Naval Open Architecture

Contract Guidebook For Program Managers

Version 2.0

30 June 2010

Greater Value, Innovative Solutions For the Warfighter

Prepared by: Naval Open Architecture Enterprise Team

Distribution Statement A: Approved for Public Release; distribution is unlimited

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
30 JUN 2010		**00-00-2010 to 00-00-2010**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Naval Open Architecture Contract Guidebook For Program Managers	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Department of Navy,Program Executive Office, Integrated Warfare Systems,1333 Isaac Hull Ave. SE,Washington,DC,20376**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**94**	

DEPARTMENT OF THE NAVY
PROGRAM EXECUTIVE OFFICE
INTEGRATED WARFARE SYSTEMS
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WASHINGTON NAVY YARD DC 20376-2301

IN REPLY REFER TO
9010
Ser IWS/233
JUN 30 2010

From: Program Executive Officer, Integrated Warfare Systems

Subj: EMPLOYMENT OF OPEN ARCHITECTURE CONTRACT GUIDEBOOK

Ref: (a) OA Contract Guidebook, Ver 2.0, April 2010

Encl: (1) Improvements in version 2.0
(2) Acknowledgments OA Contract Guidebook Use

1. Purpose. To update direction to PEO IWS Program Managers (PMs) and Contracting Officers on the use of reference (a).

2. Information.

a. In April 2010, Version 2.0 of the Open Architecture (OA) Contract Guidebook was signed. The Government-only version of this guide contains information and recommended contract language to assist PMs and Contracting Officers in drafting requests and contracts that ensure the products delivered meet the Navy's standards for OA development.

b. A 'Statement A" version of the OA Contract Guidebook is accessible at the OA website (https://acc.dau.mil/NOAGuidebook) to allow potential solicitations insight into the Navy's OA principles and goals, without the sensitive portions contained in the government-only version.

c. The language in this guidebook has been used successfully in several PEO IWS contracts including Undersea Systems, SEWIP Block 2, and Platform Systems Engineering Agent (PSEA) as well as in many contracts throughout the Naval Enterprise.

3. Action.

a. All PEO IWS PMs and Contracting Officers are directed to become familiar with reference (a) and employ its principles in all future contractual program development. This includes, but is not limited to, using its recommended contract language in requests for information, requests for proposal, and all contracts. The Milestone Decision Authority (MDA) will use the PEO and PM questions contained in Appendices 2 and 3 of the Guidebook to determine OA-compliance at major milestones.

b. The OA Contract Guidebook is for guidance only and PMs and Contracting Officers have the authority to tailor this language as necessary to meet their programs' situations.

4. My point of contact for this policy is Mr. Nickolas Guertin, PEO IWS 7B.

CHRIS DEEGAN
Acting

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INTRODUCTION

Purpose: The *Naval Open Architecture Contract Guidebook for Program Managers* is to be used by Program Managers (PMs) who are incorporating Naval Open Architecture (NOA) principles (*see* NOA Requirements Letter, available on the NOA website at https://acc.dau.mil/oa) into National Security System (NSS) acquisition programs as defined by 40 U.S.C § 11101 et seq. These same principles, described later in this document, can be tailored to apply to the acquisition of any system or service, including those not considered to be "information intensive."

This *Guidebook* contains recommendations and is offered with the understanding that individual Program Executive Offices (PEOs) and programs must have the flexibility to adapt its principles and guidance to meet their needs. This document is intended to augment, rather than replace, existing contractual source materials such as the Federal Acquisition Regulations (FAR) and the Defense Federal Acquisition Regulation Supplement (DFARS).

There are a variety of tools, devices and resources available to the PM when planning for and conducting the acquisition of a NSS or other system using NOA guidelines such as those contained in this *Guidebook*. The proper use of these resources is an important element of the acquisition process and will reduce the overall risk to the Navy and Marine Corps by ensuring that all necessary NOA aspects of the procurement are covered. In addition to the contract, Request for Proposal (RFP), and Statement of Work (SOW) elements that are discussed in this *Guidebook*, the System Specification and other system architecture and design materials are important. Because the System Specification defines the attributes of the overall system to be developed, it must describe how the technical system characteristics will contribute to its openness (such as its modularity and how open standards will be incorporated). The System Specification should also address those areas where future growth is expected, where reuse is envisioned, etc. Proper balance and coordination among these elements is important to both the technical design and the overall lifecycle support of the system. Additional information on these topics is included in the appendices of this document.

Organization: This document is divided into five chapters containing suggested language for RFP Sections C, H, L and M, and Award Fee Plans. This material can be tailored for use in the specific phase of an acquisition program. It can also be tailored for use in Contract Modifications. Appendix 1 contains suggested NOA-related Data Item Descriptions (DIDs) for use in preparing the Contract Data Requirements List (CDRL) and for identifying other contractual deliverables. Appendices 2 and 3 are checklists to assist the Program Manager to better understand the business and technical aspects of NOA. Appendices 4 and 5 address Data Markings and Open Source Software (OSS). Appendix 6 contains a Glossary of Terms.

Providing Comments and Feedback: Development and maintenance of this *Guidebook* is an interactive process involving the "build-test-build" method, each on a roughly

biennial release. These releases will incorporate community inputs and address topics that emerge from the Naval Enterprise's experience from implementing NOA. Therefore, PEO Integrated Warfare Systems (IWS) 7 is very interested in comments, suggestions, and feedback. We are also very interested in any "real world" experiences you may have in using NOA principles in programs. Comments can be submitted via email, with "Comments on NOA Contract Guidebook" in the subject line, to NavalOA@navy.mil.

Background: Naval Open Architecture (NOA) is the confluence of business and technical practices yielding modular, interoperable systems that adhere to open standards with published interfaces. This approach significantly increases opportunities for innovation and competition, enables reuse of components, facilitates rapid technology insertion, and reduces maintenance constraints. NOA delivers increased warfighting capabilities in a shorter time at reduced cost. The U.S. Government's ("Government") ability to acquire at least Government Purpose Rights (GPR) in technical data and computer software and to obtain rights in other intellectual property is critical to this effort.

The Navy and Marine Corps have adopted OA as a way to reduce the rising cost of Naval warfare systems and platforms while continuing to increase capability delivery on shortened demand timelines.

NOA is the Naval implementation of the Office of the Secretary of Defense's Open Systems Joint Task Force's (OSJTF) Modular Open System Approach (MOSA) that was first introduced in 2004. While MOSA and NOA each have five principles, there is a synergy between them. Each Naval Domain may choose to implement them in a different manner.

NOA allows for incorporating more commercial-off-the-shelf (COTS) technology in warfare systems and enabling reuse of software and related assets. In addition, NOA is an enabler of FORCEnet, the operational construct and architectural framework for Naval Warfare in the information age (see http://www.forcenet.navy.mil). More importantly, OA increases competition among system developers through the use of open standards and standard, published interfaces. It also facilitates greater collaboration within and across Naval Domains. Individual Domains (Air, Submarines, Surface, C4I, Space and Marine Corps) and PEOs may opt to pursue common architectures or capabilities across platforms; the NOA principles highlighted in these materials would apply to these common architectures.

On October 16, 2009, acting Assistant Secretary of Defense (Networks & Information Integration) / DoD Chief Information Officer (CIO) David M. Wennergren promulgated a memorandum clarifying guidance on Open Source Software (OSS). The memo stated that in "almost all cases, OSS meets the definition of 'commercial computer software' " and, therefore, should be given similar consideration as more traditional commercial

computer software when a program is looking to acquire such software. [1] This will allow the Department of Navy (DON) to utilize OSS throughout the enterprise when acquiring capabilities to meet DON business and warfighter requirements. As with any COTS solution, the use of OSS must adhere to all Federal, DoD, and DON policies and be based on open standards to support the DoD's goals of net-centricity and interoperability. In addition, DON commands must work with their intellectual property counsel to ensure compliance with OSS license agreements.

This contract language guidance is designed to assist PEOs, Program Managers, legal, and contracting officials in addressing the technical and business aspects of OA in the solicitation and award of Navy and Marine Corps contracts. The language represents a long-term view and incorporates many of the principles of open systems mandated by the Department of Defense (DoD) Open Systems Joint Task Force (OSJTF) and the Office of the Secretary of Defense (OSD)/Networks & Information Integration (NII).

Discussion: This *Guidebook* contains recommended language for Section C and associated Contract Data Requirements Lists (CDRLs) of contracts and Sections L and M of solicitations issued by the Navy or Marine Corps for NSS or larger "systems of systems" that integrate NSS with platforms such as aircraft, submarines, land vehicles, satellites or ships. There are also recommendations for language that can be incorporated in Section H of solicitations, including those that are directed at existing programs. The term "NSS" refers to any telecommunications or information system operated by the Government, the function, operation, or use of which (1) involves intelligence activities; (2) involves cryptologic activities related to national security; (3) involves command and control of military forces; (4) involves equipment that is an integral part of a weapon or weapons system; or (5) is critical to the direct fulfillment of military or intelligence missions, but excluding any system that is to be used for administrative and business application purposes (including payroll, finance, logistics, and personnel management applications).[2]

Sections L and M are pre-award documents not incorporated into the actual contract but are key to ensuring contractor understanding of and compliance with OA principles. Execution of an effective NOA strategy including strategic asset reuse must be considered from both a Pre-Award and Post-Award perspective. The language contained in this document should be tailored to reflect the program's phase and the goals of the intended procurement action.

Program Managers are advised to use this recommended language and other appropriate technical documents after determining the specific acquisition relevance to the requirement. Prior to tailoring this language to the specific needs of the acquisition program, Program Managers should have a clear understanding of NOA principles. Acquisition Programs should have a strategy and supporting plan that addresses an appropriate (business and technical) OA end state and acts as a framework for structuring

[1] DoD Memorandum Clarifying Guidance Regarding Open Source Software (OSS), October 16, 2009.
[2] 40 U.S.C. §11103.

contract language that is consistent with DoD guidance for interoperability, such as that included in PEO C4I's Net-Centric Enterprise Solutions for Interoperability (NESI) V3.1.0 (available at http://nesipublic.spawar.navy.mil/). The Open Architecture Assessment Tool (OAAT)[3] (developed by the Naval Open Architecture Enterprise Team), which incorporates the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) Open Systems Joint Task Force's (OSJTF's) MOSA PART[4] tool, should be used to formulate an OA strategy. Additionally, the Naval Air Systems Command (NAVAIR) Key Open Sub Systems (KOSS) tool can be used to identify the components of a modular architecture that are going to be evolving the most over time and, therefore, should receive extra OA emphasis.[5] Appendices 2 and 3 consist of two checklists that will also be helpful in preparing acquisition materials.

The goal of maximizing program flexibility to enable competition and programmatic course changes must be balanced against providing the contractor enough incentive to agree to the contract. Short duration tasks and small deliverable quantities provide the Program Manager with the flexibility to shift to other providers to obtain better performance, introduce different products and technologies, or when otherwise deemed in the best interest of the Government. Such mechanisms are not a substitute for effective project and contract management practices by the Program, but can provide additional leverage to support these practices.

Intellectual Property Rights (IPR) and Data Rights: Program Managers are strongly encouraged to assess the IPR and data rights requirements of their program and/or community of interest.[6] Navy and Marine Corps Program Managers responsible for ACAT I and II programs are further advised to immediately take steps to incorporate the requirements of DoD Instruction 5000.02 dated December 2, 2008 and Under Secretary of Defense (Acquisition, Technology and Logistics) Memorandum on Data Management and Technical Data Rights dated July 19, 2007 as directed by the Assistant Secretary of the Navy (Research, Development and Acquisition).[7] This analysis will help Program Managers develop Acquisition Strategies that anticipate potential reuse in other programs and thus guide decisions related to IPR and data rights. These decisions include: (1) whether these rights will be procured, (2) whether it will be considered as part of the technical evaluation, and/or (3) a combination of both. The alternative selected by the Program Manager will drive different solutions in the construct of Sections C, L and M.

[3] The OAAT can be found in the "Tools" section of the Naval OA website at https://acc.dau.mil/oa.
[4] Modular Open System Approach Program Assessment Review Tool.
[5] The KOSS tool can be found in the "Tools" section of the Naval OA website at https://acc.dau.mil/oa.
[6] A "community of interest" or COI is a group of organizations or entities having similar interests and goals. For example, Navy COIs can be along warfare requirements (anti-air warfare or littoral defense), families of system or components (radars or displays), or functions (acquisition or test and evaluation).
[7] Assistant Secretary of the Navy (Research, Development and Acquisition) Memorandum on Data Management and Technical Data Rights dated September 11, 2007.

The attached Section L and M language provides general guidance on data rights while specifics must be tailored to specific programs.

Program Managers (in coordination with their PEOs and Resource Sponsor) should develop a post-award strategy to ensure they are exercising their IPR as defined by the Federal Acquisition Regulations (FAR) and Defense Federal Acquisition Regulation Supplement (DFARS). Historically, the Navy and Marine Corps have not effectively exercised or enforced the intellectual property rights (IPR) procured by the Government or identified by contractors in their proposals by not including effective Contract Data Requirements Lists (CDRLs) and Data Item Descriptions (DIDs) in contracts. The Statement of Work (SOW) establishes the product/system development expectations; the CDRL orders the delivery of the data according to the SOW, and the DID describes the format and content of the data ordered by the CDRL as articulated in the FAR and DFARS. It is incumbent upon the Government, in general, and the Program Manager and Contracting Officer's Representative (COR) specifically, to review each deliverable and report unjustified/nonconforming or other inappropriate markings on delivered data to the Contracting Officer in order to ensure the PEO is able to take full advantage of the Government's rights. The Contracting Officer, with the assistance of counsel, is responsible for enforcement of the DFARS provisions.

An overarching concern is reconciling 10 U.S.C. § 2320 section (a)(2)(F) "Rights in Technical Data" requirements with the proposed evaluation factors. Although the Government cannot condition award or responsiveness on relinquishing rights, under 10 U.S.C. § 2320(a)(2)(G)(i) and (iii), the Government can negotiate for additional rights or, if necessary, the development of alternative sources of supply and manufacture. Also, under DFARS 227.7103-2(b)(2) "Acquisition of Technical Data" and DFARS 227.7203-2(b)(2) "Acquisition of Noncommercial Computer Software and Computer Software Documentation" the Government can and must balance the original assessment of the Government's data needs with data prices contained in the offer. Furthermore, 10 U.S.C. § 2305(d)(4)(B) "Contracts: Planning, Solicitation, Evaluation, and Award Procedures" states: "[i]n considering offers in response to a solicitation requiring proposals described in paragraph (1)(B) or (2)(B), the head of an agency shall base any evaluation of items developed exclusively at private expense on an analysis of the total value, in terms of innovative design, life-cycle costs, and other pertinent factors, of incorporating such items in the system." Such factors may include the IPR specified in an offer.

As part of a best value analysis, the Government may consider an Offeror's willingness to provide the Government with the equivalent of GPR. The evaluation criteria must make clear that the Government will be evaluating the costs associated with an Offeror's restrictions on data and software-related assets that would be delivered under the contract. The Government will assess the impact on costs of the delivery of: 1) limited rights (LR) data, 2) restricted rights (RR) software, 3) standard licenses in Commercial computer software (CS)[8], or 4) items covered under DFARS 252.227-7015, "Technical Data – Commercial Items." For example, the Government will examine the impact of LR

[8] "Firmware" is considered to be a category of "Computer Software" as defined in the DFARS.

in data on system life cycle costs (when making cost assessment keep in mind alternatives like use of form, fit, function, etc., as assessment must be "reasonable"). To avoid an unstated evaluation criteria problem, the criteria must at least specify the relative importance of costs associated with needs set forth in the "Data Rights and Patent Rights" portion of the solicitation, e.g., life cycle costs for system. Finally, the data rights and associated markings of intellectual property – including releasability statements – will impact the Government's ability to deposit intellectual property (IP) in asset repositories/libraries and be able to use these assets in other systems.

Award Incentives: Contract type is determined based on risk of on-time completion of the work to be performed. For firm fixed-price contracts (regardless of dollar value), program managers must receive Milestone Decision Authority (MDA) approval, which must be based on a business case analysis.

Incentivizing technical excellence in the program is an important aspect of the program acquisition strategy and is usually applied with award fees or award terms. The same approach should be used in encouraging appropriate NOA business and technical practices. Award Fee earnings are briefed to the highest levels within corporate management and thus have the added benefit of reinforcing the importance of the Government's emphasis on technical leadership, planning and execution with this group of senior leaders. Award fee criteria that support NOA principles are an important mechanism for encouraging appropriate behavior.

The incentive arrangement should be designed to motivate contractor performance that might not otherwise be emphasized – such as adoption and adherence to NOA business and technical principles. Award incentives may be applied when it is not possible to establish a predetermined target to measure desired performance and are earned by a contractor through an evaluation process described in the Award Fee Plan. The application of award fee incentives are generally associated with cost contracts and performance is evaluated periodically in accordance with the Award Fee Plan. This incentive approach allows the Government to motivate exceptional contractor performance considering the conditions under which it was achieved, normally in such areas as adherence to NOA technical tenets, business practices, and cooperative behavior with other vendors as well as the more usual quality, timeliness, technical progress, technical ingenuity, and cost-effective management requirements. The award fee or term criteria must be based on the requirements described in the contract. The most effective criteria are objective in nature. When possible, criteria should be expressed in quantifiable terms. Some NOA technical criteria are inherently mixed with and supportive of NOA business criteria.

The "DoD Guide for Integrating Systems Engineering into DoD Acquisition Contracts Version 1.0" promulgated by the Office of the Under Secretary of Defense (OUSD) for Acquisition, Technology and Logistics (AT&L) includes recommendations for including language regarding interface design, consideration of Modularity and Open Systems

Standards as part of Evaluation Criteria and proposal content for System Performance Specifications that could be considered when developing technical award fee criteria.[9]

[9] "DoD Guide for Integrating Systems Engineering into DoD Acquisition Contracts Version 1.0," dated December 11, 2006, page 20, Tables 3-4 and 3-5. This document is located at: https://acc.dau.mil/CommunityBrowser.aspx?id=127987.

Chapter A: RECOMMENDATIONS FOR SECTION C (STATEMENT OF WORK) LANGUAGE

Section C of the Request for Proposal (RFP) and the resulting contract contains the detailed description of the products to be delivered or the work to be performed under the contract. Section C typically includes a Statement of Objectives/Statement of Work (SOO/SOW) for the RFP/contract. The SOO is a clear and concise statement that delineates the program objectives and the overall program approach, including the outcome desired. The SOO, along with the preliminary system performance specification (covering the technical performance requirements), provides Offerors guidance for proposing a solution to meet the user's needs. An additional helpful reference is the Department of Defense Handbook for Preparation of Statement of Work (SOW).[10]

Although the Guidebook was developed for mixed systems comprised of hardware, middleware and software elements, the recommended language can be easily tailored to reflect hardware- or software-only acquisitions.

The following contains recommended language for the SOW included in Section C of the RFP/contract.

1. Open Systems Approach and Goals

The Government intends to procure system(s) having an Open System Architecture and corresponding components. As part of this contract, the contractor shall define, document, and follow an open systems approach for using modular design, standards-based interfaces, and widely-supported consensus-based standards. The contractor shall develop, maintain, and use an open system management plan to support this approach and will be required to demonstrate compliance with that plan during all design reviews. As part of an open system management plan, the contractor will be required to identify to the Government all Commercial-Off-the-Shelf/Non-development Item (COTS/NDI) components[11], their functionality and proposed use in the system, and provide copies of license agreements related to the use of these components for Government approval prior to use. The proposed open system management plan will be incorporated into the contract with any changes, alterations, and/or modifications requiring Government approval.

[10] The DoD Handbook for Preparation of Statement of Work (SOW) is available on the web at https://www.acqsolinc.com/mockups/7steps/library/DODhandbook.pdf.

[11] The appropriate definition should be included in Section C. In this case, we define "component" consistent with the Institute of Electrical and Electronics Engineers (IEEE) definition from IEEE Std 610.12-1990, "one of the parts that make up a system. A component may be hardware or software and may be subdivided into other components."

In addition, the contractor shall provide the Government (and/or Government support contractors) electronic access to its integrated development environment throughout the term of the contract.

Program Managers should consider including a requirement to have real-time access to the Offeror's (or an associated sub-contractor's) software development environment, providing the government with continuous on-line access to work products under development commencing at the start of work. See section titled "Data Management and Integrated Development Environment (IDE)" below. Collaborative tools to support this access must be adopted, tailored, and applied by the program in a manner consistent with its specific requirements and circumstances.

In satisfying the Government's requirements, the following system architecture approach characteristics shall be utilized:

a. Open Architecture – The contractor shall develop and maintain an architecture that incorporates appropriate considerations for reconfigurability, portability, maintainability, technology insertion, vendor independence, reusability, scalability, interoperability, upgradeability, and long-term supportability as required by the 23 DEC 2005 Office of the Chief of Naval Operations (OPNAV N6/7) requirements letter. (This letter is available at https://acc.dau.mil/oa.)
   i. Ensure that external information exchange requirements are implemented in a standard and open manner as part of this effort. These actions shall include planning that identifies the contractor's specific approach to ensuring system and interface data is well-defined, available to all programs, and uses a standards-based tool for definition within the context of the Navy and Marine Corps upgrade programs. The contractor shall develop system upgrades that ensure that 1) data will be posted to shared spaces for users to access except when limited by security, policy, or regulations; 2) data shall provide for interoperability with many-to-many exchanges of data, and verified trust and integrity of users and applications; and 3) data shall be transmitted through well and openly defined interfaces.
   ii. The contractor shall ensure that their projects, at the architectural and operational level, continue to promote the use of an open architecture as well as adoption of Net Centric Enterprise Services (NCES) concepts. The contractor shall assist in the continuing pursuit of Net-Centric/FORCEnet compliance. Contractor plans must comply with the appropriate and applicable standards. The contractor shall ensure that the program is capable of interacting with the Joint Environment and DoD Global Information Grid when developing applications that share data via external communications.

b. Modular, Open Design – The contractor shall develop an architecture that is layered and modular and uses standards-based COTS/NDI hardware, operating systems, and middleware that all utilize either non-proprietary or non-vendor-unique key Application Programming Interfaces (APIs). The contractor's design approach shall be applied to all subsystems and components. As part of its open

system management plan, the contractor will be required, at a minimum, to describe how the proposed system architecture meets these goals, including the steps taken to use non-proprietary or non-vendor unique COTS or reusable NDI components wherever practicable.

