

**SUPPORT PLAN
FOR THE
CARGO UTILITY GPS RECEIVER
(CUGR)**

**AN/ASN-175
SATELLITE SIGNALS
NAVIGATION SET**

(NSN 5826-01-442-4579)

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**DEPARTMENT OF THE ARMY
PRODUCT MANAGER
GLOBAL POSITIONING SYSTEM**

**FORT MONMOUTH FIELD OFFICE
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HEADQUARTERS, DEPARTMENT OF THE ARMY

(FINAL DRAFT - APRIL 2004)

Table of Contents

FORWARD

Scope
GPS Operation
Safety Summary

GENERAL

- 1.1 Introduction/Change Highlights
 - 1.1.1 Purpose
 - 1.1.1.1 Conflict
 - 1.1.2 Background
 - 1.1.3 Authority
- 1.2 AN/ASN-175 Defined
 - 1.2.1 CUGR Receiver System
 - 1.2.2 Functional/Physical Configuration
 - 1.2.3 Operational and Physical Characteristics
 - 1.2.4 Equipment Identification

PLANS, GOALS and STRATEGY

- 2.1 Acquisition Strategy
- 2.2 System Readiness Objectives
- 2.3 Distribution and Installation
 - 2.3.1 Distribution
 - 2.3.1.1 Army UH-1H/V Aircraft
 - 2.3.1.2 Army OH-58A+/C Aircraft
 - 2.3.1.3 Other non-standard Army Aircraft
 - 2.3.1.4 USAF UH-1N Aircraft
 - 2.3.1.5 Installation Kits
 - 2.3.1.6 Foreign Military Sales
 - 2.3.2 UH-1 Integration Concept
 - 2.3.3 OH-58 Installation Concept
 - 2.3.4 Non-standard Aircraft installation concept
- 2.4 Integrated Logistics Support (ILS) Elements
 - 2.4.1 Design Influence
 - 2.4.2 Maintenance Concept
 - 2.4.2.1 Organizational (AVUM) Maintenance
 - 2.4.2.2 Contractor Depot Level Maintenance
 - 2.4.2.3 Warranty
 - 2.4.2.4 Post-warranty Support
 - 2.4.2.5 Repair Return Procedures via LMP Turn-in Process
 - 2.4.2.6 Contractor Depot Level Repair Options
 - 2.4.3 Manpower and Personnel

- 2.4.4 Supply Support
 - 2.4.4.1 Initial Provisioning for LRU Components
 - 2.4.4.2 Materiel Management
 - 2.4.4.3 Requisitioning Repair Parts
 - 2.4.4.4 Identification of Component parts
 - 2.4.4.5 Spares
- 2.4.5. Test Measurement and Diagnostic Equipment
- 2.4.6. Training and Training Devices
- 2.4.7. Technical Manuals
 - 2.4.7.1.CUGR system manuals
 - 2.4.7.2.Aircraft Operations and Maintenance Manuals
 - 2.4.7.3.Aircraft Installation Manuals
- 2.4.8. Packaging Handling and Storage
- 2.4.9. Transportation and Transportability
- 2.4.10. Facilities
- 2.4.11. Computer Resources Support
 - 2.4.11.1. Navigation Database Support
 - 2.4.11.2. Mission Planning System (MPS)
 - 2.4.11.3. Field Reprogramming
 - 2.4.11.4. Current Version Software
 - 2.4.11.5. Data Transfer from PLGR
- 2.5. Materiel Fielding
 - 2.5.1. Fielding via Modification Work Order (MWO)
 - 2.5.2. Materiel Release
 - 2.5.3. Removal of Existing GPS Systems
 - 2.5.4. Disposition and Removal of CUGR Systems
 - 2.5.5. Variations in Installation
 - 2.5.6. Fielding via Technical Bulletin (TB)
 - 2.5.7. Fielding Via Non-standard Installations
- 2.6. Associated Items of Equipment
 - 2.6.1. Aircraft Installation Kits
 - 2.6.2. AVUM level repair kits
 - 2.6.3. Cryptographic Key Fill devices
- 2.7. Reliability and Availability
 - 2.7.1. Calculated Reliability
 - 2.7.2. Availability

APPENDICES

- A Acronyms and Abbreviations
- B CUGR System Components
- C Aircraft Installations
- D Points of Contact
- E Direct Vendor Support and Trimble Repair Return Form

FORWARD

SCOPE

The CUGR Support Plan provides a historical overview of the CUGR program and current field support procedures in effect as of the date of publication.

GPS OPERATION

The Navigation System by Timing and Ranging (NASTAR) GPS System is a space-based navigation and timing system made up of multiple satellites, a ground control system and receiver sets such as the CUGR aircraft navigation system that provide Position Velocity and or Timing (PVT) data to the user.

SAFETY SUMMARY

CAUTIONS

General Handling Procedures for Electrostatic Discharge (ESD) Items

- Use wrist ground straps or manual grounding procedures. Keep end items in protective covering when not in-use.
- Ground all electrical tools and test equipment.
- Periodically check continuity and resistance of grounding system.
- Use only metalized solder suckers. Handle ESD items only in protected areas.

WARNINGS

- Operation in a spoofed environment without the protection offered by P(Y) Code may result in degradation of accuracy.
- The CUGR is a point-to-point navigator. It does not track terrain features. Check your flight plan and route for terrain features to be avoided.
- The CUGR has a night vision goggles enabled mode. Failure to enable the NVG Mode prior to using night vision equipment could adversely affect night vision.
- Trichloroethane and similar chemical solvents will no longer be used for equipment cleaning. These substances threaten public health and the environment by destroying ozone in the earth's upper atmosphere. Non-hazardous cleaning materials will be used instead, such as clean cloth, water and mild detergent.
- Do not allow the radio receiver to hang by its cables. The strain could cause damage to the system.

SECTION ONE

GENERAL

1.1 INTRODUCTION/ CHANGE HIGHLIGHTS (April 2004)

This document replaces prior versions dated November 1998 or June 2001. This document provides updated information on the following topics: Post-warranty repair support; OH-58 installations; piece part support for installation kits, Mission Planning Software and options for unit-level replacement of the radio receiver memory battery.

1.1.1 PURPOSE

This document provides support guidance for the AN/ASN-175 Cargo Utility GPS Receiver (CUGR). This plan is not a substitute for the CUGR Operator's and Unit Aviation Maintenance Manual, TM 11-5826-315-12&P or host aircraft operation and maintenance manuals. This document focuses on logistical support of interest to field operators and maintainers.

1.1.1.1 Conflict. In the event of conflict with information contained in an official publication with a more recent publication date, the official publication supercedes this document. Conflicts between this document and an official publication of an earlier date may indicate obsolete information in the official publication. Questions should be directed to PM GPS or CECOM (Appendix D).

