Audit Report

OFFICE OF THE INSPECTOR GENERAL

PROCUREMENT OF THE TARGET HOLDING MECHANISM, TANK GUNNERY, FROM ECC INTERNATIONAL CORPORATION

Report No. 95-256

June 27, 1995

Department of Defense

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Acronyms

FAR	Federal Acquisition Regulation
TACOM	Tank-automotive and Armaments Command
THM/TG	Target Holding Mechanism, Tank Gunnery

June 27, 1995

MEMORANDUM FOR AUDITOR GENERAL, DEPARTMENT OF THE ARMY

SUBJECT: Audit Report on Procurement of the Target Holding Mechanism, Tank Gunnery, From ECC International Corporation (Report No. 95-256)

We are providing this audit report for your information and use. This report is the final in a series of reports responding to congressional concerns regarding procurement of the target holding mechanism, tank gunnery.

A draft of the report was provided to management. Because the report contains no recommendations, comments were not required, and none were received.

We appreciate the courtesies extended to the audit staff. If you have any questions on this audit, please contact Ms. Kimberley A. Caprio, Audit Program Director, at (703) 604 9248 (DSN 664-9248) or Ms. Victoria C. Hara, Audit Project Manager, at (703) 604-9228 (DSN 664-9228). See Appendix J for the report distribution. The audit team members are listed inside the back cover.

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Office of the Inspector General, DoD

Report No. 95-256 **June 27, 1995**
(Project No. 3CD-5026.04)

Procurement of the Target Holding Mechanism, Tank Gunnery, From ECC International Corporation

Executive Summary

Introduction. This report is the final in a series of reports responding to congressional concerns on the procurement for the target holding mechanism, tank gunnery. Responsibility for the three procurements discussed in this report and personnel associated with the procurements are now assigned to the Army Tank-automotive and Armaments Command (the Command).

Audit Objectives. The overall audit objectives were to determine:

o the adequacy of the contract award process for the target holding mechanism, tank gunnery;

o the Army responsiveness to requests for equitable price adjustment from target holding mechanism, tank gunnery, contractors;

o the impact on training and readiness of target holding mechanism, tank gunnery, shortages; and

o the adherence to DoD regulations by acquisition officials.

An additional audit objective was to evaluate the management controls over the procurement of the target holding mechanism, tank gunnery. The review of the procurement for the target holding mechanism, tank gunnery, was limited to contracts awarded to ECC International Corporation. This report discusses the adequacy of the contract award process, the Army responsiveness to requests for equitable price adjustments, the Army adherence to DoD regulations, and management controls as they applied to those specific objectives.

Audit Results. The Command inappropriately awarded three firm-fixed-price contracts to ECC International Corporation. The Command provided ECC International Corporation with flawed technical data packages. In addition, the Command was not responsive to ECC International Corporation requests for equitable price adjustments. As a result, production and deliveries were delayed, and ECC International Corporation submitted claims to the Armed Services Board of Contract Appeals, which found that the technical data packages provided by the Command were defective and, on one contract for which ECC could provide specific documentation for added costs, awarded monetary damages. See the finding in Part I for details. No material management control weaknesses were identified. See Appendix A for details.

Summary of Recommendations. Recommendations made in Report No. 95-146, "Procurement of the Target Holding Mechanism, Tank Gunnery, From Action Support Service Corporation," March 13, 1995, address the issues in this report. Therefore, we are not including recommendations in this report.

Management Comments. The Army did not comment on a draft of this report. Because this report contains no recommendations, written comments were not required.

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Part I - Audit Results

Audit Background

This report is the fifth, and last, in a series of reports responding to congressional concerns on procurements of the target holding mechanism, tank gunnery (THM/TG). This report discusses the three procurements from ECC International Corporation (ECC), Orlando, Florida. The organization involved with the THM/TG at Army Armament, Munitions, and Chemical Command, Rock Island, Illinois, became the Armament and Chemical Acquisition and Logistics Activity assigned to Tank-automotive and Armaments Command (TACOM), formerly the Tank-Automotive Command, Warren, Michigan. TACOM awarded three contracts to ECC for THM/TGs: contract DAAA09-85-C-1296 (contract 1296), contract DAAA09-86-C-1020 (contract 1020), and contract DAAA09-87-C-1374 (contract 1374).

This report discusses the contract award process, configuration management of the THM/TG technical data package, and TACOM responsiveness to the ECC requests for equitable price adjustments.

Purpose of THM/TGs. The THM/TG is an electro-mechanical-hydraulic device that raises and lowers an attached target. The THM/TG is available in two versions: portable, radio controlled, with a receiver; and not portable, not radio controlled, without a receiver. The THM/TG is used to train active duty, Reserve, and National Guard tank gunners.

Congressional Interest in THM/TG Procurements. We received letters from two senators and two congressmen expressing concerns about THM/TG procurements. The concerns included:

o unusual numbers of errors in the technical data packages,

o excessive delays or failures in correcting errors in the technical data packages,

o unusual delays in processing requests for equitable price adjustments from contractors, and

o potential shortages in the supply of THM/TGs that may affect readiness.

The congressional concerns identified a pattern of potential problems in the contract award and administration process, configuration management, and readiness of the THM/TG.

Audit Objectives

The overall audit objectives were to determine:

- o the adequacy of the contract award process for the THM/TG,
- o the Army responsiveness to requests for equitable price adjustments from THM/TG contractors,
- o the impact on training and readiness of THM/TG shortages, and
- o the adherence to DoD regulations by acquisition officials.

This report discusses the contract award process, the adequacy of the technical data packages, the Army responsiveness to requests for equitable price adjustment, and the Army adherence to DoD regulations as they apply to ECC.

An additional audit objective was to evaluate management controls over the procurement of THM/TGs and implementation by management of the management control program as it applies to the other objectives. The review of the procurement for the THM/TG was limited to three contracts awarded to ECC. See Appendix A for a discussion of the scope, methodology, and the results of the review of the management control program. See Appendix B for a summary of prior coverage related to the audit objectives.

Procurement of Target Holding Mechanisms, Tank Gunnery

TACOM inappropriately awarded three firm-fixed-price contracts to build THM/TGs to ECC. TACOM also provided ECC with flawed technical data packages. In addition, TACOM was not responsive to ECC requests for equitable price adjustment. Those conditions occurred because TACOM:

- o certified three flawed technical data packages,
- o did not control subsequent configuration revisions, and
- o did not provide ECC with decisions on requests for equitable price adjustment by the self-imposed decision dates.

As a result of the technical data packages being flawed when certified, TACOM formally and informally revised the technical data packages for the three contracts, resulting in production delays. The flawed technical data packages and lack of control over the subsequent revisions led to delays in delivery. A lack of responsiveness by TACOM to ECC requests for equitable price adjustment resulted in ECC submitting claims to the Armed Services Board of Contract Appeals. The Armed Services Board of Contract Appeals found that the technical data packages provided to ECC by TACOM were defective and, on one contract for which ECC could provide specific documentation for added costs, awarded monetary damages to ECC.

Contract Award Considerations

TACOM knew, or should have known, that a reasonably detailed specification for the THM/TG, a portion of the technical data package, did not exist. Therefore, its award of three firm-fixed price contracts was inappropriate.

