



NAVSEA WARFARE CENTERS

Technical Capabilities Manual

CARDEROCK CORONA CRANE DAHLGREN EOD TECH DIV INDIAN HEAD KEYPORT NEWPORT PANAMA CITY PORT HUENEME



NSWC
Naval Surface Warfare Center



NUWC
Naval Undersea Warfare Center

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APPROVED BY


RDML James J. Shannon
Commander, Naval Surface Warfare Center

24 JUNE 2011
Date


RDML Thomas G. Wears
Commander, Naval Undersea Warfare Center

13 JUNE 2011
Date


Mr. Stephen E. Mitchell
Technical Director, Naval Surface Warfare Center

9 JUNE 2011
Date


Mr. Donald F. McCormack
Technical Director, Naval Undersea Warfare Center

9 JUNE 2011
Date

CHANGE RECORD

Date	Rev	Change Description
1/10/07	Baseline	Created baseline document from 23 Feb 06 version and latest status of TCs overlap resolution
2/27/07	1	Corrected description of DD30 that was entered incorrectly in 10 Jan 07 version Incorporated approved TC changes from 13 Feb 07 BOD TC Overlap meeting Converted all previously approved TC descriptions to Green headers and Black text and updated status of outstanding TC overlaps Changed Appendix B from TC Overlap Status Presentation to TC Approval Summary
7/20/07	2	Incorporated BOD decisions and status changes since Revision 1 Changed all Technical Capability titles to BLACK that were formerly GREEN, removing TC overlap resolution history Changed color code in TC overlap status table to indicate open issues as RED instead of YELLOW
01/01/08	3	Incorporated BOD decisions and status changes since Revision 2 resulting in no unresolved TC overlaps
12/08/10	3	(Addendum 1) Incorporated BRAC 2005 changes for Picatinny, moving CR02 to IH06 and PH05 to IH07
06/01/11	4	Incorporation of TCs for Explosive Ordnance Disposal (EOD) Division Incorporation of TCs for Naval Sea Logistics Center (NSLC) under Keyport Division Incorporation of Addendum 1 from Revision 3 Correction to title of DD10, adding "Surface" to title Update of Appendix A, Technical Capability Proposal, Review, and Approval Process General administrative corrections to Revision 3

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Executive Summary

This document lists and defines the current Technical Capabilities of the NAVSEA Warfare Centers.

The NAVSEA Warfare Centers (WC) are composed of the Naval Undersea Warfare Center (NUWC) and Naval Surface Warfare Center (NSWC). Together they cohesively and seamlessly operate the Navy's full spectrum research, development, test and evaluation, engineering, and fleet support centers for offensive and defensive systems associated with surface warfare, undersea warfare and related areas of joint, homeland and national defense systems from the sea.

NUWC has two Divisions with the lead locations in Newport RI and Keyport WA. Keyport Division has a second major site, Naval Sea Logistics Center, in Mechanicsburg, PA. NSWC has 8 Divisions with the lead locations in Carderock MD, Corona CA, Crane IN, Dahlgren VA, Indian Head MD, Panama City FL, Port Hueneme CA and EOD Tech Div in Stump Neck MD. Carderock Division has a second major site, Ship Systems Engineering Station, in Philadelphia, PA, and Dahlgren Division has a second major site, Combat Direction Systems Activity, in Dam Neck, Virginia. To accomplish their mission, the Divisions have specific and unique Technical Capabilities (TCs) which describe the work they perform. A TC is defined as:

A Technical Capability represents the blending of intellectual and physical assets provided by a cadre of technical people with knowledge, skill, experience and requisite facilities and equipment that yield the ability to deliver technical products. The work in a TC is core when the function enables the accomplishment of a Division's key mission element and/or is inherently governmental, particularly in the case of value judgments affecting technological superiority; i.e., the quality and effectiveness of weapons, combat systems, and ship systems.

This document publishes the FY11 baseline of WC TCs defined by the Divisions and approved by the Warfare Centers Board of Directors (WCBOD). TC nomenclature consists of a two letter Division/two number designator, followed by the TC title. Over the last year, TCs have been added to incorporate the Explosive Ordnance Disposal (EOD) Technical Division, and the addition of the Naval Sea Logistics Center (NSLC) to Keyport Division. Management and assessment of these TCs is performed at the Division and Headquarter/national level to help avoid competition and redundancy and ensure that efficiencies and synergies between the Divisions are realized.

This document will be reviewed and updated to maintain the national stewardship of Technical Capabilities identified in the Warfare Centers Concept of Operations (CONOPS). Appendix A describes the process for defining, proposing and reviewing TCs for potential addition to, or removal from, the FY11 baseline.

Carderock

CD01 Ship and Submarine Design and Integration

Provides naval architectural and integrated surface ship and submarine design analysis capability to support ship systems integrated designs for acquisition programs and to generate advanced concepts ship designs for future naval capabilities. Involves integration of the hull, mechanical and electrical (HM&E) systems technologies developed throughout the NAVSEA Enterprise. Carderock Division serves as the naval architectural total ship systems engineering agent for TWH at NAVSEA Headquarters and other customers requiring this capability within an in-house Navy organization.

CD02 Ship and Submarine Acquisition Engineering

Provides the engineering and technical expertise to support headquarters acquisition Program Offices throughout each stage of the life cycle. Performs functions of Ship Design Manager, Deputy Ship Design Manager, and Systems Engineering Manager in support of SEA 05 and acquisition program offices. Assures integrated technical solutions from all HM&E areas are developed and available to Program Offices/Lead Design Yards.

CD03 Ship and Submarine Systems Concepts, Technologies, and Processes

Provides the development, application, and advocacy of advanced concepts, technologies, and processes to support Total Ship Systems Engineering (TSSE). The following areas are included: information, software, and hardware integration and interoperability associated with ship design; information technology for ship life cycle support and other Navy needs; shipbuilding process improvements, product data acquisition, development, management, distribution, and use; ship costing, manpower, warfare assessment, and early stage design tool development and application; and development and application of collaborative teaming tools and environments.

CD04 Surface and Undersea Vehicle Machinery Systems Integration

Provides a coordinated, integrated approach for all surface ship and submarine major machinery programs. Includes test and evaluation initiatives, enabling technology insertion, and machinery integration into new acquisition programs and the deployment of machinery initiatives into the fleet. This capability provides an integrated approach to systems engineering for machinery systems that requires focus from multiple technical capabilities.

CD05 Combatant Craft and Marine Corps Vehicles

Provides naval architecture and marine engineering full spectrum, full life cycle support for the government's Combatant Craft and Boats and technical expertise for Marine Corps Vehicles and Marine Corps vehicle S&T programs. The synergistic integration of full spectrum, full life cycle boat/craft expertise and experience near the boat/craft fleet provides for unique capabilities. Provides boat/craft level integration for all naval architecture and marine engineering aspects of boat, craft and vehicle development including vehicles with all types of hull forms and mission requirements from unpowered, towed craft to high speed vehicles with dynamic as well as buoyant lift.

CD06 Unmanned Vehicles Naval Architecture and Marine Engineering

Provides Naval Architecture and Marine Engineering expertise and facilities for the design, development, and testing of unmanned vehicles and their physical integration with existing and future manned naval and MARCORPS vehicles; and the fielding of all unmanned surface vehicles and unmanned subsurface vehicles with increasing responsibility when the vehicle size is larger than torpedo diameters, and unmanned air and ground vehicles. In addition, provides Naval Architecture and Marine Engineering expertise and facilities for launch and recovery of those unmanned vehicles (excluding payloads) from ships and submarines.

CD07 Hull Forms and Fluid Dynamics

Provides the Navy's hydromechanics capability for surface and undersea vehicle platforms excluding small UUVs and torpedoes. Supports all marine vehicles, including surface ships, submarines, unmanned vehicles, and other craft by developing the technologies for systems and procedures that define the external shape of the vehicle, the control systems and control surfaces. These systems are necessary to ensure that the performance of each platform meets mission requirements for controllability, powering, mobility, seakeeping, and signatures. These characteristics, to a large part, determine the safety, efficiency, and affordability of the platform operation. Addresses vehicles with all types of hull forms and mission requirements from unpowered, towed vehicles to high-speed vehicles with dynamic as well as buoyant lift. Aspects of aerodynamics, including the assessment of ship topside performance and the ship/aircraft interface for all air-capable ships, are included. The Division provides the required, extensive and highly specialized model testing facilities necessary to fully support sponsors, and to develop and validate analytic tools used to design and/or assess alternatives to meet Navy requirements.

CD08 Propulsors

Provides assessment and design capability for Navy's propulsor for surface and undersea vehicle platforms (excluding small UUVs and torpedoes) including surface ships, submarines, unmanned vehicles, and other craft by developing the technologies, including Computational Fluid Dynamics, for systems and procedures to design, assess, test, and verify propulsor performance. These systems are necessary to ensure that the performance of each propulsor meets mission requirements for effectiveness, produceability, size, weight, and signatures. These characteristics, with structural and material properties, determine the safety, efficiency, and affordability of the propulsor. Extensive and highly specialized model testing facilities, including the Large Cavitation Channel, water tunnels, and towing basins, necessary to fully support sponsors and to develop and validate analytic tools used to design and/or assess alternative propulsors to meet Navy requirements are included. The quiet, efficient propulsor design capability included in this TC does not exist elsewhere in the world. Industry does not have this capability, nor does it exist outside the U.S.

CD09 Surface and Undersea Vehicle Mechanical Power and Propulsion Systems

Provides full spectrum support for the engines (non-nuclear), reduction gears, shafting, bearings and associated mechanical components, which provide mobility, range, and endurance to surface ships, submarines and craft. Specific items include gas turbine, internal combustion, and steam power systems, equipment, and components; main propulsion reduction gears, clutches, brakes, couplings, thrust bearings, shafting components, and propulsors. Principal functions performed are the research and development, test and evaluation, and life cycle management of mechanical power and propulsion systems and equipment.

CD10 Surface and Undersea Vehicle Electrical Power and Propulsion Systems

Provides full spectrum support for the electrical power and propulsion generation, conversion and distribution systems for surface ships, submarines and craft. Specific items within this technical capability include electric power and propulsion generators and motors, current collectors, high power energy storage devices, switch gear, power conditioning devices and equipment, and electric distribution systems, pulse forming networks, and equipment as applied to ship's prime power and propulsion. Principal functions performed are the research and development, test and evaluation, and life cycle management of electrical power and propulsion systems and equipment.

CD11 Surface and Undersea Vehicle Auxiliary Machinery Systems

Provides full spectrum support for the critical infrastructure systems and equipment that support all aspects of operation such as propulsion, power generation, combat systems, life support, weapons, acoustics, depth, and maintenance for surface ships, submarines and craft. Specific items include pumps, air compressors, hydraulics, piping and valves, actuators, distillation plants, oxygen generators, heat exchangers and cooling systems and equipment. Principal functions performed are the research and development, test and evaluation, and life cycle management of auxiliary machinery systems and equipment.

CD12 Surface and Undersea Vehicle Hull, Deck, and Habitability Machinery Systems

Provides full spectrum support for systems and equipment which provide the intra-ship materiel and weapons handling and stowage, boat, vehicle and aircraft handling, navigation, closures and habitability and hotel service systems. Specific items include: anchor windlasses, boat davits, conveyors, cranes, elevators (aircraft, cargo, weapons, and personnel), escalators, hoists, submarine hydraulics, torpedo handling, minesweeping handling, steering, helicopter hangar doors, life lines, safety nets, doors, hatches, scuttles, food service, galley, laundry and dry cleaning, lavatories and berthing equipment. Principal functions performed are the research and development, test and evaluation, and life cycle management of hull, deck and habitability machinery systems and equipment.

CD13 Surface and Undersea Vehicle Machinery Automation, Controls, Sensors and Network Systems

Provides full spectrum support for the devices, systems, applications, connectivity, and interfaces that provide the enabling smart-ship driven digital technologies and programs. Functions include performance detection and monitoring, control, unmanned machinery operation, automated navigation, and distribution of information for machinery systems and components. They enable situational awareness, fault detection and corrective action, intelligent reconfiguration and redistribution of vital systems, and reduction of human involvement in machinery operation and decision making tasks. Principal functions performed are the research and development, test and evaluation, in service engineering, software support, and life cycle management of machinery automation, controls, sensors and network communications systems and equipment.

CD14 Surface, Undersea, and Weapon¹ Vehicle Materials

Provides RDT&E, acquisition support, and In-Service Engineering for Surface, Undersea and Weapon Vehicle Materials (excluding torpedoes, small UUVs and energetics). Includes certifying and validating technical requirements for all materials used in the fleet; supporting Navy safety standards; identifying materials and fabrication processes; analyzing engineering mechanics and fitness for purpose; developing and validating chemical formulations; and metallic and non-metallic tests and characterizations; fabricating and testing prototypes of ship systems and components; and developing materials and processes for survivability systems, sea borne signature reduction, ship structures, weapons, and propulsion and auxiliary machinery systems.

CD15 Surface and Undersea Vehicle Structures

Provides full spectrum RDT&E, acquisition support and ISE agent for surface ship and submarine structures. Includes identifying new structural concepts and materials applications; identifying potential failure modes; developing and validating methods to predict seaway, ice-breaking, and other loads; developing and validating structural analysis and design procedures; proven analytical and experimental procedures to support ship design; confirming designs through analysis, model tests, sea trial, and deep dives; and ISE support.

CD16 Alternative Energy and Power Sources R&D

Provides the R&D personnel, equipment, facilities, and necessary body of knowledge to investigate, develop and implement programs in emerging alternative energy source technologies. Combines the strengths of the Navy's recognized leaders in electrochemical power sources (e.g. batteries and fuel cells) R&D and leadership in marinization and ship integration with other disciplines such as nuclear technologies, biotechnology, physics, materials science, and shipboard electric power systems enabling the development of energy source specifications, which effectively address safety and environmental issues as well as performance requirements. Includes certification of advanced technology energy/power sources.

CD17 Liquid Waste Management, Science and Systems

Provides full spectrum support necessary to equip Navy ships and shore operations with liquid waste collection, transfer, management, treatment and discharge procedures, equipment, and systems that are best suited and/or designed to meet the unique requirements within the constraints of the warship environment (e.g., environmental

¹ Weapon – Missiles Only

compliance, space, weight, stealth, noise, logistics, manning, etc.). Includes the prevention, management and cleanup of liquid waste spills. Provides the body of knowledge to sustain stewardship of liquid waste systems throughout their life cycle; ensures independent and objective testing, validation and integration of products; and provides teaming/partnering with industry and academia to ensure technological superiority for the future fleet's war fighting systems.

CD18 Solid Waste, Hazardous Material, and Radiation Technology Management, Science and Systems

Provides full spectrum support necessary to equip Navy ships and shore operations with solid waste and hazardous (solid, liquid and gaseous) material collection, management, transfer, treatment and discharge procedures, equipment, and systems that are best suited and/or designed to meet the unique requirements within the constraints of the warship environment (e.g., environmental compliance, space, weight, stealth, noise, logistics, manning, etc.). Provides the body of knowledge to sustain stewardship of solid waste and hazardous material management systems throughout their life cycle; ensures independent and objective testing, validation and integration of products; and provides teaming/partnering with industry and academia to ensure technological superiority for the future fleet's war fighting systems.

