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**TECHNICAL SUPPORT AND
DOCUMENTATION MANAGEMENT
FOR
25 TON ALL TERRAIN CRANE
(ATEC)**

TECHNICAL REPORT

11 MARCH 1991

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**The views and/or findings contained in this report are those of the authors and
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decision unless so designated by other documentation.**

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) The study was conducted to review and integrate all aspects of the programmatic documentation for the procurement of the 25 ton all terrain crane (ATEC). Major revisions were made to the 25 ton ATEC Test and Evaluation Master Plan (TEMP) after providing support and minutes for a Test Integration Working Group (TIWG) meeting. A specification was prepared for the crane.					
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TECHNICAL SUPPORT AND DOCUMENTATION MANAGEMENT FOR 25 TON ALL TERRAIN CRANE (ATEC)	ONE SHEET STUDY GIST
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PRINCIPAL FINDINGS

1. The Test and Evaluation Master Plan (TEMP) for ATEC was reviewed through the Test Integration Working Group (TIWG) process, with subsequent comments inserted. ATEC will be acquired as a non-developmental item (NDI). The TEMP was updated to conform with the format and content required by Army Regulation 73-XX, transmitted on 30 November 1990.

2. The ATEC draft specification was completed and staffed within the Government and with commercial firms. Cogent comments from the Government and commercial firms were inserted in the ATEC specification. The specification is oriented toward ATEC's performance.

MAIN ASSUMPTIONS

None

PRINCIPAL LIMITATIONS

None

SCOPE OF EFFORT

The scope of the effort was to update programmatic documentation for an In-Process Review (IPR)

STUDY OBJECTIVE

The objective of this study was to provide the technical and management support and documentation necessary for the 25 Ton All Terrain Crane procurement.

BASIC APPROACH

The effort was conducted in five tasks. First, all available programmatic documentation was reviewed and appropriate documents prepared or updated, including the Harvard Total Program Manager Schedule. Second, a TIWG meeting was supported by providing meeting minutes and updated documentation.. Third, documentation was revised based upon comments received by TIWG members and others. Fourth, test events and activities were coordinated from Independent Evaluation Plans and testers in the TEMP. Finally, the effort was documented in a Technical Report and this Study Gist.

REASON FOR PERFORMING STUDY

The study was conducted to prepare an up-to-date programmatic documentation package for the 25 Ton ATEC procurement.

IMPACT OF STUDY

The study supports the acquisition of the 25-Ton ATEC as a NDI, to be procured from a generic, type classified, performance-oriented specification.

SPONSOR

US Army Belvoir Research Development and Engineering Center (BELVOIR)

PRINCIPAL INVESTIGATOR

Mr. John M. Daugherty, Science Applications International Corporation (SAIC)

ADDRESS WHERE COMMENTS AND QUESTIONS CAN BE SENT

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**TECHNICAL SUPPORT AND DOCUMENTATION
FOR
25 TON ALL TERRAIN CRANE (ATEC)**

TECHNICAL REPORT

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**TECHNICAL SUPPORT AND DOCUMENTATION
FOR
25 TON ALL TERRAIN CRANE (ATEC)
TECHNICAL REPORT**

1.0 INTRODUCTION

1.1 PURPOSE OF STUDY

The study was conducted to prepare an up-to-date programmatic documentation package for the 25 Ton ATEC procurement.

1.2 BACKGROUND

1.2.1 General. The 25 Ton ATEC program was initiated in FY86 with approval of an Operational and Organizational (O&O) Plan in July 1986 which redirected the 20 Ton Crane replacement program to procurement of state-of-the-art 25-ton class cranes. An aggressive program schedule was formulated and coordinated with Tank-Automotive Command (TACOM) and the US Army Engineer School (USAES) to meet a FY89 planned procurement. The program was slowed to a standstill when the Required Operational Capability (ROC) went to Training and Doctrine Command (TRADOC) for approval in April 1988. In November 1988 funding was deleted from the Materiel Acquisition Master Plan (MAMP) for FY89-92. The following year, funding was pushed out to FY95 and beyond. Current proposed procurement funding indicates FY95 and 96 and again in FY04 and 05. Most of the basic program documentation exists in initial draft form due to the extreme delays involved with the ROC approval process. The ROC was approved in June 1990 so the documentation could be updated. Difficulty in obtaining Test Integration Working Group (TIWG) approval of the Test and Evaluation Master Plan (TEMP) for the Non-Developmental Item (NDI) ATEC has caused slippage of the Milestone I/III In-Process Review (IPR) into the second or third quarter (2Q or 3Q) FY91.

1.2.2 Program Management Responsibilities. The Materiel Developer (MATDEV) for cranes is found within the Construction, Rail and Diving Team (STRBE-FMT), Marine and Mechanical Division of the Logistics Equipment Directorate (LED) of the Belvoir Research, Development and Engineering Center (BELVOIR), Fort Belvoir, VA, and the Program Manager for Commercial Construction Equipment (PM-CCE) located with the US Army Tank-Automotive Command (TACOM) in Warren, MI. The Combat Developer (CBTDEV) is the Director of Combat Developments (ATSE-CDM-S) at the US Army Engineer School at Ft. Leonard Wood, MO.

1.2.3 Program Status. The 25 Ton ATEC program is in preparation to enter the Milestone I/III IPR. During the IPR, ATEC is expected to be generically type classified, based upon its specification. Milestone I/III should occur sometime in the 2Q or 3Q of FY91.

1.3 SUMMARY

The study provides updated program documentation to support the Milestone I/III IPR.

2.0 STUDY APPROACH

The study was divided into five tasks. A copy of the approved Statement of Work (SOW) is provided in Appendix A (the completion date of the study was formally extended from 11 January 1991 until 11 March 1991). The following paragraphs provide descriptions of the work accomplished for each task.

2.1 WORK ACCOMPLISHED FOR THE FIVE TASKS

2.1.1 Task I: Revise Program Documentation. The initial thrust to revise ATEC documentation was focused on the Test and Evaluation Master Plan (TEMP). The initial draft TEMP was three years old (August 1987). Since its publication, much of the guidance for preparation TEMPs provided in DA PAM 70-21 (Research and Development - A Test and

Evaluation Guide, November 1988) changed. On 4 October 1990, the Test Integration Working Group (TIWG) convened to consider the TEMP. DOD Directive 5000.3-M-1 (TEMP Guidelines, January 1990) was followed in preparing the TEMP which became effective 26 October 1990. Both the comments provided by the TIWG and changes from the new DOD Directive 5000.3-M-1 were integrated into a revised ATEC TEMP. Also, the TEMP was revised to include the requirements found in Army Regulation (AR) 73-XX, Test and Evaluation Policy, dated 30 November 1990. The revised TEMP (Appendix B) was distributed to TIWG members along with the TIWG minutes (Appendix C).

A specification was prepared for ATEC which was based upon a previously acquired, NDI, 20 ton rough terrain crane. One of the key changes for the NDI specification, was the removal of many of the MIL-STD requirements, with most of them being replaced by Society of Automotive Engineer (SAE) Standards. The SAE standards are those normally used by industry for commercially-designed equipment. The MIL-STDs included in the specification are items such as the decontamination bracket and can, and blackout lights; items which require only a small level of effort for design integration. The specification was staffed within the Government and was sent to industry for comment. Of 80 comments received from six Government offices and four commercial firms, 65 were accepted and have been included in the specification. A summary of the comments is provided in Appendix E

The Harvard Total Program Manager (HTPM) II network and schedule were updated and provided the Government both in hard copy and on a 5 1/4-inch floppy disk

Several documents relating to the ATEC acquisition were reviewed to obtain current information and to coordinate requirements. The following documents were reviewed for integration with the ATEC program:

- Acquisition Strategy
- Procurement Acquisition Plan
- Costs for Cost and Operational Effectiveness Analysis
- Decision Coordinating Paper
- Required Operational Characteristics

- Integrated Logistics Support Plan
- Qualitative and Quantitative Personnel Requirements Information
- Basis of Issue Plan
- TECOM Independent Evaluation Plan
- Engineer School Independent Evaluation Plan
- Test and Evaluation Master Plan
- MIL-C-29425(MC), Crane: High Speed, High Mobility
- Operational and Organizational Plan
- MANPRINT Management Plan
- RAM Rationale Report
- Market Investigation and Supplement
- Technical Feasibility Test

Having considered material contained in the above documents and the desire to procure NDI cranes, some of the ROC requirements may require relaxation. For example, the ROC requires a backup, emergency power steering system which will operate with the main diesel engine off. This would require the addition of a backup, electrically-driven hydraulic system; this capability is not provided on commercial cranes and would increase the cost, weight and complexity of the crane (thus lowering reliability). As stated in The TEMP states that, relaxation of ROC requirements will be considered during the technical testing of ATEC.

2.1.2 Task II: Develop Draft IPR Package for Materiel Acquisition Review Committee (MARC). The programmatic documentation developed during this study constitutes the major contents needed for the IPR Package.

2.1.3 Task III: Revise IPR Package to Include and Incorporate Directed Changes. All programmatic documentation associated with this study has been kept current through the insertion of received comments. A draft TEMP was prepared and submitted to TIWG members prior to their meeting on 4 October 1990. As a result of the TIWG meeting, many TEMP changes were necessary. The updated TEMP and meeting minutes were distributed to TIWG members, soliciting additional comments. The additional round of comments were received and included in another revision to the ATEC TEMP, including the requirements from AR 73-XX.

The specification was circulated to Government agencies and commercial firms for comments. Ten agencies/firms responded, and their cogent comments were included in the ATEC specification (see Task I and Appendix E).

2.1.4 Task IV: Test Coordination. Test plans were not provided by the technical tester (TECOM) or operational tester (OPTEC). However, the preparation of the TEMP philosophy for the scale, scope and sequence of ATEC testing required close coordination with the testing activities.

2.1.5 Task IV: Technical Report. This draft of the Technical Report and Study Gist is provided the Government for review and comment.

3.0 CONCLUSIONS

3.1 TEST AND EVALUATION MASTER PLAN

The TEMP meets the requirements contained in current testing policy documents, including AR 73-XX. The focus of the TEMP is toward a NDI ATEC for which exhaustive testing would not be required. The TEMP, when coupled with the specification, will lead to a performance-oriented acquisition.

3.2 ATEC SPECIFICATION

The ATEC specification uses a minimum number of Military Standards and a maximum number of SAE Standards. SAE Standards are those normally used by industry for the design and fabrication of commercial equipment. The maximum use of SAE Standards will minimize design changes made necessary by unique military requirements.

3.3 ATEC AVAILABILITY

Two of the four commercial forms responding and providing comments about the specification showed interest in, and have a capability to produce an ATEC. This indicates that it is possible to obtain a fully competitive ATEC acquisition.

4.0 RECOMMENDATION

The tone of the ATEC programmatic documentation is directed toward a NDI acquisition which is also supported by a Market Investigation. Manufacturers support the ATEC specification so it is recommended that the acquisition of ATEC proceed as scheduled.

APPENDIX A
TECHNICAL SUPPORT AND DOCUMENTATION MANAGEMENT
FOR
25 TON ALL TERRAIN CRANE

STATEMENT OF WORK

STATEMENT OF WORK AND SERVICES FOR
TECHNICAL SUPPORT AND DOCUMENTATION MANAGEMENT FOR 25 TON ALL TERRAIN CRANE

1. The contractor shall perform the following work and services:

a. Background: The 25 Ton All Terrain Crane program was initiated in FY86 with approval of an O&O Plan in July 1986 which redirected the 20 Ton Crane replacement program to procurement of state-of-the-art 25 Ton class cranes. An aggressive program schedule was formulated and coordinated with TACOM and USAES to meet an FY89 planned procurement. The program was slowed to a standstill when the ROC went to TRADOC for approval in APR 88. In NOV 88 funding was deleted from the MAMP for FY89-92. The following year funding was pushed out to FY95 and beyond. Current proposed procurement funding indicates FY95 & 96 and again in FY04 & 05. Most of the basic program documentation {ILSP, TEMP, AS, QQPRI, BOIP, IEP's, ROC, and specification} exists in initial draft form due to extreme delays involved with the ROC approval process. When the ROC is finally approved, the backlog of documentation update requirements will need to be performed expeditiously and accurately to meet tight guidelines. The planned milestone I/III IPR is currently scheduled for 1QFY91.

b. Objective: The objective of this task is to provide the technical and management support and documentation necessary for the 25 Ton All Terrain Crane {ATEC} procurement. Tasks include program scheduling; revising existing program documents to conform to program changes; managing technical data; and preparing an In-Process Review {IPR} package.

c. Program Approach: The contractor's expertise in the materiel acquisition process, engineering support, and systems analysis will be used to support the acquisition of the ATEC. The contractor will provide technical support to the Logistics Equipment Directorate and assist in completing program actions leading to, but not including procurement actions. The contractor will ensure that all developed or revised program documents, technical data, and logistics data adhere to the latest Department of the Army guidance on materiel acquisition.

Task I: Revise Program Documentation. The contractor will develop or revise all Program Management Documentation {PMD} for the ATEC and maintain a detailed Harvard {TM} Total Project Manager II schedule for this program. PMD includes an Acquisition Strategy, Procurement Acquisition Plan, Test and Evaluation Master Plan, Materiel Developer input to the Cost and Operational Effectiveness Analysis, Decision Coordinating Paper, and specification. {C.4.2}

Task II: Develop Draft IPR Package for Materiel Acquisition Review Committee (MARC). The contractor will develop a draft Milestone (MS) I/III IPR package for the MARC and selected elements of BELVOIR. The contractor will review and incorporate all approved staffing comments received into the draft IPR package. The IPR package will include, but is not limited to, the Decision Coordinating Paper, Acquisition Strategy, Test and Evaluation Master Plan, Safety and Health Data Sheet, Production Readiness Master Plan, Configuration Management Plan, TDP Acquisition Plan and all the appropriate Annexes of these documents. {C.4.2}

Task III: Revise IPR Package to Include and Incorporate Directed Changes. The contractor will incorporate the comments from the MARC meeting into the MS I/III IPR package, as required. The contractor will then reproduce and prepare for Government distribution the IPR package to IPR members and observers. {C.4.2}

Task IV: Test Coordination. The contractor will review test plans for the First Article Test (FAT) and Logistics Demonstration as outlined in the TEMP. These independent reviews will be submitted to the Government for comment. {C.4.1}

Task V: Technical Report. The contractor will document the results of the above tasks and guidance provided by the Government into a Final Technical Report. {C.5}

2. The work shall be in accordance with Section C of the contract and CLIN 0003AA and 0003AB. Data, CLIN 0004 shall be delivered as set forth on Contract Data Requirements List, DD Form 1423, Sequence Numbers A001, A002, A003, and A007.

3. CLASSIFICATION: Work on this task order may be classified up to SECRET. If SECRET information is used in the report, it will be contained in a separate classified annex.

4. GOVERNMENT FURNISHED EQUIPMENT: None.

5. The completion date for this task order is 11 January 1991.

APPENDIX B
TECHNICAL SUPPORT AND DOCUMENTATION MANAGEMENT
FOR
24 TON ALL TERRAIN CRANE
TEST AND EVALUATION MASTER PLAN

TEMP I/III

**TEST AND EVALUATION MASTER PLAN
FOR THE
25 TON ALL TERRAIN CRANE
(ATEC)**

NON DEVELOPMENTAL ITEM PROGRAM

REQUIREMENTS DOCUMENT - ROC DATED 1 JUNE 1990

28 JANUARY 1991

**BELVOIR RD&E CENTER
ATTN: STRBE-FMT
FORT BELVOIR, VA 22060-5606**

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SECURITY CLASSIFICATION - UNCLASSIFIED

TEMP I/III

Coordination Cover Page
for
25 Ton All-Terrain Crane (ATEC)

SUBMITTED BY:

TIWG Chairman
US Army Belvoir Research,
Development and Engineering
Center, STRBE-FMT

Date: _____

APPROVED BY:

JAMES R. CARLSON
Acting Chief, Marine and Mechanical
Equipment Division
Logistics Equipment Directorate

Date: _____

SUITABLE FOR TIWG STAFFING:

T&E Manager
Belvoir RD&E Center

Date: _____

**TIWG TEMP COORDINATION SHEET
FOR THE
25 TON ALL TERRAIN CRANE (ATEC)**

<u>Representative</u>	<u>Signature</u>	<u>Date</u>
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Technical Tester USATECOM ATTN: AMSTE-TA-T Aberdeen, MD 21005-5505	_____	CONCUR/ NONCONCUR
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Operational Tester USATEXCOM ATTN: ATCT-AE-EN Fort Knox, KY 40121-5000	_____	CONCUR/ NONCONCUR
OTEC Representative ATTN: CSTE-ECS-S Alexandria, VA 22302-1458	_____	CONCUR/ NONCONCUR
Logistician USAMSSA ATTN: AMXSY-LX Aberdeen Proving Ground, MD 21005-5066	_____	CONCUR/ NONCONCUR
Trainer USAES ATTN: ATSE-TDN Fort Leonard Wood, MO 65473-6620	_____	CONCUR/ NONCONCUR

**TIWG TEMP COORDINATION SHEET
FOR THE
25 TON ALL TERRAIN CRANE (ATEC) (Continued)**

<u>Representative</u>	<u>Signature</u>	<u>Date</u>
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Transportability Representative MTMCTEA ATTN: MTTE-TRV Newport News, VA 23606-0276	_____	CONCUR/ NONCONCUR
MANPRINT Integrator USAPIC ATTN: ATNC-NMM-B Alexandria, VA 22332-1345	_____	CONCUR/ NONCONCUR

TEMP I/III
TEST AND EVALUATION MASTER PLAN
25 TON ALL-TERRAIN CRANE (ATEC)

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TEMP I/III
TEST AND EVALUATION MASTER PLAN
25 TON ALL-TERRAIN CRANE (ATEC)

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TEST AND EVALUATION MASTER PLAN

All-Terrain Crane (ATEC)

PART I - SYSTEM DETAILS

1. MISSION DESCRIPTION.

Mission requirements are described in the TRADOC-approved Required Operational Capability (ROC), dated 11 June 1990. The ATEC will be employed in the division, corps, and theater army areas primarily to handle construction materials, remove debris and rubble, perform excavation, and support standard and non-standard bridging operations for both wet and dry gaps. Additionally, the ATEC will assist in other combat service support functions that include: sustainment engineering, maintenance, and logistics. The ATEC will be able to travel safely at least 40 mph on primary roads and as convoy member be able to travel and operate on secondary roads and off-road areas. Conversion from the travel to operation mode and vice versa shall be accomplished by only its operator with no external equipment or manpower support. Only one man will be required to operate the ATEC in each mode. It will be capable of 24-hour operations in hot, basic and cold climates, in NBC environments. The ATEC will be transportable by C-17 and C-5B aircraft, rail, highway, and ship without major disassembly.

2. SYSTEM DESCRIPTION

a. Key Features. The following features were extracted from the Approved ROC and the US Army Engineer School Independent Evaluation Plan (IEP), dated February 1987.

COMBAT ENGINEERING

- (1) Operate on primary and secondary roads at speeds of 40 to 50 miles per hour (MPH) on grades up to 1-percent (without trailer).
- (2) Ascend and descend, stop and start on 30-percent grades without a trailer.
- (3) Lift a minimum of 25 tons at a 10-foot radius with outriggers extended.
- (4) Operate with at least a 70 foot, telescoping boom.
- (5) Lift, swing, lower and rotate continuously through a 360° sweep with rated load and outriggers extended.
- (6) Pick up and move 12,000 pounds at a 15-foot radius over the rear of the carrier.
- (7) Traverse a 15° side slope without a load or trailer.
- (8) Tow a 10-ton, M345 trailer.
- (9) Be equipped with or compatible with attachments necessary to perform basic crane functions.

- (10) Be equipped with selective/all wheel drive and three-mode steer (front, all and crab).
- (11) Hydraulically operated using diesel engines.
- (12) Transportable by rail, marine, and C-5 and C-17 aircraft.

b. Interfaces. The ATEC must be able to utilize the concrete bucket - 1 yd' (LIN C30313) in the current US Army inventory. Also the ATEC must have the standard NATO slave receptacle and the Diagnostic Connector Assembly (DCA) to allow engine diagnostic checks using Simplified Test Equipment - Internal Combustion Engine - Reprogrammable (STE/ICE-R). ATEC must be equipped to tow the loaded M345 10-ton attachment trailer using a standard towing pintle, brake and light connections. ATEC must be compatible with Hydraulic System Test and Repair Unit (HSTRU). ATEC will have optional hydraulic clamshell and grapple attachments.

c. Unique Characteristics. The ATEC ROC has a requirement for survivability from NBC decontamination and high altitude electromagnetic pulse (HAEMP). The NBC decontamination requirement will not apply to unprotected and exposed hydraulic lines since it is known that decontamination fluid 2 will severely deteriorate hydraulic hoses to the point they will need replacement. To protect against HAEMP would be a very expensive process so an HAEMP analysis will be performed and used to advise the user community of ATEC's expected performance after a HAEMP attack.

d. Software. There is no unique software or firmware requirement for ATEC. Software and firmware associated with power train control or lift indicators will be off-the-shelf packages used in normal production models. The STE-ICE-R application is considered off-the-shelf.

3. REQUIRED TECHNICAL CHARACTERISTICS

The ATEC must have the critical and associated technical characteristics as described in the TECOM IEP dated April 1987. The critical and associated technical characteristics matrix is at Figure 1.

25 TON ALL TERRAIN CRANE

Critical and Associated Technical Characteristics	Test Events	Technical Threshold for Each Test Event	Location	Schedule	Decision Supported
Excavate and Load Loose to Medium Soils (ROC 4.a.)	PPQT	Satisfactorily w/1/4-cuyd Clamshell and Tagline	A b e r d e e n	1-2QFY96	MS IIIA
Lift, Swing, & Lower Loads, Cargo and Equipment (ROC 5.a.4)	PPQT	25 Tons @ 10-Foot Radius w/ Hook Block		1-2QFY96	MS IIIA
Tow 10-ton M345 Loaded Attachment Trailer (ROC 5.1.14)	PPQT	On Primary and Secondary Roads		1-2QFY95	MS IIIA
Operate, 5% Female, 95% Male (MOS 628) (ROC 8.d)	PPQT/PQT	95% Performance Requirement for MOSs 62F, 62B and 35H in Climatic and MOPP Gear	P r o v i n g	1QFY96-1QFY97	MS IIIA/B
Safety and Health Hazards Eliminated (ROC 8.e, 8.f)	PPQT/PQT	Controlled to Acceptable Level; TOP 1-1-060 and MIL-STD-882B		1QFY96-1QFY97	MS IIIA/B
RAM Characteristics Must Meet Army Mission Needs (ROC 5.d)	PPQT/PQT	As War 83%, Peace 87%; MIBOMF 75hr; ALDT 33hr; MR Unit 124, Org 010, Int 021, Overall 120.	n g G r o u n d	1QFY96-1QFY97	MS IIIA/B
Demonstrate System Support and ILS Requirements (ROC 7)	LOG Demo	With Standard Army System for 60 Days		1QFY96-1QFY97	MS IIIB
Transportability Characteristics (ROC 5.c)	PPQT	Road, Rail and Air. Are Restrictions Necessary; AR 70-47		1QFY96-1QFY97	MS IIIA
RAM, ILS, HIE & System Safety Requirements Adequate (ROC 8)	PPQT/PQT	Validate for MANPRINT Performance	M D	1QFY96-1QFY97	MS IIIA/B

Figure 1. Critical Technical Characteristics Matrix

4. REQUIRED OPERATIONAL CHARACTERISTICS

The ATEC must have the following operational characteristics as described in the US Army Engineer School ROC dated 1 June 1990.

- a. Have a rated capacity of not less than 25 tons through 360° rotation at 10 foot radius.
- b. Be equipped with a full-powered telescoping boom extendible to 70 feet in length when loaded with maximum rated loads.
- c. Be equipped with a hydraulically operated ¾-cubic yard clamshell and 1-cubic yard scrap grapple.
- d. Be equipped with a hook block that has a swivel hook and safety latch with a minimum capacity of 50,000 pounds and a means for securing it and the clamshell when in the travel mode.
- e. Be equipped with four independently controlled hydraulic outriggers that provide support for the 25 ton, 10 foot, 360° lift requirements on soils subject to all types of weather conditions.
- f. The ATEC shall have the capability of being driven to and from the work site over primary roads, secondary roads, and cross country.
- g. The ATEC must have the capability to travel safely at speed up to 40 MPH on up to 1-percent grades, without attachment trailer.
- h. *The ATEC must be equipped with a suspension system for highway travel which will not interfere with the job site and off-road operations.*
- i. ATEC must have the capability to ford streams up to and including depths of 30 inches.
- j. Be capable of use with pile driving equipment which now exists in the Army inventory.

PART II - PROGRAM SUMMARY

1. MANAGEMENT

An outline of the major test & evaluation responsibilities of all participating test and evaluation organizations is provided below. All participants are voting members of the TIWG, and each is responsible to provide input, comments and concurrence/approval for this TEMP.

a. Belvoir RD&E Center. The materiel developer is responsible for the following: developing and coordinating the TEMP for concurrence; scheduling TIWG's; technical support on procurement contract; Safety Assessment Report (SAR) to TECOM prior to Preproduction Qualification Testing (PPQT); prepare the IPR package.

b. TACOM. TACOM is the Readiness Command and will procure ATEC.

c. USAES. (1) Participate in the preparation of the TEMP.

(2) Participate in the test planning, review test reports, and forward comments as appropriate.

(3) Monitor the conduct of tests to assist in clarifying the system's requirements, or the concept of operations.

(4) Provide approved issues and criteria to support testing.

(5) Provide a subject matter expert (operator) to participate in the technical testing.

d. TECOM. The technical tester and technical assessor is responsible for development of the TEMP and IAP, development of the Outline Test Plan (OTP) for PPQT and PQT, scheduling and acquisition of resources for PPQT and PQT, IAP update and a Independent Assessment Report, and test reports. TECOM participates in test planning, review of test reports, monitor test conduct to assist in clarifying system requirements, and participates in all scoring conferences.

e. TEXCOM. The operational tester is normally responsible for the following: preparation of the Detailed Test Plan (DTP); performance of PPQT; preparation of Expanded Test Report (ETR). In this case, the testing will be accomplished by the technical tester with TEXCOM invited to monitor PPQT and PQT.

f. AMSSA. AMSSA, as the independent logistician, will review, analyze and/or assist in preparing requirements documents, logistics plans, test issues, test and evaluation planning documents, TEMPs, system support packages, and contract solicitation documents. AMSSA participates in test readiness reviews, the Logistics Demonstration and as an observer in scoring conferences, RAM Assessment Conferences and monitors supportability testing on an exception basis.

g. TRAINER. The trainer is responsible for coordination of all training prior to PPQT.

h. OTEC. OTEC is responsible for endorsing the ETR.

i. MTMC. The Transportation Engineering Agency (TEA) of MTMC is responsible to evaluate the transportability issues for air, rail, water, and road movement of ATEC, providing a transportability report describing any limitations for ATEC's transport.

2. DECISION POINTS AND DOCUMENTATION

The key decision points for the ATEC acquisition are a generic type classification IPR, and procurement with a PPQT, Logistics Demonstration, and PQT. It has not yet been determined if there will be follow-on evaluation for ATEC. Following, is the documentation necessary to support the identified milestones.

a. MILESTONE I/III SIPR for Generic Type Classification

- (1) TECOM IAP and IAR
- (2) TRADOC ROC, IEP, and IER
- (3) TACOM Acquisition Strategy, ILSP and Decision Coordinating Paper.
- (4) BRDEC TEMP
- (5) TDP (Tech Data Pkg)

b. MILESTONE IIIA for PPQT, Logistics Demonstration

- (1) Detailed Test Plan
- (2) Training Plan
- (3) Commercial Technical Manuals
- (4) TECOM IAR
- (5) System Support Package Component List (SSPCL)
- (6) Plus current versions of documents listed in subparagraph a above.

c. MILESTONE IIIB for PQT

- (1) Revised Test Plan
- (2) PPQT Test Report
- (3) Plus current versions of documents listed in subparagraphs a and b above.

3. TEST MANAGEMENT

Test and Evaluation will be guided by the Test Integration Working Group (TIWG) and conducted in accordance with the decisions and agreements formulated at those meetings. User and technical testing will be conducted by TECOM through PPQT and PQT. Operational issues will be evaluated by OTEC as observers to the qualification testing. A logistics demonstration will be conducted in parallel with PPQT, under the guidance of AMSSA.

4. BUDGET CONSTRAINTS

The major budget constraint on the ATEC Program is the planned production funding in FY95 and FY96, and then FY2004 and FY2005. (All cranes replaced by ATEC will be overaged and obsolete by FY95).

5. RELATED PROGRAMS None.

6. INTEGRATED PROGRAM SCHEDULE

Refer to Figure 2 for the Integrated Program Schedule.

EVENT		AGENCY	FISCAL YEARS AND QUARTERS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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* - Decision Points, with appropriate Materiel Release.

