

U.S. ARMY TANK-AUTOMOTIVE AND ARMAMENTS COMMAND

DETAILED PURCHASE DESCRIPTION FOR

THE OFF-ROAD FAMILY OF VEHICLES (11 TON TO 16.5 TON PAYLOADS): THE  
HEAVY EXPANDED MOBILITY TACTICAL TRUCK (HEMTT) A4 AND THE  
PALLETIZED LOAD SYSTEM (PLS) A1/**A2**

ATPD 2304 REVISION D

**UPDATED 23 MAY 2023**

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**DETAILED PURCHASE DESCRIPTION FOR THE OFF-ROAD FAMILY OF VEHICLES  
(11 TON TO 16.5 TON PAYLOADS): THE HEAVY EXPANDED MOBILITY TACTICAL  
TRUCK (HEMTT) A4 AND THE PALLETIZED LOAD SYSTEM (PLS) A1/A2**

This specification was **updated** on **23 May 2023** by the US Army Tank-automotive and Armaments Command.

This specification is approved for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This specification covers a family of diesel engine driven, multi-wheel drive trucks and trailer designed to perform the following missions: Tanker, Tractor, Cargo (Light and Heavy), Wrecker, Load Handling System (LHS) (Light, Heavy and Common Bridge Transporter (CBT)) and PLS Trailer (PLST). The goal of this acquisition is to maximize component commonality within a vehicle and between vehicle variants; minimizing cost of ownership (high reliability, low maintainability) by incorporating diagnostic systems into the vehicles; and providing a cab that minimizes the potential of soldier injury that may result from frontal and roll-over type accidents through a combination of passive and active designs. The contractor is encouraged to use state-of-the-art components equal to or better than items stated herein as long as items meet requirements of this document.

1.1.1 Missions. The various mission categories are defined below:

MODEL	VEHICLE	MISSION
M977A4 Bare	HEMTT Light Cargo Bare	IA0
M977A4	HEMTT Light Cargo	IA1
M977A4 EPP	HEMTT Electrical Power Plant (EPP)	IA2
<b>M977A4 LRPT</b>	<b>HEMTT Large Repair Parts Transporter (LRPT)</b>	<b>IA3</b>
M985A4 Bare	HEMTT Heavy Cargo Bare (HEWATT Chassis)	IB0
M985A4	HEMTT Heavy Cargo	IB1
M985E1A4	HEMTT Heavy Cargo Guided Missile Transporter (GMT)Patriot	IB2
M978A4	HEMTT Tanker	II
M984A4	HEMTT Wrecker	III
M983A4	HEMTT Tractor	IVA1
M983A4 LET	HEMTT Tractor Light Equipment Transporter	IVA2

M1120A4	HEMTT LHS-Light	VA1
M1075A1 Bare	PLS LHS-Heavy Bare (w/o LHS/MHC/winch/ Auxiliary Fuel Tank)	VB0
<b>M1075A2 Bare</b>	<b>PLS LHS-Heavy Bare (w/o LHS/MHC/winch/ Auxiliary Fuel Tank)</b>	<b>VB0-A</b>
M1075A1	PLS LHS-Heavy without Material Handling Crane	VB1
M1074A1	PLS LHS-Heavy with Material Handling Crane	VB2
<b>M1075A2</b>	<b>PLS LHS-Heavy without Material Handling Crane</b>	<b>VB1-A</b>
<b>M1074A2</b>	<b>PLS LHS-Heavy with Material Handling Crane</b>	<b>VB2-A</b>
M1977A4	HEMTT Common Bridge Transporter (CBT)	VC
M1076	PLS Trailer (PLST)	VI
M1076A1	PLS Trailer A1 (PLSTA1)	VI-1

The term Mission Variants or variants refers to all trucks and trailer. Mission Vehicle or vehicle describes the truck without trailer (e.g. Mission I Vehicle equates to the light and heavy cargo trucks). Mission Trailer or trailer refers to the PLST variants (M1076 and M1076A1). Mission System describes the truck and trailer combination (e.g. Mission VB1 System equates to the PLS with PLST variants). M977 Bare Vehicles IA0 shall be used as a platform for the M1142 Tactical Fire-Fighting Truck (TFFT) and M985 Bare Vehicles IB0 shall be used as a platform for the M1158 HEWATT.

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

### 2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issue of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation

(see 6.2).

## COMMERCIAL ITEM DESCRIPTION (CID)

## DEPARTMENT OF DEFENSE

A-A-50271	Plate, Identification
A-A-52418	Light, Warning, Vehicular: Rotating, Unit, 14 and 28 Volt DC
A-A-52432	Mirror Assembly, Rearview: Automotive Exterior Mounting
A-A-52474	Electrocoating Primer
A-A-52507	Chain Assembly and Cross Chain, Tire: For Military Vehicles
A-A-52513	Bracket Assembly, Liquid Container, Five Gallon
A-A-52525	Horns and Buzzers, Air- and Electrically-Actuated
A-A-52557	Fuel Oil, Diesel; for Posts, Camps and Stations
A-A-52624	Antifreeze, Multi-Engine Type
A-A-59326	Coupling Halves, Quick-Disconnect, Cam-Locking Type, General Specification for
A-A-59487	Padlock (Key Operated)
A-A-59719	One Hundred Percent Polyurethane Sprayed On Linings

## SPECIFICATIONS

## DEPARTMENT OF DEFENSE

MIL-PRF-2104	Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service
MIL-PRF-10924	Grease, Automotive And Artillery
MIL-PRF-20696	Cloth, Waterproof, Weather Resistant
MIL-S-40626	Sign Kit, Vehicle Class
MIL-PRF-46167	Lubricating Oil, Internal Combustion Engine, Arctic
MIL-PRF-52308	Filter-Coalescer Element, Fluid Pressure
MIL-DTL-53072	Chemical Agent Resistant Coating (CARC) System Application Procedures and Quality Control Inspection
MIL-DTL-53084	Primer, Cathodic Electrodeposition, Chemical Agent Resistant
MIL-PRF-62048	Air Cleaners, Automotive: Heavy Duty, Dry-Type (For Internal Combustion Engines) (Metric)

MIL-DTL-83133

Turbine Fuel, Aviation, Kerosene Type,  
JP-8 (NATO F-34), NATO F-35, and JP-8+100

## STANDARDS

## FEDERAL

FED-STD-595

Colors Used in Government Procurement

## DEPARTMENT OF DEFENSE

MIL-STD-129

Military Marking For Shipment and Storage  
Interface Standard for Lifting and Tiedown  
Provisions

MIL-STD-209

MIL-STD-209E

Interface Standard for Lifting and Tiedown  
Provisions

MIL-STD-209G

Interface Standard for Lifting and Tiedown  
Provisions

MIL-STD-461

Requirements for the Control of  
Electromagnetic Interference Characteristics  
of Subsystems and Equipment

MIL-STD-461B

Requirements for the Control of  
Electromagnetic Interference Characteristics  
of Subsystems and Equipment

MIL-STD-461C

Requirements for the Control of  
Electromagnetic Interference Characteristics  
of Subsystems and EquipmentMIL-STD-462,  
Interim Notice 4Measurement of Electromagnetic  
Interference CharacteristicsMIL-STD-462,  
Interim Notice 5Measurement of Electromagnetic  
Interference Characteristics

MIL-STD-464

Electromagnetic Environmental Effects  
Requirements for Systems

MIL-STD-810

Environmental Engineering Considerations  
and Laboratory Tests

MIL-STD-889

Dissimilar Metals

MIL-STD-1275

Characteristics of 28 Volt DC Electrical  
Systems in Military Vehicles

MIL-STD-1366

Interface Standards for Transportability  
Criteria

MIL-STD-1472

Human Engineering

MIL-STD-1474

Noise Limits

MIL-STD-1553B	ATPD 2304 Rev D Digital Time Division Command/Response Multiplex Data Bus
MIL-PRF-32143	Batteries, Storage: Automotive, Valve Regulated Lead Acid (VRLA)

## HANDBOOKS

### DEPARTMENT OF DEFENSE

MIL-HDBK-454	General Guidelines for Electronic Equipment
MIL-HDBK-1791	Designing for Internal Aerial Delivery in Fixed Wing Aircraft

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia PA 19111-5094 or reference <http://assist.daps.dla.mil/quicksearch/>.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

## DRAWINGS

### U. S. ARMY TANK-AUTOMOTIVE AND ARMAMENT COMMAND

7012810	Mount Assy, Ring Cal. 50, M 66
8710630	Pintle Assembly, Heavy Duty
11630529	Mounting Kit, M16/M14 Rifle
11630581	Bracket, Mounting, Catch Assembly
11630594	Support, Mounting- Rifle
11677011	First Aid Kit
11682336	Cable & Plug Assy Intervehicle Power Cable
11682379	Kit, Intervehicle Power Cable
12258941	Connector, Receptacle, Electrical (54 Pin)
12322663	Bar Assy, Tow, Heavy Duty
12360870	Stop Lamp Assembly, Rear Blackout
12508360	Armor Kit
13013615	Headlight

(Application for copies should be addressed to the U.S. Army Tank automotive and Armament Command, ATTN: AMSTA-AQ-ATBC, Warren, MI 48397-5000)

US ARMY EDGEWOOD RESEARCH DEVELOPMENT AND  
ENGINEERING CENTER

D5-15-8779                      Interface for M-8 Alarm

(Application for copies should be addressed to the: U.S. Army Research, Development and Engineering Command, Acquisition Center, E5179 Hoadley Rd, Aberdeen Proving Ground, MS 21010)

US ARMY COMMUNICATIONS ELECTRONICS MATERIEL READINESS  
COMMAND

A3013814	SINGARS AN/VRC-90 Radio Set
A3013842	Antenna (AS-3684)
A3014039	Power Cable
A3019214	Mounting Base, Electrical Equipment For The MT6352/VRC-VEC
SCD189023	Antenna Support Assembly

(Application for copies should be addressed to the: US Army Communications and Electronics Materiel Readiness Command, Logistics Engineering Directorate, 12WD Bldg. 601 McAfee Center, Fort Monmouth, NJ 07703)

GUIDES, DESIGN

U.S. ARMY TANK-AUTOMOTIVE AND ARMAMENT COMMAND

CR-82-588-003                      STE/ICE DCA Design Guide

(Application for copies should be made to U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-AQ-ATBC, Warren, MI 48397-5000)

PURCHASE DESCRIPTION

U. S. ARMY TANK-AUTOMOTIVE AND ARMAMENT COMMAND

ATPD 2205	Test Equipment (Simplified) for Internal Combustion Engine – Reprogrammable (STE/ICE-R) Test Set
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ATPD 2206R7      Batteries, Storage: Lead-Acid, "Maintenance Free"  
(Metric)

(Application for copies should be addressed to the U.S. Army Tank automotive and Armament Command, AMSTA-AQ-ATBC, Warren, MI 48397-5000)

## TECHNICAL BULLETIN (TB)

### U. S. ARMY TANK-AUTOMOTIVE AND ARMAMENT COMMAND

TB 43-0213      Corrosion, Prevention and Control Including  
Rustproofing Procedures for Tactical Vehicles and  
Trailers

(Application for copies should be addressed to the U.S. Army Tank automotive and Armament Command, AMSTA-AQ-ATBC, Warren, MI 48397-5000 or  
<https://www.logsa.army.mil/etms/online.htm>)

## REGULATIONS, ARMY

AR 70-38      Research, Development, Test and Evaluation of  
Materiel for Extreme Climatic Conditions

(Copies are available from the following website: <http://www.usace.army.mil/inet/usace-docs/army-reg>)

## SOFTWARE

Reference Mobility Models for the HEMTT, PLS, PLST

(Application for copies should be addressed to the U.S. Army Tank automotive and Armament Command, ATTN: AMSTA-AQ-ATBC, Warren, MI 48397-5000)

## GOVERNMENT AGENCIES

CALIFORNIA AIR RESOURCES BOARD (CARB)



## Tank Pressure and Vacuum Requirements

(Application for copies should be addressed to the: California Air Resources Board, 1001  
“I” Street, P.O. Box 2815, Sacramento, CA 95812)

## DEPARTMENT OF TRANSPORTATION (DOT)

### Federal Motor Vehicle Safety Standards (FMVSS)

178.346	Specification DOT 406; Cargo Tank Motor Vehicle
571.101	Controls and Displays
571.102	Transmission Shift Lever Sequence, Starter Interlock, and Transmission Braking Effect
571.104	Windshield Wiping and Washing Systems
571.108	Lamps, Reflective Devices, and Associated Equipment
571.119	New Pneumatic Tires for Vehicles other Than Passenger Cars
571.120	Tire Selection and Rims for Motor Vehicles Other Than Passenger Cars
571.121	Air Brake Systems
571.124	Accelerator Control Systems
571.208	Occupant Crash Protection
571.209	Seat Belt Assemblies
571.210	Seat Belt Assemblies Anchorages

### Federal Motor Carrier Safety Regulation (FMCSR)

#### Title 49, Volume 5, Chapter III:

393.28	Wiring Systems
393.30	Battery Installation
393.40	Required Brake Systems
393.41	Parking Brake System
393.42	Brakes Required on All Wheels
393.43	Breakaway and Emergency Braking
393.45	Brake Tubing and Hoses; Hose Assemblies and End Fittings
393.47	Brake Actuators, Slack Adjusters, Linings/Pads and Drums/Rotors
393.48	Brakes to Be Operative
393.49	Control Valves on Brakes

393.50	Reservoirs Required
393.51	Warning Signals, Air Pressure and Vacuum Gauges
393.52	Brake Performance
393.55	Antilock Brake Systems
393.65	All Fuel Systems
393.67	Liquid Fuel Tanks
393.70	Coupling Devices and Towing Methods, Except for Driveaway-Towaway Operations
393.83	Exhaust Systems
393.95	Emergency Equipment on All Power Units

(Application for copies should be addressed to the Dept of Transportation, Federal Highway Administrations, Washington, DC 20591 or <http://www.gpoaccess.gov/cfr/index.html>)

#### ENVIRONMENTAL PROTECTION AGENCY (EPA)

##### Title 40, Chapter 1

Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines Compliance with Interstate Motor Carrier Noise Emission Standards

(Application for copies should reference "Code of Federal Regulations 40 CFR and the Federal Register, and should be addressed to the Superintendent of Documents, US Government Printing Office, Washington, DC 20402)

#### HEADQUARTERS, DEPARTMENT OF THE ARMY

##### Common Table of Allowances (CTA)

50-900 Clothing and Individual Equipment

(Application for copies should be made to: Headquarters, Department of the Army, Washington, DC or reference [http://www.army.mil/usapa/doctrine/DR\\_pubs/dr\\_a/pdf/cta\\_info.pdf](http://www.army.mil/usapa/doctrine/DR_pubs/dr_a/pdf/cta_info.pdf) to obtain instructions for accessing CTA)

#### NATIONAL FIRE PROTECTION AGENCY (NFPA)

NFPA 407 Standard for Aircraft Fuel Servicing (National Fire Codes, Vol. 7)

(Application for copies should be addressed to the National Fire Protection Agency, One

Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101 or purchase online at <http://www.nfpa.org/index.asp>)

# NORTH ATLANTIC TREATY ORGANIZATION (NATO) STANDARDIZATION AGREEMENT (STANAG)

STANAG 2413	Demountable Load Carrying Platforms (DLCP/Flatracks)
STANAG 4007	Electrical Connectors Between Prime Movers, Trailers and Towed Artillery
STANAG 4074	Auxiliary Power Unit Connections for Starting Tactical Land Vehicles
QSTAG 244, Ed 3	Nuclear Survivability Requirements For Military Equipment

# NORTH ATLANTIC TREATY ORGANIZATION (NATO) ALLIED VEHICLE TESTING PUBLICATION (AVTP)

AVTP 03-30WT	Steering and Maneuverability
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(Applicable NATO documents are those that are current at NATO Headquarters (Military Agency for Standardization , 1110 Brussels). Copies are available from Global Engineering, Inc., 15 Inverness Way East, Englewood, CO 80112).

# OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA)

Title 29, CFR, Chapter XVII, Part 1910.1000	Air Contaminants
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(Application for copies should be addressed to the American Conference of Government Industrial Hygienists (ACGIH), 1330 Kemper Meadow Drive, Cincinnati, OH 45240 or <http://www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=200529>).

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

# AMERICAN PETROLEUM INSTITUTE (API)/INSTITUTE OF PETROLEUM (IP)

STD 1529	Aviation Fueling Hose and Hose Assemblies
SPEC 1581	Specifications and Qualification Procedures for
	Aviation Jet Fuel Filter/Separators

(Application for copies should be made to the: American Petroleum Institute, 1220 L St NW, Washington, DC 20005)

#### AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B30.5	Mobile and Locomotive Cranes
ASME B30.22	Articulating Boom Cranes

(Applications for copies should be addressed to the: Headquarters, ASME International, Three Park Avenue, M/S 10E, New York, NY 10016-5990 or available electronically from <http://store.asme.org/default.asp>)

#### AMERICAN SOCIETY FOR TESTING & MATERIALS (ASTM).

D522	Standard Test Method for Mandrel Bend Test of Attached Organic Coatings
D1171	Standard Test Method for Rubber Deterioration – Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens)

(Applications for copies should be addressed to the: American Society for Testing & Materials, 100 Bar Harbor Drive, West Conshohocken, PA 19428-2959)

#### EUROPEAN TYRE AND RIM TECHNICAL ORGANISATION (ETRTO)

Standards Manual

(Application for copies should be addressed to the: European Tyre and Rim Technical Organization, Rue Defacqz 78-80, B-1060 Brussels, Belgium or <http://www.etrto.org>).

#### GAMBER-JOHNSON, LLC DRAWINGS

EPO103-6	Arrangement Drawing For PLS & HEMTT
EPO120-05	PGI HHC-133 Computer Mount Concept
EPO120-10	Arrangement, MTS Battery Box (FMTV, PLS, HEMTT, 900 Series)

EPO120-12	Arrangement, MTS Control Panel (FMTV, PLS, HEMTT & 900 Series)
EPO120-13	Antenna/Modem Mount Concept for the PLS/HEMTT, FMTV & HETS Vehicles

(Application for copies should be addressed to the: Gamber-Johnson LLC, 3001 Borham Ave, Stevens Point, WI 54481).

#### GENERAL MOTORS (GM)

GM 9540P	Accelerated Corrosion Test
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(Application for copies should be addressed to General Motors North America, c/o Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112)

#### INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

668	Series 1 Freight Containers – Classification, Dimensions and Ratings
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(Application for copies should be addressed to International Organization of Standardization (ISO), Case Postale 56, Geneva, Switzerland CH-1211)

#### SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

AS8090	Mobility, Towed Aerospace Ground Equipment, General Requirements for
J163	Low Tension Wiring and Cable Terminals and Splice Clips
J198	Windshield Wiper Systems - Trucks, Buses, and Multipurpose Vehicles
J318	Automotive Air Brake Line Couplers (Gladhands)
J336	Sound Level for Truck Cab Interior
J343	Test and Test Procedures for SAE 100R Series Hydraulic Hose and Hose Assemblies
J366	Exterior Sound Level for Heavy Trucks and Buses
J381	Windshield Defrosting Systems Test Procedures and Performance Requirements -Trucks, Buses, and Multipurpose Vehicles
J382	Windshield Defrosting Systems Performance Requirements - Trucks, Buses, and Multipurpose Vehicles (DOD Adopted)
J516	Hydraulic Hose Fittings
J517	Hydraulic Hose
J534	Lubrication Fittings

J560	Primary and Auxiliary Seven Conductor Electrical Connector for Truck-Trailer Jumper Cable
J682	Rear Wheel Splash and Stone Throw Protection
J683	Tire Chain Clearance-Trucks, Buses (Except Suburban, Intercity, and Transit Buses), and Combinations of Vehicles
J697	Safety Chain of Full Trailers or Converter Dollies
J701	Truck Tractor Semitrailer Interchange Coupling Dimensions, Information Report
J706	Rating of Winches
J848	Fifth Wheel Kingpin, Heavy Duty - Commercial Trailers and Semitrailers
J849	Connection and Accessory Locations for Towing Multiple Trailers Truck and Bus
J994	Alarm - Backup - Electric Laboratory Performance Testing, Standard
J1100	Motor Vehicle Dimensions
J1292	Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach Wiring
J1436	(R) Requirements for Engine Cooling System Filling, Deaeration, and Drawdown Tests
J1587	Joint SAE/TMC Electronic Data Interchange Between Microcomputer Systems in Heavy Duty Vehicle Applications
J1708	Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications
J1850	Class B Data Communications Network Interface
J1939 Series:	
J1939-11	Physical Layer, 250K bits/s, Twisted Shielded Pair
J1939-13	Off-Board Diagnostic Connector
J1939-21	Data Link Layer
J1939-31	Network Layer
J1939-71	Vehicle Application Layer
J1939-73	Application Layer – Diagnostics
J1939-81	Recommended Practice for Serial Control and Communications Vehicle Network – Part 81 – Network Management
J1992	Wheels/Rims – Military Vehicles – Test Procedures and Performance Requirements
J2360	Automotive Gear Lubricants for Commercial and Military Use

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

## TIRE AND RIM ASSOCIATION (TRA) INCORPORATED

TRA 1            Year Book

(Application for copies should be addressed to the: TRA Inc., 175 Montrose West Avenue, Suite 150, Copley, OH 44321)

## TRW DRAWINGS

865988            Installation Drawing, HEMTT & PLS

(Application for copies should be addressed to the: TRW Space and Defense Sector, Space and Electronics Group, 1 Space Park Blvd, Redondo Beach, CA 90278-1078).

2.4. Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

### 3. REQUIREMENTS

3.1 Commerciality/commonality, components, parts, and accessories. All variants shall be the same to the maximum extent practical. All power train components shall be certified by the contractor as being compatible with and properly matched with all related or affected components assembled to meet the specifications stated herein. Maximum commonality of components shall be used throughout.

#### 3.2 Manpower & Personnel Integration (MANPRINT)

3.2.1 Human engineering. System design and integration, to include operation of all equipment, shall accommodate operation and maintenance by a target audience of 5th percentile female through 95th percentile male (reference MIL-STD-1472 for guidance).

3.2.2 Safety. Unless otherwise specified herein, the Mission Variants shall comply with all FMCSR and FMVSS regulations applicable to a vehicle/system of this weight class at the time of original HEMTT and PLS contract (threshold) (objective – at the time of manufacture). The variants shall be free of sharp projections and/or edges that may cause operator/maintainer injury. Operators and maintenance personnel shall not be unknowingly exposed to rotating or moving parts, hot surfaces, electrically energized components, components containing high pressures or other inherently hazardous components or systems. Consideration shall be given to expected failure mode situations in addition to normal operations. Type II (4-point) passenger restraints conforming to FMVSS 571.209 and FMVSS 571.210 shall be provided at all seating positions.

3.2.3 Manpower. Mission Variants shall be operational and maintainable by the following Military Operational Specialties while wearing the full range of army clothing, including arctic, and MOPP IV (see 6.3.9) clothing. The variants shall be operational and maintainable by the following Military Operational Specialties while wearing full combat gear (to include Load Bearing Equipment (LBE), personal body armor and protective mask), individual MOPP IV and arctic clothing. All operations for the variants shall be capable of being performed by a crew of two soldiers (threshold) (objective - one soldier; with the exception of Mission VA and VB Vehicles when outfitted with the Enhanced Container Handling Unit (E-CHU) and the M1076A1 which shall require no more than two soldiers to perform).

MOS for Operators:

12C	Bridge Crewmember
13B	Cannon Crew Member
55B	Ammunition Specialist
62E	Heavy Construction Equipment Operator
62F	Crane Operator
62G	Quarry Equipment Operator
62H	Concrete and Asphalt Equipment Operator
62J	General Construction Equipment Operator
77F	Petroleum Heavy Vehicle Operator
77W	Water Heavy Vehicle Operator
88M	Motor Transport Operator

MOS for Maintainers:

44B	Metal Workers
91L (formerly 62B)	Construction Equipment Repairer
63G	Fuel and Electrical Systems Repairer
91J (formerly 63J)	Quartermaster and Chemical Equipment Repairer
91B (formerly 63B)	Light Wheel Vehicle Mechanic/Heavy Wheel Vehicle Mechanic/Wheel Vehicle Repairer

3.2.4 Noise (objective). For each personnel position (operator, passenger, winch operator, crane remote operator, LHS remote operator) the steady state noise levels shall be below 85 dB(A) while in any operational mode when measured for maximum noise as specified in SAE J336.

3.2.4.1 Mission I, II, III, IV, VA and VC Vehicles (threshold). Vehicles shall also comply with both the exterior and interior noise limits outlined in MIL-STD-1474. The exterior sound level limits shall not be exceeded when measured according to the test procedure cited in SAE J366. The steady-state interior noise levels in personnel occupied areas shall not be exceeded when measured by MIL-STD-1474 with a steady-state noise Category of D. The personnel occupied areas shall be the following: Each operator and crew position, and



occasionally occupied positions.

3.2.4.2 Mission VB Vehicles (threshold). The steady state noise levels in personnel occupied or occasionally occupied areas (each operator or crew position) shall be below 85 db(A) when measured for maximum noise as specified in SAE J336, except that the readings should be made at two-thirds the maximum rated engine speed with the transmission in the highest gear with the truck and trailer both at two-thirds rated payload. The noise levels within the cab shall not exceed 85 db(A) when the Load Handling System (LHS), and separately the Material Handling Crane are in full operation.

3.2.5 Hand holds and steps. All hand holds and steps shall be an integral part of the vehicle. This does not pertain to movable ladders if provided. If a movable ladder is provided, it shall be stored in a readily accessible location.

3.2.6 Emissions. New production vehicles shall comply with the Environmental Protection Agency (EPA) 2004 on-road emission regulations/standards (threshold) for new motor vehicles and new motor vehicle engines in effect at time of contract award (Objective).

3.3 Dimensions. Dimensions shall be as follows, when the vehicle is at GVW, unless otherwise specified.

3.3.1 Width. Mission IA1, II, III, IV, VA and VC Vehicles shall not exceed 96 inches (2.4 M) in width when measured IAW SAE J1100 excluding grab handles on all variants (objective – Mission IA2 and IVA2 Vehicle). Mission VB Vehicles shall not exceed 100 inches (2.54 M) in width when measured IAW SAE J1100 excluding mirrors, grab handles, marker lamps, and splash and spray suppressant devices, front axles, rubber moldings around cab, removable wheel covers, and tire bulges, but including bumpers, moldings, and sheet metal protrusions. Mission II Vehicles shall not exceed 99 inches (2.51 M) in width due to tank configuration required for the application of Fuel Tank Self Sealing (FTSS) System (see 3.12.3.1.2).

3.3.2 Height (with the exception of kits). Overall height of Mission VA, VB and VC Vehicles and PLST at VCW, shall not exceed 142 inches (3.6 M) (threshold). Mission VA, VB and VC Vehicles and PLST shall be capable of negotiating a 157.5 inch (4 M) underpass while transporting an empty ISO 668, Type 1C (8 ft high) freight container mounted on a flatrack (FR) (objective). Overall height of Mission IB2 Vehicles VCW, shall not exceed 148 inches (threshold).

3.3.3 Length. The overall length of the Mission System (vehicle and primary trailer – see Table IV) shall not exceed 60 ft (excluding Mission IVA2 which shall not exceed 68 ft with M870 Semitrailer and Mission VB vehicles which shall not exceed 60 ft 4 inches with M1076 trailer variants) during highway and secondary road operation (without extended drawbar kit). Mission System may exceed 60 ft as required to preclude interference between the truck and trailer such as during cross-country operation. The Swing Radius (SR) and Clearance (CT)

minimum dimensions shall comply with SAE J701.

3.4 Transportability. The variants, and all FR models (see 3.10.1.1) as applicable, shall be transportable by highway, rail, marine, and air modes worldwide. The transportability criteria shall be as specified in MIL-STD-209 (objective) and MIL-STD-1366 (Mission I, II, III and IV Vehicle threshold - MIL-STD-209E; Mission VA and VC Vehicles (without FRs or Bridge Adapter Pallets (BAP)) threshold - MIL-STD-209E; Mission VB Vehicle threshold – MIL-STD-209G). Unless otherwise specified, preparation for transport by any mode shall not exceed 15 minutes using only two soldiers and onboard equipment (basic issue item (BII) tools). It shall be capable of negotiating a 15-degree ramp (air and marine transport) at GVW/GCW unless limited solely by the trailer. All removed parts (except spare tire) and tools shall be self-storing and secured for travel on the vehicle and shall not interfere with other loads or the normal actions required for movement in and around transport aircraft.

3.4.1 Lifting and tiedown provisions. Lifting and tiedown provisions, including the connecting structural members on the vehicle and PLST, separately at GVW, shall be IAW MIL-STD-209 (objective), Type I vehicles, lifting, equipment tiedown and/or multipurpose provisions (Mission I, II, III, IV, VA and VC Vehicle threshold - MIL-STD-209E (tiedown provisions shall be limited to 4 with the pintle available as an optional 5<sup>th</sup> tiedown point for tiedown; rail impact testing shall utilize only 4 tiedown points); Mission VB Vehicle threshold – MIL-STD-209G, type II vehicles, class 1, 2, and/or 3 provisions) (reference MIL-HDBK-1791 for guidance). The lifting and equipment tiedown provisions on all vehicles shall be hard-mounted (objective). The locations of the equipment tiedowns shall permit the vehicle to be secured to the transport medium in such a manner as to prevent shifting or movement in any direction. Designs using single purpose provisions (maximum - four used for lifting only and four used for tiedown only to meet MIL-STD-209G requirements and the latest revision of MIL-STD-209) will be permitted for Mission VB Vehicles (objective – Mission I, II, III, IV, VA and VC Vehicles). As of 13 October 2009, the requirement for storage of the spreader bars on Mission VB and Mission VI Vehicles (ref MIL-STD-209K, paragraph 4.8) was waived by Surface Deployment and Distribution Command - Transportation Engineering Agency (SDDCTEA), Deployability Division Transportability Branch (SDTE-DPE).

3.4.2 Cargo aircraft. All equipment removed in order to meet Air Transportability requirements shall be stowed on the vehicle. Reference MIL-HDBK-1791 for guidance.

a. Mission I, II, III, IV, VA, **VB** and VC Vehicles at VCW (less machine gun (MG) ring mount kit; associated cab armor kits; Gunner Protection Kit (GPK); and Enhanced Container Handling Unit (E-CHU)) shall be capable of being transported without restriction on the **C-17, and C-5A aircraft**.

b. Mission VI Trailer variants (PLST/PLSTA1) shall be capable of having one trailer stacked on top of another, such that two PLST variants shall be transportable in C-5A and C-17 aircraft. The PLST variants shall be transportable by the C-130 as a single unit.

3.4.2.1 Mission II and III Vehicle preparation. 120 minutes total is permitted for two individuals to prepare the Mission III Vehicle for air transportation. Equipment removed from Mission III Vehicle and the spare tire from the Mission II Vehicle may be stored directly in the aircraft(s).

3.4.3 Rail. The vehicle at VCW shall meet the unrestricted rail transport criteria for North America when loaded on a 50 inch high flatcar and NATO rail transport criteria when loaded on a 51.4 inch flatcar without armor, armor related kits, or machine gun kit.

a. The vehicle at GVW (except Mission III and IV Vehicles at vehicle curb weight) shall withstand, without damage or degradation in performance, the rail impact test in accordance with MIL-STD-810, test 516.6, procedure VII. Crossed tiedown cables or chains shall not be used to pass the rail impact test.

b. Mission VI Trailer (PLST) variants shall be capable of having one trailer stacked on top of another, such that two PLST shall be transportable on a 50 inch (1.27 M) high railcar with a maximum of 30 minutes preparation time.

#### 3.4.4 Marine.

a. Mission I, II, III, IV, VA and VC Vehicles at GVW shall be capable of being transported on the Logistics Over the Shore (LOTS) craft. Mission I, II, III, IV, VA and VC Vehicles at GCW shall be capable of being transported on larger vessels/ships.

b. Mission VB Vehicles at GVW shall be capable of being transported on the LARC-LX. Mission VB Vehicles at GCW shall be capable of being transported on RO/RO ships (objective) and larger vessels/ships.

c. Mission VI Trailer variants shall be capable of having one trailer stacked on top of another, such that two PLST shall be transportable on the LARC-LX and larger vessels.

#### 3.4.5 Highway.

a. Mission I, II, III, IV, VA and VC Vehicles shall be transportable under its own power or by semitrailer for highway movement in CONUS and OCONUS (using permits as required).

b. Mission VB2 Vehicle shall be transportable by commercial and military trucks and have a CONUS and OCONUS (with special permit for weight in OCONUS) highway legal minimum usable payload of 5 tons except the states listed in Table I below. Mission VB1 System shall have a CONUS and OCONUS (with special permit for weight in OCONUS) highway legal usable payload of at least 7 tons except in the state listed in Table II below. The U.S. highway legal width limits are those that pertain to interstate highways and federally designated connector routes.

TABLE I – MISSION VB2 PAYLOAD PROHIBITED STATES

Arizona	New Mexico
District of Columbia	New York
Illinois	Ohio
Missouri	Washington

TABLE II – MISSION VB1 PAYLOAD PROHIBITED STATES

Arizona

#### 3.4.5.1 Hazardous material transport.

a. Vehicles shall meet all CONUS, OCONUS and NATO highway safety requirements for the transport of POL, conventional ammunition, and missiles where applicable.

b. Mission VI Trailer shall meet all of the CONUS and NATO highway safety requirements for the transportation of hazardous materials.

3.5 Fuels and lubricants. The variants shall be operable with applicable standard military fuels (JP-8 and diesel), lubricants and fluids as required by the climatic operating requirements without component degradation and adverse affect on the vehicle performance or warranty provisions. All initial fills shall be of standard military fuels, lubricants and fluids including those called out in A-A-52557, MIL-PRF-46167, SAE J2360, MIL-PRF-2104, MIL-PRF-10924, MIL-DTL-83133, and A-A-52624. If liquid cooled, the engine shall be serviced with a solution of ethylene glycol conforming to A-A-52624 and water in equal parts by volume.

3.5.1 Vehicle lubrication. Grease lubrication fittings shall conform to SAE J534. Pressure relief shall be provided in all cases when lubricating pressure may damage grease seals or other parts.

#### 3.6 Materials, painting, marking and corrosion.

3.6.1 Material. Unless specified otherwise in the contract, all materials provided as part of the Production Variants shall be new and unused. Recycled material is acceptable when processed to make new material. The recycled material shall consist of at least 50% virgin material.

#### 3.6.2 Reserved.

3.6.3 Painting. All variants shall be painted with CARC topcoats (Green 383 – chip #34094, Black – chip #37030, Brown 383 – chip #30051, Tan 686A – chip #33446 in

accordance with FED-STD-595). All painting shall be performed IAW MIL-DTL-53072 using only those cleaning, pretreatment, primer, and topcoat specifications contained therein except that A-A-52474 can be substituted for MIL-DTL-53084. It is the responsibility of the manufacture to select the proper pre-treatment, primer and topcoat to achieve short term and long term adhesion and corrosion resistance. Regardless of the number of layers of topcoat, the total dry film thickness (from substrate to outer layer) shall not exceed 13 mils. Adhesion and corrosion resistance testing (see 3.6.6) shall be the method by which the paint and pretreatment systems are qualified. Parts not normally painted in commercial practice, such as tires, hoses and hydraulic cylinders, shall not be painted but shall be protected against corrosion (see paragraph 6.4).

The vehicle exterior treat, prime, and paint requirements were developed to provide a surface of low reflectivity, no effort shall be made to counter that effect. All metal and plastic surfaces not normally painted shall be prepared, treated and finished to provide a matte finish. There shall be no exposed chrome, reflective surfaces or ornamental trim.

**3.6.3.1 Camouflage pattern.** Updated camouflage patterns will be provided by the Government. When specified, variants shall be painted in accordance with the Government furnished camouflage pattern drawing. Variants not requiring camouflage pattern shall be painted Green 383 – chip #34094 or Tan 686A – chip #33446 as directed by the Government.

**3.6.4 Identification and marking.** The national symbol (five pointed star) shall be applied to the front and rear of the vehicle, in a readily visible location on the longitudinal centerline of the truck. The national symbol shall be inscribed within a three-inch diameter circle. The color of the national symbol shall be Black chip number 37030 in accordance with FED-STD-595 on backgrounds of green or brown. Camouflage 383 chip number 34094 shall be used on black backgrounds. Marking and identification in accordance with MIL-STD-209 shall be provided.

a. Mission I Vehicle shall have two stabilizing system signs, one inch lettering, shall be placed at each side next to the control station stating STABILIZERS MUST BE FULLY EXTENDED AND IN PLACE BEFORE LIFT IS MADE.

b. The Mission II Vehicle shall also have on each side and the rear of the vehicle:

1. "FLAMMABLE" in 6-inch block letters
2. "NO SMOKING WITHIN 50 FEET" in 3-inch block letters

c. Mission III Vehicle shall have two stabilizing system signs, one inch lettering, shall be placed at each side next to the control station stating "STABILIZERS MUST BE FULLY EXTENDED AND IN PLACE FOR ALL LIFT OPERATIONS WHICH ARE NOT DIRECTLY BEHIND THE TRUCK".

d. Mission VB2 Vehicle shall have one sign, one inch lettering, shall be placed next to the control station stating "CAUTION STABILIZERS MUST BE FULLY EXTENDED AND

IN PLACE BEFORE LIFT CAN BE MADE".

3.6.5 Data plates. Instruction, caution, identification, operating and data plates shall be provided in accordance with A-A-50271 and installed by rivets, screws or bolts at fixed control stations and appropriate operating instructions shall also be placed on the remote control unit (as applicable). Military model number, nomenclature, National Stock Number (NSN), contract number, date of manufacturer, and manufacturer's serial number shall be imbedded or embossed on an additional metal identification plate. The identification plate shall be installed in the crew area in a readily visible location. The variants shall be equipped with data plates containing instructions or diagrams including procedures to be followed in assembling, operating or servicing the variants. The contractor shall apply the vehicle weight classification numbers to each vehicle utilizing a vehicle classification number kit (reference MIL-S-40626 for guidance), except that the colors used shall be black characters on a background field of #383 camouflage green chip # 34094. The kit shall be located in the front of the vehicle. "CARC" shall be painted in block letters no larger than 1 inch (25.4 mm) in a conspicuous place near the truck, trailer, and FR dataplates. Shipping dataplate and identification, in accordance with (IAW) MIL-STD-209 shall be provided. As per prior contract, the following may be provided as adhesive backed decal/sticker type plates: Noise warning, rustproofing, transmission shift caution, cargo tank vent, EPA exemption, and warranty.

### 3.6.6 Corrosion.

3.6.6.1 Corrosion control for all Mission Variants (threshold). The vehicle shall operate for a 10 year minimum service life, which can include varying or extended periods in corrosive environments involving one or more of the following: high humidity, salt spray, road de-icing agents, gravel impingement, atmospheric contamination and temperature extremes. Only normal washing, scheduled maintenance and repair of accidentally damaged areas (not a result of deficiency in design, material, manufacturing or normal wear), shall be necessary to keep the corrosion prevention in effect. Dissimilar metals in accordance with MIL-STD-889 shall be electrically insulated from one another to prevent galvanic corrosion.

3.6.6.2 Corrosion control for all Mission Variants (objective). Vehicles shall be protected from rust and corrosion such that there shall not be any corrosion beyond stage 2 as defined by TB 43-0213 for a period of 20 years service life when operated through its mission profile, to include extensive periods in highly corrosive salty environments and exposure to high humidity, road de-icing agents, gravel impingement, and atmospheric contamination. Stage 2 corrosion shall be limited to 5% of major subassemblies (e.g. cab, doors, frame, winch station, etc.). Stage 1 corrosion during this period is limited to 20% of the surface area. Where Government/Military representatives determine components repair due to corrosion is required, the component shall be considered a failed part, necessitating no-cost to the government replacement of that component. The accelerated corrosion test GM 9540P, method B, 160 cycles and ASTM D522 Mandrel Bend Test shall be used to evaluate the relative performance of a proposed design.