Application of a Firm-Fixed-Price Contract. Federal Acquisition Regulation (FAR) 16.202-2, "Application," states that a firm-fixed-price contract is suitable for acquiring supplies or services on the basis of reasonably detailed specifications. Specifications are part of a technical data package.

Type of Contracts Awarded for THM/TGs. ECC was a capable manufacturer with prior experience on military contracts. TACOM awarded three firm-fixed-price contracts under full and open competition to ECC. TACOM awarded contract 1296 to ECC on September 19, 1985, for

102 THM/TGs with receivers and 381 THM/TGs without receivers. TACOM awarded contract 1374 on September 18, 1987, for 263 THM/TGs with receivers, 83 THM/TGs without receivers, and spare parts.

The serious deficiencies found with the technical data packages, coupled with numerous formal and informal revisions, show that the technical data packages were unsuitable for firm-fixed-price procurements. TACOM should have awarded a cost-type contract or fixed the technical data packages before contract award.

Reliability of the Certified Technical Data Packages and Effect of Revisions

TACOM did not provide ECC with a reliable technical data package at contract award on any of the ECC contracts and did not control revisions subsequent to the awards. See Appendix F for details on contract 1296, Appendix G for details on contract 1020, and Appendix H for details on contract 1374.

Purpose of Technical Data Packages. A technical data package defines and documents an engineering design of a product to allow for duplication of the product. An inaccurate or incomplete technical data package results in additional Government contract administration costs and Government engineering costs to process revisions needed to correct the technical data package. An inaccurate or incomplete technical data package can also result in contract terminations and in additional costs to reprocure the product. For the contractor, an inaccurate or incomplete technical data package can result in an improperly prepared proposal, an increased contractor learning curve, an inferior product, delayed deliveries, and the need to request equitable price adjustments to cover increased production costs.

Management of Technical Data Packages. MIL-STD-973, "Configuration Management," applies to DoD organizations and contractors who are tasked with configuration management. A Configuration Control Board is a board composed of technical and administrative representatives who recommend approval or disapproval of proposed revisions to an approved technical data package. Configuration management should ensure an adequate and reliable technical data package by controlling revisions to products and their related documentation and recording and reporting information needed to manage the product effectively, including the status of proposed revisions and implementation status of approved revisions.

Army "Technical Data Package Review Guidelines" require that prior to procurement, all known design deficiencies be eliminated from the technical

data package and that the technical data package be reviewed and certified as adequate for procurement purposes. The technical review is to ensure, among other things, that the design problems and needed corrections are identified.

Inspector General, DoD, Assessment of Technical Data Packages. An Inspector General, DoD, engineer and auditors evaluated and identified revisions made to the three THM/TG technical data packages provided by TACOM to ECC. The revisions were evaluated to determine the potential impact the revisions could have on the ability of ECC to meet the contract schedules. Basic information for each technical data package follows. For details of the Inspector General, DoD, assessment of the technical data packages, see Appendixes F, G, and H.

The lack of a reliable technical data package contributed to an average delay of 551 days in delivery on contract 1296, an average delay of 872 days in delivery on contract 1020, and an average delay of 1130 days in delivery on contract 1374.

Contract 1296. TACOM did not ensure that design problems and needed corrections identified for the technical data package issued for contract 1296 were resolved in a timely manner. As a result, the flawed technical data package contributed to an average delay of 551 days in delivery on contract 1296 and production was more difficult than necessary.

In October 1985, ECC began to manufacture parts for the first article THM/TGs under contract 1296. The first article testing was required to be completed by February 28, 1986, 162 days after contract award. The technical data package, however, contained illegible drawings, tolerances inconsistent with mating requirements, and sources that could not supply the specified part.

Between September 19, 1985, the date of contract award, and October 1986, 31 technical data package problems were identified and referred to TACOM. On October 8, 1986, TACOM:

- o provided the first article test plan,
- o acknowledged deficiencies with the technical data package,
- o agreed to revise the contract price later definitized by $115,000,
- o included a requirement for testing production hardware,
- o extended delivery of the first-article requirements to October 30, 1986, and
- o extended the delivery schedule to December 30, 1986, through March 30, 1987.

On June 20, 1986, ECC requested an equitable price adjustment for first article testing in the amount of $366,864. ECC based the request for equitable price adjustment on technical data package inadequacies and loss of learning. The loss of learning portion of the request for equitable price adjustment was based on ECC not being able to improve its knowledge, skills, and techniques employed in the production of the THM/TG because production of the THM/TG did not continue without material change. Thus, ECC was not able to reduce the time and material required to produce the THM/TG and therefore was not able to reduce THM/TG production costs.

ECC obtained first article approval on March 25, 1987, 552 days after contract award. The initial ECC shipment of THM/TGs was April 6, 1987. ECC made the final shipment of THM/TGs under contract 1296 on August 25, 1988. Final shipment occurred 757 days after the original scheduled final shipment date of July 30, 1986. Between November 1986 and August 1991, ECC identified seven additional technical data package problems and referred them to TACOM. Problems with the technical data package and problems encountered during first article testing prevented ECC from meeting the February 28, 1986, contract requirement.

Contract 1020. TACOM did not ensure that design problems and needed corrections identified for the technical data package issued for contract 1020 were resolved in a timely manner. As a result, the flawed technical data package contributed to an average delay of 872 days in delivery on contract 1020, and production was more difficult than necessary.

Contract 1020 initially required delivery of the first article test report by December 30, 1986, 210 days after contract award. The contract required delivery of all production units by June 30, 1987, 392 days after contract award. Performance was substantially delayed by errors and omissions in the technical data package for the hit sensor, electronic control unit, battery box, light indicator, and receiver.

On November 13, 1986, TACOM issued a stop work order for the hit sensor because a revision was being drafted to improve the testing standards and the hit sensitivity of the hit sensors. On February 27, 1987, TACOM provided ECC the revisions needed to correct problems with the technical data package for the hit sensor, 106 days after the stop work order and 269 days after contract award.

ECC performance was also delayed by the failure of the technical data package to specify first article test procedures. Due to Government delay, the process of adding those procedures and running the first article test extended out to March 30, 1989, 1,031 days since contract award. The first 41 THM/TGs without receiver were delivered on April 15, 1989, 686 days after the original scheduled delivery date. ECC obtained approval of the first article test procedure on May 8, 1990, 1,851 days after contract award.

The remaining THM/TGs without receivers were delivered between August 30, 1989, and October 30, 1989. The Government accepted final shipment of THM/TGs under contract 1020 on July 25, 1990, more than 1,121 days after the original scheduled final shipment date of June 30, 1987. The receivers were delivered between January 1992 and September 1992, 1,911 days after the original final shipment date.

Contract 1374. TACOM did not ensure that design problems and needed corrections identified for the technical data package issued for contract 1374 were resolved in a timely manner. As a result, the flawed technical data package contributed to an average delay of 1,130 days in delivery on contract 1374 and production was more difficult than necessary.