1.1.2 BACKGROUND

In the early 1990s, the UH-1H/V/N fleet began using commercial 'standalone' GPS receivers as an aid to navigation in accordance with Public Law 103-160 which required GPS aiding on all DoD aircraft. Commercial receivers operate on the Standard Positioning Service (SPS) GPS signal. The requirement for GPS in military aircraft was further defined by the Office of the Secretary of Defense (OSD) to require that weapons systems supporting combat operations be capable of utilizing the Precise Positioning Service (PPS) GPS signal. The PPS signal provides superior accuracy and signal protections not available in the SPS signal. As a result, the use of commercial standalone GPS receivers was considered an interim solution and OSD directed the GPS Joint Program Office (JPO) to procure a PPS-rated system for Instrument Flight Rules (IFR) capable aircraft, specifically the UH-1 fleet.

1.1.3 AUTHORITY

In FY96, the GPS JPO and Army Acquisition Executive delegated the procurement of PPS-capable GPS systems to equip UH-1 aircraft to the US Army Communications and Electronics Command (CECOM) since the bulk of these aircraft are Army-owned. The GPS JPO retained program technical oversight and the resulting device would still be considered Common User Equipment.

1.2 AN/ASN-175 CUGR

1.2.1 CUGR RECEIVER SYSTEM

The CUGR system, or “B kit”, is comprised of the receiver, servo amplifier and antenna (see figure 1 below). The receiver includes a receiver processor, controls for user inputs and function selection, input/output displays, interfaces and a power supply function. The servo amplifier boosts receiver output to drive UH-1 instruments. The servo amplifier is only used for the UH-1. The antenna is common to other GPS aircraft systems.

The CUGR fulfills the OSD mandate for a PPS capable system. CUGR accesses the PPS signal through the use of COMSEC crypto-variable key operations.

Supporting aircraft installation kits, or “A kit” may include remote switches, annunciator panel, interfaces and connecting cables depending upon the specific kit. Description of CUGR A and B kit components is provided at Appendix B.

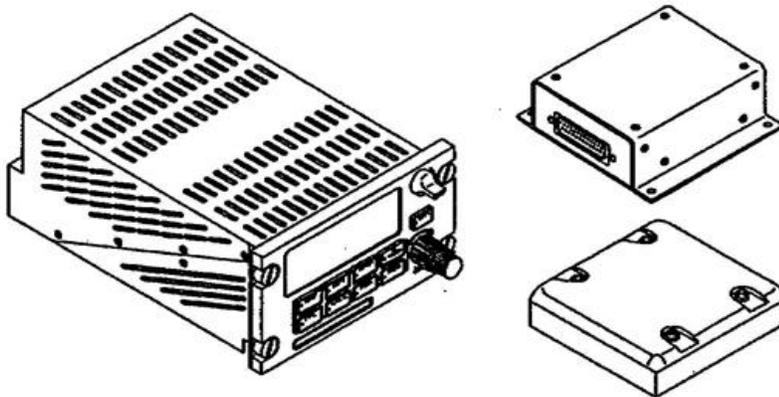


Figure 1 NAVIGATION SET, SATELLITE SIGNALS, AN/ASN-175

1.2.2 FUNCTIONAL/PHYSICAL CONFIGURATION

The basic functional and physical configuration of the AN/ASN-175 is as follows:

<u>Component</u>	<u>Description</u>
Radio Receiver Unit	6 channel P(Y) code continuous tracking Digital receiver, dual frequency capable.
Antenna	L1/L2 omni-directional flat w/integral Pre-amp.
Servo Amplifier	3 channel synchro driver in accordance with ARINC 407 and ARINC 547.

1.2.3 OPERATIONAL AND PHYSICAL CHARACTERISTICS

<u>Parameter</u>	<u>Specification</u>
Operating Frequencies	L1: 1575.42 Mhz L2: 1227.6 Mhz
Number of Receiver Channels	Six
Position Accuracy	With PPS: 16 meter (SEP ¹) With Differential GPS: 5 meter
Velocity Accuracy	.2m/sec
Weight	Receiver: 3.05 lb Servo Amp: 0.6 lb Antenna: 11 oz.
Power	28 VDC, 37 W
Software Current Version	V0102A
Memory Battery Life	Average 5 years ²
Environmental Conditions	Tested to MIL-STD 810E

The faceplate of the radio receiver or Control Display Unit (CDU), provides a display screen incorporating both scrolling and multi-page features. This enables the CUGR to display bearing, distance, destination name, ground speed, ground track, Estimated Time of Arrival (ETA) and by use of the integrated Course Deviation Indicator (CDI) for UH-1 installations, the course deviation from a selected waypoint or series of waypoints. See Chapter 2 of the CUGR TM for a full description of CUGR display capabilities. CUGR display and key lighting are compatible with the AN/AVS-6 Aviators Night Vision Imaging System (ANVIS). The display is readable in all but direct sunlight conditions.

The faceplate of the receiver has a slot for a Jeppesen data card. Subscription to the Jeppesen data service is a unit-funded option. Subscribers receive monthly updates of navigation aids and hazards. The Jeppesen card is further described in paragraph 2.4.11.1.

1.2.4 EQUIPMENT IDENTIFICATION

See equipment breakout listed at Appendix B.

¹ Spherical Error Probable meaning displayed location is within a 16m sphere of true location.

² Memory battery failure was the most common reason for warranty return. Post-warranty options for memory battery replacement are discussed in paragraph 2.4.2.1.

SECTION TWO

PLANS, GOALS AND STRATEGY

2.1 ACQUISITION STRATEGY

CUGR is a Non-Developmental Item (NDI) program with Contractor Logistics Support (CLS) for life. CECOM awarded contract DAAB07-96-C-A780 to Trimble Navigation Ltd. for a modified version of the Trimble 2101 Input/Output Approach Navigation Set in September 1996. The 2101 is a commercial product that utilizes the SPS signal only. Incorporating a PPS-capability was the most significant element in the modification of the 2101 to become the CUGR. 1,024 CUGR systems were purchased during the contract ordering period: 804 Army, 75 USAF and 145 Foreign Military Sales (FMS).

2.2 SYSTEM READINESS OBJECTIVES

The system readiness objective for CUGR is an Operational Availability (Ao) = 0.95. Calculation of the Mean Time Before Failure (MTBF) determines overall readiness status of operating CUGR systems. MTBF is discussed further in paragraph 2.7 below.

2.3 DISTRIBUTION AND INSTALLATION

2.3.1 Distribution:

- 2.3.1.1 Army UH-1H/V aircraft: CUGR systems and installations kits were delivered to the US Army Aviation and Missile Command (AMCOM) as specified in a Memorandum of Agreement (MOA) between PM GPS and Project Manager, Utility Helicopters (PM, UH). PM UH identified the aircraft to receive CUGR. PM GPS funded the AMCOM MWO workforce to install the system to aircraft.
- 2.3.1.2 Army OH-58A+/C aircraft: CUGR systems and installation kits were shipped from Army stock to designated Army National Guard locations during FY03/04. The operating commands assumed responsibility for installation to aircraft.
- 2.3.1.3 Other Non-Standard Army aircraft: After the suspension of UH-1H/V installations, CUGR systems and installation kits were provided on a case-by-case basis to requesting organizations which assumed responsibility for installation and any requirements to supplement the original Air-worthiness Release (AWR).
- 2.3.1.4 USAF UH-1N aircraft: CUGR systems plus spares were delivered to the designated agent at Lakehurst NJ for distribution to USAF commands operating the UH-1N aircraft. The USAF coordinated installation to aircraft.
- 2.3.1.5 Installation Kits: Lear Siegler Inc. (LSI), formerly UNC Tracor Inc. developed and produced CUGR UH-1 and OH-58 installation kits at Lakehurst NJ.
- 2.3.1.6 Foreign Military Sales: FMS purchases were delivered to designated FMS freight forwarders. FMS installation and support is outside the scope of this plan.

