

We envision the future Fleet, create it and help sustain it.

NSWC Carderock Division –

Where the Fleet Begins



**Ship Signatures Department
(Code 70) Overview**

01 MAY 2017

Dr. Paul Shang

Department Head, Signatures Department

Mission & Vision

Code 70 Ship Signatures Department

Mission

To provide technical solutions to the warfighter that ensure a signatures advantage for Navy submarines, surface ships, and small craft and keep our Fleet at sea, capitalizing on the Navy's prior investments in stealth and attendant reduced susceptibility

Vision

A high-performing technical organization recognized as a world-class innovator for the underwater acoustic, underwater electromagnetic and topside signature reduction technologies required for advanced submarines, ships, unmanned vehicles and their respective systems

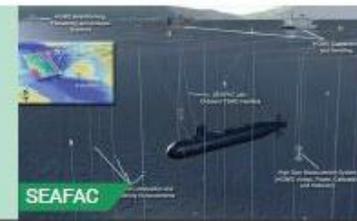
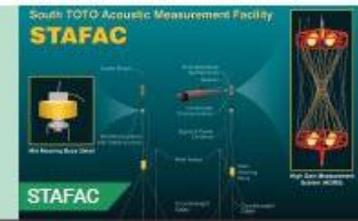


70 Ship Signatures Department: Signatures Product Lifecycle

Envision, Design & Realize the Future Fleet | Sustain the Current Fleet

SCIENCE & TECHNOLOGY	RESEARCH & DEVELOPMENT	TEST & EVALUATION	ACQUISITION SUPPORT	FLEET SUPPORT
<ul style="list-style-type: none"> ▶ Basic & Applied Research ▶ Detailed understanding of Physics ▶ Modeling & Simulation ▶ Numerical & Analytical Model Development 	<ul style="list-style-type: none"> ▶ Concept Studies ▶ Technology Development ▶ Small and Large Scale Model Experiments 	<ul style="list-style-type: none"> ▶ Signature Measurement ▶ Systems Development ▶ Advanced Signal Processing ▶ Source Localization ▶ Full-Scale Trials 	<ul style="list-style-type: none"> ▶ Threat Analysis and Requirements Development ▶ Silencing System Design and Development ▶ Ship Acquisition & Construction Engineering ▶ Technical Warrant Holder Support 	<ul style="list-style-type: none"> ▶ Direct Fleet Support ▶ SHIPALTS/TEMPALTS ▶ On-Board Acoustic Measurement Systems ▶ Fleet Training Systems

FACILITIES



Organizational Structure

Code 70 Ship Signatures Department

Ship Signatures Department (70)

Administrative Office

Senior Scientists

Platform and Programs Group

Signatures Characterization & Analysis Division (71)

- Signature Monitoring & Surface Ship Programs
- Susceptibility Assessment and Modeling
- Onboard Signatures and Fleet Support
- Radiated Noise Signatures
- Trial Directors, Facilities & Mission Readiness

Acoustic Signatures Technology Division (72)

- Signatures Materials Physics
- Structural Acoustics & Target Strength
- Hydroacoustics & Propulsor Development
- Acoustic Research Detachment (Lake Operations)

Signatures Measurement Technologies & Systems Division (73)

- Acoustic Systems Development
- Fleet Systems
- Signature Measurement and Processing
- Advanced Signatures Training & Decision Systems

Acoustics

Electromagnetic Signatures Technology Division (74)

- Radio Frequency (RF) Systems Development
- Infrared / Electro-optical (IR/EO) Technology
- Signatures Engineering
- Radio Frequency (RF) Technology Development

Above Water Electromagnetics

Underwater Electromagnetic Signatures & Technology Division (75)

- Theory, Modeling & Analysis
- Systems & Measurement
- Electromagnetic Sensors & Technology
- South Florida Ocean Measurement Facility