Contract 1374 initially required the first article test report by May 30, 1988, 255 days after contract award. The contract also initially required delivery of all production units by March 31, 1989, 560 days after contract award. Performance was substantially delayed by errors and omissions in the technical data package for the hit sensor, electronic control unit, battery box, light indicator, and receiver. ECC performance was also delayed by the failure of the technical data package to specify first article test procedures. Due to Government delay, the process of adding those procedures and running the first article test extended out to March 30, 1989, 304 days after the first article test report was originally scheduled.

ECC experienced problems aligning the high frequency circuit cards because information included in the technical data package for that procedure was not complete. The 83 THM/TGs without the receiver were delivered in December 1989. Problems with the technical data package and the test procedures for the THM/TG receiver continued in 1990 and 1991. The initial ECC delivery of THM/TGs was April 2, 1990. The first article test report for the THM/TG receiver was not approved until June 28, 1991, 1,379 days after contract award. The THM/TGs with receiver were delivered between January 1992 and September 1992, 1,809 days after contract award. The Government accepted final shipment of THM/TGs on October 30, 1992, more than 1,309 days after the original scheduled final shipment date of March 31, 1989.

TACOM Configuration Control of Revisions to the THM/TG Technical Data Package

TACOM did not properly control configuration of the THM/TG. Procurement and configuration management lacked control over what revisions ended up in the technical data packages provided to ECC. TACOM procurement officials and TACOM configuration management officials could not demonstrate that they knew what revisions were provided to ECC or what formal or informal

revisions were accepted by ECC on contracts 1296, 1020, or 1374. TACOM procurement and configuration management did not maintain adequate tracking procedures for revisions to the technical data packages.

Configuration Control of the Technical Data Packages. Once either the contractor or the Government has identified a need for a revision to a technical data package, a revision to the technical data package is written and submitted to the Configuration Control Board. The Configuration Control reviews and evaluates the need for the revision. If the revision is determined not to be needed, the Configuration Control Board disapproves the revision and no change is authorized to the technical data package.

If the revision is determined to be needed, the Configuration Control Board approves the revision for incorporation to the technical data package by solicitation or contract. The Configuration Control Board also decides whether a revision is to be a mandatory revision or nonmandatory revision to the technical data package. A mandatory revision is a revision that the contractor is required to incorporate. A nonmandatory revision is a revision that the contractor may incorporate if the contractor believes the revision is beneficial.

If the Configuration Control Board has disapproved a revision, no other action is taken. If the Configuration Control Board has approved a revision, then the revision is provided to procurement for submission to the contractor. Procurement submits the approved revision, either mandatory or nonmandatory, to the contractor and requests a cost proposal from the contractor for all mandatory revisions. The contractor cost proposal for mandatory revisions is evaluated by procurement and a cost is negotiated with the contractor. The mandatory revision and the cost of the mandatory revision are then incorporated into the contract by a formal contract modification. This is a formal mandatory revision.

Procurement also submits nonmandatory revisions to the contractor. Procurement does not request a cost proposal for nonmandatory revisions. Ideally, the contractor notifies procurement whether or not the contractor intends to incorporate a nonmandatory revision. If the contractor does notify Ideally, the contractor notifies procurement whether or not the contractor intends to incorporate a nonmandatory revision. If the contractor does notify procurement that the nonmandatory revision is going to be incorporated, then procurement should issue a contract modification incorporating the nonmandatory revision into the contract with no increase in cost. This is a formal nonmandatory revision.

Informal revisions to the technical data package occur when the established configuration control process is not followed. Informal revisions are revisions discussed between the contractor and Government engineers or procurement officials or both. The contractor is authorized by the Government to revise the production process, but the revision is not formally incorporated into the technical data package or the contract.

We identified revisions approved by the Configuration Control Board for the ECC contracts but not sent to ECC. We also identified revisions sent to ECC that were not approved for ECC contracts by the Configuration Control Board. We reviewed supporting documentation at TACOM; Army Armament Research, Development, and Engineering Center; and ECC.

Contract 1296. Based on supporting documentation for contract 1296, we determined the following concerning configuration control.

o The Configuration Control Board approved five formal revisions to the ECC technical data package after contract award. All five revisions were mandatory.

o ECC did not receive the five formal revisions that were approved by the Configuration Control Board.

o The Government cost to process the five formal revisions approved for incorporation into the ECC technical data package was $2,700.

o TACOM granted two formal waivers and two formal deviations to the technical data package. In addition, numerous informal revisions provided in letter format were approved by TACOM. The letter format revisions were not processed as revisions, waivers, or deviations, and the technical data package was not changed. Consequently, other contractors did not benefit from those revisions, and the costs for the revisions were not tracked by TACOM.

Contract 1020. Based on supporting documentation for contract 1020, we determined the following concerning configuration control.

o The Configuration Control Board approved 39 formal revisions to the ECC technical data package after contract award. The 39 formal approved revisions consisted of 12 mandatory revisions and 27 nonmandatory revisions.

o The contractor received 18 formal approved revisions. ECC also received 11 revisions that were not approved by the Configuration Control Board for contract 1020.

o The contractor did not receive 21 formal revisions that were approved by the Configuration Control Board.

o The Government cost to process the 39 formal revisions approved for incorporation into the ECC technical data package was $27,750 (8 percent) of the original contract price of $354,960. The Government cost to process the 29 formal revisions that ECC received was $18,870.

o TACOM granted 13 formal waivers and 1 formal deviation to the technical data package. A waiver is a written authorization to accept an item that departs from the technical data package, but is considered suitable for use. A deviation is a written authorization to depart from the technical data package for a specific number of units or specified time. No change is made to the technical data package for approved waivers and deviations. In addition, numerous informal revisions were approved by TACOM. The informal revisions were not processed as revisions, waivers, or deviations, and the technical data package was not changed. Consequently, other contractors did not benefit from those revisions, and the costs for the revisions were not tracked by TACOM.

Contract 1374. Based on supporting documentation for contract 1374, we determined the following:

o The Configuration Control Board approved 32 formal revisions to the ECC technical data package after contract award. The 32 formal approved revisions consisted of 5 formal mandatory revision and 27 formal nonmandatory revisions.

o Of the 32 formal approved revisions, all were approved after contract award.

o The contractor received 17 formal approved revisions. ECC also received three formal revisions approved by the Configuration Control Board, but not approved for contract 1374.

o ECC did not receive 15 formal revisions that were approved by the Configuration Control Board.

o The Government cost to process the 32 formal revisions approved for incorporation into the ECC technical data package was $21,900.

o TACOM granted 11 waivers to the technical data package. In addition, numerous informal revisions were approved by TACOM. The informal revisions were not processed as revisions, waivers, or deviations, and the technical data package was not changed. Consequently, other contractors did not benefit from those revisions, and the costs for the revisions were not tracked by TACOM.

Adequacy of Contract Management. TACOM procurement was unable to provide a complete and accurate list of revisions to the technical data packages applicable to the ECC contracts. On August 16, 1993, we met with TACOM procurement and requested a listing of THM/TG revisions sent to ECC for each contract. TACOM procurement could not provide a list. We reviewed the contract files and developed the lists independently using source documentation

including the amendments to the solicitations, modifications to the contract, and the actual letters sent to ECC requesting review and potential incorporation of revisions to the technical data package.

