

How to Build a Better Specification



Certification Training



Knowledge Sharing



Continuous Learning



Mission Assistance

Date: 19 August 2015

Presenter: Jim Weitzner and John Heinbuch

Email Addresses:

James.Weitzner@dau.mil

John.Heinbuch@dau.mil





Purpose and Background

- This webinar is intended help you develop a better Specification by sharing best practices



Specification Definition

- Specification - A document prepared to support acquisition that describes essential technical requirements for materiel and the criteria for determining whether those requirements are met.

...MIL-STD-961

- Specification— A document used in development and procurement that describes the technical requirements for items, materials, and services including the procedures by which it will be determined that the requirements have been met. Specifications may be unique to a specific program (program-peculiar) or they may be common to several applications (general in nature).

...Glossary of DAU Acronyms & Terms

Purpose of Specification

- Purpose of a specification to provide a basis for obtaining a product/service that will satisfy a particular need at an economical cost and to invite maximum reasonable competition.
- Specifications may not be unduly restrictive.
- A specification sets limits and thereby eliminates, or potentially eliminates, items that are outside the boundaries drawn.
- A specification should be written to encourage, not discourage, competition consistent with seeking overall economy for the purpose intended.



A Good Specification

- A good specification should do four things:
 - identify minimum requirements
 - list reproducible test methods to be used in testing for compliance with specifications
 - allow for a competitive bid
 - provide for an equitable award at the lowest possible cost.
- Proper preparation and use of defense specifications is a difficult task requiring careful analysis and good judgment.



Specification Considerations

- a. For commercial products, first consider using or developing a non-Government standard or including DoD requirements in an existing non-Government standard. If that will not meet the need, consider developing or revising a commercial item description.
- b. The specification preparing activity should maintain a carefully documented, permanent record of the source and reason behind particular requirements and changes to requirements. Issues and controversial areas during the coordination process should be noted, and it may be desirable to summarize these issues and areas in the “Notes” section of the document and solicit feedback as experience develops. This record should provide a basis for related application guidance and a history useful in future document revisions.



Specification Considerations

c. Wherever possible, state requirements in terms of performance or form, fit, and function, as opposed to providing details on “how to” achieve the desired result.

d. Avoid unnecessary reference to other documents, which can lead to excessive “tiering” of requirements. If only a small portion of another document is needed, it may be better to extract that portion and include it in the specification rather than reference the document. When referencing another document, try to limit the extent of its application by citing specific grades, types, or classes, or citing specific requirements or tests. Do not cite paragraph numbers in referenced documents since these are likely to change in future updates.

- e. Try to make use of commercial products, processes, or practices when setting requirements or tests.
- f. Make a distinction between requirements portions and guidance portions of documents. Careful attention to use of the words “should” (guidance language) and “shall” (requirement language) is important.
- g. Use Section 6 “Notes” to provide users with guidance information that should be considered for inclusion in the contract, how to apply the document to different contract types and different program phases, lessons learned, relationship to other documents, tailoring guidance, and any other information that is not suitable for inclusion as a requirement or test.



Specification Considerations

h. If a specification is the source document for data item descriptions, develop, coordinate, and issue the specification and the data item descriptions together.



Types of Specifications

The following are some of the types of specifications called out in MIL-STD-961

- A specification that specifies design requirements, such as materials to be used, how a requirement is to be achieved, or how an item is to be fabricated or constructed. A specification that contains both performance and detail requirements is still considered a detail specification. Both defense specifications and program-unique specifications may be designated as a detail specification.

...MIL-STD-961



General Specification

- A specification prepared in the six-section format, which covers requirements and test procedures that are common to a group of parts, materials, or equipment and is used with specification sheets.

...MIL-STD-961

- A type of program-unique specification that describes the form, fit, and function and method for acceptance of parts, components, and other items that are elements of a system.
...MIL-STD-961

- A type of program-unique specification that describes such raw or processed materials as metals, plastics, chemicals, synthetics, fabrics, and any other material that has not been fabricated into a finished part or item.
...MIL-STD-961



Performance Specification

- A specification that states requirements in terms of the required results with criteria for verifying compliance, but without stating the methods for achieving the required results. A performance specification defines the functional requirements for the item, the environment in which it must operate, and interface and interchangeability characteristics. Both defense specifications and program-unique specifications may be designated as a performance specification.