- FY04 \$38.25M, FY05 \$4.9M

FIGURE 2. 25 TON ALL TERRAIN CRANE ACQUISITION SCHEDULE

7. INTEGRATED TEST SCHEDULE AND DATA SOURCE MATRIX.

The Integrated Test Schedule and Data Source Matrix have been combined into Annex E. Both PPQT and PQT will be conducted by TECOM, and the Logistics Demonstration by AMSSA, at Aberdeen Proving Grounds, MD. TECOM will be provided operational issues input prior to the start of testing for the development of a test plan.

PART III - TECHNICAL TEST & EVALUATION OUTLINE

1. TECHNICAL TEST AND EVALUATION (TT&E) OVERVIEW

a. Technology Demonstration. When considering the acquisition of ATECs, it was found that seven firms manufacture cranes of the ATEC type. Two of the firms are US, the other five being in Europe. There exists, therefore, a technology and manufacturing base which has designed, built and fielded cranes with capabilities close to the ATEC requirements. A Market Investigation was conducted to establish the existing technology base for ATEC-like commercial cranes, with favorable results. For this reason, it was decided to proceed with the ATEC acquisition as a Non-developmental Item (NDI), saving development time and dollars, and providing a unit price considerable less than that for a militarized crane.

2. TECHNICAL TEST & EVALUATION TO DATE

The ATEC is a Non-Developmental Item that is used in the commercial construction industry for projects similar to Army requirements. The results of the Market Investigation, along with the results of a Technical Feasibility Test by the Combat Systems Test Activity (CSTA) at Aberdeen are reported in the following subparagraphs.

a. Market Investigation. A Market Investigation (MI) and supplement was conducted by the MATDEV which was reported in July 1987, and January 1988. The conclusion of the investigation was that there exists, currently in commercial production, only one 25 ton ATEC, the KRUPP Model 25 GMT-AT. There were however at least six other models in the 18-35 ton capacity that can meet most of the requirements as stated in the O&O Plan. It was noted at that time, that all industry models currently called ATECs, are essentially rough terrain models previously produced, with improvements to the suspension systems and tires to allow higher highway speeds.

The user survey portion of the investigation was limited in scope due to a lack of ATEC use in the US; only one user had experience with an 80-ton ATEC, with other users reporting personal knowledge gained from European ATEC use.

The results of the MI were sufficiently encouraging as to continue with a NDI approach for a US Army ATEC.

b. Technical Feasibility Test (TFT). A TFT was conducted by CSTA at Aberdeen, MD, during the period March through July 1989. Two cranes were tested; a Grove AT400 and a P&H S-30. Testing was conducted to assess the physical characteristics, vehicle and crane performance characteristics, environmental, transportability, safety and human factors engineering characteristics, and the commercial technical manuals. The test results were generally favorable in regard to the requirements for an ATEC. Listed below in Figure 3, are those areas where problems were noted.

A review of the problem areas would indicate that many of them may be solved with little effort such as the hearing protection warning sign. Others would require significant redesign of the commercial model to reach military standard such as the cab dimensions and backup steering. ROC requirements must be relaxed to accept the design and performance characteristics of the commercial ATECs.

Operation	Grove AT400	P&H S-30
Emergency, Backup Steering	D	D
Trailer Towing	D	D
Lift at 10-foot Radius (50,000#)	38,400#	50,000#
Outriggers	Deformed	OK
Hook Block Wire Cable	Insufficient Length	
Hydraulic Fluid Temperature (180°F)	188°F S	194°F S
Ford 30 inches	OK	24" Exhaust
Transportability	Note	Note
Max Effective Braking @ 30 MPH	D	OK
Hearing Protection Warning Signs	D	D
Smooth Metal Brake Pedal	OK	D
Control Labeling	OK	D
Backup Alarm	OK	D
Excessive Step Distance to Cab	OK	S
Technical Manuals	A	A
Max Speed Secondary Road (40 MPH)	35 MPH	28 MPH
Parking Brake on 30 % Grade	OK	S
Width	P	P
Operation in MOPP IV/Arctic Gear	S	S
Cab Work Space	S	S
Note: For transportability, the superstructure must be removed for rail transport outside CONUS, Mexico and Canada. Legend: D - Deficiency S - Shortcoming A - Adequate P - Permit Required		

Figure 3. ATEC Technical Feasibility Testing by Combat Systems Test Activity

3. FUTURE TECHNICAL TEST & EVALUATION If available commercial test data for ATEC candidates cannot be used to confirm specific requirements from the ROC, the manufacturers will perform tests and certify the data to confirm that the ATEC candidate meets ROC requirements. If a manufacturer's commercial ATEC is modified to the extent of changing its response to static or dynamic loads, power output, roadability, etc., the new ATEC configuration will be retested to the same construction industry standards and the data certified.

ATEC will be procured along with two hydraulically-operated attachments; a clamshell and grapple. The engineer school will be asked to develop and provide a BOIP for these attachments. These hydraulic attachments will each have their own LIN and may be issued as standard equipment to TOE/SRC units or otherwise be acquired as associated support items of equipment (ASIOE). It is planned to obtain the hydraulic attachments as NDI items. Any time the ATEC procurement and its associated test is mentioned, it includes the two hydraulic attachments.

The test activities that remain will be a PPQT, a Logistics Demonstration and a PQT. The ATECs acquired will be commercial, production items procured from a NDI generic, performance specification.

a. Configuration Description. The ATEC configurations for PPQT, the Logistics Demonstration and PQT, will be very similar. For example, there are requirements in the ROC which will be specified in the RFP solicitation, from which the ATECs will be obtained. There are several modifications needed to a commercial ATEC which do not require development, but rather may be classified as minor modifications or accessories. These are such items as a towing pintle and brake and lighting connections for the 10 ton trailer, blackout lights, and the decontamination bracket and can.

b. TT&E Objectives. It is desired that PPQT and the Logistics Demonstration develop any shortfalls/deficiencies unacceptable to the Army to be used at MS IIIA to determine whether to proceed as is, make minor modifications to the production contract, or stop the procurement. If no shortcomings/deficiencies are found during PPQT and the Logistics Demonstration, the TIWG may elect to forego MS IIIB. If there is a minor modification to the contract to correct shortfalls/deficiencies, then PQT followed with a MS IIIB decision would be necessary. All of the technical testing by TECOM/CSTA, would be observed by invited members of the user (operational) community.

c. TT&E Events, Scope of Testing and Basic Scenarios. The primary test events and scope are described in the TT&E objectives above. The test scenario may vary from a straight-forward test designed and executed by TECOM at Aberdeen, or the scenario may place ATEC in an operational setting with a task force supported by engineers. Testing will be accomplished at Aberdeen in a three-to-four month period, in an environment similar to that for the Technical Feasibility Testing conducted in March through July of 1989. TEXCOM will be invited to observe all facets of testing for ATEC, including input for test plans.

d. Limitations. There are no known limitations for technically testing ATEC other than those mentioned above.

4. SPECIAL TT&E TOPICS

a. Reliability, Availability, and Maintainability (RAM). The basic requirements for ATEC RAM performance are listed in Figure 1, with detailed requirements contained in the RAM Rational Report, dated 11 September 1989 and approved 13 October 1989.

b. Safety. ATEC shall possess provisions for maximum safety to personnel and equipment during operation, storage, transport, movement and maintenance. Hand-holds, non-skid surfaces for walkways, guards around moving parts, and warning signs or decals must be provided.

c. Software Test and Evaluation. Software/firmware in this type machinery is normally used for engine control, instrumentation, and for the crane boom lockout/safety device, the system which prevents moment overloads. The functions these devices control will be tested in the normal test process.

d. Manpower, Personnel and Training. Testing will be accomplished principally by test personnel at TECOM. Some soldiers may be used as coordinated with TEXCOM. Training and the development of the Training Support Plan will be conducted by the Materiel Developer. The Training Package will be coordinated with the TRADOC Training Developer for approval prior to the PPQT and PQT. Resources to conduct the Logistics Demonstration will be as coordinated by AMSSA.

The MANPRINT strategy will serve to establish the man-machine relationship through analysis and design using the issues and criteria for manpower, personnel, training, system safety, health hazards, and human engineering factors. Information (input) from the MANPRINT domains defined in the ATEC System MANPRINT Management Plan (SMMP) will lead to a well integrated and structured materiel system to meet user personnel requirements. MANPRINT will be given soldier consideration during all phases of the system's acquisition. Where possible, the MANPRINT effort will be conducted in conjunction with the Logistics Support Analysis (LSA) process. MANPRINT will be considered during the review of specifications to ensure the ATEC design reflects MANPRINT goals to the greatest possible extent.

e. Nuclear Hardness and Survivability. It is known that equipment with automated control processors will most likely lose their processors from High Altitude Electromagnetic Pulse (HAEMP). The cost for nuclear hardening is high so the approach has been to accept the risk of damage, then replace the parts. In the case of ATEC, a paper analysis of HAEMP survivability will be conducted and provided the CBTDEV to use in considering doctrinal and logistical implications of HAEMP damage levels.

f. Nuclear, Biological and Chemical (NBC). The ROC requires a chemical agent resistant coating (CARC) finish be placed on the ATECs, as well as the installation of a decontamination fluid bracket. The decontamination fluid will harm the hydraulic hoses on ATEC but other parts will be protected with the CARC. The ability to decontaminate ATEC will be determined using a paper analysis.

g. Environmental. ATEC is to operate in hot, basic and cold climates, or in a temperature range from +120°F to -50°F. This testing will be conducted in the environmental test cell at Aberdeen. The cell testing will not only evaluate the ability to start and operate the engines on ATEC, but the performance of the hydraulic system.

h. Logistics Supportability. Logistics supportability will be determined using a Logistics Demonstration which will take place in the same timeframe as PPQT.

PART IV - OPERATIONAL TEST & EVALUATION RESOURCE SUMMARY

1. OPERATIONAL TEST AND EVALUATION (OT&E) OVERVIEW

There will be no specific OT&E for ATEC. The operational issues will be included in the PPQT and PQT test planning and execution. The user community and OTEA are invited to monitor or participate in PPQT, Logistics Demonstration and PQT. The reason for eliminating specific OT&E for ATEC is because of the acquisition of existing commercial designs which, in effect, have been tested operationally by their commercial users.

2. **CRITICAL OPERATIONAL ISSUES** Critical operational issues have been identified in the US Army Engineer School IAP dated February 1987. These operational issues will be verified during PPQT and PQT.

a. Critical Operational Test and Evaluation Issues.

(1). Does the ATEC demonstrate essential performance characteristics to complete mission requirement in an operational environment?

(2). Do the overland mobility and maneuverability characteristics of the ATEC satisfy the mission requirements?

3. OPERATIONAL TEST & EVALUATION TO DATE

No OT&E has been performed to date.

4. FUTURE OPERATIONAL TEST & EVALUATION

All OT&E issues will be addressed during PPQT and PQT so no future OT&E is planned. However, if Follow-On Test and Evaluation (FOT&E) if requested by the user, the ability of the ATEC to effectively perform the military missions as specified in Part I, paragraphs 3 and 4, and paragraph 2a above will be confirmed. These tests will be conducted under the conditions specified by the Test Evaluation Plan (TEP) prepared by TEXCOM. The operational tests will be conducted by TEXCOM by resident test personnel. BRDEC personnel will monitor the testing process. The test report will be written by TEXCOM. Testing will be sufficient to obtain enough data to prove the ATEC's abilities to meet all performance requirements and issues.

a. **Equipment Description.** The fielded ATEC will be a standard production model, incorporating any necessary modifications from the ROC or changes determined through previous testing.

b. **FOT&E Events, Scope of Testing, Scenarios.** FOT&E will consist of phases in which the ATEC will tactically deploy with an Armor/Infantry Task Force. The ATEC will be a member of an Engineer Battalion in direct support of that task force. The following is a list of OT phases and the associated T&E issues that will be evaluated in the following test phases:

(1) Convoy Phase. The ATEC will be a member of a tactical convoy moving on primary and secondary roads moving in daylight and night to include blackout conditions. The ATEC will be fully loaded and tow its attachment trailer. The ATEC's ability to move on primary roads at 40 mph

will be evaluated; factors to be checked will include: oscillations while at 40 mph, ability to climb grades, ability of the operator to control the ATEC and trailer while in a convoy, ability to ford up to 30 inches, and fuel consumption rates. The ATEC will move 3 hours in daylight, 2 hours at night, and 1 hour at night under blackout conditions.

(2) Bridging Phase. The ATEC will move to the wet gap crossing site: it will tow its attachment trailer to the work site. The ATEC will perform the following missions: assist in the construction and disassembly of a Ribbon raft, excavate below the water line adjacent to an abutment with the ¾-yard clamshell, load 5 ton dump trucks with spoil, and assist in building a non-standard class 60 bridge with steel and wood components. When building the non-standard bridge, the ATEC will operate on the near shore and on the completed sections of the bridge as required. The respective times to complete each mission will be recorded. Set-up times to install attachments will also be recorded. After completion of the bridging phase, all attachments will be stowed in the attachment trailer and/or on the ATEC which will then move under its own power out of the bridging site.

(3) Quarry Phase. The ATEC will move to the quarry site towing its complete attachment trailer. The following clamshell missions will be performed: excavate in-place, medium soil at ground level and build stockpile, and load 5-ton dump trucks from soil stockpile. Times to attach and detach the clamshell and properly stow for movement will be recorded as well as the clamshell production rates.

(4) Rubble Removal Phase. The ATEC will move to the mock city site and using the grapple, perform the following rubble clearing missions: remove timber obstacles, remove reinforced concrete debris, remove triple standard concertina and barbed tape obstacles, and remove structural steel debris. The ATEC candidate must be able to stockpile the removed debris and load 5-ton dump trucks with debris to haul away. The ability the ATEC to move into, within, and out of the military operations in urban terrain (MOUT) site will be recorded as well as rubble removal production rates.

(5) Maintenance Phase. The ATEC will move to the field maintenance site. Using the hook, it will be used to replace the pack (engine/transmission) of an M1A1 Tank and M2/3 Bradley Fighting Vehicle.

(6) Logistics Phase. The ATEC will move to the logistics site. Using the hook, the ATEC will load and off load bulk cargo from US Army railcars, watercraft (mock-ups), and flatbed trailers. Production rates will be recorded.

(7) Vertical Construction Phase. The ATEC will move to the construction site and assist in constructing a permanent pre-fabricated steel tower and in erecting and placing poles for 500 meters of landline. Once at the job site, the ATEC will lift the materials to their respective placement and assembly points.

(8) Horizontal Construction Phase. The ATEC will move to the horizontal construction site: a dirt flight landing strip (FLS) or 2-lane unimproved road. The ATEC will assist in the construction of a 50-100 foot section of 60 inch diameter corrugated metal pipe (CMP) culvert. The ATEC will carry any required attachments to the job site. The use of the clamshell for excavation is optional.

(9) NBC Phase. Reacting to an unannounced NBC attack during one of the other test phases, the ATEC will continue work for 2 hours with the operator at MOPP IV. The production rates and operator's ability to safely operate the ATEC will be recorded. After two hours, the operator will stow his attachments in the attachment trailer or on the ATEC and move to the Equipment and Personnel Decontamination Site (EDS/PDS) at MOPP IV; travel time will be 15-30 minutes. At the EDS/PDS, a decontamination unit authorized a corps-sized task force must perform a hasty

decontamination of the ATEC within one hour, to include decontamination and reissue to the operator; this does not include any time necessary to replace hydraulic hoses damaged through the decontamination process.

d. Test Limitations. None anticipated.

PART V - TEST AND EVALUATION RESOURCE SUMMARY

1. TEST ARTICLES

Test articles will be furnished by the contractor (probably four(4) production vehicles per test phase) along with a System Support Package sufficient to see the hardware through PPQT and PQT.

2. TEST SITES AND INSTRUMENTATION

Testing will be accomplished at Aberdeen Proving Ground, MD, by TECOM with their normally available instrumentation, and the environmental test cell. Testing will include PPQT and, as required, PQT.

3. TEST SUPPORT EQUIPMENT

A 1-cubic yard concrete bucket attachment and the M-345, 10-ton attachment trailer will be required, along with a hydraulic clamshell and grapple acquired with the ATEC, and a diesel pile hammer system.

4. THREAT SYSTEMS/SIMULATORS

The NBC test phase threat will be inert training agents delivered by an airborne spray system. These inert agents will simulate Soviet nerve and blister agents.

5. TEST TARGETS AND EXPENDABLES

Not required for this program.

6. OPERATIONAL FORCE TEST SUPPORT

All test support will be provided by TECOM.

7. SIMULATIONS, MODELS, AND TESTBEDS

Not required for this program.

8. SPECIAL REQUIREMENTS

None anticipated.

9. TEST & EVALUATION FUNDING REQUIREMENTS T&E funding will be provided by TACOM.

10. MANPOWER/TRAINING

Test manpower will be provided by TACOM and possibly TEXCOM. Training requirements will be developed and provided by the CBTDEV. Training requirements by the manufacturer of ATEC may be included in the ATEC procurement contract. FOE will require troop support planning, if required.

11. RESOURCE SCHEDULE

The following resources are identified for ATEC procurement:

<u>FY95</u>	<u>FY96</u>	<u>FY04</u>	<u>FY05</u>
\$19.0M	\$13.0M	\$38.25M	\$4.9M

APPENDIX A - REFERENCES

- a. TRADOC-approved Required Operational Capability (ROC) for the 25 Ton All-Terrain Crane (ATEC), TRADOC ACN 070252, Cards Reference Number 0691 dated 1 June 1990.
- b. Independent Evaluation Plan (IEP) for the All Terrain Crane (ATEC), US Army Engineer School, dated 4 March 1987.
- c. Independent Evaluation Plan (IEP) for the All Terrain Crane (ATEC), US Army Test and Evaluation Command, dated April 1987.
- d. Integrated Logistics Support Plan (ILSP) Update for the All Terrain Crane (ATC), US Army Tank-Automotive Command, dated 10 June 1990.
- e. Military Specification, Crane 25-Ton All Terrain Crane (ATEC), October 1990 (Draft), US Army Belvoir Research, Development and Engineering Center (STRBE-FMT).
- f. Life Cycle Cost Data for the 25-Ton All Terrain Crane (ATEC) Cost and Operational Effectiveness Analysis (COEA), US Army Belvoir Research, Development and Engineering Center (STRBE-CA), dated 9 November 1987.
- g. Operational and Organizational (O&O) Plan for the All Terrain Crane (ATEC), Headquarters, US Army Training and Doctrine Command, dated 23 July 1986.
- h. Expedited Amendment 2 Qualitative and Quantitative Personnel Requirements Information (EXA1QQPRI) for Crane, Wheel Mounted: Hydraulic 25 Ton All Terrain, LIN Z20150, US Army Troop Support Command, dated 28 September 1987.
- i. Basis of Issue Feeder Data, US Army Belvoir Research, Development and Engineering Center (STRBE-TIS), dated 14 September 1987.
- j. Acquisition Strategy (Draft), All Terrain Crane, US Army Tank-Automotive Command (AMCPM-CE), undated, circa 1987.
- k. System MANPRINT Management Plan (SMMP) for the 25 Ton All Terrain Crane, US Army Engineer School, dated 20 March 1990.
- l. RAM Rationale Report (RRR), US Army Engineer School, dated 13 October 1989.
- m. DA Pamphlet 70-21, Test and Evaluation Guide, dated November 1988.
- n. AR 70-10, Test and Evaluation.
- o. DOD 5000.3-M-1, Test and Evaluation Master Plan (TEMP) Guidelines, effective 26 October 1990.

APPENDIX B - BIBLIOGRAPHY OF TEST PLANS AND REPORTS

- a. Report of Market Investigation on NDI Item: 25 Ton All Terrain Crane (ATEC), US Army Belvoir Research, Development and Engineering Center (STRBE-FMT), dated 30 July 1987.
- b. Report of Supplemental Market Investigation on NDI Item: 25 Ton All Terrain Crane (ATEC), US Army Research, Development and Engineering Center (STRBE-FMT), January 1988.
- c. Final Report on Technical Feasibility Test (TFT) of All Terrain Cranes (ATEC), TECOM Project No. 8-EG-845-ATC-001. Report No. USACSTA-6668, US Army Combat Systems Test Activity, dated 24 August 1989.

APPENDIX C - SOFTWARE TEST AND EVALUATION PLAN

None required for this program.

APPENDIX D - LIST OF ACRONYMS

AAL	Additional Authorization List
ALDT	Administrative and Logistical Down Time
AMC	Army Materiel Command
AMSSA	US Army Materiel Systems Study Activity
Ao	Operational Availability
AS	Acquisition Strategy
ASIOE	Associated Support Items of Equipment
ATEC	All Terrain Crane
BDU	Battle Dress Uniform
BII	Basic Issue Item
BRDEC	US Army Belvoir Research, Development and Engineering Center
CARC	Chemical Agent Resistant Coating
CMP	Corrugated Metal Pipe
CSTA	Combat Systems Test Activity, TECOM
DCA	Diagnostic Connector Assembly
DOT	Department of Transportation
DS	Direct Support
EDS/PDS	Equipment/Personnel Decontamination Site
EMI	Electromagnetic Interference
EPA	Environmental Protection Agency
ETR	Expanded Test Report
FLS	Flight Landing Strip
FOE	Follow-on Evaluation
FORSCOM	Forces Command
FUE	First Unit Equipped
HAEMP	High Altitude Electromagnetic Pulse
HSTRU	Hydraulic System Test and Repair Unit
HQDA	Headquarters, Department of the Army
IAP	Independent Assessment Plan
IAR	Independent Assessment Report
IEP	Independent Evaluation Plan
IER	Independent Evaluation Report
ILSP	Integrated Logistics Support Plan
IOC	Initial Operational Capability
IPR	In-Process Review
IOT&E	Initial Operational Test and Evaluation
LOGC	Logistics Center
LOTS	Logistics Over the Shore
LSA	Logistics Support Analysis
MANPRINT	Manpower and Personnel Integration
MOPP	Mission Oriented Protective Posture
MOUT	Military Operations in Urban Terrain
MR	Maintenance Ratio
MTBOMF	Mean Time Between Operational Mission Failure
NBC	Nuclear, Biological and Chemical
NDI	Non-Developmental Item
OCONUS	Outside the Continental United States
O&O	Operational and Organizational
OSHA	Occupational Safety and Health Administration

APPENDIX D - LIST OF ACRONYMNS (Continued)

OTEC	Operational Test and Evaluation Command
OTP	Outline Test Plan
OVE	On-Vehicle Equipment
POL	Petroleum, Oil and Lubricants
PPT	Preproduction Testing
PPQT	Preproduction Qualification Testing
PQT	Production Qualification Testing
RAM	Reliability, Availability, and Maintainability
RD&E	Research Development and Engineering
ROC	Required Operational Capability
SMMP	System MANPRINT Management Plan
SSPCL	System Support Package Component List
STE/ICE-R	Simplified Test Equipment - Internal Combustion Engine - Reprogrammable
TACOM	Tank-Automotive Command
TDP	Technical Data Package
T&E	Test and Evaluation
TECOM	Test and Evaluation Command
TEP	Test and Evaluation Plan
TEMP	Test and Evaluation Master Plan
TEXCOM	Test and Evaluation Experiments Command
TIWG	Test Integration Working Group
TRADOC	Training and Doctrine Command
TT	Technical Testing
USAES	US Army Engineer School
USALEA	US Army Logistics Evaluation Agency

APPENDIX E - INTEGRATED TEST SCHEDULE AND DATA SOURCE MATRIX

25 Ton AM Terrain Crane (ATEC)

ITEM	TEST TITLE	TEST OBJECTIVES (CRITICAL ISSUES)	TEST SCOPE	TEST	TYPE OF DATA	SCHEDULE	PARTICIPANTS									
							L	O	C	A	T	T	R	A	M	O
2																
5	P	Excavation	Loose and In-place Soils	P	Times, Limits of Reach versus Weight	2QFY96-	A	E	E	R	E	E	R	E	E	
	P	Supply Arena	Package and Supply Handling	R	Weight, Size, Other Limitations	3QFY96	B	E	E	R	E	E	R	E	M	
	Q	ATEC with Trailer	Towing Limitations	D	Speed, Cross Country Travel, Convoy, Load Capacity	(PPQT, LOGO)	R	E	E	R	E	E	R	E	M	
	T	in Tow		U			D	E	E	R	E	E	R	E	M	
	-	Attachment Trailer	Grapnel, Clamshell, and Concrete Bucket	C	Speeds, Utility, Limitations, Adaptations	1QFY97-	E	E	E	R	E	E	R	E		
	L	in Tow		T	Work Performance	2QFY97	N	E	E	R	E	E	R	E		
	L	Personnel Performance	5th Percentile Female, 95th Percentile Male	I		(PQT)	P	E	E	R	E	E	R	E	M	M
	D	Safety and Health	Controlled to Acceptable Level	N	Observation, Measurement and Inspection		R	E	E	R	E	E	R	E	M	
	G		Quantify RAM Capabilities	O	MTBOMF, MTR, System RAM, Total Failures		V	E	E	R	E	E	R	E	M	
		RAM	Supportable in Operating Arena	P	Restrictions, Extra Tools or Personnel, PM Time, Adequacy of Manuals		I	E	E	R	E	E	R	E	M	
		Logistics		E			N	E	E	R	E	E	R	E	M	
				V			G	E	E	R	E	E	R	E	M	
				E			R	E	E	R	E	E	R	E	M	
				H			O	E	E	R	E	E	R	E	M	
				I			D	E	E	R	E	E	R	E	M	
				C				E	E	R	E	E	R	E	M	
				L				E	E	R	E	E	R	E	M	
				E				E	E	R	E	E	R	E	M	

Continued on Next Page.

Test Key: R: Responsible for Test
P: Participant in Test
M: Monitor for Evaluation
E: Evaluation of Data
O: Observe Only

APPENDIX F - OPERATIONAL CHARACTERISTICS

Following, are the operational characteristics for the ATEC listed in the approved ROC, dated 11 June 1990. The list includes both associated and non-critical test issues.

- a. Operate on US, German and Korean primary and secondary roads with a loaded M345 10-ton attachment trailer (special permits are acceptable), and off-road.
- b. On primary and secondary roads, maintain minimum speeds of 40 to 45 mph on grades less than one percent and ascent, descend, stop, and start on 30 percent grades without a trailer.
- c. Lift a minimum of 25 tons (50,000 lb) at a 10-foot radius through 360° rotation with outriggers extended.
- d. Perform basic crane functions (lift, swing, lower, and rotate continuously through a 360° sweep with rated loads and outriggers extended) and other operational missions described in paragraph 3c of the TEMP body, and pick and carry a minimum of 12,000 pounds at a radius of 15 feet.
- e. Operate and withstand storage on climatic design types hot, basic, and cold. Use of a cold weather kit is acceptable in temperatures below -25°F.
- f. Be equipped with selective/all wheel drive which is capable of being engaged from the driver's position.
- g. Be equipped with three-mode (front wheel, all wheel, and crab steer) steering and an emergency backup steering system. The steering system must include an indicator in the cab and a rear-wheel steering lockout device from within the cab.
- h. Be equipped with independently controlled hydraulic outriggers.
- i. Have a hydraulically operated, telescoping boom extendible and operable to at least 70 feet in length.
- j. Be camouflage painted.
- k. Be capable of being employed with appropriate clamshell, concrete bucket, pile driving, and grapnel attachments compatible with the item selected for procurement.
- l. Be equipped with a load moment indicating system, boom lockout/safety device to percent overloading during lifting operations, a mechanical boom angle and boom length indicator, and complete load capacity charts affixed inside the cab, so as to be easily visible to the operator when seated.
- m. Traverse a 15 percent side slope without a load or trailer.
- n. Tow a 10 ton, M345 trailer (or equivalent) on primary and secondary roads at reduced speed (<40 mph). Be able to stop with trailer in tow in a reasonable, safe distance.

- o. Be towable with standard military tow bars without incurring damage to its drive chain.
- p. Provide illumination for nighttime loading and unloading operations and be equipped with standard blackout, marker, and secure (bluegreen) lighting systems.
- q. Be compatible with STE/ICE-R internal combustion engine diagnostic system.
- r. Achieve acceptable operational performance using standard military lubricants, kerosene type turbine fuels (JP-5 and JP-8), distillate type fuels (diesel), and commercial equivalents.
- s. With rated payload in trailer, have a minimum range of 200 miles.
- t. Without the trailer, be able to negotiate truck traffic fords (30 in.).
- u. Not produce electromagnetic interference (EMI) that will interfere with the operations of adjacent communications and electronic systems.
- v. Be equipped with a standard NATO slave cable and be able to use the NATO slave cable to receive a slave start from and give a start to other military vehicles and equipment.
- w. Have secure storage for BII, AAL items, and publications.
- x. Be capable of operations in petroleum storage areas.
- y. Be compatible with the Hydraulic System Test and Repair Unit (HSTRU).
- z. The ATEC will be high altitude electromagnetic pulse (HAEMP) survivable and contamination survivable.
- aa. The LSA process and LSAR process will be used to determine and define the logistic support and the personnel tasks and skills for operation, maintenance, and support of the ATEC system.