- Module Coupling – The contractor's design approach shall result in modules that have minimal dependencies on other modules (loose coupling), as evidenced by simple, well-defined interfaces and by the absence of implicit data sharing. The purpose is to ensure that any changes to one module will not necessitate extensive changes to other modules, and hence facilitate module replacement and system enhancement. The approach used to determine the level of coupling and the design trade-off approach shall be described.
- Module Cohesion – The contractor's design shall result in modules that are characterized by the singular assignment of identifiable and discrete functionality (high cohesion). The purpose is to ensure that any changes to system behavioral requirements can be accomplished by changing a minimum number of modules within the system. The approach used to determine the level of cohesion and the design trade-off approach shall be described.

c. System Requirements Accountability – The contractor will be required to ensure that all system requirements (including those contained in the Initial Capabilities Document, Capabilities Development Document, Capabilities Production Document, and in this Section C) are accounted for through a demonstrated ability to trace each requirement to one or more modules that consist of components that are self-contained elements with well-defined, open and published interfaces implemented using open standards.

d. Inter-component Dependencies – The contractor's design approach shall result in a layered system design, maximizing software independence from the hardware, thereby facilitating technology refresh. The design shall be optimized at the lowest component level to minimize inter-component dependencies. The layered design shall also isolate the application software layers from the infrastructure software (such as the operating system) to enhance portability and to facilitate technology refresh. The design shall be able to survive a change to the computing infrastructure with minimal or no changes required to the application logic. The interfaces between the layers shall be built to open standards or available to the Government with at least Government Purpose Rights. The system architecture shall minimize inter-component dependencies to allow components to be decoupled and re-used, where appropriate, across various Naval programs and platforms.

e. Modular Open Systems Approach (MOSA) – The contractor shall describe its rationale for the modularization choices made to generate the design. The contractor's design approach shall produce a system that consists of hierarchical collections of software and hardware configuration items (components). These

components shall be of a size that supports competitive acquisition as well as reuse. The contractor's design approach shall emphasize the selection of components that are available commercially or within the DoD, to avoid the need to redevelop products that already exist and that can be re-used. The contractor's rationale must explicitly address any tradeoffs performed, particularly those that compromise the modular and open nature of the system.

f. MOSA Objectives – The contractor shall specify how it plans to use MOSA to enable the system to adapt to evolving requirements and threats; accelerate transition from science and technology into technology and deployment; facilitate systems reconfiguration and integration; reduce the development cycle time and total life cycle cost; maintain continued access to cutting edge technologies and products from multiple suppliers; and mitigate the risks associated with: (1) technology obsolescence, (2) being locked into proprietary or vendor-unique technology, and (3) reliance on a single source of supply over the life of the system.

g. MOSA Support Plan – The contractor shall provide a plan for supporting the proposed Modular Open System Approach, including, but not limited to, plans for integrating the systems under development both internally and externally, a strategy for maintaining the currency of the technology (through COTS and other reusable NDI insertions, technology refresh strategies, and other appropriate means) and creation of different processes necessary to support MOSA (more information on MOSA is available from the Open Systems Joint Taskforce (OSJTF) at http://www.acq.osd.mil/osjtf/index.html).

h. Design Information Documentation – The contractor shall document and model the system or component (e.g., software, hardware, middleware) design information using industry standard formats, (e.g., Unified Modeling Language). It shall also document and model how it will use tools that are capable of exporting model information in a standard format (e.g., Extensible Markup Language Metadata Interchange (XMI) and AP233/ISO 10303). The contractor shall identify the proposed standards and formats to be used. The contractor shall maintain the design information, including any models used, so that it is current with the as-built system.

i. Technology Insertion – The contractor's architectural approach shall support the rapid and affordable insertion and refreshment of technology through modular design, the use of open standards and open interfaces. The contractor shall define the functional partitioning and the physical modularity of the system to facilitate future replacement of specific subsystems and components without impacting other parts of the system and to encourage third-party vendor's participation.

j. Life-Cycle Sustainability – The contractor shall consider use of COTS/NDI and open standards to enhance the system's life-cycle sustainability by implementing

performance-based logistics (PBL) arrangements to sustain the components through their life cycle.

k. Interface Design and Management – The contractor shall:
   i. Clearly define and describe all component and system interfaces;
   ii. Define and document all subsystem and configuration item (CI) level interfaces to provide full functional, logical, and physical specifications;
   iii. Identify processes for specifying the lowest level (i.e. subsystem or component) at and below which it intends to control and define interfaces by proprietary or vendor-unique standards and the impact of that upon its proposed logistics approach. Interfaces described shall include, but not be limited to, mechanical, electrical (power and signal wiring), software, firmware, and hardware interfaces;
   iv. Identify the interface and data exchange standards between the component, module or system and the interconnectivity or underlying information exchange medium;
   v. Consider using these interfaces to support an overall information assurance strategy that implements Information Assurance (IA) Processes in accordance with DoD Instruction 8500.2 (dated February 6, 2003) and [*Insert any PEO-specified documents*];
   vi. If applicable, select external interfaces from existing open or Government standards with an emphasis on enterprise-level interoperability. The contractor shall describe how its selection of interfaces will maximize the ability of the system to easily accommodate technology insertion (both hardware and software) and facilitate the insertion of alternative or reusable modular system elements;
   vii. Describe the extent that the change or configuration management process proposed will use "community of interest" teams in an integrated team approach to effectively identify how individual changes impact the system's internal or external interfaces and information exchange standards.

l. Treatment of Proprietary or Vendor-Unique Elements – The contractor shall explain the use of proprietary, vendor-unique or closed components or interfaces. If applicable, the contractor will define its process for identifying and justifying proprietary, vendor-unique or closed interfaces, code modules, hardware, firmware, or software to be used. When interfaces, hardware, firmware, or modules that are proprietary or vendor-unique are required, the contractor shall demonstrate to the Government that those proprietary elements do not preclude or hinder other component or module developers from interfacing with or otherwise developing, replacing, or upgrading open parts of the system.

m. Open Business Practices – The contractor shall demonstrate that the modularity of the system design promotes the identification of multiple sources of supply and/or repair, and supports flexible business strategies that enhance subcontractor competition. The contractor shall conduct a market survey to identify candidate

COTS, proprietary, open source software (OSS) and other reusable NDI capable of achieving the performance requirements of solutions that it proposes to custom build. The survey results shall be provided to support each major review. COTS and other reusable NDI selection criteria shall address the following factors, at a minimum: Electrostatic Sensitive Device (ESD) immunity; Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC); Integrated Logistics Support requirements; safety; reliability consistent with the environment described in the System Specification; maintainability; subsystem performance trade-offs; power, cooling, and physical form factors; open system architecture break out compatibility; cost; manufacturer's quality assurance provisions; market acceptability; obsolescence; adequacy of available technical and intellectual property data and re-procurement data rights on the product; and merits of the software supported by the product. Decisions leading to the selection of specific COTS, NDI, proprietary or OSS products should be supported by appropriate analysis (*e.g.* with test results, architectural suitability, "best value" assessments, etc.).

n. Reuse of Pre-existing or Common Items – The contractor shall re-use pre-existing or common items unless a determination is made to not re-use. Exceptions to reuse of pre-existing items must be accompanied by justification, such as cost (both of adoption and life cycle support), schedule, functional and non-functional performance, etc. The general objective of these efforts shall be the development of a common system and/or common elements or components which meet the performance requirements of the various U.S. Navy or Marine Corps platform missions, where commonality offers the greatest technical and cost benefits.

o. Third Party Development – The contractor shall address how it will provide to the Government information needed to support third-party development and delivery of competitive alternatives of designs for software or other components or modules on an ongoing basis. The contractor shall provide a list of those proprietary, vendor-unique elements that it requests be exempt from this review.

p. Life Cycle Management and Open Systems – The contractor's architecture shall provide for insertion of COTS into the system and demonstrate that COTS, reusable NDI, and other components are logistically supported throughout the life cycle. The contractor shall describe and demonstrate the strategy for reducing product or system and associated supportability costs through insertion of COTS and other reusable COTS or NDI products. The contractor shall establish a process to logistically support COTS or NDI products. The contractor shall describe the availability of commercial repair parts and repair services, facilities, and manpower required for life cycle support and demonstrate they are adequate to ensure long term support for COTS or NDI products. The contractor shall provide the proposed methodology for pass through of COTS warranties to the Government.

q. Use of Standards – In designing the system(s), the contractor shall use the following standards in descending order of importance:
   - Standards as specified within the contract
   - Commercial standards
     - Standards developed by international or national industry standards bodies that have been widely adopted by industry. Examples of widely adopted standards are:
       1. SQL for databases (e.g., SQL for databases ANSI ISO/IEC 9075-1, ISO/IEC 9075-2, ISO/IEC 9075-3, ISO/IEC 9075-4, ISO/IEC 9075-5)
       2. HTML for presentation layer (e.g., XML 1.0 www.webstandards.org)
       3. XML for data transfer
       4. Web Services for remote system calls
     - Standards adopted by industry consensus-based standard bodies and widely adopted in the market place.
     - De facto standards (those widely adopted and supported in the market place).

     Note: Standards that are not specified within this contract or that are modified must be submitted to and approved by the Government Program Manager prior to use.

There is additional guidance to Naval acquisition managers intended to provide improved visibility into Offeror's and contractor's software development processes to ensure there are well-documented, effective software processes and continuous process improvement practices in place during contract performance. This guidance and requirements are contained in the Software Process Improvement Initiative (SPII) Policy. Mandatory and discretionary elements of the SPII Policy are described in the policy document. The SPII Policy and accompanying documents are available on NOA website at https://acc.dau.mil/CommunityBrowser.aspx?id=180966&lang=en-US.

Statement of Work (SOW)[12]

Within the SOW there shall be a "Technical Approach" section. This section describes the Navy and Marine Corps' expectations regarding the technical approach to be taken by the Offerors. It is recommended that these expectations be based on the characteristics of the system to be developed and not mandate any specific approach, but rather define the criteria with which proposed approaches will be evaluated. In some cases, however, specific approaches may be required based on Navy and Marine Corps needs and the system to be acquired. Within the "Technical Approach" section, there shall be a subsection titled "Software Engineering Approach," containing at a minimum the following language:

[12] Assistant Secretary of the Navy (Research, Development and Acquisition)'s Memorandum on "Software Process Improvement Initiative Contract Language," dated November 17, 2006.

Software Engineering: The contractor shall define a software development approach appropriate for the computer software effort to be performed under this solicitation. This approach shall be documented in a Software Development Plan (SDP) (CDRL AOOx). The contractor shall follow this SDP for all computer software to be developed or maintained under this effort.

The SDP shall define the Offeror's proposed life cycle model and the processes used as a part of that model. In this context, the term "life cycle model" is as defined in IEEE/EIA Std. 12207.0. The SDP shall describe the overall life cycle and shall include primary, supporting, and organizational processes based on the work content of this solicitation. In accordance with the framework defined in IEEE/EIA Std. 12207.0, the SDP shall define the processes, the activities to be performed as a part of the processes, the tasks which support the activities, and the techniques and tools to be used to perform the tasks. Because IEEE/EIA Std. 12207 does not prescribe how to accomplish this task, the Offeror shall provide this detailed information so the Navy and Marine Corps can assess whether the Offeror's approach is viable.

The SDP shall contain the information defined by IEEE/EIA Std. 12207.1, section 5.2.1 (generic content) and the Plans or Procedures in Table 1 of IEEE/EIA Std. 12207.1. In all cases, the level of detail shall be sufficient to define all software development processes, activities, and tasks to be conducted. Information provided must include—at a minimum--specific standards, methods, tools, actions, strategies, and responsibilities associated with development and qualification.

Software Code Walkthroughs: In addition, another step in the software development management process that supports OA and can be included in Section C of the contract is the requirement to hold Software Code Walkthroughs. As an example, this requirement may look like this:

> "The contractor shall conduct periodic code walkthroughs during the development Phase, as specified by the Statement of Work (SOWW) or by Technical Instruction (TI). Senior technical personnel from the development team will review the code and unit test plans that have been developed for a Technical Design Specification (TDS). The purpose of the review is to identify that the code adheres to the program's development standards, is technically sound, meets the design articulated in the related TDS, and that the unit test plan for the code under review is documented in accordance with QA/Test standards as defined. The Navy reserves the right to have one or more representatives, on a not-to-interfere basis, observe any and all code walkthroughs and create a detailed report."

Code walkthroughs will not be conducted until the code has appropriate markings with respect to intellectual property rights. These walkthroughs help support the OA principle of design disclosure.

Data Management and the Integrated Development Environment (IDE): The IDE is an integral tool for facilitating data management and design disclosure, including a

requirement to maintain an IDE as part of contract performance is important to the Government's interests. The following is sample contract language for this requirement:

> "The contractor shall establish and maintain a secure Integrated Data Environment (IDE) for hosting all data used on or produced in support of this contract, including cost, schedule, and technical data and deliverables.
>
> This purpose of the IDE is to create a seamless, collaborative data environment for the contractor and government team which contains all pertinent data about the project throughout its development and delivery. This data management program, including IDE structure, format, processes, and procedures, shall be documented as part of the contract Program Management Plan.
>
> The contractor shall provide the Government team access to all data listed in the Data Accession List (DAL) by actively using the IDE. The DAL shall contain the list of all data generated in support of this contract. Deliveries of data in addition to the IDE shall be as indicated in the CDRL attachment.
>
> Data shall be protected in accordance with (IAW) the appropriate Program Protection Plans and Information Assurance guidelines. The Government reserves the right to witness all contractor efforts to accomplish the Statement of Work (SOW) requirements and maintains the right to comment on processes.
>
> All products and data developed under this Contract shall be delivered with unlimited usage rights, as defined in Section H, DFARS clause 252.227.7013, 7014, and 7017.

Product Reuse Demonstration: As part of system acceptance, the contractor shall demonstrate the steps necessary to give third parties, as directed by the Government, the ability to rebuild the software for operational use in compatible processing hardware. This effort shall be comprehensive and require the contractor to perform the following activities:

1. Inventory: A detailed inventory of all code files in the product baseline shall be conducted. This inventory shall extend to all third-party software not delivered within the terms of the contract but used in the system to form the working product. Third-party product descriptions and version information shall be required for all operating systems, applications, middleware, and device drivers.
2. Inspection: File headers and any other company markings found in the source code shall be inspected to ensure clear indication that the Government has GPR to use the software delivered in the contract.
3. Build Procedure Development: A build procedure shall be developed in sufficient detail to allow a third party to recreate the operational system on a compatible processing platform. This build procedure shall address the results of the code inventory and inspection to account for software that is not deliverable due to

proprietary rights limitations such that the user can complete the installation process.

4. Conduct Demonstration: The contractor shall conduct a formal demonstration of the build process using the product baseline software and approved procedures to show the software can be successfully ported to other third-party compatible open architecture processing systems.

Technical Development Reviews: In some cases, the Government may want to require the contractor to perform Technical Development Reviews. The purpose of these reviews includes, but is not limited to, observing that the design documentation is complete, complies with the established design approach, is technically sound and will satisfy the functional requirements. The following is sample contract language for this requirement:

> ***Perform Technical Development Reviews***
> The contractor shall conduct formal technical reviews as well as periodic Technical Development Reviews for major capability upgrades. The contractor, in concert with the Government, shall develop a Design Review Plan for the conduct of formal reviews, using agreed upon tailoring of the Technical Review Manual (TRM) (Attachment J-9) and/or the SEMP. The purpose of these reviews is to observe that the design documentation is complete, complies with the established design approach, is technically sound and will satisfy the functional requirements as defined in the approved Functional Design Specification documents. Senior technical personnel from the development team will review each design approach and Technical Design Specification as it is completed to ensure it has been properly documented as defined in the CDRL. The Navy will establish entry/exit criteria and acceptance/rejection criteria for each formal review and will document these criteria in a Technical Instruction (TI). These Technical Reviews, both formal and informal, are to be scheduled in the Program Master Schedule so they are visible to the Navy.
>
> ***Technical Review Objectives:***
> a. Assess the development maturity based on technical development goals, systems engineering events and accomplishments, and empirical test data supporting progress to date.
> b. Ensure operational, functional, performance, information assurance, cost, schedule requirements and objectives, designs, implementations, technical performance measurements, and technical plans are being tracked, are on schedule, and are achievable within existing programmatic constraints.
> c. Assess the system requirements and allocations to ensure that requirements are unambiguous, consistent, complete, feasible, verifiable, and traceable to top-level requirements.
> d. Demonstrate that the relationships, interactions, interdependencies, and interfaces between required items and externally interfacing items, system functions, subsystems, and system elements (including operators and maintainers), as

appropriate, have been addressed.

e. Assess the degree of openness of the emerging system, its degree of Naval Enterprise reuse, and critique any tradeoff decisions made.

OA Approach to Developing to a Technical Review:

General and specific OA objectives shall be developed to evaluate the degree of system openness as defined in the Open Architecture Assessment Tool (OAAT) and activities defined in the Open Systems Management Plan (OSMP).

1. Define OA objectives for each technical review as defined in the System Engineering Technical Review (SETR) manual
2. Tailor the OA objectives to what can be accomplished by the time of the review and for which there is supporting technical information
3. Map OA objectives to specific metrics from the OAAT and the results of activities defined in the OSMP
4. Record the OA objectives and the results of the metrics and activities as an input to the technical review

Example OA Technical Review Objectives:

1. The OA emphasis for Alternative Systems Review (ASR) is on innovation and competition. A specific focus will be to evaluate the degree to which functionality and solutions are drawn from a diversified range of large and small businesses and maximize affordable use of COTS/NDI.

2. The OA emphasis for System Requirements Review (SRR) is on collaboration and the accessibility and availability of data. A specific focus will be to evaluate the consistency between the system requirements and open system design considerations, ensuring that the preferred system solution does not contain design specific solutions.

3. The OA emphasis for System Functional Review (SFR) is on enterprise architectures, strategic reuse, and the potential for small business participation throughout the program lifecycle. A specific focus will be to evaluate whether the system functional definition follows modular design tenets and well-defined interfaces to effectively manage risks of obsolescence and dependence upon a sole source of supply.

4. The emphasis of the OA objectives for Preliminary Design Review (PDR) is on the requirements tradeoffs to meet performance. A specific focus will be to evaluate the degree to which inter-component dependencies preclude affordable and lower-risk future open system capability insertion, which will drive cycle-time for capability improvements.

Chapter B: EXAMPLES OF SECTION H (SPECIAL CONTRACT REQUIREMENTS) LANGUAGE

Section H of the Request for Proposal (RFP) and the resulting contract contains special clauses that can be incorporated into contracts as appropriate. The following are examples taken from contracts that may be useful to Programs. An additional helpful reference is the Department of Defense Handbook for Preparation of Statement of Work (SOW).[13]

This section contains only recommended guidance, and is offered with the understanding that individual PEOs and programs can be flexible in selecting those items needed to meet their needs. Programs should not feel that they need to address all of the items contained in these recommendations.

There is additional guidance to Naval acquisition managers intended to provide improved visibility into Offeror's and contractor's software development processes to ensure there are well-documented, effective software processes and continuous process improvement practices in place during contract performance. This guidance and requirements are contained in the Software Process Improvement Initiative (SPII) Policy. Mandatory and discretionary elements of the SPII Policy are described in the policy document, which is available on NOA website at: https://acc.dau.mil/CommunityBrowser.aspx?id=180966&lang=en-US.

