

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE U	PAGE OF PAGES 1 3
2. AMENDMENT/MODIFICATION NO. 05	3. EFFECTIVE DATE 25-Feb-2011	4. REQUISITION/PURCHASE REQ. NO. See Page 2	5. PROJECT NO. (If applicable) N/A
6. ISSUED BY NSWC, CARDEROCK DIVISION, MARYLAND 9500 MacArthur Blvd West Bethesda MD 20817 donna.stride@navy.mil 301-227-5749	CODE N00167	7. ADMINISTERED BY (If other than Item 6) DCMA HARTFORD 130 DARLIN STREET EAST HARTFORD CT 06108-3234	CODE S0701A

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State, and Zip Code) Applied Physical Sciences Corp. 2 State Street, Suite 300 New London CT		9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
[X]		10A. MODIFICATION OF CONTRACT/ORDER NO. N00178-04-D-4014-FD01
		10B. DATED (SEE ITEM 13) 30-Sep-2010
CAGE CODE 1ZG32	FACILITY CODE 112716357	

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning one (1) copy of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
SEE SECTION G

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(*)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
<input type="checkbox"/>	
<input type="checkbox"/>	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
<input type="checkbox"/>	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
[X]	D. OTHER (Specify type of modification and authority) Unilateral modification in accordance with FAR 52.232-22 Limitation of Funds

E. IMPORTANT: Contractor is not, is required to sign this document and return ___ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
SEE PAGE 2

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Esterlena D Unger, Contracting Officer	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		BY /s/Esterlena D Unger (Signature of Contracting Officer)	25-Feb-2011

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 2 of 3	FINAL
----------------------------------	----------------------------	----------------------------------	----------------	-------

GENERAL INFORMATION

The purpose of this modification is to add an increment of funding in the amount of \$230,000.00. Accordingly,

1) The total amount of funds obligated to the task is hereby increased from \$533,900.00 by \$230,000.00 to \$763,900.00. The total remaining unfunded balance is \$21,207,687.00.

2) Sections B and G are revised to add the following:

CLIN/SLIN	Type Of Fund	From (\$)	By (\$)	To (\$)
400008	RDT&E	0.00	96,900.00	96,900.00
400009	RDT&E	0.00	85,000.00	85,000.00
400010	RDT&E	0.00	36,000.00	36,000.00
600006	RDT&E	0.00	3,100.00	3,100.00
600007	RDT&E	0.00	5,000.00	5,000.00
600008	RDT&E	0.00	4,000.00	4,000.00

3) The total value of the order is hereby increased from \$21,971,587.00 by \$0.00 to \$21,971,587.00.

4) Section G clause entitled "SEA 5252.232-9104 ALLOTMENT OF FUNDS (MAY 1993)" has been revised as follows:

ESTIMATED

ITEM(S)	ALLOTED TO COST	ALLOTED TO FEE	PERIOD OF PERFORMANCE
4000	\$675,958.00	\$53,942.00	Through 30 September 2012
6000	\$ 34,000.00	N/A	Through 30 September 2012

5) The Accounting and Appropriation Data added to Section G is as follows:

MOD 05

400008 10390645 96900.00

LLA :

AG 97X4930 NH1C 000 77777 0 000167 2F 000000 111722002510

400009 10400902 85000.00

LLA :

AH 97X4930 NH1C 000 77777 0 000167 2F 000000 111707291420

400010 10474081 36000.00

LLA :

AJ 97X4930 NH1C 000 77777 0 000167 2F 000000 111707292094

600006 10390645 3100.00

LLA :

AG 97X4930 NH1C 000 77777 0 000167 2F 000000 111722002510

600007 10400902 5000.00

LLA :

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 3 of 3	FINAL
----------------------------------	----------------------------	----------------------------------	----------------	-------

AH 97X4930 NH1C 000 77777 0 000167 2F 000000 111707291420

600008 10474081 4000.00

LLA :

AJ 97X4930 NH1C 000 77777 0 000167 2F 000000 111707292094

6) The end of task order performance remains unchanged at 30 September 2012

A conformed copy of this Task Order is attached to this modification for informational purposes only.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 1 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	-----------------	-------

SECTION B SUPPLIES OR SERVICES AND PRICES

CLIN - SUPPLIES OR SERVICES

For Cost Type Items:

Item	Supplies/Services	Qty	Unit	Est. Cost	Fixed Fee	CPFF
-----	-----	-----	-----	-----	-----	-----
4000	Engineering services for for ship signature control and signature mitigation (TBD)		1.0 Lot	\$19,687,802.00	\$1,570,535.00	\$21,258,337.00
400001	Funding in the amount of \$142,500 for TI-1 (RDT&E)					
400002	Funding in the amount of \$50,000 for TI #2 (RDT&E)					
400003	Funding in the amount of \$10,000 for TI #3 (RDT&E)					
400004	Funding in the amount of \$138,000 for TI #5 (O&MN,N)					
400005	Funding in the amount of \$18,500 for TI #4 (SCN)					
400006	Funding in the amount of \$94,000 for TI #6 (SCN)					
400007	Funding in the amount of \$59,000 for TI #7 (RDT&E)					
400008	Funding in the amount of \$96,900 for TI #8 (RDT&E)					
400009	Funding in the amount of \$85,000 for TI #10 (RDT&E)					
400010	Funding in the amount of \$36,000 for TI #11 (RDT&E)					
4100	Option Year 1 Engineering services for for ship signature		1.0 Lot	\$10,401,642.00	\$829,751.00	\$11,231,393.00

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 2 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	-----------------	-------

control and
signature
mitigation (TBD)
Option

4200	Option Year 2 Engineering services for for ship signature control and signature mitigation (TBD) Option	1.0 Lot	\$10,792,295.00	\$860,907.00	\$11,653,202.00
------	--	---------	-----------------	--------------	-----------------

For ODC Items:

Item	Supplies/Services	Qty	Unit	Est. Cost

6000	Other Direct Costs (material, travel, miscellaneous including applicable indirect costs) - Non-fee bearing (TBD)	1.0 Lot		\$713,250.00
600001	Funding in the amount of \$7,500 for TI-1 (RDT&E)			
600002	Funding in the amount of \$2,000 for TI-5 (O&MN,N)			
600003	Funding in the amount of \$1,500 for TI-4 (SCN)			
600004	Funding in the amount of \$6,000 for TI-6 (SCN)			
600005	Funding in the amount of \$4,900 for TI-7 (RDT&E)			
600006	Funding in the amount of \$3,100 for TI-8 (RDT&E)			
600007	Funding in the amount of \$5,000 for TI-10 (RDT&E)			
600008	Funding in the amount of \$4,000 for TI-11 (RDT&E)			
6100	Option Year 1 Other Direct Costs (material,	1.0 Lot		\$356,625.00

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 3 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	-----------------	-------

travel,
miscellaneous
including
applicable
indirect costs) -
Non-fee bearing
(TBD)
Option

6200	Option Year 2 Other Direct Costs (material, travel, miscellaneous including applicable indirect costs) - Non-fee bearing (TBD) Option	1.0 Lot	\$356,625.00
------	---	---------	--------------

The fee percentage applied to CLINs 4000, 4100, and 4200 is 7.98%

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 4 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	-----------------	-------

SECTION C DESCRIPTIONS AND SPECIFICATIONS

SECTION C DESCRIPTIONS AND SPECIFICATIONS

Ship Signature Control and Signature Mitigation

STATEMENT OF WORK

This is a performance-based statement of work. The efforts performed hereunder will be evaluated in accordance with the performance standards / acceptable quality levels described in the attached Performance Evaluation Table and the evaluation methods described in provision CAR H09.

1.0 BACKGROUND

Department 70, Ship Signatures Department, of the Naval Surface Warfare Center, Carderock Division (NSWCCD) investigates signatures from Navy surface and subsurface platforms over a wide frequency spectrum ranging from very high frequencies to very low frequencies. These signatures are the result of physical processes produced from the platform itself, the platforms physical presence, or from energy scattered by a platform from sources external to a platform. For example, a magnetic signature may arise from the mere presence of a platform in a magnetic field within a geographic region. Examples of self generated signatures include infrared emissions, radiated sound caused by internal machinery within and vibrations induced on a platform hull due to external fluid flow. Examples of scattered signatures are found in radar and active sonar sensing.

The above noted signature types as well as other platform signatures have been analyzed and evaluated utilizing innovative collections of predictive methods that incorporate representations of physical models of sufficient fidelity to characterize observed signatures. Measurements have likewise been made to understand observed platform signatures. As new technologies have been developed to detect platform signatures, additional mitigation signature technologies are required to improve stealth and platform survivability. Further, as new missions are defined for Navy platforms, the impact of design changes on platform signatures and on operational requirements are considered necessary. Further, signature evaluation methodologies and technology developments are needed to assist in new platform acquisitions. To support Navy requirements pertaining to platform signature control for existing designs, design modifications, and new designs/acquisitions, a wide range of technical backgrounds and personnel experience levels are vital to support programs under the purview of NSWCCD Department 70 Ship Signatures Department.

To further these objectives, Department 70 has established or has access to data archives of ship signatures that could be applicable to verify numerical predictions that characterize signatures of models of Navy platforms. In those instances where data is not available, test facilities may be available to the contractor, under the supervision and approval of the Navy, to acquire needed ship signature characteristics upon approval of Government program managers and test facilities managers. Additionally, resources for research and development (R&D) include resident Government staff of

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 5 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	-----------------	-------

engineering, scientific, technical and administrative personnel along with additional NSWCCD support at test measurement facilities or ranges.

2.0 PURPOSE

The objective of the technical efforts described in this Statement of Work (SOW) is to identify engineering analysis and test support to assist the Naval Surface Warfare Center Carderock Division (NSWCCD) Department 70 with engineering services to include but is not limited to theoretical development, numerical modeling and software code development, testing and data analysis and documentation. Work may be accomplished by teams consisting of Government and Contractor personnel.

3.0 REQUIREMENTS

The contractor shall perform the following tasks under the direction and guidance of NSWCCD Department 70 Signature Department. The contractor efforts shall contribute to the NSWCCD achieving mission goals and to assure that surface ships, submarines and other navy vehicles have signature characteristics, which will ensure their operational superiority over other navies. The contractor shall contribute as directed to support the conduct of R&D for underwater acoustics and non-acoustics signatures and the establishment of signature requirements. The contractor shall assist in research and testing relating to hydro acoustics, structural acoustics, mechanical vibrations, target strength, radar cross section, infrared and electro-optical, magnetics, advanced signal processing, measurement technology, model testing and full-scale trials. The contractor shall evaluate advanced technologies, define and assess specific technology issues/initiatives and approaches, provide assistance to document recommendations and implementations to realize acoustic/non-acoustic signature and survivability technology potentials and achieve technical, schedule and cost goals.

3.1 Platform Signature Modeling Support

The contractor shall provide engineering and technical support relating to predicting the signature characteristics of submarines, surface ships and watercraft for acoustic, infrared, electro-optical, radar, magnetic and other signatures. These predictions may require deriving theoretical models and the subsequent development of algorithms implementing these models. Engineering support shall include the application of existing Navy approved numerical models and methods to predict signatures. Not to be excluded are considerations for developing computer aided design (CAD) or similar representations of platforms that can be incorporated into multi-frequency predictive approaches/software.

3.2 Large-Scale Testing and Trial Support

The contractor shall provide engineering and technical support covering activities central to testing operations on any vehicle, model, test platform, including autonomous submarines, static or buoyant vehicles, watercraft or any other equipment and support platforms employed in the utilization of the vehicles or models for technology demonstrations, R&D tests, systems/component evaluation, and fleet support. Further, this support includes full scale testing of platform types to investigate configurations not available in scaled models. This support includes developing engineering alteration designs, test plans,

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 6 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	-----------------	-------

procedures for measurements, reports and other research and development data, such as signal analysis obtained during testing and other related evolutions.

3.3 Ship Signatures Reduction R&D

The contractor shall provide engineering and technical support for signature reduction and control in the areas of propulsors, propulsion systems, machinery, auxiliary systems, special treatments, airborne and structure borne noise coupling and control, flow generated noise, target strength, electromagnetics, active control, electromagnetic interference, IR(infra red)/optical, magnetic and RCS (radar cross section) signatures. The contractor shall assist in the development, planning, execution, and analysis of tests for these various signature types. Further, the contractor shall assist in formulating and developing new concepts for sensing, data acquisition, sensor prototypes, analysis methodologies including waveform designs and implementing these concepts into algorithms that produce clearly identifiable signature features which assist understanding of physical processes producing observed signature characteristics. From the understanding of the cause of a signature type, approaches shall be formulated to reduce signature levels such that the detection or classification of a platform signature improves survivability and/or expands mission options.

The contractor shall provide engineering and technical support to control and/or mitigate signatures produced by transient events. These efforts shall address but are not limited to weapons performance and preparation, onboard machinery operations, pumps, personnel deployments and aircraft operations. The contractor shall assist in the development, planning, execution, and analysis of tests for these transient signatures and development of structure and component designs that minimize initiation of transient events. Further, the contractor shall assist in formulating and developing analysis methodologies into algorithms that produce clearly identifiable signature features which assist understanding of physical processes producing observed signature characteristics. From the understanding of the cause of a signature type, approaches shall be formulated to reduce signature levels such that the detection or classification of a platform signature or mission improves survivability and/or expands mission alternatives.