APPENDIX G - POINTS OF CONTACT

<u>POSITION</u>	<u>NAME/ORGANIZATION</u>	<u>AV/COMMERCIAL</u>
Materiel Developer	Edward E. Rudy Belvoir RD&E Center	AV 354-4774 C (703)664-4774
Combat Developer	Charles Jackson USAES (ATSE-CDT)	AV 676-7966 C (314)563-7966
Technical Tester	Gary Jastrob USATECOM	AV 298-3766 C (301)278-3766
Independent Techni- cal Assessor	Jerry Schueler USATECOM	AV 298-3026 C (301)278-3026
Operational Tester	Sean M. Wachutka USATEXCOM	AV 738-9146 C (817)288-9146
Operational Evaluator OTEC Representative	MAJ Joseph C. Marino, Jr. USAOTEA	AV 289-0378 C (703)756-0378
Logistician	Sharon Leukin USAMSSA	AV 298-6777 C (301)278-6777
Trainer	Roland Dyer USAES (ATSE-TDN-M)	AV 676-7633 C (314)565-7633
Procurement Activity Product Manager - CE	Dennis McCarthy USATACOM, AMCPM-CE	AV 786-5001 C (313)574-5001
Materiel Developer (RAM)	Anh Ma Belvoir RD&E Center	AV 354-5988 C (703)664-5988
Combat Developer (RAM)	Rebecca Johnson USAES	AV 676-7973 C (314)563-7973
Log Center	Howard Cohen USALOGC	AV 687-3455 C (804)734-3455
Hq, TRADOC	LTC Ledbetter USATRADOC-MW	AV 680-2285 C (804)727-2285
Hq, AMC	MAJ Schwarz USAAMC	AV 284-8122 C (202)274-8122
Hq, DA	MAJ Gallion USAHQDA	AV 225-7545 C (202)695-7545

APPENDIX G - POINTS OF CONTACT (Continued)

<u>POSITION</u>	<u>NAME/ORGANIZATION</u>	<u>AV/COMMERCIAL</u>
Hq, FORSCOM	LTC Duncan USAFORSCOM - Force Mod	AV 367-5424 C (404)669-5424
AMC Maj Subordinate	David Craycraft USACTA (AMXCT)	AV 745-3779 C (
ILS Manager	Ms. Davies-Gaddy BRDEC (AMSTR-LAL)	AV 354-2879 C (703)664-2879
DADCSLOG	Mrs. Blank DALO-SMS	AV 224-7054 C (703)694-7054
Materiel Readiness Support Activity	Mr. Byrnes AMXMO-ED	AV 298-4202 C
Personnel Integration Center	Mr. Joe Sawyer ATNC-NMM-B	AV 221-2080 C (202)325-2080
Transportability Representative	Mr. Michael Cochrane MTTE-TRV	AV 927-4646 C (804)878-4646
Naval Construction Battalion Center	Mr. Tom Ward Port Hueneme, CA	AV 360-1255 C (805)982-1255

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Commander US Army Belvoir Research, Development and Engineering Center ATTN: SLCHE-ME, STRBE-Q, STRBE-TE, STRBE-TS, STRBE-TQ, AMSTR-LAL Fort Belvoir, VA 22060-5606	6
(Note: CAC has been removed from distribution per Major Bolt, ATZL-TIE, (913)684-5680, since they have reorganized and only do IAPs). Commander US Army Combined Arms Center ATTN: ATZL-TIE Fort Leavenworth, KS 66027-5130	1

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Commanding Officer Naval Construction Battalion Center Port Hueneme, CA 93043-5000	1
Commander US Army Personnel Integration Command ATTN: ATNC-NMM-B 200 Stovall Street Alexandria, VA 22332-1345	1

APPENDIX C
TECHNICAL SUPPORT AND DOCUMENTATION MANAGEMENT
FOR
24 TON ALL TERRAIN CRANE
MINUTES OF THE ATEC TEST INTEGRATION WORKING GROUP (TIWG)
MEETING



DEPARTMENT OF THE ARMY

US ARMY BELVOIR RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
FORT BELVOIR, VIRGINIA 22060-5606

STRBE-FMT

14 November 1990

MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: Minutes of the 25 Ton All Terrain Crane (ATEC) Test Integration Working Group (TIWG) Meeting - 4 October 1990

1. The TIWG for the ATEC was held at Ft. Belvoir, VA on 4 October 1990 to review the Test and Evaluation Master Plan. A list of attendees is at Enclosure 1.

2. Following introductions and administrative announcements, the project engineer, Mr. Ed Rudy, presented an overview of the ATEC program (see enclosure 2). Copies of the draft TEMP were mailed out on 27 August 1990 and seven sets of comments had been received which were discussed during the TWIG. A subsequent set of comments was received from the Personnel Integration Command which are included in the evaluated set of comments. A box score of accepted and rejected comments along with the reasons for rejection are at Enclosure 3, and the comments themselves are at Enclosure 4. Attached is a revised ATEC TEMP with major revisions, reflecting the numerous accepted comments and a conversion to the TEMP format required in DOD 5000.3-M-1 which was effective 26 October 1990.

3. Several issues were raised during the TIWG. Some of these issues were minor and dealt with format of the TEMP, while others were important and are covered in Enclosure 3, and highlighted in the following subparagraphs.

a. Of key importance to this non-developmental item (NDI) program, are the standards to which it is designed. AMCPM-CE was emphatic about the fact that a NDI crane can not be acquired using the requirements outlined in MIL-STDs-1472 and 1474. After some discussion, it was agreed that ATEC's design would be guided by Society of Automotive Engineers (SAE) Standards, the standards normally used by industry.

b. An Integrated Logistics Support Management Team (ILSMT) meeting was held on 30 August 1990, during which was discussed how to handle hydraulic versus cable-operated attachments (clamshell and grapple). There was no resolution of this issue for the TIWG meeting but subsequently, it was determined that the Engineer School will be asked to prepare a separate Basis of Issue Plan (BOIP) for each attachment, and that a Line Item Number (LIN) will be obtained for each. This approach provides the flexibility for the LINs to be in TOEs and still be available for acquisition by other units.

c. Testing will be technical in nature, and accomplished by Test and Evaluation Command (TECOM)/Combat Systems Testing Activity (CSTA). The additional time and cost of operational testing by Test and Evaluation Experimental Command (TEXCOM) is not deemed necessary since similar cranes evaluated in the Market Investigation had been used in the commercial field for years and would be operationally adequate for US Army needs. Also, TEXCOM/User

personnel are invited to attend, observe and comment upon technical testing. The Market Investigation has not been favorably evaluated by the Engineer School, nor assessed by TECOM.

d. The production contract will be structured to acquire approximately four ATECs and sets of attachments which will undergo Preproduction Qualification Testing (PPQT). A Logistics Demonstration (LOGD) in the same time frame may require one or two more ATECs. If the PPQT and LOGD are successful and no modifications are desired, ATEC would go into full-scale production without any other testing. If minor (<5 percent price increase) changes are desired to improve the technical or operational performance of ATEC, the production contract would be modified, and the modified production cranes would undergo production qualification testing (PQT). It is understood that any modifications to ATEC will not only require a contract modification, but also additional funding.

e. The Project Manager for Commercial Construction Equipment (AMCPM-CE) has updated the ATEC Acquisition Strategy, which is available from Commander, USATACOM, ATTN: AMSTE-WD, Warren MI 48397-5000; POC is Ms. Masty at AV 786-5671.

4. Request you provide concurrence/comments on the minutes and the revised TEMP to Mr. Ed Rudy, AV354-4470, Commercial (703)664-4774, FAX (703)355-7732 before 21 December 1990. Non-responses by that time will be considered concurrence with the minutes, enclosures and attachments.

4 Encls

1. Attendees
2. Program Overview
3. Accepted/Rejected Comments
4. Comments

2 Att

1. Revised TEMP
2. Updated Acquisition Strategy



LYNWOOD C. ROOT

Chief

Marine and Mechanical Equipment
Division

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Commander, US Army Materiel System Study Activity, ATTN: AMXSV-LA, Aberdeen Proving Ground, MD 21005-5066

Commander, US Army Military Traffic Management Command - Transportation Engineering Agency, ATTN: MTTE-TRV (Mr. Michael Cochrane), Newport News, VA 23606-0276

Commander, US Army Belvoir Research, Development and Engineering Center
ATTN: SLCH-ME, STRBE-Q, STRBE-TE, STRBE-TS, STRBE-TQ, AMSTR-LAL, Fort Belvoir, VA 22060-5606

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Commander, US Army Materiel Command, ATTN: AMCDE-SSV, 5001 Eisenhower Ave., Alexandria, VA 22333-0001

Operational Test and Evaluation Agency, ATTN: CSTE-CSS, 4501 Ford Ave., Alexandria, VA 22302-1458

Commanding Officer, Naval Construction Battalion Center, Port Hueneme, CA 93043-5000

Commander, US Army Personnel Integration Command, ATTN: ATNC-NMM-B, 200 Stovall Street, Alexandria, VA 22332-1345

Enclosure 1

25 Ton ATEC TIWG Attendees

4 October 1990

Fort Belvoir, VA 22060-5606

<u>Attendee Name</u>	<u>Agency</u>	<u>Phone Numbers</u>
Edward Rudy	BRDEC (STRBE-FMT)	AV 354-4770 C (703)664-4774 FAX (703)355-7732
Henry W. Schaefer	BRDEC (STRBE-FMT)	AV 354-5501 C (703)664-5501 FAX (703)355-7732
Vinod Mehta	AMCPM-CE	AV 786-6649 C (313)574-6649 FAX AV786-6833
Dennis McCarthy	AMCPM-CE	AV 786-5001 C(313)574-5001 FAX AV786-6833
Charles D. Jackson	USAES (ATSE-CDT)	AV 676-7966 C (314)563-7966 FAX (314)563-7950
Roland A. Dyer	USAES (ATSE-TDN-M)	AV 676-7633 C (314)563-7633 FAX (314)563-7950
Sean M. Wachutka	HHC TEXCOM	AV 738-9146 C (817)288-9146
Sudarana R. Paruchuri	TACOM (AMSTA-QRA)	AV 786-8784 C (313)574-8784
Anh Ma	BRDEC (STRBE-TQR)	AV 354-5988 C (703)664-5988
Daniel Ojeifoh	BRDEC (STRBE-TQR)	AV 354-5988 C (703)664-5988.
John Reinhart	Belvoir HEL Det (SLCHE-ME)	AV 354-4713 C (703)664-4713

25 Ton ATEC TIWG Attendees (Continued)

Davies Gaddy	BRDEC (AMSTR-LAL)	AV 354-2879 C (703)664-2879 FAX (703)355-7732
Gary Jastrob	TECOM (AMSTE-TA-T)	AV 298-3766 C (301)278-3766
Le Luu	BRDEC (STRBE-Q)	AV 354-2681 C (703)664-2681
Don Sherwood	BRDEC (STRBE-TE-1)	AV 354-4019 C (703)664-4019
LTC Wojtkuy?	OTEA (CSTE-CS)	DSN 289-0370 FAX DSN 289-0365
John Daugherty	SAIC	C (703)821-4347 FAX (703)821-1037

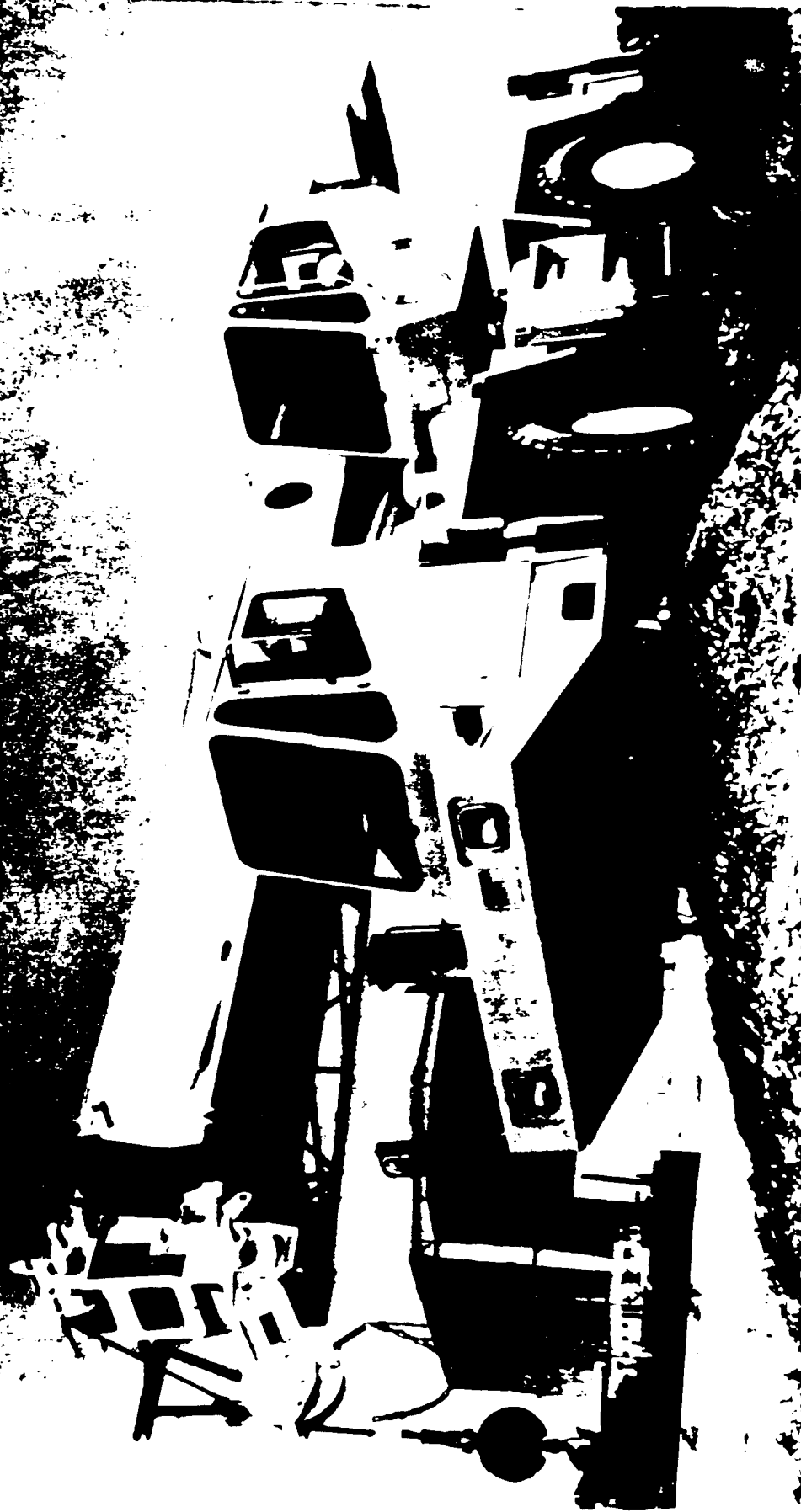
Enclosure 2

25 Ton All Terrain Crane (ATEC) Overview

TIWG PRESENTATION

Enclosure2-1

IN CRANE



25 TON ALL TERRAIN CRANE PROGRAM

BELVOIR RD&E CENTER FUNDING

<u>FY87</u>	<u>FY88</u>	<u>FY89</u>	<u>FY90</u>	<u>FY91</u>
\$100K (DE125-201)	\$290K (DE65-3581)	\$105K (DE65-3581)	\$100K (DE65-3581)	\$100K (DE65-3581) (PROPOSED)

FY90 FUNDING BREAKDOWN:

PROGRAM DOCUMENTATION TO INCLUDE:

- UPDATE OF AS, ILSP, AND TEMP
- FORMULATION AND COORDINATION OF SPECIFICATION
- PREPARATION OF NEEDED DOCUMENTATION FOR AMC PRE-IPR MARC AND MDR I/III SIPR (TC)

ATEC ACCOMPLISHMENTS

29 AUG 1990

ACCOMPLISHMENTS:

FIRST CONSTRUCTION EQUIPMENT PROGRAM INVOLVING TACOM FROM INCEPTION (FY87)

MARKET INVESTIGATION COMPLETED JUL 87, UPDATED JAN 88

LIFT AND REACH REQUIREMENTS FOR 25 TON CLASS CRANE DETERMINED

TECHNICAL FEASIBILITY TESTS OF TWO COMMERCIAL ALL TERRAIN MODELS COMPLETED AUG 89

ROC APPROVED

TASKINGS:

BELVOIR: DEVELOP AND COORDINATE SPECIFICATION, UPDATE TEMP AND PREPARE OTHER DOCUMENTATION FOR PROGRAM REVIEWS

TACOM: UPDATE AS AND ILSP

CRITICAL EVENTS:

COORDINATED SPECIFICATION

TYPE CLASSIFICATION

ISSUES:

PRODUCTION FUNDING SPLIT - FY95, FY96, FY04, FY05. ORIGINALLY PROGRAMMED FOR FY 89-92

USE OF HYDRAULIC ATTACHMENTS VERSUS CURRENT CABLE OPERATIONS AND EFFECT OF PILEDIVING REQUIREMENTS

ATEC STATUS

(1 AUG 90)

- ROC APPROVED 29 MAY 1990
- PROGRAM DOCUMENTATION BEING UPDATED - TASK ORDER
AWARDED TO SAIC FOR IPR PREPARATION
- MDR I/III SIPR (TC) IS SCHEDULED FOR 3QFY91

ATEC TECHNICAL CHARACTERISTICS

- STATE-OF-THE-ART, HYDRAULICALLY OPERATED
- TRAVEL OVER PRIMARY, SECONDARY, AND OFF-ROAD AT THE TACTICAL SUPPORT MOBILITY LEVEL
- SAFE OPERATION AT HIGHWAY SPEEDS OF AT LEAST 40 MPH ON PRIMARY AND SECONDARY ROADS WITH 1% GRADES, AND STOP AND START ON 30% GRADES
- MINIMUM LIFT OF 25 TONS @ 10' RADIUS WITH OUTRIGGERS
- PERFORM BASIC CRANE FUNCTIONS INCLUDING PICK AND CARRY AT LEAST 12,000 LBS
- PERFORM ENGINEER MISSION TASKS DURING DAY AND NIGHT OVER TERRAIN NORMALLY ENCOUNTERED BY ENGINEER UNITS
- LOGISTICALLY SUPPORTABLE IN WARTIME ENVIRONMENT

ATEC REQUIREMENTS

- OPERATIONAL AND ORGANIZATIONAL PLAN APPROVED BY TRADOC
23 JULY 1986
- PROPONENT - TRADOC THROUGH ENGINEER SCHOOL
- PROGRAM ADDRESSES BDP DEFICIENCIES #43, 104, 270, AND 282
- PROGRAM MAMP DESIGNATION - SSN X00800
- DRAFT ROC FORMULATED FEB 87, UPDATED BY JWG'S 10 JUN 87, 25
AUG 87, 7 OCT 87, AND 27 JAN 88. SUBMISSION TO TRADOC FOR
APPROVAL ON 7 APR 88.
- ROC APPROVED 31 MAY 90

25 TON ALL TERRAIN CRANE

(ATEC)

THE 25 TON ALL TERRAIN CRANE (ATEC) IS A PROGRAM TO REPLACE OUTDATED, WORN OUT 20 TON ROUGH TERRAIN AND TRUCK- MOUNTED CRANES PLUS THE 25 TON TRUCK-MOUNTED CCE CRANES WITH STATE-OF-THE-ART, HYDRAULICALLY OPERATED ALL TERRAIN CRANES. THE PROGRAM IS BEING CO-MANAGED BY TACOM (PM-CCCE) AND BELVOIR RESEARCH, DEVELOPMENT AND ENGINEERING CENTER.

Enclosure 3

ACCEPTANCE AND REJECTION OF COMMENTS - 25 TON ATEC TIWG

3.1 The figure which follows, contains the box score for the comments accepted and rejected from the eight sets of comments received for the 25 Ton ATEC TEMP. Following the Figure, is a cite to comments which were rejected, and the rationale therefore. Copy of all the comments and their transmittal letters are contained in Enclosure 4.

	Comments		
	Received	Accepted	Rejected
TACOM (AMCPM-CE)	56	53	3
OT&A (CSTE-CS)	34	29	5
Engineer School (ASTE-CDT)	29	29	0
USAPIC (ATNC-NMM-B)	17	15	2
BELVOIR ILS (AMSTR-LAL)	14	13	1
MCMT-TEA (MTTE-TRV)	7	7	0
BELVOIR HEL (SLCHE-ME)	5	3	2
HQ,TRADOC (ATCD-ME)	Concurred	w/o	Comments
Totals	162	149	13

Figure 3-1. Comment Acceptance and Rejection Tally

3.2.1 TACOM Comment tt.

COMMENT Page IV-2, paragraph 3.a

We will not allow ourselves to be preplanning for changes of NDI after award of a production contract which will cause increased contract cost. If need be, let's plan for more testing prior to Milestone III IPR.

RESPONSE

The acquisition of test articles for PPQT will be the Army's first time to put their hands on the equipment. The "more testing" will be accomplished during

PPQT. It is understood that changing the contract will incur increased cost; if some small items are not acceptable to the technical/user community, will we terminate the contract? Probably not, we would modify it. As suggested in the revised TEMP, the increase in cost may be limited to some percent of unit cost such as five percent.

3.2.2 TACOM Comment uu.

COMMENT Page IV-2, paragraph 3.c

Need to do before production if we are trying to determine acceptability of Equipment. Maybe we shouldn't be NDI.

RESPONSE

Same as 3.2.1 above.

3.2.3 TACOM Comment ww.

COMMENT Page IV-2, paragraph 3.c.(3)

What if rates are not acceptable to user? Do we cancel program? Point being, it must be done before production.

RESPONSE

Same as 3.2.1 above.

3.2.4 OTEA Comment 7.

COMMENT Page I-2, paragraph 2.c

Revise to include the unique characteristics which drive special test and analysis requirements. Among such are NBC contamination survivability, support of logistics over-the-shore (LOTS) operations, and HAEMP survivability testing.

RATIONALE: The stated characteristics appear to drive unique test requirements as defined in paragraph 2c, Part I, Figure O-5, DA Pam 70-21.

RESPONSE

The need to adequately address NBC and HAEMP survivability has been included in the revised TEMP. LOTS is not addressed because it is not now mentioned in the 11 June 1900 ROC, and is omitted intentionally.

3.2.5 OTEA Comment 14.

COMMENT Page II-1, paragraph 1.e

TEXCOM test activities prepare T&E plans and expanded test reports for user tests, not technical tests. In that regard, it appears that an operational test is required to answer the 11 critical operational issues (COIs) included in Part

Enclosure 3-2

IV, this TEMP. The TIWG should be convened to prepare a revised T&E strategy. The current T&E strategy appears to be inadequate for reasons stated above.

RATIONALE: Self-explanatory.

RESPONSE

The TEMP has been revised to include user participation in technical testing - PPQT and PQT testing. This provides the user/operator the opportunity to observe and evaluate their COIs. An NDI approach still appears feasible, and is desired.

3.2.6 OTEA Comment 15.

COMMENT Page II-1, paragraph 1.g

Recommend expanding the tester's T&E responsibilities. Also, will the trainer actually coordinate the training for the PPQT?

RATIONALE: Completeness and correctness.

RESPONSE

The TEMP has expanded the responsibilities of the testers. Yes, the trainers will actually coordinate training for the PPQT, and PQT.

3.2.7 OTEA Comment 26.

COMMENT Page IV-1, paragraph 2

The MI and the subsequent TRADOC evaluation if conducted, should be described here. The content should be described here. The contents should be as described in paragraph 2, Part IV, Figure 0-5, DA Pam 70-21. If the evaluation was not conducted, so state. If such is the case, an operational test or tests must be scheduled to address operational issues.

RATIONALE: Self-explanatory. The approved COIs and additional operational issues must be appropriately resolved.

RESPONSE

This is not an R&D effort. The operational aspects are considered from industry successfully using ATEC for similar missions. As stated above, users/operators are invited to attend the PPQT and PQT.

3.2.8 OTEA Comment 34.

COMMENT Page E-1, Appendix E

Add OTEA and the USAES to the list of participants. OTEA will evaluate the result of testing in preparing its IPR position paper and it will endorse the test report for each schedule OT&E. Show that TECOM will evaluate the results

Enclosure 3-3

of PPQT and PQT. Delete TRADOC and replace with the appropriate TRADOC proponent (the USAES). Use test objectives for each test (show PPQT and PQT separately) not a list of issues. Also, it appears inappropriate to state that the PPQT will use a production type vehicle. By definition, a PPQT is a preproduction test conducted on prototypes or preproduction hardware. The PQT must be conducted on production items.

RATIONALE: Correctness.

RESPONSE

Most of this comment is accepted as it pertains to assigning responsibilities. The definition of PPQT as it appears on Page E-2 of DA Pam 70-21 states " PPQTs will also provide a baseline for the test requirements in the Technical Data Package for follow-on production testing. PPQT is accomplished during the first limited production or full scale production contract and is repeated if the process or design is significantly changed, if a second source for the system or a major component thereof is brought on line, or if a significant break in production occurs." This definition seems right on for the ATEC NDI process, and will most likely lead to a PQT. If the PPQT goes exceptionally well, the TIWG may decide to omit a PQT phase, thus the specific PQT issues are not identifiable at this time.

3.2.9 USAPIC Comment 3.

COMMENT Cover page

Line states: Release Limitations - US Government Agencies only. Should security classification be for Official Use Only?

RATIONALE: TEMP coordination cover page not IAW DA Pam 70-21, page Q2.

RESPONSE

There is no precedent for making the TEMP for an NDI Official Use Only, and it would tend to restrict the document's utility because it must be secured (out of sight, out of mind). The TEMP coordination cover sheet is per the locally directed format.

3.2.10 USAPIC Comment 10.

COMMENT Page I-3, Figure 1

Figure 1 is incomplete.

RATIONALE: Ref approved ROC, dated 29 May 1990. The 40-50 MPH on less than one percent grade, traverse 15 slope w/o trailer, pick and carry operation, etc.

RESPONSE

The figure on page 3 includes critical and associated technical issues which are taken from the ROC and the Engineer School IEP.

Enclosure 3-4

3.2.11 BELVOIR ILS 7.

COMMENT Page IV-2, paragraph 3

First sentence, after "Follow-On" add "Operational Test and".

REASON: IF FOTE is required, it should be performed concurrently with PPQT to confirm that the winning production contractor's ATEC will meet performance/user requirements. PQT is geared more to materiel release testing performed on randomly selected production items.

RESPONSE

As a result of the TIWG, it was determined that FOTE was not appropriate and that user requirements would be validated with their observation during PPQT and PQT.

3.2.12 BELVOIR HEL 1.

COMMENT Page I-2, paragraph 3.e

Change paragraph to read: The ATEC shall comply with the applicable HFE criteria in MIL-STD-1472.

REASON: Conformance to MIL-STD-1472 is a technical, rather than operational issue. The current paragraph 3.e is an operational issue and should be addressed in section 4.

RESPONSE

It was discussed and determined by the TIWG, that the ATEC will be designed according to commercial Society of Automotive Engineers (SAE) standards, which is consistent with the NDI process. To do MIL-STD-1472 would not result in a NDI.

3.2.13 BELVOIR HEL 2.

COMMENT Page I-3, Figure 1

Change "Operate, 5% Female, 95% Male" to read: "Human Factors Engineering" and change "Requirement" to: MIL-STD-1472.

REASON: Same as 1 above.

RESPONSE

Same as 3.2.12 above.

Enclosure 4

**25 Ton All Terrain Crane (ATEC) Comments Received
for
TIWG**

Enclosure 4

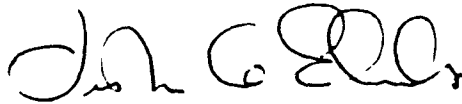
ATCD-ME (STRBE-FMT/27 Aug 90) (70-ir) 1st End
SUBJECT: Test Integration Working Group (TIWG) Meeting for the
25 Ton All Terrain Crane (ATEC) on 4 October 1990

Commander, TRADOC, ATTN: ATCD-ME, Ft Monroe, VA 23651-5178

FOR Commander, USABRDEC, ATTN: STRBE-FMT, Ft Belvoir, VA
22060-5606

1. This directorate concurs with the subject document.
2. Restrictions on TDY for the foreseeable future will preclude TRADOC HQ attendance at this TIWG review.
3. POC this headquarters is LTC Leadbetter, ATCD-ME, AV 680-2285.

FOR THE DEPUTY CHIEF OF STAFF FOR
CONCEPTS, DOCTRINE AND DEVELOPMENTS:



JEROME G. EDWARDS
Colonel, GS
Director, Combat Requirements

Encl
wd



DEPARTMENT OF THE ARMY

UNITED STATES ARMY ENGINEER SCHOOL
FORT LEONARD WOOD, MISSOURI 65473-8000



REPLY TO
ATTENTION OF

ATSE-CDT

0100000

MEMORANDUM FOR COMMANDER, U.S. ARMY BELVOIR RESEARCH, DEVELOPMENT
AND ENGINEERING CENTER, ATTN: STRBE-FMT
(MR. RUDY), FORT BELVOIR, VA 22060-5606

SUBJECT: 25 Ton All Terrain Crane (ATEC), Test and Evaluation
Master Plan (TEMP)

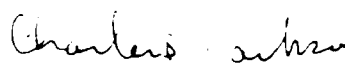
1. Reference memorandum, BRDEC, STRBE-FMT, 27 Aug 90, subject:
Test Integration Working Group (TIWG) Meeting for the 25 Ton All
Terrain Crane (ATEC) on 4 October 1990.
2. Enclosed are USAES comments regarding the ATEC TEMP.
3. TEMP concurrence/nonconcurrence will be provided at the 4 Oct
TIWG.
4. Point of contact for this action is Mr. Charles Jackson,
AUTOVON 676-7966.

