



Ranges, Engineering, and Analysis Department

LEADER IN UNDERSEA TEST AND EVALUATION AND FLEET TRAINING

FULL SPECTRUM ENGINEERING

NUWC Industry Day

Ranges, Engineering, and Analysis Department

(Code 70)

Presented by

Mr. Eric Spigel

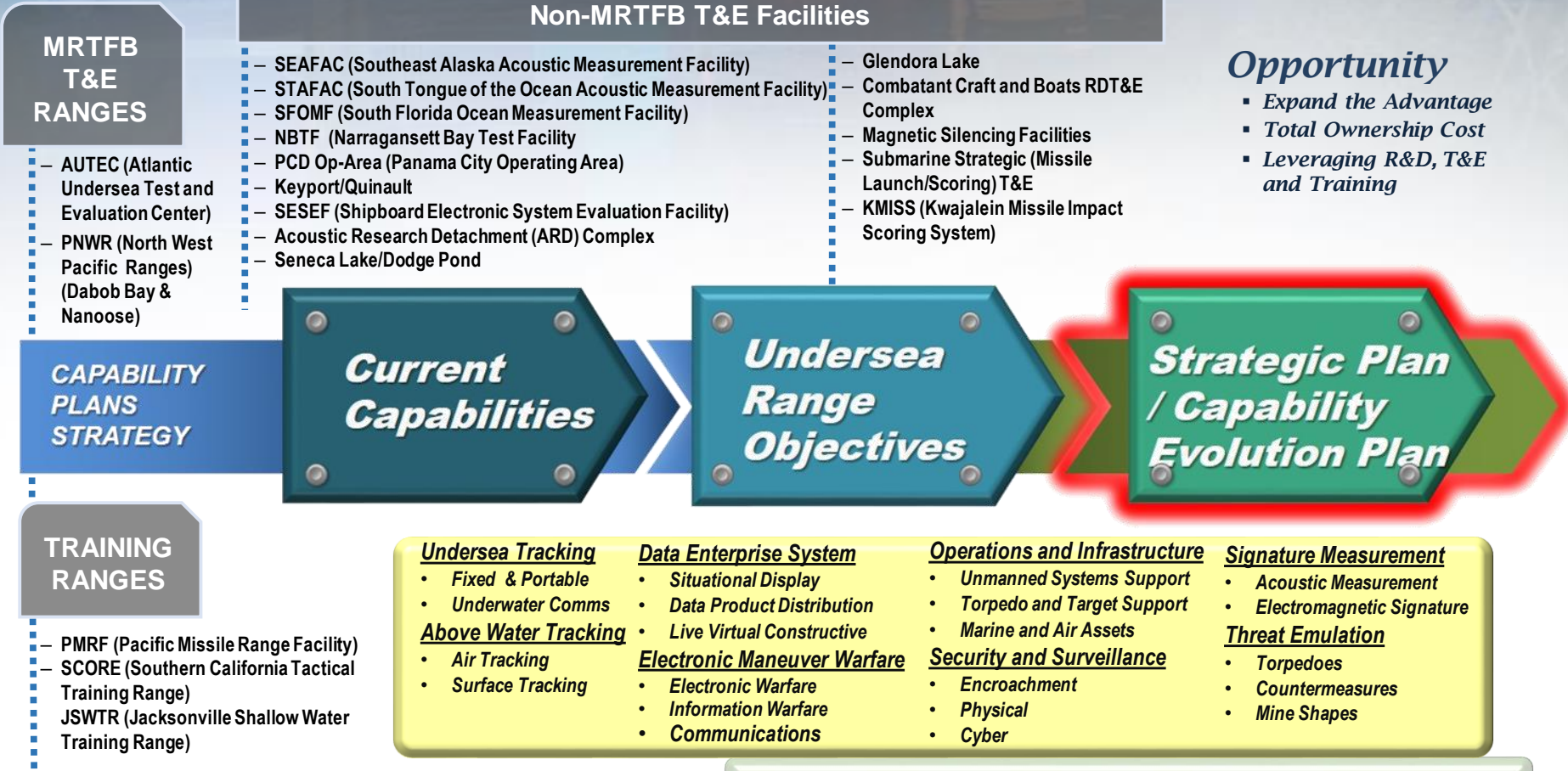
Ranges, Engineering, and Analysis
Department Head

22 October 2020

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Navy's USWRE Capability Roadmap - "A Holistic Approach" *Understanding, Awareness, Visibility*



Range Mission Functions: ASW, ASUW, Electronic Warfare/Info Ops, Mine Warfare, Acoustic Measurement, Special Ops, SeaBed Warfare
 Lifecycle Scope: Research and Development, Rapid and Standard Prototyping, System Test and Evaluation, Tactics Development, Training



Ranges, Engineering, and Analysis Department

LEADER IN UNDERSEA TEST AND EVALUATION AND FLEET TRAINING

FULL SPECTRUM ENGINEERING

Code 70 provides a full spectrum of engineering resources to enhance undersea warfare through the application of simulation-based design, range development, engineering analysis and design, prototype fabrication, test and evaluation, readiness and training in both simulated and in-water environments.

Who We Are / What We Do

Code 70 Vision: The recognized leader for undersea test and evaluation and fleet training

Range\Facilities

- **Atlantic Undersea Test and Evaluation Center**
- **Seneca Lake Acoustic Test Facility**
- **Shipboard Electronic Systems Evaluation Facility**
- **Narragansett Bay Test Facility**
- **Survivability Testing Facility**
- **Industrial Services Enterprise / Cal Lab**
- **Dodge Pond Acoustic Test Facility**
- **NATO Naval Forces Sensor and Weapons Accuracy Check Sites**

Technical Expertise

- **Fixed & Portable Range Development & Sustainment**
 - **Underwater Tracking**
 - **Ocean Engineering**
 - **Acoustic Survey**
 - **Range display, processing and control**
 - **Cyber security**
- **Computational Science & Engineering**
- **Marine Species Monitoring & Modeling**
- **Reliability, Maintainability Engineering**
- **Independent System Safety**
- **Waterside Security**



