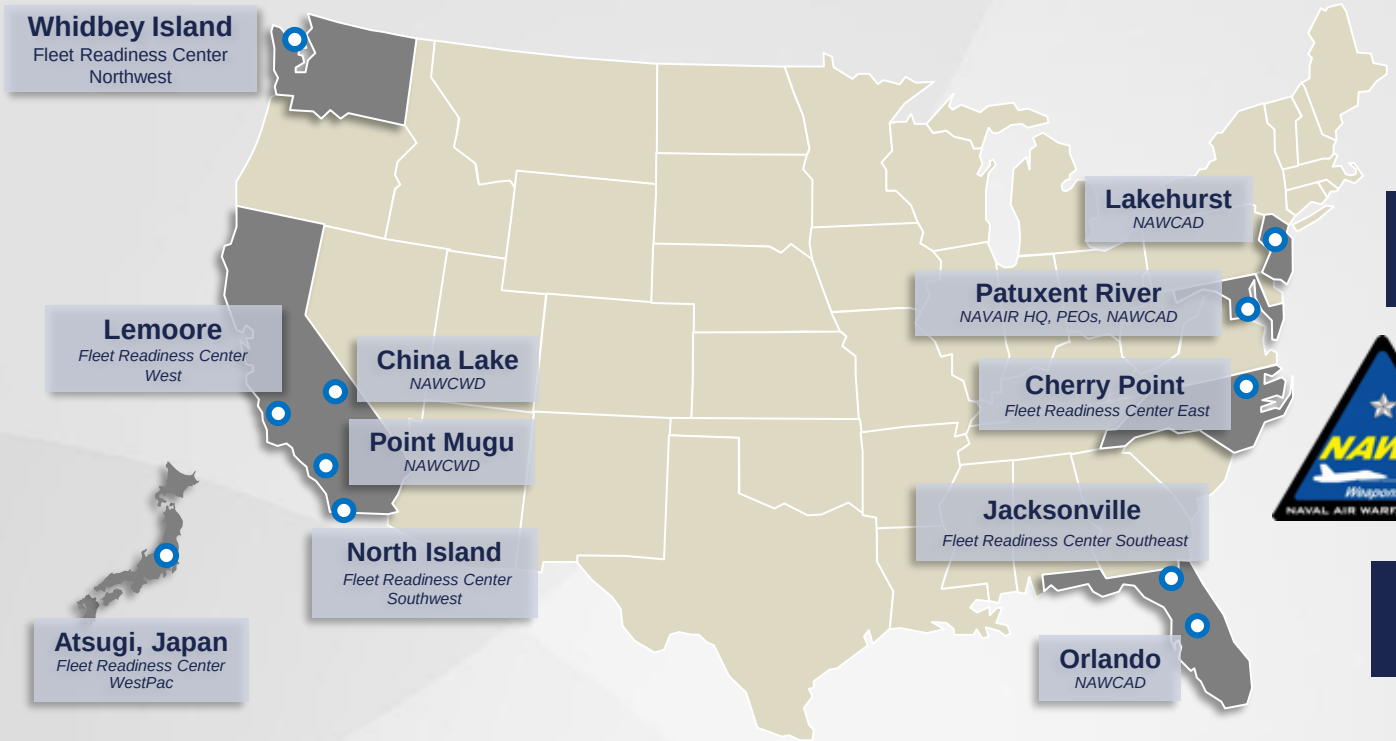
Avg ~7 proposals per topic

5

NAVAIR Snapshot

Full Life-Cycle Management

Requests, Risks from Fleet, OPNAV	Materiel Solution Analysis	Technology Maturation & Risk Reduction	Engineering & Manufacturing Development	Production & Deployment	Operations & Support



NAWCAD
East Coast Hub

NAWCWD
West Coast Hub

COMFRC
Fleet Readiness Centers

All NAVAIR SBIR/ STTR Topics are aligned to acquisition, sustainment and modernization programs with a customer sponsor and defined transition end-state