Maintaining Adequate Control Logs. The contracting officer did not maintain adequate control logs from 1985 through 1994 that documented revisions to the technical data packages applicable to the contracts. The control logs did not identify the following by change to the technical data packages:

- o the purpose of the revision,
- o whether the revision was mandatory or nonmandatory,
- o whether and when the revision was submitted to the contractor,
- o whether and when the revision was accepted or rejected by the contractor,
- o whether the revision was incorporated into the contract, and
- o the estimated cost, if any, to incorporate the revision into the contract.

TACOM should establish and implement control logs that document revisions to the technical data package applicable to an individual contract. At a minimum, the control logs should identify the revisions to the technical data package; whether the revision is mandatory or nonmandatory; whether and when a revision was submitted to the contractor; whether and when the revision was accepted or rejected by the contractor; whether the revision has been incorporated into the contract; and the estimated cost to incorporate the revision into the contract.

Identifying Engineering Change Proposals. TACOM could not identify the revisions applicable to the ECC procurements. On August 18, 1993, we requested from TACOM configuration management personnel a listing of THM/TG engineering revisions from 1985 through August 13, 1993, applicable to ECC procurements. TACOM configuration management personnel would have to physically search configuration management files from 1985 through 1993 to develop the requested list. As of June 12, 1995, TACOM had not provided the list, 663 days after it was requested. Therefore, the Inspector General, DoD, list of engineering revisions has not been reconciled with TACOM.

TACOM Responsiveness to Requests for Equitable Price Adjustment

TACOM was not responsive to the requests for equitable price adjustment from ECC. TACOM did not follow established procedures in processing the ECC claims. As a result, ECC considered its request denied and submitted four claims to the Armed Services Board of Contract Appeals.

Equitable Price Adjustment. Under Federal Acquisition Regulation part 43.2, "Change Orders," the contracting officer may make changes to a contract within the general scope of that contract. If the changes cause an increase or decrease in the cost of or the time required for performance of the contract, the contracting officer will make a reasonable adjustment in the contract price, the delivery schedule, or both. The contracting officer should also modify the contract. Contracting officers are required to negotiate equitable adjustments in the shortest practicable time.

Contractor Disputes. United States Code, title 41, "Contract Disputes Act of 1978," section 601-613, as amended by the Administrative Disputes Resolution Act, establishes procedures and requirements for asserting and resolving claims subject to the Contract Disputes Act of 1978.

FAR 33.211, "Contracting Officer's Decision," requires the contracting officer to decide on the contractor's claim within 60 days. If a decision is not possible, then the contracting officer should, within the 60 days, state when a decision will be issued.

Contractor Claims. Between May 19, 1988, and August 23, 1991, ECC submitted five claims to TACOM. TACOM was not responsive in providing a timely decision. Consequently, ECC deemed the claims denied and appealed the claims to the Armed Services Board of Contract Appeals.

Contract 1296. On May 19, 1988, ECC submitted a claim on contract 1296 to TACOM for damages for $452,320, based on loss of learning and a substantial number of technical data package changes. TACOM received the certified claim on May 21, 1988. TACOM issued a final decision on March 20, 1989, denying the ECC claim for lack of proof, 303 days after TACOM received the claim. ECC appealed the decision to the Armed Services Board of Contract Appeals. The Armed Services Board of Contract Appeals determined that deficiencies in the technical data package existed, but found no credible evidence supporting ECC's loss of learning. The Armed Services Board of Contract Appeals denied the appeal for lack of proof of loss of learning.

On August 23, 1991, ECC submitted two additional claims to TACOM. The Government received the claims on or about September 10, 1991. On June 2,

1992, ECC appealed a "deemed denial" of both claims to the Armed Services Board of Contract Appeals. For 266 days after receipt of the claim, TACOM did not issue a final decision on the claims.

On January 11, 1994, the Armed Services Board of Contract Appeals found that deficiencies in the technical data package existed and that some of those deficiencies delayed completion of the work and caused increased costs for labor rate escalation, engineering, production planning, scrap, and rework. The appeal was sustained with interest from September 10, 1991. ECC was awarded $27,452 plus interest under the changes clause for cost and profit on the work caused by the technical data package problems and $5,581 plus interest under the delay of work clause for the Government delay in determining first article test requirements.

Contract 1020. On April 2, 1990, ECC submitted a claim on contract 1020 for $2.4 million. On March 16, 1992, ECC revised its April 2, 1990, claim to $1.4 million. On July 2, 1992, ECC appealed a "deemed denial" of the revised claim to the Armed Services Board of Contract Appeals, 820 days after TACOM received the claim.

On January 11, 1994, the Armed Services Board of Contract Appeals found that the technical data package provided by TACOM was defective with substantially the same types of problems as the technical data package for contract 1296. The problems with the technical data package increased the engineering and manufacturing planning work, caused a substantial delay in completing the production work, and, in some instances, caused scrap and rework.

The Armed Services Board of Contract Appeals determined that a substantial delay in completion was caused by problems with the technical data package, particularly by the problems with the receiver. The Armed Services Board of Contract Appeals did not award monetary damages, however, because ECC could not support most of the claimed costs.

Contract 1374. On April 26, 1990, ECC submitted a claim on contract 1374 for $2 million to TACOM. On June 30, 1992, ECC revised its April 26, 1990, claim to $1.6 million. On September 1, 1992, ECC appealed a "deemed denial" of the revised claim to the Armed Services Board of Contract Appeals, approximately 859 days after TACOM received the claim.

On January 11, 1994, the Armed Services Board of Contract Appeals found that the technical data package provided by TACOM was defective. The technical data package had substantially the same types of problems as the technical data packages for contract 1296 and contract 1020. The problems with the technical data package on contract 1374 increased the engineering and manufacturing planning work, caused a substantial delay in completing the production work, and in some instances caused scrap and rework.

The Armed Services Board of Contract Appeals determined that a substantial delay in completion was caused by problems with the technical data package, particularly by the problems with the receiver. The Armed Services Board of Contract Appeals did not award monetary damages, however, because ECC could not support most of the claimed costs.

Management Oversight of Contractor Claims. We could not document management oversight of responsiveness to contractor claims. We did not locate any mechanism that tracked whether and when the contractor was notified that the claim was received; whether and when the audit, technical evaluation, and legal review were requested; and whether and when a decision was made and the contractor was notified of the decision. TACOM should establish and implement procedures for management oversight of responsiveness to contractor claims. The procedures should require milestones to be set for notifying the contractor that the claim was received; for requesting audit, technical evaluations, and legal review; and for establishing a decision date.

Conclusion

TACOM improperly awarded three firm-fixed-price contracts. The technical data packages used in the procurements were seriously flawed, and thus, were not suitable for firm-fixed-price contracts. The contract type placed the maximum risk, and full responsibility for all costs and resulting profit or loss, on ECC. TACOM should have awarded a cost-type contract or fixed the technical data packages before award.

The flawed technical data packages and lack of control over subsequent revisions contributed to ECC delays. However, ECC delivered all of the production quantities required in the contracts.

Government policy is to try to resolve all contractual issues by mutual agreement at the contracting officer level. TACOM, however, did not formulate a response to the ECC claims within a reasonable time.

