Audit Report

OFFICE OF THE INSPECTOR GENERAL

ACQUISITION OF THE DEFENSE SUPPORT PROGRAM SATELLITES

Report Number 92-040

February 3, 1992

This is an special version of Report No. 92-040 that omits Government sensitive data.

Department of Defense

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202

February 3, 1992

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION
ASSISTANT SECRETARY OF THE AIR FORCE (FINANCIAL MANAGEMENT AND COMPTROLLER)
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Audit Report on the Acquisition of the Defense Support Program Satellites (Report No. 92-040)

We are providing this final report for your information and use. Management comments on a draft of this report were considered in preparing the final report. DoD Directive 7650.3 requires that all recommendations be resolved promptly. Therefore, the Commander, Air Force Space Systems Division, must provide final comments on the unresolved issues by April 3, 1992. See the management comments section at the end of the Executive Summary for the specific requirements for those comments. Monetary benefits are subject to resolution in accordance with DoD Directive 7650.3 in the event of nonconcurrence or failure to comment.

The courtesies extended to the audit staff are appreciated. If you have any questions on this audit, please contact Mr. John Meling, Program Director, at (703) 614-3994 (DSN 224-3994) or Mr. Thomas Bartoszek, Project Manager, at (703) 693-0481 (DSN 223-0481). The planned distribution of this report is listed in Appendix F.

Robert J. Lieberman
Assistant Inspector General
for Auditing

Enclosure

cc:
Secretary of the Air Force

The following acronyms are used in this report.

CSCI .....Computer Software Configuration Items
DPRO .....Defense Plant Representative Office
DSPS.....Defense Support Program Satellite
FAR.....Federal Acquisition Regulation
IBM.....International Business Machine
LCS.....Laser Crosslink Subsystem

Office of the Inspector General

REPORT NO. 92-040 **February 3, 1992**
(Project No. 1AS-0027)

ACQUISITION OF THE DEFENSE SUPPORT PROGRAM SATELLITES

EXECUTIVE SUMMARY

Introduction. The Defense Support Program satellites provide near real-time warning of intercontinental and submarine ballistic missile launches and nuclear detonation reporting. The satellite is an Air Force program with an estimated cost of about $9.9 billion (then-year dollars) for 26 satellites. The satellite began development in the 1960's and has been in production since the early 1970's.

Objective. The audit objective was to evaluate the effectiveness of the acquisition management of the satellite to determine whether it was being cost-effectively procured. We also reviewed associated internal controls.

Audit Results. We identified other matters of interest in the areas of transfer of material between contracts, spare configured items, laser crosslink subsystems, and software upgrades. We did not report these findings because management was taking corrective actions during the audit. However, we did find two reportable conditions.

o The satellite program office did not adequately consider the need for positive orbital incentives in planning the procurement of satellite numbers 23 and 24. As a result, the incentive plans would result in the contractors being paid up to * million in unnecessary positive orbital incentives for the two satellites (Finding A).

o TRW did not ensure that McDonnell Douglas Corporation maintained adequate property records for Government-owned material and an engineering model unit procured on satellite contracts. As a result, Government-owned material, costing about $1.2 million, and the engineering model unit, costing about $5.6 million, were not recorded in McDonnell Douglas' property records. In addition, McDonnell Douglas was unable to locate a component of the engineering model unit costing about $167,000 (Finding B).

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Internal Controls. The Air Force's internal controls were not sufficient to ensure that orbital incentives for satellite numbers 23 and 24 were adequately justified (Finding A). Additional details are provided in the Internal Controls section of Part I.

Potential Benefits of Audit. We estimated that the Air Force could avoid up to * million in procurement costs in the Future Years Defense Program by eliminating orbital incentives for satellite numbers 23 and 24. Additional details are included in Appendix D.

Summary of Recommendations. We recommended that orbital incentive plans for the block 23 satellites be deleted and that final payment on contract F04701-82-C-0035 be withheld.

Management Comments. The Program Director, Defense Support Program, concurred with Recommendations A.1. and A.2. The Deputy Controller, Defense Logistics Agency, partially concurred with Recommendations B.1. and B.2.

We request that the Commander, Air Force Space Systems Division, provide an estimated completion date for implementation of Recommendation A.1. and a statement on the amount of monetary benefits concurred with on Recommendation A.2. in response to the final report. The full discussion of the responsiveness of management comments is included in Part II of the report, and the complete texts of management's comments are included in Part IV of the report.

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This report was prepared by the Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, DoD. Copies of the report can be obtained from the Information Officer, Audit Planning and Technical Support Directorate, (703) 693-0340.

PART I - INTRODUCTION

Background

The Defense Support Program satellite (DSPS) is an outgrowth of ballistic missile infrared technology. The DSPS is an Air Force program that was started in the 1960's to provide near real-time warning of intercontinental and submarine ballistic missile launches and nuclear detonations. The DSPS consists of the satellite and sensors and is supported by ground data processing stations. To accomplish its mission, the satellite operates in a geosynchronous orbit at 23,000 miles above the earth, which allows the satellite to travel at the same speed that the earth rotates and provides continuous coverage of the Atlantic and Pacific Oceans and the Federation of Independent States.