2.3.2. UH-1 Integrated Installation concept: AMCOM installed CUGR to the UH-1H/V fleet in accordance with Modification Work Order (MWO) 1-1520-210-50-32. The radio receiver, annunciator panel and remote switches are installed to the center console

of the UH-1 aircraft. The servo amplifier is mounted on a shelf in the lower right forward quadrant of the aircraft. The antenna is roof mounted. In February 1999, installations were curtailed with 371 completed out of a planned 783 as a result of an Army decision to accelerate the retirement schedule for UH-1H/V aircraft.

2.3.3. OH-58 Stand-alone Installation concept: After the curtailment of Army UH-1H/V installations, PM GPS determined the OH-58A+/C aircraft fleet was the largest potential fleet to use surplus CUGR systems. PM GPS funded the prototype, validation and verification effort to approve a stand-alone installation kit for OH-58 aircraft. The radio receiver and annunciator components are installed to the center console. The antenna is roof mounted. The servo amplifier is not used.

2.3.4. Non-standard Installation concept: Additional CUGR systems were approved for distribution to requesting units on a case-by-case basis. Non-standard installations may include UH-1 aircraft utilizing the original full-integration MWO. These aircraft typically did not receive CUGR prior to the curtailment of formal MWO installations but have been retained or transferred for operation in a unit with UH-1 having integrated CUGR. Other non-standard installations involve aircraft utilized in RDT&E or Opposing Force missions where CUGR contributes to mission effectiveness and safety of flight.

2.4 INTEGRATED LOGISTICS SUPPORT ELEMENTS

2.4.1 DESIGN INFLUENCE

The CUGR is based on a commercial design, the Trimble 2101 Input/output Approach Navigation Set. The primary design influences that led to selection of the 2101 as the basis for CUGR were the form, fit and functional requirements of the UH-1 aircraft and the performance requirements of the US Army Aircraft GPS Integration Guide (GIG).³

2.4.2 MAINTENANCE CONCEPT

The CUGR employs a two level maintenance concept: Organizational Level or Aviation Unit Maintenance (AVUM) and Contractor Depot Level Maintenance.

2.4.2.1 ORGANIZATIONAL (AVUM) MAINTENANCE

There are no operator maintenance requirements.

Organizational maintenance is limited to fault isolation at the component level utilizing Built-In-Test (BIT), basic trouble-shooting for loose connectors, pinched cables, loose or broken knobs, replacement of externally accessible items including the knobs and replacement of faulty Line Replaceable Units (LRU).

³ The GIG was a modified version of the TSO-C129 definition of performance requirements, written with the intention of allow Army self-certification of the essential TSO requirements. Subsequently, Army Aviation declined to update the GIG and the CUGR was never formally certified as compliant.

Effective March 2004, organizational maintenance includes the option of allowing aviation maintenance personnel to open the receiver and replace the memory battery after the receiver warranty has expired. Procedures for performing this task are contained in a separate document titled “Service Bulletin Guidance – Replacement of CUGR Memory Battery”. This document is available from PM GPS or CERDEC (See Appendix D). Read the following caution statement concerning risks associated with this task. The owning unit has two other options to replace the memory battery: Depot turn-in of the unserviceable receiver through standard supply procedures (paragraph 2.4.2.4) or direct-funded battery replacement by the vendor (see Appendix E).

CAUTION
Organizational Maintenance Personnel

Maintenance personnel are advised not to open the CUGR receiver for other than memory battery replacement since the government does not possess the technical data necessary to support organic repair and post-repair test of the receiver. If collateral damage occurs in the course of replacing the memory battery, the receiver must be treated as unserviceable and returned for repair/replacement in accordance with the maintenance options discussed in paragraph 2.4.2.4 below.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

<u>Sequence</u>	<u>Item to be Inspected Procedure</u>	<u>Work Time/Frequency in Hours</u>
1	Remove all dirt, grease and moisture from the antenna radome with a cloth dampened (not wet) with warm soapy water. Wipe dry with a clean lint-free cloth. Inspect radome for cracks and signs of deterioration.	0.2 Weekly/Monthly
2	Check for proper mechanical action (positive action without backlash, binding or sticking) of all push-button keys and rotary switches.	0.1 Monthly
3	Clean the front-panel using a clean lint-free cloth.	0.1 Weekly

NOTE: Owing units are advised to retain a data card (valid or invalid) in the faceplate slot at all times in order to prevent the entry of dust or other environmental contaminants. If CUGR displays “faulty data card” while a card is inserted, remove and clean the contact plate end of the data card with a common eraser. This may eliminate the “fault”.

NOTE: For detailed guidance on troubleshooting and other AVUM maintenance instructions, see Chapter 3, CUGR TM and UH-1H/V aircraft maintenance manuals.

2.4.2.2 CONTRACTOR DEPOT LEVEL MAINTENANCE

The government designated Trimble as the sole provider of Contractor Logistics Support (CLS) for the lifecycle of the CUGR system. Organic Depot maintenance was not established. This section provides historical information concerning the expired warranty support and addresses the owning unit's current options for post-warranty support.

2.4.2.3 WARRANTY

The radio receiver, servo amp and antenna plus software and firmware were warranted for a period of 66 months from the date of delivery, defined by DD250 acceptance date. The warranty covered defects in design, manufacturing, materials and workmanship. Each radio receiver and servo amp carried a warranty nameplate with an expiration date (month/year). The antenna did not have an individual warranty label. The last of the warranties for CUGRs delivered to DoD expired in April 2004. Owing units are directed to obtain repair support as discussed in paragraph 2.4.2.4 below.

Installation kits and the Jeppesen data card were not warranted. Owing units can identify failed installation kit components from the parts breakout in the installation MWO/TB. If the needed item is not bench stock or DLA-listed, seek assistance from the office listed for installation kit support at Appendix D. Unserviceable Jeppesen data cards should be reported directly to Jeppesen for direct support.

2.4.2.4 POST-WARRANTY SUPPORT

CECOM placed a new maintenance contract DAAB07-03-D-J614 with Trimble in September 2003 for post-warranty contractor depot repair support through September 2007. The Indefinite Delivery Indefinite Quantity (IDIQ) contract provides these six services: Standard repair of the radio receiver and servo amplifier, replacement of the memory battery, bench check, receiver software update and receiver demilitarization.