CLAUSE H - _____: REQUIREMENT FOR AN OPEN SYSTEM MANAGEMENT PLAN

The contractor shall submit to the Government an Open System Management Plan as set for the in the Contract Data Requirements List (CDRL). At a minimum, the plan shall address:

Technical Approach and Processes

Open Systems Approach and Goals. The contractor shall prepare and submit for Government approval its Open System Management Plan which shall include its approach for using modular design, standards-based interfaces, and widely-supported, consensus-based standards to achieve the following goals. At a minimum, the plan shall include:

a. **OPNAV OA Requirements –** A detailed description of the contractor's approach for addressing a system architecture that incorporates appropriate considerations for reconfigurability, portability,

[13] The DoD Handbook for Preparation of Statement of Work (SOW) is available on the web at https://www.acqsolinc.com/mockups/7steps/library/DODhandbook.pdf.

maintainability, technology insertion, vendor independence, reusability, scalability, interoperability, upgradeability, and long-term supportability as defined by the Naval Enterprise in the 23 Dec 2005 Office of the Chief of Naval Operations (OPNAV) requirement letter.

b. **Design Disclosure –** Within the constraints of contractual data rights, a detailed description of the contractor's approach to facilitate the sharing of system or component (e.g., software, hardware, middleware) design information. The contractor shall describe how its design will be documented and modeled using industry standard formats (e.g., Unified Modeling Language), and how it will use tools that are capable of exporting model information in a standard format (e.g., Extensible Markup Language Metadata Interchange (XMI) and AP233/ISO 10303). The Offeror shall identify the proposed standards and formats to be used.
c. **Technology Insertion and Refresh –** A detailed description of how the contractor's proposed system will allow for rapid and affordable technology insertion and refresh. At a minimum, the contractor shall describe how the proposed system will allow incremental systems improvement through upgrades of individual hardware or software modules with newer modular components. At a minimum, the description shall address how the contractor's architectural approach will support this requirement including how components from third-party providers and reuse sources shall be included.
d. **Asset Reuse –** A detailed description of the steps taken to reduce acquisition of duplicative system components where possible. At a minimum, the contractor shall describe what artifacts from the _____ or common components it intends to use within its proposed solution.
e. **Modular Open Systems Approach (MOSA) –** A detailed description of the contractor's modular, open systems approach. At a minimum, the contractor shall address:
    i. Plans for integrating the systems both internally and with external systems;
    ii. The means for ensuring conformance to open standards and profiles throughout the development process, as discussed in Section C;
    iii. A description of how the technical approach ensures having access to mature as well as the latest technologies by establishing a robust, modular, and evolving architecture based on open standards;
    iv. A description of the strategy for maintaining the currency of technology (e.g., through COTS or reusable NDI insertion, technology refresh strategies, and other appropriate means); and
    v. Identification of processes for:
        (1) Isolating functionality through the use of modular design;

(2) Evaluating modular open system baseline standards, defining and updating profiles, and evaluating and justifying new or vendor-unique profiles;
(3) Validating implementation conformance to selected profiles;
(4) Managing application conformance to selected profiles; and
(5) Training in use of profiles.

f. **MOSA as an Enabler of OA Objectives –** A detailed description of how the contractor intends to use a modular open systems approach as an enabler to achieve the following objectives:
   i. Adapt to evolving requirements and threats as identified by the Government;
   ii. Enhance interoperability and the ability to integrate new capabilities without redesign of entire systems or large portions thereof;
   iii. Accelerate transition from science and technology into acquisition and deployment;
   iv. Facilitate systems reconfiguration and integration;
   v. Reduce the development cycle time and total life-cycle cost;
   vi. Maintain continued access to cutting edge technologies and products from multiple suppliers; and
   vii. Mitigate the risks associated with reliance on a single source of supply over the life of the system, to include, but not be limited to, technology obsolescence and dependence on proprietary or vendor-unique technology.

g. **Life-Cycle Supportability –** A detailed description of how the contractor intends to enhance life-cycle supportability by implementing performance-based logistics arrangements to sustain the components through their life cycle.

h. **Employ a Layered, Modular Architecture –** A detailed description on how the proposed system architecture is layered, modular, and makes maximum use of Commercial-Off-the-Shelf/Non-developmental Item (COTS/NDI) hardware, operating systems, and middleware that utilize non-proprietary key Application Programming Interfaces (APIs) whenever practicable.

i. **Traceability of System Requirements –** A detailed description of the contractor's approach for ensuring that all system requirements (including those contained in the Initial Capabilities Document, Capabilities Development Document, and in Section C) are accounted for through a demonstrated ability to trace each requirement to one or more modules. Modules consist of components (one of the parts that make up a system and may be hardware and/or software) which are self-contained elements with well-defined, standards-based and published interfaces.

j. **Minimize Inter-Component Dependencies –** A detailed description of the contractor's approach for designing a system that, to the maximum extent practicable, minimizes inter-component dependencies and allows components to be decoupled and re-used, where appropriate, across various Naval programs or replaced by competitive alternatives.
k. **Rationale for Modularization Choices –** A detailed description of the contractor's rationale for the modularization choices made to generate the design. At a minimum, the rationale shall explicitly address any tradeoffs performed, particularly those that compromise the modular and open nature of the system.
l. **Future System Upgrades –** A detailed description of how a modular design strategy will be demonstrated in all aspects of future system upgrades.
    i. In addressing the specified requirements, the plan, at a minimum, must demonstrate how the modular design strategy applies, and the effect it will have on future systems upgrades.
    ii. The contractor shall describe an orderly planned process to address migration of proprietary, vendor-unique, or closed system equipment or interfaces to a modular open systems design when technological advances are available or when operational capability is upgraded. The proprietary, vendor-unique or closed systems implementation shall also be reflected in the contractor's system level life cycle cost estimates.
    iii. The modular design approach shall either mitigate or partition – at the lowest subsystem or component level – proprietary, vendor-unique or closed system implementation to avoid out-year supportability issues and diminished manufacturing and repair sources.

Interface Design and Management. The contractor shall describe how it will clearly define component and system interfaces. At a minimum, the contractor shall address the following:

a. The contractor shall describe how it will define and document all subsystem and configuration item (CI) level interfaces to provide fully functional, physical and electrical specifications.
    i. The contractor shall identify processes for specifying the lowest level (i.e. subsystem or component) at and below which it intends to control and define interfaces by proprietary, vendor-unique standards, as well as the impact of those standards upon the proposed modularity and logistics approach.
    ii. Interfaces described shall include, but not be limited to, mechanical, electrical (e.g., power and signal wiring), software (e.g., API), firmware, and hardware.
    iii. The contractor shall address the interface and data exchange standards between the component, module or system and the interconnecting or underlying information exchange medium.

iv. The contractor shall state how these interfaces support an overall Information Assurance strategy that provides a defense in depth in accordance with CJCSI 3170.01E and [*Add appropriate PEO-specified requirements*].

b. The contractor shall describe how interfaces will be selected from existing open or Government standards with emphasis on system-level or enterprise-level (where applicable) interoperability. The contractor shall describe how its selection of interfaces will maximize the ability of the system to readily accommodate technology insertion (both hardware and software) and facilitate the insertion of alternative or reusable modular system elements.

c. The contractor shall describe how its system will allow for:
   i. Quickly interconnecting, reconfiguring, and assembling existing systems, subsystems, and components;
   ii. Interchanging and using information, services and/or physical items among components within a system;
   iii. Interchanging and using information, services and/or physical items among systems within an integrated architecture, platform, PEO, Community of Interest, or a DoD component;
   iv. Supporting reuse of software and the common use of components across various product lines; and
   v. Transferring a system, component, or data, from one hardware or software environment to another.

d. The contractor shall describe the degree to which the defined interfaces will support an Information Assurance (IA) strategy that implements IA Processes in accordance with DoD Instruction 8500.2 (dated February 6, 2003) and [*Add appropriate PEO-specified requirements*].

e. The contractor shall describe the degree to which proposed interfaces use defined commercial or Government standards as called for in Section C.

Treatment of Proprietary or Vendor-Unique Elements. The contractor shall justify any use of proprietary, vendor-unique, or closed components, including but not limited to COTS, and interfaces in current or future designs. The contractor shall define its process for identifying and justifying proprietary, vendor-unique or closed interfaces, code modules, hardware, firmware, or software to be used.

a. The contractor shall describe how it will employ hardware and/or software partitioning or other design techniques to isolate all proprietary, vendor-unique portions of interfaces, hardware, firmware and modules – at the lowest subsystem or component level.

b. The contractor shall include documentation to support the rationale for a decision to integrate proprietary, vendor-unique or closed system hardware and/or software functions within the proposed system.

c. The contractor shall describe how the integration of closed or proprietary, vendor-unique equipment, interfaces, data systems or functions due to a unique or specific system requirement will not preclude or hinder other component or module developers from

interfacing with or otherwise developing, replacing, or upgrading open parts of the system.

d. The contractor shall identify and take steps to prevent the open elements of the system from intertwining with proprietary or vendor-unique elements in a manner that restricts or limits the ability to replace or upgrade the open elements using an open competitive selection process.

e. The contractor shall describe and demonstrate that the modularity of the system design promotes identification of multiple sources of supply and/or repair, and supports flexible business strategies that enhance sub-contractor competition.

i. The contractor shall conduct a market survey to identify candidate COTS and other reusable NDI, including Government IP assets, capable of achieving the performance requirements of solutions that it has proposed to custom build. Sound "market research" will help to identify opportunities to use COTS or re-use existing components and is called for by the OSJTF. The COTS and other NDI selection criteria shall, at a minimum, address the following factors: Electrostatic Sensitive Device (ESD) immunity; Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC); Integrated Logistics Support requirements; Safety; Reliability (to include the hardware's designed-in ability to accommodate such stresses as electrical power fluctuation (voltage, current, frequency)), temperature, shock, vibration, operating time (duration), changes in atmospheric pressure, and humidity consistent with the environment described in the System Specification; Maintainability; Subsystem performance trade-offs; Power, cooling, and physical form factors; Open system architecture break out compatibility; Cost; Manufacturer's quality assurance provisions; Market acceptability; Obsolescence; Adequacy of available technical and intellectual property data and reprocurement data rights on the product; and Merits of the software supported by the product.

ii. The Offeror shall identify those pre-existing items (Government IP assets, NDI, and COTS) it will evaluate for reuse. At a minimum, the Offeror shall describe what artifacts from the _____ it intends to use within its proposed solution. Exceptions to reuse of pre-existing items must be accompanied by justification, such as cost (both of adoption and life cycle support), schedule, functional and non-functional performance, etc.

f. The contractor shall address how it will provide information needed to support third-party development and delivery of competitive alternatives or designs for software or other components or modules on an ongoing basis. This information may be used as part of peer review processes, to support Integrated Product Teams (IPTs), and to facilitate competition for component suppliers. The Offeror will provide a list of those proprietary or vendor-unique elements that it requests be exempt from this review.

Life Cycle Management and Open Systems. The contractor shall describe and demonstrate the strategy for reducing product or system and associated supportability costs through insertion of COTS or reusable NDI products.

a. The contractor shall identify and demonstrate a strategy to insert COTS technologies and other reusable NDI into the system and demonstrate that COTS, other reusable NDI, and other components are logistically supported throughout the system's life cycle.
   i. The contractor shall identify specific hardware and software elements of the subsystem designs that are planned for COTS and other reusable NDI replacement and the supportability plans for those elements.
   ii. The contractor shall demonstrate how the subsystem design allows for timely and cost-effective replacement of subsystem elements or modules. The COTS/NDI selection processes shall be specifically addressed, including validation of those processes.

b. The contractor shall provide a description of processes that will be established and demonstrate that COTS and other reusable NDI products are logistically supported.

c. The contractor shall describe the availability of commercial repair parts and repair services, facilities and manpower required for life cycle support and demonstrate that they are adequate to ensure long term support for COTS and other reusable NDI products. The Offeror shall provide the proposed methodology for pass through of COTS warranties to the Government.

Clause H -_____ : EARLY AND OFTEN TECHNICAL DISCLOSURE

The contractor shall submit a detailed plan for making design and interface information available as soon as possible after it is defined or established. The contractor shall establish and maintain a process that will provide "early and often" design disclosure directly to the Government or to third-party contractors via Government-established access (e.g., the Naval Sea Systems Command Software/Hardware Asset Reuse Enterprise (SHARE) library, its successor, or other Navy and Marine Corps repository/library resources) to in-process design documentation and computer software. Access to this information shall be supported using industry standards and at minimal cost to the Government. The exchange of information shall be structured so as to protect the Offeror's and third-party developers' proprietary or vendor-unique rights in the information. The plan shall address how comments from the Government and third-party contractors are resolved. The plan shall describe a schedule of when non-proprietary licenses, source code, drawings, repair and engineering documentation will be provided to the Government and third-party contractors at specified key events or at defined intervals.

[**Note:** Firmware is considered to be a category of Computer Software (CS), as defined in the DFARS.]

Identification of Open Source Software (OSS) in contractor Deliverable Items

The following H Clauses present two alternatives for addressing the identification of OSS in items delivered to the Government by contractors. The first clause has been in use for several years and served as our original attempt to help programs understand the OSS they may be acquiring in their contractor-delivered items. The second clause is a recent update that we believe improves upon the original.

Clause H - _____ : Identification of Commercial Technical Data/Computer Software (Including Open Source Software) Use and Modifications

Commercial Technical Data/Computer Software Title and Version # *	If Open Source Software, Open Source License and Version # **	Name of contractor Delivering Commercial Software ***	Technical Use/ Implementing Approach ****	If OSS, Was OSS modified by contractor? *****	If OSS and OSS was Modified, was OSS modified by incorporation into a third party's software? ******

* The complete title and version number of the Commercial Software should be listed. If the line item is Open Source Software that was downloaded from a website, the website address should also be provided.

** The Open Source Software license and version number should be listed. If a version number is not available, the contractor should state no version number.

*** Corporation, individual, or other person as appropriate.

**** The contractor should describe the functionality of the Commercial (Open Source) Software, and where it is being used within the larger computer software deliverable (if applicable).

***** If the contractor is delivering OSS, the contractor should state whether it has modified the Open Source Software.

****** If the contractor is delivering OSS that it has modified, the contractor should state whether the Open Source Software was modified by combining with another party's non-open source software. If the other party is a third party, the third party's non-open source computer software may be licensed with distribution restrictions which would not allow the Government to accept delivery of the software combination.

Clause H - _____ : IDENTIFICATION AND ASSERTION OF RESTRICTIONS ON TECHNICAL DATA –COMMERCIAL ITEM AND COMMERCIAL COMPUTER SOFTWARE, INCLUDING OPEN SOURCE SOFTWARE

THIS CLAUSE IS UNDERGOING ADDITIONAL REVIEW and will be posted when the review is complete

Clause H - _____ : SPECIALLY NEGOTIATED LICENSE RIGHTS
[*Fill in based on the Section B Data Rights Table*.]

1. The United States Government has Special License Rights in the Data. Special License Rights means the right to:
   (i) Use, modify, reproduce, perform, display, or disclose the Data within the Government without restriction; and
   (ii) Release or disclose the Data outside the Government and authorize persons to whom the release or disclosure has been made to use, modify, release, perform, display, or disclose that Data for United Sates Government Purposes.
2. Data, as used in this clause, means all the information delivered to the Government as required by CDRL.
3. United States Government Purposes, as used in this clause, has the same definition as Government Purpose found at DFARS 252.227-7013 and DFARS 252.227-7014, except
   (i) It does not include foreign military sales (FMS) and Foreign Military Funded (FMF), and
   (ii) It does not include allowing states and/or local governments to directly procure equipments utilizing the [*Complete based on the program specifics*.] for any purpose or to authorize parties other than the Federal Government to do so.

Clause H – _____ : SPECIAL PROVISIONS FOR THE PURPOSE OF CONFIGURATION CONTROL; REGARDING RELEASE AND DISCLOSURE OF [*Complete based on program specifics*.] **SOFTWARE AND SOFTWARE DOCUMENTATION**

It is specifically agreed that software and software documentation delivered by [*contractor*] to the Government as required by this contract or [*Add other contracts as appropriate*.] shall not be released or disclosed in whole or in part by [*contractor*], or by any subcontractor or entity acting on its behalf, to any entity, for U.S. Department of Defense purposes, other than to the U.S. Government entity described in section(s) H to this contract without first providing written notification to the contracting officer unless

such notification would result in a violation of third-party agreements existing on the date of award of this contract, in which case no notification is required. Such disclosure restrictions shall remain in effect for the term of this contract and for six (6) months [*or other period*.] thereafter.

Except as otherwise provided for above, nothing contained in this clause shall be construed to limit any intellectual property rights owned by, controlled by, or licensed to [*contractor*] and used in the performance of this contract.

Clause H – _____: SPECIAL DEVELOPMENT LIMITATION PROVISIONS

a) While the Government understands that the initial software development of [*the specific program version X*] will be performed on [*platform*], [*contractor*] specifically agrees that the completion of the [*the specific program version X*] software shall be successfully tested on a(n) [*specific platform*] product prior to delivery, unless otherwise approved by the Contracting Officer.

b) [*contractor*] specifically agrees that the [*the specific program version X*] developed under this contract shall be developed on a(n) [*specific platform*] product, unless otherwise approved by the Contracting Officer.

c) Notwithstanding the foregoing, [*contractor*] shall not be prohibited under this contract from performing design and development on, or making modification or enhancements to the software or documentation provided under this contract if such effort is performed outside of this contract. To the extent that [*contractor*] designs or develops or makes modification to such software or software documentation that is not prohibited by this clause, [*contractor*] shall only use the name or term [*program name*] when followed by "[*contractor*] Rev XX" [*For "XX" insert applicable revision number*] when referring to these versions in order to distinguish these versions of the software from the [*program name*] versions delivered under this contract and being maintained by the Government. The purpose of these restrictions in use of the name or term [*program name*] is to assure that the Government maintains configuration control of the [*program artifacts*] resulting from this contract.

Chapter C: RECOMMENDATIONS FOR SECTION L (INSTRUCTIONS TO OFFERORS) LANGUAGE

Although the Guidebook was developed for mixed systems comprised of hardware, middleware and software elements, the recommended language can be easily tailored to reflect hardware- or software-only acquisitions.

There is additional guidance to Naval acquisition managers intended to provide improved visibility into Offeror's and contractor's software development processes to ensure there are well-documented, effective software processes and continuous process improvement practices in place during contract performance. The guidance and requirements are contained in the Software Process Improvement Initiative (SPII) Policy. Mandatory and discretionary elements of the SPII Policy are described in the policy document, which is available along with other SPII documents on the NOA website at: https://acc.dau.mil/CommunityBrowser.aspx?id=180966&lang=en-US.

Naval Open Architecture Guidance

Factor ( ): Technical Approach and Processes

The Offeror shall describe its proposed Naval Open Architecture (NOA) technical approach and processes to be employed in performing this contract. At a minimum, the Offeror shall describe its OA technical approach and processes in the following areas:
Subfactor 1. Open Systems Approach and Goals. The Offeror shall describe its open systems approach for using modular design, standards-based interfaces, and widely-supported, consensus-based standards to achieve the following goals. At a minimum, the Offeror shall provide the following as part of its proposal:

a. **Address OPNAV OA Requirements –** A detailed description of the Offeror's approach for addressing a system architecture that incorporates appropriate considerations for reconfigurability, portability, maintainability, technology insertion, vendor independence, reusability, scalability, interoperability, upgradeability, and long-term supportability as called for by the 23 Dec 2005 Office of the Chief of Naval Operations (OPNAV) requirement letter, which is available at https://acc.dau.mil/oa.
b. **Design Disclosure –** Within the constraints of contractual data rights, a detailed description of the Offeror's approach to facilitate the sharing of system or component (e.g., software, hardware, middleware) design information in support of peer reviews and the incremental development process. [*"Design Disclosure" can be enabled through a variety of mechanisms including keeping data, code and design artifacts in a repository either maintained by or overseen by the Government (such as the Surface Domain's SHARE); providing the artifacts electronically upon requests made via the Government; or allowing requesting parties to obtain them directly from the source firm through a process involving review and approval from the Government. Each program has the flexibility to*

establish the most appropriate mechanism for its specific needs; with a goal of establishing a process that is both cost-effective and responsive to requests.] The Offeror shall describe how its design will be documented and modeled using industry standard formats (e.g., Unified Modeling Language), and how it will use tools that are capable of exporting model information in a standard format (e.g., Extensible Markup Language Metadata Interchange (XMI) and AP233/ISO 10303). The Offeror shall identify the proposed standards and formats to be used.

c. **Technology Insertion and Refresh –** A detailed description of how the Offeror's proposed system will allow for rapid and affordable technology insertion and refresh. For example, the Offeror should describe how the proposed system will allow incremental systems improvement through upgrades of individual hardware or software modules with newer modular components. At a minimum, the description shall address how the Offeror's architectural approach will support this requirement including how components from third-party providers and reuse sources shall be included.
d. **Asset Reuse –** A detailed description of the steps taken to reduce acquisition of duplicative system components where possible. At a minimum, the Offeror shall describe what artifacts from the _____ or common components it intends to use within its proposed solution.
e. **Modular Open Systems Approach (MOSA) –** A detailed description of the Offeror's modular open systems approach. At a minimum, the Offeror shall address:
    i. Plans for integrating the systems both internally and with external systems;
    ii. The means for ensuring conformance to open standards and profiles, as discussed in Section C, throughout the development process;
    iii. A description of how the technical approach ensures having access to mature as well as the latest technologies by establishing a robust, modular, and evolving architecture based on open standards;
    iv. A description of the strategy for maintaining the currency of technology (e.g., through COTS or reusable NDI insertion, technology refresh strategies, and other appropriate means); and
    v. Identification of processes for:
        (1) Isolating functionality through the use of modular design;
        (2) Evaluating modular open system baseline standards, defining and updating profiles, and evaluating and justifying new or vendor-unique profiles;
        (3) Validating implementation conformance to selected profiles;
        (4) Managing application conformance to selected profiles; and
        (5) Training in use of profiles.

f. **MOSA as an Enabler of OA Objectives –** A detailed description of how the Offeror intends to use a modular open systems approach as an enabler to achieve the following objectives:
    i. Adapt to evolving requirements and threats as identified by the Government;
    ii. Enhance interoperability and the ability to integrate new capabilities without redesign of entire systems or large portions thereof;
    iii. Accelerate transition from science and technology into acquisition and deployment;
    iv. Facilitate systems reconfiguration and integration;
    v. Reduce the development cycle time and total life-cycle cost;
    vi. Maintain continued access to cutting edge technologies and products from multiple suppliers; and
    vii. Mitigate the risks associated with reliance on a single source of supply over the life of the system, to include, but be not limited to, technology obsolescence and dependence on proprietary or vendor-unique technology.
g. **Life-cycle Supportability –** A detailed description of how the Offeror intends to enhance life-cycle supportability by implementing performance-based logistics arrangements to sustain the components through their life cycle.
h. **Employ a Layered Modular Architecture –** A detailed description on how the proposed system architecture is layered, modular, and makes maximum use of Commercial-Off-the-Shelf/Non-Developmental Item (COTS/NDI) hardware, operating systems, and middleware that utilize non-proprietary key Application Programming Interfaces (APIs) whenever practicable.
i. **Traceability of System Requirements –** A detailed description of the Offeror's approach for ensuring that all system requirements (including those contained in the Initial Capabilities Document, Capabilities Development Document, and in Section C of this Solicitation) are accounted for through a demonstrated ability to trace each requirement to one or more modules. Modules consist of components (one of the parts that make up a system and may be hardware and/or software) which are self-contained elements with well-defined, standards-based and published interfaces.
j. **Minimize Inter-Component Dependencies –** A detailed description of the Offeror's approach for designing a system that, to the maximum extent practicable, minimizes inter-component dependencies and allows components to be decoupled and re-used, where appropriate, across various Naval programs or replaced by competitive alternatives.
k. **Rationale for Modularization Choices –** A detailed description of the Offeror's rationale for the modularization choices made to generate the design. At a minimum, the rationale shall explicitly address any tradeoffs performed, particularly those that compromise the modular and open nature of the system.

l. **Future System Upgrades –** A detailed description of how a modular design strategy will be demonstrated in all aspects of future system upgrades.
   i. In addressing the specified requirements, the proposal, at a minimum, must demonstrate how the modular design strategy applies, and the effect it will have on future systems upgrades.
   ii. The proposal shall describe an orderly planned process to address migration of proprietary, vendor-unique, or closed system equipment or interfaces to a modular open systems design when technological advances are available or when operational capability is upgraded. The proprietary, vendor-unique or closed systems implementation shall also be reflected in the Offeror's system level life cycle cost estimates.
   iii. The modular design approach shall either mitigate or partition – at the lowest subsystem or component level – proprietary, vendor-unique or closed system implementation to avoid out-year supportability issues and diminished manufacturing and repair sources.