...MIL-STD-961



Process Specification

- A type of program-unique specification that describes the procedures for fabricating or treating materials and items.

...MIL-STD-961



Program Unique Specification

- A specification that describes a system, item, software program, process, or material developed and produced (including repetitive production and spares purchases) for use within a specific program, or as a part of a single system and for which there is judged to be little potential for use by other systems.

...MIL-STD-961

- A type of program-unique specification that describes the requirements and verification of requirements for the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information.

...MIL-STD-961

- A type of program-unique specification that describes the requirements and verification of the requirements for a combination of elements that must function together to produce the capabilities required to fulfill a mission need, including hardware, equipment, software, or any combination thereof.

...MIL-STD-961



Solicitation Requirements Documents

- Specification describes the essential and technical work effort for the acquisition of products or services including standards to determine whether the requirements have been met.
- The specifications become part of the contract.



Contractual and administrative requirements

- Do not include requirements that are properly a part of the contract such as:
 - cost
 - quantity required
 - time or place of delivery
 - methods of payment
 - liquidated damages
 - repair
 - resubmittal
 - packaging
 - requirements for preparation, submission, delivery, approval, and distribution of data, and record keeping



Contractual and administrative requirements

- Do not include contract quality requirements such as:
 - responsibility for inspection
 - establishment of quality or inspection program
 - warranties
 - instruction for nonconforming items
 - contractor liability for nonconformance



Contractual and administrative requirements

- Contractual and administrative provisions considered essential for acquisition may be included in section 6 of the specification for information.
- The specification shall not prescribe mandatory requirements or instructions for the Government Contract Administration Office. These include directions relating to quality assurance functions such as:
 - inspections
 - audits
 - reviews
 - certifications
 - technical approvals



9 Steps to Writing a Specification

1. Determine the purpose of the specification
2. Determine the scope of the specification
3. Identify program specific risks
4. Develop specific specification sections
5. Determine responsibilities for each WBS element
6. Develop specification outline
7. Develop specification content
8. Conduct internal specification review
9. Conduct external specification review



Step 1 - Determine the Purpose of the Specification

- Based upon the specific program needs and the life cycle phase (for systems acquisition).
- Once defined, three essential planning and preparation efforts should be initiated prior to developing the Specification
 - Market Research
 - Identifying required Subject Matter Expertise
 - Establishing and documenting a Specification Preparation Plan



Market Research

- Involves the collection and analysis of information about the market that can be used to determine if products and producers are available to meet mission objectives, system development, and system support.
- Resources:
 - SD-5 Market Research
 - CLE 028 Market Research for Technical Personnel

- Identify who will participate in preparing the Specification
 - Systems Engineering
 - Science & Technology
 - Logistics Support
 - Test & Evaluation
 - Quality
 - Reliability/Availability/Maintainability
 - Configuration Management/Data Management
 - Environment/Safety/Health
 - Manufacturing
 - Security
 - Other (as required)

