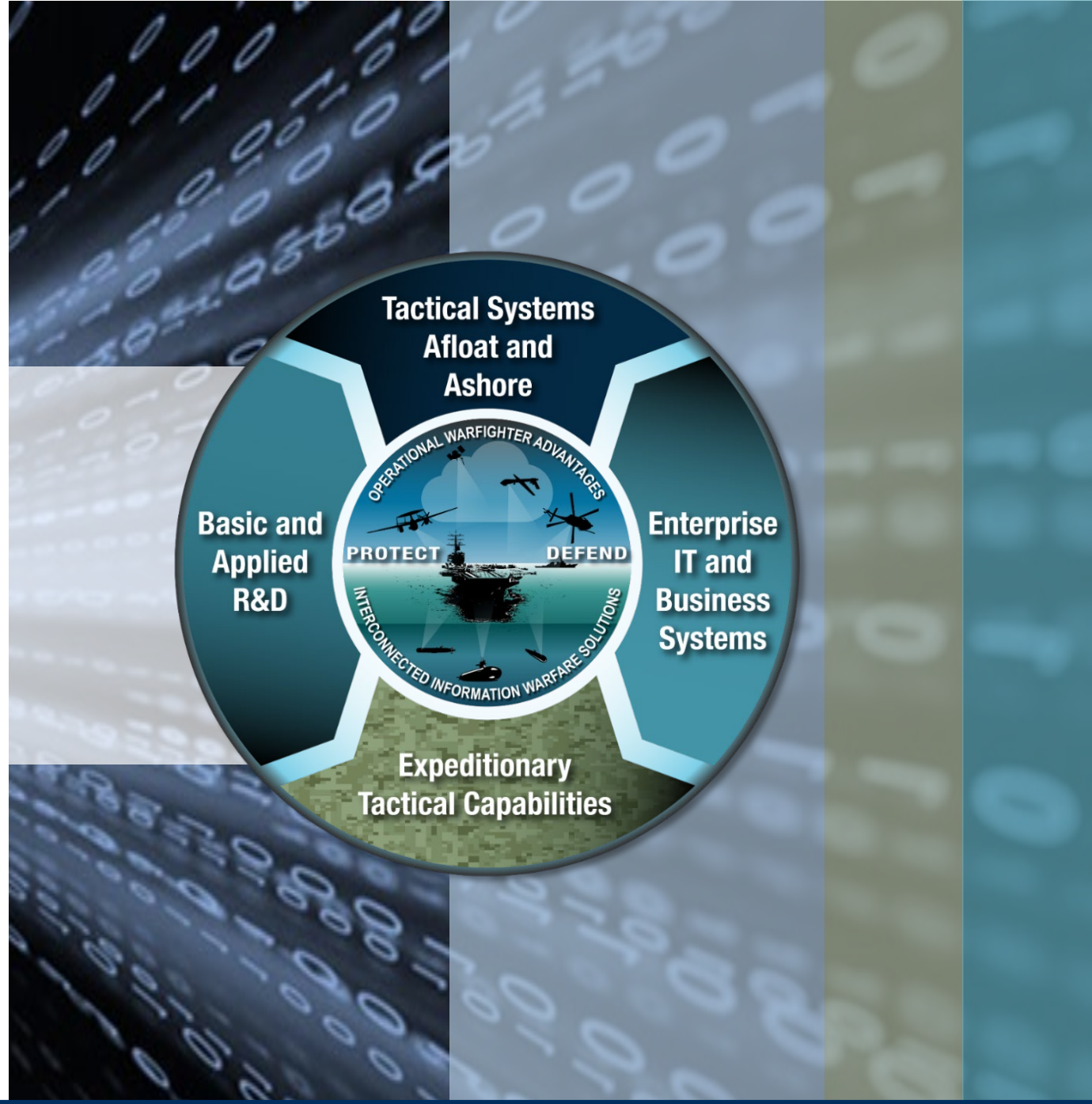
Naval Information Warfare Center
ATLANTIC

Naval Information Warfare Center Atlantic

Science and Technology

Innovation and Collaboration Supporting the Fleet and Force



CDCA Strategic Business and Industry Outreach Initiative (SBIOI) Symposium

11 March 2025

Mr. Bruce Billian
NIWC Atlantic
Deputy Department Head for S&T

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Introduction

- How We are Structured
- S&T Department within NIWC Atlantic
- Current Landscape
- Strategic Imperatives
- Embracing Innovation
  - Prototyping, Experimentation, and Learning Campaigns
  - Embracing Change
  - Future Trends
- S&T Department Priority Focus Areas
- Rapid Capabilities Office
- Tech Transfer and Tech Transition

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How We are Structured

XO – CAPT Aaron Gall

OICs
Bahrain – CDR Alexander Baynes
New Orleans, LA – CDR Andrés Otero
Naples, Italy – CDR Alexander Williams

CMC – MRCM Matthew Keller

IG – Michael O'Shea

Commanding Officer
CAPT Matthew O'Neal

Executive Director (A)
Kevin Charlow, SSTM

Deputy ED
Kevin Charlow, SSTM

Network Centric Development and Integration/TD
Andrew Mansfield, SL

Command Information Officer
Corinne Millington (A)

Office of Small Business Programs
John OConnor

Departments
(cost, schedule and performance)

Fleet C4I and Readiness Department
Dept. Head: Greg Lancaster, SSTM
Deputies: Kevin Gerald 100s, Travis Tillman 700s

Expeditionary Warfare Department
Dept. Head: Ashlee Landreth, SSTM
Deputy: Peter Ward

Enterprise Systems Department
Dept. Head: Kevin Allen, SSTM
Deputy: Brian Ratliff

Shore C2ISR and Integration Department
Dept. Head: Bruce Carter, SSTM
Deputy: Timothy Turner

