Guidance for the ASN (RD&A)
Software Process Improvement Initiative (SPII) Policy

1. Introduction to the SPII Policy

a. Background of the SPII Policy

On 17 Nov. 2006, as a part of the Department of the Navy (DON) Software Process Improvement Initiative (SPII), ASN (RD&A) issued a policy memorandum to improve software acquisition discipline (hereinafter the SPII policy). To that end, the SPII policy requires that standardized contract language be included in solicitations or contracts under which contractor(s) are required to perform "software development," as defined in paragraph 2 below.

b. Purpose of the SPII Policy

The purpose of the SPII policy is to provide DON acquisition managers with improved visibility into Offerors' and contractors' software development processes to ensure there are well-documented, effective software processes and continuous process improvement practices in place during contract performance.

SPII policy language for solicitations will provide DON acquisition managers with useful information about the Offerors' planned software development approaches, and thereby assist the managers to make a more informed source selection decision. SPII policy language for contracts will help DON acquisition personnel monitor and track the contractor's noncommercial computer software development progress, process discipline, and process improvement during contract performance. See paragraph 3 below for further discussion.

c. Purpose of this Guidance

The purpose of this guidance is to assist DON acquisition managers' implementation of the SPII policy within their contracting activities.

d. Mandatory and Discretionary Elements of the SPII Policy

Incorporation of the SPII policy language into solicitations and contracts should conform to the current policies and procedures of each contracting activity, and therefore contracting activities have discretion, as outlined below, to tailor the SPII language to meet end user needs. Certain requirements of the SPII policy language, however, are mandatory and shall be included in solicitations without alteration.

The mandatory elements of the SPII policy language are:

i. The requirement that Offerors submit a proposed Software Development Plan (SDP) with their proposals, and, during contract performance, deliver a completed SDP (based on the proposed SDP) as a Contract Data Requirements List (CDRL) deliverable, subject to Government review and approval.[1]
ii. The information content of the SDPs, which shall follow the framework of IEEE/EIA Std 12207 regarding subject content, level of detail, and completeness.
iii. The requirement that the SDP serve during contract performance as the benchmark for the contractor's software development effort.
iv. The requirement that the SDP shall be periodically evaluated and updated, as a part of continuous process improvement subject to Government review and approval.[2]

See paragraph 3 below for further discussion of mandatory elements of the SPII policy language, notably concerning the SDP.

The discretionary elements of the SPII policy language are:

i. Where the language is incorporated in the solicitation and contract.
ii. The format of the SDP (including whether it needs to be a single volume or may consist of multiple volumes).
iii. The other elements of IEEE/EIA Std 12207 that must be included, as based on the needs of the system to be acquired and its associated work content.

See paragraph 3 below for further discussion of discretionary elements of the SPII policy language; notably concerning the SDP.

Note - The Department of Defense (DOD) adopted IEEE/EIA Std 12207, "Information Technology-Software Life Cycle Processes," on 27 May 1998.[3]

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[1] Government approval of a SDP that makes changes to the general scope of work that the contractor is required to perform, or that directs or encourages the contractor to perform work that should be the subject of a contract modification, shall not be effective until it is approved in writing by the Government contracting officer administering the contract requiring the SDP. *See* Federal Acquisition Regulation (FAR) 43.102 (policy), 43.202 (Authority to issue change orders), *available at* http://acquisition.gov/comp/far/current/html/FARTOCP43.html#wp232933.

[2] *Id.*

[3] *See* SPAWAR, MIL-STD-498 Notice 1, *Military Standard – Software Development and Documentation* (May 27, 1998) (cancelling MIL-STD-498 and adopting IEEE/EIA Std 12207 as the DoD standard for software development and documentation), *available at* http://sepo.spawar.navy.mil/SW_Standards.html.

2. Scope of the SPII Policy

a. General

SPII language shall be included in solicitations and contracts for DON requirements under which the contractor will perform "software development," unless the ASN RD&A Chief Engineer grants a waiver for this policy in accordance with paragraph 5 below.

The SPII policy applies to software development performed by Government contractors and subcontractors, regardless of tier. The prime contractor is responsible for ensuring that computer software developed or delivered by subcontractors under an affected DON contract follows the SPII policy.

The SPII policy applies even if the contract awarded will not contain a separate line item for a noncommercial software deliverable, such as where the software will be developed or delivered embedded in a hardware item or developed or delivered under a services contract. See paragraph 2(d) below for further applicability.

b. Definitions

The term "solicitation" includes solicitations issued under Standard Form (SF) 18 - Request for Quotation, SF 33 – Solicitation, SF 1442 – Solicitation, SF 1447 – Solicitation, SF 1449 - Solicitation, Optional Form (OF) 308, or similar documents.