3.4 Ship Signatures Design and Engineering

The contractor shall provide engineering and technical support for the design and installation of signature control features required for existing and future platforms for the hull, mechanical, electrical and combat systems to support a specific Navy risk reduction objective. The contractor shall utilize a combination of Navy accepted analytical tools, numerical software and empirical data to assess the signature performance of candidate signature control treatments and systems, and provide designs and integration approaches to optimize whole platform performance pertaining to signature control, cost impact, weight effect and platform stability. The contractor shall assist the Navy in estimating signature characteristics, platform features and performance trade-off studies to evaluate the potential incorporation of signature control approaches into the Navy's acoustic, top-side, magnetic, IR (infrared) and RCS (radar cross section) and EM (electromagnetic) platform architectures for new platform designs as well as retrofits. The contractor shall assist the Navy in analyses to assess signature contributions of platform systems and compare predicted signature characteristics against established signature budgets and signature goals to determine the level of signature mitigation required to meet those goals.

The contractor shall assist in the development of platform specifications for signature requirements and budgets. The contractor shall provide engineering and technical support to Navy Design/Build Teams

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 7 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	-----------------	-------

for the development, review and disposition of acoustic, RCS, IR, magnetic and EM signatures, processes and analyses pertaining to existing and future platform construction and Noise Reduction Programs (NRP). The contractor shall assist the Navy in the development and management of signature budgets and performance models in each signature area throughout the design process, updating predicted signature performance as a design matures.

The contractor shall develop and evaluate signature control alternatives appropriate to a given signature mitigation type, including component isolation devices, advanced raft isolation systems, advanced materials, piping system noise control features and signature control materials. The contractor shall utilize specific Navy approved tools and analytical approaches to develop the signature predictions in support of those evaluations. The contractor shall review and evaluate the performance of candidate signature controls to achieve the signature mitigation objectives, addressing transmission loss, absorption, performance at depth and temperature and frequency range. Further, the contractor shall assess the impact of integration issues including shock survivability, vibration, physical arrangements, and weight and buoyancy requirements against ship specifications. The contractor shall document developed solutions that best meet competing signature mitigation approaches.

The contractor shall assist in the development of platform specifications to define system signature requirements and signature budgets. The contractor shall provide engineering and technical support to Navy Design/Build Teams for the development, review and disposition of acoustic, RCS, IR, magnetic and EM signatures, processes and analyses pertaining to existing and future platform construction and signature reduction programs. The contractor shall assist in the development and management of signature budget and performance models in each signature area throughout the design process, updating predicted performance as a design matures.

The contractor shall assist in the evaluation of alternative platform propulsion system and onboard control designs associated with an all electric platform. The contractor shall provide engineering and technical support necessary to develop powering requirements conducive to reduced signature levels, conversion of hydraulic to electromagnetic actuators and reducing electric motor imperfections that produce acoustic signatures. The contractor shall assist the Navy in the development and management of signature budgets and performance models for each potential signature area throughout the design process, updating predicted performance as a design matures.

3.5 Fleet Support

The contractor shall provide engineering and technical support for assessing airborne and structureborne noise and mechanical vibrations of completed platforms related to HVAC, fans, pumps, auxiliary and primary propulsion systems and the associated shafting, bearings, gearing and thrust blocks. Further, the contractor shall provide engineering and technical support for assessing radar signatures, electro optic characteristics and magnetic signatures, eddy currents and stray fields. The contractor shall provide measurement plans and sensor configurations necessary and analyses methodologies to identify significant noise and/or vibration sources that produce excesses of sound levels per platform hearing habitability specifications or vibration levels during all platform operations given in platform specifications as well as evaluate underwater electromagnetic and topside electromagnetic signatures. The contractor shall review and evaluate noise and vibration candidate mitigation strategies to achieve platform objectives stated in specifications for platforms of interest. If treatments are considered for mitigation, transmission loss, absorption, performance at temperature and frequency range shall be provided by the

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 8 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	-----------------	-------

contractor as well as consideration of cost and weight. Further, the contractor shall assess the impact of implementation issues including environmental survivability, volume, attachment method and physical arrangements requirements against platform specifications. The contractor shall document developed solutions that best meet competing noise and vibration mitigation approaches.

The contractor shall utilize a combination of Navy-accepted analytical tools, numerical software and empirical data to assess the performance of candidate control treatments and systems, and provide designs and integration approaches to optimize whole platform performance pertaining to noise and vibration control, cost impact, weight effect and platform stability. The contractor shall assist the Navy in signature estimates, designs and performance trade-off studies to the Navy for further assessment and potential incorporation into the Navy's NRP (noise reduction program) for new platform designs. The contractor shall conduct analyses to assess noise and vibration contributions of platform systems and compare predicted noise and vibration characteristics against established compartment noise categories and vibration goals to determine the level of mitigation required to meet those goals.

4.0 DELIVERABLES

The following listed tasks shall be accomplished to provide deliverables that support established Department 70 project schedules.

4.1 Deliver a report for a specified signature including the issues to be addressed and approach to candidate solutions. Review and analyze operational signature control issues/goals and conduct analytical research involving the application of theory through computational and physical modeling to evaluate causes of observed signatures. The developed models and methods should account for dynamics of platform operations. Verify, update and extend control and evaluation of acoustic/non-acoustic signature source and mechanism theory for conventional and new ship/system design concepts. Identify limitations and frequency regime of applicability of theory.

4.2 Deliver a measurement/test plan to characterize a specified signature that leads to better understanding of its cause and its location on/in a platform. Develop/evaluate experimental plans to further quantify and characterize signatures that exceed operational platform goals. Plan, conduct, evaluate and document small model, large model and full-scale test results. Develop and demonstrate novel experiment techniques that can distinguish spatial locations on platforms which contribute most to observed signatures. For radiated acoustic signatures, assess primary energy paths, structure or fluid borne, associated with on-board systems and prioritize their significance on observed signature levels.

4.3 Provide test plans to accumulate electromagnetic signatures for identified or predicted level overages for a specified platform. Advance/appraise experimental plans to further quantify and characterize topside and underwater electromagnetic signatures that exceed operational platform goals. Plan, conduct, evaluate and document small model, large model and full-scale test results. Develop and demonstrate novel experiment techniques that can distinguish spatial locations, geometries and material properties on platforms which contribute most to observed signatures. For electromagnetic signatures, assess primary physical processes that produce signatures that exceed present operational performance and future signature objectives and prioritize their significance on observed signature levels.

4.4 Provide a report and a briefing that addresses signature excess of a government specified Navy

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 9 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	-----------------	-------

platform/class. Review potential naval vessel radiated, platform, sonar self-noise, and non-acoustic signature reduction technologies. Review and evaluate hydro acoustic, structural acoustic, magnetic, infrared signature, survivability and related technology transition alternatives. Conduct technology maturity, risk, practicality, transition feasibility and related assessments and develop recommendations. Develop and document technical and programmatic approaches for signature reduction technology development and exploitation. Provide technical support to the Navy to preparatory to prepare plan of action and milestones (POA&M) and program planning support documentation including test plans, test and evaluation master plans (TEMP), and individual task management plans (ITMPs).

4.5 Deliver a briefing of signature reduction approaches for a Government specified signature issue and distinguish risks and mitigation solution approach. Provide a report on recommendations and research plans. Review signature reduction technology ship design applications, tradeoffs and ship impacts. Conduct design concept maturity, risk, cost and related assessments for identified platforms. Prepare and document design concept development recommendations. Prepare design component development plans, and R&D planning documentation.

4.6 Provide a report that evaluates survivability of a specified platform related to a designated signature of interest to the Navy and include a plan to understand the signature characteristics which impact survivability. Review and analyze program hydro acoustic, structural acoustic, magnetic, RCS, IR/Optical and survivability performance goals. Define and document technical objectives to support performance goal achievement. Identify and organize multi-disciplinary technical efforts to accomplish the necessary design support products including specifications, drawings and data sheets. Analyze platform design milestones and define design input needs. Conduct schedule, cost, risk and related technical assessments of the major elements impacting design success. Develop documentation, which identifies and documents controlling interactions among participating design component elements.

4.7 Develop a report on flow induced noise, expected noise levels and validation of predictions with measurements for a platform specified by the Navy. Review, predict and evaluate flow generated noise using physics based theoretical models for narrow and broadband signatures. Newly developed numerical models to account for turbulent boundary layers (TBL) adjacent to structural discontinuities and propulsion structures are to be validated with observed signatures. Assess numerical models developed for limitations and applicability to current platform designs and future propulsor system configurations and/or hull shapes.

4.8 Provide program/project management reports to the Navy including but not limited to

reviews and evaluations of signature development support project technical developments and progress. Conduct schedule, cost, risk and technical assessments. Develop and document technical and programmatic recommendations to support achievement of program goals. Develop program periodic and annual progress reports and management support documentation including MS Project, PERT cost/schedule and ITMP. Develop and provide Future Year Development Plan (FYDP) inputs in RDT&E, SCN, O&MN and OPN planning formats. Develop, maintain and update project support databases and documentation.

4.9 Analyze acoustic/non-acoustic signature reduction and survivability program technical, performance, cost, schedule, design and related issues. Develop analysis assessments, recommendations and support documentation. Develop program support documentation including POA&Ms, memoranda of agreement/understanding (MOA/MOU), Test and Evaluation (T&E) plans, FYDP inputs, and program

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 10 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

technical, schedule and financial issue reports.

4.10 Review potential acoustic/non-acoustic signature reduction experimental, research and creation of computational tool technology applications and provide documented software and manuals to the Navy. Conduct technology maturity, risk, transition feasibility and related assessments pertaining to these numerical approaches. Develop and document integrated approaches for computational tool development and validation.

4.11 Prepare POA&M, program planning, briefings, progress reports, and related management support documentation. Review and evaluate materials or approaches for potential application to signature and survivability improvement. Review and evaluate technology transition alternatives. Conduct technology maturity, risk, practicality, transition feasibility and related assessments and develop recommendations. Develop and document technical and programmatic approaches for technology development and exploitation.

4.12 Develop, compile and assess data and documentation pertaining to the specification, acquisition and application of active and passive materials for signature reduction and survivability performance, cost, and life cycle reliability improvement in conventional and new concept naval vehicles, systems and military devices. Prepare installation support and training documentation for material applications. Analyze material fabrication techniques and alternatives and develop recommendations for increasing effectiveness and reducing cost. Provide material fabrication, installation and training support. Prepare acquisition specifications and design documentation.

4.13 Develop integrated propulsor program technical plans that review and analyze conventional and new concept propulsor signatures and other defined propulsor performance goals in a report. Define and document technical objectives to support performance goal achievement. Identify, organize and document multi-disciplinary technical efforts to accomplish the necessary propulsor design support products. Conduct schedule, cost, risk and related technical assessments of the major elements impacting performance success. Identify and document controlling interactions among contributing design elements. Prepare POA&Ms and program management support documentation including POA&Ms, memoranda of agreement/understanding (MOA/MOU), T&E plans, FYDP inputs, and program technical, schedule and financial issue reports.

4.14 Compile, organize and document propulsor design guidance support information. Develop and recommend documentation formats for translating design guidance information into parameters that can be utilized in propulsor hydrodynamic, structural and acoustic design. Develop and document propulsor acoustic design guidance documentation including procedures and specifications.

4.15 Provide a report that: 1) Reviews potential propulsor signature reduction design support computational tool technology applications; 2) Conduct technology maturity, risk, transition feasibility and related assessments; 3) Develop and document integrated approaches for computational tool development and validation.

4.16 Develop, document and demonstrate signal and data processing algorithms and procedures for defining signature's temporal, spectral and spatial characteristics and behavior. Perform engineering and data analyses in support of signature measurement and test activities. Participate in measurement and support system development and documentation. Perform data acquisition, verification and validation. Prepare test data packages from model and full-scale tests in the established formats. Provide

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 11 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

recommendations in memoranda for test and evaluation (T&E) system performance improvement and operating cost reduction.

4.17 Report on operational, cost, technical and O&M risks and tradeoff assessments between viable signature control features. Provide engineering and technical support for the design and installation of signature control features for current and future platforms.

4.18 Develop, provide and present documentation to support achievement of naval mission support project goals and objectives. Perform analyses and reviews in support of definition, establishment, evaluation and implementation of new signature/survivability initiatives to support achievement of operational mission requirements and needs. Provide documentation to support project acquisitions. Design, fabricate and demonstrate equipment to support RDT&E and system operations.

4.19 Develop and document approaches for design guidance and platform integration of noise control technologies. Perform research and development of noise reduction and control technologies for alternative machinery and auxiliary systems quieting, advanced treatments to mitigate airborne noise, airborne noise coupling, structure borne noise and flow generated noise. Develop analytical and physical modeling tools that investigate new concepts and modifications to existing concepts, to validate analytical models and to study signature interaction and tradeoff effects and report by document on the findings.

4.20 Document the performance verification, validation and accreditation of the signature prediction tools and models developed to evaluate platform signatures. Assess the limitations and implications of developed signature simulation tools and define the theoretical approach of the physics-based processes of the model. Evaluate and assess predictive tools to complement an integrated design process using standard personal computer systems and software or Navy available supercomputing sites and software. Maintain configuration management to ensure consistent model history.

4.21 Prepare test data packages from model and platform tests in the established formats. Assess signature contributions of platform systems to be compared against established signature budgets for total ship signature goals to determine the level of signature mitigation required to meet those goals. Design, develop and evaluate the signature control options appropriate for the frequency regime, source localization and source characteristics. Integrate material models into signature prediction tools to estimate mitigation effectiveness and design. Plan and implement measurement approaches to validate control signature levels. Participate in measurement, data acquisition system development and documentation.