Since 1971, the Air Force has awarded production contracts for 22 satellites. In May 1985, the Defense Systems Acquisition Review Council (subsequently renamed the Defense Acquisition Board) validated the need to procure satellite numbers 18 through 22 (block 18). In July 1987, the Air Force awarded TRW, Incorporated (TRW), fixed-price-incentive-fee, multiyear contract F04701-86-C-0022, with a ceiling price of $760.9 million for block 18 satellites. Congress authorized use of a multiyear contract because the design was stable, technical risks were not considered excessive, and annual contracts were expected to remain substantially unchanged in terms of procurement rates. In August 1987, the Air Force awarded Aerojet, Electronic Systems Division (Aerojet), fixed-price-incentive/award-fee contract F04701-86-C-0023, with a ceiling price of $496.1 million for block 18 satellite sensors. The contracts included orbital incentives, which are technical performance incentives to tailor contractors' profits to the orbital life achieved by the satellite and sensors when compared with the 3-year DSPS system life requirement. Contractor orbital incentive fees were based on satellite and sensor on-orbit performance. Other incentives included cost, integration, test, and launch operations support. Positive incentives were to reward the contractors for satellite and sensor performance, while negative incentives were to penalize the contractors for performance below contractual requirements. The Air Force plans to procure 26 satellites at an estimated cost of about $9.9 billion (then-year dollars).

At program inception, the Air Force decided to procure satellite sensors as Government-furnished equipment with the intent to achieve program cost savings. We applaud the Air Force for implementing this successful and cost-effective procurement action.

Objectives

The audit objectives were to evaluate the overall effectiveness of the DSPS acquisition management and to determine whether the satellite was being cost-effectively procured. In performing the audit, we reviewed modification plans, logistics support, cost estimating procedures, contracting procedures, and production work measurement. We also reviewed internal controls related to these management elements.

Our audit tests identified no deficiencies in logistics support, cost estimating procedures, and production work measurement (Appendix A). We did identify a modification plan issue (Other Matters of Interest). The results of our review of contracting procedures are in Part II of this report.

Scope

This economy and efficiency audit was performed from February through August 1991 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly included such tests of internal controls as were considered necessary. We reviewed accounting and program data for the period January 1982 through August 1991. We interviewed Government, contractor, and subcontractor personnel involved in the management, acquisition, and manufacture of the DSPS. A list of the activities visited or contacted is in Appendix E.

We obtained the assistance of personnel in the Technical Assessment Division of the Office of the Assistant Inspector General for Auditing in the areas of logistics, software testing, and production work measurement. They reviewed logistics support for the ground processing stations, International Business Machine's (IBM) software upgrade test plan, and TRW's production work measurement practices.

Internal Controls

Internal controls were reviewed for the five critical program management elements addressed during the audit. Internal controls were determined from applicable DoD and Air Force directives, instructions, and manuals. Our review included inventory, procurement, pricing, contracting, and work measurement controls established to promote segregation of duties and responsibilities and safeguarding of Government assets. The audit identified a significant internal control weakness as defined by Public Law 97-255, Office of Management and Budget Circular A-123, and DoD Directive 5010.38. Controls were not

sufficient to ensure that the program office adequately considered technical and cost benefits before planning to include orbital incentive fees in DSPS production contracts (Finding A). Recommendations A.1. and A.2. in this report, if implemented, will correct the weakness. We have determined that the monetary benefits that can be realized by implementing Recommendation A.2. are * million. We could not determine the monetary benefits to be realized by implementing Recommendation A.1. The monetary benefits were not determinable because the regulatory change would only affect future procurements. A copy of this report is being provided to the senior official responsible for internal controls within the Air Force.

Prior Audits and Other Reviews

There were no audits in this area requiring follow-up action in the last 5 years.

Other Matters of Interest

During the audit, we identified four areas of concern that did not warrant findings and recommendations because management had taken corrective actions during the audit. A discussion of the four areas is in Appendix B.

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PART II - FINDINGS AND RECOMMENDATIONS

A. ORBITAL INCENTIVES

The DSPS program office planned to include unnecessary positive incentives in the procurement of satellite numbers 23 and 24 (block 23). This condition occurred because the Air Force Space Systems Division's regulations did not require that the program office perform a documented review to justify the need to continue using orbital incentives. As a result, the program office did not consider DSPS design maturity, actual life spans of existing satellites, and proven contract testing and quality assurance requirements before developing the block 23 procurement incentive plans. Accordingly, the incentive plans would result in the DSPS contractors being paid up to * million in unnecessary positive orbital incentives for satellite numbers 23 and 24.

DISCUSSION OF DETAILS

Background

Federal Acquisition Regulation. Federal Acquisition Regulation (FAR), subpart 16.4, "Incentive Contracts," states that incentive contracts are appropriate when the required supplies can be acquired at lower costs with improved technical performance. With respect to using contract incentive fee provisions, subpart 16.4 requires that contracting officers design the incentive arrangements to motivate contractor efforts that might not otherwise be emphasized.

Air Force criteria. The Air Force Space Systems Division (the Division) Supplement to the FAR, subpart 16.402-2(b), "Technical Performance Incentives," requires that Division contracting officers include performance incentives in contracts for all space vehicles and payloads unless the inclusion of performance incentives is deemed impractical after a thorough review. Accordingly, the contracting officer is required to document the rationale for not including performance incentives in the acquisition plan for the system being procured. The Supplement did not specify the type of review and documentation required to support the contracting officer's determination concerning the practicality of including performance incentives in space system contracts. Division contracting personnel advised us that the review should include a technical and

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cost-benefit analysis of all factors influencing the use of performance incentives.

Incentive Plans for Block 23 Satellites

The program office budgeted * million in the Future Years Defense Program to fund orbital incentives in the procurement of block 23 satellites. The program office budgeted the orbital incentives based on the Division's requirement to include performance incentives in contracts for all space vehicles and payloads. However, the program office did not perform a technical and cost-benefit analysis to justify the need to continue providing DSPS contractors orbital incentives because Division regulations only required a review if orbital incentives were not used.