Products

Tactical Aircraft

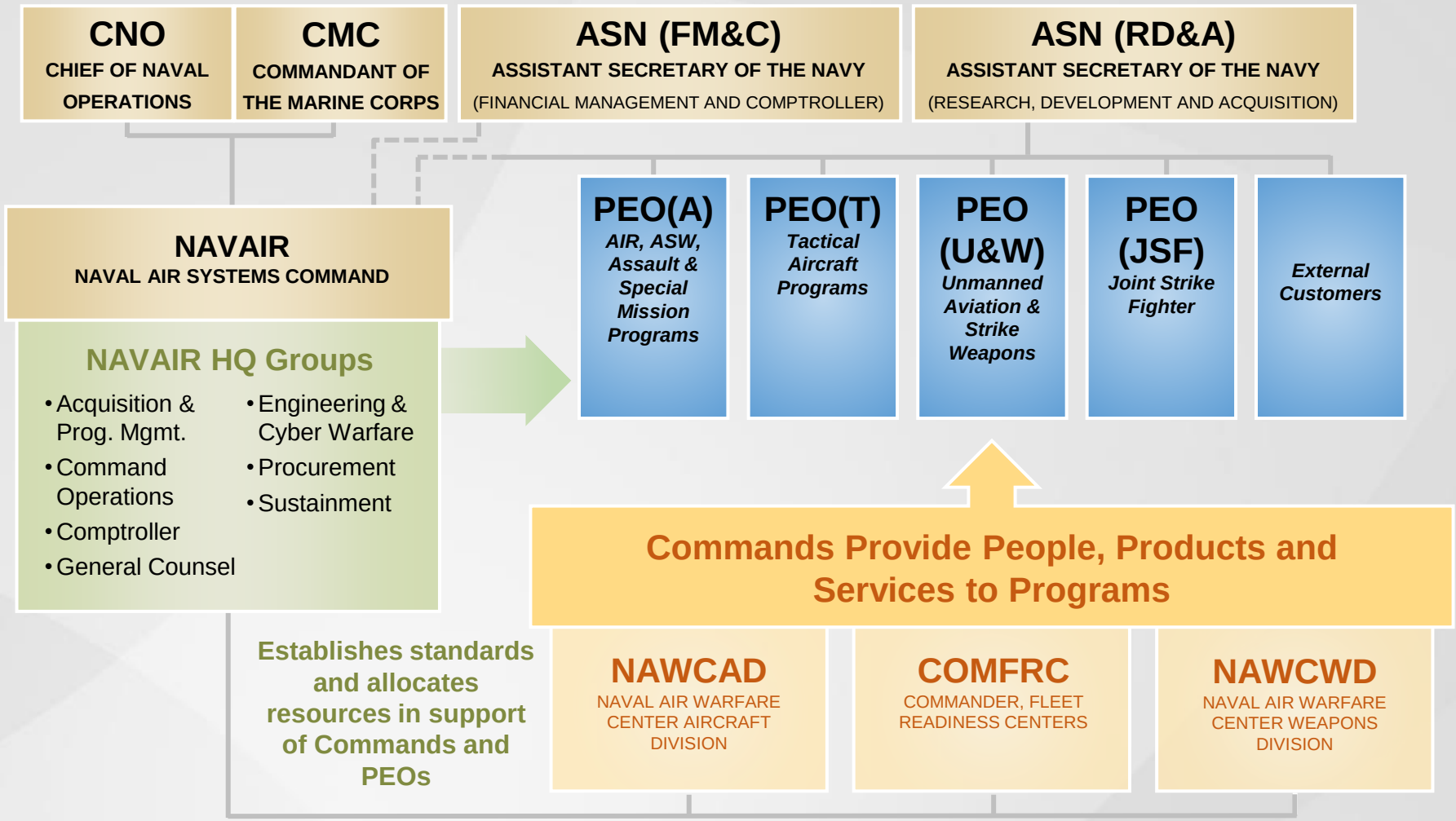
Air ASW, Assault & Special Mission

Unmanned Aircraft & Strike Weapons

Common Systems, Mission Systems, Training, ALRE

PEOs

Operating Construct



The SBIR/STTR Program (How it Works)

Develop SBIR/ STTR topics to solicit innovative Research & Development (R&D) solutions to meet defense needs

Agencies release topics via a Broad Agency Announcement (BAA), typically two-three times per year

The BAA details the process for small businesses to submit proposals to the topics published in the BAA

Proposal Evaluation Criteria

- **Technical Merit**
- **Degree of Innovation**
- **Qualification**
- **Future Market Potential**

Phase I
Concept Phase

Determine feasibility and scientific or technical merit of proposed solution

Competitive down-select

Phase II
Prototype Development

Perform R&D work, demonstrate innovative process or prototype for Naval Aviation

Internal Nomination

Catapult Phase II
Technology Maturity Acceleration

Facilitate transitions for SBIR technologies that meet PMA requirements and NAVAIR high priority needs through shared SBIR/ PMO investment & risk mitigation

Phase III
Innovation Transitions

Finalize development and transition of an SBIR/ STTR effort into hardware or software products, processes, or services using non-SBIR funding.

