Office of Naval Research

Modern Day Marine 2025

29 April 2025

Col Russell Rybka

Assistant Vice Chief of Naval Research

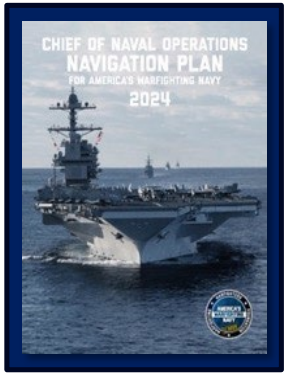
*"To plan, foster and **encourage scientific research** in recognition of its paramount importance as related to the maintenance of **future naval power**."*

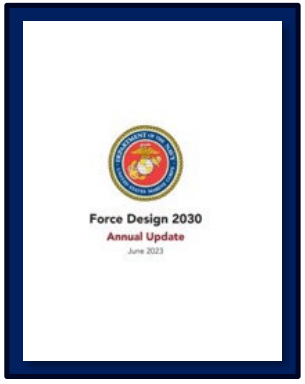
– Public Law 588, 1 Aug 1946

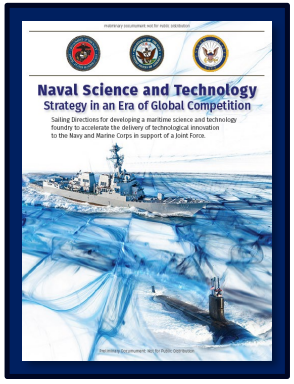
KNOWLEDGE and **DISCOVERY** for the FLEET and FORCE DESIGN

CAPABILITY DEVELOPMENT & EXPERIMENTATION for the FLEET and FORCE

INDUSTRY and **GLOBAL NAVAL SCIENTIFIC PARTNERSHIPS**







ONR Delivers Future Naval Capabilities

Naval Research "Operating Frameworks"