CD19 Advanced Logistics Concepts and HM&E Life Cycle Logistics Support

Provides R&D for Navy logistics support technology and develops and maintains Integrated Logistics Support (ILS) products for HM&E equipment and systems in the Fleet and for Army watercraft. Products and services include: Concept development, R&D, T&E, Modeling and Simulation, Cost/Benefit Analysis, Designs and Specifications Hardware, Technology Transition, Knowledge/Tech. Base, and Management Support. Specific Areas of expertise and programs include: Life Cycle Engineering, Logistics Technical Documentation, Logistics Information Technology, Condition-Based Maintenance, Logistics Systems Analysis and Modeling, Offshore Basing, Materiel Support and Automated/Prognostics Maintenance. Provides Navy-wide logistics R&D, and RDT&E, Fleet Support, and In-Service Engineering for Fleet HM&E Logistics Systems (including ordnance, material, boat and vehicle handling systems), ensuring mission sustainability where and when needed. Examines development and application of technologies pertinent to transportation and transfer of personnel and material; maintenance, diagnostics, and repair of surface and subsurface vessels and marine vehicle systems; development and maintenance of logistics technical documentation for HM&E systems; digital Logistics data environments, and ILS planning, management and implementation.

CD20 Surface, Undersea and USMC Vehicle Vulnerability Reduction and Protection

Provides full spectrum support for submarines, surface ships, boats, crafts and vehicles. Vulnerability and protection products are the technologies, engineering and systems necessary to ensure that all Navy platforms have the lowest vulnerability and highest survivability possible. Products apply to the platforms, and onboard systems and equipment. Functions performed include the full spectrum of RDT&E, acquisition support and ISE for new designs and for alterations to current platforms. Products include damage tolerant hull forms and structures to UNDEX and AIREX threats; shock and live fire trials, and surrogate ship tests; survivability and vulnerability analyses and assessments; weapons loading and effectiveness assessments; design guidance and analyses of alternatives; tests, analyses and assessments for achieving acquisition program LFT&E objectives; vulnerability modeling technologies and tools development and utilization; battle force survivability assessments; system and equipment shock hardening evaluation and protection; and improved armor and protection concepts to protect all platforms from current and emerging, conventional and asymmetric threats.

CD21 Ship Recoverability and Damage Control

Provides full spectrum support for ship recoverability and damage control. Products are the technologies, engineering, equipment, systems, procedures, and logistics necessary to ensure that all Navy ships and submarines are safe to operate and have the optimal recoverability while in theater and during peace time accidents. These products apply to the platform, systems/equipment, and onboard personnel. Functions performed include RDT&E, design and acquisition support, and engineering for new ship and submarine designs, and in-service engineering and alterations for current vehicles, systems, and equipment. Ship products include damage control and firefighting systems and equipment; damage control sensor systems and equipment, including fire and smoke detection; design guidance and analyses of alternatives; fire resistant and fire safe materials; automated and conventional damage control systems and processes; damage control training; and damage control/recoverability analyses, assessment, tests and trials. Additionally, in-service engineering is provided for individual protection and decontamination for Chemical, Biological and Radiological (CBR) defense aboard ship and for Navy land-based forces; CBR defense equipment stowage and readiness improvement; collective protection systems; damage stability analysis; and equipment for floatation and survival-at-sea.

CD22 Surface and Undersea Vehicle Underwater Signatures, Silencing Systems, and Susceptibility

Develops technologies and methodologies employing stealth concepts to reduce ships (also submarine, unmanned vehicle, and craft) underwater signatures. Silencing

concepts and products are developed from mission requirements factored with existing technology along with materials and cost considerations. In their primarily military application, the products reduce the signature at its source, reduce the signature before it is radiated, and/or impedes the return of threat sensor energy to its source (echo mitigation). Includes all Ships, Submarines, boats, craft, and vehicles; silencing approaches, materials, hardware, machinery and systems to reduce ships signatures; research in radiated noise, structureborne noise, structural acoustics, sonar self-noise measurement and analysis, propulsor noise, acoustic materials, machinery noise, ship vibration and airborne noise, magnetic and electric signatures, and synergistic concept integration for future quiet ships and submarines with increased tactical mission envelopes; acoustic and magnetic/electric signature measurement facilities, equipment, techniques, and sensors, including onboard systems to monitor and mitigate signatures; the relationship of marine structures to target echo structure, the mitigation of target echo by passive means through structural design and echo reducing materials suitable for marine applications; precision active acoustic measurements and data reduction, analysis, and interpretation on full-scale and large models; measurements and analysis of radiated noise, structureborne noise, structural acoustics, sonar self noise, propulsor noise, machinery noise systems; acoustic target strength, and magnetic and electric fields. Supports the fleet by providing awareness of signature deficiencies and capabilities, aiding in the resolution of deficiencies, and providing and maintaining reference systems for ships' signatures. Develops and maintains databases and formats for calibrated U.S. and Rest of World ship signatures. Provides corporate scientific and engineering knowledge and facilities for planning, developing, systems engineering and integration of synthetic signature generation. Develops all signature-related SIM/STIM and their incorporation into signature-based training systems. Also includes systems/procedures for the collection of calibrated signature of Rest of World and threat platforms and assessment of the ability of threat systems to exploit ship and submarine underwater signature characteristics and advice to operating forces on how to minimize own ship/submarine signatures and susceptibility.

CD23 Surface and Undersea Vehicle Non-Acoustic Topside Signatures, Silencing Systems, and Susceptibility

Develops technologies and methodologies employing stealth concepts to reduce ships (submarines, surface ships, boats, crafts and vehicles) topside signatures. Silencing concepts and products develop from mission requirements factored with existing technology and materials, and cost considerations. In their primarily military application, the products reduce the signature at its source, reduce the signature before it is radiated, and/or impede the return of threat sensor energy to its source. Includes all Ships, Submarines, boats, craft, and vehicles: signature mitigation approaches, materials, hardware, and systems to reduce topside signatures; research in radar cross-section (RCS), infra-red (IR), and electro-optical/visual (EO/Vis); topside signature measurement facilities, equipment, techniques and sensors, including onboard systems to monitor and mitigate signatures; the relationship of marine structures and equipment to RCS, IR, and EO/Vis, the mitigation of the signature by passive means through structural design,

shaping, and signature mitigation materials suitable for marine applications; measurement, analysis, and interpretation of full-scale, model, and topside components signatures; recommendation of system and component signature requirements; assessments of signatures of existing ships; signature predictions of notional vessels based on modeling and simulation; design change recommendations to mitigate topside signatures of existing and future ships; advanced electromagnetic signature theories; formulations, manufacturing processes and measurement techniques for low-observable materials, coating, and equipment; system designs for backfits, new construction, and countermeasures; and Fleet support. Also includes the assessment of the ability of threat systems to exploit ship and submarine topside signature characteristics throughout the kill chain and advice to operating forces on how to minimize own ship/submarine susceptibility.

CD24 HM&E for Undersea Vehicle Sail Systems and Deployed Systems

Provides full spectrum support for HM&E for submarine sail and deployed systems used to communicate, navigate, and conduct surveillance and intelligence in an undersea and littoral environment. Specific items within this technical capability include the sail mounted and deployed (buoy and floating wire) antenna, periscope, snorkel, imaging and electronic warfare (I&EW), and radar systems. Of critical importance is the operation of the Hull, Mechanical and Electrical components, which raise/lower or deploy/retrieve sensors from the submarine. Principal functions performed are the research and development, test and evaluation, engineering, SUBSAFE certification, and life cycle management of undersea vehicle sail and deployed systems and equipment.

Corona

AC01 Warfare Systems Performance and Readiness Assessment

Provide Readiness and Performance Assessment of deploying and deployed complete weapons systems and combat systems using consistent, government approved criteria, processes, and methodologies. Provides customers with objective measures of systems and force-level warfare capability in threat-representative scenarios and operational environments. Manages the operational collection, distribution, and analysis of Navy, Joint, and coalition warfare system data. Identifies and evaluates factors that enhance or limit systems capability and effectiveness. Provides the analytic framework to identify performance issues and validate corrective actions. Assesses Navy material readiness. Applies standard measures of readiness to gauge material condition and mission capability. Determines readiness trends and drivers, performs diagnostics and prognostic analysis, and verifies effectiveness of material-based corrective actions. Develops and maintains authoritative databases for providing both performance and readiness metrics of combat and weapons systems.

AC02 Quality and Mission Assurance Assessment

Provides Quality and Mission Assurance Assessment to identify, define, and implement cost effective, disciplined, and agile technical and management processes to assure the successful acquisition and fielding of defense systems. A critical capability provided is the Government's independent and objective technical assessment of quality-related strategy, requirements, processes, and practices performed over the system's lifecycle to identify and mitigate design, production, test, and sustainment issues. This provides a context within which program managers can make informed decisions to assure the effective application of credible systems engineering, risk management, quality, logistics support, and technical management principles. A key component of this capability is the role of authoritative source and manager of quality-related data exchange systems. Research and expertise is also provided to develop top-level quality and mission assurance guidance, policy, and standards for the defense acquisition community including OSD, Military Services, Defense Agencies, Systems Commands, PEOs, and Program Managers.

AC03 Metrology, Test, and Monitoring Systems Assessment

Serve as the United States Navy's Metrology and Calibration (METCAL) Program's primary technical agent. Provide METCAL technical support for the Navy METCAL Executive Director, all Navy and Marine Corps acquisition program managers, and Systems Command METCAL program managers. Assess technical measurement

requirements and capabilities for the Navy to ensure that metrology and calibration support is in place; that measurement technology keeps pace with advancements in combat systems, weapons, and test equipment technology; and that measurements are accurate and traceable to national standards. Develop, evaluate, approve, and implement test equipment calibration procedures, weapon system calibration support plans, and measurement standards for calibration laboratories. Serve as the Navy's Subject Matter Expert for calibration and metrology training. Establish and optimize calibration intervals for all Navy test equipment to ensure measurement reliability targets are met at the most efficient cost. Manage and provide technical oversight for the Navy and Marine Corps calibration laboratory audit and certification program. Perform research and development of new measurement standards to fill national measurement capability deficiencies that impact Navy weapon system development, testing, operation, and maintenance. Develop engineering prototypes for new measurement and calibration technologies. Coordinate Joint Service metrology initiatives and represent the Navy on the Joint Logistics Commander's Joint Technical Coordination Group for Calibration and Measurement Technology to ensure that the maximum benefit of cooperative metrology efforts is achieved. Employ test and measurement engineering, diagnostics, quality, and process control disciplines to measure the capability of testing in support of development, production, and servicing of Navy weapon and combat systems.

AC04 Force Training Assessment

Provides training feedback to operational naval forces and the Navy-wide training community for in-port and at-sea exercises throughout the Fleet Readiness Training Cycle. Enables Fleet trainers and ships force to rapidly determine operational performance as well as training effectiveness, from individual console operators through Strike Group operations. Engineers and integrates specialized data collection, reduction, display, distribution instrumentation and networks to support Navy range data management requirements to enable consistent and standardized exercise reconstruction and analysis used to determine military proficiency and combat system performance. Provides engineering, acquisition, and Operation and Maintenance (O&M) management for Navy air and surface Tactical Training Range systems. Provides air and surface range system replacement and modernization. Based on Fleet training objectives, plans the application of and provides range tracking instrumentation, electronic warfare, weapons scoring, and communication systems for unit level, intermediate, and advanced training by squadrons, Airwings, Carrier and Expeditionary Strike Groups (CSGs/ESGs), and Joint Force Exercises. Performs Operational Assessments of new air and surface range systems and upgrades/enhancements to determine effectiveness and suitability.

AC05 Weapons Systems Interface Assessment

Provides mechanical interface assessment services throughout the life cycle to assure interchangeability, interoperability, inspectability, and maintainability of weapon system, sub-system, and critical components. During pre-production phases support the RDT&E lead to assure design tolerances allow for interchangeability, determine critical features, analyze component fit at assembly, and determine appropriate inspection methods. During production provide and certify Navy Gages, evaluate contractor gages and methods of inspection, and evaluate the effect of design changes on interchangeability. In post production phases continue evaluation of changes and support maintenance activities for gages to assure the integrity of interfaces. Perform special investigations on gage interface issues experienced by the Fleet. Special investigation tasks include analyzing the problem, determining root cause, developing a plan of action, and fielding corrective measures. Provide measurement support to a wide variety of customers in the Measurement Science and Technology Laboratory by measuring large geometries to accuracies of 90 millionths of an inch, and small linear objects to accuracies of 3 millionths of an inch.

Crane

CR01 Strategic Systems Hardware Engineering, AE, and Sustainment¹

Provides full spectrum life cycle management functions to provide safe, reliable and effective hardware, ordnance and power systems to the Strategic Missions Community. Provides design, development, test and evaluation, logistics management, and sustainment of mechanical, electrical, small ordnance and power systems to enhance or sustain the overall performance of the weapons system throughout its life cycle. Provides design and development, technology insertion, modeling and simulation, acquisition support, obsolescence management, test and evaluation of high reliability products, quality evaluation, failure analysis, logistics support, demilitarization/disposal and sustainment functions for strategic missions electronics and ordnance systems.

CR03 Special Operations Hardware In-Service Engineering, Procurement and Sustainment¹

Provides full spectrum (only limited basic research and exploratory development), life cycle support functions to provide safe, reliable and effective special missions hardware primarily for use by the individual warfighter including weapons, munitions, and electronic systems for Special Operations and Expeditionary Forces. Support includes requirements analysis, design, rapid prototype, combat development, integration, deployment, engineering support, test and evaluation, qualification, failure analysis, acquisition, logistics and field support. Weapon systems include small arms (less than 20mm). Munitions include small arms ammunition, hand emplaced and man-portable anti-personnel and anti-material munitions. Electronic systems include electro-optic and visual augmentation sensors, electronic warfare, explosive detection, personnel and vehicle scanning and command and control systems. Hardware provides communications, surveillance, detection, tracking, targeting and engagement capabilities in support of special missions for Department of Defense and Department of Homeland Security.

¹ Sustainment - Sustainment of a weapon system consists of the system engineering tasks dedicated to ensure that a fully developed weapon system continues to meet the needs of warfighter until the system taken out of service. These tasks include production engineering support, performance enhancements, maintenance, overhaul, obsolescence management, technology refresh, procurement strategies and acquisition support, configuration management, logistics support, reliability and maintainability analysis, testing and evaluation and working with the industrial base to find the most cost effective strategy for sustaining the system.

CR04 Electronic Warfare (EW) Systems RDT&E/Acquisition/Sustainment¹

Provides technical leadership and execution throughout the lifecycle for air, ground, undersea, and surface EW, including SIGINT and IO systems. Leads research and development, system engineering, acquisition engineering and logistics, Test and Evaluation (T&E), design verification, and TECHEVAL / OPEVAL for all surface and undersea EW elements, and for all ground and air EW capabilities. Develops EW system and element technical requirements. For surface and undersea EW, provides the cohesive EW element for Combat Systems Integration and supports the integration effort. Collaborates with other Warfare Center activities to facilitate the transition of new technologies into existing and planned EW capabilities. Supports higher level Combat System activities relative to the evolutionary acquisition strategy. Leads logistics support services for fielded air, surface and undersea EW systems including supply chain management, performance assessments, continual technical refresh, obsolescence management, configuration control, data management services, and maintenance, overhaul and depot repair.