Subfactor 2. Interface Design and Management. The Offeror shall describe how it will clearly define component and system interfaces. At a minimum, the Offeror shall address the following:

a. The Offeror shall describe how it will define and document all subsystem and configuration item (CI) level interfaces to provide fully functional, physical and electrical specifications.
   i. The Offeror shall identify processes for specifying the lowest level (i.e. subsystem or component) at and below which it intends to control and define interfaces by proprietary, vendor-unique standards, as well as the impact of those standards upon the proposed modularity and logistics approach.
   ii. Interfaces described shall include, but not be limited to, mechanical, electrical (power and signal wiring), software, firmware, and hardware.
   iii. The Offeror shall address the interface and data exchange standards between the component, module or system and the interconnecting or underlying information exchange medium.
   iv. The Offeror shall state how these interfaces support an overall Information Assurance strategy that provides a defense in depth in accordance with CJCSI 3170.01E.

b. The Offeror shall describe how interfaces will be selected from existing open or Government standards with emphasis on system-level or enterprise-level (where applicable) interoperability. The Offeror shall describe how its selection of interfaces will maximize the ability of the system to readily accommodate technology insertion (both hardware and software) and facilitate the insertion of alternative or reusable modular system elements.

c. The Offeror shall describe how its system will allow for:

i. Quickly interconnecting, reconfiguring, and assembling existing systems, subsystems, and components;
ii. Interchanging and using information, services and/or physical items among components within a system;
iii. Interchanging and using information, services and/or physical items among systems within an integrated architecture, platform, PEO, Community of Interest, or a DoD component;
iv. Supporting reuse of software and the common use of components across various product lines;
v. Transferring a system, component, or data, from one hardware or software environment to another.

d. The Offeror shall describe the degree to which the defined interfaces will support an Information Assurance (IA) strategy that implements IA Processes in accordance with DoD Instruction 8500.2 (dated February 6, 2003).
e. The Offeror shall describe the degree to which proposed interfaces use defined commercial or Government standards as called for in Section C.

Subfactor 3. Treatment of Proprietary or Vendor-Unique Elements. The Offeror shall justify any use of proprietary, vendor-unique, or closed components, including but not limited to COTS, and interfaces in current or future designs. This justification shall include documentation of the decision leading to the selection of specific COTS products (*e.g.*, with test results, architectural suitability, "best value" assessments, etc.). The Offeror shall define its process for identifying and justifying proprietary, vendor-unique or closed interfaces, code modules, hardware, firmware, or software to be used.

a. The Offeror shall describe how it will employ hardware and/or software partitioning or other design techniques to isolate all proprietary, vendor-unique portions of interfaces, hardware, firmware and modules – at the lowest subsystem or component level.
b. The proposal shall include documentation to support the rationale for a decision to integrate proprietary, vendor-unique or closed system hardware and/or software functions within the proposed system.
c. The Offeror shall describe how the integration of closed or proprietary, vendor-unique equipment, interfaces, data systems or functions due to a unique or specific system requirement will not preclude or hinder other component or module developers from interfacing with or otherwise developing, replacing, or upgrading open parts of the system.
d. The Offeror shall identify and take steps to prevent the open elements of the system from intertwining with proprietary or vendor-unique elements in a manner that restricts or limits the ability to replace or upgrade the open elements using an open competitive selection process.
e. The Offeror shall describe and demonstrate that the modularity of the system design promotes identification of multiple sources of supply and/or repair, and supports flexible business strategies that enhance sub-contractor competition.

i. The Offeror shall conduct a market survey to identify candidate COTS and other reusable NDI, including Government-owned assets, capable of achieving the performance requirements of solutions that it has proposed to custom build. [*Sound "market research" will help identify opportunities to use COTS or re-use existing components and is called for by the OSJTF*.] COTS and other NDI selection criteria shall, at a minimum, address the following factors: Electrostatic Sensitive Device (ESD) immunity; Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC); integrated logistics support requirements; safety; reliability (to include the hardware's designed-in ability to accommodate such stresses as electrical power fluctuation (voltage, current, frequency)), temperature, shock, vibration, operating time (duration), changes in atmospheric pressure, and humidity consistent with the environment described in the System Specification; maintainability; subsystem performance trade-offs; power, cooling, and physical form factors; open system architecture break out compatibility; cost; manufacturer's quality assurance provisions; market acceptability; obsolescence; adequacy of available technical and computer software data rights and reprocurement intellectual property rights in the product; and merits of the software supported by the product. The Offeror shall provide documentation of the decision leading to the selection of specific COTS products (*e.g.*, test results, architectural suitability, "best value" assessments, etc.).

ii. The Offeror shall identify those pre-existing items (Government intellectual property assets, NDI, open source software, and COTS) it intends to evaluate for reuse. At a minimum, the Offeror shall describe what artifacts from the _____ it intends to use within its proposed solution. Exceptions regarding reuse of pre-existing items must be accompanied by justification, such as cost (both of adoption and life cycle support), schedule, functional and non-functional performance, etc.

f. The Offeror shall address how it will provide information needed to support third-party development and delivery of competitive alternatives or designs for software or other components or modules on an ongoing basis. This information may be used as part of peer review processes, to support Integrated Product Teams (IPTs), and to facilitate competition for component suppliers. The Offeror will provide a list of those proprietary or vendor-unique elements that it requests be exempt from this review.

Subfactor 4. Life Cycle Management and Open Systems. The Offeror shall describe and demonstrate the strategy for reducing product or system and associated supportability costs through insertion of COTS or reusable NDI products.

a. The Offeror shall identify and demonstrate a strategy to insert COTS technologies and other reusable NDI into the system and demonstrate that COTS, other reusable NDI, and other components are logistically supported throughout the system's life cycle.

i. The proposal shall identify specific hardware and software elements of the subsystem designs that are planned for COTS, open source software, proprietary and other reusable NDI replacement and the supportability plans for those elements.

ii. The Offeror shall demonstrate how the subsystem is designed to allow for timely and cost-effective replacement of subsystem elements or modules. The COTS selection processes shall be specifically addressed, including validation of those processes, and shall be supported by documentation of the decision leading to the selection of specific COTS products (*e.g.*, with test results, architectural suitability, "best value" assessments, etc.).

b. The Offeror shall provide a description of processes that will be established and demonstrate that COTS and other reusable NDI products are logistically supported.

c. The Offeror shall describe the availability of commercial repair parts and repair services, facilities and manpower required for life cycle support and demonstrate that they are adequate to ensure long-term support for COTS and other reusable NDI products. The Offeror shall provide the proposed methodology for pass through of COTS warranties to the Government.

Factor ( ): System Compliance with Naval OA Guidance

The language used in this section will be specified by the Community of Interest or PEO. For example, PEO C4I may use language from Netcentric Enterprise Solutions for Interoperability (NESI). The material that follows should be tailored by each PEO/Community of Interest to meet its specific technical requirements, when enterprise-wide Naval requirements do not exist. The language should also be tailored to address different types of contracts, levels of systems acquisition, and phases in the acquisition life cycle.

Each Offeror shall provide a narrative to the Government entitled "Naval Open Architecture Technical Guidance Narrative" (hereinafter referenced to as the "Narrative"). In preparation for drafting the Narrative, Offerors are requested to thoroughly review the [*PEO-specified*] technical guidance points provided in Table A below. The technical guidance points represent the critical technical characteristics required to implement the NOA design for deliverables under the contract awarded pursuant to this RFP.

1. Each Offeror shall provide a Narrative explaining how each technical guidance point in Table A is addressed in the proposal. For those technical guidance points in Table A that the Offeror asserts are not applicable or not relevant to deliverables under the contract, the Offeror

shall, in the Narrative, explain its basis for asserting non-applicability or non-relevance.

2. The NOA Compliance subfactor is directed to each of the technical guidance points in Table A below, and the Offeror's ability to provide a Narrative explaining how its proposal meets each technical guidance point as defined by the [*insert relevant reference*].

Table A

[*PEO-specified*] Technical Guidance Points	**[*PEO-specified*] Reference Document Citation**
Component design	
Portability	
Location transparency	
Client server	
Data distribution	
State data coherency	
Computational flow	
Fault tolerance	
Scalability	
Real-time performance	
Process, thread & memory management	
Data brokers	
Cabling and Cabinets	
Information Transfer	
Computing Resources	
Peripherals	
Operating Systems	
Adaptation Middleware	
Distribution Middleware	
Frameworks	
Dynamic Resource Management	
Instrumentation	
Failure Management	
Information Assurance	
Time Service	
Programming Language Facilities	
Displays	
System Test and Certification	
Selection of Standards	

Factor ( ): Management Approach

The first paragraph below is standard contract language with some modification to reflect the objective of facilitating competition at appropriate system or sub-system levels. While the number of contractors or subcontractors working on a contract is not necessarily a guaranty of openness, effective competition at the component-level is facilitated by NOA. The second paragraph articulates the view that true competition cannot be measured by the percentage of work awarded but rather the significance of their contributions.

The Offeror shall describe its approach to managing the efforts required for this contract. Of particular interest to the Government is the Offeror's approach for facilitating competition at various levels (tiers) of the logical or modular subdivisions or tasks and for awarding significant portions of the overall system to third-party sources.

The Offeror shall describe its approach for using Integrated Product Teams (IPTs) to improve processes, proactively manage risk and increase efficiency. The Offeror shall describe steps it shall take to educate IPT members and others involved in the project on the importance and principles of NOA.

Factor ( ) Data Rights and Patent Rights

The Offeror shall propose the extent to which the rights in technical data (TD), computer software (CS), computer software documentation (CSD), and inventions/patents offered to the Government ensure unimpeded, innovative, and cost effective production, operation, maintenance, and upgrade of the [*SYSTEM NAME*] throughout its life cycle; allow for open and competitive procurement of [*SYSTEM NAME*] enhancements; and permit the transfer of the [*SYSTEM NAME*] non-proprietary object code and source code to other contractors for use on other systems or platforms.

The Offeror shall describe its plan for making design and interface information available as soon as possible after it is defined or established. The Offeror shall establish and maintain a process that will provide "early and often" design disclosure directly to the Government or to third-party contractors via Government-established access (e.g., the Naval Sea Systems Command Software/Hardware Asset Reuse Enterprise (SHARE) library or other Navy and Marine Corps repository/library resources) to in-process design documentation and computer software. Access to this information shall be supported using industry standards and at minimal cost to the Government. The exchange of information shall be structured so as to protect the Offeror's and third-party developers' proprietary in the information. The Offeror shall address how it intends to resolve any comments from the Government and third-party contractors. The Offeror shall describe how it intends to provide all non-proprietary licenses, source code, drawings, repair and engineering documentation to the Government and third-party contractors at specified key events or at defined intervals.

The Data Rights and Patent Rights offered shall be provided as attachments to the proposal. The Offeror shall cite specific examples of the Government's IPR that illustrate the tenets of the offer, including an overview of the information provided in the following required attachments, as well as a discussion of how the information contained in the attachments impacts or illustrates the tenets of the proposal:

2. The Offeror shall provide the following information as attachments to its offer:

a. Rights in Noncommercial TD, Noncommercial CS, and Noncommercial CSD.

i. The 7017 List. The Offeror shall attach to its offer a list identifying all noncommercial TD, CS, and CSD that it asserts should be delivered with other than unlimited rights. Specific instructions and requirements concerning this list are set forth in the DFARS 252.227-7017 "Identification and Assertion of Use, Release, or Disclosure Restrictions" (June 1995) provision incorporated at Section K of this solicitation. If the Offeror is awarded a contract, the 7017 List shall be attached to the contract.

ii. The 7028 List. The Offeror shall attach to its offer a list identifying all noncommercial TD, CS, and CSD that it intends to deliver with other than unlimited rights and that are identical or substantially similar to TD, CS, or CSD that the Offeror has delivered to, or is obligated to deliver to, the Government under any contract or subcontract. Specific instructions and requirements concerning this list are set forth in the DFARS 252.227-7028 "Technical Data or Computer Software Previously Delivered to the Government" (June 1995) provision incorporated at Section K of this solicitation. Additionally, if there is no data or software to be identified in the 7028 list, the Offeror shall submit the list and enter "None" as the body of the list. If the Offeror is awarded a contract, the 7028 List shall be attached to the contract.

iii. Supplemental Information. The Offeror shall attach to its offer a statement, entitled "Supplemental Information—Noncommercial Technical Data, Noncommercial Computer Software, Noncommercial Computer Software Documentation" (the statement) that, for each item of noncommercial TD, CS, or CSD that the Offeror asserts should be delivered with specifically negotiated license rights or other non-standard rights (as discussed at DFARS 252.227-7013 "Rights in Technical Data – Noncommercial Items" (Nov 1995) and/or DFARS 252.227-7014 "Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation" (June 1995)), sets forth a complete description of all such proposed non-standard

restrictions on the Government's ability to use, modify, release, perform, display, or disclose such TD, CS, or CSD. This information may be provided by referencing any proposed non-standard license agreement that is attached to the statement. The Offeror shall submit the statement as an attachment to its offer, dated and signed by an official authorized to contractually obligate the Offeror. If there is no information to be included in the statement, the Offeror need not submit the statement. If the Offeror is awarded a contract, any statement provided will be attached to the contract.

b. Rights in Commercial TD, Commercial CS, and Commercial CSD.

i. The Offeror shall attach to its offer a list, entitled "Commercial Technical Data, Commercial Computer Software, and Commercial Computer Software Documentation-Government Use Restrictions" (the Commercial Restrictions List), that provides the following information regarding all commercial TD, CS, and CSD that the Offeror (including its sub-Offerors or suppliers, or potential sub-Offerors or suppliers, at any tier) intends to deliver with other than unlimited rights: (1) identification of the data or software; (2) basis for asserting restrictions, such as licensed products including open source; (3) asserted rights category (e.g. GPR or restricted rights); and (4) name of the entity asserting restrictions. For any item designated as NDI, the Offeror is requested to provide details of the Agency and level therein that paid for development and the contract number(s) and dates wherein payments were received. For each entry in the list citing an asserted rights category other than the standard license rights applicable to commercial TD as set forth in the DFARS 252.227-7015 "Technical Data – Commercial Items" (Nov 1995) clause, the Offeror shall provide a complete description of the asserted rights (e.g., a specially negotiated license, open source, or the license customarily offered to the public); this information may be provided by referencing any proposed non-standard or commercial license agreement that is attached to the list, but in all cases, the non-standard or commercial license will be attached for Government review. The Offeror shall submit the Commercial Restrictions List as an attachment to its offer, dated and signed by an official authorized to contractually obligate the Offeror. If there is no information to be included in the Commercial Restrictions List, the Offeror shall submit the list and enter "None" as the body of the list. If the Offeror is awarded a contract, the Commercial Restrictions List shall be attached to the contract.

ii. The Offeror shall attach to its offer a list, entitled "Commercial-Off-the-Shelf (COTS) Licenses – Identification and Licensing" (the COTS List), providing information concerning all COTS licenses for which it intends to pay license fees and the amount of the fees in order to perform under the contract. The Offeror shall submit the COTS List as an attachment to its offer, dated and signed by an official authorized to contractually obligate the Offeror. The Offeror's COTS list shall also include a statement explaining how the COTS will be used in the system. If there is no information to be included in the COTS List, the Offeror shall submit the list and enter "None" as the body of the list. If the Offeror is awarded a contract, the COTS List shall be attached to the contract.

c. Rights in Background Inventions.

i. The Offeror shall attach to its offer a list, entitled "Background Inventions—Identification and Licensing" (the BIIL List), providing information concerning all background inventions. A "background invention" is any invention, other than a subject invention, that is covered by any patent or pending patent application in which the Offeror (including its sub-Offerors or suppliers, or potential sub-Offerors or suppliers, at any tier) (1) has any right, title, or interest; and (2) proposes to incorporate into any items, components, or processes (ICP) to be developed or delivered, or that will be described or disclosed in any TD, CS, or CSD to be developed or delivered, under the resulting contract. For each background invention, the BIIL List shall identify (1) the invention, by serial number, title, and date of the patent application or issued patent; (2) the ICP, TD, CS, and CSD that will incorporate or disclose the invention; (3) the nature of the Offeror's right, title, or interest in the invention; and (4) whether the Offeror is willing to sell to the Government a license to practice the invention, and if so, a complete description of the terms of such proposed license. The Offeror shall submit the BIIL List as an attachment to its offer, dated and signed by an official authorized to contractually obligate the Offeror. If there is no information to be included in the BIIL List, the Offeror shall submit the list and enter "None" as the body of the list. If the Offeror is awarded a contract, the BIIL List shall be attached to the contract.

ii. The Offeror shall attach to its offer a list, entitled "Third Party Patent Rights – Identification and Licensing" (the 3PRIL List), providing information concerning all third party patent rights for which it intends to pay royalties and the amount of the royalties in order to perform under the contract. The Offeror shall submit the

3PRIL List as an attachment to its offer, dated and signed by an official authorized to contractually obligate the Offeror. If there is no information to be included in the 3PRIL List, the Offeror shall submit the list and enter "None" as the body of the list. If the Offeror is awarded a contract, the 3PRIL List shall be attached to the contract.

Evaluation Subfactor ( ): OA Past Performance

The Offeror shall demonstrate, through its use of previously developed similar technologies, the Offeror's ability to meet the design, development, testing, and production requirements of this solicitation, in particular its approach to a modular open system design, in the quantities and schedules specified. The Offeror shall provide a list of all relevant contracts and subcontracts of similar work scope or technical complexity to the efforts described herein within the last five (5) years. In addition to contracts and subcontracts performed by the Offeror, relevant contracts and subcontracts of an acquired company, division, or subsidiary shall be identified. The Offeror shall place particular emphasis on DoD or Government contracts and subcontracts, especially those that involved a modular open systems approach.

If the Offeror did not perform similar projects during the last five years, the Offeror may discuss other related projects that demonstrate the Offeror's capabilities to perform work of similar nature and magnitude. Note, if the Offeror omits projects or contracts of which the Government evaluation team is aware or becomes aware, then customer assessments may be sought from the relevant program and technical support offices. Offerors are advised that (1) the Government may contact any or all references listed in the proposal and other third parties, unreferenced customers, agencies, Offerors, consumer protection organizations, etc., for performance information, or use any other data available (such as contractor Performance Assessment Reporting System (CPARS)); (2) the Government reserves the right to use any such information received as part of its evaluation of the Offeror's past performance; and (3) if the Offeror omits projects of which the Government evaluation team is aware or becomes aware, customer assessments may be sought from the relevant organizations.

For each listed contract, the Offeror shall prepare a synopsis that includes a narrative self-assessment of the contract and specific details describing why the contract was, or was not, successful. Each synopsis shall be in the following format:

(1) Contract number;
(2) Customer's name, address, telephone number, and a point of contact (whether Government or Commercial), and whether the Offeror was the prime Offeror or a sub-Offeror;
(3) Contract type;
(4) Cost information;
(5) Brief product description, including quantities, hours, and state of acquisition (i.e., development or production);

(6) Self-Assessment. The Offeror shall provide a self assessment of its performance under each contract identified above. The self assessment shall address (a) the degree to which the Offeror demonstrated its design approach, plans for technology insertion, and sustainment strategy were consistent with the modular open systems requirements, (b) the degree to which the Offeror managed the impact of changing requirements and evolving technology on the system's ability to continue to satisfy improved capabilities over time, (c) the degree to which the Offeror's test and evaluation planning contained the means for testing the conformance to open standards to ensure the openness of key interfaces throughout the system life cycle, and (d) the degree to which the Offeror's approach contains capabilities to easily and quickly update, revise, and change the system as threats (warfighting and information assurance threats) or technologies (COTS or reusable) evolve. Cost growth, material problems, manufacturing problems, quality problems, labor problems, facility problems, and delivery delays shall be disclosed and fully explained. The Offeror shall demonstrate how it was able to resolve (or why it could not resolve) special or unexplained problems as well as difficulties in meeting delivery schedule, performance, or cost parameters. Emphasis shall be placed on the Offeror's ability to solve problems associated with critical testing, quality control, and production. Furthermore, the Offeror shall indicate any quality awards or recognition received.

