ATTACHMENT 8
SAMPLE TASK

Each offeror is required to complete and submit at least one technical and cost proposal against a Sample Task for evaluation. The technical proposal shall be included as Volume V; the cost proposal shall be included as part of Volume IV. The purpose of the Sample Task is for the offeror to demonstrate its ability to provide soundness of approach, credibility, realism, and logic to proposed tasking, and its understanding of the Government's requirements. The Sample Task will also be used by the Government to assess the offeror's methodology for proposing costs by evaluating the reasonableness, realism, and completeness of the proposed costs for performance of the Sample Task. The Sample Task will not constitute a part of the offer, and the information communicated as part of the order will not become a part of any resultant contract; however, the response to the Sample Task will be a material part of the evaluation by the Government.

The following Sample Statements of Work (one for each task area in the performance work statement) are provided to allow the offeror to prepare and submit a technical and cost proposal for assessment ONLY:

SAMPLE TASK STATEMENT OF WORK (SOW), TASK 3.1

TASK OVERVIEW
The contractor shall conduct research focused on the development of new batteries and electrochemical capacitors with enhanced energy and power densities. This effort should focus on the design and fabrication of 3D multifunctional architectures from appropriate nanoscale building blocks, including the strategic use of void space and designs that use deliberate disorder to enhance production or storage energy. The end result of this program will be a new battery architecture in which nanometric feature sizes are integrated via interpenetrating transport pathways such that electrical and molecular communication are wired throughout an ultraporous form that can be readily scaled to macroscale sizes.

BACKGROUND
NRL conducts basic and applied research that centers on the design, synthesis, characterization, and validation of nanostructured materials for various applications, including electrochemical energy generation, storage, and conversion (batteries, capacitors, fuel cells). This work involves electroanalytical methods (e.g., voltammetry, potentiometry, amperometry, impedance); solgel synthesis; scanning electron microscopy; ultraviolet–visible spectroscopy; nitrogen-sorption porosimetry; chemisorption; thermal analysis; electroless and electrochemical deposition; and carbonization of polymeric solids to synthesize/fabricate materials of interest. Electrochemical methods are used to assess activity, energetics, and stability for charge-storage and electrocatalytic turnover. Specific projects include the development and testing of 3D batteries, electrochemical capacitors, and metal–air batteries using in-house-synthesized and commercial materials.

TASK ORDER DELIVERABLES
The contractor shall prepare and submit the following reports, in accordance with the DD 1423, Contract Data Requirements List:

1. Monthly Progress and Funds Status Report
2. Studies Final Report
3. Contract Summary Technical Report
4. Oral briefings and other interim progress reports as required

PERIOD OF PERMANCE
Performance shall be from date of award through twelve (12) months.

SAMPLE TASK STATEMENT OF WORK (SOW), TASK 3.2

TASK OVERVIEW

The contractor shall conduct research to develop analytical methods to characterize vapors from traditional and nontraditional (i.e., homemade) explosives. The explosives to be characterized are pentaerythritol tetranitrate (PETN) and triacetone triperoxide, peroxyacetone (TATP). This effort should focus on identifying the molecular species in the vapor as a function of time under ambient conditions. The method should not alter the natural composition of the vapor. The end result of this program will be the development of a vapor generator capable of delivering these vapors to NRL's explosives test bed.

BACKGROUND

NRL is working with the Department of Homeland Security (DHS) to improve explosives detection systems to protect personnel and platforms from attack from insurgents and terrorists both at home and abroad. Research is underway for the development of new materials and sensors for explosives vapor detection. However, uniform, reliable methods for evaluating new detection systems are limited, making assessments of the new products difficult. Drawing from much experience in hazardous chemical vapor generation and detection, NRL has developed a comprehensive test bed for trace explosives vapor generation and assessment of sensor technology.

To support this and other research, NRL employs a variety of characterization tools including gas chromatography (GC); high-performance liquid chromatography (HPLC); gas chromatography/mass spectrometry (GC/MS); two-dimensional gas chromatography/mass spectrometry (GCxGC/MS); liquid chromatography/mass spectrometry/mass spectrometry (LC/MS/MS); polymerase chain reaction (PCR); reverse transcription-polymerase chain reaction (RT-PCR); enzyme-linked immuno-sorbent assay (ELISA); calorimetry; electroanalytical methods (e.g., voltammetry, potentiometer, amperometry, impedance); X-ray photoelectron spectroscopy; Auger electron spectroscopy; secondary ion mass spectrometry; various optical and electron microscopes; ultraviolet–visible spectroscopy; nitrogen-sorption porosimetry; chemisorption and thermal analysis; scanning probe microscopy; micro/nanofabrication and lithography equipment; micro/nanofluidics systems; mechanical test equipment; etching and deposition equipment; and other equipment as required for surface analysis, materials growth and characterization, and micro/nanofabrication.