AUTECE



SENECA LAKE



SESEF



NBTF



SURVIVABILITY



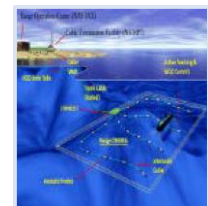
ISE



DODGE POND



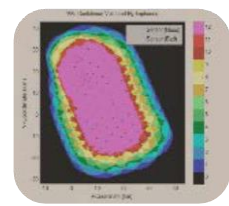
NATOFORACS



FIXED RANGES



PORTABLE RANGES



COMPUTATIONAL S&E



MARINE MAMMALS



RM&E



SYSTEMS SAFETY



WATERSIDE SECURITY



ADVANCED INSTRUMENTATION SYSTEMS TECHNOLOGY



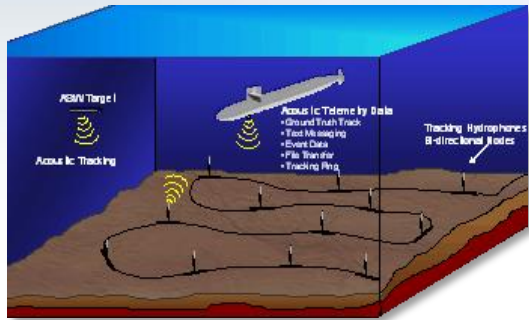
Code 70 Technical Leadership

- Maintain Technical Capabilities and Advance the State of the Art

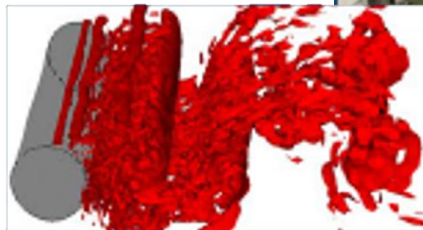
...For NUWC Newport core mission areas:

- Undersea Ranges

- Marine Species Modeling and Monitoring

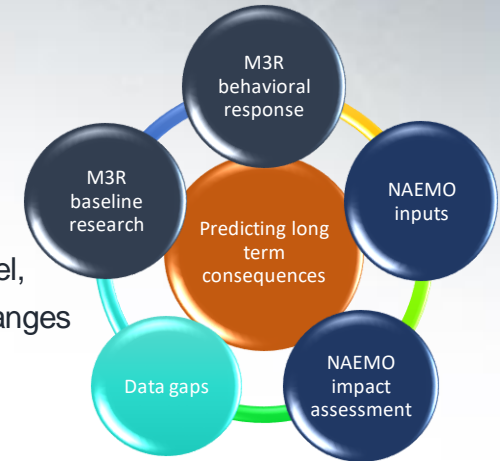


- Rapid Prototyping



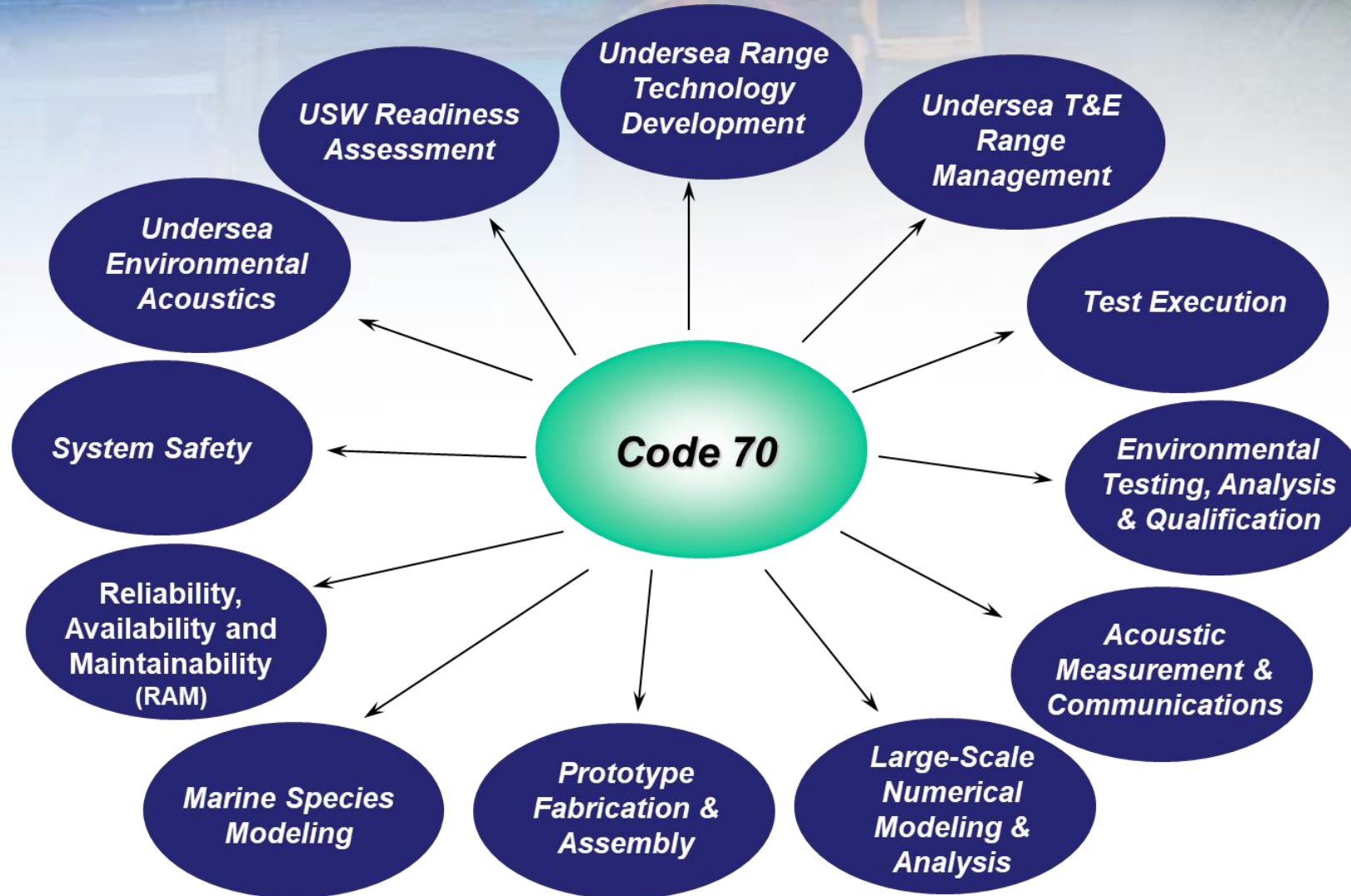
- Engineering Analysis

Note: NAEMO = Navy Acoustic Effects Model, M3R = Marine Mammal Monitoring on Navy Ranges