(7) Customer References. The Offeror shall request Customer questionnaires to be submitted directly to the Procurement Contracting Officer's (PCO's) representative and/or copies submitted with the Offeror's proposal and provide the following information for each described contract:

- The Procuring Contracting Officer's name, address, and telephone number.
- The Administrative Contracting Officer's name, address, and telephone number.
- The Government and Offeror's Program Managers' names, addresses, and telephone numbers.
- The names, addresses, and telephone numbers of other individuals having knowledge of the Offeror's performance under each contract.

At a minimum, the Government's questionnaire for assessing an Offeror's OA past performance must address:

- The degree to which the Offeror demonstrated its design approach, plans for technology insertion, and sustainment strategy were consistent with the modular open systems requirements.
- The degree to which the Offeror managed the impact of changing requirements and evolving technology on the system's ability to continue to satisfy improved capabilities over time.
- The degree to which the Offeror's test and evaluation planning contained the means for testing the conformance to open standards to ensure the openness of key interfaces throughout the system life cycle.

- The degree to which the Offeror's approach contains capabilities to easily and quickly update, revise, and change the system as threats (warfighting and information assurance threats) or technologies (COTS or reusable) evolve.

COST PROPOSAL (NOA RELATED)

Section ( ) Supplemental Information Concerning Cost/Price of Noncommercial Technical Data (TD), Noncommercial Computer Software (CS), and Noncommercial Computer Software Documentation (CSD)

(a) Cost/Price Information. In addition to the submission requirement of DFARS 252.227-7017, the Offeror shall provide a list entitled "Supplemental Information Concerning Cost/Price of Noncommercial Technical Data (TD), Noncommercial Computer Software (CS), and Noncommercial Computer Software Documentation (CSD)" (hereinafter the Supplemental 7017 Cost/Price List). This list shall be provided as an attachment to proposal. This list shall provide supplemental information concerning the noncommercial TD, CS, or CSD identified in the DFARS 252.227-7017 "Identification and Assertion of Use, Release, or Disclosure Restriction" list (hereinafter 7017 List), as follows:

(1) License Option Price Information. For each item of noncommercial TD, CS, and/or CSD that the Offeror asserts should be delivered with less than Government Purpose Rights (GPR) (as defined in (DFARS 252.227-7013 "Rights in Technical Data – Noncommercial Items" (Nov 1995) and/or DFARS 252.227-7014 "Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation" (June 1995)), and for which the Offeror is willing to sell to the Government greater rights than those identified in the 7017 List, the Offeror shall identify those greater rights, provide an option price at which the Government may purchase such greater rights, and identify the period of time during which the option is available for the Government to exercise.

(2) Government Preferences. The Offeror may state any license option price as a firm fixed price, a percentage royalty rate (or use fee), or any other comparable compensation scheme, provided that the Government can reasonably calculate a sum-certain price for the license option using the price information and terms and conditions information the Offeror provided. The Government prefers that any license option prices the Offeror provides in the Supplemental 7017 Cost/Price List cover all noncommercial CS, noncommercial CSD, and noncommercial TD included in any affected software and that the Offeror state them on a price-per-system basis.

(b) Duty to Submit Negative List. If there is no supplemental information to be submitted in the Supplemental 7017 Cost/Price List the Offeror shall submit the list and enter "None" as the body of the list. Failure to provide a list may render the Offeror ineligible for award.

(c) Use During Source Selection. Information provided in the Supplemental 7017 Cost/Price List, as well as the information provided in the 7017 List, may be used in the source selection process as part of the Government's best value analysis to evaluate the impact on the Government's ability to use, re-use, or disclose the TD, CS, and/or CSD for government purposes.

Section ( ) Supplemental Information Concerning Cost/Price of Commercial Computer Software (CS), and Commercial Computer Software Documentation (CSD) and Commercial Technical Data (TD)

(a) Cost/Price Information. The Offeror shall provide a list to the Government, entitled "Commercial Restrictions List – Cost/Price Information" (hereinafter the CRLCPI List). This list shall be provided as an attachment to proposal. The CRLCPI List shall state a license option price for all commercial CS, commercial CSD, and commercial TD on the CRL List for which the Offeror is willing to sell the Government a license. If the Offeror is willing to provide a license option, the Offeror shall identify the specific rights it is willing to grant, and the period of time during which the option is available for the Government to exercise.

(b) License Option Pricing: Government Preferences. The Offeror may state any license option price as a firm fixed price, a percentage royalty rate (or use rate), or any other comparable compensation scheme, provided that the Government can reasonably calculate a sum-certain price for the license option using the price information the Offeror provided. The Government prefers that any license option prices the Offeror provides in the CRLCPI List cover all commercial CS, commercial CSD, and commercial TD included in any affected software and that the Offeror state them on a price-per-system basis.

(c) Duty to Submit Negative List. If the Offeror has no Option License Pricing to provide in the CRLCPI List, the Offeror shall still submit the CRLCPI List and enter "None" in the body of the List. Failure to provide a list may render the Offeror ineligible for award.

Section ( ) Supplemental Information Concerning Cost/Price of Background Inventions

(a) License Option Pricing: Government Preferences. The Offeror may state any license option price as a firm fixed price, a percentage royalty rate (or use rate), or any other comparable compensation scheme, provided the Government can reasonably calculate a sum-certain price for the license using the price information provided by the Offeror. The Government prefers that any license option prices stated by the Offeror in the Background Inventions List – Cost/Price Information (BICPI List) cover all background inventions included in any affected software, and the Offeror states them on a price-per-system basis.

(b) Duty to Submit Negative List. If the Offeror has no Option License Pricing to provide in the BICPI List, the Offeror shall still submit the BICPI List and enter "None" in the body of the list. Failure to provide a list may render the Offeror ineligible for award.

Software Process Improvement Initiative Guidance[14]

The Navy and Marine Corps shall request that Offerors submit a draft version of their Software Development Plan (SDP) as a part of their proposal package as well as a rationale for how the Navy justify their process selection.

> "As a part of the proposal, Offerors shall submit a draft version of their SDP in accordance with the content defined in the SOW. The SDP may be formatted as desired by the Offeror but must contain the information described by the SDP DID. The SDP is not page limited. An SDP, if it is to-the-point and appropriate, may be preferable to a SDP that is excessively wordy and contains non-essential material.
>
> "Offerors shall also submit, as a part of their proposal, an SDP Rationale which describes why their specific approach is appropriate for the system to be procured and how their proposed processes are equivalent to those articulated by CMMI® capability level 3.
>
> "Offerors shall submit a description of previous experience in developing software of the same nature as this solicitation. As a part of this description, the Offerors shall describe the extent to which personnel who contributed to these previous efforts will be supporting this solicitation.
>
> "Offerors shall submit a description of previous experience in developing software using the same or similar processes and approaches as proposed for this solicitation. Offerors shall describe the extent to which personnel who contributed to these previous efforts will be supporting this solicitation. Offerors shall also describe any previous CMMI or equivalent model-based process maturity appraisals performed. As a part of this description, Offerors shall identify the organizational entity and location where the appraisal was performed, the type of evaluation, the organization performing the evaluation, and the level earned."

[14] Assistant Secretary of the Navy (Research, Development and Acquisition)'s Memorandum on "Software Process Improvement Initiative Contract Language," dated November 17, 2006.

Chapter D: RECOMMENDATIONS FOR SECTION M (EVALUATION CRITERIA) LANGUAGE

Although the Guidebook was developed for mixed systems comprised of hardware, middleware and software elements, the recommended language can be easily tailored to reflect hardware- or software-only acquisitions.

EVALUATION FACTORS

The Government will evaluate the Offeror's proposal in accordance with the factors and subfactors set forth below:

Naval Open Architecture Guidance

Factor ( ): Technical Approach and Processes
In evaluating the OA Technical Approach and Processes, the Government will use information provided in the proposal to assess the Offeror's ability to execute:

Subfactor 1. Open Systems Approach and Goals

Subfactor 2. Interface Design and Management

Subfactor 3. Treatment of Proprietary or Vendor-Unique Elements

Subfactor 4. Life Cycle Management and Open Systems

Factor ( ): System Compliance with Naval OA Guidance
In evaluating the System Compliance with Naval OA Guidance, the Government will use information in the proposal to assess the degree to which the Offeror's approach complies with PEO-specified (or Naval Enterprise) Technical Guidance Points as identified in Table A of Section L.

Factor ( ): Management Approach
In evaluating the Management Approach, the Government will use information in the proposal to assess the degree to which the Offeror's approach facilitates competition at various levels (tiers) of the offered modular system, awards significant portions of the overall system to third party sources, and uses Integrated Product Teams (IPT) to improve processes, manage risk, and increase efficiency.

Factor ( ): Data Rights, Computer Software Rights and Patent Rights
In evaluating the Data Rights and Patent Rights, the Government will use information in the proposal to assess the extent to which the rights in technical data (TD), computer software (CS), computer software documentation (CSD), and inventions/patents offered to the Government ensure unimpeded, innovative, and cost effective production, operation, maintenance, and upgrade of the [*SYSTEM NAME*] throughout its life cycle;

allow for open and competitive procurement of [*SYSTEM NAME*] enhancements; and permit the transfer of the [*SYSTEM NAME*] non-proprietary object code and source code to other contractors for use on other systems or platforms.

Factor ( ): Past Performance

Subfactor 1. Offeror's OA Past Performance Submissions

In assessing the Offeror's past performance submissions on similar contracts, the Government will consider how well the Offeror implemented Open Architecture principles and used a modular open system approach, including:

- The degree to which the Offeror demonstrated that its design approach, plans for technology insertion, and sustainment strategy were consistent with the modular open systems requirements.
- The degree to which the Offeror managed the impact of changing requirements and evolving technology on the system's ability to continue to satisfy improved capabilities over time.
- The degree to which the Offeror's test and evaluation planning contained the means for testing the conformance to open standards to ensure the openness of key interfaces throughout the system life cycle.
- The degree to which the Offeror's approach contains capabilities to easily and quickly update, revise, and change the system as threats (warfighting and information assurance threats) or technologies (COTS or reusable) evolve.

Factor ( ): Cost Proposal (NOA Related)

The Government will evaluate the following costs with respect to how they further Naval Open Architecture goals:

- Supplemental Information Concerning Cost/Price of Noncommercial Technical Data (TD), Noncommercial Computer Software (CS), and Noncommercial Computer Software Documentation (CSD)
- Supplemental Information Concerning Cost/Price of Commercial Computer Software (CS), and Commercial Computer Software Documentation (CSD) and Commercial Technical Data (TD)
- Supplemental Information Concerning Cost/Price of Background Inventions

Software Process Improvement Guidance[15]

At a minimum, the following three evaluation factors relating to the Offeror's software development process shall be included in Section M:

[15] Assistant Secretary of the Navy (Research, Development and Acquisition)'s Memorandum on "Software Process Improvement Initiative Contract Language," dated November 17, 2006.

a) Factor x – Software development approach

Description: The Government will evaluate the Offeror's proposed software development approach to ensure it is appropriate for the system to be developed and meets standard levels of completeness and process quality. For this evaluation, the Government will rely primarily on the draft SDP and the SDP Rationale.

Criteria: IEEE/EIA Std. 12207.1, Section 4.2.3, H.3 - Characteristics of Life Cycle Data

b) Factor x – Software development experience

Description: The Government will evaluate the Offeror's previous experience in developing software of the same nature as that being acquired with this solicitation.

Factor x - Software development process experience

Description: The Government will evaluate the Offeror's previous experience in developing software using the same or similar approach as proposed for this solicitation. The results of any standard model-based process maturity appraisals performed within 24 months prior to proposal submission, and the number of proposed staff experienced in using these processes will be part of the evaluation criteria.

Chapter E: RECOMMENDATIONS FOR INCENTIVIZING CONTRACTORS

In response to a December 2005 report and recommendations by the Government Accountability Office, "DEFENSE ACQUISITIONS: DoD Has Paid Billions in Award and Incentive Fees Regardless of Acquisition Outcomes," the Defense Department on March 29, 2006, issued a Memorandum on Award Fee Contracts (FAR 16, DFARS 215, DFARS 216). We recommend that this memorandum be consulted when preparing an Award Fee Plan. (It is available on the Office of the Secretary of Defenses website at http://www.acq.osd.mil/dpap/policy/policyvault/2006-0334-DPAP.pdf.)

Subsequently, the Government Accountability Office (GAO) in May 2009 issued a follow-up report on award fee practices, "Federal Contracting: Guidance on Award Fees Has Led to Better Practices but Is Not Consistently Applied" (GAO-09-630, available at http://www.gao.gov/new.items/d09630.pdf). The report reviewed the award fee practices of five government agencies, including the Department of Defense—that accounted for over 95 percent of dollars spent on award fee contracts in 2008. This GAO review was conducted in light of Office of Management and Budget (OMB) December 2007 guidance on the "Appropriate Use of Incentive Contracts" (available at http://www.whitehouse.gov/omb/assets/omb/procurement/memo/incentive_contracts_120407.pdf).

The OMB memo espoused principles for applying award fees such as (1) limiting the opportunities for earning unearned fees in subsequent periods (fee rollover); (2) linking award fees to acquisition outcomes; (3) designing evaluation criteria to motivate excellent performance; and (4) not paying for unsatisfactory performance. GAO found that DoD's updated guidance largely reflects these principles and that it now prohibits payment of award fees for unsatisfactory performance. In addition, it found that DoD will save more than $450 million by not routinely offering contractors a second chance at unearned fees and $68 million by using more clearly defined evaluation criteria.

In addition, the report cites other important guidance, such as the Federal Acquisition Regulations (FAR), which advise that "an award fee should be used when the work to be performed is such that it is neither feasible nor effective to devise predetermined objective incentive targets applicable to cost, technical performance, or schedule." It also reiterates the OMB guidance that "it is imperative that award fees are linked to desired outcomes such as discrete events or milestones. Such milestones include design reviews and system demonstrations for weapons systems."

In April 2007, DoD provided additional guidance on contracting incentives, "[r]ecognizing that most DOD contracts contain objective criteria, the guidance clarified that in instances where objective criteria exist and the Contracting Officer and Program Manager wish to also evaluate and incentivize subjective elements of performance, the most appropriate contract type would be a multiple incentive type contract containing both incentive and award fee criteria."

As part of the Naval OA effort, we recommend the OMB and DoD guidance cited in this GAO report be followed to help programs reap the benefits of properly motivating contractors. The Office of Management and Budget's Office of Federal Procurement Policy Incentive Contract Checklist is available from the OMB website at http://www.whitehouse.gov/omb/assets/omb/procurement/memo/incentive_contracts_120407.pdf

Although the Guidebook was developed for mixed systems comprised of hardware, middleware and software elements, the recommended language can be easily tailored to reflect hardware- or software-only acquisitions.

For additional guidance, refer to Office of the Under Secretary of Defense (Acquisition, Testing, and Logistics (OUSD(AT&L)/DPAP) policy memo dealing with "Proper use of Award Fee Contracts and Award Fee provisions" available at: http://www.acq.osd.mil/dpap/policy/policyvault/2007-0197-DPAP.pdf.

The following is guidance for developing a contract Incentive Plan for a program seeking to implement Naval Open Architecture principles. Additional information is found in the Department of Defense's Open Systems Joint Task Force (OSJTF) Modular Open Systems Approach (MOSA) to acquisition.

This chapter is intended to serve as a guide for those programs seeking to incentivize their contractors to implement Naval Open Architecture business and technical principles in both development and production contracts. The award fee criteria are drawn from the business and technical principles embodied in the MOSA principles and OUSD (AT&L)'s draft guide. The Award Term recommendations are based on contracting practices that have been used in the Army, Air Force, SPAWAR and NAVSEA (on the Seaport contract vehicle and Submarine Warfare Federated Tactical System contract). Award Terms are particularly appropriate for service and support contracts but are worth considering for other types of contracts for such functions as integration, test, and installation.

Part 1 Award Fees

For "Performance and Schedule" portion of the Award Fee Plan, the Government shall apply the following OA-related award fee criteria:

- Incorporation of considerations for reconfigurability, portability, maintainability, technology insertion, vendor independence, reusability, scalability, interoperability, upgradeability, and long-term supportability as defined by Naval Open Architecture.
- Implementation of a layered and modular system that makes maximum use of non-proprietary Commercial-Off-the-Shelf / Non-developmental Item (COTS/reusable NDI) hardware, software, operating systems, and middleware.

- Minimization of inter-component dependencies and ability to allow components to be decoupled and re-used, where appropriate.
- Early and often disclosure of data related to the design of designated components or subcomponents.
- Adaptability to evolving requirements and threats.
- Modularity of products.
- Use of open, standards-based interfaces.
- Interoperability with joint warfighting applications and secure information exchange.
- Reduction of development cycle time and total life-cycle cost.
- Commonality and reuse of components within the system. Emphasis should be placed on reuse of components (software, middleware, applications software, algorithms, etc.) from the pertinent Navy and Marine Corps community of interest as a means of facilitating maintenance and upgrades.
- Identification of potential candidates for reuse from outside the contractor's own organization for inclusion in selection of design alternatives.
- Enabling rapid technology insertion.

For "Work Relations" portion of the Award Fee Plan, the Government shall apply the following OA-related criteria:

- Collaboration with the Government, contractors and Vendors to develop a highly performing system.
- Working with the Government, contractors and Vendors to incorporate revised schedules and meet changing Government requirements.
- Identification of and working with contractors and Vendors to improve *PROGRAM X* performance.
- Identification and incorporation of innovative methods with contractors and Vendors to provide development assets without procuring unique assets.
- Identification of and working with contractors and Vendors who possess innovative technologies and methods.
- Working with contractors and Vendors to identify new technology and functionality.
- Working with contractors and Vendors to identify innovative ways to incorporate new technology that improves performance.
- Working with contractors and Vendors to mitigate the risks associated with technology obsolescence, being locked into proprietary or vendor-unique technology, and reliance on a single source of supply over the life of a system.

Alternatively, a Program Manager may want to structure award fees around four different categories: (1) Cost, (2) Schedule, (3) Management, and (4) Technical attributes. This provides a different kind of flexibility where each category can be given a different emphasis by giving it a percentage weight of the award fee total. For example, 10%, 20%, 30%, and 40%, respectively, would hold technical attributes as the most important and cost as the least important. Additionally, from an OA perspective, a PM will want to include the following language under "Technical":

The contractors will be evaluated on whether the technical data rights submitted with the deliverable support the Naval Open Architecture (OA) principles, including minimizing proprietary elements, without unjustified or inappropriate limitations on rights or use by the Government.

Part 2 Award Terms

An award term incentive contract is a relatively new acquisition option and while it is not yet described in the Federal Acquisition Regulation (FAR) or Defense Federal Acquisition Regulation Supplement (DFARS) it is modeled after the award fee incentive described in FAR 16.405-2 and DFARS 216.405-2. Being that award term incentives relate closely with those of award fee, the guidance described in Chapter D of this Guidebook are directly applicable and will not be restated in this chapter. Rather, an explanation of the award term contract and recommendations for establishing an Award Term Plan is provided. Program Managers should weigh the benefits of using award terms against the value of frequent competitions to encourage innovation and exceptional performance.

Contract Premise: Instead of rewarding the contractor with additional fee for exceptional performance the award term contract rewards the contractor by extending the contract period of performance in the form of additional term periods added on to the basic contract. Under an award term incentive the Government monitors and evaluates the contractor's performance, and if it is decided that the contractor's performance was excellent, then the contractor earns an extension. During subsequent evaluations if the contractor maintains excellent performance additional terms are awarded. If the contractor's performance decreases, the possibility of the contractor not being awarded an additional term or even having terms previously awarded taken away is the incentive for the contractor to perform at an exceptional level. The additional terms are not option periods but extensions to the contract. This distinguishes the award term contract from other incentive type contracts in that if the contractor meets the award term criteria outlined in the contract, and if all other stipulated conditions such as continuing need and availability of funds are met, then the Government must either extend the contract or terminate it for convenience or default.

Example of an Award Term Contract Timeline. A competitive contract is awarded consisting of a base year plus four (4) one-year options. During the base year the contractor's performance is evaluated and, depending on how the Award Term Plan is structured, the initial evaluation can either be for informational purposes only or it can be a formal evaluation in which contractor performance determines the awarding of an award term (at this point no award terms can be lost since the contractor has yet to earn one). Since the basic contract is for five years (where an evaluation is conducted for each of those years) the contractor could be rewarded with up to five additional year long extensions to the basic contract for a total of 10 years maximum.

Considerations:

- It is highly recommended that mid-year reviews be conducted that will provide informational feedback to the contractor on performance.
- The structure of the contract period of performance is flexible within the boundaries established by the FAR/DFARS. For example, Award Term Review Board (ATRB) reviews could be conducted annually or semiannually; base and option years, number of award terms, etc., are at the discretion of the contracting office.
- Evaluation criteria are at the discretion of the contracting officer and program office administering the contract and could include evaluations for cost, schedule, technical performance, customer satisfaction, etc. It is the policy of the Department of Defense that objective criteria be utilized, whenever possible, to measure contract performance.
- Within the evaluation criteria it is recommended that the government's expectation of how the contractor will be evaluated in implementing Naval Open Architecture be clearly defined (using the same considerations as those identified in Chapter D for award fee contracts).