Science and Technology Department
Dept. Head: Dr. Suzanne Huerth, SSTM, CTO
Deputy: Bruce Billian

Rapid Capabilities Office
Greg Hays, SSTM

Dept. have embedded 6.0 PM Support

Competencies
(people, processes and tools)

1.0 **Finance**
Co-Competency Directors:
Stephen Spencer and Tony Jones
1.1 Comptroller (Spencer)
1.2 Business/Resource Financial Management (Jones)
Deputies: Hugh Smith 1.1 and Amanda Hays 1.2

2.0 **Contracts**
Comp. Director
Steve Harnig
Deputy: Kelly Cannady

3.0 **Office of Counsel**
Comp. Director
Barbara Shestko
Deputy: Scott McGuigan

4.0 **Logistics and Life Cycle Engineering**
Comp. Director
Jennifer Shauger, SSTM
Deputy: George Willman

5.0 **Engineering**
Comp. Director
Erick Fry, SSTM, CHENG
Deputy: Frank McAlhany

6.0 **Program and Project Mgmt.**
Comp. Director
Ken Ayers

7.0 **Science and Technology**
Comp. Director
Dr. Suzanne Huerth, SSTM, CTO
Deputy: Bruce Billian

8.0 **Corporate Operations**
Comp. Director,
Joanna Shirey (A)

S&T Department within NIWC Atlantic

Department Head
Dr. Suzanne Huerth, SSTM, CTO

Deputy: Bruce Billian

Integrated Product Teams (IPTs)

- Office of Naval Research (ONR) — **Steve Fraile**
- Advanced Technology Research (ATR) — **Steve Fraile**
- Defense Advanced Research Projects Agency (DARPA) — **Jason Livingston**
- Naval Innovative Science and Technology Program (NISE) — **Tom Glabb**

Major Sponsors

- Defense Advanced Research Projects Agency (DARPA)
- Office of Naval Research (ONR)
- Navy Tactical Exploitation of National Capabilities (TENCAP)
- Office of the Secretary of Defense (OSD) Research and Engineering (R&E)
- USN Fleet Readiness
- 4th Fleet, NAVSOUTH

Innovating Tomorrow's Navy Today

- **Research and aid in the development of game-changing technologies** in the fields of artificial intelligence, cyber information science and software, autonomy, assured communications, mobility, data analytics, electromagnetic warfare (EMW) as well as other emerging technologies to anticipate and create rapid shifts in the complex national security landscape.
- **Rapidly prototype, demonstrate,** and provide exercise support for capabilities that address emergent Naval technology needs
- Seek innovative means for **accelerated technology transition** to Warfighters
- Create opportunities to **engage with industry and academia**

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Current Landscape

Threat Environment

- The Chairman of the People's Republic of China (PRC) has told his forces to be ready for war by 2027
  - The PRC presents a complex multi-domain and multi-axis threat
- A wounded and isolated Russia remains dangerous
  - Russia has demonstrated operational learning, adapting technologically and tactically to Ukrainian innovations
- Highly interconnected threats make peace brittle
  - Recent events have required a Navy presence across the Middle East to deter by Iranian proxies and reduce the risk of a wider conflict

Rapidly Evolving Challenges and Adversary Learning

- "We have seen breakthroughs in battlefield innovation over the last two years."
  - Ukrainian Navy use of a combination of missiles, surface vessels, and agile digital capabilities to deny the Russian Navy use of the western Black Sea
  - Current employment of first-person-view drones in Ukraine
  - Rapid digital innovation on the battlefield

Naval Warfare in the 18th Century

Chinese 56 boat drone swarm demonstration (2018)

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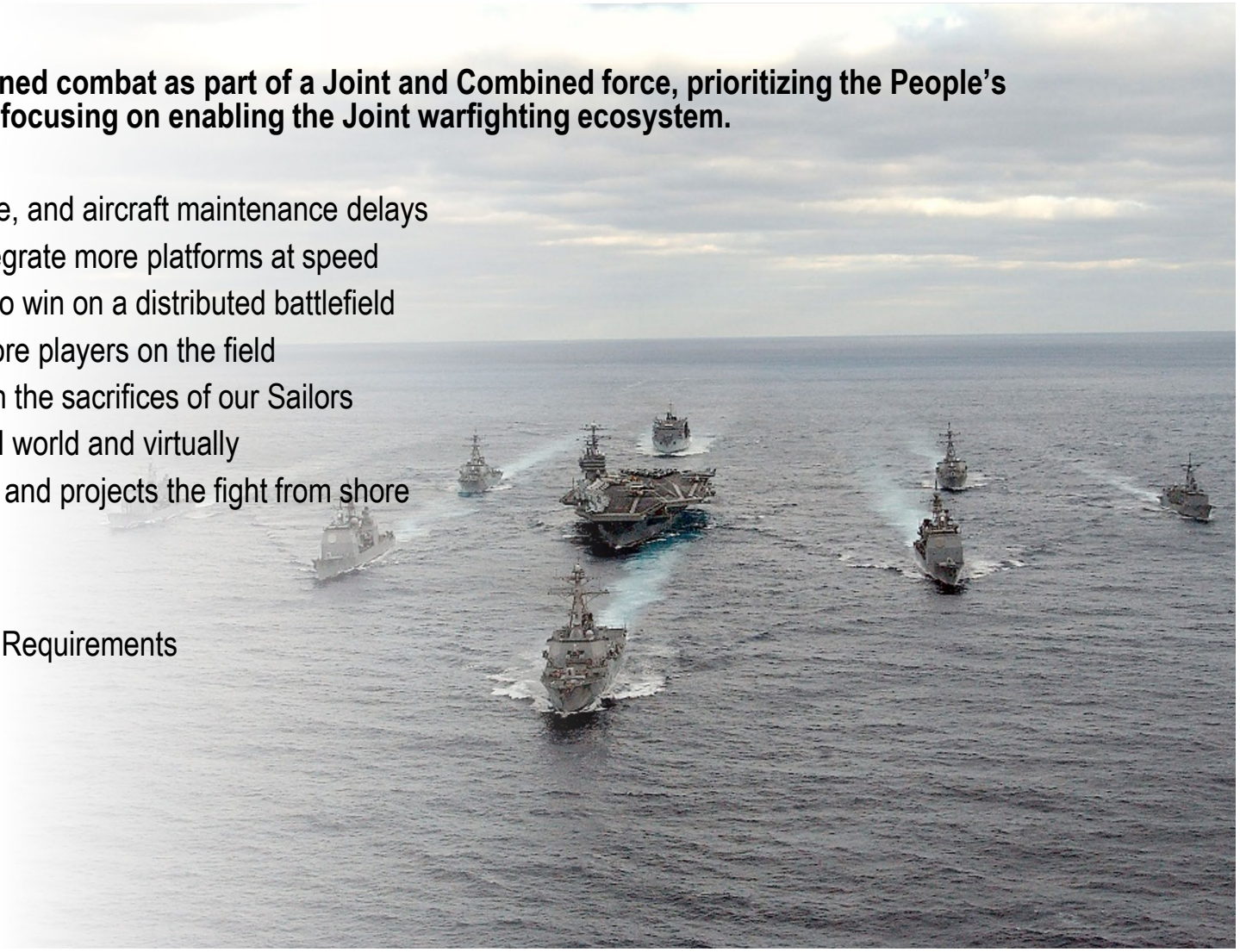
Strategic Imperatives