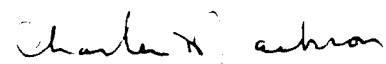
Encl

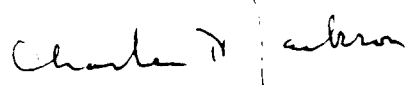

FREDERICK J. CHARLES, III
COL, EN
Director of Combat Developments



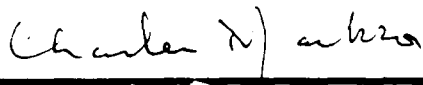
Center for Excellence

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).		DATE	
For use of this form, see AR 25-30, the proponent agency is ODISC4									
TO: (Forward to proponent of publication or form) (Include ZIP Code) Cdr, USABRDEC ATTN: STRBE-FMT FT Belvoir VA 22060-5606						FROM: (Activity and location) (Include ZIP Code) Cdr, USAES ATTN: ATSE-CDT Ft Leonard Wood, MO 65473			
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS									
PUBLICATION FORM NUMBER						DATE 14 Feb 90		TITLE TEMP for the 25 TON Crane (ATEC)	
ITEM NO	PAGE NO	PARA-GRAPH	LINE NO	FIGURE NO	TABLE NO	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended change, if possible.)			
1						COMMENT: Regarding the TIWG Coordination Sheet, change the Combat Developer attention line to read: " <u>ATSE-CDT.</u> " RATIONALE: Correctness.			
2						COMMENT: Regarding the TEMP cover sheet, delete: "O&O Plan (Jul 86)," and replace with: " <u>ROC dated 11 Jun 90,</u> " as the requirement document. RATIONALE: The approved ROC should represent the authority for requirements.			
3	POC-1					COMMENT: Change the Combat Developer POC from: "Lucius Warrick," to: " <u>Charles Jackson,</u> " phone numbers are: <u>AV 676-7966/(C)(314) 563-7966.</u> RATIONALE: Correctness.			
4	POC-1					COMMENT: Delete entire line regarding "Independent Operational Assessor." RATIONALE: This is not a function of "USAES."			
5	I-1	1	10			COMMENT: Change "hot and basic climates" to read " <u>Hot, basic, and cold climates.</u> " RATIONALE: Agreement with ROC.			
*Reference to line numbers within the paragraph or subparagraph.									
TYPED NAME, GRADE OR TITLE Charles D. Jackson GS-12					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION AV 676-7966			SIGNATURE 	

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30, the proponent agency is ODISC4						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: (Forward to proponent of publication or form) (Include ZIP Code)						FROM: (Activity and location) (Include ZIP Code)	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION FORM NUMBER						DATE	TITLE
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended change, if possible).	
6	I-1	2(a)				COMMENT: Delete: "... (IEP - now refereed to as the Independent Assessment Plan (IAP)), ... " RATIONALE: Correctness. The term Independent Evaluation Plan (IEP) hasn't changed. The IAP is a technical, not an operational evaluation plan. It is a TECOM, not a TRADOC product.	
7	I-2	Communications				COMMENT: Delete "(1)". RATIONALE: If there is a (1) there should be a (2).	
8	I-3	Figure				COMMENT: Delete: "82% Ao" and replace with: <u>"83% Ao"</u>. RATIONALE: Correct per the approved "RAM Rational Report (RRR)," dated 13 Oct 89.	
9	1-4	4				COMMENT: This paragraph is not consistent with the approved ROC dated 11 Jun 90. RATIONALE: The operational characteristics stated in this paragraph are based on the approved USAES IEP, dated Feb 87.	
10	I-4	g.				COMMENT: Recommend deletion. RATIONALE: Information is covered under k.	
*Reference to line numbers within the paragraph or subparagraph.							
TYPED NAME, GRADE OR TITLE Charles D. Jackson GS-12					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION AV 676-7966		SIGNATURE 

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
For use of this form, see AR 25-30, the proponent agency is ODISC4							
TO: (Forward to proponent of publication or form) (Include ZIP Code)						FROM: (Activity and location) (Include ZIP Code)	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION FORM NUMBER						DATE	TITLE
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended change, if possible).	
11	I-4	k.				COMMENT: Change Operational Availability figures to read <u>"83% and 87% for was and peacetime, respectively"</u>. COMMENT: After Maintainability, add <u>"(mmh/op.hrs)." </u> Change .084, .021, .010 and .120 to read <u>".124, .031, .015 and .170 respectively."</u> RATIONALE: Correct per the approved "RAM Rational Report (RRR)," dated 13 Oct 89.	
12	I-5	g.	2			COMMENT: Change "with it on a trailer" to read <u>"with it on a M345, 10 ton trailer"</u>. RATIONALE: Identifies type of trailer.	
13	I-5	h	1			COMMENT: Change "40 mph on level primary" to read <u>"40 mph on level (grade < 1%) primary"</u>. RATIONALE: Agreement with ROC.	
14	I-6	nn				COMMENT: Change "Be compatible with selected existing crane attachments" to read <u>"Be compatible with the end item selected for procurement"</u>. RATIONALE: Change 1 to approved ROC (PENDING).	
15	I-6	pp				COMMENT: Change "hot and basic" to read <u>"hot, basic and cold"</u>. RATIONALE: Agreement with ROC.	
*Reference to line numbers within the paragraph or subparagraph.							
TYPED NAME, GRADE OR TITLE Charles D. Jackson GS-12						TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION AV 676-7966	SIGNATURE 

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC, SM).	DATE
For use of this form, see AR 25-30, the proponent agency is ODISC4							
TO: (Forward to proponent of publication or form) (Include ZIP Code)						FROM: (Activity and location) (Include ZIP Code)	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC, SM) AND BLANK FORMS							
PUBLICATION FORM NUMBER						DATE	TITLE
ITEM NO.	PAGE NO.	PARA- GRAPH	LINE NO.	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON <i>(Provide exact wording of recommended change, if possible).</i>	
16	II-1	1(d)				RECOMMENDATION: Delete entire sentence and replace with following: (1) Participate in the preparation of the TEMP. (2) Participate in the test planning, review test report, and forward comments as appropriate. (3) Monitor the conduct of tests to assist in clarifying the system's requirements, or its concept of operations. (4) Provide approved issues and criteria to support testing. (5) Participate as a voting member at all Scoring Conference. RATIONALE: Accuracy	
17	II-1	1(e)				RECOMMENDATION: Confer with TEXCOM regarding the correctness of this paragraph. RATIONALE: Per conversation with Mr. Milton, TEXCOM do^s not conduct PPQT, only operational tests such as, EUT&E, IOT&E, and FOT&E.	
18	II-1	2a(2)				COMMENT: Delete: "IAP" and "IAR." RATIONALE: "IAPs" and "IARs" are not TRADOC products, they are TECOM products.	
19	II-3			fig-2		COMMENT: Delete: "IAP" (TRADOC), and replace with: "IEP" (TRADOC). RATIONALE: Correct terminology.	
*Reference to line numbers within the paragraph or subparagraph.							
TYPED NAME, GRADE OR TITLE						TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Charles D. Jackson GS-12						AV 676-7966	Charles D. Jackson

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).		DATE	
For use of this form, see AR 25-30, the proponent agency is ODISC4									
TO: (Forward to proponent of publication or form) (Include ZIP Code)						FROM: (Activity and location) (Include ZIP Code)			
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS									
PUBLICATION FORM NUMBER						DATE		TITLE	
ITEM NO	PAGE NO	PARA-GRAPH	LINE NO *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended change, if possible)			
20	II-3			fig-2		COMMENT: Delete: "IAR" (TRADOC) RATIONALE: "IAR" is a TECOM, not a TRADOC product.			
21	IV-1	1				COMMENT: Delete: "... School IAP dated..." and replace with: "...School IEP dated..." RATIONALE: Correct terminology.			
22	IV-1	1(a)				COMMENT: Delete entire paragraph and replace with: a. Critical Operational Test & Evaluation Issue: (1) Does the ATEC demonstrate essential performance characteristics to complete mission requirement in an operational environment? (2) Do the overland mobility and maneuverability characteristics of the ATEC satisfy the mission requirements? RATIONALE: The above are the only approve critical operational issue (COI).			
*Reference to line numbers within the paragraph or subparagraph.									
TYPED NAME, GRADE OR TITLE					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE		
Charles D. Jackson GS-12					AV 676-7966				

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
For use of this form, see AR 25-30. The proponent agency is ODISC4							
TO: (Forward to proponent of publication or form) (Include ZIP Code)						FROM: (Activity and location) (Include ZIP Code)	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION FORM NUMBER						DATE	TITLE
ITEM NO.	PAGE NO.	PARA- GRAPH	LINE NO.	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended change, if possible).	
23	IV-1	1a.(1)				COMMENT: Change "towing a fully-loaded attachment trailer," to read: "towing a fully loaded M345, 10 ton attachment trailer". RATIONALE: Identify type trailer.	
24	IV-2	3c(2)				COMMENT: On line 4, change "excavate below the water line adjacent to an abutment the 3/4 yard clamshell. . . ." to read ". . . . <u>with</u> the 3/4 yard clamshell" RATIONALE: Clarity.	
25	IV-3	3c(7)				COMMENT: Change "The ATEC will move to the communications site" to read "<u>The ATEC will move to the construction site</u>". RATIONALE: It appears that you mean construction site rather than communication site.	
26	IV-3	3c(9)				COMMENT: On line 4, change "show his attachments" to read "load his attachments". RATIONALE: Accuracy.	
27	V-1	3				COMMENT: Change "Crane attachments and trailer" to read "<u>Crane attachments and M345 trailer</u>". RATIONALE: Identify trailer.	
*Reference to line numbers within the paragraph or subparagraph.							
TYPED NAME, GRADE OR TITLE						TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Charles D. Jackson GS-12						AV 676-7966	<i>Charles D. Jackson</i>

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
For use of this form, see AR 25-30. the proponent agency is ODISC4							
TO: (Forward to proponent of publication or form) (Include ZIP Code)						FROM: (Activity and location) (Include ZIP Code)	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION FORM NUMBER						DATE	TITLE
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended change, if possible).	
28	A-1					COMMENT: Change reference to approved ROC dated 29 May 90. RATIONALE: Accuracy.	
29	B-1					COMMENT: Change RAM Rationale date to read " <u>13 Oct 89</u> " and show " <u>Abbreviated Analysis approved by TRAC 23 Feb 90</u> ". RATIONALE: Completeness and accuracy.	
*Reference to line numbers within the paragraph or subparagraph.							
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE	
Charles D. Jackson GS-12				AV 676-7966			

DA FORM 2028
1 FEB 74

REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED.

CSTE-CS (STRBE-FMT/27 Aug 90) (70) 1st End MAJ Marino/dh/
AV289-0378

SUBJECT: Test Integration Working Group (TIWG) Meeting for the
25-ton All Terrain Crane (ATEC) on 4 October 1990

28 SEP 1990

Commander, U.S. Army Operational Test and Evaluation Agency, Park
Center IV, 4501 Ford Avenue, Alexandria, VA 22302-1458

FOR Commander, U.S. Army Belvoir Research, Development and
Engineering Center, ATTN: STRBE-FMT, Fort Belvoir, VA
22060-5606

1. Subject document has been reviewed by this Agency. Comments
are provided on DA Forms 2028 at enclosure 2.

2. As indicated by the comments on the DA Forms 2028 this TEMP is
not sufficiently mature to describe the life cycle T&E program for
this system in the detail necessary for an acquisition that
anticipates a type classification decision in early FY91. Of
particular concern are:

a. The lack of detail concerning the market investigation
(MI) and the TECOM assessment and TRADOC evaluation which should
have been completed as part of the MI.

b. The lack of a coherent test and evaluation strategy with
appropriate agencies responsible for technical tests and
operational tests.

c. The lack of detail on the plans for technical testing.

d. The inconsistency between the critical operational issues
listed in the TEMP and those previously approved by HQ, TRADOC.

e. The lack of a clear indication that the technical and
operational issues in the TEMP have been revised since completion
of the MI.

3. It is recommended that the focus of the planned TIWG be the
development of a coherent and complete T&E strategy. Once the T&E
strategy is agreed upon the TIWG should address the need for
revision of the technical and operational issues. Such develop-
ment provides the guidance for revising the TEMP.

CSTE-CS

SUBJECT: Test Integration Working Group (TIWG) Meeting for the
25-Ton All Terrain Crane (ATEC) on 4 October 1990

4. The POC for this action is MAJ Joseph C. Marino, Jr., AUTOVON
289-0378, Commercial (202) 756-0378.

FOR THE COMMANDER:

2 Encls
wd encl 1
Added 1 encl


JOSEPH B. MISSAL
COL, GS
Director, Combat Support

CF (w/encl):

CDR, TRADOC, ATTN: ATCD-T, Fort Monroe, VA 23651-5000

CDR, AMC, ATTN: AMCQA-SE, 5001 Eisenhower Avenue, Alexandria,
VA 22333-0001

CDR, TACOM, ATTN: AMSTA-QA, Warren, MI 48397-5000

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 310-1, the proponent agency is the U.S. Army Adjutant General Center.						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).		DATE 12 SEP 90	
TO: (Forward to proponent of publication or form) (Include ZIP Code)						FROM: (Activity and location) (Include ZIP Code)			
CDR, USABRDEC (STRBE-FMT)						CDR, USAOTEA (CSTE-CS)			
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS									
PUBLICATION FORM NUMBER						DATE		TITLE	
						27 AUG 90		ATEC TEMP	
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON <i>(Provide exact wording of recommended change, if possible).</i>			
1		COVER PAGE				<u>COMMENT:</u> Delete the reference to the 23 Jul 86 O&O Plan and insert in its place the approved ROC, dated 29 May 90. <u>RATIONALE:</u> There is an approved ROC. It provides the basic system operational characteristics that must be met in the development.			
2	POC-1	TEMP ADMIN INFO POC				<u>COMMENT:</u> The OTEA TIWG Representative is MAJ Joseph C. Marino, Jr. The AV/Commercial telephone numbers are 289-0378 and (202) 756-0378, respectively. The area code changes to 703 effective 1 OCT 90. Also, obtain and include the AUTOVON and commercial telephone numbers for each TIWG member. Further, change the position titles for "Independent Operational Assessor" and the "MATDEV Independent Assessor." <u>RATIONALE:</u> Completeness and correctness.			
3						<u>COMMENT:</u> Consider adding a MTMC TEA representative to the TIWG. The ATEC appears to have the potential to be a "problem item" as described in paragraph 4-2b(12), DA Pam 70-21 (draft), Nov 88 and AR 70-47. <u>RATIONALE:</u> Self-explanatory. Part IV, this TEMP includes three COIC (01, 09, and 010) that address transportability/mobility.			
4	I-1	Part I, 1				<u>COMMENT:</u> Add a reference to the approved requirements documents.			
<i>*Reference to line numbers within the paragraph or subparagraph.</i>									
TYPED NAME, GRADE OR TITLE					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION			SIGNATURE	

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PUBLICATION FORM NUMBER						DATE 27 AUG 90		TITLE ATEC TEMP	
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON <i>(Provide exact wording of recommended change, if possible).</i>			
5	I-1 & I-2	Part I, 2a				<u>RATIONALE:</u> Completeness. <u>COMMENT:</u> Delete the entire description of the ATEC's key functions and replace it with a description of the <u>systems features</u> that permit it to accomplish the various operational missions, i.e., for example describe for item 2a(1) the key features of the system that permit it to conduct loading/off-loading operations. <u>RATIONALE:</u> Correctness IAW paragraph 2a, Part I, Figure 0-5, DA Pam 70-21. The USAES IEP, dated Feb 87 is not a current document. It was designed to guide an MI which should have been completed.			
6	I-2	Part I, 2b				<u>COMMENT:</u> Expand to include the interfaces with the C-17, C-5B, etc. (see paragraph 1, Part I, this TEMP). Also, include the 10-ton trailer referred to in "SYSTEM CHARACTERISTICS" paragraph of the approved ROC. <u>RATIONALE:</u> Completeness.			
7	I-2	Part I, 2c				<u>COMMENT:</u> Revise to include the unique characteristics which drive special test and analyses requirements. Among such are NBC contamination survivability, support of logistics over-the-shore (LOTS) operations, and HAEMP survivability testing. <u>RATIONALE:</u> The stated characteristics appear to drive unique test requirements as defined in paragraph 2c, Part I, Figure 0-5, DA Pam 70-21.			
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8	I-2	Part I, 2				<u>COMMENT:</u> Add a subparagraph which addresses system software IAW paragraph 2d, Part I, Figure 0-5, DA Pam 70-21. If none, so state and delete Appendix C, Software Test and Evaluation Plan. <u>RATIONALE:</u> Completeness and clarity.			
9	I-2 thru I-4	Part I, 3		1		<u>COMMENT:</u> Revise to integrate into a matrix. List each key technical characteristic versus the thresholds against which they will be evaluated (measured) at each milestone. Use <u>quantified thresholds</u> where appropriate. With respect to milestones, Figure 1 lists only a MS III scheduled for 2QFY96. Figure 2, 25-TON ALL TERRAIN Crain Program Schedule on page II-3, this TEMP includes only a MS I/III scheduled for 1QFY91. Neither of the figures includes a milestone for materiel release (see AMCR-700-34). The test strategy includes a PPQT which is normally conducted post MS I/II or II and before a MS III. Such test strategy is inconsistent with the program strategy indicated in Part II, this TEMP. Delineate those development objectives and performance thresholds (criteria) that must be achieved to confirm that a follow-on test and evaluation (FOT&E) (shown as a Follow-on Evaluation in paragraph 3, Part IV, this TEMP) is not required. The following additional errors/omissions should be corrected:			
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						a. List the source document and its date for each technical characteristic. The TECOM IAP, dated Apr 87 is not an appropriate source document. b. Replace the operational RAM parameters in paragraphs 3g and k, Part I, this TEMP with technical RAM parameters that support achievement of the operational RAM parameters as indicated in paragraph 4-4d(6), AR 702-3 (draft for interim use), 19 Apr 89. The technical RAM parameters used at each stage in development should be such that they incorporate reliability growth considerations, i.e., the thresholds used for the MI, PPQT, and PQT should be such that they are suitable for assessing satisfactory progress in achieving RAM requirements (see paragraph 5-5, AR 702-3). c. Expand Figure 1 to include MS I/III (or should it be MS I/II?), and the materiel release decision. Include all planned tests, e.g., the PQT. Also, include the MI and the associated technical thresholds and the decision review that the MI supported. (Appendix B indicates the basic MI was completed in Jul 87 and that a supplemental MI was completed in Jan 88). d. Change the dates in the "Schedule" column of Figure 1 to show the inclusive dates for the MI and each test that will provide data for a decision review.			
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10	I-4 thru I-7	Part I, 4				e. Replace the term "requirement" in Figure 1 in the third column from the left with appropriate quantitative threshold values. <u>RATIONALE:</u> The draft does not include the appropriate set of technical characteristics. The test and milestone included in the matrix (Figure 1) is not consistent with Part II of the TEMP. Operational not technical RAM is included in the text (it should be in the matrix). RAM growth is not appropriately indicated. The matrix does not show how the need for operational testing will be obviated. The appropriate source document is not listed. Also, there are numerous omissions/errors in the matrix. <u>COMMENT:</u> Revise to list only the key operational effectiveness and operational suitability characteristics of the system. Also, include the thresholds against which each were/will be evaluated at each milestone. Operational RAM thresholds, for example, should be included. Identify the source document from which extracted and its date. A matrix format is recommended. <u>RATIONALE:</u> The draft does not provide the required information (see paragraph 4, Part I, Figure 0-5, DA Pam 70-21). It does not show the thresholds used in the operational evaluation that was part (or			
*Reference to line numbers within the paragraph or subparagraph.									
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11	II-1	Part II, 1	2			should have been) of the MI. It does not include thresholds for the production decision milestone (MS III) or for the materiel release decision. The source document and its date are not included. Furthermore, many of the characteristics presented are technical not operational and are also not significant (key). <u>COMMENT:</u> Delete the sentence which states that "All participants are voting members of the TIWG." <u>RATIONALE:</u> TIWG's are not intended to be "voting" bodies. TIWGs are established as an appropriate forum to effect T&E coordination and solve routine problems. Their function is explained in paragraph 4-1, Chapter 4, DA Pam 70-21.			
12	II-1	Part II, 1a-h				<u>COMMENT:</u> Expand to provide a more complete outline of each participant's T&E responsibilities. Include responsibilities for conduct of the MI, conduct/participation in RAM scoring conferences, provision of test support packages, (see paragraph 3.3, DA Pam 71-3 (draft), Dec 88), presentation of T&E briefings, conduct of training for each planned test versus coordination of training, participation in TIWG subgroups, and other responsibilities as desired. TECOM's test and evaluation responsibilities should be discussed separately. The T&E function of			
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13	II-1	Part II, 1d	2-3			the MTMC TEA should also be included in this section of the TEMP. OTEA's responsibilities include the following: a. Review, comment on, and concur with the TEMP. b. Attend the TIWG called to approve the TEMP. c. Review and comment on all user RDTE documentation and on selected MATDEV RDTE documentation. d. Endorse the expanded test report for each OT conducted during the development. e. Provide an IPR position for each decision review and for the materiel release decision. <u>RATIONALE:</u> The draft is incomplete and in certain areas (responsibilities for planning and conduct of PPQT and PPT (PQT?)) in error. The MI, conducted earlier in the development, is not mentioned. Transportability T&E is not addressed. <u>COMMENT:</u> Revise the part of the sentence which discusses provision of a safety release to TEXCOM for PPT. A PPT is a technical test, as such, it is normally conducted by a TECOM test activity.			
*Reference to line numbers within the paragraph or subparagraph.									
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14	II-1	Part II, 1e				<u>RATIONALE:</u> TEXCOM is a operational test agency. It does not normally conduct technical testing. <u>COMMENT:</u> See item 13, above. TEXCOM test activities prepare test and evaluation plans and expanded test reports for user tests not technical tests. In that regard, it appears that an operational test is required to answer the 11 critical operational issues (COIs) included in Part IV, this TEMP. The TIWG should be convened to prepare a revised T&E strategy. The current T&E strategy appears to be inappropriate for reasons stated above. <u>RATIONALE:</u> Self-explanatory.			
15	II-1	Part II, 1g				<u>COMMENT:</u> Recommend expanding the tester's T&E responsibilities. Also, will the trainer actually coordinate the training for the PPQT? <u>RATIONALE:</u> Completeness and correctness.			
16	II-1	Part II, 1h				<u>COMMENT:</u> Expand OTEA's T&E responsibilities as indicated in item 12a-e, above. <u>RATIONALE:</u> Completeness and correctness.			
17	II-1	Part II, 2				<u>COMMENT:</u> Based on information provided elsewhere in the TEMP and the guidance in paragraph 4-9b(2) and/or (3), AR 70-1, 10 Oct 88, conduct of a MS I/III decision			
*Reference to line numbers within the paragraph or subparagraph.									
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18	II-1	Part II, 2b				review at the time scheduled appears to be inappropriate. The program appears to be an NDI adaption or integration. A PPQT is scheduled and the TEMP provides no evidence from an MI that can be used to support a MS I/III decision. Also, the listing of documentation appears to be incomplete in that it does not meet the minimum requirements for an IPR specified in paragraph 5-7c, AR 70-1. Additionally, the IAPs are not required to support an IPR. <u>RATIONALE:</u> Self-explanatory. <u>COMMENT:</u> Revise the subparagraph. <u>RATIONALE:</u> PPQT and PQT are technical tests not key decision points. A PPQT is a technical test normally used to support entry into an IOT&E and a MS III decision. A PQT is normally a post production (post MS III) technical test required to provide test data for materiel release (see page E-3, DA Pam 70-21). The listing of required documentation is incomplete (see paragraph 5-7c, AR 70-1).			
19	II-2	Part II, 3				<u>COMMENT:</u> Revise the paragraph. TIWGs do not conduct T&E. User testing is normally conducted by a TEXCOM test activity. <u>RATIONALE:</u> Self-explanatory.			
<i>*Reference to line numbers within the paragraph or subparagraph.</i>									
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20	II-2 & II-3	Part II, 7		2		<u>COMMENT:</u> Delete "PROGRAM" from the paragraph title. Also, retitle Figure 2 as appropriate. <u>RATIONALE:</u> Correctness IAW paragraph 2, Part II, Figure 0-5, DA Pam 70-21.			
21	II-3	Part II		2		<u>COMMENT:</u> Revise to provide all of the information required by paragraph 2, Part II, Figure 0-5, DA Pam 70-21. Use of the format in Figure 0-7, DA Pam 70-21 is recommended. Include the following: a. The MI. b. A logistics demonstration unless waived IAW AR 700-127. c. All decision points to include materiel release. d. Test readiness reviews. e. Test report due dates. f. IAR due dates following PPQT and PQT (show related milestones). g. The number of ATECs to be available for each test. h. Appropriate OT&E (after reconsideration by the TIWG).			
<i>*Reference to line numbers within the paragraph or subparagraph.</i>									
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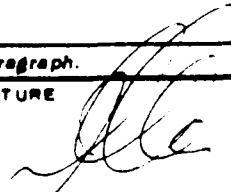
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22	III-1	Part III, 1				Also, delete references to IAPs and IARs prepared by TRADOC. TRADOC no longer has the operational evaluation mission. IAPs and IARs are prepared by TECOM for selected programs only. Further, provide a footnote(s) to explain the use of the asterisks in the figure. <u>RATIONALE:</u> Completeness and correctness. <u>COMMENT:</u> Update the technical issues. Provide a test matrix design to relate the technical issues to test and analyses objectives. Describe how each issue will be evaluated. Also expand to address each issue area described in paragraph 1d, Part III, Figure 0-5, DA Pam 70-21. <u>RATIONALE:</u> The April 1987 issues appear to be out of date (they were provided to guide an MI?). The draft does not provide the information required by paragraph 1, Part III, Figure 0-5, DA Pam 70-21. <u>COMMENT:</u> Revise to provide the information required by paragraph 2, Part III, Figure 0-5, DA Pam 70-21. Treat the MI as past TT&E and in particular summarize the results of TECOM's assessment based on the MI results. The emphasis should be on the degree to which the critical technical issues were answered (confirmed).			
23	III-1	Part III, 2							
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24	III-2	Part III, 4				<u>RATIONALE:</u> The discussion is too brief and does not present the results of TECOM's IAR. It does not state whether or not any of the critical technical issues were answered. <u>COMMENT:</u> Revise to provide separate discussions for each planned TT (PPQT, PQT, and logistics demonstration). Describe contractor and government testing separately. Describe subtests separately as appropriate. Follow the format and content outline provided in paragraph 4, Part III. Figure 0-5, DA Pam 70-21.			
25	IV-1	Part IV, 1				<u>RATIONALE:</u> Completeness IAW the reference. The draft fails to respond to the requirement. Is this a discussion of a MI that is yet to be conducted? <u>COMMENT:</u> The listed COIs are not consistent with the TRADOC TMEC COIC for the ATEC (see letter HQ, TRADOC, ATZL-TIE-O, 28 Jan 87, subject: Approved Critical Evaluation Issues and Criteria for All Terrain Crane (ATEC)). Also, the issues listed in the TEMP are not consistent with those listed in the TRADOC approved ATEC IEP, dated 17 Feb 87. Also, such issues were developed to support a planned MI and may not be current. <u>RATIONALE:</u> Self-explanatory.			
<i>*Reference to line numbers within the paragraph or subparagraph.</i>									
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26	IV-1	Part IV, 2				<u>COMMENT:</u> The MI and the subsequent TRADOC evaluation if conducted, should be described here. The content should be as described in paragraph 2, Part IV, Figure 0-5, DA Pam 70-21. If the evaluation was not conducted so state. If such is the case, an operational test or tests must be scheduled to address the operational issues. <u>RATIONALE:</u> Self-explanatory. The approved COIC and additional operational issues must be appropriately resolved. <u>COMMENT:</u> Revise the introductory remarks. Use current test terminology - follow-on test and evaluation (FOT&E) not follow-on evaluation. The FOT&E will be conducted in accordance with a test and evaluation plan (TEP) not an IAP. It will provide data to evaluate the COIC and any additional operational issues and criteria (AOIC) that require evaluation. The thresholds for such evaluation should appear in paragraph 4, Part I, this TEMP. The FOT&E or any other operational test judged to be necessary should be conducted by a TEXCOM test activity not TECOM. The expanded test report (ETR) for such test will be prepared by the operational tester. <u>RATIONALE:</u> The draft is inaccurate and shows a basic misunderstanding of the OT&E process.			
27	IV-2	Part IV, 3a							
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28	IV-2	Part IV, 3a				<u>COMMENT:</u> Revise to describe the configuration to be tested. If an FOT&E is required the test items should be production models of the ATEC. <u>RATIONALE:</u> The test items for an FOT&E are normally production items (see definition of FOT&E on page E-4, Appendix E, DA Pam 70-21).			
29	IV-2 & IV-3	Part IV, 3c				<u>COMMENT:</u> Revise to delete all references to the PQT and to an IAP. Describe the player personnel and the training planned for the test. State who will conduct maintenance on the ATEC. Also, describe the operational doctrine to be used. Furthermore the number of test items should be included in the description. <u>RATIONALE:</u> Correctness. The testing described appears, to some degree, to be an operational type test. The use/availability of an armor or infantry task force at Aberdeen Proving Ground, MD as part of a PQT does not seem to be plausible. The description is incomplete.			
30	IV-3	Part IV, 3c(5)	2			<u>COMMENT:</u> Delete M60A3 and M113 and replace with M1A1 and M2/3 BFVs. <u>RATIONALE:</u> Correct maneuver force equipment.			
*Reference to line numbers within the paragraph or subparagraph.									
TYPED NAME, GRADE OR TITLE						TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE	

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).		DATE 12 SEP 90	
For use of this form, see AR 310-1, the proponent agency is the US Army Adjutant General Center.									
TO: (Forward to proponent of publication or form) (Include ZIP Code)						FROM: (Activity and location) (Include ZIP Code)			
CDR, USABRDEC (STRBE-FMT)						CDR, USAOTEA (CSTE-CS)			
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS									
PUBLICATION FORM NUMBER						DATE		TITLE	
						27 AUG 90		ATEC TEMP	
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended change, if possible).			
31	V-1 & V-2	Part V				<u>COMMENT:</u> Part V will require revision to provide a better description of test resources. The revision should be completed after resolution of the comments provided regarding the plans for PPQT, PQT, LD, and FOT&E or other required OT&E. <u>RATIONALE:</u> The draft is incomplete. This part of a TEMP should be titled as indicated in Part V, Figure 0-5, DA Pam 70-21.			
32	A-1	Appendix A				<u>COMMENT:</u> Expand to include <u>current</u> approved system documentation. <u>RATIONALE:</u> Completeness and correctness. There is an approved ROC. The O&O Plan should also be included here.			
33	B-1	Appendix B				<u>COMMENT:</u> Expand to include complete titles, document dates, and names of the agency preparing the documents. Include the TECOM IAR and the TRADOC IER that were completed based on the results of the MI. <u>RATIONALE:</u> Completeness and correctness.			
34	E-1	Appendix E				<u>COMMENT:</u> Add OTEA and the USAES to the list of participants. OTEA will evaluate the results of testing in preparing its IPR position paper and it will endorse the test report for each scheduled OT&E. Show that TECOM will evaluate the results of PPQT and PQT. Delete TRADOC and replace with the appropriate TRADOC proponent (the			
*Reference to line numbers within the paragraph or subparagraph.									
TYPED NAME, GRADE OR TITLE					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE		

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 310-1; the proponent agency is the U.S. Army Adjutant General Center.						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).		DATE 12 SEP 90	
TO: (Forward to proponent of publication or form) (Include ZIP Code) CDR, USABRDEC (STRBE-FMT)						FROM: (Activity and location) (Include ZIP Code) CDR, USAOTEA (CSTE-CS)			
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS									
PUBLICATION FORM NUMBER						DATE 27 AUG 90		TITLE ATEC TEMP	
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON <i>(Provide exact wording of recommended change, if possible).</i>			
						USAES). Use test objectives for each test (show PPQT and PQT separately) not a list of issues. Also, it appears inappropriate to state that the PPQT will use a production type vehicle. By definition, a PPQT is a preproduction test conducted on prototypes or preproduction hardware. The POT must be conducted on production items. <u>RATIONALE:</u> Correctness.			
<i>*Reference to line numbers within the paragraph or subparagraph.</i>									
TYPED NAME, GRADE OR TITLE J. C. Marino, Jr., MAJ, GS T&E Staff Officer					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION AV 289-0378 COM (202) 756-0378			SIGNATURE 	



DEPARTMENT OF THE ARMY

US ARMY BELVOIR RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
FORT BELVOIR, VIRGINIA 22060-5606

REPLY TO
ATTENTION OF

STRBE-FMT (70-1r)

27 August 1990

MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: Test Integration Working Group (TIWG) Meeting for the 25 Ton All Terrain Crane (ATEC) on 4 October 1990.