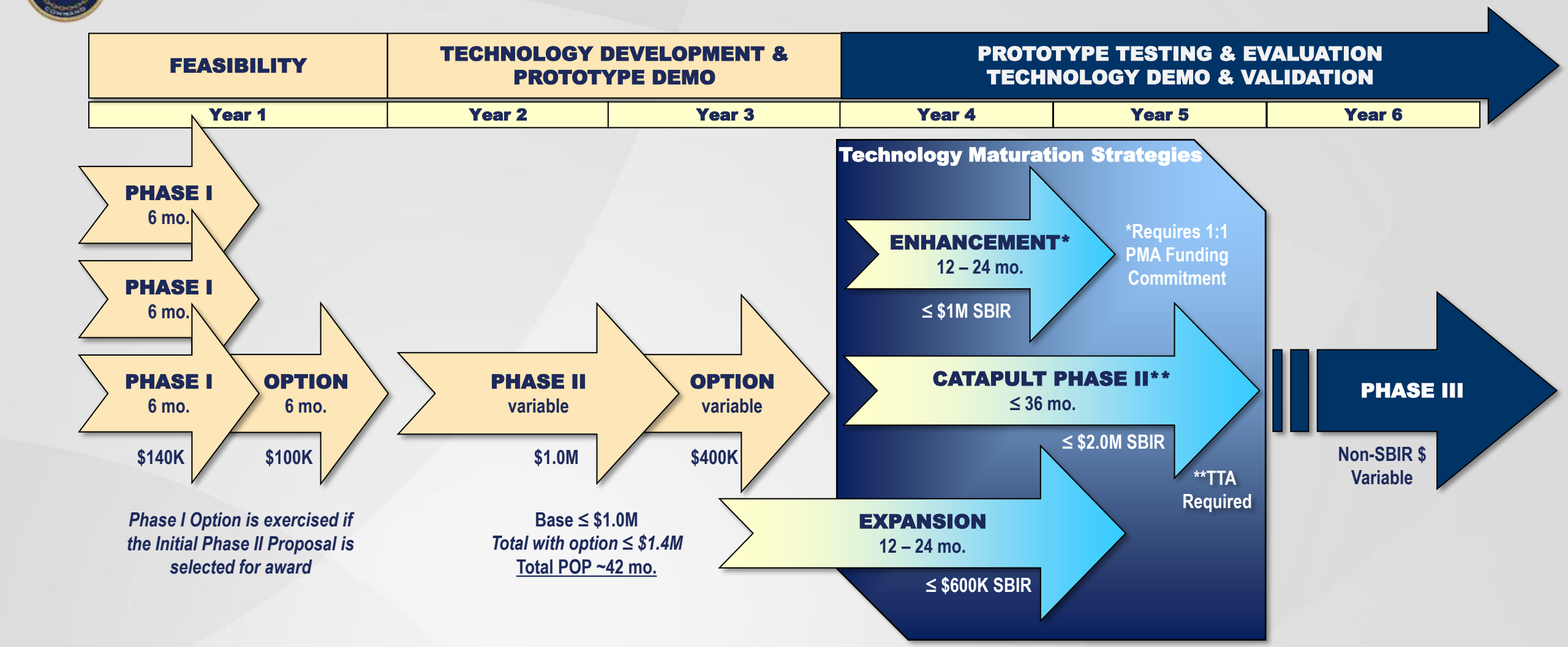
Phase III brings:

- Right to directed award (like sole-source contracts)
- Exemption from SBA size standards for a procurement
- No limits on the dollar size of a Phase III procurement

Phase I/ II/ Catapult funding provided by SBIR/ STTR Program

Phase III funding provided by government customer

NAVAIR SBIR/ STTR Award Structure



SBIR FUNDS*	NTE $240K	NTE $2M	NTE $2M	ANY
CONTRACT	FFP	CPFF	CPFF	
TYPICAL TRL	~ 1-3	~ 2-5	~ 4-7	~ 6-9

NAVAIR Catapult

NAVAIR Catapult leverages prior SBIR investment to accelerate technology development to meet Naval priorities with a 2nd Phase II award.

- Leverages prior Naval and cross-Agency investment
- Identifies priority SBIR technologies that meet PMA requirements & provides additional SBIR funding for technology maturation
- Accelerates SBIR technology incorporation & transition into naval weapons systems & Programs of Record through SBIR / PMO coordination, transition planning documentation, and risk mitigation
- Catapult moves at the speed of the Naval customer! The Naval customer drives the process and projects are selected based on priority of Naval need, availability of SBIR funding, and potential of additional non-SBIR funding

Projects selected for Catapult investment are selected through an *internal* evaluation process by the PEOs/PMAs - There is no application

Demonstration & Experimentation

NAVAIR SBIR/ STTR program management office will assist with coordinating activities, government expertise, venues, access and other support to identify and facilitate opportunities for demonstration and experimentation, test and evaluation of SBIR/ STTR technologies.

Demonstration (Lower TRL)

- Assessing technologies in a laboratory, range or on an aircraft during a ground test event.
- Evaluate a technology's maturity in a relevant environment and capture stakeholder feedback on the merit, feasibility and commercial potential of technologies prior to acquisition testing and evaluation.

Experimentation (Mid to High TRL)

- Coordinating industry technologies into mission-relevant environments across the DON for experimentation and testing, including fleet exercises and other warfare center events.
- Opportunities for industry partners to access to Department of Navy Modeling and Simulation Naval Integrated Live Virtual Constructive Environment events, program office and SBIR/STTR opportunities.

Eligibility: NAVAIR Phase II and Catapult SBIR/ STTR projects that reach an appropriate level of maturity.

Phase III

Phase III is the ultimate goal of the SBIR/STTR Program

Phase III tasking should derive from, extend or conclude technology developed during Phase I or II. Examples of tasking that can be included are further development, testing, V&V, transition integration, etc.

- Only non-SBIR funding may be put on a Phase III
- Sole source award: Competition was satisfied in the Phase I and/or II
- SBA size standards do not apply. Large businesses who have acquired an SBIR business or SBIR developed technology may receive a Phase III based upon novated technology
- Contract types: C-Type or Basic Ordering Agreement (BOA) with Delivery Orders
- 5 Year POP with unlimited ceiling

NAVAIR has a dedicated Phase III team within the NAVAIR SBIR PMO and dedicated Phase III Contracting Specialists.