Owing units have two options to obtain post-warranty support:

TURN-IN VIA STANDARD SUPPLY PROCEDURES (Recommended):

The recommended procedure is for owning units to turn-in unserviceable items and requisition replacements using standard wholesale supply procedures in accordance with Logistics Modernization Program (LMP). See paragraph 2.4.2.5 below.

DIRECT VENDOR SUPPORT (Alternative):

Alternatively, owning units may directly fund the repair and return of unit-owned unserviceable items on a pay-as-you-go basis using procedures that are a modified version of the original warranty repair procedures. See Appendix E.

In choosing a mechanism for post-warranty support, the owning unit should consider factors such as the availability of funds, urgency of need and overall cost effectiveness.

2.4.2.5 REPAIR RETURN PROCEDURES (LMP PROCESS)

Owning units turn-in unserviceable items to the CECOM B-16 account at Tobyhanna Army Depot (BY6) W25G1W and submit funded requisitions for replacement items using standard LMP wholesale supply procedures.

SHIP TO: Tobyhanna Army Depot (BY6)
W25G1W
11 Hap Arnold Blvd
Tobyhanna, PA 18466

The CECOM LRC Item Manager will issue turn-in credit, charge the unit account and ship replacement items in accordance with timelines consistent with requisition priority and subject to availability of stock.

NOTE: Units are requested to include written comments to describe the circumstances under which failure occurred with all turn-ins. This information will be appreciated as it helps the diagnosis and repair process.

NOTE: Units subscribing to the Jeppesen Data service should retain the data card when turning in an unserviceable receiver for repair.

2.4.2.6 CONTRACTOR DEPOT LEVEL MAINTENANCE ACTIONS

NOTE: Procedures described in this paragraph apply when CECOM refurbishes unserviceable turn-ins or when an owning unit chooses Direct Vendor Support.

Trimble will evaluate the receiver or servo amplifier and advise the submitting agency (CECOM or the owning unit) of one of the following repair determinations:

- 1) Fault is economically repairable. Trimble will repair or replace the item ⁴. If a repair cannot be completed within 21 days, a replacement component will be shipped from government repair pool stock at Trimble, subject to asset availability. Trimble will observe the Turn-Around-Time (TAT) for standard repair service defined in the post-warranty repair contract.
- 2) Fault is not economically repairable. When an item is judged Beyond Economic Repair (BER), Trimble will coordinate with DCMC to demilitarize and retire the affected serial number. The submitting agency will be advised of BER status and close out documentation will be provided. When an owning unit used Direct Vendor Support and received such a BER notice, the unit must requisition a replacement through standard supply procedures.

⁴ Bench check, memory battery replacement, fault locate, repair/replace faulty components, reassemble, test and return to owning unit./CECOM after QA release and receipt of funds.

NOTE: Minor cosmetic damage (scratches, fade paint) resulting from wear and customary use that do not affect performance will not be corrected.

2.4.3 MANPOWER AND PERSONNEL

The CUGR is operated by US Army and USAF pilots and maintained by helicopter avionics mechanics. No special or additional manpower is required.

2.4.4 SUPPLY SUPPORT

2.4.4.1 Initial Provisioning for Line Replaceable Unit (LRU) Components

There was no initial provisioning since the CUGR system was comprised of sealed LRU components with all replacements provided under terms of a multi-year warranty. Since fielding was limited to aircraft listed by tail number, there was no requirement to establish a wholesale supply stock of CUGR items.

With expiration of the warranty in 2004, wholesale supply stock of the receiver and servo amp was established at the organic BY6 depot (Tobyhanna Army Depot) to provide post-warranty support for previously fielded systems. The receiver stock is not available for general requisitions to support new installations through the standard supply system. The CECOM Item Manager and PM GPS control wholesale stock of receivers.

2.4.4.2 Material Management

The US Army CECOM Logistics Readiness Center (LRC) is designated the Primary Inventory Control Activity (PICA) and the CUGR was designated as Non-consumable Item Material Support Code 5 (NIMSC5).

NIMSC5 obligates CECOM to support the USAF depot designated as Secondary Inventory Control Activity (SICA) with wholesale supply stock functions.

USAF units are directed to utilize standard LMP turn-in and requisition procedures for post-warranty support. USAF requests for additional fielding must be coordinated with CECOM Item Manager and PM GPS.

2.4.4.3 Requisitioning Repair Parts

Control knobs for the radio receiver are replaceable at the AVUM shop. They are externally accessible, stock-listed and available by requisition. The receiver and servo amplifier are listed as Secondary Items and Repair Parts respectively. The receiver remains subject to controlled distribution as noted in paragraph 2.4.4.1 above.

2.4.4.4 Identification of Component Parts

The following identification and supply codes apply to CUGR components:

REPAIR PARTS LIST

<u>SMR/CAGE CODE</u>	<u>NSN</u>	<u>DESCRIPTION</u>	<u>PART NUMBER</u>
PAODA/0LL70	5826-01-441-9797	Receiver, radio	82128-00
PAODA/0LL70	5985-01-422-4719	Antenna, L1/L2	22433-40
PAODA/0LL70	5996-01-442-0832	Amplifier, Electronic Control (Servo Amp)	81827-00
PAOZZ/15084	5355-01-448-1612	Knob, black plastic	TT207-A2B1
PAOZZ/86797	5355-01-071-9351	Knobs, concentric dual	RB-67-1+0
****	****	Connector kit	82129-00
****	****	Memory Battery Tadiran TL-5104/P-BP	87F6413

NOTE 1: The connector kit is not stock-listed by the government. Users may obtain replacement connector kit components from bench stock or via local purchase.

NOTE 2: Aviation Maintenance units may obtain the memory battery by contacting LSI Lakehurst or PM GPS (see Appendix D) or by local purchase. Instructions for replacing the memory battery are contained in Service Bulletin Guidance – Replacement of CUGR Memory Battery which is also available from LSI Lakehurst or PM GPS.

2.4.4.5 Spares

Army spares were not authorized due to the high reliability of CUGR and the designation of CUGR as a Secondary not Primary Means of Navigation. The USAF placed spares at each site operating the UH-1N. PM GPS placed spare at the Trimble repair depot to serve as replacements when exclusion repairs exceeded 21 days Turn Around Time (TAT) or when an item was determined BER. Those depot spares now serve as rotating general repair stock to support standard supply procedures.

2.4.5 TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT

There are no special tools or support equipment required for CUGR. The following common AVUM tools and test equipment are applicable for AVUM support.

<u>Nomenclature</u>	<u>NSN</u>	<u>Tool Number</u>
Tool kit, Electronic Equipment or	5180-00-064-5178	TK-100G
Tool kit, Electronic Repairman Aircraft	5180-01-375-6926	
Multi-meter	6625-01-265-6000	AN/PSM-45A

NOTE: Common AVUM tools needed to replace the memory battery are identified in “Service Bulletin Guidance – Replacement of CUGR Memory Battery“.