Code 70 Skill Areas and Competencies



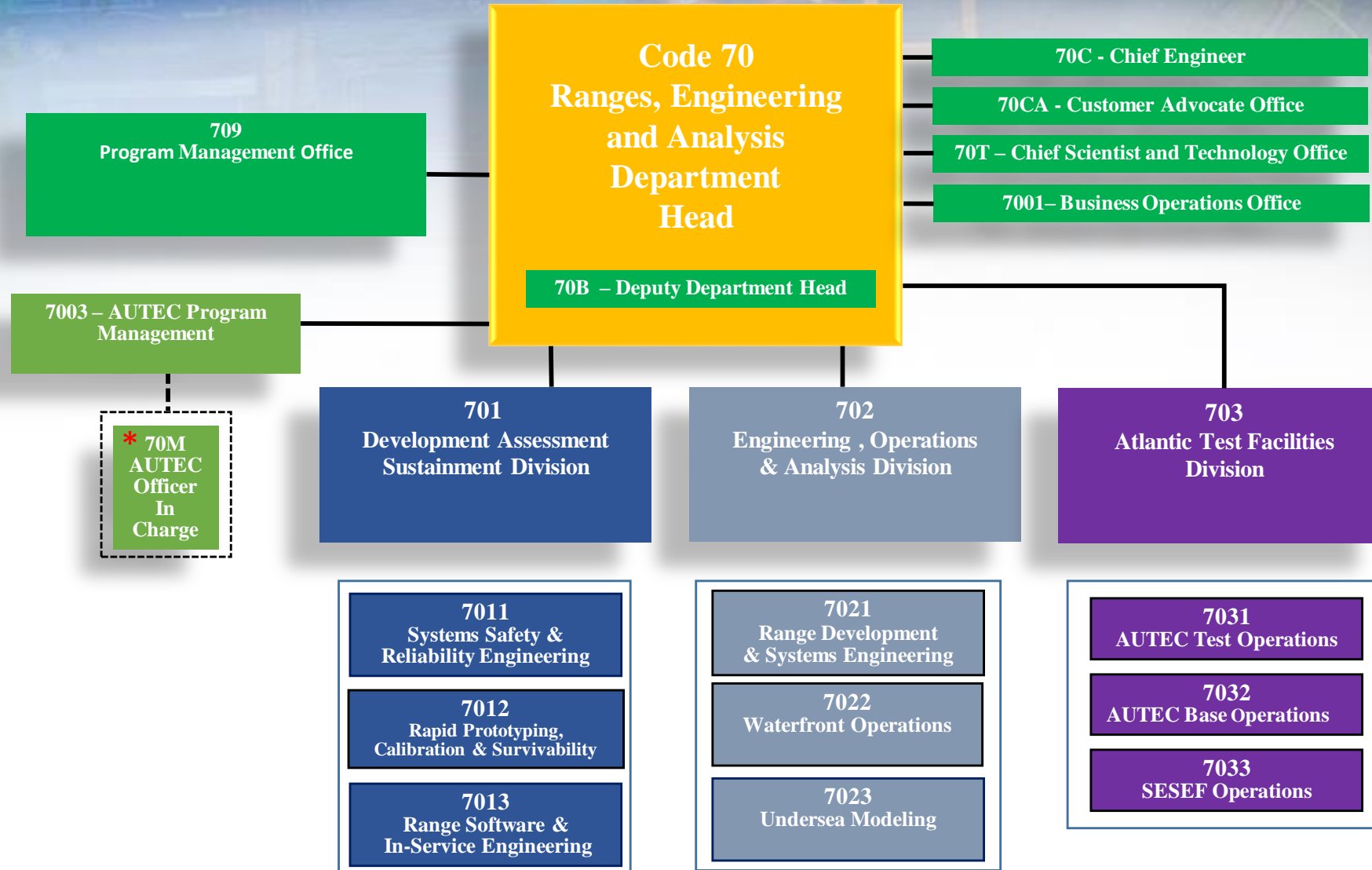


Ranges, Engineering, and Analysis Department

LEADER IN UNDERSEA TEST AND EVALUATION AND FLEET TRAINING

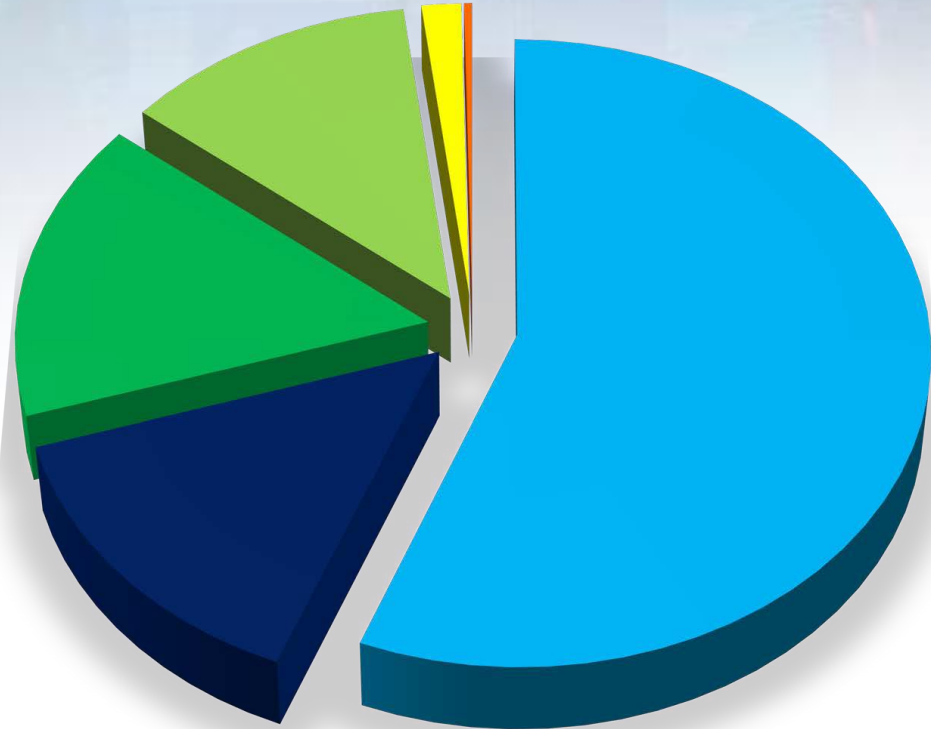
FULL SPECTRUM ENGINEERING

Ranges, Engineering and Analysis Department





Code 70 Workforce



Workforce breakdown

- ENGINEER: 169
- TECHNICIAN: 47
- SCIENTIST: 43
- ADMIN/TECH SPECIALIST: 37
- CLERICAL: 5
- WAGE: 1
- TOTAL: 302



Code 70 Operates Major NUWC Test Facilities



- Atlantic Undersea Test & Evaluation Center (AUTEC)
 - West Palm Beach, FL Headquarters
 - AUTEC Ranges, Andros Island Bahamas
- Narragansett Bay Shallow Water Test Facility
 - Newport, RI
- Dodge Pond Acoustic Measurement Facility
 - Niantic, CT
- Seneca Lake Acoustic Test Facility
 - Dresden, NY
- Shipboard Electronics Systems Evaluation Facility (SESEF)
 - Mayport, FL, Norfolk, VA, and Rota Spain
- Survivability Testing Facility
 - Newport, RI
- Industrial Services Enterprise (ISE) Facility
 - Newport, RI
- Metrology / Calibration Laboratory Facility
 - Newport, RI

AUTEC



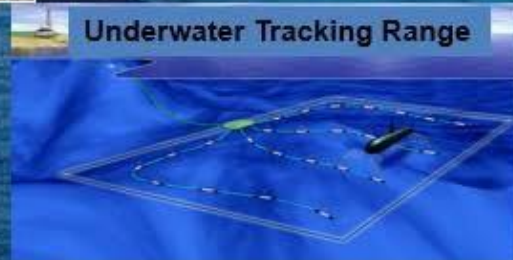
Site 1 Main Base
(approx. 1 Sq. mile)
143 Buildings



Site 2
31 acres
7 Buildings



Electronic Warfare
Information Operations



Underwater Tracking Range

AUTEC supports:

Developmental and Operational Testing for every major USW asset including:

- VIRGINIA Class submarine
- DDG 51 Arleigh Burke Destroyer
- SSN 688 and 688I submarines
- Submarine and surface ship SONAR, combat and weapon systems

Atlantic Fleet assessment and readiness exercises:

- Submarine Command Course
- Helicopter Advanced Readiness Program
- Seahawk Helicopter Weapons and Tactics Instructor course
- Submarine, surface ship and aircraft torpedo proficiency



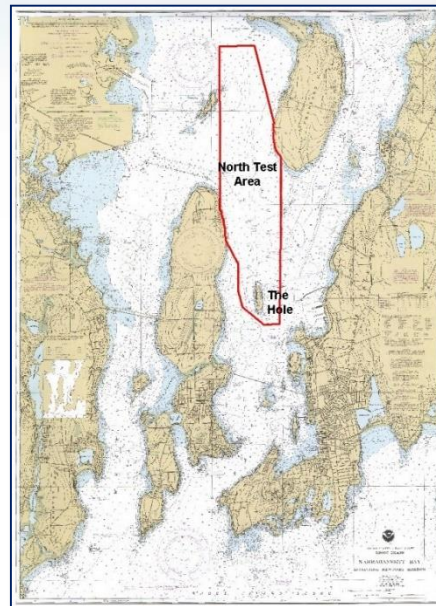
Narragansett Bay Shallow Water Test Facility



The Narragansett Bay Test Facility (NBTF) is a world class test and evaluation facility and in-water test range that supports research and development, and engineering and analysis of underwater, surface and aerial vehicles and related technologies in a realistic, operational environment. It is a valuable resource that enables rapid prototyping and high velocity learning for not only government agencies, but for academia and private industry partners alike. The NBTF is the hub for NUWC Division Newport deployment of Navy systems and has been the site of the Division Newport's Advanced Naval Technology Exercise for five years

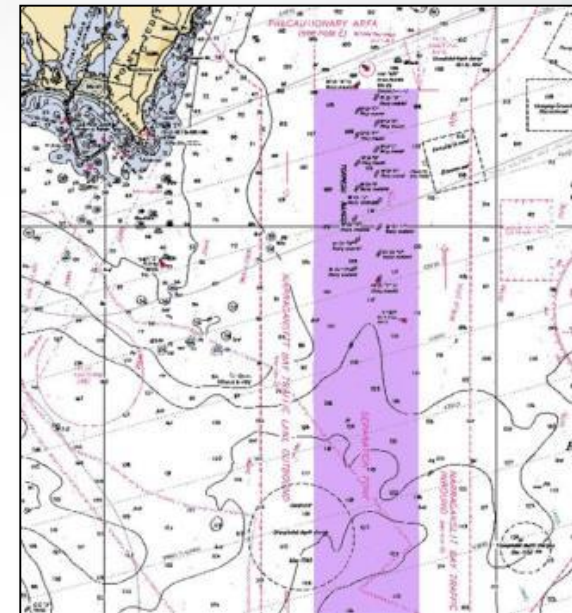
Test Facility designed to support R&D:

- Advanced Underwater Weapons
- Weapon Systems and Launchers
- Unmanned Underwater Vehicles
- Surface Vehicles
- Acoustic Sensor Development
- Electromagnetic sensor development
- Electronic warfare system development
- Ship navigation, location and tracking systems
- Oceanographic instrumentation and systems
- UAS Integration



Inner Range - 10,000 yards long and 2,750 yards wide, depths vary from 60 feet to 20 feet. Tracking buoys can provide a tracking area of 8 square miles.

Hole Test Area - 1,760 yards long and 880 yards wide, with a maximum depth of 127 feet.