In March 1991, the Division developed positive and negative orbital incentive plans for the block 23 satellites and sensors. The positive incentive plans were designed to reward the contractors for system performance that exceeded the 3-year DSPS system life requirement. Under the plan, the contractors would earn up to * million in positive orbital incentives for satellites that effectively operate for 10 years. The negative incentive plan was designed to ensure that satellites lived at least as long as the 3-year DSPS system life requirement and that the satellites' quality continued despite this being the last satellite block procurement under the DSPS program. Under the plan, contractors would forego up to $60 million in negative orbital incentives for satellites that operate less than 3 years.

In our opinion, the plan to provide contractors positive orbital incentives was not warranted based on our review of DSPS design maturity, actual life spans of existing satellites, and proven contract testing and quality assurance requirements.

Design maturity. The program office has successfully identified design problems affecting the performance of earlier satellites and implemented design improvements to extend the lives of subsequent satellites.

Resolution of design problems. In 1985, the program office awarded TRW and Aerojet service contracts to support the DSPS program from October 1985 through September 1995. The contracts required that the contractors support satellite operations and resolve problems affecting satellite performance in orbit. Since October 1985, TRW and Aerojet have identified

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problems with the satellite reaction wheel, the propellant tank, and the extent of system redundancy within the satellite that affected the satellite's life span. To correct these problems, TRW and Aerojet recommended, and the program office accepted, that a satellite reaction wheel with a 10-year life cycle and a larger propellant tank be designed and that system redundancy within the satellite be increased. TRW and Aerojet implemented these satellite design improvements in block 18 satellites, and the improvements will be included in block 23 satellites.

Design stability. The program office did not plan to make any material design changes to the DSPS system specifications for the block 23 satellite procurement. The DSPS acquisition plan provides that the block 23 satellite design will be functionally and physically equivalent to the designs for the block 14 and 18 satellites. Further, the plan provided that the block 23 satellites will differ from earlier satellites only to the extent necessary to eliminate obsolescence and implement minor engineering improvements. Accordingly, the plan specified that production technical risk was low to moderate for block 23 satellites because of the well-defined requirements and specifications and because of the prime contractor's experience in manufacturing, testing, and launching earlier satellites.

The Air Force also cited system design stability and low technical risks in justifying the use of multiyear DSPS contracts for the procurement of block 18 satellites. The multiyear procurement was approved in Public Law 99-591, section 101(c), "Continuing Appropriations Fiscal Year 1987," October 30, 1986.

Satellite life spans. On average, satellites deployed in the DSPS program through block 14 have exceeded the 3-year DSPS system specification orbital life requirement and the Air Force's 5-year DSPS orbital life goal. The satellites exceeded the DSPS orbital life requirement and goal without system design improvements to extend satellite life spans that were included in block 18 and beyond satellites. Accordingly, we reasonably expect that block 23 satellites will exceed the DSPS orbital life requirement and goal without the use of orbital incentives.

Testing and quality assurance. DSPS contract specifications require extensive testing of DSPS components and systems and strict controls over the quality of materials and parts used to manufacture the satellites. The contracts also require that the contractors procure parts with a laboratory tested reliability of 5 years or more. Accordingly, TRW and Aerojet implemented testing and quality assurance programs at their plants that have ensured that quality materials and parts were used in manufacturing the satellite and sensors. In addition, program

office representatives maintained active testing, quality assurance, and engineering oversight of the contractors' manufacturing processes to ensure compliance with contract requirements.

Orbital Incentives on Another Satellite Program

The program office for the Defense Satellite Communications System, Phase III, has established precedent for not including positive orbital performance incentives in satellite production contracts once the satellite design has matured. Once the system design stabilized, the program office for the Defense Satellite Communications System, Phase III, included only negative orbital performance incentives in production contracts. The program office considered the system design stable after the first four satellites were procured. In this case, the program office motivated the contractor to continue producing reliable satellites by applying negative orbital performance incentives in the procurement of the last 10 satellites. This arrangement proved to be cost-effective and resulted in the continued production of reliable satellites.

Conclusion

The plan to include positive orbital performance incentives in the procurement of block 23 would not motivate the contractors for the satellite and the sensors to perform functions that the program office had not already emphasized and paid for. Also, a documented technical and cost-benefit analysis would have shown that the Government would not receive additional benefits from providing the contractors positive orbital performance incentives. Accordingly, we believe that the Division Supplement to the FAR needs to be revised to require that program offices perform a documented technical and cost-benefit analysis to support decisions to provide contractors positive orbital performance incentives in satellite production contracts.

At our exit conference, the DSPS program manager tentatively agreed that positive orbital performance incentives were not warranted and would be deleted from block 23 procurement plans. On September 23, 1991, the program office indicated that savings realized by deleting positive orbital incentives from the block 23 procurement were absorbed by additional unfunded needs of the DSPS program and by funding needs of the Follow-on Early Warning System (Appendix C). We commend the DSPS program manager for his timely action to eliminate positive orbital incentives from the block 23 procurement plans.

RECOMMENDATIONS FOR CORRECTIVE ACTION

1. We recommend that the Commander, Air Force Space Systems Division, revise the Division's Supplement to the Federal Acquisition Regulation to require that program offices perform and document technical and cost-benefit analyses to support decisions to provide contractors positive orbital performance incentives in mature satellite production contracts.

2. We recommend that the Air Force Program Executive Officer for Space, Air Force Space Systems Division, make sure that positive orbital incentive plans for Defense Support Program block 23 satellites are deleted from the Request for Proposals.

MANAGEMENT COMMENTS

The Program Director, Defense Support Program, concurred with Recommendation A.1. stating that the recommended change to the Division's Supplement to the FAR had been transmitted to the Division's office responsible for local policy implementation.

The Program Director also concurred with Recommendation A.2. stating that orbital incentive plans for block 23 satellites were revised as recommended.