2.4.6 TRAINING AND TRAINING DEVICES

New Equipment Training (NET): During FY99 a three-day course of instruction for Operator/Pilot and Maintainer NET was presented to instructor pilots and selected other pilots using the “train the trainer” concept. Training was provided at unit locations then operating UH-1 aircraft. The NET program concluded in FY01.

Institutional Training: The US Army Aviation Center (USAAVNC) does not provide training for equipment associated exclusively with non-modernized aircraft.

Sustainment Training: During NET visits, the CECOM NET Team provided operating units with copies of the NET Program of Instruction, lesson plans and instructor notes to support unit-managed sustainment training.

As of 2004, a refresher/sustainment course with a limited scope that excludes flight operations is available through coordination with PM GPS. The owning unit must fund the cost and training is subject to the availability of instructors.

2.4.7. TECHNICAL MANUALS

2.4.7.1. CUGR System Manuals.

TM 11-5826—315-12&P	Operator’s and Unit Aviation Maintenance Manual for Satellite Signals Navigation Set, AN/ASN-175 (Sep 98)
TB 11-5826-315-10	Quick Reference Guide for the Satellite Signals Navigation Set, AN/ASN-175
TB 11-5826-315-12-1	CUGR Support Plan (April 04)
No TB # assigned	Service Bulletin Guidance – Replacement of CUGR Memory Battery (Adobe document) (March 2004)

NOTE: The content for TM 11-5826-315-12&P was revised after initial printing. The correct cover date for the TM is 1 Sep 98. Copies obtained through standard publications systems include these corrections along with a Repair Parts List, Special Tools List (RPSTL) and Maintenance Allocation Chart (MAC).

An update to the TM to reflect the post-warranty support discussed in this document is being considered for publication in FY04.

Other TM, TB and publications applicable to the AN/ASN-175 are listed in Appendix A to the Operator's TM.

2.4.7.2 Aircraft Operations and Maintenance Manuals. Content to update the -55 series and the -11 series operating and maintenance manuals was provided to AMCOM and CECOM respectively. The update of those documents was completed by those commands subject to the availability of funds.

2.4.7.3. Aircraft Installation Manuals

UH-1H/V installation: MWO 1-1520-210-50-32 dated 12 Feb 99
OH-58 Installation: TB 11-5826-315-12-2 dated 15 Apr 03

2.4.8 PACKAGING, HANDLING AND STORAGE

Packaging: Any components turned-in through LMP or returned for Direct Vendor Support should be packaged in such a manner as to preclude in-transit damage.

Handling: A receiver, which cannot be verified as zeroized, should be handled in accordance with the Controlled Item procedure outlined in Appendix E.

Storage: There are no extraordinary storage requirements for CUGR components beyond normal protection from temperature extremes and pilferage.

2.4.9. TRANSPORTATION AND TRANSPORTABILITY

Items turned-in through LMP shall be processed in accordance with local policy.

Items returned for Direct Vendor Support should utilize traceable means (e.g., Fed Ex, UPS or registered US Mail) with a DD1149 to document shipment.

The radio receiver contains a lithium memory battery but the quantity of lithium falls below the threshold requiring Hazardous Materials handling.

2.4.10. FACILITIES

No special facilities are required to support CUGR.

2.4.11. COMPUTER RESOURCES SUPPORT

CUGR operating software is proprietary and contractor-supported for life. Any proposed or required software upgrades will be processed as Engineering Change Proposal (ECP)

for government review and release. Owning units will be notified through multiple channels of any requirement for a field software upgrade.

Any computer requirements needed to support a software upgrade or to load mission-planning data will be called out in the implementing instructions for that process.

2.4.11.1. Navigation Database Support

Each CUGR was delivered with a Jeppesen database card containing data describing airports, approaches, SIDS, STARS, VORs, NDB, intersections, airspace boundaries and other aircraft navigation information. Jeppesen is a commercial enterprise which sells monthly updates to subscribing customers. Units desiring to subscribe may contact Jeppesen directly at the address provided at paragraph 1-11 of the CUGR TM or at the POC listing in this document. Funding a Jeppesen subscription is a unit responsibility. Customers obtain appropriate interface hardware from Jeppesen in order to receive monthly data service updates via the Skywriter internet-based subscription service.

NOTE: The CUGR may be operated with an expired data card or without a data card in the faceplate slot. In either case the CUGR will indicate “missing or invalid data card” upon power-up, requiring operator acknowledgement. When operating with an expired card or without a data card in the faceplate slot, the CUGR will not display the additional navigation data that would otherwise be available from the data card.

NOTE: Operating units are advised to maintain a card in the faceplate slot to reduce the opportunity for dust or other environmental contaminants to enter the CUGR.

NOTE: The CUGR data card is unique and cannot be exchanged with data cards used in the TNL 2101 or other similar commercial receivers.

2.4.11.2. Mission Planning System (MPS)

For US Army operators: Product Manager, Aviation Mission Equipment (PM AME) manages Aviation Mission Planning System (AMPS) for Army aviation. AMPS does not support non-modernized aircraft such as the UH-1. Unit personnel can use AMPS to create mission data at a workstation and transfer the data to the CUGR via a laptop computer or Personal Digital Assistant (PDA) palmtop computer connected to the remote data port. Prior to such upload, the remote data port in Army UH-1 installations must be modified. Contact CERDEC Project Engineer for pin-out modification drawings.

AMPS developed linkage to the USAF mapping application software known as FalconView. PM GPS and the CERDEC Project Engineer are investigating alternative MPS for CUGR based on FalconView and/or components from AMPS. (Contact PM GPS or CERDEC Project Engineer for current status of this effort).

Alternatively, Army units may participate in the USAF system described below.

For USAF operators: The USAF developed Portable Flight Planning Software (PFPS) and FalconView™ mapping application software.

USAF Software: The USAF provided CUGR Aircraft Weapons Electronics (AWE) software to UH-1N operators to transfer routes and waypoints from PFPS FalconView to the CUGR along with checklists and settings such as audio/video levels. The AWE has a component that runs on a PC and another component that runs on PDA hardware. The USAF CUGR PFPS software is distributed free-of-charge via CD ROM from the USAF Mission Planning System Support Facility (MPSSF) at Hill AFB, Ogden Utah listed at Appendix D.

USAF Hardware: The USAF provided supporting hardware to UH-1N units including a laptop computer, PDA palmtop computer and interface cable. The PDA or notebook may be used to transfer data to the aircraft. (Army users may procure a USAF Panasonic CF-47 "ToughBook" or use a similar notebook PC that meets the minimum requirements to host the software).

Although tailored for USAF UH-1N, the CUGR PFPS software is available to Army operators who register with the USAF MPSSF at Hill AFB. The software is free but the hardware must be procured with unit/command funds. Source information may be obtained from the USAF MPSSF POC listed at Appendix D.

Commercial Alternative. Trimble offers a commercial MPS software package called NAVPLAN. The kit includes hardware and software components needed to prepare MPS on a PC and transfer to the CUGR. This system is similar to that developed for the commercial Trimble 2101 receiver. NAVPLAN has not been evaluated for military use.