3.6.7 Material Resistance (objective). All materials, except brake hoses shall be resistant

to fungus inert (reference MIL-HDBK-454, Requirement 4 for guidance) and all rubber products ozone resistant in accordance with ASTM-D1171, using Ozone-Chamber exposure method B as applicable, but meeting the standard of method B (reference paragraph 7.4 of ASTM-D1171).

3.6.8 Non-skid surface. When surfaces of the variants are to be used as walkways, working areas (including cargo truck beds) and steps, non skid protection (excluding adhesive tape) shall be provided.

3.6.9. Hazardous Material Restrictions. Asbestos, beryllium, beryllium alloys, cadmium, cadmium alloys, Class I and Class II Ozone Depleting Substances, hexavalent chromium, lead, leaded alloys, mercury, radioactive materials and other Group 1 Agents classified as “carcinogenic to humans” by the International Agency for Research on Cancer (IARC) Monographs, shall not be present in or on any delivered materials, required for the operation and sustainment of the system, or used in final system manufacture and assembly processes.

The following materials may be used without prior approval from the Government:

- Cadmium on electrical connectors and back shells used to mate with cadmium electrical connectors on Government Furnished Equipment (GFE)
- Chemical Agent Resistant Coating (CARC) primers and topcoats
- Lead-acid batteries
- Lead solder
- Beryllium and Beryllium alloys used in electrical components
- Mercury containing fluorescent lighting

3.6.9.1 Exceptions to the Hazardous Materials Requirements. Deviations are not required for the existing configuration baseline to allow maximum usage of existing components for this remanufacturing effort. Deviations shall be required for any redesigned components, newly introduced components, or components replaced to obsolescence. Deviations from the hazardous materials requirements shall not be permissible except where a suitable alternative does not exist, with the exception of hexavalent chromium already in use on the legacy product, such as platings applied to fasteners, fittings, and tubes; and with the exception of lead already in use on the legacy products, such as lead used on batteries and wire harness solder, and the impurities in standard steel, copper and brass alloys. The Government will consider deviations in these situations on a case by case basis. The Government will make the final determination on whether sufficient justification has been provided to support approval of any deviation requests. The contractor shall not use or deliver any prohibited hazardous materials without prior Government deviation acceptance.

3.7 Environmental conditions. The variants shall be capable of full vehicle and crew operation, transport, and stowage in climactic hot, basic, and cold areas as defined in AR 70-38. This shall include stowage on Preposition (PREPO) Afloat vessels up to one year with 6 month maintenance interval (threshold) (30 months without loss of mission essential functions with routine unit-level (i.e., -10 level) maintenance performed every six months - objective). For storage purposes, minimum processing and deprocessing is permitted. Special kits to meet cold

area climactic conditions are acceptable. Preheating, if required, shall not require an external electrical power source.

3.8 Interoperability, standardization and compatibility with other NATO countries. Interoperability with similarly equipped NATO country equipment is mandatory. Trailer interface shall be in accordance with NATO STANAG 4007 12 pin connector requirements. Mission V Vehicles and PLST variants shall interface with flatracks which conform to NATO STANAG 2413 (see 3.10.9.1.1).

3.9 Component protection. The design shall prevent accidental damage from standing or stepping over components to gain access to other areas of the Mission System.



TABLE III – PERFORMANCE REQUIREMENTS

TEST	MISSION	GVW/GCW	THRESHOLD	OBJECTIVE
GRADE OPERATION	I, II, III, IVA1, VA, VB, VC	GCW	30% GRADE	40% GRADE
	IVA2	GCW	20% @ 2 mph	
	I, II, III, VA, VB, VC	GVW	60% GRADE	60% GRADE @ 5 MPH
SPEED	I, II, III, IV, VA, VC	GCW @ 100,000 lbs.	3% GRADE @ 25 MPH	
	IVA2	GCW @ 135,000 lbs	Paved/secondary – 12% GRADE	
	IVA2	GCW @ 117,000 lbs	CROSS COUNTRY – 20% GRADE	
	I, II, III, IV, VA, VC	GVW	3% GRADE @ 40 MPH	
	I, II, III, IV, VA, VC	GCW@ 100,000 lbs.	2% GRADE @ 40 MPH	2% GRADE @ 60 MPH
	VB	GCW	2% GRADE @ 35 MPH	2% GRADE @ 40 MPH
	I, II, III, VA, VB, VC	GVW	2% GRADE @ 50 MPH	
	I, II, III, IV, VA, VC	GCW	40,000 LB Towed Load @ 55 MPH on Level Surface	
	VB	GCW	55 MPH on Level Surface	60 MPH on Level Surface
	VB	GVW	55 MPH on Level Surface	60 MPH on Level Surface
SIDE SLOPE	I, II, III, IV, VA, VB, VC	GCW	30% GRADE	>30% GRADE
	I, II, III, IV, VA, VB, VC	GVW	30% GRADE	40% GRADE
PARKING BRAKES	I, II, III, IV, VA, VC	GVW	20% GRADE	40%GRADE
	I, II, III, IV, VA, VC	GCW	-----	30% GRADE
	VB	GVW	30% GRADE	40% GRADE
	VB	GCW	30% GRADE	40%GRADE

TABLE IV – Minimum Payloads for Vehicles and Trailer

MODEL	MISSION	VEHICLE	PRIMARY TRAILER	PAYLOAD Threshold - Objective	TRAILER PAYLOAD Threshold – Objective
M977A4 Bare	IA0	Light Cargo – Bare	M989A1	22,000 lbs.- N/A	22,000 lbs.- N/A
M977A4	IA1	Light Cargo	M989A1	22,000 lbs.- N/A	22,000 lbs.- N/A
M977A4 EPP	IA2	Electrical Power Plant	M989A1	<b>22,000 lbs.-N/A</b>	<b>22,000 lbs.-N/A</b>
<b>M977A4 LRPT</b>	<b>IA3</b>	<b>Large Repair Parts Transporter</b>	<b>M989A1</b>	<b>22,000 lbs.-N/A</b>	<b>22,000 lbs.-N/A</b>
M985A4 Bare	IB0	Heave Cargo - Bare	M989A1	22,000 lbs - N/A	22,000 lbs – N/A
M985A4	IB1	Heavy Cargo	M989A1	22,000 lbs.- N/A	22,000 lbs.-N/A
M985E1 A4	IB2	Heavy Cargo GMT	M989A1	22,000 lbs.- N/A	22,000 lbs.- N/A
M978A4	II	Tanker	M105 w/POD	2500 gal.(1)- N/A	22,000 lbs.-N/A
M984A4	III	Wrecker	M1073	N/A- N/A	60,000 lbs.(2)- N/A
					100,000 lbs.(3)-N/A
M983A4	IVA1	Tractor	M860A1	21,000 lb king pin load – N/A	16,930 lbs.-N/A(4)
M983A4 LET	IVA2	Tractor – LET	M870	40,000 lb king pin load – N/A	80,000 lbs.-N/A (4)
M1120A4	VA1	LHS-Light	M1076/A1	26,000 lbs.(6)(8)-22,000 lbs.(7)	26,000 lbs.(6)(8)-22,000 lbs.(7)
M1075A1/A2 Bare	VB0/VB0-A	LHS-Heavy Bare (w/o LHS/MHC/winch)		N/A(5)	26,000 lbs.(6)-22,000 lbs.(7)
M1075A1/A2	VB1/VB1-A	LHS-Heavy (w/o MHC)	M1076/A1	36,250 lbs.(6)(9)-33,000 lbs.(7)	36,250 lbs.(6)(9)-33,000 lbs.(7)
M1074A1/A2	VB2/VB2-A	LHS-Heavy (w/MHC)	M1076/A1	36,250 lbs.(6)(9)-33,000 lbs.(7)	36,250 lbs.(6)(9)-33,000 lbs.(7)
M1977A4	VC	Common Bridge Transporter (CBT)	M1076/A1	24,000 lbs.(6)(10)-N/A	24,000 lbs.(6)(10)-N/A
M1076/A1	VI	PLSTrailer (PLST)	N/A	36,250 lbs.(6)-33,000 lbs.(7)	N/A-N/A

(1) Payload shall be 2500 gallons of JP-8.

(2) Payload applies to the weight of the recovered vehicles for lift and tow requirement.

(3) Payload applies to the weight of the recovered vehicle for flat tow requirement.

(4) Payload applies to the weight loaded onto the M860A1 semitrailer for Mission IVA1 vehicle and M870 semitrailer for Mission IVA2 Vehicle

(5) Payloads apply to the variants only when outfitted with applicable LHS or CBT provisions.

(6) Payload shall include the weight of the flatrack (approx. 4,000 lbs.) and the weight of the Container Handling Unit (CHU) (lifting frame and stowage brackets) (as applicable), BAP, IBC, ISO containers/shelters.

(7) Payload shall not include the weight of any component such as flatrack (FR), Container Roll On/Off Platform (CROP) or ISO containers/shelters, Enhanced Container Handling Units (E-CHU) (lifting frame and stowage brackets), tiedown devices, sideboards or tarpaulins.

(8) Combined payload center of gravity shall be located no greater than 44 inches above the flatrack corner casting bottom and 110 inches rearward of the bail bar.

(9) The ISO container/FR/shelter shall be loaded with a uniformly distributed load and a payload center of gravity 24 inches (610 mm) above the container floor.

(10) The payload longitudinal center of gravity must not be more than 5 inches forward or behind flatrack center.

**3.10 Performance.** All performance requirements shall be met with the vehicle at Gross Vehicle Weight (GVW) (not including – cab armor B-Kit, Gunner’s Protection kit), unless otherwise specified. If Gross Combination Weight (GCW) is specified, the PLST/PLSTA1 shall be the towed trailer for all Mission Vehicles, unless otherwise specified. Minimum payload requirements are defined in Table IV. All performance requirements shall be met while operating on DF-2 (threshold), JP-8 (MIL-DTL-83133) (objective). The system shall be capable of all slope operations as specified herein (threshold) with 10% of the fuel tanks useable volume remaining (objective) and without leakage when at maximum rated capacity. Grade surface shall be smooth, dry, hard surface pavement. Brakes shall conform to paragraph 3.11.10.

**3.10.1 Payload.** Mission Vehicles shall be capable of transporting the payloads and towed payloads using the Mission Trailer (as applicable) as outlined in Table IV.

**3.10.1.1 Flatracks (FR) and containers.** LHS Vehicles shall interface with the following FR and containers: M1077, M1077A1, M1, M3, M3A1, Engineering Mission Modules (EMMs) (dump body modules, concrete mobile mixer, bituminous distributor), fuel tank and pump modules/modular fuel farm, Fuel Racks, ISO 668, Type 1CX (4 ft. 3 in. height) to ISO 668, Type 1CC (8 ft 6 in. height) freight containers, Forward Repair Systems (FRS), Boat Cradles, Bridge Adapter Pallets (CBT Vehicle only) and FR built to NATO STANAG 2413. Containers shall require the use of an E-CHU installed on the vehicle (threshold) (objective – no E-CHU required). LHS vehicles shall interface with any properly configured load that can be loaded /unloaded on/from the vehicle.

	Mission VA - M1120A4 (up to 26,000 lbs)	Mission VC - M1977A4 (up to 24,000 lbs)	Mission VB - (up to 36,250 lbs) M1074A1 M1075A1		Mission VI – M1076/A1 (up to 36,250 lbs)
M1	X	X	X	X	X
M1077, M1077A1	X	X	X	X	X
M3, M3A1	X	X	X	X	X
EMM (Dump Body)				X	X
EMM (Concrete)				X	X
EMM (Bituminous)				X	X
Fuel Tank and Pump Modules				X	X
Fuel Racks				X	X
ISO 668, Type CX (4 ft 3 in height) to Type 1CC (8.5 ft height) Freight Containers	X	X	X	X	X
FRS			X	X	X
Boat Cradles		X			
Bridge Adapter Pallets		X			
Flatracks (NATO STANAG 2413 Based)	X	X	X	X	X

3.10.2 Towing a like truck. The vehicle at GVW shall be capable of being towed by any other like vehicle at GVW, (with no preparation (other than customary actions such as shifting the t-case into neutral) - threshold for Mission VB Vehicles, objective for Mission I, II, III, IV, VA and VC Vehicles), with the exception of the hook-up of the towbar (dwg 12322663) and the towbar adapter (NSN 2540-01-408-1538), for a distance of at least 100 miles (160 km) at a minimum speed of 35 mph (56 km/hr) on a paved level road. All vehicles at Vehicle Curb Weight (VCW) (see 6.3.24) shall be capable of being lifted and towed from the front and rear by the Mission III Vehicle.

3.10.3 Towed load capability. All Mission Vehicles at VCW shall be capable of pintle towing the following trailers at GVW: M105, M1073, M149, M332, M989. Mission VB Vehicles at VCW shall be capable of pintle towing the additional trailers at GVW: Mission VI Trailer (PLST) variants at GVW. Mission I, II, III, IV Vehicles (objective), and VA Vehicles (threshold) shall be capable of pintle towing the M1076 variants at Mission VA payload (see Table IV).

3.10.4 Grade operation (longitudinal slope). The variants shall be capable of climbing and descending at the grades and payloads specified by Table III with intermediate starts and stops, and without loss of fluids or malfunction. Engine shall be capable of starting/stopping/and restarting while at GCW on specified grade. At GVW, engine shall be capable of running while the truck is stopped on specified grade. Fluid leakage through DOT regulated vents (cargo tank manhole cover and vehicle fuel tank vent) are regulated per the appropriate DOT standards for leakage rate - THRESHOLD; No Leakage – OBJECTIVE.

3.10.5 Side slope operation. The variants shall be capable of operating on and traversing side slopes at the grades and payloads specified in Table III. As a result of the operation, no evidence of faulty lubrication, leakage, or other malfunction/degradation or loss of stability shall be found. Fluid leakage through DOT regulated vents (cargo tank manhole cover and vehicle fuel tank vent) are regulated per the appropriate DOT standards for leakage rate - THRESHOLD; No Leakage – OBJECTIVE.

a. Side slope operation of the Mission VA1, VB1, **VB1-A**, VB2, **VB2-A** and VC vehicles shall also be capable of being performed with an ISO 668, Type 1C freight container secured with a flatrack (threshold) (objective - without a FR) with the Central Tire Inflation System (CTIS) set in the highway mode, as applicable.

3.10.6 Speed. The variants shall be capable of obtaining and maintaining the speeds specified by Table III at the specified grades and payloads.

3.10.7 Governed speed. Maximum geared speed at engine full load governed speed shall not exceed 65 mph for all vehicles. Engine governed speed shall not exceed the maximum RPM rating specified by the engine manufacturer.

3.10.8 Range. Mission I, II, III, IV, VA and VC Vehicles at GCW shall be capable of being operated at least 300 miles (563.6 km) (objective 400 miles) while operating over a

representative portion of the mission profile (Table VII) without refueling. Mission VB Vehicles at GCW shall be capable of being operated at least 225 miles (objective 300 miles) while operating over a representative portion of the mission profile (Table VII) without refueling. The average speeds over each terrain type shall not be less than 50% of the maximum safe speed.

3.10.9 Vertical step. Variants shall be able to negotiate a 24-inch (610 mm) minimum vertical step while moving forward.

3.10.10 Tracking. The Mission System shall conform to the tracking requirements of FMCSR 393.70.

3.10.10.1 Backing. Mission Vehicles shall be capable of interfacing with the backing assist device of the PLST variants (objective) (see 3.12.7.2).

3.10.11 Steerable/lockable rear axle (objective). If a steerable rear axle is used on the vehicles, a locked neutral steer position shall be provided at speeds over 20 MPH. Transitions to and from the neutral steer position shall not adversely affects the handling of the vehicle. In the event of a rear steer system failure, the rear axles shall assume a neutral, locked position.

3.10.12 Lane changing. The vehicle at GCW shall be capable of making lane changes at speeds up to 35 mph (55 km/hr). The vehicle shall move from one lane to another, between 2 pylons located a distance of 118 feet (36 M) apart. The vehicle shall then return (continuing at same speed) to the original lane prior to reaching a third pylon located in a straight line from and the same distance apart as the original pylons, without any tire leaving the ground.

3.10.13 Turning requirement.

a. For Mission I, II, III, VA and VC Vehicles, in no case shall the turning diameter (curb-to-curb) exceed 110 feet.

b. Mission IV Vehicle clearance circle shall not exceed 108 feet. Mission IV Vehicle with M860 semitrailer (Mission IVA2 Vehicle with M870 semitrailer) at GCW shall be able to negotiate a right angle turn posed by an intersection of two roads 30 feet wide (wall to wall) (threshold), 24 feet wide (wall to wall) (objective), without stopping.

c. Mission VB Systems at GCW shall be able to negotiate a right angle turn posed by an intersection of two roads 30 feet wide (curb to curb) (threshold), 25 feet wide (curb to curb) (objective), without stopping.

3.10.14 Lateral stability.

a. For Mission III and IV Vehicles, the roll stiffness shall be such that a .5G lateral acceleration shall not produce a body roll angle of more than 5 degrees or a total roll angle of more than 7.5 degrees with the tires at the off-road inflation pressure and at full gross vehicle weight.

b. Mission I, II, VA and VC Vehicles shall be allowed greater roll freedom over the requirements for Mission III and IV Vehicles, compatible with overall vehicle stability.

c. For Mission VB Vehicles (objective), the roll stability as determined from a steady-state circular turn test on a 170 to 200 foot radius course with a level, paved surface shall meet or exceed a wheel-liftoff threshold of 0.34 g's with a total body roll not to exceed 8.0 degrees. The steering stability as determined from a steady-state circular turn test on a 170 to 200 foot radius course with a level, paved surface shall meet or exceed an instantaneous characteristic understeer gradient (steer angle divided by the lateral acceleration) of -5.0.

d. The PLST variants transporting an ISO 668, Type 1C freight container secured to a FR at GVW defined by Table IV, shall be able to sustain up to 0.40g lateral acceleration without any of the tires of the PLST leaving the ground while being towed by the vehicle on a paved level road.

#### 3.10.15 Fording.

a) The Mission System (vehicle and trailer) shall, without any preparation, be driven into a water crossing 48 inches in depth with hard bottom for not less than 5 minutes, at speeds up to 5 mph (8 km/h) without preparation or additional maintenance prior to further operation. The Mission System lubricants shall be checked for contamination. Contaminants beyond 0.25% by volume are not allowed for Mission VB Vehicles. Contaminants beyond 2.0% by volume are not allowed for Mission I, II, II, IV, VA and VC Vehicles.

b) The Mission System shall, without preparation, be driven into a water crossing 48 inches in depth with hard bottom for five minutes and then the engine shall be turned off. After 5 minutes, the Mission System shall be restarted and the vehicle backed out of the water. The Mission System lubricants shall be checked for contamination. Contaminants beyond 0.25% by volume are not allowed for Mission VB Vehicles. Contaminants beyond 2.0% by volume are not allowed for Mission I, II, II, IV, VA and VC Vehicles.

3.10.16 Approach & departure angles. Protrusion of the tow eyes and skid plate support into the angle of approach plane is permitted.

a. The angle of approach shall not be less than 32 degrees and the angle of departure not less than 39 degrees in the area of the pintle hook not including the safety chain loop for Mission I, II, III, IV, VA, and VC. Angles shall be defined in accordance with SAE J1100.

b. For Mission VB Vehicles, the angle of approach shall not be less than 40 degrees and the angle of departure shall not be less than 42 degrees. Angles shall be defined in accordance with SAE J1100.

3.10.17 Braking. Unless otherwise specified in this purchase description, the performance of the brake system shall comply with FMVSS 571.121 (see 3.11.10). The brake system of all vehicles post-production shall be burnished sufficient for the vehicles to meet the grade holding requirements of this purchase description.

### 3.10.17.1 Service brakes.

a. Mission I through V Vehicles. Service brakes shall meet the requirements of FMVSS 571.121. In addition, Mission VB Vehicles service brakes shall bring the vehicle to a complete stop from a speed of 20 mph (32 km/hr) within 30 feet (9 M), measured from the point of brake application (to a tolerance of two (2) feet shall be acceptable). The service brakes shall hold the vehicle at GVW on a dry hard surface, 60% grade pointing either uphill or downhill.

b. Mission VI Vehicles. The PLST variants' service brakes, under all conditions of loading shall stop within the distances specified by the FMVSS appropriate for the type of braking system used.

3.10.17.2 Parking brakes. The vehicle parking brake shall be capable of holding the chassis motionless in either direction on the grades and payloads specified in Table III, with the engine off and the transmission in neutral. An indicator light shall be provided to alert the crew when the parking brake is engaged (objective).

### 3.10.17.3 Emergency brakes.

a. Mission I, II, III, IV, VA and VC Vehicles (objective), Mission VB Vehicles (threshold). The emergency brake system, in the event of a single point failure in the service brake system, shall stop the truck at GVW on a 30% grade. The vehicle at GVW, on dry level primary roads, shall be capable of stopping within 170 feet (52 M) (measured at point of brake application) while traveling at least 30 mph (48 km/hr) and within 530 feet (162 M) while traveling at least 55 mph (90 km/hr). Emergency brakes shall activate after both the visual and audible low air pressure warnings have activated. Emergency braking shall include a means of stopping the vehicle in the event that any loss of air pressure occurs as a result of trailer breakaway. Emergency braking requirements shall be met without the use of the retarder.

b. Mission VI Vehicle. The PLST variants' emergency braking system shall activate when the air supply from the prime mover ceases and shall apply the emergency brakes. The brakes when applied shall hold the PLST variants (at GVW) while on a 30% grade.

3.10.18 Mobility. The vehicles shall be capable of operating over primary (see 6.3.14) and secondary (see 6.3.19) roads, trails (see 6.3.22) and rough trails (see 6.3.18) for the mobility level stated herein, under the varied environmental conditions specified. The mobility characteristics shall equal or exceed those quantified by the NATO Reference Mobility Model (NRMM) in the following paragraphs.

### 3.10.18.1 Minimum mobility rating speeds (mph)

Mission IA and II Vehicles (threshold); Mission VA, VC Vehicles (objective)

WEST GERMANY

MID-EAST

	DRY	WET	SNOW	DRY	WET	SAND
Tactical High	8	7	7	9	8	1
Tactical Standard	13	12	10	13	13	2.5
Tactical Support	18.5	17.5	13.5	17	16	15

Mission IV (with Patriot XM860 semitrailer only).

	WEST GERMANY			MID-EAST		
	DRY	WET	SNOW	DRY	WET	SAND
Tactical High	7	2.5	1.5	8	3	0.5
Tactical Standard	12	6.5	3.5	12	3	1
Tactical Support	17	16	4.5	15.5	14	14

Mission VB2 Vehicles

	WEST GERMANY			MID-EAST		
	DRY	WET	SNOW	DRY	WET	SAND
Truck W/MHC						
TACTICAL STD	14	3	11	14	14	<b><u>14</u></b>
Vehicle W/MHC						
at GCW	13	1	5	13	8	0.5

3.10.18.2 Maximum percent NO-GO.

Mission IA and II Vehicles (threshold); Mission VA, VC Vehicles (objective)

	WEST GERMANY			MID-EAST		
	DRY	WET	SNOW	DRY	WET	SAND
	9	9	9	10	10	12

Mission IVA1 Vehicles

	WEST GERMANY	MID-EAST
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DRY	WET	SNOW	DRY	WET	SAND
9.0	14.0	19.0	3.0	7.5	28

Mission VB2 Vehicles

	WEST GERMANY			MID-EAST		
	DRY	WET	SNOW	DRY	WET	SAND
Truck W/MHC	6	34	15	5	5	14
<u>Vehicle W/MHC</u>						
<u>at GCW</u>	14	68	23	5	10	28

3.10.18.3 Vehicle Cone Index (VCI). The single pass VCI1 (fine grained) shall not exceed:

a) 36-39 for the Mission VB2 Vehicles w/MHC and 34-37 for the Mission VB1 Vehicles w/o MHC, and 50 for the Mission VB1 Vehicles at GCW, w/o MHC.

b) 29 for Mission II Vehicles (threshold) (objective - Mission I, III, IV, VA and VC Vehicles.

c) 38 for Mission IV Vehicles w/M860 patriot semitrailer.

3.10.18.4 Ride Quality

3.10.18.4.1 Ride Quality (objective – Mission I, II, III, IV, VA and VC Vehicles). Vehicles at GVW shall attain no more than 6 watts average vertical absorbed power at all seating locations within the cab while negotiating a 0.7 inch (18 millimeter (mm)) Root Mean Square (RMS) course at speeds up to 17 mph (27 km/hr) and a 1.5 inch (38 mm) RMS course at speeds up to 12 mph (19 km/hr) with the tires at normal cross-country inflation pressure. The vehicles shall show no more than 2.5 g acceleration at the driver's station while negotiating half round obstacles of 8 inch (203 mm) height at a speed of at least 12 mph (19 km/hr). Whole body vibration shall meet the applicable frequency range to limit motion sickness, health comfort and perception (reference MIL-STD-1472 for guidance).

3.10.18.4.2 Ride Quality Mission VB Vehicles

3.10.18.4.2.1 Threshold. The vehicle shall attain no more than 6 watts average vertical absorbed power at the driver's or passenger's station at the following speeds, on terrain at the stated inches (in.) root mean square (RMS) elevations at gross vehicle weight or vehicle curb weight and with the tires at normal cross country inflation pressure: 24 MPH at 0.78 in. RMS, 18 MPH at 1.2 in. RMS, and 17 MPH at 1.5 in. RMS. The vehicle shall attain no more than 2.5g

vertical peak acceleration at the driver's station at 12 MPH over an 8-inch half round obstacle at gross vehicle weight with the tires at normal cross country inflation pressure.

3.10.18.4.2.2 Objective. The vehicle shall attain no more than 6 watts average vertical absorbed power at the driver's or passenger's station at greater than the following speeds, on terrain at the stated inches RMS elevations at gross vehicle weight or vehicle curb weight and with the tires at normal cross country inflation pressure: 24 MPH at 0.78 in. RMS, 18 MPH at 1.2 in. RMS, and 17 MPH at 1.5 in. RMS. The vehicle shall attain no more than 2.5g vertical peak acceleration at the driver's station at greater than 12 MPH over an 8-inch half round obstacle, at gross vehicle weight with the tires at normal cross country inflation pressure. Acceleration levels measured at the truck and/or trailer payload positions should not exceed levels specified in MIL-STD-810.

3.10.19 Reliability, Maintainability, and Durability (RM&D). Vehicles shall exhibit the reliability, maintainability and durability characteristics as specified herein, while operating on the terrain specified in Table VI, and when evaluated to the HEMTT and PLS Failure Definition Scoring Criteria (FDSC) (Appendices C, D and E). Conformance of RM&D requirements shall be verified by Government conducted technical and production tests. The Government shall unilaterally determine conformance of RM&D by scoring failure incidents and severity classification on each system using the HEMTT and PLS Family Failure Definition Scoring Criteria (FDSC).

3.10.19.1 Reliability. To determine conformance to the reliability requirements, reliability requirements shall be demonstrated at the paragraph specified point estimate (threshold) (80% confidence level - objective). Reliability shall be computed by dividing the total operating hour/mile by the total number of the appropriate failure category from the FDSC (Appendices C, D and E).

3.10.19.1.1 Mission I, II, III, IV, VA and VC Vehicles. Exclusive of the MHC and fuel loading/dispensing system, the vehicle shall meet or exceed the reliability requirement of 1500 Mean Miles Between Hardware Mission Failure (MMBHMF) (threshold) (2900 MMBHMF – objective).

3.10.19.1.1.1 Ancillary tanker equipment reliability. The tanker installed system, together with those auxiliary vehicle components which are required for its operation, shall meet or exceed the reliability requirement of 75 hours MTBHMF (threshold) (160 hours MTBHMF – objective).

3.10.19.1.1.2 Ancillary cargo equipment reliability. The vehicle installed material handling crane, together with those auxiliary vehicle components which are required for its operation, shall meet or exceed the reliability requirement of 75 hours MTBHMF (threshold) (200 hours MTBHMF – objective).

3.10.19.1.1.3 Ancillary wrecker equipment reliability. The MHC shall meet or exceed of the reliability requirement of 100 hours MTBHMF (threshold) (200 hours MTBHMF – objective). The truck installed vehicle recovery system, along with its associated subsystems

shall meet or exceed the reliability requirement of 125 hours MTBHMF (threshold) (250 hours MTBHMF – objective).

3.10.19.1.1.4 Ancillary CBT equipment reliability. The CBT LHS shall meet or exceed acceptance criteria based on a test value of 81 Mean Missions Between Failures (MMBF). A mission consists of 20 miles of transporting distance and one launch/retrieval cycle. The 20 mile transporting distance consists of the following scenario: 12 miles of primary roads, 6 miles of secondary roads and 2 miles of cross country terrain. The reliability shall meet or exceed 81 missions between failures.

3.10.19.1.2 Mission VB and VI Vehicles. The vehicle shall meet or exceed the reliability requirements of 2250 MMBHMF (threshold) (3200 MMBHMF – objective) for the truck, 2280 MMBHMF (threshold) (7100 MMBHMF – objective) for the trailer.

3.10.19.1.2.1 Material Handling Crane (MHC) reliability. The MHC shall meet or exceed the reliability requirement of 195 hours MTBHMF (threshold) (320 hours MTBHMF – objective).

3.10.19.2 Maintainability. To determine conformance to maintainability requirements, the Maintainability Ratio (MR) shall be calculated using the total chargeable scheduled and unscheduled maintenance man-hours divided by the total number operating mile/hour.

3.10.19.2.1 Maintenance ratio (MR). The Maintenance Ratio (MR) in terms of Maintenance Man-Hours per Operating Mile (MMH/OM) for the basic chassis and Maintenance Man-Hours per Operating Hour (MMH/OH) for the ancillary equipment shall be demonstrated on a basic chassis operating for a total test time of 20,000 miles plus a composite engine idle time necessary to operate the various ancillary equipment. All scheduled and unscheduled maintenance man-hours, excluding operator/crew checks and services, shall be included in this ratio.

3.10.19.2.2 Preventive Maintenance Checks and Services (PMCS) (objective). Preventive maintenance shall not exceed 10 minutes for before-operations checks, 10 minutes for after-operations checks, and 30 minutes for weekly PMCS. Replacement of components and modules and all repairs shall occur at the lowest possible level of maintenance, but should not increase the crew's responsibility.

3.10.19.2.3. Mission I, II, III, IV, VA and VC Vehicles. All type vehicles of this family shall be designed so that the following can be removed from the vehicle and replaced in less than four hours by a 4-man crew.

- a. Transfer Case

All type vehicles of this family shall be designed so that each of the following can be removed from the vehicle and replaced in under four and one-half hours by a 4-man crew.

- b. Engine (only)

- c. Transmission (only)
- d. Engine – Transmission Assembly

The four hour criteria include all preparation, i.e., hood removal, tilting the cab or draining fluids, etc. Routing, daily maintenance checks, i.e., engine oil, coolant level, battery liquid level, etc., must be readily accessible without the use of tools. Pre-operation fluid level checks shall not take longer than 5 minutes. Components of the chassis shall be accessible for servicing, repair, and replacement. Ease of maintenance provisions shall incorporate features insuring operating clearances and facilitating maintenance and service operations.

3.10.19.2.3.1 Vehicle Maintainability. The MR for the basic chassis shall not exceed 0.010 MMH/OM at organizational level, 0.002 MMH/OM at GS/DS level, for a total of 0.012 MMH/OM (objective). The MR for the basic chassis shall not exceed a total of 0.23 MMH/OM (threshold).

3.10.19.2.3.1.1 Ancillary tanker equipment maintainability. The tanker installed system, together with those auxiliary vehicle components which are required for its operation, shall not exceed 0.006 MMH/OH at organizational level, 0.004 MMH/OH at DS/GS level, for a total of 0.010 MMH/OH (objective). The tanker installed system, together with those auxiliary vehicle components which are required for its operation, shall not exceed a total of 0.09 MMH/OM (threshold).

3.10.19.2.3.1.2 Ancillary cargo equipment maintainability. The MR for Material Handling Crane shall not exceed 0.017 MMH/OH at organizational level, 0.011 MMH/OH at DS/GS level, for a total of 0.028 MMH/OH (objective). The MR for the Material Handling Crane shall not exceed a total of 0.13 MMH/OM (threshold).

3.10.19.2.3.1.3 Ancillary tractor equipment maintainability. The tractor variant and its unique subsystems shall meet or exceed the maintainability standards of the basic configuration (See 3.10.19.2.3.1).

3.10.19.2.3.1.4 Ancillary wrecker equipment maintainability. The MR for the MHC shall not exceed 0.020 MMH/OH at organizational level, 0.012 MMH/OH at DS/GS level, for a total of 0.032 MMH/OH (objective). The MR for the MHC shall not exceed a total of 0.075 MMH/OM (threshold). The MR for the truck installed vehicle recovery system, along with its associated subsystems shall not exceed 0.004 MMH/OH at organizational level, 0.003 MMH/OH at DS/GS level, for a total of 0.007 MMH/OH (objective). The MR for the truck installed vehicle recovery system, along with its associated subsystems shall not exceed a total of 0.062 MMH/OM (threshold).

3.10.19.2.3.1.5 Ancillary CBT equipment maintainability. The CBT LHS shall have a maintenance ratio not more than 0.145 Maintenance Man-Hours per Mission (MMH/M) per launch cycle.

3.10.19.2.4. Mission VB Vehicles. The vehicle shall be designed so that the transfer case and the axle assembly, can each be completely removed and replaced within 8 man hours,

utilizing authorized tools and equipment. The truck shall also be designed so that the engine and transmission can each be completely removed and replaced within 13 man-hours utilizing authorized tools and equipment.

3.10.19.2.4.1 Vehicle maintainability. The MR for the truck shall not exceed 0.011 MMH/OM at organizational level, 0.002 MMH/OM at DS/GS level, for a total of 0.013 MMH/OM (threshold), and the MR for the trailer shall not exceed 0.0019 at organizational level, 0.0001 MMH/OH at DS/GS level, for a total of 0.002 MMH/OM (objective). The MR for the trailer shall not exceed a total of 0.004 MMH/OM (threshold).

3.10.19.2.4.1.1 MHC maintainability. The MR for the MHC shall not exceed 0.034 MMH/OH at organizational level, 0.021 MMH/OH at DS/GS level, for a total of 0.055 MMH/OH (objective). The MR for the MHC shall not exceed a total of 0.83 MMH/OM (threshold).

3.10.19.3 Durability for Mission I, II, III, IV, VA and VC Vehicles.

3.10.19.3.1 The vehicle shall not have less than a 60% probability of completing the first 32,000 kilometers (20,000 miles) of operation without overhaul, rebuild, or replacement of any of the following components.

1. Engine
2. Transmission
3. Transfer Case
4. Axles

3.10.19.3.2 The vehicle shall not have less than a 90% probability of completing the first 32,000 kilometers (20,000 miles) of operation without cracking or permanent deformation of the frame and major supporting members.

3.10.19.3.3 The CBT LHS with Bridge Adapter Pallet (BAP) shall be capable of achieving 1380 launch/retrieval cycles without a durability failure.

3.10.20 Electromagnetic emissions and High Altitude Electromagnetic Pulse (HAEMP).

3.10.20.1 All Mission Variants (objective). The electromagnetic interference emission (EMI) and susceptibility characteristics of the vehicle shall conform to MIL-STD-461E and MIL-STD-464A. The electronics of the truck, excluding the chassis, shall also be in accordance with MIL-STD-1275.

3.10.20.2 Mission I, II, III, IV, VA and VC Vehicles (threshold). All vehicle types shall comply with the requirements for Class C1 equipment and systems as per MIL-STD-461B steady state radiated emissions over a frequency range of 30 to 75.95 MHz and tested in accordance with MIL-STD-462 Interim Notice 4.

3.10.20.3 Mission VB and VI Vehicles (threshold). The vehicle shall conform to electromagnetic emissions/interference (EME/EMI) characteristic levels for classes A3 and C1, parts 4 & 8 as specified in MIL-STD-461C and tested in accordance with MIL-STD-462 Interim Notice 5. The vehicle at GCW shall be fully operable within the allotted downtimes as specified in figures A10, A11 and Table A3 of QSTAG 244 edition 3.

3.10.21 Nuclear, Biological, and Chemical (NBC) Warfare for Mission I, II, III, IV, VA and VC Vehicles (objective). The systems shall be designed and constructed to survive the set of nuclear effect levels that are stated in the PATRIOT requirements document and perform all mission essential functions.

3.11 Components. Components shall allow easy servicing utilizing common tools available at the operator/field level. All reservoirs, filters, drains, vents and valves shall be easily accessible and identified for inspection and servicing. Drain plugs installed in engine, transmission, transfer case, axles, and hydraulic reservoir shall be of the permanent magnet type and readily accessible. The function of all drains, vents and valve openings shall not adversely affect the function of or damage to any other vehicle component (i.e. battery box) (objective). Provisions shall be in place to prevent draining fluids from contacting other components of the vehicle. All seals shall restrict the entrance of all foreign materials and prevent the leaking of lubricants. At a minimum, the engine, transmission, antilock brake system and Central Tire Inflation System (applicable to Mission VB Vehicles) shall be electronically controlled. All lines and fittings shall be secured in such a manner to prevent rubbing on adjacent lines or vehicle appendages. The variants shall be equipped with all items necessary to accomplish all mission objectives and tasks. The variants shall have mounting and stowage provisions for all Basic Issue Items (BII) (reference Appendices F, G, and H).

3.11.1 Components and vehicle ratings. Vehicle/trailer ratings shall be manufacturer's current published ratings for on/off road operating conditions as applicable to the vehicle/trailer type. Component and vehicular ratings shall not be raised to meet the requirements of the specification. When published ratings are not available, component manufacturer's verification of rating must be submitted to the Engineering Office of the Procuring Activity. Maximum axle loads allowed by all State and NATO countries shall be complied within relation to load distribution, front to rear axles (except for Wrecker with lifted/towed vehicle) (see 3.10.1).

#### 3.11.2 Engine.

3.11.2.1 Engine cooling system. The cooling system shall meet the requirements of SAE J1436 except for the following:

- a. A completely drained system shall fill with cold water at a minimum of 3 gpm with hose until filler neck overflows.
- b. The system shall be able to have a minimum of 10% of its volume drawn off before aeration is seen in the engine outlet sight glass.

Inspection of fluid fill levels shall be accomplished without removal of caps from coolers or

surge tanks. A cooling system shall be furnished capable of maintaining engine and transmission operating temperatures within the specified limits while operating continuously under full load at a 0.55 Tractive Effort to Gross Vehicle Weight ratio (TE/GVW) for Mission VB Vehicles and 0.6 TE/GVW for Mission I, II, III, IVA1, VA and VC Vehicles under the maximum conditions of 120 degrees F (49 degrees C) and the cooling system shall be capable of not exceeding temperature limits while operating at rated engine power. Mission IVA2 vehicles shall have the same cooling capacity as Mission IVA1 vehicles. The radiator shall be guarded against thrown stones and damage by contact with vegetation.

3.11.2.1.1 Fan clutch. If a fan clutch is used, a positive lockup shall be provided in case of a clutch or a control system failure.

#### 3.11.2.2 Reserved

3.11.2.3 Engine speed control. Tamper resistant means shall be provided to limit the maximum engine speed to the engine manufacturer's maximum recommended operating speed. The accelerator control system shall conform to FMVSS 571.124.

3.11.2.4 Air cleaner. The vehicle shall incorporate an air cleaner that complies with the requirements of MIL-PRF-62048, Air cleaner, automotive, heavy duty dry type, except that the cleaner shall provide a minimum dust capacity sufficient for a 60 hour service life minimum, without removal and cleaning. The induction air ducts shall not require disassembly for normal vehicle maintenance or element servicing. Air cleaner restriction indicator, visible from the driver's seat, shall be provided. The restriction indicator shall retain and display the highest restriction level attained during vehicle operation. The indicator shall be resettable from inside the cab and shall retain the reading after the engine is shut off.