CR05 Radar Component Sustainment¹

Provide facilities, processes, and skilled personnel required to perform depot level refurbishment, obsolescence engineering, and production engineering support, for the development, acquisition and support of existing radar systems, including the continuing spiral development of existing radar systems, and the support of legacy radar systems. Services include systems engineering to determine cost effective solutions for obsolete and difficult to procure parts, and assistance to industry with manufacturing technology solutions. Provide reverse engineering services or subsystem/component redesign when necessary to maintain system supportability. Provide obsolescence engineering for radar system components, providing the expertise and knowledge to formulate cost effective solutions. Services include predictive obsolescence management, technical analysis, and engineering services such as redesign, development and limited prototyping and manufacturing in response to problems with Diminishing Manufacturing Sources.

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CR06 Energy and Power Source AE, ISE, T&E and Sustainment¹

Provides comprehensive life cycle management functions to provide safe, reliable and effective batteries and other energy storage and power source devices. Includes engineering expertise and facilities to provide industrial base support services for batteries and other energy storage and transfer devices (fuel cells, uninterrupted power supplies, solar cells, power supplies and ancillary equipment). Services include: product improvement, requirements definition, design, development, prototyping and limited production, acquisition and acquisition engineering, standardization, test and evaluation, safety certification of high energy battery systems including lithium technology, technology evaluation and insertion, production engineering, in-service engineering, obsolescence management, maintenance, Fleet training and system retirement.

CR07 Acoustic Sensors AE, ISE and Sustainment¹

Provides acquisition, acquisition engineering, test and evaluation, production engineering, in-service engineering (including alterations) and integrated logistics concepts for Acoustic Sensors (assigned systems). Includes engineering, technical, logistics, surge production, maintenance, overhaul, and depot repair, and extensive acoustic test facilities. Includes teaming with the Fleet, industry and other Government Activities to provide solutions to problems at the product level. Products include sonobuoys, transducers, underwater cables, acoustic countermeasures, countermeasure launchers, and underwater communication devices.

Note: In FY 09, Crane transitioned underwater countermeasures, countermeasure launchers, and underwater communications work to Keyport and transitioned its sonobuoy work to NAVAIR Pax River.

CR08 Microwave Technologies RDT&E, AE and Sustainment¹

Provides comprehensive life cycle management functions to provide safe, reliable and effective microwave technologies components, which include Solid State and Vacuum

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Electron (Microwave Tube) devices, for military Electronic Warfare, Sensor, and Communication systems. Includes research, design, acquisition engineering, procurement, testing and evaluation, qualification, failure analysis, sustainment, in service engineering, and engineering expertise necessary to develop, improve, and sustain military Electronic Warfare, Sensor, and Communication systems. Services provided include RDT&E, AE and Sustainment of microwave technologies components utilizing the Systems Engineering process; Executive Agent for DoD Microwave Tubes; Navy Radar Microwave Tube acquisition engineering and in service engineering, including Fleet/ship problem investigations, system requirements determination, performance based logistics management, reliability and maintainability analysis, manufacturing audits, organic qualification testing of microwave technologies components, and specialized microwave laboratory test equipment design.

CR09 Microelectronic Technologies RDT&E, AE and Sustainment¹

Provides comprehensive life cycle management functions to provide safe, reliable and effective electronic products. Provides design and development, obsolescence management and solutions, reverse engineering, technology insertion, modeling and simulation, open system engineering, product assessment, electronic packaging, technology roadmapping, acquisition support, development of test requirements and test systems, test and evaluation of high reliability products, quality evaluation, failure analysis, logistics support, rapid response prototypes, manufacture, demilitarization/disposal and sustainment function for electronics products and sub-systems. Performance Based Logistics (PBLs), progressive maintenance and distance support capabilities are included. Products include microcircuits, circuit cards, interconnect technologies, electronic controls, computers and displays, and other electronic assemblies.

CR10 Infrared Countermeasures and Pyrotechnic RDT&E and Sustainment¹

Provides comprehensive life cycle management functions to provide safe, reliable and effective infrared countermeasures, countermeasures systems, and pyrotechnics for a variety of functions including platform self-protection, target enhancement, illumination

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and signaling and marking. Provides total life cycle support except research, development and scale-up of energetic materials for all Navy infrared countermeasures, countermeasures systems and pyrotechnics. Provides Navy expertise and leadership for infrared countermeasures, countermeasures systems, and pyrotechnics

CR11 Defense Security Systems AE, ISE and Sustainment¹

Provides acquisition, acquisition engineering, test and evaluation, production engineering, in-service engineering (including alterations) and integrated logistics concepts to achieve total security solutions for safeguarding personnel, property and material aboard Navy ships and at Navy, Marine Corps and other DoD shore installations and activities. By coupling extensive knowledge of physical security with a workforce skilled in design, acquisition, logistics and integration, the capability acts as a technical agent providing dynamic, regionalized, integrated force protection solutions employing the latest in COTS electronic and physical security equipment.

CR12 Navy Electronics Depot

Provides facilities, capital equipment, processes, and skilled personnel required to sustain the readiness of in-service surface warfare systems and equipments. This involves performing diagnostics and fault identification, depot level repair, overhaul, and the test and subsequent calibration required to provide ready for issue items to various DON and DoD material stock systems. This capability also includes the development and establishment of all required test capability, procedures, and repair and test standards for the depot. Products typically include various types of electronic modules, electronic components, displays, circuit cards, power supplies, and other miscellaneous electronic assemblies or sub-assemblies as assigned.

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CR13 Electro-Optic, AE, ISE and Sustainment¹

Provides full spectrum life cycle support functions to provide safe, reliable, and effective visual augmentation, electro-optic sensors and laser surveillance and targeting devices. Services are provided for the acquisition support and sustainment of surface systems and include development, acquisition, test and evaluation, systems engineering, sustainment, fielding and improvement of electro-optic man portable air and vehicle mounted electro-optic systems. Electro-optic products provide sighting, surveillance, detection and tracking of targets for both combat and non-combat missions.

CR14 Obsolescence Management

Provides the expertise and knowledge to formulate warfare center obsolescence engineering/custom engineered solutions policies; develop and manage standards, analysis tools, and processes; and provide these to the warfare centers to support logistics and acquisition communities in performing analysis to extend service life and lower life-cycle costs of in-service components, systems and platforms associated with surface warfare systems. This includes performing predictive obsolescence management; technical analysis and engineered solutions to mitigate current/future obsolescence problems; development and application of emerging repair and maintenance technologies; and affordable, rapid repair and manufacturing for resolution of unanticipated logistics requirements. This capability includes skilled personnel with specialization in component obsolescence research, reverse engineering commercial/emerging technology application/adaptation, hardware design and integration, and material qualification.

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EOD Tech Div

ED11 Threat and Countermeasure Information Development and Dissemination for EOD, IED, and CREW

Provides corporate Explosive Ordnance Disposal (EOD), Foreign Material Acquisition (FMA) and Exploitation (FME), intelligence analysis, electronic and mechanical engineering, and EOD response procedural development knowledge and facilities to collect information regarding Improvised Explosive Devices (IEDs), Improvised Nuclear Devices (IND), Weapons of Mass Destruction (WMD) and conventional & unconventional ordnance; perform analysis of IEDs, INDs, WMDs, conventional & unconventional ordnance and associated components and enemy tactics, techniques, and procedures (TTPs); develop systems of relevant data to support EOD-related decision-making and response capabilities; and develop and deliver threat information and countermeasures—dissemination methods for the Joint Service EOD (JSEOD) community.

Provides operational and tactical Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (CREW) life cycle integration of data and data management to support delivery of authoritative information for CREW systems, threat characteristics and countermeasure information for CREW developers and users worldwide."

ED12 Technology Development and Integration for EOD, IED, and CREW

Provides corporate scientific and engineering knowledge and facilities to develop and integrate the technologies required to provide the Joint Service Explosive Ordnance Disposal community the ability to Detect/Locate, Access, Identify, Render Safe, Recover/Exploit, and Dispose of conventional ordnance, weapons of mass destruction (WMDs) and Improvised Explosive Devices. The capability includes Science and Technology (S&T); Research, Development, Test, and Evaluation (RDT&E); and Acquisition efforts to identify, develop, deliver, and provide full life-cycle support for EOD-related sensors, explosive detection equipment, ordnance locators, unmanned ground vehicles (robots), underwater/countermine technologies, radiographic equipment, explosive neutralization tools, disruptors and robotic capabilities to permit remote access, identification, neutralization and recovery of IEDs and associated components.

Provides corporate scientific and engineering knowledge and facilities to develop and integrate the technologies required to provide the Counter Radio-Controlled Improvised Explosive Device (IED) Electronic Warfare (CREW) systems. The capability includes Science & Technology (S&T) for both JSEOD users and the JCREW community. This capability also includes Research, Development, Test, and Evaluation (RDT&E) and Acquisition efforts associated with the development, delivery and the full life-cycle support of Counter Radio-Controlled IED Electronic Warfare (CREW) technologies for JSEOD users.

Dahlgren

DD01 Force and Surface Platform Level Warfare Systems Analysis and Modeling

Provides the ability to identify the strengths and weaknesses of warfare systems (with exception of USW) in meeting national objectives; conducts special studies to evaluate the effects of modifying force structure, mission effectiveness, target selection, tactics, techniques and procedures, CONOPS development, and science and technology guidance. Provides assistance in developing requirements and options for future forces, evaluating variations in threat scenarios and impacts of technologies, and assessing comparative capability versus costs for Forces, Warfare Mission Areas, and complex System-of-Systems within the Naval environment.

DD02 Weapon Systems Analysis, Effects, and Effectiveness

Provides the ability to identify the strengths and weaknesses of weapons systems (with exception of USW) in meeting national objectives; conducts special studies to evaluate the effects of modifying force structure, targets, or tactics, and provides science and technology guidance. Provides assistance in developing and improving weapon systems, evaluating variations in threat scenarios and impacts of technologies; assessing comparative capability versus costs; assessing effects of kinetic and non-kinetic weapons systems on targets and identifying means to counter the effects; and assessing effectiveness of new weapons systems to achieve desired goals.

DD03 Radar and Electro-Optic Systems RDT&E

Provides investigations into promising Science and Technology thrusts for potential maturation and transition into Radar and Electro-Optic Systems. Provides for the research, development, test and evaluation (RDT&E) of radar and electro-optic sensors for naval systems. This function is full spectrum, including RDT&E of exploratory, advanced and engineering development sensors and systems as well as sensor development support and software support agent functions, for the development and acquisition of new radar systems, and the continuing spiral development of existing radar systems. Testing and evaluation services are provided from concept exploration through developmental testing. During formal DT/OT, testing and evaluation support emphasis shifts to providing data analysis and system expertise with this support continuing as necessary after the DT/OT. Also provides worldwide quick reaction support to the fleet to develop new sensors, modify existing sensors and to develop and evaluate sensor performance and countermeasures in times of crisis.

DD04 Surface Warfare Systems Engineering and Integration RDT&E

Provides for the specification and leadership necessary to develop warfare systems architectures including the design and integration of RDT&E for the Navy's surface force operating in the joint environment. Includes analysis, architecture and technology development for warfare systems. Also includes all the capabilities, functions, components, trade studies and elements required to systems engineer and develop warfare systems as well as adapting and transitioning new technologies and advanced capabilities to meet changing requirements.

DD05 Surface Combat Systems Engineering and Integration RDT&E

Provides investigations into promising Science and Technology thrusts for potential maturation and transition into Surface Combat Systems. Provides the RDT&E necessary to specify and develop combat system capabilities and architectures, including design and integration at the component, element and system level for the Navy's surface ships to optimize their effectiveness in the joint operational environment. Includes analysis, technology development, trade studies, integration and evaluation, and testing of combat systems. Also includes all the capabilities, functions, components, and elements required to systems engineer, develop, test, and support the combat systems architecture and integration from conception through fleet introduction. Performs Combat Systems Development support for fielded systems, adapting and transitioning new technologies, affecting architectural migration and advancing system and subsystem capabilities to meet changing requirements. Lead modeling and simulation (M&S) Verification, Validation, and Accreditation (VV&A). Develop and instantiate standards and process for models used in system development, testing, and certification. Provides Systems Engineering leadership for Acquisition activities.

DD06 Surface Combat Control Systems S&T, RDT&E

Provides investigations into promising Science and Technology thrusts for potential maturation and transition into Surface Combat Control Systems. Provides for the specification and leadership enabling the development and support of combat control systems RDT&E for the Navy's surface ship fleet. Includes analysis, architecture development and engineering, technology development, integration and evaluation, and testing of combat control systems. Also includes all the capabilities, functions, components, trade studies and elements required to systems engineer, develop, test, and support the combat control systems from conception through fleet introduction. Performs Combat Control systems development support for fielded systems, adapting and transitioning new technologies, affecting architectural migration, and advancing system and subsystem capabilities to meet changing requirements. Provides Systems Engineering leadership for Acquisition activities.

DD07 Surface Conventional Weapon Control Systems RDT&E

Provides investigations into promising Science and Technology thrusts for potential maturation and transition into Surface Conventional Weapon Control Systems. Provides for the specification and leadership enabling the development and support of conventional weapon control systems RDT&E for the Navy's surface ship fleet. Includes analysis, technology development, integration and evaluation, and testing of conventional weapon control systems. Also includes all the capabilities, functions, components, and elements required to systems engineer, develop, test, and support the conventional weapon control systems from conception through fleet introduction. Performs Weapon Control System development support for fielded systems, adapting and transitioning new technologies and advanced capabilities to meet changing requirements. Provides Systems Engineering leadership for Acquisition activities

DD08 Surface Warfare System and Force Level Certification/IV&V

Provides for the specification and leadership enabling the development of common processes for the execution of warfare, combat systems, control and weapon systems, and element certification activities for effective force operation in the joint arena. Certification processes are optimized to address competing concerns precipitated by increasingly complex system development. Processes must be both comprehensive and independent to address technology and architecture advancements and threat evolution. Certification and Independent Verification and Validation spans the development cycle from requirements to deployed baselines.

DD09 Human Systems Integration Science and Engineering

Provides a body of knowledge and subject matter expertise for the development of technologies in support of HSI. Provides science, technology, and systems engineering expertise in human systems integration to define policy, processes and enterprise solutions for Navy acquisition programs with the exception of submarines, stressing optimization of manpower, decision support, and knowledge superiority in an effort to enhance the capabilities of our warfighters and improve total system performance and affordability over the entire life-cycle cost of a platform or system. Addresses Surface Navy definition requirements for knowledge superiority; decision support; effective communications; human-computer interaction; manning optimization; training; usability testing of new warfighter-centered designs; design of work environments, workstation/consoles, and command spaces; measurement of workload and performance across individual, team, systems, and organizational domains; and is instrumental in identifying issues regarding a new way of thinking about afloat and ashore command and control.