The term "contract" includes contracts awarded under Form SF 26 – Contract, SF 33 – Award, SF 1442 – Award, SF 1447 –Contract, SF 1449 – Contract or Order for Commercial Items, OF 307 – Contract Award, OF 347 – Order for Supplies or Services, DoD Form 1155 - Order for Supplies or Services, or similar documents.

"Computer software development" or "software development" means, as applicable, developing or delivering new source code, modifying existing source code, coding computer instructions and data definitions, building databases schema, and performing other activities needed to implement the design of a noncommercial computer software product. This definition recognizes that even small changes to software code can result in significant changes to software system behavior and quality, and, consequently, that it is necessary for developers to define and follow disciplined and appropriate processes.

"Computer software" or "software" means noncommercial computer software and noncommercial computer software documentation as it is defined in DFARS 252.227-7013, and as such includes any noncommercial firmware that is to be developed or modified as programmable logic (*e.g.*, VHDL[4] for FPGAs[5]).

c. Procurements Where the SPII Policy Does Not Apply

The SPII policy language does not apply to these types of procurements:

i. Solicitations and contracts for supplies, services, facilities or utilities under which no software development will be performed by the contractor for any end item under the contract.
ii. Solicitations and contracts for the production, maintenance, or repair of vehicles, weapons, or weapon systems, or components or parts thereof, under which no software development will be performed by the contractor for any end item under the contract.
iii. Solicitations and contracts for the post-Milestone C installation of software systems under which no software development will be performed by the contractor for any end item under the contract.
iv. Solicitations and contracts to acquire "software maintenance," as defined by DFARS 208.7401, from the original manufacturer of commercial computer software, or its authorized representative.
v. Solicitations and contracts for commercial computer software that do not require the contractor to modify the commercial computer software so that it no longer meets the definition of "commercial item" as set forth in FAR 2.101.
vi. Task orders under Level of Effort contracts, where the task order(s) do not require the development or delivery of computer software.
vii. FAR Part 13 simplified acquisition procurements.
viii. FAR Part 14 sealed bidding procurements.
ix. Procurements of commercial computer software products, which will be acquired under the same licenses customarily provided to the public consistent with Defense Federal Acquisition Regulation Supplement (DFARS) 227.7202.
x. Small Business Innovation Research (SBIR) Phase I solicitations and contracts, since the dollar value for such a procurement should not exceed $100,000.

Procurements that do not issue competitive solicitations (e.g., sole source procurements) do not need to comply with the SPII policy as it relates to the content requirements for Section L and Section M of solicitations. However, DON acquisition

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[4] VHSIC Hardware Description Language.

[5] Field Programmable Gate Arrays.

managers for such acquisitions shall ensure that the contractor develops and delivers a SDP in accordance with the SPII policy where software development is required.

d. Procurements Where the SPII Policy Applies

The SPII policy language includes these types of procurements:

i. Solicitations and contracts for services or services under which the contractor will develop or deliver software for an end item under the contract.
ii. Solicitations and contracts for the design and development of vehicles, weapons, or weapon systems, or components or parts thereof, under which the contractor will develop software for an end item under the contract.
iii. Solicitations and contracts for the production, maintenance or repair of vehicles, weapons, or weapon systems, or components or parts thereof, under which the contractor will develop software for an end item under the contract.
iv. Solicitations and contracts for the maintenance and sustainment of computer software under which the contractor will develop software for an end item under the contract.
v. Procurements for computer software wherein the software is modified to meet Government needs such that the software no longer meets the definition of "commercial item" as set forth in FAR 2.101.
vi. SBIR Phase II, SBIR Phase III, or other Small Business solicitations and contracts under which the contractor will develop software for an end item under the contract.

If contract work meets the definition of "software development," then the SPII policy language applies regardless of whether such efforts could be fairly characterized as software enhancement, software integration, software maintenance, or software modification for other purposes.

Similarly, if contract work meets the definition of "software development," then the SPII policy language applies regardless of whether a fixed-priced or cost-type contract is awarded.

The SPII policy language is not required in solicitations or contracts to procure computer software for which the software has been previously developed and will be delivered to the Government without modification. Examples of such procurements include the purchase of unmodified Commercial-Off-The-Shelf (COTS) software products delivered under the license customarily offered to the public as well as the direct reuse of unmodified legacy software systems. However, if the application of the software involves integration in unprecedented ways, or involves the development of so-called "glue" code used to integrate the software, then the SPII policy language applies to the code to be written, but does not apply to the commercial item or unmodified legacy

software. This is necessary to ensure that such integration is performed in a disciplined manner to minimize unexpected side-effects.