AUDIT RESPONSE TO MANAGEMENT COMMENTS

The Air Force's comments are considered responsive. However, we request that the Air Force provide an estimated completion date for the implementation of Recommendation A.1. and a statement on the amount of monetary benefits concurred with on Recommendation A.2. in response to the final report.

B. GOVERNMENT-OWNED PROPERTY

TRW did not ensure that its subcontractor, McDonnell Douglas Corporation, maintained adequate property records for Government-owned property. This condition occurred because TRW believed that the Defense Plant Representative Office (DPRO) at McDonnell Douglas was responsible for overseeing the subcontractor's property records for Government-owned material procured on the DSPS block 14 (satellite numbers 14 through 17) contract. Also, McDonnell Douglas Corporation did not comply with established property accounting procedures. As a result, Government-owned material costing about $1.2 million and an engineering model unit costing about $5.6 million were not recorded in subcontractor property records. In addition, McDonnell Douglas Corporation was unable to locate a component of the engineering model unit costing about $167,000.

DISCUSSION OF DETAILS

Background

Long-lead material. In November 1981, the Air Force awarded TRW contract F04701-82-C-0035 for production of block 14 satellites. Contract line item 1 authorized TRW to procure long-lead material costing $33.9 million. The material consisted of property that may have been incorporated into a deliverable end item or that may have been expended in performing the contract. In respect to title and control over long-lead material, the contract required that TRW comply with requirements in Defense Acquisition Regulation, clause 7-203.21, "Government Property," July 1, 1976.[1/] Clause 7-203.21 specifies that property title is transferred to the Government for all property purchased by the contractor, upon delivery by the vendor, and reimbursed on a cost basis. The clause also requires that all Government material be recorded in the contractor's property control system. In addition, the clause requires that the contractor:

o require that all subcontractors comply with Government property requirements in the prime contract, and

o establish procedures to ensure that the subcontractors comply with the contractor's approved property control system.

1/ The Defense Acquisition Regulation was replaced by the Federal Acquisition Regulation in April 1984.

Engineering model unit. In October 1981, the Air Force awarded TRW cost-plus-incentive-fee contract F04701-81-C-0014 to develop a laser crosslink subsystem (LCS) for the DSPS. The LCS was to be developed by McDonnell Douglas Corporation. Contract F04701-81-C-0014 and TRW's subcontract with McDonnell Douglas also specified Government property control requirements in Defense Acquisition Regulation, clause 7-203.21.

Property Records for Long-Lead Material

On contract F04701-82-C-0035, TRW did not ensure that long-lead material that the subcontractor procured, for which the Government had title upon delivery by vendors, was controlled through, and recorded in, the subcontractor's property records. TRW incorrectly believed that the Naval Plant Representative Office[2/] at McDonnell Douglas Corporation was responsible for overseeing McDonnell Douglas' maintenance of property records for Government-owned long-lead material.

In July 1983, TRW submitted two written requests to the Air Force Plant Representative Office[2/] at TRW for authority to delegate responsibility for property administration to the Naval Plant Representative Office at McDonnell Douglas. One request pertained to property on TRW contract F04701-81-C-0014, and the other request pertained to property on TRW contract F04701-82-C-0035 that was purchased by McDonnell Douglas Corporation. In August 1983, the Air Force Plant Representative Office notified TRW that the Naval Plant Representative Office had been delegated responsibility for property administration for TRW purchase orders pertaining to contract F04701-81-C-0014. The notification expressly stated that responsibility for property administration was not delegated for the TRW purchase order on contract F04701-82-C-0035 (DSPS block 14 production contract).

Subsequently, TRW definitized McDonnell Douglas Corporation's purchase orders on the two contracts into one combined purchase order. TRW advised us that it believed that the delegation authority for contract F04701-81-C-0014 purchase orders automatically transferred to all property included in the combined purchase order. This belief was incorrect.

As required by contract F04701-82-C-0035, TRW did include Defense Acquisition Regulation, clause 7-203.21, in its purchase order to McDonnell Douglas Corporation. Similarly, McDonnell Douglas Corporation included the Government property clause in its subcontracts to Kodak and Motorola, Incorporated. However, TRW

2/ Now Defense Plant Representative Office.

did not implement procedures to ensure that McDonnell Douglas Corporation and its subcontractors complied with TRW's approved property control system because of TRW's incorrect assumption regarding property administration cognizance.

Our review at McDonnell Douglas Corporation and its subcontractors disclosed that McDonnell Douglas Corporation and Motorola were adequately maintaining property records for Government-owned long-lead material in their possession. On the other hand, Kodak had not established property records to control and account for Government-owned long-lead material, costing about $1.2 million, that was procured for contract F04701-82-C-0035. However during our review, Kodak was able to account for the Government-owned material.

Property Records for the Engineering Model Unit

McDonnell Douglas Corporation did not record the engineering model unit of the LCS, with an estimated value of $5.6 million, developed on contract F04701-81-C-0014. This condition was attributed to McDonnell Douglas' failure to follow its Government approved property control system. During the audit, McDonnell Douglas Corporation was able to locate or account for all but the optical relay tube assembly component of the engineering model unit. The component had an estimated cost of about $167,000.

As of August 1991, the contractor had not reported the loss of the optical relay tube assembly component to the contracting officer. Reporting such a loss is required by the Defense Acquisition Regulation, clause 7-203.21, so that the contracting officer may assess the contractor's liability for loss or damage of Government property. If this component is not located, this may result in the loss of a Government asset valued at approximately $167,000.

