

United States Government Accountability Office  
Washington, DC 20548

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August 23, 2012

Congressional Committees

Subject: *Department of Defense's Waiver of Competitive Prototyping Requirement for Enhanced Polar System Program*

The Weapon Systems Acquisition Reform Act of 2009, as amended (WSARA), requires that the acquisition strategy for each major defense acquisition program provides for competitive prototypes before Milestone B approval—which authorizes entry into system development—unless the Milestone Decision Authority waives the requirement.<sup>1</sup> Competitive prototyping, which involves commercial, government, or academic sources producing early prototypes of weapon systems or critical subsystems, can help Department of Defense (DOD) programs reduce technical risk, refine requirements, validate designs and cost estimates, and evaluate manufacturing processes prior to making major commitments of resources. WSARA states that the Milestone Decision Authority may waive the competitive prototyping requirement only on the basis that (1) the cost of producing competitive prototypes exceeds the expected life-cycle benefits (in constant dollars) of producing such prototypes, including the benefits of improved performance and increased technological and design maturity that may be achieved through competitive prototyping; or (2) but for such a waiver, DOD would be unable to meet critical national security objectives. WSARA also directed us to review and assess DOD's rationale for competitive prototyping waivers.<sup>2</sup>

On June 18, 2012, DOD notified us that it had waived the competitive prototyping requirement for the Control and Planning Segment (CAPS), a subsystem of the Air Force's Enhanced Polar

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<sup>1</sup>Pub. L. No. 111-23, § 203(a), as amended by the Ike Skelton National Defense Authorization Act for Fiscal Year 2011, Pub. L. No. 111-383, § 813. Specifically, WSARA required DOD to modify its guidance relating to the operation of its acquisition system to incorporate these competitive prototyping provisions. DOD did so through Directive-Type Memorandum (DTM) 09-027, "Implementation of Weapon System Acquisition Reform Act of 2009 (Dec. 4, 2009, incorporating Change 3, Dec. 9, 2011). Major defense acquisition programs are those estimated by DOD to require an eventual total expenditure for research, development, test, and evaluation of more than \$365 million, or for procurement, including all planned increments or spirals, of more than \$2.19 billion in fiscal year 2000 constant dollars. The Milestone Decision Authority for major defense acquisition programs is the Under Secretary of Defense for Acquisition, Technology and Logistics, the head of a DOD component, or if delegated the component acquisition executive.

<sup>2</sup>Pub. L. No. 111-23 § 203(b)(2). Specifically, WSARA provides that whenever a Milestone Decision Authority authorizes a waiver of the competitive prototyping requirement on the basis of what WSARA describes as "excessive cost," the Milestone Decision Authority is required to submit notification of the waiver, together with the rationale, to the Comptroller General of the United States at the same time it is submitted to the congressional defense committees. WSARA further provides that we are to review the rationale for the waiver and submit a written assessment of that rationale to the congressional defense committees.

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System (EPS).<sup>3</sup> EPS, which consists of two payloads hosted on classified satellites, a gateway to connect user terminals to other communication systems, and a control and planning segment to control the payloads and manage communications, will provide extremely high frequency, jam-resistant, and secure satellite communications to strategic and tactical forces in the polar region. According to DOD, this is the first waiver of WSARA's competitive prototyping requirement since it was enacted in 2009.

In this report, we assess (1) DOD's rationale for waiving the competitive prototyping requirement for CAPS and the analysis used to support it and (2) the acquisition strategy for CAPS in the context of the waiver. To conduct our assessment, we compared the rationale in the waiver to the WSARA requirement to determine the extent to which the waiver is consistent with the statute. In addition, we reviewed the Air Force's business case analysis, which provides the data and assumptions on which the waiver is based, the acquisition strategy, and other relevant documentation. We also submitted written questions to DOD, Air Force, and EPS program officials to clarify information in this documentation, as necessary.