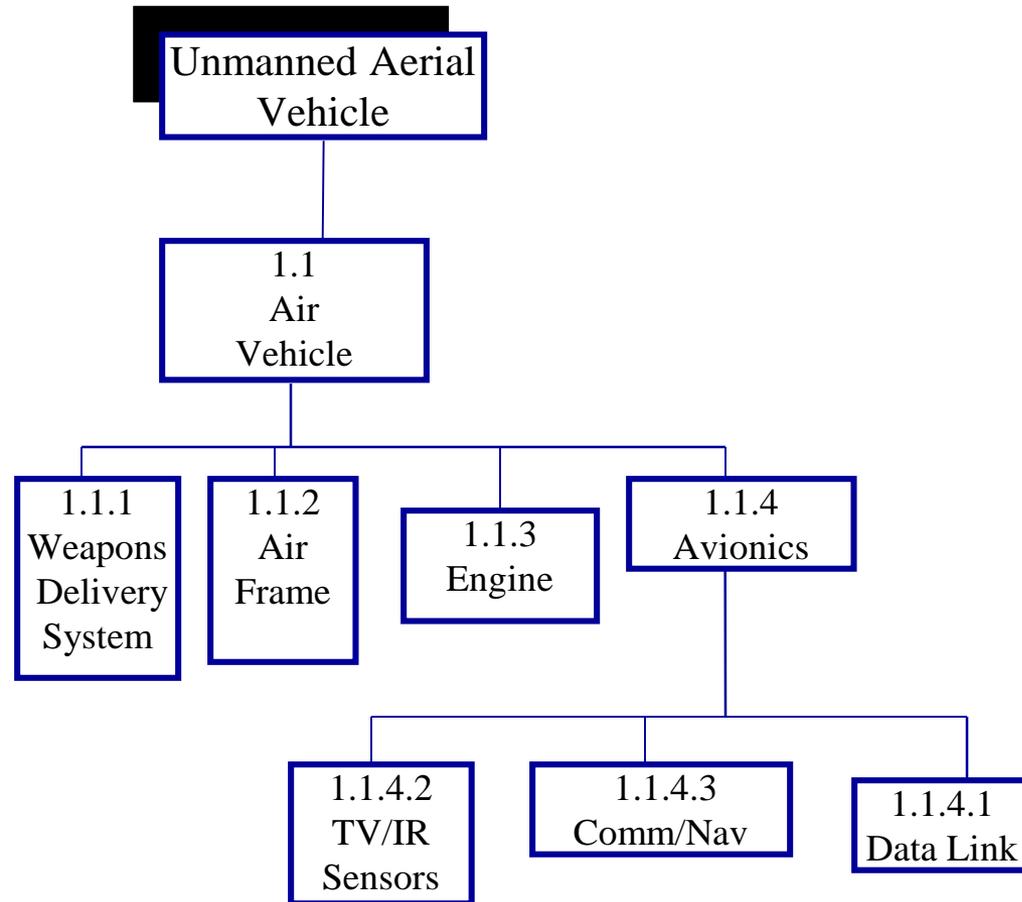
- Develop and use a specification preparation guide.
 - Assemble an experienced, multi-function team.
 - Assemble and review all the applicable reference material.
 - Assemble and review Market Research Data
- Establish Schedules and Milestones.
- Use a mature WBS to develop the Specification framework and outline.
- For each task, document the name of the task, who is responsible, and a projected schedule.



Step 2 – Determine the Scope of the Specification

- The scope may be defined and directed by the acquisition managers (PM, PEO, MDA).
- Typically developed by developing a matrix of competencies (e.g., Systems Engineering, Test and Evaluation)
- Based on areas of cross-interest, and organizational structure, a logical framework for the SPEC is implemented.
 - NOT “one-size fits all”
 - **Specification** usually reflects **product** WBS
 - usually reflects the 881 Common Elements
 - WBS (MIL-STD-883C)

Work Breakdown Structure (WBS) for Product





Step 3 – Identify Program Specific Risks

- For each element, identify the program-specific and acquisition lifecycle phase-specific risks.
- Risk identification will help maintain focus on key tasks.



Step 4 - Develop Specific Specification Sections

- Each of the major areas or sections of the specification identified, the process should be broken down into its basic elements.
- These basic elements become the building blocks for that portion of the Specification.
- The Product WBS facilitates a logical arrangement of Specification elements and provides a reference to trace all necessary elements to ensure they are addressed.
 - Sufficient detail to cover all the required work
 - Tailored to the level required



Step 5–Determine Responsibilities for each WBS element

- For each Product WBS Element, the responsibilities for both the Government and Contractor should be identified.
- Although the contractor may do most of the system development, some Product WBS elements will primarily be the domain and responsibility of the Government (e.g., GFE).

- MIL-STD-961 should be used for format.
- The Product WBS facilitates a logical arrangement of Specification elements and provides a checklist to trace all necessary elements to ensure they are addressed.
- For each Product WBS element, identify the product requirements that define the system necessary to satisfy the needs of the program.



Specification Format MIL-STD-961

- Section 1. SCOPE
- Section 2. APPLICABLE DOCUMENTS
- Section 3. REQUIREMENTS
- Section 4. VERIFICATION
- Section 5. PACKAGING
- Section 6. NOTES

- The statement of the scope shall repeat the item name and its modifiers and consist of a clear, concise abstract of the coverage of the specification.
- The scope may include information as to the use of the item other than specific detailed applications covered under “Intended use” (section 6).
- This brief statement shall be the first paragraph in section 1 of the six-section specification.
- The scope shall not contain requirements.
- Figures shall not be included in the scope.