1. You are requested to participate in the 25 Ton ATEC TIWG to review and recommend approval of the ATEC Test and Evaluation Master Plan (TEMP).
2. The TIWG will convene on Thursday, 4 October 1990, at Belvoir Research, Development and Engineering Center (BELVOIR), at 0800 hours in the Main Conference Room in Building 333. We anticipate concluding the TEMP review the same day.
3. Inclosed for your review, is the recently updated ATEC TEMP
4. Attendees will be asked to render decisions of agreement/disagreement with the TEMP for their respective functional areas, and concur/nonconcur on the TIWG TEMP Coordination Sheet.
5. The point-of-contact for this action is Mr. Ed Rudy, TIWG Chairman, STRBE-FMT, at AV 354-4774 or Commercial (703)664-4774.

1 Encl

LYNWOOD C. ROOT

Chief

Marine and Mechanical Equipment
Division

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US Army Test and Evaluation Command, ATTN: AMSTE-EV-S, -TE-T
US Army Logistics Center, ATTN: ATCL-MG
US Army Logistics Evaluation Agency, ATTN: DALO-LEI
US Army Military Traffic Management Command, ATTN: MTT-TRV
US Army Belvoir, Research, Development and Engineering Center, ATTN: STRBE-ME,
-Q, -TE, -TS, -TQ, -TIC
US Army Combined Arms Center, ATTN: ATZL-TIE
US Army Operational Test and Evaluation Agency, ATTN: CSTE-CSS
US Army Materiel Command, ATTN: AMCDE-SSV
US Army Materiel Systems Analysis Activity, ATTN: AMXSV-LA
US Navy Naval Construction Battalion Center

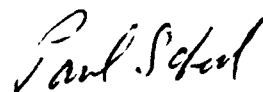
SLCHE-ME

29 August 1990

MEMORANDUM FOR STRBE-FMT (Ed Rudy)

SUBJECT: Test and Evaluation Master Plan (TEMP) I/III for the All Terrain Crane (ATEC)

1. The Human Engineering Lab Detachment has reviewed subject TEMP as requested. Although comments were not specifically requested in advance of the 4 October 1990 Test Integration Working Group (TIWG) meeting, the Detachment provides the enclosed comments for your information.
2. The Detachment plans to attend the 4 October 90 TIWG to address the enclosed comments.
3. Point of contact for this office is John Reinhart, AV 354-4713.



PAUL J. SCHOOL
C, HEL Detachment
at Fort Belvoir

RECOMMENDED CHANGES TO PUBLICATIONS				DATE: 08-29-1990	
To: STRBE-FMT				From: SLCHE-ME US ARMY HEL DETACHMENT AT FORT BELVOIR, VIRGINIA	
			DATE 27 AUG 90	TITLE: Test and Evaluation Master Plan (TEMP) for the All Ton All Terrain Crane (ATEC)	
ITEM	PAGE	PARAGRAPH	LINE	COMMENT	

1 I-2 3.e

Change paragraph to read: The ATEC shall comply with the applicable HFE criteria of MIL-STD-1472.

Reason: Conformance to MIL-STD-1472 is a technical, rather than operational issue. The current paragraph 3.e is an operational issue and should be addressed in section 4.

2 I-3 Figure 1

Change "Operate, 5% Female, 95% Male" to read: "Human Factors Engineering" and change "Requirement" to: MIL-STD-1472.

Reason: Same as item 1 above.

3 I-3 Figure 1

Delete "HFE" from last item in Figure 1.

Reason: 1) HFE is addressed per comment 2 above, 2) The "Threshold" statements are not HFE related.

4 I-4 3.1

Add new item: 1. Noise produced by the ATEC shall comply with MIL-STD-1474, Category D (less than 85 dB(A)).

Reason: AR 40-5.

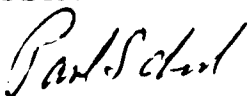
NAME: PAUL J. SCHOOL Chief, HEL Det at Fort Belvoir, VA	TELEPHONE: Comm (703)664-4713 AV 354-4713	SIGNATURE:
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RECOMMENDED CHANGES TO PUBLICATIONS				DATE: 08-29-1990	
To: STRBE-FMT				From: SLCHE-ME US ARMY HEL DETACHMENT AT FORT BELVOIR, VIRGINIA	
			DATE 27 AUG 90	TITLE: Test and Evaluation Master Plan (TEMP) for the All Ton All Terrain Crane (ATEC)	
ITEM	PAGE	PARAGRAPH	LINE	COMMENT	

5 I-6 4.cc

Delete and replace with: cc. The ATEC shall be operable and field maintainable in daylight and darkness by 5th percentile female through 95th percentile male soldiers who are appropriately dressed for the environments of operation (ie. NBC, arctic, etc.). The ATEC shall be operable with less than 5 percent repeated error (errors of omission and commission) in performance of mission critical tasks.

Reason: To state the HFE operational issue in terms of human performance which can be tested operationally. MIL-STD-1472 is technical criteria and MIL-H-46855 is a programmatic document. Both are inappropriate as operational issues.

NAME: PAUL J. SCHOOL Chief, HEL Det at Fort Belvoir, VA	TELEPHONE: Comm (703)664-4713 AV 354-4713	SIGNATURE: 
--	---	--

29 Sep 90

MEMORANDUM FOR STRBE-FMT

SUBJECT: Test Integration Working Group Meeting for the 25-Ton All Terrain Crane (ATEC) on 4 October 1990

1. Reference memorandum, STRBE-FMT, 27 Aug 90, subject as above.
2. As requested in referenced memorandum, representation will be provided from this Division for the ATEC TIWG on 4 Oct 90 by Mrs. Davies Gaddy, Belvoir ILS manager for the ATEC.
3. Review of the draft TEMP provided as enclosure to reference 1 has been accomplished, and changes/comments are contained on the DA 2028 formats at enclosure 1 of this memorandum.
4. Mrs. Gaddy will serve as POC for this action, and can be reached on X42879 should there be questions about this response.

Encl


D. L. BUCHAN
Chief
Belvoir ILS Division

DATE: 29 Sep 90

TO STRBE-FMT

FROM: AMSTR-LAL

PUBLICATION NO.:
None

DATE:
27 Aug 90

TITLE:
Draft TEMP for the
All-Terrain Crane

<u>Item</u>	<u>Page</u>	<u>Para.</u>	<u>REMARKS</u>
1	Coord.	Sheet	Logistician needs changing to read: "USAMSAA, ATTN: AMXSY-LA, Aberdeen Proving Ground, MD 21005-5071 REASON: As of 1 Oct, AMSAA replaces LEA as ILS evaluator/logistician.
2	POC-1		Remove LEA as Logistician REASON: Same as above
3	POC-2		HQDA POC is MAJ Gallion, AV225-7545
4	II-1		Replace LEA with AMSAA REASON: Same as 1 and 2 above.
5	II-3		Program Schedule needs to be redone starting with the first test. REASON: Production contract award is shown for 3QFY95; PPQT starts 4QFY95. This schedule will not accommodate delivery of System Support Package Components List (SSPCL) for Government Approval 90-120 days prior to test start and delivery of SSP 30 days prior to test start. Also, a Logistics Demonstration needs to be scheduled sufficiently ahead of the PPQT start to allow for its conduct and for correction of any deficiencies found in the SSP. The SSP contains items such as manuals and training,

Typed Name and Grade/Title
Davies Gaddy
Log Mgmt Spec

AUTOVON
354-2879

SIGNATURE

<u>Item</u>	<u>Page</u>	<u>Para.</u>	<u>REMARKS</u>
			which could not be delivered in the timeframe shown between contract award and PPQT. In addition, training must be conducted for user or user representatives prior to start of Operational T&E to be conducted with PPQT.
6	III-2		This section should mention PPQT and PQT since both these tests will examine technical issues.
7	IV-2	3	First sentence, after "Follow-On" add "Operational Test and". REASON: Correctness
8	IV-2	3.c	Line 2, replace "PQT" with "PPQT". REASON: If FOTE is required, it should be performed concurrently with PPQT to confirm that the winning production contractor's ATEC will meet performance/ user requirements. PQT is geared more to materiel release testing performed on randomly selected production items.
9	IV-3	3.c.(9)	Line 4, change "show" to "stow" to correct typo.
10	IV-3	3.c.(9)	Last line. Does this one hour include replacement of the parts of the ATEC which will be damaged or destroyed by the decontamination procedures. Also, the decontaminated ATEC should be redeployed to the work site to be sure it has survived the contamination/ decontamination and is capable of continuing the mission.
11	APP A		Show approved ROC with date of 29 May 90; Add the following: DA PAM 70-21, Test and Evaluation Guide AR 70-10, Test and Evaluation

Typed Name and Grade/Title	AUTOVON	SIGNATURE
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<u>Item</u>	<u>Para.</u>	<u>Line</u>	<u>REMARKS</u>
12	APP D		Add definitions for the following: MOUT AMSAA
13	E-1&2		A decision needs to be made by the TIWG body concerning conduct of the Logistics demonstration. (See comment 5 above). When that decision is made, the LD should be added to Part III or IV and at Appendix E and Figure 1.
14	GENERAL		If a decision is made to go with hydraulic attachments, they may require additional testing to type classify them. Proposed ROC change currently underway may require that separate Line Item Numbers (LIN's) be assigned for each attachment. The proposed ROC change will set requirement for one to one issue of attachments to crane for certain engineer units. Other requirements will be filled with the crane only. Therefore, the LIN for the crane-only cannot be the same as the LIN for the crane and hydraulic attachments. Concurrent TC of the attachments as individual LIN's appears to be necessary. Will the trailer currently authorized in units for transport of the cable attachments be able to transport the hydraulic attachments (weight, size and cube capacity) and be capable of safe transport of the new attachments at 40 MPH?

Typed Name and Grade/Title	AUTOVON	SIGNATURE
----------------------------	---------	-----------

ATNC-NMM-B (STRBE-FMT/27 Aug 90) (70-1r) 1st Encl Mr. Sawyer/
dad/AV 221-2080

SUBJECT: Test Integration Working Group (TIWG) Meeting for the
25-Ton All Terrain Crane (ATEC) on 4 October 1990

Commander, US Army Personnel Integration Command, 200 Stovall
Street, Alexandria, Virginia 22332-1345 2 October 1990

FOR Commander, US Army Research, Development, and Engineering
Center, ATTN: STRBE-FMT, Fort Belvoir, Virginia 22060-
5606

1. This command has reviewed the updated Test and Evaluation Master Plan (TEMP) and comments/recommendations are on DA Form 2028 at Encl 2.
2. This command is under the assumption that all MANPRINT issues and concerns for the ATEC will be addressed and answered during the preproduction qualification test and the production qualification test. No other testing is planned by the materiel developer.
3. This command is an integrating center within TRADOC and is an associate member of the Test Integration Working Group (TIWG). USAPIC representatives are required to attend TIWGS, review test and evaluation master plans and applicable testing documentation for MANPRINT areas of interest, and ensure the six domains of MANPRINT are incorporated into the materiel system programs.
4. This command has no record of a test integration working group charter for the ATEC IAW DA Pam 70-21.
5. Point of contact for this action at USAPIC is Mr. Sawyer, AUTOVON 221-2080.

FOR THE COMMANDER:

2 Encls
wd 1 encl
Added 1 encl
2. DA Form 2028

Charles A. Young Jr., Maj.
for FRED R. ROTE
Acting Director, Manning
Integration Directorate

ATNC-NMM-B

SUBJECT: Test Integration Working Group (TIWG) Meeting for the
25-Ton All Terrain Crane (ATEC) on 4 October 1990

CF:

Cdr, USA TRADOC, ATTN: ATCD-MW, Ft Monroe, VA 23651-5000

Cdr, USA LOGCEN, ATTN: ATCL-MGF, Ft Lee, VA 23801-6000

Cdr, USA CAC, ATTN: ATZL-CAM-R, Ft Leavenworth, KS 66027-5300

Cdmt, USAES, ATTN: ATSE-TD-NE/ATSE-CDM, Ft Leonard Wood, MO
65473-6600

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE 2 Oct 90
For use of this form, see AR 310-1; the proponent agency is the US Army Adjutant General Center.							
TO: (Forward to proponent of publication or form) (Include ZIP Code) Commander USA Research, Development, and Engineering Center, ATTN: STRBE-FMT Fort Belvoir, VA 22060-5606						FROM: (Activity and location) (Include ZIP Code) Commander U.S. Personnel Integration Command, ATTN: ATNC NMH-B Alexandria, VA 22332-1345	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION/FORM NUMBER						DATE	TITLE
						27 Aug 90	PRE TEMP I/III For 25T ATEC
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended change, if possible).	
1.	Cover	Page	1			<u>CHANGE:</u> "PRE-TEMP I/III" to "TEMP I/III." <u>RATIONALE:</u> Correctness.	
2.	Cover	Page	7			<u>CHANGE:</u> Requirements document "O&O Plan dated 23 Jul 86" to <u>Required Operational Capability (ROC) Approved 29 May 90.</u> <u>RATIONALE:</u> Correctness.	
3.	Cover	Page	13			<u>COMMENT:</u> Line states: Release limitations - US Government Agencies only. Should security classification be for Official Use Only?	
4.	TEMP	Coordination				<u>COMMENT:</u> TEMP coordination cover page not in IAW DA Pam 70-21, page Q2.	
5.	POC-1					<u>ADD:</u> USAPIC Mr. Sawyer AV 221-2080, Commercial (202) 325-2080. <u>RATIONALE:</u> Correctness.	
6.	1-1	1				<u>ADD:</u> Reference to the TRADOC approved ROC. <u>RATIONALE:</u> Ref DA Pam 70-21.	
7.	1-1 & 1-2	2				<u>COMMENT:</u> System description paragraph incomplete. <u>RATIONALE:</u> Ref DA Pam 70-21; i.e., interface with 10 ton trailer and other planned attachments.	
8.	1-2	3.d.				<u>ADD:</u> ATEC must satisfactorily tow a <u>10 ton</u> trailer. <u>RATIONALE:</u> Ref approved ROC, dated 29 May 90.	
*Reference to line numbers within the paragraph or subparagraph.							
TYPED NAME, GRADE OR TITLE					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE
JOSEPH A. SAWYER, GS12					AV 221-2080		<i>Joseph A. Sawyer</i>

DA FORM 2028

REPLACES DA FORM 2028, 1 DEC 88, WHICH WILL BE USED.

ENC 1, 2

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
For use of this form, see AR 310-1; the proponent agency is the US Army Adjutant General Center.							
TO: (Forward to proponent of publication or form) (Include ZIP Code)						FROM: (Activity and location) (Include ZIP Code)	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION/FORM NUMBER				DATE		TITLE	
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended change, if possible).	
9.	1-2	3.e.				<u>CHANGE:</u> To read: The ATEC must be operated by <u>MOS 62F</u> and maintained by <u>MOS 62B and 35H</u> by the <u>5th thru 95th percentile soldier dressed in protective clothing for climatic and NBC MOPP IV conditions.</u> <u>RATIONALE:</u> Correctness; Operator/Maintainer Decision dated 16 Jun 87.	
10.	1-3	Figure 1-3				<u>COMMENT:</u> Figure 1-3 is incomplete. <u>RATIONALE:</u> Ref approved ROC, dated 29 May 90. The 40-50 MPH on less than one percent grade, traverse 15 slope w/o trailer, pick and carry operation, etc.	
11.	1-4 thru 1-7	4.				<u>RECOMMENDATION:</u> Recommend the required operational characteristics paragraph be updated from the current approved ROC, dated 29 May 90. <u>RATIONALE:</u> Correctness, consistency and some requirements are not included.	
12.	11-3	Figure 2				<u>COMMENT:</u> Program schedule incomplete. <u>RATIONALE:</u> Reference DA Pam 70-21.	
13.	III-I	Part III				<u>RECOMMENDATION:</u> Add MANPRINT issues and concerns from the approved System MANPRINT Management Plan to the technical test and evaluation outline. <u>REASON:</u> Ref DA Pam 70-21. MANPRINT is not included in planned testing.	
*Reference to line numbers within the paragraph or subparagraph.							
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE	
JOSEPH A. SAWYER, GS12,				AV 221-2080			

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).		DATE:
For use of this form, see AR 310-1; the proponent agency is the US Army Adjutant General Center.								
TO: (Forward to proponent of publication or form) (Include ZIP Code)						FROM: (Activity and location) (Include ZIP Code)		
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS								
PUBLICATION/FORM NUMBER						DATE		TITLE
ITEM NO.	PAGE NO.	PARA- GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended change, if possible).		
14.	IV-I	PART IV				RECOMMENDATION: Update the Critical Operational Issues and Criteria dated Feb 87 to current approved ROC and SMMP. RATIONALE: Correctness.		
15.	A1	Appendix A				COMMENT: Appendix A - References incomplete. Add: O&O Plan, RAM Rationale Report, ILS Plan, SMMP, etc. RATIONALE: Correctness.		
16.	B1	Appendix B				COMMENT: Move documents to appendix A and write 2 Bibliography of Test Plans and Reports. RATIONALE: Correctness.		
17.	E1 thru E2	Appendix E				COMMENT: Integrated Test Schedule and Data Source Matrix is incomplete. RATIONALE: Reference DA Pam 70-21.		
*Reference to line numbers within the paragraph or subparagraph.								
TYPED NAME, GRADE OR TITLE JOSEPH A. SAWYER, GS12,					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION AV 221-2080		SIGNATURE 	



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY

US ARMY BELVOIR RESEARCH DEVELOPMENT AND ENGINEERING CENTER
FORT BELVOIR, VIRGINIA 22060-5606

Handwritten notes:
All - 10/19/90
rec at 11:00
8-58-90
S. 38 Sept

STRBE-FMT (70-1r)

27 August 1990

MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: Test Integration Working Group (TIWG) Meeting for the 25 Ton All Terrain Crane (ATEC) on 4 October 1990.

1. You are requested to participate in the 25 Ton ATEC TIWG to review and recommend approval of the ATEC Test and Evaluation Master Plan (TEMP).
2. The TIWG will convene on Thursday, 4 October 1990, at Belvoir Research, Development and Engineering Center (BELVOIR), at 0800 hours in the Main Conference Room in Building 333. We anticipate concluding the TEMP review the same day.
3. Inclosed for your review, is the recently updated ATEC TEMP
4. Attendees will be asked to render decisions of agreement/disagreement with the TEMP for their respective functional areas, and concur/nonconcur on the TIWG TEMP Coordination Sheet.
5. The point-of-contact for this action is Mr. Ed Rudy, TIWG Chairman, STRBE-FMT, at AV 354-4774 or Commercial (703)664-4774.

1 Encl

LYNWOOD C. ROOT

Chief

Marine and Mechanical Equipment
Division

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US Army Logistics Evaluation Agency, ATTN: DALO-LEI
US Army Military Traffic Management Command, ATTN: MTT-TRV
US Army Belvoir, Research, Development and Engineering Center, ATTN: STRBE-ME,
-Q, -TE, -TS, -TQ, -TIC
US Army Combined Arms Center, ATTN: ATZL-TIE
US Army Operational Test and Evaluation Agency, ATTN: CSTE-CSS
US Army Materiel Command, ATTN: AMCDE-SSV
US Army Materiel Systems Analysis Activity, ATTN: AMXSV-LA
US Navy Naval Construction Battalion Center



DEPARTMENT OF THE ARMY

UNITED STATES ARMY TANK-AUTOMOTIVE COMMAND
WARREN, MICHIGAN 48397-5000

REPLY TO
ATTENTION OF

AMCPM-CE (70-17a)

1 October 1990

MEMORANDUM FOR Commander, U.S. Army Belvoir Research, Development
Engineering Center, ATTN: STRBE-FMT (Mr. Rudy),
Ft. Belvoir, VA 22060-5606

SUBJECT: TIWG Meeting for the 25 Ton ATEC on 4 October 1990

1. Reference memorandum, Belvoir RD&E Center, STRBE-FMT, 27 Aug 90, SAB.
2. This office will be participating in the subject TIWG with the following personnel attending.

Vinod Mehta
Dennis McCarthy

3. Attached at Encl 1 are this office's comments and questions on the ATEC TEMP. While the comments may appear voluminous two main concerns are behind the majority of the detailed comments.

a. Commerciality: Reference to specifications which rule out an NDI acquisition strategy must be eliminated. It is not possible to require standards such as MIL-STD-1472 and MIL-STD-1474 and expect a commercially available ATC to meet these requirements. These are military design standards with some requirements common to industry standards; however, past precedence indicates that the requirements of these standards will result in major redesign of the commercial vehicle and cause either a research and development effort or a crane which is developed through the NDI integration effort as described in paragraph 4-9 a(3) of AR 70-1.

b. User Acceptance: A related issue is user acceptance and testing. Tests and IPRs related to user acceptance must be complete and the votes cast prior to the production contract being awarded. It is not an acceptable approach to schedule a user operational test after the Army has entered into a production contract with the intent of determining the acceptability of the equipment to meet the user's requirements. This must be determined prior to award of a production contract. In particular, it is unusual to be specifying teardown of vehicle components for wear analysis and strain gauging the crane in an operational test (Ref 3.b.(5) of TEMP). These are technical requirements and not operational which can be validated during First Article Testing. Further discussion of operational test and its timing is required at the TIWG.

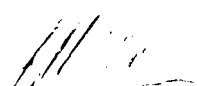
AMCPM-CE (70-17a)

SUBJECT: TIWG Meeting for the 25 Ton ATEC on 4 October 1990

4. These concerns cause this office to non concur in the TEMP as written. We hope to work with the community during the TIWG to eliminate our concerns and develop an acceptable product consistent with an appropriate acquisition strategy which will fulfill the requirements of all agencies involved.