5.0 SECURITY REQUIREMENTS

The contractor shall have a security clearance in accordance with the DD Form 254 provided as an attachment.

6.0 PERSONNEL REQUIREMENTS

The estimated level of effort for the performance of this task order is based on the following labor category and hours per year:

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 12 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

<u>Key Personnel</u>	<u>Hours Per Year</u>	<u>Resumes Required</u>
Senior Scientist (Acoustics)	4,000	2
Senior Scientist (Hydroacoustics)	4,000	2
Senior Scientist (Radar)	2,000	1
Senior Scientist (Magnetics)	2,000	1
Senior Scientist (Infrared/Optics)	2,000	1
Senior Analyst (Acoustics)	4,000	2
Senior Analyst (Hydroacoustics)	4,000	2
Senior Analyst (Radar)	2,000	1
Senior Analyst (Magnetics)	2,000	1
Senior Analyst (Infrared/Optics)	2,000	1
Senior Engineer (Acoustics)	4,000	2
Senior Engineer (Hydroacoustics)	4,000	2
Senior Engineer (Radar)	2,000	1
Senior Engineer (Magnetics)	2,000	1
Senior Engineer (Infrared/Optics)	2,000	1
Senior Program Manager	<u>2,000</u>	<u>1</u>
Subtotal	44,000 per year	22
<u>Non-Key Personnel</u>	<u>Hours Per Year</u>	<u>Resumes Required</u>
Analyst	6,000	N/A
Engineer	4,000	N/A
Technical Specialist	<u>4,000</u>	<u>N/A</u>
Subtotal	<u>14,000 per year</u>	<u>N/A</u>
Total	58,000 per year	22

KEY PERSONNEL

6.1 SENIOR SCIENTIST (Acoustics)

The Senior Scientist (Acoustics) should have a Masters degree (PhD desired) in Physics or Mathematics and at least fifteen (15) years related professional experience which should include ten (10) years experience pertaining to Navy platform signature mitigation research, modeling, testing, platform design and evaluation. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

- (1) Initiating and accomplishing pioneering scientific research in the area of ship acoustic signature sources and mechanisms. Developing scientific advancement to the body of technical knowledge on Navy platform acoustic signature sources, mechanisms, their behavior and cause.
- (2) Developing and accomplishing nationally and internationally recognized ship acoustic signature research projects leading to major technology breakthroughs in acoustic signature control and reduction. Developing and demonstrating new ship acoustic signature characteristics and the relationship of these signatures to physics mechanisms.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 13 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

(3) Organizing multi-functional research projects at the 6.2 through 6.6 RTD&E levels. Developing new technology for supporting submarine radiated-, platform- and sonar self-noise and target strength signature reduction.

(4) Organizing of multi-functional research projects at the 6.2 through 6.6 RDT&E levels. Developing new technology for surface ship radiated-noise, airborne noise, fluidborne noise or structureborne noise reduction.

(5) Nationally and internationally recognized expertise in target strength, radiated noise and structural acoustics of ships and submarines. Pioneering research on the effects of platform structures on acoustic scattering, source localization and mechanical energy flow in structures for acoustic frequency bands of Navy interest.

(6) Demonstrated familiarity with Navy accepted methods to predict sound levels external to a platform including but not limited to finite element method (FEM), boundary element method (BEM), statistical energy analysis (SEA), Darby modeling or designer noise for submarines or submersibles.

(7) Development of advanced techniques for the quantitative measurement and characterization of structural acoustics and vibration signature parameters and their interrelationships, e.g.; coupling factors and frequency response functions, including transients.

(8) Development of physical model and computational facilities to predict acoustic signatures, target strength, airborne noise, structureborne noise or fluidborne noise for the evaluation of ship hull, appendages, propulsor, propulsor plant/structural interactions and related structural components.

(9) Identifying, reviewing, evaluating and documenting that include but are not limited to potential platform radiated, sonar self-noise, target strength (TS), airborne noise and propulsor signature reduction technology alternatives.

(10) Reviewing and documenting of technology applications for platform signature computational tools in the areas of hull, appendage, top-side, internal structures and propulsor components.

(11) Designing, developing, evaluating and reviewing methods or materials that can be applied to or incorporated into Navy platforms to control acoustic signatures or airborne noise.

(12) Designing, fabricating and testing including but not limited to acoustic treatments, dampings and blankets that increase transmission loss, absorb energy or reflect incident acoustic fields.

6.2 SENIOR SCIENTIST (Hydroacoustics)

The Senior Scientist (Hydroacoustics) should have a Masters degree (PhD desired) in Physics or Mathematics and at least fifteen (15) years related professional experience with ten (10) years experience pertaining to Navy platform hydroacoustic signature mitigation research, modeling, testing, platform design and evaluation. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Initiating and accomplishing pioneering scientific research including but not limited to hydrodynamic

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 14 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

flow, fluid turbulence impinging on naval structures, fluid flow in pipes or ducts and forces produced by fluid gradients, fluid flow defects interacting with propulsion system components or turbulent flow ingestion for propulsor systems. Developing scientific advancement to the body of technical knowledge on acoustic signatures or structural vibrations caused by fluid flow interactions with a platform, appendages or propulsion systems.

(2) Developing and accomplishing nationally and internationally recognized ship acoustic signature research projects leading to major technology breakthroughs in acoustic signature control and reduction related to fluid structure interactions. Developing analytic methods and physics based model to predict broadband flow noise from complex, treated or untreated plate structures driven by equilibrium or non-equilibrium turbulent boundary layers (TBL). Implementing provisions within new or existing analytic methods to include the effects on flow noise from rapidly distorting TBL over complex structural discontinuities, including roughness.

(3) Organizing multi-functional research projects at the 6.2 through 6.6 RDT&E levels in hydroacoustics. Developing new technology for reducing the unsteady forces acting on the platform structures related adjacent fluid flows that demonstrate improvements of the risk/benefit of new technology implementations for expected operational maneuvers. Improvements must demonstrate their effect on radiated acoustic noise and the association of unsteady forces with the structural response and re-radiation. applicable to future surface ship and submarine designs.

(4) Developing tests plans to acquire data, data reduction/analyses, data interpretation and comparing results obtained from measurements with predicted results for signatures attributed to the interaction of fluid flow and structures. Verifying and validating hydroacoustic prediction tools that evaluate performance predictions for future surface ship and submarine designs.

(5) Nationally and internationally recognized expertise the field of hydrodynamic flow interactions with marine and/or naval structures to assess the steady and unsteady forces acting on structures (including hulls, rudders, appendages, propulsors, etc.) under consideration. Modeling efforts shall also assess 1) the fluid pressures and velocities in the vicinity of structures, and 2) the design and expected operational performance of structures, including hydroacoustic and non-acoustic hydrodynamic signatures, 3) flow perturbations resulting from maneuvers and the associated signatures, and 4) sea keeping and localized flow analyses to assess the impact on acoustic and non-acoustic ship signatures, propulsor noise, cavitation, appendage cavitation, flow noise and unsteady platform response. In addition, apply optimization methods to identify and assess modifications to hull and appendage design to minimize potential signature impacts.

(6) Demonstrating familiarity with Navy accepted numerical tools that provide computational efficiency and physical resolution including but not limited to the Reynolds-Averaged Navier Stokes (RANS), Large-Eddy Simulation (LES) and Direct Numerical Simulation (DNS) leading to predictions of sound levels external to a Navy platform.

(7) Demonstrating familiarity with Navy accepted methods to predict sound levels due to fluid flows for air and/or water, cavitating flows, multi-phase flows, flows with free-boundaries and unsteady wake flows and hydraulic actuators as they relate to acoustic signatures.

(8) Developing advanced techniques for the quantitative measurement and characterization of structural acoustics and vibration signatures characterizing airborne, structureborne and external noise fields and

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 15 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

their interrelationships with fluid flow interactions on a surface ship or submarine platforms, ducts, appendages and components of the propulsion system, e.g., waterjet.

(9) Developing physical models and computational system configurations to predict acoustic signatures. These models shall assess 1) the fluid pressures and velocities in the vicinity of structures, and 2) the design and expected operational performance of structures attributed to hydroacoustic phenomena for surface and submarine platform hulls, appendages, propulsor, ducts, piping and other structural components.

(10) Identifying, reviewing, evaluating and documenting potential hydrodynamic platform acoustic radiation, structureborne or airborne noise and propulsor or signature reduction technology alternatives.

(11) Designing, developing, evaluating and reviewing methods or materials that can be applied to or included in Navy platforms to control acoustic signatures and/or airborne noise due to hydrodynamic flows.

(12) Designing, fabricating and testing including but not limited to hydroacoustic grooming, dampings and fairings that reduce drag, wake or mitigate acoustic responses from fluid-structure interactions.

6.3 SENIOR SCIENTIST (Radar)

The Senior Scientist (Radar) should have a Masters degree (PhD desired) in Physics or Mathematics and at least fifteen (15) years related professional experience with ten (10) years experience pertaining to Navy platform signature characterization, mitigation research, modeling, testing, platform design and evaluation for radar frequencies. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Nationally and internationally recognized expertise in radar cross-sections of Navy platforms, radar measurements and radar mitigation materials. Pioneering research to include but not limited to the effects of top-side structures shapes and/or materials and configurations and ocean roughness on radar scattering characteristics for Navy radar frequency bands of interest.

(2) Initiating and accomplishing pioneering scientific research including but not limited to radar mitigation treatments, effects of platform design (shapes, configurations, material composition), radar echo information extraction, physics model development and effects of radar target background on target detectability and classification.

(3) Developing and accomplishing nationally and internationally recognized ship radar signature research projects leading to major technology breakthroughs in radar signature control and reduction. Developing analytic methods and physics based models to predict radar signatures from complex, treated or untreated platform structures.

(4) Organizing multi-functional research projects at the 6.2 through 6.6 RDT&E levels in predicting, measuring and analyzing radar signatures. Developing new technology for reducing the radar echo levels from platform structures that demonstrate improvements of the risk/benefit of new technology implementations. Improvements shall be demonstrated on their effectiveness on radar levels and beam patterns associated with the structural response for future surface ship and submarine designs.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 16 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

(5) Developing tests plans to acquire data, data reduction/analyses, data interpretation and comparing results obtained from measurements with predicted results for radar signatures within radar bands of Navy interest. Verifying and validating radar prediction tools used to evaluate performance predictions for future surface ship and submarine designs.

(6) Demonstrating application and formulating of modeling efforts to assess 1) measurement systems used to characterize radar scattering from Navy platforms through waveform grooming and subsequent signal analysis, and 2) the design and expected operational performance of surface ships and submarines for weapons frequencies. In addition, apply optimization methods to identify and assess modifications to hull and appendage design or placement to minimize potential signature impacts.

(7) Demonstrating familiarity with Navy accepted numerical tools that provide computational efficiency and physical resolution including but not limited to Radar Target Signature (RTS) and method of moments leading to predictions of radar cross-sections of Navy platforms.

(8) Developing physical models and computational system configurations to predict radar cross-sections. These models shall assess surface treatments, surface shapes and base platform materials. Further, assess platform designs and expected operational performance of structures attributed to appendages, hulls, antenna, cavities and deck-house components.

(9) Identifying, reviewing, evaluating and documenting radar signature reduction technology alternatives.

(10) Designing, developing, evaluating and reviewing methods or materials that can be applied to or included in Navy platforms to control radar signatures.

(11) Designing, fabricating and testing including but not limited to radar treatments, composites and blankets that reduce radar reflections or absorb energy

6.4 SENIOR SCIENTIST (Underwater Magnetic Fields)

The Senior Scientist (Underwater Magnetic Fields) should have a Masters degree (PhD desired) in Physics or Mathematics and at least fifteen (15) years related professional experience with ten (10) years experience pertaining to Navy platform signature mitigation research, modeling, testing, influence platform design, mines and detection/sensor techniques for underwater magnetic signatures. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Initiating and accomplishing pioneering scientific research including but not limited to degaussing, active control, inverse modeling, induced forces from magnetic fields related to component imperfections in electric motors and mine sensitivities as related to platform magnetic field signatures. Developing scientific advancement to the body of technical knowledge on underwater magnetic field signature mitigation, material developments pertaining to magnetic fields from platform systems and/or structural elements, magnetic field sources and their characterization and the interaction of mechanical forces produced by the interactions of magnetic fields in motors that produce acoustic noise and/or mechanical vibration.

(2) Developing and accomplishing nationally and internationally recognized ship magnetic signature research projects leading to major technology breakthroughs in magnetic signature control and reduction

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 17 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

related to AC or residual associated fields. Developing analytic methods and physics based models to predict magnetic far and near fields from AC or residual magnetizations from complex, treated or untreated structures driven by equilibrium or non-equilibrium processes.

(3) Organizing multi-functional research projects at the 6.2 through 6.6 RDT&E levels in underwater magnetic signatures. Developing new technology for underwater magnetic signature reduction through active and passive methods that demonstrate improvements of the risk/benefit of new technology implementations for expected operational maneuvers. Improvements shall demonstrate their effect on the total platform magnetic signature of future surface ship and submarine designs.

(4) Developing tests plans to acquire data, data reduction/analyses, data interpretation and comparing results obtained from measurements with predicted results for magnetic signatures attributed to own platform sources and/or perturbations of geomagnetic fields. Verifying and validating magnetic field prediction tools that evaluate performance predictions for future surface ship and submarine designs.

