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NASA PROCUREMENT

Approach to Sharing Risk
Under Certain Research and
Development Contracts Is
Starting to Change

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Mr. Chairmen and Members of the Subcommittees:

I appreciate the opportunity to testify before your subcommittees today on the distribution of risk in National Aeronautics and Space Administration (NASA) contracts. My testimony will address the following points based on Chairman Wolpe's request.

- How NASA allocates risk for research and development contracts.
- How the Department of Defense (DOD) uses warranties.
- How NASA uses the inspection and correction of defects warranty¹ in its research and development contracts and its cost.
- The availability of insurance to cover contractors' materials and workmanship defects.

In addition, while doing our work we noted a number of ways to shift more risk to contractors without changing laws or regulations. I would like to share those ideas with you.

Overall, NASA's decision on the distribution of risk in the procurement of research and development is implicit in the selection of the type of contract. Historically, this decision has not been a contentious one. Typically, NASA has accepted all of the cost risk by using cost reimbursement contracts without any cost sharing provisions. Recently, however, NASA headquarters procurement officials have been advocating that some risk be shifted to contractors in two proposed multiple-unit contracts where a production phase can be reasonably defined. Some of NASA's field centers, on the other hand, continue to advocate the traditional approach. Establishing a procurement strategy in one of these proposed contracts has revealed especially sharp differences within NASA on how best to apportion risk. Clearly, the traditional approach involving no risk sharing is beginning to receive more scrutiny and intervention by NASA headquarters procurement officials. We support this initiative to explore opportunities for apportioning risk differently in appropriate circumstances.

Contracts for DOD satellites typically include on-orbit performance warranties, which means payment is in the form of negative and positive incentive fees. Under a "negative incentive fee" arrangement, a contractor pays the government in case of a warranted performance failure. Under a "positive incentive fee" arrangement, a contractor earns the fee for successful performance or forgoes the fee in the event of performance failure.

The warranty in NASA's cost reimbursement research and development contracts is usually the standard inspection and correction of defects warranty. Under this warranty, the government has the

¹48 C.F.R. 52.246-8.

right to require contractors to replace or correct defects for up to 6 months after acceptance. Except in specified circumstances, the government must pay any allowable costs incurred by the contractor. There are no agency records on the aggregate amounts NASA has paid contractors under this clause. Therefore, it is not possible to readily compare the cost to the government under this warranty with the estimated cost of insurance to cover defects in materials and workmanship, especially since there is no commercial market for this type of warranty insurance. However, two reasons for being wary of insurance come to mind. First, it is reasonable to assume that, over time, insurance would cost the government or its contractors more than the cost of correcting defects under the standard warranty because insurance companies would want to make a profit and, eventually, premiums would exceed claims. Second, insurance might dilute the value of on-orbit performance-related incentives by allowing contractors to offset their risk exposure.

I want to spend a few minutes talking about each of these points in more detail before mentioning some ways to shift more risk to contractors without changing laws or regulations.

RESEARCH AND DEVELOPMENT
CONTRACT RISK SHARING BEGINNING
TO GET MORE SCRUTINY WITHIN NASA

Broadly speaking, NASA's officials see the organization as one that performs and funds research and development, and they believe that role generally dictates the use of cost reimbursement, rather than fixed-price, contracts. While this perception is certainly correct in the research and development of a single product where uncertainty can remain high essentially throughout the entire contract, routine use of cost reimbursement contracts masks the distinction between development and production phases when research and development procurements involve producing multiple units of a product. Under the traditional approach, production of multiple units is considered continuous development with NASA continuing to bear all of the cost risk. At the other extreme, premature transfer of this risk to contractors through, for example, the use of firm fixed-price contracts² could prove ruinous to NASA's programs and its contractors' finances if the development and cost risks are poorly understood.

