Command, Control, Computing, Communications, Cyber, Intelligence, Surveillance, Reconnaissance, and Targeting (C5ISRT) - Research, development, and advanced demonstration of technologies forming the backbone of modern military operations. Key efforts include:

- Infrastructure and Software: Developing generic databases, secure networks, advanced software engineering practices, and telecommunications. This includes information exchange standards, identity and privilege management, cloud security, and both hardware and software for new computing paradigms.
- Information Dominance: Enhancing battlespace awareness through resilient, high-data-rate communications, including mesh networks and cloud-based architectures, to ensure a common operating picture, defend against cyber threats, and enable delivery of cyber effects to disrupt enemy command and control.
- Advanced Computing and Software: Researching tools and techniques for the entire system lifecycle, including formal verification, algorithmic design, high-availability computing, compiler technologies, software assurance, and automated code generation. This includes hardware and software architecture and design, formal verification tools and techniques, algorithmic development and design, networking tools and the necessary hardware and software to improve the state of the art in the field of computation and advanced computing, automated containerization of applications and developer tools, fusion of identity management across heterogeneous platforms and automated file based access encryption technologies across all platorms from embedded to high-performance computing.

Radio and Communications Systems – Research, development, and demonstration of robust, secure, and agile radio communication technologies. This includes the entire lifecycle from component-level research to system integration and demonstration. Key areas of focus are:

- Advanced Waveform Development: Novel waveforms that provide enhanced anti-jamming (AJ) and Low Probability of Intercept/Detection (LPI/LPD) capabilities. This includes research into cognitive radio technologies that can autonomously adapt to contested electromagnetic environments.
- Spectrum Agility and Management: Systems capable of Dynamic Spectrum Access (DSA) to operate effectively in congested and contested spectrum. Research should address AI/ML-driven spectrum sensing, interference mitigation, and real-time frequency allocation to ensure communications resilience.
- Hardware and Platform Integration: Size, Weight, Power, and Cost (SWaP-C) optimized radio hardware for man-pack, vehicular, and airborne platforms. Efforts should focus on modular, open-architecture designs (e.g., SOSA, CMOSS) to ensure interoperability and ease of future upgrades.

- Regulatory and Compliance Pathways: All developed systems shall be designed with a clear path toward spectrum certification. Research shall include methodologies for demonstrating compliance with DoD (DD Form 1494), NTIA, and FCC requirements to ensure operational viability.

Robotic and Autonomous Systems (RAS) and Counter Robotic and Autonomous Systems (CRAS) - Research, development, and demonstration of robotic and autonomous systems across all domains (Space, Air, Surface, Ground, Underwater). Key efforts include:

- System and Payload Development: Research, development, test, and evaluation (RDT&E) of RAS and CRAS platforms and their integrated payloads, such as sensors, onboard computing, weapons, and deployment mechanisms.
- Advanced Control and Collaboration: Developing advanced control methods for individual systems and sub-systems to allow massive scalability for multi-RAS and CRAS "swarms" for both offensive and defensive missions.
- RAS and CRAS and Security: Engineering systems to test, train, integrate, and operate RAS and CRAS capabilities and ensure the security of unmanned platforms.
- Deployment Systems: Prototyping and manufacturing of RAS and CRAS deployment and recovery systems, including environmental mitigation, control electronics, and modular designs.

Cyber and Cybersecurity - Research, development, demonstration, test and evaluation of tools, techniques, procedures and processes that expand the state-of-the-art in cyber warfare, system security, and cyber engineering throughout the system lifecycle. Key efforts include:

- Offensive and Defensive Cyber: Developing advanced applications, tools, and technologies for vulnerability and adversarial assessments (e.g., red teaming), and implementing policy-as-code.
- System Security Engineering: RDT&E technologies such as anti-tamper, supply chain risk management (SCRM), and security from the microcode to the application layer.
- Platform-Specific Cybersecurity: Ensuring compliance with Department of War (DoW) standards for high-speed connector platforms and investigating novel cybersecurity methods.

Materials and Advanced Manufacturing - Research, development, and application of advanced materials and manufacturing processes to enhance the performance, reliability, and availability of military systems. Key areas of interest include:

- Advanced Materials: Developing materials for terrestrial, marine, and undersea applications that are lighter, stronger, and more resistant to corrosion and failure. This

includes finding alternative or surrogate materials that improve the performance and reliability for those with supply chain trust issues.