3.11.2.5 Retarder. A retarder with modulated driver control shall be provided which develops at least 70% of the rated horsepower output of the engine as measured at the wheels.

3.11.3 Electrical system. Electrical system shall be in accordance with Federal Motor Carrier Safety Regulations 393.27 through 393.33. Variants shall be equipped with a 24 VDC electrical system with either a 12 VDC lighting system or a 24 VDC lighting system. Electrical systems shall be waterproof in accordance with Appendix A with the exception of components and connections inside the cab or other enclosures. Circuits and components shall be protected from corrosion by the use of corrosion resisting materials or by the application of corrosion resisting compound that is readily removable for maintenance (objective). The 24 VDC electrical circuits shall conform to the limits prescribed in MIL-STD-1275. Reverse polarity and over-voltage protection shall be incorporated into all electrical systems. All manual circuit breakers shall be readily accessible to facilitate manual resetting. Circuits shall be identified with the contractor's code for electrical wiring and electrical components. Manually operated, keyless ignition switches with "off", "on" and "start" positions shall be provided. Step-down converters on Mission VB variants shall be utilized to supply 12 VDC to accessories, UPIK and PLST variants.

3.11.3.1 Electrical accessories (objective). Provisions to mount 2 additional circuit

breakers shall be provided on each bus, in addition to those items suggested by paragraph 3.11.20. A minimum of one dedicated Meals Ready to Eat MRE/Water Heater outlet, and a minimum of 3 convenience outlets (12/24v including on/off switch) shall be provided as a power source for portable electrical equipment. The MRE/Water Heater shall be mounted in a location to discourage use during vehicle movement. A grounding circuit shall be autonomous and separate from the chassis.

3.11.3.2 Alternator. The vehicle shall be equipped with a 24 volt DC, 240 amp minimum, alternator capable of providing enough current to operate all Original Equipment Manufacturer (OEM) components on the vehicle while the engine is idling. The regulator shall be temperature compensated.

3.11.3.3 Lighting. All clearance lights, marker lights, and military composite lights shall be LED. All interior lighting shall be LED. The vehicle exterior and interior lights shall be protected to preclude any damage when interfacing with other vehicles or ancillary equipment and shall be protected from terrain and natural obstacles while traveling cross country. The vehicle shall be equipped with lamps, reflective devices, and associated equipment as specified per FMVSS 571.108. Actuation of the brakes shall override the vehicle hazard lights. All indicators and gauges shall be illuminated in service mode. PLST variants' lighting shall be configured to meet all referenced requirements when the PLST is loaded or unloaded.

3.11.3.4 Headlights. Headlights shall be LED with the headlight height requirements in FMVSS 571.108 not applicable. Headlights shall meet DOT illumination requirements and conform to the requirements of drawing 13013615.

3.11.3.5 Work lamps. Mission Vehicles shall be equipped with a minimum of 2 permanently mounted work lamps (threshold - Mission III and IV Vehicles; objective – Mission I, II and V Vehicles) to facilitate night operation and maintenance and meet the requirements below:

a. Lamp housing shall be mounted in a protected position and such that the lamps are aimed at areas around the rear and sides of the vehicle.

b. The work lamps shall not be less than 4 inches in diameter and a minimum of 1,500 candlepower (c.p.) and be provided with an individual on/off switch plus a master switch in the vehicle cab accessible to the driver.

c. An on/off switch accessible from the driver's position shall be furnished and operate individually from the light itself.

Mission III and IV Vehicles shall have 2 additional work lamps (threshold) that shall be demountable and provide the capability to permit hand illumination of the truck pintle area and 20 ft. beyond.

3.11.3.6 Convoy warning lights. There shall be provisions for readily mounting and connecting a commercial, yellow strobe type warning light on the vehicle. The strobe light shall



have a light intensity equal to or greater than warning light A-A-52418. The warning light shall be visible for 360 degrees and shall not be capable of being activated during the blackout mode (threshold – Mission III and VB Vehicles, objective – Mission I, II, IV, VA and VC Vehicles).

3.11.3.7 Secure lighting. A 24 VDC blackout lighting system shall be furnished. The blackout system shall be controlled by an interior switch, readily accessible to the driver, which shall prevent accidental disengagement of the blackout system from the blackout mode and shall automatically disengage all lights and devices required by paragraph 3.11.3.3, 3.11.3.4, 3.11.3.5, 3.11.3.6, the electric horn (see 3.11.3.11) and backup alarm (see 3.11.3.18). Exterior blackout lighting shall consist of, either separately mounted or in a composite light assembly, one LED blackout drive lamp (reference part number 07320, CAGE 13548, NSN 6220-01-496-1925), and two rear mounted blackout stop lamp assemblies (reference 12360870). Interior blackout lighting shall be as required for safe operation of the vehicle and compatible with night vision devices (i.e. night goggles) in use at time of fielding. The emission of any vehicle interior or exterior light source which may be illuminated (including warning lights) in the blackout mode, shall be limited to the visible spectrum (380 to 700 nanometers No energy shall be emitted in the 700 to 1200 nanometer portion of the electromagnetic (EM) spectrum. (Emission peaks shall not exceed 1% relative to the peak emission in the visible spectrum.) Colored warning lights shall be maintained as necessary while meeting the above requirements.

3.11.3.8 Reserved.

3.11.3.9 Wiring. All wiring shall be in accordance with SAE-J1292 and SAE-J163. Unless otherwise specified herein, wiring not protected from accidental contact with troops, terrain or vegetation shall be a minimum of 14 gauge. Vehicle junction boxes/connectors shall be furnished at multiple disconnect points.

3.11.3.10 Batteries. Batteries shall be IAW MS 52149. Batteries shall be readily accessible for service and shall be protected from the environment. Checking the battery electrolyte levels shall not require special tools. The battery carrier shall be insulated to prevent short circuiting during maintenance and operation. The battery carrier shall not be located in the cab or vented into the cab. Batteries should be as close to the starter as possible. MIL-PRF-32143 Valve Regulated Lead Acid Batteries may be used as part of an arctic kit.

3.11.3.11 Horn. The vehicle shall be equipped with a 12 or 24 volt electric horn which meets SAE J1105. The vehicle shall also be equipped with a 3.81 inch diameter, 2 bell air horn.

3.11.3.12 Electrical connectors. Waterproof, shelled connectors shall be utilized for all electrical connectors. All electrical connector bodies, pins and contacts shall be made of corrosion resistant material or shall be coated with a corrosion resistant material that is readily removable for maintenance. The vehicle shall be equipped with all connectors necessary to operate electrical components of towed military trailers. Connectors shall allow for disconnection and reconnection without damage. Intervehicle slaving connections will be accomplished through cable and plug assembly, Intervehicle Power Cable No. 11682336 (a sub-component of 11682379 – Kit, Intervehicle Power Cable). The slave receptacle shall be located so as to preclude damage, corrosion and contamination. The receptacle cover shall stay in place

under all mission scenarios. A 7-pin connector conforming to SAE J560 shall be located at the front and rear of the vehicle and shall be integrated with the 12 volt lighting system. A 12 pin NATO STANAG 4007 connector shall be located at the rear of the vehicle and shall be integrated into the blackout lighting system. The PLST variants shall be equipped with one waterproof NATO STANAG 4007 compliant 12- contact receptacle with cover and one waterproof SAE J560 compliant 7-contact receptacle with cover, installed at the front of the PLST. Cables of sufficient length to reach the towing vehicle without interference during operation and capable of connecting to a 7 & 12 pin connector shall be provided on the PLST variants.

3.11.3.12.1 PLST bridging light bar. PLST variants shall be equipped to accept the installation and operation of a bridging light bar.

3.11.3.13 Instruments/switches. The vehicle shall be equipped with gauges/indicators, which shall be readily visible to the driver and illuminated for night operation. Gauges may be replaced by an on board message center. Gauges/indicator shall include as a minimum, fuel level, engine coolant temperature, transmission fluid temperature, engine oil pressure, engine tachometer, speedometer/odometer, voltmeter, air pressure (air assist vehicle/trailer brakes), brake warning, park brake on-and air filter gauge and Power Take-Off (PTO) engagement light (applicable only if equipped with a clutched PTO). The speedometer shall be calibrated in both MPH and KPH. An odometer shall be provided to indicate mileage and kilometer. Warning lights shall be provided and shall include, engine temperature, headlight high beam, emergency brake engaged and an ABS error indicator. There shall be a warning light and an audible warning to indicate low air pressure, and high coolant temperature. The warning lights shall be capable of being activated while in the blackout mode, and shall meet the secure lighting requirements of 3.11.3.7. The audible warning indicators shall be inactive while in the blackout mode. There shall also be self canceling turn indicators, emergency flasher system, light switch which controls service lights, blackout lights, driving and instrument panel lights. Additional instrumentation/indicators requirements are referenced in 3.11.2.2 and 3.11.2.4. Gauges and switches shall be color coded on the face scale indicators to indicate information such as: desirable operating range in green; cautious, undesirable, or ineffective usage in yellow; dangerous or harmful operating level in red (objective). Lenses shall not discolor throughout the life of the vehicle. Two map lights with one located in each upper rear corner of the cab with individual switches shall be provided. These lights shall be overridden during blackout mode.

3.11.3.14 Master power cutoff switch. The vehicle shall be equipped with a master power cutoff switch that, when activated, disconnects power to all systems in the truck and towed trailer. The switch shall be capable of handling both 12 and 24-volt systems. Switch shall have a failsafe system that prevents damage from shutoff.

3.11.3.15 Reserve

3.11.3.16 Databus connectors (objective). The vehicle data bus(s) shall be defined by the subsystems employed (i.e. SAE J1708, J1939, J1850 or MIL-STD-1553). The connectors shall be standard 9-pin DDL type (Military connector 10). Databus-sensor connections shall interface with the engine, transmission, antilock brake system, Central Tire Inflation System and

as many other electronic subsystems as possible. A sensor suite shall be installed on the vehicle, which shall, at a minimum, monitor hydraulic, pneumatic, and electrical systems in order to provide prognostic and diagnostic capability.

#### 3.11.3.17 Diagnostic tools.

3.11.3.17.1 Diagnostic Connector Assembly (DCA) (threshold). The vehicle shall be provided with direct and unrestricted access to a DCA for Simplified Test Equipment/Internal Combustion Engine Reprogrammable (STE/ICE-R) IAW ATPD 2205 and CR 82-588-003. The Diagnostic Connector, TACOM dwg 12258941, on the vehicle shall interface with the STE/ICE-R Test Equipment. The DCA shall have the capability to perform the measurements listed in Table II of ATPD 2205. Sufficient sizes and quantities of transducers shall be provided to support diagnosis of the vehicle IAW Table 3-1, (except for electrolyte sensor) of CR 82-588-003. For Mission VB Vehicles, a fuel shut-off method shall be provided for running compression unbalance tests and Built in Test Equipment (BITE) shall be provided. BITE shall include an in-cab read-out diagnostic display (stop engine and check engine lights) and the capability to flash out diagnostic codes that uniquely identify detected faults. Data bus communications for electronic controlled drivetrain components shall be IAW SAE J1587 and SAE J1708.

3.11.3.17.2 Diagnostic tools (objective). Diagnostic tools shall be available which allows for complete diagnostic review of all vehicle systems through databus connections. The vehicle shall have embedded diagnostics capable of identifying system failures and isolating to the failed component 90% of the time. These identified failures shall be passed into the Integrated Electronic Technical Manual (IETM) that shall be developed using the TACOM-owned Electronic Maintenance System (EMS) Software, provided as Government Furnished Information (GFI). These failure modes shall be identified on a within-the-cab display that can also be read through an external source (system shall have a standard computer bus that shall allow connection with another computer to transfer this data or attachable RF limit. The manufacturer shall provide all standard proprietary data, data descriptions and program/fault codes necessary to communicate with the electronic control modules and to maintain the electronically controlled modules and to maintain the electronically controlled subsystems. The test/maintenance equipment connectors and circuits to all data buses shall be compatible with current standard test equipment (i.e. Soldier Portable On-system Repair Tool (SPORT)). Diagnostic assembly shall be capable of interfacing with (both hardware and software) either Movement Tracking System (MTS) or Force XXI Battle Command Brigade and Below (FBCB2) (see 3.11.20.1, 3.11.20.2).

3.11.3.18 Backup alarm. A backup alarm shall be installed on the vehicle in accordance with SAE J994 requirements. The backup alarm shall be disabled in blackout mode.

3.11.4 Fuel system. Fuel system shall conform to FMCSR 393.65 and 393.67. Fuel lines shall be routed and/or protected to preclude foreign object contact during operation.

3.11.4.1 Fuel tanks. All vehicle types shall be equipped with corrosion resistant fuel tank(s) of sufficient volume to satisfy the vehicle range requirement of paragraph 3.10.8. When more than one fuel tank is furnished, means shall be provided to assure equalized level and draw

in the tanks. Internally carried fuel includes all fuel tanks at no more than 95% full with 5% allowed for ullage. If two or more tanks are provided, a manual shut-off valve shall be furnished with each tank. Fuel tank(s) shall be provided with minimum 3-inch diameter, safety-type tank filler cap or caps. Filler caps shall be located to preclude mud build up and captive chained to filler neck. Removable strainers and drain plug(s) are required. A sealed filler cap and vent is required for each tank for fording requirements. The fuel tank/line venting system shall not be combined or inter-connected with any other vent system. Fuel tank fill ports shall be capable of receiving fuel-dispensing nozzles of a minimum of 2 inches (50.3 mm) in diameter.

3.11.4.2 Fuel/water separator. All vehicles shall be equipped with fuel water separators having heating elements and drain provisions. A shield shall be provided which surrounds the fuel/water separator bowl to prevent damage from thrown stones or personnel operating near the fuel/water separator. The shield shall not impair visibility of the fluid level in the bowl or accessibility to the drain.

3.11.5 Exhaust system. The exhaust system shall conform to FMCSR 393.83. The exhaust system as installed shall be gas tight and leakproof to prevent the accumulation of exhaust gas in the occupied areas in accordance with best commercial practice. The exhaust pipe(s) shall be configured to prevent entry of water when vehicle is not operating. Exhaust mufflers and exhaust pipes shall be corrosion resistant and shall be furnished with adequate guards/shielding to prevent personnel contact.

3.11.5.1 Toxic gas exposure. Concentrations of Carbon Monoxide (CO) in the cab or at any operator's station/position shall not exceed 50 parts per million under any operating condition. Nitrogen dioxide, ammonia, nitric oxide sulfur dioxide, ether and other harmful gases generated, shall be limited to concentrations not to exceed those specified in OSHA, Title 29 CFR, Part 1910.1000.

### 3.11.6 Gear Train.

3.11.6.1 Transmission. The transmission shall be an automatic and shall have a gear range capable of meeting the performance specification as stated herein. The main transmission, shall include the following:

- a. A downshift inhibitor system that prevents driver shift control action from overspeeding or damaging engine, transmission, or drive train components.
- b. Starter Interlock. The engine starter shall be inoperative when the transmission shift lever is in a forward or reverse drive position.
- c. A means to manually select and identify the gear range (see 3.11.18).
- d. A neutral interlock shall be provided which shall allow the truck to start only in neutral

3.11.6.2 Transfer case. The transfer case shall be installed which has the ability to provide all-wheel drive. A multi-speed transfer case, if used, shall provide a low range speed

capability of at least 20 mph (32 kmh).

3.11.6.3 Power Take-Off (PTO) openings. PTO openings shall be provided and shall be driven at engine speed, independent of transmission operation. On Mission IV Vehicles one of the PTO locations shall be of sufficient capacity to deliver a minimum of 100 hp (150 hp objective) while the vehicle is in motion.

3.11.6.4 Steering. Power steering shall be furnished and have full limit steer when the vehicle is stationary while at GCW. In the event power assist is lost, the system shall be manually steerable and capable of being brought to a safe stop. The steering wheel shall be capable of being locked with a standard padlock A-A-59487 (Part Identification Number AA59487-1BC).

3.11.7 External, MHC or LHS hydraulics. The hydraulic system, if used, shall have provisions for operating a crane and/or other hydraulic equipment external to the vehicle and include such provisions for future use. Removable caps or plugs shall be installed at the points of attachment of the external hydraulic system to prevent dirt or other foreign objects from contaminating the system.

3.11.7.1 Hydraulic reservoir. Vehicle shall have a hydraulic reservoir of sufficient capacity to operate vehicle systems and auxiliary equipment for all mission types. Reservoir shall be provided with at least the following:

a. Filter(s) shall be readily accessible for cleaning or replacement without draining the reservoir in all hydraulic circuits. Bypasses shall be furnished where necessary to protect filters during cold temperature operation.

b. Baffles to preclude foaming.

c. Dip stick, sight gage (which provides marking for full cold only), and pressure vented type filler cap of no less than 5 psi.

d. Access size to allow manual cleaning of the reservoir.

e. Reserved.

f. Hydraulic system cooler (threshold – Mission VB Vehicles; objective Mission I, II, III, IV, VA and VC Vehicles).

3.11.7.2 Hydraulic hoses and fittings. High pressure hoses and fittings shall conform to the requirements of SAE J516, SAE J517 and SAE J343.

3.11.8 Axles and suspension.

3.11.8.1 Axle lubrication. All axles shall be properly vented and equipped with lubricated wheel bearings and seals adequate to meet fording requirements (see 3.10.15).

### 3.11.8.2 Suspension.

a. Mission I, II, III, IV, VA and VC Vehicles shall limit the vertical natural frequency of the sprung mass to a maximum of 2 Hz at GVW. The suspension will be air ride which is compatible with the current axles and can be incorporated during a vehicle remanufacture process.

b. The suspension design of Mission VB Vehicles shall limit the vertical natural frequency of the sprung mass to a maximum of 1.6 Hertz (Hz) at GVW and 2.2 Hz at VCW.

3.11.9 Rims and tires. Rims and tires shall meet the requirements of SAE J1992 and conform to FMVSS 571.119 and 571.120. Vehicle and trailer tires shall be a tubeless radial design with bolt-together rims and beadlock.

All tire and rim ratings shall conform to the Tire and Rim Association (TRA) 1 or the European Tire and Rim Technical Organization (ETRTO) Standards Manual for the maximum GCW and maximum speed of the vehicle. The vehicle shall have tires with tread design that maximizes off-road mobility but maintains safe on-road handling. All wheel assemblies shall be interchangeable across all vehicle/trailer types (objective). Tires shall have a minimum tread life of 10,000 miles (threshold, except for Mission III Vehicles (objective)), 18,000-mi. (28,968-km) (objective).

3.11.9.1 Spare tire and wheel assembly. A spare wheel and tire assembly meeting requirements of 3.11.9 shall be provided on each variant. For Mission I through VI Vehicles, a mechanical assist device shall be provided which shall permit dismounting and restowing of the spare assembly by no more than two soldiers. All vehicles shall be equipped with sufficient tools and equipment, including jack, to facilitate tire/wheel removal on the system on both hard and soft surfaces within 30 minutes by no more than two soldiers. On level, hard ground the one jack shall be used to lift the variants from a flat tire height to a height necessary to install a fully inflated tire without the need for a second jack.

### 3.11.9.3 Reserved.

3.11.9.3 Wheel splash and stone throw protection. Splash shields (quarter fenders) ahead of the rear wheels and quick-change anti-sail flexible mud flaps shall be installed to the rear of the rear wheels in accordance with normal commercial practice. Mud flap installations at rear wheels, shall conform to the rear wheel splash and stone throw protection provisions of SAE J682. Mud flaps on the tractor shall be mounted to react passively without damage to flaps or semitrailer in turning and backing situation without operator intervention, and shall also be removable using only on-board hand tools.

3.11.9.4 Tire chains. All variants shall have sufficient clearance in accordance with SAE J683 to allow the safe operation of the variants with standard military tire chains (A-A-52507) mounted on both tires of each non-steering axle and any combination of one or more non-steering axles.

3.11.9.5 Limp home capability (threshold - Mission I, II, III, IV, VA and VC Vehicles; objective – Mission VB and VI Vehicles). A means of raising one wheel off the ground using a developed system of chains and/or cable and hooks shall be provided for each vehicle. Storage space shall be provided. This capability shall be for emergency operation only in case of wheel bearing failure, damaged wheel, inability to change wheel/tire, etc.

3.11.9.6 Central tire inflation system (CTIS). A CTIS shall be provided on Mission VB Vehicles as specified herein.

3.11.9.6.1 Tire pressure control. The system shall allow the driver to adjust all truck tires to any one of four preset tire pressures (highway, cross country, mud/snow/sand, emergency). The system control shall be located so that the system may be activated while the driver continues to operate the Mission VB Vehicle.

3.11.9.6.2 Spare tire. The spare tire shall be equipped with all CTIS provisions, which allows for immediate installation.

3.11.9.6.3 Manual tire inflation/deflation. The system shall provide for the isolation of any or all tires from the CTIS in the event of CTIS failure for any reason. Valves for manual inflation shall be readily accessible and compatible with the standard on-board inflation system.

3.11.9.6.4 Air-priority system. The CTIS shall incorporate sufficient safeguards to assure that air pressure necessary to continue safe operation of the Mission VB System shall be available at all times during activation of CTIS or in the event of a CTIS failure. Use of brakes is the minimum requirement for safe operation.

3.11.9.6.5 Speed/pressure control warning. The CTIS shall include sensing of the Mission VB Vehicle speed and comparing indicated speed to the maximum allowable speed for each control setting. In the event that the vehicle average speed exceeds maximum allowable speed for that setting for a period of more than one minute, a panel mounted light shall activate to warn the driver of this condition until the system has automatically inflated to the appropriate pressure.

3.11.9.6.6 Maintenance of tire pressure. With the CTIS in operation, tire pressure shall be checked and adjusted at intervals necessary to assure that no more than 3 psi variation exists between selected pressure and actual pressure except during the inflation/deflation operation caused by the selection of a new tire pressure. With the CTIS not in operation and the Mission VB Vehicle engine not running after 24 hours, the tire pressure shall not drop below 97% of the pressure setting which existed before the vehicle was stopped. No action shall be required of crew personnel beyond normal shutdown to meet this requirement.

3.11.9.6.7 Time to inflation/deflation. The CTIS shall be capable of deflation within the time constraints as listed below, (minutes: seconds). Inflation times shall not exceed the lower of those which the tire manufacturer shall provide warranty for when the Mission VB Vehicle is traveling at the top speed of the next highest pressure setting during inflation, or the following:

Inflation

<u>From</u>	<u>To</u>	<u>Maximum Time Allowed</u>
Cross-country	Highway	12:30
Mud/Snow/Sand	Cross-country	5:30
Emergency	Mud/Snow/Sand	3:00

Deflation

Highway	Cross-country	4:00
Cross-country	Mud/Snow/Sand	4:00
Mud/Snow/Sand	Emergency	3:00

3.11.10 Brake configuration. Brakes shall conform to Federal Motor Vehicles Safety Standards (FMVSS) 571.121 and Federal Motor Carriers Safety Regulations (FMCSR) 393.40 through 393.42 (b), 393.43, and 393.45 through 393.52. All brakes shall be releasable from the cab in the tactical environment in the event of emergency lock-up per FMVSS 393.41.c. Brake apply cylinders/cams, associated lines and components shall be located to minimize exposure to "road hazards" or cause reduced ground clearance.

3.11.10.1 Split apply circuitry. Each circuit is protected from leaks elsewhere by check valves providing emergency stopping capability. No air shall be used directly from the "wet" tank except for the governor pressure signal. Air for all accessories shall be taken from one tap on either one of the apply circuit reservoirs and that tap will be provided with a shut off valve.

3.11.10.2 Trailer brake control system.

3.11.10.2.1 Semitrailer requirements for Mission IV Vehicles. A complete semitrailer brake control system shall be furnished that includes the following:

a. Two connecting air hoses adequate in length, equipped with coiled spring hose guards and "glad hand" quick connectors on trailer end of hoses. Hoses shall reach from the vehicle mounted pogo stick to the semitrailers specified in 3.12.5.4 and connect to the trailer brake system.

b. A wiring harness and connector to mate with the electrical system on the semitrailers specified in 3.12.5.4. The interface shall occur in the same location as the air brake line interface. The interface connector shall be in accordance with SAE J849, 12 pin, 24-volt plug and receptacle.

3.11.10.2.2 Trailer requirements for all Mission Vehicles. The requirements are the same as those for a semitrailer (see 3.11.10.2.1) except that the interface connections shall occur at the rear of the vehicle. The air line and electrical connectors shall be rigidly mounted in a protected location at the rear end of the vehicle frame but also located to facilitate the easy connection of



the mating lines/harness from the trailer.

3.11.10.3 Glad hands. Two glad hand type air line coupler conforming to SAE J318, figure 1 (service) and figure 2 (emergency), with captively retained dummy couplers at both the front and rear of the vehicles shall be provided to permit a towing vehicle to supply air to the reservoirs on the towed vehicle and to apply the towed vehicles brakes (PLS Trailer variants). Two glad hand type air line coupler conforming to SAE J318, figure 1 (service) and figure 2 (emergency), with captively retained dummy couplers at the front of the PLST variants shall also be provided. Glad hand identification shall be in accordance with SAE J318.

#### 3.11.10.4 Air compressor.

3.11.10.4.1 Mission I, II, III, IV, VA and VC Vehicles. An air dryer, hoses to and from the compressor, intake hose(s) and stowage tanks shall be required as a minimum for use with the air compressor.

3.11.10.4.2 Mission VB Vehicles. The brake system air compressor shall be 30 CFM minimum capacity on all vehicles. An air dryer, aftercooler, oil coalescing filter, hoses to and from the compressor, intake hose(s) and stowage tanks shall be required as a minimum for use with the air compressor.

3.11.10.5 Traction Control. The vehicle shall be equipped with a traction control system. This system, under conditions of varying traction, shall be capable of shifting power to the tire(s) with the highest degree of traction, such that the tractive effort is maintained to the maximum extent possible. This system may use a combination of Automatic Traction Control (ATC) and differential locking methods to achieve traction control under various operating conditions.

3.11.10.5.1 Antilock Braking System (ABS). A multi-channel Antilock Braking System shall be installed on all variants that meets the requirements for brake performance specified within FMVSS 571.121 regulation. ABS shall be activated while the CTIS is in the "Highway" mode and shift to an off-road setting, which will modify ABS behavior and use differential locking methods to achieve traction control in all other modes of CTIS operation for Mission VB Vehicles. Mission I, II, III, IV, VA, VB and VC Vehicles shall have an operator-controlled switch that-allows for off-road mode which will disengage traction control. Deactivating the ABS shall not deactivate driveline traction control system. The system shall have built in test for troubleshooting and dash mounted error indication lights. The diagnostic information shall display system error either on board, by use of a Soldier Portable On-system Repair Tool (SPORT), or acquisition by way of the SAE J1587/J1939 data bus for use with the contract test set.

#### 3.11.11 Towing and tiedown provisions.

3.11.11.1 Towing eyes. Two towing eyes shall be installed on both the front and rear of the vehicle and at the rear of the PLST variants. The PLST variants shall be recoverable with full payload from the rear. Each towing eye and its mounting shall withstand a load of at least

60,000 pounds without failure or permanent deformation when the load is applied at an angle up to 45 degrees from the longitudinal axis. The towing eyes shall be of a size such that the vehicle can be towed with the heavy-duty towbar described on dwg 12322663. Towing shackles shall be provided with the towing eyes. Front tow eyes shall be located in the vertical plane of the frame side rails.

#### 3.11.11.2 Pintle.

3.11.11.2.1 Pintle for Mission I, II, III, IV, VA and VC Vehicles. A towing pintle at the rear of the vehicle shall be furnished. The pintle assembly shall be of the swivel type and conform to the size and strength described on dwg 8710630. The assembly shall be furnished with mounting flanges and lubrication fitting. The pintle assembly mounting surface shall be forward but not more than 4 inches forward of the rear most part of the vehicle. The mounting of the pintle assembly shall include reinforcements to transfer pintle loads directly to the web of the chassis frame. Provision for attachment of trailer safety chains shall be provided as per SAE J849 (per truck installation note) for single axle trailers to be compatible with the M989 trailer which requires a one inch safety chain bracket pin.

Pintle height shall be 35 inches +/-3 inches from the ground with truck loaded to its rated cargo capacity. Pintle height shall be appropriate to accommodate the following trailers with towbar height inches as listed: M105 (34-1/4), M149 (30 to 41), M332 (33-3/8), HEMAT (32-1/2 to 40).

3.11.11.2.2 Pintle for Mission VB Vehicles. The self guiding tow pintle assembly, that mates 3 inch ID Lunette Rings, shall be furnished not more than 4 inches (102 mm) forward of the rearmost part of the truck (excluding FR). The assembly shall be furnished with mounting flanges and lubrication fitting. The assembly shall be positioned to accommodate the lunette height of the PLST variants. Provisions for attachment of trailer safety chains shall be in accordance with SAE J849 (per truck installation note).

3.11.12 Cab. The cab shall be a common cab design between all Mission vehicles. Accommodations to accept the varying features of the difference Mission vehicles will be incorporated into the common cab design via any cutouts or access points not used by a particular mission module will be covered or sealed. The vehicle cab shall accept the LTAS crew protection kit part number 12508360, or equivalent armor kit. Cab shall be protected from terrain and natural obstacles while travelling cross-country.

3.11.12.1 Seating. The cab shall have air ride seating provisions for a minimum of two crewmembers. Seats shall be individually adjustable fore and aft and to the occupant's height. The design shall provide leg, back and shoulder support.

3.11.12.2 Windshield and windows. Windshields and windows shall be configured to minimize solar glare. Visors or other means shall be used to preclude performance degradation due to glare from external sources such as sunlight or headlights. Visors shall have a mechanical detent to prevent movement while in the stowed position.

3.11.12.3 Windshield wipers and washers. The cab shall be equipped with multi-speed

windshield wipers and windshield washing system. A 3-qt (2.8 l) washer reservoir compatible with cleaner and appropriate additives for the climatic conditions for destination shall be furnished. Windshield wipers and washers shall conform to FMVSS 571.104 and SAE J198.

3.11.12.4 Vehicle cab interior. The vehicle upholstery color shall be either black, dark green, or dark brown. If the vehicle exterior is tan, then the interior shall be either black, green, or tan. The cab undercarriage and doghouse shall be insulated to reduce engine and transmission noise. A first aid kit (reference drawing 11677011 for guidance) and a #10 BC fire extinguisher IAW FMCSR 393.95 shall be mountable within the cab interior (objective – first aid kit mounted in the cab) and shall be detachable to allow removal from the cab.

3.11.12.5 Cab floor drains. The cab floor shall be provided with floor drains to permit draining of freestanding water on the cab floor. Removable plugs shall be provided for sealing of each hole. The plugs shall be captively restrained to the cab floor with a tether.

3.11.12.6 Chemical protective equipment storage. Space shall be provided inside the cab for the following: NBC garment suit, two per crewmember; NBC mask, one per crewmember; NBC gloves, two pair per crewmember; NBC overboots, one pair per crewmember; NBC hood, one per crewmember. The specified protective clothing shall be restrained by a quick disconnect type device to prevent unseating when traveling over rough terrain and when only a portion of the garments are being utilized.

3.11.12.7 M4/M16 rifle mounting. This kit will provide the necessary hardware for the mounting of two government-furnished rifle mounting kits inside the cab, one on each door. The kits shall consist of the items found on drawing 5705590. Holes will be provided for attachment of all items to the doors and will be filled with threaded fasteners.

3.11.12.8 Cab temperature control.

3.11.12.8.1 Heater and defroster. The vehicle shall come equipped with a heater, blower and defroster. The heater shall be capable of raising the cab temperature from -25 to +41 degrees F (-32 to +5 degrees C) within 45 minutes after the vehicle has been started. The blower shall be operable independent of the heater. Windshield defrosting and defogging system shall conform to SAE J382, Area "A" at ambient temperatures of down to -50 degrees F (-46 degrees C) within 1 hour when tested in accordance with SAE J381.

3.11.12.8.2 Reserve.

3.11.12.8.3 Climate Control. A climate control system shall be standard equipment on all mission vehicles. A CFC free refrigerant shall be used. Fresh air and recirculation options in both the cooling and heating modes will be incorporated into the climate control system.

3.11.12.8.3.1 Cooling requirements. The Climate control system with the vehicle at 120 degrees F and 40% relative humidity ambient conditions shall provide cooling to 86 degrees F within 120 minutes of elapsed time.

3.11.12.9 Rear view mirrors. Mirrors conforming to A-A-52432 shall be provided on the left and right hand sides, be capable of folding toward the body sides in at least one direction, and prevent vibration during operations. A passenger side spotter mirror shall be provided which shall fold in for transportability purposes using on-board tools.

3.11.13 Vehicle security. Shall have a means to provide vehicle security (i.e., locking hatches, bulk fuel tanks, module doors, steering lock bracket) (objective – padlock-type door locks). The cab shall have the ability to be padlocked for the purpose of securing sensitive equipment in the cab when the vehicle is not in use. The means of padlocking the cab shall be designed to eliminate hazard to personnel and equipment when the vehicle is in use.

3.11.14 Stowage. Stowage space with latching device to utilize a standard military padlock shall be provided to accommodate Basic Issue Items (BII), publications (operator, hand receipt and warranty) and operator's Common Table of Allowances (CTA) 50-900 personal clothing and equipment (objective). All stowage boxes shall contain drain holes. Publications shall be stowed inside of the cab above the fording line. Provisions shall be included that prevent contents of BII from resting on the bottom of the box without obstruction of the drain holes

3.11.15 Reserve.

3.11.16 Controls and control cables. Identifying symbols for controls and operating mechanisms shall be in accordance with FMVSS 571.101 and 571.102. All control cables shall be of the low friction type protected at both ends with adequate seals to prevent entry of moisture and contamination into the support tube and to provide a bearing surface for smooth motion of the end rod.

3.11.17 Rear reflective signature. Exterior safety markings meeting the intent of the requirements of FMVSS 571.108, section 5.7, shall be applied on the rear of Mission IV Vehicles (threshold) (objective – Mission I, II, III, VA, VB, VC and VI Vehicles). Marking system shall be designed for ease of removal/reattachment and storage requirements for repeated use (objective).

3.11.18 Reserved.

3.11.19 Kits. The vehicle shall be capable of accepting all kits as specified herein. Each kit shall not take longer than 4 man-hours to install by the MOS's as specified in 3.2.3. Holes shall be provided for the attachment of all kits and shall be filled with threaded fasteners or plugs. When specified the following kits shall be provided.

3.11.19.1 Engine arctic kit. The vehicle shall be capable of or the contractor shall provide an engine arctic kit that allows the vehicle to be started within 45 minutes, and operated within 15 minutes after starting, at temperatures down to -50 degrees F (-46 degrees C).

3.11.19.2 LTAS (Long Term Armor Strategy). The vehicle cab shall accept the LTAS crew protection kit part number 12508360 or a kit of equivalent protection.

3.11.19.3 Machine gun mounting interface kit. The machine gun ring mount kit shall include the M1114 Ring and the appropriate interface ring for mounting the M1114 Ring on the cab roof. The Ring shall be centered over the cab-roof and include provisions for operating at a gunners station between the passenger's and driver's seats. This kit shall interface with the vehicle both with and without LTAS B-kit installed. The kit shall function with the M60, M2 and MK-19 machine guns and shall provide a continuous 360 degrees of traverse. The machine gun kit shall contain a cover, which shall prevent personnel from accidentally falling through the hole. The cover shall be solid in color matching the vehicle color.

3.11.19.4 Cargo covering. The contractor shall design a cargo covering kit. This kit shall provide tarpaulin covering(s) for the cargo area of the vehicle conforming to MIL-PRF-20696, Type I, Class 2. Such covering(s) shall be totally detachable from the vehicle, along with necessary supports. The overall height of the vehicle (with bows and tarps installed) shall be no more than 11 feet 11 inches in the cargo portions of the Mission I Vehicle. The cargo color covering shall be specified in the contract and shall have the infrared reflectance properties of the vehicle paint.

3.11.19.5 Gas particulate filter unit (GPFU) interface kit Mission I, II, III, IV, VA, VB and VC Vehicles. This kit shall provide the necessary hardware and power hook-up provisions for the mounting of an M2A2 filter unit.

3.11.19.6 Chemical alarm interface kit. The contractor will make provisions to incorporate the M42 alarm unit, the M43A1 Chemical Detector, as well as the M256 Chemical Agent Detector Kit. Drill holes as required to mount equipment allowing for installation of grommets in the holes for passage of required power cables. Mounting holes will be drilled and plugged to accommodate installation of units in the field by the user. An installation drawing will be provided to insure correct installation by the user.

3.11.19.7 Decontamination apparatus interface kit. This interface kit shall provide the necessary hardware for mounting and supporting a M-13 Decontamination Apparatus Portable (DAP) (reference NSN 4230-01-133-4124). The DAP shall be mounted in a location accessible from the ground in its upright position using attaching bracket A-A-52513.

3.11.19.8 Universal Power Interface Kit (UPIK). Mission VB1 Vehicles (threshold), shall have a UPIK available for providing hydraulic, electric and pneumatic power to FR mounted equipment when loaded onto the vehicle. The connections shall be quick-disconnect. The vehicle mounted connections to the FR-mounted equipment shall be located in the vicinity of the left front corner of the FR in a location accessible by a soldier on the ground and protected from the build up of mud/dirt and splashing of water. The cab interior electrical connections shall be mounted in the vicinity of a suitable mounting surface for a magnetic mount control box with an 18-inch pigtail electrical harness. The minimum power available shall be as follows: Hydraulic – 30 gallons per minute at 3000 psi; Electric – 25 Amps at 12 volt and 25 Amps at 24 volt; and Pneumatic-20 cubic feet per minute at 120 psi. The hydraulic supply shall be controlled through the hydraulic selector switch. Interlocks shall be incorporated to prevent LHS operation while the UPIK is connected.

### 3.11.19.9 Reserved.

### 3.11.19.10 Self-recovery winch (SRW) kit.

3.11.19.10.1 Mission I, II, III, IVA1, VA and VC Vehicles. When specified, the vehicle shall be equipped with a winch for self recovery, for both forward and rearward deployment (Mission III Vehicles - forward deployment only). The winch shall be driven by a hydraulic motor mounted directly on the winch. The winch installation shall not decrease vehicle approach or departure angles or the ground clearance of the vehicle. The winch shall provide a minimum line pull of 20,000 lbs from a bare drum with a minimum line speed of 15 ft/min from a bare drum. The winch cable shall be at least 200 feet in length, with a safety factor of 50% above maximum line pull capacity. A pressure relief valve shall be provided to limit winch overloading to 110% maximum line pull. End of wire rope will be equipped with clevis end. Roller or sheave assemblies shall be located at the front and rear of the vehicle to guide the cable. Winch shall be controllable from the driver's position. All controls shall be of the dead man type that will revert to neutral when released. A snatch block shall be provided with this truck to permit using a two part line. Means of securing the snatch block to a tree shall be provided. Stowage provisions for this hardware shall be provided. The winch design shall be in compliance with SAE J706. The maximum continuous rating shall be such that 2 (two) successive 100 ft line pulls can be accomplished at 90 percent of maximum torque necessary to exert a 20,000 lb line pull on bottom layer of cable without exceeding a lube oil temperature of 250° F or damaging the safety brake at 120° F ambient. A tension mechanism to assist in level rewind shall be provided.