Striking the proper balance in this regard is a purpose of NASA's acquisition strategy meetings when deciding the type of contract to

²The firm fixed-price contract provides for a price that is not subject to any adjustment on the basis of the contractor's cost experience in performing the contract.

use in a contentious issue. For major procurements,³ acquisition strategy is determined by consensus building meetings among NASA headquarters procurement officials, field centers, and program offices. We reviewed the minutes of meetings held in 1990 and 1991 for six proposed procurements, and followed discussions held early this year on another procurement. In two cases, deciding the type of contract or other risk sharing elements was an issue. These procurements are considered acquisition sensitive, and I will talk about them in only very general ways.

Both cases involve buying multiple units under proposed cost-type contracts. The difficult question is how to structure these procurements in ways that reasonably shift risk to a contractor as development ends and production begins. In one case, NASA headquarters agreed with the field center that a cost reimbursement contract was appropriate in the development phase, but stated that using a separate fixed-price type contract in the production phase was more appropriate than the center's suggested strategy of using a separate cost reimbursement contract for this phase. The other case involved establishing a "fixed-price environment" within the context of a cost reimbursement contract. Essentially, this approach means that if a contractor's actual cost to develop and build several spacecraft exceeds the contract's target cost, the contractor pays a set proportion of the excess cost with no dollar limit on the contractor's exposure. The approach also envisions on-orbit performance guarantees. If the first or second satellite fails to perform its mission, the contractor rebates to the government a portion of the award fee earned before the failure occurred. The amount of the rebate would decline during the first 3 years of the satellite's operational life, and there would be no rebate after that time.

While two acquisitions do not necessarily establish a clear trend, they appear to mark the beginning of an attempt to broaden the thinking of NASA personnel in developing acquisition strategies.

DOD SATELLITES HAVE ON-ORBIT PERFORMANCE GUARANTEES

According to the Federal Acquisition Regulation, a warranty is the seller's promise or affirmation regarding the nature, usefulness, or condition of supplies or performance of services to be furnished. The principal purposes of a warranty are to (1) describe the rights and obligations of the contractor and the government for defective items and services and (2) foster quality

³A major procurement or "master buy" is defined by NASA's regulations (NFS 18-7.71) as a procurement of \$25 million or more for large field centers and lesser amounts for smaller NASA organizations.

performance.⁴ Generally, warranties remain in effect after the contract items are accepted until a specified event occurs or for a stated period of time⁵

Warranties on DOD satellite programs typically are in the form of positive and negative incentives that are linked to guaranteed performance measures, such as available communications channels. In the DOD satellite programs we reviewed, contractors guaranteed a level of on-orbit performance. The contractor pays the government a "negative incentive fee" if such requirements are not initially met. If on-orbit performance requirements are met, the government pays the contractor a "positive incentive fee." The contractor forgoes this fee if performance degrades later in a spacecraft's operational life depending on the requirements contained in each incentive fee plan.

We examined the performance incentive plans for one Navy and three Air Force satellite programs.⁶ All the programs use fixed-price type contracts for purchasing multiple satellites. The features of the incentive plans vary, but generally are based on some common attributes. The attributes are (1) on-orbit performance and the amount of incentive are defined in the contracts and are subject to the contracts' disputes clause;⁷ (2) negative incentives, if necessary, are assessed before positive incentives; and (3) amounts of negative incentives decrease over time, while amounts of positive incentives increase or remain constant.

⁴48 C.F.R. Subpart 46.7.

⁵The Congress passed warranty laws for major weapons systems in 1983 and 1984. Current legislation requires defense contractors to guarantee that systems in mature full-scale production will meet essential performance requirements specifically delineated in contracts. We reported on the administration of this warranty requirement in DOD Warranties: Improvements Needed in Implementation of Warranty Legislation (GAO/NSIAD-87-122, July 21, 1987) and DOD Warranties: Effective Administration Systems Are Needed To Implement Warranties (GAO/NSIAD-89-57, Sept. 27, 1989).

⁶The Navy program is the Ultra High Frequency (UHF) Follow-on Satellite System, and the Air Force programs are the (1) Defense Meteorological Satellite Program, (2) Defense Satellite Communication System, and (3) Navstar Global Positioning System.

⁷48 C.F.R. 52.233-1 and NFS 18-33.211-70.