Phase III Contracts

The **"C-Type" contract** is a single-action or completion contract with a set period of performance and full funding based on a set of tasks.

The **Basic Ordering Agreement (BOA)** is a written instrument of understanding that contains terms and clauses applying to future contracts (delivery orders) between the parties during its term. It is a description, as specific as practicable, of supplies or services to be provided; methods for pricing, issuing and delivering future orders under the BOA. ***NOTE:*** *A BOA is not a contract.*

- A BOA may be used to expedite contracting for uncertain requirements for supplies or services when a substantial number of purchases are anticipated
- Advantages of BOAs include:
  - Allows for multiple customers – from NAVAIR or other agencies – to transition technology developed by a single firm regardless of who initiated the technology development
  - Specific tasking and funding is identified on Deliver Order (DO) Contracts that may be five years in length with no maximum contract value

Upcoming SBIR/STTR BAAs

- 25.1/A DoD SBIR/STTR BAAs
  - Pre-release: 04 Dec 2024
  - BAA opens: 08 Jan 2025
  - BAA close (proposals due): 05 Feb 2025

- 25.2/B DoD SBIR/STTR BAAs
  - Pre-release: 02 Apr 2025
  - BAA opens: 23 Apr 2025
  - BAA close (proposals due): 21 May 2025

- 25.4 DoD SBIR BAA for Navy Open Topic
  - Pre-release: TBD, likely Summer 2025
  - BAA opens: TBD, likely Summer 2025
  - BAA close (proposals due): TBD, likely Fall 2025

- Submit proposals via the Defense SBIR/STTR Innovation Portal (DSIP) at: https://www.dodsbirsttr.mil

DSIP Defense SBIR/STTR Innovation Portal
Proposal Submissions

NAVAIR Research Areas of Interest

Enabling technologies:

- Improved materials and manufacturing processes
- Technologies to reduce dependence on global positioning systems
- Advanced electronics with reduced size, weight and power requirements and expanded capabilities in high-temperature environments
- Artificial intelligence, machine learning, autonomy, human systems interface, network and sensor technologies to enable manned and unmanned systems to operate as an effective hybrid team
- Quantum sensors, computers and networks

Technologies to improve readiness and sustainment:

- Next-generation repair technologies for metals and composites (i.e., particle deposition/cold spray)
- Advanced manufacturing technology and 3D technical data
- Corrosion prevention, prediction, detection and removal technology
- Physiological episode protection and aeromedical/man-machine interface challenges
- New fuel bladder materials and advanced manufacturing processes
- Improved maintenance capabilities
- Next-generation metrology
- Improved supply chain management through data analytics
- Prognostics and health management enabled by machine learning and artificial intelligence
- Distance support/remote training of fleet maintainers and operators
- Technologies to automate current and future flight deck operations, increasing deck efficiencies and aircraft readiness in all weather conditions to enable round-the-clock operations

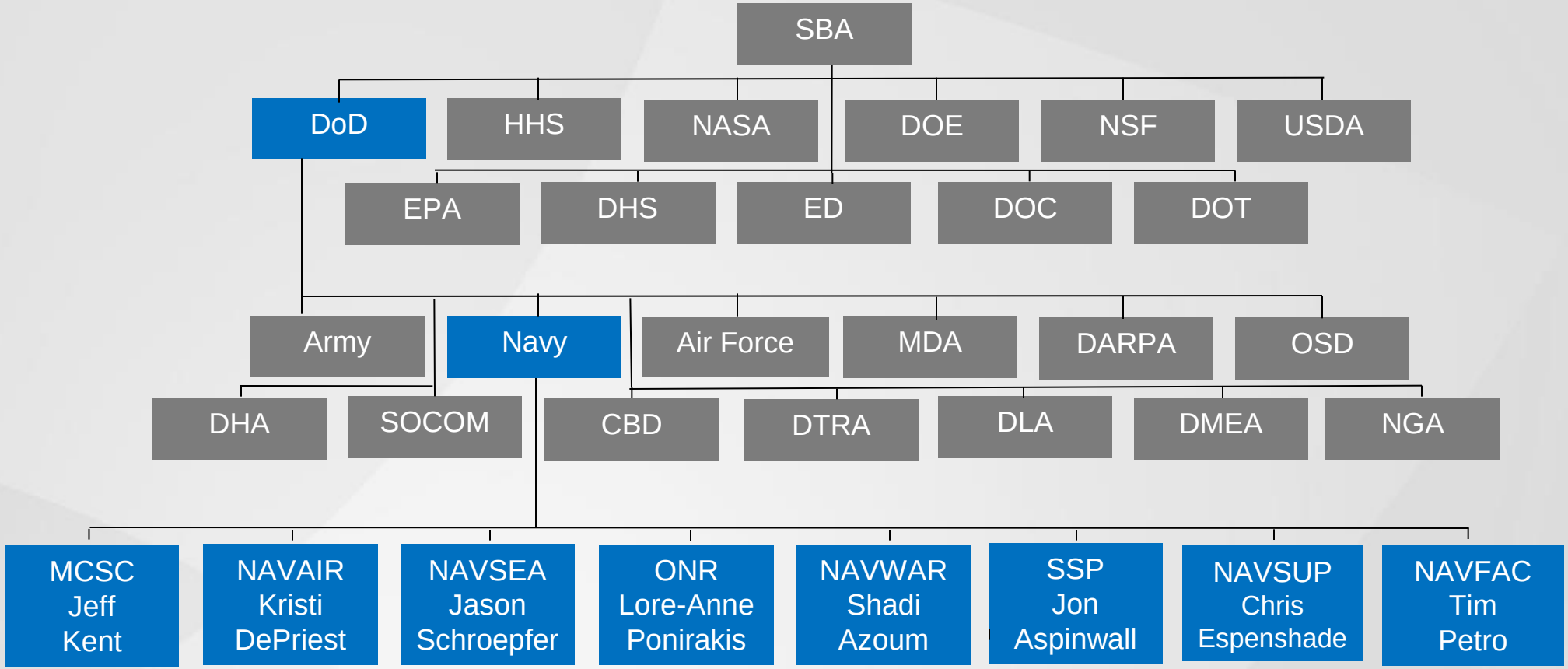
Technologies to improve warfighter performance:

- Training and education instructional technologies and strategies that support the requirements of forward-deployed warfighters and training environments
- Human performance modeling, assessment and ergonomic design
- Human system design to reduce manned and unmanned operator workload, enhance decision-making and improve situational awareness
- Life-support technologies and personal protective equipment spanning from physiological state monitoring, to hearing/eye protection, to helmet-mounted displays, to crashworthy seating systems that optimize warfighters' physical and cognitive performance, effectiveness, safety and survival

Technologies to improve warfighting capability:

- Technologies to improved shared battlespace awareness
- Fully networked command, control and communications
- Flight controls, handling qualities, propulsion, materials and aerodynamic technologies to improve maneuverability and agility
- Improved transport and employment of personnel, internal and external cargo, weapons and sensors
- Technologies to increase range, speed and endurance of naval aircraft and weapons
- Technologies to protect all manned and unmanned aircraft, including passive and active susceptibility reduction, aircraft countermeasures, electronic protection and increased crashworthiness
- Technologies to project aeronautical-based lethal and directed energy effects against air, surface, surfaced submarine and land targets in any operational theater
- Dynamic mission planning and execution technologies
- Networked and collaborative electronic attack technologies
- Hypersonic technology, including thermal management, lightweight/resilient materials, sensors/subsystems, flight separation and propulsion systems

Federal SBIR/STTR Programs – SBIR.gov



$4B in Opportunities Across Granting and Contracting Agencies

Phase II Transition Support – Unique to Navy

SBIR/STTR Transition Program (STP) *25 years strong!*

- Annual 11-month Navy-funded Program for Phase II awardees
- Services to assist with transition of technologies through business mentoring, education, and networking
- Information at *NavySBIR.com/programs/navystp*

DON SBIR/STTR Experimentation Cell (DON-SEC)

- Connects SBIR innovators with the DON experimentation community to test innovative solutions
- Full spectrum of end-to-end facilitation, mentoring, and training in all aspects of experimentation
- Information at *NavySBIR.com/SEC*

Support to firms to deliver solutions at scale

Phase II Transition Support – Unique to Navy

NAVY Launch

- Annual 10-month program to Educate + Accelerate + Scale beyond traditional defense markets; entrepreneur-first startup strategies
- Prioritize markets, explore private funding, discover customers, and engage for new growth
- Information at *NavySBIR.com/programs/navylaunch*

Private Capital Education ***New!***

- Deeper understanding of private capital and the strategies and knowledge needed to leverage private capital effectively
- Bootcamp in a 3-part series, delivered in a hybrid format
- Virtual office hours to answers questions and engage further
- Information at *NavySBIR.com/programs/private_capital*

Support to firms to deliver solutions at scale

SBIR / STTR Program Resources

- SBA tutorials available on *SBIR.gov*
  - Program basics
  - Agency introductions
  - How to find topics
  - How to prepare a responsive proposal
  - SBIR data rights and International Traffic in Arms (ITAR)

- DON SBIR program information available on *navysbir.com*
  - BAA schedules and links
  - Navy SBIR announcements
  - Event calendars
  - Navy SYSCOM POCs
  - Phase III Guidebook

SBIR Program Legislation and Guidance

- Small Business Innovation Development Act of 1982, Public Law 97-219
- The SBA has the statutory obligation to provide guidance to the participating Federal Agencies for the general operation of the SBIR and STTR programs
  - This guidance is referred to as the Policy Directive, or PD. It is prepared by SBA.
  - Federal Agencies participating in the SBIR and STTR programs are obligated to follow the guidance provided in the Policy Directive.
  - Each Agency is required to review its rules, policies, and guidance to ensure consistency with the relevant Policy Directive and make any necessary changes in accordance with each Agency's normal procedures.