Section 2

APPLICABLE DOCUMENTS

- Section 2 shall list only those documents referenced in sections 3 and 4 of the specification that are needed to meet requirements or provide useful information for meeting requirements.
- If a document is only cited as an example or for background information, it does not have to be listed.
- Improper document referencing can be a major cost driver since total compliance is implied unless specified otherwise.
- Section 2 documents should have the specific version referenced by date and/or revision letter.
- ASSIST Database is useful resource for identifying latest versions, dates, and titles of documents.



Section 3 REQUIREMENTS

- This section shall define the requirements that the entity shall meet to be acceptable.
- Requirements need to be stated clearly to facilitate cost and schedule estimating.
- Each major WBS product element may become a separate section of the specification.

Section 3 REQUIREMENTS

- The following criteria shall apply for stating requirements:
 - Each requirement shall be stated in such a way that an objective verification can be defined for it.
 - Each requirement should be cross-referenced to the associated verification.
 - Only requirements that are necessary, measurable, achievable, and verifiable shall be included.
 - Requirements shall be worded to provide a definitive basis for acceptance or rejection.
 - Requirements shall be described in a manner to encourage competition.
 - Requirements shall be worded such that each paragraph only addresses one requirement or topic.

- Section 4 shall include all verifications to be performed by the contractor or the government to determine that the item to be offered for acceptance conforms to the requirements in section 3 of the specification.
- Verification may be accomplished by
 - analysis
 - demonstration
 - examination
 - testing
 - or any combination thereof

- This section shall not include quality requirements that belong in the contract, such as:
 - responsibility for inspection
 - establishment of quality or inspection program requirements
 - warranties
 - instructions for nonconforming items
 - contractor liability for nonconformance



Section 5 PACKAGING

- The packaging requirements shall be as specified in the contract or order.
- When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements.
- Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.”

- Section 6 is not contractually binding.
- No requirements shall be included.
- Shall only contain information of a general or explanatory nature.
- Information shall assist in determining the applicability of the specification
 - the selection of appropriate type, grade, or class of the commodity
 - additional superseding data
 - changes in product designation such as grades or class
 - standard sample (if required)
 - and other information deemed appropriate

- Specifications should be written in a language that is understandable by all participants.
- Requirements should be stated explicitly avoiding words that allow for multiple interpretations.
- Use active rather than passive voice.
- Spell out acronyms and abbreviations when first used.
- Terminology should be consistent.
- Each paragraph should contain only one requirement.



A Place for Everything and Everything in its Place

- The Specification is not a catch-all for miscellaneous information
- It should NOT contain:
 - Proposal criteria
 - Instructions to the offeror
 - Conditions of security or clearance
 - Contract clauses
 - Conditions of contract
 - Work efforts
- It Is:
 - The requirements for the system to be procured

- Referenced documents shall be cited in the following manner:
 - “conforming to ...”
 - “as specified in ...”
 - “in accordance with ...”

- “Unless otherwise specified” shall be used to indicate an alternative course of action. The phrase shall always come at the beginning of the sentence, and, if possible, at the beginning of the paragraph. This phrase shall be used only when it is possible to clarify its meaning by providing a reference, such as to section 6 of the specification, for further clarification in the contract or reference to another paragraph in the specification.

Specification Wording 3

- The phrase “as specified herein” may be used when making reference to a requirement in a specification that is rather obvious or not difficult to locate.
- The phrase “to determine compliance with” or “to determine conformance to” should be used in place of “to determine compliance to.” In any case, use the same wording throughout.
- In stating limitation, the phrase shall be stated thus: “The diameter shall be not greater than ...” for the upper limit, or “The diameter shall be not less than ...” for the lower limit.
- The following prepositional phrases shall be used when referencing figure and table information: “on a figure” or “in a table”.

