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STATEMENT OF WORK (SOW)

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GUIDANCE FOR WRITING WORK STATEMENTS

Preface

The objective of this guide is to provide guidance and assistance to our technical and program customers when it is necessary to develop a statement of work for a procurement.

This document provides guidance, instructions and references for the preparation of statements of work for NASA acquisitions. Although it provides coverage for statements of work in general, it emphasizes the use of Performance (Based) Work Statements (PWS). It is the NASA policy that all contracts will be considered for PWS and focus on outcomes or results and not methods of performance or processes. Acquisition reform is striving to reduce Government risk by using performance-based specifications and standards, which make the contractor responsible for providing the product requested, assuming the risk for meeting performance requirements, and seeking innovations to efficiently and effectively achieve performance objectives. Contractors will be given more latitude for determining methods of performance, with more responsibility for performance quality. The use of PWS should lead to more cost-effective acquisitions and better value.

Chapter 4, Section 403 provides the NASA Procurement internet address (URL) for Performance Based Contracting. It contains policy documents, guidance, training modules and statement of work templates to help in preparing PWSs. This handbook replaces the Statements of Work Handbook, NHB 5600.2A.

/Original Signed/

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CHAPTER 1

REQUIREMENTS DOCUMENTS

101 GENERAL

NASA expends approximately 90% of its annual budget each year through the acquisition process. In order to acquire goods, services, research, products and other items through this process, our needs must be described to contractors, suppliers and vendors. This description is called a specification, needs statement or statement of work. The Federal Acquisition Regulation (FAR) (Part 11) prescribes policies and procedures for describing agency needs. It has

established an order of priority that requirement documents, such as statements of work, should be "performance-oriented". The next type of needs document is a "detailed design-oriented" document. Lastly, the FAR lists government standards and specifications as the least preferred type of needs document. Developing a needs or requirements document can be a very complex and challenging task. Statements of work are the most challenging of the requirements documents. Normally a statement of work is employed when the simpler needs requirements documents cannot be used and it must describe in sufficient detail what must be accomplished. The statement of work must be done properly and with high quality. Contracting for timely, high quality products or services is wholly dependent on the statement of work or requirements document. If the needs are not well described it is highly likely that a contractor will have difficulty producing what NASA needs to support its mission. As a result, this guidance is being issued to assist technical and program personnel in writing the most difficult requirements document, the statement of work.

102 ALTERNATIVES TO A STATEMENT OF WORK

Once a requirement of need has been identified, it is possible that a requirements document or statement of work may not be necessary. There are a number of Governmentwide and Agency initiatives that may save time and effort by using existing other contracts or a streamlined acquisition method.

For small dollar acquisitions credit cards can now be used across the Federal Government. Should a requirement fit into the credit card program, a very short and succinct statement may be all that is needed. Federal Supply Schedules have been expanded to include many services that NASA uses. Two other NASA initiatives may also be considered before embarking on a formal statement of work. First, is the Consolidated Contracting Initiative (CCI). This program involves sharing of contract resources across the agency and the government. Products and services that are used by more than one NASA Center are acquired under one contract at one Center. Any Center can order off of the contract for their mission needs. Many other Federal agencies have contracts that are available to NASA which are also included in this system. More information can be found on the internet at <http://www.hq.nasa.gov/office/procurement/cci.html>. Second is the mid-range procurement initiative. This is a very streamlined method of procurement for acquisition between \$1 million and \$5 million. It requires less documentation and much less time.

Acquiring commercial items is another method of procurement that eliminated the need for a formal statement of work. The principle employed here is that the Government acquires supplies and services from the commercial sector the way they sell to each other. A statement of need is developed which explains to industry what needs to be accomplished, the type of product or service to be acquired, the performance requirements and/or the essential physical characteristics. It is also the preferred manner in which to conduct an

acquisition. Should your requirement appear to meet this commercial items method it offers shorter procurement lead time and other advantages. To find out more about these streamlined approaches and whether any would satisfy your need, contact your Center procurement office.

103 STATEMENTS OF WORK

Statements of work are the most essential documents in any Federal solicitation or contract. They are read and interpreted by government and industry personnel with diverse backgrounds such as engineers, scientists, accountants, lawyers, contract specialists and other business fields. Therefore, the statements of work must be written so that technical and non-technical readers can understand them during the solicitation, award and administration phases of the acquisition cycle. An initial investment of time and effort to write a clear and high quality statement of work will:

- a. enable offerors to clearly understand the requirements and needs of NASA;
- b. allow offerors to more accurately cost or price their proposal and submit higher quality technical proposals;
- c. provide a baseline for the development of other parts of the solicitation, particularly the evaluation criteria, technical proposal instructions and independent cost estimate;
- d. minimize the need for change orders which can increase the cost or price and delay completion;
- e. allow both the Government and contractor to assess performance ; and
- f. reduce claims and disputes under the contract.

104 KINDS OF STATEMENTS OF WORK (SOW)

There are three major types of statements of work (SOW) and they are:

- a. Design/detailed specification;
- b. Level of effort; and
- c. Performance oriented (based).

Although there are other types and variations of each, this guide will work within these three categories.

Design/detail statements of work tell the contractor how to do the work. It may include precise measurements, tolerances, materials, quality control requirements, and other government requirements that control the processes of the contractor. There are wide variances in application of this type of SOW. It is as varied as the requirements that are acquired under them. The point is that the government, to a large degree, requires the contractor to follow the government's way of performing the task or making a product. This causes the risk of performance to be borne by the government. For instance, if the contractor builds and/or performs a task and follows the government's SOW exactly, and the product or service is faulty, who is to blame? Absent malfeasance or shoddy workmanship it is the government's process that the contractor was implementing so the contractor cannot be faulted. Although this type of SOW is primarily used for manufacturing or construction, other work efforts are described in this rigid format.

Level-of-effort SOWs can be written for almost any type of service unless it is an inherent government function. The real deliverable under this type of contract is an hour of work. They are normally associated with task order and delivery order contracts. Services or products are acquired via individual orders issued by the Contracting Office. The SOWs are usually very broad and describe the general nature, scope or complexity of the services or products to be procured over a given period of time. It is important in writing these SOWs to assure all work items are sufficiently covered. Task orders or delivery orders can only be issued in those areas specifically covered in the SOW. All activities outside of the SOW must be acquired through a separate procurement action.

Performance-based statements of work are the preferred method of stating needs. A performance based statement of work structures all aspects of an acquisition around the purpose of the work to be performed and does not dictate how the work is to be accomplished. It is written to ensure that contractors are given the freedom to determine how to meet the Government's performance objectives and provides for payment only when the results meet or exceed these objectives. It maximizes contractor control of work processes and allows for innovation in approaching various work requirements. Performance based SOWs emphasize performance that can be contractually defined so that the results of the contractor's effort can be measured in terms of technical and quality achievement, schedule progress, or cost performance. The goal of PBC is to:

- a. Save money by reducing contract costs from elimination of unnecessary effort, through innovation by the contractor, and also by reducing Government surveillance.
- b. Enable NASA to shift its emphasis from processes to outputs.
- c. Hold contractors accountable for the end results. Ensure that contractors are given the freedom to determine how to meet NASA's performance objectives.

105 NASA POLICY

All new NASA contracts for services, hardware, and research and development will be considered for suitability for PBC and focus on required outcomes or results, not methods of performance or processes (NFS 1815.406-2). Justification is required for the use of other than PBC methods when acquiring services.

CHAPTER 2 STATEMENT OF WORK CONSIDERATIONS

201 ADVANCE PLANNING

Attention to the early stages of program and procurement planning is critical to achieving a successful acquisition. Identify and contact your Center Contracting Officer or representative. Inform them of what you are planning and ask for any suggestions. Keep them informed as you progress. There may be items such as, reporting requirements, market research, appropriateness of contract type, and the incorporation of effective incentive provisions that relate to your SOW that the contracting office can help you with. The amount of planning will be proportional to the complexity of the contemplated procurement. Program and

Project Offices must determine what work will be performed by civil servants and by contractors. The SOW should be structured so that it is conducive to efficient performance. Contractors and civil servants must be given complete and severable pieces of work for which they are accountable. It is much easier to write a SOW around the required output if a complete task is turned over to the contractor.

201.1 Market Research

Agencies are required by Part 10 of the Federal Acquisition Regulation (FAR) to ensure that legitimate needs are identified and trade-offs evaluated to acquire items that meet those needs. Market research can include the Project Officer's knowledge of the marketplace, information gleaned from prior acquisitions, or from a formal sources sought synopsis published either in the Commerce Business Daily (CBD) or over the NASA Acquisition Internet Service (NAIS).

Research must determine if commercial or nondevelopmental items are available to meet NASA's needs. FAR Parts 11 and 12 require NASA to buy a commercial product or service if feasible. If a commercial item is not available, the requirement must be reviewed to see if it can be revised to encompass commercial items.