3.11.19.10.2 Mission VB Vehicles (threshold). When specified the vehicle shall be equipped with a winch for self-recovery capable of rearward deployment. The vehicle shall be configured to accept the winch kit as described herein, with all controls, electrical, hydraulic and mechanical linkages as required. The winch installation shall not decrease vehicle approach or departure angles or the ground clearance of the vehicle. The winch shall be provided with free spooling capability. Free spooling capability shall be controllable at the winch only. The winch shall be equipped with holding brake and counter-balance valve to safely deploy and hold the full rated load of the winch. Winch brake shall be automatic and shall be fully engaged anytime the winch is stopped or not in use and shall be fully released during operation. The winch shall provide a minimum line pull of 20,000 lbs from a bare drum with a minimum line speed of 15 ft/min from a bare drum. The winch cable shall be at least 200 feet (61M) long with a safety factor of at least 100% above the maximum line pull capacity. A device shall be provided to limit winch overloading to 110% of maximum line pull. End of the cable shall be equipped with a clevis end. Roller assemblies shall be provided to guide the cable. Winch shall be controllable from the driver's position and at the winch itself. All controls shall be of the dead man type that shall revert to neutral when released. The winch design shall be in compliance with SAE-J706. Forward deployment of the self-recovery winch with or without the LTAS B Kit installed is an objective.

3.11.19.11 Extended drawbar kit. An extended drawbar kit shall be available to preclude interference between the truck and trailer such as during cross-country operation.

3.11.19.12 Bridging light bar kit. A bridging light bar kit shall be available which mounts to Mission VI Vehicles (PLS-Trailer) variants to provide stopping/hazard lights during bridging operations.

3.11.20 Additional provisions. Vehicle shall have space and power allocation for any combination of the following:

3.11.20.1 C4ISR Equipment (MTS, PLGR, EPLRS, SINCGARS, and FBCB2)

3.11.20.1.1 Movement Tracking System (MTS). A system which will allow the Government to track its assets worldwide. Installation/conceptual drawings for the MTS are as follows:

EPO103-6	Arrangement Drawing For PLS & HEMTT
EPO120-05	PGI HHC-133 Computer Mount Concept
EPO120-10	Arrangement, MTS Battery Box (FMTV, PLS, HEMTT, 900 Series)
EPO120-12	Arrangement, MTS Control Panel (FMTV, PLS, HEMTT & 900 Series)
EPO120-13	Antenna/Modem Mount Concept for the PLS/HEMTT, FMTV & HETS Vehicles
865988	Installation Drawing, HEMTT & PLS

3.11.20.1.2 Force XXI Battle Command Brigade and Below (FBCB2)/Blue Force Tracker (BFT). An FM radio based digital messaging and vehicle tracking device.

3.11.20.1.3 Single Channel Ground and Airborne Radio System (SINCGARS). Adequate space and power hook-up (24 volt, 100 amp Power Cable (A3014039) shall be provided as part of the vehicle) provisions shall be available inside the cab and convenient to the driver for the installation of two SINCGARS AN/VRC-90 Radio Sets (A3013814) including the MT6352 mount (A3019214) and future electronic equipment such as position and navigation equipment (see 3.11.20). Holes shall be provided for attachment of an antenna support for mounting of an AS-3684 antenna (A3013842). All unused cab holes shall be closed with removable plugs. Equipment shall be operable from all seating positions inside the cab.

3.11.20.1.4 Enhanced Position Location Reporting System (EPLRS). Adequate space and power hook-up shall be provided as part of the vehicle. Holes shall be provided for attachment of an antenna support for mounting of an EPLRS antenna. All unused cab holes shall be closed with removable plugs.

3.11.20.1.5 Precision Lightweight GPS Receiver (PLGR). Adequate space shall be provided for 2 PLGRs inside the cab. Since an individual vehicle will not be equipped with both MTS and FBCB2 at the same time, the provisions for the PLGRS will coincide with the locations for the MTS and FBCB2 so that either location can be used to stow 2 PLGRS when that piece of equipment is not installed.

3.11.20.2 Driver's Vision Enhancer (DVE) Connections (objective). The cab shall be

configured to accept a standardized Driver's Vision Enhancer (DVE), which will help drivers safely operate the vehicle at night and in otherwise obscured driving conditions. This shall include creating a dedicated space and mounting provisions, and providing hard-wired power provisions for the DVE hardware.

3.11.20.3 Automatic asset identification (objective). A Radio Frequency Automatic Identification Technology (RF AIT) device, or alternative device(s), which permits movement, material, or other management of wheeled vehicles, containers, and FR.

3.11.20.4 Identifying Friend or Foe (IFF) devices (objective).

3.11.20.5 Self-defense (objective). Shall be equipped with standard available mounts for self-defense weapons such as the M2 and M60 machineguns and the Mk-19 grenade machine gun that will allow a maximum field of fire.

3.12 Mission vehicle types.

3.12.1 Mission IA Vehicle Type – Light Cargo.

3.12.1.1. Cargo Body. The cargo vehicle shall be able to support eight std 40 x 48 inch pallets one tier high (4-1/2 feet) with load clearance of 42 x 54 inches (i.e., not less than 90" x 216"). The cargo body shall have sides, front, and tailgate with a minimum of 23 inches height above the loading surface. The sides shall be hinged to permit ease of loading and unloading and the sides and tailgate shall be removable without tools. The removable components shall have recesses or specific handles to facilitate removal. Storage space will be provided on unloaded vehicle for dropsides and posts when not in use. Cargo body inboard bed dimensions between dropsides shall be as large as possible but no less than 90 x 216 inches. Cargo covering tiedowns are required. Cargo vehicle shall also be able to support two 4500 lb pallets in rear most location of cargo bed. These pallets are 54" high, 44" wide, 55" long.

3.12.1.1.1 Cargo tiedowns. The cargo carrier shall have suitable cargo tiedowns to safely secure pallets and other payloads during all modes of operation in accordance with MIL-STD-209E (threshold) (objective- MIL-STD-209). Tiedowns shall be required at two foot (+/-4") intervals in each side of cargo bed. A minimum of two tiedowns shall also be required at front and rear of cargo bed. There shall be no holes in cargo bed; however, each tiedown bracket depression will have a 1/4" hole to permit drainage of water. The cargo bed shall be equipped with 4 large cargo tiedown provisions that meet the requirements of MIL-STD-209 (objective).

3.12.1.2 Material handling crane, (MHC). The vehicle shall include a crane. Crane shall be operated by controls at the side of the vehicle and a remote control. Crane design shall provide for smooth and quiet operations, ease and flexibility of operation, and versatility of performance. Crane shall comply with Federal OSHA and ASME B 30.5. A flexible/swiveling 1-foot interface between boom and hook shall be provided with each crane to facilitate attachment of load without precise positioning of the boom. Vertical lift of load is required. All cranes shall be fully operable without movement of any other vehicle component or assembly. The winch shall have a braking system for lowering and raising of the load. The crane winch



shall not prevent the crane from folding into the stowed position to meet the requirements set forth in 3.4. All cranes shall be fully operable without movement of space tire/carrier assemblies.

3.12.1.2.1. Location and Capability. The MHC shall be mounted centrally (on or near the longitudinal center line) at the rear of the cargo bed and be capable of lifting 2,500 pounds at a minimum of 19 feet reach to allow vertical pick-up of the pallet at the outermost location of the cargo body. It shall have a minimum working traverse of 370 degrees with a static capacity of 125 percent of rated capacity at inner and outermost reach. The traverse overlap shall be centered at 90 degrees to the longitudinal centerline of the vehicle and at the same side of the vehicle as the manual control station. In addition, the crane shall be capable of lifting a 4,500 lb pallet with chain sling (NSN 3940-01-209-6008) and stow two pallets in rear most location of cargo bed. The lift must be at a minimum of 9 feet reach. The pallet dimensions are 54" high, 44" wide, 55" long.

3.12.1.2.2 Stabilizing system. The stabilizing system shall be designed to provide stable crane operation at all operating capacities and reach down slope with the empty vehicle on 5-degree lateral slope (threshold) (7-degree lateral slope – objective). The stabilizing system retracted or extended shall have zero creep for Mission I, III, VA and VC Vehicles. The stabilizing system when extended shall have creep of not more than 0.5 inch (12.7 mm) in 30 minutes with truck and crane boom at maximum load, boom at maximum extension for Mission VB Vehicles. The stabilizing system retracted shall not interfere with the vehicle road operation. The stabilizing system shall lock in place in order to stabilize the vehicle at all times. The stabilizing system safety requirements shall be IAW with those defined in ASME B30.5. A safety switch shall be integrated with the system to preclude use of the crane unless outriggers are in place (threshold – Mission VB Vehicles; objective – Mission I, III, VA and VC Vehicles).

3.12.1.2.3 Crane controls. The crane shall be operated by controls mounted at the side of vehicle. The valve shall consist of a main relief and individual circuit reliefs to prevent overloading of crane in inner and outer boom systems. The design shall permit operating a minimum of two functions simultaneously. Crane design shall prevent load drop due to system failure. With stabilizer engaged, boom at minimum and maximum extension positioned approximately horizontal in the most stable direction the crane shall lift a rated load and hold the rated load for 30 minutes within 1 inch. Each actuator shall be labeled for its function. Controls shall automatically revert to neutral when not in use. The crane shall provide vertical lift using one control.

3.12.1.2.4 Remote control. Remote control of the MHC shall be wireless (objective) and fully proportional in regards to line speed, slewing, telescoping of boom and elevation of boom. The remote control shall be designed that in case of failure, the manual valve can be utilized immediately. If wireless, the crane operator shall be able to operate the remote control at any location within 35 feet (10.7 M) of the crane base; otherwise, a nominal 35 ft cable shall be provided. The remote control shall not seep and performance shall not be diminished when tested in accordance with MIL-STD-810, Method 512.5, Procedure I (threshold – Mission VB Vehicles; objective – Mission I, III, VA and VC Vehicles). The remote control shall be shock resistant IAW MIL-STD-810 Method 516.6, Procedure IV (threshold – Mission VB Vehicles;

objective – Mission I, III, VA and VC Vehicles). The remote control shall have functions to match manual control except for the mast and stabilizing system controls. Stowage shall be provided for remote controller and any accessories and designed to take shock loads. The stowage box shall contain drain holes for the egress of water and be located above the 48 inch fording depth. Controller shall be sealed against moisture and debris.

3.12.1.2.5 Overload shutdown system. The crane shall be provided with an overload shutdown, which shall preclude structurally overloading the crane. The crane's function shall cease when the crane's capacity is exceeded, except to allow lowering of the overload.

3.12.1.2.6 Load capacity chart. Load capacity chart shall be visible from each control station.

3.12.1.2.7. Line Load Winch. The crane shall provide vertical lift using one control. The winch shall have the capacity of lowering or raising a 2,500 lb. load at speed not less than 30 ft/min; (but, with a multiparty line reduced line speed is allowed), and shall comply with ASME B30.5. If used, the crane manufacturer shall supply non-twist wire rope of sufficient length that, at a minimum, two full wraps remain on the drum when the hook is in its extreme low position with the boom in its extreme upright and extended position. Wire rope shall have a safety factor of not less than 250 percent of rated load. The hook shall have a built in swivel in order to facilitate the guidance of loads into enclosed areas. The winch shall be operated by both manual and the remote controls for the crane. The winch shall have a braking system for lowering and raising.

### 3.12.2 Mission I Vehicle Types – IB1 Heavy Cargo, IB2 Heavy Cargo GMT.

3.12.2.1 Cargo body. The vehicle shall have a payload capacity of 22,000 pounds (not including the pintle load). The cargo body shall be able to support four MLRS RPCs rocket pods each weighing 5400 pounds and measuring 165" x 41" x 31" high, double stacked on cargo bed having inside dimensions between the dropsides of not less than 90" x 216". A 600 lbs. allowance is assumed for miscellaneous tiedowns, straps and chains. The cargo vehicle shall be able to support eight standard 40 x 48 inch pallets one tier high (4-1/2 feet) with evenly distributed weight and load clearance of 42 x 54 inches (i.e., not less than 90" x 216") including overhang. The cargo body shall have sides, headboard, and tailgate with a minimum 23 inch height above the loading surface. The sides shall be hinged or removable to permit ease of loading and the sides and tailgate shall be removable without use of tools. Side posts and corner posts shall also be removable. The removable components shall have specific recesses or handles to facilitate their removal. Storage space shall be provided on unloaded vehicle for unused dropsides and posts. The heavy duty cargo body shall have crossmembers of sufficient strength to support the government designed MLRS pod feet retainers and tiedowns. Cargo covering tiedowns are required. The vehicle shall be capable of and certified for transporting tank, infantry, aviation and artillery battalion ammunition loads consisting of palletized rounds, projectiles, fuses, and propellant canisters. For Mission IB2 Vehicles, the cargo body shall be able to support four PATRIOT MLRS RPCs rocket pods each weighing 4,277 lbs.

3.12.2.1.1 Cargo tiedowns. The cargo carrier shall have suitable cargo tiedowns to safely

secure pallets and other payloads during all modes of operation in accordance with MIL-STD-209E (threshold) (objective- MIL-STD-209). Tiedowns shall be required at two foot (+/-4") intervals in each side of cargo bed. A minimum of two tiedowns shall also be required at front and rear of cargo bed. There shall be no holes in cargo bed; however, each tiedown bracket depression will have a 1/4" hole to permit drainage of water. The cargo body shall be equipped with government designed MLRS pod feet retainers and tiedowns. The cargo bed shall be equipped with 4 large cargo tiedown provisions that meet the requirements of MIL-STD-209 (objective).

3.12.2.2 Material handling crane, (MHC). Same as 3.12.1.2 except AMSE B30.22 shall apply to Mission IB2 Vehicle crane.

3.12.2.2.1 Location and capability. The MHC of Mission IB1 Vehicles shall be capable of lifting 5400 pounds at a minimum of 16 feet from the rear of the truck to allow pickup of four PODS, singularly, from the vehicle and four PODS stacked on an attached towed trailer, with center of load 15 feet from vehicle pintle centerline and off-loading to the same side of the vehicle as stacked. It shall have a minimum working traverse of 370° with a static capacity of 125 percent of rated capacity at inner and outermost reach. The traverse overlap shall be centered at 90° to the longitudinal centerline of the vehicle and at the same side of the vehicle as the manual control station. In addition, the crane shall be capable of lifting a 4,500 lb pallet with chain sling (NSN 3940-01-209-6008) and stow two pallets in rear most location of cargo bed. The lift must be at a minimum of 9 feet reach. The pallet dimensions are 54" high, 44" wide, and 55" long. Crane shall also be capable of on/off loading M989 and M989A1 trailer while hitched in truck pintle. The MHC shall be capable of loading/unloading and positioning of ammunition pallets into the field artillery ammunition support vehicle (FAASV). For Mission IB2 Vehicles interfacing with the PATRIOT, the lift capacity shall be a minimum of 4,277 pounds with an extension of 20 feet.

3.12.2.2.2 Stabilizing system. Same as 3.12.1.2.2 except AMSE B30.22 shall apply to Mission IB2 Vehicle crane.

3.12.2.2.3 Crane controls. Same as 3.12.1.2.3.

3.12.2.2.4 Remote control. Same as 3.12.1.2.4.

3.12.2.2.5 Overload shutdown system. Same as 3.12.1.2.5

3.12.2.2.6 Load capacity chart. Same as 3.12.1.2.6.

3.12.2.2.7 Line load. Same as 3.12.1.2.7

3.12.3 Mission II Vehicle Type - Tanker.

3.12.3.1 Operation. The tanker truck, under standard operating conditions with all basic equipment, shall:

- a. Automatic bottom load with self-contained shut-off, by a P.T.O driven pump unfiltered fuel, 300 gpm (1,135 lpm) minimum, see 3.12.3.5.
- b. Bulk unload filtered and unfiltered fuel, 260-300 gpm (984-1,135 lpm) diesel, gasoline & jet fuel with a flow control valve. See 3.12.3.5.
- c. Gravity discharge through bulk discharge port with 4" pipe and hose, unfiltered fuel.
- d. Automotive fuel servicing, metered, filtered fuel, w/flow control valve.
- e. Overwing aircraft fuel servicing, metered, filtered fuel, with flow control valve.
- f. Aircraft closed circuit refueling, and D-1, metered, filtered fuel, 100 gpm (378 lpm) per hose.
- g. Defueling capabilities to evacuate the nozzle hose.
- h. Recirculate through all lines and hoses, D-1 type receptacle in tank and D-1 type nozzle.
- i. Meet DOT 406 and meet the requirements of NFPA-407 aircraft fuel servicing regulations where possible.
- j. A means for measuring fuel in bulk shall be provided in both gallons and liters. If external, it shall be stowed outside the cab.

3.12.3.1.1 Regulations. The tank shall conform to the current California Air Resources Board (CARB) pressure and vacuum requirements (threshold), and DOT 406 (objective) (threshold – DOT 406 with the exception of meeting the requirements pertaining to (a) rear under-ride protection (b) location of front and rear gusset welds, and (c) rollover rails). Carbon steel piping shall not be permitted.

3.12.3.1.2 Fuel Tank Self Sealing (FTSS) System. The FTSS consists of the following (when specified):

- a. Fuel Tank Self Sealing (FTSS) – Application of FTSS to all areas of the bulk cargo tank susceptible to fuel leakage when penetrated by small arms fire.

FTSS Application – The contractor shall apply the FTSS uniformly over the exterior of the tank vessels that are susceptible to fuel leakage. The FTSS application will be in accordance with the Government-approved FTSS Application Procedures Drawings and Government approved Final Inspection Record (FIR). In the event that any differences between the FTSS Applications Procedures Drawings and the FIR occurs, the FTSS Application Procedures shall take precedence over the FIR. The FTSS when applied to the fuel tanker shall meet all requirements of Commercial Item Description (CID) A-A-59719. The color of the FTSS shall be Tan 686A, Color Chip 33446 of FED-STD-595. FTSS shall be applied in accordance with the FTSS

Applications Procedures and FIR Revision 11.0, dated 23 Mar 2006.

b. FTSS Field Repair Kit – A tank vessel FTSS repair kit and written repair procedures. A FTSS Field Repair Kit will be furnished with each tanker.

FTSS Field Repair Kit – The contractor shall provide a tank vessel FTSS repair kit and written repair procedures with each fuel tanker that receives the FTSS. The kit shall have sufficient material to seal 5 punctures. The repair kit shall be provided in a soft sided bag for stowage in the BII box.

3.12.3.2 Capacity. Mission II Vehicle shall have the maximum payload compatible with the chassis capacity (2,500 gallons minimum plus 3%) and transportability constraints.

3.12.3.3 Space allocation. Mission II Vehicle shall have the capability to carry at least ten 5-gallon (18.9 liters) cans of packaged lubricants. This space shall serve as alternate storage for six 50 ft x 2 in collapsible hoses, and three "Y" fittings.

3.12.3.4 Bulk discharge port hose. A 15-foot hose shall be provided using A-A-59326/2 and A-A-59326/6 Class A, 3-inch coupling halves and shall have a pressure rating suitable for the Tanker requirements to fit the bulk discharge port (see 3.12.3.5.5).

3.12.3.5 Fuel servicing pump.

3.12.3.5.1 Emergency valve. Fuel servicing system shall include an emergency valve assembly, which provides the means whereby fuel is not permitted to flow into the plumbing. The control for the emergency valve shall automatically be closed when the compartment door is shut. The emergency valve shall be remotely opened/closed from a point allowing the operator access to the fuel servicing controls. The control shall contain a fusible section causing the valve to close in case of fire. The control shall be positioned on the extreme exterior of the vehicles to allow the operator accessibility during an emergency.

3.12.3.5.2 Metering. Fuel servicing shall include a meter, which provides the capability of metering filtered fuel flow from any fuel dispensing hose reel. The flow meter shall be able to simultaneously measure all fuel servicing lines.

3.12.3.5.3 Bottom Loading. Fuel servicing system shall include an automatic bottom loading method capable of accepting 600 gpm (2,271 lpm) from an external pumping source utilizing a D-1 type receptacle. The automatic bottom loading apparatus shall be adjusted to automatically shut off flow of fuel when the fuel in the tank reaches within 25 gallons of capacity.

3.12.3.5.4 Connectors. Fuel servicing system shall include all necessary couplers, adapters, and reducers to insure interoperability with existing fuel dispensing equipment systems and vehicle (i.e., HEMTT Tanker Aircraft Refueling System (HTARS), Fuel Systems Supply Point (FSSP), Forward Area Refueling Equipment (FARE) System, M49 Series 1,200 gallon tankers, M131 series 5,000 gallon semitrailer tankers, and tank and pumping units to include the

Tank and Pump Units (T&PU) (objective), FMTV tanker (objective), and M967, M969, M1062 tankers (objective)).

3.12.3.5.5 Hoses and reels. Fuel servicing system shall include two (objective – four) 50-foot (minimum) fuel dispensing hoses on hose reels. Hose ends shall be male quick disconnect. Hoses shall comply with API STD 1529 Grade 1, Type C, 150 psi working pressure, except for static wire requirements. Two static grounding reels with 40 ft grounding cables and a ten foot long Y branch at the end, with alligator type end connections on the end of each branch, shall be provided. A ball stop shall be added to the deadman hose and static grounding reels to prevent damage to components and deadman handle during reel recoil.

3.12.3.5.6 Nozzles. Two open port automotive refueling nozzles NSN 4930-01-318-6091 (Oshkosh P/N 1853750), and equipped with swivel fittings and female quick disconnect are required. Fuel servicing system shall be equipped and have the capability of utilizing two open port nozzles each with spouts for aircraft servicing and motor vehicle servicing (leaded and unleaded fuel) and the closed-circuit refueling nozzles and "D-1" center point. The nozzles shall be equipped with female quick disconnects and be compatible with fuel receiving ports in all fuel consuming equipment or containers. Provisions shall be made to secure the automotive refueling nozzles in the pump module when the nozzles are stored on the fuel dispensing hoses. Open port nozzles less than 1-1/8 inch shall be available as Common Table of Allowances (CTA) items.

3.12.3.5.7 Filter separator. The fuel servicing system shall include a filter/separator assembly, which meets the performance requirements of API SPEC 1581, group II, class B (threshold), MIL-PRF-52308 (objective).

3.12.3.5.8 Sampling probe. The vehicle at a minimum shall be equipped with a sampling probe (NSN 4730-01-133-7964) on the discharge side of the filter/separator for use with the aqua-glow water test kit (NSN 6640-00-244-9478).

3.12.3.5.9 Alternate back-up fuel delivery. An alternate fuel delivery means capable of delivering a minimum of 25 gpm (95 lpm) shall be included.

3.12.3.5.10 Tank fuel level indicator. The tank shall be equipped with a device to visibly determine tank fuel level from operator ground level position (threshold) and from within the cab (objective).

3.12.3.5.11 Gages. The bezels of the discharge line pressure gage, venturi nozzle pressure gage, and differential pressure gage shall be positively attached (as opposed to press-fitted) to the gage casing. The differential pressure gage shall have sufficient sensitivity to indicate a positive reading when the tanker filter separator (see 3.12.3.5.7) is installed with new/clean filter elements. Lenses must be compatible with all fuels utilized by the Tanker. If analog gauges are used, they shall be dampened. The differential pressure gage shall not directly contact metal.

3.12.3.5.12 Pump module locking provisions. A single locking device shall be provided to secure the pumping module. Locking of the module door(s) shall be accomplished by using

padlocks (NSN 5340-00-158-3805).

3.12.3.6 Fire extinguisher. The tanker truck shall be equipped with two dry chemical extinguishers with a 20 BC rating mounted on the exterior of the truck. Mountings shall be installed so that the extinguishers are easily accessible to the operator.

3.12.3.7 System drain. A convenient drain shall be provided to allow excess fuel to be completely drained from undertank and distribution module piping to permit safe maintenance procedures.

3.12.3.8 Tanker Access Ladder. Access to the top of the tank shall be provided while maintaining a minimum of 3 points of physical contact. The ladder shall be a bolt-on, removable item.

3.12.3.9 Reserve.

3.12.4 Mission III Vehicle Type - Wrecker.

3.12.4.1 Recovery and retrieval (towing and lift/towing). The vehicle shall have the following capabilities:

3.12.4.1.1 Recovery. To affect recovery/evacuation of all U.S. Army wheeled vehicles (objective) with a two soldier crew (Threshold), one soldier (Objective) through the use of tools and onboard equipment (i.e., tow bar, chock blocks, ground anchors, pulley, winches, etc.). Threshold requirement is the recovery and evacuation of the following vehicles: M151, M880, 2 ½ ton M35 series, 5 ton M939 series, 10 ton M123 M911, M915 series, (M915 through M920), HEMTT series (A0 through A2 and A4) HMMWV, CUCV (M1008) FMTV, HET M1070, and PLS series.

3.12.4.1.2 Retrieval. Hook-up, lifting and towing from the front or rear all towed vehicles loaded to their respective capacities, without trailer or towed loads; and hook-up, lifting and towing up to the GCW rating and axle ratings of the Mission III Vehicle (Wrecker) from the front or rear of the other vehicles, with their associated trailers in accordance with 3.12.4.1.1. Mission III Vehicles shall lift and tow vehicles with the wheels of these towed vehicles off the ground at the lifted end. Mission III Vehicles shall be capable of lift and tow the Family of Tactical Vehicle (FMTV) variants with the wheels of the towed vehicles off the ground at the lift end.

Rear lifting of the M917, M918 and M919 are excluded. The vehicle shall be capable of lifting and towing and flat towing all wheeled vehicles and trailers at a GCW of no greater than 100,000 lbs. on relatively level hard surface roads at speeds up to 15 mph for a duration of 50 miles. The vehicle shall be capable of lifting and towing all wheeled vehicles and trailers at a GCW of no greater than 60,000 lbs. over the Mission III Vehicle Operational Mode Summary/Mission Profile (OMS/MP).

3.12.4.1.3 Retrieval system. The vehicle shall have a retrieval system to take the pull

force necessary to lift and tow the specified vehicles.

3.12.4.1.4 Recovery angles. Recovery of loaded vehicles with the recovery winch cable deployed at a sideward angle of up to 32° from the longitudinal centerline and at a downward angle of up to 23° from the vehicle longitudinal, horizontal centerline.

3.12.4.1.5 Retrieval height. Maximum height of the Wrecker in the retrieval (lift and towing) mode shall be no greater than 143 inches.

3.12.4.1.6 Chock provisions. Provisions for attachment of ground chocks (spades) at rear of vehicle, both in the longitudinal and transverse direction.

3.12.4.2 Maintenance and crane assistance. The vehicle shall have the following capabilities up to the weight, reach, and hook height requirements of the crane as specified in 3.12.4.3.

3.12.4.2.1 Power pack removal and installation. Removal and installation of power packs from all wheeled vehicles and all variants of the following tracked vehicles: M88, M1, M109, M60, M2 and M3.

3.12.4.2.2 Power pack transport. Lift above power packs from vehicle, drive away and place on ground and also place on stake and platform trailers (i.e., M127, M872, M871) or cargo trucks (i.e., those cargo trucks listed under 3.12.4.1.1).

3.12.4.2.3 Gun tube and mount removal and installation. Remove and install gun tubes and gun mounts from all variants of the following tracked vehicles: M1, M2, M3, M60 and M109.

3.12.4.3 Material handling crane (MHC). Same as 3.12.1.2.

3.12.4.3.1 Location and capacity. The MHC shall be capable of performing all the lifting functions specified below, as measured from the rearmost extremity of the vehicle. It shall have a minimum working traverse of 370° with a static capacity of 125 percent of rated capacity at outermost reach. The traverse overlap shall be centered toward the front of the vehicle.

a. Lift 6,000 lbs at 18 ft 2 in, with bottom of lift hook located no less than 14 feet from ground (without boom supports).

b. 8,000 lbs at 16 ft 5 in, with bottom of lift hook located no less than 14 feet from ground (without boom supports).

c. 12,000 lbs at 11 ft 10 in, with bottom of lift hook located no less than 14 feet from ground (without boom supports).

d. 14,000 lbs at 9 ft, with bottom of lift hook located no less than 14 feet from ground (without boom supports).



3.12.4.4 Stabilizing system. Same as 3.12.1.2.2.

3.12.4.5 Crane controls. Same as 3.12.1.2.3.

3.12.4.6 Crane remote control. Same as 3.12.1.2.4.

3.12.4.7 Overload shutdown system. Same as 3.12.1.2.5.

3.12.4.8 Load capacity chart. Same as 3.12.1.2.6.

3.12.4.9 Self-recovery winch. Same as 3.11.19.10, except only forward deployment is required and a front mounted winch is permissible and the angle of approach (specified in 3.10.16.a) may not be less than 31°.

3.12.4.10 Heavy duty recovery winch. The winch design shall be in compliance with SAE J706. The system shall be composed of one winch with a bottom layer rating of 60,000 lbs. The rating shall be established on the basis of cable deployment horizontally rearward on the longitudinal centerline of the vehicle. The winch shall have a minimum of two-speeds. The low speed shall not be less than 10 fpm at full load on the first layer of the winch drum. The no-load high speed shall be at least twice as fast as the low speed. Uniform level winding of the winch cable onto the winch drum is required. There shall be a minimum of 185 feet of useable wire rope in continuous length beyond the rear of the vehicle without splice joint with a safety factor of at least 50 percent above maximum line pull capacity. End of wire rope shall be equipped with clevis. The maximum continuous operational rating shall be such that two (2) full length line pulls can be accomplished in the low speed ratio at 90% maximum pull at 120° F ambient without exceeding a lube temperature of 250° F. The power take-off shall be of a capacity to operate the winch at full load in low speed. The winch shall be protected with a hydraulic relief valve set at 105% of pressure required for maximum line pull horizontally rearward on the longitudinal centerline of the vehicle. When in the stowed position, the free end of the heavy-duty winch clevis shall not be permitted to strike or cause damage to any vehicle component. A means of securing the clevis when in the stowed position shall be provided.

3.12.4.10.1 Heavy duty recovery winch system and controls. The winch shall be operated by controls mounted on one side of vehicle and also by a remote control unit with a nominal cable length of 35 feet (threshold). The winch operator shall be able to operate the wireless remote control at any location within a minimum of 35 feet (10.7 M) from the back of the vehicle (objective).

3.12.4.11 Reserve.

3.12.4.12 Reserve.

3.12.4.13 Anchor/spade deployment. The deployment of anchors/earth spades shall not exceed 45 minutes using 2 soldiers (Threshold), 15 minutes with one soldier (objective).

### 3.12.5 Mission IV Vehicle Types – IVA1 Tractor, IVA2 Tractor – Light Equipment Transporter (LET).

3.12.5.1 Fifth wheel. Vehicle shall be equipped with a full oscillating, 36-inch diameter fifth wheel with forks and lock for SAE J848 3.5-inch kingpin. The fifth wheel shall be capable of being uncoupled by the operator while at the side of the fifth wheel. Uncoupling action shall be protected by a secondary manual lock, preventing uncoupling of the primary locking mechanism until the secondary lock is manually released.

3.12.5.1.1 Swing clearance. Swing clearance from centerline of kingpin to rear point of obstruction (semitrailer nose to tractor components) forward of the fifth wheel shall be adequate to accommodate trailers in 3.12.5.4, in a full articulated condition.

3.12.5.1.2 Mounting. Fifth wheel mounting shall conform to FMCSR 393.70.

3.12.5.1.3 Fifth wheel height. Loaded level height of the fifth wheel shall be 63 inches plus or minus one inch for IVA1, and 65 inches plus or minus 1 inch at curb weight for IVA2.

3.12.5.2 Maintenance platform. A self-cleaning grating of sufficient structural strength (for use while connecting air and electrical lines between tractor and semitrailer and for maintenance access to equipment mounted on the front of the semitrailer) shall be installed. Provisions to allow access to personnel climbing onto the deck plate shall be furnished. Access for maintenance of fittings and other equipment shall be furnished.

Maintenance platforms shall be capable of being walked on and of supporting two 200-pound men. Maintenance platforms shall provide access to equipment mounted on the semitrailer gooseneck, even with the tractor up to 20° off the semitrailer centerline.

3.12.5.3 Hose tender and cable supports. A hose tender with dummy gladhand connectors (to retain hoses when not in use) shall be provided in a convenient location to secure the trailer air hoses and electrical cables. The specific arrangement of hardware shall be dictated by the configuration of the semitrailers specified in 3.12.5.4, and auxiliary equipment on the tractor. A retention device to secure the slave cable (3.11.3.12) to the NATO outlet receptacle shall be provided utilized during towing operations. This cable shall have adequate secured routing along the tractor deck plate and be securely fastened to the hose tender.

3.12.5.4 Towed vehicles. The truck tractor (threshold - Mission IVA1 Vehicle, objective - mission IVA2 Vehicle) shall operate both on- and off-road and be compatible the PATRIOT Missile Launcher Station and Radar Set on the M860 semitrailer in accordance with SAE AS8090, (with exception of paragraph 3.5.1.2.1.2.2 of SAE AS8090 as it pertains to kingpin vertical location), and the M870 family of 40-ton lowbed semitrailers (threshold Mission IVA2 Vehicles, objective Mission IVA1 Vehicles), M871 (objective) and M872 (objective).

3.12.5.5 Winch (Mission IVA2 Vehicles). A winch will be provided to assist in the coupling of Semitrailers such the M870 Semitrailer models with folding goosenecks. The winch cable will be a minimum of 150 feet in length and will be used additionally to assist in

payloading vehicles on the semitrailer.

3.12.5.6 External or MHC hydraulics. Same as 3.12.1.2.3

3.12.5.7 Spare trailer tire (Mission IVA1 Vehicles). The tractor shall provide for stowage of a single 18.00 x 22.50 tire for the M860A1 semitrailer.

3.12.5.8 NATO connectors. For PATRIOT missile system support, both tractor variants shall be equipped with a separate NATO STANAG 4074 type connector capable of being used to deliver 1000 watts of power at 28 volts to the missile system during road march/emplacement.

3.12.5.9 Mission IVA2 specific requirements – recovery winch, controls, stowage box, deck and aux hydr power connections & 5<sup>th</sup> wheel ramps.

3.12.5.9.1 Equipment recovery winch. Mission IVA2 Vehicle shall provide an equipment recover winch. The winch design shall be in compliance with SAE J706. The system shall be composed of one winch with a bottom layer rating of 45,000 lbs. The rating shall be established on the basis of cable deployment horizontally rearward on the longitudinal centerline of the vehicle.

a. The winch shall have a minimum of two-speeds.

b. The minimum high idle 90% rated pull (40,500 lb.) speed shall be 13 ft/min. The minimum high idle 30% rated pull (13,500 lb.) speed shall be 26 ft/min.

c. The winch shall be equipped with a 7/8 inch 150 foot wire rope in continuous length without splice joint with a safety factor of at least 50 percent above maximum line pull capacity. End of wire rope shall be equipped with closed spelter socket (ref. Crosby Group p/n G-417) clevis.

d. The maximum continuous operational rating shall be such that one (1) full length line pulls can be accomplished in the low speed ratio at 90% maximum pull at 120 degrees F ambient without exceeding a lube temperature of 250 degrees F.

e. Winch shall be equipped with an air actuated cable tensioner for uniform level winding of the winch cable onto the winch drum.

f. The winch shall be protected with a hydraulic relief valve, set at maximum 110% of pressure required for maximum line pull horizontally rearward on the longitudinal centerline of the vehicle. When in the stowed position, the free end of the heavy-duty winch clevis shall not be permitted to strike or cause damage to any vehicle component. A means of securing the clevis when in the stowed position shall be provided.

3.12.5.9.1.1 Equipment recovery winch system and controls. The winch shall be operated by a remote control unit with a nominal cable length of 35 feet and by back up manual controls mounted on one side of vehicle.

3.12.5.9.2 Additional Stowage box – Mission IVA2 Vehicles shall have a frame mounted stowage box located in place of the SRW . SRW kit nor provision for its mounting is required on the Mission IVA2 Vehicle.

3.12.5.9.3 Auxiliary hydraulic power connection - Mission IVA2 Vehicle shall have 1 each male & female ¾” quick disconnects (ref. Parker p/n FF-751-12F0 & FC-752-12F0 or equivalent/compatible) couplings for M870A3 trailer hydraulic hose connection to supply vehicle hydraulic power for M870A3 hydraulic goose neck operation (nominal. 3,000 psi).

3.12.5.9.4 Fifth wheel ramp assembly – Mission IVA2 Vehicles shall have reinforced ramps and rear ramp roller to accommodate operational use, raising & lowering the folding gooseneck of the M870 trailer.

3.12.6 Mission VA, VB and VC Vehicles - Light and Heavy Load Handling Systems (LHS) and Common Bridge Transporter (CBT). The LHS variants shall meet all requirements herein while interfacing with ISO containers and FR at the payloads outlined in Table IV. The CBT LHS shall also interface with the Government furnished Bridge Adapter Pallet (BAP). The LHS shall be operated from inside the cab, with the controls readily accessible to the driver. The LHS shall be capable of completely loading/unloading a FR or container (see 3.10.1.1) by a crewmember sitting in the driver's position, without the assistance of other personnel or equipment (objective). The Light LHS and CBT vehicle shall also incorporate an interface for auxiliary LHS controls external to the cab to permit full LHS operation by an operator or maintainer standing outside the vehicle. The cab controls for the CBT shall include a two-speed engine idle control switch readily accessible to the driver.

3.12.6.1 Lifting capability. The CBT, Light and Heavy LHS shall be capable of the following, at the payloads specified in Table IV, in the automatic mode. Payload shall include the weight of any component such as FR, FR mounted equipment, Container Roll-on/Off Platform (CROP) or ISO containers/shelters, CHU, BAP, IBC, tiedown devices, sideboards, or tarpaulins.

a. Loading/unloading the FR from/to the truck a minimum of 12 inches (305 mm) below ground level, and any intermediate level (threshold – Mission VC Vehicles in the manual mode; objective – Mission VC Vehicles in the automatic mode) in the manual and automatic mode.

b. Loading/unloading from/onto uneven ground slopes a minimum of 5 degrees threshold (10 degrees objective) from the truck’s lateral and horizontal axis.

c. Loading/unloading to/from the PLST or docks in which the height is equal to or less than the height from the ground to the bottom of the FR (while on the truck).

d. Attaching/detaching itself to a FR from an approach angle of 20 degrees from the truck centerline and load and secure the FR to the prime mover without the assistance of other personnel or material handling equipment.

e. Be capable of self-loading, unloading, or transporting standard ISO 668, Type 1CX (4 ft. 3 in. height) to ISO 668, Type 1CC (8 ft 6 in height) freight containers, shelters and mission modules onto both the vehicle (threshold) and the PLS trailer without use of FR (objective) (through the use of the CHU). On-vehicle-storage of necessary interface equipment is desired and shall not exceed 96 inches overall width when stowed (Objective).

f. A fully loaded CROP shall be capable of being extracted from and inserted into an ISO container using the LHS. The ISO/CROP weight shall be at the respective payloads of the Light and Heavy LHS.

g. Loading/Unloading to/from the PLST in which the height is 8.9 inches or more below the bottom of the BAP rails (while on the CBT).

3.12.6.2 Loading/unloading time. The time for loading/unloading a FR, fully loaded, to or from the truck shall not exceed 1 minute. The time for transferring a FR to or from the PLST shall not exceed 1 minute. The time shall begin when the LHS is activated, and shall end when the FR is secured to the truck. Time taken to back the vehicle up and attach to the FR shall not be considered for this requirement.

3.12.6.3 Height limitations. No portion of the LHS, A-frame FR, or the vehicle (not including the CHU), shall exceed 177.2 inches (4.5 M) when loading or unloading a FR. Mission vehicles equipped with a CHU kit are allowed to exceed 177.2 inches when loading ISO containers.