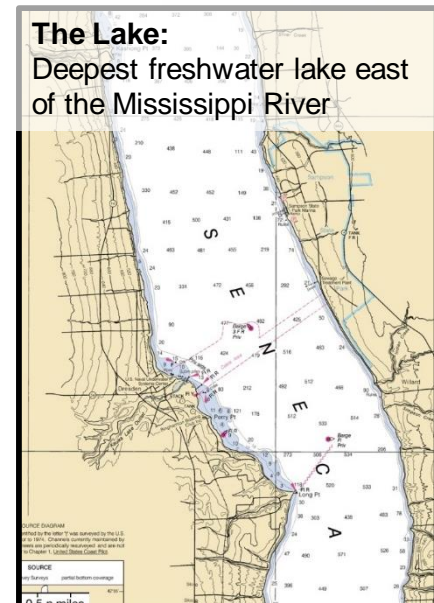
Outer Range - 17,500 yards long and 4,000 yards wide, depths vary from 100 feet to 120 feet. Tracking buoys can provide a tracking area of 8 square miles.

Other NBTF East Coast OPAREAS: NBTF services the entire east coast to include Long Island sound, Gulf of Maine, Cape Cod, Virginia Capes, and Florida coast.



Seneca Lake Acoustic Test Facility

- Sonar and acoustic parameter measurement for single element transducers to complex arrays
- Statistical and spectrum analysis
- Instrumented calibration
- Heavy lift capability
- Unique to the Navy
- Canal access to the ocean
- Low ambient noise conditions
- Test depths to 600 feet
- Target response measurement capability





Dodge Pond Acoustic Measurement Facility

R&D Capabilities

- Acoustic Measurement Facility
 - Pressure test capability to 500 psi
 - 33 acre fresh water pond with 50 ft operating depth
 - Very quiet ambient noise levels below sea state 0, frequency from 50 Hz to 500KHz
 - Close proximity to Division Newport
 - Test all types of:
 - Transducers
 - Arrays
 - Domes
 - Baffles
 - Towed Line Arrays
 - Other underwater electro-acoustic devices





Shipboard Electronics Systems Evaluation Facility (SESEF)

- Technical Design Agent (TDA) – 7 locations near major homeports operated and maintained to provide real-time electromagnetic (EM) and RF signal analysis - Norfolk VA, Mayport FL, San Diego CA, Port Angeles WA, Hawaii, Japan and Rota Spain
 - Norfolk and Mayport facilities are operated by Division Newport
- Identify and assist in correction of deficiencies in the ship's combat systems electronics suite
- Determine system operational performance and material readiness following new construction and overhaul
- Validate engineering designs
- Support Inspection & Survey (INSURV)
- Provides significant Fleet cost savings
 - Technical assists
 - Tactical Air Navigation (TACAN) Certifications





Survivability Testing Facility

Providing Navy Shock and Environmental Qualification Testing from Requirements Planning to Test Conduct and Evaluation

- Facility

- 23,000 SF Mechanical Lab

- Staff

- (10) Mechanical Engineers
- (8) Mechanical Engineering Technicians
- (1) Logistics Support
- (2) Computer Scientists
- (1) Industrial/Systems Engineer
- (1) Report Editor

- Functions

- Research and Development Testing
- Test Requirements Planning
- Mechanical Test and Evaluation
- CASREP Support

- Equipment

- (9) Hydrostatic Pressure Vessels
- (3) 9491.C Approved Navy Shock Machines
- (3) Programmable Drop Shock Machines
- (6) Climatic Chambers
- (4) Electrodynamic Vibration Machines
- (1) Mechanical Vibration Machine
- (2) Instron Machines
- Airborne and Structureborne Noise Test Equipment
- Modal Testing
- Fungus Test Chamber
- Salt Fog Chamber
- Inclination Machine
- Enclosure Test Machine
- Torpedo wire coil Payout Machine
- Instrumentation and recording devices for strain, acceleration, temperature, pressure, force, torque





Industrial Services Enterprise (ISE) Facility Full-service Engineering & Manufacturing Support Concept to Design to Fabrication

- Facility
 - 21,800 SF Building
 - All areas serviced by 2Ton capacity bridge cranes and 2,000 Sf area serviced by 10 Ton bridge crane with 28'-6" lift
- Engineering
 - (10) Engineers staffed to provide customers with design and Engineering support
- Technicians / Machinist
 - (2) Planners
 - (2) Logistics support personnel
 - (3) CNC programmers
 - (2) Welders
 - (17) Machinist/Tool makers
- Equipment
 - (4) 4-axis CNC Vertical Milling Machines all
 - (1) 4-axis CNC Horizontal Milling Machine
 - (3) 3- axis CNC Turning Centers
 - (1) 4-axis CNC Turning Center
 - (1) 5-axis Water Jet Machine
 - (1) Coordinate Measuring Machine
 - Paint & Powder-Coating Booth
 - Sheet Metal
 - (3) Welding Machines



Shop Overview



Metrology / Calibration Lab Facility

Providing Top Level Standards Calibration Support for Navy Operations

- Facility
 - 1,900 SF Electronics Lab
 - 1,400 SF Mechanical Lab
- Technicians
 - (5) Electronic Technicians
 - (2) Mechanical Technicians
 - (1) Logistics Support
 - (2) QA support



- Functions
 - Support Fleet Readiness
 - Ensure NAVSEA METCAL Program Compliance
 - Support NUWC RDT&E
 - Perform Direct Support Calibration for Division Newport
 - Provide Work-overflow Calibration Support for Portsmouth Shipyard and SUBLANT



Electronics

- Current
- Voltage
- Resistance
- Time/Frequency
- Inductance
- Capacitance
- General Purpose

High Frequency

- RF/Microwave
- COAX
- X-band
- P-band
- K-band
- R-band
- Attenuation
- VSWR

Dimensional

- Length
- Mass
- Flatness
- Scales
- Balances

Physical

- Pressure
- Torque
- Force
- Vibration
- Temperature
- Humidity
- Shock



Undersea Tracking Ranges Roles

- Technical Design Agent (TDA) for Undersea Tracking Ranges Equipment (UTRE) Program
 - Design, development and lifecycle support of underwater tracking systems including pingers and portable nodes for submarines, torpedoes, targets and unmanned undersea vehicles
- Acquisition Management (DAWIA Certified)
 - Program Management & Contracting
 - Systems Engineering and Lead Systems Integrator
- Range Systems Development
 - Applies corporate technical knowledge across programs & products
- Range Technology Research and Development
- Range Operational Management
 - AUTEK and Narragansett Bay
 - Portable Systems
- Ocean Systems Support Activity
 - System Sustainment and Product Upgrades
 - Trouble Report Resolution and Customer Support
 - Integrated Logistics Support, Quality Assurance, Configuration Management, Testing and Certification
 - Cybersecurity