2.4.11.3. Field Reprogramming

Periodic Software Update. CUGR software may be upgraded by field reprogramming. When software upgrade is required, the CERDEC Project Engineer will define resources needed for the specific application. This may include loading software (provided) via the data port from a unit-owned PC or laptop and or update via the faceplate by insertion of a flash card provided by PM GPS.

NOTE: As installed, the Army UH-1 data port does not support field reprogramming. The receiver must be removed from the aircraft or the remote data port cable must be modified. CERDEC Project Engineer has pin-out data to modify the remote data port cable. USAF UH-1N installations provide a fully functional remote data port.

Owning units have the option of direct-funding the return of a receiver to the vendor depot for software reprogramming as one of the support options listed in the post-warranty support contract.

2.4.11.4. Current Software Version:

<u>Version</u>	<u>Acceptance Date</u>	<u>Effect of Change</u>
V0101	Initial Delivery	Most sets upgraded to V0102 before shipment.
V0102	Dec 97	Modified Non-Precision Approach capabilities.
V0102A	Dec 99	PLGR Time transfer message 5101 made Y2K compliant, correct offset waypoint display, correct display of Nav Database waypoints in APR Mode.

NOTE: V0102A was applied via field reprogramming: AMCOM OLR or PM GPS personnel visited field units with multiple aircraft; other units were advised to cycle receivers through Trimble for software update. Receivers repaired during the warranty period were updated at no charge. USAF units with CUGR that does not display V0102A should contact supporting USAF sites. Army units should contact their supporting AMCOM OLR office or PM GPS.

2.4.11.5. Data Transfer from AN/PSN-11 PLGR

Owning units may transfer data from an AN/PSN-11(V) Precision Lightweight GPS Receiver (PLGR) handheld GPS receiver to CUGR via the external data port. The purpose of this data transfer is to provide a “hot start” for a CUGR that has not operated recently and does not have current GPS almanac data. This action avoids the delay associated with a “cold start” wherein CUGR must download data (minimum 15 minutes) from the satellites. For more information, see paragraph 2-49.2 of the CUGR TM.

2.5. MATERIEL FIELDING

- 2.5.1 **Fielding via Modification Work Order (MWO).** CUGR was installed to selected UH-1H/V aircraft in accordance with MWO 1-1520-210-50-32, dated 12 Feb 99. Beginning in 1999 approximately 370 UH-1 aircraft received CUGR prior to the Army decision to accelerate the aircraft retirement schedule which resulted in the suspension of MWO applications to UH-1 aircraft.
- 2.5.2 **Materiel Release.** CECOM approved Materiel Release for the CUGR and AMCOM convened the MWO Release Board/Configuration Control Board (CCB) to approve the installation design, culminating in an Air-Worthiness Release (AWR) for the UH-1H/V installation.
- 2.5.3 **Removal of Existing GPS Systems.** Army Aviation policy indicated that any previously installed GPS systems such as the AN/PSN-10 or AN/ASN-169 be removed when CUGR was installed to UH-1. One exception to policy provided that in the event an aircraft was equipped with AN/ASN-128 Doppler Navigation Set per MWO 55-1520-210-50-17, it would not be equipped with CUGR.

- 2.5.4 **Disposition and Removal of CUGR Systems.** When UH-1 aircraft are removed from service, the avionics “pull list” includes CUGR components that are to be removed and returned to AMCOM at Fort Lewis. Under no circumstances should CUGR components remain in an aircraft being demilitarized, sold or otherwise disposed. If there is any question about proper disposition of CUGR system components please contact PM GPS.
- 2.5.5 **Variations in Installation.** The UH-1H/V fleet contains various non-standard systems including dual VOR, Distance Measuring Equipment (DME) and External Fuel System controls. For aircraft built in 1970 or prior years, the UHF antenna was relocated. Some aircraft were equipped with panel-mounted rather than remote-mounted HAVEQUICK radios. PM GPS developed installation sub-kits to accommodate variations in the DME, antenna location and HAVEQUICK formats. Sub-kits were called forward from Lakehurst by the OLR installation team as needed. The disposition of non-standard components affected by the CUGR installation was left to AMCOM and the owning unit.
- 2.5.6 **Fielding via Technical Bulletin.** Beginning in 2003, CUGR was provided for standalone installation to Reconnaissance and Air Interdiction of Drugs (RAID) mission OH-58A+ aircraft. A number of OH-58C aircraft also received CUGR. TB 11-5826-315-12-2, dated 15 April 03 covers all OH-58 variant installations. AMCOM approval of the TB and its subsequent publication constituted authorization to operate CUGR in the OH-58 aircraft.
- 2.5.7 **Fielding via Non-standard Installations.** PM GPS supported additional fielding for non-standard installations on a case-by-case basis as noted in paragraph 2.3.4. above.

2.6 **ASSOCIATED SUPPORT ITEMS OF EQUIPMENT**

- 2.6.1 **Aircraft Installation Kits.** See Appendix C.
- 2.6.2 **AVUM level repair tools and parts.** See paragraph 2.4.5. above.
- 2.6.3 **Cryptographic Key Fill Devices.** The CUGR interface with standard crypto-variable fill devices including the KYK-13, KOI-18, Automated Net Control Device (ANCD) or by manual input. For up-to-date information on key loading devices and procedures contact the COMSEC Custodian. For information on crypto-variable key loading procedures, see Appendix I of the CUGR TM.

2.7 **RELIABILITY AND AVAILABILITY**

- 2.7.1 **Calculated Reliability.** CUGR projected reliability was calculated by analysis to be 5,000 hours Mean Time Between Failure (MTBF). Actual MTBF was to be calculated semi-annually using actual repair data from Trimble and operating hours reported by AMCOM. Due to the low incidence of repairs, the reduction of

the operating UH-1 fleet reduction and the cost of AMCOM data reporting, no formal MTBF calculations were performed.

- 2.7.2 **Availability.** This paragraph originally addressed the availability of replacement components under warranty terms which allowed a 21 day Turn-Around-Time (TAT) for repair or replacement of CUGR components. In the post-warranty environment, this paragraph now refers to the availability of stock at the organic depot to fill requisitions received through standard supply procedures. The CECOM Item Manager is responsible to maintain stock availability by refurbishing turn-ins using the CUGR post-warranty repair contract. Depot repair TAT is transparent to the user when standard supply procedures are utilized. The post-warranty repair TAT is listed as 21 days (target) and 42 days (allowable with notice to government) and this TAT applies should an owning unit utilize the Direct Vendor Support option per Appendix E.

NOTE: Although CUGR was designated as a Secondary not Primary Means of Navigation, Trimble, PM GPS and the CECOM Item Manager will strive to provide replacement assets in a timely manner to support unit readiness.

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APPENDIX A: ACRONYMS AND ABBREVIATIONS

This Appendix provides an explanation of the abbreviations and acronyms used in this support plan. Additional terms may be found in the glossary to the CUGR TM.