201.2 Early Communication with Industry

Work with the contracting office to determine whether to release draft SOW and solicitation documents. This pre-release is recommended and has the following advantages:

- (1) permits early industry review and comment on complex specifications or Statements of Work,
- (2) promotes competition,
- (3) encourages informal resolution of procurement problems,
- (4) improves industry's understanding of NASA's requirements and evaluation criteria, and
- (5) encourages proposers to replace Government standards with non-Government standards as recommended by Office of Management and Budget (OMB) Circular A-119.

NASA normally requires a draft solicitation to be issued permitting early identification and resolution of industry's questions, concerns, and recommendations. Conferences with prospective offerors can also be held to clarify or explain requirements or to address industry questions or recommendations on how to state those requirements. These may be Pre-solicitation Conferences (held before release of the solicitation) or Pre-proposal Conferences (held after release of the solicitation but before proposals are due).

202 PREPARATION GUIDANCE

This section provides suggestions for developing and writing statements of work. The suggestions are organized by topic.

202.1 General

- a. The SOW will be read and interpreted by a variety of people from diverse disciplines, such as attorneys, acquisition personnel, cost estimators, accountants, technical specialists, engineers, etc. It is imperative that the words be understood not only by the writer of the SOW, but by the readers.
- b. The SOW/specification, as an integral part of a contract, is subject to contract law. A fundamental legal principle is that because the Government is the drafter,

any ambiguity usually is construed against the Government by the courts; that is, when two reasonable interpretations are possible, the court will adopt the interpretation espoused by the non-drafting party. The interpreter must look to what the contract actually says, not what the Government meant to say or would like to have said. Drafters of SOWs are often tempted to write vague language because they think it gives them the flexibility to loosely interpret the SOW at a later date. However, the drafter (Government) would lose in a contract dispute based on an ambiguity in the SOW. Further, ambiguous work statements result in protests, unsatisfactory contractor performance, delays, claims, disputes, and increased contract costs. Conversely, a high-quality document leads to a greater likelihood of successful contractor performance. When drafting a SOW, strive for clarity above all else.

c. Simple words, phrases, and sentences are used for clarity. Well-understood words and phrases improve the PWS by minimizing ambiguities. Be concise, precise, and consistent. Careful and exact descriptions will avoid misunderstandings before and during the life of a contract. Keep sentences short and to the point.

d. Choice of Verbs.

(1) Use **Active verbs**. Examples include: analyze, audit, calculate, create, design, develop, erect, evaluate, explore, interpret, investigate, observe, organize, perform, and produce (work words). For instance, the PWS could require the contractor to "conduct the experiment and produce a report describing and analyzing (or interpreting) the results."

(2) Avoid **Passive verbs** that can lead to vague statements. For example, the phrase "the contractor shall perform," is preferred in lieu of "it shall be performed" because the latter does not definitively state which party shall perform. Avoid "should" or "may" because they leave the decision for action up to the contractor. Use "shall" when describing a provision binding on the contractor. Use "will" to indicate actions by the Government.

e. To reduce the possibility of misinterpretation, terminology must be consistent. The same words and phrases must be used when describing the same requirement. It is confusing if a hole is referred to as an "orifice" and later called an "aperture".

f. When contracting for services, NASA must ensure that any final Agency action reflects the informed, independent judgment of NASA officials. Contractors must not be allowed to perform inherently Governmental functions as defined in OFPP Policy Letter 92-1, Inherently Governmental Functions. These functions include those activities that require either the exercise of discretion in applying Government authority or the making of value judgments in forming decisions for the Government.

g. Avoid redundancy. Redundancy can reduce clarity, thereby increasing the possibility for ambiguity and contradiction. If amplification, modification, or exceptions are required, make specific reference to the applicable portions and describe the change.

h. Vague/inexact words and generalizations are open to so many interpretations that they become meaningless. Phrases such as "securely mounted", "properly assembled", and "carefully performed" are examples of unenforceable language.

Avoid catch-all and open-ended phrases, such as "is common practice in the industry," "as directed," or "subject to approval."

- i. Note that common industry or in-house terminology is not always as universally defined as might be assumed. Technical terms must be specifically defined since judges settling disputes lean toward the "ordinary and usual" meaning and usually interpret the meaning against the drafter. If the writer is unable to define the term, potential offerors will have the same difficulty.
- j. Avoid using "any," "either," or "and/or" unless NASA wants to give the contractor a choice in what must be done. Also, avoid the use of "etc.," because the reader doesn't have any idea of the items that could be missing.
- k. Include definitions that provide a common basis for understanding between the contractor and NASA. Ensure each "term of art" has only one universally understood meaning; otherwise define it.
- l. Use abbreviations or acronyms only after spelling them out the first time they are referenced. When there are many, it is advisable to provide an appendix.
- m. Any document referenced in the solicitation must be either furnished with the solicitation or available at a location identified in the solicitation. The date or version of each document must also be specified, not listed as "version in effect on date of award."
- n. Do not duplicate material in the SOW that the CO will include in other parts of the contract. Consult the CO for guidance during the early stages of SOW preparation.
- o. As part of the initial proposal, offerors can (1) be required to submit detailed plans for compliance with Safety and Health Requirements, Quality System and Assurance Requirements, and similar items, or (2) allowed to submit summary plans accompanied by a statement to provide more detailed plans if selected. A preference must be stated in the PR package.
- p. The Project Manager should indicate, if appropriate, desired design output, verification, and how design changes will be managed. The inspection portion shall address inspection and testing requirements (if appropriate, reference ISO element 4.10). It may be helpful to have the contractor develop a quality plan or documented procedure that will be used to inspect and test the product or identify non-conforming items. If appropriate, reference ISO elements 4.4 (Design) and 4.9 (Process Control).
- q. In all cases, statements of work must:
 - (1) be definitive enough to protect the Government's interests;
 - (2) serve as a basis for contractor response, evaluation of proposals, and source selection; and
 - (3) provide a meaningful measure of performance so both the Government and the contractor will know when the work is satisfactorily completed (see Appendix D).

202.2 Deliverables

- a. This section contains information on what the contractor is to provide NASA and when it is required. Identify only those outputs that are essential and a part of the performance requirement's summary. Express the outputs in concise, easily understood, measurable terms.

b. Clearly state which party will perform each task by delineating a division of responsibilities between NASA, the contractor, and others.

(1) If review is to be provided by NASA, a time limit must be set within which review/comment must be provided. Each time the contractor suspends activity to wait for NASA's response, time and money are expended. To avoid a breach of contract by the Government, the contract should state "*the contractor shall presume "no comment" and proceed if comment is not provided within _____*" (a specified period).

(2) Clauses or statements that make contractor performance dependent on NASA must be avoided. A contract shall clearly state the intended effect of interim reviews to avoid releasing the contractor from subsequent liability. For example, if the contractor's overall obligation is to design and build an item that meets a final specification but NASA's review of the design is required before proceeding, such review should not be considered as an approval. Courts have generally held that an approval transfers responsibility to the approving party. Beware of the contractor giving accountability back to the Government while they are being paid to be accountable. A contractor may readily agree or even request NASA's review and approval of their plans and procedures. Do not do it! Make contractors accountable.

c. Provide a realistic delivery schedule for contract performance and completion. Schedules that are unnecessarily short or difficult to attain tend to restrict competition and result in higher contract prices. Provide sufficient information for the contractor to establish its own milestones against which its progress can be measured. Be sure this section is consistent with the rest of the solicitation.

202.3 Data Requirements

a. Minimize the data requirements. Buy only the data needed by NASA to make a decision and/or comply with a higher level requirement. Reduce costs by requesting data that will normally be created in performance of the contract. Avoid contractor proprietary information management or technical data systems that hinder Government oversight or create a sole source problem in follow-on procurements. Don't request reports that NASA can generate on its own from contractor data.

b. The PR Initiator must prepare a list of all data to be delivered under the contract, including the time and frequency of delivery. This includes information on the status of the contractor effort, information needed to support, manage, and operate the system, and using contractor formats or those common to the contractor's customers, if feasible.

c. In major system acquisitions, all data requirements must be specified in a separate line item listed in a section of the solicitation other than the PWS.

202.4 Government Property

a. FAR Subpart 45.3 requires that contractors provide all facilities required for performance of Government contracts unless the contracting situation falls within one of the stated exceptions in FAR 45.302. Facilities in this context refers to real property (i.e., land, buildings, and other structures) and plant equipment (i.e., general purpose equipment, test equipment, furniture, computers, vehicles, and similar items). The same rule applies to furnishing material, except the Government may do so to achieve significant economy or standardization, or when in the Government's interest.

b. Providing equipment to contractors on-site must be done sparingly since the contractor will be dependent upon the Government for care and maintenance. This dependence may hinder the ability of contractors to be fully accountable.

c. When furnishing property to contractors appears necessary, care must be taken to assure that regulatory authority exists and that appropriate documentation is prepared justifying an exception to general policy. Following this determination, the identification of each item, time of delivery, and condition (if feasible) of the Government property must be itemized.