DOD AND NASA SATELLITE PERFORMANCE GUARANTEES COMPARED

While NASA does not use on-orbit performance related incentive fees, it does use award fees. Award fees are analogous to DOD's positive incentives in that earning the fee depends on successful contractor performance. Award fee determinations, however, are made unilaterally by the government and are not subject to the disputes clause of the contract.

The incentives in the contract to build the Navy's UHF Follow-on satellites and the award fees in NASA's contract to build GOES-Next satellites illustrate different approaches to guarantee on-orbit performance.

UHF Follow-On Warranty

The UHF Follow-on Satellite System is to provide DOD worldwide communications coverage. Nine satellites are to be built under a fixed-price contract with Hughes Aircraft Company. The contract includes a warranty covering the loss of power or broadcast channel during the on-orbit check-out period before the satellite achieves initial operating capability. Specifically, if such a failure occurs, Hughes will rebate 80 percent of the satellite's unit price to the government. There are also provisions for rebates due to partial or intermittent on-orbit failure. The amount of the potential rebate diminishes to zero by the end of the 10th year of a satellite's operational life.

The size of the proposed rebate was a factor in the contractor selection process. A rebate percentage was included by the potential contractors as part of their offers to build the satellites, but the Navy mandated that it had to be at least 10 percent of a satellite's unit price. This contractor assessment-of-risk feature was unique among the DOD and NASA contracts we reviewed.

GOES-Next's Award Fee Plan

GOES-Next is an effort to develop and build five geostationary weather satellites under a cost-plus-award-fee contract.⁸ The contract includes a contractor rebate feature as did the previous geostationary environmental satellite contract. One year after the first two satellites are launched, NASA will determine and provisionally pay the award fee it expects the spacecrafts' performance to earn during the remaining 4 years of their

⁸We reported last year on GOES-Next development problems in Weather Satellites: Action Needed to Resolve Status of the U.S. Geostationary Satellite Program (GAO/NSIAD-91-252, July 24, 1991).

operational lives. For the next three satellites, this determination will be made at each launch, and the provisional award fee will be paid for all 5 years of expected operation. If any of the satellite's on-orbit performance degrades during its operational life, the contractor must refund a portion of the provisional award fee, with interest.

USE AND COST OF INSPECTION AND
CORRECTION OF DEFECTS WARRANTY

The Federal Acquisition Regulation states that a warranty is generally not appropriate in cost reimbursement contracts except for the warranty in the inspection and correction of defects clause.⁹ Under this warranty, the government can require a contractor, for up to 6 months after acceptance of all contract items, to replace or correct work not meeting contract specifications as long as the government pays the cost or without cost to the government if such work is due to (1) fraud, lack of good faith, or willful misconduct by a contractor's management personnel or (2) contractor's employees who are retained after contractor's management has reasonable grounds to believe the employees are habitually careless or unqualified.

The inspection and correction of defects warranty was included in the relevant cost reimbursement contracts we reviewed at the Langley, and Marshall centers.¹⁰ In addition, NASA procurement officials could not remember any relevant cost reimbursement research and development contract where use of the clause was waived. However, NASA does not collect agency-wide information on its experience in either paying contractors or requiring contractors to pay for work under this clause.

USE OF INSURANCE TO
COVER CONTRACTORS'
CORRECTIONS OF DEFECTS

The Federal Acquisition Regulation states that contractors' cost of insurance to protect themselves against the costs of correcting their own material and workmanship defects is unallowable. You asked us to compare the possible costs to the government if this insurance requirement were waived for the costs associated with the inspection and correction of defects warranty.¹¹

⁹48 C.F.R. 46.705.

¹⁰The inspection clause at 48 C.F.R. 52.246-8 is not required for cost reimbursement research and development contracts where end items are designs, drawings, or reports.

¹¹ 48 C.F.R. 31.205-19 (a)(4).

Such a ready comparison is not possible given the lack of comprehensive cost information related to enforcement of the warranty. In addition, the cost of insurance during research and development is speculative because there is no current commercial market for insurance to correct defects prior to launch. Our discussions with insurance industry executives indicate that this type of prelaunch insurance is generally not used by commercial satellite manufacturers. Instead, manufacturers usually self-insure and assume the cost risk of correcting their own defects in materials and workmanship.