#### 3.12.6.4 CBT Bridge Bay Water Launch and Retrieval.

a. Free launch an interior bay and/or ramp bay into the water in no more than five minutes. The time shall begin when the truck has backed into the water to the required depth and the parking brake is set, and shall end when the bridge bay is floating free of the vehicle. For free launch, the shore slope shall not be more than 20 percent. With a 10 percent slope, the interior bay requires a water depth of at least 36 inches; and, the ramp bay requires a water depth of at least 44 inches.

b. Controlled launch of an interior bay and/or ramp bay into the water in no more than five minutes. The time shall begin when the truck has backed into the water to the required depth and the parking brake is set, and shall end when the bridge bay is floating free of the vehicle. For a controlled launch, the shore slope shall be no more than 10 percent. With a 10 percent slope, the interior bay requires a water depth of at least 42 inches and the ramp bay requires a water depth of at least 50 inches. During this operation, the BAP winch frame is attached to the LHS hook arm to crane the bay into the water.

c. High bank launch of an interior bay and/or ramp bay into the water from a vertical slope with a maximum bank height of 28 feet. For a high bank launch, the shore slope shall not exceed 20 percent. On shore slopes greater than 10 percent, the front end of the vehicle shall be anchored. Minimum water depth at the launch site shall be 30 inches. The bridge bay shall be high bank launched in the transport (i.e. folded) condition with all travel latches secured. Bridge

bay lifting slings are a part of the ribbon bridges supplementary set.

d. Retrieve and fold interior bay and/or ramp bay from the water in not more than ten minutes. The time shall begin when the bridge bay is hooked to the BAP winch cable and the bridge erection boat is free from the bridge bay. The time shall end when the bridge bay is secured for transport and ready to exit the launch area. The shore slope shall not exceed 20 percent.

3.12.6.5 FR/container/BAP locking. The LHS shall automatically guide, center, and secure a FR/container/BAP to the vehicle such that during rough trail operations as described within the mission profile (Tables VI and VII), the FR/container remains secure. There shall be a means to manually “unload” the FR/container from the vehicle in the event of a hydraulic system or control failure within 15 minutes.

#### 3.12.6.6 LHS overload.

3.12.6.6.1 LHS overload (threshold). The LHS overload protection system shall protect the CBT, Light and Heavy LHS, truck, and FR from permanent damage or deformation while loading/unloading distributed payloads greater than 20% for Mission VC Vehicles, **25% for Mission VA Vehicles** and 27% for Mission VB Vehicles over the payloads defined by Table IV, in the automatic mode under the conditions of paragraph 3.12.6.1. **For Mission VA Vehicles, the overload protection system shall allow lifting up to 15% over the payloads defined by Table IV, in the automatic mode on level ground.** There shall be an overload warning light located in the cab, in plain view of the driver. The LHS warning light shall indicate activation of the overload protection system. The CBT, Light and Heavy LHS shall be capable of loading/unloading, in the manual mode (CBT may require opening of LHS hydraulic access cover), an overload condition of **15%** for Mission VA and VC Vehicles and 27% for Mission VB Vehicles over the payloads defined by Table IV, without permanent damage or deformation (the overload protection system may be deactivated for lift capability verification).

#### 3.12.6.6.2 **Reserve**

3.12.6.7 Slave hydraulics. Self sealing quick disconnect hydraulic couplings and one hose with appropriate connectors shall be provided, such that one LHS variant can readily power the LHS of the same LHS truck variant with each truck providing one hose. The operable CBT shall unload the loaded BAP from the inoperable CBT at both low and high idle speed. Each hose shall be at least 35 feet long (10.7 M) and stowed on the truck in a storage box. Tethered caps are required to protect the fittings. The female coupling shall be installed on the truck and the male coupling on the hose.

3.12.6.8 Hydraulic system and controls. By-passes shall be furnished where necessary to protect filters during cold temperature operation. A means shall be provided for bleeding all air trapped in the hydraulic system. A means shall be provided to release the hook arm of the LHS from the FR in the event of a hydraulic system or control failure. In the event of a system hydraulic failure during loading or unloading, a release mechanism(s) is required to safely offload the FR to the ground, or to load the FR to the truck or trailer. There shall be no leakage

of hydraulic fluid past couplings or seals at any load and speed within the operational conditions cited herein.

3.12.6.8.1 Hydraulic system cleanliness. The hydraulic fluid cleanliness level shall conform to the following contamination limits (particles per milliliter).

Quantity (max)	Particle Size
1000	Greater than 10 microns
100	Greater than 20 microns
40	Greater than 30 microns
10	Greater than 40 microns

3.12.6.8.2 Manual operation of solenoid control valves. Vehicles shall come equipped with the capability of permitting manual operation of solenoid valves when electrical power is not available to operate the valves.

3.12.6.9 Material handling crane (MHC) for Mission VB2 Vehicles. Same as 3.12.1.2

3.12.6.9.1 Location and capability. The crane shall be mounted behind the cab in a position which shall not interfere with the LHS, and be capable of:

- a. Lifting a 3900 lb (1770 kg) pallet from any location on the FR. The crane shall be capable of off-loading pallets to either side of the truck.
- b. The crane shall have a lift radius minimum such that a 3900 pound (1770 kg) pallet can be loaded or unloaded from the rearmost portion of the FR. (The lift radius is that distance as measured from the crane's rotational center to the center of the lifting hook).
- c. The crane shall have a minimum working traverse of 180 degrees (90 degrees minimum to each side of the trucks longitudinal axis) with a rated capacity of 125% of static capacity at inner and outermost reach.
- d. The crane shall comply fully with federal OSHA safety standards.
- e. The crane shall be capable of loading/unloading any pallet from any location on a fully loaded FR without rearranging other pallets or causing damage to the other pallets.

3.12.6.9.2 Stabilizing system. Same as 3.12.1.2.2

3.12.6.9.3 Crane controls. Same as 3.12.1.2.3

3.12.6.9.4 Fixed operator's station. All crane controls and indicators shall be located at the crane position, passenger side of the vehicle. The controls shall be accessible to the operator while standing on the ground. Each functional control, both crane and stabilizing system, shall be of the "deadman" type which shall automatically return to the neutral position should the operator inadvertently or intentionally release the control. All controls governing a function

(rotation, boom extension and retraction, vertical lift and drop) shall be of the proportionally variable types. All controls shall be clearly marked as to the use and function. The control spacing and size shall be such that an operator wearing arctic mittens and separately NBC gloves shall be able to operate the controls. Controls shall be waterproof and performance shall not be diminished when tested in accordance with MIL-STD-810, Method 506.4 Procedure 1. In addition, controls shall be protected from weather and accidental damage.

3.12.6.9.5 Remote control. Same as 3.12.1.2.4

3.12.6.9.6 Overload shutdown system. Same as 3.12.1.2.5

3.12.6.9.7 Load capacity chart. Same as 3.12.1.2.6

3.12.6.9.8 Line load. The crane winch shall have the capacity of loading/unloading loads/pallets weighing up to 3900 lb. (1700 kg) at a 22 foot radius at a speed of not less than 30 feet/min (9 M/min) and shall comply with ASME B30.5. The crane manufacturer shall supply a minimum of 50 feet (15 M) of non-twist wire rope with a safety factor of not less than 350 percent of rated capacity of the winch. The pitch diameter of the drum or sheave(s) shall not be less than 18 times the diameter of the rope used. No less than two full wraps of rope shall be remaining on the hook line drum when the hook is in its extreme low position with the boom at maximum extension in the most upright position. The winch shall be operable by the fixed and remote controls for the crane. The winch shall have a braking system for lowering in accordance with ASME B30.5.

3.12.6.9.9 Boom angle indicator. A boom angle indicator shall be provided that is visible from both sides of the vehicle that shall indicate the boom's angle from maximum elevation to maximum depression relative to horizontal and marked in 5 degree increments with zero degrees correlating to horizontal. The boom angle indicator shall show a direct correlation to the crane load capacity.

3.12.6.10 CBT operator's platform. The operator shall have the capability of standing on the CBT and operating the remote control unit. The operator shall have the additional capability of moving from the location directly behind the hydraulic reservoir to the location directly behind the spare tire. Walkway grating and handholds shall include sound engineering principles relating to safety and human factors engineering. The platform shall be removable such that the truck lifting provisions are accessible.

3.12.6.11 CBT pneumatic system performance. The pneumatic system shall operate from the air supply available on the vehicle and shall have quick disconnect fittings between the air supply from the vehicle chassis and the air lines to the BAP.

**3.12.6.12 By-Wire Active Safety. Mission VB0-A, VB1-A and VB2-A vehicles shall incorporate ECP FHTV 418R2 and meet the performance requirement of the By-Wire Active Safety Kit Performance Specification (P-Spec).**

3.12.6.13 Reserve.



3.12.7 Mission VI Vehicles – PLS Trailer Variants (PLST/PLSTA1). The PLST variants shall be a multi-axle trailer. The PLST variants shall meet all of the requirements of this specification where applicable.

3.12.7.1 Drawbar. The PLST variants shall be capable of being coupled/uncoupled by one person and capable of free standing on both hard and soft surfaces when fully loaded and not attached to the prime mover. The design of the PLST variants may require the use of a multi-position drawbar to accommodate the following situations: highway operations, off-road mobility, Multi-Role Bridging Company operations (with a kit).

3.12.7.2 Backing assist device (objective). If steerable axles are present, the PLST variants shall be equipped with a backing assist device which shall prevent the steerable axles of the trailer from steering once the selector in the vehicle is placed into reverse.

3.12.7.3 Stowage Box. A fully enclosed weatherproof storage box shall be provided to store any special equipment. There shall be a latch which can be secured by a standard padlock. The box shall be fully accessible when the PLST variants are loaded or unloaded. Storage box drain holes shall be required.

3.12.7.4 PLST equipment. The PLST variants shall be equipped with all items necessary to accomplish all applicable missions. The PLST variants shall have mounting and stowage provisions for all equipment required to accomplish its mission.

3.12.7.5 Safety Chains. The PLST variants shall come equipped with rust resistant safety chains IAW SAE-J697.

3.12.7.6 Container/shelter transport without FR (PLSTA1). The PLSTA1 shall be capable of transporting standard ISO 668, Type 1CX (4 ft. 3 in. height) to ISO 668, Type 1CC (8 ft. 6 in. height) freight containers, shelters and mission modules without the use of a FR.

3.12.7.7 FR/CROP Loading. The PLST variants shall be capable of having a fully loaded FR and CROP, loaded and unloaded by the LHS of the truck or a vertical lift.

### 3.13 Reserved

3.14 Workmanship. Workmanship shall be of such a quality so as to assure that the vehicle and its components are defect free and no conditions exists which compromises, limits or reduces the capability of the vehicle system in the performance of its intended use. Bolted and riveted construction shall be secure IAW its intended use. All fuels, lubricants, and hydraulic fluids shall be provided clean and filtered IAW their intended use.

3.15 Servicing and Adjusting. Prior to acceptance of the vehicles by the Government, contractor shall service and adjust each vehicle including at least the following: Focusing of lights; adjustment of engine and transmission; adjustment of electrical and brake systems; burnishing of the brakes sufficient for the vehicle to meet the grade holding requirements of this

purchase description; alignment of steering and front wheels; inflation of all tires; complete lubrication of chassis, engine, running gear, and mounted equipment with grades of lubricants required for the ambient air temperature at the delivery point; filling of windshield washer reservoir with water and appropriate additives rated to -25° F(-31° C); check of wheel lug nut torque; check of the continuity of the electrical system; and filling and charging of batteries. A minimum of 1/4 fill of fuel shall be provided in each vehicle's fuel tank.

#### 4. VERIFICATION.

##### 4.1 Methods of verification.

4.1.1 Test. Verification shall be accomplished through systematic operation of the end item under appropriate conditions, with or without instrumentation, and the collection, analysis, and evaluation of quantitative data.

4.1.2 Analysis. Verification shall be accomplished by technical or mathematical evaluation, mathematical models or simulations, algorithms, charts, or diagrams, and representative data.

4.1.3 Examination. Verification shall be accomplished by visual examination of the end item or its components, reviewing descriptive documentation, certifications, and comparing characteristics to established criteria.

4.1.4 Demonstration. Verification shall be accomplished by appropriate functional checks and/or operation of the end item or its components.

4.1.5 Certification. A document-certifying conformance to a specific requirement or standard signed by the certifying official or responsible party. When required by contract or this specification, Certifications may be used in lieu of additional verification methods and must include supporting documentation (test data, materiel analysis, etc.).

##### 4.2 Classes of verification.

4.2.1 First Article Test. When required by contract, this test consists of a First Production Vehicle Inspection and Production Verification Test.

4.2.2 First Production Vehicle Inspection. A government inspection of the first vehicle produced under contract, usually at the place of manufacture, utilizing one or more of the verification methods referenced in paragraph. 4.1.

4.2.3 Production Verification Test. A test of the end item conducted by the government and performed at a Government test site, to establish product conformance to requirements and production capability.

4.2.4 Follow-on Production Test. A test of the end item similar to Production Verification Test, but more limited in scope, to assess continued conformance to requirements and production capability.

4.2.5 Quality Conformance Inspection. A final inspection of the end item performed before government acceptance of a production vehicle utilizing a Final Inspection Record. The Final Inspection Record is a quality record, which documents all verification actions performed on each production vehicle, both in process and final, with documented results and corrective action.

4.2.6 Control Test. When required by contract, control tests for maintaining and evaluating process control shall be conducted by the contractor as referenced in Table V. This test is performed on selected vehicles after completion of Quality Conformance Inspection.

4.3 Verification matrix. The following table displays the verification method and classification (event) for each applicable section 3 requirement. All verifications referenced in this table may be modified at the discretion of the government by deletion or addition of items listed to assure conformance to specification and/or contractual requirements.

TABLE V - VERIFICATION MATRIX

## VERIFICATION LOCATION:

First Production Vehicle Inspection (FPVI)  
 Production Verification Test (PVT)  
 Follow-on Production Test (FPT)  
 Quality Conformance Inspection (QCI)  
 Control Test (CNT)

Manufacturers Facility  
 Government Test Site  
 Government Test Site  
 Manufacturers Facility  
 Manufacturers Facility

SECT. 3	PARAGRAPH TITLE	VERIFICATION METHOD					VERIF. CLASS/EVENT				
		<u>CERT</u>	<u>ANLS</u>	<u>DEM</u> <u>O</u>	<u>EXA</u> <u>M</u>	<u>TES</u> <u>T</u>	<u>PVT</u>	<u>FPVI</u>	<u>FPT</u>	<u>QCI</u>	<u>CNT</u>
3.1	COMMERCIALITY/COMMONALITY, COMPONENTS, PARTS & ACCESSORIES	X						X			
3.2	MANPOWER & PERSONNEL INTEGRATION (MANPRINT)										
3.2.1	HUMAN ENGINEERING					X	X		X		
3.2.2	SAFETY										
	a. Complies with FMCSR & FMVSS regulations	X						X			
	b. Free of sharp edges, projections rotating parts, hot surfaces, etc.				X			X		X	
	c. Type II (4-point) restraints IAW FMVSS 571.209 & 210	X						X			
3.2.3	MANPOWER				X	X	X				
3.2.4	NOISE (OBJECTIVE)					X	X				
3.2.4.1	MISSION I, II, III, IV, VA AND VC VEHICLES (THRESHOLD)					X	X				
3.2.4.2	MISSION VB VEHICLES (THRESHOLD)					X	X				
3.2.5	HAND HOLDS AND STEPS				X		X	X			
3.2.6	EMISSIONS	X						X			
3.3	DIMENSIONS				X			X	X		
3.4	TRANSPORTABILITY					X	X		X		
3.4.1	LIFTING AND TIEDOWN PROVISIONS										
	a. Meets MIL-STD-209 requirements					X	X				
	b. Quantity and Locations				X			X		X	
3.4.2	CARGO AIRCRAFT				X	X	X				
3.4.2.1	MISSION II AND III VEHICLE PREPARATION					X	X				
3.4.3	RAIL					X	X				
3.4.4	MARINE		X			X	X				
3.4.5	HIGHWAY			X		X	X				
3.4.5.1	HAZARDOUS MATERIAL TRANSPORT	X						X			
3.5	FUELS & LUBRICANTS	X						X			
3.5.1	VEHICLE LUBRICATION										

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	a. Maintenance Free Drag links & Tie Rods				X			X		X	
	b. Mission VB Maintenance Free Prop Shafts				X			X		X	
3.6	MATERIALS, PAINTING, MARKING & CORROSION										
3.6.1	MATERIAL	X						X			
3.6.2	RESERVED										
3.6.3	PAINTING										
	a. CARC Topcoat	X						X			
	b. Meet MIL-DTL-53072 requirements			X	X						X
	c. Dry Film Thickness Check					X					X
	d. Adhesion & Corrosion Test					X					X
	e. No reflective surfaces check				X			X		X	X
3.6.3.1	CAMOUFLAGE PATTERN				X						X
3.6.4	IDENTIFICATION AND MARKING				X			X		X	
3.6.5	DATA PLATES				X			X		X	
3.6.6.1	CORROSION CONTROL (Threshold)	X						X			
3.6.6.2	CORROSION CONTROL (Objective)	X						X			
3.6.7	MATERIAL RESISTANCE	X						X			
3.6.8	NON-SKID SURFACE				X			X		X	
3.6.9	HAZARDOUS MATERIAL RESTRICTIONS	X						X			
3.6.9.1	EXCEPTIONS TO THE HAZARDOUS MATERIALS REQUIREMENTS	X						X			
3.7	ENVIRONMENTAL CONDITIONS					X	X				
3.8	INTEROPERABILITY, STANDARDIZATION & COMPATIBILITY WITH OTHER NATO COUNTRIES	X				X	X	X	X		
3.9	COMPONENT PROTECTION				X		X	X	X		
3.10	PERFORMANCE					X	X		X		
3.10.1	PAYLOAD					X	X	X	X		X
3.10.1.1	FLATRACKS (FR)					X	X		X		
3.10.2	TOWING A LIKE TRUCK			X			X		X		
3.10.3	TOWED LOAD CAPABILITY					X	X		X		
3.10.4	GRADE OPERATION (LONGITUDINAL SLOPE)					X	X		X		X
3.10.5	SIDE SLOPE OPERATION					X	X		X		
3.10.6	SPEED					X	X		X		
3.10.7	GOVERNED SPEED					X	X		X		X
3.10.8	RANGE					X	X		X		



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3.10.9	VERTICAL STEP					X	X		X		
3.10.10	TRACKING					X	X		X		X
3.10.10.1	BACKING					X	X	X	X	X	
3.10.11	STEERABLE/LOCKABLE REAR AXLE			X			X	X	X		
3.10.12	LANE CHANGING					X	X	X	X		
3.10.13	TURNING REQUIREMENT					X	X		X		
3.10.14	LATERAL STABILITY					X	X		X		
3.10.15	FORDING					X	X		X		
3.10.16	APPROACH & DEPARTURE ANGLES					X	X				
3.10.17	BRAKING										
	a. Brake burnishing					X	X		X	X	
3.10.17.1	SERVICE BRAKES										
	a. Meets FMVSS 121	X				X	X	X			
	b. Holds on 60% grade					X	X	X	X		X
	c. Operation					X	X	X	X	X	
	d. Stopping distance					X	X	X			X
3.10.17.2	PARKING BRAKES						X				
	a. Grade requirements					X	X	X	X		X
	b. Indicator light					X	X	X		X	
3.10.17.3	EMERGENCY BRAKES					X	X	X	X		
3.10.18	MOBILITY		X			X	X				
3.10.18.1	MINIMUM MOBILITY RATING SPEEDS (MPH)					X	X				
3.10.18.2	MAXIMUM PERCENT NO- GO					X	X				
3.10.18.3	VEHICLE CONE INDEX (VCI)					X	X				
3.10.18.4	RIDE QUALITY					X	X				
3.10.19	RELIABILITY, MAINTAINABILITY AND DURABILITY		X			X	X		X*		
3.10.19.1	RELIABILITY					X	X		X*		
3.10.19.1.1	MISSION I, II, III, IV, VA AND VC VEHICLES					X	X		X*		
3.10.19.1.1.1	ANCILLIARY TANKER EQUIPMENT RELIABILITY					X	X		X*		
3.10.19.1.1.2	ANCILLIARY CARGO EQUIPMENT RELIABILITY					X	X		X*		
3.10.19.1.1.3	ANCILLIARY WRECKER EQUIPMENT RELIABILITY					X	X		X*		
3.10.19.1.1.4	ANCILLIARY CBT EQUIPMENT RELIABILITY					X	X		X*		
3.10.19.1.2	MISSION VB AND VI VEHICLES					X	X		X*		
3.10.19.1.2.1	MATERIAL HANDLING CRANE (MHC) RELIABILITY					X	X		X*		

\* Failure Only



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3.10.19.2	MAINTAINABILITY					X	X		X*		
3.10.19.2.1	MAINTENANCE RATIO (MR)					X	X		X*		
3.10.19.2.2	PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)					X	X		X*		
3.10.19.2.3	MISSION I, II, III, IV, VA AND VC VEHICLES			X			X		X*		
3.10.19.2.3.1	VEHICLE MAINTAINABILITY					X	X		X*		
3.10.19.2.3.1.1	ANCILLIARY TANKER EQUIPMENT MAINTAINABILITY					X	X		X*		
3.10.19.2.3.1.2	ANCILLIARY CARGO EQUIPMENT MAINTAINABILITY					X	X		X*		
3.10.19.2.3.1.3	ANCILLIARY TRACTOR EQUIPMENT MAINTAINABILITY					X	X		X*		
3.10.19.2.3.1.4	ANCILLIARY WRECKER EQUIPMENT MAINTAINABILITY					X	X		X*		
3.10.19.2.3.1.5	ANCILLARY CBT EQUIPMENT MAINTAINABILITY					X	X		X*		
3.10.19.2.4	MISSION VB VEHICLES						X				
3.10.19.2.4.1	VEHICLE MAINTAINABILITY					X	X		X*		
3.10.19.2.4.1.1	MHC MAINTAINABILITY					X	X		X*		
3.10.19.3	DURABILITY (FOR ALL MISSION TYPES)					X	X		X*		
3.10.19.3.1	60% probability of completing 32,000 km (20,000 miles) on engine, transmission, transfer case and axles					X	X		X		
3.10.19.3.2	90% probability of completing 32,000 km (20,000 miles) without frame cracking					X	X		X		
3.10.19.3.3	CBT LHS cycle durability of 1380 launch/retrieval cycles					X	X		X		
3.10.20	ELECTROMAGNETIC EMISSIONS AND HIGH ALTITUDE ELECTROMAGNETIC PULSE (HAEMP)										
3.10.20.1	ALL MISSION VARIANTS (OBJECTIVE)					X	X		X		
3.10.20.2	MISSION I, II, III, IV, VA AND VC VEHICLES (THRESHOLD)					X	X		X		

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3.10.20.3	MISSION VB AND VI VEHICLES (OBJECTIVE)					X	X				
3.10.21	NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) WARFARE)	X						X			
3.11	COMPONENTS				X		X	X	X	X	
3.11.1	COMPONENTS AND VEHICLE RATINGS	X						X			
3.11.2.1	ENGINE COOLING SYSTEM										
	a. Meet SAE J1436 requirements	X						X			
	b. Maintain engine operating temperature					X	X	X	X	X	X
	c. Radiator guarded against stone & brush damage				X		X		X		
3.11.2.1.1	FAN CLUTCH			X			X	X	X		
3.11.2.2	PERMANENT OIL FILTRATION										
	a. Filter rating 10 Microns or less	X						X			
	b. Cab indicator lamp				X			X		X	
3.11.2.3	ENGINE SPEED CONTROL										
	a. Tamper resistant				X			X			
	b. Meet FMVSS 574.124 requirements	X						X			
3.11.2.4	AIR CLEANER										
	a. Meet MIL-PRF 62048 requirements	X						X			
	b. Air Cleaner restriction indicator				X		X	X	X	X	
3.11.2.5	RETARDER										
	a. Horsepower Output check	X						X			
	b. Retarder Operational check					X		X		X	X
3.11.3	ELECTRICAL SYSTEM										
	a. Meet FMCSR 393.27 through 393.33 and MIL-STD 1275 requirements	X						X			
	b. 24 V system, 12 or 24 volt lighting system					X		X		X	
	c. On, Off, Start ignition switch				X			X			
	d. Corrosion Resistant wiring	X						X			

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	e. Reverse Polarity Check			X				X			
	f. Circuit Identification Check				X			X		X	
3.11.3.1	ELECTRICAL ACCESSORIES				X			X			
3.11.3.2.1	Mission I, II, III, IV VA and VC Vehicles				X			X			
3.11.3.2.2	Mission VB vehicles				X			X			
3.11.3.3	LIGHTING										
	a. Meet FMVSS 571.108 requirements	X						X			
	b. Brake lights override Hazard lights					X	X	X	X	X	X
	c. All Light Emitting Diodes (LEDs) includes interior lights				X			X		X	X
	d. All indicators and gauges illuminated in Service Mode				X			X		X	X
3.11.3.4	HEADLIGHTS				X			X		X	X
3.11.3.5	WORK LAMPS										
	a. Minimum of 1500 candlepower	X						X			
	a. 4 inch diameter lenses				X			X		X	
	b. On/Off switches on lamps and in drivers area				X			X		X	
	c. Mission III & IV vehicles have two (2) additional demountable worklamps with a cord that can reach 20 feet beyond rear of truck				X			X		X	
3.11.3.6	CONVOY WARNING LIGHTS										
	a. Mounting provision check				X			X		X	
	b. Meet A-A-52418 requirements	X						X			
	c. Deactivation during blackout					X		X			X
	d. 360 degree visibility				X		X	X	X		
3.11.3.7	SECURE LIGHTING					X	X	X	X		
3.11.3.8	RESERVE										
3.11.3.9	WIRING	X						X			
3.11.3.10	BATTERIES										

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3.11.3.11	HORN										
	a. Electric horn conforming to A-A-52525, type II	X						X			
	b. Air horn conforming to A-A-52525, type I	X						X			
	c. Operation of each horn					X		X		X	
3.11.3.12	ELECTRICAL CONNECTORS										
	a. Intervehicular cable & receptacles				X			X		X	
	b. 12 pin NATO connector on rear of vehicle integrated into Blackout system				X			X			
	c. 7 pin connector IAW SAEJ560 on front & rear of vehicle integrated into 12 volt lighting system				X			X			
	d. Corrosion Resistance	X						X			
	e. Trailer Cable requirements				X			X		X	
	f. Cable Length				X			X		X	
	g. Water proof Connections	X						X			
3.11.3.12.1	PLST BRIDGING LIGHT BAR				X			X			
3.11.3.13	INSTRUMENTS/SWITCHES				X	X	X	X	X	X	X
3.11.3.14	MASTER POWER CUTOFF SWITCH					X	X	X	X	X	X
3.11.3.15	RESERVE										
3.11.3.16	DATABUS CONNECTIONS	X						X			
3.11.3.17.1	DIAGNOSTIC CONNECTOR ASSY (THRESHOLD)			X				X		X	
3.11.3.17.2	DIAGNOSTIC CONNECTOR ASSY (OBJECTIVE)			X				X		X	
3.11.2.17.2.1	DATA STORAGE			X				X			
3.11.3.18	BACKUP ALARM			X			X	X	X	X	X
3.11.4	FUEL SYSTEM										
	a. Conforms to FMCSR 393.65 and 393.67 requirements	X						X			
	b. Fuel line routing and protection				X		X	X	X	X	
3.11.4.1	FUEL TANKS										
	a. Corrosion Resistance	X						X			
	b. Equalized Distribution					X		X			
	c. Manual Shut-off				X			X		X	
	d. 3" diameter opening and safety type cap				X			X		X	
	e. Capture chain on cap				X		X	X	X		

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	f. Location of Fill Hole				X		X		X		
	g. Removable strainer and drain plugs				X			X		X	
	h. Sealed filler cap				X			X		X	
	i. Venting system				X			X			
	j. Fill port size					X		X			
3.11.4.2	FUEL/WATER SEPARATOR				X		X	X	X	X	
3.11.5	EXHAUST SYSTEM										
	a. Conforms to FMCSR 393.83	X						X			
	b. Gas tight and leakproof	X						X			
	c. Rain cap				X			X		X	
	d. Corrosion Resistance	X						X			
	e. Guards, shield and personnel protection check				X			X		X	
3.11.5.1	TOXIC GAS EXPOSURE					X	X				
3.11.6.1	TRANSMISSION										
	a. Automatic Transmission					X	X	X	X	X	X
	b. Down Shift Inhibitor System					X	X	X	X	X	X
	c. Starter Interlock					X		X		X	
	d. Gear Range selector				X			X		X	
	e. Neutral Interlock					X		X		X	
3.11.6.2	TRANSFER CASE					X	X	X	X	X	X
3.11.6.3	POWER TAKE-OFF (PTO) OPENINGS										
	a. PTO openings				X			X			
	b. Mission IV vehicle PTO output					X		X			X
	c. Power Assist to Semi-trailer axles				X			X			
3.11.6.4	STEERING										
	a. Full limit steering at GCW					X	X		X		
	b. Emergency Steering					X	X		X		
	c. Dead Engine Steering Test					X	X		X		
	d. Free of interference				X			X		X	X
	e. Permanently Lubricated Joints				X			X		X	
	f. Steering Lock				X			X		X	
3.11.7	EXTERNAL, MHC OR LHS HYDRAULICS				X			X		X	
3.11.7.1	HYDRAULIC RESERVOIR										
	a. Readily accessible filters				X			X		X	
	b. Tank baffles				X			X		X	
	c. Level indicators				X			X		X	
	d. Pressure Vented cap					X		X			X

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	e. Internal accessibility				X			X			
	f. Hydraulic Reservoir Maintenance				X			X			
	g. Hydraulic System Cooler				X			X		X	
3.11.7.2	HYDRAULIC HOSES AND FITTINGS	X						X			
3.11.8.1	AXLE LUBRICATION				X		X	X	X	X	X
3.11.8.2	SUSPENSION				X		X	X	X		
3.11.9	RIMS AND TIRES										
	a. Meets SAE J1992 requirements	X						X			
	b. Conforms to FMVSS 571. 119 & 120 requirements	X						X			
	c. Interchangeable wheel assemblies				X			X			
	d. Tread Life	X			X		X	X	X		
3.11.9.1	SPARE TIRE AND WHEEL ASSEMBLY										
	a. Tire and wheel assembly				X			X		X	
	b. Mechanical Assist Device				X			X		X	
	c. Tools (Jack, Wrenches, etc)				X			X			
	d. Tire change (30 minutes/2 soldiers)			X			X	X	X		
	e. Single Jack Capability			X			X	X	X		
3.11.9.2	RUN-FLAT CAPABILITY (OBJECTIVE)			X				X	X		
3.11.9.3	WHEEL SPLASH AND STONE THROW PROTECTION										
	a. Splash shield and mudflaps				X			X		X	
	b. Conform to SAEJ682	X						X			
	c. Stone and mud protection					X	X	X	X	X	
	d. Compatible with semi-trailer and removable			X			X	X	X	X	
	e. Rear wheel fenders			X			X	X	X	X	
3.11.9.4	TIRE CHAINS				X			X			
3.11.9.5	LIMP HOME CAPABILITY			X			X	X	X		
3.11.9.6	CENTRAL TIRE INFLATION SYSTEM (CTIS)				X		X	X	X	X	
3.11.9.6.1	TIRE PRESSURE CONTROL					X	X	X	X	X	
3.11.9.6.2	SPARE TIRE				X		X	X		X	
3.11.9.6.3	MANUAL TIRE INFLATION/DEFLATION			X				X		X	
3.11.9.6.4	AIR-PRIORITY SYSTEM			X				X		X	

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3.11.9.6.5	SPEED/PRESSURE CONTROL WARNING			X			X	X	X	X	
3.11.9.6.6	MAINTENANCE OF TIRE PRESSURE			X				X			X
3.11.9.6.7	TIME TO INFLATION/DEFLATION					X	X	X	X		X
3.11.10	BRAKE CONFIGURATION										
	a. Conforms to FMVSS & FMCSR	X						X			
	b. Releasable from inside of cab			X				X		X	
3.11.10.1	SPLIT/ APPLY CIRCUITRY					X	X	X	X		
3.11.10.2	TRAILER BRAKE CONTROL SYSTEM				X		X	X	X	X	
3.11.10.3	GLAD HANDS										
	a. Conforms to SAE J318	X						X			
	b. Quantity, location, and marking				X			X		X	
	c. Retention chains for dummy couplers				X			X		X	
3.11.10.4	AIR COMPRESSOR										
3.11.10.4.1	a. Mission I,II,III,IV, VA & VC Vehicles				X			X		X	
3.11.10.4.2	b. Mission VB vehicles				X			X		X	
	1. 30 CFM Minimum capacity	X						X			
3.11.10.5	TRACTION CONTROL					X	X		X		
3.11.10.5.1	ANTILOCK BRAKING SYSTEM (ABS) (OBJECTIVE)										
	a. Conform to FMVSS 571.121					X	X		X		
	b. ABS Operation for Mission VB vehicles					X	X	X	X	X	
	c. ABS operation for Mission I, II,III,IV, VA & VC vehicles					X	X	X	X	X	
	d. ABS/Traction control system compatibility					X	X		X		
	e. Diagnostic Capability			X			X	X	X		
3.11.11.1	TOWING EYES										
	a. Towing eye quantity check				X			X		X	
	b. PLST recoverability			X			X		X		
	c. Towing eyes withstand 60,000 #	X						X			
	d. Tow eyes accept towbars IAW 12322663			X				X			
	e. Tow shackles provided				X			X		X	
	f. Front tow eye location				X			X			

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3.11.11.2.1	MISSION I, II, III, IV, VA and VC VEHICLES										
	a. Conforms to size & strength of DRWG 8710630	X						X			
	b. Safety Chain attachment				X			X		X	
	c. Mounting/reinforcement check				X			X		X	
	d. Location and Height					X	X		X		
3.11.11.2.2	MISSION VB VEHICLES (Threshold)										
	a. Self-Guiding operation					X		X		X	
	b. Safety Chain attachment				X			X		X	
	c. Mounting/lubrication fittings check				X			X		X	
3.11.12	CAB										
	a. Crash protection per FMVSS 571.208	X						X			
	b. Visibility at break over angles			X			X		X		
	c. Cab protection check				X		X	X	X		
3.11.12.1	SEATING										
	a. Air ride seating for two (2) crewmembers				X		X	X	X		
	b. Seats adjustable, fore & aft, up & down					X		X		X	
3.11.12.2	WINDSHIELD AND WINDOWS										
	a. Solar glare reducing glass	X						X			
	b. Sun Visor operation check					X		X		X	
	c. Mechanical detent keeps visors in place.			X				X		X	
3.11.12.3	WINDSHIELD WIPERS & WASHERS										
	a. Multi-speed wiper motor check					X		X		X	
	b. Washer reservoir capacity check				X			X			
	c. Wipers/washers meet FMVSS 571.104 & SAE J198	X						X			
3.11.12.4	VEHICLE CAB INTERIOR										
	a. Proper Interior color				X			X		X	
	b. First Aid Kit installed – Check for mounting provisions in cab. First aid kit is in packaged BII and not checked at QCI.			X	X			X		X	



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	c. Fire Extinguisher meeting FMCSR 393.95 installed – Check for mounting provisions in cab. Fire extinguisher is in packaged BII and not checked at QCI.	X		X	X			X		X	
	d. Cab undercarriage and doghouse insulation				X			X		X	
3.11.12.5	CAB FLOOR DRAINS				X			X		X	
3.11.12.6	CHEMICAL PROTECTIVE EQUIPMENT STORAGE				X		X	X	X		
3.11.12.7	M4/M16 RIFLE MOUNTING			X	X			X	X	X	
3.11.12.8.1	HEATER & DEFROSTER										
	a. Heater, Defroster and Blower provisions and operation					X		X		X	X
	b. Temperature check (-25 degrees to +41 degree F within 45 minutes of vehicle starting					X	X		X		
	c. Windshield defrost/defog IAW SAE J382 Area “A” at ambient temperatures of down to -50 degrees F (-46 degrees C) within 1 hour when tested IAW SAE J381					X	X		X		
3.11.12.8.2	CAB COOLING				X			X		X	
3.11.12.9	REAR VIEW MIRRORS										
	a. Mirrors conform to A-A 52432	X						X			
	b. Mirrors foldable towards body			X				X		X	
	c. Mirrors vibration free					X		X		X	
	d. Folding spotter mirror							X			
3.11.13	VEHICLE SECURITY				X			X		X	
3.11.14	STOWAGE										
	a. Stowage space with latching device check			X			X	X	X		
	b. Drain holes				X			X			
	c. BII stowage capability			X				X			
	d. BII protection				X			X		X	
3.11.15	RESERVED										
3.11.16	CONTROLS & CONTROL CABLES										
	a. Conforms to FMVSS 571.101 and 571.102	X						X			
	b. Operation					X		X		X	
3.11.17	REAR REFLECTIVE SIGNATURE										
	a. Conform to FMVSS 571.108	X						X			
	b. Application				X			X		X	
3.11.18	COLLISION WARNING SYSTEM										
	a. Visible and audible alarms			X				X		X	
	b. Compute closing speeds					X	X		X		

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		CERT	ANLS	DEM O	EXA M	TES T	PVT	FPVI	FPT	QC I	CN T
	c. Front antenna range					X	X		X		
	d. Side blind spot indicator				X		X	X	X	X	
	e. Environmental Operations					X	X		X		
	f. Operation					X		X		X	
3.11.19	KITS										
	a. Installation			X			X		X		
	b. Mounting holes shall be filled with threaded fasteners				X			X		X	
3.11.19.1	ENGINE ARCTIC KIT										
	a. Heater installed				X			X		X	
	b. Heater operational test					X	X		X		
3.11.19.2	Reserved										
3.11.19.3	MACHINE GUN MOUNTING INTERFACE KIT										
	a. Machine Gun mounting kit installed				X			X		X	
	b. Machine Gun mount location				X			X			
	c. Operational check with M60, M2, MK 246					X	X		X		
	d. 360 degree traverse check					X	X		X		
	e. Protective Cover				X			X		X	
3.11.19.4	CARGO COVERING										
	a. Meets MIL-PRF 20696, Type I, Class 2 requirements	X						X			
	b. Vehicle height with tarps and bows installed NTE 11ft, 11 in					X		X			
3.11.19.5	GAS PARTICULATE FILTER UNIT (GPFU) INTERFACE KIT			X	X		X	X	X		
3.11.19.6	CHEMICAL ALARM INTERFACE KIT										
	a. Design and fabricate kits for Mission I,II, III,IV,VA,VC vehicles			X				X		X	
	b. Detector and alarm mounting for Mission VB vehicles				X			X		X	
	c. 10 minute installation using on-board tools			X			X	X	X		
3.11.19.7	DECONTAMINATION APPARATUS INTERFACE KIT			X	X		X	X	X		
3.11.19.8	UNIVERSAL POWER INTERFACE KIT (UPIK) LHS VARIANTS VA,VB & VC ONLY										
	a. Location of kit mounting				X			X		X	
	b. Hydraulic power check- 30 gallons @ minute at 3000 psi					X	X	X	X		X
	c. Electric (25 amps @ 12 Volts and 25 amps @ 24 Volts					X	X	X	X		X
	d. Pneumatic (20 cubic feet/minute at 120 psi)					X	X	X	X		X
	e. Interlocks to prevent LHS operation while UPIK connected.					X		X			



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3.11.19.9	CREW COMPARTMENT PROTECTION KIT				X		X	X	X		
3.11.19.10.1	Mission I, II, III, IV, VA & VC Vehicles Self-Recovery Winch (threshold)										
	a. Location check				X			X		X	
	b. Winch Performance					X	X	X	X		X
	c. Cable length check				X			X			X
	d. Controls/Rollers/Clevis Ends				X			X		X	X
	e. Snatch block check				X			X		X	
	f. Design meets SAE J706 requirements	X						X			
	g. Tension mechanism check				X			X		X	X
3.11.19.10.2	Mission VB Vehicles Self-Recovery Winch (threshold)										
	a. Location check				X			X		X	
	b. Winch Performance					X	X	X	X		X
	c. Cable length check				X			X			X
	d. Controls/Rollers/Clevis Ends				X			X		X	X
	e. Snatch block check				X			X		X	
	f. Design meets SAE J706 requirements	X						X			
	g. Tension mechanism check				X			X		X	X
3.11.19.10.3	SELF-RECOVERY WINCH (OBJECTIVE)										
	a. Accessibility							X			
	b. Winch performance						X				
3.11.19.11	EXTENDED DRAWBAR KIT					X	X	X	X	X	
3.11.19.12	BRIDGING LIGHT BAR KIT				X			X		X	
3.11.20	ADDITIONAL PROVISIONS (vehicle will have space for the following items...)										
3.11.20.1	ASSET TRACKING SYSTEM (MTS & FBCB2)				X			X			
3.11.20.2	DRIVER'S VISION ENHANCER (DVE)				X			X			