1946-2025

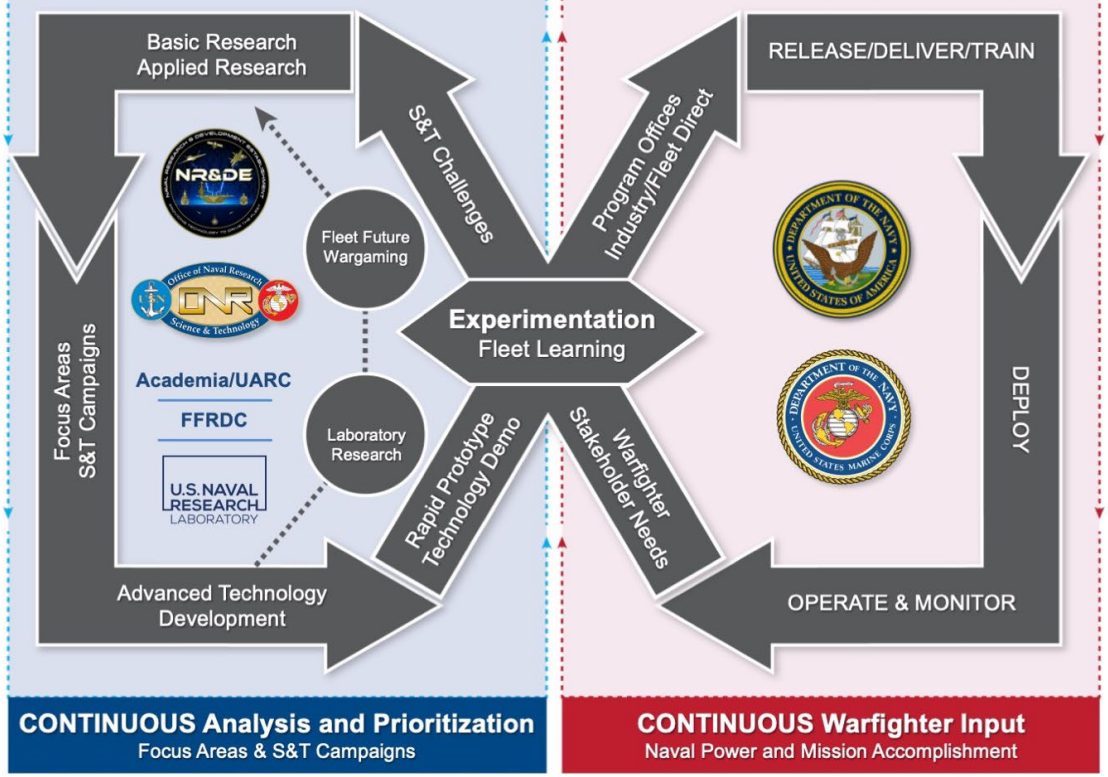
1.0 Defense Centric R&D 1946~1990

2.0 Commercial Tech 1990~2015

3.0 Strategic Competition Present

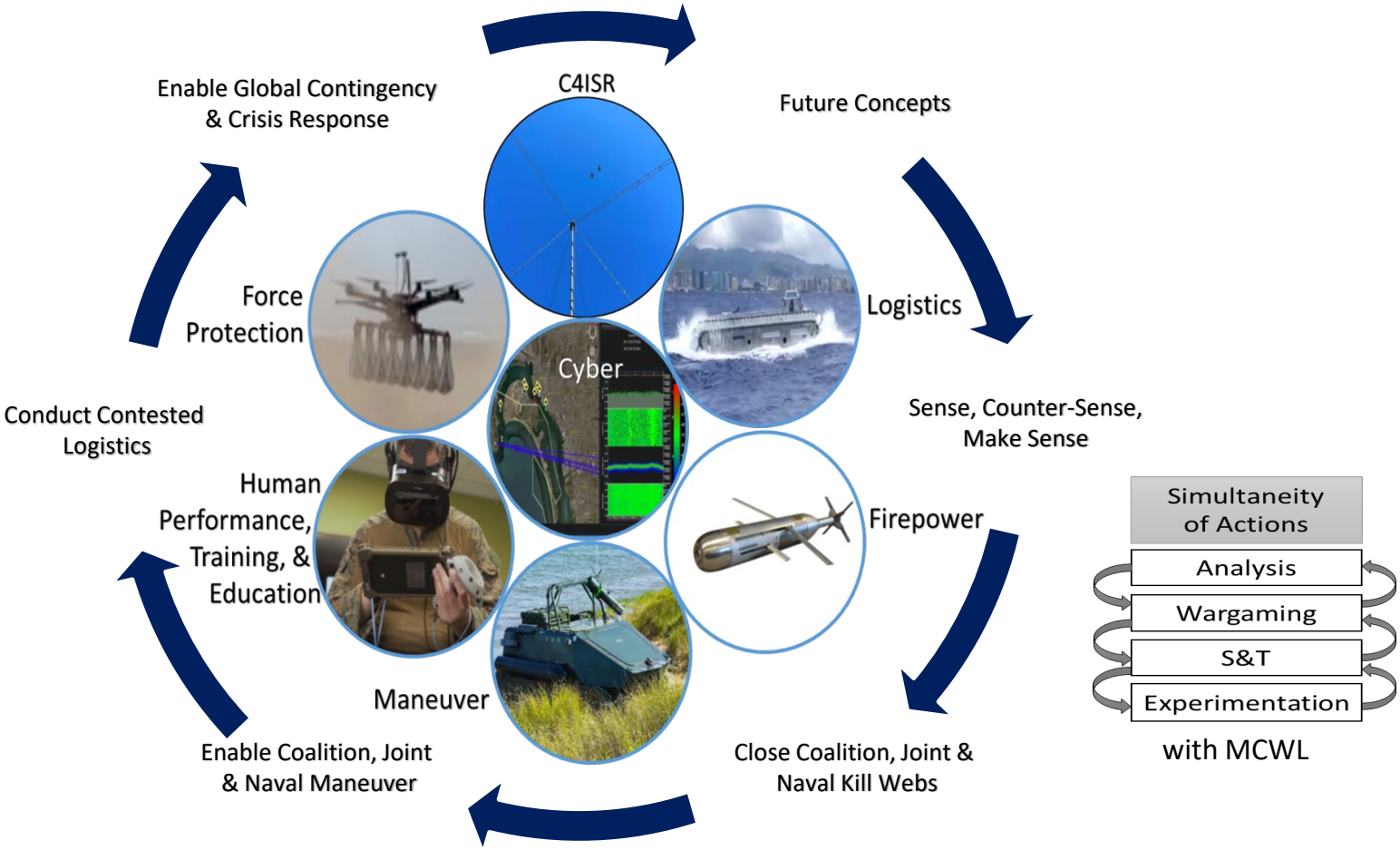
Naval S&T Focus Areas

- Autonomy/AI
- Naval Aerospace
- Directed Energy & Kinetic Systems
- C5ISR/Naval Space
- Human & Biological Systems
- Manufacturing
- Materials/ Electronics
- Naval Engineering
- Ocean, Atmosphere & Space
- Power and Energy
- Undersea Systems



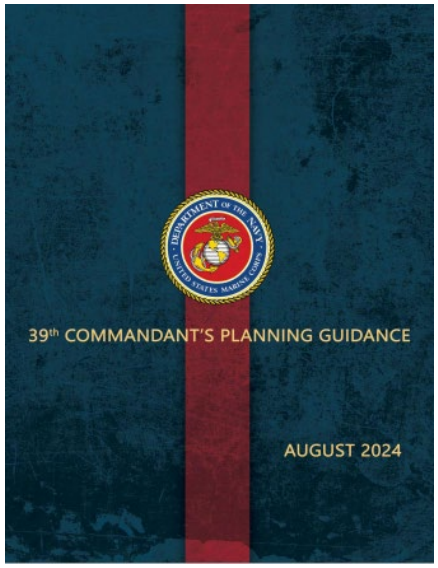
ONR Organization

Expeditionary Portfolio



S&T Demand Signals

39th Commandant's Planning Guidance



"increase the velocity of fielding key capabilities as we identify them."

"We will continue to experiment with and invest in burgeoning capabilities that are defining the modern battlefield such as Ground Based Air Defenses, including Counter-small Unmanned Aircraft Systems (C-sUAS), our own sUAS, and loitering munitions."

1. Contested Logistics and Littoral Mobility. long-term solutions for littoral surface connectors; autonomous tactical resupply capabilities
2. Enabling Joint & Coalition C2 & Kill Webs. act as the forward element of the Joint Force – sensing, making sense, and communicating that information to any shooter…C2, Cyber, AI at the tactical edge
3. Long-Range Precision Fires. Including cheap, long-range one-way attack drones and enhancements to long range missiles

S&T Priorities

Littoral Maneuver
Logistics
Force Protection
C5/Counter C5 (Command, Control, Communication, Computers & Cyber)
Persistent/Counter Intelligence, Reconnaissance & Surveillance (ISR)
Ops in the Information Environment
Electronic Warfare
Cyber
Fires
Training
Medical

Common Elements in All Investment Areas				
Joint common & interoperable	**Open system architecture**	**Alternate PNT**	**Robotics & Autonomy (RaS)**	**Artificial Intelligence**