(5) Nationally and internationally recognized expertise in modeling underwater magnetic signatures of marine and/or naval structures. Modeling efforts shall also assess 1) potential magnetic sources and their relationship to structural materials and structural configurations, and 2) the design and expected operational performance that include but are not limited to power control systems for electric motors and house keeping power systems, 3) geomagnetic field perturbations resulting from platform maneuvers, and 4) survivability risks pertaining to magnetic ship signatures. In addition, applying optimization methods to identify and assess modifications to hull, appendage and power system designs and their placements to minimize potential signature impacts.

(6) Demonstrating application and use of 2D/3D finite element, boundary element and finite difference software that provide computational efficiency and physical resolution including but not limited to predictions of underwater magnetic signatures from Navy platforms.

(7) Developing advanced techniques and sensors for the quantitative measurement and characterization of magnetic field signatures produced by induced currents, power circuits, electric motors or developed or residual magnetization. Developing onboard magnetic field sensing and monitoring systems.

(8) Developing physics based models and computational system configurations to predict underwater magnetic signatures. These models shall assess the influence of designs and expected operational performance of platforms for surface and submarine platform hulls, appendages, propulsion systems and other structural components.

(9) Identifying, reviewing, evaluating and documenting of potential underwater magnetic signatures risks and tradeoffs for signature reduction technology alternatives.

(10) Designing, developing, evaluating and reviewing methods or materials that can be applied to or included in Navy platforms to control underwater magnetic signatures.

6.5 SENIOR SCIENTIST (Infrared/Optics)

The Senior Scientist (Infrared/Optics) should have a Masters degree (PhD desired) in Physics or Mathematics and at least fifteen (15) years related professional experience with ten (10) years experience pertaining to Navy platform infrared/optical signature mitigation research, modeling, testing,

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 18 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

platform design and risk assessments. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Nationally and internationally recognized expertise in infrared (IR) and/or optical signatures of Navy platforms. Pioneering research in understanding the effects IR/optically induced signature dependence on frequency, polarization, emissivity, geometric platform features and physical bases of IR/optical source distributions or scatters.

(2) Developing and accomplishing nationally and internationally recognized ship magnetic signature research projects leading to major technology breakthroughs in IR/optical signature control and reduction related to passive sources. Developing analytic methods and physics based models to predict IR/optical emissions from complex, treated or untreated structures driven by equilibrium or non-equilibrium processes.

(3) Organizing multi-functional research projects at the 6.2 through 6.6 RDT&E levels in IR/optical signatures from Navy platforms. Developing new technology for IR/optical signature reduction through methods that demonstrate improvements of the risk/benefit of new technology implementations for expected operational maneuvers. Improvements shall demonstrate their effect on the total platform IR/optical signature of future surface ship and submarine designs.

(4) Developing tests plans to acquire data, data reduction/analyses, data interpretation and comparing results obtained from measurements with predicted results for IR/optical signatures attributed to a platform. Verifying and validating IR/optical field prediction tools that evaluate performance predictions for future surface ship and submarine designs.

(5) Nationally and internationally recognized expertise in IR/optical signature modeling of marine and/or naval structures. Modeling efforts shall assess 1) internal and external thermal sources and their distributions and their relationship to structural materials and structural configurations, and 2) the design and expected operational performance that include but are not limited to power plant and exhaust heating as well as solar and influences of the ocean and 3) survivability risks pertaining to IR/optical ship signatures. In addition, apply optimization methods to identify and assess modifications to hull, appendage and power system designs and their placement to minimize potential signature impacts.

(6) Demonstrating familiarity with Navy accepted numerical tools that provide computational efficiency and physical resolution including but not limited to ShipIR, Multi-Service Electro-optics Signature (MUSES) and Direct Numerical Simulation (DNS) leading to predictions of spectral distributions, levels and radiation patterns.

(7) Developing advanced techniques and sensors for the quantitative measurement and characterization of IR/optical signatures characterizing the interrelationships between diffuse and specular natures of deck structures of surface ship and submarine platforms, appendages, communication domes and antennas.

(8) Developing physical models and computational system configurations to predict IR/optical signatures of Navy platforms. These models shall assess 1) the design during expected operational performance of structures for surface and submarine platform hulls, appendages, ducts and other structural components.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 19 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

(9) Identifying, reviewing, evaluating and documenting of potential IR/optical platform signature reduction technology alternatives.

(10) Designing, developing, evaluating and reviewing methods or materials that can be applied to or included in Navy platforms to control IR/optical radiations.

(11) Designing, fabricating and testing including but not limited to infrared/optic treatments, paints, composites and blankets that reduce infrared/optic reflections or absorb energy

6.6 SENIOR ANALYST (Acoustics)

The Senior Analyst (Acoustics) should have a Masters degree (PhD desired) in Engineering, Physics or Mathematics and at least fifteen (15) years related professional experience with ten (10) years experience pertaining to Navy platform signature mitigation analysis, processing testing data, numerical code development and statistical methods applied to measurement data. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Analysis including but not limited to advanced submarine acoustic silencing; surface ship fluidborne, airborne, structureborne and transient noise reduction; signal processing and data analyses encompassing radiated noise, sonar self-noise, target strength (TS), propulsor noise; and full-scale and large- and small- platform model acoustic facility experiments data reduction, data analysis code development including statistical evaluations of data quality and accuracy of extracted information; interpretation and assessments of findings.

(2) Formulating, assessing and documenting submarine or surface ship signature reduction technologies based upon extracted metrics (consider the five specialties individually) from available or acquired data sets. Designing T&E approaches that emphasize measurement systems and measurement configurations that accentuate appraising signature characteristics of defined interest.

(3) Formulating, assessing and documenting ship component design/modification technical tradeoff analyses and signature performance assessments. Developing ITMPs, and integrated data acquisition plans separately among the five signature areas of interest.

(4) Assessing and documenting submarine and surface ship signature measurement technical progress.

(5) Reviewing, evaluating and documenting submarine and surface ship signature reduction design concepts, technology applications, tradeoffs and ship-design impacts as determined from acquired data.

(6) Defining, reviewing, evaluating and documenting treatment alternatives or approaches to mitigate or control signatures. Defining, assessing and documenting platform performance ship design impact issues.

(7) Developing, reviewing and documenting submarine or surface ship acoustic signature reduction technology integration technical approaches.

(8) Developing and documenting position papers on Navy platform signature control. Identifying integrated plans to address multi-signature measurement issues.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 20 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

6.7 SENIOR ANALYST (Hydroacoustics)

The Senior Analyst (Hydroacoustics) should have a Masters degree (PhD desired) in Engineering, Physics or Mathematics and at least fifteen (15) years related professional experience with ten (10) years experience pertaining to Navy platform signature mitigation analysis, processing testing data, numerical code development and statistical methods applied to measurement data. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Analysis including but not limited to flow turbulence, flow ingestion into propulsor, fluid flow in ducts, fluid flow in piping and pump systems, fluid-structure interactions that produce acoustic airborne and/or fluidborne noise as well as flow induced mechanical excitations of platform structures. Experience should also be described to illustrate experience in analyzing hydraulic systems. Development of signal processing code and data analyses encompassing radiated noise, sonar self-noise, target propulsor-fluid noise; and full-scale, large-scale and small-scale platform model acoustic facility experiments, data reduction, data analysis code development including statistical evaluations of data quality and accuracy of extracted information; interpretation and assessments of findings.

(2) Formulating, assessing and documenting submarine or surface ship signature reduction technologies based upon extracted metrics (consider the five specialties individually) from available or acquired data sets. Designing T&E approaches that emphasize measurement systems and measurement configurations that accentuate appraising signature characteristics of defined interest.

(3) Formulating, assessing and documenting ship component design/modification technical tradeoff analyses and signature performance assessments. Developing ITMPs, and integrated data acquisition plans separately among the five signature areas of interest.

(4) Assessing and documenting submarine and surface ship signature measurement technical progress.

(5) Reviewing, evaluating and documenting submarine and surface ship signature reduction design concepts, technology applications, tradeoffs and ship-design impacts as determined from acquired data.

(6) Defining, reviewing, evaluating and documenting treatment alternatives or approaches to mitigate or control signatures. Defining, assessing and documenting platform performance ship design impact issues.

(7) Developing, reviewing and documenting submarine or surface ship acoustic signature reduction technology integration technical approaches.

(8) Developing and documenting position papers on Navy platform signature control. Identifying integrated plans to address multi-signature measurement issues.

6.8 SENIOR ANALYST (Radar)

The Senior Analyst (Radar) should have a Masters degree (PhD desired) in Engineering, Physics or Mathematics and at least fifteen (15) years related professional experience with ten (10) years experience pertaining to Navy platform signature mitigation analysis, processing testing data, numerical code development and statistical methods applied to measurement data. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 21 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

individual is capable of performing the required tasking below:

(1) Analysis including but not limited to Navy platform radar signature mitigation; transmitted waveform development, assessing the influence of top-side components, materials and shapes, implementation of statistical confidence and accuracy measures of data sets, image processing applications to enhance contrast and image profiles and contours and presentation and graphics of extracted platform characteristics for both global and localized features. Additionally, collecting, sampling and logging of radar signatures on ranges for full-scale and large-scale and small-scale platform models employing both stationary and moving acquisition systems. Further describe, performing data reduction, data analysis code development including statistical evaluations of data quality and accuracy of extracted information; interpretation and assessments of findings.

(2) Formulating, assessing and documenting submarine or surface ship signature reduction technologies based upon extracted metrics (consider the five specialties individually) from available or acquired data sets. Designing T&E approaches that emphasize measurement systems and measurement configurations that accentuate appraising signature characteristics of defined interest.

(3) Formulating, assessing and documenting ship component design/modification technical tradeoff analyses and signature performance assessments. Developing ITMPs, and integrated data acquisition plans separately among the five signature areas of interest.

(4) Assessing and documenting submarine and surface ship signature measurement technical progress.

(5) Reviewing, evaluating and documenting submarine and surface ship signature reduction design concepts, technology applications, tradeoffs and ship-design impacts as determined from acquired data.

(6) Defining, reviewing, evaluating and documenting treatment alternatives or approaches to mitigate or control signatures. Defining, assessing and documenting platform performance ship design impact issues.

(7) Developing, reviewing and documenting submarine or surface ship acoustic signature reduction technology integration technical approaches.

(8) Developing and documenting position papers on Navy platform signature control. Identifying integrated plans to address multi-signature measurement issues.

6.9 SENIOR ANALYST (Underwater Magnetic Signatures)

The Senior Analyst (Underwater Magnetic Signatures) should have a Masters degree (PhD desired) in Engineering, Physics or Mathematics and at least fifteen (15) years related professional experience with ten (10) years experience pertaining to Navy platform signature mitigation analysis, processing testing data, numerical code development and statistical methods applied to measurement data. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Analysis including but not limited to Navy platform underwater magnetic signature mitigation, materials, shapes and power densities, geomagnetic perturbations due to platform presence, own platform monitoring and implementation of statistical confidence and accuracy measures of data sets, and presentation and graphics of extracted platform characteristics for both global and localized

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 22 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

features, including electric motors. Additionally, collecting, sampling and logging of underwater magnetic signatures on ranges for full-scale and large-scale and small-scale platform models employing both stationary and moving acquisition systems. Further describe performing data reduction, data analysis code development including statistical evaluations of data quality and accuracy of extracted information; interpretation and assessments of findings.

(2) Formulating, assessing and documenting submarine or surface ship signature reduction technologies based upon extracted metrics (consider the five specialties individually) from available or acquired data sets. Designing T&E approaches that emphasize measurement systems and measurement configurations that accentuate appraising signature characteristics of defined interest.

(3) Formulating, assessing and documenting ship component design/modification technical tradeoff analyses and signature performance assessments. Developing ITMPs, and integrated data acquisition plans separately among the five signature areas of interest.

(4) Assessing and documenting submarine and surface ship signature measurement technical progress.

(5) Reviewing, evaluating and documenting submarine and surface ship signature reduction design concepts, technology applications, tradeoffs and ship-design impacts as determined from acquired data.

(6) Defining, reviewing, evaluating and documenting treatment alternatives or approaches to mitigate or control signatures. Defining, assessing and documenting platform performance ship design impact issues.

(7) Developing, reviewing and documenting submarine or surface ship acoustic signature reduction technology integration technical approaches.

(8) Developing and documenting position papers on Navy platform signature control. Identifying integrated plans to address multi-signature measurement issues.

6.10 SENIOR ANALYST (Infrared/Optics)

The Senior Analyst (Infrared/Optics) should have a Masters degree (PhD desired) in Engineering, Physics or Mathematics and at least fifteen (15) years related professional experience with ten (10) years experience pertaining to Navy platform signature mitigation analysis, processing testing data, numerical code development and statistical methods applied to measurement data. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Analysis including but not limited to Navy platform infrared/optical signature mitigation, assessing the influence polarization, platform surface roughness, materials and shapes, implementation of statistical confidence and accuracy measures of data sets, image processing applications to enhance contrast and image profiles and contours and presentation and graphics of extracted platform characteristics for both global and localized features. Additionally, collecting, sampling and logging of infrared/optical signatures on ranges for full-scale and large-scale and small-scale platform models employing both stationary and moving acquisition systems and the influence of environmental factors. Further describe, performing data reduction, data analysis code development including statistical evaluations of data quality and accuracy of extracted information; interpretation and assessments of findings.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 23 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

(2) Formulating, assessing and documenting submarine or surface ship signature reduction technologies based upon extracted metrics (consider the five specialties individually) from available or acquired data sets. Designing T&E approaches that emphasize measurement systems and measurement configurations that accentuate appraising signature characteristics of defined interest.