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		CERT	ANLS	DEM O	EXA M	TES T	PVT	FPVI	FPT	QC I	CN T
3.11.20.3	AUTOMATIC ASSET IDENTIFICATION				X			X			
3.11.20.4	IDENTIFYING FRIEND OR FOE (IFF) DEVICES				X			X			
3.11.20.5	SELF-DEFENSE				X			X			
3.12.1	MISSION IA VEHICLE TYPE – LIGHT CARGO										
3.12.1.1	CARGO BODY										
	a. Payload Capacity Check					X		X			X
	b. Side, head & tailgate/dimensional check, removable			X		X	X	X	X		
	c. Cargo covering tiedowns				X			X		X	
3.12.1.1.1	CARGO TIEDOWNS										
	a. Meet MIL-STD 209 requirements	X				X	X	X			
	b. Quantity and spacing				X			X		X	
	c. ¼" hole in tiedowns				X			X		X	
3.12.1.2	MATERIAL HANDLING CRANE (MHC)										
	a. Operation					X		X		X	
	b. Conforms to OSHA & ASME B30.5	X						X			
3.12.1.2.1	LOCATION AND CAPABILITY					X		X		X	X
3.12.1.2.2	STABILIZING SYSTEM										
	a. Slope requirements					X		X			X
	b. Conforms to ASME 30.5	X						X			
	c. Safety switch					X		X		X	
3.12.1.2.3	CRANE CONTROLS										
	a. Operation					X		X		X	
	b. Creep test					X		X			X
	c. Control Labels				X			X		X	
3.12.1.2.4	REMOTE CONTROL										
	a. Operation & Storage Location					X		X		X	
	b. Cable length					X		X			X
	c. Drain holes					X		X		X	
	d. Door seal				X			X		X	
	e. Shock resistant	X						X			
	f. Meet MIL-STD-810, method 512.4, procedure I	X						X			
	g. Meet MIL-STD-810, method 516.5, procedure IV	X						X			
3.12.1.2.5	OVERLOAD SHUTDOWN SYSTEM					X	X	X	X	X	
3.12.1.2.6	LOAD CAPACITY CHART				X			X		X	

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3.12.1.2.7	LINE LOAD WINCH										
	a. Line load capacity					X		X			X
	b. Conforms to ASME B30.5	X						X			
	c. Operation					X		X		X	
3.12.2.1	CARGO BODY, Heavy										
	a. Payload capacity check					X		X			X
	b. Side, head & tailgate/ dimensional check, removable			X		X	X	X	X		
	c. Cargo covering tiedowns				X			X		X	
3.12.2.1.1	CARGO TIEDOWNS										
	a. Meets MIL-STD 209 requirements	X						X			
	b. Quantity , Spacing & location				X			X		X	
	c. Pod feet retainers and tiedowns				X			X		X	
	d. ¼ " drain holes in tiedowns				X			X		X	
3.12.2.2	MATERIAL HANDLING CRANE (MHC) (SAME AS 3.12.1.2.2)										
3.12.2.2.1	LOCATION AND CAPABILITY					X		X		X	
3.12.2.2.2	STABILIZING SYSTEM (SAME AS 3.12.1.2.2)										
3.12.2.2.3	CRANE CONTROLS (SAME AS 3.12.1.2.3)										
3.12.2.2.4	REMOTE CONTROL (SAME AS 3.12.1.2.4)										
3.12.2.2.5	OVERLOAD SHUTDOWN SYSTEM (SAME AS 3.12.1.2.5)										
3.12.2.2.6	LOAD CAPACITY CHART (SAME AS 3.12.1.2.6)										
3.12.2.2.7	LINE LOAD WINCH (SAME AS 3.12.1.2.7)										
3.12.3	MISSION II VEHICLE TYPE - TANKER										
3.12.3.1	OPERATION										
	a. Automatic Bottom load					X		X		X	
	b. Bulk Unload filtered and unfiltered fuel, 260-300 gpm					X		X		X	
	c. Gravity discharge through bulk discharge port with 4" pipe & hose, unfiltered fuel					X		X		X	
	d. Automotive fuel servicing, metered, filtered fuel with flow control valve			X				X			

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	e. Overwing aircraft servicing, metered filtered fuel, with flow control valve			X			X		X		
	f. Aircraft closed circuit refueling and D-1 , metered, filtered fuel, 100 gpm per hose			X			X		X		
	g. Defuel nozzle tube and evacuate hoses			X				X		X	
	h. Recirculate through all lines and hoses, D1 receptacle, D-1 type nozzle			X				X		X	
3.12.3.1.1	REGULATIONS	X						X			
3.12.3.1.2	FUEL TANK SELF SEALING (FTSS) SYSTEM				X			X			
3.12.3.2	CAPACITY					X	X	X	X	X	
3.12.3.3	SPACE ALLOCATION				X			X			
3.12.3.4	BULK DISCHARGE PORT HOSE										
	a. Hose length (15 ft) check					X		X		X	
	b. Conforms to A-A-59326/6 Class 1, 3 inch coupling	X						X			
	c. Pressure rating suitability for tanker requirements				X			X			
3.12.3.5.1	EMERGENCY VALVE				X	X		X		X	
3.12.3.5.2	METERING					X		X		X	
3.12.3.5.3	BOTTOM LOADING			X		X		X		X	
3.12.3.5.4	CONNECTORS				X		X	X	X	X	
3.12.3.5.5	HOSES AND REELS										
	a. Qty/Length of hoses/Quick connect fittings				X			X		X	
	b. Hoses meet API Std 1529, Grade 1 Type C requirements	X						X			
	c. Static Ground reel checks				X			X		X	
3.12.3.5.6	NOZZLES				X	X		X		X	
3.12.3.5.7	FILTER SEPARATOR										
	a. Completeness				X			X		X	
	b. Meets MIL-PRF-52308 requirements	X						X			
3.12.3.5.8	SAMPLING PROBE				X			X		X	
3.12.3.5.9	ALTERNATE BACK-UP FUEL DELIVERY					X		X		X	
3.12.3.5.10	TANK FUEL LEVEL INDICATOR				X			X		X	
3.12.3.5.11	GAGES				X			X		X	
3.12.3.5.12	PUMP MODULE LOCKING PROVISIONS				X			X		X	
3.12.3.6	FIRE EXTINGUISHER				X			X		X	
3.12.3.7	SYSTEM DRAIN				X			X		X	

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3.12.3.8	TANKER ACCESS LADDER				X			X		X	
3.12.4.1	RECOVERY AND RETRIEVAL (TOWING AND LIFT/TOWING) WRECKER										
3.12.4.1.1	RECOVERY			X			X		X		
3.12.4.1.2	RETRIEVAL			X			X		X		
3.12.4.1.3	RETRIEVAL SYSTEM			X			X		X		
3.12.4.1.4	RECOVERY ANGLES			X			X		X		
3.12.4.1.5	RETRIEVAL HEIGHT					X		X		X	
3.12.4.1.6	CHOCK PROVISIONS				X			X		X	
3.12.4.2.1	POWER PACK REMOVAL & INSTALLATION			X			X		X		
3.12.4.2.2	POWER PACK TRANSPORT			X			X		X		
3.12.4.2.3	GUN TUBE & MOUNT REMOVAL/ INSTALLATION			X			X		X		
3.12.4.3	MATERIAL HANDLING CRANE (MHC) (SAME AS 3.12.1.2)										
3.12.4.3.1	LOCATION & CAPABILITY										
	a. Crane location (rear of truck)				X			X			
	b. Lifting capability (7,500 lbs. @ 11 feet					X		X		X	
	c. Working traverse (370 degrees)					X		X		X	
	d. 125% static capacity check					X		X		X	
	e. Lift checks					X		X		X	
3.12.4.4	STABILIZING SYSTEM (SAME AS 3.12.1.2.2)										
3.12.4.5	CRANE CONTROLS (SAME AS 3.12.1.2.3)										
3.12.4.6	CRANE REMOTE CONTROL (SAME AS 3.12.1.2.4)										
3.12.4.7	OVERLOAD SHUTDOWN SYSTEM (SAME AS 3.12.1.2.5)										
3.12.4.8	LOAD CAPACITY CHART (SAME AS 3.12.1.2.6)										
3.12.4.9	SELF-RECOVERY WINCH (SAME AS 3.11.19.10)										
3.12.4.10	HEAVY DUTY RECOVERY WINCH										
	a. Meet SAE J706	X						X			
	b. Length of useable wire (185 feet required)				X			X		X	
	c. Max operational rating (line pull) check					X		X			X



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3.12.4.10.1	HEAVY DUTY RECOVERY WINCH SYSTEMS AND CONTROLS										
	a. Side mounted controls				X			X			
	b. Remote control with 35 foot cord (Threshold)				X			X			X
	c. Wireless remote operations within 35 feet of back of vehicle					X		X		X	
3.12.4.11	Reserved										
3.12.4.12	Reserved										
3.12.4.13	ANCHOR/SPADE DEPLOYMENT			X			X		X		
3.12.5	MISSION IV VEHICLES - TRACTOR										
3.12.5.1	FIFTH WHEEL										
	a. Full oscillating, 36 in diameter fifth wheel with fork and locks for SAE J848, 3.5" kingpin				X			X		X	
	b. Side uncoupling operation			X				X		X	
	c. Secondary manual lock			X				X		X	
3.12.5.1.1	SWING CLEARANCE			X			X		X		
3.12.5.1.2	MOUNTING	X						X			
3.12.5.1.3	FIFTH WHEEL HEIGHT					X		X		X	
3.12.5.2	MAINTENANCE PLATFORM				X			X		X	
3.12.5.3	HOSE TENDER AND CABLE SUPPORTS				X			X		X	
3.12.5.4	TOWED VEHICLES			X			X		X		
3.12.5.5	Reserved										
3.12.5.6	EXTERNAL OR MHC HYDRAULICS (SAME AS 3.12.1.2.3)										
3.12.5.7	SPARE TRAILER TIRE				X			X		X	
3.12.5.8	NATO CONNECTORS				X			X			
3.12.5.9	MISSION IVA2 SPECIFIC REQUIREMENTS										
3.12.5.9.1	EQUIPMENT RECOVERY WINCH										
	a. Location check				X			X		X	
	b. Design meets SEA J706 requirements	X						X			
	c. Winch performance					X	X	X	X		X
	d. Cable length check				X			X			X
	e. Tension mechanism check				X			X		X	X
	e. Clevis check stowage				X			X		X	X
3.12.5.9.1.1	EQUIPMENT RECOVERY WINCH SYSTEM AND CONTROLS										
	a. Cable length				X			X			X

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	b. Location				X			X			X
	c. Performance					X	X	X	X		X
3.12.5.9.2	ADDITIONAL STOWAGE BOX				X			X		X	X
3.12.5.9.3	AUXILLIARY HYDRAULIC POWER CONNECTION				X			X		X	X
3.12.5.9.4	FIFTH WHEEL RAMP ASSY				X			X		X	X
3.12.6	MISSION VA, VB AND VC VEHICLES - LIGHT & HEAVY LOAD HANDLING SYSTEMS (LHS) AND COMMON BRIDGE TRANSPORTER (CBT)			X				X		X	
3.12.6.1	LIFTING CAPABILITY			X				X		X	
3.12.6.2	LOADING/UNLOADING TIME a. Load /unload fully loaded FR to/from truck in one (1) minute			X				X		X	
3.12.6.3	HEIGHT LIMITATIONS					X	X	X	X		
3.12.6.4	CBT BRIDGE BAY WATER LAUNCH AND RETRIEVAL					X	X	X	X		
3.12.6.5	FR/CONTAINER/BAP LOCKING			X			X	X	X	X	X
3.12.6.6	LHS OVERLOAD					X	X	X	X	X	
3.12.6.7	SLAVE HYDRAULICS										
	a. Hose Characteristics				X			X		X	
	b. Emergency BAP removal			X				X			X
3.12.6.8	HYDRAULIC SYSTEM AND CONTROLS			X	X			X		X	
3.12.6.8.1	HYDRAULIC SYSTEM CLEANLINESS	X						X			
3.12.6.8.2	MANUAL OPERATION OF SOLENOID CONTROL VALVES			X				X			X
3.12.6.9	MATERIAL HANDLING CRANE (MHC) FOR MISSION VB2 VEHICLES (SAME AS 3.12.1.2)										
3.12.6.9.1	LOCATION AND CAPABILITY										
	a. Lifting 3900 # from FR					X		X		X	
	b. Lift radius check					X		X		X	
	c. Working traverse of 180 degrees					X		X		X	
	d. Capacity Check (125%)					X		X		X	
	e. Complies with OSHA safety standards	X						X			
3.12.6.9.2	STABILIZING SYSTEM (SAME AS 3.12.1.2.2)										
3.12.6.9.3	CRANE CONTROLS (SAME AS 3.12.1.2.3)										
3.12.6.9.4	FIXED OPERATOR'S STATION										
	a. Operation				X	X		X		X	
	b. Meet MIL-STD-810	X						X			

SECT. 3	PARAGRAPH TITLE	VERIFICATION METHOD					VERIF. CLASS/EVENT				
		<u>CERT</u>	<u>ANLS</u>	<u>DEM</u> <u>O</u>	<u>EXA</u> <u>M</u>	<u>TES</u> <u>T</u>	<u>PVT</u>	<u>FPVI</u>	<u>FPT</u>	<u>QC</u> <u>I</u>	<u>CN</u> <u>T</u>
3.12.6.9.5	REMOTE CONTROL (SAME AS 3.12.1.2.4)										
3.12.6.9.6	OVERLOAD SHUTDOWN SYSTEM (SAME AS 3.12.1.2.5)										
3.12.6.9.7	LOAD CAPACITY CHART (SAME AS 3.12.1.2.6)										
3.12.6.9.8	LINE LOAD										
	a. Line load capacity & Operation					X		X		X	
	b. Conforms to ASME B30.5	X						X			
3.12.6.9.9	BOOM ANGLE INDICATOR			X	X			X		X	
3.12.6.10	CBT OPERATOR'S PLATFORM				X			X		X	
3.12.6.11	CBT PNEUMATIC SYSTEM PERFORMANCE			X				X		X	
3.12.6.12	By-Wire Active Safety										
3.12.6.13	Reserved										
3.12.7	MISSION VI VEHICLES – PLS TRAILER (PLST)					X		X		X	
3.12.7.1	DRAWBAR			X				X		X	
3.12.7.2	BACKING ASSIST DEVICE			X				X		X	
3.12.7.3	STOWAGE BOX				X			X		X	
3.12.7.4	PLST EQUIPMENT				X			X		X	
3.12.7.5	SAFETY CHAINS										
	a. Chains available				X			X		X	
	b. Meets SAEJ697	X						X			
3.12.7.6	CONTAINER/SHELTER TRANSPORT			X			X	X	X		
3.12.7.7	FR/CROP LOADING			X				X		X	
3.13	Reserved										
3.14	WORKMANSHIP				X	X	X	X	X	X	
3.15	SERVICING & ADJUSTING				X	X	X	X	X	X	

#### 4.4 First Production Vehicle Inspection.

4.4.1 In-Process Inspection. During fabrication of first production vehicle, in-process inspections shall be performed by the contractor and witnessed by government representatives, to evaluate conformance to the section 3 requirements referenced in Table V for those items and/or processes which can not be evaluated once the end item is in its final form. In addition, evaluation of process controls and workmanship shall be made at this time. During the inspection, the contractor shall have available for review and evaluation the following records: quality manual (or appropriate document) work instructions, process procedures, inspection records, and welder certifications. When directed by the government, these inspections shall be made prior to the application of primer and paint.

4.4.2 Contractor Inspection. The first production vehicle shall be inspected by the contractor, as a minimum, to the requirements of Table V. Upon completion of inspection, the contractor shall submit this vehicle, and all records associated with its inspection, to the designated government element for review and/or additional verification. The government reserves the right to witness and/or participate in this inspection.

4.4.3 First Production Vehicle Disposition. When required by contract, the vehicle, which was used for First Production Vehicle Inspection, shall remain at the manufacturer facility as a manufacturing standard and shall be the last vehicle delivered on the contract.

4.5 Production Verification Test. Upon completion of First Production Vehicle Inspection, one or more production vehicles shall undergo production verification testing at a designated government approved test site to evaluate conformance to section 3 requirements as referenced in Table V. When required by contract, after completion of Production Verification Test, test vehicle(s) shall be updated to the approved final first article configuration. Unless otherwise stated in the contract, Production Verification Test, test vehicles will be operated in accordance with the test profile (Table VI, VII, VIII, IX, X) below:

TABLE VI - 20,000 MILE DURABILITY TEST PROFILE

Mission I, II, III, IV, VA and VC Vehicles - Threshold

%	TERRAIN	AVERAGE SPEED	TOTAL MILES	MILES (PER INTERVAL)
15	Hard Surface	45-55 mph	3,000	(150)
75	Secondary Road	30-45 mph	15,000	(750)
5	Cross Country - Level	10-30 mph	1,000	(50)
5	Cross Country - Hilly	5-15 mph	1,000	(50)

## Mission I, II, III, IV, VA and VC Vehicles - Objective

%	TERRAIN	AVERAGE SPEED	TOTAL MILES	MILES (PER INTERVAL)
15	Hard Surface	45-55 mph	3,000	(150)
25	Secondary Road	30-45 mph	5,000	(250)
10	Cross Country	10-30 mph	2,000	(100)
50	Trails	5-15 mph	10,000	(500)

Note: All test distances are to be accomplished with the PLST payloaded to its maximum required capacity of the towing vehicle payload, 50% of the time, 1/2 maximum required capacity 25% of the time, and no load 25% of the time.

TABLE VII - 20,000 MILE DURABILITY TEST PROFILE

## Mission VB and VI Vehicles

%	TERRAIN	AVERAGE SPEED	TOTAL MILES	MILES (PER INTERVAL)
20	Primary Road	45-55 mph	4,000	(200)
50	Secondary Road	30-45 mph	10,000	(500)
15	Trails (0.5 – 1.5 RMS Elevation)	10-30 mph	3,000	(150)
15	Rough Trails (1.5 – 2.0 RMS Elevation)	5-15 mph	3,000	(150)

Note: All test distances are to be accomplished with the PLST payloaded to its maximum required capacity, 50% of the time, 1/2 maximum required capacity 25% of the time, and no load 25% of the time. Trailer test distances shall be equally accumulated with both prime movers with MHC and prime movers without MHC.

TABLE VIII  
TEST SCENARIO CYCLING PER FLATRACK - PRIME MOVER

%	TERRAIN	TOTAL MILES	TOTAL CYCLES
20	Primary Road	1,200	20
50	Secondary Road	3,000	50
15	Trails (0.5 – 1.5 RMS Elevation)	900	15
15	Rough Trails (1.5 – 2.0 RMS Elevation)	900	15

TABLE IX

## TEST SCENARIO CYCLING PER FLATRACK - TRAILER

%	TERRAIN	TOTAL MILES	TOTAL CYCLES
20	Primary Road	1,200	20
50	Secondary Road	3,000	50
15	Trails (0.5 – 1.5 RMS Elevation)	900	15
15	Rough Trails (1.5 – 2.0 RMS Elevation)	900	15

4.6 Quality Conformance Inspection. Each vehicle produced shall undergo a complete final inspection by the contractor to the degree necessary to assure a defect free product. This inspection shall include those section 3 requirements as referenced in Table V. The Quality Conformance Inspection shall be conducted and documented using a contractor prepared and government approved Final Inspection Record.

4.7 Control Test. To demonstrate continuous control of the manufacturing operation, Control Tests shall be conducted by the Contractor at the manufacturing facility. The Contractor shall conduct all tests referenced in Table V. Mission I, II, III, VA and VC Vehicles shall be tested at GVW payloads as specified in Table IV. Mission IV Vehicles shall be tested at GCW payload as specified in Table IV with a surrogate trailer. Mission VB1 and VB2 Vehicles shall be tested at GCW payloads as specified in Table IV with the PLST. All payloads shall be actual or simulated. The test vehicle shall be operated for a minimum of 50 miles on a hard surface road. After the road test the vehicle shall be examined for leaks, damage, cracks, and permanent set. The Government may elect to witness and participate in any or all testing.

4.8 Follow-on Production Test (FPT). When required by contract, one production vehicle shall undergo Follow-on Production Testing at a designated government approved test site to evaluate continued conformance to section 3 requirements as referenced in Table V. Test shall be 6,000 miles, matching the terrain and load percentages in Tables VI and VII.

4.8.1 Test deficiencies. Test vehicle deficiencies found during or as a result of the Follow-on Production Test may result in the Government stopping acceptance on subsequent vehicles until the conditions causing failures have been corrected by the contractor. All corrective actions carried out as a result of the deficiencies found during or as a result of FPT may be successfully demonstrated during a full retest to the portion of the FPT as directed by the Government Contracting Officer.

4.9 Repair of defects. Defects noted during the above Verification Matrix inspections shall be corrected by the contractor at no additional cost to the Government. Vehicles shall not be shipped for any Government testing until all inspection defects have been corrected and approved by the Government Contracting Officer.

## 5. PREPARATION FOR DELIVERY

5.1 Vehicles. Vehicles shall be processed in accordance with the contract and the approved Equipment Preservation Data Sheets (EPDS). Vehicles shall be provided for drive-away capability unless otherwise specified.

5.2 Basic Issue Items. Basic Issue Items shall be preserved, packaged and packed into wood boxes and be packed separately from other equipment.

5.3 Deprocessing instructions. The contractor shall prepare deprocessing instructions for each vehicle that will enable receiving personnel to place the vehicle in full operation condition.

5.4 Marking. The vehicles and shipping containers shall be marked in accordance with MIL-STD-129 for Department of Defense shipments.

## 6. NOTES

6.1 Intended use. The intended use of this system is combat support, through the transport of mass quantities of ammunition from the corps area forward.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, Number and Date of specification
- b. Quantity of initial production vehicles
- c. Arctic kit, manufacturer furnished and installed, if required
- d. Alternator kit, manufacturer furnished and installed, if required
- e. Machine gun mounting kit, manufacturer furnished and installed, if required
- f. Gas Particulate Filter Unit kit, manufacturer furnished and installed, if required
- g. Chemical Alarm kit, manufacturer furnished and installed, if required
- h. Decontamination Apparatus kit, manufacturer furnished and installed, if required
- i. Self Recovery Winch kit, manufacturer furnished and installed, if required
- j. FR Sideboard Kit, manufacturer furnished and installed, if required
- k. Welding Procedures
- l. First Article Test

m. Certifications

n. Material Handling Crane, manufacturer furnished and installed, if required

6.3 Definitions. For the purpose of this specification the following definitions shall apply.

6.3.1 After market part. Any part or component that has been manufactured or fabricated by a company other than the original equipment manufacturer or their approved subcontractors, and sold as a replacement part for an OEM part or component.

6.3.2 Condition Code A. Serviceable without qualification. New, used, repaired or reconditioned material that is serviceable and issuable to all customers without limitation or restriction. Includes material with more than 6 months shelf life remaining, level of preservation and packaging is not a restriction for issue.

6.3.3 Cone Index (CI). An index of the shearing resistance of a medium at any depth by a penetrometer. The resistance to penetration by a 30 degree cone with a 0.5 square inch circular base is expressed in pounds of force on the handle per square inch of the base area. In the basic Waterways Experiment Station (WES) Vehicle Cone Index (VCI) system the CI is considered as an index only, and no direct meaning is assigned to it's dimensions.

6.3.4 Cycle. A cycle shall start when a FR loaded to a predetermined payload is on the ground, and the LHS is in a secure non-load/unload position at the front of the truck. Next the LHS shall attach to the FR, load and secure it to the truck. Next the LHS shall unsecure the FR and unload it to the ground, and finally the LHS will return to it's original position.

6.3.5 Disassembly. The disassembly of the truck and its components to a level that allows a thorough inspection.

6.3.6 FR Degradation. Cracked welds, cracked material, permanent deformation, or any other indication of a decline of the structural integrity of the FR.

6.3.7 Gross Combination Weight (GCW). The GCW shall be defined as the sum of the GVW and the maximum towed load.

6.3.8 Gross Vehicle Weight (GVW). The GVW shall be defined as the sum of the VCW and the payload.

6.3.9 Mission-Oriented Protective Posture MOPP IV. The highest level of individual protection during chemical or germ warfare to facilitate mission accomplishment. Overgarments, overboots, mask/hood and gloves will be worn at this level of protection.

6.3.10 Modernization. Replacing obsolete and/or unsupportable functional components and parts with those that are used on the manufacturer's current production model.



6.3.11 Nonserviceable part. Any part that no longer can be reconditioned to meet the minimum OEM standards.

6.3.12 OEM. The original equipment manufacturer that originally manufactured, fabricated or supplied a part. OEM may also refer to a subcontractor that manufactured or fabricated an item from an original equipment manufacturer.

6.3.13 Paint, corrosion and rust removal. The removal of paint to a degree that allows for a thorough inspection and proper sanding, repainting and the removal of all corrosion and rust.

6.3.14 Primary Roads. Two or more lanes, all weather, maintained, hard surface (paved) roads with good driving visibility used for heavy and high density traffic. These roads have lanes with a minimum width of 108 inches (2.75 M), road crown to 20 degrees and the legal maximum GVW/GCW for the country or state is assured for all bridges. These roads are surfaces having Root Mean Square (RMS) value of 0.1 inch (2.54 mm).

6.3.15 Rating Cone Index (RCI). The product of the measured CI and the RI of the same layer.

6.3.16 Reconditioning. The disassembly, cleaning, repair and/or replacement, testing and inspection, based on the OEM's specifications of all functional and structural components and parts of an end item to restore the item to such mechanical condition that its performance characteristics shall be equal to that of a new item of the same type.

6.3.17 Remolding Index (RI). A ratio that expresses the proportion of original strength of a medium that will remain under a moving vehicle. The ratio is determined from CI measurements made before and after remolding a 6 inch long sample using special apparatus.

6.3.18 Rough Trails. Vehicle operations over terrain not subject to repeated traffic in addition, no roads, routes, well-worn trails or man made improvements exist (This definition does not apply to vehicle test courses which are used to simulate cross-country terrain). These are surfaces having an RMS value varying between 1.5 inches (38.1 mm) - 2.0 inches (50.8 mm).

6.3.19 Secondary Roads. Two lanes, all weather, occasionally maintained, hard or loose surface (e.g., large rock, paved, crushed rock, gravel) intended for medium-weight, low-density traffic. These roads have lanes with minimum width of 98.5 inches (2.5 M) and no guarantee that the legal maximum GVW/GCW for the country or state is assured for all bridges. These roads are surfaces having a RMS value varying between 0.3 inch (7.63 mm) - 0.6 inch (15.24 mm).

6.3.20 Seep. Any recurring evidence of fluid beyond the seal that does not result in formation of a droplet.

6.3.21 Serviceable part. Any part that is capable of meeting or exceeding the minimum OEM standards for performing the function for which it was originally designed.

6.3.22 Trails. One lane, dry weather, unimproved, seldom maintained loose surface roads, intended for low density traffic. Trails have a minimum width of 98.5 inches (2.5 M), no large obstacles (boulders, logs, stumps) and no bridging. These are surfaces having an RMS value varying between 0.5 inches (12.7 mm) - 1.5 inches (38.1 mm).

6.3.23 Vehicle Cone Index (VCI). The minimum soil strength in the critical soil layer in terms of RCI for fine grained soils, and CI for coarse grained soils, required for a specific number of passes of a vehicle. VCI1 indicates only 1 (one) pass.

6.3.24 Vehicle Curb Weight (VCW). The VCW shall include the weight of the truck (or trailer), including MHC (if applicable), with all kits (not including – cab armor kit, Gunner’s Protection kit), attachments, accessories, equipment, BII and full complement of fuel, lubricants, coolants, hydraulic fluid and crew. It shall not include the weight of the FR.

6.3.25 Threshold. An item or requirement is considered a threshold requirement when it is mandated that this item or requirement shall be met with this purchase description. Requirements within this document without a specified designation of either threshold or objective are considered threshold values.

6.3.26 Objective. An item or requirement is considered an objective when it is not required to be met with this performance description. It is optional for the manufacturer to meet these requirements. When a single item or requirement has both a threshold and objective, the manufacturer has the option of meeting the threshold, the objective, or both. The manufacturer must at a minimum meet one of these options. If there is a conflict over the threshold and objective requirements stated in this document, the threshold shall be used.

6.4 Vehicle overspray. The following items shall not be painted/oversprayed:

- Air Springs (Air Bags)
- Data Plates
- Fuel/Water Separator Plastic Bowl
- ~~Air Drain Valves on Air Tanks (Pull Cable Type)~~
- ~~Self Recovery Winch Cables~~
- ~~Tire Davit Winch Cables~~
- Axle Air Vent Valves
- Mud Flaps
- ~~Brake Caging Bolts, Nuts and Rust Caps~~
- Tires
- Reflectors and Clearance Light Lens
- Sight Indicators for Fluid Levels
- Fuel Tank Fill Lines (Painted on Outside of Tank)
- ~~Hydraulic Hoses~~
- ~~Air Hoses and Air Lines~~
- ~~Wire Connections and Harnesses~~
- Chrome Plating on Hydraulic Cylinders
- ~~Rubber Mounts — Cab, Engine, Transmission, Engine Computers, etc.~~

Engine Exhaust Ducting  
 Electrical Connectors, Proximity Switches, Limit or Position Switches  
 Door Seals, BII Storage Box Door Seals  
 Engine Hood Rubber Flaps  
 Material Handling Crane Turn Table Gear Teeth  
 Fifth Wheel Surface  
~~Rollers (i.e. PLS and HEMTT M1977 Loading Rollers)~~  
 Quick Release Pins, Snap Rings and Telescoping Tubes or Tow Bars  
 Safety Straps (i.e. Spare Tire Mounting)  
 Rubber Protective Covers  
~~Rubber Strips under Fuel Tank Mounting Straps~~  
 Air Connections (Glad Hands)  
 Composite Light Lens  
 Oil Filter Cartridges  
 HEMTT/HET Anchor Rod (Pogo Stick) – NSN 4030-01-306-4526  
 HEMTT/HET Nonmetallic Hose Set – NSN 4720-01-106-9681  
 M983 LET Quick Disconnect – NSN 4730-01-519-2280  
 M983 LET Quick Disconnect – NSN 4730-01-519-2285  
 M1977 CBT Quick Disconnect – NSN 4730-01-025-4918  
 M1977 CBT Quick Disconnect – NSN 4730-01-024-1347

## APPENDIX A

## WATERPROOF VERIFICATION TEST PROCEDURE

## PROCEDURE 1 - Pretest Performance Record.

Step 1 - Prior to submersion, rotating (continuous operation) and non-rotating components shall be installed in a test circuit equivalent to their normal dry environment and operated both mechanically and electrically, as applicable, for a period of 30 minutes at full rated current and voltage. Rotating (intermittent operation) components, shall be operated three times for 30 seconds each. Operation shall be with no load, at reduced voltage (18-20 volts), at five minute intervals shall be allowed between each operation.

## PROCEDURE 2 - Test Procedure

Step 1 - The component, with its electrical connections, shall be submerged in a container with the uppermost surface a minimum of one inch below the surface of the saline solution and installed in the chamber. The salt used shall be sodium chloride containing on a dry basis not more than 0.1 percent of sodium iodide and not more than 0.2 percent of total impurities. The solution shall be prepared by dissolving 5 parts by weight of salt in 95 parts by weight of distilled water or other water containing not more than 200 parts per million of total solids. The solution shall be kept free of sediment by filtration or decantation. The component shall be carefully observed during its entire period of submersion and shall be operated while submerged for 30 minutes at full rated current and voltage. The chamber shall be evacuated to a pressure six pounds below atmospheric so as to apply a minimum of six pounds per square inch (psi) in-internal pressure to all voids within the component. Test results obtained shall be compared with the data obtained from the test of Procedure 1. During this period the component shall be carefully observed for poor seals, as evidenced by bubbles escaping from the interior of the component. (The term "leakage", as used in this document, is intended to mean that there shall be no bubbles escaping from the interior of the component when the test chamber is evacuated to a pressure six pounds below atmospheric). Leakage thus indicated shall be considered as noncompliance with the waterproofness requirement and the component shall be rejected. Bubbles which are the result of entrapped air on the exterior surfaces of the component shall not be considered a leak.

Step 2 - The chamber shall then be pressurized to six pounds above atmospheric and the component again operated for 30 minutes. Test results obtained shall be compared with the data from the test of Procedure 1.

Step 3 - Class 1 components only shall be disassembled as normally required in servicing and inspection made for the presence of water. If water is present, the component shall be rejected. If the component is dry, it shall be reassembled and subjected to 15 hours of dry operation (three 5-hour periods) at full rated current and voltage. The results shall be compared with the test data obtained under Procedure 1 (prior to initial submersion). Insulation breakdown or other damage

## APPENDIX A

that would impair mechanical or electrical operation of the component shall be considered as evidence of failure.

Failure criteria - Components shall evidence no leakage and shall be mechanically and electrically operable during and subsequent to submersion, when subjected to the tests specified in Procedure 2, steps 1, 2 and 3.

APPENDIX B - RESERVED

APPENDIX C

EXHIBIT C  
HEAVY EXPANDED MOBILITY TACTICAL TRUCK

APPENDIX H

FAILURE DEFINITION & SCORING CRITERIA

FOR

10 TON - HEAVY EXPANDED MOBILITY TACTICAL TRUCK (HEMTT)

JUNE 1980

Proponent Agency  
RAM Engineering Division  
Product Assurance Directorate  
US Army Tank-Automotive Research Development Command, Warren, MI

## APPENDIX C

HEAVY EXPANDED MOBILITY TACTICAL TRUCK  
APPENDIX H10 TON HEAVY EXPANDED MOBILITY TACTICAL TRUCK (HEMTT)  
Failure Definition & Scoring Criteria

## Section 1 Introduction

- 1.1 Purpose: This document sets forth the policies and procedures, and coordination between DARCOM and TRADOC, to assure a complete system assessment during test, and consistent determination of scheduled maintenance, unscheduled maintenance, system failures, and mission failures so that RAM characteristics and the logistics burden for the 10 Ton HEMTT vehicle may be established.
- 1.2 References:  
  
AR 702-3, Army Materiel RAM, (15 Nov 76).
- 1.3 Background: Per 3,R 702-3, the combat developer and materiel developer will jointly develop and formally approve the failure definition and scoring criteria (FD/SC) to provide the basis for determining the RAM characteristics during testing. In addition, the operational and developmental testers, evaluators and logisticians will review and comment on the FD/SC as to the realism and feasibility of the statements contained in the document.
- 1.4 Objective: To provide Consistent criteria for assessing RAM characteristics of the vehicle system that can be utilized throughout the vehicle's life cycle.
- 1.5 Scope: This document provides the Definitions and Scoring Criteria which will be used by all responsible elements concerned with the quantitative measurement of RAM values. The guidance provided in this document will be utilized throughout development and operational testing (DT/O:) and also provide the baseline for the analysis and utilization of field data.
- 1.6 Policies:
  - a. The system reliability (MMBF) will be analyzed in accordance with the procedures reflected herein and assessed with respect to the reliability requirement baseline to be contained in the vehicle requirements



## APPENDIX C

HEAVY EXPANDED MOBILITY TACTICAL TRUCK  
APPENDIX H

documents. Mission reliability will be calculated for use in the user Independent Evaluation Report (IEP).

b. Joint DARCOM/TRADOC scoring conferences will be held to conduct a total assessment of all test incidents, using the scoring criteria contained herein. This assessment and the quantitative measurement of RAM levels achieved against the defined requirements will be reported to essential points of authority.

c. The minimum elements of information to be collected during testing are defined in Appendix C. These elements will provide the essential information to perform an adequate evaluation/assessment of the RAM characteristics and performance. Specific elements of Information to be collected for OT testing are identified in the Test Plan.

d. The maintenance burden will be jointly assessed by DARCOM and TRADOC proponents to provide an estimate of total maintenance impact.

e. The scoring criteria contained herein consists of guidelines for consistent classification of test incidents.

(1) Guidelines for classification and scoring of test incidents are in Appendices A and B.

(2) Tactical mission essential functions:

(a) Mission essential functions required to preclude a mission abort are prescribed through a functional block diagram in Appendix D, which shows the functions essential for mission performance.

#### 1.7 Procedures:

a. The measurement of RAM characteristics will begin when test results become available utilizing the scoring criteria contained herein. The test agency personnel assign the initial classification of each test incident. Scoring conferences will be conducted at mutually agreeable points in the test program, to

## APPENDIX C

HEAVY EXPANDED MOBILITY TACTICAL TRUCK  
APPENDIX H

establish coordinated DARCOM/TRADOC incident classifications.

b. As testing progresses, the analysis of the test data and the subsequent decisions made to scoring conferences will be recorded and used to assure that consistent scoring decisions are made throughout the testing program for each system.

2. Failure Definition: The jointly developed and approved failure definition is the responsibility of the combat developer and the materiel developer. For each Tank-Automotive System engineering development, the following general failure definitions will ensure a consistent data base for the vehicle systems from which technological forecasts and RAM-D requirements analyses for future systems and components may be developed.

- a. System Failures - See para 2.5.1, Appendix A.
- b. Mission Failure - See para 2.5.2, Appendix A.
- c. Durability Failure - See para 2.5.3, Appendix A.

## APPENDIX C

HEAVY-EXPANDED MOBILITY TACTICAL TRUCK  
APPENDIX A OF APPENDIX H  
GUIDELINES FOR CLASSIFICATION OF TEST INCIDENTS

1. Application: These guidelines are to be used to classify test incidents under the following categories: No test, no failure, unscheduled and scheduled maintenance, system failures, and tactical mission failures. The impact of equipment failures is reduced through the planned maintenance and servicing which is developed prior to the test. It is necessary, therefore, to distinguish between test incidents resulting from programmed maintenance and test incidents requiring unprogrammed maintenance. It is not possible to have hard rules for evaluating all incidents, therefore, Judgment will have to be exercised in the classification of sane incidents.
2. Scoring Criteria: In order to provide for accurate and timely maintenance incidents for both test and operational data, the following generalized incident classification categories are provided. The use of these categories will provide a common data baseline for the Tank-Automotive System and its components and permit technological forecasting and accurate determination of RAM-D attribute needs in future Tank-Automotive Systems and components.
  - 2.1. No Test. Incidents which are not counted as maintenance actions or as failures are to be placed in this category. The "no test" category will include such things as test item abuses, unrealistic operating conditions, accidents, operator or maintenance error, modifications, kit installations, or maintenance/engineering evaluations.
  - 2.2. No Failure. Incidents which require unscheduled maintenance action but which are not to be counted as system failures or mission failures fall into this category. The "no failure" category covers such test interruptive incidents as:
    - a. Actual or incipient malfunctions for which corrective action is authorized or prescribed as an operator/crew function and can be accomplished within 30 minutes using only controls, OEM tools, and spare parts incorporated in or carried with the system.
    - b. Actual or incipient malfunctions, detected during operations, that can be deterred for the remainder of its specified life before overhaul, replacement, rebuild or salvage (as applicable), or until the next scheduled maintenance that is

## APPENDIX C

HEAVY EXPANDED MOBILITY TACTICAL TRUCK  
APPENDIX A OF APPENDIX H

prescribed for the level authorized for correction.

c. Incipient malfunctions o: the system detected during prescribed inspections connected with a scheduled maintenance unless higher level maintenance is prescribed for the corrective action.

d. Actual or incipient malfunctions resulting from not following the prescribed operational or maintenance procedures dictated by the equipment manuals or which can be directly attributed to improper replacement of components or omission of prescribed scheduled service or inspections. This does not apply if the malfunction is attributed to improper design of the test item, error in the operator/maintenance manuals, or inadequacy of any other element of the maintenance test package.

e. Actual or incipient malfunctions resulting from test item abuse, unrealistic operating conditions, non-valid test or accident.

f. The incident was caused by another incident (i.e., secondary failure).

g. A malfunction which may be overcome by the use of a redundant mode which provides equivalent and/or satisfactory performance, the correction of which can be deferred for the remainder of its specified life before overhaul, replacement, rebuild or salvage (as applicable), or until the next scheduled maintenance that is prescribed for the level authorized for correction.

h. Actual or incipient malfunctions subsequently traced to a common and predictable failure mode which is positively isolated, corrected by modification, and verified by test.

i. Malfunctions deferred to and/or corrected during the final technical inspection, except for those which would have previously been considered a system failure if an attempt had been made to operate the affected subsystem prior to final inspection.