Navy Guidance

- **By 2027, the Navy will be more ready for sustained combat as part of a Joint and Combined force, prioritizing the People's Republic of China as the pacing challenge and focusing on enabling the Joint warfighting ecosystem.**
- **Accelerating towards Navy's goals:**
  - Ready the force by eliminating ship, submarine, and aircraft maintenance delays
  - Scale robotic and autonomous systems to integrate more platforms at speed
  - Create the command centers our fleets need to win on a distributed battlefield
  - Recruit and retain the force we need to get more players on the field
  - Deliver a quality of service commensurate with the sacrifices of our Sailors
  - Train for combat as we plan to fight, in the real world and virtually
  - Restore the critical infrastructure that sustains and projects the fight from shore



39th Commandant's Planning Guidance

- Balancing Modernization with Current Operational Requirements
- Naval Integration and Organic Mobility
- Critical Capabilities and Future Investments
  - Contested Logistics and Littoral Mobility
  - Enabling Joint & Coalition C2 & Kill Webs
  - Long-Range Precision Fires

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Prototyping, Experimentation, and Learning Campaigns

Prototyping

- From CPG: “In the future, we will fight with prototypes. Battlefields throughout history demonstrate this fact... We must... increase the velocity of fielding key capabilities as we identify them.

Experimentation

- Fleet/Force experimentation with prototype platforms in real-world operations
  - The cycle from development to procurement to obsolescence in both hardware and software is lightning fast on a modern battlefield
- Experiment with and invest in burgeoning capabilities that are defining the modern battlefield
- Enabling transition and fleet/force integration
- Helping to define the future’s hybrid fleet and future operations

Campaign of Learning

- Experimentation and exercises “are helping us to capture the capability of industry partners to innovate at the speed of relevance.”

Digital Horizon 2022

4TH Fleet Hybrid Campaign

Bold Quest 2023

Accelerate Innovation

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Embracing Change

Operational Concepts and Their Impact to Technology

- **Distributed Maritime Operations (DMO)**
  - Means dispersing the fleet while concentrating effects; the approach demands distributing, integrating, and maneuvering people, platforms, munitions, and data across time, spectrum, and space,"
  - "Information dominance is the key enabler in this new form of maneuver warfare, by which we confound the adversary's ability to find fix and attack our forces."
- **Expeditionary Advanced Base Operations (EABO)**
- **Stand-in-Force (SIF)**
  - Will act as the "JTAC of the Joint Force" – sensing, making sense, and communicating to the rest of the Joint Force with an "any sensor, any shooter" mindset
  - A modernized warfighting capability with the agility and lethality capable of gaining and maintaining advantage from inside the WEZ

We must think, act, and operate differently today so the leaders of tomorrow have the players, the concepts, and the capabilities they need to fight and win.

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Future Trends

Accelerate

- Innovation and delivery of capability must move faster
- While we are delivering for today, there is still a focus on the mid-term and long-term
  - We cannot mortgage the navy's future just to achieve near-term readiness.

Beyond 2027 (S&T Investments)

- We must move rapidly to stay ahead and continuously create warfighting advantages
- We must accelerate our ability to move from design to something that flies, floats, dies, orbits, or computes at scale to meet the pace of technological change

The designs of today build the foundation for the future and shape the Navy of 2045 and beyond

- "We must get the details right for the future force while matching the changing character of war"