(3) Formulating, assessing and documenting ship component design/modification technical tradeoff analyses and signature performance assessments. Developing ITMPs, and integrated data acquisition plans separately among the five signature areas of interest.

(4) Assessing and documenting submarine and surface ship signature measurement technical progress.

(5) Reviewing, evaluating and documenting submarine and surface ship signature reduction design concepts, technology applications, tradeoffs and ship-design impacts as determined from acquired data.

(6) Defining, reviewing, evaluating and documenting treatment alternatives or approaches to mitigate or control signatures. Defining, assessing and documenting platform performance ship design impact issues.

(7) Developing, reviewing and documenting submarine or surface ship acoustic signature reduction technology integration technical approaches.

(8) Developing and documenting position papers on Navy platform signature control. Identifying integrated plans to address multi-signature measurement issues.

6.11 SENIOR ENGINEER (Acoustic)

The Senior Engineer (Acoustic) should have a Masters degree in Engineering, Applied Engineering or Physics and at least fifteen (15) years related professional experience with ten (10) years experience years pertaining to Navy platform signature mitigation analysis, data acquisition system design, array or antenna design and test design. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Organizing test agendas and analyzing measurement system design and measurement system component integration commensurate with but not limited to signal processing methods, data acquisition parameters including sampling requirements, signal conditioning, dynamic range, provisions to minimize the influence of background noise, allowance for transducer positioning, sensitivity and stability within a measurement environment, and measurement system computer control. Measurements may address submarine acoustic signature silencing, surface ship fluidborne, airborne, structureborne and transient noise reduction, transducer calibration, analyses encompassing radiated noise, sonar self-noise, target strength (TS), propulsor noise, transients and full-scale and large- and small- platform model measurements conducted at prescribed acoustic facilities, littoral or open ocean ranges. Experience must be described in the resume pertaining to sensor development, array construction and powering approaches. Experiences listed must also address measurement and auxiliary system fabrication, maintenance and repair.

(2) Formulating, planning and conducting signature engineering research projects; formulating multi-disciplinary project technical approaches and organizing multi-element resources; conducting, and evaluating the results of model and full-scale tests; and developing component design documentation.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 24 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

(3) Conducting measurement performance requirement analyses; developing system hardware and software specifications; performing hardware and assessment of measurement on software design for data acquisition, control and communications components; conducting system evaluations; and providing design documentation.

(4) Formulating, reviewing and documenting technology applications for submarine or surface ship signatures related to hull, appendages, platform internal structures and systems and propulsor components.

(5) Developing, reviewing and documenting platform signature reduction technology development technical approaches.

(6) Assessing and documenting Navy platform signature characteristics. Preparing R&D program technical progress.

(7) Developing measurement systems, sensors or measurement methods to quantify platform signature control R&D and their influence platform design programs.

(8) Conducting, assessing and documenting the test methods for RDT&E 6.2, 6.3 and 6.4 Navy platform signature-related small-and large-model experiments and full-scale tests.

(9) Reviewing, assessing and documenting technical and program approaches for model-scale measurement facility integration. Developing POA&M and integrated multi-year program plans.

(10) Assessing and documenting measurement instrumentation ship-impact issues.

(11) Assessing signature measurement technology maturity, technical and cost risks for supporting retrofit and new platform designs.

6.12 SENIOR ENGINEER (Magnetic)

The Senior Engineer (Magnetic) should have a Masters degree in Engineering, Applied Engineering or Physics and at least fifteen (15) years related professional experience with ten (10) years experience years pertaining to Navy platform signature mitigation analysis, data acquisition system design, array or antenna design and test design. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Organizing test agendas and analyzing measurement system design including but not limited to Navy platform underwater magnetic signature mitigation, materials, shapes and power densities, geomagnetic perturbations due to platform presence, own platform monitoring and implementation of statistical confidence and accuracy implication of measurement approaches for both global and localized features, including electric motors. Additionally, collecting, sampling and logging of underwater magnetic signatures on ranges for full-scale and large-scale and small-scale platform models employing both stationary and moving acquisition systems. Experience must also be listed for leading and participating in platform demagnetization.

(2) Formulating, planning and conducting signature engineering research projects; formulating multi-

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 25 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

disciplinary project technical approaches and organizing multi-element resources; conducting, and evaluating the results of model and full-scale tests; and developing component design documentation.

(3) Conducting measurement performance requirement analyses; developing system hardware and software specifications; performing hardware and assessment of measurement on software design for data acquisition, control and communications components; conducting system evaluations; and providing design documentation.

(4) Formulating, reviewing and documenting technology applications for submarine or surface ship signatures related to hull, appendages, platform internal structures and systems and propulsor components.

(5) Developing, reviewing and documenting platform signature reduction technology development technical approaches.

(6) Assessing and documenting Navy platform signature characteristics. Preparing R&D program technical progress.

(7) Developing measurement systems, sensors or measurement methods to quantify platform signature control R&D and their influence platform design programs.

(8) Conducting, assessing and documenting the test methods for RDT&E 6.2, 6.3 and 6.4 Navy platform signature-related small-and large-model experiments and full-scale tests.

(9) Reviewing, assessing and documenting technical and program approaches for model-scale measurement facility integration. Developing POA&M and integrated multi-year program plans.

(10) Assessing and documenting measurement instrumentation ship-impact issues.

(11) Assessing signature measurement technology maturity, technical and cost risks for supporting retrofit and new platform designs.

6.13 SENIOR ENGINEER (Radar)

The Senior Engineer (Radar) should have a Masters degree in Engineering, Applied Engineering or Physics and at least fifteen (15) years related professional experience with ten (10) years experience years pertaining to Navy platform signature mitigation analysis, data acquisition system design, array or antenna design and test design. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Organizing test agendas and analyzing measurement system design including but not limited to Navy platform radar signature mitigation; transmitted waveform development, assessing the influence of top-side components, materials and shapes, implementation of statistical confidence and accuracy measures of data sets, image processing applications to enhance contrast and image profiles and contours and presentation and graphics of extracted platform characteristics for both global and localized features. Additionally, collecting, sampling and logging of radar signatures on ranges for full-scale and large-scale and small-scale platform models employing both stationary and moving acquisition systems. Further

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 26 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

describe experiences performing data reduction, data analysis code development including statistical evaluations of data quality and accuracy of extracted information; interpretation and assessments of findings. Experiences listed must also address measurement and auxiliary system design, fabrication, maintenance and repair.

(2) Formulating, planning and conducting signature engineering research projects; formulating multi-disciplinary project technical approaches and organizing multi-element resources; conducting, and evaluating the results of model and full-scale tests; and developing component design documentation.

(3) Conducting measurement performance requirement analyses; developing system hardware and software specifications; performing hardware and assessment of measurement on software design for data acquisition, control and communications components; conducting system evaluations; and providing design documentation.

(4) Formulating, reviewing and documenting technology applications for submarine or surface ship signatures related to hull, appendages, platform internal structures and systems and propulsor components.

(5) Developing, reviewing and documenting platform signature reduction technology development technical approaches.

(6) Assessing and documenting Navy platform signature characteristics. Preparing R&D program technical progress.

(7) Developing measurement systems, sensors or measurement methods to quantify platform signature control R&D and their influence platform design programs.

(8) Conducting, assessing and documenting the test methods for RDT&E 6.2, 6.3 and 6.4 Navy platform signature-related small-and large-model experiments and full-scale tests.

(9) Reviewing, assessing and documenting technical and program approaches for model-scale measurement facility integration. Developing POA&M and integrated multi-year program plans.

(10) Assessing and documenting measurement instrumentation ship-impact issues.

(11) Assessing signature measurement technology maturity, technical and cost risks for supporting retrofit and new platform designs.

6.14 SENIOR ENGINEER (Hydroacoustic)

The Senior Engineer (Hydroacoustic) should have a Masters degree in Engineering, Applied Engineering or Physics and at least fifteen (15) years related professional experience with ten (10) years experience years pertaining to Navy platform signature mitigation analysis, data acquisition system design, array or antenna design and test design. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Organizing test agendas and analyzing measurement system design including but not limited to flow

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 27 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

turbulence, flow ingestion into propulsor, fluid flow in ducts, fluid flow in piping and pump systems, fluid-structure interactions that produce acoustic airborne and/or fluidborne noise as well as flow induced mechanical excitations of platform structures. Experience should also be described to illustrate experience in analyzing hydraulic actuator systems. Development of measurement systems should include arrangements, sensor development, data acquisition control software and sensor installations for full-scale, medium-scale and small-scale platforms as well as experience with measurements in flow tunnels ,e.g.; NAVSEA LCC facility. Examples illustrating consideration for measurement limitations, accuracies and statistical evaluations of quantity measured. Experiences listed must also address measurement and auxiliary system fabrication, maintenance and repair.

(2) Formulating, planning and conducting signature engineering research projects; formulating multi-disciplinary project technical approaches and organizing multi-element resources; conducting, and evaluating the results of model and full-scale tests; and developing component design documentation.

(3) Conducting measurement performance requirement analyses; developing system hardware and software specifications; performing hardware and assessment of measurement on software design for data acquisition, control and communications components; conducting system evaluations; and providing design documentation.

(4) Formulating, reviewing and documenting technology applications for submarine or surface ship signatures related to hull, appendages, platform internal structures and systems and propulsor components.

(5) Developing, reviewing and documenting platform signature reduction technology development technical approaches.

(6) Assessing and documenting Navy platform signature characteristics. Preparing R&D program technical progress.

(7) Developing measurement systems, sensors or measurement methods to quantify platform signature control R&D and their influence platform design programs.

(8) Conducting, assessing and documenting the test methods for RDT&E 6.2, 6.3 and 6.4 Navy platform signature-related small-and large-model experiments and full-scale tests.

(9) Reviewing, assessing and documenting technical and program approaches for model-scale measurement facility integration. Developing POA&M and integrated multi-year program plans.

(10) Assessing and documenting measurement instrumentation ship-impact issues.

(11) Assessing signature measurement technology maturity, technical and cost risks for supporting retrofit and new platform designs.

6.15 SENIOR ENGINEER (Infrared/Optic)

The Senior Engineer (Infrared/Optics) should have a Masters degree in Engineering, Applied Engineering or Physics and at least fifteen (15) years related professional experience with ten (10) years experience years pertaining to Navy platform signature mitigation analysis, data acquisition system

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 28 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

design, array or antenna design and test design. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

(1) Organizing test agendas and analyzing measurement system design including but not limited to Navy platform infrared/optical signature mitigation/characterization, materials, shapes and background variability. Also listed must include analyses of the statistical confidence and accuracy implication of measurement approaches for both global and localized features. Describe the influence of polarization, platform surface roughness, materials and shapes, implementation of statistical confidence and accuracy measures of data sets, image processing applications to enhance contrast and image profiles and contours. Further describe the impact of measurement approach on data acquisition and statistical implications of data quality and accuracy of extracted information and ultimately on interpretation and assessments of findings.

(2) Formulating, planning and conducting signature engineering research projects; formulating multi-disciplinary project technical approaches and organizing multi-element resources; conducting, and evaluating the results of model and full-scale tests; and developing component design documentation.

(3) Conducting measurement performance requirement analyses; developing system hardware and software specifications; performing hardware and assessment of measurement on software design for data acquisition, control and communications components; conducting system evaluations; and providing design documentation.

(4) Formulating, reviewing and documenting technology applications for submarine or surface ship signatures related to hull, appendages, platform internal structures and systems and propulsor components.

(5) Developing, reviewing and documenting platform signature reduction technology development technical approaches.

(6) Assessing and documenting Navy platform signature characteristics. Preparing R&D program technical progress.

(7) Developing measurement systems, sensors or measurement methods to quantify platform signature control R&D and their influence platform design programs.

(8) Conducting, assessing and documenting the test methods for RDT&E 6.2, 6.3 and 6.4 Navy platform signature-related small-and large-model experiments and full-scale tests.

(9) Reviewing, assessing and documenting technical and program approaches for model-scale measurement facility integration. Developing POA&M and integrated multi-year program plans.

(10) Assessing and documenting measurement instrumentation ship-impact issues.

(11) Assessing signature measurement technology maturity, technical and cost risks for supporting retrofit and new platform designs.

6.16 SENIOR PROGRAM/PROJECT MANAGER

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 29 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

The Senior Program/Project Manager should have a bachelor's degree in Engineering, Physics, Mathematics or Science and at least fifteen (15) years related professional experience with ten (10) years experience involvement with Navy platform acoustic or magnetic or radar or infrared/optics or hydroacoustic signature mitigation and/or control. The ten (10) years experience should also include a listing of documents published by the proposed individual to verify that the individual is capable of performing the required tasking below:

- (1) Documenting multi-organization, multi-disciplinary POA&Ms, ITMPs, MOA/MOUs, program issue reports, and integrated multi-year program plans.
- (2) Developing and documenting Microsoft Project-type management support documentation for multi-disciplinary signature R&D projects.
- (3) Preparing integrated multi-task progress reports and revised multi-year program plans.
- (4) Defining, reviewing, evaluating and documenting ship signature full-scale or scale-model test schedule and cost issues so that program schedule goals and costs are met. Developing multi-year cost estimates, support plans and cost-tracking management information system.
- (5) Tracking and documenting platform signature test facility and/or assess availability and cost issues for characterizing Navy platform signatures.
- (6) Providing and reporting program cost accounting, spending rate and task progress.