DD10 Surface Missile Systems Integration

Provides national technical leadership and oversight for missile systems integration including the integration of associated launchers and payloads. Performs integration assessments of advanced concepts for missiles, payloads, and launchers. Performs integration and development of integration requirements for missiles, lethal and non-lethal payloads, launchers and associated sub-systems. Provides the systems engineering and integration required to transform a multiplicity of system elements into effective engagement systems. Expertise in mechanical, electrical and C2 systems is utilized for the integration of engagement systems with the host ship systems.

DD11 Surface Conventional and Electromagnetic Gun Systems RDT&E

Provides S&T, RDT&E and Acquisition Support for conventional and electromagnetic gun systems and associated munitions (greater than or equal to 20MM) from technology development to platform integration. Provides critical technology development and the systems engineering and integration required to transform a multiplicity of system elements into an effective gun system. Process involves both the maturing of technologies and the flow down of requirements necessary to define the specifications for new gun systems, product improvements, and modifications.

DD12 Directed Energy Systems RDT&E

Leads all S&T and RDT&E for the development and weaponization of Directed Energy (DE) systems for surface, air and ground environments. Leads the development of offensive and defensive DE technologies needed to characterize and exploit vulnerabilities, provide weapons, and protect against attack. Provides the technologies, devices, and systems designed to create or control electromagnetic energy that is used to cause persistent disruption or permanent damage by attacking target materials, electronics, optics, antennas, sensors, arrays and personnel, including non-lethal applications. Efforts include requirements analysis, measurement capabilities, concept demonstrations, system engineering, major product improvements, system integration, product development test and evaluation, and test and evaluation support through the formal DT/OT stages of acquisition.

DD13 Weaponization of Surface and Air Unmanned Systems

Provides RDT&E, Acquisition Support for weaponization of surface and air unmanned systems for missions other than USW – from technology development to platform integration. Provides the systems engineering and integration required to effectively weaponize an unmanned system. Process involves the flowdown of requirements necessary to define the specifications for weaponization, product improvements, and modifications.

DD14 Marine Corps and Other Weaponry Systems RDT&E

Provides the technology base and conducts RDT&E to develop and demonstrate technologies to meet the Marine Corps unique weapons responsibility for expeditionary missions, amphibious warfare, and subsequent operations ashore. Also provides technology base and RDT&E support for unique programs for Navy and other DoD customers. Responsibilities includes the design and development of new systems or components, product improvements enhancing the military performance of existing systems or components, the neutralizing of deficiencies in stated requirements, weapons system integration and acquisition.

DD15 Strategic Mission Planning, Targeting, and Fire Control Systems

Provides technology advancement, systems engineering, software development, and operational support for mission planning, targeting, and fire control systems for nuclear and non-nuclear strategic systems. Development of modernization concepts, development of technology to meet future need, and new system concepts (e.g., SSGN) is also supported. Applies to existing systems (all U.S. and U.K. Submarine Launched Ballistic Missile (SLBM) systems), evolving systems and to needs not previously identified by the Navy or other services

DD16 Re-Entry Systems

Provides the system definition and participates in and manages the development of reentry systems, including definition of environments of their effects, performing analysis of reentry materials, technology development, reentry vehicle design, testing of conceptual and prototype vehicles and project management.

DD17 Surface Electronic Warfare Systems Architecture and Combat System Integration RDT&E

Leads for overall top-level combat systems requirements definition, design, integration, analysis of alternatives, and requirements decomposition to the Electronic Warfare element of Surface Ship Combat Systems. Is responsible for up front systems engineering, combat system integration, performance requirements, combat system architectures, generation of weapon system integration requirements, and requirements definition. Leads the Electronic Warfare combat systems integration role; specifically, the bringing together of the Electronic Warfare elements of the Combat System for integration, test, and certification at the Platform, Strike Group, and Force levels. Is responsible for integration into the combat system, integration of elements into a suite, development, maintenance and upgrades of combat system databases which will be

used by the Electronic Warfare elements, and combat system Electronic Warfare control and interface with the Electronic Warfare elements. Provides systems engineering, acquisition support, software expertise, technical evaluation and T&E for integration into the combat system. Collaborates with other Warfare Center activities to facilitate the transition of new technologies into EW elements for existing and planned combat systems.

DD18 Surface Warfare Systems Safety

Provides analytical, technology base, systems engineering, product development, and fleet support expertise to assess compliance of systems safety and survivability requirements of fleet assets, especially surface warfare assets. Defines and determines effects from shock, blast, fragments, toxic products, and laser radiation in the life cycle evolution of weapons and/or combat systems. Assesses system and item vulnerabilities including software; and specifies, designs, and develops means to remove failure modes, control environments, limit damage, or otherwise reduce possible loss of combat capability.

DD19 Surface Warfare Electromagnetic Environmental Effects

Provides leadership in the area of Electromagnetic Environmental Effects (E3) RDT&E that assures operational effectiveness of Naval and joint systems exposed to stressing electromagnetic (EM) environments. Develops and applies analytical and experimental techniques, facilities, and instrumentation required in the shipboard EM susceptibility/vulnerability assessment of electronic components, circuits, and systems. Coordinates and directs programs such as Hazards of Electromagnetic Radiation to Ordnance (HERO), Personnel (HERP), and Fuel (HERF) and Electromagnetic Vulnerability (EMV) to determine EM effects on equipment and systems. Investigates specific and generic EM susceptibility problems and develops, evaluates, and recommends procedural and hardware changes to ensure successful mission completion. Manages the Shipboard Electromagnetic Capability Improvement Program and serves as the E³ Battle Force interoperability electromagnetic interference (EMI) problem solver for the Navy. Develops and validates analytical and experimental techniques/tools, including computational electromagnetics, to predict and assess topside design issues based on location and performance. Coordinates and directs programs to achieve integrated topside designs maximizing system performance in the EM environment for new ships and ship alterations. Provides, via the Afloat Electromagnetic Spectrum Operations Program (AESOP) processes and guidance for Battle Force frequency management to the Fleet.

DD20 Chemical, Biological, and Radiological Warfare Defense Systems RDT&E

Provides for the RDT&E enabling aspects of Chemical, Biological and Radiological Warfare Defense (CBR-D). Provides technology base, threat analysis and full spectrum research, development and engineering expertise necessary to design, develop, integrate and support equipment to protect Naval and Joint Services forces afloat or ashore, whether the threat is chemical or biological. Technical Design and Acquisition Engineering, and In-Service Engineering are provided for CBR Collective Protection and CB Detection, and Acquisition Engineering is performed for Decontamination. In-service engineering is specifically provided in the areas of CB Detection systems, and land-based applications of CBR Collective Protection.

DD21 National Response Missions, Including Homeland Security and Defense

This technical capability focuses on the research, development, test, and engineering (RDT&E) and acquisition of capable warfighting and peacekeeping technology options that enable the Navy and Nation to more effectively and appropriately understand and respond to asymmetric threats and acts of aggression, with timely, balanced and appropriate measures. The focus of this technical capability is to adequately safeguard and empower our Nation's warfighters, homeland defenders, and first responders by ensuring they are equipped with proven and response-ready technologies for continuing to fight and win the Global War on Terrorism. This technical capability allows our men and women in uniform to effectively prepare for and react to the most pressing needs across a full spectrum of military operations, and focuses on improving our capacity to identify, deter, combat, defend against, and recover from terrorist attacks, major disasters, and national emergencies. To benefit the Navy, Joint Forces, and the Nation, this technical capability is intended to deliver innovative and cost-effective solutions to bolster asymmetric defense, maritime security, anti-terrorism, force protection, non-lethal warfare, identity management, stability, and law enforcement operations. These solutions directly impact our national efforts to combat and counter terrorism, including counter-narco terrorism; oppose the full spectrum of maritime threats; to enforce border and trade sanctions; integrate battlefield and special technologies; mature and integrate biometrics; enhance intelligence collection; refine security and defensive equipment; and support world-wide humanitarian services.

DD22 Physical and Non-Physical Vulnerability Analysis

Provides robust integration across the spectra of research, development, analysis, deployable tools and systems to assist the services, other government agencies, and the civilian sector in analyzing the support networks in place and developing options to mitigate potential threats. Addresses homeland security initiatives by providing the technical and systems engineering capability necessary to mitigate the effects of

asymmetric threats on our homeland to include homeland defense and support to civilian authorities. Supports force protection requirements in the areas of combating terrorism, physical security, operations security and personal protective services by developing products to mitigate hostile actions against DoD personnel, resources, facilities, and critical information. Includes a commercial and defense critical infrastructure protection, information assurance, and mission assurance capabilities by providing the ability to identify critical infrastructure susceptibilities and operational dependencies that, if not assured, could adversely impact mission success or continuity of operations.

DD23 Force Level Warfare Systems Engineering and Integration

Provides technical direction and systems engineering for the development of integrated systems and components that provide integrated force level capabilities, with emphasis on establishing the requirements necessary to define the total system in the context of the Joint Services platforms and the overall mission warfighting capability. Activities include systems engineering and analysis of new and existing systems, defining system interface requirements, reviewing platform integration packages, establishing test requirements, preparing test plans when applicable, reviewing and monitoring contractor test events, reviewing interface specifications, defining requirements for interfacing with communications systems as well as other Navy/Joint tactical systems, and defining communication architectures. Effort includes establishment of Performance and Functional baselines; development and analysis of requirements; and requirements mapping and allocation – all leading to the development of Key Performance Parameters (KPPs), Measures of Performance (MOPs), Measures of Effectiveness (MOEs), and Information Energetics Requirements (IERs) based on collaborative inputs from WFC divisions. Provides systems engineering expertise to devise and deploy systems that integrate within the U.S. Navy, U.S. Marine Corps, U.S. Army, U.S. Air Force, USSOCOM, Agency, and coalition forces operations.

DD24 Force Level Warfare Systems Interoperability Engineering

Provides the analysis, systems engineering, and evaluation of the interoperability of systems and system of systems during early stages of program development. Evaluates the ability of deploying or deployed Navy / Joint systems and platforms to fulfill required contributions to mission capability within the context of naval, joint, allied and coalition operating environments, with overarching emphasis on achieving force interoperability. Live, virtual, and constructive environments are used to measure, quantify and report operational capabilities and limitations of developmental, prototype and deployed systems. Products assist in the development of acquisition strategies by identifying redundancies, deficiencies, and inefficiencies in the Navy's ability to support interoperable Joint operations across required capability areas. In support of the formal interoperability testing, provides:, developing the specialized facilities and assessment tools in an open architecture environment, characterizing deploying tactical group (CSG or ESG, etc) contributions to mission capabilities within the context of joint and coalition

operating concepts and developing interoperability metrics and measurement techniques and systems that support evaluation of performance against warfighter mission threads. Also provides for the development of distributed (at-sea and land-based) technology and architectures to test and certify selected C5I software interoperability. As programs continue through the acquisition cycle, force warfare system interoperability performance is assessed through collaboration with the Corona division.

DD27 Tactical Common Data Communications Systems Integration and Interoperability

Provides the technology applications, design, development, integration, test, and evaluation, to enable tactical common data communication infrastructure for integration of tactical subsystems. Capabilities focus on situational awareness, hostile detection, targeting, communication signature management, communications, and subsystem integration. Using the tactical common data communication infrastructure, these subsystems will be integrated into Joint and Navy large force units' strategic architectures and supported as needed to ensure operational capability and effectiveness.

DD35 Integrated Surface Combat Control Systems Support

Provides Systems Engineering and analysis to support the full integration of combat system elements. Provides In-Service Engineering support for currently assigned legacy systems throughout their remaining life-cycle. Analyzes fleet combat system and combat system interface issues in conjunction with combat system and element Design and In Service Engineering agents, and actively supports the acquisition, delivery, and software support of Integrated Combat Control Systems.

DD36 Integrated Training Systems

Focus of capability is the development and support of an integrated training capability across the National/ Agency/ Joint / Coalition / Maritime military system domains excluding USW training systems. Emphasis is placed on ensuring training capability is horizontally integrated and interoperable within the specific domain, meets the complete operational mission requirements of the specific domain, and is vertically integrated and interoperable with neighboring, superior, and subordinate systems and domains. Incorporates and integrates live/virtual/constructive training capabilities as well as modeling and simulation systems, learning methodologies and Human Systems Integration approaches to meet training system requirements. Through System of Systems engineering, design, development, and life cycle support, provides integrated training systems which improves readiness across the Fleet and will support all warfare areas across the breath of military Naval, Joint and Coalition operations.

DD37 Radar Distribution Systems

Specifies and leads the development, integration, acquisition and support of radar distribution systems and equipment for the Navy's surface ship fleet. Includes design, integration, analysis, technology development, software support, and testing of radar distribution systems and equipment. Also includes all the capabilities, functions, components, and elements required to acquire, develop, systems engineer, and test for the radar distribution systems and equipment from conception through their lifetime as well as adapting and transitioning new technologies and advanced capabilities to meet changing requirements. Provide In-Service Engineering and Integrated Logistics Support of radar distribution systems and equipment during all phases of the system life cycle. Develop system requirements and specifications. Provide Systems Engineering and analysis to support the full integration of radar distribution system elements. Analyze fleet system integration problems and failures to provide engineering and logistic solutions. Provide equipment restoration and COTS material support including COTS obsolescence management.

DD38 Joint Command and Control Systems Integration and Architecture Development

Provide developmental support and integration of Joint and Coalition systems. This technical capability provides systems engineering for development and evaluation of warfighter operational requirements, integration of technology with superior and subordinate system structures, and identification and development of next-generation technology including prototype assessment and rapidly fielding of new technology. Additionally, this capability provides full life cycle support as an engineering agent including on-site support at Combatant Commands, Software Support Activities, and engineering required to address technology obsolescence. Joint Task Force (JTF) and Joint Force Maritime Component Commander (JFMCC) architectural frameworks are decomposed to identify and correct specific domain shortfalls in capability, interoperability, and integration. Provides Joint Warfighter Command and Control capability across the Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facility (DOTMLPF) spectrum.

Indian Head

IH01 Energetic Systems RDT&E, AE, ISE and Sustainment¹

Provides the corporate scientific and engineering knowledge, expertise, and facilities for the science and technology, research, development, design, engineering, test and evaluation of energetic systems, MicroElectro Mechanical Systems (MEMS), embedded sensors, and predictive technologies for ordnance items (such as rockets, jet-assisted take-off (JATO) motors, propellant actuated devices (PADs), missile propulsion (boosters and rockets), gun ammunition, warheads, and gas generators) in support of underwater warfare, surface warfare, air warfare, ground warfare, unconventional warfare, national defense and homeland security needs. The Indian Head Division is designated as a DoD Energetics Center and as such is a tri-service provider of energetic and energetic system capabilities. Includes the application of energetic and energetic system technologies to the prediction, detection, prevention, neutralization and effects mitigation of conventional warfare items and unconventional warfare items including Improvised Explosive Device (IED) systems and energetic support to Counter-Improvised Explosive Device (C-IED) system efforts and the neutralization of chemical-biological warfare items. The capability includes the research, synthesis, development and application of specialty energetic chemicals, explosives, propellants, reactive materials, ignition materials, and pyrotechnics (for subcomponents such as igniters); the energetic selection and characterization of propulsion and explosive sub-components and energetic systems; the use of thermal, structural, ballistic, and flight modeling analysis to design rocket motor cases, nozzles, and igniters; design, development and testing of prototype propulsion and explosive systems; and fleet engineering and in-service engineering support for energetic systems. Provides the specialized full life cycle support for underwater warheads including fuzing, safe-arm devices, initiation systems, and MEMS research and development; this includes lethality and target vulnerability (including foreign systems) assessment; warhead exploratory research and development; and naval weaponry test and evaluation. Indian Head Division in-service engineering support includes engineering, integrated logistics support, surveillance, quality evaluation and technical documentation support for energetic systems as well as the safety and training for the end user.