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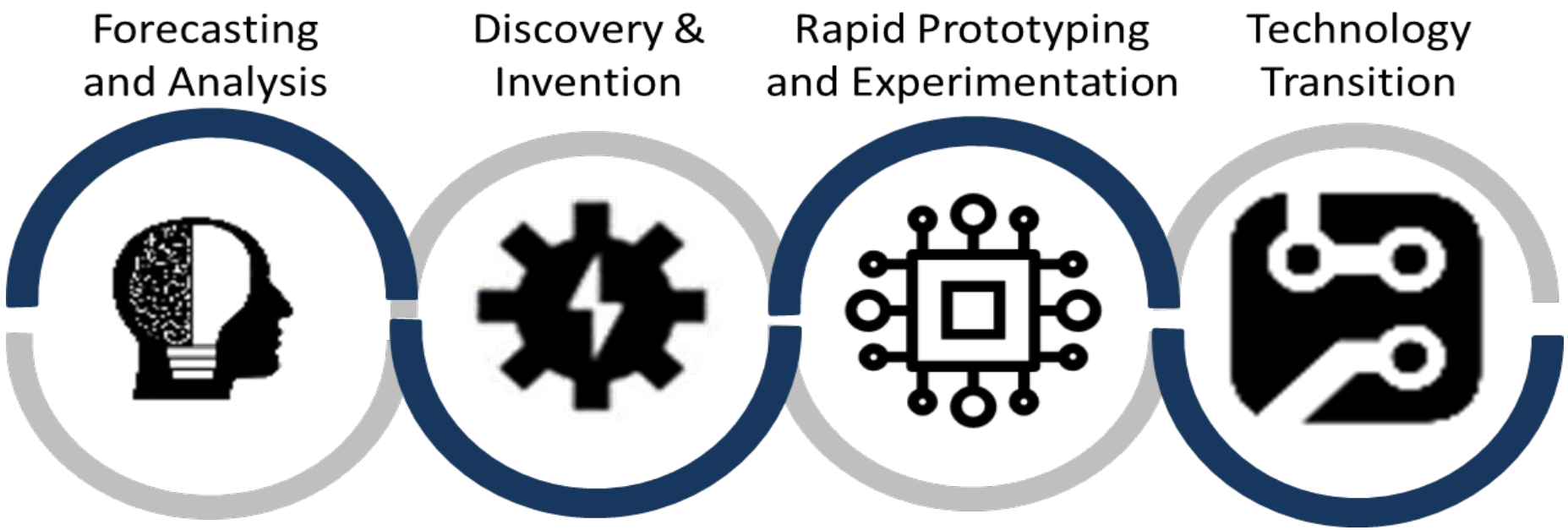
Science and Technology Mission



We are the solutions provider for mission critical information warfare!

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S&T Department Priority Focus Areas

Autonomy-Enabled Battle Mgmt. Aids

Mission Areas

- Robotic and autonomous systems
- Next-generation MOC capabilities
- Autonomy-enabled decision making
- Battlespace awareness
- Trusted AI and autonomy
- Optimized contested logistics

Research Areas

- Optimization for complex environments
- AI-based decision making and pattern of life analysis
- Test, evaluation, verification, and validation of AI systems

Electromagnetic Maneuver Warfare (EMW)

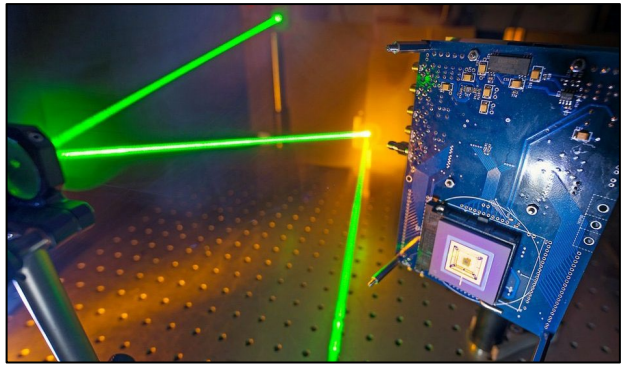
Mission Areas

- Persistent battlespace awareness
- RF-enabled cyber effects
- C-C5ISRT
- Edge sensing and processing
- Assured/resilient communications

Research Areas

- Multi-modal sensor fusion
- RF front end design
- Low-SWAP hardware and algorithms
- IoT

Quantum Communications and Sensing



Mission Areas

- Assured communications
- Persistent targeting
- Persistent ISR
- Assured PNT
- Quantum AI/ML

Research Areas

- Quantum communication
- RF E-field sensing
- QuDAR / illumination
- Quantum computation

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Rapid Capabilities Office (RCO) – Speed to Capability

- **Battlespace Connectivity** – Assured communications and transport across all domains and platforms for all payloads/sensors
- **Robotics and Autonomous Systems** – C2, autonomy, and communications of unmanned across all domains for any mission
- **Non-Kinetic Effects** – EMSO, C-C5ISRT, Cyber, and counter unmanned though the detection, collection, deception, decoy, and exploit/attack of information
- **Battlespace Command and Control** – DOTMLPF required to synchronize and integrate execution of joint functions across and within all domains and echelons at operations and effects centers
- **Decision Intelligence for the Warfighter** – AI/ML, enterprise, tools/dashboards, and etc. Focused on warfighter-centric solutions

Go Faster with Good Enough

- **Driven by emerging warfighter problems not traditional requirements process to support closing capability gaps**
- **Uses SPEED as a lever with working capital fund model**
- **Rapid Prototyping – Accelerating S&T and DIB/Commercial IR&D through stacking acquisition paths**
- **Rapid Fielding – Mature tech, likely commercial or dual-use for scale through integration and warfighter adoption**
- **Operational Experimentation with warfighter**
- **Organic experimentation for rapid development, & risk reduction with tech feasibility and utility assessments**
- **Coordination with Navy DCO, OPNAV N94, DASN RDTE RPEDs, ONR-G, OUSD R&E, DARPA, SCO, DIU, NavalX, other RCO's (Navy PEOs, Marine Corps, Space, AF, Army)**

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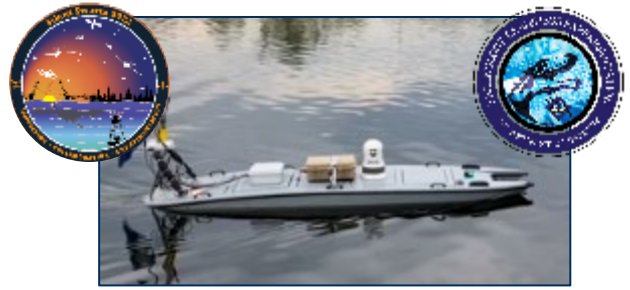
Accelerating via Rapid Prototyping and Experimentation

Developing, adopting, integrating, and testing capabilities for manned, unmanned, and autonomous missions in experiments, exercises, and toward operationalization.