NON-KEY PERSONNEL

6.17 ANALYST

The Analyst shall have a Bachelors degree in Engineering, Physics, Mathematics or Science with at least seven (7) years related professional experience with three (3) years involvement with Navy RDT&E. The individual shall capable of performing the required tasking below:

- (1) Reviewing, assessing and documenting Navy platform acoustic or magnetic or radar or infrared/optics or hydroacoustic signature reduction technology.
- (2) Reviewing, assessing and documenting platform component design/modification technical tradeoff analyses and performance assessments.
- (3) Assessing and documenting submarine acoustic or magnetic or radar or infrared/optics or hydroacoustic signature R&D program technical progress.
- (4) Reviewing, evaluating and documenting platform acoustic or magnetic or radar or infrared/optics or hydroacoustic signature reduction design concepts.
- (5) Conducting platform design and performance analysis; assist small- and large-model test data reduction approaches and analysis code development.
- (6) Formulating platform model and full-scale acoustic or magnetic or radar or infrared/optics or

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 30 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

hydroacoustic signature evaluations; performing data analysis and preparing signature reports.

(7) Reviewing, evaluating and documenting potential Navy platform signature reduction technologies and technology transition alternatives for the six (6) areas listed above.

(8) Developing, reviewing and documenting submarine or surface ship acoustic or magnetics or radar or infrared/optics or hydroacoustics signature reduction technology integration technical approaches.

6.18 SCIENTIST

The Scientist shall have a Bachelors degree in Engineering, Physics, Mathematics or Science with at least seven (7) years Navy program-related experience with three (3) years experience in Navy platform RDT&E program signature mitigation and/or control in one of the six (6) topic areas listed below. The individual shall be capable of performing the required tasking below:

(1) Reviewing and documenting Navy platform signature reduction technology development technical approaches.

(2) Reviewing, evaluating and documenting full-scale or large-scale model platform designs and the relationship of the designs with physics phenomena causing signature excesses.

(3) Assessing and documenting Navy platform multi-disciplinary signature R&D program technical progress.

(4) Developing treatments and/or approaches to mitigate and/or control Navy platform signatures and assess platform designs relevant to program goals.

(5) Reviewing and documenting Navy platform signature reduction technology integration.

(6) Experience in Navy platform in the design of platform and technical and program issue analysis covering platform signature characteristics for small-scale, medium-scale, large-scale or full-scale platform models and the implications on system operational and tactical operations.

6.19 ENGINEER

The Engineer shall have a Bachelors degree in Engineering, Mathematics or Science and seven (7) years professional experience. The individual shall be capable of performing the required tasking below:

(1) Navy RDT&E project support, including but not limited to measurement design, test system fabrication and system implementation.

(2) Technical data compilation, organization and analysis.

(3) Project support documentation preparation.

(4) Technical analysis including but not limited to data logging, equipment maintenance and measurement system operations.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 31 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

6.20 TECHNICAL SPECIALIST

The Technical Specialist shall have formal technical training and seven (7) years professional experience related to ship signature/survivability technical support; or, an associate, or higher, degree in a field related to project technical support. The individual shall capable of performing the required tasking below:

- (1) Signature/survivability project technical support.
- (2) Data compilation, organization and analysis.
- (3) Information compilation and documentation.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 32 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

SECTION D PACKAGING AND MARKING

Packing and Marking shall be in accordance with Section D of the base contract.

Contracting Officer Representative (COR)
 Ronald Hughes Code 7200
 9500 MacArthur Blvd
 West Bethesda, MD 20817-5700
 ronald.g.hughes@navy.mil
 301-227-5248

HQ D-2-0008 MARKING OF REPORTS (NAVSEA) (SEP 1990)

All reports delivered by the Contractor to the Government under this contract shall prominently show on the cover of the report:

- (1) name and business address of the Contractor
- (2) contract number
- (3) task order number
- (4) sponsor: _____
(Name of Individual Sponsor)

(Name of Requiring Activity)

(City and State)

All deliverables shall be packaged and marked IAW Best Commercial Practice.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 33 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

SECTION E INSPECTION AND ACCEPTANCE

Inspection and Acceptance shall be performed at a destination by the Government.

DODAAC: N00167
Contracting Officer Representative (COR)
Ronald Hughes Code 7200
9500 MacArthur Blvd
West Bethesda, MD 20817-5700
ronald.g.hughes@navy.mil
301-227-5248

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 34 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

SECTION F DELIVERABLES OR PERFORMANCE

CLIN - DELIVERIES OR PERFORMANCE

52.211-8 TIME OF DELIVERY (JUN 1997)

(a) The Government requires delivery to be made according to the following schedule:

<u>ITEM NO.</u>	<u>QUANTITY</u>	<u>WITHIN DAYS AFTER DATE OF TASK ORDER</u>
4000 & 6000	ALL	TWO (2) YEAR AFTER THE EFFECTIVE DATE OF THE TASK ORDER
4100 & 6100	ALL	ONE (1) YEAR AFTER THE DATE OF OPTION EXERCISE
4200 & 6200	ALL	ONE (1) YEAR AFTER THE DATE OF OPTION EXERCISE

DELIVERY INFORMATION

FOB: Destination

DODAAC: N00167
Contracting Officer Representative (COR)
Ronald Hughes Code 7200
9500 MacArthur Blvd
West Bethesda, MD 20817-5700
ronald.g.hughes@navy.mil
301-227-5248

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 35 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

SECTION G CONTRACT ADMINISTRATION DATA

G17S TOM APPOINTMENT (AUG 2005)

(a) The Contracting Officer hereby appoints the following individual as the Contracting Officer Representative (COR) for this task order:

Contracting Officer Representative (COR)
 Ronald Hughes Code 7200
 9500 MacArthur Blvd
 West Bethesda, MD 20817-5700
 ronald.g.hughes@navy.mil
 301-227-5248

Ddl-G-21 TYPES OF ORDERS UNDER INDEFINITE DELIVERY TYPE CONTRACTS
 This Task Order shall be issued on a Cost-Plus-Fixed-Fee (Term) basis.

CAR-G11 INVOICE INSTRUCTIONS (DEC 2007) (NSWCCD)

(a) In accordance with the clause of this contract entitled "ELECTRONIC SUBMISSION OF PAYMENT REQUESTS" (DFARS 252.232-7003), the Naval Surface Warfare Center, Carderock Division (NSWCCD) will utilize the DoD Wide Area Workflow Receipt and Acceptance (WAWF) system to accept supplies/services delivered under this contract. This web-based system located at <https://wawf.eb.mil> provides the technology for government contractors and authorized Department of Defense (DoD) personnel to generate, capture and process receipt and payment-related documentation in a paperless environment. Invoices for supplies/services rendered under this contract shall be submitted electronically through WAWF. Submission of hard copy DD250/invoices may no longer be accepted for payment.

(b) It is recommended that the person in your company designated as the Central Contractor Registration (CCR) Electronic Business (EB) Point of Contact and anyone responsible for the submission of invoices, use the online training system for WAWF at <http://wawftraining.com>. The Vendor, Group Administrator (GAM), and sections marked with an asterisk in the training system should be reviewed. Vendor Quick Reference Guides also are available at <http://acquisition.navy.mil/navyaos/content/view/full/3521/>. The most useful guides are "Getting Started for Vendors" and "WAWF Vendor Guide".

(c) The designated CCR EB point of contact is responsible for activating the company's CAGE code on WAWF by calling 1-866-618-5988. Once the company is activated, the CCR EB point of contact will self-register under the company's CAGE code on WAWF and follow the instructions for a group administrator. After the company is set-up on WAWF, any additional persons responsible for submitting invoices must self-register under the company's CAGE code at <https://wawf.eb.mil>.

(d) The contractor shall use the following document types, DODAAC codes and inspection and acceptance locations when submitting invoices in WAWF:

Type of Document (*contracting officer check all that apply*)

<input type="checkbox"/>	Invoice (FFP Supply & Service)
<input type="checkbox"/>	Invoice and Receiving Report Combo (FFP Supply)
<input type="checkbox"/>	Invoice as 2-in-1 (FFP Service Only)
<input checked="" type="checkbox"/>	Cost Voucher (Cost Reimbursable, T&M , LH, or FPI)
<input type="checkbox"/>	Receiving Report (FFP, DD250 Only)

DODAAC Codes and Inspection and Acceptance Locations (*contracting officer complete appropriate information as applicable*)

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 36 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

Issue DODAAC	<u>N00167</u>
Admin DODAAC	<u>S0701A</u>
Pay Office DODAAC	<u>HQ0337</u>
Service Approver DODAAC	<u>N00167</u>
DCAA Auditor DODAAC	<u>HAA661</u>

Attachments created in any Microsoft Office product may be attached to the WAWF invoice, e.g., backup documentation, timesheets, etc. Maximum limit for size of each file is 2 megabytes. Maximum limit for size of files per invoice is 5 megabytes.

(e) Before closing out of an invoice session in WAWF, but after submitting the document(s), you will be prompted to send additional email notifications. Click on "Send More Email Notification" and add the acceptor/receiver email addresses noted below in the first email address block, and add any other additional email addresses desired in the following blocks. This additional notification to the government is important to ensure that the acceptor/receiver is aware that the invoice documents have been submitted into WAWF.

Send Additional Email Notification To:
ronald.g.hughes@navy.mil

(f) The contractor shall submit invoices/cost vouchers for payment per contract terms and the government shall process invoices/cost vouchers for payment per contract terms. Contractors approved by DCAA for direct billing will submit cost vouchers directly to DFAS via WAWF. Final voucher submission will be approved by the ACO.

(g) The WAWF system has not yet been implemented on some Navy programs; therefore, upon written concurrence from the cognizant Procuring Contracting Officer, the Contractor is authorized to use DFAS WinS for electronic end to end invoicing until the functionality of WinS has been incorporated into WAWF.

(h) If you have any questions regarding WAWF, please contact the WAWF helpdesk at the above 1-866 number or the NSWCCD WAWF point of contact Kay Wade at (301) 227-5419 or karen.wade@navy.mil.
(End of Clause)

SEA 5252.216-9122 LEVEL OF EFFORT (DEC 2000)

(a) The Contractor agrees to provide the total level of effort specified in the next sentence in performance of the work described in Sections B and C of this contract. The total level of effort for the performance of this contract shall be 116,000 total man-hours of direct labor, including subcontractor direct labor for those subcontractors specifically identified in the Contractor's proposal as having hours included in the proposed level of effort.

(b) Of the total man-hours of direct labor set forth above, it is estimated that _0_(to be identified at the task order level) man-hours are uncompensated effort.

Uncompensated effort is defined as hours provided by personnel in excess of 40 hours per week without additional compensation for such excess work. All other effort is defined as compensated effort. If no effort is indicated in the first sentence of this paragraph, uncompensated effort performed by the Contractor shall not be counted in fulfillment of the level of effort obligations under this contract.

(c) Effort performed in fulfilling the total level of effort obligations specified above shall only include effort performed in direct support of this contract and shall not include time and effort expended on such things as (local travel to and from an employee's usual work location), uncompensated effort while on travel status, truncated lunch periods, work (actual or inferred) at an employee's residence or other non-work locations (except as provided in paragraph (j) below), or other time and effort which does not have a specific and direct contribution to the tasks described in Sections B and C.

(d) The level of effort for this contract shall be expended at an average rate of approximately 1,115 hours per week. It is understood and agreed that the rate of man-hours per month may fluctuate in pursuit of the technical objective, provided such fluctuation does not result in the use of the total man-hours of effort prior to the expiration of the term hereof, except as provided in the following paragraph.

(e) If, during the term hereof, the Contractor finds it necessary to accelerate the expenditure of direct labor to such an extent that the total man hours of effort specified above would be used prior to the expiration of the term, the

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 37 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

Contractor shall notify the Contracting Officer in writing setting forth the acceleration required, the probable benefits which would result, and an offer to undertake the acceleration at no increase in the estimated cost or fee together with an offer, setting forth a proposed level of effort, cost breakdown, and proposed fee, for continuation of the work until expiration of the term hereof. The offer shall provide that the work proposed will be subject to the terms and conditions of this contract and any additions or changes required by then current law, regulations, or directives, and that the offer, with a written notice of acceptance by the Contracting Officer, shall constitute a binding contract. The Contractor shall not accelerate any effort until receipt of such written approval by the Contracting Officer. Any agreement to accelerate will be formalized by contract modification.

(f) The Contracting Officer may, by written order, direct the Contractor to accelerate the expenditure of direct labor such that the total man hours of effort specified in paragraph (a) above would be used prior to the expiration of the term. This order shall specify the acceleration required and the resulting revised term. The Contractor shall acknowledge this order within five days of receipt.

(g) If the total level of effort specified in paragraph (a) above is not provided by the Contractor during the period of this contract, the Contracting Officer, at its sole discretion, shall either (i) reduce the fee of this contract as follows:

Fee Reduction = Fee((Required LOE minus Expended LOE)divided by Required LOE))

or (ii) subject to the provisions of the clause of this contract entitled "LIMITATION OF COST" (FAR 52.232-20) or "LIMITATION OF COST (FACILITIES)" (FAR 52.232-21), as applicable, require the Contractor to continue to perform the work until the total number of man hours of direct labor specified in paragraph (a) above shall have been expended, at no increase in the fee of this contract.

(h) The Contractor shall provide and maintain an accounting system, acceptable to the Administrative Contracting Officer and the Defense Contract Audit Agency (DCAA), which collects costs incurred and effort (compensated and uncompensated, if any) provided in fulfillment of the level of effort obligations of this contract. The Contractor shall indicate on each invoice the total level of effort claimed during the period covered by the invoice, separately identifying compensated effort and uncompensated effort, if any.