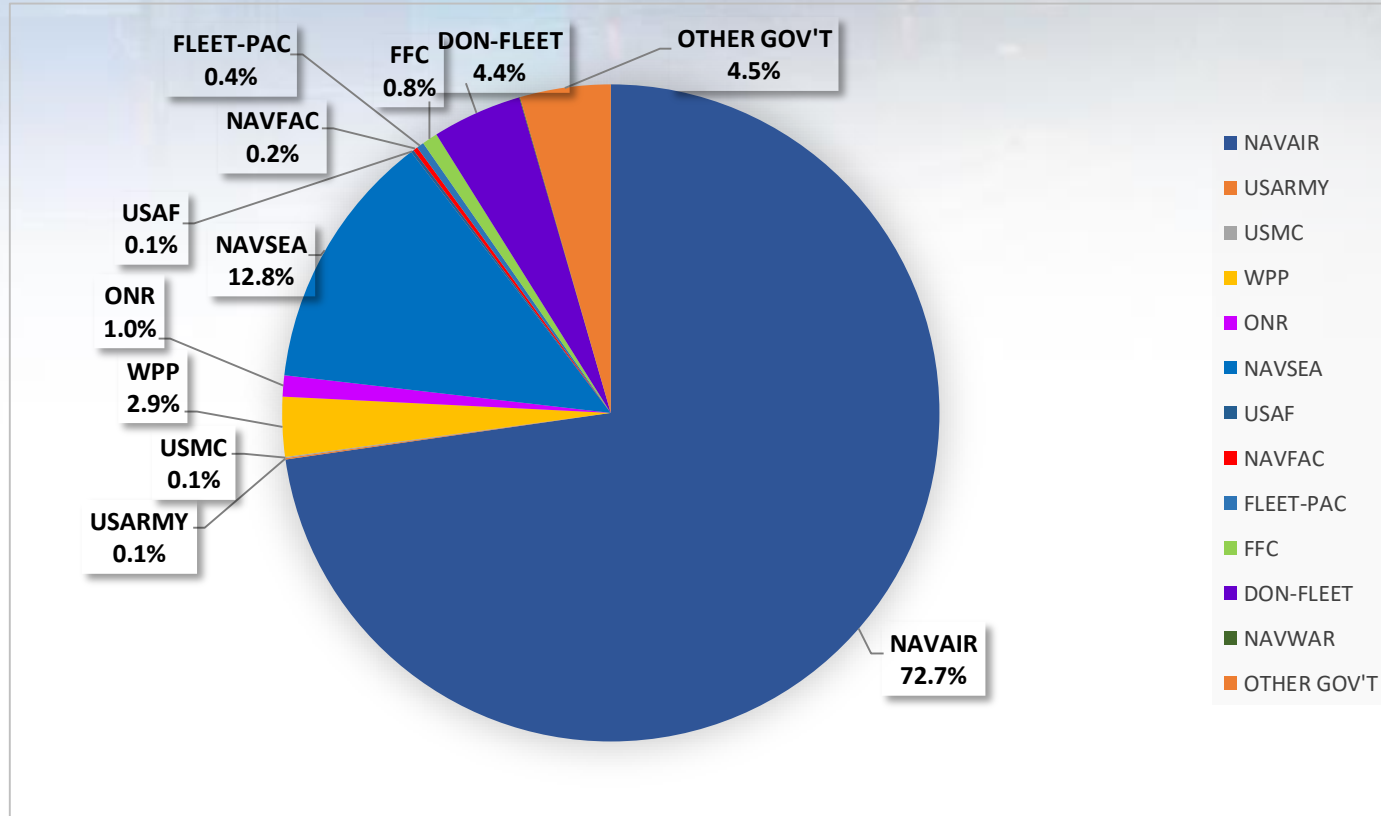


Major Range Development Programs

- Undersea Warfare Training Range (USWTR)
 - Customers: NAVAIR PMA205, NAVAIR 5.0W
 - Increment I
 - 500 nmi² instrumented range for the Atlantic Fleet's use in training
 - 60 nmi offshore Jacksonville FL
 - Increment III
 - Replace existing instrumentation at both Pacific Missile Range Facility (PMRF) and Atlantic Undersea Test and Evaluation Center (AUTEK)
- Portable Undersea Training Range (PUTR II)
 - Customer: NAVAIR PMA205
 - Portable nodes that provide standard fleet pinger tracking as well as submarine self-track capability for Fleet training
- AUTEK I&M Projects
 - Customer: NAVAIR 5.0W
 - Shore Electronics System Replacement
 - In water Sensor System Replacement