Specification Wording 4

- “Shall”, the emphatic form of the verb, shall be used throughout sections 3, 4, and 5 of the specification whenever a requirement is intended to express a provision that is binding. For example, in the requirements section, state that “The gauge shall indicate” and in the test section, “The indicator shall be turned to zero, and 220 volts of alternating current shall be applied.”
- “Will” may be used to express a declaration of purpose on the part of the Government. It may be necessary to use “will” in cases when simple futurity is required.
- Use “should” and “may” to express nonmandatory provisions.
- “Must” shall *not* be used to express a mandatory provision. Use the term “shall.”



Paragraph numbering and identification

- Each paragraph and subparagraph shall be numbered consecutively within each section of the specification, using a period to separate the number representing each breakdown.
- Lowercase letters followed by a period shall be used to identify listings within a paragraph or subparagraph. Bullets shall not be used.
- For clarity of text, paragraph numbering should be limited to three sublevels, unless additional sublevels are unavoidable.
- Each paragraph and subparagraph shall be given a subject identification.
- The first letter of the first word in the paragraph and subparagraph identification shall be capitalized.
- Paragraph and subparagraph identifications shall be underlined, italicized, or bold type.



Step 8 – Conduct Internal Specification Review

- Sanity check
 - Are any requirements missing?
 - Are there any unnecessary requirements?
 - Do requirements flow?
 - Is redundancy minimized?
- Verify internal consistency of Specification
- Verify cross-referencing

- RFP Sections
 - Section C – Description/SOW/Specification
 - Section E – Acceptance
 - Section F – Deliveries (CDRLs, etc.)
 - Section I – Contract Clauses
 - Section J – Exhibits
- Sections K, L, and M are included only in the RFP - they do not become part of the contract
 - Section K – Representations and Certifications
 - Section L – Instructions
 - Section M – Evaluation Factors



Step 9 – Conduct External Specification Review

- Often consists of senior management
 - Many organizations have a mandatory “Executive Review”
- Provides an objective review
 - Unintended consequences
 - Ambiguities
- Verifies the SPECIFICATION says what you intend

- Specification References
- ASSIST Links
- Recommended practices
- Discouraged practices



Specification References

- MIL-STD-961: Defense and Program-unique Specifications Format and Content
- MIL-HDBK-520A: System Requirements Document Guidance
- SD-15: Guide for Performance Specifications
- MIL-STD-881C: Work Breakdown Structures
- SD-5: Market Research, Defense Standardization Program, January 2008
- Contract Guidebook for Program Managers v0.1, December 2011
- SYS 130: Specification Selection and Application Course (DAU Course)
- CLE 065: Standardization Documents (DAU Continuous Learning Module)



Link to ASSIST

- Assistdocs.com provides access to Defense Standardization Program documents (e.g. SD-5) from the ASSIST database.
- The link is:
http://www.assistdocs.com/search/search_basic.cfm
- ASSIST is the official source for Department of Defense specifications and standards.
- Useful for developing a Document Summary List identifying revisions and dates for documents listed on Section 2 APPLICABLE DOCUMENTS.

- Do
 - Select a competent team with an experienced leader.
 - Use the program Work Breakdown Structure (WBS) and MIL-STD-961 to outline the work effort.
 - Define explicitly the tailored limitations of cited Specs and Standards.
 - Try to make use of commercial products, processes, or practices when setting requirements or tests
 - Provide a set of requirements that can be priced.

- Do
 - Express requirements in performance language whenever possible.
 - Use “shall” whenever a task is mandatory.
 - List tasks in logical sequence.
 - Typically limit paragraph numbering to the 3rd sub-level (3.3.1.1).
 - Limit one requirement to each paragraph.
 - Allow for the contractor’s creative effort.



Discouraged Practices “Don’ts”

- Avoid
 - SOW language in the specification
 - Using the specification to describe work that should be in the SOW.
 - Specifying technical proposal criteria or evaluation factors.
 - Establishing a delivery schedule.
 - In-house management instructions
 - Cutting and pasting from previous specifications without tailoring for the specific needs



For more info on the webinar or a specification workshop, contact one of the following:

- Presenter: Jim Weitzner
 - 240-895-7326
 - James.Weitzner@dau.mil
- Moderator: John Heinbuch
 - 240 895-7355
 - John.Heinbucht@dau.mil
- Producer: Bill Conroy
 - 240-895-7368
 - William.Conroy@dau.mil