¹ Sustainment - Sustainment of a weapon system consists of the system engineering tasks dedicated to ensure that a fully developed weapon system continues to meet the needs of warfighter until the system taken out of service. These tasks include production engineering support, performance enhancements, maintenance, overhaul, obsolescence management, technology refresh, procurement strategies and acquisition support, configuration management, logistics support, reliability and maintainability analysis, testing and evaluation and working with the industrial base to find the most cost effective strategy for sustaining the system.

IH02 Energetic Systems and Material Scale-up, Manufacture and Manufacturing Technology

Provides the corporate scientific and engineering knowledge, expertise, and facilities for the development and validation of the manufacturing technologies, the scale-up and the manufacture of specialty energetic chemicals, explosives, solid propellants, gelled propellants, liquid propellants, ignition materials, reactive materials, nano-materials, and pyrotechnics (for specialty devices such as igniters and explosive bolts; manufacturing technologies supporting CADs is captured under IH03) as well as energetic components and energetic systems. Supports underwater warfare, surface warfare, air warfare, ground warfare, unconventional warfare, national defense and homeland security needs. The Indian Head Division is designated as a DoD Energetics Center and as such is a tri-service provider of energetic systems, energetic materials and energetic manufacturing capabilities. Also encompasses the Energetics Manufacturing Technology Center of Excellence, which was established in 1995 by the Office of Naval Research. The Center interacts with the Navy Acquisition Program Offices, the Program Executive Offices (PEO's), and the System Commands to identify and validate pervasive produceability and affordability issues and coordinates through the Joint Defense Manufacturing Technology Panel, with other service MANTECH programs to eliminate duplication and leverage investments. The Manufacturing Technology Program focuses on the development and technology transfer of new manufacturing technologies and processes for energetic materials; including manufacturing and produceability issues unique to energetics. Also includes the application of state of the art equipment and processing techniques to the development and manufacture of new or existing energetic materials. Indian Head Division's energetics manufacturing capability allows for the transition of energetic materials from laboratory bench scale to low rate initial production (LRIP) quantities to full production. Also provides support for production rate surges and as the provider of last resort (for military unique products, products not available in industry) as required by military requirements.

IH03 Cartridge Actuated Devices, Cutters, Sounding and Specialty Devices RDT&E, AE, ISE, Sustainment¹, and Manufacturing

Provides the corporate scientific and engineering knowledge, expertise, and facilities for the full spectrum support for the entire life cycle of CAD (and similar device) activity from: S&T, R&D, engineering development, acquisition, manufacture to fleet support of aircraft,

¹ Sustainment - Sustainment of a weapon system consists of the system engineering tasks dedicated to ensure that a fully developed weapon system continues to meet the needs of warfighter until the system taken out of service. These tasks include production engineering support, performance enhancements, maintenance, overhaul, obsolescence management, technology refresh, procurement strategies and acquisition support, configuration management, logistics support, reliability and maintainability analysis, testing and evaluation and working with the industrial base to find the most cost effective strategy for sustaining the system.

missile and target subsystems (e.g. aircrew escape, stores/bomb rack, electronic counter-measure (ECM), fire extinguisher, and missile flight components). This full spectrum support is rounded out by a comprehensive fleet support capability providing integrated logistics support, maintenance engineering, and training of fleet personnel. The Indian Head Division holds the tri-service charter for RDT&E, engineering, acquisition, manufacturing, and fleet support of cartridge actuated devices (CADs) and propellant actuated devices (PADs); this charter allows for improved interoperability, reduced duplication and costs, optimized resources, and increased standardization. CADs perform vital functions such as stores ejection, flare and chaff deployment, and sequencing functions in aircrew escape and various weapon systems. Design, engineering, and prototype capabilities enable the development of emerging technologies to transition into operational evaluation and service use. Complementing these capabilities are specialized nondestructive and destructive test facilities dedicated to CAD/PAD testing. Acquisition engineering and management functions allow IHDIV to perform the "smart buyer" role for DoD and Foreign Military Sales (FMS) customers.

IH04 Weapon Simulators, Trainers, Training, Test and Diagnostic Equipment RDT&E, AE, ISE, and Sustainment¹

Provides the corporate scientific and engineering knowledge, expertise, and facilities for the RDT&E, AE, ISE and sustainment of weapon and missile simulators, trainers, training, test and diagnostic equipment. This capability evolved over 35-years and was consolidated due to synergies with Indian Head Division's extensive knowledge of safety critical systems. The consolidated expertise in weapon and missile simulators and certification test equipment reduces dependence on proprietary systems and system specific, prime vendor configurations with no common software/hardware architecture. Weapons simulation/emulation is a mission critical function for the DON because the products are required for certification of weapons systems to fire live ordnance and they provide a safe and cost effective way of keeping personnel trained and ready. Because simulators and certification test equipment are procured in limited quantities, which are not profitable for industry to design and fabricate, Indian Head Division is frequently called upon as the source of last resort.

IH05 Energetic Safety, Environmental Technology, Logistics, and PHST (Packaging, Handling, Storage and Transportation) RDT&E, AE, ISE and Sustainment¹

¹ Sustainment - Sustainment of a weapon system consists of the system engineering tasks dedicated to ensure that a fully developed weapon system continues to meet the needs of warfighter until the system taken out of service. These tasks include production engineering support, performance enhancements, maintenance, overhaul, obsolescence management, technology refresh, procurement strategies and acquisition support, configuration management, logistics support, reliability and maintainability analysis, testing and evaluation and working with the industrial base to find the most cost effective strategy for sustaining the system.

Provides the corporate scientific and engineering knowledge, expertise, and facilities for safe and environmentally compliant methods pertaining to energetic processing and support ensuring continued compliance with explosive safety and environmental regulations. Includes RDT&E, AE, ISE and sustainment of PHS&T for ordnance including the application of joint modular packaging and container technologies and handling equipment. Includes the application of active and passive RFID technologies, MicroElectro Mechanical Systems (MEMS) sensors, and embedded sensors for real-time health and inventory management. Includes Environmental RDT&E activities as applied to energetic systems, processing and facilities. The nature of the energetics work performed at the Indian Head Division provides a natural link to the explosives safety; logistics; packaging, handling, storage and transportation (PHS&T); and environmental issues surrounding energetic materials and ordnance for Navy and Joint warfare. The Naval Ordnance Safety and Security Activity (NOSSA), including the Ordnance Environmental Support Office (OESO), utilizes Indian Head Division's expertise for environmental issues, explosive decontamination and safety, energetic systems' manufacturing safety, and ordnance safety issues.

IH06 Conventional Ammunition Engineering and Sustainment¹

The Conventional Ammunition Engineering technical capability provides in-service engineering and sustainment functions to provide safe, reliable and effective munitions to the Fleet and the Marine Corps.

IH07 Gun Systems ISE, T&E, and ILS

Provide In-Service Engineering, Test and Evaluation, and Integrated Logistics Support throughout the entire life cycle of major and minor caliber (20mm and greater) gun systems. Provides support for design and development of advanced gun systems. Ensure shipboard safety and operational readiness is maintained and that the systems are managed efficiently and effectively. Develop system documentation and procedures, maintain computer programs, and certify gun systems. Analyze fleet problems and failures to produce engineering and logistics solutions.

¹ Sustainment - Sustainment of a weapon system consists of the system engineering tasks dedicated to ensure that a fully developed weapon system continues to meet the needs of warfighter until the system taken out of service. These tasks include production engineering support, performance enhancements, maintenance, overhaul, obsolescence management, technology refresh, procurement strategies and acquisition support, configuration management, logistics support, reliability and maintainability analysis, testing and evaluation and working with the industrial base to find the most cost effective strategy for sustaining the system.

Keyport

KP01 Pacific USW T&E Range and Test Facility Operations

Provides the real estate, capital equipment, human resources and skills, and processes required for operations of Division USW Test facilities including the Pacific Northwest Ranges, Division Environmental Test Facilities and Range and Test Facilities located with Division Detachments at San Diego and Hawaii. Enables the conduct of experimentation, test and evaluation and training operations for the purpose of obtaining critical data for analysis of USW system performance, reliability and readiness. Supports conduct of operations utilizing fixed ranges and land based test facilities, and remote testing in threat representative littoral and deep water environments through the use of portable T&E systems.

KP02 Independent USW Systems Test and Evaluation and Experimentation

Provides Acquisition and Development managers with independent assessments of performance and reliability of USW Systems and components. Includes skilled personnel for translation of critical test objectives into executable tests, development of test strategies and methods, architecting test plans, executing operations, and performing post test evaluation of the data. Utilizes highly specialized analysts and specialized tools for the purposes of making acquisition and material support recommendations to decision makers. Includes the ability to support Joint Collaborative T&E events.

KP03 USW Weapons and Vehicles Range and Environmental Test Systems

Provides the skilled personnel, facilities and processes required for the development, acquisition, application and support of test and evaluation technology used for the Division's Pacific Northwest Range and land based environmental test operations. These systems are used to accomplish high-fidelity, precision test measurement and analysis of USW weapon systems and components. Includes the design, integration, modernization and improvement of test systems required to support torpedo and undersea vehicle T&E requirements spanning the full spectrum of the life-cycle from S&T to FOT&E.

KP04 Torpedo and Unmanned Undersea Vehicle Maintenance and Repair

Provides facilities, capital and test equipment, skilled personnel and processes required for the maintenance, repair, and upgrade of torpedoes and unmanned undersea vehicles. This capability provides for the conduct of Depot and Intermediate Maintenance

processes for upgrades and turnaround of all US Navy torpedoes and Vertical Launch ASROC, undersea targets, and UUVs; installation and maintenance of countermeasures; and maintenance and repair of undersea mines. The overhaul and repair of the associated electronic, electro-mechanical, and mechanical components and systems require teams of highly skilled mechanics, technicians, logisticians, and engineering personnel as well as unique specialized industrial facilities. It also includes the unique facilities and processes for maintenance, storage, and handling of ordnance.

KP05 Obsolescence Management for Undersea Warfare Systems

Provides the expertise and knowledge to formulate warfare center obsolescence engineering/custom engineered solutions policies; develop and manage standards, analysis tools, and processes; and provide these to the warfare centers to support logistics and acquisition communities in performing analysis to extend service life and lower life-cycle costs of in-service components, systems and platforms. This includes performing predictive obsolescence management; technical analysis and engineered solutions to mitigate current/future obsolescence problems; development and application of emerging repair and maintenance technologies; and affordable, rapid repair and manufacturing for resolution of unanticipated logistics requirements. This capability includes skilled personnel with specialization in component obsolescence research, reverse engineering, commercial/emerging technology application/adaptation, hardware design and integration, and material qualification.

KP06 Undersea Warfare Systems Material Depot

Provides facilities, capital equipment, processes, and skilled personnel required to sustain Navy USW Material readiness by ensuring material availability through Navy and Defense material stock systems. The Division maintains technical capability to repair a broad base of legacy and state-of-the-art, electronic, mechanical and electromechanical devices. This involves performing depot level repair, overhaul, test and/or calibration of systems, sub assemblies, and components required for material support of in-service systems. Depot Maintenance Activities are managed by the DoD Joint Depot Maintenance Advisory Group (JDMAG). Requirements and workload for this capability are determined through Naval Supply material requirement projections and similar processes of other material supply agencies. Depot capability is established, certified, and maintained in accordance with Program technical requirements and NAVSEA certification processes.

KP07 Torpedo and Unmanned Undersea Vehicles ISE and ILS

Provides the personnel knowledge and skills, analysis tools, facilities and processes for performing In-Service Engineering and Integrated Logistics Support for the Navy's surface and air-launched torpedoes, Vertical Launch ASROC systems, undersea

vehicles including undersea targets and Unmanned Undersea Vehicles; and Integrated Logistics support for Heavyweight Torpedoes. Capabilities include engineering and technical specialists with the skills and knowledge to monitor and maintain system readiness and reliability goals, and to provide the Fleet and program maintenance activities with the processes and tools for effective employment and maintenance of the systems. Includes implementing programs to maintain or improve system material reliability and availability, and development or recommendation of engineering changes to maintain or improve system supportability. Provide like functions for Foreign Military Sales cases.

Note: In FY 09, Crane transitioned underwater countermeasures, countermeasure launchers, and underwater communications work to Keyport. This TC has not yet been updated to include that work.

KP08 Submarine USW Systems ISE and ILS

Provides the personnel knowledge and skills, facilities and processes for performing life-cycle engineering and acquisition support, Integrated Logistics Support and waterfront technical support for systems as assigned for US Navy submarines. Includes maintaining processes and personnel certifications for installing SHIPALTs using Alteration Installations Teams (AITs). Also includes maintaining personnel with requisite system technical and process knowledge in in-service engineering disciplines to monitor, assess and maintain system readiness and material availability to meet system and program goals.

KP09 Carrier USW Systems

Provides laboratory facilities, equipment, processes and skilled personnel to perform full spectrum engineering, logistics and Fleet support for Carrier Strike Group Undersea Warfare Combat and Sonar Systems. Includes requirement definition, system development and full service In-Service Engineering and Integrated Logistics Support for the Carrier Tactical Support Center (CV-TSC) and related systems.

KP10 Fleet Training and Training Management Systems

Provides full spectrum engineering, logistics and Fleet support for assigned Fleet computer-based training systems, training and job performance support and applications, and shipboard non-tactical data and application management systems supporting Fleet individual skill training, qualification and job task performance requirements. Training systems and applications are delivered across the individual training continuum spanning US Navy training centers, schoolhouses and deployed training and job task performance onboard ships. Includes the personnel, facilities and tools for the design, fielding and support of electronic classrooms; and portable, computer-based training devices for shipboard use. Includes the personnel, facilities and tools. It also includes

the development, deployment, integration, test and support of electronic classrooms, computer based training applications, training curriculum, training management systems, and shipboard non-tactical data management application systems.