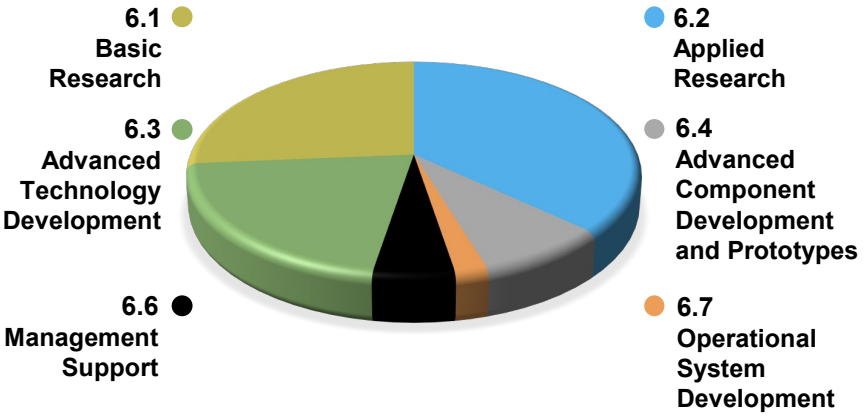
Programs Funded by the EP

- **6.1 Basic Research**
  - Generally 2-3 larger, focused Basic Research programs per 3X Code already selected for new starts. *Make an impact where it matters.*
  - Other seedlings or STEM.
- **6.2 Applied Research**
  - *Is it feasible?*
  - Lower fidelity components and breadboards validated in laboratory or outdoors environment.
  - Pre-FNC.
  - Seeking to mature technologies to transition to the warfighter.
  - Component and/or breadboard validation in relevant environment.
- **6.3 FNC (Advanced Technology Development)**
  - *Is there military utility?*
  - Higher fidelity subsystems and systems demonstrated in a relevant environment.
  - Funded by the EP, but process and timelines governed by the FNC Champion.
  - EP funds ~$28M total annually.
  - *Normally 1-2 new starts a year.*

1. Seek out and uncover research and development activities around the world that have naval relevancy.

2. Provide evolutionary/revolutionary technology solutions in support of warfighting needs.

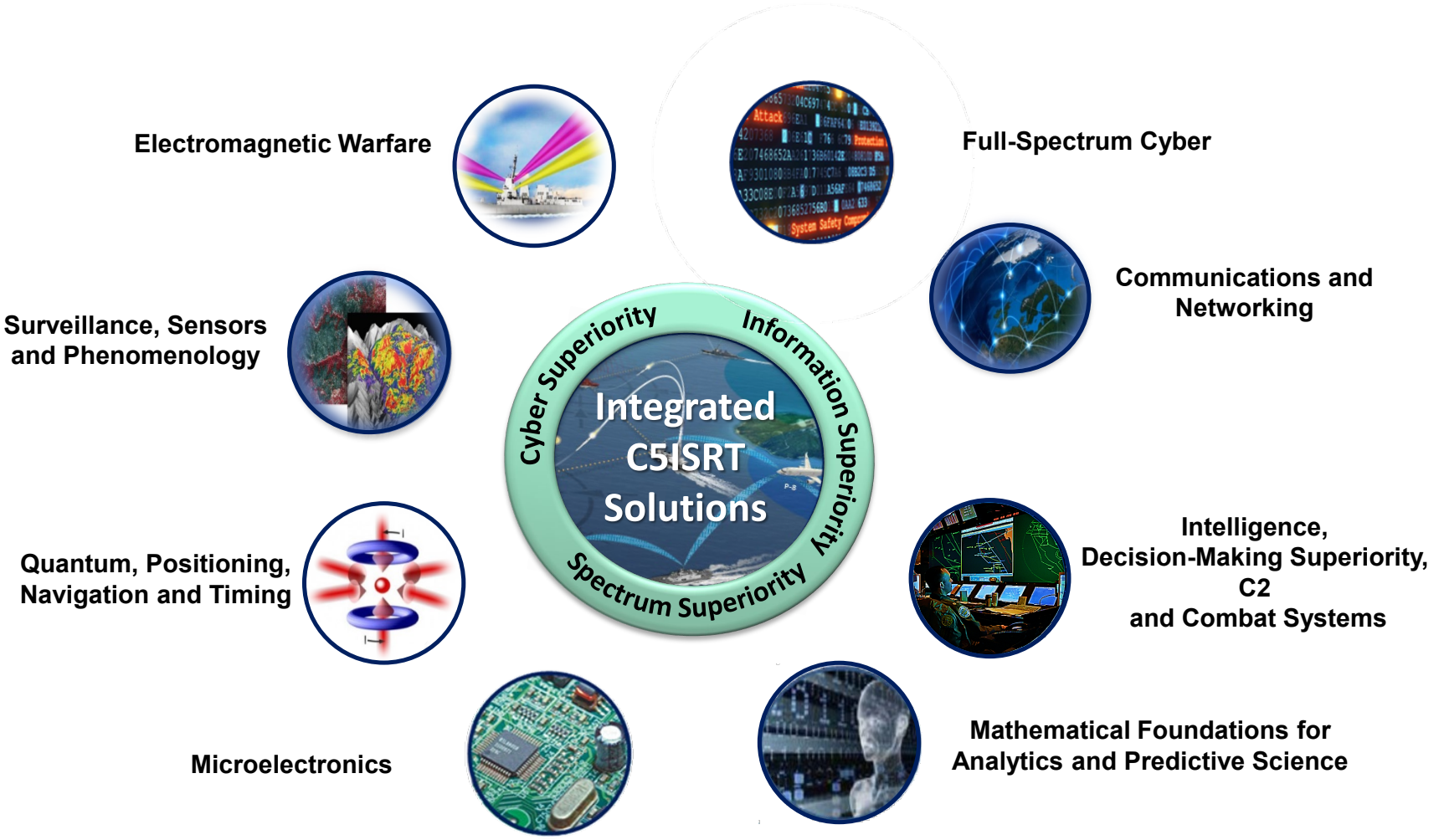
3. Make strategic investments that will lead to accelerated technology development and integration into future naval capability.