Recommendations for Corrective Action

We did not include recommendations in this report because the appropriate corrective measures were addressed in Report No. 95-146, "Procurement of the Target Holding Mechanism, Tank Gunnery, From Action Support Service Corporation," March 13, 1995.

Part II - Additional Information

Appendix A. Scope and Methodology

Scope

Audit Period, Standards, and Locations. We performed this economy and efficiency audit from June 1993 through June 1995 in accordance with audit standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD. Accordingly, we included a review of management controls considered necessary. We reviewed the procurement process for the THM/TG at TACOM and ECC. Appendix I lists the organizations visited or contacted during the audit.

Data Reviewed and Use of Computer-Processed Data. This report discusses three contracts that TACOM awarded to ECC. Contract DAAA09-85-C-1296 was for the procurement of 1,400 THM/TGs, valued at $2,485,200; DAAA09-86-C-1020 was for the procurement of 483 THM/TGs, valued at $1,605,972; and DAAA09-87-C-1374 was for the procurement of 346 THM/TGs and spare parts, valued at $4,692,982 after modifications. We reviewed the solicitations, preaward documents, notices of revision to the technical data packages, pertinent laws and regulations, and other related documentation for the period 1985 through 1995. We developed an accurate computer-processed data base to perform the audit. The data base was verified against source documentation and Army Armament, Research, Development, and Engineering Center documents.

Methodology

Universe Development. To review configuration management, we identified 5 revisions that impacted contract 1296, 50 revisions that impacted contract 1020, and 35 revisions that impacted contract 1374.

Contract 1296. TACOM configuration management approved five revisions that impacted contract 1296. However, TACOM did not send ECC the five revisions for its use in manufacturing THM/TGs.

Contract 1020. Of the 50 revisions that impacted contract 1020, TACOM configuration management approved 39 revisions for the contract. Of the 39 approved revisions, TACOM sent 18 revisions to ECC. In addition, TACOM sent ECC 11 revisions that were not approved by configuration management for contract 1020. However, TACOM did not send 21 of the 39 approved revisions to ECC.

We identified a universe of 29 revisions* received by ECC to evaluate after contract award. We reviewed all of the 29 revisions received by ECC.

Contract 1374. Of the 35 revisions that impacted contract 1374, TACOM configuration management approved 32 revisions for the contract. Of the 32 approved revisions, 17 revisions were sent to ECC. In addition, TACOM sent ECC three revisions that were not approved by configuration management for the ECC contract. However, TACOM did not send 15 of the 32 approved revisions to ECC.

We identified a universe of 20 revisions* received by ECC to evaluate after contract award. We reviewed all of the 20 revisions received by ECC.

Use of Technical Staff. Personnel from the Technical Assessment Division, Office of the Inspector General, DoD, provided support for the audit. An engineer from the Technical Assessment Division evaluated the accuracy and completeness of revisions to the technical data packages applicable to the three contracts.

Management Control Program

Management Control Program

DoD Directive 5010.38, "Internal Management Control Program," April 14, 1987, requires DoD organizations to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

Scope of Review of the Management Control Program. We reviewed the adequacy of management controls applicable to laws, regulations, and procedures for the acquisition of and configuration management of the THM/TG. In addition, we evaluated management controls applicable to TACOM responsiveness to requests for equitable adjustment from ECC. Specifically, we reviewed TACOM compliance with the Federal Acquisition Regulation; with the Defense Federal Acquisition Regulation Supplement; with MIL-STD-973, "Configuration Management;" and with pertinent Army regulations. Our review was limited to the guidance as it was implemented with regard to the contracts that TACOM awarded to ECC. We also assessed the adequacy of management's self-evaluation of those controls.

Adequacy of Management Controls. Management controls were adequate in that the audit identified no material management control weaknesses.

*For the purpose of this count, multiple sheets, parts lists, and quality assurance provisions for one drawing within an engineering change proposal constitute only one notice of revision.

Appendix B. Summary of Prior Audits and Other Reviews

General Accounting Office Report. General Accounting Office Report GAO/NSIAD-92-23 (OSD Case No. 8891), "Improvement Needed in Technical Data Management," February 25, 1992, states that data quality problems inhibit contractors from competing for Government work or from completing the work after a contract is awarded. The General Accounting Office report made no recommendations pertaining to issues in this report.

Inspector General, DoD, Reports. Four reports relating to this audit have been issued by the Inspector General, DoD.

Report No. 95-204. Report No. 95-204, "Procurement of the Target Holding Mechanism, Tank Gunnery, From Technical Systems, Incorporated," May 26, 1995 states that TACOM inappropriately awarded two contracts to build THM/TGs to Technical Systems, Incorporated. TACOM provided the contractor with flawed technical data packages. In addition, TACOM was not responsive to a request for equitable price adjustment. As a result, TACOM revised the technical data packages for the two contracts with 297 revisions on one contract and 26 revisions on the second contract. The flawed technical data packages and lack of control over the subsequent revisions led to delays in delivery. A lack of responsiveness by TACOM to a request for equitable price adjustment resulted in the contractor submitting a certified claim. We did not include recommendations in the report.

Report No. 95-146. Report No. 95-146, "Procurement of the Target Holding Mechanism, Tank Gunnery, From Action Support Service Corporation," March 13, 1995, states that TACOM awarded a firm-fixed-price contract to build THM/TGs to a contractor with financial difficulties, no employees, and no other contracts, who was working out of a garage. TACOM terminated the contract for default for a failure to perform. In addition, TACOM certified a flawed technical data package. As a result, 797 revisions impacted the contract. Also, TACOM was not responsive to the Action Support Service Corporation request for equitable price adjustment. As a result, the contractor submitted a claim to the Armed Services Board of Contract Appeals. We made the same recommendations to TACOM that were made in Inspector General, DoD, Report No. 95-030, "Procurement of the Target Holding Mechanism, Tank Gunnery, From Combined Arms Technical Systems," November 16, 1994. See Report No. 95-030 for a summary of those recommendations and corrective actions taken by the Army.

Report No. 95-030. Report No. 95-030, "Procurement of the Target Holding Mechanism, Tank Gunnery, From Combined Arms Technical Systems," November 16, 1994, states that TACOM awarded a firm-fixed-price contract to build THM/TGs to a contractor with financial difficulties, no prior experience, limited accounting controls, and limited technical skills. TACOM terminated the contract for default for a failure to perform. In addition,

TACOM certified a flawed technical data package. As a result, 720 revisions impacted the contract. Also, TACOM was not responsive to requests from the contractor for equitable price adjustments. As a result, the contractor submitted a claim to the Armed Services Board of Contract Appeals. We recommended that TACOM:

o establish and implement procedures to provide management oversight of contracts involving contractors experiencing financial or technical performance difficulties,

o establish and implement procedures to require that outstanding revisions to the technical data package do not exceed 5 percent of the number of drawings before the solicitation is issued,

o establish and implement contract control logs documenting revisions to the technical data package applicable to an individual contract, and

o establish and implement procedures to provide management oversight of responsiveness to contractor claims.