(i) Within 45 days after completion of the work under each separately identified period of performance hereunder, the Contractor shall submit the following information in writing to the Contracting Officer with copies to the cognizant Contract Administration Office and to the DCAA office to which vouchers are submitted: (1) the total number of man hours of direct labor expended during the applicable period; (2) a breakdown of this total showing the number of man hours expended in each direct labor classification and associated direct and indirect costs; (3) a breakdown of other costs incurred; and (4) the Contractor's estimate of the total allowable cost incurred under the contract for the period. Within 45 days after completion of the work under the contract, the Contractor shall submit, in addition, in the case of a cost underrun; (5) the amount by which the estimated cost of this contract may be reduced to recover excess funds and, in the case of an underrun in hours specified as the total level of effort; and (6) a calculation of the appropriate fee reduction in accordance with this clause. All submissions shall include subcontractor information.

(j) Notwithstanding any of the provisions in the above paragraphs, the Contractor may furnish man hours up to five percent in excess of the total man hours specified in paragraph (a) above, provided that the additional effort is furnished within the term hereof, and provided further that no increase in the estimated cost or fee is required.

(End of Clause)

SEA 5252.232-9104 ALLOTMENT OF FUNDS (MAY 1993)

(a) This contract is incrementally funded with respect to both cost and fee. The amount(s) presently available and allotted to this contract for payment of fee for incrementally funded contract line item number/contract subline item number (CLIN/SLIN), subject to the clause entitled "FIXED FEE" (FAR 52.216-8) or "INCENTIVE FEE" (FAR 52.216-10), as appropriate, is specified below. The amount(s) presently available and allotted to this contract for payment of cost for incrementally funded CLINs/SLINs is set forth below. As provided in the clause of this contract entitled "LIMITATION OF FUNDS" (FAR 52.232-22), the CLINs/SLINs covered thereby, and the period of performance for which it is estimated the allotted amount(s) will cover are as follows:

ESTIMATED ITEM(S)	ALLOTED TO COST	ALLOTED TO FEE	PERIOD OF PERFORMANCE
----------------------	-----------------	----------------	-----------------------

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 38 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

4000	\$675,958.00	\$53,942.00	Through 30 September 2012
6000	\$ 34,000.00	N/A	Through 30 September 2012

(To be provided at the task order award)

(b) The parties contemplate that the Government will allot additional amounts to this contract from time to time for the incrementally funded CLINs/SLINs by unilateral contract modification, and any such modification shall state separately the amount(s) allotted for cost, the amount(s) allotted for fee, the CLINs/SLINs covered thereby, and the period of performance which the amount(s) are expected to cover.

(c) CLINs/SLINs are fully funded and performance under these CLINs/SLINs is subject to the clause of this contract entitled "LIMITATION OF COST" (FAR 52.232-20) or "LIMITATION OF COST (FACILITIES)" (FAR 52.232-21), as applicable.

(d) The Contractor shall segregate costs for the performance of incrementally funded CLINs/SLINs from the cost of performance of fully funded CLINs/SLINs.

(End of Clause)

Accounting Data

SLINID	PR Number	Amount
400001	01810099	142500.00
LLA :		
AA 97X4930 NH1C 000 77777 0 000167 2F 000000 101508078291		
600001	01810099	7500.00
LLA :		
AA 97X4930 NH1C 000 77777 0 000167 2F 000000 101508078291		

BASE Funding 150000.00
Cumulative Funding 150000.00

MOD 01

400002	03280209	50000.00
LLA :		
AB 1701319 H4RJ 253 SASUB 0 068342 2D 010240 F32200000010		
Standard Number: N0002411WX10412		
400003	03280224	10000.00
LLA :		
AB 1701319 H4RJ 253 SASUB 0 068342 2D 010240 F32200000010		
Standard Number: N0002411WX10412		

MOD 01 Funding 60000.00
Cumulative Funding 210000.00

MOD 02

400004	03496435	138000.00
LLA :		
AC 1711804 8B5B 252 VU021 0 050120 2D 000000 A00000623322		
Standard Number: N0002411RX00719/AA		
400005	03547328	18500.00
LLA :		
AD 97X4930 NH1C 000 77777 0 000167 2F 000000 111915214008		
600002	03496435	2000.00
LLA :		
AC 1711804 8B5B 252 VU021 0 050120 2D 000000 A00000623322		

CONTRACT NO.	DELIVERY ORDER NO.	AMENDMENT/MODIFICATION NO.	PAGE	FINAL
N00178-04-D-4014	FD01	05	39 of 49	

Standard Number: N0002411RX00719/AA

600003 03547328 1500.00
 LLA :
 AD 97X4930 NH1C 000 77777 0 000167 2F 000000 111915214008

MOD 02 Funding 160000.00
 Cumulative Funding 370000.00

MOD 03

400006 10245821 94000.00
 LLA :
 AE 97X4930 NH1C 000 77777 0 000167 2F 000000 111915214418

600004 10245821 6000.00
 LLA :
 AE 97X4930 NH1C 000 77777 0 000167 2F 000000 111915214418

MOD 03 Funding 100000.00
 Cumulative Funding 470000.00

MOD 04

400007 10215565 59000.00
 LLA :
 AF 97X4930 NH1C 000 77777 0 000167 2F 000000 111707291160

600005 10215565 4900.00
 LLA :
 AF 97X4930 NH1C 000 77777 0 000167 2F 000000 111707291160

MOD 04 Funding 63900.00
 Cumulative Funding 533900.00

MOD 05

400008 10390645 96900.00
 LLA :
 AG 97X4930 NH1C 000 77777 0 000167 2F 000000 111722002510

400009 10400902 85000.00
 LLA :
 AH 97X4930 NH1C 000 77777 0 000167 2F 000000 111707291420

400010 10474081 36000.00
 LLA :
 AJ 97X4930 NH1C 000 77777 0 000167 2F 000000 111707292094

600006 10390645 3100.00
 LLA :
 AG 97X4930 NH1C 000 77777 0 000167 2F 000000 111722002510

600007 10400902 5000.00
 LLA :
 AH 97X4930 NH1C 000 77777 0 000167 2F 000000 111707291420

600008 10474081 4000.00
 LLA :
 AJ 97X4930 NH1C 000 77777 0 000167 2F 000000 111707292094

MOD 05 Funding 230000.00
 Cumulative Funding 763900.00

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 40 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

SECTION H SPECIAL CONTRACT REQUIREMENTS

NOTIFICATION CONCERNING DETERMINATION OF SMALL BUSINESS SIZE STATUS

For the purposes of FAR clauses 52.219-6, NOTICE OF TOTAL SMALL BUSINESS SET-ASIDE, 52.219-3, NOTICE OF TOTAL HUBZONE SET-ASIDE, 52.219-18, NOTIFICATION OF COMPETITION LIMITED TO ELIGIBLE 8(A) CONCERNS, and 52.219-27 NOTICE OF TOTAL SERVICE-DISABLED VETERAN-OWNED SMALL BUSINESS SET-ASIDE, the determination of whether a small business concern is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the size standards in this solicitation, and further, meets the definition of a HUBZone small business concern, a small business concern certified by the SBA for participation in the SBAs 8(a) program, or a service disabled veteran-owned small business concern, as applicable, shall be based on the status of said concern at the time of award of the SeaPort-e MACs and as further determined in accordance with Special Contract Requirement H-19.

52.219-6 NOTICE OF TOTAL SMALL BUSINESS SET-ASIDE (JUNE 2003)

(a) Definition. "Small business concern" as used in this clause, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the size standards in this solicitation.

(b) General. (1) Offers are solicited only from small business concerns. Offers received from concerns that are not small business concerns shall be considered nonresponsive and will be rejected. (2) Any award resulting from this solicitation will be made to a small business concern.

(c) Agreement. A small business concern submitting an offer in its own name shall furnish, in performing the contract, only end items manufactured or produced by small business concerns in the United States or its outlying areas. If this procurement is processed under simplified acquisition procedures and the total amount of this contract does not exceed \$25,000, a small business concern may furnish the product of any domestic firm. This paragraph does not apply to construction or service contracts.

HQ C-2-0037 ORGANIZATIONAL CONFLICT OF INTEREST (NAVSEA) (JUL 2000)

(a) "Organizational Conflict of Interest" means that because of other activities or relationships with other persons, a person is unable or potentially unable to render impartial assistance or advice to the Government, or the person's objectivity in performing the contract work is or might be otherwise impaired, or a person has an unfair competitive advantage. "Person" as used herein includes Corporations, Partnerships, Joint Ventures, and other business enterprises.

(b) The Contractor warrants that to the best of its knowledge and belief, and except as otherwise set forth in the contract, the Contractor does not have any organizational conflict of interest(s) as defined in paragraph (a).

(c) It is recognized that the effort to be performed by the Contractor under this contract may create a potential organizational conflict of interest on the instant contract or on a future acquisition. In order to avoid this potential conflict of interest, and at the same time to avoid prejudicing the best interest of the Government, the right of the Contractor to participate in future procurement of equipment and/or services that are the subject of any work under this contract shall be limited as described below in accordance with the requirements of FAR 9.5.

(d) (1) The Contractor agrees that it shall not release, disclose, or use in any way that would permit or result in disclosure to any party outside the Government any information provided to the Contractor by the Government during or as a result of performance of this contract. Such information includes, but is not limited to, information submitted to the Government on a confidential basis by other persons. Further, the prohibition against release of Government provided information extends to cover such information whether or not in its original form, e.g., where the information has been included in Contractor generated work or where it is discernible from materials incorporating or based upon such information. This prohibition shall not expire after a given period of time.

(2) The Contractor agrees that it shall not release, disclose, or use in any way that would permit or result in disclosure to any party outside the Government any information generated or derived during or as a result of performance of this

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 41 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

contract. This prohibition shall expire after a period of three years after completion of performance of this contract.

(3) The prohibitions contained in subparagraphs (d)(1) and (d)(2) shall apply with equal force to any affiliate of the Contractor, any subcontractor, consultant, or employee of the Contractor, any joint venture involving the Contractor, any entity into or with which it may merge or affiliate, or any successor or assign of the Contractor. The terms of paragraph (f) of this Special Contract Requirement relating to notification shall apply to any release of information in contravention of this paragraph (d).

(e) The Contractor further agrees that, during the performance of this contract and for a period of three years after completion of performance of this contract, the Contractor, any affiliate of the Contractor, any subcontractor, consultant, or employee of the Contractor, any joint venture involving the Contractor, any entity into or with which it may subsequently merge or affiliate, or any other successor or assign of the Contractor, shall not furnish to the United States Government, either as a prime contractor or as a subcontractor, or as a consultant to a prime contractor or subcontractor, any system, component or services, which is the subject of the work to be performed under this contract. This exclusion does not apply to any recompetition for those systems, components or services furnished pursuant to this contract. As provided in FAR 9.505-2, if the Government procures the system, component, or services on the basis of work statements growing out of the effort performed under this contract, from a source other than the contractor, subcontractor, affiliate, or assign of either, during the course of performance of this contract or before the three year period following completion of this contract has lapsed, the Contractor may, with the authorization of the cognizant Contracting Officer, participate in a subsequent procurement for the same system, component, or service. In other words, the Contractor may be authorized to compete for procurement(s) for systems, components or services subsequent to an intervening procurement.

(f) The Contractor agrees that, if after award, it discovers an actual or potential organizational conflict of interest, it shall make immediate and full disclosure in writing to the Contracting Officer. The notification shall include a description of the actual or potential organizational conflict of interest, a description of the action which the Contractor has taken or proposes to take to avoid, mitigate, or neutralize the conflict, and any other relevant information that would assist the Contracting Officer in making a determination on this matter. Notwithstanding this notification, the Government may terminate the contract for the convenience of the Government if determined to be in the best interest of the Government.

(g) Notwithstanding paragraph (f) above, if the Contractor was aware, or should have been aware, of an organizational conflict of interest prior to the award of this contract or becomes, or should become, aware of an organizational conflict of interest after award of this contract and does not make an immediate and full disclosure in writing to the Contracting Officer, the Government may terminate this contract for default.

(h) If the Contractor takes any action prohibited by this requirement or fails to take action required by this requirement, the Government may terminate this contract for default.

(i) The Contracting Officer's decision as to the existence or nonexistence of an actual or potential organizational conflict of interest shall be final.

(j) Nothing in this requirement is intended to prohibit or preclude the Contractor from marketing or selling to the United States Government its product lines in existence on the effective date of this contract; nor, shall this requirement preclude the Contractor from participating in any research and development or delivering any design development model or prototype of any such equipment. Additionally, sale of catalog or standard commercial items are exempt from this requirement.

(k) The Contractor shall promptly notify the Contracting Officer, in writing, if it has been tasked to evaluate or advise the Government concerning its own products or activities or those of a competitor in order to ensure proper safeguards exist to guarantee objectivity and to protect the Government's interest.

(l) The Contractor shall include this requirement in subcontracts of any tier which involve access to information or situations/conditions covered by the preceding paragraphs, substituting "subcontractor" for "contractor" where appropriate.

(m) The rights and remedies described herein shall not be exclusive and are in addition to other rights and remedies provided by law or elsewhere included in this contract.