We conducted this performance audit from June 2012 to August 2012 in accordance with generally accepted government auditing standards. These standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

## Results in Brief

DOD's rationale for waiving WSARA's competitive prototyping requirement for CAPS covered both bases provided in the statute; however, DOD did not provide complete information about the potential benefits of competitive prototyping or support for its conclusion that prototyping would result in schedule delays. In the waiver, DOD found reasonable the Air Force's conclusion that the additional \$49 million cost of producing competing prototypes exceeded the negligible expected life-cycle benefits because minimal opportunities exist to increase CAPS technological and design maturity through competitive prototyping. The Air Force's conclusions about CAPS technical and design risk are supported by its market research, but its cost-benefit analysis was incomplete because neither the waiver nor the business case analysis supporting it provided an estimated dollar value for the expected benefits. Further, the Air Force's cost estimate of competitively prototyping CAPS was based on a program office estimate, which has not been independently reviewed by DOD's Office of Cost Assessment and Performance Evaluation. DOD also did not provide support in the waiver for its conclusion that implementing competitive prototyping will delay EPS's initial operational capability and result in DOD being unable to meet critical national security objectives. Finally, the CAPS acquisition strategy anticipates the use of a cost-reimbursement contract for designing and building the system; however it may be difficult for DOD to meet the requirements for justifying the use of a cost-type contract for development, given the low design and development risk described in the waiver.

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<sup>3</sup>DOD reported in the waiver that the program has produced a single prototype. Pub. L. No. 111-23 § 203(a)(3)(A) provides that whenever a Milestone Decision Authority authorizes a competitive prototyping waiver, the program is still required to produce a prototype prior to Milestone B approval if the expected life-cycle benefits (in constant dollars) of producing such prototype exceed its cost and its production is consistent with achieving critical national security objectives.

## Waiver Rationale Is Consistent with WSARA, but Gaps Exist in the Analysis

DOD's rationale for waiving WSARA's competitive prototyping requirement for CAPS addressed the two bases provided for a waiver in the statute, which focus on costs and benefits and critical national security objectives. In the waiver, DOD accepted the Air Force's conclusion that competitively prototyping CAPS would increase development costs by approximately \$49 million (base year 2012 constant dollars).<sup>4</sup> Based on market research and other factors, such as previous efforts to reduce CAPS requirements and risk reduction work that demonstrated these requirements can be met with a low risk design and primarily commercial off-the-shelf hardware and software, the Air Force concluded that the life-cycle benefits of competitive prototyping were negligible and the level of cost savings needed to recoup the additional investment was unrealistic.<sup>5</sup>

The Air Force's conclusions about CAPS technical and design risk are supported by its market research, but its cost-benefit analysis was incomplete. Neither the DOD waiver nor the Air Force business case analysis included an estimate of the life-cycle benefits that may be achieved through competitive prototyping. In the absence of a specific dollar value or range of values for the estimated life-cycle benefits of CAPS competitive prototyping, the Air Force cannot conclusively determine whether the costs outweigh the benefits. According to the EPS program office, it did not perform a more detailed life-cycle cost-benefit analysis because the additional cost and burden of producing such an analysis was not warranted based on its business case analysis. Further, the Air Force's estimated \$49 million cost for competitively prototyping was based on a program office estimate and has not been independently estimated or reviewed by DOD's cost estimating organization, the Office of Cost Assessment and Performance Evaluation. According to our best practices criteria, an independent cost estimate is considered one of the best and most reliable resource estimate validation methods because it provides an independent view of expected program costs that tests the program office estimate for reasonableness.<sup>6</sup>

DOD's conclusion that it cannot meet critical national security objectives without the CAPS competitive prototyping waiver was not well supported in the waiver. The waiver states that implementing competitive prototypes for CAPS will further delay the EPS's initial operational capability, but it does not explain why or how it adds to the schedule risks the program already faces. We noted during our review that the Air Force's acquisition strategy concludes that competitive prototyping could delay initial operational capability by 6 months to 2 years because

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<sup>4</sup>According to the EPS program office, \$49 million includes not only the cost of producing an additional prototype, but also the cost of funding a second contractor through preliminary design review.

<sup>5</sup>During our review, we found errors in the program costs and percentages cited in the waiver. The waiver states that the Air Force estimate for remaining CAPS development following prototyping is \$177 million and for CAPS operations and sustainment is \$134 million (base year 2012 constant dollars). By comparing these costs to the cost of competitive prototyping, DOD concluded that a cost savings of more than 16 percent would have to be achieved to make competitive prototyping viable. However, the waiver incorrectly stated that these cost estimates were in base year 2012 constant dollars. We found and the Air Force acknowledged that the dollar amounts were in then-year dollars. During our review, we requested and received these dollars amounts in 2012 base year constant dollars from the EPS program office. It also provided us an updated estimate of operations and sustainment costs. According to this data, the estimated cost of CAPS development work following prototyping is \$158 million and CAPS operations and sustainment is \$71 million (base year 2012 constant dollars).