We find it difficult to see how reimbursing contractors for their insurance costs could be less costly to the government over time than the self-insurance inherent in the standard inspection and correction of defects warranty. In the long run, insurance companies' need to make a profit will influence the cost of insurance. An insurance broker told us that such costs were likely to be quite high given the research and development nature of the activity.

The contract for the UHF Follow-on satellite suggests another reason for being cautious about the insurance option. The contractor agreed not to obtain insurance coverage of its potential liability for on-orbit failure. As the contract implicitly recognizes, insurance might weaken the value of incentives even if the contractor paid for it.

WAYS FOR NASA TO SHIFT MORE RISK TO CONTRACTORS

I would now like to summarize several ways NASA might shift more risk to its contractors under cost-type contracts without changing laws and regulations. Some of them are already being developed or applied on a limited scale in NASA; others are based on DOD practices.

Contractually delineating the point where development ends and production begins or, more precisely, where high risk starts to diminish under research and development contracts for multiple units of the same product is difficult. Adding to the difficulty is NASA's long-standing view that its research and development activities dictate the use of cost reimbursement contracts under which the government assumes all cost risk. Thus, NASA's recent efforts to define a production phase when it is buying multiple units under research and development contracts and to introduce risk sharing arrangements into this phase are of particular interest.

Since the "bottom line" of spacecraft procurement is how well the spacecraft performs its mission, it seems logical to consider how on-orbit performance incentives or award fees might be used. However, NASA does not typically use on-orbit performance incentive

fees. Instead, it favors award fees. NASA's reasons for favoring award fees are not clear except that award fee determinations are made unilaterally by NASA and are not subject to the disputes clause of a contract, an obviously attractive feature. Certainly, using positive and/or negative incentives is a way to shift more risk to contractors. Similarly, putting more of contractors' profits at risk by increasing the proportion of positive award fees allocated to on-orbit performance and/or using significant negative award fees would serve the same purpose. By "negative award fee", I mean an award fee plan under which a contractor would pay back to the government a fixed amount or proportion of the award fees previously earned under the contract if the contractor's product partially or totally failed in operation.

In addition, some tailoring of the correction of defects warranty on cost reimbursement contracts has already been done. For example, under a NASA cost reimbursement contract to build part of space station Freedom, the contractor is required, with some limitations, to repair or replace defective hardware at no cost to the government if the defect occurs after formal acceptance by NASA but before launch. Apportioning responsibility to correct defects might also be done on a dollar or percentage basis and adjusted in relation to risk.¹² That is, the government's share of the cost to correct defects would progressively decline as risks under the contract became better known. One difficulty with tailoring this type of warranty is that NASA and its contractors would have to track costs relative to a specific contract clause. Such tracking would impose additional administrative costs.

Overall, NASA has some options under existing laws and regulations to shift more cost risk to contractors as work under multiple unit research and development contracts progresses or later on as part of an on-orbit performance commitment. NASA has occasionally used some of these options. The challenge is to have NASA personnel routinely consider them in designing acquisition strategies. This will not be an easy task because of the entrenched procurement culture that such thinking threatens and the highly judgmental nature of the activity.

Of course, an important test of any changes in NASA's risk sharing strategy will be its acceptance by the contractor community. The measure of that acceptance will be contractors' responses to NASA's request for proposals that include such changes. Inadequate numbers of responsible bidders could send NASA back to the drawing board to design other approaches. However, the risk of false

¹²Since such tailoring of allowable costs would be subject to negotiation, its application could be limited if it adversely affects NASA's ability to attract a reasonable level of competition. Allowable costs are discussed at 48 C.F.R. Subpart 31.2.

starts and lost time and effort in contracting should not deter NASA from thoroughly considering and testing its options for sharing cost risk. NASA procurement officials' recent efforts to explore opportunities to shift cost risk to contractors should be continued, expanded, and strongly encouraged.

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This concludes my prepared statement. I would be pleased to respond to your questions.

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