Underwater Electromagnetics

Sites & Facilities

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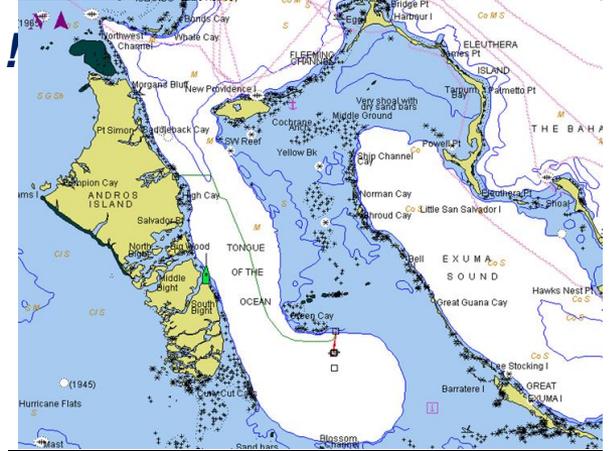
Acoustic Signature Maintenance

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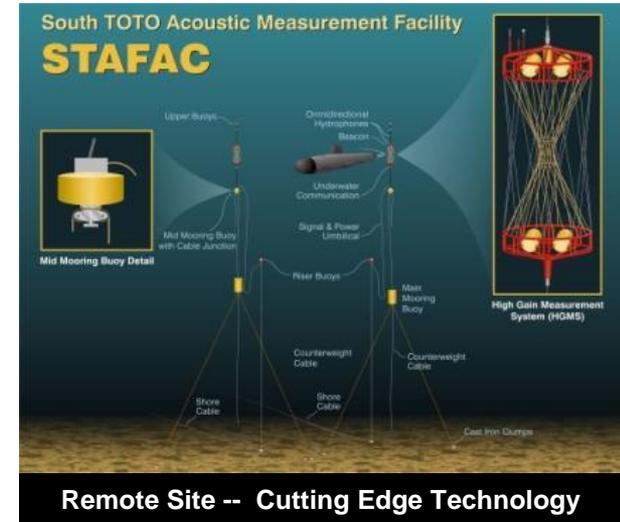
Direct Fleet Interaction ! Help Ships Stay Undetected !

Areas of Technical Expertise

- Underwater Acoustics Measurement & Analysis
- Vibration Transmission Path Analysis
- Machinery Vibration
- Life Cycle Assessment
- Design and Fleet Support



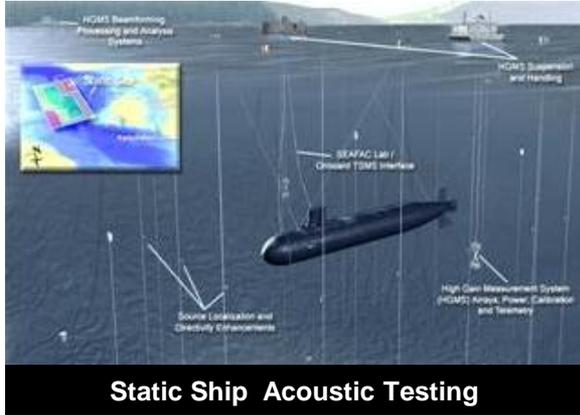
Atlantic Fleet Testing – STAFAC Bahamas



Remote Site -- Cutting Edge Technology



Twisted Bicone Arrays

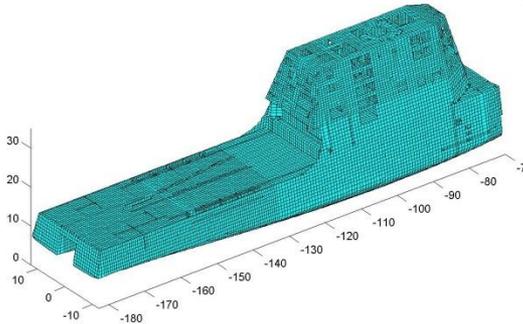


Static Ship Acoustic Testing



Pacific Fleet Testing – SEAFAC Alaska

Develop and Deliver Advanced Acoustic Silencing Solutions for the Acquisition Community