RECOMMENDATIONS FOR CORRECTIVE ACTION

1. We recommend that the Director, Defense Logistics Agency:

a. Withhold final payment on contract F04701-82-C-0035 until TRW provides the Defense Plant Representative Office complete property records of Government-owned long-lead material purchased under contract line item number 1.

b. Issue a letter to TRW requiring that it locate or account for the optical relay tube assembly component on contract F04701-81-C-0014 or report the loss to the contracting officer in accordance with requirements in Defense Acquisition Regulation, clause 7-203.21, "Government Property."

2. We recommend that the contracting officer, Air Force Space Systems Division, determine TRW's liability on contract F04701-81-C-0014 in the event the optical relay tube assembly component cannot be accounted for. Also, if the Space Systems Division determines that TRW is liable for the component, the Air Force should request reimbursement for the cost of the component.

MANAGEMENT COMMENTS

The Deputy Controller, Defense Logistics Agency, partially concurred with Recommendation B.1.a. stating that the Defense Contract Management Command, West was directed in writing to ensure that the DPRO at TRW reviewed TRW's subcontract property management program to determine compliance with property control requirements in the Defense Acquisition Regulation. Further, the Deputy Controller stated that the DPRO was directed to take appropriate corrective action based on the review findings. DPRO actions that may be taken include providing copies of complete property records, inventorying all property in possession of subcontractors, withholding contract payment, or some other appropriate remedy. The estimated date for completion of the planned action is June 18, 1992.

The Deputy Controller partially concurred with Recommendation B.1.b. stating that McDonnell Douglas had located the optical relay tube assembly component and moved it to Government property control after the audit.

AUDIT RESPONSE TO MANAGEMENT COMMENTS

Management comments to Recommendations B.1.a. and B.1.b. were considered responsive to the intent of the recommendations. Although management comments were not received in response to Recommendation B.2., management comments are not required in response to the final report since McDonnell Douglas located the optical relay tube assembly component.

PART III - ADDITIONAL INFORMATION

Appendix A - Areas Not Requiring Further Review
Appendix B - Other Matters of Interest
Appendix C - Management Comments from Air Force Program Office
Appendix D - Summary of Potential Benefits Resulting from Audit
Appendix E - Activities Visited or Contacted
Appendix F - Report Distribution

APPENDIX A: AREAS NOT REQUIRING FURTHER REVIEW

During the audit, we determined that internal controls related to logistics support, cost estimating procedures, and production work measurement were adequate. A discussion of these areas follows.

Logistics support. We reviewed the Integrated Logistics Support Plan, Technical Order Development Management Plan, Logistics Support Analysis Plan, Transition Plan, and logistics support for the ground data processing stations. Planning and internal controls appeared adequate.

Cost estimating procedures. Program office procedures for preparing and updating DSPS program cost estimates complied with procedures in DoD Instruction 5000.2, "Defense Acquisition Management and Procedures," February 23, 1991. In addition, the Air Force adequately prepared the independent cost analysis and "should cost" study needed to support the Defense Systems Acquisition Review Council's May 1985 program review for block 18 satellites.

Production work measurement. TRW was complying with production work measurement requirements in Military Standard 1567A, "Work Measurement System," March 1983. In addition, the program office and the DPRO at TRW were effectively monitoring the results of the contractor production work measurement system and recommending changes, when appropriate.

APPENDIX B: OTHER MATTERS OF INTEREST

We identified potential audit issues relating to contracting and modification plans, for which corrective action was taken during the audit but where continued management oversight is needed.

Transfer of material. TRW transferred approximately $2.45 million of long-lead material from block 14 satellite production contract F04701-82-C-0035 (satellite numbers 14 through 17) to block 18 satellite follow-on production contract F04701-86-C-0022 (satellite numbers 18 through 22) without Government consent. The DPRO at TRW contended that the material was Government property because it was a required deliverable in the block 14 satellite contract. The "title and risk of loss" clause in the contract transferred material title to the Government upon payment to TRW or on vendor delivery of long-lead material to TRW. The vendors delivered the long-lead material in question to TRW; therefore, it was the DPRO's position that the material transfer required Government approval. The Air Force's Judge Advocate supported the DPRO's position in opinions issued in July and December 1990. Further, the Judge Advocate stated that TRW decreased its long-lead material costs and increased its profit on the block 14 contract by transferring the long-lead material in question. In doing so, TRW could receive a windfall profit on the block 14 contract.

As a result of the material transfer, the DPRO proposed reducing TRW's progress payments on the block 14 contract. The Judge Advocate advised against this action until all facts concerning the block 18 contract negotiations were obtained and reviewed. Continued management oversight is needed to ensure the timely resolution of the legal issue concerning TRW's transfer of long-lead material from the block 14 contract to the block 18 contract without obtaining Air Force approval.

Spare configured items. The Air Force and TRW did not agree on whether the costs for spare configured items were included in the negotiated target cost for the block 18 production contract. During contract negotiations, TRW proposed costs totaling $26 million to procure spare configured items to be used by a subcontractor, McDonnell Douglas Corporation, in the production of the LCS. TRW stated that spare configured items were needed to enable the subcontractor to meet TRW's production schedule requirements. In the post-negotiation memorandum, the

Air Force contracting officer stated that the negotiated target cost included $14 million to cover costs for the LCS spare configured items. The contracting officer, however, did not include the LCS spare configured items as deliverable in the block 18 production contract.

TRW contended that it did not consider costs for LCS spare configured items to be included in the negotiated target cost for the block 18 production contract. Accordingly, TRW did not require that McDonnell Douglas procure spare configured items in the production of the LCS. Therefore, TRW did not incur the cost for LCS spare configured items. From the Air Force's perspective, TRW's action reduced its cost risk in exceeding the target cost on the block 18 contract and could result in a windfall profit. During our audit, the Air Force Office of Special Investigations was determining the facts concerning TRW not procuring the LCS spare configured items.