<u>Acronym/Abbreviation</u>	<u>Definition</u>
ADF	Automatic Direction Finder
AMCOM	Aviation and Missile Command
AMPS	Aviation Mission Planning System
ANCD	Automated Net Control Device
ANVIS	Aviator Night Vision Imaging System
ARINC	Aeronautical Research Incorporated
AUX	Auxiliary
AVUM	Aviation Unit Maintenance
AWE	Aircraft Weapons Electronics
AWR	Air-worthiness Release
BER	Beyond Economic Repair
BIT	Built In Test
BOIP	Basis of Issue Plan
CAGE	Commercial and Government Entity Code
CCB	Configuration Control Board
CCSS	Command Commodity Standard System
CDI	Course Deviation Indicator
CDRL	Contract Data Requirements List
CDU	Control Display Unit
CECOM	Communication Electronics Command
CERDEC	Communications Electronics Research & Development Command
CI	Controlled Item
CLIN	Contract Line Item Number
CLS	Contractor Logistics Support
CONUS	Continental United States
COMSEC	Communications Security
CUGR	Cargo Utility GPS Receiver
DAC	Days After Contract
DCMC	Defense Contract Management Command
DGPS	Differential GPS
DODAAC	Department of Defense Activity Address Code
DoD	Department of Defense
DLA	Defense Logistics Agency
DME	Distance Measuring Equipment
DTD	Data Transfer Device
ECP	Engineering Change Proposal
ESD	Electrostatic Discharge
ETA	Estimated Time of Arrival
FAT	First Article Testing
FMS	Foreign Military Sales
GIG	GPS Integration Guide
GPS	Global Positioning System
GUV	Group Unique Variable
HQDA	Headquarters, Department of the Army
IAW	In Accordance With
IDIQ	Indefinite Delivery Indefinite Quantity
IFR	Instrument Flight Rules
IPT	Integrated Product Team

JPO	Joint Program Office
L1/L2	GPS Operating Frequencies
LAR	Logistics Assistance Representative
LMP	Logistics Modernization Program
LRC	Logistics Readiness Center
LRU	Line Replaceable Unit
LSI	Lear Siegler Inc.
MAC	Maintenance Allocation Chart
MOA	Memorandum of Agreement
MPS	Mission Planning System
MTBF	Mean Time Between Failure
MTOE	Modified Table of Organization and Equipment
MWO	Modification Work Order
MPS	Mission Planning System
NET	New Equipment Training
NDB	Non-Directional Beacon
NDI	Non-Developmental Item
NIMSC	Non-consumable Item Material Support Code
NSA	National Security Agency
NSN	National Stock Number
NVG	Night Vision Goggles
OA	Operational Availability
OCONUS	Outside Continental United States
ODCSOPS	Office of Deputy Chief of Staff for Operations and Security
OLR	A computer generated Project Code (no specific meaning)
OSD	Office Secretary of Defense
PDA	Personal Digital Assistant
PFPS	Portable Flight Planning Software (USAF)
PICA	Primary Inventory Control Activity
PLGR	Precision Lightweight GPS Receiver
PPS	Precise Positioning Service
P(Y)	Protected Code
PBO	Property Book Officer
PFPS	Portable Flight Planning System
RAID	Reconnaissance and Air Interdiction of Drugs
RDT&E	Research Development Test and Evaluation
PLGR	Precision Lightweight GPS Receiver
PMCS	Preventive Maintenance Checks and Services
PPS	Precise Positioning Service
PVT	Position Velocity and Timing Data
QAR	Quality Assurance Representative
Radome	Radar Dome
RDU	Receiver Display Unit
RMA	Return Material Authorization
RPSTL	Repair Parts and Special Tools List
SA	Selective Availability
SAR	Safety Assessment Report
SEP	Spherical Error Probable
SICA	Secondary Inventory Control Activity
SID	Standard Instrument Departure
SLGR	Small Lightweight GPS Receiver
SMRC	Source Maintainability and Reliability Code
SOW	Statement of Work
SPS	Standard Position Service
STAR	Standard Terminal Arrival
TAT	Turn Around Time

TB	Technical Bulletin
TBD	To Be Determined
TCTO	Technical Change Order
TM	Technical Manual
TMDE	Test, Measurement & Diagnostic Equipment
UHF	Ultra High Frequency
USAANVC	US Army Aviation Center
VOR	VHF Omni-directional Range Transmitter
WARCO	Warranty Control Officer
WLMP	Wholesale Logistics Modernization Program
WR-ALC	Warner Robins Air Logistics Center
WTB	Warranty Technical Bulletin

APPENDIX B: CUGR SYSTEM COMPONENTS

<u>Nomenclature</u>	<u>NSN</u>	<u>Part Number</u>	<u>Description</u>
System	Standard Line Item Number (LIN) N96112		
AN/ASN-175	5826-01-442-4579	82800-00	Navigation Set Satellite Signal
LRU Components	5826-01-441-9797	82128-00	Receiver Radio
	5985-01-422-4719	22433-40	Antenna L1/L2
	5996-01-442-0832	81827-00	Amplifier, Servo
Installation Kit Components			
Installation Kit	5895-01-462-1605	1200413-10	A kit for UH-1H/V
Sub-kits for UH-1			
DME Switch	5895-01-462-1664	1200413-30	DME supplemental kit
Antenna relocation	5985-01-462-1600	1200413-50	Antenna relocation kit
HAVEQUICK	5985-01-462-0733	4200238-10	HQ panel mount kit
HAVEQUICK	5985-01-462-0730	4200238-30	HQ remote mount kit
Installation Kit	TBD	1201185-10 1201185-20 1201185-30	OH-58A+ (non-RAID) OH-58A+ (RAID) OH-58C
Other components			
Connector Kit	N/A	82129-00	Connector Kit
PCM NavData Card (Jeppesen part number DTRM-61)	N/A	83124-00	Jeppesen data card
NOTE: The connector kit is comprised of approximately 14 items and is included in the purchase of a CUGR system. It is not included when a replacement radio receiver is purchased. The connector kit is not stock listed and if a replacement is required, it must be purchased directly from Trimble.			
Reprogramming Kit Components (For ECP 3)			SB 82128-XX-34-SW02
Components:	N/A	83924	Reprogramming cable
	N/A	83926-00	2M data flashcard
	N/A	83927-00	1.44/3.5 programming disk
Consumable:	Memory Battery	Tadiran TL-5104/P-BP	

APPENDIX C: AIRCRAFT INSTALLATIONS

FOR UH-1H/V AIRCRAFT

PM GPS contracted with Lear Siegler Inc (LSI) Lakehurst NJ for:

- a. An ECP and MWO for the installation of CUGR to the UH-1H/V aircraft, changes for host aircraft O&M documentation.
- b. 785 UH-1H/V installation kits and an appropriate number of sub-kits.

AMCOM applied MWO 1-1520-210-50-32 at home station locations in accordance with the Memorandum of Agreement (MOA) signed between PM GPS and PM, Utility Helicopter (PM UH). PM UH determined which aircraft received CUGR systems.