TASK ORDER DELIVERABLES

The contractor shall prepare and submit the following reports, in accordance with the DD 1423, Contract Data Requirements List:

1. Monthly Progress and Funds Status Report
2. Studies Final Report
3. Contract Summary Technical Report
4. Oral briefings and other interim progress reports as required

PERIOD OF PERMANCE

Performance shall be from date of award through twelve (12) months.

SAMPLE TASK STATEMENT OF WORK (SOW), TASK 3.3

TASK OVERVIEW

The contractor shall conduct research to support the testing of naval fuels. This effort shall focus on determining the oxygen content of fuels in order to understand the degradation of stored or thermally stressed fuel and to determine the suitability of a fuel for a particular application. The contractor shall develop a method to monitor the oxygen content in thermally stressed fuels as a function of time and determine the impact of antioxidants as naturally occurring components or additives.

BACKGROUND

As a member of the Navy Fuels and Lubricants Cross Functional Team (NF&LCFT), NRL researchers conduct basic and applied research and provide science and technology support for a wide range of Navy fleet fuel issues. This includes basic and applied research in the reaction mechanisms of fuels; metal catalyzed autoxidation mechanisms; defining fit-for-purpose criteria for synthetic fuels; combustion characterization and model development; fuel identification and shipboard quality surveillance; fuel storage and thermal stability assessment; high-energy fuel additives; fuel microbiological contamination; additive detection; biofuel characterization; synthetic fuel feed stocks from the sea; sensors and modeling technologies; lubricity of alternative fuels and blends with petroleum fuels; long-term materials compatibility/durability; applicability of current test specifications for synthetic fuels and blends; impact of metal contamination (e.g., copper, synthesis catalyst carryover); new additive technologies for alternative fuels; design and evaluation of chemical systems for hydrogenation of carbon dioxide (CO_2) to hydrocarbons; thermochemical processes to produce hydrogen using different solvent media; design, test, and evaluate technologies to extract carbon dioxide from seawater; formulation of novel chemometric algorithms to enable sensing technologies to perform automated fuel quality diagnostics and prognostics; and development of novel analytical methods for alternative fuel certification. NRL is actively pursuing research that will lead to the development of new and basic understanding of chemical reactions and data analysis methods as applied to fuel properties and stability. Research thrusts encompass chemical sensing, mobility fuel utilization, and synthesis. Projects include hazardous chemical detection; intelligent data fusion; alternative fuel certification, utilization analytics and synthesis; and chemometrics applied to sensor systems, and trace analytical methods.

TASK ORDER DELIVERABLES

The contractor shall prepare and submit the following reports, in accordance with the DD 1423, Contract Data Requirements List:

1. Monthly Progress and Funds Status Report
2. Studies Final Report
3. Contract Summary Technical Report
4. Oral briefings and other interim progress reports as required

PERIOD OF PERMANCE

Performance shall be from date of award through twelve (12) months.

SAMPLE TASK STATEMENT OF WORK (SOW), TASK 3.4

TASK OVERVIEW

The contractor shall conduct research focused on the fusion of disparate data sources towards the development of a multisensory, fused-data system for explosives detection. This effort should focus on the role data fusion plays in enhancing chemical selectivity in chemical detection technologies. The end result of this program will be an algorithmic capability to accurately model performance of theoretical fused data systems, incorporating information about data quality and specific sensing contexts with the inherent information contained within a given detection method. The goal will be to give the end user a systematic knowledge of the tradeoffs inherent between analytical performance and instrument choice for a given chemical sensing task, and thus direct formulation of new fused data systems.

BACKGROUND

NRL is actively pursuing research to provide future ships with advanced systems for fire safety through autonomy including improved situational awareness, novel sensors, and robotics to enable a revolutionary approach to shipboard recoverability action. This objective relies on the application of artificial intelligence techniques to data interpretation problems associated with hazardous material detection and improved situational awareness. A key focus of this research is the analysis of sensor array data using multivariate mathematical and statistical methods, such as pattern recognition algorithms, neural networks, and machine vision. Novel data fusion methods are being used to convert data into information that can be more effectively used for the detection of trace chemicals, such as explosives, the characterization of complex mixtures (such as fuels), and the acquisition of situational awareness (such as recognition of shipboard damage control events). For example, NRL's Volume Sensor is a real-time, multi-sensory detection system that provides early warning detection of flames, smoke, thermally hot objects, pipe ruptures, and gas leaks through improved shipboard situational awareness.

TASK ORDER DELIVERABLES

The contractor shall prepare and submit the following reports, in accordance with the DD 1423, Contract Data Requirements List:

1. Monthly Progress and Funds Status Report
2. Studies Final Report
3. Contract Summary Technical Report
4. Oral briefings and other interim progress reports as required

PERIOD OF PERMANCE

Performance shall be from date of award through twelve (12) months.