- Most recent Policy Directive revisions for both the SBIR and STTR programs were effective 01 Oct 2020.
- SECNAVINST 4380.9 (23 Jul 2018) defines governance of the Department of Navy's (DON) OSBP, SBIR, and STTR.
- The SBIR & STTR Extension Act of 2022 reauthorized the program through 30 September 2025.

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https://www.navair.navy.mil/SBIR-STTRAboutUs

NAVAIR SBIR/ STTR Programs Website:

- Resources/ Links/ FAQs
- NAVAIR PEO needs videos
- Public release process

QUESTIONS?

NAVAIR SBIR/ STTR Program Manager
Kristi DePriest
navair-sbir@us.navy.mil

25.1/ A Topic Launch

11 December 2024

N251-006

Matthew Marko

Topic Title: Diagnostics, Prognostics, and Health Management for Non-Steady State, Rapid Acceleration/Deceleration, High-Load Bearings

Endorsing PEO/PMA: PMA-251, Aircraft Launch and Recovery Equipment Program

Objective: Develop and demonstrate an empirically developed system for failure risk prediction, diagnostics, prognostics, and health management of rapid acceleration/deceleration, high-load bearings to increase operational availability (Ao) of carrier-based recovery systems.

- When selecting a roller bearing, it is necessary to determine the bearing's "L10" life, defined as the number of revolutions (sometimes listed as a time at a constant speed) before there is a 10% chance of bearing failure.
  - Based off of old empirical data, collected for bearings operating at constant speed.
  - Aircraft arrestment involve rapid acceleration and deceleration of roller bearings.
- The Navy seeks a solution to set up an apparatus to subject roller bearings under a high load, cyclically ramp up the bearings from stationary to a high speed, and then rapidly decelerate the bearings to stationary in under 5 seconds.
- The Navy is seeking an empirically derived solution to predict the risk of a bearing failure and to track the bearing health over time.

N251-007

Ric Rey Vergara, presented by Todd Morehouse

Source: Navy.mil

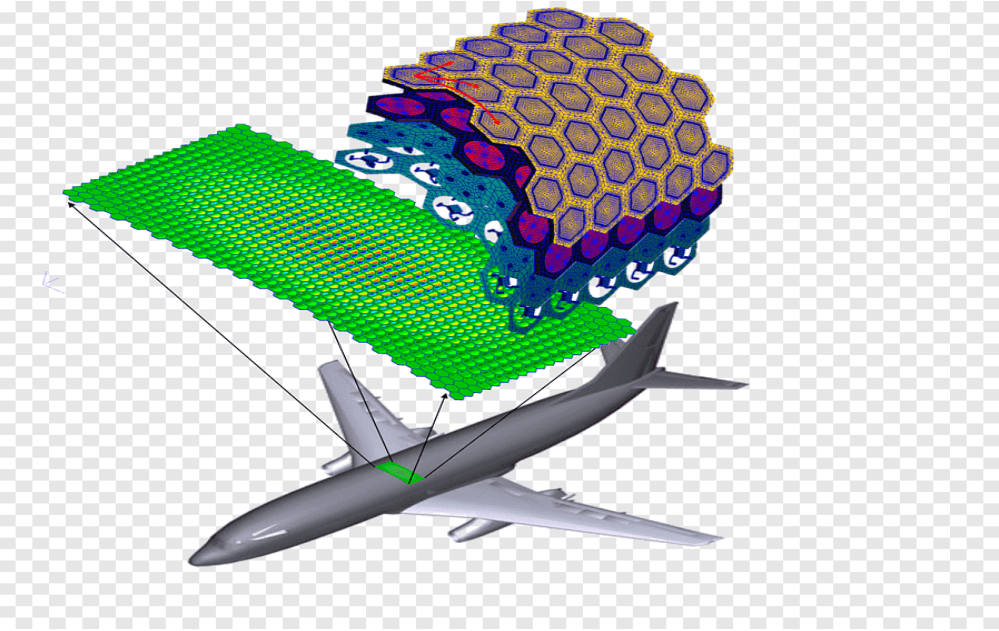
Topic Title: Alternative Wireless Technologies for the Aircraft Carrier Flight Deck

Endorsing PEO/PMA: PMA-251 Aircraft Launch and Recovery Equipment

Objective: Develop a wireless communication method that functions inside shipboard radio frequency limited environments to accommodate data links between mobile devices and computer systems.

- The aircraft carrier flight deck is not only a physically hazardous environment, but a highly contested electromagnetic environment. Allowing wireless communication between computers and mobile devices on a flight deck is a challenging problem.
- A solution is needed to establish a wireless communication network on a flight deck that can operate in harsh electromagnetic environments and function during radio frequency limited conditions.