We are including this area of concern in the report as a "lesson learned." This case stresses the importance of contracting officers listing in contracts all end items included in negotiated target costs as deliverable end items to protect the Government's interest.

Laser crosslink subsystem. The LCS subcontractor has continued to experience technical problems in producing the second LCS unit. The LCS, when installed on the DSPS, will allow direct communication between launched satellites that are LCS configured. In 1982, the Air Force contracted with TRW to produce four LCS units for satellite numbers 14 through 17. In July 1990, the DSPS program office rebaselined the delivery schedule for the LCS acquisition because of subcontractor difficulties. As rebaselined, the second LCS unit was to be delivered to the Government by October 15, 1991. In consideration for extending the LCS delivery schedule, TRW agreed to perform additional contract tasks, which included storing completed satellites at no cost to the Government. As of August 1991, TRW estimated that subcontractor acceptance testing of the second LCS unit would not be completed until December 31, 1991, with delivery to the Government in January 1992. This further delay in the delivery of the second LCS unit may ultimately cause TRW not to meet its satellite delivery requirements. Continued management oversight is needed to minimize the effect of the late delivery on satellite acceptance and deployment.

Software upgrade of the fixed ground station equipment. System 1 is a software upgrade to the fixed ground station equipment that will enable the Air Force to exploit capabilities of block 14 and beyond satellites. In May 1987, the Air Force awarded IBM an $80.8 million cost-plus-award-fee contract to develop and deliver the software upgrade by September 30, 1992. In March 1990, IBM initiated revision of the System 1 development specification because of significant software growth beyond the Air Force approved development baseline. In May 1990, IBM initiated further specification revisions because a new software operation system was substituted to facilitate competition in the computer hardware acquisition.

In May 1991, the Air Force approved the revisions, which extended the delivery schedule for the software upgrade to April 30, 1993. To meet the revised schedule, IBM proposed to test 65 percent of system specifications during functional level testing while the remaining 35 percent would be tested during system level testing.

Functional level testing determines whether specific computer software configuration items (CSCI) meet technical criteria in the System 1 developmental specification. System level testing determines whether specific CSCI, as integrated with all other CSCI, meet the technical and mission criteria in the System 1 system specification.

In proposing less than 100-percent system level developmental testing, IBM has increased the risk that software performance problems will not be identified and corrected before conducting operational testing. Program office representatives plan to witness portions of IBM's functional level testing and all of the system level testing. The program office needs to continue working with IBM to ensure that sufficient developmental tests are performed before conducting operational tests.

APPENDIX C: MANAGEMENT COMMENTS FROM AIR FORCE PROGRAM OFFICE

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE SYSTEMS DIVISION (AFSC)
LOS ANGELES AIR FORCE BASE PO BOX 92960
LOS ANGELES CA 90009-2960

REPLY TO ATTN OF: MJP

24 September 1991

SUBJECT DSP Oribtal Incentives

TO ATTN: Mr Tom Bartoszek (DOD-IG)

1. The DSP Acquisition Strategy for three DSP-I Satellites (23-25) as prepared in CY1990 had orbital incentives proposed at * million per satellite (* M for TRW, * M for AESD). The FY92 Presidents Budget proposed two DSP-I Satellites (23 and 24), for which the total of orbital incentives would be * million. The current guidance for DSP is to procure three DSP-I Satellites (23-25). The program office proposes no positive orbital incentives for the next buy in FY 93-96.

2. Our concerns regarding the * million figure are as follows: Although the * million identified in the FY92 PB will not be applied to incentives, this is not * million which is available for other programs. The FY93 ABES restructured the FY92 PB for DSP and allocated any identified excess for FEWS. As DOD proceeds through the ABES and FY94-99 POM, the * million has already been absorbed between DSP and FEWS, and there are still shortfalls in both programs. Our other concern is that we are six weeks from releasing $1.5 billion of RFPs for Block 23. We are sensitive to discussing anything which might compromise our negotiating strategy or budget. We hope that you will be able to write your draft report without releasing budget specifics. Address questions to Ms Jane Dziedzic, AV 833-5850, or Maj Doug Stewart, AV 833-5855.

Douglas E Stewart

DOUGLAS E. STEWART, Major, USAF
Director, Program Control

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* DoD Budgeting Data Deleted

APPENDIX D: SUMMARY OF POTENTIAL BENEFITS RESULTING FROM AUDIT

Recommendation Reference	Description of Benefit	Amount and/or Type of Benefit
A.1.	Internal Control and Economy and Efficiency. Reduced procurement costs will result from a requirement for program offices to assess technical and cost benefits before authorizing and providing contractors orbital incentives on satellite contracts.	Undeterminable.
A.2.	Economy and Efficiency. Reduced procurement cost will result from the program office assessing the technical and cost benefits of providing contractors orbital incentives on the block 23 satellite contract.	Funds put to better use. The Air Force could avoid up to * million in procurement costs over the Future Years Defense Program.
B.1.a.	Compliance with Regulations. Ensure property records are complete.	Nonmonetary.
B.1.b.	Compliance with Regulations. Ensure missing components are located or reported as lost.	Nonmonetary.

* DoD Budgeting Data Deleted

APPENDIX D: SUMMARY OF POTENTIAL BENEFITS RESULTING FROM AUDIT (cont'd)

Recommendation Reference	Description of Benefit	Amount and/or Type of Benefit
B.2.	Compliance with Regulations. Ensure responsibility for lost property is determined.	Undeterminable. Amount not quantifiable until liability, if any, is established.