(n) Compliance with this requirement is a material requirement of this contract.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 42 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

(End of Clause)

CAR-H09 Performance-Based Acquisition Evaluation Procedures for a SeaPort e Task Order (MAR 2006) (NSWCCD)

(a) Introduction: The contractor's performance on this task order will be evaluated by the Government, in accordance with this task order clause. The first evaluation will cover the period ending twelve months after the date of task order award with successive evaluations being performed for each twelve-month period thereafter until the contractor completes performance under the task order. Based on the evaluation results, the PCO will assign an overall performance rating in accordance with paragraph (b) of this clause. The purpose of the evaluation is to determine remedies that may be invoked due to "Unsatisfactory" performance. If the PCO assigns an "Unsatisfactory" performance rating for the period evaluated, the PCO may take unilateral action, in accordance with clause 52.246-5 entitled "Inspection of Services-Cost Reimbursement", dated Apr 1984, in Section E of the base contract, to provide for a fee reduction covering the performance period evaluated. This clause provides the basis for evaluation of the contractor's performance and for determining if the fee amount should be reduced due to "Unsatisfactory" performance.

(b) Performance Ratings: The Government will evaluate the contractor's performance of the Statement of Work under the task order for each twelve month period of performance, using the measurable performance standards set forth in the Performance Requirements Summary Table in the SOW, or elsewhere in the task order, and the PCO will assign one of the following ratings:

- (1) Excellent
- (2) Very Good
- (3) Satisfactory
- (4) Unsatisfactory

The standards associated with these ratings are given in the following Table 1.

Table 1: Overall Performance Ratings

For The Evaluation Period

Overall Performance Rating	Standard
Excellent	"Excellent" ratings for all performance evaluation criteria.
Very Good	A combination of "Excellent" and "Satisfactory" ratings determined by the PCO to exceed Satisfactory" overall.
Satisfactory	A minimum of "Satisfactory" ratings for all performance evaluation criteria.
Unsatisfactory	A rating of "Unsatisfactory" for one or more performance evaluation criteria.

(c) Evaluation Objective: The purpose of the evaluation and the inclusion of a remedy to the Government for unsatisfactory contractor performance under this task order is to ensure that the Government receives at least "Satisfactory" overall performance.

(d) Performance Evaluation Criteria: The contractor's performance will be evaluated on an annual basis using the criteria and standards provided for each task objective in the Performance Requirements Summary Table, and considering the criterion in Tables 2 through 4 of this task order clause.

(e) Organization: The performance evaluation organization consists of the Procuring Contracting Officer (PCO), who will serve as the Evaluation Official, and the Task Order Manager (ToM).

(1) ToM: The ToM will provide ongoing performance monitoring, evaluate task performance based on the task order

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 43 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

Performance Requirements Summary, prepare the evaluation report, including a recommended overall performance rating, and submit the report to the PCO for final decision within thirty days after the end of the evaluation period. The ToM will maintain the written records of the contractor's performance so that a fair and accurate evaluation is made.

(2) Procuring Contracting Officer (PCO): The PCO is responsible for properly administering the performance evaluation process, maintaining the official performance evaluation file, and making the decision about the overall performance rating and whether to reduce the fee if performance is rated as unsatisfactory.

(f) Evaluation Schedule: Each performance evaluation will cover the previous twelve months of performance. The Government will evaluate all work under the task order performed by the contractor during the twelve-month period. Following each evaluation period, the PCO (or Contract Specialist if so designated by the PCO) and the ToM will hold a meeting with the contractor's Senior Technical Representative to review performance under the task order during the previous twelve months, including overall trends, specific problem areas, if any, and their resolution. Other Government and contractor personnel may also participate as deemed appropriate.

(g) Contractor's Self-Evaluation: The contractor may also submit a Self-Evaluation Report for consideration. The report must include an overall performance rating for the task order, covering the evaluation period, and may include whatever information the contractor deems relevant to support that rating. The report shall not exceed two (2) pages in length.

(h) Performance Evaluation: The PCO will make the decision on the overall performance rating for the work performed under the task order within thirty days after receipt of the evaluation report from the ToM. The decision will be based upon the ToM's recommendations, the contractor's comments, including any Self-Evaluation Report, and any other information deemed relevant by the PCO. The PCO shall resolve disagreements between the ToM's recommendations and the contractor's comments/report regarding the evaluation. The PCO will provide a copy of the evaluation report, including the overall rating, to the contractor within five working days after completion of the evaluation.

(i) Contractor's Review of the Evaluation Report: Contractors shall be given a minimum of 15 calendar days to submit comments, rebut statements, or provide additional information. The PCO shall consider the contractor's submission and respond as appropriate. Although the PCO will consider the contractor's comments, rebuttals, or additional information, the PCO may, or may not, change the overall rating. The decision to change the rating based on contractor input at this stage is solely at the discretion of the PCO.

(j) This performance evaluation does not replace any other requirement for evaluating contractor performance that may be required by the base contract, such as a Contractor Performance Assessment Reporting System (CPARS) report, or a Task Order Performance Evaluation (TOPE).

TABLE 2: TASK PERFORMANCE EVALUATION CRITERIA AND STANDARDS

Criterion	UNSATISFACTORY	SATISFACTORY	EXCELLENT
Task Performance	Work product fails to meet Acceptable Quality Levels (AQLs) defined in Performance Requirements Summary Table (see SOW or elsewhere in the Task Order).	Work product routinely meets Acceptable Quality Levels (AQLs) defined in Performance Requirements Summary Table (see SOW or elsewhere in the Task Order).	Work product frequently exceeds Acceptable Quality Levels (AQLs) defined in Performance Requirements Summary Table (see SOW or elsewhere in the Task Order).
Staffing	Contractor provides marginally qualified or unqualified personnel. Lapses in coverage occur regularly.	Contractor provides qualified personnel. Lapses in coverage may occasionally occur and are managed per individual task order policy.	Contractor provides highly qualified personnel. Contractor reassigns personnel to ensure proper coverage. Actual lapses in coverage occur very rarely, if ever, and are managed per individual task order policy. Contractor ensures staff training remains current.
Timeliness	Contractor frequently misses deadlines, schedules, or is	Contractor routinely meets deadlines, schedules, and	Contractor always meets deadlines, schedules, and

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 44 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

	slow to respond to government requests or is non-responsive to government requests.	responds quickly to government requests.	responds immediately to government requests.
Customer Satisfaction	Fails to meet customer expectations	Meets customer expectations.	Exceeds customer expectations.

TABLE 3: CONTRACT MANAGEMENT PERFORMANCE EVALUATION CRITERIA AND STANDARDS

CRITERION	UNSATISFACTORY	SATISFACTORY	EXCELLENT
Problem Resolution	Problems are unresolved, repetitive, or take excessive government effort to resolve.	Problems are resolved quickly with minimal government involvement.	Problems are non-existent or the contractor takes corrective action without government involvement.
Responsiveness	Contractor's management is unresponsive to government requests and concerns.	Contractor's management is responsive to government requests and concerns.	Contractor's management takes proactive approach in dealing with government representatives and anticipates Government concerns.
Communications	Contractor often fails to communicate with government in an effective and timely manner.	Contractor routinely communicates with government in an effective and timely manner.	Contractor takes a proactive approach such that communications are almost always clear, effective, and timely.

TABLE 4: COST EFFICIENCY PERFORMANCE EVALUATION CRITERIA AND STANDARDS

CRITERION	UNSATISFACTORY	SATISFACTORY	EXCELLENT
Cost Management	Contractor routinely fails to complete the effort within the originally agreed to estimated cost, i.e. cost overruns frequently occur.	Contractor routinely completes the effort within the originally agreed to estimated cost. Contractor provides measures for controlling all costs at estimated costs. Funds and resources are generally used in a cost-effective manner. No major resource management problems are apparent.	Reductions in direct costs to the Government below contract estimated costs are noteworthy. Contractor provides detailed cost analysis and recommendations to Government for resolution of problems identified. Funds and resources are optimally used to provide the maximum benefit for the funds and resources available. Documented savings are apparent.
Cost Reporting	Reports are generally late, inaccurate incomplete or unclear.	Reports are timely, accurate, complete and clearly written. Problems and/or trends are addressed, and an analysis is also submitted.	Reports are clear, accurate, and pro-active. Problems and/or trends are addressed thoroughly, and the contractor's recommendations and/or corrective plans are implemented and effective.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 45 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

In accordance with SECNAV M-5510.30 Chapters 5 and 6, all Contractor personnel that require access to Department of Navy (DON) information systems and/or work on-site are designated Non-Critical Sensitive/IT-II positions, which require an open investigation or favorable adjudicated National Agency Check (NACLC) by the Industrial Security Clearance Office (DISCO). Investigations should be completed using the SF- 85 Form and the SF-87 finger print card. An interim clearance can be granted by the company Security Officer and recorded in the Joint Personnel Adjudication System (JPAS). An open investigation or favorable adjudication is required prior to issuance of a Common Access Card (CAC) card or a badge providing access to NSWCCD sites and buildings. If an unfavorable adjudication is determined by DISCO all access will terminated.

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 46 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

SECTION I CONTRACT CLAUSES

52.217-9 Option to Extend the Term of the Contract (Mar 2000)

(a) The Government may extend the term of this contract by written notice to the Contractor before the end of the period of performance; provided that the Government gives the Contractor a preliminary written notice of its intent to extend at least 30 days before the contract expires. The preliminary notice does not commit the Government to an extension.

(b) If the Government exercises this option, the extended contract shall be considered to include this option clause.

(c) The total duration of this contract, including the exercise of any options under this clause, shall not exceed four years.

(End of Clause)

52.222-2 PAYMENT FOR OVERTIME PREMIUMS (JUL 1990)

(a) The use of overtime is authorized under this contract if the overtime premium cost does not exceed \$ **-0-** or the overtime premium is paid for work --

(End of Clause)

CAR-I18 TECHNICAL INSTRUCTIONS (DEC 2001)

(1) Directions to the Contractor

(a) Performance of the work hereunder may be subject to written technical instructions signed by the Task Order Manager. As used herein, technical instructions are defined to include the following:

(1) Directions to the Contractor that suggest pursuit of certain lines of inquiry, shift work emphasis, fill in details or otherwise serve to accomplish the statement of work.

(2) Guidelines to the Contractor that assist in the interpretation of drawings, specifications or technical portions of work description.

(b) Technical instructions must be within the general scope of work stated in the task order. Technical instructions may not be used to :

(1) assign additional work under the task order;

(2) direct a change as defined in the "Changes" clause of the base contract;

(3) increase or decrease the contract price or estimated amount (including fee), as applicable,

the level of effort, or the time required for task order performance; or

(4) change any of the terms, conditions or specifications of the task order.

(c) If, in the opinion of the Contractor, any technical instruction calls for effort outside the scope of the task order or

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 47 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

is inconsistent with this requirement, the Contractor shall notify the Contracting Officer in writing within ten (10) working days after the receipt of any such instruction. The Contractor shall not proceed with the work affected by the technical instruction unless and until the Contracting Officer notifies the Contractor that the technical instruction is within the scope of this task order.

(d) Nothing in the paragraph (c) of this clause shall be construed to excuse the Contractor from performing that portion of the task order statement of work which is not affected by the disputed technical instruction.

(End of Clause)

252.239-7000 PROTECTION AGAINST COMPROMISING EMANATIONS (JUN 2004)

(a) The Contractor shall provide or use only information technology, as specified by the Government, that has been accredited to meet the appropriate information assurance requirements of—

(1) The National Security Agency National TEMPEST Standards (NACSEM No. 5100 or NACSEM No. 5100A, Compromising Emanations Laboratory Test Standard, Electromagnetics (U)); or

(2) Other standards specified by this contract, including the date through which the required accreditation is current or valid for the contract.

(b) Upon request of the Contracting Officer, the Contractor shall provide documentation supporting the accreditation.

(c) The Government may, as part of its inspection and acceptance, conduct additional tests to ensure that information technology delivered under this contract satisfies the information assurance standards specified. The Government may conduct additional tests—

(1) At the installation site or contractor's facility; and

(2) Notwithstanding the existence of valid accreditations of information technology prior to the award of this contract.

(d) Unless otherwise provided in this contract under the Warranty of Supplies or Warranty of Systems and Equipment clause, the Contractor shall correct or replace accepted information technology found to be deficient within 1 year after proper installations.

(1) The correction or replacement shall be at no cost to the Government.

(2) Should a modification to the delivered information technology be made by the Contractor, the 1-year period applies to the modification upon its proper installation.

(3) This paragraph (d) applies regardless of f.o.b. point or the point of acceptance of the deficient information technology.

(End of clause)

252.239-7001 INFORMATION ASSURANCE CONTRACTOR TRAINING AND CERTIFICATION (JAN 2008)

(a) The Contractor shall ensure that personnel accessing information systems have the proper and current information assurance certification to perform information assurance functions in accordance with DoD 8570.01-M, Information Assurance Workforce Improvement Program. The Contractor shall meet the applicable information assurance certification requirements, including—

(1) DoD-approved information assurance workforce certifications appropriate for each category and level as listed in the current version of DoD 8570.01-M; and

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 48 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

(2) Appropriate operating system certification for information assurance technical positions as required by DoD 8570.01-M.

(b) Upon request by the Government, the Contractor shall provide documentation supporting the information assurance certification status of personnel performing information assurance functions.

(c) Contractor personnel who do not have proper and current certifications shall be denied access to DoD information systems for the purpose of performing information assurance functions.

(End of clause)

CONTRACT NO. N00178-04-D-4014	DELIVERY ORDER NO. FD01	AMENDMENT/MODIFICATION NO. 05	PAGE 49 of 49	FINAL
----------------------------------	----------------------------	----------------------------------	------------------	-------

SECTION J LIST OF ATTACHMENTS

DD254

Performance Evaluation Criteria