TACOM nonconcurred that procedures were needed to require that notices of revision to the technical data package not exceed 5 percent. The entire THM/TG data package was updated in August 1994, which should resolve the concerns of the audit. We accepted the response. During mediation, the Army agreed that contract specialists will establish and maintain records documenting:

o the processing activity of large numbers of unincorporated engineering change proposals,

o Government assistance of contractors in financial and technical difficulty, and

o the status of receipt and resolution of certified claims.

We accepted the Army response.

Report No. 94-170. Report No. 94-170, "Quick-Reaction Report on the Audit of the Target Holding Mechanism, Tank Gunnery Procurement," July 27, 1994, states that the sole-source and competitive solicitation for the THM/TG lacked reliable technical data packages. In addition, TACOM improperly issued the sole-source solicitation. As a result, both solicitations may result in production delays, delinquent deliveries, and requests for equitable price adjustments. Also, the sole-source solicitation unnecessarily restricted competition. TACOM did not evaluate the use of commercial target holding mechanisms, which might have eliminated the need for development of a prototype. As a result, a $587,382 cost-plus-fixed-fee contract was awarded, which reduces the chances for procurement of commercial target holding mechanisms. We recommended that TACOM cancel the sole-source and competitive procurements and withhold any new requests for proposals until all the issues pertaining to the technical data packages are resolved. We also recommended that TACOM determine whether requirements can be met with

commercial target holding mechanisms before allowing further prototype development or production. The Army resolved the issues on the technical data package and concurred with the report recommendations during mediation.

Appendix C. Chronology of Procurement Action Involving Contract DAAA09-85-C-1296

Date	Event
December 30, 1983	Technical data package issued.
August 2, 1985	TACOM issued a competitive solicitation to manufacture 1000 THM/TGs.
August 30, 1985	TACOM amended the solicitation to increase the quantity to 1,400 THM/TGs.
September 3, 1985	Bid closing date.
September 19, 1985	TACOM awarded the contract to ECC for $2,370,200 for THM/TGs.
February 28, 1986	First article test report due from ECC. First article testing and approval ensures that the contractor can furnish a product that conforms to all contract requirements for acceptance. Number of days since contract award: 162.
October 8, 1986	TACOM increased the contract by a ceiling price of $139,402.48. That modification incorporated design changes, revised the delivery schedule from December 30, 1986, through March 30, 1987, and revised first article delivery to October 30, 1986. Number of days since contract award: 384.
April 3, 1987	TACOM accepted the first shipment of 250 THM/TGs. Number of days since contract award: 561.
February 26, 1988	TACOM modified the contract to resolve deficiencies with the technical data package identified by the contractor. TACOM authorized production before first article testing. TACOM extended the delivery schedule and definitized the October 8, 1986 modification contract value increase for $115,000. Number of days since contract award: 890.
May 19, 1988	ECC submitted a certified claim based on a loss of learning in the amount of $452,320. Number of days since contract award: 973.

Appendix C. Chronology of Procurement Action Involving Contract DAAA09-85-C-1296

Date	Event
May 21, 1988	TACOM received the certified claim.
August 25, 1988	ECC delivered the final THM/TGs for this contract. Number of days since contract award: 1,071.
March 20, 1989	TACOM issued a final decision that denied the May 19, 1988, ECC claim for lack of proof. Number of days since contract award: 1,278.
July 19, 1989	ECC appealed to the Armed Services Board of Contract Appeals. Number of days since contract award: 1,399.
August 23, 1991	ECC submitted two additional claims.
September 10, 1991	The two claims were received by the Government on or about September 10, 1991.
June 2, 1992	ECC appealed a "deemed denial" of both claims to the Armed Services Board of Contract Appeals. TACOM did not issue a final decision for about 8 months.
January 11, 1994	The Armed Services Board of Contract Appeals found that the technical data package provided to ECC by TACOM was defective and awarded monetary damages.
October 24, 1994	ECC appealed to the United States Court of Appeals the amount of monetary damages awarded by the Armed Services Board of Contract Appeals.
November 21, 1994	The United States Court of Appeals denied the ECC appeal of the decision on the amount of monetary damages by the Armed Services Board of Contract Appeals.

Appendix D. Chronology of Procurement Action Involving Contract DAAA09-86-C-1020

Date	Event
December 30, 1983	Technical data package issued.
January 29, 1986	TACOM issued competitive solicitation to manufacture 102 THM/TGs that were portable, radio controlled, with receivers; and 381 THM/TGs that were not portable, not radio controlled, without receivers.
March 3, 1986	Bid closing date.
March 18, 1986	The solicitation was amended four times from January 29, 1986, to March 18, 1986, to clarify part numbers, extend the bid closing date, add items, and correct errors in the solicitation.
March 20, 1986	Extended bid closing date.
June 3, 1986	TACOM awarded the contract, valued at $354,960, to ECC, for 102 THM/TGs that were portable, radio controlled, with receivers.
November 13, 1986	TACOM issued a stop work order to ECC for the hit sensor. Number of days since contract award: 163.
December 30, 1986	First article test report due. Number of days since contract award: 210.
March 30, 1988	TACOM modified the contract by $74,306, to incorporate improved hit sensor sensitivity. TACOM revised the delivery schedule from July 30, 1988, to December 30, 1988. Number of days since contract award: 666.
September 7, 1988	TACOM modified the contract by $28,205, to incorporate the first article test plan for the THM/TG without the receiver. Number of days since contract award: 827.
February 21, 1989	TACOM extended the first article test report delivery to March 3, 1989, with production of 150 units 30 days thereafter, if hit sensor testing is at no cost to the Government. Number of days since contract award: 994.

Appendix D. Chronology of Procurement Action Involving Contract DAAA09-86-C-1020

Date	Event
March 30, 1989	TACOM approved the first article test report. Number of days since contract award: 1,031.
August 14, 1989	TACOM modified the contract by $5,200 for hit sensor revisions. The delivery schedule was revised to October 30, 1989, to allow time for receiver, watertight and production testing. Number of days since contract award: 1,168.
October 31, 1989	ECC delivered the last 34 of 381 THM/TGs without receivers. Number of days since contract award: 1,246.
April 2, 1990	ECC filed a certified claim for $2,368,161. ECC cited an inadequate technical data package as the reason for the claim. Number of days since contract award: 1,399.
May 8, 1990	TACOM modified the contract by $38,313 to incorporate the first article test procedure for the "with receiver" configuration and the receiver high frequency card adjustment procedure. Delivery of test report was due by June 30, 1990. Number of days since contract award: 1,435.
July 25, 1990	ECC delivered 102 THM/TGs, that were portable, radio controlled, without receivers. Number of days since contract award: 1,513.
June 28, 1991	TACOM modified the contract to approve the first article test report for the receiver. Procedures for production testing, receiver alignment, and receiver waterproofing were incorporated. Frequency crystals were also added and the delivery schedule was revised to March 30, 1992. Number of days since contract award: 1,851.
March 16, 1992	ECC revised its April 2, 1990, claim from $2,368,161 to $1,418,081. Number of days since contract award: 2,113.
July 2, 1992	ECC submitted a claim to the Armed Services Board of Contract Appeals, stating that the contracting officer failed to issue a decision. Number of days since contract award: 2,221.