203 PROTECTING THE INTEGRITY OF THE PROCESS

The Government acquisition process must be conducted in a manner above reproach, with complete impartiality and with no preferential treatment. NASA personnel associated with the acquisition process have a responsibility to protect its integrity and must abide by the following:

(1) All potential offerors must be given equal access to information on competitive acquisitions. Generally draft Requests for Proposals (RFPs), pre-solicitation/ pre-proposal conferences, and/or one-on-one discussions between NASA technical personnel and potential offerors improve the acquisition process. However, any information that could give an offeror a competitive advantage must be made available to all potential offerors.

(2) In the interval between release of a competitive solicitation and contract award, all communication with prospective contractors relating to the acquisition must be through the Contracting Officer.

(3) Proprietary and source selection sensitive information must be protected from unauthorized disclosure. Violations of the procurement integrity provisions in Section 27 of the Office of Federal Procurement Policy Act and FAR 3.104 may lead to civil and criminal penalties for improper disclosure of information relating to a procurement.

(4) Specifications and SOWs must not be unnecessarily restrictive to avoid unfairly excluding one vendor or increasing prospects for award to another.

(5) Contractors that prepare NASA SOWs are generally prohibited from proposing on that same requirement. This is an organizational conflict of interest.

204 KEY PARTICIPANTS

The organization needing contractor support is required to provide the SOW or Specification; however, writing these documents must always be a team effort. The Project Manager and the Contracting Officer will build a team that includes personnel who are experts in the technical disciplines, financial management, fabrication, test, logistics, configuration management, operations, safety, reliability, maintainability, and quality assurance. Contractor personnel or consultants cannot be members of this team without written justification by the appropriate Head of the Center and prior written consent from the Headquarters Office of Procurement.

204.1 Project Manager

The requesting organization will assign an individual who is familiar with the technical requirements of the procurement to be responsible for writing the SOW. This person will define and articulate the contract requirements and is also responsible for planning, program control functions, developing program objectives, delivery requirements, scheduling, estimating, budgeting, specific

project plans, surveillance plan development, and participating in the source selection.

204.2 Contracting Officer (CO)

Contracting Officers are responsible for ensuring performance of the contract, and safeguarding the interest of the U.S. in its contractual relationships. The CO does not decide NASA's need, but rather assists the project manager in preparation of a SOW/specification that clearly states NASA's needs in conformance with the regulations. A CO is the only member of the team that has authority to obligate the Government (FAR 2.101).

204.3 Contracting Officer's Technical Representative (COTR)

The technical Program Office will nominate as COTR an employee with the technical expertise necessary to administer the contract. This person must have received the mandatory COTR training, and is often the Project Manager who initiated the Procurement Request (PR). At contract award, the CO will issue a letter of delegation that specifies the limits of the COTR's authority. This appointment enables the COTR to assist the CO with the technical aspects of the contract. See NFS 1842.270.

204.4 Quality Representative (QR)

The QR provides the quality assurance requirements, and assists in developing performance standards and project surveillance plans. The QR is also responsible for evaluating contractor performance in accordance with the pre-established Surveillance Plan described in §604.

CHAPTER 3 REQUIREMENTS ANALYSIS

301 GETTING STARTED

Requirements analysis determines what NASA's needs are, and what kinds of services and outputs are to be provided by a contractor. A systematic process for SOW development begins with an analysis of what work is to be performed and breaks down the work into components. It ends with a clear description of performance output requirements.

302 WORK BREAKDOWN STRUCTURES (WBS)

- a. The WBS is a top-level overview that provides the basis for monitoring a program or project by subdividing the work into successively smaller increments until a manageable element is reached. It develops a program-team consensus on what the customer wants. Together with a make/buy determination, it can be a useful tool in deciding what elements are performed by civil servants and by contractors. A good WBS assures that significant tasks are not overlooked.
- b. Although the WBS can be a valuable tool, it is not necessary for all procurements. When used, the WBS must avoid stifling innovative ideas. Rigid control of every detail is neither necessary nor desirable. It must not be so explicit that there is no room for creative thinking or individual empowerment, yet it must be sufficiently defined and all work elements identified to permit inspection and acceptance.

c. NASA Systems Engineering Handbook sets forth policies and processes for preparation of the WBS.

303 GATHERING HISTORICAL DATA

a. After identification by means of the WBS of services or products that are required, resource data are gathered for both in-house and contractor efforts. This involves collecting and analyzing historical data (indicating what, when, how much, etc. relative to prior work performed) to describe the job, establish how often the service or output is needed, and ensure that we don't pay for something that has already been done. Then define objectives or goals that differentiate the programs. Finally, establish a historical background of prior successes/failures throughout this program.

b. Data required is available from NASA's Lessons-Learned System, from other databases or records (such as sampling or on-the-job observation), or from other agencies that have acquired similar services. Also, where applicable, review past safety violations, OSHA judgments, EPA violations or citations, and employee lost-time accident rates.

303.1 Benchmarking

The purpose of benchmarking is to improve the workings of your own organization by taking advantage of another organization's Lessons Learned and to avoid mistakes made in the past. In the early steps of planning, communicate with other organizations to gain insight on similar requirements. Then follow the four basic steps to benchmarking: preparation, observation, comparison, and action.

(1) Preparation means identifying contracts similar to the one you are trying to write, but do not limit the search to Government contracts. Networking at procurement offices can often lead to other connections. Be prepared with specific questions concerning expected deliverables, services, etc., and what measures they use in determining success.

(2) The second and most important step is observation. Write down all facts that are useful. Find out what the organization has learned, both good and bad. Observe how successful its approach has been. You could also request a copy of their SOW to use as a template.

(3) The third phase is comparison. Look at the information gained and ask, "what useful and relevant information did I get?" Make a matrix of what is needed and what you got to assist in understanding how to apply the information received.

(4) The final phase is action. Now apply what was learned by drafting the SOW. Continue working with procurement, your technical staff, and other managers so problem areas and missing details can be identified. You may want to have one of the benchmarking organizations help you, but be careful since you may be in a procurement-sensitive phase.

303.2 Output Data

One of the most important and difficult tasks of the team is to find how often output services will be furnished during contract performance. Historical information must be modified by incorporating anticipated changes. In Performance-Based Contracting this information may be made available to the contractor for information purposes only.

WORKLOAD

SERVICE	HISTORICAL WORKLOAD	KNOWN (ANTICIPATED) CHANGE	ESTIMATED WORKLOAD
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Launches	7 per year	± 1	6 to 8 per year
Payloads	2 Major, 3 Minor per Flight	-1 to 1	1 Major, 2 to 4 Minor per Flight

303.3 Physical Resources Data

Another challenging task is to gather data on facilities, materials, and equipment required to support the work to be performed. As a general rule, contractors are required to provide all resources for work they will be doing. However, in the rare exceptions where equipment is furnished, writers of the SOW will use the resources data to develop their list of Government-furnished property.

FACILITY: ENGINE PROCESSING

FACILITY	DESCRIPTION	SQ. FT.	LOCATION
Building #223	Engine Processing facility. A single story type building used to shelter Flight Hardware and workers during turnaround activities.	25,000	KSC

MATERIALS: ENGINE REPAIR

NAME	STOCK NO.	DESCRIPTION	QTY.	LOCATION	ESTIMATED YEARLY USE
Hydrogen	100357	Used for engine propellant	20 tons per flight	Bldg 223	150 Tons

EQUIPMENT: ENGINE REPAIR

NAME	STOCK NO.	DESCRIPTION	LOCATION	QTY.
Engine Stand	101135	Holds engine for turnaround activity	Vehicle Overhaul Facility, Bldg #233	1

303.4 Personnel Resources Data

Gather data on the numbers and types of personnel that may be needed to perform each service output. This will be useful in evaluating a proposal's cost realism and in developing the Government estimate. It is the responsibility of the contractor to manage its own staffing plan. This gives the contractor latitude to manage its own work force and choose its own methods for work accomplishment. The contract should not normally specify staffing levels or use "key personnel" clauses.

303.5 Quality Systems Data

Data on the contractor's ability to meet contract requirements must be in accordance with ISO 9000; including quality system and QA requirements.

304 PROJECT WORK BREAKDOWN STRUCTURES (PWBS)

a. The WBS will be further developed from the program level downward to a project-by-project basis by means of the PWBS. A PWBS is prepared when project definition permits and will be refined and changed as design concepts change to reflect new system and subsystem approaches. Until a project is completed, the PWBS is a flexible working tool.

(1) It includes all effort required to achieve an end objective. It encompasses total project content by relating the elements of work to each other and to the end product. A PWBS, which describes inputs, covers both in-house and contractor efforts.

(2) It is developed by displaying and defining the total effort to be performed in identifiable and measurable elements. A PWBS element can represent varying aggregations of individual jobs or tasks, each of which is planned, approved, and managed at an appropriate level. No task should be overlooked.

(3) It provides the framework for project planning and control and also for making decisions conducive to effective use of contractor support.