All S&T programs executed by, with, and through the ONR 3X Departments.

Innovate, Incubate, Scale IOT Disrupt an adversary's calculus

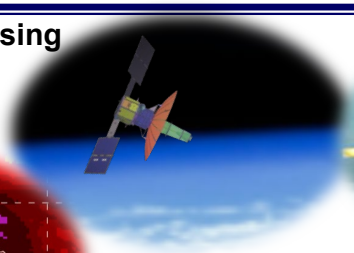
Command, Control, Communications, Computers, Cyber, ISRT (Code-31) Dept



onrcode31ideas.fct@navy.mil

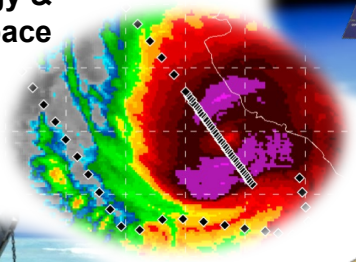
Ocean Battlespace Sensing (Code-32) Dept

Remote Sensing



Anti-Submarine Warfare

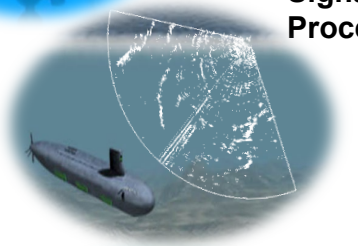
Marine Meteorology & Space



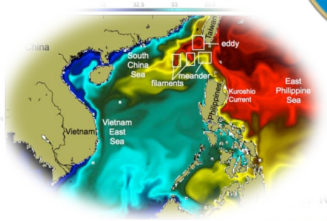
Mine Warfare & Ocean Engineering

Littoral Geosciences

Undersea Signal Processing

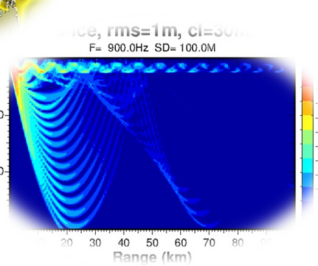


Office of Naval Research ONR USN Science & Technology



Physical Oceanography

Unmanned Systems Technology & Autonomy



Ocean Acoustics (NNR)