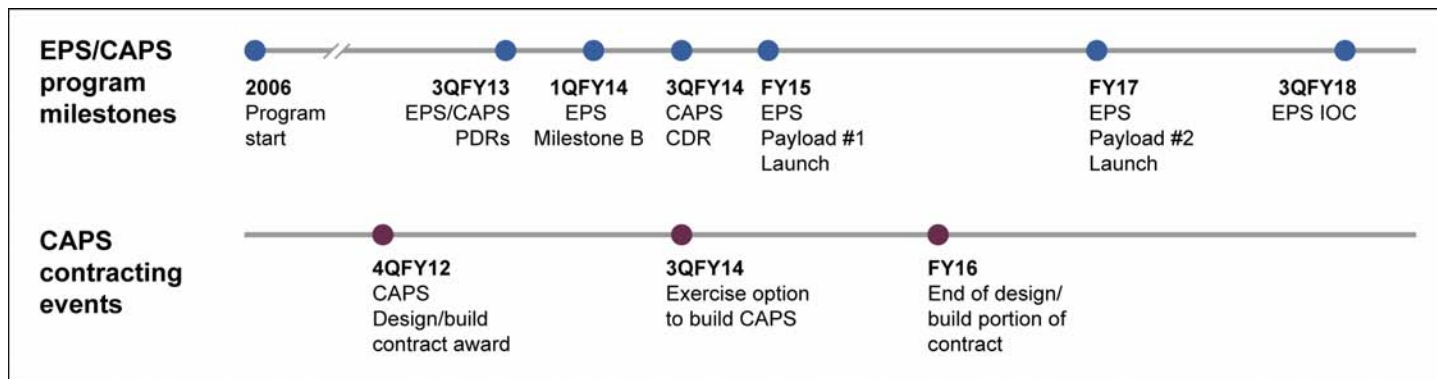
<sup>6</sup>GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-09-3SP](#) (Washington, D.C.: March 2009).

the program would have to not only award contracts for competitive prototyping, but also go through another source selection to award a CAPS design and development contract. On the other hand, according to the EPS program office, alternatives exist if CAPS is not ready by the time the payloads, which have almost completed production, are launched. According to the program office, ground test assets have been procured to enable payload calibration and check-out prior to CAPS operational readiness, though these assets could not sustain CAPS operations. In addition, there are currently two Interim Polar System payloads in operation that the program office estimates will continue to meet operational requirements while the EPS is deployed and readied for operations.

### Contract Type in CAPS Acquisition Strategy May Be Difficult to Justify

The CAPS acquisition strategy anticipates the use of a cost-reimbursement contract for designing and building the system; however, it may be difficult for DOD to meet the requirements for justifying the use of a cost-type contract for development, given the description of risk in the waiver. The waiver concluded that, based on market research, there is no significant technology development anticipated in the contractors' proposals for CAPS and design risks are expected to be low. However, DOD acquisition regulations state that if a cost-type contract is selected for a development program at Milestone B, the contract file shall include the Milestone Decision Authority's written determination that the program is so complex and technically challenging that it would not be practicable to reduce program risk to a level that would permit the use of a fixed-price type contract.<sup>7</sup> As shown in figure 1, the EPS program's Milestone B is planned for the first quarter of fiscal year 2014.

Figure 1: EPS and CAPS Program Schedule



Source: GAO presentation of EPS program data.

Notes: CDR critical design review  
FY fiscal year  
PDR preliminary design review  
Q quarter

According to the acquisition strategy, a cost-reimbursement contract was chosen for the basic CAPS contract because of the nature of the design work, which includes software design and development. This contract type was also chosen for the option to develop and build the system because of the difficulty in pricing the development of a system that has not yet completed

<sup>7</sup> Subpart 16.1 of the FAR and DFARS §§ 216.104-70 and § 234.004(2)(iii) outline a variety of factors to consider in selecting contract types.

preliminary design review. According to the acquisition strategy, using a cost-plus-incentive fee contract will reduce the level of risk for the competing contractors and allow them to deliver more reasonably priced proposals up front; however, it will result in the government assuming a greater portion of the cost and performance risk. Decisions on the specific contract type remain and in making those decisions, DOD will need to appropriately address the expected level of risk to both the government and contractors.