- Technical areas
  - Data repositories and architectures
  - Command and control
  - Comms and networks
  - Computer vision
  - Mission autonomy
  - RF/Cyber/EW
  - Operational Experimentation
  - System of Systems Interoperability

NAVCENT Task Force 59 (TF-59)

Disruptive Capabilities Office (DCO) / OPNAV N9B



Silent Swarm / Southern Lightning

Hybrid Fleet South

Mission Autonomy Proving Ground

MADIS

System of Systems Naval Integration Experiment (SoSNIE)

PMS 420 C3

NAVEUR TF-66

NextGen Unmanned Operations Center

DARPA Autonomy

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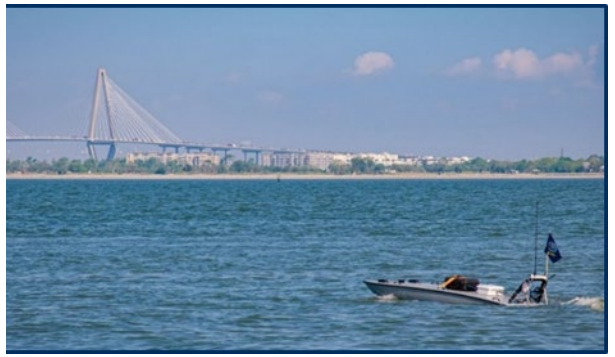
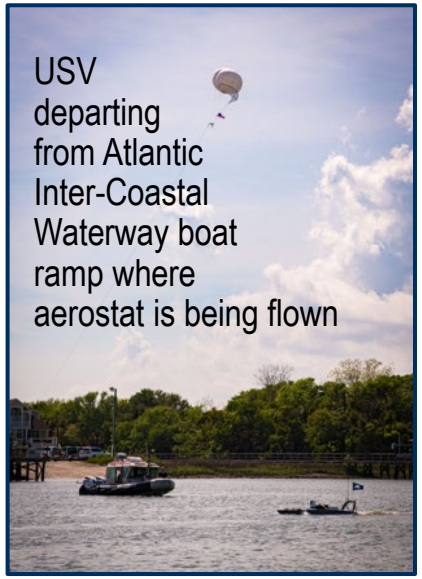
Wargaming and Realistic Testing Experimentation

Developing the best capabilities for maritime and expeditionary operations

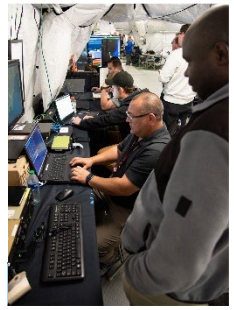
National Cyber Range Complex (NCRC) Charleston, a DoD resource
Supports Cyberspace testing, training, mission rehearsals, cyberspace operations, tactics, science and technology demonstrations and forensics/malware analysis.

Communications Test Events
for a future fleet that better connects critical command and control functions to various weapons, sensors and small unmanned Systems.





SoSNIE | System of Systems Naval Integration Experiment
An agile event that allows for maximum flexibility to support any experimentation, specifically designed for the engineers to focus on the advancement of their technology.
~ 300 attendees on DV Day
~200 participants and 45 systems



Events are aligned with DoD's Joint All-Domain Command and Control | JADC2

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Technology Transfer & Technology Transition

NIWC Atlantic's force to accelerate spin-in, spin-out, and dual use technology

Office of Research and Technology Applications (ORTA)

ORTA directs, manages and coordinates the Command's T2 Program by:

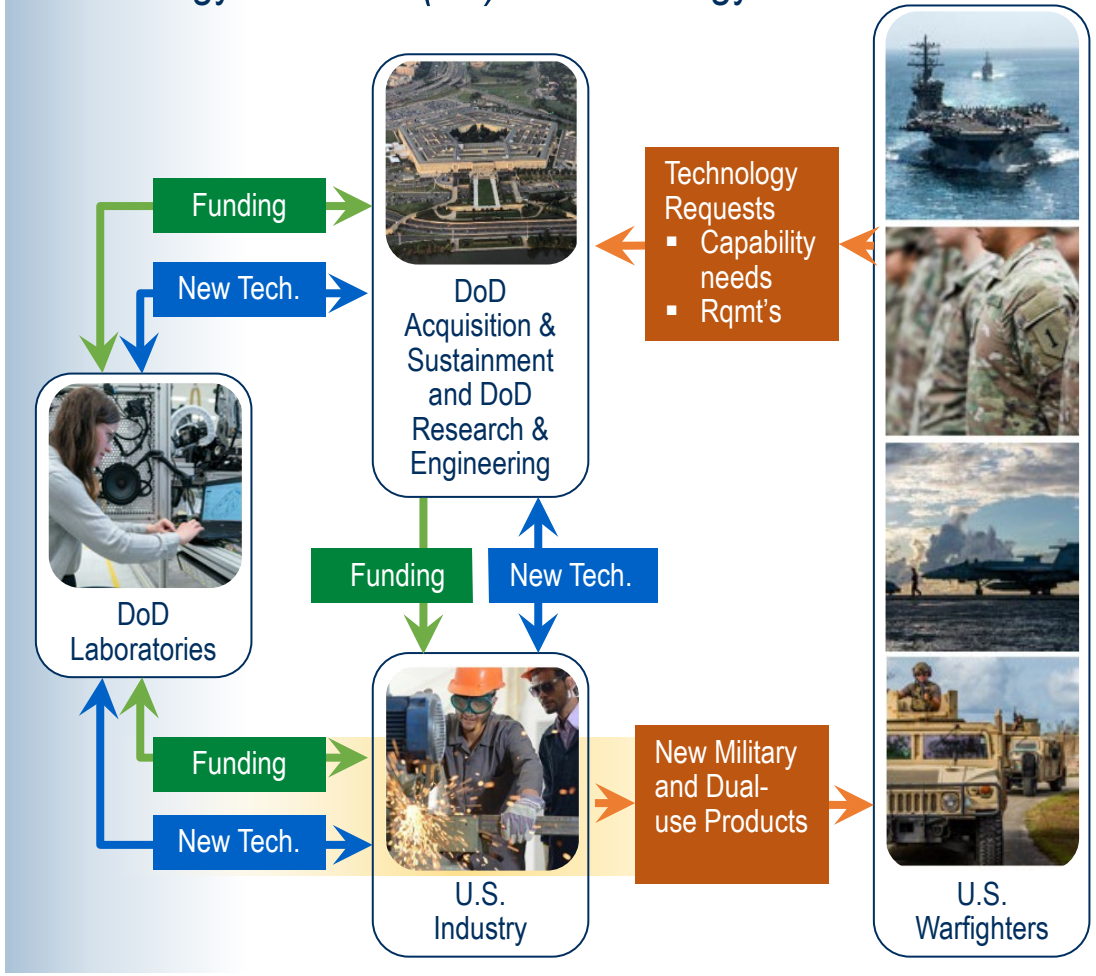
- Leveraging advantages of both federal and civilian technology bases
- Applying of a wide variety of flexible and agile T2 tools
- Partnering with non-federal entities to transfer intellectual property with the goal to bring the technology back into the DoD