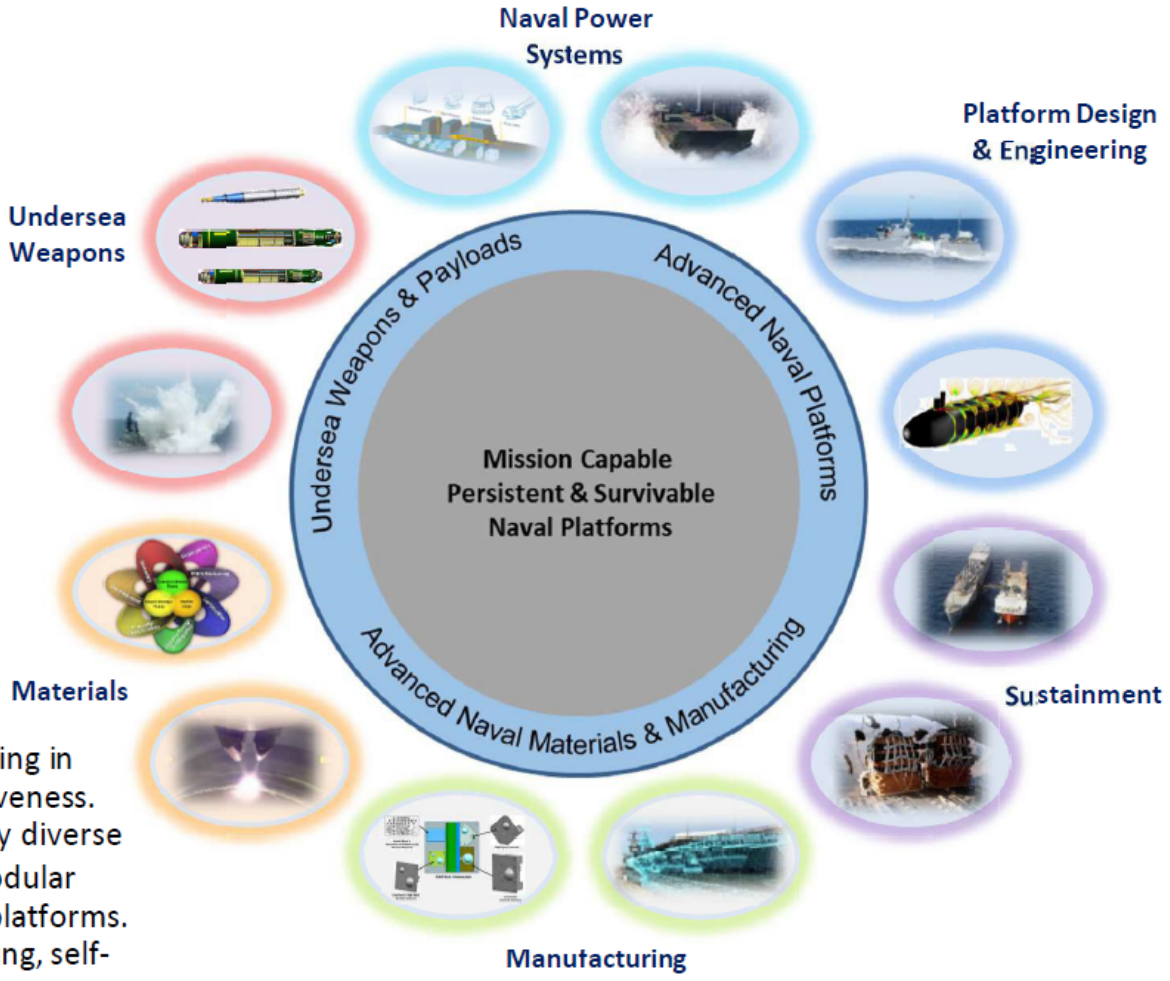
Marine Mammals & Biology

Research Facilities

Sea Warfare and Weapons (Code-33) Dept

AT A GLANCE

Research on concepts, systems and component technologies that improve the performance and survivability of Navy and Marine Corps platforms in an increasingly distributed yet interconnected force.