(4) It provides means for integrating and assessing technical, schedule, and cost performance.

(5) It provides a framework for performance measurement.

(6) It provides all applicable quality systems and quality assurance requirements, as well as definition of the type and extent of control to be exercised on subcontracts.

(7) All element descriptions are concise and easy to understand.

b. A PWBS must also be compatible with the coding structure defined in NASA Financial Management Manual FMM 9100.

c. Following a PWBS breakdown, the section of the PWBS identifying contracting efforts is extended by using a contract WBS (CWBS).

305 CONTRACT WORK BREAKDOWN STRUCTURES (CWBS).

a. For non-routine, more complex requirements, a CWBS is created. A CWBS is a hierarchical diagram for a specific contract. It identifies the requirements to be satisfied, **leaving the contractor free to determine how to achieve the desired result.**

b. A CWBS is prepared prior to writing the SOW and serves as an "outline" for the technical requirements contained in the SOW. A good CWBS makes a SOW easier to write, facilitates preparation of contractor proposals, helps in preparation of the in-house estimate, and assists with evaluation and source selection activities.

(1) The first step is to provide a systematic approach to facilitate project management by breaking the effort into easily managed units of work that have an identifiable output and a similar technical or managerial nature. Divide the overall requirement into major phases or tasks that represent a logical, and usually chronological, division of the work effort.

(2) For the second step, the major tasks required to achieve the end objectives are identified.

(3) Then, in the third and final step, each task is broken down further into sub-phases; normally to no more than three levels of detail. **Remember, each level identified by the Government in the SOW will limit the innovation and creativity allowed to the contractor on that level.** In addition, avoid developing the PWBS to a level so low that it will be in conflict with industry's normal management practices.

(4) When complete, the CWBS will break down each component, when the primary end item is hardware, as follows:

	Levels
1. Contract, Space Shuttle System	I
1.1 Propulsion System	II
1.1.1 Fan	III
1.1.2 Compressor	
1.1.3 Turbine	
1.2 Guidance	
1.3 Life Support System	
1.4 Project Management	

1.4.1 Performance Reports

Note: Changes to the CWBS recommended by the contractor should be examined. In the above chart, a choice was made by NASA to go down to three levels. Remember, this limits the contractor in proposing any innovative methods in lieu of what is required in those three levels.

305.1 Extension of the CWBS by Contractors

- a. In the RFP, contractors will be instructed to include in their proposals an extension of the CWBS to a level compatible with their management systems, e.g., earned value reporting.
- b. The proposals normally include:
 - (1) **A Configuration Item** that is an aggregation of hardware/computer programs or any of its discrete portions, which satisfies an end-use function and is designated by NASA for configuration management. They may vary widely in complexity, size, and type. During development and manufacture of the initial (prototype) production configuration, they are those specification items whose functions and performance parameters must be defined and controlled to achieve the overall end-use function and performance. An item required for logistic support and designated for separate procurement is a configuration item.
 - (2) **High Risk Items** that involve technological, manufacturing or other state-of-the-art advances or considerations. They are critical in achieving program objectives, reliability, maintainability, safety, quality assurance or other such factors. They are designated by program/project management as requiring special attention.
 - (3) **Major Subcontracts and Inter-divisional Work** that are identified at the appropriate level on the extended CWBS. If they are large or complex enough, they are broken down to the same extent as if the tasks were a prime contract.
 - (4) **Cost Accounts** that are clear definitions of work to be performed and are distinct from other cost accounts. They have measurable beginning and end points.
- c. Whenever NASA Form 533 (NASA Contractor Financial Management Reporting) is required, the 533 reporting categories must correlate with the CWBS (see NHB 9501.2, NASA Contractor Financial Management Reporting) as well as with the contractor's accounting system. In addition, each CWBS shall be designed to facilitate accounting for costs in accordance with the Agency-wide Coding Structure found in the NASA Financial Management Manual FMM 9100.
- d. The extended CWBS will help in evaluating the contractor's understanding of the work to be done and of cost realism.

305.2 Contractual Use of the CWBS

- a. The CWBS may be changed during negotiations to meet the needs of NASA and/or the contractor. In routine efforts, it becomes the basis, in conjunction with the SOW, against which the contractor performs the effort. In non-routine efforts, the CWBS should be a flexible guide developed by and for the use of the contractor, but the acceptance of the product should be against the performance standards.
- b. Upon award, the levels of the CWBS that become part of the contract are what have been agreed upon by both parties; this is usually the top three levels. At that point, the CWBS cannot be changed except by modification of that contract.

306 GOVERNMENT COST ESTIMATE

- a. Preparation of an estimate of costs to perform the effort is a responsibility of the Project Manager, with support from other technical experts and budget personnel. Estimated costs for each service output, based on available data, include details of assumptions made in preparing the estimate. These costs are

also used in evaluating proposals and determining positive and negative performance incentives. The level of documentation required is dependent on the complexity and dollar value of the procurement. For major acquisitions, an independent cost estimate is often required.

b. NASA has decided to integrate full cost accounting, budgeting and management changes and practices to optimize the anticipated cost effective mission benefits of its full cost initiative. Full cost accounting is required by Federal legislation and related guidance. Full cost budgeting and management are indicated in Federal legislation and related guidance but are not specifically required. The strength and benefits of NASA's full cost practices are optimized by the integration and synergy of changes in each area. Full cost accounting by itself, over time, would likely lead to gradual budget and management improvements. However, concurrent changes to full cost practices in the accounting, budgeting and management areas can be expected to ensure that NASA optimizes improvements in each area immediately.

c. NASA must also consider commercial costs of performing similar work in the private sector.

d. In-house cost estimates (labor hours, material costs, software requirements, etc.) developed by the cost estimating specialists must be reviewed by SOW contributors. Such reviews will permit early trade-off consideration on the desirability of requirements that are not directly related to essential technical objectives. These estimates will also be used to assist evaluators in determining if proposal costs are realistic.

CHAPTER 4

PERFORMANCE (BASED) WORK STATEMENTS (PWS)

401 GENERAL

Performance-Based Contracting means structuring all aspects of an acquisition around the purpose of the work to be performed - not to dictate how the work is to be accomplished. It is designed to ensure that contractors be given the freedom to determine how to meet the Government's performance objectives, the appropriate performance levels are achieved, and that payment is only made for results that meet these levels. It maximizes contractor control of work processes and allows for innovation in approaching various work requirements. Remember, when contractors are not told "how" to do the job, their ingenuity may surprise you.

PBC emphasizes performance that can be contractually defined so that the results of the contractor's effort can be measured in terms of technical and quality achievement, schedule progress, or cost performance. The significant steps in the PBC process include:

- (1) emphasizing contract performance requirements that can be measured by a meaningful performance evaluation;
- (2) selecting contractors that provide "best value" with proven past performance;
- (3) providing positive incentives for good performance;
- (4) determining contract type and incentives in accordance with a fair assessment and assignment

- of performance risk;
- (5) performing contract surveillance and administration for insight only into essential areas of contractor performance; and
- (6) being mindful of the need for conservation of Government resources.

The goal of PBC is to:

- (1) Save money by reducing contract costs by eliminating unnecessary effort and through innovation by the contractor, and also by reducing Government surveillance.
- (2) Enable NASA to shift its emphasis from processes to outputs.
- (3) Hold contractors accountable for the end results.
- (4) Ensure that contractors are given the freedom to determine how to meet NASA's performance objectives.

c. The following decision tree must be used by those who draft requirement documents.

PBC Roadmap

Can the Government assign performance responsibility to the contractor, and can performance be validated against a performance standard?	Yes- ->	Write a performance-based contract
If No--		
Can discrete portions of the effort be assigned to the contractor for performance responsibility, and can performance against those portions be validated against performance standards?	Yes- ->	Specify performance standards in the contract.
If No--		
Specify critical processes in the contract or contract-referenced documents.		

To be considered PBC, a PWS must include meaningful measurable performance standards and the quality level the NASA expects the contractor to provide. There are two categories of PBC-type contracts: contracts of a routine nature and contracts of a non-routine nature.

401.1 Routine Services

a. In contracting for services of a routine nature, whether high or low "tech" (e.g., computer service, guard service, or janitorial), it is essential to avoid under-specifying NASA's requirements. Work inadvertently omitted may later be construed to be outside the requirements of the contract and could require a contract change and increased costs. Even worse, omissions outside the scope of the contract could require a significant effort from NASA; a new competition or a Justification for Other Than Full and Open Competition (JOFOC).

b. The PWS for routine services is usually written to require **output** (see Appendix D, §102). In the absence of a performance-based standard, NASA may not be able to ensure that the contractor completes the work at an acceptable level. In that event, NASA may be obligated to accept whatever product or service the contractor provides or make changes in the work requirements and pay more to acquire what is actually needed.

c. There is usually a significant amount of data available for routine services plus a competitive marketplace with several suppliers; consequently, a firm-fixed price contract with deduction schedules (which are applied when performance is inadequate) is commonly used.