- Advanced Manufacturing: Exploiting processes like additive manufacturing and robotics for the fabrication of prototype hardware. This includes material science research to enable new materials for these advanced manufacturing technologies.
- Design for Manufacturing: Improving system designs for ease and cost-effectiveness, utilizing third-party Technical Data Packages or developed Technical Data Packages in long-term, production-level manufacturing, including supply chain analysis and cost reduction.
- Revitalization and Remanufacturing: Developing new methods for machinery revitalization, including inspection, cleaning, restoration, and upgrades to improve functionality and usability.

Modeling, Simulation, and Test & Evaluation - Research, development, demonstration, test and evaluation of technical capabilities from initial requirements through production by developing virtual prototypes and establishing robust testing standards. Key areas include:

- Modeling and Simulation (M&S): RDT&E of virtual prototypes to support component, system, and mission-level analysis, including hardware-in-the-loop, virtual/augmented reality, and simulations for weapon systems, supply chain risk, and cyber vulnerability.
- Test and Evaluation (T&E): Establishing new technology qualification standards to reduce development time and cost. This includes infrastructure and personnel to support T&E for Mine Warfare, Expeditionary Warfare, and other mission areas, as well as developing dynamic adversarial threats for realistic testing.
- Hydrospace Testing: RDT&E of systems designed for extreme environments, including hyperbaric/hypobaric conditions, extreme temperatures, and high pressure to ensure resilience. This includes unmanned life support testing, hyperbaric and hypobaric environment testing, extreme temperature testing, helium intrusion/soak, and internal/external pressure testing.

Warfare and Mission Areas - Research, development, demonstration, test and evaluation of technologies and systems for specific warfighting domains. Key areas include:

- Subsea and Seabed Warfare (SSW): RDT&E of technologies for underwater surveillance, counter-SSW, and ensuring access or denial to the maritime battlespace. This includes advanced sensors of all modalities, payloads, and systems for detecting, classifying, and neutralizing threats in deep-water environments.

- Expeditionary Warfare: RDT&E of technologies for expeditionary and littoral mission systems, including Power and Energy systems, mobility, Weapons, C5ISRT components, ISR, and RAS/CRAS.
- Maneuver Warfare: RDT&E of technologies that support rapid, flexible, and opportunistic maneuvers to disrupt an adversary's cohesion, manipulate their situational awareness, and deliver kinetic and non-kinetic effects.
- Mine Warfare (MIW) and Explosive Ordnance Disposal (EOD): RDT&E enhancing MIW and EOD capabilities with advanced sensors and payloads to detect, classify, identify, and neutralize threats. This also includes technology for battle damage assessment.
- Asymmetric Warfare: Rapidly develop and field systems to counter non-traditional or numerically superior threats. By combining scientific knowledge with operational experience, create innovative and cost-effective solutions that allow warfighters to respond effectively to asymmetric threats. This includes developing specialized hardware and software for a range of capabilities, such as unique payloads, advanced countermeasures, scalable weapons, special signals collection, tagging and tracking systems, and forensics.
- Infrastructure Protection and Offshore Energy: Scientific research and technology design, development, prototyping, demonstration, testing, and/or evaluation that addresses the growing importance of protecting infrastructure and offshore energy production. This area addresses the demand of advanced sensing capabilities, sensor products, and payloads that can monitor and secure these assets from underwater threats.
- Spectrum Warfare: RDT&E as well as the demonstration of technologies to control and exploit the electromagnetic spectrum. Key efforts include developing intelligent and networked sensors, high-power radio frequency (RF) systems, and communications that are difficult to intercept. The research also covers RF and infrared countermeasures, advanced optics, and improved methods for assessing and exploiting electronic threats.

Oceanography and Hydrography - Research, development, demonstration, test and evaluation of technologies for the accurate and detailed mapping of the seafloor and water column. Key areas include:

- Advanced Sensors and Payloads: RDT&E of sensors and payloads capable of collecting and analyzing oceanographic and hydrographic data.
- Geographic and Hydrographic Localization: RDT&E of technologies that enable geographic and hydrographic positioning in environments where GPS or other satellite navigation systems are unavailable.