WHY IS THIS IMPORTANT

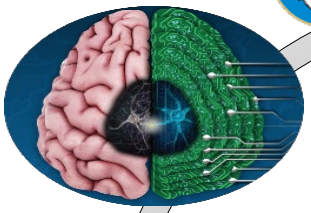
- Threats to the fleet/force are increasing in number, range, precision and effectiveness.
- Sustainable operations in increasingly diverse environments require affordable, modular survivable and rapidly upgradeable platforms.
- Maritime superiority requires enduring, self-sustaining platforms able to deter/defeat aggression through overwhelming capability.

Warfighter Performance (Code-34) Dept

Enhancing warfighter effectiveness and efficiency through bioengineered / biorobotic systems, medical technologies, improved manpower, personnel, training & system design

Decision Sciences

Vision: Better Decisions, Faster

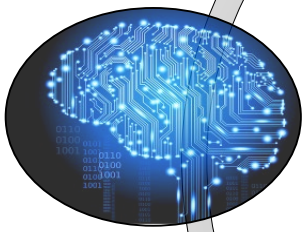


Human Research Protection Program

Vision: Preserve the rights and welfare of human subjects in Naval- supported research.

Information Warfare & Future Conflict

Vision: Shaping & Understanding Attitudes & Behaviors



Human Performance

Vision: Win in Extreme Environments

Manpower Personnel Training & Education

Vision: Outthink, Outfight Any Adversary

Medical

Vision: Assured Warfighter Health, Survivability, & Recovery

Biocentric Technologies

Vision: Naval Innovation Driven By Biological Principles

Intelligent & Autonomous Systems

Vision: Intelligent Autonomy To Enable Human-Machine Team As A Force Multiplier

Naval Air Warfare & Weapons (Code-35) Dept

Aerodynamics / Flight Dynamics & Control
Structures & Materials
Power, Propulsion, & Thermal Management

Naval Research Enterprise (NRE)