KP11 Corporate Logistics Policy, Planning, and Oversight

In support of NAVSEA HQ and acquisition program offices, and in collaboration with assigned design and in-service engineering agents, provide comprehensive and standardized acquisition and life-cycle logistics policy, planning, budgeting, execution management, and program administration. This capability includes the analytical capabilities to collect, analyze and provide performance assessments of acquisition and life- cycle logistics policies and process oversight to provide a corporate focus on areas needing improvement. Perform configuration management for assigned systems and manage the qualification and training standards and IT infrastructure for NAVSEA configuration management processes within the boundaries of NAVSEA's authorized ship level Configuration Status Accounting (CSA) program. Provides coordination and integration for all aspects of distance support for the effective transfer of data, information and knowledge to forward deployed Naval forces. Directly supports the Navy Enterprise efforts to combine people (e.g., subject matter experts), processes (e.g., remote equipment monitoring, tele-medicine, interactive detailing, etc.), and technology (e.g., data compression and replication) into a collaborative infrastructure without regard to geographic location. Supports Navy and DoD material quality assessment and contractor past performance systems.

KP12 Central Design Agent for Navy and NAVSEA Corporate Logistics Data Systems

Provide capabilities to establish requirements, develop, maintain, operate and host information and data systems which support execution and analysis of Navy logistics and maintenance programs. For assigned Central Design Agent (CDA) roles, provide and host applications for Navy logistics and maintenance data systems that include shipyards, material outfitting, configuration management (as well as management of supplier performance and product quality), and process management systems. CDA capabilities includes providing skilled personnel responsible to review and recommend changes to the maintenance and logistics enterprise architecture and assist in determining the most efficient hosting of legacy logistics applications to the future Navy business system architecture.

KP13 Ships Planned Maintenance System

Provide management of the development and deployment of NAVSEA's Planned Maintenance System (PMS) in accordance with Reliability Centered Maintenance principles and requirements for carriers, surface ships, and submarines. Provide

oversight/direction for PMS, coordination of PMS tasks with supporting maintenance and technical organizations, and performance of assigned Maintenance Effectiveness Reviews for evaluation of PMS. This capability continuously collects data and publishes information and analysis that allow the ships maintenance community to manage the availability and readiness of Navy platforms.

Newport

NP01 Submarine Exterior Communication Systems

Provides corporate scientific and engineering knowledge and facilities for planning, design, developing, and conducting research, advanced engineering and operational systems development to ensure submarine exterior communications system (ECS) systems readiness. Performs systems engineering, IV&V, and certification for integration of new and upgraded communications subsystems into submarine combat systems. Performs analysis, assessments, and evaluation of advanced technologies for transition to ECS to ensure an affordable evolution of compatible systems for fleet use.

NP02 USW Communication Antenna Systems

Provides corporate scientific and engineering knowledge and facilities for planning, design, developing, and conducting research, advanced engineering and operational systems development to ensure USW communications antenna systems readiness. USW Communications Antennas Systems supports submarines, USW distributed sensor systems, and other USW platforms. Performs systems engineering, IV&V, and certification for integration of new and upgraded communications antennas and subsystems into submarine combat systems. Performs analysis, assessments, and evaluation of advanced technologies for transition to development to ensure an affordable evolution of compatible systems for fleet use. Ensures continuum of life cycle engineering support for fleet, industry and academia toward development and maintenance of USW Comms antenna systems.

NP03 USW Combat Systems

Provides corporate scientific and engineering knowledge, expertise and facilities for planning, design, developing and conducting research, advanced engineering, data fusion, and operational systems development to ensure technical and operational performance of USW combat systems. Ensures leadership in advanced technology development and transition and an end-to-end systems engineering discipline in the application of technology to USW combat and command and control systems. Performs the analysis and evaluation of deployed and advanced command and control systems and technologies and provides the expertise and resources for a full spectrum continuum of life cycle engineering support, both shore-based and at-sea, for Fleet, industry and academia. Provides specialized technical expertise and laboratory test facilities to execute assigned engineering agent roles and technical authority responsibilities in support of in-service and advanced submarine and USW combat systems.

NP04 USW Trainer Systems

Provides land-based and shipboard trainer development for USW combat systems, command and control systems and other Anti-Submarine Warfare/Anti-Surface Warfare training applications. Provides trainers related stimulation technologies/sub-systems for integrating signatures simulations from others. Performs analysis and evaluation of embedded system commercial equivalents and advanced SIM/STIM technologies for transition to USW combat, command and control system trainers with application to enumerated mission areas to ensure affordable and timely trainer devices for Fleet use. Provides corporate scientific and engineering knowledge and facilities for planning, developing, and integrating trainer devices. Performs systems engineering for integration of new and upgraded USW combat, command, and control system trainers into total combat system trainers. Ensures continuum of life cycle engineering support for Fleet, industry and academia toward development and maintenance of combat system trainers. Provide technical expertise for development/specification of trainer architecture and equipment, and their performance integration.

NP05 USW Sensor and Sonar Systems

Provides a full spectrum program of research, development, engineering, and test and evaluation for underwater sensors and sonar systems (except those designed principally for mines and small objects) applicable to all platforms as well as off board distributed and unmanned systems, with equal emphasis on technology base, advanced development, requirements generation and system employment, modeling and simulation, full-scale development, in-service engineering, supportability, and life-cycle hardware and software support. Provide and maintain national underwater acoustic metrology science, technology and standards.

NP06 Submarine Periscopes and USW Imaging Systems

Provides corporate scientific and engineering knowledge and facilities for planning, design, developing, and conducting research, advanced engineering and operational systems development to ensure Periscope and Imaging systems readiness in support of USW Imaging Sensor Systems on submarines, USW distributed sensor systems, and other USW platforms. Performs systems engineering, IV&V, and certification for integration of new and upgraded Periscope and Imaging subsystems and sensors into USW systems and submarine combat systems. Performs analysis, assessments, (including Radar Cross section analysis of sensors and masts) and evaluation of advanced technologies for transition to development to ensure an affordable evolution of compatible systems for fleet use. Is the lead Navy laboratory for periscope imaging systems. Provides full spectrum RDT&E, acquisition support and In-Service Engineering (ISE) Agent for all imaging systems on Navy submarines. Provides the engineering and technical expertise to develop state-of-the-art imaging concepts. Supports headquarters' acquisition programs throughout each stage of the life cycle

taking imaging concepts from development to land-based testing at government owned-contractor operated test facilities. Provides life cycle management of all imaging systems and Depot repair of imaging components. Provides test and simulation facilities for all imaging concepts and interfacing systems.

NP07 USW Electronic Warfare, SIGINT, IO Sensors and Systems Integration

Provides technical leadership, engineering expertise, execution, and facilities for the submarine unique aspects of the following sensors and systems: Electronic Warfare (EW), Signal Intelligence (SIGINT; including ELINT and COMINT), and Information Operations (IO). These functions are provided throughout all phases of the sensors' and systems' lifecycles that require specific submarine-unique mission, platform, system, and subsystem expertise. Leads submarine EW/SIGINT/IO requirements definition; submarine specific threat and mission area analysis (including Radar Cross section analysis of sensors and masts); C4ISR system-of-systems end-to-end performance analysis; submarine combat system integration; submarine-unique component development, acquisition and modernization; submarine platform integration and testing; rapid prototyping and fielding of submarine-unique aspects in support of emergent EW/SIGINT/IO/GWOT mission needs; and, submarine installations and submarine-unique in-service support.

NP08 Undersea Surveillance Systems

Provides research, development, engineering, integration, networking, test and evaluation and in service support in the development of undersea fixed surveillance system shore processing systems, fixed distributed surveillance systems, ocean survey systems, and towed and distributed surveillance systems

NP09 USW Launcher Systems and Payload Integration

Provides national technical leadership, system engineering, and technical direction oversight of assigned submarine and surface ship USW weapon/countermeasure launcher systems and associated sub-systems (including torpedoes and UUVs). Provides specialized technical expertise and unique national asset laboratory test facilities to execute assigned engineering agent roles and technical authority responsibilities in support of in-service and advanced USW launcher systems, including submarine internal and external launcher systems and advanced concepts. Performs integration assessment of advanced USW payloads and weapons including launch dynamics, transient launch acoustics, payload shock survivability, and other related payload integration requirements. Provides full spectrum life cycle engineering support for all assigned USW launcher systems and associated equipment and sub-systems.

NP10 Submarine Tactical Missile Integration

Provides national technical leadership, system engineering, and technical direction oversight of assigned submarine launched all-up-round tactical missiles, capsules, missile electronic simulators, and associated equipment and sub-systems. Provides specialized technical expertise and unique national asset laboratory test facilities to execute assigned engineering agent roles and technical authority responsibilities in support of in-service and advanced submarine launched tactical missiles. Performs system engineering, design engineering, software engineering, logistics engineering, and test and evaluation for integration of new and existing tactical missile systems onto submarines. Provides full spectrum life cycle engineering support for all assigned submarine launched tactical missiles and associated equipment and sub-systems.

NP11 USW Autonomous Vehicles

Provides corporate scientific and engineering knowledge and facilities for conducting a full spectrum program of research, science and technology, development, engineering, acquisition planning, and test and evaluation for USW autonomous unmanned undersea systems, with equal emphasis on technology base, advanced development, requirements generation and system employment, modeling and simulation, full-scale development, in-service engineering, supportability, and life-cycle hardware and software support. Provides research and concept development expertise and specialized facilities in support of experimental UUV technology base programs, including air-independent fuel cell and advanced energy and power conversion, to ensure technology development and insertion for unmanned undersea vehicle systems and USW mobile training targets. This technical capability also includes hulls, power, propulsion, machinery, and associated controls for small tactical scale UUVs with responsibilities decreasing when vehicle size exceeds 21 inches in diameter. This capability also includes payload integration and associated core systems for all USW Autonomous Systems in the following mission areas: ASW, above water ISR, ISR supporting ASW, Tactical Oceanography, and Multi-Mission.

NP12 Torpedo and Sonar Defensive and Countermeasure Systems

Provides corporate scientific and engineering knowledge and facilities for conducting a full spectrum program of research, development, engineering, and test and evaluation for USW defensive and countermeasure systems, with equal emphasis on technology base, advanced development, requirements generation and system employment, modeling and simulation, full-scale development, in-service engineering, supportability, and life-cycle hardware and software support. Provides the capabilities required to develop and transition technologies needed to defend both surface ships and submarines from threat torpedoes. These techniques include torpedo detection, classification and localization, effective combat control and data fusion interfaces, various devices and methods employed to defeat the threats and the overall system

engineering efforts to ensure the subsystems work effectively.

NP13 Torpedo Systems

Provides corporate, scientific, and engineering knowledge and facilities for planning, development, acquisition and life cycle support of torpedo systems for all submarine, surface ship, and air-launched torpedo platforms. Performs S&T research and development, allocates requirements, directs advanced and engineering development, and provides systems engineering, design engineering and software engineering for development and integration of new and upgraded torpedo systems into the Fleet. Performs torpedo systems acquisition engineering, logistics engineering, test and evaluation, software upgrades, and performance assessment. Provides support to Fleet operations with tactical training, Heavyweight in-service engineering, failure analysis, and facility certification. Develops and acquires ancillary and support equipment for organizational and intermediate level support. Provides and maintains facilities, analytic tools, and modeling and simulation capabilities to support these activities

NP14 Undersea Warfare (USW) Analysis

Provides a comprehensive analysis foundation that supports the conceptualization of current and emerging undersea warfare technological and operational directions. Performs the analytical modeling and simulation of USW mission effectiveness required to assess submarine, surface ship, undersea surveillance and air-based USW, encompassing all aspects of warfare from under the sea and warfare against undersea threats. Provides comprehensive analysis of USW systems and their performance. Evaluates at-sea exercises through detailed reconstruction to explain system-level operations. Performs technical analysis of intelligence information to assess implications for USW research and development. This technical capability excludes mine warfare (MIW) missions in riverine, surf zone, beach zone, and very shallow water domains; "dedicated" mine countermeasures (MCM) systems; ship vulnerability to mines; and mine systems.

NP15 USW Environmental Assessment Effects Analysis

Provides comprehensive environmental planning and effects analysis of Navy at sea operations, training and testing on the marine environment with emphasis on marine biological resources. Provides technical expertise and knowledge on the effects of explosive and acoustic sources on the environment combining expertise in the areas of marine biology and oceanography, underwater acoustics, sonar systems, computer modeling and simulation for open ocean and range operations. Develops marine mammal monitoring and effects mitigation technologies and plans, computer models simulating environmental effects and provides analyses of potential effects.

NP16 Undersea Range Technology and Application

Provides corporate engineering and scientific knowledge and facilities for planning, developing, installing, and operating of fixed and portable undersea ranges for training and test and evaluation of platforms and systems. Performs program management, systems engineering, requirements definition, algorithm and software development, environmental assessment and monitoring, ocean engineering, and development of acoustic, optical, and electronics technologies for training and T&E range applications. Provides leadership for undersea ranges.

NP17 Atlantic Range Management

Provides management and technical oversight, and Improvement and Modernization of the Atlantic Undersea Test and Evaluation Center (AUTECE) and related test sites, portable systems and facilities. Provides expertise in safety, security, and environmental compliance.

NP18 USW Test and Training Operations

Provides comprehensive end-to-end USW (excluding MIW) readiness assessment, facilities, and training support to undersea warfare system acquisition, Fleet tactical development, and readiness assessment programs. Provides leadership for the development/specification of the Undersea Battlespace, providing the ability to simulate the introduction of new and proposed systems to the warfighter in his environment. Performs full spectrum test requirement development, production acceptance, test planning, conduct, and performance assessment of assigned systems, subsystems, and components at diverse facilities, in both real and simulated environments. Conducts comprehensive laboratory, dockside and underway testing and training of USW systems. Conducts operational testing, develop evaluation reports for operational test and evaluation for assigned systems.

NP19 USW Systems Test and Evaluation

Provides T&E expertise for tactical USW (excluding MIW) systems development programs from program start, as a member of a concurrent engineering team, and throughout the test life of the program. Provides specialized T&E expertise, including test logistics, test planning, test facility operation and management, and installation support as required by the program specific needs. Serves as an independent T&E agent in assessment of alternatives. Provides test direction and performance analysis to supplement tactical system expertise.

NP20 USW Distributed Netted Systems

Provides corporate scientific and engineering knowledge and facilities to develop and integrate the technologies required to deliver netcentric battlespace warfighting capability. Supports the deployment and utilization of distributed netted sensors and systems and the command and control capabilities and tools necessary to provide an expanded battlespace awareness and enable effective and timely warfighter response. Provides end to end systems engineering, including architectures, information assurance, anti-tamper and interface requirements, of undersea warfare distributed sensor systems, and command and control across platforms, within the undersea warfare battle space and the theater level battle space. Unique technical challenges include off board, mobile and fixed, netted sensors, long endurance energy sources, autonomy and group behavior, underwater communications, advanced processing techniques and system-level command and control.

Panama City

PC20 Chemical and Biological Warfare Individual Protection Systems

Covers all aspects of Chemical Biological Warfare (CBW) for Individual Protection from initial technology development through system procurement. It provides the technology base, threat analysis and the full spectrum of engineering expertise necessary to design, develop and support the equipment needed to protect Naval and Joint Services forces afloat or ashore, whether the threat is chemical or biological.