Award Term Plan Structure: There is no mandated format for an award term plan. It is recommended that the structure, however, include the following components:

- A cover sheet that identifies the Award Term Plan (ATP) as an attachment to the formal contract with signature blocks included for the Procuring Contracting Officer (PCO) and the Term Determining Official (TDO);
- Table of Contents;
- An Introduction section that describes the overall objectives of the ATP and how it relates to the requirements in the Statement of Work (SOW);
- A section that describes the organization (Award Term Review Board (ATRB), TDO, etc.) and responsibilities of the board and its members;
- A description of the award term process;
- A description of how changes to the ATP will be addressed; and
- Annexes to the ATP should include:
    - Members of the ATRB (by government code – not by name)
    - A time line for award term evaluation periods
    - Evaluation Criteria
    - Example of the assessment form(s).

Appendix 1: RECOMMENDED NOA CDRL AND DELIVERABLE ITEMS

The following are examples of Contract Data Requirements Lists (CDRLs) and deliverable items that support NOA and can be incorporated into contracts. This is not intended to be an exhaustive list of all potential deliverable items, but is an attempt to list only those deliverables we believe significantly support Naval Open Architecture, and can be augmented/reduced as the Program Manager believes is appropriate. The frequency and delivery dates of the deliverables must be specified, along with a list of deliverable recipients.

Deferred Ordering of Technical Data or Computer Software (Including Design and Development Artifacts)

DFARS 227.7103-8(b) DEFERRED DELIVERY AND DEFERRED ORDERING OF TECHNICAL DATA

(b) *Deferred Ordering*. Use the clause at 252.227-7027, Deferred Ordering of Technical Data or Computer Software, when a firm requirement for a particular data item(s) has not been established prior to contract award but there is a potential need for the data. Under this clause, the contracting officer may order any data that has been generated in the performance of the contract or any subcontract thereunder at any time until three years after acceptance of all items (other than technical data or computer software) under the contract or contract termination, whichever is later. The obligation of subcontractors to deliver such data expires three years after the date the contractor accepts the last item under the subcontract. When the data are ordered, the delivery dates shall be negotiated and the contractor compensated only for converting the data into the prescribed form, reproduction costs, and delivery costs.

Software Development Process[16]

The software development process to be used by the winning contractor team is to be defined and documented in the developer's SDP which shall be designated as a CDRL. Contractor teams are to submit an initial delivery of the SDP with the proposal. After contract award, an updated version is to be delivered based on discussion and negotiations with the Government regarding approval of SDP content.

In accord with DoN policy, the SDP is to conform to the framework established in IEEE.EIA 12207, with the content as required in ASN(RD&A) Memo Nov. 17, 2006 titled, "Software Process Improvement Initiative Contract Language," and ASN(RD&A)

[16] Assistant Secretary of the Navy (Research, Development and Acquisition)'s Memorandum on "Software Process Improvement Initiative Contract Language," dated November 17, 2006.

Memo July 13, 2007 titled, "Software Process Improvement Initiative (SPII) Guidance for Use of Software Process Improvement Contract Language." The format of the SDP can be contractor-selected, but can be required to follow the format as defined in Appendix L of the SPII Guidebook.

Specifically, the SDP should:

- Document all processes applicable to the system to be acquired, including the Primary, Supporting, and Organizational life cycle processes as defined by IEEE/EIA Std. 12207 as appropriate.
- Contain the content defined by all information items listed in Table 1 of IEEE/EIA Std. 12207.1, as appropriate for the system and be consistent with the processes proposed by the developers. If any information item is not relevant to either the system or to the proposed process, that item need not be required.
- Adhere to the characteristics defined in section 4.2.3 of IEEE/EIA Std. 12207, as appropriate.
- Contain information at a detail sufficient to allow the use of the SDP as the full guidance for the developers. In accordance with section 6.5.3a of IEEE/EIA Std. 12207.1, it should contain, "specific standards, methods, tools, actions, reuse strategy, and responsibility associated with the development and qualification of all requirements, including safety and security."

Naval Open Architecture Products

It is recommended that the Program Office perform an assessment of its Intellectual Property Rights needs and craft its CDRL and Deliverable requirements accordingly. If the Program Office, PEO, Domain or Sponsor believes that the program deliverables would be of such interest that they warrant inclusion in the appropriate repository (such as Surface's SHARE or PEO C4I's NESI) then the CDRL and deliverables should include those design, developmental, or diagnostic items needed to reproduce or recreate the asset.

The ideal asset would have artifacts in most or all of the following categories. The key to obtaining these artifacts is to require that they be delivered as part of the terms of the contract. These deliverables must be delivered with Government Purpose Rights (GPR) if they are to be added to a Government repository. In order to facilitate reuse, the asset should bundle the following or their equivalent:

- Requirements (e.g., Word documents, DOORS file or Excel or XML export)
- Architecture models (e.g., System Architect files, including DoDAF views where required)
- Functional models (e.g., CORE file in native format or XML export) Software models (e.g., Rose/Rhapsody/iUML (Unified Modeling Language)/Artisan models in native or XMI format; minimum diagrams Class and State or Interaction/Sequence)

- Hardware models (e.g., CAD DXF, IEGS files)
- Human systems engineering models (e.g., IPME or Envision Ergo files)
- Cost models (e.g., PRICE, SEER, COMET, VAMOSC, Excel files)
- Modeling and Simulation data (e.g., NETWARS/OPNET, NSS, GCAM - scenarios, environmental, platforms, tactics, MOEs, MOPs in XMI format following JC3IEDM or XMSF standards)
- Test plans and results (e.g., QA Run, Quality Center files or Word or Excel export)
- Logistics data (e.g., COMPASS, CASA, PowerLOG in native or XML/CSV format)

Recommended NOA CDRL and Deliverable Items

The following recommended deliverables for open architecture systems have official Deliverable Item Descriptions (DIDs) accepted by the Department of Defense's Defense Standardization Program. The official DIDs are available from the Document Automation and Production Service (DAPS) Acquisition Streamlining and Standardization Information System (ASSIST) database at http://assist.daps.dla.mil. To obtain these DIDs simply search the database using either the DID's title or its ID number listed below in the brief descriptions.

1. Software Development Plan (SDP): The SDP describes a developer's plans for conducting a software development effort. The term "software development" is meant to include new development, modification, reuse, reengineering, maintenance, and all other activities resulting in software products. [DID ID: DI-IPSC-81427A]

2. Software Requirements Specification (SRS): The SRS specifies the requirements for a Computer Software Configuration Item (CSCI) and the methods to be used to ensure that each requirement has been met. Requirements pertaining to the CSCI's external interfaces may be presented in the SRS or in one or more Interface Requirements Specifications (IRSs) (DI-IPSC-81434A) referenced from the SRS. [DID ID: DI-IPSC-81433A] It has also been defined as a complete description of the behavior of the software to be developed. It includes a set of use cases that describe all of the interactions that the users will have with the software. It also contains functional requirements, which define the internal workings of the software: that is, the calculations, technical details, data manipulation and processing, and other specific functionality that shows how the use cases are to be satisfied. It also contains nonfunctional requirements, which impose constraints on the design or implementation (such as performance requirements, quality standards or design constraints). [Stellman & Greene Consulting; http://www.stellman-greene.com]

3. Software Version Description (SVD): The Software Version Description (SVD) identifies and describes a software version consisting of one or more Computer Software Configuration Items (CSCIs). It is used to release, track, and control software versions. [DID ID: DI-IPSC-81442A]

4. Software Product Specification (SPS): The SPS contains or references the executable software, source files, and software support information, including "as built" design information and compilation, build, and modification procedures, for a Computer Software Configuration Item (CSCI). [DID ID: DI-IPSC-81441A] It is the detailed design and description of Software Items (SIs) comprising the product baseline. Analogous to the Item Detail Specification of a hardware Configuration Item (CI) in the product baseline of a hardware system. [Defense Acquisition University]

5. Software Installation Plan (SIP): The SIP is a plan for installing software at user sites, including preparations, user training, and conversion from existing systems. [DID ID: DI-IPSC81428A]

6. Software Test Plan (STP): The Software Test Plan (STP) describes plans for qualification testing of Computer Software Configuration Items (CSCIs) and software systems. It describes the software test environment to be used for the testing, identifies the tests to be performed, and provides schedules for test activities. There is usually a single STP for a project. The STP enables the acquirer to assess the adequacy of planning for CSCI and, if applicable, software system qualification testing. [DID ID: DI-IPSC-81438A]

7. Software Test Report (STR): The Software Test Report (STR) is a record of the qualification testing performed on a Computer Software Configuration Item (CSCI), a software system or subsystem, or other software-related item. The STR enables the acquirer to assess the testing and its results. [DID ID: DI-IPSC-81440A]

8. Software Test Description: The Software Test Description (STD) describes the test preparations, test cases, and test procedures to be used to perform qualification testing of a Computer Software Configuration Item (CSCI) or a software system or subsystem. [DID ID: DI-IPSC-81439A]

9. Software Design Description: The Software Design Description (SDD) describes the design of a Computer Software Configuration Item (CSCI). It describes the CSCI-wide design decisions, the CSCI architectural design, and the detailed design needed to implement the software. The SDD may be supplemented by the Interface Design Descriptions (IDDs) and Database Design Descriptions (DBDDs). [DID ID: DI-IPSC-81435A]

10. Interface Requirements Specification: The Interface Requirements Specification (IRS) specifies the requirements imposed on one or more systems, subsystems, Hardware Configuration Items (HWCIs), Software Configuration Items (SWCIs), manual operations, or other system components to achieve on or more interfaces among these entities. [DID ID: DI-IPSC-81434A]

11. Software Transition Plan (STrP): The developer shall identify all software development resources that will be needed by the support agency to fulfill the support

concept specified in the contract. The developer shall develop and record plans identifying these resources and describing the approach to be followed for transitioning deliverable items to the support agency. [DID ID: DI-IPSC-81429A]

12. Interface Design Description: An Interface Design Description (IDD) describes the interface characteristics of one or more systems, subsystems, hardware configuration items (HWCIs), computer software configuration items (CSCIs), manual operations, or other system components. [DID ID: DI-IPSC-81436A]

13. Data Accession List (DAL): The purpose of the DAL is to provide a medium for identifying contractor internal data which has been generated by the contractor in compliance with the work effort described in the Statement of Work (SOW). The DAL is an index of the generated data that is made available upon request. [DID ID: DI-MGMT-81453A]

14. Computer Software Product End Items: Provides data formatted for review or maintenance to ensure significant milestones are met. Data produced under this requirement will be used during the life cycle for development, operation and maintenance. [DID ID: DI-MCCR-80700]

15. Product Drawings/Models and Associated Lists: These data items provide engineering data to support competitive procurement and maintenance for items interchangeable with the original items. This data represents the highest level of design disclosure. [DID ID: DI-SESS-81000C]

16. Commercial Drawings/Models and Associated Lists: These data items define commercial items acquired by the Department of Defense. [DID ID: DI-SESS-81003C]

17. Drawing Number Assignment Report: This data item provides the information necessary to maintain the Government's drawing number usage records. [DID ID: DI-SESS-81011C]

18. Proposed Critical Manufacturing Process Description (PCMPD): The PCMPD identifies processes which are proposed for inclusion in the technical data package (TDP) as mandatory to meet the engineering requirements of the item or component part thereof for which the TDP is being prepared. [DID ID: DI-81012C]

19. Special Inspection Equipment (SIE) Drawings/Models and Associated Lists: These data items provide the data required for the limited production of SIE which duplicates the physical and performance characteristics of the original SIE. [DID ID: DI-SESS-81004C]

20. Special Tooling (ST) Drawings/Models and Associated Lists: These data items provided the data required for the limited production of ST which duplicates the

physical and performance characteristics of the original ST. [DID ID: DI-SESS-81008C]

21. Source Control Drawing Approval Request: This data item provides the Government with a means for approving and disapproving the use of source control drawings for specific items selected for use in the equipment. [DID ID: DI-SESS-81010C]

22. Detail Specification Documents: A detail specification will be used to specify design requirements for items used in multiple programs or applications, in terms of materials to be used, how a requirement is to be achieved or how an item is to be fabricated or constructed. Detail specification documents are intended for reference in acquisition contracts. [DID ID: ID-SDMP-81464A]

23. Program-Unique Specification Documents: A program-unique specification will be used to specify functional and performance requirements and, where applicable, design solutions for systems, items, software, processes, and materials developed and manufactured for use with a single system, product, or application. Requirements are stated, as applicable, in terms of required results, the environment in which it must operate, interface, and interchange characteristics; materials to be used; how the item is to be fabricated or constructed; and criteria for verifying compliance. Program-unique specification documents are intended for reference in contracts. [DID ID: ID-SDMP-81493]

24. Integrated Master Schedule (IMS): The IMS is an integrated schedule containing the networked, detailed tasks necessary to ensure successful program execution. The IMS is vertically traceable to the Integrated Master Plan (IMP) (if applicable), the Contract Work Breakdown Structure (CWBS), and the Statement of Work (SOW). The IMS shall be used to verify attainability of contract objectives, to evaluate progress toward meeting program objectives, and to integrate the program schedule activities with all related components. This DID is applicable to development, major modification, and low rate initial production efforts; it is not typically applied to full rate production efforts. [DID ID: DI-MGMT-81650]

25. Reuse Management Report (ReMR): The Reuse Management Report (ReMR) provides information about existing software products intended to be re-used as-is or modified as part of the delivered operational software. The report also provides the acquirer insight into the current status of the activities associated with the reuse of these products as compared to the planned activities, and alternative approaches. [DID ID: DI-SESS-81771]

The following recommended deliverables for open architecture systems do not have official Data Item Descriptions (DIDs) maintained by DoD. However, we have listed them and provided brief descriptions to help programs understand the additional types of data they should acquire during system acquisition:

1. An Open System Management Plan addressing architecture openness that describes, but is not limited to: the Offeror's approach to open system architecture, modular, open design; inter-component dependencies; design information documentation; technology insertion; life-cycle sustainability; interface design and management; treatment of proprietary or vendor-unique elements; and, reuse of pre-existing items including all Commercial-Off-the-Shelf/Non-developmental Item (COTS/NDI) components, their functionality and proposed function in the system, and copies of license agreements related to the use of these components for Government approval. The open system management plan shall also include a statement explaining why each COTS/NDI was selected for use. The initial plan shall be submitted with the CDRL.

2. Results of [*periodic or milestone-based*] NOA assessments using Government-specified tools and methodologies (e.g., OAAT or MOSA PART).

3. Results of [*periodic or milestone-based*] market surveys conducted to identify candidate Government IP assets, COTS and other reusable NDI capable of achieving the performance requirements of solutions that it has proposed to custom build.

4. [*Semi-annual, annual, etc.*] Naval Open Architecture-related updates to the System Management Plan.

5. Results of regular [*semi-annual, annual, etc*.] reviews of the contractor's plan for addressing exceptions to reuse.

6. Results of regular [*semi-annual, annual, etc*.] reviews of the contractor's plan for addressing (and minimizing the use of) proprietary or vendor-unique elements.

7. Documented results of product demonstrations that exhibit the OA aspects of the system or component.

8. Regular [*semi-annual, annual, etc*.] review and update of the contractor's rationale for the modularization choices made to generate the design. These updates shall explicitly address any tradeoffs performed, particularly those that compromise the modular and open nature of the system.

9. Documents that provide a detailed tracing of all system requirements (including those contained in the Initial Capabilities Document, Capabilities Development Document, and in Section C of this Solicitation) to one or more design modules. [*See Section L, Paragraph 1, subparagraph c*.]

10. The Offeror shall provide documentation demonstrating that their system design meets MOSA and other requirements identified in Section C/SOW and can facilitate component reuse by conducting a series of demonstrations.

11. The Offeror shall deliver a notional test plan, test protocol, test design, testing software, testing tools, etc., necessary to support the independent Government testing and assessment of the _____ components and demonstration of the interoperability of the components.

12. The Offeror shall deliver to the Government, specifically the activity _____ a copy of the _____software application(s) including all testing devices, testing software, results and materials, along with all supporting documentation, for the Government to use for testing.

13. The Offeror will develop and maintain a Common Data Model for the system and will provide the Government with updates at [*monthly, quarterly, etc*.] intervals.

14. Executable source code and binaries (including the specified programming languages, libraries, and tools).

15. Package description: makefiles. "Makefiles" is a set of software code that performs a set of actions in a sequence. Normally a "makefile" is a (plain text) script file that a compiler uses to compile and link files to make an executable. The file lets the compiler know the order to compile. Specifically, "make" is a command to use the makefile to compile a C++ file. For example, Java uses a program called Ant (http://ant.apache.org/) which uses an XML file to do the same thing.

16. Environment description.

17. Ownership / licensing and permission information.

18. Installation script files in uncompressed segment installer format.

19. Software test programs and source code, including tools.

20. Software and system test report(s), test data (if available) and test metrics, including "bug reports."

21. Software Development File (SDF): A repository for material pertinent to the development of a particular body of software. Contents typically include (either directly or by reference) considerations, rationale, and constraints related to requirements analysis, design, and implementation; developer-internal test information; and schedule and status information. [http://sepo.spawar.navy.mil/SDF.doc]

22. Software Test Procedures: The Software Test Procedure describes plans for qualification testing of Computer Software Configuration Items (CSCIs) and software systems. [Pogner]

23. Software Users Manual (SUM): The Software User Manual (SUM) tells a hands-on software user how to install and use a Computer Software Configuration Item (CSCI), a group of related CSCIs, or a software system or subsystem. [University of Massachusetts; http://www2.umassd.edu/SWPI/DOD/MIL-STD-498/SUM-DID.PDF]

24. Waveform: A waveform is the representation of a signal as a plot of amplitude versus time. [DAU]

25. Design Specification: A design specification provides detailed description of the design. It uses data flow diagrams or other data representations developed during requirements analysis and refined during design to derive software structure. [University of Southern California; http://sunset.usc.edu/classes/cs577b_97/projdocs/team1/design.html]

26. Porting Plan: A porting plan lists the main tasks of the port and some of the associated information for each task (start date, end date, elapsed time, dependencies, who is assigned, etc.). [IBM; http://www.ibm.com/developerworks/db2/zones/porting/planning.html] In programming, to "port" (verb) is to move an application program from an operating system environment in which it was developed to another operating system environment so it can be run there. Porting implies some work, but not nearly as much as redeveloping the program in the new environment. open standard programming interface (such as those specified in X/Open's 1170 C language specification and Sun Microsystem's Java programming language) minimize or eliminate the work required to port a program. [SearchNetworking.com; http://searchnetworking.techtarget.com/sDefinition/0,,sid7_gci212807,00.html]

27. Waveform Port Report

28. Waveform Description Document

29. Security Engine: A security engine is a software resource that enforces security policies designed to help ensure that a vulnerability of an application or operating system cannot be exploited. [Free Patents Online; http://www.freepatentsonline.com/20060021002.html]

30. Software Estimation File: The software estimate file contains the estimation of the software size, cost, schedule, and critical computer resources critical to the effective planning and tracking of a software-intensive project. [http://sepo.spawar.navy.mil/SW_Estimation_Process_Expert_Mode.doc]

31. Software Security Report

32. Software Metrics Report: The software metrics report presents guidelines for establishing a software measurement process as part of an organization's overall

software process. [IT Metrics & Productivity Institute; http://www.itmpi.org/default.aspx?pageid=235]

33. Interface Control Document: An interface control document describes the relationship between two components of a system in terms of data items and messages passed, protocols observed and timing and sequencing of events. [Chamber of Commerce; http://www.chambers.com.au/glossary/icd.htm]

34. Software Maintenance Plan (or Software Configuration Management Plan): A software configuration management plan enables the controlled and repeatable management of information technology components as they evolve in all stages of development and maintenance. Enables the controlled and repeatable management of information technology components as they evolve in all stages of development and maintenance. [State of Michigan]

35. Product Reuse Demonstration Inventory List: A detailed list of all code files in the product baseline, including all third-party software (operating systems, middleware, applications, and device drivers) not delivered within the terms of the contract but used in the system to form the working product.

36. Product Reuse Demonstration Inspection Report: A detailed list of all company markings found in the source code to ensure the Government has GPR to use the software delivered in the contract.

37. Product Reuse Demonstration Build Procedure Development Report: A report containing a build procedure in sufficient detail to allow a third party to recreate the operational system on a compatible processing platform. It shall address the results of the code inventory and inspection to account for software that is not deliverable due to proprietary rights limitations such that the user can complete the installation process.

38. Product Reuse Demonstration Report: A report detailing the results of the formal demonstration of the build process using the product baseline software and approved procedures showing the software can be successfully ported to other third-party compatible open architecture processing systems.

Appendix 2: NOA CHECKLIST (short)

The items below are intended to be a quick check on a system's programmatics that, when properly applied, will yield the benefits of an open system.

- □ For components which are expected to evolve to meet new or unforeseen performance requirements, does the Government have at least Government Purpose Rights (GPR) in any software or documentation being developed or used to build the system?
- □ Are proprietary components well-defined, limited in scope, and designed so that others are not precluded from interfacing with the component or other parts of the system or from developing and providing components with comparable or improved performance and form, fit and function?
- □ Are your program's design artifacts disclosed "early and often" and freely available for reuse by another program or third parties?
- □ Is design disclosure enabled by keeping data, code and design artifacts in a repository either maintained by or overseen by the Government, such as the Surface Domain's SHARE Repository or the C4I Domain's NESI Collaboration site; providing the artifacts electronically upon requests made via the Government; allowing requesting parties to obtain them directly from the source firm through a process involving review and approval from the Government; or requiring that contractors allow the program to have continuous, real-time access to the development environment with access to artifacts?
- □ Does the program use widely-accepted and supported standards to define interface definitions or key interfaces that are published and maintained by recognized organizations?
- □ Does your program encourage continuous competition for components, modules, and tasks? Is it easy for your follow on contract to go to anyone other than the incumbent?
- □ Does your program utilize commodity products (i.e. COTS products with a large user base)? Can the decision leading to the selection of specific COTS products be supported (e.g., with test results, architectural suitability, "best value" assessments, etc.)?
- □ Does your program use modules or components that are also being used by other programs with different product vendors?
- □ Does the Program plan and directive documentation specify that anything the government paid to develop is available for delivery to the Government with all of the developmental artifacts and unlimited usage rights?
- □ Does your program use an integrated team approach to identify how changes affect the system?
- □ Is the infrastructure of your system open? (Operating System, Databases, Communications, Interfaces, Tools)
- □ Does porting to a new hardware platform require minimal time and resources?