N251- 010



Topic title: Enterprise Enabler:
Conformal Antennas for Unmanned
Aerial Vehicles (UAV)

Endorsing PMA: PMA101

Objective : Develop Additive Manufacturing techniques to enable conformal antennas that also serve as the structural skin of pods, UAV and fixed wing drones

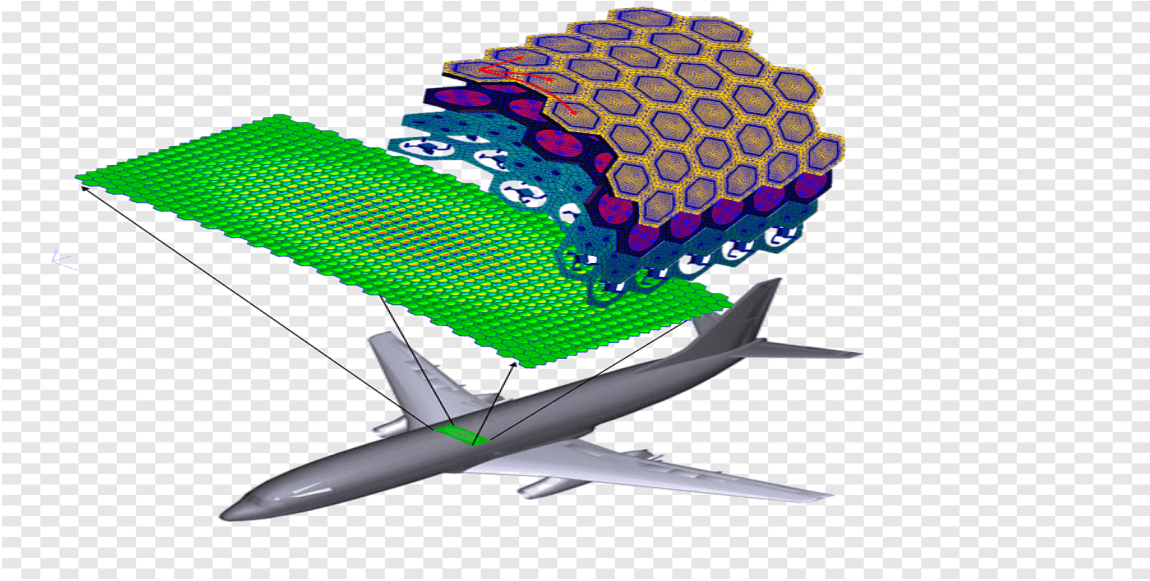
Specific requests:
Ultra-wideband reconfiguration (>4:1) via multiple, switched feed points, Fins for air flow reasons, not antenna elements. Recommend use CNT doped polymers, compare standard additive conductive elements and slot antennas, single vs multilayer construction

Phase 1: 6-24 GHz 90 degree FOV 10 inch diameter cylinder 5 feet long plus 2 sets of wings.
Simulate whole & prove could manufacture radiators
Phase 2: Specific functionality, 2 iterations of prototype in base and option, possibly classified
Flight test in option

N251- 010

PMW101 Enterprise Enablers

Dr. Deborah Van Vechten



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Flight test in option

N251-013

Katrina Colucci-Chang

Source: SWITLIK, AEROSTAR

Topic: Passive Cooling/Heating System for Thermal Regulation in Clothing

Endorsing PEO/PMA: PMA-202

Objective: Solution to passively regulate body temperature while wearing an exposure suit.

- Aircrew wear exposure suits when flying over water at 60°F (15.6°C) or when outside temperature is 32°F (0°C) after wind-chill.
- Increases in body temperature during flight and decreases in temperature during in water survival can impact strength, endurance, cognitive function, and mission effectiveness.
- Missions are becoming longer due to mid-air refueling and rescue survival time being extended from 3 to 7 or 10 days.
- Seeking novel solutions to improve personal thermal management in flight and maintain or improve in water thermal protection from hypothermia.
- Seeking novel solution that can be added to the existing aircrew life support system (ALSS) while wearing an exposure suit.

N251-015

Clifton Bumgardner

Source: Navy.mil

Source: DefenseNews.com

Topic Title: Predictive Lifing Tool for Coupled Corrosion, Pitting, and Fatigue Degradation

Endorsing PEO/PMA: NAVAIR Enterprise / Multi-platform benefit.

Objective: Develop and demonstrate predictive modeling and lifing capability for coupled corrosion, pitting, fracture, and fatigue mechanisms of naval aero-engine propulsion materials.

- In naval aviation, the warfighter must operate in maritime atmospheric environments with exposure to corrosive environments; this exposure is further complicated by elevated temperatures within propulsion systems.
- Component lifing analyses are necessary to uphold system safety and reliability in these operational environments and to inform inspection, maintenance, and removal intervals.
- Conventional component lifing evaluates fatigue performance based on Weibull analyses of usage and failure points and requires empirical data from known materials and environments.
- Predictive lifing capabilities are needed in the absence or lack of sufficient empirical data, for new operational environments, or use of new propulsion material systems.
    - Integrate a material model to capture the environment-dependent corrosion degradation (i.e., pitting).

N251-016

Ángel Ruiz-Reyes

Source: Defense-update.com

Topic Title: Expendable Sonobuoy-Launched Unmanned Aerial Vehicle for ASW Cued Search, Detection, Tracking, and Classification.