Procurements that require sustainment of fielded software systems (to include corrective, adaptive, and perfective maintenance) are not exempt from the SPII policy language. However, the SDPs associated with these acquisitions need to cover only those IEEE/EIA Std 12207 processes and activities that are associated with the expected work content (such as the Maintenance process and the Problem Resolution Process). If any major enhancements are to be made to such systems, then the SDP must cover all processes that are applicable to such efforts.

3. Applicability of IEEE/EIA 12207 in DON Procurements

a. IEEE/EIA 12207 is a DOD Standard for Software Lifecycle Processes

As noted in paragraph 1 above, in 1998 DOD adopted IEEE/EIA Std 12207 as its standard for software lifecycle processes. This standard does not define a specific life cycle model; rather, it establishes a framework within which individual life cycle models can be defined for each software development effort. It also establishes standardized terminology with which these individual models may be described.

b. IEEE/EIA Std 12207 Implemented in DON Procurements by a SDP

The SPII policy language requires DON contractors and their subcontractors (if any) to define and describe their software development processes in a SDP that will be submitted during contract source selection, and to use IEEE/EIA Std 12207 as the framework for that explanation. The intent of the SPII policy language is not to change the internal standards and practices of contractors, but rather to communicate those standards and practices to DON acquisition managers and contracts personnel in a standardized format – e.g., the IEEE/EIA Std 12207 framework.

Although IEEE/EIA Std 12207 covers the entire software life cycle, contractors shall be required to use only those parts that apply to the software development efforts they are proposing to perform under the applicable contract. In particular, for software development efforts that are of small value compared to the total value of the contract, contractors can satisfy the intent of the SPII policy language with minimal effort by developing tailored SDPs to address the specific work to be performed.

In accordance with paragraph 1c above, DON acquisition managers may incorporate the SPII policy language in Section C, in a Statement of Work (SOW), in a Statement of Objectives (SOO), or in an equivalent solicitation section, as appropriate.

c. Content of the SDP – In General

The SPII policy language specifies the required characteristics and content of the SDP. The language describing the SDP contents may be placed into a Data Item Description (DID) for the SDP or, alternatively, may be included elsewhere in the solicitation or contract at the discretion of DON acquisition managers. DON acquisition managers, as appropriate, may require supplemental information from the contractor about its proposed software development approach. There is no requirement that the specific IEEE/EIA Std 12207 documents need to be created, just that their information content must be provided in some format, as appropriate, for the proposed work effort. The way these are packaged can be tailored by the Government or by the Offerors, based on their organizational practices and based on the work effort. However, all information relating to the software development processes, activities, tasks, techniques, and tools to be used on an effort must be described.

The SDP must be written with sufficient detail to allow the SDP to be used as the full guidance for the developers, to include both the prime contractor and any subcontractors. As such, they must include descriptions down to the level of 12207 tasks as well as the way that these tasks are performed (techniques and tools). Separate lower-level contractor plans and instructions (such as Software Standards and Procedures Manuals (SSPMs) will not be permitted if they contain substantive guidance regarding how the software effort will be conducted, unless they are handled as an extension of the SDP and are under Government review and approval.[6] This level of detail is important for the Government to be able to effectively assess the proposed approaches, and to be able to monitor and track progress after award.

d. Content of the SDP – In Particular

For SDP content, the SPII policy refers to Table 1 (Information Item Matrix) of IEEE/EIA 12207.1 which lists a set of documentation items associated with a software development effort. This list includes eighteen Plans and nine Procedures which, taken as a whole, cover the software development life cycle. The information content of these plans and procedures must be included in the SDP wherever relevant to the work effort being procured.

The SPII policy also cites Sections 5.2 and 5.3 of IEEE/EIA Std 12207.1 to define the generic content expectations for these Plans and Procedures. All topics listed in these sections are required, but DON acquisition managers may annotate some topics as "not applicable" based on the work to be performed. Likewise, in preparing proposals,

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[6] *See supra* note 1.

Offerors may decide that certain topics are not applicable. In such cases, they must submit as a part of their proposals a rationale for why these topics are not applicable.

Further, Table 1 of 12207.1 describes two additional items defined as "Descriptions" that address the development process. These are Software Development Standards Description and the Software Engineering Methods/Procedures/Tools Description. Even though these are not specifically mentioned in the SPII policy, the information content of these are closely associated with the planning process and so should also be included because they document the "specific standards, methods, tools, actions, strategies . . . associated with development and qualification."