401.2 Non-Routine Requirements

When acquiring supplies, engineering, or unique non-routine services (including studies, analyses, or R&D efforts), performance-based specifications must **avoid over-specifying** NASA's requirements. Accordingly, the PWS for non-routine work is usually written to require an **outcome** (see Appendix D, §102). The policy limits the involvement of Government employees and provides contractors maximum flexibility in meeting NASA's need. If that need is succinctly defined, the contractor should be entrusted to fulfill that need.

402 GUIDELINES FOR WRITING A PWS

- a. The contract will be a completion form (something is accomplished) as opposed to a term/level-of-effort form.
- b. To the maximum extent practicable (FAR Part 11.002), state the requirements in terms of:
 - (1) Functions to be performed;
 - (2) Performance required; or

The PWS must include performance requirements and verification requirements that are measurable or quantifiable.

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- c. Without specifying how to perform the work, the PWS must clearly indicate the expected outcomes or outputs from the contractor such that contractor performance can be measured against the performance standards in the PWS. The definitions of standard performance, maximum positive and negative performance incentives, and the units of measurement will be established in the solicitation. They will vary from contract to contract and are subject to discussion during source selection.
- d. To aid in continuity and to avoid confusion, the PWS format must conform to the numerical coding of the related task elements of the CWBS (see §305c). The coded task descriptions clearly define each deliverable end item, product, and task.

402.1 Hardware or End Item Deliverables

The PWS/specification describes, at the highest practicable level, what the end product must do (performance) and any critical constraints (e.g., size, weight). It eliminates process-oriented (how to) requirements and includes only minimally essential reporting requirements. The contract requirements and incentives are clearly communicated. Actual demonstrated performance of the end item is normally one of the measures -- in some cases the only measure.

402.2 Performance Based Specification

- a. A major effect of acquisition reform is that the number of performance statements should be increased and the number of detailed, design-solution statements should be decreased. A performance specification, which shall be used to the greatest extent practicable, describes the work broadly by form, fit, and function instead of using detailed drawings, specifications, and standards. Offerors are free to meet the requirements in any way they can. This increases NASA's access to commercial, state-of-the-art technology. Requirements are expressed in terms of minimum acceptable performance standards (Appendix E)

and place maximum responsibility for performance on the contractor. Additional information, such as standards, may be referenced as information to providers to improve understanding, but should be clearly distinguished/separated from requirements.

b. A performance specification also requires results, with criteria for verifying compliance without stating methods for achieving the required results. By not specifying an approach in manufacturing, design, or quality assurance to be used by the contractor, it permits a wide variety of contractor methods; thereby potentially increasing the number of contractors who can satisfy the requirement. Contractors can use their creative and innovative skills to the maximum.

c. Nevertheless, PBC emphasis does not preclude highly descriptive specifications, which (if expressed in performance terms) accurately and inclusively describe what we want done or delivered.

d. In writing performance-based specifications, avoid the following:

- (1) Performance specified at the subsystem or component level when it could be more appropriately specified at a higher level; e.g., the reliability of the system or vehicle should be specified instead of specific components with the system.
- (2) Requirements that are not measurable or verifiable.
- (3) Statements that constrain the solution to a single solution; e.g., "shall be fabricated from composite material."
- (4) Orphan requirements; i.e., requirement statements that are not traceable to a specific performance or verification requirement statement in the specification.
- (5) Requirement statements that are not appropriate for an effort in this phase of development or production.
- (6) Specifications relying solely on directives to define performance, not the mission requirements.
- (7) Citing standards and processes when performance standards can be developed.
- (8) Citing of mandatory standards without justification.
- (9) Requirements that are vague (e.g., "in accordance with commercial practices" in lieu of citing a commercial standard).
- (10) Language in the specification that belongs in the PWS.

e. Listed below are key elements to be considered in preparing specifications and the related technical requirements.

- (1) Description of supplies, or data that identifies the requirement. When appropriate, describe requirements broadly by form, fit, and function.
- (2) Quantity (and unit).
- (3) Packaging and marking requirements.
- (4) Inspection, acceptance, and quality assurance. The concern for quality must be expressed by providing standards which result in proposals that offer credible responses concerning the ability to perform quality work; e.g., if the surface must not contain imperfections exceeding .01 inch, specifically state this as the assessment of quality.
- (5) Place of delivery, performance and delivery dates, period of performance, and f.o.b. point. Efforts shall be made to give prospective contractors adequate time to produce the item or to provide the required service.
- (6) Other information as necessary.

402.3 Major Systems Contracts

a. Contracts for definition and development of Major Systems have short, concise outcome PWSs that do not necessarily go into great detail. There is usually a specification/contract deliverable requirements list associated with these contracts, which may contain specific requirements for the product(s). The PWS

must, however, state all requirements necessary to complete each task element of the WBS and be complete enough to allow the contractor to generate all information necessary to design, prototype, test, and verify.

b. A good approach for the acquisition of major systems is to acquire the effort in phases, with each phase having a limited but clear objective (see NFS Sub Part 1834.005-1). This approach also is a safeguard against committing scarce resources to an effort prematurely.

c. For study and preliminary definition contracts, the PWS must allow the contractor wide latitude for creativity, innovation and research. Describe efforts necessary to supplement existing information and bring present knowledge to a point where further detailed study for the most promising systems can be made.

402.4 Support Services

The PWS generally describe all of the services to be performed and includes explicit, measurable performance standards, surveillance procedures, and incentives. It includes only minimally essential reporting requirements, but the contractor will be held accountable for failure to meet those minimum requirements. The outline will be similar to the following:

1. Introduction
2. Scope of Work
3. Management Administration
4. Description of Services
 - 4.1 Performance Standards
 - 4.2 Performance Requirements Summary
5. Contract Deliverables
6. Minimally Essential Reporting Requirements
7. Appendices
8. Special Terms and Conditions

In preparing a PWS or a task assignment consider the following:

a. The PWS clearly describes the specific requirements the contractor is required to meet in performance of the contract. Specify the minimum required level of performance and quality, failing which, the objective of the contract or task will not be met.

b. Over-defining the contractor's responsibilities in terms of methods or procedures must be avoided since the Government is purchasing a result/service or some requirement which includes not only the contractor's labor, but also its expertise in the services to be provided and the management of those services. Place the responsibility for success on the contractor, not the Government.

c. On the other hand, provide enough information to define clearly and precisely the magnitude and complexity of the outcome/output desired. This will slightly restrict the contractor in managing their work force, but will help ensure all bidders clearly visualize the extent of effort required.

d. In addition to the desired outputs or outcomes:

- (1) specify the schedules of accomplishment and/or time limitations in which all services must be completed,
- (2) provide a list of mandatory operating and safety procedures that the contractor must follow, and
- (3) provide historical data on previous contracts or work by in-house personnel. This needs to be done carefully to avoid specifying staffing levels, etc.

e. In those cases where the Government can provide only a broad description, use of a task order contract shall be considered. Individual task orders can be written that clearly define each deliverable end item or product and include performance standards and incentives. All essential tasks must be included.

402.5 Research and Development (R&D) Contracts

a. Unlike contracts for supplies and services, most R&D contracts are directed toward specified objectives and knowledge where the work or methods cannot be precisely described in advance. It is difficult to judge the probabilities of ultimate success or required effort for technical approaches. R&D PWSs can be difficult to write if the contract's objectives are not defined sufficiently, yet they must be flexible enough to allow contractors freedom to exercise innovation and creativity. The most important performance-based element is to clearly define the requirements and/or the schedule such that the performance of the contractor is measurable. Following is a sample outline:

1. Introduction
2. Scope of Work
3. Description of Tasks to Be Performed/outputs desired
4. Schedule
5. Reporting Requirements
6. Attachments, Appendices and Exhibits

b. Typically for R&D, the contractor has a cost-type contract, therefore, has no cost risk. However, if the contractor receives a small fee for performing "best efforts," the substantive portion of any fee must be tied to successful performance - an objective measurement is preferred, however, at times a subjective determination could be meaningful and acceptable.

402.6 Basic Research

a. In basic research results cannot be determined in advance and often no deliverable is required except for a final report. In that case, the performance standards may be focused on timeliness, organization and thoroughness of the report, comprehensive bibliography, etc. These performance standards shall be used to "gate" contractor eligibility for fee, if any.

b. When the principle purpose of the research is for the direct benefit or use of NASA, a contract shall be used. When not a direct benefit or use to NASA, the proper procurement vehicle is usually a grant or cooperative agreement.

403 PBC INTERNET REFERENCES, GUIDANCE AND TRAINING

The NASA Procurement home page at URL

<http://www.hq.nasa.gov/office/procurement/pbc.html> has information, policies and guidance on PBC and contracting. It also has PBC templates from The U.S. Navy and the Department of Energy for use in preparing PBC statements of work. A tutorial is also available at this site.