Appendix 3: NOA CHECKLIST (long)

OPNAV has established five principles of Naval Open Architecture (NOA) that form the basis for system design and program management of weapons systems. The items below are intended to be a quick check on a system's programmatics that, when properly applied, will yield the benefits of an open system.

Modular Design and Design Disclosure

- □ Has the system design separated hardware from operating system from middleware from applications?
- □ Are the system's applications functionally segregated to provide separability and the ability to function as independent entities?
- □ Can the computing plant be upgraded without the necessity to change operating system, middleware or applications?
- □ Are the functional components of the system well defined with clearly specified functions and interfaces?
- □ Are the system/subsystem/component/application specifications and design data available to a broad cross section of potential providers?
- □ Is design disclosure accomplished on a frequent basis throughout the development process?
- □ Is design disclosure enabled by keeping data, code and design artifacts in a repository either maintained by or overseen by the Government such as the Surface Domain's SHARE Repository or the C4I Domain's NESI Collaboration Site; providing the artifacts electronically upon requests made via the Government; allowing requesting parties to obtain them directly from the source firm through a process involving review and approval from the Government; or requiring that contractors allow the program to have continuous, real-time access to the development environment with access to artifacts?
- □ Does the Program plan and directive documentation specify that anything the government paid to develop is available for delivery to the Government with all of the developmental artifacts and unlimited usage rights?

Reusable Application Software

Reuse practices by the program:

- □ Has the program investigated potential reuse components from other programs?
- □ Has the contract/RFP required the prospective integrator to conduct market research to identify potential reuse candidates from a broad spectrum of providers?
- □ Does the program participate in Domain/Community of Interest asset reuse repository/library capabilities?
- □ Can Programs ensure that potential Offerors who do not have access to reuse repositories/libraries because they lack a current contractual vehicle are informed of the contents of the repositories and allowed access to artifacts as appropriate?

Creating assets suitable for potential reuse:

- □ Are applications created with well-defined and documented interfaces?
- □ Have widely-accepted standards been used in application design?
- □ Are the application functional requirements clearly defined and well documented?
- □ Have the test cases for each application been documented and made available?
- □ Is the development environment for each application an industry standard, openly available product?
- □ Have the appropriate data rights been obtained with each application (normally Government Purpose Rights)?
- □ If a product contains proprietary elements, are the license requirements for use clearly documented, and those proprietary elements segregated with well-defined interfaces such that modification of another component will not require modification of the proprietary product?
- □ Does the RFP/Contract require that the vendor provide deliverables that are structured to provide for discovery and potential reuse of the asset?
- □ Have the asset packages (i.e., the deliverable) been reviewed prior to Government acceptance to ensure that they contain only the agreed upon license and data rights markings?

Interoperable joint warfighting applications and secure information exchange

- □ Have the functions of the application been well defined to facilitate commonality with other service programs?
- □ Has the application/system been designed to conform to a community of interest/joint warfighting data/information model?
- □ Does the application/system comply with current information assurance standards and requirements?
- □ Is the application/system designed to function in a net-centric environment according to well-defined, net-ready Key Performance Parameters (KPPs)?
- □ Has the system design considered and does it comply with a higher-level architecture to facilitate interoperability?
- □ Is there continual, data-driven assessment of deployed operational performance incorporating end-user feedback and explicit data gathered from real world operations?

Life Cycle Affordability

- □ Has the system/program leveraged common development and maintenance of applications with another system/program to reduce life cycle software maintenance costs?
- □ Has the program executed Performance Based Logistics (PBL) agreements for life cycle support that leverage the advantages of COTS hardware?
- □ Do PBL agreements employ distance support techniques to reduce down time and reduce cost?

- □ Is operator and maintenance training optimized to support shortened cycle times and leverage commercial training?
- □ Are training systems designed to leverage the COTS nature of open system architecture systems to provide better fidelity to operational systems and reduce cost?
- □ Has the program built in incentive structures to reward reduction in total ownership cost over the life cycle?
- □ Has the system design reduced life cycle cost by leveraging modularity to reduce the effort and cycle time of system modernization?
- □ Has the program made use of commodity COTS computing and networking hardware to reduce procurement and maintenance cost? Can the decision leading to the selection of specific COTS products be supported (e.g., with test results, architectural suitability, "best value" assessments, etc.)?
- □ Has system modularity been leveraged to provide a hardware modernization and obsolescence mitigation path?
- □ Have proprietary products been avoided to prevent vendor lock-in and sole source environments?

Encouraging Competition and Collaboration

- □ Has the acquisition plan separated functions (e.g., architect, integrator, application provider) to permit separate contracts for components of the system?
- □ Has a transparent peer group process been established to provide for independent evaluation of alternative components and selection of best of breed components for the system?
- □ Has a collaborative environment been established to promote cooperation and collaboration among government and industry partners in the system development?
- □ Are logical points in the development cycle established at which competitive processes can be leveraged to expand the vendor base where advantageous to the Government?
- □ Can a different vendor be chosen to provide any component of the system if advantageous to the Government?
- □ Have incentive structures been built into the program plan and contracts to reward cooperation and collaboration among the architect, integrator, and component providers?
- □ Has the program leveraged the Science and Technology (S&T) program to identify innovative concepts and new participants?
- □ Is there a SBIR and technology transition plan in place to encourage participation by qualified small businesses?
- □ Has the program sought opportunities for joint development or component reuse with other Naval and Joint programs?
- □ Is the end user included in the system design and upgrade process as well as the training definition?

Appendix 4: RECOMMENDED DATA LANGUAGE FOR CODE HEADERS

Deliverable artifacts should include embedded data or language in code headers or in other locations that provides key information for those seeking to use these items in the future. The following are suggestions that can be used as appropriate for artifacts delivered under Unlimited, GPR, and Specially Negotiated License Rights.

Recommended Language Regarding Restrictive Rights

The Government must be vigilant in identifying and challenging any restrictive markings on deliverables that are inconsistent with the rights the Government has acquired under the contract. For example, if the Government has contracted for GPR in a particular deliverable, the contractor shall not mark that deliverable with any legend that would limit or contradict that GPR license.

To protect against this occurrence, if an individual supporting the [*specific*] program identifies any restrictive markings on a deliverable, that individual shall immediately notify the cognizant Program Manager and Contracting Officer to ensure that any such restrictive markings are consistent with the terms of the contract. If those markings are not consistent with the terms of the contract, the Government shall not accept the deliverables, the Program Manager shall promptly notify the [*PEO*], and the Contracting Officer shall promptly follow the procedures in DFARS 252.227-7013 and DFARS 252.227-7014 for handling nonconforming markings and the procedures in DFARS 252.227-7019 and DFARS 252.227-7037 for handling unjustified markings.

Unlimited

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Appendix 5: OPEN SOURCE SOFTWARE

Open Source Software (OSS) is a valuable resource for the development of modern National Security Systems (NSS). Many OSS products are robust and can be integrated with low technical risk and provide a high degree of design disclosure. However, there are certain programmatic issues or risks that must be evaluated when selecting OSS products. The terms "open source" and "open architecture" are often confused and at times even used interchangeably. However, these terms are distinct. "Naval Open Architecture" (NOA) refers to business and technical principles the Navy and Marine Corps are applying to modernize its Fleet and systems, reduce costs, decrease time to field, and facilitate rapid technology insertion (and is defined in the Glossary). "Open architecture" is a type of architecture (or design) whose specifications are made public by its designers which allows users to make modifications to various components. It should be noted that "openness" can be thought of in degrees, based on the level and scope of the information provided and its availability to third parties. OSJTF defines "open system architecture" as a system that employs modular design, uses widely supported and consensus based standards for its key interfaces, and has been subjected to successful validation and verification tests to ensure the openness of its key interfaces.

Open source software is a good resource for assisting in the implementation of the technical aspects of open architecture but its use is not sufficient for a system to be "open." According to the Open Source Initiative, "open source doesn't just mean access to the source code." The distribution terms of the open-source software must also comply with 10 criteria, several of which include: (1) free distribution; (2) include the source code; (3) allow modifications and derived works; and (4) distribution of the license.[17] The following is recommended guidance for Navy and Marine Corps Program Managers who choose to use open source software in their systems.

General Information:

DoD Memorandum Clarifying Guidance Regarding Open Source Software (OSS)

On October 16, 2009, acting Assistant Secretary of Defense (Networks & Information Integration) / DoD Chief Information Officer (CIO) David M. Wennergren promulgated a Memorandum for Secretaries of the Military Departments on Clarifying Guidance Regarding Open Source Software (OSS). In the memo, Wennergren noted that "there have been misconceptions and misinterpretations of the existing laws, policies and regulations that deal with software and apply to OSS, that have hampered effective DoD use and development of OSS."

The DoD guidance acknowledges that in "almost all cases, OSS meets the definition of 'commercial computer software'." It also details some "positive aspects" of OSS to be considered when conducting market research into commercial computer software:

[17] A more complete definition of open source, including all 10 open source criteria, is available from the Open Source Initiative's website at http://www.opensource.org.

- Continuous and broad peer-review supports software reliability efforts;
- Unrestricted ability to modify source code enables rapid responses to changing situations;
- Reduced reliance on a particular software developer or vendor;
- Lack of restrictions on who can use the software and in what fields of endeavor it can be used, thus enabling a net-centric licensing model;
- A cost advantage due to its typical lack of a per-seat licensing cost;
- Reduced total ownership cost due to shared maintenance responsibility; and
- Suitability for rapid prototyping and experimentation due to the ability to "test drive" the software with minimal costs and delays.

Additionally, the guidance highlights the common "misconception that the Government is always obligated to distribute the source code of any modified OSS to the public, and therefore that OSS should not be integrated or modified for use in classified or other sensitive DoD systems. In contrast, many open source licenses permit the user to modify OSS *for internal use* without being obligated to distribute source code to the public."

More information on the DoD's policies with respect to OSS is available at http://www.defenselink.mil/cio-nii/sites/oss/index.shtml. The October 16 memo is available at http://www.defenselink.mil/cio-nii/sites/oss/2009OSS.pdf.

As the DoD guidance states, open source software is generally regarded as commercial computer software for which the source code is publicly available to all users under specific licensing terms and conditions that provide a user the right to use, modify, and redistribute the modified open source software to the public. Some open source software licenses require that, if further distributed, the modified open source software be distributed under the terms and conditions of the original license.

To accept open source software, the Government must be prepared to accept delivery of open source software under the terms of the open source software license, and with the knowledge that Government will not be able to negotiate the open source software license terms. At the same time, the Government must also comply with the licensing and operational security requirements of non-open source software. Government cannot modify open source software by merging open source software with computer software that is classified or otherwise not releasable to the public because of licensing or data rights restrictions.

Thus, to accept delivery of open source software while complying with all computer software licensing requirements, the Government must have a very good understanding of:

1. What the open source software is and the licensing constraints for the open source software;
2. How the open source software will be used within the system being procured;
3. Whether it is likely the open source software will need to be modified and/or distributed over the lifecycle of the system; and

4. The impacts on non-open source computer software, both commercial and non-commercial, if distribution under the open source software license is required when the open source software is modified.

Issues to Consider When Using Open Source Software

Since open source software is really a particular type of commercial computer software, open source software is almost always treated as commercial computer software under the Defense Federal Acquisition Regulations Supplement (DFARS). As such, the same DFARS policies that apply to procurement of commercial computer software would also apply to open source software. That is, the Government shall have only the rights specified in the license under which the commercial computer software was obtained. If the Government has a need for rights not normally conveyed to the public, then the Government must negotiate with the commercial computer software vendor. See DFARS 227.7202-3, "Rights in Commercial Computer Software or Commercial Computer Software Documentation." But for open source software, this presents special problems as detailed below.

a) Inability to Negotiate

The owner(s) of the intellectual property rights in the open source software generally are not available for negotiating lesser or greater rights than those rights provided by the license that governs the open source software. Accordingly, the Government must accept open source software under the terms and conditions dictated by the open source software license with the knowledge that the Government will not be able to negotiate the open source software license terms.

b) "Viral" Licenses

Open source software delivered or used to perform work under government contracts may be unmodified or modified. If modified, "viral' open source software licenses require that the modified open source software, if further distributed, be distributed under the terms and conditions of the license covering the original unmodified open source software. Accordingly, the Government cannot modify open source software that is governed by viral licenses by merging open source software with computer software that is classified or otherwise not releasable to the public due to proprietary restrictions (for commercial computer software) or data rights restrictions (for non-commercial computer software). This is because the Government may want to distribute the classified/restricted software on its own terms, or not at all. If there is a need to further distribute the open source software that is accepted for delivery, the Government must be aware of whether the open source software has a viral license and whether the open source software has been modified, and how. In some cases, a well-defined Application Programming Interface (API) may be provided to serve as a buffer between the open source software and the other non-open source software, which Government desires to distribute under its own terms, or not at all. With respect to Naval Open Architecture, the

Government prefers to distribute software under the Software-Hardware Asset Repository Enterprise (SHARE) license.

(c) Authorization and Consent. Open source software may be covered by a patent of the United States, or by copyright under the Copyright Act (Title 17, U.S. Code). When the Government "authorizes and consents" to patent or copyright infringement under 28 U.S.C. §1498, the Government may be sued for money damages for the infringement but not enjoined from using the open source software. However, where the Government does not "authorize or consent," the contractor may be sued for money damages and may be enjoined from further use of the open source software.

(i) As a general rule, the Government should not insert an authorization and consent clause in contracts involving open source software deliverables, or where open source software is used to develop a non-commercial computer software deliverable. However, the Government may give authorization and consent to ensure that work under a Government contract is not enjoined in certain cases, such as when the quality of the open source software justifies acceptance despite the licensing constraints, where there are no acceptable substitutes, where time constraints for delivery do not allow for substitutes, etc.

(ii) As discussed above, open source software is automatically licensed to a user on nonnegotiable terms. Accordingly, a contractor may accept the open source software license subjecting them to possible infringement liability; license or develop alternative software; obtain an authorization and consent clause to shift the infringement liability to the Government; or rely on the doctrine of implied authorization and consent. If it is appropriate for the Government to authorize and consent to patent and copyright infringement for open source software, the Contract Officer may grant the authorization

Program Managers and Data Managers Actions

Program Managers and data managers should know and understand what open source software is proposed for delivery or performance of work under the contract, what licenses govern the open source software, where the open source software is to be used and whether the open source software has been or will be modified. With this knowledge and understanding, Program Managers and data managers should evaluate use of the open source software in light of the issues discussed above. Some open source software licenses are fairly innocuous (i.e. attribution, promise not-to-sue, etc.), but others are not.

If the license is "viral," the program has to understand what it will be using the open source software for and whether it will be used in conjunction with assets obtained from the SHARE library or assets contributed to the SHARE library (see the SHARE license).

(1) To record the due diligence described above, and to facilitate acceptance of open source software delivery, use a list which becomes an Attachment to Section J of the Contract. A suggested format for the Attachment is as follows:

Identification of Open Source Software Use and Modifications

Open Source Software Title and Version #	License and Version #	Name of contractor Asserting Restrictions	Was Open Source Software modified by contractor?	If Modified, was Open Source Software modified by incorporation into a third party's software?

Use of OSS in Performing Under a Contract But Not for Delivery

In cases where the contractor proposes to use open source software while performing under a contract, but not to deliver open source software, program managers and data managers should take care that such use does not create Government obligations under the open source software licensing scheme. The following language is suggested for incorporation into procurement actions.

"Open source software… is often licensed under terms that require the user to make the user's modifications to the open source software or any software that the user 'combines' with the open source software freely available in source code form." If the contractor uses open source software in the performance of a Government contract, it must ensure that the use thereof does not: (i) create, or purport to create, any Government distribution obligations with respect to the computer software deliverables; or (ii) grant, or purport to grant, to any third party any rights to or immunities under Government intellectual property or Government data rights to the Government computer software deliverables.

For example, the contractor may not develop a computer software deliverable using a open source program (including without limitation libraries) and non-commercial computer software program where such use results in a program file(s) that contains code from both the non-commercial computer software and open source software if the open source software is licensed under a license that requires any 'modifications' be made freely available. Additionally, the contractor may not combine any non-commercial computer software deliverable with open source software licensed under the General Public License (GPL) or the Lesser General Public License (LGPL) in any manner where such use would cause, or could be interpreted or asserted to cause, the non-commercial computer software deliverable or any modifications thereto to become subject to the terms of the GPL or LGPL."

Appendix 6: GLOSSARY OF TERMS

Please Note: The definitions of the following terms are included as guidance for the Preparer and were compiled from the sources indicated in brackets and italics following each definition and were provided in this appendix for the user's convenience. It is not intended to be authoritative or comprehensive. For the definitions of additional terms or clarification of these definitions, please refer to the Defense Federal Acquisition Regulation Supplement (DFARS) and other source documents.

"Activity" is set of actions which, taken as a whole, transform inputs into outputs. [IEEE/EIA Std. 12207/1997]

"APP233/ISO 10303" – APP233 an "Application Protocol" for Systems Engineering that is based on the ISO 10303 Standard. AP233 is specific to Systems Engineering, but its purpose, like all of the 10303 standards, is to allow data exchange of SE models between tools -- it does not limit what "language" the tools use to represent a system. Neither is it meant to be a human-readable language, so using it directly for "tool neutrality" is not likely to work. ISO 10303 "is an International Standard for the computer-interpretable representation and exchange of industrial product data. The objective is to provide a mechanism that is capable of describing product data throughout the life cycle of a product, independent from any particular system. The nature of this description makes it suitable not only for neutral file exchange, but also as a basis for implementing and sharing product databases and archiving." [*Source is Wikipedia*].

"Architecture" means the fundamental organization of a system embodied in its components, their relationships to each other, and to the environment, and the principles guiding its design and evolution. [Institute of Electrical and Electronics Engineers (IEEE) Std 1471-2000]

"Commercial component" means any component that is a commercial item. [*FAR §2.101(b)*]

"Commercial item" means:
(1) Any item, other than real property, that is of a type customarily used by the general public or by non-governmental entities for purposes other than Governmental purposes, and:
(i) Has been sold, leased, or licensed to the general public; or
(ii) Has been offered for sale, lease, or license to the general public;
(2) Any item that evolved from an item described in paragraph (1) of this definition through advances in technology or performance and that is not yet available in the commercial marketplace, but will be available in the commercial marketplace in time to satisfy the delivery requirements under a Government solicitation;
(3) Any item that would satisfy a criterion expressed in paragraphs (1) or (2) of this definition, but for:

(i) Modifications of a type customarily available in the commercial marketplace; or

(ii) Minor modifications of a type not customarily available in the commercial marketplace made to meet Federal Government requirements. Minor modifications mean modifications that do not significantly alter the nongovernmental function or essential physical characteristics of an item or component, or change the purpose of a process. Factors to be considered in determining whether a modification is minor include the value and size of the modification and the comparative value and size of the final product. Dollar values and percentages may be used as guideposts, but are not conclusive evidence that a modification is minor;

(4) Any combination of items meeting the requirements of paragraphs (1), (2), (3), or (5) of this definition that are of a type customarily combined and sold in combination to the general public;

(5) Installation services, maintenance services, repair services, training services, and other services if:

(i) Such services are procured for support of an item referred to in paragraph (1), (2), (3), or (4) of this definition, regardless of whether such services are provided by the same source or at the same time as the item; and

(ii) The source of such services provides similar services contemporaneously to the general public under terms and conditions similar to those offered to the Federal Government;

(6) Services of a type offered and sold competitively in substantial quantities in the commercial marketplace based on established catalog or market prices for specific tasks performed or specific outcomes to be achieved and under standard commercial terms and conditions. This does not include services that are sold based on hourly rates without an established catalog or market price for a specific service performed or a specific outcome to be achieved. For purposes of these services—

(i) "Catalog price" means a price included in a catalog, price list, schedule, or other form that is regularly maintained by the manufacturer or vendor, is either published or otherwise available for inspection by customers, and states prices at which sales are currently, or were last, made to a significant number of buyers constituting the general public; and

(ii) "Market prices" means current prices that are established in the course of ordinary trade between buyers and sellers free to bargain and that can be substantiated through competition or from sources independent of the Offerors.