Section 6.5 of 12207.1 describes the content of a Development Process Plan, which is the plan that is the most similar to the SDP. Section 6.5 requires that the Plan include information concerning the thirteen activities associated with software development processes. All of these activities must be addressed within the SDP, but if a specific activity is not relevant to a software effort (that is, will not be applied), and then the activity may be annotated as "not applicable." Such exclusions must be justifiable. In addition, if the Government has a particular interest in requiring that certain activities be performed in a specific way, using certain techniques and/or tools, then these may be defined as a part of this language. It is extremely important, in all cases to include information concerning the 12207 Improvement Process.

4. Guidance for Solicitation Sections L and M (or equivalent proposal instructions)

a. Guidance for Section L

The SPII policy language specifies four items that the Government must require Offerors to submit as a part of their proposal. These are:

i. Draft SDP – The SDP is the key document for any software development activity. It will be used as one factor in performing source selection, and will form the basis for the SDP to be used during contract execution. Requiring the SDP facilitates proposal evaluation and aids in the transition of the software approach into contract. The SDP may be formatted as desired by the Offeror, but must contain the information described by the SPII policy (which may be placed into a DID). The SDP is not page limited, but must be concise, to-the-point, and appropriate to the planned software effort, since it is to be used as direction to the developers.

ii. SDP Rationale – The SDP Rationale is important because it describes why the proposed approach is appropriate for the system to be procured. As such, it helps the Government assess the suitability and effectiveness of the proposed development approach to the software to be developed. A well-described process is of little value unless it is closely mapped to the specific needs of the system. As

a part of the rationale, Offerors are required to show how their proposed processes are equivalent to those articulated by CMMI® capability level 3 or some other equivalent process model. Because the CMMI provides a convenient, well-understood, commonly-used set of practices, it provides a useful framework for evaluating proposed SDPs, and for ensuring that all key practices are covered. Based on the needs of the specific program, the Government may emphasize certain process areas over others or leave the decision to the Offerors. The Government will use this information to assist in evaluating the proposal but does not need to perform a formal analysis to verify the completeness and accuracy of the Offeror's mapping.

iii. Previous system experience - The SPII policy requires Offerors to provide a description of previous experience in developing software of the same nature as being acquired, and a description of the extent to which personnel who contributed to these previous efforts will be supporting this effort. The approaches used by developers vary according to the characteristics of the system being built. Knowing that Offerors have had experience developing the same types of systems will aid the Government in assessing the proposals. The Government may expand on the meaning of "same nature" if there is a need to be more specific.

iv. Previous process experience – The SPII policy requires Offerors to provide a description of previous experience in developing software using the same or similar processes and approaches as they have defined in the SDP. This is important because, historically, developers who apply processes in which they have little or no experience encounter higher levels of risk as they learn how to apply the processes and techniques. As a part of this description, Offerors need to describe the extent to which personnel who contributed to these previous efforts will be supporting this effort. Offerors are also required to describe any previous CMMI® or equivalent model-based process maturity appraisals performed, and to identify the organizational entity and location where the appraisal was performed, the type of evaluation, the organization performing the evaluation, and the level earned. By knowing if an Offeror had had such an appraisal, the Government may increase their confidence that the Offeror has a disciplined approach, particularly if it was performed on the same organization that was proposed to develop the software. The SPII policy does not require the Government to formally verify or repeat any such appraisals however.

b. Guidance for Section M

The SPII policy language requires that, at a minimum, a specific set of factors be used as a part of proposal evaluation. These factors directly correlate to the proposal items required in Section L discussed above. The exact format and location used by the Government in describing these factors can vary, but it must be clear to the Offerors that these topics will be part of the evaluation process, and that the IEEE/EIA Std 12207 life cycle data characteristics (as defined in section 4.2.3, table H.3 will be used as guidance for such evaluations.

The SPII policy does not require that the Offerors have had a CMMI® or any other model-based process appraisal as a precondition to award. While having done so is beneficial to the Offerors, enabling them to prepare higher quality SDPs, the focus of this language is on ensuring that the proposed software approach is fully described and is appropriate to the system to be built.

Correspondingly, the SPII policy does not require the Government perform a process maturity appraisal as a part of source selection. The CMMI® however provides a useful framework to develop a Source Selection Plan to assist the Government is defining their overall expectations and selection criteria.

5. Waivers to the SPII Policy

The ASN (RD&A) Chief Engineer, or designee, is authorized to waive the requirement to comply with the SPII policy language. Waiver requests should be submitted to the Chief Engineer and will be considered on a case by case basis. Send written waiver requests to **Carl Siel**, at email address **carl.siel@navy.mil**, telephone number **202-781-3971**.

(END SPII POLICY GUIDANCE)