CHAPTER 5 OTHER CONSIDERATIONS

501 SINGLE PROCESS INITIATIVE (SPI)

The purpose of the Single Process Initiative is to eliminate duplicative, highly tailored or customer unique requirements from NASA , DoD and other agency

contracts and adopt instead a single process proposed by the contractor unless these requirements are essential to ensure mission safety and reliability. The thrust of this initiative is to enable contractors to propose single processes that meet the needs of multiple Government customers. Thus, eliminate duplicative and expensive contractor systems that are similar, and are required to satisfy various Government customers. SPI is expected to improve process efficiencies, improve product quality, reduce the contractors' operating costs, and ultimately reduce Government procurement costs. If, however, proprietary processes are selected over recognized consensus standards, the Government's competitive options may be limited.

Whenever possible, remove highly tailored or customer-unique requirements from contracts and adopt instead the single process principle. SPI would eliminate many unique systems and processes that are imposed by each of the contractor's many customers. For example, if a contractor is allowed to use a single soldering standard for all work at its facility instead of a unique standard for every customer, costs to every affected customer would be reduced while increasing the contractor's responsibility and accountability for quality.

PBC and the SPI are closely interrelated acquisition initiatives that affect how contract requirement documents are drafted. Ideally, all requirement documents would be completely performance-based. However, in some cases, that may not be practicable for some, or even all of the work. NASA may not want to relinquish performance responsibility and risk to the contractor, or the attainability of the desired performance may be in doubt. It may be necessary to describe the requirement in terms of processes to be followed, not in terms of required outcomes. Where processes must be specified, OMB Circular A-119 requires the use of existing voluntary consensus standards in preference to Government processes, unless impractical. It is preferable that processes be based on voluntary consensus standards to minimize reduction of the Government's competitive systems by being tied to a proprietary option. More information on SPI is available at <http://www.dcmc.dcrb.dla.mil> .

502 STANDARDS AND DIRECTIVES

All potentially relevant directives must be screened to determine which will be used, if any. When only a part of a directive applies, excerpt (by reference) only the required parts of the directive into the contractual document.

The number of directives must be held to a minimum. Negative effects from excessive or inappropriate application of directives include: confusion or errors in performing work; undermining NASA's ability to enforce performance; increases in the cost of performance; unwarranted dictation of how work is to be performed; and discouraging or foreclosing contractor use of innovative or cost-effective performance methods. Remember, if NASA specifies "how to perform", it assumes the responsibility for the outcome.

OMB Circular A-119 requires the use of voluntary consensus standards in preference to Government standards unless their use is impractical or inconsistent with law.

503 THE METRIC SYSTEM

As part of an effort to maintain the competitiveness of the U.S. in international trade, the Metrics Conversion Act of 1975, as amended, requires Federal agencies to use the metric system of measurement in procurements, grants, and other business-related activities, except when impractical. NASA Management Instruction 8010.2 entitled, *"Use of the Metric System of Measurement in NASA Programs,"* specifically requires that all new projects use the metric system unless a waiver is obtained. Hybrid approaches, where metric units are used for new design elements and inch-pound units are used for existing designs, are acceptable but should be documented. PR initiators are responsible for determining the extent to which the metric system is used for their requirements and providing for waivers.

504 VALUE ENGINEERING (VE)

Value engineering is a program that rewards contractors for suggesting innovative ways to conduct work at a lower life-cycle cost without impairing essential functions. During the course of contract performance, contractors may submit Value Engineering Change Proposals (VECP). NASA evaluates each proposal and the estimated savings, and if a change is accepted, the contractor will share in any savings realized. See FAR Part 48.

Vague and unclear SOWs make VE assessments extremely difficult. Overstated requirements can provide opportunities to a contractor to be rewarded for eliminating requirements that should never have been included. On the other hand, failure to clearly state requirements makes it impossible to subsequently determine if the VECP covered work that was expected to be performed under the contract or is, in fact, innovative and worthy of award.

505 SHARED SAVINGS

This program provides an incentive for contractors to propose and implement, with NASA approval, significant cost reduction initiatives. NASA will benefit as the more efficient business practices that are implemented lead to reduced costs on current and follow-on contracts. In return, contractors are entitled to share in cost savings subject to limits established in a contract. See NFS subpart 1843.7101.

APPENDIX A DOCUMENT REVIEW CHECKLIST

The following Checklist should be reviewed prior to forwarding the PWS/specification for approval. It is a guide only, and items should be added or deleted to tailor it to the specific document.

1. Can I give the contractor full management responsibility and hold them accountable for the end results? Can I perform a meaningful evaluation of performance? Does my draft PWS reflect this strategy?
2. Is the PWS sufficiently detailed to permit both the Government and the contractor to estimate costs, to tabulate labor and other resources required to accomplish each task element? Will the contractors be able to prepare a sound

technical and cost proposal?

3. Are standards clear that make it possible for all parties to measure performance?
 4. Is the PWS/specification too restrictive? Does it tell contractors how to run their business?
 5. Are proper quantities and delivery dates indicated for each deliverable?
 6. When necessary to reference other documents, is the proper reference document described and cited? Is the entire document pertinent to the task or should only portions be referenced? Is it cross-referenced to the applicable SOW task element?
 7. Have all requirements for data been specified separately in a Data Requirements section? Have all extraneous data requirements been eliminated? Are requirements specified adequately to obtain sufficient data to permit competition for anticipated follow-on procurements?
 8. Have appropriate Government and industry standards been researched and referenced in the PWS, as necessary? Have requirements to use Government standards been limited to those where it is impractical to use non-Government standards? Have options been provided for proposers to recommend suitable replacement of Government standards with non-Government Standards?
 9. Are all safety, reliability, quality assurance, and security requirements defined for the total life of the contract?
 10. Has extraneous material been eliminated?
 11. Has the document been checked for format and grammar? Are subheadings compatible with the subject matter of the heading? Is the text compatible with the title? Is a multi-decimal or alpha-numeric numbering system used in the PWS that can be cross-referenced to the CWBS?
 12. Are all terms used consistently throughout, and adequately defined, including "industry-wide" terms?
 13. Does the PWS cover the requirements imposed on the contractor's quality system to ensure that products conform to requirements?
 14. Does the PWS cover any design or process control requirements required by NASA?
 15. Does the PWS cover any specific Government requirements for inspection and testing?
 16. Does the PWS provide for corrective/preventive action by the contractor in the event the product delivered is non-conforming to the specified product?
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APPENDIX B DEFINITIONS

CONTRACT. A bilateral agreement between two or more parties, enforceable by law, that obligates the seller to furnish something, and obligates the buyer to pay for it.

COOPERATIVE AGREEMENT. A legal instrument to reflect a relationship between the Government and a recipient to transfer a thing of value (money) to

the recipient to accomplish a public purpose of support or stimulation authorized by Federal Statute.

COST-PLUS-AWARD-FEE CONTRACT (CPAF). A cost-reimbursement contract that provides for a fee consisting of an award amount, based upon a judgmental evaluation by the Government, sufficient to provide motivation for excellence in contract performance.

COST-PLUS-INCENTIVE-FEE CONTRACT (CPIF). A cost-reimbursement contract that provides for the initially negotiated fee to be adjusted later by a formula based on the relationship of total allowable costs to total target costs. The contract may include technical performance incentives when it is highly probable that the required development of a program is feasible and the Government has established its performance objectives.

COST-REIMBURSEMENT CONTRACT. A type of contract that provides for payment of allowable incurred costs, to the extent prescribed in the contract. These contracts establish an estimate of total costs for the purpose of obligating funds and establishing a ceiling that the contractor may not exceed without approval of the CO.

FEDERAL ACQUISITION REGULATION (FAR). The Federal regulation that implements procurement-related statutes and governs Government procurement.

FIXED-PRICE CONTRACT. A contract where the contractor agrees to deliver supplies or services at the times specified for an agreed upon price that cannot be changed unless the Government modifies the contract.

GOVERNMENT-FURNISHED PROPERTY (GFP). Property in the possession of, or directly acquired by, the Government and subsequently made available to the contractor.

GRANT. A legal instrument to transfer a thing of value (money) to the recipient to accomplish a public purpose of support or stimulation authorized by Federal statute.

MAJOR SYSTEM ACQUISITION. Those programs that are directed at and critical to fulfilling a NASA mission, entail the allocation of relatively large resources, and warrant special management attention.

NASA FAR SUPPLEMENT (NFS). NASA's supplement to the FAR, which together with the FAR governs NASA procurements.

NEGOTIATIONS. Written or oral discussions usually conducted with the selected offeror(s) to settle cost and other terms, which will be incorporated into the resultant contract.

NONDEVELOPMENTAL ITEM. Any previously developed item used by the Federal Government, state or local government, or a foreign government that the U.S. has a mutual defense cooperation agreement with.

OBJECTIVE PERFORMANCE MEASURE. Based on the attributes of physical objects that can be measured or counted.