5. POCs in this office are Mr. Vinod Mehta, DSN 786- 6649, or Mr. Dennis McCarthy, DSN 786-5001.

Encl


ROBERT C. McCANN
LTC, IN
Product Manager, CCE/SMHE

CF:

Cmdt, U.S. Army Engineer School, ATTN: AMSTE-CDT/CDM, Ft Leonard
Wood, MO 65473-5000

Cdr, U.S. Army Test and Evaluation Command, ATTN: AMSTE-TE-T,
Aberdeen Proving Ground, MD 21005-5005

Cdr, Test and Evaluation Agency, ATTN: CSTE-CSS, Alexandria, VA
22302-1458

ATEC TEMP Comments

- a. Title page, top line - What is a PRE-TEMP I/III?
- b. Coordination sheet, USATACOM Rep - Correct office symbol is AMCPM-CE.
- c. Points of Contact, page POC-2, HQDA - MAJ Henderson is POC for MHE. Since this is a CCE system sponsored by USAES should LTC Craig be the DA POC?
- d. Page I-1, para 1, line 10 - What constitutes major reconfiguration? We should be looking for no reconfiguration. What did the market investigation show? What is acceptable to the user (i.e. removal of counterweight, etc.)?
- e. Page I-1, para 2.a.1-8 - What is percent of operation in each of these modes? Is it defined in the O&O Plan? This is necessary to determine the percent of operation required during FAT and to be specified in the specification.
- f. Page I-2, para 2.b. - Is this the final decision on the attachments, i.e., we will use existing attachments in the inventory? Also change STE-ICE to STE-ICE-R (Reprogrammable). In para 3.e., same page, change MOS 63F to 62F.
- g. Page I-4, para 3.g. - Consolidate the RAM requirements from para 3.k. into this paragraph. There is no need to have each subparagraph g & k addressing the same requirement of RAM.
- h. Page I-4, para 3.h. - How will this be demonstrated and when? Need to have definitized how this will be addressed during the acquisition cycle.
- i. Page I-4, para 3.i. - Can't demonstrate adherence to acceptable transportability characteristics as a requirement when the second part of the sentence allows exceptions. What is considered acceptable transportability characteristics?
- j. Page I-4, para 3.k. - RAM rationale identifies Ao for peacetime as 87%. Also, abbreviations MRunit, MRids, and MRios are not defined in the Appendix D. Also, it appears unusual that Ao is the same for peacetime and wartime. Is there documentation available that identifies how MTBOMF and ALDT was established?
- k. Page I-4, para 4.a-c. - What are the missions that support these requirements? Where are they documented? These requirements appear to be a repeat of existing 25 Ton Crane requirements. What requirement supports 25 Ton lift capacity at 10 feet?

l. Page I-5, para 4.e. - What is the plan to test for this condition? There is a broad range of soil conditions and weather conditions which could vary from frozen ground to very wet terrain. Will the type of soils be specified?

m. Page I-5, para 4.h. - A speed of 40 MPH on primary roads with trailer seems attainable, but secondary roads may be questionable. Is there a real requirement for 40 mph on secondary roads? How is a secondary road defined?

n. Page I-5, para 4.k. - Until hydraulic hoses and rubber products that can withstand DS-2 are developed, this requirement is questionable.

o. Page I-5, para 4.l. - How is this a characteristic of the machine? It appears to be a function of time and operator speed. How is it to be designed into the equipment?

p. Page I-5, para 4.m. - How is this tested to demonstrate ability to achieve the requirement?

q. Page I-5, para 4.o. - What are the mission requirements? Do the quantitative requirements cited in para 3.k. meet mission requirements?

r. Page I-5, para 4.q. - Not much can be done with OVE. What is anticipated as being required? How much storage is required on vehicle to accommodate OVE?

s. Page I-5, para 4.r. - What do we expect these component parts to be?

t. Page I-5, para 4.t. - What did market investigation indicate? Can commercial vehicles meet requirement.

u. Page I-5, para 4.u. - Probably not achievable without exceeding permit limitations.

v. Page I-6, para 4.w. - This spec refers to DA TMs. They would not be available in time to support First Article Testing.

w. Page I-6, para 4.x. & 4.y. - How are these elements tested?

x. Page I-6, para 4.bb. - How do we enforce this when it is NDI and we do not control the design?

y. Page I-6, para 4.cc. - Requirement for these MIL Standards are for design of military equipment and program will no longer be NDI.

z. Page I-6, para 4. ff. - No longer NDI. 1472 (HFE) and 1474 (Noise) cannot be achieved if NDI.

aa. Page I-6, para 4. nn. - What are the attachments? How are they to be tested? Is there a requirement for GFE to contractor to assure compatability?

bb. Page I-6, para 4. oo. - What is reduced speed, 39 or 15? Also it doesn't describe the attachments trailer. It must have a capacity of 15,000 lbs, and at least an 18 foot bed. Drive train requirements for towing this load may not be available on NDI.

cc. Page I-6, para 4. pp. - What are "existing commercial arctic kits? How do you specify in NDI? Or is this "swing fire heater"?

dd. Page I-4, thru I-7. - Many of these requirements are not required operational characteristics and should not be included in this section.

ee. Page II-1, para 1. a. - What is PPQT vs. old PPT?

ff. Page II-1, para 1. d. - Why is TEXCOM doing PPT. How is this different from PPQT?

gg. Page II-1, para 1. e. - Who's responsible ^{F&L} performance of PPQT: TECOM or TEXCOM?

hh. Page II-1, para 2. b. - Where does TEXCOM fall in this?

ii. Page II-2, para 3 - Now it says TECOM is conducting tests. User test is TEXCOM, Technical test is TECOM. Needs sorting out.

jj. Page II-3, Program Schedule Chart, - Solicitation will probably be an RFP not an IFB. Also scheduling of PQT is too tight if DA TMs are required to support testing. Need a greater time frame between PPT and IPT to allow for start up of production. Also, what do asterisks mean?

kk. Page III-1, para 1. a., T(1) - We need to know this before we approve spec. What are reqt's put in spec? Does 25 tons at 10 ft cover all requirements? Hopefully, answer is yes.

ll. Page III-1, para 1. a., T(2) - What is criteria: with or without permits?

mm. Page III-1, para 1. a., T(4) - What is criteria of wet gap crossing site? Need to assess in order to identify power reqt's in spec.

nn. Page III-1, para 1.a., T(6) - What's the issue/criteria? So what if it does? As long as it supports mission. If it does degrade rated hoist lift, is it no longer acceptable?

oo. Page III-1, para 1.a., T(11) - The ATEC will not be NDI if MIL-STD 1472 & 1474 are req'd.

pp. Page III-2, para 3., - Should validation of clamshell and dragline operations be completed as part of this subsystem test?

qq. Page IV-1, para 1.a., O(4) - Industry uses excavators for this. Will future USAES excavator reqt supercede this reqt and therefore, are we designing in the capability soon to be replaced?

rr. Page IV-1, para 1.a., O(5) - What is Mout? Not in acronym chart at rear of TEMP.

ss. Page IV-2, para 3., - Non Concur. FOE will not be done concurrent with PQT. Once we are in production, it is too late for the user to decide if crane meets mission. This must be determined earlier and user agrees with spec at Milestone III IPR that vehicle meets their requirement if designed to meet spec.

tt. Page IV-2, para 3.a., - We will not allow ourselves to be preplanning for changes of NDI after award of the production contract which will cause increased contract costs. If need be, lets plan for more testing prior to Milestone III IPR.

uu. Page IV-2, para 3.b., - Need to do before production if we are trying to determine acceptability of equipment. Maybe we shouldn't be NDI.

vv. Page IV-2, para 3.c., - How can this be done at APG as stated in para 3 of TEMP. This is operational test which is not done at APG.

ww. Page IV-2, para 3.c.(3)., - What if rates are not acceptable to user? Do we cancel program? Point being, it must be done before production.

xx. Page IV-3, para 3.c.(5)., - Why aren't M1 components included? Also, are we really considering strain gauging the crane on operational test? Finally, we are not going to disassemble for wear analysis after one lift.

yy. Page V-1, Para 1. - Are four vehicles required for each phase? What are plans for type of test done on each crane.

zz. Page V-1, para 3. - Requires coordination with NICP to get assets to TECOM for test. Annotate what the attachments are so TACOM can process loan requests.

aaa. Page A-1, para a. - Final ROC has been approved.
Recommend changing date.

bbb. Page B-1, Appendix B, - Add ROC to bibliography.

ccc. Page E-1, Schedule, - Need six months between PPQT and
PQT to allow for production start up.

ddd. Page F-1, Appendix F, - Office symbol for TACOM should
be AMCPM-CE.



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
MILITARY TRAFFIC MANAGEMENT COMMAND
TRANSPORTATION ENGINEERING AGENCY
12388 WARWICK BOULEVARD, P.O. BOX 6276
NEWPORT NEWS, VIRGINIA 23606-0276

MTTE-TRV (70-47a)

12 SEP 1990

MEMORANDUM FOR Commander, U.S. Army Belvoir Research, Development and Engineering Center, ATTN: AMSTR-LAL
(Mr. Rudy), Fort Belvoir, VA 22060-5606

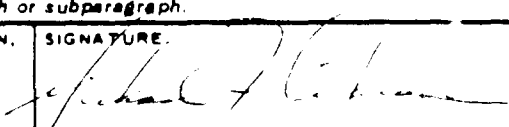
SUBJECT: Review of the Test & Evaluation Master Plan (TEMP) for the All-Terrain Crane (ATEC) program

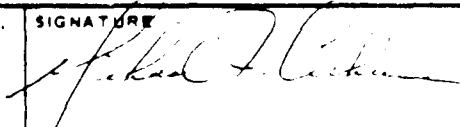
1. We have reviewed the above TEMP and have enclosed our comments on DA form 2028.
2. Please include MTMCTEA on the TIWG TEMP coordination sheet. Also, please change our point of contact office symbol to MTTE-TRV in all future correspondence.
3. We have no objection to your addressing transportability as an operational issue instead of a technical one; however, transportability testing falls under technical testing.
4. The project engineer at MTMCTEA for the ATEC is Mr. Michael Cochrane. If you have any questions, please feel free to call him at AUTOVON 927-4646 or (804) 878-4646.

FOR THE COMMANDER:

Encl


HENRY M. BENNETT, P.E.
Chief, Transportability
Engineering Division

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC SM).	DATE 5 Sep 90
For use of this form see AR 25-30 the proponent agency is ODISC4							
TO: (Forward to proponent of publication or form) (Include ZIP Code) Commander 3RDEC ATTN: AMSTR-LAL Fort Belvoir, VA 22060-5606						FROM: (Activity and location) (Include ZIP Code) Commander MTMC Transportation Engineering Agency ATTN: MTTE-TRV, P.O. Box 6276 Newport News, VA 23606-0276	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC SM) AND BLANK FORMS							
PUBLICATION FORM NUMBER				DATE		TITLE	
				27 Aug 90		Test & Evaluation Master Plan (TEMP) All Terrain Crane (ATEC)	
ITEM NO	PAGE NO	PARA-GRAPH	LINE NO *	FIGURE NO	TABLE NO	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended change, if possible.)	
1	I-3			1		<u>Essential:</u> Under "Transportability", eliminate the words, "Characteristics or Restrictions Added". Eliminate "Road, Rail and Air" and replace with "MIL-STD-209, MIL-STD-810 and meet ROC requirements". <u>Reason:</u> 1. The Critical Technical Characteristic being evaluated is simply Transportability. 2. The actual technical threshold for transportability is whether the ATEC meets the criteria of MIL-STD-209 for lifting and tiedown provisions and MIL-STD-810 for rail impact. These tests must be passed before transportability approval is granted.	
2	I-4	3i.				<u>Essential:</u> Eliminate paragraph as it is now written and change to "ATEC must meet ROC requirements for transportability as well as the criteria of MIL-STD-209 and MIL-STD-810." <u>Reason:</u> Consistency with item 1. The possibility that ATEC will not meet transportability requirements should not be mentioned in the TEMP.	
3	I-5	4.s.				<u>Essential:</u> Rewrite paragraph as follows: "Will be marine transportable by LARC-LX and larger vessels." <u>Reason:</u> MTMCTEA will evaluate ATEC for transport in Army vessels. The U.S. Navy will evaluate ATEC for transport in all Navy ships. Item 4 explains elimination of MIL-STD-1366 reference.	
4	I-5	4.t.				<u>Essential:</u> Rewrite paragraph as follows: "Will be rail transportable and pass the MIL-STD-810 rail impact test."	
* Reference to line numbers within the paragraph or subparagraph.							
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE AUTOVON, PL'S EXTENSION		SIGNATURE	
MICHAEL F. COCHRANE Mechanical Engineer				AUTOVON 927-4646			

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs Supply Manuals (SC SM)		DATE 5 Sep 90
TO: (Forward to proponent of publication or form) (Include ZIP Code) Commander BRDEC ATTN: AMSTR-LAL Fort Belvoir, VA 22060-5606						FROM: (Activity and location) (Include ZIP Code) Commander MTMC Transportation Engineering Agency ATTN: MTTE-TRV, P.O. Box 6276 Newport News, VA 23606-0276		
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC SM) AND BLANK FORMS								
PUBLICATION FORM NUMBER						DATE		TITLE
						27 Aug 90		Test & Evaluation Master Plan (TEMP) All Terrain Crane (ATEC)
ITEM NO	PAGE NO	PARA-GRAPH	LINE NO *	FIGURE NO	TABLE NO	RECOMMENDED CHANGES AND REASON <i>(Provide exact wording of recommended change, if possible)</i>		
5	I-5	4.u.				Reason: It is not necessary to reference MIL-STD-1366 or MIL-HDBK-157. These documents contain outdated material and are currently being revised. <u>Essential:</u> Eliminate reference to MIL-STD-1366. <u>Reason:</u> (See Reason in Item 4)		
6	E-1					<u>Essential:</u> Combine test objectives 9 and 10 into one entitled, "Transportability". Test scope: "All modes". Type of Data: "ATEC dimensions and strength of lift/tiedown provisions". <u>Reason:</u> Clarity and simplicity.		
6	E-1					<u>General Comment:</u> Please note that the Combat Systems Test Activity (CSTA), Aberdeen Proving Ground, would be responsible for conducting the transportability tests. MTMCTEA, as a participant, will use the results to determine ATEC compliance with the ROC requirements. MTMC will not be involved in monitoring towing limitations, bridging capability, mobility or fording capability.		
*Reference to line numbers within the paragraph or subparagraph								
TYPED NAME, GRADE OR TITLE MICHAEL F. COCHRANE Mechanical Engineer						TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION AUTOVON 927-4646		SIGNATURE 

APPENDIX D
TECHNICAL SUPPORT AND DOCUMENTATION MANAGEMENT
FOR
24 TON ALL TERRAIN CRANE
ATEC SPECIFICATION

NOT MEASUREMENT SENSITIVE

MIL-X-XXXXX(A)
February 1991

MILITARY SPECIFICATION

CRANE: 25-TON, ALL-TERRAIN

This specification is approved for use within the U.S. Army, Marine Corps, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for a diesel engine-driven, fully revolving, hydraulic operated, multi-axle, high-speed, all-terrain crane (ATEC).

2. APPLICABLE DOCUMENTS

2.1 Government Documents.

2.1.1 Specifications, Standards and Handbooks. The following specifications, standards and handbooks form a part of this specification as specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited herein. (Unless otherwise indicated, copies of federal/military specifications, standards, and handbooks are available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094).

SPECIFICATIONS

FEDERAL

VV-F-800	-	Fuel Oil, Diesel
TT-P-28	-	Paint, Aluminum, Heat Resisting (1200 °F.)
*RR-W-410	-	Wire, Rope, and Strand

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Belvoir Research, Development and Engineering Center, ATTN: STRBE-FMT, Fort Belvoir, VA 22060-5606, using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.
Federal Supply Code (FSC) 3810

MILITARY

MIL-HDBK-157 -	Transportability Criteria
MIL-T-704 -	Treatment and Painting of Material.
MIL-C-1283 -	Can, Gasoline, Military, 5-Gallon
MIL-L-2104 -	Lubricating Oil, Internal Combustion Engine, Tactical Service.
MIL-L-2105 -	Lubricating Oil, Gear, Multi-Purpose.
MIL-C-3580 -	Crane and Crane-Shovels, Truck, Crawler and Wheel-Mounted, Full-Revolving and Their Attachments, Packaging of.
MIL-G-3859 -	Grease Gun, Hand-Operated, Lever, Push and Screw Type
MIL-M-7866 -	Molybdenum Disulfide, Technical, Lubrication Grade
MIL-G-10924-	Grease, Automotive and Artillery
MIL-P-14105-	Paint, Heat-Resisting, (For Steel Surfaces)
MIL-S-40626-	Sign Kit, Vehicle Class
MIL-A-46153-	Antifreeze, Ethylene Glycol, Inhibited, Heavy Duty, Single Package
MIL-L-46167-	Lubricating Oil, Internal Combustion Engine, Arctic
MIL-B-46176-	Brake Fluid, Silicone, Automotive All Weather Operational and Preservative
MIL-C-46168/- 53039	Coating, Aliphatic Polyurethane, Chemical Agent Resistant (CARC)
MIL-A-52363-	Air Cleaners, Intake: Dry-Type (for Internal Combustion Engines)
MIL-P-53022/- 53030	Primer, Coating, Epoxy
MIL-T-62314-	Simplified Test Equipment/Internal Combustion Engine-Reprogrammable (STE/ICE-R)

STANDARDS

MILITARY

MIL-STD-129 -	Marking for Shipment and Stowage
MIL-STD-209 -	Slings and Tiedown Provisions for Lifting and Tying Down Military Equipment
MIL-STD-642 -	Identification Marking of Combat and Tactical Transport Vehicles
MIL-STD-889	Dissimilar Metals
MIL-STD-1366-	Material Transportation System Dimensional and Weight Constraints, Definition of
MIL-STD-1474-	Noise Limits for Military Materiel
MS-24207-	Coupling, Grease Gun, Hydraulic Type Nozzle
MS-35000-	Battery, Storage, Lead Acid, Waterproof
MS-51113-	Switch, Vehicular Lights, 24-volt, DC, Waterproof
MS-51118-	Pintle Assembly, Towing - 40,000 lbs. Capacity, Manual Release
MS-51318-	Headlight, Blackout, 24-volt, Waterproof

MIL-X-XXXXX(A)

MS-51330-	Stoplight, Taillight, Vehicular - 24 Volt, Blackout Tail, Blackout Stop
MS-52125-	Composite Light, Tail, Stop, Turn and Marker
MS-52131-	Connector, Plug, Electrical Intervehicular Power Cable
MS-53052-	Bracket Assembly, Liquid Container, Five - Gallon
MS-500004-	Pad Eye, Vehicular, Towing Lug
MS-500048-	Towbar, Motor Vehicle: Light, Medium and Heavy-Duty

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, ATTN: NPODS, 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

2.1.2 Other Government Documents, Drawings, and Publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation (see 6.2).

DEPARTMENT OF LABOR (DoL)
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

Occupational Safety and Health Standards..

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

DEPARTMENT OF TRANSPORTATION (DoT)

Motor Carrier Safety Regulations.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

ENVIRONMENTAL PROTECTION AGENCY

Federal Emission Standards

US ARMY TANK-AUTOMOTIVE COMMAND

Report No. CR-28-588-003, STE/ICE-R Design Guide for Vehicle
Diagnostic Connector Assemblies
Drawing No. 8383832 - Tow Bar, Heavy Duty
Drawing No. 8764378 - Pintle Mount and Assembly
Drawing No. 12258941 - Connector, Receptacle . Electrical (54 Pin)
Drawing No. 12258955 - Vehicle Test Card

MIL-X-XXXXX(A)

(Copies of specifications, standards, handbooks, drawings, publications, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2. Non-Government Publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD-adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI)

Safety Standards for Mobile Hydraulic Cranes (ANSI B30.5)

(Application for copies should be addressed to the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.)

POWER CRANE AND SHOVEL ASSOCIATION (PCSA)

Mobile Hydraulic Crane Standards (PCSA No. 4)

(Application for copies should be addressed to the Power Crane and Shovel Association, Marine Plaza, Suite 1700, 111 East Wisconsin Avenue, Milwaukee, WI 53202.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE Handbook

- SAE J53 - Minimum Performance Criteria for Emergency Steering of Wheeled Earthmoving Construction Machines
- SAE J154 - Operator Enclosure Human Factor Design Considerations
- SAE J159 - Crane Load Moment System
- SAE J209 - Instrument Face Design and Location for Construction and Industrial Equipment
- SAE J318 - Air Brake Gladhand Service (Control) and Emergency (Supply) Line Couplers - Trucks, Truck-Trailers, and Trailers
- SAE J371 - Drain, Fill, and Level Plugs for Earthmoving Machinery

MIL-X-XXXXX(A)

- SAE J375A - Radius-of-Load and Boom Angle Measuring System
- SAE J376 - Load Indicating Devices in Lifting Crane Service
- SAE J386 - Seatbelts for Construction Machines
- SAE J514 - Hydraulic Tube Fittings
- SAE J516 - Hydraulic Hose Fittings
- SAE J518 - Hydraulic Flanged Tube, Pipe, and Hose Connections, 4-Bolt Split Flange Type
- SAF J534 - Lubrication Fittings
- SAE J538 - Grounding of Storage Batteries
- SAE J551 - Performance Levels and Methods of Measurement of Electromagnetic Radiation from Vehicles and Devices (20-1000MHz)
- SAE J552 - External Electromagnetic Radiation Suppressor
- SAE J614b - Dipstick Markings
- SAE J678 - Speedometers and Tachometers - Automotive
- SAE J753 - Lubrication Chart - Construction and Industrial Machinery
- SAE J765 - Crane Load Stability Test Code
- SAE J821 - Electrical System for Construction and Industrial Machinery
- SAE J833 - Human Physical Dimensions
- SAE J898 - Control Locations for Off-Road Work Machines
- SAE J899 - Operator's Seat Dimensions for Off-Road, Self Propelled Work Machines
- SAE J931 - Hydraulic Power Circuit Filtration
- SAE J925 - Minimum Service Access Dimensions for Off-Road Machinery
- SAE J994 - Alarm - Backup - Electric - Performance, Test, and Application
- SAE J1024 - Fuel-Fired Heaters - Air Heating - for Construction and Industrial Machinery
- SAE J1063 - Cantilevered Boom Crane Structures - Method of Test
- SAE J1127 - Battery Cable
- SAE J1128 - Low Tension Primary Cable
- SAE J1180 - Telescopic Boom Length Indicating System\
- SAE J1305 - Two-Block Warning and Limit Systems in Lifting Crane Service
- SAE J1308 - Fan Guards for Off-Road Machines
- SAE J1362 - Symbols for Controls, Indicators, and Tell-Tales for Off-Road Work Machines

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.)

TIRE AND RIM ASSOCIATION, INC. (TRA)

TRA Yearbook.

(Application for copies should be addressed to the Tire and Rim Association,

MIL-X-XXXXX(A)

Inc., 3200 West Market Street, Akron, OH 44313.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC.

Agent, National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc. ATTN: Traffic Department, 1616 P. Street N.W., Washington D.C. 20036.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, ATTN: Tariff Publishing Officer, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

AMERICAN WELDING SOCIETY, INC. (AWS)

D14.3 - Specification for Welding Earthmoving and Construction Equipment.

(Application for copies should be addressed to the American Welding Society, Inc., 2501 NW Seventh Street, Miami, FL 33125.)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

Boiler and Pressure Vessel Code, Section IX, Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing and Brazing Operators.

(Application for copies should be addressed to the American Society of Mechanical Engineers, United Engineering Center, 354 East 47th Street New York, NY 10017.)

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Rule 442 - Usage of Solvents

(Application for copies should be addressed to the South Coast Air Quality Management District, 9150 Flair Drive, El Monte, CA 91731.)

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

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2.3 Order of Precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or Military Standards (MS)), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First Article. Unless otherwise specified (see 6.3), the contractor shall furnish one or more cranes for first article inspection and approval. The first article may be either a first production item or a standard production item from the supplier's current inventory provided the item meets the requirements of the specification and is representative of the design, construction and manufacturing technique applicable to the remaining items to be furnished under the contract.

3.2 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this specification unless otherwise specified.

3.2.1 Hazardous Materials. In the event of products received from foreign sources, care must be taken to ensure lubricants and cooling oils in the item are free of polychlorinated biphenyls (PCBs).

3.2.2 Material Deterioration Prevention and Control. The item(s) shall be fabricated from compatible materials, inherently corrosion resistant or treated to provide protection against the various forms of corrosion and deterioration that may be encountered in any of the applicable operation and storage environments to which the items may be exposed.

3.2.3 Dissimilar Metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889.

3.2.4 Identification of Materials and Finishes. The contractor shall identify the specific materials, material finish or treatment for use with component and subcomponent, and shall make information available upon request to the contracting officer or designated representative.

3.3 Design and Construction. The crane shall be an all-terrain, pneumatic-tired, diesel engine-driven vehicle, with a fully revolving superstructure and cab, and hydraulically-powered, telescoping boom. It shall be capable of operating with a hydraulic clamshell and hydraulic grapple. The design criteria and practices used, when not specifically specified, shall follow normal commercial crane industry practices for hydraulic cranes. The crane shall be capable of independently and simultaneously lifting and rotating its rated load through a 360° traverse. The crane, without load, shall be capable of attaining and maintaining a travel speed of not less than 40 miles per hour (MPH) on paved

roads of up to 1 percent grade. The crane, without load, shall be capable of traveling on: highways, unimproved roads, sandy beaches, unprepared and uneven surfaces to include sand, snow and mud. The crane shall be capable of stopping and then accelerating while on a longitudinal slope of not less than 30 percent in either the forward or reverse direction on paved roads or hardpacked surfaces, and shall be capable of negotiating a 15 percent side slope. The crane shall be capable of operating after exposure to chemical decontamination solutions and shall incorporate seals and other synthetic components that are resistant to deteriorating bacteria. High Altitude Electromagnetic Pulse (HAEMP) survivability of ATEC is desired; the Government will estimate its HAEMP survivability which will be reported to the Combat Developer for inclusion in doctrinal considerations.

3.3.1 Crane. The crane assembly, designed for carrier mounting, shall consist of a fully revolving superstructure with boom support, hydraulically operated telescoping boom and attachments, main winch with wire rope, hook block, cab, controls and necessary accessories. The crane shall be capable of lifting 25 tons at a radius of 10 feet with outriggers emplaced, and move (pick and carry) 12,000 pounds at a 15-foot radius.

3.3.1.1 Superstructure. The superstructure shall be mounted on the carrier to insure full working range and designed to withstand the forces caused by lifting and swinging safe loads. It shall not exceed the width of the carrier on which it is mounted. The superstructure shall provide stable retention of the boom in all positions and, with its base, shall rotate on ball thrust or tapered roller bearings of sufficient number, size and capacity to support working loads. To provide constant counterbalance to the boom and load, a counterweight shall be mounted on the superstructure.

3.3.1.2 Boom. The boom shall extend to a minimum of 70 feet and when fully retracted shall not exceed 35 feet. The boom shall be made of alloy steel and shall be a hydraulically operated, telescoping type, consisting of a base section and sliding section(s). The boom shall be capable of elevation from the horizontal to a vertical angle of not less than 70°. A boom angle indicator meeting the requirements of SAE J375A and J1180 shall be furnished. The boom angle indication shall be visible to the operator in his normal seated position. The crane shall be equipped with a moment-indicating, boom lockout/safety device to prevent overloading during lifting operations as defined in SAE J159 and J376. Means shall be provided for the operator to determine the boom length with match points for the load capacity chart. An anti two-block device shall be installed to prevent the hook block from contacting the boom tip.

3.3.1.2.1 Boom Maintainability. All components of the system shall be accessible for repair and maintenance without the removal of adjacent components. Each component of the system shall have provisions to inspect, test and evaluate the item for replacement without special tools except as detailed in the operators and maintenance manuals.

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3.3.1.2.2 Boom System Components. The system shall consist of components that have been tested and approved for the application being offered. All crane exterior mounted components shall be water resistant. The system shall consist of, but not be limited to the following:

- a. Anti-two-block hoist limit system
- b. Boom length indicator feature.
- c. Boom angle/radius indicator feature.
- d. Load movement indicator system.
- e. Cab-mounted operators display console.

3.3.1.2.2.1 Anti-Two-Block Hoist Limit System. The anti-two-block hoist limit system shall prevent the operator from allowing the hook block assembly to approach the boom tip. The system shall warn the operator when an impending two-block condition exist. The warning shall include both an audible and visual alarm. The audible alarm shall be clearly distinguishable from engine and machinery noise. The visual alarm shall also be clearly visible indicating an impending two-block condition on the operators in-cab display console. The system shall incorporate a control lock-out feature in accordance with SAE J1305, June 1987 edition, paragraph 4.2.1.

3.3.1.2.2.2 Boom length Indicator. The boom length indicator feature shall meet or exceed the recommended requirements as specified in SAE J1180.

3.3.1.2.2.3 Boom Angle/Radius Indicator. The boom angle/radius indicator feature shall meet or exceed the recommended practices in SAE J375, April 1985 edition. This feature shall be equipped with adjustable working range set points having visual and/or audible warning signals.

3.3.1.2.2.4 Load Moment Indicator. The system shall meet or exceed recommended requirements specified in SAE J159, April 1985 edition. This system shall have a control lock-out feature which will disable these control functions which increase the load moment.

3.3.1.2.2.5 In-Cab Operators Display Console. The operators display console shall display all relevant data recommended in SAE J159, J375, J376, J1180, J1305 and shall be user friendly. The system shall be operational when the crane's main electrical system is in the "ON" position. The console shall not contain a switch allowing the total system to be completely turned off. The console shall have water-tight connections to the operator's in-cab display and any other system components. All visual caution functions featured on the console shall be amber in color. All visual impending danger indicators/system lock-out features on the console shall be red in color. The console shall have provisions for night operation. All required operational functions shall be visible to reduced light levels during blackout conditions. All letters shall be of sufficient size to enable the operator to read all data while sitting in the normal operator's position. The console shall be adjustable by the operator for easy viewing. The percentage of load reading may be an analog-type indicator. When the indicator is analog, the percentages shall display green for 0 to 90 percent, amber from 90 to 100 percent caution, and red when rated capacity is

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exceeded. The data display shall be compatible with the units of measure published on the crane load charts. The console shall have provisions for mounting in the cab without obstructing the operator's vision while operating the controls of the crane. This system shall be self-diagnosing in nature for failures/errors that may exist during crane operations. The error display shall inform the crane operator the types of failure, and if he can continue to operate the crane in a normal or reduced crane capacity.

3.3.1.2.2.6 Nuclear, Chemical and Chemical (NBC). Unless otherwise specified (see 6.2), the system shall be operable by personnel wearing chemical protective clothing in accordance with MIL-G-43976.

3.3.1.3 Winch Assembly. A cable hoist drum, with wire rope as specified in 3.3.1.5, shall be mounted at the base of the boom or on the boom support to facilitate crane operations. The hoist drum shall be actuated by a hydraulic motor controlled from the operator's station. This assembly shall include a motor, a drum, and a self-energizing brake mechanism. The winch shall not be free wheeling, and shall be weatherproof for outdoor operation. The winch shall have a minimum of two speeds. Low speed shall have a minimum line pull on the last working layer capable of starting a load in mid air equal to 118 percent of the maximum rated capacity divided by the number of parts of line, and obtain a minimum line speed of 110 feet per minute (FPM) at no load. High speed shall have a minimum of 6000 pounds line pull and obtain a line speed of not less than 300 FPM with no load. An auxiliary winch is required to support pile driving operations (see 6.2.1g).

3.3.1.4 Hook Block. The running block and hook shall have adequate weight to insure payout of cable without load on the hook, with the hook block and boom in any position when reeved for the load which is to be lifted at the given radius. The hook shall be a swivel type with an ultimate breaking strength at least four times the maximum rated capacity of the crane and shall include a safety latch. The hook block shall permit disassembly for visual and nondestructive testing.

3.3.1.5 Rope. Load hoist ropes shall be at least improved plow steel (IPS), independent wire rope center (IWRC), with a safety factor of not less than 3.5. The winch shall be furnished with the manufacturer's standard length rope. The contractor shall provide a signed certification with each crane identifying the crane serial number, wire rope manufacturer, type of wire rope construction, type of wire rope material, and the minimum rated breaking strength of the wire rope provided.

3.3.1.6 Sheaves. Sheaves shall have a pitch diameter at least 18 times the rope diameter. The hook block pitch diameter shall be at least 16 times the rope diameter. Sheaves shall be adequately guarded to prevent the wire rope from leaving the sheave during operation.