Human Systems Integration (HSI) and Warfighter Performance - Research, development, demonstration, test and evaluation of optimization of the interaction between warfighters and technology to enhance performance, safety, and mission effectiveness. Key efforts include:

- Human-Computer Interaction (HCI): Researching augmented/virtual reality, advanced data visualization, wearable interfaces, and performance monitoring.
- Human-Autonomy Teaming: Designing interfaces and models to improve teamwork between humans and autonomous systems.
- Cognitive and Physical Performance: Developing technologies and methods to enhance human and team cognitive, physical, and behavioral performance, improve training, and optimize environmental conditions.
- AI for Human Performance: Utilizing AI/ML to aid in decision-making, threat detection, mission planning, and creating advanced analysis and design tools.

Logistics and Industrial Operations - Research, development, demonstration, test and evaluation of systems related to military transportation, logistics, and industrial processes. Key efforts include:

- Logistics Platforms: RDT&E of high-speed logistics platforms like Air Cushion Vehicles (ACVs) and wing-in-ground (WIG) effect vehicles, including innovative upgrades and payloads.
- Contested Logistics: RDT&E of capabilities for logistics in contested environments, including manned and unmanned platforms, packaging, and delivery mechanisms.
- Waterfront Industrial Operations: Enhancing the efficiency of industrial waterfront processes through automation, optimized system design, and improved program management and quality assurance tools.

Diving, Life Support, and Force Protection - Research, development, demonstration, test and evaluation of technologies that ensure the safety, security, and effectiveness of personnel in hazardous environments.

- Diving Systems: RDT&E of technologies for safe and effective diving operations, including thermal protection, navigation, underwater communication, propulsion, and diver tools.
- Life Support Systems: RDT&E of breathing loop in life support systems, including rebreathers, gas purification, masks, and sensors for use in undersea, land, and air applications.
- Anti-Terrorism/Force Protection: RDT&E of technologies and systems for anti-terrorism and force protection.

- Damage Control and Firefighting: Improving damage control and firefighting operations through better PPE, automation, and chemical/biological defense equipment.

Platform Design & Survivability (PDS) - Research, development, demonstration, test and evaluation focusing on enhancing the design and survivability of platforms intended for harsh, dynamic, and hostile undersea and coastal environments. The core objective is to ensure these platforms can avoid, defeat, and survive attacks. To achieve this, effort is directed towards three main areas:

- Advanced Tools: Developing better design and engineering tools to support the entire lifecycle of undersea systems, from development to maintenance.
- Efficient Manufacturing: Using advanced manufacturing technologies to enable faster, cheaper, and potentially remote production of these platforms.
- Stealth and Freedom of Operation: Improving the ability of platforms to remain undetected and operate without hindrance in future combat zones.

Undersea Precision Navigation and Timing (UPNT) - RDT&E highly accurate methods for determining position and timing for undersea assets, especially in challenging or hostile environments where traditional systems may fail. The primary goal is to ensure that undersea missions can be conducted with a precise understanding of location, which is critical for their success. The focus is on maturing existing technologies and developing new technology to maintain reliable and high-confidence navigation and timing capabilities.

Artificial Intelligence and Machine Learning (AI/ML) - RDT&E AI and ML to enhance MIW and SSW capabilities. Key areas include:

- Automated Target Recognition: Using AI to automatically identify mines, subsea targets, and infrastructure from sensor data.
- Threat Analysis and Task Automation: Employing analytics to detect, classify, identify, and neutralize threats by optimizing the use of resources and automating routine tasks for autonomous systems.
- Real-Time Decision Making: Developing autonomous systems that can react to live sensor data in real time.
- Advanced Communication: Using large language models (LLMs) to enable communication with operators over low-bandwidth channels.
- Efficient and Robust AI: Creating AI models that require less training data, can be updated quickly, and operate reliably in complex environments.
- Hardware Solutions: Developing specialized, low-power AI hardware to overcome the size, weight, power, and cost (SWaP-C) limitations of traditional GPUs.

Corporate Operations – Research, development, and demonstration of new and innovative software and business tools and techniques to support the Government Corporate Operation efforts.