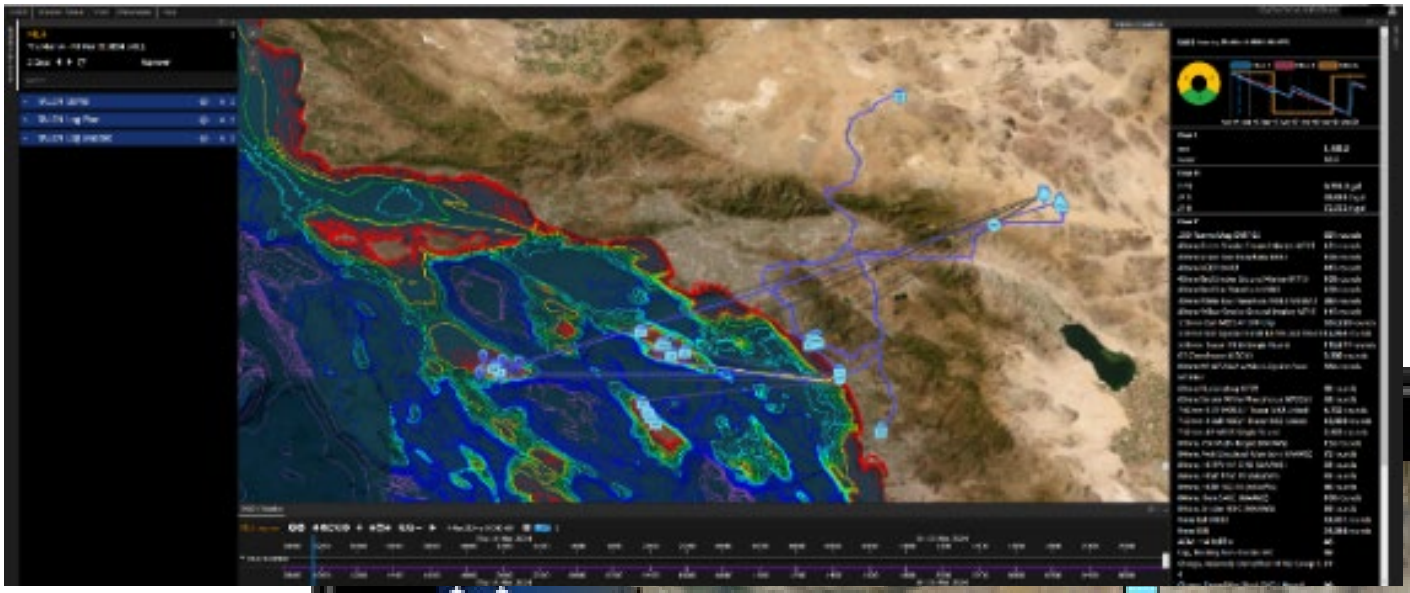
>1100 PhDs
>$3B Budget

Current Technology Transitions

Current Example Tech Transitions

- Advanced Reconnaissance Vehicle (ARV)
- Joint Marksmanship Assessment Program (JMAP)
- Amphibious Combat Vehicle Driver Training Systems (ACV DTS)
- JTAC Virtual Trainer (JVT)

Visual Integrated Tactical Logistics (VITL)



Regiment and Battalion S-4 generates optimal distribution plan based on dynamic forecasting of EAB/SiF logistics support requests and available logistics connectors via Web Tactical Assault Kit (TAK) Server

EAB/SiF users with handheld MAGTAB VITL Tactical Assault Kit (TAK) plugin visualizes LOGSTAT and submits logistics support requests

Free Space Optics

Unmanned Swarming Assault Craft & Advanced Reconnaissance vehicle

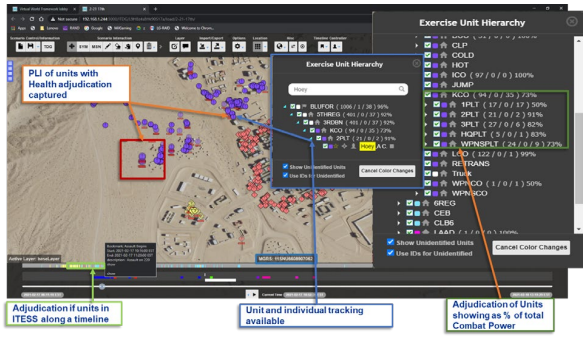
JTAC Virtual Trainer

ACV Driver Training System

Joint Marksmanship Assessment Training

Streamlined Marine After Action Review Tool – Visualization (SMART-Viz) System Elements

Analysis Dashboard (AD)
hosted on AAR laptop

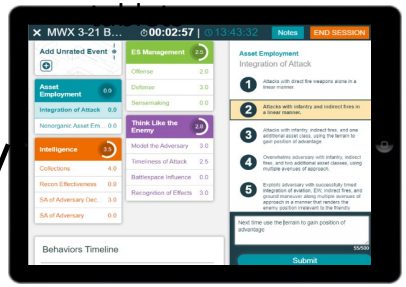


AD collects position, adjudication, significant events,
& similar data and presents for analysis via map, event &

Consolidated with O/C data for analytics

Output Data
(Ratings & observer markings)

Field Assessment System (FAS)
software on Observer/Controller (O/C)



O/C tablets collect cognitive and behavioral data in the field

View & edit O/C-collected data (to be developed)

ONR Marine Corps Billets

- Assistant Vice Chief of Naval Research (Marine Corps Colonel)
- Expeditionary Portfolio Director (SSTM)
- ONR Expeditionary Operations Officer (GS-15)
- ONR Code-31 Liaison Officer (Marine Corps Captain)
- ONR Code-32 Liaison Officer (Marine Corps Captain)
- ONR Code-33 Liaison Officer (Marine Corps Lieutenant Colonel)
- ONR Code-34 Liaison Officer (Marine Corps Captain)
- ONR Code-35 Liaison Officer (Marine Corps Lieutenant Colonel)
- Marine Corps Artificial Intelligence (Marine Corps Lieutenant Colonel)

Questions