## **Agency Comments and Our Evaluation**

We provided a draft of this report to DOD for comment. In its written comments, reproduced in the enclosure, DOD agreed that it could have provided additional documentation in support of the waiver and stated that it appreciated our clarification of the types of information and data that should be included in the future waivers for best practices purposes. We believe that if DOD takes note of our findings on the CAPS waiver, in particular the lack of a specific estimate of the expected life-cycle cost benefits of competitive prototyping, it would improve future waiver requests. DOD also noted that WSARA does not specifically ask us to review waivers based on national security objectives and considers our comments on its national security rationale outside the scope of the statute. We recognize that WSARA specifically provides for our review of competitive prototyping waivers after receipt of a notification of a waiver on the basis of excessive cost, i.e., the cost of producing competitive prototypes exceeds the expected life-cycle benefits of producing such prototypes. However, in this instance, because DOD's rationale for the waiver included both excessive cost and national security considerations, our assessment included both bases. Our finding that DOD's national security rationale was not well supported still stands; and we believe that providing adequate support for the national security rationale in competitive prototyping waivers is important for congressional oversight. Finally, DOD noted that we questioned the justification for using a cost-reimbursement contract for CAPS. For clarification, we did not question DOD's decision, which is ultimately one for the agency, on the appropriate contract type. Instead, we highlighted that the low design risks described in the waiver seem inconsistent with the requirements in DOD's acquisition regulations for justifying the use of a cost-reimbursement contract for development.

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We are sending copies of this report to interested congressional committees, the Secretary of Defense, and Secretary of the Air Force. In addition, the report will be available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions, please contact me at (202) 512-4841 or [sullivanm@gao.gov](mailto:sullivanm@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report were Ron Schwenn, Assistant Director; Jacob Leon Beier; Marie Ahearn; Kenneth E. Patton; and Carol Petersen.

A handwritten signature in black ink, appearing to read 'Michael J. Sullivan', with a stylized, flowing script.

Michael J. Sullivan  
Director, Acquisition and Sourcing Management

Enclosure

*List of Committees*

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Enclosure

## Comments from the Department of Defense



ACQUISITION,  
TECHNOLOGY  
AND LOGISTICS

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Mr. Michael J. Sullivan  
Director, Acquisition and Sourcing Management  
U.S. Government Accountability Office  
441 G Street, N.W.  
Washington, DC 20548

AUG 20 2012

Dear Mr. Sullivan:

This is the Department of Defense (DoD) response to the GAO Draft Report, GAO-12-983R, "Department of Defense's Waiver of Competitive Prototyping Requirement for Enhanced Polar System Program," dated August 2012 (GAO Code 121085).

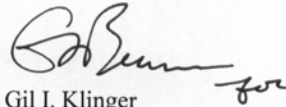
The DoD appreciates the GAO's analysis that the Department's waiver of the Weapon Systems Acquisition Reform Act of 2009, Public Law 111-23 (WSARA) Competitive Prototyping Requirement for the Enhanced Polar System (EPS) Program's Control and Planning Segment (CAPS) met the statutory requirement. We affirm the GAO's verbal conclusions that the CAPS waiver is rational based on the projected technical and design risk and the specific circumstances of the EPS program.

We further appreciate the GAO's clarification on the types of information and data that should be included in future waivers. While DoD concurs that additional documentation could have been provided, all efforts were made to clearly document the process while recognizing what information was reasonably available to support the decision. The business case analysis provided sufficient evidence to support the waiver given the specific circumstances of the EPS program. All supporting analysis for the waiver was completed in accordance with generally accepted practices. GAO provided comments on both basis for the EPS CAPS competitive prototype waiver: the cost benefit analysis and the national security objectives. WSARA section 203(b) designates GAO review of competitive prototype waivers "on the basis of excessive cost". Section 203(b) did not specifically designate GAO review for waivers based on national security objectives. While we welcome GAO comments on the waiver, we believe the comments on basis of the waiver related to the national security are outside the scope of WSARA.

The report questioned the justification of using a cost-reimbursement contract for CAPS. This contract type was chosen due to the nature of the early design work required including software design and development, and related systems engineering integration and test (SEIT) support. This approach was approved by the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) as documented in the program's acquisition strategy.

DoD will take into consideration inclusion of GAO “best practices” as noted in this report. Moving forward, DoD remains committed to excellence and will certainly look to improve the process should a future waiver be requested.

Sincerely,

A handwritten signature in black ink, appearing to read "Gil I. Klinger" with a stylized flourish at the end.

Gil I. Klinger  
Deputy Assistant Secretary of Defense  
For Space and Intelligence

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