Appendix D. Chronology of Procurement Action Involving Contract DAAA09-86-C-1020

Date	Event
September 25, 1992	Contract DAAA09-86-C-1020 was completed with final delivery of the receivers and the first article test of the receivers. Number of days since contract award: 2,306.
January 11, 1994	The Armed Services Board of Contract Appeals found that the technical data package provided to ECC by TACOM was defective but denied monetary damages.
October 24, 1994	ECC appealed to the United States Court of Appeals the decision of the Armed Services Board of Contract Appeals not to award monetary damages.
November 21, 1994	The United States Court of Appeals denied the ECC appeal of the decision by the Armed Services Board of Contract Appeals not to award monetary damages.

Appendix E. Chronology of Procurement Action Involving Contract DAAA09-87-C-1374

Date	Event
December 30, 1983	Technical data package issued.
May 13, 1987	TACOM issued a competitive solicitation to manufacture 263 THM/TGs portable, radio controlled, with a receiver and 83 THM/TGs without a receiver and spares.
June 12, 1987	Original bid closing date.
August 21, 1987	Extended bid closing date.
August 28, 1987	The solicitation was amended four times from May 13, 1987 to August 28, 1987 to extend the bid closing date, and correct errors in the solicitation and amendments.
September 18, 1987	TACOM awarded the contract to ECC for 346 THM/TGs and spares for $4,542,030.
December 12, 1989	TACOM modified the contract to extend the delivery schedule and incorporate hit sensor testing, circuit card assembly first article testing, and numerous waivers. Number of days since contract award: 816.
April 26, 1990	ECC filed a certified claim for $1,969,043. ECC cited technical data package deficiencies. Number of days since contract award: 951.
June 28, 1991	TACOM modified the contract by $54,890 to incorporate procedures for the receiver production test, receiver alignment, and receiver waterproofing. Frequency crystals were also added and the delivery schedule was revised. Number of days since contract award: 1,379.
June 30, 1992	ECC revised its claim to $1,593,288 citing technical data package deficiencies. Number of days since contract award: 1,747.
June 30, 1992	ECC delivered the final shipment of THM/TGs. Number of days since contract award: 1,747.

Date	Event
September 1, 1992	ECC appealed a "deemed denial" of the revised claim to the Armed Services Board of Contract Appeals. Number of days since contract award: 1810.
January 11, 1994	The Armed Services Board of Contract Appeals found that the technical data package provided to ECC by TACOM was defective, but denied monetary damages.
October 24, 1994	ECC appealed to the United States Court of Appeals the decision of the Armed Services Board of Contract Appeals not to award monetary damages.
November 21, 1994	The United States Court of Appeals denied the ECC appeal of the decision by the Armed Services Board of Contract Appeals not to award monetary damages.

Appendix F. Inspector General, DoD, Review of the Technical Data Package for Contract DAAA09-85-C-1296

The Inspector General, DoD, engineer did not review any formal revisions to the technical data package for contract 1296 because TACOM did not send ECC the formal revisions. The Inspector General, DoD, auditors evaluated formal and informal revisions to the THM/TG technical data package provided by TACOM to ECC for contract 1296.

Auditor Review of Revisions. Auditors reviewed both formal and informal revisions approved by TACOM to contract 1296.

Formal Revisions. Formal revisions are revisions that are approved by the Configuration Control Board and officially incorporated into the THM/TG technical data package by written notices of revision. We reviewed all five mandatory revisions to the technical data package that were applicable to contract 1296. The five revisions were to correct technical data package errors. TACOM stated that if the revisions were not approved, contractors could seek extra payment for additional work. ECC received none of the revisions.

Informal Revisions. Informal revisions are revisions TACOM authorized to a specific contractor's technical data package but were not approved by the Configuration Control Board and were not officially incorporated as a permanent change to the THM/TG technical data package. ECC cited welding, dimension, and tolerance problems on the drawings, which ECC was required to resolve. On the following drawings, TACOM agreed to the ECC solutions to the drawing problems.

Welding. Welding was required to assemble various components of the THM/TG. In the welding examples that follow, welding requirements were omitted from the drawings and the components could not be assembled.

o The protection frame drawing did not specify any welding for the box to the side frame. As a result, 2,800 protector frames required additional welding.

o The drive shaft drawing did not specify any welding for the disc of the drive shaft or any other component. As a result, ECC was required to perform additional welding and machining on all the drive shafts.

o The drive shaft extension drawing specified a weld requirement that was not watertight. Since the specified welds were not leak proof, caustic solutions leaked and damaged the paint. As a result, ECC had to fabricate a test fixture, leak test, and rework 582 drive shaft extensions. Another 244 drive shaft extensions in process had to be tested. The revision also applied to contracts 1020 and 1374.

o The drawing for the clamp holder did not specify any welding for attaching the clamp holder to a square-threaded block. As a result, additional welding was required for each clamp holder.

Tolerance. Tolerances provide the minimum and maximum measurements necessary for various components to fit properly. In the examples that follow, tolerances did not allow for the proper fit of interfacing parts.

o The tolerance on the drive shaft of the tank target assembly had to be tighter to allow proper installation of the actuator. As a result, ECC had to rework 762 drive shafts already manufactured to a tighter tolerance.

o The tolerance for the clamp holder yielded a minimum opening that was too small to interface with the drive shaft extension. As a result, ECC had to rework 676 clamp holder welds to accept the drive shaft extension.

Dimension. The dimension for the pressure pad clamp interfered with the pressure pad retainer when it was welded because it did not consider the protrusion from the weld and protective coating. As a result, ECC had to rework 528 pressure pad clamps and grind 710 pressure pad clamps to ensure proper fit.

Appendix G. Inspector General, DoD, Review of the Technical Data Package for Contract DAAA09-86-C-1020

An Inspector General, DoD, engineer and auditors evaluated revisions to the THM/TG technical data packages provided by TACOM to ECC for contract 1020.

Engineer Review of Revisions. The engineer reviewed formal revisions to evaluate and identify formal revisions that significantly affected the ability of ECC to meet the contract schedules. The engineer concluded that the revisions resulted in serious deficiencies in the technical data packages, which resulted in production delays to the contractor.

The opinion of the engineer was based solely on the content of the formal revision and did not consider the effect of the formal revision in the context of the contractor's schedule. Therefore, the impact could be greater than or less than that indicated, depending on the revision and the manufacturing schedule of the contractor.

In the table on the next page, the revisions were categorized as having major impact, minor impact, or no impact. A revision determined to have major impact could result in a schedule delay greater than 2 weeks. A revision determined to have minor impact could result in a schedule delay of up to 2 weeks. Revisions determined to have no impact would not individually affect contractor cost or schedule. Although each revision had no individual impact, the aggregate of the revisions would impair the ability of ECC to meet the delivery schedule.

The engineer reviewed all 29 formal revisions to contract 1020 received by ECC and evaluated the impact of the revisions on contract 1020 after contract award. The table on the next page summarizes and categorizes the 29 formal revisions the engineer reviewed.