## APPENDIX C

HEAVY EXPANDED MOBILITY TACTICAL TRUCK  
APPENDIX A OF APPENDIX H

2.3. Scheduled Maintenance: A scheduled maintenance action is any test incident which results from actions programmed to occur, such as servicing and scheduled replacement of components as specified in the maintenance documents.

2.4. Unscheduled Maintenance: An unscheduled maintenance action is any test incident which is not scheduled as defined in para 2.3. above.

2.5. Failures:

2.5.1. System Failures:

a. A system failure is defined as any actual or incipient malfunction of the vehicle that required diagnostic or corrective action which could not have been deferred:

(1) Until the next scheduled maintenance (exclusive of lubrication services), if organizational maintenance is prescribed for correction or:

(2) For the remainder of its specified life before overhaul, replacement, rebuild, or salvage (as applicable).

b. Diagnostic and/or corrective action is not considered deferrable if the malfunction caused (or would have caused if not corrected, i.e., incipient malfunction):

(1) Inability to commence operation, cessation of operation, or reduction in performance capability to the extent that a prescribed or system function is either lost or significantly degraded, or:

(2) A critical or catastrophic hazard to personnel or equipment as defined by MIL-STD-882A (28 June 1977).

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HEAVY-EXPANDED MOBILITY TACTICAL TRUCK  
APPENDIX A OF APPENDIX Hc: Amplification:

(1) Prescribed organizational level corrective actions deferrable to the scheduled maintenance are to be accomplished without charging a system failure. Incipient malfunctions of the end item detected during prescribed inspections connected with the scheduled maintenance will also be corrected without charging a system failure unless higher level maintenance is prescribed for the corrective action. In this event, a system failure will be charged if the corrective action is not deferrable to the next scheduled maintenance at that level. A system failure will also be charged if a malfunction of a subsystem of the end item was detected during the scheduled maintenance that would have been previously considered a system failure of the end item if an attempt had been made to operate the affected subsystem prior to the scheduled maintenance.

(2) If an incipient malfunction of the end item was detected during the correction of another malfunction, two system failures will be charged provided that: The malfunctions were totally unrelated, maintenance was performed to prevent progression of the incipient malfunction, and both malfunctions comply with the above stated definition of "system failure". However, if the malfunctions were related (e.g., secondary damage caused by primary component malfunction) only the primary malfunction will be considered a system failure.

(3) When the occurrence of more than one actual malfunction is subsequently traced to a common cause which is positively isolated, corrected by maintenance action and verified, only one malfunction in the series will be scored as a system failure (if otherwise qualified). Diagnostic and unscheduled maintenance time associated with all of the malfunctions will be chargeable.

(4) Extract of MIL-STD-882A: MIL-STD-882A System Safety Program Requirements, dated 28 June 1977, provides uniform requirements and criteria for establishing and implementing system safety programs. Under para 5.4.3.1, hazard severity is defined as follows:

Hazard Severity: Hazard severity categories are defined to provide a qualitative measure of the worst potential consequences resulting from personnel error, environmental conditions, design inadequacies, procedural deficiencies, system,

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HEAVY EXPANDED MOBILITY TACTICAL TRUCK  
APPENDIX A OF APPENDIX H

subsystem or component failure or malfunction as follows:

- (a) Category I - Catastrophic: May cause death or system loss.
- (b) Category II - Critical: may cause severe injury, severe occupational illness, or major system damage.
- (c) Category III: - Marginal: May cause major injury, minor occupational illness, or minor system damage.
- (d) Category IV - Negligible: -Negligible will not result in injury, occupational illness, or system damage.

(5) These hazard severity categories provide guidance to a wide variety of programs. However, adaptation to the 10 Ton Extended Mobility Vehicle Program is required. This adaptation may include definite transition points between categories and further definition of injury or damage. Examples of each category are:

- (a) Category I - Catastrophic: Rupture of fuel or brake line.
- (5) Category II - Critical: Failures which result in excessive CO concentration.
- (c) Category III - Marginal: Loss of coolant, may deteriorate to Category II.
- (d) Category IV - Negligible: Loss of panel indicators (instruments).

2.5.2. Mission Failure. -A mission failure is any incident which results in the inability to begin or complete a prescribed mission, degrades mission performance or presents a critical or catastrophic hazard to personnel or equipment as defined by MIL-STD-882A (28 June 1977). Prescribed mission profile will be defined by TRADOC, and provided to the tester.

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HEAVY EXPANDED MOBILITY TACTICAL TRUCK  
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2.5.3. Durability Failures: A system or major component durability failure will be considered to have occurred when the failure results in a condition requiring replacement or overhaul of the system or major component prior to the specified scheduled overhaul cycle.

a. System Level Conditional Overhaul: For the system level, a durability failure will be categorized if the failure is beyond the limits of General Support Maintenance. Generally the overhaul at the system level will be conditional. For example, the conditional overhaul of a tactical vehicle would have occurred if the chassis and/or cargo structural members suffers a severe crack or distortion.

b. Major Component Durability: For major components, a durability failure will be charged when any malfunction occurs which results in a condition requiring unscheduled replacement or overhaul of the specified components prior to the specified overhaul cycle. Replacement or overhaul will be considered to have happened if the repair of the specified major components is beyond the capabilities of organizational or direct support maintenance level as designated by the Maintenance Allocation Chart. Durability failures can occur in major components on the basis of part failure and/or performance degradation below a previously designated level.

3. Incident Scoring Flow Chart: As each test incident is reviewed a score will be assigned. The scoring logic and values are described in the Scoring Decision Flow Chart which is presented in Appendix B.

4. Periodic Review: For the purpose of determining the RAM characteristics, the original scoring of incidents will be subjected to periodic review predicated on institution of corrective actions. The basis for eliminating failures or maintenance time in order to arrive at the adjusted values will be scoring conference consensus that a given modification was satisfactory and therefore would have either precluded the failure (or maintenance time) or substantially reduced the failure rate for the component.



## APPENDIX C

APPENDIX B OF APPENDIX H  
DECISION FLOW CHART

STEP	GUIDELINES		FAILURE CATEGORY	REMARKS
1.	Does incident concern RAM-D?	NO	No Test (Information Only)	These will include suggested improvements, test procedures, extraneous test information.
	YES			
2.	Was incident detected during initial/final inspection?	YES	No Test (Information Only)	Quality failures/problems. Problems discovered prior to start of test. Shipping damage, etc.
	NO			
3.	Did incident result from test item abuse, unrealistic operating conditions, accident, or failure to follow maintenance procedures?	YES	No Test (Information Only)	Incidents will be assessed for man/machine interface problems.
	NO			
4.	Was the incident a kit installation authorized modification?	YES	No Test (Information Only)	
	NO			
5.	Was the incident a scheduled replacement or service of parts before failure?	YES	No Failure (Scheduled Maintenance)	Does not include malfunctions detected during scheduled maintenance.
	NO			

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APPENDIX B OF APPENDIX H  
DECISION FLOW CHART

STEP	GUIDELINES		FAILURE CATEGORY	REMARKS
6.	Was the incident caused by improper/insufficient maintenance/operator instructions or any other element of maintenance test support package?	YES	Unscheduled Maintenance and may not be a system and/or Mission Failure.	Assessed for changes to MTSP, e.g. instructions, parts, tools, etc.
	NO			
7.	Was the incident caused by an incipient malfunction detected during scheduled maintenance or detected during operations for which correction can be deferred to a scheduled maintenance and corrected at that level?	YES	No Failure (Unscheduled Maintenance)	Unprogrammed action.
	NO			
8.	Was incident an actual malfunction for which maintenance can be deferred to the next scheduled maintenance and corrected at that level or deferred to end of test?	YES	No Failure (Unscheduled Maintenance)	Incident would not cause degradation of system performance.
	NO			

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APPENDIX B OF APPENDIX H  
DECISION FLOW CHART

STEP	GUIDELINES		FAILURE CATEGORY	REMARKS
9.	Was incident the result of another incident?	YES	No Failure (Unscheduled Maintenance)	Secondary malfunctions contribute to maintenance times only.
	NO			
10.	Could incident have been corrected within 30 min by operator/crew using OEM tools, spare parts?	YES	No Failure (Unscheduled Maintenance)	Authorized or prescribed operator/crew function only except tires. One hour is allowed for tire changing.
	NO			
11.	Could mission be completed without safety hazard or loss of degradation of any mission essential function?	YES	System Failure (Unscheduled Maintenance)	
	NO			
12.	Would incident present critical or catastrophic hazard to crew or equipment?	NO	Unscheduled Maintenance * System Failure * Mission Failure	MIL-STD-882A Category I and II.
	YES		Unscheduled Maintenance * System Failure Mission failure Criticality Factor Of 1.00	

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HEAVY EXPANDED MOBILITY TACTICAL TRUCK  
APPENDIX C OF APPENDIX H

Data Requirements: The minimum data listed below will assure a homogenous database for RAM-D assessment, growth, technological forecasting and the determination of requirements for future Tank-Automotive Systems and components.

1. Complete description of test incident and its mission effect to the extent necessary to allow a coordinated changeability classification.
2. Complete description of all hardware modifications incorporated during test (including identification and action on parts involved, reason for modification, etc.).
3. Complete system identification (Vehicle No., etc.).
4. Age of test item and system in miles, hours, rounds, and cycles, as applicable (all age information), at time of test incident.
5. Age of test item and system at start and end of test in miles, hours, rounds, and/or cycles, as applicable (all age information) .
6. Date and time test incident occurred in the format of "Day, Month, Year, Time" e.g., 23 Oct 75 (1300 hr).
7. Location where test incident occurred/was detected; e.g., APG paved track #2, YPG tank gravel course, shop etc.
8. major subsystem identification (engine, suspension, weapon station, etc.).
9. Test item identification (nomenclature, FSN, standard government group) .
10. Effect of test incident on the completion of the next general mission.
11. Maintenance actions(s) taken as a result of the test incident.(adjusted, replaced, none, etc.).
12. Time required in manhours and clockhours to perform each scheduled and unscheduled maintenance action.

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### HEAVY EXPANDED MOBILITY TACTICAL TRUCK

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- a. Active maintenance Time
  - b. Diagnostic Maintenance Time
  - c. Total out of Service Time
13. Number of men, MOS, and level of maintenance required to perform scheduled and unscheduled maintenance services.
14. Initial scoring per specified Failure Definition and Scoring Criteria, and rationale as required.

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## PALLETIZED LOADING SYSTEM

## FAILURE DEFINITION AND SCORING CRITERIA

MAY 1989

a. Introduction: This paragraph contains the failure definition and scoring criteria for establishing an agreed upon database. The data base will be used for making reliability and maintainability assessments for evaluation of CFE and GFE. All test incidents will be scored using the guidelines in paragraph c.

b. Mission Essential Functions.

- (1) One of the key elements in the operational RAM concept is the section of the FD/SC called mission essential functions. Mission essential functions are the minimum operational tasks which the system must be capable of performing to successfully complete its missions. The purpose of clearly describing the mission essential functions is to allow application of the failure definition which references the mission essential functions to the test data. The loss of any mission essential function regardless of when it occurs will be scored as an operational mission failure. Since the intent is to address operational RAM rather than hardware RAM, the mission essential functions must be described in simple operational terms instead of being related to the design of the hardware.
- (2) The heavy truck has three mission essential functions. They are: Move, Transport, Self Load/Unload under conditions as specified in the OMS/MP. An actual or incipient malfunction which would result in the inability to perform one or more mission essential functions) to a level less than that described below will be charged as an operational mission failure.
  - (a) Move-function. The mobility system must be capable of effectively maneuvering such that the system can maintain its assigned position within a tactical convoy and to complete a round trip transport mission. In order to carry out the convoy or transport tasks, the vehicle must be able to:
    1. Begin operation without outside assistance.
    2. Maneuver by steering so as to be functionally and safely controllable by the operator on roads, trails, and cross-country terrains.
    3. Maneuver by moving forwards and backwards.
    4. Move with sufficient speed and power to maintain the

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average speeds specified in the mission profile over the indicated terrain and grades (Determined by the operator's observation of the vehicle speedometer and/or tachograph to within 20 percent of the specified speeds.)

- (b) Transport Function. The vehicle must be capable of carrying military cargo up to and including the 16.5 ton payload limit.
  - (c) Self Load/Unload Function. The vehicle and LHS must be capable of loading and unloading the load racks up to and including the 16.5 ton payload limit using vehicle power only.
- (3) The Trailer has three mission essential functions. They are move, transport, to be loaded/unloaded under conditions specified in the OMS/MP. An actual or incipient malfunction which would result in the inability to perform one or more mission essential function to a level less than that described below will be charged as an operational mission failure.
- (a) Move Function. The mobility system must be capable of effectively maneuvering such that the system can maintain its position behind the towing vehicle. In order to carry out the tasks the trailer must be able to:
    - 1. Maneuver when towed so as to be functionally and safely controllable by the operator on primary and secondary roads, trails, and rough trails.
    - 2. Maneuver by moving forward and backwards with towing vehicle.
    - 3. Move with sufficient speeds so towing vehicle can maintain the average speeds specified in the mission profile over the indicated terrain and grades. (Determined by the operator's observation of the vehicle speedometer and/or tachograph to within 20 percent of the specified speeds.)
  - (b) Transport Function. The trailer must be capable of carrying standard military cargo up to the 16.5 ton payload limit.
  - (c) Load/Unload Function. The trailer must be capable of being loaded/unloaded with racks up to and including the 16.5 ton payload limit using towing vehicle power only.
- (4) The Material Handling Crane has two mission essential functions. They are to provide lift and position the load. An actual or incipient malfunction

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which would result in the inability to perform one or more mission essential functions to a level less than that described below will be charged as an operational mission failure.

- (a) Provide Lift Function. The Material Handling Crane must have the capability of lifting a 3900 lb pallet from any location on a flatrack positioned on the prime mover, holding that weight, and lowering it while maintaining control of that weight at all times. Operation of the crane must begin without outside assistance.
- (b) Provide Position Function. The Material Handling Crane must have the capability of articulating at least 180 degrees, picking up from any location on the flatrack, and operate at any location on the flatrack.

c. Classification/Chargeability Guidelines. for PLS

- (1) Outline. The process of scoring test incidents is divided into two parts. The first part is the classification of the test incident based upon the failure definition. Classification is a categorization of the effect of the incident. The classification is made without regard to who or what caused the incident or when it occurred. The classification procedures are covered in steps 1 thru 6 of paragraph c. (3)(a) thru c. (3)(f). The second part of the scoring process is the assignment of chargeability for all test incidents. The chargeability step assigns the primary cause for the occurrence of the incident to one of seven operational elements. Once chargeability has been determined the appropriate agency will be assigned the responsibility for the corrective action. Figure 3-1 contains the classification/chargeability flow chart. Chargeability is covered in step c. (3)(g).
- (2) Generalized Operational Mission Failure Definition. An operational mission failure is any incident or malfunction of the system which caused or could have caused the inability to perform one or more mission essential functions or is a critical or catastrophic hazard to personnel or equipment.
- (3) Classification/Chargeability Flow Chart Expansion. (See figure 3-1).
  - (a) STEP 1 - NO TEST
    - 1. Question: Is the incident a "NO TEST"
    - 2. Procedure: If the answer is "NO" proceed directly to STEP 2. If the answer is "YES" score the incident as STEP 1, then stop.



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3. Expansion: The "NO TEST" category includes the following:
- (a) Pretest Checkout. This includes an initial road test and "burn-in" of components. The test plan must specify the number of miles, hours, etc., for the pretest "burn-in". Incidents occurring during this period are scored as "NO TEST". All incidents detected after the initial inspection period will be scored on their own merits under succeeding steps.
  - (b) Equipment Modification. This includes all maintenance actions involved in the installation of hardware kits or incorporation of redesigned components. If the replaced component was not functioning at the time of its replacement with the modification, the incident will be scored on its own merit. The maintenance time will be estimated based on the time to restore the system to its original condition. Subsequent malfunctions of the modification will be scored on their own merit.
  - (c) Test Peculiar. Malfunctions caused by non-system equipment or people not acting as crew or maintenance personnel are scored as "NO TEST". Engineering evaluations to analyze the cause of malfunctions as well as any malfunctions and/or maintenance efforts caused by the engineering evaluation are scored as \*NO TEST". This also includes maintenance evaluations conducted as a part of the test plan and malfunctions to or caused by test peculiar instrumentation. Incidents caused by contractor or other personnel acting as crew or maintenance personnel will be scored under their own merit under succeeding steps.
  - (d) Flatrack Related. This includes all incidents which were due directly to the flatrack itself and not caused by the PLS version, hydraulic mechanisms, and/or mounting devices integral to the PLS version. All incidents under this step will be scored as a "NO TEST" to the PLS version and a chargeability element will be assigned to be evaluated against the flatrack only. Clock time and maintenance man time for system maintenance by

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level and MOS will be recorded but not charged against the PLS version. The chargeability elements for the flatrack are as follows:

1. Chargeable to the hardware (CH). This incident is due to design inadequacy and includes personnel related Incidents that are attributable to characteristics of the hardware design which results in a fracture or deformation of the flatrack base, supporting members, pick-up points, loading points of contact or securing or tiedown mechanisms integral to the flatrack for securing the flatrack to the PLS version which severely limits or prohibits loading, securing or unsecuring, or deploying of a flatrack.
  2. Chargeable to crew (CC).
  3. Chargeable to maintenance personnel (CMP).
  4. Chargeable to manuals (CM). This includes personnel related incidents that are attributable to misleading, incorrect, or missing information.
  5. Chargeable to support equipment (CSE). The support equipment includes special and common tools, spares, repair parts, associated software, etc.
  6. Chargeable to accident (CA). This includes only accidents which cannot-be charged to one of the above elements; e.g., an accident caused by crew error would be charged as "CC".
- (e). Daily Checks and Services. This consists of preoperation, during operation, and postoperation checks and services performed by the crew as prescribed by the equipment publication which were completed within 15 minutes using only 2 quarts of petroleum, oils and lubricants (POL) and the on

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equipment material (OEM) tools. If these criteria are not met, the incident will be scored on its own merit under succeeding steps.

- (f). Deliberate Abuse. This includes willful abuse (e.g., performance capability limit test) whether it was prescribed by the test plan' or not. Abuse by crew or maintenance personnel will be scored on its own merit under succeeding steps.
- (g). Non-RAM Oriented. This step includes those events for which a test incident report might be initiated by the test activity, but which are not incidents used in RAM computations. Examples include suggested improvements, reports of test procedure, unusable or unacceptable replacement parts which were discovered prior to installation, inability to meet performance specifications where no malfunction has occurred, and suggested human factors improvements. Recommended changes to the system support package not related to a specific test incident are also covered by this step.

(b) STEP 2 - SCHEDULED MAINTENANCE ACTION (SMA)

- 1. Question: Was the incident a scheduled maintenance action
- 2. Procedure: If the answer is "NO", proceed directly to STEP 3. If the answer is "YES", classify incident as a "SCHEDULED MAINTENANCE ACTION" (SMA). It is necessary to record one removal for each spare used and record the clock time, maintenance man time and the repair parts used.
- 3. Expansion: Scheduled Maintenance Actions are programmed services and/or replacements performed at intervals defined by either calendar time or by usage (miles, hours, etc). Scheduled maintenance also covers those programmed replacements which are not usage related, but which are dictated by measured wear or deterioration (on condition maintenance such as replacement of tires). These actions must be prescribed by the equipment publications and must have sufficient latitude in their time of performance to permit them to be accomplished during a slack period between missions.

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## (c) STEP 3 - CREW CORRECTABLE MAINTENANCE ACTION (CCMA).

1. Question: Was the incident a malfunction which was corrected by the crew using only authorized tools, repair parts and spares found on board, and which was performed within 30 minutes.
2. Procedure: If the answer is "NO", proceed directly to STEP 4. If the answer is "YES", classify a "CCMA" and record one removal for each spare (i.e., repairable item) used. Record the clock time, maintenance man time, and repair parts used.
3. Expansion: STEP 3 covers those minor maintenance actions which may interrupt the mission, but which the crew can repair by "immediate action" and continue the mission. Crew "action" need not be maintenance, but may be simply rerunning the "beginning operations" procedures. In a test environment, there will usually be test peculiar analysis and diagnostic time associated with the action. Delete test peculiar time before scoring this incident. Allowable time must be consistent with mission requirements. The time limit is the maximum downtime of a mission essential function which would not result in a serious impact on the effectiveness of the system. A spare is defined as "those support items that are coded as repairable (i.e., repairable items)." A repair part is defined as "those support items that are coded as not repairable (e.g., consumable items)." Any crew correctable maintenance time will not be charged against the Maintenance Ratio Requirement.

## (d) STEP 4 - UNSCHEDULED MAINTENANCE ACTION (UMA)

1. Question: Was incident an actual malfunction for which maintenance can be deferred to the next scheduled maintenance and corrected at that level or deferred to end of test.
2. Procedure: If the answer is "NO", proceed directly to STEP 5. If the answer is "YES", classify incident as a "UMA" before proceeding to STEP 7. It is necessary to record one removal for each spare used and record the clock time, maintenance man time, and the repair parts used.

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3. Expansion: The total time the item or component has been in service should be recorded and stated at the time that the item or component is replaced.

## (e) STEP 5 - ESSENTIAL MAINTENANCE ACTION (EMA)

1. Question: Was the incident an unscheduled maintenance action that can be deferred until the end of the current mission because of no effect on a mission essential function and must be repaired prior to the start of the next mission.
2. Procedure: If the answer is "NO", proceed directly to STEP 6. If the answer is "YES", classify as "EMA" and "UMA" and record one removal for each spare used. Record the clock time, maintenance man-time, and the repair parts used.
3. Expansion: Essential maintenance actions include all operational mission failures plus any additional unscheduled maintenance actions which require corrective action prior to starting the next mission (e.g., repair of a redundant mission essential component).

## (f) STEP 6 - OPERATIONAL MISSION FAILURE (OMF)

1. Question: Did the incident cause or could it have caused either:
  - a. The inability to perform one or more of the mission essential functions to the degree specified in paragraph b
  - b. A critical or catastrophic hazard to personnel or equipment as defined by MIL-STD-882B, (ref. paragraph d).
2. Procedure: If the answer is "NO", proceed directly to STEP 1. If the answer is "YES", classify the incident as "OMF", "EMA", and "UMA" then proceed to STEP 7. Record one removal for each spare used, record the clock time, maintenance man time, by level and Military Occupational Specialty (MOS) and repair parts used.
3. Expansion: A malfunction caused by another simultaneous malfunction is scored as one failure. The maintenance time will be the sum of the maintenance time for both incidents.

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An incipient malfunction whose repair is deferred to a scheduled maintenance period will be scored on its own merits.

## (g) STEP 7 - IDENTIFICATION OF CHARGEABLE ELEMENTS

1. Question: What operational element was primarily responsible for the incident:
2. Procedure: Assign the test incident to one of the following categories:
  - a. CHARGEABLE TO HARDWARE (CH). This includes personnel related incidents that are attributable to characteristics of the hardware design.
  - b. CHARGEABLE TO CREW (CC).
  - c. CHARGEABLE TO MAINTENANCE PERSONNEL (CMP)
  - d. CHARGEABLE TO MANUALS (CM). This includes personnel related incidents that are attributable to misleading, incorrect, or missing information.
  - e. CHARGEABLE TO SUPPORT EQUIPMENT (CSE). The support equipment includes special and common tools, spares, repair parts, associated software, etc.
  - f. CHARGEABLE TO ACCIDENT (CA). This includes only accidents which cannot be charged to one of the above elements; e.g., an accident caused by a crew error would be charged as "CC".
3. Expansion: This step assigns chargeability to all incidents except the "NO TEST". Actual maintenance need not be performed in order to assign chargeability. During the scoring conference corrective action process, chargeability may be further broken out if necessary (e.g., Contractor Furnished Equipment (CFE), Government Furnished- Equipment (GFE)).

- d. Extract of MIL-STD-882B. MIL-STD-882B, Requirements for System

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Safety Program for Systems and Associated Subsystems and Equipment, dated 30 March 1984, provides uniform requirements and criteria for establishing and implementing system safety programs. Under Section V, the work hazard severity is defined as follows:

Hazard severity categories are defined to provide a qualitative measure of the worst potential consequences resulting from personnel error, environmental conditions, design inadequacies, procedural deficiencies, system, subsystem or component failure or malfunction as follows:

CATEGORY I -	CATASTROPHIC	May cause death or system loss.
CATEGORY II -	CRITICAL	May cause severe injury, severe occupational illness or major system damage.
CATEGORY III -	MARGINAL	May cause minor injury, minor occupational illness or system damage.
CATEGORY IV -	NEGLIGIBLE	Will not result in injury, occupational illness or system damage.

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FIGURE 3-1  
DECISION FLOW CHART

STEP	GUIDELINE		FAILURE CATEGORY	REMARKS
1a	Was incident detected during initial/final insp.	YES	NO TEST	Reference para c.(3)(a) 3. for Definition of pretest checkout and initial/final inspection.
	NO			
1b	Was incident a kit installation or an authorized MOD?	YES	NO TEST	If component being modified is found to be broken at the time of the modification, then the incident is scored on its own merit.
	NO			
1c	Was the incident an engring or maint evaluation or caused by test peculiar instrumentation?	YES	NO TEST	
	NO			
1d	Was the incident due to the flatrack?	YES	NO TEST	Ref para (3)(a) 3.d for expan Assign to one of the following categories: CH - HARDWARE CC - CREW CORRECT CMP - MAINTENANCE CM - MANUALS CSE - SUPPORT EQUIP CA - ACCIDENT
	NO			
1e	Was the incident detected preoperation, operation crew checks & services. & minor preventive repairs/services/ adjustments which can be completed in less than 15 min by the operator/crew.	YES	NO TEST	Ref para (3)(a) 3.e for definition of preventive maint
	NO			
1f	Did incident result from deliberate test abuse?	YES	NO TEST	Ref para (3)(a) 3.f for definition of deliberate abuse.
	NO			
1g	Is the incident Non-RAM oriented?	YES	NO TEST	These will include suggested improvements, test procedures, extraneous test information. No impact on RAM-D.
	NO			



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2.	Scheduled replacement/ Service	YES	SCHEDULED MAINTENANCE	Ref para (3)(b) for definition of scheduled maint. This step does not include actual or incipient malfunctions detected during scheduled maintenance.
	NO			
3.	Could incident have been corrected within 30 min by operator/crew using OEM tools, spare parts?	YES	CREW CORRECTABLE MAINTENANCE	Ref para (3)(c) for definition of operator/crew correctable incident. Go to step 7 to determine incident chargeability.
	NO			
4.	Was the incident an actual malfunction for which maint can be deferred to the next sched maint and corrected at that level or deferred to the end of the test?	YES	UNSCHEDULED MAINTENANCE	Ref para (3)(d) for definition of unscheduled actions. Go to step 7 to determine chargeability.
	NO			
5.	Was the incident an unsched maint action that can be deferred until the end of the current mission because of no effect on a mission essential-function?	YES	ESSENTIAL MAINT & UNSCHED MAINT ACTION	Ref para (3)(e) for a description of essential maint actions. Go to step 7 to determine chargeability.
	NO			
6.	Was the incident and actual intermittent or incipient malfunction which caused or could have caused the inability to safely perform the mission essential functions?	YES	OPERATIONAL MISSION FAILURE EMA & UMA	Ref para b. for description of the mission essential functions. Go to step 7 to determine incident chargeability
	NO			
7.	What operational element was primarily responsible for the incident?  (USE ONLY WITH STEPS 3-6)			Assign to incident one of the following categories: CH - HARDWARE CS - SOFTWARE CC - CREW CMP - MAINTENANCE CM - MANUALS CSE - SUPPORT EQUIPMENT CA - ACCIDENT
	—			

## APPENDIX E

3.0 IMPROVED RIBBON BRIDGE (IRB) FAILURE DEFINITION AND SCORING CRITERIA (FDSC) REVISED FOR COMMON BRIDGE TRANSPORTER (CBT), IMPROVED BOAT CRADLE (IBC), and BRIDGE ADAPTER PALLET (BAP) TESTING (SEP 96)

## 3.1 INTRODUCTION.

a. This document contains a failure definition and scoring criteria for establishing an agreed upon data base. The data base will be used for making-operational reliability and maintainability assessments for evaluation of Contractor Furnished Equipment (CFE) and Government Furnished Equipment (GFE). All test incidents will be scored using guidelines in paragraphs 3.2 and 3.3. Figure 3-1 provides a flowchart summarizing the scoring process.

b. System Description. The Improved Ribbon Bridge (IRB) system consists of a transporter, launch/retrieve mechanism, interior bays, ramp bays and ribbon bridge erection boats shallow draft (BEB-SD). The transporter is a Heavy Expanded Mobility Tactical Truck (HEMTT) M977 chassis with a Palletized Load System (PLS) Load Handling System (LHS) installed allowing the truck to self load, unload, and transload various bridge pallets compatible with the NATO standard flatrack. The Bridge Adapter Pallet (BAP) and the Improved Boat Cradle (IBC) have been developed for the transport and deployment of the ribbon bridge bays (interior and ramp) and the BEB-SD, respectively. The M977 HEMMT will optionally tow the PLS M1076 trailer, depending on mission requirements. The system also has the capability of transloading a BEB-SD/IBC, Bay/BAP, or a flatrack from the transporter to the trailer, and vice versa. The flatrack provides an optional cargo carrying capability, as well as carrying Medium Girder Bridge (MGB) components. The flatrack is not considered part of the IRB system.

c. This document was updated from the June 1994 version as agreed upon at the 9 Aug 96 CBT scoring conference, held at Aberdeen Proving Ground, MD. The following changes were made to the FDSC:

- (1) The acronym was changed from Improved Common Bridge Transporter (ICBT) to CBT.
- (2) Transloading was added as a Mission Essential Function.
- (3) The MEFs were modified to properly describe the functions of the IBC and SAP. The original IRB MEFs were added for completeness.
- (4) A brief system description was added.
- (5) Figures 3-1 (scoring worksheet) and 3-2 (scoring summary) were deleted. Figure 3-3 then becomes Figure 3-1.

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## 3.2 MISSION ESSENTIAL FUNCTIONS:

a. Mission Essential Functions (MEFs) are the minimum operational tasks which the system must be capable of performing in order to successfully complete its missions. The operator should be able to readily identify the loss of a mission essential function during normal operations. The loss of any mission essential function, regardless of when it occurs will be scored as an operational mission failure (OMF). An OMF is any incident or malfunction (actual, intermittent, or incipient) of the system which caused or would have caused the inability to perform one or more of its MEFs or a critical or catastrophic hazard to personnel or equipment. Paragraph 3.4 describes critical and catastrophic failures in further detail.

b. The IRB system has the following MEFs:

- (1) Must be able to transport its bridge components.
- (2) Must be able to launch bridge components for a 100 meter bridge from a prepared dirt site.
- (3) Must be able to assemble bridge components for a 100 meter bridge.
- (4) Must be able to handle bridge crossings at the rate and volume specified in the OMS/MP.
- (5) Must be able to disassemble bridge components of a 100 meter bridge.
- (6) Must be able to retrieve bridge components of a 100 meter bridge from a prepared dirt site.

c. The following MEFs were derived for the CBT system:

- (1) Must be able to transport the bridge components (interior bay, ramp bay, BEB).
- (2) Must be able to launch bridge components from a prepared site.
- (3) Must be able to retrieve bridge components from a prepared site.
- (4) Must be capable of transloading IBC, BAP, and PLS

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flatrack with payload to/from a PLS trailer.

d. The following MEFs were derived for the IBC/BAP:

- (1) Must be able to cradle the BEB/bay securely for transport or storage.
- (2) Must be able to support the BEB/bay until it is launched.
- (3) Must be able to accept the BEB/bay for retrieval.

### 3.3 CLASSIFICATION/CHARGEABILITY GUIDELINES:

a. Outline: The process of scoring test incidents is divided into two parts. The first part is the classification of the test incident based upon the failure definition. Classification is a categorization of the effect of the incident and is made without regard to who or what caused the incident or when it occurred. The classification procedures are covered in steps 1 through 7 of paragraph 3.3.

b. The second part of the scoring process is the assignment of chargeability for all test incidents. The chargeability step assigns the primary cause for the occurrence of the incident to one of six operational elements. Once chargeability has been determined, the appropriate agency will be assigned the responsibility for the corrective action. Figure 3-1 contains the classification/chargeability flow chart. Chargeability is covered in step 8 of paragraph 3.3.c.

c. Classification/Chargeability Flow Chart Expansion (see Figure 3.3):

(1) Step 1 -- No Test

(a) Question: Is the incident a "No Test?"

(b) Procedure: If the answer is "YES", score the incident as "NO TEST", and record the no test category, then stop. If the answer is "NO", proceed directly to step 2.

(c) Expansion: The "No Test" category includes the following:

1. Pretest/Posttest Checkout. Prior to test start any incident that occurs will be scored as No Test. This includes an initial "burn-in" of components, if there is burn-in. All incidents detected after the initial inspection period will be scored on their own merits under succeeding steps. Incipient

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failures found under final inspection will be scored under their own merits under succeeding steps.

2. Equipment Modification. This includes all maintenance actions involved in the installation of hardware kits or incorporation of redesigned components. If the replaced component was not functioning at the time of its replacement with the modification, the incident will be scored on its own merit. The maintenance time will be estimated based on the time to restore the system to its operational state. Subsequent malfunctions of the modification will be scored on their own merit.

3. Test Peculiar. Malfunctions caused by nonsystem equipment or people not acting as crew or maintenance personnel are scored as "No Test". Engineering evaluations to analyze the cause of malfunctions as well as any malfunction and/or maintenance efforts caused by the engineering evaluation are scored as "No Test". This also includes maintenance evaluations conducted as part of the test plan and malfunctions to or caused by test peculiar instrumentation. Incidents related to test peculiar diagnostic equipment used in lieu of the diagnostic equipment which will-be fielded are scored on their own merit under succeeding steps. Incidents caused by contractor or other personnel acting as crew or maintenance personnel will be scored on their own merit under succeeding steps.

4. Daily Checks and Services. This consists of preoperation, during operation, and postoperation checks and services performed by the crew as prescribed by the equipment publication, which were completed within 60 minutes per end item 'using the On Equipment Materiel (OEM) tools and repair parts. As daily services are not anticipated, 60 minutes is estimated to be an acceptable, nominal amount of time per end item. If these criteria are not met, the incident will be scored on its own merit under succeeding steps.

5. Deliberate Abuse. This includes willful abuse (e.g. performance capability limit test) whether it was prescribed by the test plan or not. Abuse by operator or maintenance personnel will be scored on its own merit under succeeding steps.

6. Non-RAM Oriented. This step includes those events for which a test incident report might be initiated by the test activity, but which are not used in RAM computations. Examples include suggested improvements, reports of test procedure, unusable or unacceptable replacement parts which were discovered prior to or during installation, consistent inability to meet performance specifications where no malfunction has occurred, and suggested human factors improvements. Recommended changes to the system support package not related to a specific test incident are also covered by this step.

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## (2) Step 2: Durability Failure:

(a) Question: Was the incident a durability failure?

(b) Procedure: If the answer is "NO," proceed directly to step 3. If the answer is "YES," score as a durability failure and proceed to step 5.

(c) Expansion: A durability failure is defined as a malfunction that precludes further operation of an individual IRB component (i.e. bridge, bay, launch/retrieve mechanism, IBC, or BAP) and is great enough in cost, safety, or time to restore, that the component must be replaced, rebuilt, or overhauled. Such failures are considered durability failures if they occur prior to reaching a predefined level of use. Normally, durability failures are evidenced by replacement or rebuild at GS or Depot levels of maintenance. The onset of a suddenly increasing failure rate indicative of overall component wearout should be considered as well.

The following are the durability criteria for the CBT:

The CBT must be able to execute 1380 launch/retrieve cycles before experiencing a durability failure of the launch/retrieve mechanism.

The IBC must be able to execute 414 launch/retrieve cycles before experiencing a durability failure.

The launch/retrieve cycle breakdown for the CBT is listed in Table 1.

TABLE 1 -- CBT LAUNCH/RETRIEVE BREAKDOWN

<u>Component</u>	<u>No. of Cycles</u>
Interior Bay	690 (50%)
Ramp Bay	276 (20 %)
BEB with IBC	414 (30%)
Total	1380

## (3) Step 3: Scheduled Maintenance Action:

(a) Was the incident a scheduled maintenance action?

(b) Procedure: If the answer is "NO," proceed directly to step 4. If the answer is "YES," score as a scheduled maintenance action and proceed to step 8. It is necessary to record one removal for each spare and record the clock minutes, maintenance man-minutes for both on and off-system maintenance by level and MOS and the repair parts used.

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(c) Expansion: Scheduled maintenance actions are programmed services and/or replacements performed at intervals. defined by either calendar time or usage in hours. Scheduled maintenance also covers those programmed replacements which are not usage related, but which are dictated by measured wear or deterioration (on-condition maintenance). These actions must be prescribed by the equipment publications and must have sufficient latitude in their time of performance to permit them to be accomplished during a slack period between missions.

(4) Step 4: Crew Correctable Maintenance Action (CCMA):

(a) Question: Was the incident a malfunction which was corrected by the operator using only on-board tools, repair parts and spares, and was it performed within 45 minutes?

(b) Procedure: If the answer is "YES", score as "CCMA" and record one removal for each spare used. Record clock minutes, maintenance man-minutes and repair parts used. If the answer is "NO", proceed to step 5.

(c) Expansion: This step covers those minor maintenance actions which may interrupt the missions, but which the operator can correct by immediate action and continue the mission. Crew action need not be maintenance, but may be simply rerunning the beginning operations procedures. In a test environment, there will usually be test peculiar analysis and diagnostic time associated with the action. Delete test peculiar time before scoring this incident. Allowable time must be consistent with mission requirements. The time limit is the maximum downtime which would not result in a serious impact on the effectiveness of the system. A spare is defined as those support items that are coded as repairable. A repair part is defined as those support items that are coded. as not repairable.

(5) Step 5. Operational Mission Failure (OMF).

(a) Question: Was the incident an actual, intermittent or incipient malfunction which caused or could have caused either:

1. The inability to perform one or more of the mission essential functions to a degree specified in paragraph 3.2?

2. A critical or catastrophic hazard to personnel or equipment as defined in MIL-STD-882B. 30 Mar 84 (reference paragraph 3.4)?

(b) Procedure: If the answer is "YES", score as "OMF". If a maintenance action is performed record an Essential Maintenance Action "EMA" and Unscheduled Maintenance Action

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"UMA". Record one removal for each spare used. Record the clock-minutes, maintenance man-minutes for both on- and off- system maintenance by level and military occupational specialty (MOS) and repair part used, then proceed to step 8. If the answer is "NO", proceed directly to step 6.

(c) Expansion: A malfunction caused by another simultaneous malfunction is scored as one failure. The maintenance time will be sum of the maintenance time for both incidents. An incipient malfunction whose repair is deferred to a scheduled maintenance period will be scored on its own merits under succeeding steps. If a system has two items which are redundant at all times, an OMF is not scored unless both items are down at the same time. If a backup system is not redundant at all times, a failure of the primary item will be scored as an OMF regardless of the status of the backup system at the time of the incident.