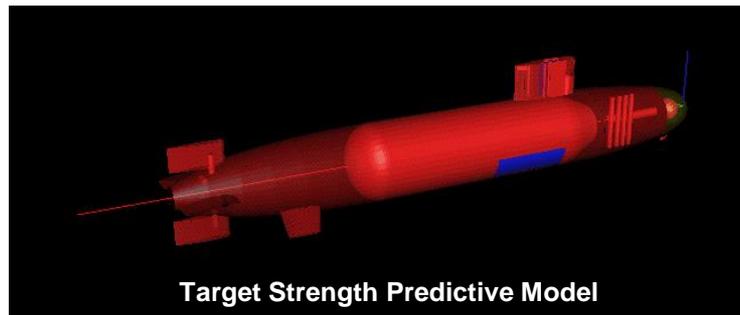
DDG 1000 Stern/Propeller Model

Technical Expertise In:

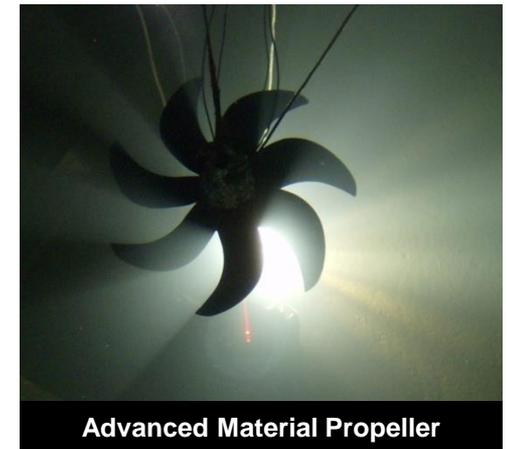
- Hydro acoustics
- Structural Acoustics
- Propulsor Acoustic Design
- Advanced Acoustic Materials Development and Applications
- Target Strength Modeling and Measurement
- Shipboard Airborne Noise and Vibration
- Scale Model and Laboratory Acoustic Testing
- Analytical and Computational Acoustics Tools



Dolly Varden 1:4 Scale Buoyant Vehicle



Target Strength Predictive Model



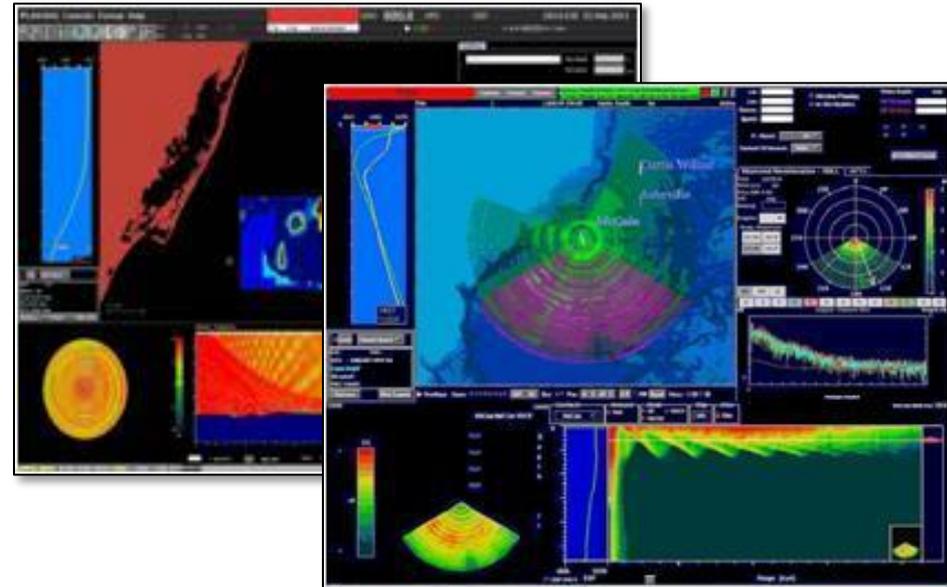
Advanced Material Propeller

Signatures Training Guidance Systems

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Guidance Systems

- Common acoustics and display widgets for Sonar, C2, Reconstruction and Analysis systems
- Customized integration into any specific system's architecture for any particular end user



Training Systems

- Common acoustic simulation for Sonar, Surface, and Integrated Undersea Surveillance System (IUSS) sonars
- Leveraged into schoolhouse trainers and onboard training simulation