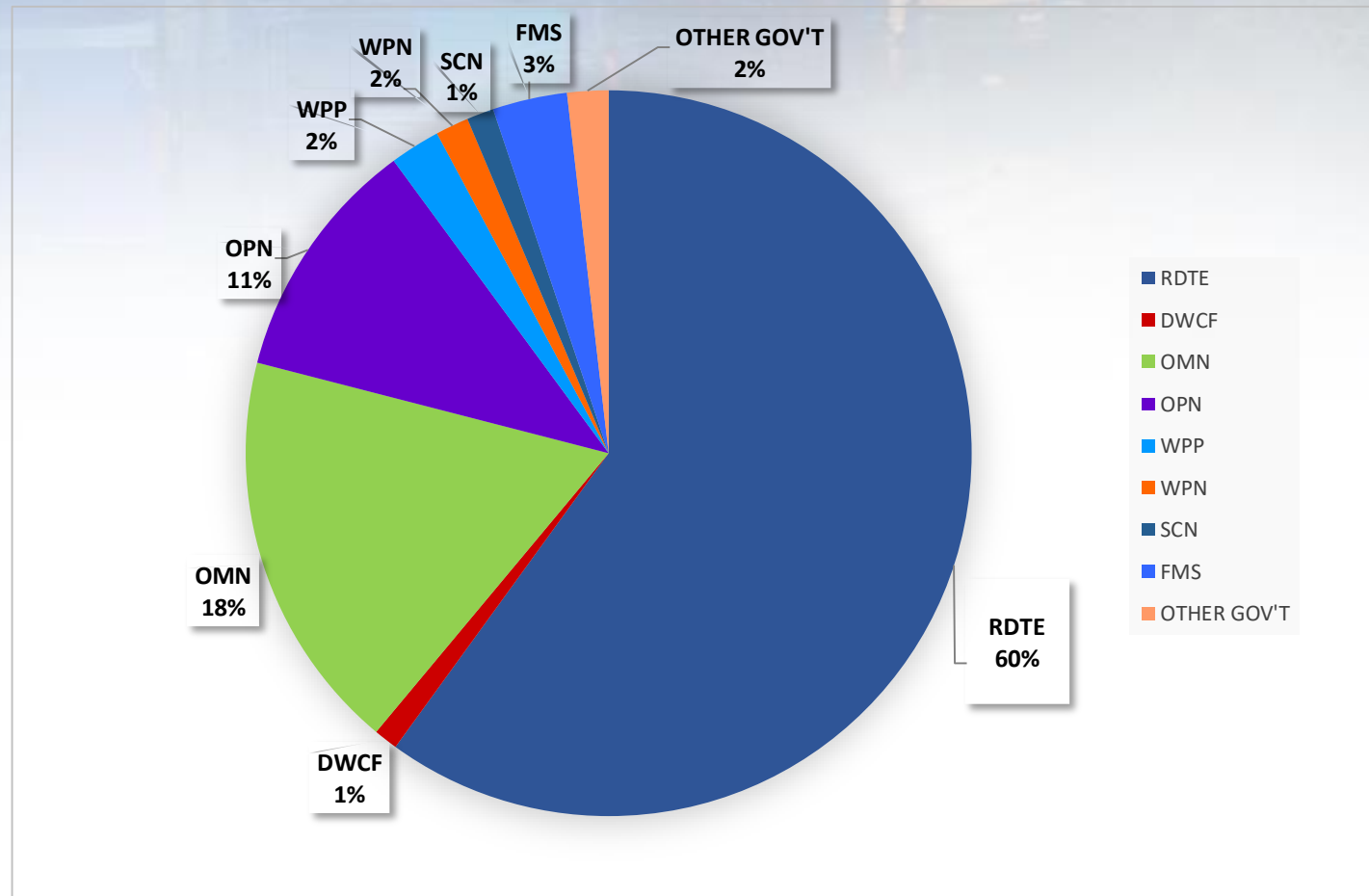
FY21 Funding Profile Funding by Sponsor



Total Funding Profile - \$140 Million



FY21 Funding Profile Funding by Appropriation



Total Funding Profile - \$140 Million



Current Code 70 Major Service Contracts

- Pacific Architects and Engineers, Inc. (PAE)
 - AUTECH Maintenance and Operations (M&O)
 - Scheduling and conduct of test programs on range
 - Operation and maintenance of range instrumentation and test support systems
 - Performance of all base operations functions at AUTECH on Andros Island
- Purvis Systems, Inc.
 - AIST Program Support
- Systems Resource Management, Inc. (SRM)
 - Industrial Services Enterprise Technicians and Machinists
- MAR Range Services
 - Seneca Lake/Dodge Pond M&O Support
- Fathom Research, LLC
 - Narragansett Bay Diving Services
- Goldbelt C6, LLC
 - Calibration Laboratory Support



Current Code 70 Major Service Contracts (cont'd)

- Seaward Services, Inc.
 - Operational Support Services for Ocean Testing
- Oceanetics, Inc.
 - Operational Support Services for Ocean Testing
- Meston Marine Services
 - Operational Support Services for Ocean Testing
 - NBSWTF M&O Support
- GSTEK, Inc.
 - SESEF
 - M&O Support on site at Norfolk, Mayport and Rota
 - Training at the other sites

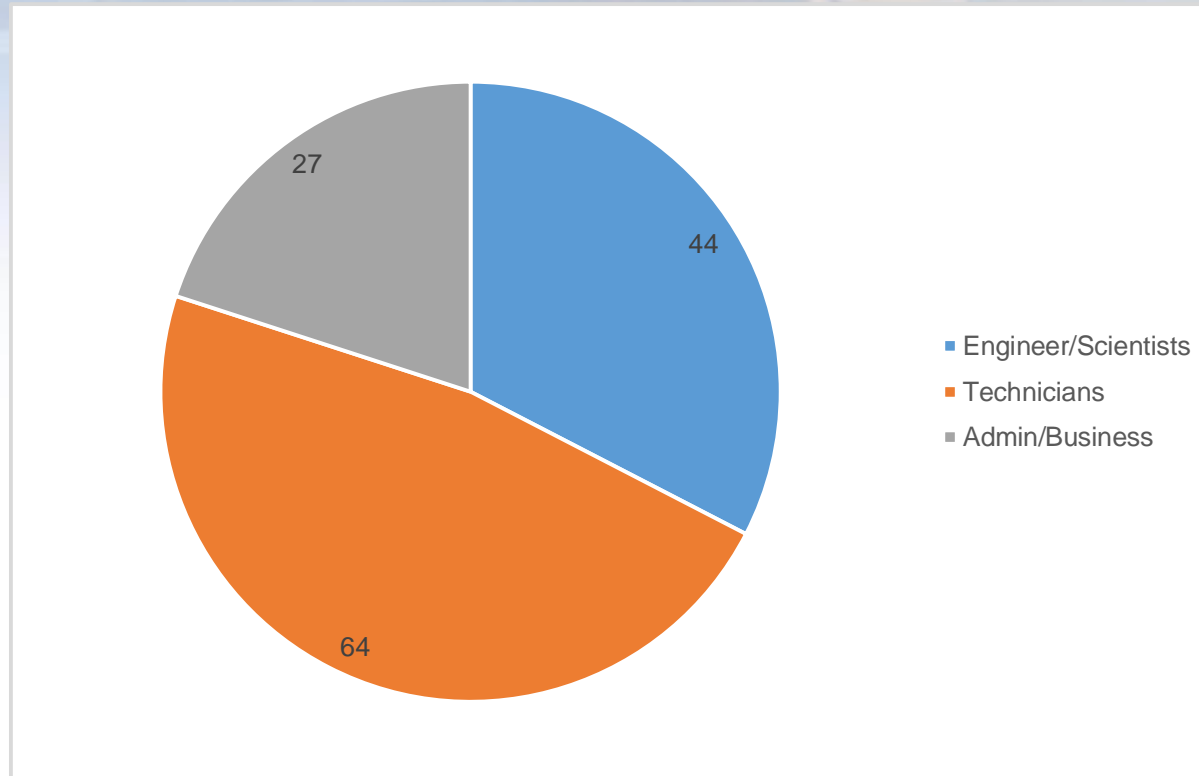


Current Code 70 Major Service Contracts (cont'd)