OFFER. A response to a solicitation that, if accepted, would bind the offeror to perform the resultant contract. Responses to invitations for bids (sealed bidding)

are offers called "bids" or "sealed bids." Responses to requests for proposals (negotiation) are offers called "proposals."

OUTCOME MEASURE. An assessment of the results of a program activity compared to its intended purpose (objective).

OUTPUT MEASURE. The tabulation, calculation, or recording of activity or effort and can be expressed in a quantitative or qualitative manner.

PERFORMANCE-BASED CONTRACTING. Structuring all aspects of an acquisition around the purpose of the work to be performed as opposed to either the manner by which the work is to be performed or broad and imprecise statements of work.

PERSONAL SERVICES CONTRACT. A contract that, by its express terms or as administered, makes the contractor personnel appear, in effect, Government employees (see FAR 37.104).

PROPOSAL. A response by a prospective contractor to a Request for Proposals issued by the CO in negotiated acquisitions. It is an offer (including technical performance, as well as cost or price terms) that can be accepted by the Government to create a binding contract, either following negotiations or when certain conditions are satisfied. The term "bid" is used in sealed bid procurements.

PROPOSAL EVALUATION FACTORS. Factors against which proposals are evaluated. The RFP must explain these factors and their order of importance.

PURCHASE OR PROCUREMENT REQUEST (PR). The document prepared by the requiring activity which (1) describes the supplies or services to be acquired, (2) certifies the availability of funds, and (3) includes other information and approvals necessary for the CO to initiate an acquisition action.

REASONABLE COST. A cost which in its nature and amount does not exceed that which would be incurred by a prudent person in the conduct of competitive business. If challenged, the burden of proof for determining cost reasonableness rests with the contractor.

REQUEST FOR PROPOSALS (RFP). The Government's invitation (solicitation) to prospective offerors to submit proposals based on the terms and conditions set forth in a RFP.

SERVICES. The performance of identifiable tasks rather than the delivery of an end item of supply. Services also include tasks that are delivered under a contract where the primary purpose of the contract is to provide supplies.

SOLE SOURCE CONTRACT. A contract awarded as a result of a solicitation that was provided to only one offeror or as a result of an unsolicited proposal.

SOLICITATION. A formal invitation by the Government to prospective offerors to submit offers to satisfy a Government need. It describes the requirements in sufficient detail to allow prospective offerors to determine their ability to meet that need and to submit a meaningful offer. It also includes the terms, conditions, and instructions under which offers may be submitted and resultant contracts will be awarded.

SOURCE EVALUATION BOARD (SEB) PROCEDURES. Formal procedures established for the solicitation, evaluation and negotiation for major negotiated procurements. SEB procedures are conducted in accordance with the NASA Source Evaluation Board Handbook set forth in NFS 18-70.

STATEMENT OF WORK (SOW). A tasking document that specifies effort to be performed by a contractor.

SURVEILLANCE: The continual monitoring and verification of status of an entity and analysis of records to ensure specified requirements are being met. Surveillance activities may be delegated to other disinterested parties on behalf of the customer. It may be 100%, statistically-based sampling, qualitative sampling, or the result of discussion with individuals who have first hand knowledge. It also may include the monitoring of contractor supplied metrics, available contractor data, sampling, or surveys.

TECHNICAL EVALUATION. The measurement of a technical proposal against the technical requirements and the rating factors stated in the solicitation. Cost may be considered as an indicator of understanding of technical requirements.

TECHNICAL STANDARD. A common and repeated use of rules, conditions, guidelines or characteristics for products or related processes and production methods. It includes the definition of terms, classification of components, delineation of procedures, specification of dimensions, materials, performance, designs, or operations. It includes measurement of quality and quantity as well as a description of fit and measurements.

UNSOLICITED PROPOSAL. A unique and innovative proposal that is made to the Government by a prospective contractor without prior formal or informal solicitation from a procuring activity.

VOLUNTARY CONSENSUS STANDARDS. Standards developed or used by voluntary consensus standards bodies, both domestic and international, which are made available in a manner which includes provisions requiring that owners of relevant intellectual property have agreed to make that intellectual property available on a non-discriminatory, royalty-free or reasonable royalty basis to all interested parties.

WORK BREAKDOWN STRUCTURE (WBS). A product-oriented, hierarchical division tree of deliverable items and associated services that relates the elements of work to each other and to the end item.

APPENDIX C ACRONYM LIST

CO	Contracting Officer
COTR	Contracting Officer's Technical Representative
CWBS	Contract Work Breakdown Structure
DoD	Department of Defense
FAR	Federal Acquisition Regulation
FMM	Financial Management Manual

JOFOC	Justification for Other than Full and Open Competition
NASA	National Aeronautics and Space Administration
NFS	NASA FAR Supplement
NHB	NASA Handbook
NPD	NASA Policy Directive
OFPP	Office of Federal Procurement Policy (a branch of OMB)
OMB	Office of Management and Budget
PBC	Performance-Based Contracting
PR	Purchase or Procurement Request
PWBS	Project Work Breakdown Structure
PWS	Performance Work Statement
QR	Quality Representative
RFP	Requests for Proposals
R&D	Research and Development
SOW	Statement of Work
SPI	Single Process Initiative
VE	Value Engineering
WBS	Work Breakdown Schedule

APPENDIX D

PBC PERFORMANCE STANDARDS AND INCENTIVES

CHAPTER 1 PERFORMANCE STANDARDS

101 INTRODUCTION

- a. A PBC must contain performance standards -- the criteria for determining whether the work requirements are met. A performance standard must be assigned to essential or critical (but not incidental) tasks or products.
- b. A baseline is established from which continuous improvement will be sought over the life of the contract, and is composed of three elements:
 - (1) *Outcome or Output*. The desired result, or necessary effort, being acquired.
 - (2) *Performance Standard*. The measurement threshold or limit that establishes that point at which successful performance has been accomplished.
 - (3) *Surveillance*. The monitoring and verification of performance.

102 OUTCOME OR OUTPUT

- a. An **outcome** measure is an assessment of the results of a program activity compared to its intended purpose. An outcome-based contract is often ideal for non-routine efforts.
- b. An **output** measure is the tabulation, calculation, or recording of activity or effort and can be expressed in a quantitative or qualitative manner. For routine efforts an output contract may be more desirable.
- c. Describe the outcome/output but do not give specific procedures or instructions on how to produce them unless absolutely necessary. When NASA specifies a procedure (how to do it), NASA assumes responsibility for ensuring

that the design or procedure will end with the desired result. However, if NASA specifies the outcome/output performance and its quality standard, the contractor must then use its best judgment in determining how to achieve that level of performance. A key tenet of PBC is that the contractor will be assigned the responsibility to meet the Government's requirements together with the flexibility to decide how it will meet those needs. NASA then evaluates the contractor's performance against the standard. In many cases, the final arrangement can be a hybrid contract with a limited number of critical specifications being imposed on the contractor.

103 PERFORMANCE STANDARDS

- a. Explicit, measurable performance standards must be included in the PWS or specification for a contract to be considered performance based. Under PBC, NASA expresses its willingness to accept the contractor solution as long as it meets performance requirements.
- b. A Performance Standard states requirements in terms of required results, with criteria for verifying compliance but without stating the methods for achieving required results. It defines the requirements for the item and/or services, the environment in which it must operate, and interface and interchangeability characteristics. Performance standards must be:
 - (1) Meaningful. An objective measurement is preferred, however, at times a subjective determination could be meaningful and acceptable.
 - (2) Understandable, and clearly communicated to the contractor.
 - (3) Realistically achievable.
 - (4) True indicators of outcome or output.
 - (5) Reflective of actual NASA needs.
- c. Typical standards are rates (e.g., cost per pound to orbit), limits (e.g., not more than and not less than), and criteria (e.g., fit and other forms of external interface standards, power, weight, volume, life, accuracy).
- d. Identification of systemic performance standards is recommended. The more critical the result is to objective accomplishment, the more appropriate it is to develop a performance standard to evaluate that result. The level of detail must correspond to that expectation. Performance standards need not be identified explicitly if the requirement is so clearly stated that a standard for performance has been unmistakably established in the PWS or specification.
- e. Always consider the cost. Applying performance standards appropriately should actually reduce overall costs as performance deficiencies are identified and improvements to these processes are made. Nevertheless, performance standards must be very selective and at the appropriate level. Do not spend money for performance standards you do not really need. Ask the questions:
 - (1) Is this level of detail necessary?
 - (2) What performance can be measured by querying the contractor's data system?
 - (3) What is the risk of not having this level of performance?
- f. "Best value" is a combination of competitive pricing and improved performance. Offerors should be encouraged to propose improvements above the minimum requirements and to propose lower cost alternatives that meet the performance criteria.

g. Standards should be published and well recognized. OMB Circular A-119 requires preference for national, international, or industry-wide standards. Standards developed by NASA with industry input may be used if technically suitable voluntary consensus standards are not available. This may be done through public meetings, public comment, or a Solicitation for Information per FAR 15.405.