3.3.2 Hydraulic System. The hydraulic system shall include, in addition to normal system components, a full flow filter and control valves to insure positive control of boom hoist, boom telescope, rope hoist and outriggers in all operations in event of loss of hydraulic power due to ruptured hoses. Hydraulic

line circuit and filtration shall be in accordance with SAE J931. The pump(s) shall be driven by the crane engine and shall have sufficient capacity to operate all hydraulically-powered components as specified herein. All rods which will be exposed during operation, shall have a hard chromium plating. All pressure hydraulic hoses and fitting shall be capable of withstanding a bursting test pressure of four times the working pressure, and a proof pressure of at least two times the operating pressure. The hydraulic system shall be compatible with the standard military Hydraulic Systems Test and Repair Unit (HSTRU).

3.3.2.1 Filling, Draining and Checking Provisions. The hydraulic system reservoir, the transmission housing, and all other enclosures which contain lubricant or hydraulic oil shall be equipped with dipsticks, sight gages or checkplugs conforming to SAE J371 to determine the fluid levels. Each enclosure shall be equipped for filling and for draining. Each drain plug or valve shall be located so that removal of the plug or valve will result in complete drainage of the fluid from the enclosure (except torque converter). When the crane is in a level position, drainage of fluids shall be to a container below the crane without draining on or over any part of the crane. Integral tubes, hose or troughs may be used to convey the fluids from the drain outlet. Accessibility to the fill opening, the fluid-level checking device, and the drain plug or valve shall be provided without removal or adjustment of accessories or parts, except for plates equipped with hand-operable, quick disconnect fasteners. The radiator drain shall be such that coolant will not drain onto any part of the crane. An extension hose attached to the draincock is permitted.

3.3.2.2 Ports, Fittings and Connections. All ports, fittings and connections for sizes larger than 1 inch shall be of the 4-bolt, split flange type conforming to SAE J518. For sizes 1 inch or less:

- a. Ports shall be the straight thread O-ring type in accordance with SAE J514.
- b. Tube fitting shall be 37° flared type in accordance with SAE J514, except straight thread O-ring fittings (also in accordance with SAE J514) shall be used when directly connecting to a port.
- c. Hose fittings shall be the 37° flared swivel type in accordance with SAE J516 and J518.

3.3.2.3 Hydraulic System Temperature. Hydraulic tank oil temperature shall not exceed 200°F with an ambient temperature of 120°F while performing repetitive craning operations.

3.3.3 Cabs. The cabs for the carrier and the crane shall be fabricated from sheet steel or fiberglass, having sufficient windows and glazed doors to permit at least 270° lateral visual field for both the crane and carrier operator and 15° above horizon visual field for the operator of the carrier. All glass shall be safety type, and shall be held in place by rubber or metal channels for easy replacement. Windows shall be arranged for easy opening and removal when required. All cab doors, whether of the sliding or swinging type, shall be adequately restrained from accidentally opening or closing when the crane is traveling or operating. All doors and opening windows shall be provided with

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means for securely locking in the closed position. Adjustable and comfortable seats shall be provided in each cab, located to provide maximum unobstructed visibility for the operator. Both cabs shall be equipped with air conditioning, heater, defroster, and air or electric operated windshield wiper. An electric or air horn, hand or foot operated, shall be provided in both cabs. The carrier cab shall be provided with West Coast type outside rearview mirrors on each side. A heater with two or more fan speeds and a defroster shall be furnished. The heater shall be capable of reaching and maintaining a uniform cab temperature of 41°F ($\pm 9^\circ\text{F}$) or higher at an ambient temperature of -25°F within 1 hour. The defroster may be either part of a heater-defroster or a separate defroster fan and shall provide defrosting of the front and side windows. If a fan type defroster is provided, it shall be safety guarded, adjustable, and provided with an on/off switch. If the heater is fuel fired, it shall conform to SAE J1024. The cabs shall be provided with adequate lighting/illumination to enable the operator to read all gages, charts and control labels under conditions of darkness. The cabs shall have provisions for storing the operator's M-16 rifle in a rack.

3.3.4 Controls. All hoist and crane controls, lockouts and indicators shall be located within easy reach of the operator in the crane cab and shall be readily accessible under all conditions of operation. All controls shall be clearly marked as to the use and function. Information shall be provided in the form of diagrams whenever possible. A positive swing lock for traveling shall be provided. Controls shall be provided in the crane operator's cab to permit remote control of the steering, braking and travel functions of the carrier.

3.3.5 Carrier. The carrier frame shall be of the heavy steel fabrication type with necessary braces and reinforcements to provide rigid support for the revolving superstructure, hoisting drum, rope and hook block under maximum load, when the telescopic boom is extended at minimum through maximum radii at any position within the full working range. The revolving superstructure shall be positioned on the carrier frame to permit maximum efficiency for all purpose crane operations. The number of axles shall be the manufacturer's standard for the capacity crane furnished with all axles to be driven. The maximum axle loads shall meet minimum requirements for highway transport during peacetime. A differential locking type mechanism shall be provided in the drive line for all driven axles and shall be engaged on demand by the operator using a cab mounted switch. The drive line shall be of the torque proportioning transfer type. The drive line system shall be designed so the operator may engage or disengage the front axles while moving without damage to the drive line or other components. Power assist steering for the front and rear wheels shall be provided. The crane shall be equipped with three-mode steering; front wheel, all wheel and crab, with controls and indicators in the carrier cab. Emergency steering conforming to SAE J53 shall be provided for retaining steering control in the event of engine failure or steering power source failure when traveling at any speed. The carrier shall be capable of fording truck traffic fords (30 inches) without contaminating the liquid reservoirs or the air induction system. If constant velocity joints are used in the steering axles, they shall have provisions to drain water after a fording operation when required. Two tow lugs, rated at 60 tons, suitable for mating with tow bar conforming to Drawing No. 8383832, shall

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be furnished and installed on the front and rear of the carrier. There shall be no drive train damage when the crane is towed. A towing pintle conforming to towing pintle mount and assembly (Drawing No. 8764378) shall be furnished on the rear of the carrier. The crane must also tow a 10 ton, M345 trailer with attachments for short distances, and must be equipped with compatible electric wiring harness and brake hose line connections. Refer to MIL-STDs-51118, 500004 and 500048 for compatibility with pintles, pad eyes and towbars.

3.3.5.1 Transmission. The crane carrier shall be equipped with a full power shift or full automatic transmission for the size crane specified. The transmission shall be equipped with a neutral safety start switch. The transmission shall provide adequate gearing for all performance conditions specified herein and operation at any speed up to the maximum speed. The transmission shall be protected from damage when the operator moves or attempts to move the directional control to the opposite direction while the crane is in motion. The transmission shall be compatible with oil conforming to MIL-L-2104, grade 10, and MIL-L-46167. The transmission system shall be furnished with filter(s) having replaceable elements and sized in accordance with the transmission manufacturer's recommendation. The filter shall be replaceable without removal of the pan or other components unless service interval for replacement is the same as for other service requiring removal.

3.3.5.2 Oil Sampling Valve. An oil sampling valve shall be provided on the engine, transmission and hydraulic system. The valve shall be manually operated and shall close automatically after release. It shall be made of material resistant to corrosion such that it will not contaminate the sample. The discharge port of the valve shall be covered with a captive chained cap conforming to SAE J514. The valve shall be located in such a way that samples can be taken easily, without personnel being exposed to danger when taking oil samples with the engine running. The location of the oil tap shall be such that when samples are taken, it shall be a true representation of oil that is flowing when the engine is running. Sampling valves shall be labeled with a plate in accordance with 3.10.2 adjacent to the valve indicating the type of oil sampled (engine or transmission, whichever is appropriate), and shall be provided with an arrow, labeled "OPEN", showing direction.

3.3.5.3 Brakes. Service and parking brakes shall be provided and shall be independently actuated. The crane carrier shall be provided with the manufacturer's standard, foot-controlled, service brakes applied to all wheels. The service brakes shall be capable of bringing the crane to a complete, safe stop on a 45 percent slope, forward or reverse. A parking brake, capable of holding the crane on a longitudinal slope of not less than 20 percent without slippage, shall be provided. If air service brakes are provided, air brake service and emergency line couplings conforming to SAE J318 shall be provided on the rear of the carrier. A relay emergency valve and an air dryer shall also be provided. The crane shall be able to stop in a reasonable distance while towing the loaded 10-ton attachment trailer.

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3.3.5.4 Transfer Case. If an automatic transmission is provided, the crane shall be equipped with a two-speed transfer case. The transfer case shall be multi-speed, torque proportioning.

3.3.5.5 Tires. Tires shall be of the tubeless type with traction type tread on all axles. All tires shall be high floatation type on all axles. Tires shall have a rated capacity at least equal to the load imposed on each tire, measured at each wheel, at the ground, with the maximum load. Tire ratings shall conform to Tire and Rim Association (TRA) recommendations for the type and size of tires furnished. All rubber tires shall be no more than one year old when accepted by the Government.

3.3.5.6 Lights and Reflectors. The following lights and reflectors shall be furnished and installed and shall be powered by a 24-volt (V) electrical system:

- a. A minimum of two sealed beams (mounted on carrier).
- b. Taillights.
- c. Stoplights.
- d. Minimum of eight clearance lights.
- e. Turn signal lights.
- f. Minimum of three adjustable floodlights mounted on the crane to rotate with the superstructure.
- g. Instrument panel lights (both cabs).
- h. Emergency 4-way flashing lights.
- i. Interior dome lights (both cabs).
- j. Reflectors positioned on all corners of the carrier. Yellow reflectors shall be on the left and right sides, and front. Red reflectors shall be on the rear of the carrier.

3.3.5.7 Back-up Alarm. A back-up alarm shall be provided on the crane and shall comply with SAE J994, Type A. The back-up alarm signal shall be at least 20 dB(A) above the background noise level produced by the carrier when backing.

3.3.5.8 Engine(s). The crane engine(s) furnished shall be of the diesel type having horsepower, torque and speed characteristics to meet satisfactorily all the crane performance requirements specified herein. The engine(s) shall be capable of meeting the performance requirements using diesel fuel conforming to VV-F-800, and perform satisfactorily when operated with turbine kerosine JP-5 and JP-8 (DOD standard logistical fuels). The diesel engine(s) shall start within 5 minutes and be ready for full load operation within 15 minutes in any ambient temperature from +120°F to -50°F. When a fluid priming system is required, it shall be of the measured shot type with storage capacity of at least 12 fluid ounces. When specified (see 6.2), the engine(s) shall be capable of starting and operating in temperatures to -50°F with the use of a winterization kit. The engine(s) shall be furnished complete with at least the following accessories:

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- a. Instrument panels in the cabs complete with a lubricating oil pressure gage, a fuel gage, a cooling liquid temperature indicator, a voltmeter or ammeter, an hour meter (may be located in engine compartment, and a speedometer with recording odometer and tachometer in the carrier cab.
- b. Charging alternator(s) with a capacity rating compatible with the electrical system requirements.
- c. Cooling-liquid high temperature visible or audible safety warning device.
- d. Lubricating oil low pressure visible or audible safety warning device.
- e. Fuel gage.
- f. An engine housing designed to facilitate maintenance of the engine.
- g. Transmission fluid temperature gage.
- h. Air compressor and receiver tank with sufficient capacity to inflate the carrier tires.
- i. Engine exhaust emissions shall be within those specified by Federal Emission Standards.

3.3.5.9 Fuel System. The fuel system shall be located so that no part of the system extends beyond the widest part of the crane and that no part of the fuel tank is forward of the front axle. The fuel tank joints shall be closed by welding, brazing, silver soldering or equivalent technique. Joint closing by crimping or lead-based or soft soldering shall not be used. The capacity of the fuel tank shall be sufficient for not less than 200 miles of highway travel at maximum attainable speeds of at least 40 MPH while pulling the loaded 10 ton attachment trailer. The fuel tank shall be legibly marked "LOGISTICAL FUEL ONLY" in block letters $\frac{1}{2}$ inch in height. The fill pipe opening shall not be less than 4 inches in inside diameter and shall be located outside of the operator's compartment so that no fuel spilled during fueling will contact any part of the exhaust or electrical systems. The tank filling components shall include a strainer. The fuel tank shall be provided with shut-off valves for all lines to and from the tank. A fuel tank drain plug located at the lowest point shall be furnished. Fuel lines and fittings shall be located and routed in protected locations not subject to chafing or damage. The mounting of the fuel tank shall prevent shifting, damage, and fatigue as a result of travel and transport. The fuel tank and the fuel filter housing shall be equipped with means for draining water and sediment from the fuel system into a suitable container. If the fuel filters are not of the type that separate out water, a water separator shall be provided. Fuel lines shall be sized to provide continuous operation at full throttle and maximum loads.

3.3.5.10 Engine Air Induction System. The air induction system shall include a pre-cleaner or dust scavenger, a heavy-duty dry type air cleaner and a locking type air cleaner restriction indicator in accordance with MIL-A-52363, Type II or III. The air cleaner restriction indicator shall be mounted in a location clearly visible to the operator without requiring removal of panels, covers or lids.

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3.3.5.11 Tachometer Drive. The engine shall be furnished with a heavy duty key drive tachometer take-off in accordance with SAE J678. The take-off shall be furnished with a treated captive chained cap.

3.3.5.12 Outriggers. Not less than four independent, hydraulically-powered outriggers capable of being extended not less than 9 inches below ground level, shall be furnished. The outriggers shall have sufficient strength to accept full stability, under all rated loading conditions, including the ability to raise the crane off the ground from travel position, when necessary, to compensate for ground surfaces having irregular contours. Vertical outrigger cylinders shall have check valves as a part of, or attached to, the cylinder. Horizontally extended hydraulic cylinders shall be enclosed within outrigger boxes. Outriggers in the stowed position, ready for travel, shall not exceed maximum allowable overall width. Devices to accurately determine when the crane is level shall be installed in a position convenient to the outrigger controls. All hydraulic hoses shall be enclosed or routed to preclude external damage.

3.3.6 Electrical System. The crane shall be equipped with a 24-volt (V) negative ground, electrical system in accordance with SAE J538, J821, J1127 and J1128. The positive battery cabling shall be red with the negative cabling black.

3.3.6.1 Batteries. The batteries shall be size 6 NT in accordance with MIL-STD-35000, and shall be readily accessible for servicing. The battery and cable terminals shall be identified with the respective polarity by raised or recessed markings and corrosion resistant nuts and bolts shall be provided. The positive battery cable shall be red, labeled "+", and provided with a rubber boot to fit over the positive battery terminal. The negative battery cable shall be black, labeled "-".

3.3.6.2 Battery Enclosure. A weather protected box, or compartment-type battery enclosure, shall be provided. The enclosure shall include a drain for water or electrolyte, and a vent to prevent gas accumulation, and shall provide accessibility for servicing without removal of the battery or other components. The enclosure shall be equipped with battery holddown components to prevent any damage to the batteries and shall be internally treated to prevent corrosion. Composite material may be used for the battery enclosure.

3.3.6.3 Intervehicular Connector. The crane shall be equipped with a 24-V slave receptacle conforming to MIL-STD-52131. The receptacle shall permit charging the crane batteries and slave starting of the engine from an external source and charging and slave starting other equipment with the crane. The receptacle shall be installed on the exterior of the crane near the battery enclosure and shall be accessible to personnel standing on the ground. The receptacle shall be marked "SLAVE 24 VOLTS DC".

3.3.6.4 Blackout Lighting. One blackout headlight conforming to MIL-STD-51318 shall be mounted as close to the extreme left of the vehicle as practical and positioned to provide illumination with minimum obstruction. Two blackout stoplight-tailights conforming to MIL-STD-51330 shall be mounted adjacent to the

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taillights in recesses, or provided with guards. The blackout lights shall be controlled by an interior switch conforming to MIL-STD-51113 in the carrier cab. All other exterior lights, backup alarm and the horn, if electric, shall be made inoperable automatically when the blackout lights are switched on. A separate wiring harness may be provided for the blackout lights. In lieu of separate service and blackout taillight assemblies, composite light assemblies conforming to MIL-STD-52125 may be provided. All interior lighting, including instrument panel lights (exclusive of warning indicator lights) and gages which are illuminated in the blackout mode, shall not emit energy outside of the 380 to 700 nanometer wavelength range. All warning indicators shall be light emitting diodes (LED).

3.3.6.5 Diagnostic Connector Assembly (DCA). The crane shall incorporate an easily accessible DCA in the operator's cab for interface with the Government's Simplified Test Equipment/Internal Combustion Engine-Reprogrammable (STE/ICE-R) in accordance with Report No. CR-82-588-003 and MIL-T-62314, Appendix B. The diagnostic connector shall be in accordance with Drawing No. 12258941. As a minimum, the DCA shall be capable of monitoring the functions defined in Table II of Report No. CR-82-588-003 and alternator/generator output voltage, alternator/generator field voltage, alternator/generator negative cable voltage drop, fuel solenoid voltage, starter voltage, starter current first peak and average, starter circuit resistance, battery internal resistance change, fuel supply pressure and fuel filter restriction (Delta P). When specified (see 6.2), additional test parameters to be monitored in either the DCA or transducer kit (TK) mode shall be specified. Test points identified to monitor functions in the TK mode shall be accessible without the removal of major assemblies and installed attachments. Fittings/adapters required for the interface with the STE/ICE-R test set when monitoring in the TK mode shall be permanently installed on the crane. Adapters in the STE/ICE-R test set shall readily mate with test point connections in the crane. A separate wiring harness shall be provided for the DCA and shall include all wiring and necessary hardware to perform required capabilities. The contractor shall also provide STE/ICE-R vehicle test cards in the format identified in Drawing No. 12258955 addressing both DCA and TK measurements.

3.3.7 Winterization. A coolant heater, an engine oil heater, and a battery heater shall be provided when specified (see 6.2). Heaters shall operate on 115-V alternating current and shall be wired through a junction block to a single three-pronged (male), weatherproof slave receptacle cable, 25 feet long and of adequate line capacity to supply power for all heater units simultaneously, shall be furnished. Connecting cable shall include a matching female connector at the vehicle end and standard weatherproof three-pronged (two power plus one ground) male connector at the other end. Electrical apparatus shall conform to Motor Carrier Safety Regulation 393.77(c)(7). Electrical insulation of connecting cable shall withstand normal operating stresses in low ambient air temperatures (-50°F) without cracking or loss of dielectric capacity. All heater lead wires shall be installed without interfering with vehicle component operation and without loose excess wire. Heaters shall be furnished as follows:

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- a. Coolant heater, 115-V, 1500-watt (W) minimum rating, shall be installed along with a 115-V coolant circulating pump in such manner that heater coolant is continually circulated through the engine block, even when the engine's thermostat is closed. Normally, the pump and heater will take coolant from a port in the lower region of the block or from the lower radiator hose and return it to the head or upper region of the block or from the lower radiator hose and return it to the head or upper region of the block through the cab heater inlet (engine or cab heater) hose. A check valve in the coolant heater circuit shall prevent reverse flow when the engine is running. An engine thermostat with an operating range of 170° to 195°F shall be installed.
- b. Immersion type engine oil heater, 115-V, 300-W minimum rating, with a 170° to 195°F thermostat, shall be installed in the oil pan through any convenient opening.
- c. Battery heater, 115-V, 200-W minimum rating controlled with an integral 60° to 80°F thermostat shall be installed either under or around the battery in either the manufacturer's standard battery box or one constructed specifically for this purpose. The battery heater shall be suitably protected from the corrosive liquids and fumes normally associated with lead-acid vehicle batteries.

3.3.8 Tools and Storage. All nonstandard or special tools required for operation and maintenance of the crane, which are normally furnished to commercial customers, shall be furnished. In addition, an air hose of sufficient length to inflate the carrier tires using the engine-driven air compressor shall be provided.

3.3.8.1 Toolbox. A permanently mounted, lockable closed compartment or toolbox shall be provided to carry tools and accessories. It shall be of sufficient size to carry all tools provided with the crane. The toolbox shall be made of sheet steel with a minimum thickness of 0.0747 inch (U.S. Standard Gage No. 14). The toolbox shall have a hinged lid with a padlock closing device that will keep the lid closed when the toolbox is subjected to vibration. The toolbox shall be in a protected and accessible location.

3.3.8.2 Storage. ATEC shall have at least fifteen (15) cubic feet of secure storage for Additional Authorization List (AAL), publications, an inflation hose, and basic issue items (BII) of clothing and personal equipment (ie. MOPP IV equipment, rucksack, etc).

3.3.9 Lubrication. Adequate and accessible means of lubricating all surfaces requiring lubrication shall be provided. A lubrication chart identical to the chart provided in the operator and maintenance manuals, and in accordance with SAE J753 shall be furnished. The chart shall identify applicable military lubricants and appropriate ambient temperature ranges, and shall be mounted on a plate conforming to 3.10.2.

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3.3.9.1 Lubricants. All parts and components shall be designed so that they are properly lubricated with specified military lubricants. The engine, transmission, and torque converter shall operate on oil conforming to MIL-L-2104, except that for low temperature operation, oil conforming to MIL-L-46167 may be used. Initial lubrication and all subsequent lubrication shall be with military lubricants conforming to MIL-L-2104, MIL-L-2105, MIL-L-46167, MIL-M-7866 and MIL-G-10924. All components shall be filled to the operating level with appropriate operational grades of military lubricants designated for use in the temperature range of the destination of the delivered crane. The crane shall be tagged in a conspicuous place to indicate the temperature ranges and grade of lubrication used.

3.3.9.2 Lubrication Fittings. Fittings in accordance with SAE J534 shall be located in protected positions, and shall be accessible to, and compatible with, a grease gun conforming to MIL-G-3859 equipped with a hydraulic coupler conforming to MIL-STD-24207 and a 10-inch flexible extension. Accessibility to fittings shall be provided without the removal or adjustment of accessories or parts, except that engine-housing side panels and plates equipped with hand-operable, quick-disconnect fasteners may be removed.

3.3.9.3 Pressure-Release Device. A pressure-release device shall be provided where the use of pressure-lubricating equipment will damage grease seals or other parts.

3.3.10 Attachments. The following attachments shall be furnished with the crane, when specified (see 6.2). Changing from the crane configuration to the configuration required for use of any of the attachments shall be accomplished in less than 2 hours and require no modification of the crane's hydraulic system. All hydraulically actuated functions shall be controlled from the operator's station. All attachments shall be provisioned for tiedown.

3.3.10.1 Clamshell. The clamshell shall be a hydraulically operated general purpose bucket, $\frac{3}{4}$ -cubic yard capacity, with teeth, controlled from the operator's station. A combination hose reel and tagline reel or a single reel which utilizes the hydraulic operating hose for the tagline function shall be attached to control and actuate the bucket.

3.3.10.2 Grapple. The grapple shall be a hydraulically operated five-tine 1.0 cubic yard grapple with heavy duty cylinders. The cylinders shall provide positive action on all five tynes simultaneously. A combination hose reel and tagline reel or a single reel which utilizes the hydraulic operating hose for the tagline function shall be attached to control and actuate the grapple.

3.3.10.3 Concrete Bucket. The crane shall have the capability to operate with a 1.0 cubic yard concrete bucket with a material release level operated by personnel on the ground.

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3.3.11 Vehicle Weight Classification Sign Kit. When specified, the contractor shall apply the Government-furnished vehicle weight classification numbers to each vehicle utilizing a vehicle weight classification number kit conforming to MIL-S-40626. The kit shall be located on the front of the vehicle in a location approved by the contracting officer. The contracting officer shall assign the classification numbers to be displayed on the vehicle. Instructions for changing the number based on the vehicle configuration shall be provided in the operator's manual.

3.3.12 Lifting and Tiedown Attachments. The crane shall be equipped with lifting and tiedown attachments. Lifting and tiedown attachments shall conform to Type II or Type III of MIL-STD-209. A nonferrous transportation plate shall be provided and mechanically attached to the crane. Transportation plates shall be inscribed with a diagram showing the lifting attachments and lifting slings, the capacity of each attachment, and the required length and size of each sling cable. A silhouette of the item furnished showing the center of gravity shall be provided on the transportation plate. Tiedown attachments may be identified by stenciling or other suitable marking. Tiedown marking shall clearly indicate that the attachments are intended for the tiedown of the crane on the carrier when shipped.

3.3.13 Power Load Lowering. Power load lowering by hydraulic control shall be provided for the main hoist to facilitate controlled load lowering at any boom length or elevation. The power load lowering means shall provide positive control of a single line load equal to the maximum rated crane capacity divided by the recommended number of parts of hoist line reeving or maximum permissible line pull, whichever is greater.

3.3.14 Hoist and Rotation. The available line pull and speed shall be as rated in accordance with PCSA Standard No. 4 for the operational requirements of the crane hoisting drum. The power transmission system used to rotate the superstructure shall be a hydraulic mechanical arrangement with a continuous swing rotation angle of not less than 360°. Swing speed within this range shall be smooth and constant, and adequate control shall be provided in the hydraulic circuit to insure smooth starting and stopping. The crane shall simultaneously lift and rotate throughout the rated working area.

3.3.15 Rated Load Capacities Chart. A permanent chart indicating all the rated load capacities on each boom reach, and radii with outriggers extended, shall be posted in the crane cab near the operator and also on the outside of the crane to be legible from ground level. The rated load capacity chart shall reflect the manufacturer's standard commercial rating practice for the size and model crane furnished.

3.3.16 Stress Requirements. Design of the completely assembled crane shall be such that the design strength margins will not be less than the minimum strength margins contained in SAE J1063. Tests, in accordance with SAE J1063 and J765, shall have been performed on the crane being provided and test results shall be made available for Government inspection at the time of first article tests.

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3.3.17 Interchangeability. All units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to insure interchangeability of component parts, assemblies, accessories and spare parts.

3.3.18 Servicing and Adjustment. The contractor shall service and adjust all cranes for operational use, including at least the following: Adjustment of lights; adjustment of the brake systems and mechanical components of the crane engine, transmission and drive train; servicing of the cooling system with a 50-50 solution, by volume, of ethylene-glycol-type antifreeze conforming to MIL-A-46153 and water; and cleaning, bleeding and filling of the hydraulic system. The crane shall be completely lubricated as specified in 3.3.9.

3.3.19 Human Factors Engineering. The crane shall be operable and maintainable by 5th percentile females through 95th percentile males in accordance with SAE J833. Accessibility will be in accordance with SAE J925. Instrumentation shall be in accordance with SAE J209. Controls and displays will be clearly labeled to indicate function and shall be provided with symbols in accordance with SAE J1362, where appropriate. Overall design considerations shall be according to SAE J154.

3.3.20 Noise Limits.

3.3.20.1 Noise Levels. Noise levels produced by the crane shall comply with the requirements of MIL-STD-1474, with the exception of MIL-STD-1474, paragraphs 5.2, 5.3, and 5.4, and except as indicated herein.

- a. The noise level at the operator's positions and other personnel occupied areas of the crane, defined to be anywhere within 3 meters of the perimeter of the crane, shall not exceed Category D from the Table below (85 dB(A)) of this specification when operating under full load with operator doors and/or windows both open and closed. Where the limit of Category D can be documented as being clearly beyond the state-of-the-art, per 3.3.20.2.2 of this specification, selection of another noise limit shall be made by the procuring activity and the requirements of 3.3.20.2 shall again apply.
- b. The following in Table I shall be used in lieu of Table II contained in MIL-STD-1474B:

Table I

Steady State Noise Limits (dB(A)) for Personnel-Occupied Areas

	Limit Category					
	A	B	C	D	E	F
A-Weighted Limit (dB(A))	107	100	90	<85	75	65

3.3.20.2 Acceptance.

3.3.20.2.1 Compliance. Compliance with the required noise limits shall be documented, based upon test requirements of paragraph 4.5.11 of this specification and the data recording requirements of MIL-STD-1474, paragraph 5.5.

3.3.20.2.2 Non-Compliance. Non-compliance with the required noise limits shall be documented based upon test requirements of paragraph 4.5.11 of this specification and the data recording requirements of MIL-STD-1474, paragraph 5.5. Additionally, the following shall apply:

- a. The required maximum noise limit(s) may be established to be technically infeasible based upon testing and analysis which clearly and convincingly proves that achievement of the required limit(s) is beyond the state-of-the-art for the item/system being procured. Such testing and the resultant analysis shall be conducted and reported by a professionally qualified acoustical consultant or acoustical laboratory. Documentation shall be furnished to the procuring activity for consideration of whether or not increase of the required limit(s) is justified.
- b. Documentation shall contain technically defensible data including technically-supported design considerations, technically supported design recommendations for noise reduction, and technically supported predictions of the resultant noise levels.
- c. Noise reduction feasibility documentation shall also include the following:
 - 1) Identification of all the noise sources that contribute to the noise level at the locations of interest.
 - 2) Identification of all noise paths between noise sources and the locations of interest.
 - 3) Rank ordering of the source/path combinations in terms of their contribution to the overall level at the locations of interest.
 - 4) Development of noise control measures for each source/path combination in order of dominance until the required noise levels at the locations of interest are attained.
 - 5) Clearly stated, convincing, and technically/fiscally supported trade-off analysis of noise control benefit against other design requirements such as weight, access, etc.
 - 6) An experimental procedure known as "window analysis" shall be used in steps 1) through 5). The procedure involves measuring the noise level while eliminating all noise sources and paths except the single one of interest. For example, one type of engine noise source determination could be made by running the engine under load with and without the engine fan being driven.
 - 7) The window analysis procedure shall be repeated for each of the combinations (see 1) to 3) above) identified.