The ORTA has the legal authority to liaison and enter into T2 agreements

Technology Mechanisms

1. Cooperative Research and Development Agreements (CRADA)
2. Limited Purpose CRADAs
3. Educational Partnership Agreements
4. Commercial Service Agreements/ Work for Privates
5. Partner Intermediary Agreements
6. Patents
7. Patent License Agreements
8. Software License Agreements
9. Memorandum of Agreements/ Understanding (when associated with T2 or protection of Intellectual Property

Technology *Transfer (T2)* & Technology *Transition*



ORTA is the foundational support for: Research and development, Test and evaluation, Experimentation, Naval STEM

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Panel Discussion

About Our IPT

Office of Naval Research (ONR) and Advanced Technology Research (ATR)

Vision

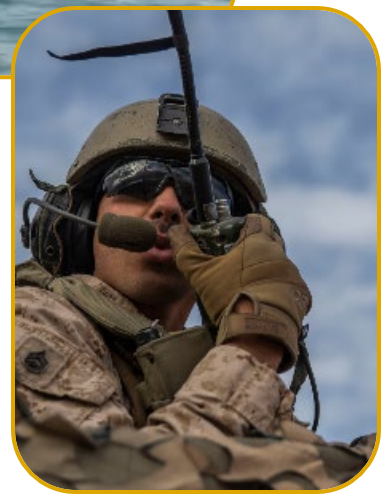
- Deliver **Meaningful** Future Technology

Mission

- Our mission is to deliver **advanced solutions** that support our project sponsors by facilitating seamless technology transitions within acquisition programs. We are dedicated to providing current and future capabilities that address evolving operational needs, ensuring the successful integration of **next-generation technologies** for the Fight After Next.

Technical Values

- **Drive** the innovation of governance, technology, and processes to address unique needs
- Execute rapid prototyping and relevant technology insertion (add in 6.1-6.4 RDT&E budget activity numbers)
- Research with a **purpose**
- Enable integration of solutions using technology transition best practices



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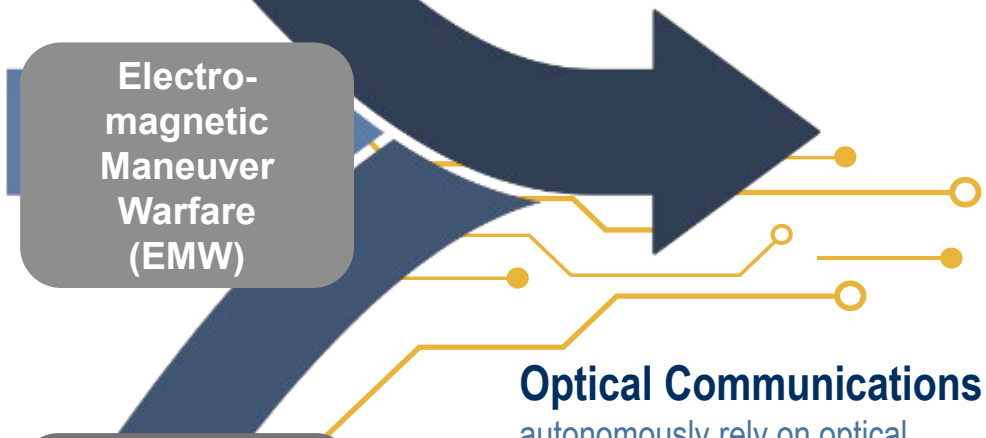
S&T 2040 Vision

Autonomy-Enabled Battle Management Aids

Electro-magnetic Maneuver Warfare (EMW)

Quantum Computing, Comms, & Sensing



Autonomous Systems such as UAVs, UGVs, USVs, and UUVs may be used for EW and EMW operations, as well as surveillance, reconnaissance, and combat missions, reducing the risk to human warfighters.

Artificial Intelligence may enhance EW and EMW capabilities, enabling more effective and efficient operations in the EM environment.

Integration of Quantum Computing may solve more complex problems and analyze vast amounts of data.