103.1 Progress/Performance Measurement

a. Results can be measured by both progress and performance. Both are critical to effective management.

(1) **Progress** measurement identifies what you did, not necessarily how well you did it. The most typical example is milestone completion. For managing progress, either maintain or achieve a specific and definable performance level and/or requirement.

(2) **Performance** measurement identifies achievement of outcome or output in terms of quality, quantity, timeliness, and cost productivity.

b. Performance is measured by comparing the performance level against the range identified in the performance standards.. The standards must require performance reflecting NASA's minimum (or minimum and maximum) needs, failing which the objective of the contract will not be met. Standards cannot be level-of-effort or procedures. This approach has an inherent advantage because it allows far greater contractor flexibility in how to satisfy these performance requirements.

c. The **Performance Goal** is a target level of performance expressed as a tangible, measurable objective, against which actual achievement can be compared. A performance goal may be expressed as an absolute or as a range of acceptable performance (usually expressed in percentages); for example:

For launches, the goal shall be 100%.

97% (3% of all tests completed on time, with a Minimum Acceptable Performance of 94% of the tests completed on time.

d. Such a measurement process could include multiple data points over time, be as quantitatively measurable as possible, and provide early identification of potential problems with the process, product, or service allowing management intervention. It often facilitates continuous improvement.

103.2 Performance Requirements Summary (PRS)

If there are a number of tasks and deliverables, summarize them in a PRS. List the contract and work requirements considered to be most critical to satisfactory contract performance, such as tasks, deliverables, and quality levels. Provide the minimum performance standard for each.

**PRS
NON-ROUTINE REQUIREMENT
AEROSPACE SYSTEMS**

TASKS	MINIMUM PERFORMANCE STANDARD	GOAL

1. Optimize the computational time and memory usage efficiency of developed deterministic or non-deterministic dynamics and control analysis.		
2. Develop simulation and computer programs that implement improvements for validation.	10% Improvement	25% Improvement
3. Perform simulations with one defined test case to demonstrate the accuracy and efficiency of the optimized algorithms.		

104 PROJECT SURVEILLANCE PLAN (PSP)

a. NASA shall, to the maximum extent practicable, assign contractors full responsibility for quality performance and shall avoid cumbersome and intrusive process-oriented inspection and oversight programs to assess that performance (OFPP Policy Letter 91-2). This must be done for each major PWS task with formal, measurable performance standards. Government established performance quality levels must be achieved, and the contractor rewarded only for services that meet or exceed those levels.

b. The contractor's quality plan shall be part of the contract. It shall describe how the contractor will assure quality. NASA's surveillance plan shall not be made part of the contract, but a copy will be provided to the contractor. It shall balance oversight and insight methods of surveillance and may be modified as necessary.

c. Before NASA can process a contractor's invoice for payment, NASA has the responsibility of determining whether or not the contractor has performed to the standards of the contract. PSPs provide a systematic approach to evaluate the contractor's performance. PSPs set forth Government responsibilities in determining whether contractor performance is acceptable.

104.1 Insight Method

a. **Insight** refers to the process of gathering a minimum set of product or process data that provides adequate visibility into the integrity of the product or process. The data may be acquired from contractor records, usually in a non-intrusive parallel method.

b. **Oversight** is an intrusive process of gathering contractor product or process data through on-site in-series involvement in the process (e.g., we don't do the welding, rather surveillance of the process). Oversight entails very detailed monitoring of the process itself. Oversight is an in-line involvement in an activity, principally through inspection with review and approval authority implicit to the degree necessary to assure that a process or product's key characteristics are stable and in control.

c. One of the initiatives of OFPP letter 91-2 is that the Government refrain from obtrusive in-process surveillance. PBC is based on the premise that the contractor has the ability to execute the job without considerable Government oversight. Because of this premise, NASA surveillance programs would not require oversight to be as intense or as frequent once the product quality is considered to be acceptable. In most cases, NASA will conduct insight (rather than oversight) surveillance to assure the Agency has received what it requested

at the time it was requested. A project-specific surveillance plan defines how NASA will accomplish "insight."

d. The PSP is created by NASA initially as a draft document in concert with the project PWS/RFP. It will describe very explicitly the project manager's overall strategy to execute a surveillance program. It reduces project risk by focusing insight activities on contract performance areas with the greatest potential to disrupt or prevent successful completion of the program. The plan shall then be revised to reflect contractor response to the RFP and the final negotiated agreement. As the program evolves, it continues to be a dynamic, living, and changeable document. At the beginning of work, a fully formed NASA PSP must be in place that identifies strategy, activities, metrics, and control limits.

e. Contractors are responsible for providing quality control, and these plans insure that a proper level of performance is maintained. It is important to select a contractor with a proven record of quality performance.

104.2 Hybrid Approach

a. A hybrid surveillance approach may be instituted at a contractor's facility when a high level of confidence does not exist relative to the contractor's ability to identify, manage, and control programmatic risks. This may occur when new technology is acquired or unproven processes are employed by a contractor. In this situation, intense oversight is conducted until sufficient data exist that demonstrate the contractor has all critical processes under control. The oversight activities usually impose mandatory Government inspection points in-series with the contractor's manufacturing processes. Only after the contractor's demonstration of risk mitigation capabilities will NASA consider transitioning to insight activities that rely predominantly on internal contractor data. Insight activities generally are conducted in parallel to contractor processes and do not impose control functions over the processes. The transition period between oversight to insight activities is hybrid and accomplished incrementally, depending on contractor performance.

b. The PSP is further described in NHB 7120.5, *Management of Major System Programs and Projects*.

CHAPTER 2 PBC PERFORMANCE INCENTIVES

201 GOALS AND OBJECTIVES

A contractor who only meets the minimum performance standards merits only a minimum fee.
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a. Performance-based contracting must assure that NASA obtains the products, services, and cost savings that it wants by providing tangible incentives that motivate the contractor to achieve levels of performance that exceed the minimum and have benefit to the Government. As NASA moves into this environment, the basic business premise requires that the contract results in a mutual value for both partners. Many contractors will not necessarily move into this higher risk performance-based business realm unless they can anticipate a

reward. Incentives must make it worthwhile to the contractor to find ways to improve performance.

b. Incentives are tools to improve the probability of better performance when the tasks are complex, critical, or have a history of performance or cost-overrun problems. A contract may include technical performance incentives when performance beyond the minimum is desirable, potentially achievable, and withstands the test of cost-benefit analysis.

c. The earning of incentives shall be based on a meaningful rating of the contractor's performance; normally, an objective measurement is preferred, however, some circumstances would allow for a subjective assessment. Where meaningful objectively measurable outcome criteria exist, combine cost incentives (CPIF and FPIF) and performance incentive provisions in preference to cost-plus-award-fee (CPAF).

d. For service-type contracts, reduction schedules may be used where appropriate.

e. A performance incentive shall be included in all cost-reimbursable contracts where the primary deliverable is hardware and where total estimated cost and fee is greater than \$25 million unless it is determined that the nature of the acquisition (e.g., commercial off-the-shelf computers) would not effectively lend itself to performance incentives. NFS Part 1816.402. The criteria listed in §202b must be used to establish the right incentives.

202 INCENTIVE CRITERIA

a. Incentive criteria must be focused on program/project objectives. Contractor input shall be obtained through the draft RFP process. b. The contractor's performance in meeting major program objectives will be measured utilizing explicit, predefined criteria, such as the following:

(1) Incentives must be relevant to performance. Follow-up must be accomplished to ensure that desired results are achieved; i.e., establish measures to determine the extent to which performance is actually achieved.

(2) The criteria for incentives must center on the areas of value to NASA and those of high risk **that are within the control of the contractor**. Do not provide the contractor an incentive for work that is the responsibility of NASA personnel.

(3) Reasonable and attainable targets must be established, which are clearly communicated to the contractor.

(4) The Government must benefit significantly from performance above the minimum.

(5) The cost of the incentives must be less than or equal to the added value of the enhanced performance.

(6) They must be consistent with contract requirements and other program documents.

(7) They must be measurable and the measurement systems must be reliable.

(8) The contractor should not earn a big incentive for a small, easily reached achievement.

c. NFS Subpart 1816.402-270(b) describes the use of NASA technical performance incentives, as follows:

"When a performance incentive is used, it shall be structured to be both positive and negative based on hardware performance after delivery and acceptance. In doing so, the contract shall establish a standard level of performance based on the salient mission performance requirement. This standard performance level is normally the contract's minimum performance requirement. No incentive amount

is earned at the standard performance level. Discrete units of measurement based on the same performance parameter shall be identified for performance both above and below the standard. Specific incentive amounts shall be associated with each performance level from maximum beneficial performance (maximum positive incentive) to minimal beneficial performance or total failure (maximum negative incentive). The relationship between any given incentive, both positive and negative, and its associated unit of measurement must reflect the value to the Government of that level of hardware performance. Contractors are not to be rewarded for above-standard performance levels that are of no benefit to the Government."

/END/

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