Categories of Notices of Revision to the Technical Data Package for Contract 1020

Types of Notices of Revision	Number of Notices of Revision	Impact of Notices of Revision		
		Major	Minor	None
Administrative	9	0	0	9
Dimension, tolerance, and specification	4	3	0	1
Drawings	0	0	0	0
Material	4	4	0	0
Parts	11	2	0	9
Testing	0	0	0	0
Value engineering change proposal	0	0	0	0
Other	1	1	0	0
Total	**29**	**10**	**0**	**19**

Based on the engineer review of the formal revisions, 10 formal revisions had major impact to the contract. Those 10 formal revisions could have resulted in a delay of more than 140 days to the production schedule, because each revision could result in a schedule delay of more than 14 days (2 weeks). None of the revisions had minor impact. Additionally, ECC received 19 revisions that had no impact individually on ECC's production schedule. As a result, performance on the contract was more difficult than necessary.

Auditor Review of Revisions. Auditors reviewed both formal and informal revisions approved by TACOM.

Formal Revisions. We reviewed all 50 formal revisions to the technical data package approved by TACOM. Of the 50 revisions, the configuration control board approved 39 revisions to contract 1020. Of the 39 revisions, ECC received only 18 revisions.

o A revision to the cable assembly was to lengthen the wire because it was being stretched and broken by the user during replacement of the limit switch. The revision was mandatory for all contracts with the exception of ECC.

o A revision to the hit sensor was necessary because the original technical data package lacked performance standards. Assembly methods were not closely controlled and allowed wide fluctuations in the hit sensor performance.

Informal Revision. An informal revision was to correct problems with the drive shaft extension. The drive shaft extension drawing specified a weld requirement that was not watertight. Since the specified welds were not leak proof, caustic solutions leaked and damaged the paint. As a result, ECC had to leak test and repair the welds before plating the drive shaft extensions. The revision also applied to contracts 1296 and 1374.

Appendix H. Inspector General, DoD, Review of the Technical Data Package for Contract DAAA09-87-C-1374

An Inspector General, DoD, engineer and auditors evaluated revisions to the THM/TG technical data package provided by TACOM to ECC for contract 1374.

Engineer Review of Revisions. The engineer reviewed formal revisions to evaluate and identify formal revisions that significantly affected the ability of ECC to meet the contract schedules. The engineer concluded that the formal revisions did not result in production delays to the contractor.

The opinion of the engineer was based solely on the content of the formal revision and did not consider the effect of the formal revision in the context of the contractor's schedule. Therefore, the impact could be greater than or less than that indicated, depending on the revision and the manufacturing schedule of the contractor.

In the table on the next page, the revisions were categorized as having major impact, minor impact, or no impact. A revision determined to have major impact could result in a schedule delay greater than 2 weeks. A revision determined to have minor impact could result in a schedule delay of up to 2 weeks. Revisions determined to have no impact would not individually affect contractor cost or schedule. Although each revision might have no individual impact, the aggregate of the revisions might impair the ability of ECC to meet the delivery schedule.

The engineer reviewed all 20 revisions to contract 1374 received by ECC and evaluated the impact of the revisions on contract 1374 after contract award. ECC received 20 revisions that individually had no impact on the production schedule. The table on the next page summarizes and categorizes the 20 revisions we reviewed.

Categories of Notices of Revision to the Technical Data Package for Contract 1374

Types of Notices of Revision	Number of Notices of Revision	Impact of Notices of Revision		
		Major	Minor	None
Administrative	7	0	0	7
Dimension, tolerance, and specification	1	0	0	1
Drawings	0	0	0	0
Material	1	0	0	1
Parts	11	0	0	11
Testing	0	0	0	0
Value engineering change proposal	0	0	0	0
Other	0	0	0	0
Total	**20**	**0**	**0**	**20**

Auditor Review of Revisions. Auditors reviewed both formal and informal revisions approved by TACOM.

Formal Revisions. We reviewed all 35 revisions to the technical data package approved by TACOM. Of the 35 revisions, the configuration control board approved 32 revisions for contract 1020. Of the 32 revisions, ECC received only 17 revisions.

o A revision to the receiver circuit card assembly was to add a high frequency card adjustment procedure to the drawing. The high frequency card cannot be aligned without this procedure. Lack of this revision in the ECC contract cost the Government $20,000. This revision also applied to contract 1020.

o A revision to the electronic control unit circuit card assembly was necessary because the technical data package omitted tolerance identifiers for resistors. Without this revision the electronic control unit could not be built. This revision also applied to contract 1020.

Informal Revision. An informal revision was to correct problems with the drive shaft extension. The drive shaft extension drawing specified a weld requirement that was not watertight. Since the specified welds were not leak proof, caustic solutions leaked and damaged the paint. As a result, ECC had to leak test and repair the welds before plating the drive shaft extensions. The revision also applied to contracts 1296 and 1020.

Appendix I. Organizations Visited or Contacted

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology, Washington, DC

Department of the Army

Secretary of the Army, Washington, DC
Assistant Secretary of the Army (Research, Development, and Acquisition), Washington, DC
Army Materiel Command, Alexandria, VA
  Army Tank-automotive and Armaments Command, Warren, MI
    Army Armament Research, Development, and Engineering Center, Picatinny Arsenal, NJ

Other Defense Organizations

Defense Contract Audit Agency, Alexandria, VA
  Southern Region, Orlando, FL
Defense Logistics Agency, Alexandria, VA
  Defense Contract Management Area Operations, Orlando, FL

Non-Defense Federal Organization

Small Business Administration, Washington, DC

Non-Government Organization

ECC International Corporation, Orlando, FL

Appendix J. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology
  Director, Defense Logistics Studies Information Exchange
Under Secretary of Defense (Comptroller)
  Chief Financial Officer
  Deputy Comptroller (Program/Budget)
Director, Defense Procurement
Deputy Under Secretary of Defense (Acquisition Reform)
Assistant to the Secretary of Defense (Public Affairs)

Department of the Army

Deputy Assistant Secretary of the Army for Procurement
Assistant Secretary of the Army (Research, Development, and Acquisition)
Commander, Army Materiel Command
  Commander, Tank-automotive and Armaments Command
    Commander, Army Armament, Research, Development, and Engineering Center
Auditor General, Department of the Army

Department of the Navy

Assistant Secretary of the Navy (Financial Management and Comptroller)
Auditor General, Department of the Navy

Department of the Air Force

Assistant Secretary of the Air Force (Financial Management and Comptroller)
Auditor General, Department of the Air Force

Other Defense Organizations

Director, Defense Contract Audit Agency
Director, Defense Logistics Agency
Director, National Security Agency
  Inspector General, National Security Agency
Inspector General, Central Imagery Office

Non-Defense Federal Organizations and Individuals

Office of Management and Budget
Technical Information Center, National Security and International Affairs Division, General Accounting Office

Chairman and ranking minority member of each of the following congressional committees and subcommittees:

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on National Security, Committee on Appropriations
House Committee on Government Reform and Oversight
House Subcommittee on National Security, International Affairs, and Criminal Justice, Committee on Government Reform and Oversight
House Committee on National Security

Honorable Robert Graham, U. S. Senate
Honorable Connie Mack, U. S. Senate
Honorable Newt Gingrich, U. S. House of Representatives
Honorable J. Dennis Hastert, U. S. House of Representatives

Audit Team Members

This report was prepared by the Contract Management Directorate, Office of the Assistant Inspector General for Auditing, DoD.

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