PC21 Expeditionary Coastal and Maritime Security System Engineering and Integration

Provides the full range of concept and technology development, systems engineering and integration functions required to provide expeditionary coastal and riverine forces with capabilities and decision support that enables their performance across the entire range of military operations. This technical capability will be predominantly focused on evolving non-traditional missions (i.e. irregular, catastrophic, disruptive warfare); Stability, Security, Transition, and Reconstruction Operations (SSTRO); Defense Support of Civil Authorities (DCSA); Theater Security Cooperation (TSC) missions as well as homeland defense missions that occur in an expeditionary context. This technical capability will be supported through a robust involvement in RDT&E programs and projects within DoD, DHS and allied research organizations when they relate primarily to coastal and maritime security related challenges.

PC25 Air Cushion Vehicle Systems

Provides the facilities and expertise to conduct research, development, test and evaluation, and in-service support of Air Cushion Vehicles (ACVs) systems, required by Joint forces as well as Navy and Marine Forces to conduct Expeditionary Maneuver Warfare and Seabasing. Encompasses ACV/LCAC craft interface systems; command, control, computer, communications and navigation (C4N) equipment; control and monitoring systems; decision support systems; and related unique hull, mechanical and electrical systems. Support encompasses acquisition, life-cycle, and fleet support.

PC26 Expeditionary Maneuver Warfare Systems Engineering and Integration

Provides the facilities and expertise to develop and support warfare systems required by Joint Forces as well as Navy and Marine Forces to conduct Expeditionary Maneuver Warfare (EMW) and Seabasing. This technical capability encompasses deployable C2;

expeditionary systems to ship interfaces; assault breaching systems; land mine countermeasures; targeting sensors; seabasing systems; Ship-to-objective maneuver systems; USMC raids and reconnaissance ISEA support and systems engineering and integration support of Littoral Joint/Navy/Marine Corps C2 systems.

PC27 Special Warfare Maritime Mobility Mission Systems and Mission Support Equipment

Spans the full spectrum Research Development, Testing, and Engineering (RDT&E), Acquisition Engineering (AE), In-service Engineering (ISE), and includes the technology development, facilities and expertise to develop, acquire, train, sustain, and support the systems and equipment (excluding personnel protection, weapons and ammunition) required by Special Operations Forces to conduct their missions in the Littorals. Missions include special mobility operations, unconventional warfare, coastal and riverine interdiction, beach and coastal reconnaissance, SOF infil/exfil and certain intelligence operations. Special Operations generally are accepted as being non-conventional in nature and clandestine in character.

PC28 MCM Detect and Engage Systems, Modular Mission Packaging, and Platform Integration and Handling

Provides for the development and implementation of new technologies, mission systems integration and packaging, and applied system engineering to conduct mine countermeasures. Mine countermeasures includes detecting, identifying, and neutralizing mine threats from deep water through the surf zone. Detection and identification may use magnetic, acoustic, and electro-optics as well as other technologies. Neutralization uses systems ranging from minesweeping to explosive clearance. Assets used for mine countermeasures operations include both dedicated modular and organic air, surface and sub-surface platforms. Included are the specialized facilities and expertise needed to exploit the new technologies found in existing and emergent mine threats and to develop new systems and tactics to counter those threats.

PC29 Littoral Mission Systems Integration and Modular Mission Packages Certification

Provides for the scientific research and engineering, analysis, and planning support for the modularization of off-board systems in support of the Littoral Warfare mission area except for ASW mission modules. Provides for the certification of all Littoral Warfare mission packages. Expertise includes the packaging and handling of off-board system hardware, tactics development and mission planning for simultaneous operation of littoral mission systems, system integration of legacy and emerging littoral mission systems, seaframe integration of off-board systems, and development of a mission systems integrated communications network, and distributed engineering testing,

validation and verification of all littoral mission packages' computing environment.

PC30 Unmanned Systems Engineering and Integration, Autonomous Operations, Joint Interoperability and Common Control

Provides the research, design, development, integration, test, evaluation and implementation of Unmanned Systems payloads on (1) Off the shelf or existing non-developmental Unmanned Underwater Vehicles (UUVs) with limited modifications; (2) Developmental or existing Unmanned Surface Vehicles (USVs) and Unmanned Ground Vehicles (UGVs); (3) Non-developmental (lightweight tactical) Unmanned Aerial Vehicles (UAVs) in support of the following missions: Mine Warfare (MIW), Amphibious Warfare, Naval Special Warfare (NSW), Diving and Life Support, Underwater Intelligence Surveillance and Reconnaissance (ISR), ISR supporting NSW, and other missions in the Littoral and Riverine environments. Provides common unmanned systems management, mission control, and integration of joint interoperability messaging standards.

PC31 Mine Sensor and Target Detection Technology, Mine Delivery Platform Integration, and Minefield Architecture

Includes analysis and modeling used to develop target detecting device algorithms and to perform mine effectiveness computations against current military targets of interest. Includes the research, development and implementation of new technologies and systems to conduct offensive undersea mine warfare. Offensive mine warfare includes those people and facilities necessary for successful and innovative research, design, development, analysis, modeling, engineering, test, acquisition, platform integration, as well as fleet and operational support for safe, effective, high technology mine systems and sub-systems including deployment equipment. Undersea mine warfare includes mine technologies that leverage other undersea programs and includes replacement of mine target detection devices with advanced detection capability.

PC33 Diving and Diving Support Systems

Encompasses RDT&E, Acquisition Support and man-rated In-Service Engineering support for the Navy's underwater diving life support systems and specialized equipment as well as support for tri-service diving requirements. This technical capability is needed for underwater Naval Special Warfare, Explosive Ordnance Disposal, U.S. Marine Combat Swimmer, and Salvage Diving for in-theater ship repair, particularly in areas remote from dry dock and pier facilities.

PC34 Surface Life Support Systems for Extreme Environments

Encompasses full spectrum support for the Navy's underwater and surface personal life support systems. In addition, this technical capability adapts and develops systems and technologies applicable to providing life support in a wide variety of other extreme environments in which manned systems are required to operate. Includes RDT&E, Acquisition Support and man-rated In-Service Engineering for critical Life Support systems and specialized equipment necessary for manned operations in hazardous environments such as Damage Control and Firefighting.

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PH01 Strike Force Interoperability and Theater Warfare Systems ISE, T&E, and ILS

Provides In-Service Engineering, Test and Evaluation and Integrated Logistics Support at the Theater Warfare and Strike Force Level. Provides systems engineering and analysis in support of integration of Command, Control, Communications, Computers, Combat Systems, Intelligence, Surveillance and Reconnaissance (C5ISR) systems used to provide Strike Force, theater and area defense, precision strike and fire support from ships and submarines, including joint interoperability. Ensures integration, interoperability, and effectiveness of Strike Force warfare systems through the assignment of Strike Force Interoperability Teams. Provides logistics support for shipboard system elements as well as test and evaluation of advanced systems and upgrades to current systems. Develops Strike Force Interoperability Capabilities and Limitations documents that include Joint and Coalition information and provide inputs to tactics development.

PH02 Surface Combat Systems ISE, T&E, and ILS

Provides In-Service Engineering, Integration, Modernization, Test and Evaluation and Integrated Logistics Support of Combat Systems during all phases of the system life cycle. Develops system requirements and specifications. Provides Systems Engineering and analysis to support the full integration of combat system elements. Analyzes fleet combat system integration problems and failures to provide engineering and logistic solutions. Plans, manages, and conducts test and evaluation throughout life cycle. Develops Capabilities and Limitations documents and provide inputs to tactics development. Develops and conducts combat system level and integration tests. Conduct CSSQTs during which the entire CS, support elements, and personnel are assessed.

PH03 Surface Weapon Systems ISE, T&E, and ILS

Provides In-Service Engineering, Integration, Modernization, Test and Evaluation, and Integrated Logistics Support throughout the entire life cycle of weapon systems. Provides input to the design and development of new weapons systems; assume design agent for out of production systems. Plans, manages and conducts ship test and evaluation throughout life cycle. Analyzes fleet problems and failures to provide engineering and logistic solutions. Provides a full array of logistics services to the fleet. Inspect, Test and Certify weapons systems and their integration. Trains and certifies personnel. Develops, maintains, tests, certifies, and distributes tactical and support

software. Ensures safety, effectiveness and affordability and integration of operational weapons systems. Develops, maintains, tests, certifies, and distributes tactical software.

PH04 Underway Replenishment Systems ISE, RDT&E, and ILS

Provides UNREP In-Service Engineering, Research, Development, Test and Evaluation, and Integrated Logistics Support throughout the entire life cycle of UNREP systems. Provides production design and Integrated Logistics Support for advanced or modernized UNREP systems. Provides life-cycle technical support for advanced, modernized and in-service UNREP systems, including: ship installations, crew training, ship qualification trials, maintenance (ships force and shipyard), CASREP assistance, analyze fleet problems and failures, and produce engineering and logistics solutions.

PH06 Surface Missile Systems ISE, T&E, and ILS

Provides In-Service Engineering, Test and Evaluation, and Integrated Logistics Support throughout the entire missile life cycle. Ensures missile safety and operational readiness are sustained at the required levels, and that missile systems are managed efficiently and effectively. Spans elements of requirements and performance effectiveness, ground testing and test systems, flight test, safe missile handling, transportation and storage ashore, and onboard transit ships and combatants.

PH07 Surface Missile Launcher Systems ISE, T&E, and ILS

Provides In-Service Engineering, Test and Evaluation, and Integrated Logistics Support throughout the entire launching system life cycle. Ensures safety and operational readiness is maintained and that the systems are managed efficiently and effectively. Develops requirements, system specifications and procedures, computer programs and procedures. Certifies launching systems and personnel to enable systems and crews to operate safely and effectively. Analyzes fleet problems and failures to produce engineering and logistics solutions.

PH08 Radar Systems ISE, T&E, and ILS

Provides In-Service Engineering, Test and Evaluation, and Integrated Logistics Support throughout the system life cycle. Services include requirements definition, design review, integration, test and evaluation, performance analysis, software support, logistics product development, configuration management and installation planning/execution for the development and acquisition of new radar systems, the continuing spiral development of existing radar systems, and the support of legacy radar systems. Testing and evaluation services are provided beginning at formal DT/OT testing and continuing through the operational deployment life-cycle until system disposal. Prior to DT/OT

testing, during concept exploration and development, support is provided as needed. Ensures system safety, operational readiness and effectiveness are maintained. Provides systems engineering services and analysis to support ship combat system integration and fleet implementation. Analyzes maintenance technician/operator performance and develops training curriculum and technology solutions to improve human performance effectiveness. Develops system documentation and procedures, operational employment guidance, remote monitoring capability, maintenance plans, tactical computer programs and availability enhancements. Analyzes fleet performance and identifies performance and sustainability problems to produce engineering and logistics solutions. Provides restoration activity certification, engineering support and oversight.

PH09 Directed Energy Systems ISE, T&E, and ILS

Provides In-Service Engineering, Test and Evaluation, and Integrated Logistics Support for Directed Energy (DE) systems throughout the system life cycle. Services include requirements definition, design review, integration, test and evaluation, performance analysis, software support, logistics product development, configuration management and installation planning/execution for the development and acquisition of DE systems. Ensures system safety, operational readiness and effectiveness are maintained. Testing and Evaluation services are provided beginning at formal DT/OT testing and continuing through the operational deployment life-cycle until system disposal. Prior to DT/testing, during concept exploration and development, support is provided as needed.

Appendix A: Technical Capability Proposal, Review and Approval Process

Purpose To provide a process for proposing and vetting Warfare Centers (WFC) Technical Capability (TC) changes, including addition of new TCs and modification or deletion of existing TCs, and approving the changes for addition to the TC manual.

Definition

- **A Technical Capability (TC)** represents the blending of intellectual and physical assets provided by a cadre of technical people with knowledge, skill, experience and requisite facilities and equipment that yield the ability to deliver technical products. The work in a TC is core when the function enables the accomplishment of a WFC Division's key mission element and/or is inherently governmental, particularly in the case of value judgments affecting technological superiority; i.e., the quality and effectiveness of weapons, combat systems, and ship systems.
- **Key rules for defining TCs include:**
 - Unique to a Division
 - Distinct (technically)
 - Standalone (title is clear by itself)
 - Narrative definitions should be not more than 3-4 sentences
- **Common Taxonomy.** TC definitions should identify the following elements, as appropriate to the capability being defined:
 1. Product or Platform
 2. Function or Component
 3. Life-cycle Stage
 4. Technical Discipline (as required to deconflict)
 5. Mission (as required to deconflict)

Background

The continued alignment and refinement of WFC TCs is integral to achieving both the NAVSEA Vision and Mission¹ and the WFC Vision and Mission². Specific and concise review filters, decision support criteria, and simplified process flow are required to facilitate the development or deletion of WFC TCs and support WFC Board of Director decision-making consistent with the WFC CONOPS³. WFC efforts to produce meaningful, specific TCs and integrate them into the cyclic Integrated Planning Process³

¹ Naval Sea Systems Command Strategic Business Plan 2009-2013

² NAVSEA Warfare Centers Strategic Plan 2008-2012, March 2008

³ Integrated NAVSEA Warfare Centers concept of Operations, 10 January 2011

will enable the alignment and shaping of the WFC TCs at a more discreet level. Fully vetted TCs will improve workload assignment and workload projections, support TCs health assessments and focus sustainment/improvement actions, and foster the alignment of human resources and investment planning consistent with Navy core requirements.

To insure that the TCs accurately reflect the capabilities of the Warfare Centers, they are periodically reviewed and updated in accordance with the WFC Integrated Planning Process. This review process takes place on a two to three year cycle, and any changes made to the TCs are validated jointly by the Divisions and the WFC Headquarters with the goal of eliminating duplication of effort at different Divisions. Management and assessment of these TCs is performed at the Division and Headquarters level to help avoid competition and redundancy and ensure that efficiencies and synergies between the Divisions are realized. The National Workload Management Directors (NWMDs) direct and oversee this process, with the WFC BOD holding final approval authority for changes.

Types of Change Requests

- **New TCs** may be submitted as a result of development of emergent technical capabilities due to change in war fighting or technology requirements (e.g., break-through or disruptive technologies) that are consistent with mission and core requirements, or as a result of new mission areas that have become part of the NAVSEA WFCs via external changes such as BRAC realignment, or NAVSEA-directed additions of new communities into the NAVSEA WFC family.
- **TC Modification** may become necessary because of changes in TCs due to growth of mission area, or as the result of shifted focus as technology develops beyond the original scope.
- **TC Realignment** may be needed as a result of shift of a technical capability to a different WFC Division due to Base Realignment and Closure (BRAC) or other realignment initiatives.
- **TC Deletion** is requested when the Division is divesting or retiring a technical capability. This occurs when workloads decrease due to maturing missions or technology, external events such as BRAC realignment move the function(s) outside the WFC Divisions, or obsolescence.

TC Change Roles and Responsibilities:

- **Divisions:** Use the common business rules to propose new or to delete existing baseline (approved) TCs. Division COs and DTDs approve all TC change submissions and comments on submissions prior to submittal.
- **Division TC Change Point-of-Contacts (POCs):** Representatives from each WFC

Division who represent their Division during the TC change process, and communicate directly with their Division's CO and TD about actions in process.