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- d. If and only if the maximum noise limit(s) required has been convincingly documented as being clearly beyond the state-of-the-art, then the procuring activity may expressly grant the contractor written permission to exceed the specified limit(s).

3.3.21 Decontamination Bracket Assembly. A decontamination bracket assembly in accordance with MIL-STD-53052 shall be furnished. The location of the bracket shall be such that it shall be accessible to personnel and provide clearance to remove and replace a 5-gallon container conforming to MIL-C-1283.

3.3.22 Fire Extinguishers. A halon 1211 fire extinguisher (5 pound) shall be securely installed in a location readily accessible to both operator positions.

3.3.23 Seatbelts. A adjustable weather-resistant seatbelt with buckle conforming to SAE J386, Type I, shall be furnished equipped with sleeves and retractor or seat mounted for both cabs.

3.4 RAM. The crane design, together with component and accessory location and installation, shall permit ready accessibility to all items requiring periodic maintenance service in the field. The replacement and adjustment of components and accessories shall be accomplished with minimum drainage requirements and minimum disturbance to other elements of the crane. Whenever possible, maintenance will be accomplished using conventional general purpose tools rather than special tools.

3.4.1 Reliability. The ATEC shall have a mean time between failure (MTBF) of 100 hours when tested and operated in the conditions specified in 4.5.17. The MTBF may also be stated as meantime between hardware mission failure (MTBHMf).

3.4.2 Maintainability. The maintenance Ratio (MR) shall not exceed 0.17 maintenance man-hours per operating hours. The MR is defined as the ratio of the total active maintenance man -hours required (scheduled or unscheduled) per operating hour. Time required to perform daily Preventive Maintenance Checks and Services shall not exceed 45 minutes.

3.5 Transportability. ATEC shall be transportable by rail, marine, and C-5 and C-17 aircraft and be equipped with towing, slinging, and tiedown devices which are adequate to meet highway, rail, marine, and air transport requirements in accordance with MIL-STD-1366 and MIL-HDBK-157.

3.6 Safety. The crane shall comply with applicable OSHA 1926 regulations and ANSI standard B30.5. All rotating or reciprocating parts and all parts subject to high operational temperatures, that are of such nature or are so located as to be or become a hazard to the operating or attending personnel, shall be substantially guarded, or insulated, to the extent necessary to eliminate the hazard. The principal platform walking surfaces shall be of an anti-skid type. Ladders, steps and handholds shall be provided in such quantity and of such size on the sides of the crane cab or superstructure that entrance thereto and exit therefrom may be unhampered and nonhazardous. Engine cooling fans shall have heavy grille or enclosed guard conforming to SAE J1308. Electrical equipment

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shall be effectively guarded and grounded to protect personnel from electrical shock hazard. The contractor shall apply the Government-furnished electrical warning decals (see 3.11) to the vehicle in a prominent position.

3.7 Electromagnetic Interference (EMI) Suppression. Electromagnetic radiation from the crane shall be within the limits of SAE J551. When required, the crane shall be equipped with radio noise suppressors conforming to SAE J552. The horn is exempt from the EMI requirement.

3.8 Dimensions and Weight. The overall dimensions and weight of the crane shall be standard for the manufacturer's product, with allowance for military modifications, and shall be within transportability requirements referenced in 3.5 above.

3.9 Treatment and Painting. The crane shall be painted in camouflage pattern. All interior and exterior portions of the crane that are normally painted and all exposed surfaces that require protection from the environment shall be cleaned, treated and painted in accordance with MIL-T-704, type F for ferrous metals and type G for nonferrous metals and fiberglass top coat, color green 383. Primer in accordance with MIL-P-53022 or MIL-P-53030. The finish coat shall be in accordance with MIL-C-46168 or MIL-C 53039. Vendor parts and components received by the prime contractor with either an alkyd primer or alkyd paint coating may be top coated with the above specified primer and paints applied directly over existing alkyd primer or paint without additional surface preparation except for cleaning if the base alkyd primer or paint meets applicable Military/Federal specifications and is allowed to cure for a period of 14 days. This exception for vendor parts and components is not intended to supersede the requirement that the complete crane be primed and painted in accordance with MIL-T-704 using the primers and paints specified above. If another color is specified, the above system shall be overcoated with MIL-C-46168 or MIL-C-53039 of the desired color. All surfaces of the crane which exceed 400°F during operation shall not be primed or painted as specified above but shall be painted in the appropriate color of the base coat or camouflage pattern scheme if applicable, with paint conforming to either MIL-P-14105 for steel surfaces or TT-P-28 for aluminum surfaces.

3.10 Vehicle Marking. Registration numbers and other markings shall be applied in accordance with MIL-STD-642 except that camouflage pattern painted cranes shall have the markings in black segments painted camouflage green 383 and the markings in green and brown segments painted black. Lifting and tiedown attachments shall be identified with 1-inch letters indicating "SLING POINT" or "TIEDOWN", and "DECONTAMINATION COMPOUND" on the 5-gallon decontamination can. The gross weight of each crane, with equipment, shall be stenciled on each side of the crane in such a manner as to be readily discernable to all personnel. The prescribed tire pressure shall be marked on the carrier frame or fenders near the wheels or wheel hubs with block or stencil-type letters not more than 1 inch and not less than 3/4 inch high.

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3.10.1 Identification Plate. An identification plate shall be furnished by the contracting officer for each crane. The contractor shall stamp all necessary data in the blank spaces of the plate provided for that purpose and securely affix a plate to each crane in a conspicuous place with nonferrous screws, rivets or bolts not less than 1/8 inch in diameter. The applicable nomenclature contained in the contract item description shall be placed in the top blank.

3.10.2 Instruction Plates. The crane shall be equipped with instruction plates suitably located, describing any special or important procedures to be followed in operating and servicing the equipment. Plates shall be of a material which will last and remain legible for the life of the equipment, and shall be securely affixed thereto with nonferrous screws, rivets or bolts of not less than 1/8 inch diameter.

3.11 Government-Furnished Property. The following property shall be furnished by the Government for installation on the crane by the contractor (see 6.4):

- a. Electrical Warning Decal Set, NSN: 7690-00-267-5778 - one each
- b. Vehicle Weight Classification sign set, NSN: 9905-00-565-6267 - one each
- c. Vehicle Identification Plate - one each

3.12 Government-Loaned Property. The following property shall be loaned to the contractor for use in testing the crane (see 6.5):

- a. STE/ICE-R, NSN: 4910-00-124-2554 for tests (see 4.5.14 and 4.5.15)
- b. DCA - Tester

3.13 Workmanship.

3.13.1 Steel Fabrication. Steel used in the fabrication of equipment shall be free from kinks and sharp bends. The straightening of material shall be done by methods that will not cause injury to the metal. Shearing and chipping shall be done neatly and accurately. All bends of a major character shall be made with controlled means to insure uniformity of size and shape.

3.13.2 Bolted Connections. Bolt holes shall be accurately punched or drilled and shall have the burrs removed. Washers or lock washers shall be provided in accordance with good commercial practice, and all bolts, nuts and screws shall be tight.

3.13.3 Riveted Connections. Rivet holes shall be accurately punched or drilled and shall have the burrs removed. Rivets shall be driven with pressure tools and shall completely fill the holes. Rivet heads, when not countersunk or flattened, shall be of approved shape and of uniform size for the same diameter of rivets. Rivet heads shall be full, neatly made, concentric with the rivet holes and in full contact with the surface of the member.

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3.13.4 Welding. The surface of parts to be welded shall be free from rust, scale, paint, grease or other foreign matter. Weld penetration shall be such as to provide transference of maximum design stress through the base metal juncture. Fillet welds shall be provided when necessary to reduce stress concentration. Welding shall conform to the procedures as prescribed by either the AWS or ASME for the type of welding operation to be performed.

3.13.4.1 Welders. Before assigning any welder or welding operator to welding work covered by this specification, the contractor will obtain certification that the welder or welding operator has passed qualification tests as prescribed by either of the following listed codes for the materials joined and the type of welding operation to be performed and that such qualification is effective as defined by the particular code:

AWS D14.3 Welding Earthmoving and Construction Equipment
ASME Boiler and Pressure Vessel Code, Section IX.

In the event of evidence of poor welds, the Government reserves the right to require retesting of any welder or welding operator. The test results shall be made available for review by the contracting officer or the contracting officer's representative.

3.13.5 Machine Work. Tolerances and gages for metals fits shall conform to the limitations specified herein and on the applicable drawings, and otherwise to the standards of good commercial practice.

3.13.6 Castings. All castings shall be sound and free from patching, misplaced coring, warping, or any other defect which reduces the castings ability to perform its intended function.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for Compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of Inspections. The inspection requirements specified herein are classified as follows:

- a. First article examination (see 4.3.1)
- b. First Article test (see 4.3.2)
- c. Quality conformance inspection (see 4.4)

4.3.1 First Article Examination. Each crane shall be examined for compliance with the requirements specified in Section 3 as outlined in Table II. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.3.2 First Article Test. When a first article is required, the first article shall be subjected to the tests specified in 4.5.1 through 4.6.19 as outlined in Table III. Failure to pass any test shall be cause for rejection. Upon acceptance of the first article, the first article shall remain at the manufacturing facility as a production sample and shall be the last crane delivered on the contract. The first article shall be reconditioned, including replacement of abnormally worn parts and paint touch-up or repainting, prior to delivery to enable it to be accepted as a contract item. The contractor shall maintain the first article in a serviceable condition for the duration of the contract.

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Table II. Examination Schedule

Major Characteristics	Requirement Paragraph
101. Assembly not complete or correct.	3.3, Applicable Dwgs
102. Parts or components missing or not as specified.	3.3, Applicable Dwgs
103. Material not as specified.	3.2
104. Transportability.	3.5
105. Safety.	3.6
106. Dimensions and weight.	3.8
107. Treatment and painting.	3.9
108. Vehicle marking.	3.10
109. Government-furnished property installed.	3.11
110. Workmanship.	3.13

Table III. Test Schedule

First Article	Characteristic	Requirement Paragraph	Test Paragraph
X	Operational Test(1200 hrs)	3.4, 3.3.10, 3.3.19	4.5.3, 4.5.4,, 4.5.6-4.5.9, 4.5.12, 4.5.13, 4.5.17,
X	Electromagnetic Interference	3.7	4.5.12, 4.6
X	Safe Load Capacity	3.3.1, 3.3.13, 3.3.15	4.5.1, 4.5.2, 4.5.5, 4.5.10, 4.5.19
X	Lifting and Tie-Down Attachments	3.3.12	4.5.11
X	STE-ICE-R	3.3.6.5	4.5.14, 4.5.15
X	Noise Level	3.3.20	4.5.16
X	Load Moment Indicator	3.3.1.2.2	4.5.18

4.4 Quality Conformance Inspection. The quality conformance inspection shall include the examination and tests of 4.3 and the packaging inspection of 4.8.

4.5 Tests.

4.5.1 Crane Safe Load Capacity Test. The crane shall be completely serviced and subjected to the manufacturer's recommended break-in. The safe load capacity test shall be performed on a level, paved surface by connecting a Baldwin SR4 load cell, or equal, between the lifting hook and a dead weight, or the direct use of calibrated weights. The crane shall then lift the loads specified in 3.3.15. The crane, with safe load raised, shall be rotated through the rated working range at a safe operational speed. Actual tipping conditions shall be determined in accordance with SAE J765. Eighty-five percent of each determined tipping load shall be compared with the applicable safe load. If the crane manufacturer has previously conducted this test on an identical model crane, the certified test records shall be made available to the Government inspector and the contracting officer during the first article testing and may be acceptable in lieu of conducting the test.

4.5.2 Stress Test Requirements. The crane shall be tested in accordance with SAE J1063 to ensure conformance with 3.3.16. The contractor may submit certified records of test performance for this test.

4.5.3 Speed Tests. Speed tests shall be taken over a 1 percent grade on a paved road. Time shall be recorded with a stopwatch accurate to 1 second. The average speed shall be recorded for the unit. Maximum average speed not less than that specified in 3.3 when calculated by the following formula shall be attained:

$$V = \frac{0.682 \times D}{T}$$

Where: V = speed in mph
D = distance in feet
T = time in seconds

A fifth wheel type recorder may be used.

4.5.4 Gradeability. The crane shall be tested for gradeability in compliance with 3.3. The crane, without load and with mounted hook block, shall negotiate a 30 percent slope on paved road at not less than 1 MPH.

4.5.5 Power Load Lowering Test. General inspection of the powerdown system shall be made for adequate lubrication, ease of operation of controls, safety precautions, and for good manufacturing practices. The power load lowering system shall be tested as follows to determine conformance to 3.3.13:

- a. With the crane equipped with a boom of a length as specified in 3.3.1.2, and with outriggers set, position the revolving superstructure in the most stable craning position and assemble a single line load equal to the maximum rated load divided by the permissible line pull.
- b. Position the boom angle for the minimum working radius.

- c. Hoist the load 20 or more feet above the ground level, or until interference with the crane boom is obvious.
- d. Prepare the crane for powerdown operation on the load line.
- e. Operate the power load lowering system in accordance with manufacturer's instructions, and lower the load under power. Vary the speed of the load.
- f. When the load reaches the ground, immediately repeat operations c., d. and e. These operations shall be repeated for 20 complete cycles.

4.5.6 Road Test. The crane shall be given a road test for a distance of not less than 500 miles at speeds up to 40 MPH over paved roads; 14 miles over uneven roads at not less than 15 MPH, and 4 miles over unpaved or unprepared surfaces composed of sandy or loose soil, or both, at maximum safe speeds.

4.5.7 Travel Control Test. To demonstrate workability of the travel controls (see 3.3), the crane shall be operated forward and backward in two figure-8 patterns and hard right and left turns.

4.5.8 Service Brake Test. The service brakes of the crane shall be tested for compliance with 3.3.5.3. The service brakes shall be applied bringing the crane to a complete halt to determine conformance to 3.3.5.3. Immediately after the crane comes to a halt, this test cycle shall be repeated for four additional cycles. All shoes, drums and other brake components, where there is indication of damage, shall be disassembled and examined.

4.5.9 Parking Brake Test. The parking brake shall be tested for compliance with 3.3.5.3.

4.5.10 Crane Hook Test. The manufacturer is required to furnish a certification from the crane hook manufacturer certifying that the hook furnished with the crane is of compatible size, having the proper load capacity and safety factor without defects or discontinuities. When this certification is not furnished, the crane hook shall be tested in the following manner. The crane hook shall be given a wet or dry ferro-magnetic particle test to determine surface or subsurface cracks or discontinuities. Either method of test used shall show clearly visible particles defining existing discontinuities. Any discontinuities shall be cause for rejection (see 3.3.1.4).

4.5.11 Lifting and Tiedown Attachments Test. The lifting and tiedown attachments shall be tested for conformance to 3.3.12. The contractor may submit certified calculations and drawings in lieu of this test with the approval of the contracting officer.

4.5.12 Measurement of Electromagnetic Radiation. To determine conformance to 3.7, electromagnetic radiation shall be measured in accordance with SAE J551. The manufacturer may, upon approval of the contracting officer, furnish a certification in lieu of the test that the crane meets the requirements, together with a list of the suppression devices installed. The list shall be sufficiently detailed to allow visual determination of installed devices.

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4.5.13 Attachments. When attachments are specified (see 6.2), the crane shall be tested to show the capability to install and operate the attachment in the allotted time (see 3.3.10).

4.5.14 DCA Capability. The contractor shall perform a 100 percent visual inspection of all DCA wiring harnesses prior to installation on the crane to insure wire and connections are free of error. After installation on the crane, test the DCA harness (reference: Chapter 5 of Design Guide for DCA) on each vehicle with a Government loaned DCA tester prior to interfacing with STE/ICE-R. Nonconformance to 3.3.6.5 shall constitute failure of the DCA.

4.5.15 DCA-STE-R/DCA Interface. Upon completion of inspection and tests specified in 4.5.14, test the DCA for all measurements specified in 3.3.6.5 using the Government loaned STE/ICE-R. After completion of first article testing, this test shall be repeated and the results compared to the first examination performed as specified in 4.3. Nonconformance to 3.3.6.5 or failure of any component or wiring in the DCA harness which results in inability to obtain the measurements previously recorded with the STE/ICE-R (4.3) shall constitute failure of this test.

4.5.16 Noise Level Test. Noise levels shall be measured in accordance with MILK-STD-1474 requirements and reported in the format indicated by MIL-STD-1474, Figure 7. As a minimum, noise levels shall be measured when the equipment is operating under full load. For stationary crane operations, MIL-STD-1474, paragraph 5.1.2.1.4 contours shall be taken at not fewer than 12 equal arc increments, one increment shall include data from the noisiest position. Additionally, the noise level at the typical operating positions shall be provided as dB(A) level. Failure to comply with MIL-STD-1474 provisions shall constitute failure of this test.

4.5.17 Reliability Test. Four first article cranes shall be tested in accordance with the schedule in the table below. A minimum of 1,200 hours of operation shall be accrued. No more than nine failures shall be allowed. The reliability test shall consist of four operations: (A) the travel mode operation, (B) the lifting/lowering/loading mode operation, (C) the excavating/clamshelling operation and (D) pile driving operation.

Crane	Operation Hours				Total Hours
	A	B	C	D	
1	126	144	15	15	300
2	126	144	15	15	300
3	126	144	15	15	300
4	126	144	15	15	300
Total Operating Hours					1,200

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- a. Travel Mode (Operation A). The travel mode operation shall be conducted as follows: 40 percent of hours traveling on primary roads, 45 percent of hours traveling on secondary roads and 15 percent of hours traveling off-roads (see 6.7.2 for definition of road types).
- b. Lifting/Lowering/Loading Mode (Operation B). This operation shall include lifting a load of no less than 25,000 pounds at the capacity chart rated radius (10 feet) with outriggers extended, swinging 360 degrees and lowering the load. The direction of rotation shall be reversed every hour. With the rated load, the boom shall be hydraulically extendable and operable to 70 feet in length. And, lastly, the crane shall pick up a load of 12,000 pounds minimum, at rated radius and carry it back and forth over improved roads.
- c. Excavating/Clamshelling Mode (Operation C). This operation shall include performing excavating and clamshelling tasks using the concrete bucket, grapple and clamshell attachments.
- d. Pile Driving Mode (Operation D) This operation shall include pile driving tasks.

4.5.17.1 Durability Test, Replacement or overhaul of any of the following components during the test will constitute a failure of component durability:

Engine	Transmission
Transfer Case	Differential
Hydraulic Pumps	Drive Shafts
Hydraulic Motors	Structural Members

4.5.18 Load Moment Indicator (LMI) Test. The LMI system specified in 3.3.1.2 shall be tested in accordance with SAE recommended practices and requirements.

4.5.19 Lock-Out Test. The control lock-out test shall be tested in accordance with the recommended practice specified in SAE J1305. Non conformance shall constitute failure of this test and shall be cause for rejection of the system.

4.6 Production Unit Operational Test. Each production crane shall be completely assembled, adjusted, lubricated, or otherwise serviced for operation. The engine shall be started and subjected to a warm-up period as recommended by the manufacturer. The crane shall be given a run-in test and all controls operated a sufficient number of times to ascertain that the components and mechanisms actuated by the controls operate promptly, fully, and without restrictions or malfunction. The manufacturer's standard production tests shall then be conducted on each production crane.

4.7 Test Records. Contractor's records of all first article tests and inspections, giving the results of said tests and inspections to determine compliance with the requirements of this specification, shall be kept complete and available to the Government representative and the contracting officer. Test

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and inspection records shall be signed and approved by a person specifically assigned by the contractor. Contractors not having laboratory testing facilities satisfactory to the Government shall engage the services of a commercial testing laboratory, satisfactory to the Government, capable of conducting required tests to determine compliance with all the requirements specified herein.

4.8 Packaging Inspection. The inspection of the preservation, packing, and marking shall be in accordance with the requirements of Section 4 of MIL-C-3580. The inspection shall consist of the quality conformance inspection; and, when specified, a preproduction pack shall be furnished for examination and test within the time-frame specified (see 6.2).

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5. PACKAGING

5.1 Preservation, Packing and Marking (See 6.2). Preservation, packing and marking shall be in accordance with the level A, B or C requirements of MIL-C-3580, except that antifreeze conforming to MIL-A-46153 shall be used.

6. NOTES

6.1 Intended Use. The cranes will be driven to and from job sites over primary and secondary roads and off-road. Both combat support (CS) and combat service support (CSS) units will employ ATEC to perform construction tasks, handle supplies (all classes), conduct wet and dry bridge crossings, remove debris, construct and/or repair lines of communication and logistical support facilities.

6.2 Ordering Data.

6.2.1 Acquisition Requirements. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- c. When first article is required (see 3.1).
- d. When winterization kit shall be provided (see 3.3.5.8 and 3.3.7).
- e. When additional STE/ICE-R/DCA test parameters are required (see 3.3.6.5).
- f. When attachments are required (see 3.3.10).
- g. An auxiliary winch when required (see 3.3.1.3).
- h. When cleaning treatment and painting shall be other than that specified (see 3.9).
- i. When a preproduction packaging inspection is required and time frame required for submission (see 4.8).
- j. When air transportability data is required, and transportability report is required (see 3.5).
- k. Level of preservation and level of packing required (see 5.1).

6.2.2 Data Requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DOD FAR Supplement, Part 27, Sub-Part 27.410-6 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraphs.

<u>Paragraph No.</u>	<u>Data Requirement Title</u>	<u>Applicable DID No.</u>
4.3	First Article Inspection	DI-T-4901
4.3	First Article Inspection Report	DI-T-4902

(Data item descriptions related to this specification, and identified in Section 6 will be approved and listed as such in DOD 5000.19L, Vol. II, AMSDL. Copies of data item descriptions required by the contractor in connection with specific acquisition functions should be obtained from the Naval Publications and Forms

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Center or as directed by the contracting officer.)

6.3 First Article. When a first article inspection is required, the item to be tested should be a first production item or it may be a standard production item from the contractor's current inventory as specified in 3.1. The first article should consist of one unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test and approval of the first article.

6.4 Government-Furnished Property. The contracting officer should arrange to furnish the property listed in 3.11.

6.5 Government-Loaned Property. The contracting officer should arrange to loan the property listed in 3.12.

6.6 Subject Term (Key Word) Listing.

All-terrain
ATEC
Boom
Bucket
Carrier
Crane
Grapple
Hydraulic
Multi-axle
Revolving

6.7 Definitions

6.7.1 Failure Definition. A failure is defined as any malfunction which cannot be repaired in 30 minutes by the operator with on-board tools and equipment which prevents performing craning operations or travel. All such malfunctions shall be considered failures except for:

- a. Installation damage.
- b. Accident or mishandling.
- c. Failure of the test facility or test-peculiar instrumentation.
- d. Equipment failures caused by an externally applied overstressed condition, in excess of the approved test requirements.
- e. Normal operating adjustments (nonfailures) specified in the approver equipment operating instructions.
- f. Secondary failures within the equipment, which are directly caused by nonrelevant or relevant primary failures. The secondary failure must be proved to be dependent on the primary failure.
- g. Failure caused by human errors where proper procedures are documented in the manuals or instruction plates, e.g., use improper lubricant.

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- h. Normal wearout of cutting edges, teeth, and tires, and flat tires due to puncture. The contractor shall provide normal wear characteristics of those components prior to testing.

6.7.2 Terrain Definition.

6.7.2.1 Primary Roads. Primary road is defined as a thoroughfare that consists of two or more lanes, all-weather, maintained and paved with asphalt or concrete.

6.7.2.2 Secondary Roads. Secondary road is defined as a well maintained hard or loose surface (e.g., paved, large rock, crushed rock, gravel) road.

6.7.2.3 Off-Road. Off-road is defined as irregular terrain not previously leveled by vehicles nor man-made improvements.

Preparing activity:
Army - ME

Air Force Custodian:
Code 99
Review - Code 84

APPENDIX E
TECHNICAL SUPPORT AND DOCUMENTATION MANAGEMENT
FOR
24 TON ALL TERRAIN CRANE

SUMMARY OF COMMENTS ON ATEC SPECIFICATION

APPENDIX E SUMMARY OF COMMENTS ON ATEC SPECIFICATION

AGENCY/FIRM	SUBJECT AREA	COMMENT	NUMBER OF COMMENTS	
			ACCEPTED	REJECTED
<u>Government:</u> US Air Force	Changes to References	Interested in Specification Include in Specification	5	0
Defense Logistics Agency	Specification Format		8	0
US Army Engineer School	Varied		16	6
BELVOIR Safety and Health	Varied		5	0
BELVOIR Materials	Varied		11	2
BELVOIR Product Assurance	Varied		8	2
<u>Commercial:</u> Century II, Inc (P&H)	Differential Lock	Built 246 40-Ton Cranes for the US Marine Corps	1	0
Koehring	Varied		3	1
Krupp Industries	None	Offered Model 25 GMT-AT	0	0
R.W. Cline & Associates	Varied		8	4
TOTAL			65	15

APPENDIX F - LIST OF ACRONYMS

AAL	Additional Authorization List
ALDT	Administrative and Logistical Down Time
AMC	Army Materiel Command
AMCPM-CE	US Army Materiel Command Project Manager - Construction Equipment
AMSSA	US Army Materiel Systems Study Activity
Ao	Operational Availability
AR	Army Regulation
AS	Acquisition Strategy
ASIOE	Associated Support Items of Equipment
ATEC	All Terrain Crane
ATSE-CDM-S	US Army Engineer School, Combat Developments Directorate
BDU	Battle Dress Uniform
BII	Basic Issue Item
BRDEC/ BELVOIR	US Army Belvoir Research, Development and Engineering Center
CARC	Chemical Agent Resistant Coating
CBTDEV	Combat Developer
CMP	Corrugated Metal Pipe
COTR	Contracting Officer's Technical Representative
CSTA	Combat Systems Test Activity, TECOM
dB(A)	Decibels (Average)
DCA	Diagnostic Connector Assembly
DF	Diesel Fuel
DLA	Defense Logistics Agency
DOT	Department of Transportation
DS	Direct Support
EDS/PDS	Equipment/Personnel Decontamination Site
EMI	Electromagnetic Interference
EPA	Environmental Protection Agency
ETR	Expanded Test Report
FLS	Flight Landing Strip
FOE	Follow-on Evaluation
FSC FORSCOM	Forces Command
FUE	First Unit Equipped
HAEMP	High Altitude Electromagnetic Pulse
HSTRU	Hydraulic System Test and Repair Unit
HTPM	Harvard Total Project Manager
HQDA	Headquarters, Department of the Army
IAP	Independent Assessment Plan
IAR	Independent Assessment Report
IEP	Independent Evaluation Plan
IER	Independent Evaluation Report
ILSP	Integrated Logistics Support Plan
IOC	Initial Operational Capability
IPR	In-Process Review
IOT&E	Initial Operational Test and Evaluation
LCCE	Life-Cycle Cost Estimate
LED	Logistics Equipment Directorate (BELVOIR)

APPENDIX F - LIST OF ACRONYMS (Continued)

LOGC	Logistics Center
LOTS	Logistics Over the Shore
LSA	Logistics Support Analysis
MAMP	Materiel Acquisition Master Plan
MANPRINT	Manpower and Personnel Integration
MARC	Materiel Acquisition Review Committee
MATDEV	Materiel Developer
MC	Marine Corps
MIL-SPEC	Military Specification
MIL-STD	Military Standard
MOPP	Mission Oriented Protective Posture
MOUT	Military Operations in Urban Terrain
MPH	Miles per Hour
MR	Maintenance Ratio
MTBOMF	Mean Time Between Operational Mission Failure
NBC	Nuclear, Biological and Chemical
NDI	Non-Developmental Item
NSN	National Stock Number
OCONUS	Outside the Continental United States
O&O	Operational and Organizational
OSHA	Occupational Safety and Health Administration
OPTEC	Operational Test and Evaluation Command
OTP	Outline Test Plan
OVE	Oa-Vehicle Equipment
POL	Petroleum, Oil and Lubricants
PPI	Preplanned Product Improvement
PPT	Preproduction Testing
PPQT	Preproduction Qualification Testing
PQT	Production Qualification Testing
RAM	Reliability, Availability, and Maintainability
R&D	Research and Development
RD&E	Research Development and Engineering
ROC	Required Operational Capability
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SMMP	System MANPRINT Management Plan
SOW	Statement of Work
SSPCL	System Support Package Component List
STE/ICE-R	Simplified Test Equipment - Internal Combustion Engine - Reprogrammable
STRBE-FMT	Equipment, Rail and Diving Team (BELVOIR)
TACOM	Tank-Automotive Command
TDP	Technical Data Package
T&E	Test and Evaluation
TECOM	Test and Evaluation Command
TEP	Test and Evaluation Plan
TEMP	Test and Evaluation Master Plan
TEXCOM	Test and Evaluation Experiments Command
TIWG	Test Integration Working Group

APPENDIX F - LIST OF ACRONYMS (Continued)

TRADOC	Training and Doctrine Command
TROSCOM	US Army Troop Support Command
TT	Technical Testing
USAES	US Army Engineer School
USALEA	US Army Logistics Evaluation Agency