**Providing Advanced Acoustic Modeling and Simulation
to the Operational and Intelligence Communities**

UEM Signature Maintenance

GUAM

55 FOOT MAGNETIC SILENCING FACILITY OC FY19

BANGOR, WA

NEW 55 FOOT MAGNETIC SILENCING FACILITY IOC FY19

YOKOSUKA, JAPAN

60 FOOT MAGNETIC SILENCING FACILITY



PEARL HARBOR, HI

55 FOOT MAGNETIC SILENCING FACILITY
MAGNETIC TREATMENT & ADS CALIBRATION FACILITY FOR ALL SUBMARINES



SAN DIEGO, CA

55 & 85 FOOT MAGNETIC SILENCING FACILITY
MAGNETIC TREATMENT & ADS CALIBRATION FACILITY FOR ALL SHIPS (EXCEPT CVN)
EMR FACILITY FOR MCM-1 CLASS SHIPS 30 FOOT DEPTH



NEW LONDON, CT

55 FOOT MAGNETIC SILENCING FACILITY

NORFOLK, VA

55 FOOT MAGNETIC SILENCING FACILITY
MAGNETIC TREATMENT & ADS CALIBRATION FACILITY FOR ALL SHIPS INCLUDING CVN

KINGS BAY, GA

655FOOT MAGNETIC SILENCING FACILITY
MAGNETIC TREATMENT & ADS CALIBRATION FACILITY FOR ALL SUBMARINES

MAYPORT, FL

55 FOOT MAGNETIC SILENCING RANGE

SOUDA BAY, GREECE

55 FOOT MAGNETIC SILENCING FACILITY OC FY19

**ISEA & TDA of 8 U.S. NAVY
MAGNETIC SILENCING FACILITIES**

Topside Signatures

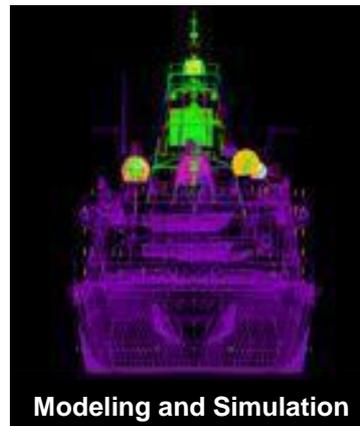
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***Develop and Deliver Topside Signature Solutions
for the Acquisition Community***



Technical Expertise In:

- Radar Cross Section Measurement and Reduction
- IR, NIR and Electro-Optical Signatures Measurement and Reduction
- Topside Design Integration
 - Combatants
 - Auxiliaries
 - Carriers
 - Special Warfare Personnel and Craft
 - Submarine Masts



RCS Signature Maintenance

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- Fixed Measurement Site
- ◆ Mobile Measurement Site

Ship Signatures Competitive Requirements Through 2018

Brief Description	Anticipated RFP Release	Acquisition Strategy	Incumbent Contractor	Projected Value
Towed Array Engineering and Array Calibrations	Q3 – FY17	Small Business Set-Aside	ManTech	\$20M - \$35M
Stealth Technology & Ship Signatures Support	Q3 – FY17	Unrestricted	NTI Corp	\$30M - \$45M
Signal Processing Systems, Acoustic Systems Modeling, and Future Data Acquisition Systems Design Support	Q3 – FY17	Unrestricted (Releasing through NUWC-KPT)	Vencore	\$20M - \$35M
Advanced Signature Technologies	Q3 – FY17	Small Business Set-Aside (Releasing through NSWC-COR)	New Requirement	\$5M - \$15M
South Florida Ocean Measurement Facilities Ocean Testing & Operations	Q4 – FY17	TBD	Seaward Services	\$20M - \$35M
Magnetic Silencing Facilities Upgrades and Electromagnetic Support	Q1 – FY18	TBD	URS	\$5M - \$15M
South Florida Ocean Measurement Facilities Engineering Services	Q1 – FY18	TBD	KMS Solutions	\$5M - \$15M
Signature Simulation and Training Systems	Q1 – FY18	Unrestricted	Leidos	\$75M+
Training Systems Tactical Scenario Control	Q1 – FY18	Small Business Set-Aside	Leidos	\$30M - \$45M