Optical Communications autonomously rely on optical communications for secure, high-speed data transfer in EW and EMW operations, supporting mission effectiveness.

Swarm Intelligence for autonomous systems, potentially enabling them to overwhelm and disrupt adversarial forces

Advanced Cognitive Architectures may enable autonomous systems to reason, learn, and adapt in complex and dynamic environments

Cyber-Electromagnetic Spectrum Operations may allow for integrated cyber and EM operations to disrupt or exploit enemy networks

Improved Spectrum Operations Management may allow for improved operations in contested environments while minimizing of friendly systems.

Tactical Quantum Computing may be deployed for accelerated real-time data analysis.

Cryptography may break classical encryption and deploy new encryption methods

Autonomous Reasoning and Quantum Optimization may enable AI systems to make quick decisions in complex environments while providing decision-making transparency, allowing for faster and trusted decision making

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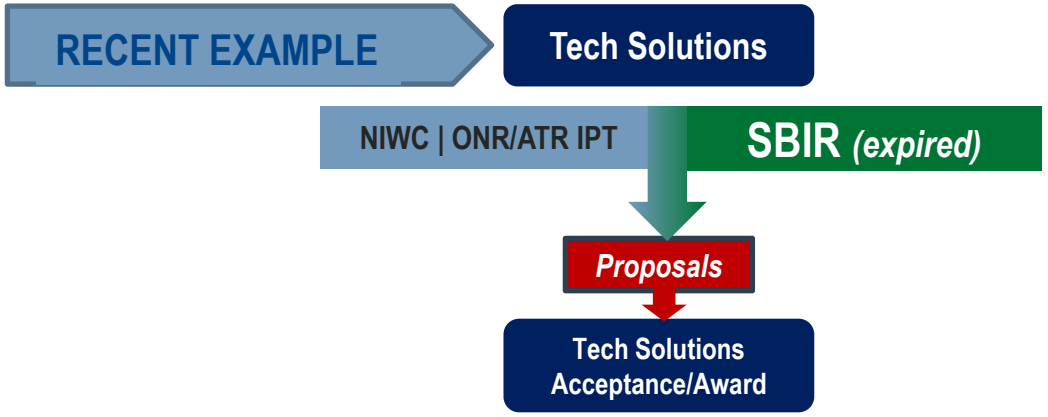
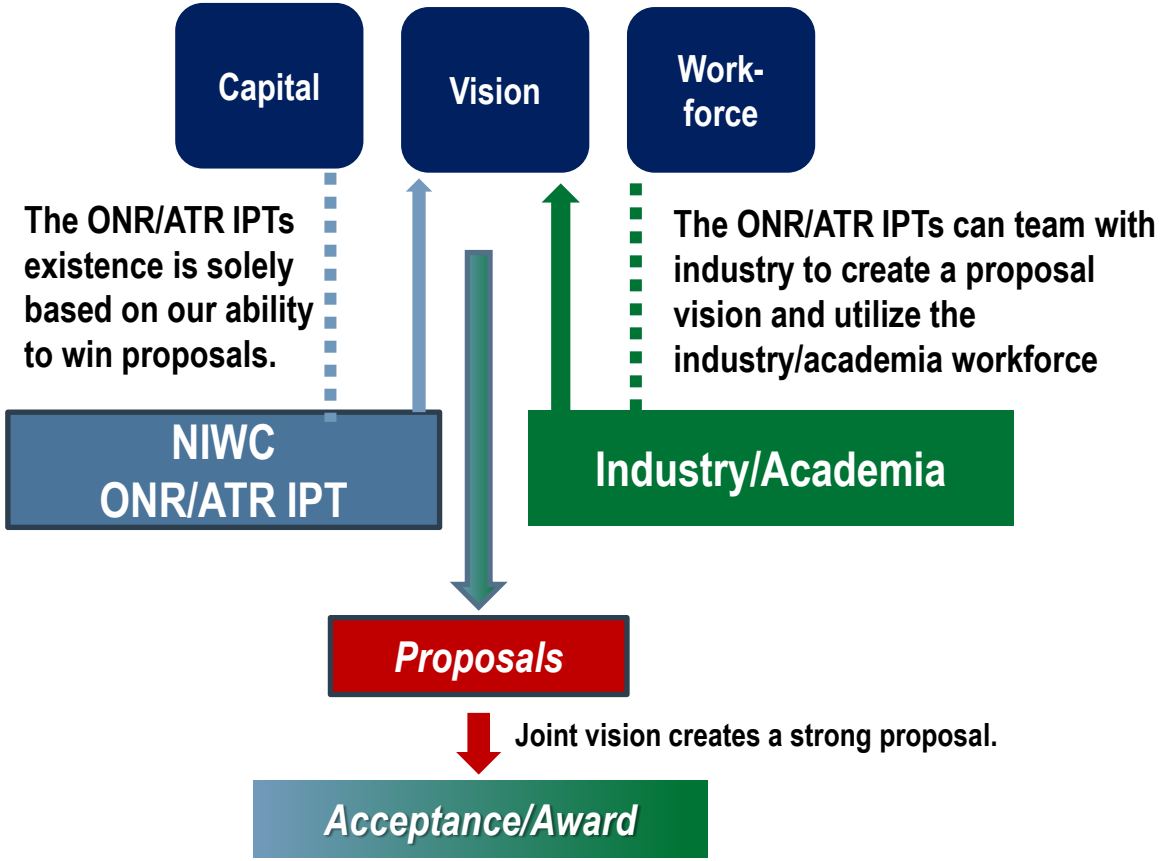
ONR/ATR Contracts & Partnerships

Future Contracts

- 8(a) – Software Development & Logistics Support
- Competitive Seaport
- Other Transactional Agreement for Prototype & Production
- Academia
  - Clemson
  - Medical University of South Carolina
- Georgia Tech Research Institute





CHALLENGES:

- Do you have a contract with NIWC-LANT?
- Do you have a SIBR?
- Are you a part of a CSO?