(6) Step 6 Essential Maintenance Action (EMA)

(a) Question: Was the incident an unscheduled maintenance action which required corrective action prior to starting the next mission?

(b) Procedure: If the answer is NO, proceed directly to step 7, if the answer is yes, classify as "EMA" and 'Unscheduled Maintenance Action "UMA" and record one removal for each spare used. Record the clock minutes, maintenance man-minutes for both on and off-system maintenance by level and MOS, and the repair parts used.

(c) Expansion: Essential maintenance actions include all operational mission failures plus any additional unscheduled actions which require corrective action prior to starting the next mission (e.g., repair of a redundant mission essential component).

(7) Step 7: Unscheduled Maintenance Action (UMA).

The incident was an unscheduled maintenance action. Record one removal for each spare used and record the clock minutes, maintenance man-minutes for both on and off-system maintenance by level and MOS, and the repair parts used.

(8) Step 8: Identification of Chargeable Elements.

(a) Question's: What operational element was primarily responsible for the incident?

(b) Procedure: Assign the test incident to one of the



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following categories:

1. Chargeable to hardware (CH). This includes personnel related incidents that are attributable to characteristics of the hardware design.

a. Chargeable to Transporter (CT)

b. Chargeable to Boat (CB)

c. Chargeable to Launch/Retrieve Mechanism (CL)

d. Chargeable to Interior Bay (CI)

e. Chargeable to Ramp Bay (CR)

f. Chargeable to Improved Boat Cradle (CBC)

g. Chargeable to Bridge Adapter Pallet (CEP)

2. Chargeable to crew (CC).

3. Chargeable to maintenance personnel (CMP).

4. Chargeable to manuals (CM).

5. Chargeable to support equipment (CSE). This support equipment includes special and common tools, spares, repair parts, associated software, etc..

6. Chargeable to accident (CA). This includes only accidents which cannot be charged to one of the above elements; e.g., an accident caused by a crew error, would be charged as CC.

c. Expansion: This step assigns chargeability to all incidents except the no test and scheduled maintenance incidents. Actual maintenance need not be performed in order to assign chargeability.

3.4 Extract of MIL-STD-882B. MIL-STD-882B, Requirements for System Safety Program for Systems and Associated Subsystems and Equipment, dated 30 March 1984, provides uniform requirements and criteria for establishing and implementing system safety programs. Under section IV, the work hazard severity is defined as follows:

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Hazard severity categories are defined to provide a qualitative measure of the worst credible mishap resulting from personnel error, environmental conditions, design inadequacies, procedure deficiencies; or system, subsystem or component failure or malfunction as follows:

<u>Description</u>	<u>Category</u>	<u>Mishap Definition</u>
CATASTROPHIC	I	Death or system loss
CRITICAL	II	Severe injury, severe occupational illness, major system damage.
MARGINAL	III	Minor injury, minor occupational illness, or minor system damage.
NEGLIGIBLE	IV	Less than minor injury, occupational, illness, or system damage.

## APPENDIX F – HEMTTA4 BASIC ISSUE ITEMS (BII)

Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
1	5120-01-146-8096	1318250	75Q65	HYDRAULIC JACK	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
2	2540-01-165-5987	1350610 W	75Q65	PLATE, JACK BASE	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
3	5120-01-070-8386	1048TR	75Q65	WRENCH	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
4	5120-01-233-9508	1049TR	75Q65	HANDLE	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
5	5340-01-209-7841	1347720	75Q65	EXTENSION, HANDLE	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
6	6545-00-922-1200	6545-00-922-1200	89875	FIRST AID KIT	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
7	9905-01-480-0644	64326B X	75Q65	WARNING KIT, HIGHWAY	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
8	4910-01-003-9599	976	94894	GAUGE, TIRE PRESSURE	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	2
9	4720-01-558-6415	2155210 U	75Q65	HOSE ASSY, TIRE INFL	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	2
10	2540-01-165-6136	1350250	75Q65	CHOCK, WHEEL	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	4
11	4210-01-133-9053	1347000	75Q65	EXTINGUISHER, FIRE, 10 BC	LH2, LH4, LH5, LH7, L11, L14 - LH9, L10	EA	1 - 2

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Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
12	4010-01-249-0548	00044-9973	96508	CHAIN, UTILITY	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
13	4010-01-200-1506	1452490	75Q65	CHAIN ASSY, AXLE	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
14	4030-00-377-1397	1361760	75Q65	SHACKLE, ANCHOR	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
15	5120-01-436-2924	AC18	96508	WRENCH, ADJUSTABLE, 8 IN	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
16	5120-00-264-3796	120405 A	75Q65	WRENCH, ADJUSTABLE, 12 IN	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
17	5120-01-480-0640	1350150	75Q65	PLIERS, 10 IN, ADJUSTABLE JOINT	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
18	5120-00-293-3309	1350160	75Q65	SCREWDRIVER, STANDARD	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
19	5120-01-398-8053	32746A X	75Q65	SCREWDRIVER, PHILLIPS #3	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
20	5140-01-167-1541	1350190	75Q65	TOOL BAG	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
21	5340-00-158-3805	1619180	75Q65	PADLOCK W/O CHAIN	LH2, LH4, LH5, LH7, LH9, L10, L11, L14 - LH4	EA	1 - 3

## APPENDIX F – HEMTTA4 BASIC ISSUE ITEMS (BII)

Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
22	5340-00-158-3807	1362720	45152	PADLOCK W/CHAIN	LH5, L14 - LH4, LH9, L10 - LH2, L11 - LH7	EA	2 - 3 - 4 - 5
23	3940-01-209-6008	1385750	75Q65	SLING ASSEMBLY	LH2, LH7	EA	1
24	1670-00-725-1437	1362610	75Q65	CARGO TIE DOWNS	LH2	EA	24
25	3940-01-163-2319	1307550	75Q65	SNATCH BLOCK	LH7, L10	EA	1
26	4210-01-460-9083	1641170	75Q65	FIRE EXTINGUISHER	LH4 - LH7	EA	2 - 1
27	4730-01-222-6705	1505480	75Q65	ADAPTER REDUCER	LH4	EA	2
28	4930-00-051-3194	1619190	75Q65	NOZZLE	LH4	EA	1
29	5975-00-878-3791	1362680	75Q65	GROUNDING RODS 30"	LH4	EA	6
30	2540-00-409-8891	1362440	75Q65	BRKT, PIONEER TOOL	LH4, LH7	EA	1
31	5110-00-293-2336	1362400	75Q65	AXE, SINGLE BIT	LH4, LH7	EA	1
32	5120-00-288-6574	1362410	76Q65	HANDLE MATTOCK PICK	LH4, LH7	EA	1
33	5120-00-243-2395	1362420	75Q65	MATTOCK PICK	LH4, LH7	EA	1
34	5120-01-515-7117	3453866	75Q65	SHOVEL, HAND	LH4, LH7	EA	1
35	5120-01-526-1378	1362600	75Q65	HAMMER 6 LBS.	LH4, LH7	EA	1
36	3990-01-204-3009	1619230	75Q65	STRAP, WEBBING	LH9, L10	EA	8
37	6220-01-326-2286	1770010	75Q65	LAMP, WORK	LH2, LH9, L10, L11	EA	1
38	6150-01-180-6035	1419770 U	75Q65	WIRE HARN 18GA 720.0 WORKLAMP	LH2, LH7, LH9, L10, L11	EA	1
39	6150-01-320-0719	1771530 W	75Q65	HARNESS, WORKLAMP	LH2, LH9, L10, L11	EA	1
40	4910-01-386-4300	2007140	75Q65	TIRE GAUGE, INFLATOR-DEFLATOR	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	2
41	4720-01-493-6466	3294652	75Q65	HOSE ASSY, SLAVE	L11	EA	1
42	5140-00-368-6326	1508440	75Q65	ROLL TOOL	L10	EA	1

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Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
43		1508450	45152	EXT SOCKET WRENCH	L10	EA	1
44	5120-00-020-5635	1508460	75Q65	ADPT TORQUE WRENCH	L10	EA	1
45	5120-01-394-4253	1508470	75Q65	WRENCH TORQUE	L10	EA	1
46	5120-00-022-9783	1508480	75Q65	RELEASE TOOL WRENCH	L10	EA	1
47	5120-00-242-3349	1508490	75Q65	SOCKET WRENCH	L10	EA	1
48	5340-01-558-6515	3636440	75Q65	HANDLE,PUMP,TIRE CARRIER	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
49	5120-01-479-9225	3294625	75Q65	SOCKET, 1.12 IN 3/4 DRIVE	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
50	5120-01-378-6699	3706699	75Q65	SOCKET, 1.69 IN .75 DRIVE	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
51	5130-01-400-0129	07569	1CV05	EXTENSION, WRENCH	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
52	5120-01-242-7218	1505380	75Q65	HANDLE, SLIDING TEE	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
53	5130-00-541-7839	1759370	75Q65	SOCKET, IMPACT 1.50	L11	EA	1
54	3040-01-593-4775	2248330 W	75Q65	PLATE, TRANSPORT, WELDMENT	LH4	EA	1
55	4710-01-593-8297	3458206	75Q65	VENT, CARGO TANK W/FIRE SCREEN	LH4	EA	1
56	4030-01-197-2334	1451750	75Q65	SHACKLE, SLINGING	LH4, L11	EA	2
57	2540-01-471-5071	3788474	75Q65	EXTENSION, HOOK ARM	L11	EA	1
58	6150-01-022-6004	1307560	45152	CABLE AND PLUG ASSY	LH7	EA	1
59	3940-01-230-0294	1477190	75Q65	SNATCH BLOCK	LH7	EA	1

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Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
60	4720-01-254-0189	1619200	75Q65	HOSE ASSY, INTERVEHICULAR	LH7	EA	2
61	5180-00-754-0661	1619210	75Q65	TOOL KIT,WELDER	LH7	EA	1
62	5140-01-227-9604	1478710	75Q65	TOOL BAG - WELDING KIT	LH7	EA	1
63	3433-00-294-6743	1362510	75Q65	TORCH SET, CUTTING	LH7	EA	1
64	8120-00-268-3360	800-1225A	8N807	TORCH TANK ACETYLENE	LH7	EA	1
65	8120-00-357-7992	1362500	45152	TORCH TANK OXYGEN	LH7	EA	1
66	4820-00-551-1094	1362470	75Q65	REGULATOR ACETYLENE	LH7	EA	1
67	4820-01-079-8235	1362480	75Q65	REGULATOR OXYGEN	LH7	EA	1
68	4720-00-356-8571	1362450	75Q65	ACETYLENE 25 FT.	LH7	EA	1
69	4720-01-600-3413	1362460	75Q65	OXYGEN HOSE 25 FT.	LH7	EA	1
70	5120-00-243-9072	1362540	75Q65	WISE 6" SWIVEL BASE	LH7	EA	1
71	5120-00-277-4244	1362640	75Q65	WRENCH PLIER ST.JAW	LH7	EA	1
72	5120-01-522-0827	1362660	75Q65	WRENCH, PLIER, CURVE	LH7	EA	1
73	5120-00-900-6098	1362570	75Q65	SLEDGE HAMMER 12 LBS	LH7	EA	1
74	5110-00-221-1075	40414	79796	COLD CHISEL HAMMER	LH7	EA	1
75	5120-00-224-1372	1362550	75Q65	BAR, PINCH, 26IN	LH7	EA	1
76	5120-00-293-0665	1362560	75Q65	WRECKING BAR	LH7	EA	1
77	5120-00-224-1390	1362590	75Q65	CROW BAR	LH7	EA	1
78	5340-00-753-3744	1619220	75Q65	STRAP 1.0X36.0 IN	LH7	EA	8
79	6220-01-250-5190	3145661	75Q65	STROBE,MAGNETIC MOUNT	LH7	EA	1
80	5340-00-543-3398	1374330	75Q65	STRAP 1.0X12.0 IN	LH7	EA	4
81	2540-01-254-5029	1567820 W	75Q65	FAIRLEAD LIFT BAR	LH7	EA	1
82	5315-01-257-7801	1564810	75Q65	PIN HITCH COTTERLESS	LH7	EA	1
83	5340-01-182-9527	1374630 W	75Q65	STRAP,OXYGEN TANK,WLDMT	LH7	EA	2

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Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
84	5340-01-236-2109	1454420 W	75Q65	STRAP ACET TANK ASSY	LH7	EA	2
85	5310-01-062-3379	362AX	75Q65	WASH,FLT .38X.81X.07 ZY	LH7	EA	2
86	5310-01-129-0450	351AX	75Q65	WASH,LK,SPLIT .38X.68X.09 ZY H	LH7	EA	4
87	5310-01-063-8970	434AX1	75Q65	NUT,HEX .38-16 G5 ZY	LH7	EA	4
88	5340-01-209-7806	1376380	75Q65	STRAP 1.0X16.0 IN	LH7	EA	1
89	4010-01-229-7769	1340930	75Q65	AXLE,RESTRAINING CHAIN	LH7	EA	1
90	5340-01-211-6107	1358410	75Q65	BRKT,STEERING LOCK	LH7	EA	1
91	5305-01-056-5448	501BO1	75Q65	SCR,CAP,HEX .38-16X.75 G5 ZY	LH7	EA	4
92	2540-01-226-5266	1497250 W	75Q65	ADAPTER,TOW,RH	LH7	EA	1
93	2540-01-226-3373	1497260 W	75Q65	ADAPTER,TOW,LH	LH7	EA	1
94	6220-01-627-4485	3917391	75Q65	TOW LIGHTS,ASSY	LH7	EA	1
95	6150-01-629-4053	4025051	75Q65	CABLE ASSY TOW LIGHTS 600.0	LH7	EA	1
96	4010-01-250-5428	1531140	75Q65	CHAIN ASSY,12 FOOT	LH7	EA	4
97	5315-01-258-8581	1536450 U	75Q65	PIN ASSY	LH7	EA	1
98	3040-01-224-5497	1447190 W	75Q65	EXTENSION,RH	LH7	EA	1
99		1447200 W	45152	EXTENSION,LH	LH7	EA	1
100		1543440 W	45152	ADAPTER ASSY,TOW EXTENSION	LH7	EA	2
101		1543800 U	45152	PIN ASSY	LH7	EA	2
102	2540-01-226-7139	1481830 W	75Q65	ADAPTER ASSY,LIFT,RH	LH7	EA	1
103	2590-01-226-3349	1481840 W	75Q65	ADAPTER ASSY,LIFT,LH	LH7	EA	1
104	2540-01-246-7770	1531170 U	75Q65	ADAPT TOW ASSY,RH	LH7	EA	1
105		1531180 U	45152	TOW ASSY,ADAPTER LH	LH7	EA	1



## APPENDIX F – HEMTTA4 BASIC ISSUE ITEMS (BII)

Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
106	5365-01-257-4399	1531110	75Q65	SPCR 4.250X4.500X4.00 ST	LH7	EA	2
107	5365-01-257-4400	1531120	75Q65	SPCR 4.250X4.500X5.00 ST	LH7	EA	2
108		1532170 W	45152	TOW ADAPTER,RH WLDMT	LH7	EA	1
109		1532180 W	45152	TOW ADAPTER,LH WLDMT	LH7	EA	1
110	5315-01-257-4512	1532880	75Q65	PIN,TOW ADAPTER	LH7	EA	2
111	5315-01-257-7802	1532890	75Q65	PIN,TOW ADAPTER	LH7	EA	2
112	5315-01-515-6848	1533610	75Q65	HAIRPIN COTTER	LH7	EA	4
113	4030-01-234-0032	1481800	75Q65	CLEVIS,GRAB HOOK	LH7	EA	2
114	5315-01-259-0313	1345470	75Q65	PIN,COT HAIR .15X2.69 ZP	LH7	EA	2
115	3940-01-270-3389	1482010	75Q65	SLING,CHAIN	LH7	EA	2
116	5305-01-167-9408	128131 A	75Q65	SCR,FLG,HEX .50- 13X2.00 G8 PO	LH7	EA	4
117	5310-01-081-8244	60860A X	75Q65	NUT,HEX,LKDT .50- 13 G8 PO	LH7	EA	4
118	5340-01-516-2058	3483699	75Q65	ADAPTER,MULTI USE,LH WLDMT	LH7	EA	1
119	5340-01-516-2059	3484856	75Q65	ADAPTER,MULTI USE,RH WLDMT	LH7	EA	1
120	5365-01-516-2066	3471714	75Q65	SPACER,3.0W,MULTI USE,WELDMENT	LH7	EA	4
121	5315-01-516-2068	3471888	75Q65	PIN,CLV .50X2.47 UF	LH7	EA	4
122	5315-01-516-2071	3475291	75Q65	PIN,SPRING .125X.75	LH7	EA	6
123	5315-01-490-5334	3471752	75Q65	RING,RUE	LH7	EA	8
124	5365-01-516-2069	3471878	75Q65	SPACER,MULTI USE,WELDMENT	LH7	EA	4
125	5315-01-513-1553	3341263	75Q65	PIN,COT SQ .09X.75 SS	LH7	EA	4
126	5315-01-516-2070	3471882	75Q65	PIN,CLV .50X1.02 UF	LH7	EA	4
127	5315-01-516-2062	3483735	75Q65	PIN,CLV 1.47X3.71 SPL	LH7	EA	4
128	5315-01-515-6847	3483739	75Q65	PIN,CLV 1.25X3.34 SPL	LH7	EA	2
129	5315-01-515-6846	3483740	75Q65	PIN,CLV 1.00X3.34 SPL	LH7	EA	2
130	5315-01-490-7325	3406240	75Q65	PIN,LNC .31X2.34 ZY	LH7	EA	4

## APPENDIX F – HEMTTA4 BASIC ISSUE ITEMS (BII)

Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
131		3811587	45152	OPERATORS MANUAL, LET TRACTOR	L14	EA	1
132		3811588	45152	OPERATORS MANUAL, TRACTOR	LH5	EA	1
133		3811589	45152	OPERATORS MANUAL,WRECKER	LH7	EA	1
134		3811590	45152	OPERATORS MANUAL,WRECKER	LH7	EA	1
135		3811591	45152	OPERATORS MANUAL, CARGO	LH2	EA	1
136		3811592	45152	OPERATORS MANUAL, CARGO	LH9	EA	1
137		3811593	45152	OPERATORS MANUAL, CARGO	L10	EA	1
138		3811594	45152	OPERATORS MANUAL, TANKER	LH4	EA	1
139		3811595	45152	OPERATORS MANUAL, LHS	L11	EA	1
140		3815190	45152	IETM, HEMTT A4	LH2, LH4, LH5, LH7, LH9, L10, L11, L14	EA	1
141	4030-01-622-9684	3790083	75Q65	SHACKLE, TOWING (non-pkg BII)	LH2, LH4, LH5, LH9, L10, L11, L14	EA	4
142	4030-01-622-9684	3790083	75Q65	SHACKLE, TOWING (non-pkg BII)	LH2, LH4, LH5, LH9, L10, L11, L14	EA	2
143	8105-01-353-2497	1362710	75Q65	BAG, ASSEMBLY, PAMPHLET (non-pkg BII)	LH2, LH4, LH5, LH9, L10, L11, L14	EA	1
144	7510-00-889-3494	1362730	75Q65	BINDER, LOOSE-LEAF (non-pkg BII)	LH2, LH4, LH5, LH9, L10, L11, L14	EA	1

## APPENDIX G – PLSA1/A2 BASIC ISSUE ITEMS (BII)

Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
1	8105-01-353-2497	1362710	75Q65	BAG, ASSEMBLY, PAMPHLET	741, 751	EA	1
2	7510-00-889-3494	1362730	75Q65	BINDER, LOOSE-LEAF	741, 751	EA	1
3	6545-00-922-1200	6545-00-922-1200	89875	FIRST AID KIT	741, 751	EA	1
4	4010-01-249-0548	1307530	75Q65	CHAIN, UTILITY	741, 751	EA	1
5	2540-01-165-6136	1350250	75Q65	CHOCK, WHEEL	741, 751	EA	2
6	4210-01-133-9053	1347000	75Q65	EXTINGUISHER, FIRE,10 BC	741, 751	EA	1
7	5120-01-480-0638	1916HX	75Q65	HAMMER, BALL PEEN	741, 751	EA	1
8	5340-00-158-3805	1619180	75Q65	PADLOCK WO CHAIN	741, 751	EA	1
9	5340-00-158-3807	1362720	45152	PADLOCK W-CHAIN	741, 751	EA	3
10	5120-01-336-5636	1898650	45152	PLIERS, 10IN	741, 751	EA	1
11	5120-01-398-8053	32746A X	75Q65	SCREWDRIVER, PHILLIPS #3	741, 751	EA	1
12	5120-00-227-7356	1898660	75Q65	SCREWDRIVER, FLAT	741, 751	EA	1
13	4030-01-408-2774	2019250	75Q65	SHACKLE, TIE DOWN	741, 751	EA	2
14	9905-01-480-0644	64326B X	75Q65	WARNING KIT, HIGHWAY	741, 751	EA	1
15	5120-01-436-2924	1350180	75Q65	WRENCH, ADJUSTABLE 8 IN	741, 751	EA	1
16	5120-00-264-3796	120405 A	75Q65	WRENCH, ADJUSTABLE, 12 IN	741, 751	EA	1
17	5120-00-277-4244	1362640	75Q65	WRENCH PLIER ST.JAW	741, 751	EA	1
18	5120-01-522-0827	1362660	75Q65	WRENCH, PLIER, CURVE	741, 751	EA	1
19	5340-01-350-0872	1731070	75Q65	PLATE, JACK BASE	741, 751	EA	1
20	5340-01-209-7841	1347720	75Q65	EXTENSION ,HANDLE	741, 751	EA	1
21	5130-01-428-3751	1789100 U	75Q65	AIR WRENCH ASSY	741, 751	EA	1

## APPENDIX G – PLSA1/A2 BASIC ISSUE ITEMS (BII)

Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
22	5120-01-242-7218	1505380	75Q65	HANDLE, SLIDING TEE	741, 751	EA	1
23	5130-01-393-1569	1789070	75Q65	SOCKET, IMPACT 33MM	741, 751	EA	1
24	5130-00-541-7839	1759370	75Q65	SOCKET, IMPACT 1.50	741, 751	EA	1
25	5130-01-400-0129	2020970	75Q65	EXTENSION, WRENCH	741, 751	EA	1
26	4910-01-386-4300	2007140	75Q65	TIRE GAUGE, INFLATOR-DEFLATOR	741, 751	EA	1
27	4720-01-341-4912	1759750 U	75Q65	HOSE ASSY #6 PO 476.0	741, 751	EA	1
28	5340-01-341-2984	1789080	75Q65	STRAP, RATCHET	741, 751	EA	2
29	6150-01-180-6035	1419770 U	75Q65	WIRE HARN 18GA WORKLAMP	741, 751	EA	1
30	5440-01-342-0700	2019940	75Q65	LADDER	741, 751	EA	1
31	5140-01-480-0634	1898680	75Q65	BAG, TOOL	741, 751	EA	1
32	5120-01-132-4038	1898690	75Q65	WRENCH, COMBINATION	741, 751	EA	1
33	5340-01-372-3987	1949670	75Q65	HANDLE, WINCH	741, 751	EA	1
34	4030-01-557-3079	1769330	75Q65	SHACKLE, TIE DOWN	741, 751	EA	2
35	5120-01-373-8833	1976800	75Q65	WRENCH, OPEN END 3/4-7/8	741, 751	EA	1
36	8105-01-394-5929	1991290	75Q65	BAG, TOOL	741, 751	EA	1
37	5120-01-387-0055	2022970	75Q65	TUBE WRENCH	741, 751	EA	1
38	5120-01-437-1642	2025160	75Q65	WRENCH, COMBINATION	741, 751	EA	1
39		3821225	45152	IETM PLS A1	741, 751	EA	1
40		3821223	45152	PLS A1 OPERATORS MANUAL	741, 751	EA	1
41		3821226	45152	HAND RECEIPT PLS A1	741, 751	EA	1
42		3821224	45152	FLAT RACK MANUAL	741, 751	EA	1

## APPENDIX G – PLSA1/A2 BASIC ISSUE ITEMS (BII)

Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
43	4720-01-571-9919	3809388	75Q65	HOSE ASSY, SLAVE	741, 751	EA	1
44	4730-01-617-7796	3809385	75Q65	ADAPTER ASSY, SLAVE	741, 751	EA	1
45	4730-01-617-5810	3809386	75Q65	ADAPTER ASSY, SLAVE	741, 751	EA	1
46	4730-01-617-5800	3809387	75Q65	ADAPTER ASSY, SLAVE	741, 751	EA	1
47	2540-01-480-0453	3361026	75Q65	RAMP, WHEEL	741, 751	EA	2
48	2540-01-576-3578	3832664	75Q65	VALVE TOOL, WLDMT	741, 751	EA	1
49	2540-01-576-3619	3832561	75Q65	BRKT, FREE FLOW TOOL	741, 751	EA	1
50	5120-01-585-4402	3833930	75Q65	HYDRAULIC JACK, 12T, TELESCOPIC	741, 751	EA	1
51	2540-01-471-5071	3788474	75Q65	EXTENSION, HOOK ARM	741, 751	EA	1
52		2069490	45152	BII PKG, M1074 (consist of the following three components)			
52a	4320-01-351-8600	1919440	75Q65	HANDLE, HAND PUMP	741	EA	1
52b	3940-01-209-6008	1385750	75Q65	SLING ASSEMBLY	741	EA	1
52c	3940-01-241-7400	1964200	75Q65	SLING, SIX LEGGED	741	EA	1

## APPENDIX H – PLS TRAILER A0/A1 BASIC ISSUE ITEMS (BII)

Item Number	National Stock Number	Part Number	CAGE	Description	Usable On Codes	U/M	Qty Req'd
1	8105-01-394-5929	1991290	75Q65	BAG, TOOL	076, 0761	EA	1
2	2540-01-165-6136	CS-2540-0067	16236	CHOCK, WHEEL	076, 0761	EA	2
3	4210-01-133-9053	429101	03670	EXTINGUISHER, FIRE	076, 0761	EA	1
4	4720-01-368-7981	1876750 U	75Q65	HOSE ASSEMBLY, AIR	076, 0761	EA	1
5	5420-00-529-4427	1048440	75535	LOAD BINDER, 5/8 RATCHET	076, 0761	EA	2
6	5340-00-158-3807	AA5948 7-2SC	58536	PADLOCK W/CHAIN	076, 0761	EA	1
7	5220-01-360-5582	1874160	75Q65	PLATE, SURFACE	076, 0761	EA	2
8	2590-01-533-8676	1246862 3-1	OBJH 4	RAMP, LOADING VEHICLE. RH	076, 0761	EA	1
9	2590-01-539-2857	1246862 3-2	OBJH 4	RAMP, LOADING VEHICLE. LH	076, 0761	EA	1
10	5120-01-375-0215	1873040	75Q65	ROD, UNLOCKING	076, 0761	EA	2
11	5315-01-371-1763	1873050	75Q65	ROD, UNLOCKING	076, 0761	EA	1
12	9330-01-371-0322	12599-072	0V4Z1	SHEATH, RUBBER	076, 0761	EA	2
13	3990-01-204-3009	MIL-PRF-71224-1	0KHZ 6	STRAP, TIEDOWN	076, 0761	EA	1
14	5120-00-423-6728	5385A1 6	39428	WRENCH, ADJUSTABLE	076, 0761	EA	1
15	5340-01-608-4501	70368	72031	HANDLE, WINCH	0761	EA	2
16	3940-01-609-2272	3813649	75770	SLING, CART LOADING	0761	EA	1
17		4106717	75Q65	TRAILER MANUAL	0761	EA	1
18	3950-01-608-4442	3900302	75Q65	WINCH ASSY	0761	EA	1
19	3950-01-608-4444	3901003	75Q65	WINCH MOUNT ASSY	0761	EA	1

APPENDIX I – CHANGES/CONTRACT MODS IMPACTING PURCHASE DESCRIPTION

**ATPD 2304 REV D – FHTV 4 CONTRACT EXTENSION – DATED 04 MAY 2021:**

a. Changed header on all pages and on cover page from “ATPD 2304 Rev D - FHTV Contract Extension” to “ATPD 2304 Rev D”

b. Original title on page 1:

“THE OFF-ROAD FAMILY OF VEHICLES (11 TON TO 16.5 TON PAYLOADS): THE HEAVY EXPANDED MOBILITY TACTICAL TRUCK (HEMTT) A4 AND THE PALLETIZED LOAD SYSTEM (PLS) A1”

Updated title on pages 1 and 2:

“THE OFF-ROAD FAMILY OF VEHICLES (11 TON TO 16.5 TON PAYLOADS): THE HEAVY EXPANDED MOBILITY TACTICAL TRUCK (HEMTT) A4 AND THE PALLETIZED LOAD SYSTEM (PLS) A1/A2”

c. Original date on cover page:

“04 MAY 2021”

Revised date on cover page:

“UPDATED 03 NOVEMBER 2021”

d. Original opening sentence, page 2:

“This specification was prepared on 04 May 2021 by the US Army Tank-automotive and Armaments Command.”

Updated opening sentence, page 2:

“This specification was **updated** on **03 November 2021** by the US Army Tank-automotive and Armaments Command.”

e. Under paragraph 1.1.1 (Missions), added the following mission categories:

<b>M1075A2 Bare</b>	<b>PLS LHS-Heavy Bare</b>	<b>VB0-A</b>
	<b>(w/o LHS/MHC/winch/ Auxiliary Fuel Tank)</b>	

**APPENDIX I – CHANGES/CONTRACT MODS IMPACTING PURCHASE DESCRIPTION**

<b>M1075A2</b>	<b>PLS LHS-Heavy without</b>	<b>VB1-A</b>
	<b>Material Handling Crane</b>	
<b>M1074A2</b>	<b>PLS LHS-Heavy with</b>	<b>VB2-A</b>
	<b>Material Handling Crane</b>	

- f. Under paragraph 2.2.2 (Other Government documents, drawings, and publications), top of page 9:

Changed “P.O. Box 2815, Sacramento, CA 95812 or )”

- to -

“P.O. Box 2815, Sacramento, CA 95812”.

- g. Original paragraph 3.4.2:

“3.4.2 Cargo aircraft. All equipment removed in order to meet Air Transportability requirements shall be stowed on the vehicle. Reference MIL-HDBK-1791 for guidance.

a. Mission I, II, III, IV, VA and VC Vehicles at VCW (less machine gun (MG) ring mount kit; associated cab armor kits; Gunner Protection Kit (GPK); and Enhanced Container Handling Unit (E-CHU)) shall be capable of being transported without restriction on the C-17, C-130, and C-5A aircraft (with the exception of the Mission III (A4 Wrecker) and Mission IB2 (A4 GMT) vehicles which are not C130 transportable.

b. Mission VB Vehicles at VCW (less machine gun (MG) ring mount kit; associated cab armor kits; Gunner Protection Kit (GPK); and Container Handling Unit (CHU)) shall be capable of being transported without restriction on the C-5A, and C-17 aircraft.

c. Mission VI Trailer variants (PLST/PLSTA1) shall be capable of having one trailer stacked on top of another, such that two PLST variants shall be transportable in C-5A and C-17 aircraft. The PLST variants shall be transportable by the C-130 as a single unit.”

Updated paragraph 3.4.2:

“3.4.2 Cargo aircraft. All equipment removed in order to meet Air Transportability requirements shall be stowed on the vehicle. Reference MIL-HDBK-1791 for guidance.

a. Mission I, II, III, IV, VA, **VB** and VC Vehicles at VCW (less machine gun (MG) ring mount kit; associated cab armor kits; Gunner Protection Kit (GPK); and Enhanced Container Handling Unit (E-CHU)) shall be capable of being transported without restriction on the **C-17, and C-5A aircraft**.



**APPENDIX I – CHANGES/CONTRACT MODS IMPACTING PURCHASE DESCRIPTION**

b. Mission VI Trailer variants (PLST/PLSTA1) shall be capable of having one trailer stacked on top of another, such that two PLST variants shall be transportable in C-5A and C-17 aircraft. The PLST variants shall be transportable by the C-130 as a single unit.”

h. TABLE IV (Minimum Payloads for Vehicles and Trailer):

Changed “M1075A1 Bare” to M1075A1/**A2** Bare”

Changed “M1075A1” to “M1075A1/**A2**”

Changed “M1074A1” to “M1074A1/**A2**”

Changed “VB0” to “VB0/**VB0-A**”

Changed “VB1” to “VB1/**VB1-A**”

Changed “VB2” to “VB2/**VB2-A**”

i. Original paragraph 3.10.5.a:

“a. Side slope operation of the Mission VA1, VB1, VB2 and VC vehicles shall also be capable of being performed with an ISO 668, Type 1C freight container secured with a flatrack (threshold) (objective - without a FR) with the Central Tire Inflation System (CTIS) set in the highway mode, as applicable.”

Updated paragraph 3.10.5.a:

“a. Side slope operation of the Mission VA1, VB1, **VB1-A**, VB2, **VB2-A** and VC vehicles shall also be capable of being performed with an ISO 668, Type 1C freight container secured with a flatrack (threshold) (objective - without a FR) with the Central Tire Inflation System (CTIS) set in the highway mode, as applicable.”

j. Original 3.12.6.6.1:

“3.12.6.6.1 LHS overload (threshold). The LHS overload protection system shall protect the CBT, Light and Heavy LHS, truck, and FR from permanent damage or deformation while loading/unloading uniformly distributed payloads greater than 20% for Mission VA and VC Vehicles and 27% for Mission VB Vehicles over the payloads defined by Table IV, in the automatic mode under the conditions of paragraph 3.12.6.1. There shall be an overload warning light located in the cab, in plain view of the driver. The LHS warning light shall indicate activation of the overload protection system. The CBT, Light and Heavy LHS, and trailer shall be capable of loading/unloading, in the manual mode (CBT may require opening of LHS hydraulic access cover), an overload condition of 20% for Mission VA and VC Vehicles and 27% for Mission VB Vehicles over the payloads defined by Table IV, uniformly distributed payload without permanent damage or deformation (the overload protection system may be deactivated for lift capability verification).”

**APPENDIX I – CHANGES/CONTRACT MODS IMPACTING PURCHASE DESCRIPTION**

Updated paragraph 3.12.6.6.1:

3.12.6.6.1 LHS overload (threshold). The LHS overload protection system shall protect the CBT, Light and Heavy LHS, truck, and FR from permanent damage or deformation while loading/unloading ~~uniformly~~ distributed payloads greater than 20% for Mission ~~VAVC~~ **Vehicles, 25% for Mission and VCVA Vehicles** and 27% for Mission VB Vehicles over the payloads defined by Table IV, in the automatic mode under the conditions of paragraph 3.12.6.1. **For Mission VA Vehicles, the overload protection system shall allow lifting up to 15% over the payloads defined by Table IV, in the automatic mode on level ground.** There shall be an overload warning light located in the cab, in plain view of the driver. The LHS warning light shall indicate activation of the overload protection system. The CBT, Light and Heavy LHS, ~~and trailer~~ shall be capable of loading/unloading, in the manual mode (CBT may require opening of LHS hydraulic access cover), an overload condition of ~~20%~~ **15%** for Mission VA and VC Vehicles and 27% for Mission VB Vehicles over the payloads defined by Table IV, ~~uniformly distributed payload~~ without permanent damage or deformation (the overload protection system may be deactivated for lift capability verification).

k. Original paragraph 3.12.6.6.2:

3.12.6.6.2 LHS overload (objective). The LHS overload protection system shall protect the CBT, Light and Heavy LHS, truck, and FR from permanent damage or deformation while loading/unloading payloads up to 10% over the threshold payloads defined by Table IV, in the automatic mode under the conditions of paragraph 3.12.6.1. There shall be an overload warning light located in the cab, in plain view of the driver. The LHS warning light shall indicate activation of the overload protection system. The CBT, Light and Heavy LHS, and trailer shall be capable of loading/unloading, in the manual mode, an overload condition of up to 20% over the payloads defined by Table IV, without permanent damage or deformation (the overload protection system may be deactivated for lift capability verification). To verify automatic mode cutoff (i.e. the inability to lift the load), test shall be performed at a payload of 13% over the threshold payloads defined by Table IV. To verify manual mode cutoff, test shall be performed at a payload of 23% over the threshold payloads defined by Table IV.

Updated paragraph 3.12.6.6.2:

### **3.12.6.6.2 Reserve**

l. Added new paragraph 3.12.6.12:

**“3.12.6.12 By-Wire Active Safety. Mission VB0-A, VB1-A and VB2-A vehicles shall incorporate ECP FHTV 418R2 and meet the performance requirement of the By-Wire Active Safety Kit Performance Specification (P-Spec).”**

**APPENDIX I – CHANGES/CONTRACT MODS IMPACTING PURCHASE DESCRIPTION**

m. Original Table V row 3.12.6.12:

3.12.6.12	Reserved											
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Updated Table V row 3.12.6.12

3.12.6.12	By-Wire Active Safety											
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n. Original Appendix G Title:

APPENDIX G – PLSA1 BASIC ISSUE ITEMS (BII)

Updated Appendix G Title:

APPENDIX G – PLSA1/A2 BASIC ISSUE ITEMS (BII)

APPENDIX I – CHANGES/CONTRACT MODS IMPACTING PURCHASE DESCRIPTION

**ATPD 2304 REV D – FHTV 4 CONTRACT EXTENSION – DATED 03 NOVEMBER 2021:**

a. Original date on cover page:

**“UPDATED 03 NOVEMBER 2021”**

Revised date on cover page:

**“UPDATED 15 SEPTEMBER 2022”**

b. Opening sentence, page 2:

“This specification was **updated** on **03 November 2021** by the US Army Tank-automotive and Armaments Command.”

Updated opening sentence, page 2:

“This specification was **updated** on **15 September 2022** by the US Army Tank-automotive and Armaments Command.”

c. Under paragraph 1.1.1, add:

**“M977A4 LRPT                      HEMTT Large Repair Parts                      IA3  
Transporter (LRPT)”**

d. Under Table IV, add:

<b>“M977A4 LRPT</b>	<b>IA3</b>	<b>Large Repair Parts</b>	<b>M989A1</b>	<b>22,000 lbs.-N/A</b>	<b>22,000 lbs.-N/A</b>
		<b>Transporter”</b>			

APPENDIX I – CHANGES/CONTRACT MODS IMPACTING PURCHASE DESCRIPTION

**ATPD 2304 REV D –DATED 15 SEPTEMBER 2022:**

a. Original date on cover page:

**“UPDATED 15 SEPTEMBER 2022”**

Revised date on cover page:

**“UPDATED 23 MAY 2023”**

b. Opening sentence, page 2:

“This specification was **updated** on **15 September 2022** by the US Army Tank-automotive and Armaments Command.”

Updated opening sentence, page 2:

“This specification was **updated** on **23 May 2023** by the US Army Tank-automotive and Armaments Command.”

c. Under Table IV:

Original Minimum Payloads:

“M977A4 EPP	IA2	Electrical Power Plant	M989A1	15,000 lbs.-N/A	15,000 lbs.-N/A”
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Updated Minimum Payloads:

“M977A4 EPP	IA2	Electrical Power Plant	M989A1	<b>22,000 lbs.-N/A</b>	<b>22,000 lbs.-N/A”</b>
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d. Under paragraph 6.4, add the following:

“HEMTT/HET Anchor Rod (Pogo Stick) – NSN 4030-01-306-4526  
 HEMTT/HET Nonmetallic Hose Set – NSN 4720-01-106-9681  
 M983 LET Quick Disconnect – NSN 4730-01-519-2280  
 M983 LET Quick Disconnect – NSN 4730-01-519-2285  
 M1977 CBT Quick Disconnect – NSN 4730-01-025-4918  
 M1977 CBT Quick Disconnect – NSN 4730-01-024-1347”

e. In Appendix I, add the following header to the top of pages 158, 159, 160 and 161 in Appendix I missing the header:

**“APPENDIX I – CHANGES/CONTRACT MODS IMPACTING PURCHASE DESCRIPTION”**