APPENDIX E: ACTIVITIES VISITED OR CONTACTED

Office of the Secretary of Defense

Office of the Under Secretary of Defense for Acquisition, Washington, DC
Office of the Assistant Secretary of Defense (Command, Control, Communications and Intelligence), Washington, DC

Department of the Air Force

Headquarters, Air Force Space Command, Peterson Air Force Base, Colorado Springs, CO
Headquarters, Space Systems Division, Air Force Systems Command, Los Angeles Air Force Base, CA
Sacramento Air Logistics Center, McClellan Air Force Base, Sacramento, CA

Other Defense Activities

Defense Plant Representative Office, McDonnell Douglas Corporation, St. Louis, MO
Defense Plant Representative Office, TRW, Redondo Beach, CA
Defense Contract Management Area Office, Denver, CO
Defense Contract Audit Agency Branch Office, Denver, CO
Defense Contract Audit Agency Branch Office, Rochester, NY
Defense Contract Audit Agency Resident Office, Redondo Beach, CA
Defense Contract Audit Agency Resident Office, St. Louis, MO

Contractors

International Business Machine, Colorado Springs, CO
Kodak, Rochester, NY
McDonnell Douglas Corporation, St. Louis, MO
Motorola, Phoenix, AZ
TRW, Redondo Beach, CA

APPENDIX F: REPORT DISTRIBUTION

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition
Assistant Secretary of Defense (Command, Control, Communications and Intelligence)
Assistant Secretary of Defense (Public Affairs)
Comptroller of the Department of Defense

Department of the Air Force

Secretary of the Air Force
Assistant Secretary of the Air Force (Acquisition)
Assistant Secretary of the Air Force (Financial Management and Comptroller)
Headquarters, Air Force Space Command
Sacramento Air Logistics Center
Defense Support Program Satellite Program Office
Auditor General, Air Force Audit Agency

Defense Logistics Agency

Director, Defense Logistics Agency
Director, Defense Logistics Studies Information Exchange
Defense Plant Representative Office, TRW

Non-DoD Activities

Office of Management and Budget

U.S. General Accounting Office, NSIAD Technical Information Center

Congressional Committees:

Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
Senate Ranking Minority Member, Committee on Appropriations
House Committee on Appropriations
House Subcommittee on Defense, Committee on Appropriations
House Ranking Minority Member, Committee on Appropriations
House Committee on Armed Services
House Committee on Government Operations
House Subcommittee on Legislation and National Security, Committee on Government Operations

PART IV - MANAGEMENT COMMENTS

Program Director, Defense Support Program
Deputy Comptroller, Defense Logistics Agency

Comments from Program Director, Defense Support Program

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE SYSTEMS DIVISION (AFSC)
LOS ANGELES AIR FORCE BASE PO BOX 92960
LOS ANGELES CA 90009-2960

10 DEC 1991

REPLY TO ATTN OF: MJ

SUBJECT: Comments to Draft Report on the Audit of the Acquisition of the Defense Support Program Satellites, dated November 8, 1991

TO: DOD-IG (Mr Tom Bartoszek)

1. MJ concurs, in general, with the findings as outlined in Part IIA, entitled Orbital Incentives and Part IIB, entitled Government Owned Property.

a. The recommended change to SSD FAR Supplement to include documentation supporting positive orbital incentives, as outlined in Part IIA, Recommendations for Corrective Action, paragraph 1, will be transmitted for action to PKOC, the primary office responsible for local policy implementation.

b. It has been determined, for reasons summarized in the findings, that positive incentives are not warranted for Block 23. Based upon the decision of the DSP Program Manager, as conveyed to the audit team during the exit conference, the Orbital Performance Plans for both TRW and Aerojet Electronic Systems Division (AESD), have been revised, as recommended in Part IIA, negative incentives The Acquisition Plan includes the strategy for only negative incentives and was reviewed and approved by AFPEO/SP and Secretary Welch.

c. The corrective action recommended in Part IIB, paragraph 1a, that final payment be withheld on contract F04701-82-C-0035 from TRW pending receipt of complete property records of Government-owned long lead material by the Defense Plant Representative Office; and paragraph 1b, that a letter be issued to TRW requiring that it locate and account for the optical relay tube assembly component on contract F04701-81-C-0014 or report the loss to the contracting officer as required will be transmitted to DPRO for appropriate corrective action.

2. If you have any questions or require additional information, please contact Ms Jane Dziedzic at (310) 363-5860.

JOHN R. KIDD, Colonel, USAF
Program Director
Defense Support Program

Comments from Deputy Comptroller, Defense Logistics Agency

DEFENSE LOGISTICS AGENCY
HEADQUARTERS
CAMERON STATION
ALEXANDRIA, VIRGINIA 22304-6100

IN REPLY REFER TO DLA-CI

07 JAN 1992

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING, DEPARTMENT OF DEFENSE

SUBJECT: Draft Audit Report on the Acquisition of the Defense Support Program Satellites (Project No. 1AS-0027)

This is in response to your 8 Nov 91 memorandum requesting our comments pertaining to the audit of Acquisition of the Defense Support Program Satellites (Project No. 1AS-0027). The attached positions have been approved by Ms. Helen T. McCoy, Deputy Comptroller, Defense Logistics Agency.