- ACUCAL Inc.
 - SESEF Calibration Support
- SAIC
 - Codes 85 & 75 Joint Contract -- Administrative Support
- L3 MariPro
 - In-water Sensor (IWS) System Maintenance, Repair and Upgrade for Undersea Ranges
- KMS Solutions, LLC
 - Engineering Support Services



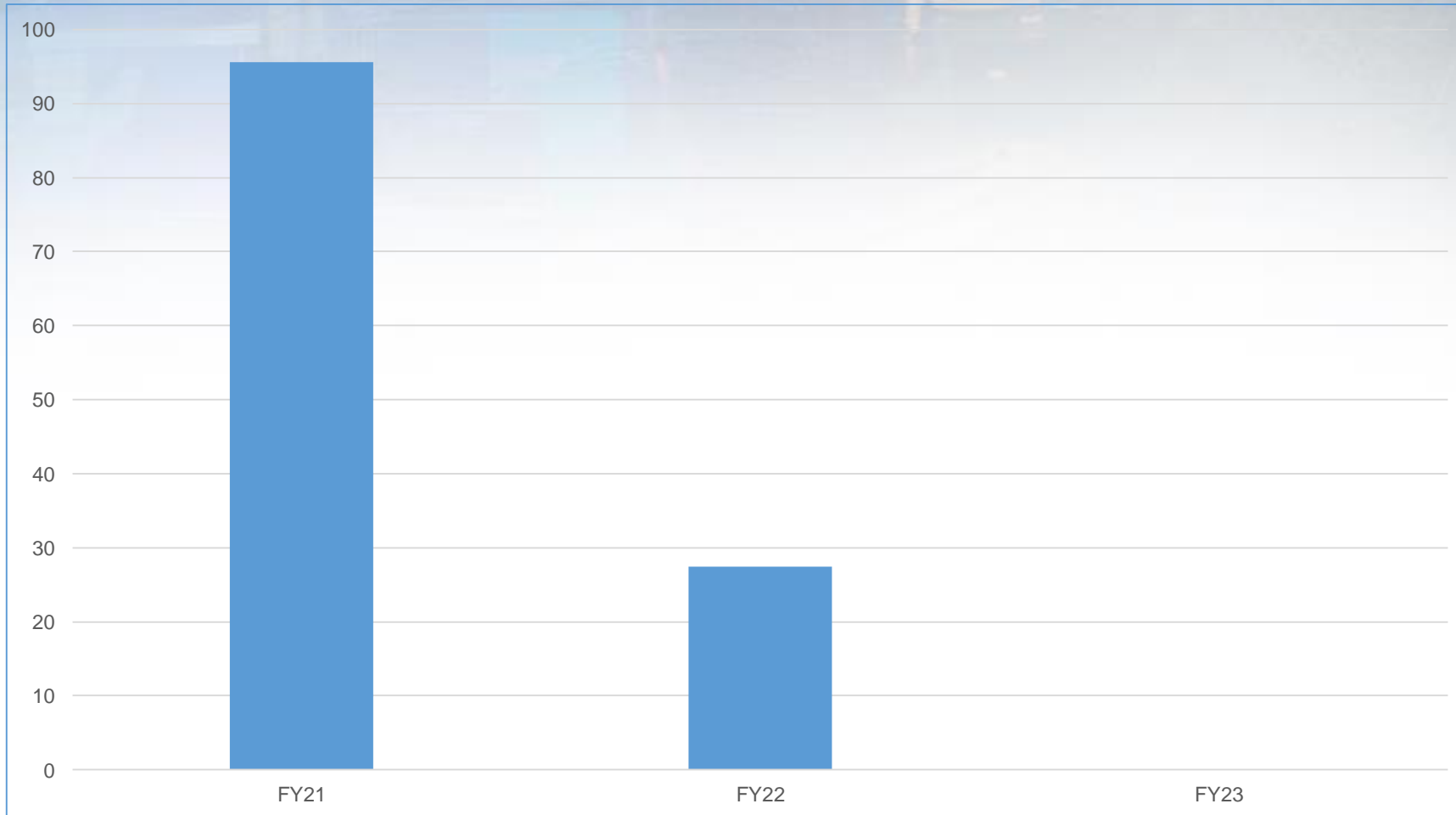
Contractor Personnel Profile



Does not include AUTEK Contractors



Projected Major Services Contracts FY21-FY23 (\$M)





Code 70 Projected Contracts FY21-FY23

Contract #	Title	Current Value (w options)	Incumbent	Seaport	Follow-On	Current Contract Type	Estimated RFP Release	Strategy
7795-N401	Code 70 Eng & Tech Supt	\$16.8M	KMS Solutions	Y	Y	CPFF / FFP	October 2020	SBSA
7795-N401	Code 70 System Safety & Reliability	\$16.8M	KMS Solutions	Y	Y	CPFF / FFP	August 2020	SBSA
18-P-2187	PACFleet Marine Mammal Tagging	\$308K	Foundation for Marine Ecology and Telemetry Research	N	Y	FFP	November 2021	SBSA
	Shock Modeling	\$5.2M		Y	N	CPFF	January 2021	TBD
	Underwater Tracking Electromechanical Rapid Prototyping & Fabrication	\$25M		TBD	N	TBD	October 2021	TBD
	Financial & Program Management Support	\$14.5M		Y	N	CPFF	March 2021	SBSA



Summary

- The Ranges, Engineering, and Analysis Department operates a number of ranges, facilities and service centers
 - Contracts are used for M&O support
- Undersea Range System Development and Engineering Support to Other Departments
 - Contracts for General Engineering Support, Prototype Systems Fabrication & Testing, System Safety and Cybersecurity
- In-water Sensor System contracts
 - Maintenance/Repair/Upgrade for existing systems
 - New IWS systems for new and existing locations



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