(7) Any item, combination of items, or service referred to in paragraphs (1) through (6) of this definition, notwithstanding the fact that the item, combination of items, or service is transferred between or among separate divisions, subsidiaries, or affiliates of a contractor; or

(8) A non-developmental item, if the procuring agency determines the item was developed exclusively at private expense and sold in substantial quantities, on a competitive basis, to multiple State and local governments. [*FAR Part 2.101(b)*]

"Commercial Off-the-Shelf (COTS)" or **"commercially available off-the-shelf item"** means an item that—

(A) is a commercial item (as described in section 403 (12)(A) of this title);
(B) is sold in substantial quantities in the commercial marketplace; and
(C) is offered to the Government, without modification, in the same form in which it is sold in the commercial marketplace. [Title 41, Chapter 7, Section 431]

"Component" is one of the parts that make up a system. A component may be hardware or software and may be subdivided into other components. [*IEEE Std 610.12-1990*]

"Community of Interest (COI)" means a collaborative group of users that must exchange information in pursuit of its shared goals, interests, missions, or business processes, and therefore must have shared vocabulary for the information it exchanges. [*DoD 8320-2*]

"Design Disclosure" means making data related to the design of a component, sub-system or system available to qualified recipients, with a goal of establishing and maintaining a process that will provide "early and often" design disclosure directly to the Government or to third-party contractors via Government-established access. This data is sufficient to allow the third party to develop and produce a competitive alternative. Design Disclosure can be enabled through a variety of mechanisms including keeping data, code and design artifacts in a repository either maintained by or overseen by the Government such as the Surface Domain's SHARE Repository; providing the artifacts electronically upon requests made via the Government; or allowing requesting parties to obtain them directly from the source firm through a process involving review and approval from the Government. In addition, the Government can require that contractors allow the program to have continuous, real-time access to the development environment with access to artifacts. Each program has the flexibility to establish the most appropriate mechanism for their specific needs; with a goal of establishing a process that is both cost-effective and responsive to requests.

"Domain" represents an administrative structure based on a common sphere of activities. In relations to NOA, the Naval Enterprise is divided into six Domains: Surface, Subsurface, Air, C4I, Space, and Marine Corps. As specified in the 5 August 2004 ASN (RDA) memorandum, the Domain Leads are PEO IWS (Ships), PEO Subs (Subsurface), PEO T (Air), PEO C4I (C4I) and PEO (Space). PEO IWS will act in collaboration with PEO Ships, PEO Carriers, and PEO LMW. PEO T will collaborate with the other Air PEOs and COMNAVAIR.

"Enterprise Architecture" represents the enterprise's key business, information, application, and technology strategies/trends and their impact on business functions and processes.
[Virginia Information Technologies Agency]

"Evolving Architecture" are software development architectures that adopts changing customer needs and rapidly developing technologies. [Carnegie Mellon University]

"Government Purpose Rights" (GPR) means the rights to—

(i) Use, modify, reproduce, release, perform, display, or disclose intellectual and technical data within the Government without restriction; and

(ii) Release or disclose intellectual and technical data outside the Government and authorize persons to whom release or disclosure has been made to use, modify, reproduce, release, perform, display, or disclose that data for United States Government Purposes.

[*DFARS §252.227-7013(a)(12)*]

"Government Purpose" means any activity in which the United States Government is a party, including cooperative agreements with international or multi-national defense organizations, or sales or transfers by the United States Government to foreign governments or international organizations. Government purposes include competitive procurement, but do not include the rights to use, modify, reproduce, release, perform, display, or disclose IP and technical data for commercial purposes or authorize others to do so. [*DFARS §252.227-7013(a)(11)*]

> **Note: In order for a software/intellectual property/technical data asset to be a viable Reuse Candidate, the Government must have at least Government Purpose Rights in the asset.**

"Information Assurance" is information operations that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. This includes providing for the restoration of information systems by incorporating protection, detection, and reaction capabilities. [*CJCSI 3170.01E*] Information Assurance compliance requirements are contained in CJCSI 3170.01E and PEO-specified requirements.

"Integrated Product Team" is a group composed of representatives from appropriate functional disciplines working together to build successful programs, identify and resolve issues, and make sound and timely recommendations to facilitate decision making. There are three types of IPTs: 1) Overarching IPTs (OIPTs) that focus on strategic guidance, program assessment, and issue resolution; 2) Working-level IPTs (WIPTs) that identify and resolve program issues, determine program status, and seek opportunities for acquisition reform; and, 3) Program-level IPTs (PIPTs) that focus on program execution and may include representatives from both Government and after contract award industry. [*DAU Glossary of Defense Acquisition Acronyms and Terms, 13th Edition*]

"Integrated Architecture" consists of multiple views or perspectives (Operational View (OV), Systems View (SV), Technical Standards View (TV) and All View (AV)) that facilitate integration and promote interoperability across capabilities and among related integrated architectures. [DoDAF]

"Interoperability" is the ability of systems, units, or forces to provide data, information, materiel, and services to and accept the same from other systems, units, or forces, and to use the data, information, materiel, and services so exchanged to enable them to operate

effectively together. [*DAU Glossary of Defense Acquisition Acronyms and Terms, 13th Edition*]

"Invention" means any invention or discovery which is or may be patentable or otherwise protectable under Title 35 of the United States Code or any novel variety of plant that is or may be protectable under the Plant Variety Protection Act (7 U.S.C. 2321, et seq.). [*FAR Section 52.227-12*]

"Layered" means a system in which components are grouped, *i.e.*, layered, in a hierarchical arrangement, such that lower layers provide functions and services that support the functions and services of higher layers. **Note:** Systems of ever-increasing complexity and capability can be built by adding or changing the layers to improve overall system capability while using the components that are still in place. [*The Alliance for Telecommunications Industry Solutions (ATIS) web site, http://www.atis.org*.]

"Lead Systems Integrator" has no official definition in the DoD 5000 series or FAR/DFARS. The generally accepted meaning of systems integrator is:

> **Systems Integrator** – A prime contractor, working with other associates or associate prime contractors on a system, whose function is total responsibility for integrating the products/processes/subsystems/components of the associates or associate prime contractors into the total system. This contractor may have been awarded a separate contract for the integration effort or it could be part of the contract for its part of the system being acquired. This contractor does not necessarily have to have a separate product/process/ subsystem/component of the system to be the systems integrator. The systems integrator may also be the government. [*Defense Systems Management College*]
>
> The Office of the Undersecretary of Defense (Acquisition, Test and Logistics) in a Memorandum entitled "Limitations on contractors Acting as Lead Systems Integrators" dated 18 January 2007 provided the following definitions:
>
> - **"Lead system integrator with system responsibility"** means a prime contractor for the development or production of a major system if the prime contractor is not expected at the time of award to perform a substantial portion of the work on the system and the major subsystems.
> - **"Lead system integrator without system responsibility"** means a contractor under a contract for the procurement of services whose primary purpose is to perform acquisition functions closely associated with inherently governmental functions with regard to the development or production of a major system.

"Life Cycle Model" in the context of the development, operation, and maintenance of a software product, a life cycle model is a defined set of processes, activities, and tasks, and their sequencing and interrelationships, spanning the life of the system from its definition to the termination of its use. [IEEE/EIA Std. 12207/1997]

"Limited Rights" (LR) means, in part, the right to use, modify, reproduce, release, perform, display, or disclose IP and technical data, in whole or in part, within the

Government. The Government may not, without permission, release or disclose the IP and technical data outside the Government, use the IP and technical data for manufacture, or permit the IP and technical data to be used by another party, except:

- When necessary for emergency repair and overhaul;
- When used for evaluation or informational purposes by foreign governments;
- Subject to prohibitions on further reuse;
- When the contractor asserting the restriction is notified of such use.

[*DFARS §252.227.7013(a)(13)*]

"Maintainability" is directed toward achieving the reliability inherent in a design through servicing and maintenance, and efficiently restoring the system to operation should failures occur. [Defense Acquisition University]

"Markings" refers to software and other Intellectual Property Rights (IPRs) legends, distribution statements, security classifications, and appropriate export control statements. It is important that Program Managers review the markings of all deliverables prior to acceptance to ensure that the Government will obtain the IPRs it has contracted for.

"Method/Technique" – The approach used to accomplish the task. [IEEE/EIA Std. 12207/1997]

"Module" is a discrete, small-grained unit of functionality, either hardware or software, with a well-defined, open and published interface. Modules are combined with other modules to create components, services, and packages.

"Modular Contracting" is a contracting approach under which the need for a system is satisfied in successive acquisitions of interoperable increments. Each increment complies with common or commercially acceptable standards applicable to information technology (IT) so that the increments are compatible with the other increments of IT comprising the system. [*Glossary of Defense Acquisition Acronyms & Terms, 13th Edition, Nov. 2009*]

"Modular Design" means a design (organization) where functionality is partitioned into discrete, cohesive, and self-contained units with well-defined, open and published interfaces that permit substitution of such units with similar components or products from alternate sources with minimum impact on existing units. [*A Modular Open Systems Approach (MOSA) to Acquisition document, (USD(AT&L)) OSJTF*]

"Modular Open Systems Approach or MOSA" is the DoD's implementation of Open Systems. Within the MOSA context, programs should design their system based on adherence to the following five MOSA principles:

- Establish an Enabling Environment.
- Employ Modular Design.
- Designate Key Interfaces.
- Use Open Standards.
- Certify Conformance.

[*A Modular Open Systems Approach (MOSA) to Acquisition, OSJTF*]

"National Security Systems (NSS)" are any telecommunications or information systems operated by DoD and the function, operation, or use of which involves intelligence activities; cryptologic activities related to national security; the command and control of military forces; equipment that is an integral part of a weapons system; or criticality to the direct fulfillment of military or intelligence missions, which does not include procurement of automatic data processing equipment (ADPE) or services to be used for routine administrative and business applications (including payroll, finance, logistics, and personnel management applications). (CJSCI 3170.01G)

"Naval Open Architecture (NOA)" is the confluence of business and technical practices yielding modular, interoperable systems that adhere to open standards with published interfaces. This approach significantly increases opportunities for innovation and competition, enables reuse of components, facilitates rapid technology insertion, and reduces maintenance constraints. NOA delivers increased warfighting capabilities in a shorter time at reduced cost. [*RhumbLines*, December 12, 2006, Naval Office of Information]

"Open Architecture" means a type of architecture whose specifications are made public by its designers which allows users to make modifications to various components. [ITtoolbox].

> **Note:** "Openness" can be thought of in degrees, based on the level and scope of the information provided (for example, both internal and external information on interfaces) and its availability to third parties (e.g. either to a select few or to a broad range of potential component providers).

"Open Source Software" is computer software for which the source code and certain other rights normally reserved for copyright holders are provided under a software license that meets the Open Source Definition or that is in the public domain. This permits users to use, change, and improve the software, and to redistribute it in modified or unmodified forms. [Wikipedia. Since different organizations define OSS differently, we strongly urge readers to also refer to the more complex definition developed by the Open Source Initiative (http://www.opensource.org) and other organizations such as the Free Software Foundation (http://www.fsf.org)]

"Open Standards" means widely accepted and supported standards set by recognized standards organizations or the marketplace. These standards support interoperability, portability, and scalability and are equally available to the general public at no cost or with a moderate license fee. [*Glossary of Defense Acquisition Acronyms & Terms, 13th Edition, Nov. 2009*]

"Open System" means a system that employs modular design tenets, uses widely supported and consensus based standards for its key interfaces, and is subject to validation and verification tests to ensure the openness of its key interfaces. [*A Modular Open Systems Approach (MOSA) to Acquisition, OSJTF*]

"Open System Architecture" is a system that employs modular design, uses widely supported and consensus based standards for its key interfaces, and has been subjected to successful validation and verification tests to ensure the openness of its key interfaces. [*A Modular Open Systems Approach (MOSA) to Acquisition, OSJTF*]

"Open Systems Approach" means an integrated business and technical strategy that employs a modular design and, where appropriate, defines key interfaces using widely supported, consensus-based standards that are published and maintained by a recognized industry standards organization. [*A Modular Open Systems Approach (MOSA) to Acquisition, OSJTF*]

"Peer Review" (as used in connection with Naval Open Architecture) is a refereed, open process used to assess technical approaches proposed by or being used by vendors. There are two general types of peer reviews. The first is a Government Peer Review that includes representation from government activities such as System Commands, PEOs and Program offices. The second type is the contractor Peer Review that includes contractors as participants. Contractor participants should be drawn from a cross section of the broader community of interest with academia and private sector entities (including large business, small business and non-traditional DoD contractors) such that the membership (taken as a whole) is unbiased and impartial. An 'independent peer review' is one where the membership includes individuals from outside the program being reviewed. Membership is structured to achieve a balanced perspective in which no one organization is numerically dominant. Consensus is a goal, but the Peer Review Group's findings or recommendations to the decision maker normally consist of a majority opinion and a documented dissenting opinion if the minority chooses to formalize its concerns. This assessment process normally results in findings or recommendations presented to the decision maker with the authority and responsibility to select or make the final course of action or decision..

"Performance-based Logistics" is the preferred sustainment strategy for weapon system product support that employs the purchase of support as an integrated, affordable performance package designed to optimize system readiness. PBL meets performance goals for a weapon system through a support structure based on long-term performance agreements with clear lines of authority and responsibility. DoDI 5000.02 introduced the term "Product-Based Life Cycle Product Support" as the latest evolution of Performance-Based Logistics and stated that both terms can be referred to as "PBL." [*DAU Glossary of Defense Acquisition Acronyms and Terms, 13th Edition*]

"Portability" is a characteristic a software system or program that deals with the ease with which the software can be modified to operate in an execution environment other than that for which it was specifically designed. Execution environments include operating systems, middleware, hardware, and environmental interfaces. If minimal changes to the software are required, then the software is considered to be highly portable. If no changes are required, then the term is not applicable.

"Practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are, to the extent permitted by law or Government regulations, available to the public on reasonable terms. [*FAR Section 52.227-12*]

"Process" is a set of interrelated activities designed to accomplish a specified goal. IEEE/EIA Std. 12207/1997 Table 1 lists all 12207 processes and their associated activities. For example *Development* is a process. Within *Development* there are thirteen activities as shown in Table 1. One of these activities is *Software Coding and Testing* which has five tasks. [IEEE/EIA Std. 12207/1997]

"Reliability" is directed toward assuring that a given design attains the longest possible continued operation [i.e., high Mean Time Between Failures (MTBF) and low Mean Time To Repair (MTTR)] and operating life. (Defense Acquisition University)

"Reconfigurability" means that a system or a service's state and behavior can be dynamically modified during its operation. [University of Athens, Communications Networks Laboratory]

"Reusability" is the degree to which a software module or other work product can be used in more than one computing program or software system [IEEE]

"Restricted Rights" (RR) applies only to noncommercial software and means, in part, the Government's rights to use the computer program:

- With one computer at a time;
- To transfer the program to another computer subject to restrictions;
- To make minimum copies for safekeeping, modification or backup;
- To modify the software for the above purposes;
- To permit contractors or subcontractors performing services in support of this or a related contract to use the software to diagnose and correct deficiencies or to respond to urgent tactical situations, subject to subject to non-disclosure and restrictions against reverse engineering and other restrictions.
- To permit contractors or subcontractors performing emergency repairs or overhaul of items or components of items procured under this or a related contract to use the computer software when necessary to perform the repairs or overhaul or to modify the software to reflect the repairs/overhaul, subject to non-disclosure and restrictions against reverse engineering.

[*DFARS §252.227-7014(a)(14)*]

"Scalability" is the capability of a piece of hardware or software to easily expand to meet future computing needs. [Microsoft TechNet]

"**Small business firms"** means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. [*FAR Section 52.227-12*]

"Software Architecture" of a program or computing system is the structure or structures of the system, which comprise software elements, the externally visible properties of these elements, and the relationships among them. [IEEE]

"Software Reuse" is the process of implementing or updating software systems using existing software assets. [*DAU Glossary of Defense Acquisition Acronyms and Terms, 13th Edition*] The DoD 5000.1 Acquisition Guidebook states that the "program manager should base software systems development on robust systems engineering principles. The following best practice[] for software systems also apply in general to any system. … Identifying and exploiting, where practicable, Government and commercial software reuse opportunities before developing new software." Potential software assets include:

1. **Computer Software -** Computer programs, procedures, and possibly associated documentation and data, pertaining to the operation of a computer system.

2. **Software Development Plan (SDP)** – A management plan usually generated by the developer describing in detail the processes, activities, and tasks to be performed to accomplish the software development effort.

3. **Computer Software Documentation** – Technical Data (TD) information, including computer listings and printouts, that documents the requirements, design, or details of computer software, explains the capabilities and limitations of the software, or provides operation instructions for using or supporting computer software during the software's operational life.

4. **Software Product Specification** – Detailed design and description of Software Items (SIs) comprising the product baseline. Analogous to the Item Detail Specification of a hardware Configuration Item (CI) in the product baseline of a hardware system.

5. **Software Requirement Specification (SRS)** – A description of the requirements (behaviors, functions, performance, design constraints and attributes) allocated to a specific Software Configuration Item (SCI). Often accompanied by an Interface Requirements Specification (IRS) for that SCI.

6. **Software Specification Review (SSR)** – A life cycle review of the requirements specified for one or more Software Configuration Items (SCIs) to determine whether they form an adequate basis for proceeding into preliminary design of the reviewed item. See Software Requirement Specification (SRS) and Interface Requirement Specification (IRS).

7. **Interface Requirement Specification (IRS) -** A type of Item Performance Specification that defines the required software interfaces for a given Software Item (SI) in the allocated baseline, the requirements for which are described by a

Software Requirements Specification (SRS). The IRS is frequently combined with the SRS.

8. **Computer Software Component (CSC) -** Under some software development standards, a functional or logically distinct part of a Computer Software Configuration Item (CSCI), or Software Configuration Item (SCI)

9. **Software Item (SI)** – An aggregation of software, such as a computer program or database that satisfies an end use function and is designated for purposes of specification, qualification, testing, interfacing, Configuration Management (CM), or other purposes. An SI is made up of Computer Software Units (CSUs).

10. **Software Resources Data Report (SRDR) -** SRDR is intended to improve the ability of the DoD to estimate the costs of software intensive programs. SRDR reporting is required by DoD Instruction 5000.2, Enclosure 3, for major contracts and sub-contracts (regardless of contract type) associated with high-cost software elements within Acquisition Category I and Acquisition Category IA programs. Data collected from applicable contracts include type and size of the software application(s), schedule, and labor resources needed for the software development.

11. **Analysis of Alternatives -** The evaluation of the performance, operational effectiveness, operational suitability, and estimated costs of alternative systems to meet a mission capability. The analysis assesses the advantages and disadvantages of alternatives being considered to satisfy capabilities, including the sensitivity of each alternative to possible changes in key assumptions or variables. The AoA is normally conducted during the Concept Refinement phase of the Defense Acquisition Framework and the results of the AoA align with the system concept contained in the Initial Capabilities Document (ICD) approved prior to Milestone A.

12. **Initial Capabilities Document** – Documents the need for a materiel approach, or an approach that is a combination of materiel and non-materiel, to satisfy specific capability gap(s). The ICD defines the gap in terms of the functional area; the relevant range of military operations; desired effects; time and Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF); and policy implications and constraints. The outcome of an ICD could be one or more DOTMLPF Change Recommendations (DCRs) or Capability Development Documents.

13. **Systems Engineering Plan** - A description of the program's overall technical approach including processes, resources, metrics, applicable performance incentives, and the timing, conduct, and success criteria of technical reviews.

14. **Test and Evaluation Master Plan** - Documents the overall structure and objectives of the Test and Evaluation (T&E) program. It provides a framework

within which to generate detailed T&E plans and it documents schedule and resource implications associated with the T&E program. The TEMP identifies the necessary Developmental Test and Evaluation (DT&E), Operational Test and Evaluation (OT&E), and Live Fire Test and Evaluation (LFT&E) activities. It relates program schedule, test management strategy and structure, and required resources to: Critical Operational Issues (COIs), Critical Technical Parameters (CTPs), objectives and thresholds documented in the Capability Development Document (CDD), evaluation criteria, and milestone decision points. For multi-service or joint programs, a single integrated TEMP is required. Component-unique content requirements, particularly evaluation criteria associated with COIs, can be addressed in a component-prepared annex to the basic TEMP.

15. **Capability Development Document** - A document that captures the information necessary to develop a proposed program(s), preferably using an evolutionary acquisition strategy. The CDD outlines an affordable increment of militarily useful, logistically supportable, and technically mature capability. The CDD supports a Milestone B decision review.

16. **Acquisition Program Baseline** - Prescribes the key cost, schedule, and performance parameters, each with an objective and threshold, to which the program will be executed in the phase succeeding the milestone for which the APB was developed. The APB constitutes an agreement between the program manager, OPNAV sponsor, and milestone decision authority, and the breaching of any one parameter threshold will necessitate a re-baselining with a new APB agreed to by those three parties.

17. **Training Plan** – Outlines the level of learning required to adequately perform the responsibilities designated to the function and accomplish the mission assigned to the system.

[*DoD 5000.1 Acquisition Guidebook*]

"System Architecture" is the composite of the design architectures for products and their life cycle processes. [IEEE 1220-1998]

"**Subject Invention**" means any invention of the contractor conceived or first actually reduced to practice in the performance of work under this contract; provided, that in the case of a variety of plant, the date of determination (as defined in section 41(d) of the Plant Variety Protection Act, 7 U.S.C. 2401(d)) must also occur during the period of contract performance. [*FAR Section 52.227-12*]

"Tasks" are specific actions performed to accomplish an activity. The way that each task is performed, such as testing, is called the *technique* or *method.* [IEEE/EIA Std. 12207/1997]

"Technology Insertion" is increasing a system's or product's Warfighting operational capability by integrating new capabilities or upgrading the system's current capabilities

with up-to-date and more capable COTS or custom technologies. [*Software Engineering Institute*]

"Upgradeability" is the ease with which a system or component can be modified to take advantage of new software or hardware technologies. [*Software Engineering Institute*]

"Unlimited rights" (UL) means rights to use, modify, reproduce, perform, display, release, or disclose intellectual property and technical data in whole or in part, in any manner, and for any purpose whatsoever, and to have or authorize others to do so. [*DAU Glossary of Defense Acquisition Acronyms and Terms, 13th Edition*]

For additional information on the Naval Open Architecture Contract Guidebook or the Naval Open Architecture (NOA) effort, please visit:

https://acc.dau.mil/oa