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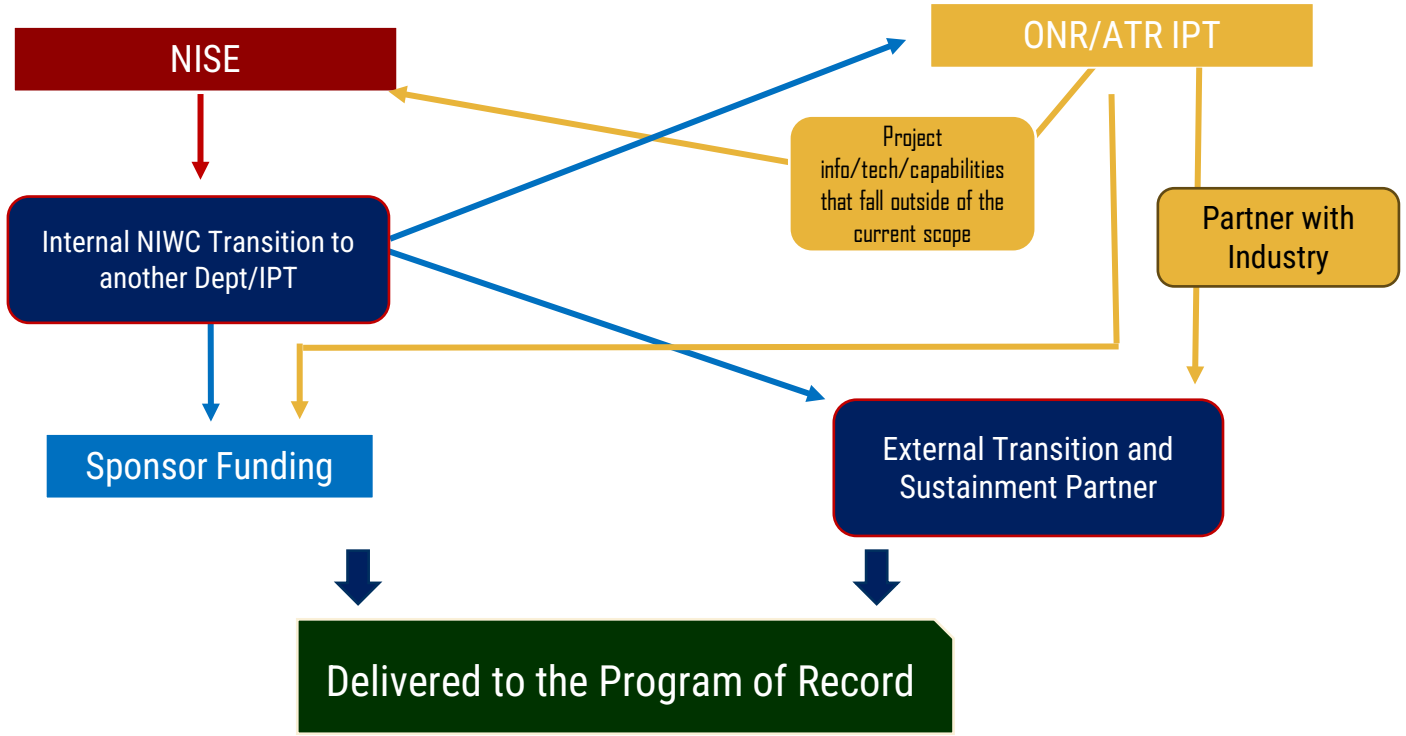
NIWC Atlantic Internal Transitions

The ONR/ATR IPT is leaning forward toward new technologies and capabilities, while also considering the necessary DoD requirements, hosting environments, and security considerations.

We work together with the Naval Innovative Science and Engineering (NISE) program for initial innovation or ingenuity that falls outside of project scope.

Warfighter Reported Problems or Capability Gaps	Internal, Applicable Scientific/Mathematical Ideas	Applicable Cutting-Edge Technology	Funded Projects Navy or USMC Sponsored



IPT EXAMPLES

MORT was a need brought to the attention of the ONR/ATR IPTs by the MARFORPAC Science Advisor. This developed into a Logistics Readiness Dashboard (NISE), presented to MARFORPAC. MARFORPAC funded project MORT (ONR/ATR). MORT leveraged a CRADA. MORT transitioned to ATD IPT and is using NISE for warfighter transition opportunities.

Fleet Work started with NISE investments. It started as NAVCENT (NISE), NAVCENT received direct funds which led to additional direct funds for C4. NAVEUR (NISE) then received direct funds. Knowledge rolled over into each project and will impact next steps. Combatant Command Work is currently supported by ONR/ATR IPTs and ShoreC2.

Important Dates	FY26 NISE Phase 1 Proposals/Quad Due APRIL 2025	FY26 NISE Phase 2 Due June 2025

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Panel Discussion

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Closing

- To address the current challenges, it will take everyone's contribution
  - Industry, Government, Academia
- Everyone must embrace change and understand how we will fight
- The force that adapts the fastest, and implements that learning, creates opportunities
- Critical technologies will help us to win the information war

Mission:

Conduct research, development, prototyping, engineering, test and evaluation, installation, and sustainment of integrated information warfare capabilities and services across all warfighting domains with an emphasis on Expeditionary Tactical Capabilities & Enterprise IT and Business Systems in order to drive innovation and warfighter information advantage.

Vision:

WIN THE INFORMATION WAR.

Learn More https://www.niwcatlantic.navy.mil

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NIWC Atlantic is part of the Naval Research & Development Establishment (NR&DE)