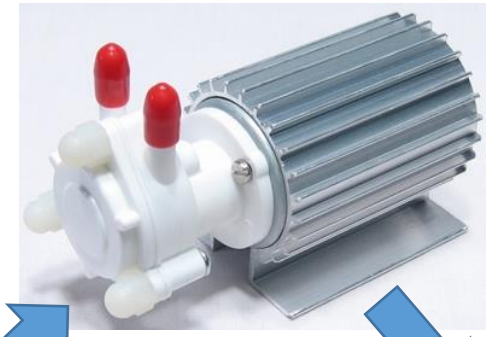
Endorsing PEO/PMA: Primary - PMA299 (ASW) H-60 Helicopter Program. Additional - PMA290 Maritime Surveillance Aircraft

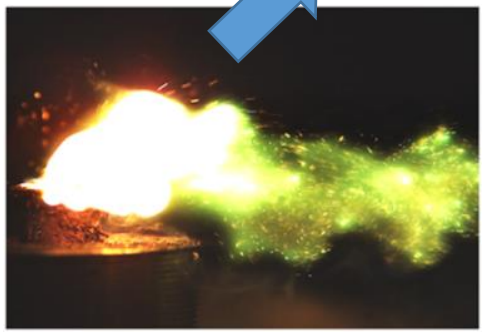
Objective: Develop an expendable Tier 1 Sonobuoy Launched Unmanned Aerial Vehicle (SL UAV) that can be launched from a P-8A's sonobuoy launcher system from high altitude, with a sensitive magnetometer, and capable of deploying an in-water passive acoustic sensor(s) for Anti Submarine Warfare (ASW) target cued search, detection, localization, tracking, and classification.

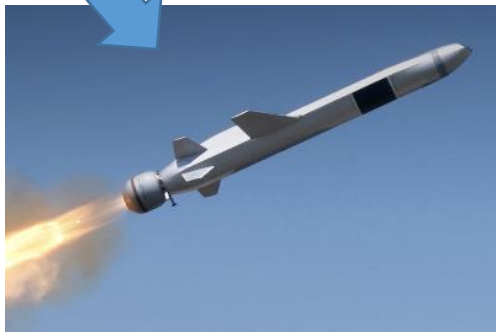
- Existing limitations on detection, localization and classification of underwater targets using airborne sensors on both manned and unmanned aircraft.
- The Navy requires of tools and techniques that allows for airborne underwater detection on contested scenarios and conditions.
- Creation of an A-size SL UAVs swarm system featuring multi-sensor capabilities together with sophisticated processing techniques which rely on data fusion and Artificial Intelligence.

N251-018

John Ellis







Topic Title: Compact Electric Fuel Pump for Extreme Viscosity Fuels and Slurries

Endorsing PEO/PMA: PMA-201 (Primary)/PMA-242

Objective: Design and demonstrate an electric metering fuel pump capable of pumping highly vicious liquid and slurry fuels of appropriate size, weight, and power for a weapon platform.

- Mission critical need for increased range across the Services
- Fuels with higher energy densities (RJ-5, slurries) are often much more vicious than standard jet fuel
- This pump would enable the use of the more vicious fuels would offer new platforms increased range potential over current fuels

N251-022

Claresta Dennis

Technical Approach/Deliverables

Topic Title: High Energy Density Synthetic Fuel Development

Endorsing PEO/PMA: PMA-201 (Primary)/PMA-242

Objective: Synthesize a novel liquid hydrocarbon fuel or generate a synthetic fuel blend with a higher volumetric energy density than JP-10 which maintains a flashpoint above 60°C and viscosity below 200cSt at -40°C.

- Mission critical need for increased range across the Services
- High energy density fuel will improve the range of current and future air-breathing propulsion systems
- Technology has the potential to benefit all JP-10 fueled systems operated by the DoD
- Synthetic fuels provide improved quality control and specification tolerance as opposed to conventional fossil fuels

N25A-T001

Joshua Butler

Source: USAF/DARPA HAWC, www.airforce-technology.com

Topic Title: High-Fidelity Computational Modeling of Fluid-Thermal-Structural Interactions in Hypersonic Air-Breathing Systems

Endorsing PEO/PMA: PMA-201 Precision Strike Weapons

Objective: Develop robust, accurate, and efficient computational methods for predicting the coupled fluid-thermal-structural response of an air-breathing hypersonic system at moderate hypersonic speeds.

- In the hypersonic environment, the performance and effectiveness of air-breathing systems are significantly impacted by multiphysics coupling between the aerodynamic environment and thermo-structural response of the vehicle, particularly through the propulsion flowpath.
- If multiphysics interactions are not properly captured and accounted for during the design phase, the resulting hypersonic system may have reduced mission performance (e.g., range, time-on-target) and/or operability (e.g., system failure due to unstart).
- Improvements in high-fidelity modeling and simulation of the fluid-thermal-structural response of a hypersonic vehicle are desired to improve system robustness, predict system capability, and assess mission effectiveness.
- This effort will develop and implement robust multiphysics coupling methodologies to simulate the coupled fluid-thermal-structural response of a body at moderate hypersonic speeds.