Jacqueline G. Bryant

JACQUELINE G BRYANT
Chief, Internal Review Division
Office of the Comptroller

3 Encl

TYPE OF REPORT: AUDIT DATE OF POSITION: 6 Jan 92

PURPOSE OF POSITION: INITIAL POSITION

AUDIT TITLE & NO.: Acquisition of the Defense Support Program Satellites (Project No. 1AS-0027)

FINDING B: TRW did not ensure that its subcontractor, McDonnell Douglas Corporation, maintained adequate property records for Government-owned property. This condition occurred because TRW believed that the Defense Plant Representative Office (DPRO) at McDonnell Douglas was responsible for overseeing the subcontractor's property records for Government-owned material procured on the DSPS block 14 (satellite numbers 14 through 17) contract. Also, McDonnell Douglas Corporation did not comply with established property accounting procedures. As a result, Government-owned material costing about $1.2 million and an engineering model unit costing about $5.6 million were not recorded in subcontractor property records. In addition, McDonnell Douglas Corporation was unable to locate a component of the engineering model unit costing about $167,000.

DLA COMMENTS: Partially concur. Paragraph B-201 of Appendix B to the Defense Acquisition Regulation, which was in effect at the time the contracts in question were written, and which was incorporated by reference into those contracts, stated that the contractor shall be responsible for all Government property in its possession or control, including property provided under such contract which may be in the possession or control of a subcontractor. Therefore, we agree that TRW did not ensure that property that was provided under a subcontract to McDonnell Douglas was being adequately controlled, which is a responsibility of TRW as the prime contractor. However, we do not agree with the statement that adequate property records at the subcontractor location were not maintained because TRW erroneously believed that the former Naval Plant Representative Office at McDonnell Douglas was responsible for overseeing the subcontractor's property records. Defense Contract Management District West states that supporting property administration was in fact delegated to the former Naval Plant Representative Office at McDonnell Douglas. Regardless of this fact, however, delegating supporting property administration to another contract administration office in no way absolves the prime contractor of responsibility for property that it may have provided to a subcontractor, including the maintenance of adequate property records.

MANAGEMENT CONTROL WEAKNESSES

( ) Nonconcur (Rationale must be documented and maintained with your copy of the response).

(X) Concur: however, weakness is not considered material.

( ) Concur; weakness is material and will be reported in the DLA Annual Statement of Assurance.

ACTION OFFICER: Loretta Bowman, DLA-AMP, 47607
PSE REVIEW/APPROVAL: CAPT James R. McNabnay, USN, DLA-AD, X47704, 20 Dec 91

DLA APPROVAL: Helen T. McCoy, Deputy Comptroller

TYPE OF REPORT: AUDIT DATE OF POSITION: 6 Jan 92

PURPOSE OF POSITION: INITIAL POSITION

AUDIT TITLE & NO.: Acquisition of the Defense Support Program Satellites (Project No. 1AS-0027)

RECOMMENDATION 1.a: We recommend that the Director, Defense Logistics Agency, withhold final payment on contract F04701-82-C-0035 until TRW provides the Defense Plant Representative Office complete property records of Government-owned long lead material purchased under contract line item number 1.

DLA COMMENTS: Partially concur. The fact that TRW did not ensure that adequate property records of Government property provided under a subcontract to McDonnell Douglas were maintained is an indicator of a possible deficiency in TRW's Government property control system. However, we are not convinced that withholding final payment on a contract is the appropriate remedy. We have written to Defense Contract Management Command West to notify them of our partial concurrence with this recommendation, and to direct them to ensure that the Defense Contract Management Command Plant Representative Office at TRW takes action to review TRW's subcontract management program for Government property to ensure proper management of Government property provided to subcontractors. As a result of this review, the DPRO should be able to determine whether this is a systemic or isolated situation and can ensure appropriate corrective action is taken. Depending on their findings, these actions might include the providing of copies of complete property records, an inventory of all property in possession of subcontractors, withholding of contract payment, or some other appropriate remedy.

DISPOSITION:
(x) Action is Ongoing. Estimated Completion Date: 18 June 1992
( ) Action is considered complete.

INTERNAL MANAGEMENT CONTROL WEAKNESSES
( ) Nonconcur.

(X) Concur; however, weakness is not considered material.

( ) Concur; weakness is material and will be reported in the DLA Annual Statement of Assurance.

ACTION OFFICER: Loretta Bowman, DLA-AMP, 47607
PSE REVIEW/APPROVAL CAPT James R. McNabnay, USN, DLA-AD, X47704, 20 Dec 91

DLA APPROVAL: Helen T. McCoy, Deputy Comptroller

TYPE OF REPORT: AUDIT DATE OF POSITION: 6 Jan 92

PURPOSE OF POSITION: INITIAL POSITION

AUDIT TITLE & NO.: Acquisition of the Defense Support Program Satellites (Project No. 1AS-0027)

RECOMMENDATION 1.b: We recommend that the Director, Defense Logistics Agency, issue a letter to TRW requiring that it locate or account for the optical relay tube assembly (ORTA) component on contract F04701-81-C-0014 or report the loss to the contracting officer in accordance with requirements in Defense Acquisition Regulation, clause 7-203.21, "Government Property."

DLA COMMENTS: Partially concur. This was an appropriate recommendation at the time of the audit. Subsequent to that time McDonnell Douglas Electronic Systems Company informed TRW that it had located the ORTA and moved it to Government property control. By the enclosed letter dated 9 December 1991 TRW informed Defense Plant Representative Office (DPRO) TRW that McDonnell Douglas had located the ORTA.

DISPOSITION:
( ) Action is Ongoing. Estimated Completion Date:
(x) Action is considered complete.

INTERNAL MANAGEMENT CONTROL WEAKNESSES
( ) Nonconcur.

(x) Concur; however, weakness is not considered material.

( ) Concur; weakness is material and will be reported in the DLA Annual Statement of Assurance.

ACTION OFFICER: Loretta Bowman, DLA-AMP, 47607
PSE REVIEW/APPROVAL: CAPT James R. McNabnay, USN, DLA-AD, X47704, 20 Dec 91

DLA APPROVAL: Helen T. McCoy, Deputy Comptroller

w/ATTACHMENT

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