- **National Workload Management Directors (NWMDs):** Support and endorse new/deleted TCs by validating against their strategic assessments. Review and adjudicate changes to this process.
- **WFC Headquarters TC Configuration Manager (TCCM).** Maintain configuration control of WFC TCs the TC Manual, and documentation regarding TC changes. Facilitate the TC Change process by supporting Division development, NWMD review and endorsement, and WCBOD review and approval of TC changes.
- **WFC Technical Directors (TDs).** Review and concur with TC changes prior to submission to WFC BOD.
- **WFC BOD.** Final approval/disapproval of all WFC TC changes. Review and approve changes to this process.

TC Review Process

Step 1: NAVSEA WFC TC review is announced.

Every two to three years as needed, the NAVSEA WFC BOD announces a schedule for the review of the Technical Capabilities. The announcement, along with the current TC document and the TC Change Request form, is distributed to all WFC COs and DTDs, with copies to the Division TC Change POCs.

Step 2: WFC Division initiates request for TC Change.

As part of the review, Divisions document any desired TC changes on the TC Change Request form, and send via their Division POC to the to WFC TC Configuration Manger (CM). The documentation provided to the CM includes detailed justification for the changes and suggested new/revised TC descriptions, as appropriate.

Step 3: Package Review

The WFC TC POC reviews the TC Change Request packages submitted by the Divisions, and works with the Division to insure that the packages contain all necessary information. The CM keeps the TC Change Request packages updated for the entire review cycle. He/she then compiles a list of proposed changes for distribution, and performs a high level review with WFC management, including the NWMDs, to ascertain if the requested change fits within the business rules and is appropriate for processing. The submitting organization is informed of the package status.

Step 4: Identification of Division Involvement, TC Change Discussion, and Submission of Comments (for each individual request)

If accepted, each individual proposed change package is sent to the Division TC Change POCs, and they are asked to indicate if they have TCs in their Division with any potential conflict. For Divisions indicating that concern, a meeting is held with the submitting Division to discuss the changes, with the CM facilitating. A deadline is set for the Divisions to submit any recommended changes, along with rationale for the change, in writing to the CM. The Division TC Change POCs must get approval from their Division COs and DTDs prior to submission of the recommended changes.

Step 5: Adjudication Process (for each individual request)

The WFC TC CM POC creates a TC adjudication document. It contains the original request and all recommended changes with accompanying rationale. The package is distributed to the NWMDs and to all Divisions involved in the initial review. A meeting is held between the NWMDs and the submitting Division to adjudicate the comments, with the CM facilitating. The CM then updates the adjudication document, creates an adjudicated version of the TC, and sends the package first to those involved in the initial review, then to all Division TC Change POCs. Barring any major issues, the package is the ready for WFC BOD approval. If additional questions are received, steps 4 and 5 are repeated as necessary to reach agreement. If agreement cannot be reached on a package, at the discretion of the WFC TDs, the package goes to the WFC BOD for decision.

Step 6: WFCBOD Approval

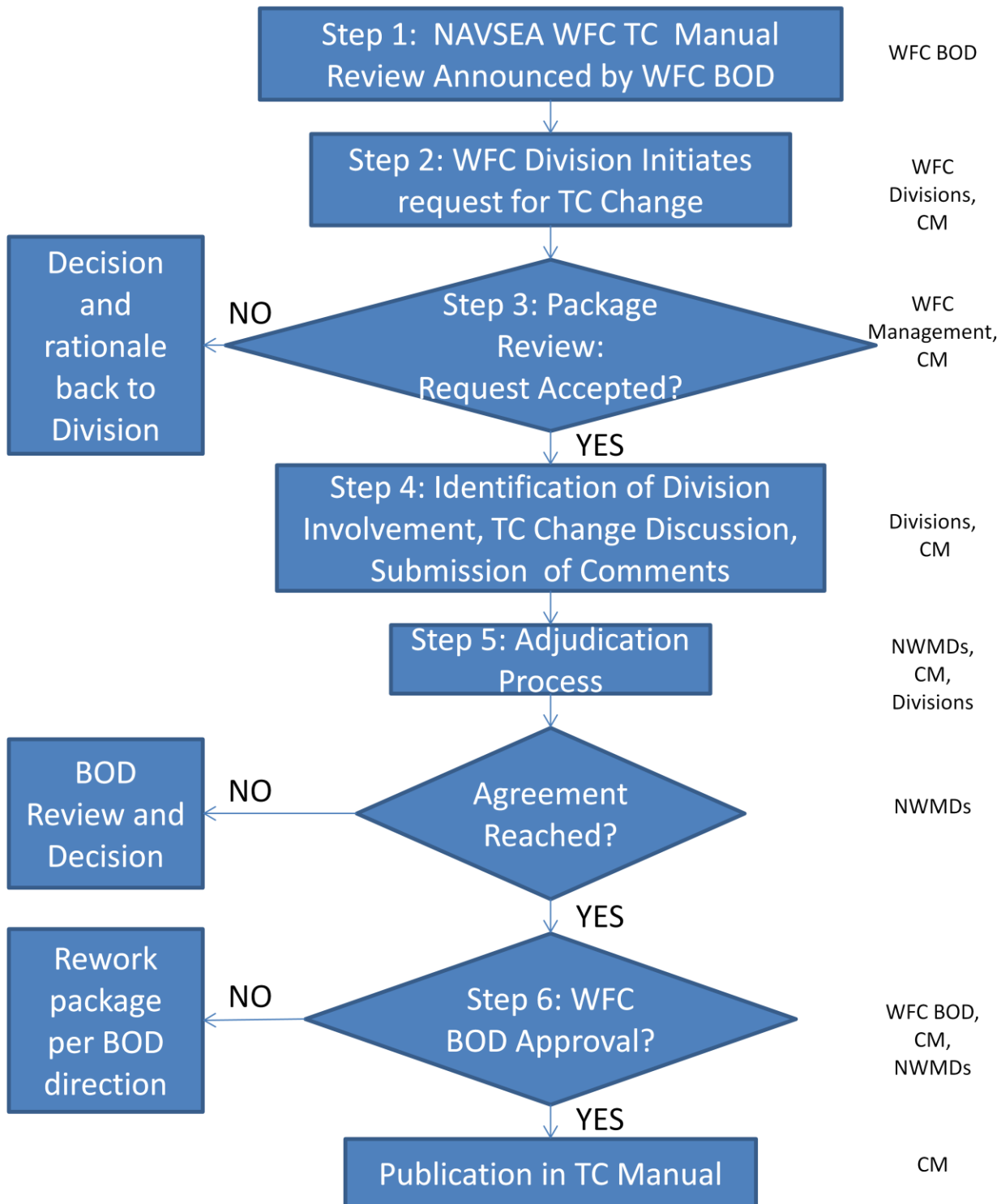
The WFCBOD reviews the final TC Change package, and either approves or rejects. Approved changes are announced to WFCs (COs and TDs with cc to TC Change POCs), and the TC document is updated.

Special Note: Steps 2 through 6 may also be initiated by the WFC BOD outside the normal 2-3 year review process for emergent changes such as BRAC or the movement of other NAVSEA organizations under the WFC structure.

TC Filter

Role/Use of TC (Division Level)	Business Rules	Major Attributes	Rejection Criteria
<ul style="list-style-type: none"> •Used to Manage/Assign Workload <ul style="list-style-type: none"> - Define Value Added Contributions - Establish Boundaries for Exploring Alternative Work Assignments - Identifies Potential Synergies/Partnerships • Fundamental Description of Workforce and Facilities (Functions Division's Do) •Inform Stakeholders of Capabilities of WC •Basic Building Blocks for Health Assessment Data Collection •Connected to Investment Decisions 	<ul style="list-style-type: none"> • Sum of TCs must Capture All Direct Work •Must Link Upward to Core Equities <ul style="list-style-type: none"> - May Support more than 1 •Extended Life <ul style="list-style-type: none"> - Live Beyond a Program/Project •Must Integrate with Infrastructure Tools <ul style="list-style-type: none"> - Link to Business Executive Efforts 	<ul style="list-style-type: none"> • Clearly relates to Warfare Center <u>Division's</u> Intellectual and Physical Assets that Deliver Products to the Customer <ul style="list-style-type: none"> -May be Distributed Within Sites of a Division •Unique in its contribution to the Warfare Center Enterprise •Clearly recognized as required in-house capability to sustain TC •Links to Division Mission/Mission Essential •Links to Acquisition Lifecycle •Links to Technical Warrant where Applicable •Unique/Distinctive <ul style="list-style-type: none"> -Or Results in a Unique Synergism •Difficult to Replicate •Best Value to Government •Government Role as Described in Health Assessment Instrument <li style="padding-left: 20px;">Core Work <li style="padding-left: 20px;">Work Industry Can't/Won't D <li style="padding-left: 20px;">Technical Pipeline •Supportive of Being Divided into Knowledge Areas 	<ul style="list-style-type: none"> • Falls Outside of Warfare Center's "Core Equities" •Overlaps Another Warfare Center Division's TC •Fails to Relate Value to Customer or Stakeholder •So Broad it Encompasses More than 1 Core Equity •So Narrow it Represents a Single Knowledge Area •Described as a Technical Warrant •Limited Life •Not an Organization •Not a Specific Product <ul style="list-style-type: none"> e.g. Aegis 7.1.1 or MK48 Torpedo •Not a Service

Annotated Flow Diagram



Appendix B: Acronyms and Abbreviations

This document contains terminology familiar to the DoD Acquisition Community. When there is a non-standard definition within the DoD and WCs Community, the term will be marked and footnoted at the bottom of the appropriate section. The following common acronyms and abbreviations will be used throughout this document.

ACV	Air Cushion Vehicle
AE	Acquisition Engineering
AIREX	Air Explosion
AIT	Alteration Installations Team
ASROC	Anti-Submarine Rocket
ASW	Anti-Submarine Warfare
AUTEC	Atlantic Undersea Test and Evaluation Center
C2	Command and Control
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance
C4N	Command, Control, Communications, Computers, and Navigation
C5I	Command, Control, Communications, Computers, Combat Systems, and Intelligence
C5ISR	Command, Control, Communications, Computers, Combat Systems, Intelligence, Surveillance and Reconnaissance
CAD	Cartridge Actuated Device
CASREP	Casualty Report
CB	Chemical Biological
CBR	Chemical, Biological and Radiological
CBR-D	Chemical, Biological and Radiological Warfare Defense
CBW	Chemical Biological Warfare
CDA	Central Design Agent
C-IED	Counter-Improvised Explosive Device
COMINT	Communications Intelligence
Comms	Communications
CONOPS	Concept of Operations
COTS	Commercial off-the-shelf
CREW	Counter Radio-Controlled Improvised Explosive Device Electronic Warfare
CS	Combat System
CSA	Configuration Status Accounting
CSG	Carrier Strike Group
CSSQTs	Combat System Ship Qualification Trials
CV-TSC	Carrier Tactical Support Center
DCSA	Defense Support of Civil Authorities
DE	Directed Energy

DHS	Department of Homeland Security
DoD	Department of Defense
DON	Department of the Navy
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facility
DT/OT	Developmental Testing/ Operational Testing
E3	Electromagnetic Environmental Effects
ECM	Electronic Counter-measure
ECS	Submarine Exterior Communications System
ELINT	Electronic Intelligence
EM	Electromagnetic
EMV	Electromagnetic Vulnerability
EO/Vis	Electro-Optical/Visual
EOD	Explosive Ordnance Disposal
ESG	Expeditionary Strike Group
EW	Electronic Warfare
FMA	Foreign Material Acquisition
FME	Foreign Material Exploitation
FMS	Foreign Military Sales
FOT&E	Follow-on Operational Test and Evaluation
FY 11	Fiscal Year 2011 (1 October 2010 to 30 September 2011)
GWOT	Global War on Terrorism
HERF	Hazards of Electromagnetic Radiation to Fuel
HERO	Hazards of Electromagnetic Radiation to Ordnance
HERP	Hazards of Electromagnetic Radiation to Personnel
HM&E	Hull, Mechanical and Electrical
HSI	Human Systems Integration
I&EW	Imaging and Electronic Warfare
IEDs	Improvised Explosive Devices
IERs	Information Energetics Requirements
ILS	Integrated Logistics Support
INDs	Improvised Nuclear Devices
IO	Information Operations
IR	Infra-red
ISE	In-Service Engineering
ISEA	In-Service Engineering Agent
ISR	Intelligence Surveillance and Reconnaissance
IV&V	Independent Verification and Validation
JATO	Jet-assisted take-off
JDMAG	Joint Depot Maintenance Advisory Group
JFMCC	Joint Force Maritime Component Commander
JSEOD	Joint Service Explosive Ordnance Disposal
JTF	Joint Task Force
KPPs	Key Performance Parameters
LCAC	Landing Craft Air-Cushioned
LFT&E	Live Fire Test and Evaluation

M&S	Modeling and Simulation
MANTECH	Manufacturing Technology Program
MARCORPS	Marine Corps/
MCM	Mine Countermeasures
MEMS	MicroElectro Mechanical Systems
METCAL	Metrology and Calibration
MIW	Mine Warfare
MOE	Measure of Effectiveness
MOP	Measure of Performance
NAVSEA	Naval Sea Systems Command
NAVSEA HQ	Naval Sea Systems Command Headquarters
NOSSA	Naval Ordnance Safety and Security Activity
NSW	Naval Special Warfare
NSWC	Naval Surface Warfare Center
NUWC	Naval Undersea Warfare Center
O&M	Operation and Maintenance
OESO	Ordnance Environmental Support Office
OPEVAL	Operational Evaluation
OSD	Office of the Secretary of Defense
PAD	Propellant Actuated Device
PBLs	Performance Based Logistics
PEO	Program Executive Office
PHS&T	Packaging, Handling, Storage and Transportation
PMS	Planned Maintenance System
R&D	Research and Development
RCS	Radar cross-section
RDT&E	Research, Development, Test, and Evaluation
S&T	Science and Technology
SEA 05	NAVSEA 05, Naval Systems Engineering Directorate
SHIPALT	Ship Alterations
SIGINT	Signal Intelligence
SIM/STIM	Simulation Stimulation
SLBM	Submarine-Launched Ballistic Missile
SOF	Special Operations Forces
SSGN	Guided Missile Submarine, Nuclear propulsion
SSTRO	Stability, Security, Transition, and Reconstruction Operations
SUBSAFE	Submarine Safety
T&E	Test and Evaluation
TC	Technical Capability
TECHEVAL	Technical Evaluation
TSC	Theater Security Cooperation
TSSE	Total Ship Systems Engineering
TWH	Technical Warrant Holder
U.K.	United Kingdom
U.S.	United States
UAV	Unmanned Aerial Vehicle

UGV	Unmanned Ground Vehicle
UNDEX	Underwater Explosion
UNREP	Underway Replenishment
USMC	United States Marine Corps
USSOCOM	U.S. Special Operations Command
USV	Unmanned Surface Vehicle
USW	Undersea Warfare
UUV	Unmanned Undersea Vehicle
VV&A	Verification, Validation, and Accreditation
WC	Warfare Center
WCBOD	Warfare Centers Board of Directors
WMD	Weapons of Mass Destruction