371 installations were completed prior to the HQDA suspension of MWO applications to the UH-1H/V fleet. Some aircraft equipped with CUGR were later removed from service. Other UH-1 have since received CUGR as “non-standard” installations.

For technical information on the UH-1H/V installation, refer to the MWO identified above or contact the CUGR Project Engineer identified at Appendix D.

FOR OH-58 AIRCRAFT

PM GPS contracted with LSI Lakehurst for:

- a. Design and prototyping of a stand-alone installation kit to mount CUGR to the OH-58A+/C aircraft and a supporting Technical Bulletin.
- b. OH-58 installation kits (production funded by owning commands)

The US Army National Guard Bureau (NGB) installed the CUGR at home station or Army Aviation Support Facilities in accordance with TB 11-5826-315-12-2. The NGB determined which OH-58 aircraft were to receive CUGR systems.

FOR OTHER APPLICATIONS

Since suspension of the original UH-1 MWO, PM GPS has received requests for CUGR for installation to additional aircraft. These requests are considered on a case-by-case basis. PM GPS has supported over 50 additional CUGR installations in support of uniformity of assigned aircraft avionics where CUGR represents an enhanced safety of flight over existing navigation systems. Organizations desiring to install CUGR to aircraft other than UH-1 and OH-58 are responsible for any design or installation efforts as well as any actions necessary to obtain AWR approval. PM GPS has authorized cannibalization of UH-1 kits as appropriate. There are no surplus OH-58 kits.

APPENDIX D: POINTS OF CONTACT

Army Product Manager, GPS, Fort Monmouth NJ

PM Support: Mr. Don Mulligan (732) 532-6137
Donald.Mulligan@iew.s.monmouth.army.mil (732) 532-3935 (fax)
Project Engineer: Mr. Bob Ohliger (732) 427-4686
Robert.Ohliger@mail1.monmouth.army.mil

Army Product Manager, GPS Georgia Field Office, Warner Robins, GA

Software issues: Mr. Frank Rowe (478) 926-9511
Frank.rowe@robins.af.mil

CECOM, Logistics Readiness Center (LRC), Fort Monmouth NJ

Item Management: Mr. Joseph Aliamo (732) 532-9209
Joseph.alaimo@mail1.monmouth.army.mil

Lear Siegler Inc. (LSI) Lakehurst NJ

Technical Support
Supervisor Matt Morrow (732) 323-0602 ext. 2120

Trimble Navigation Ltd

trimble_support@trimble.com Phone (800) 767-4822.
Fax (408) 481-2082

USAF UH-1 Program Support, Warner Robins, GA

LUH Program Office Mr. Derak Bynes DSN 468-7264
USAF Software Mr. David Ensley DSN 468-7255

USAF MSPPF, Hill AFB, UT

PFPS CUGR Software Mr. Doug Sheridan DSN 775-2781

Defense Contracting Management

Administrative Contracting Officer: Norvel Wright (408) 543-7012

Army Aviation and Missile Command, Redstone Arsenal AL

Logistics: Mr. Steve Huffman (256) 876-2510 DSN 746-2510

Maintenance/OLR Project Officers:

Chief Mr. Jim Neale (256) 313-1657 DSN 897-1657
Ft. Stewart GA Mr. Dale DeRoia (912) 352-6836 DSN 729-6836
Ft. Campbell KY Mr. Ron Hutchins (270) 798-7471 DSN 635-7471
Ft. Hood TX Mr. Mark McMillan (254) 287-3511 DSN 737-3511
Ft. Lewis WA Mr. Jim Peters (253) 967-5761 DSN 357-5761
Korea Mr. Wm Farnham 011-82-31-690-8082
Europe Mr. Bernie Wiegand 011-49-621-487-6828

PM Aviation Mission Equipment (PM AME)

Aviation Mission Planning (256) 313-4393

APPENDIX E: REPAIR PROCEDURES (DIRECT VENDOR SUPPORT)

This appendix addresses the procedures to be used when an owning unit chooses Direct Vendor Support in lieu of turn-in through standard supply procedures. Repair returns are handled in essentially the same manner as previously used for warranty repairs with the added step that the unit must fund the repair and return of unit-owned items.

Confirm Fault: Any component that presents an operational failure or displays a self-test fault should be subjected to fault isolation procedures. See troubleshooting in Sections 3-6 through 3-9 of the CUGR TM.

Obtain Trimble Return Authorization: Contact the Trimble repair center to request a Return Material Authorization (RMA) number: Email: trimble_support@trimble.com. (408)-481-7563 phone, (408)-481-7744 fax. See return form at Appendix E. Include the RMA number in the address line of the shipping package.

Contact PM GPS/CECOM Item Manager: This step is time-sensitive, as unit funds must be received by the CECOM Acquisition Center prior to issuance of a Delivery Order to authorize repair on the IDIQ contract. The most common means of transferring funds is the Military Interdepartmental Purchase Request (MIPR).

Prepare Documentation: If troubleshooting did not resolve the failure, remove and tag the item using maintenance documentation specified by local policy. A copy of the Trimble Repair Return Form (Appendix E) must accompany the faulty item to Trimble.

NOTE: Since the radio receiver is a Controlled Item (CI), when preparing to ship it for repair, the following standards for handling a CI item apply:

- (1) If the receiver is confirmed zeroized, use the General Repair address:
- (2) If the receiver is not confirmed zeroized, use CI In-Process Repairs address:

GENERAL REPAIR

Trimble Navigation Ltd
RMA _____
485 Potrero Ave.
Sunnyvale CA 94086

CI IN-PROCESS REPAIR

Trimble Navigation Ltd
ATTN: Facilities Security Officer
PO Box 62348
Sunnyvale CA 94088

NOTE: Prior to returning a set that cannot be confirmed zeroized, contact the Trimble Facilities Security Officer at (408) 481-8823.

Evacuate for Repair: Package the item to protect it from in-transit damage. Ship by traceable means: In CONUS use Fed Ex, UPS or Registered Mail. For returns from OCONUS, use Registered Mail. Enclose a copy of the maintenance documents including the Trimble Repair Return Form (below). Include the RMA number in the address line of the shipping package. Use a DD1149 Shipping Document with Dept of Defense Activity Address Code (DODAAC) and owning unit Point of Contact and commercial phone.

TRIMBLE REPAIR RETURN FORM

NOTE:: This form is only used for direct-funded repair returns by the vendor depot. It is not required for turn-in through standard supply procedures.

Obtain Trimble Return Authorization (RMA): Contact the Trimble repair center and request an RMA number: (408)-481-7563 phone, (408)-481-7744 fax or Email: trimble_support@trimble.com. Reference contract DAAB07-03-D-J614 and provide item part number, serial number, fault description, and owning unit Point of Contact, address and commercial phone number. Include the RMA number in the address line of the shipping package.

To expedite the repair and return of your CUGR system components, fill out a copy of this form and enclose it along with any repair tags as specified by government maintenance procedures with the item(s) being returned.

1. Enter serial number and part number of all item(s) being returned:

SERIAL NUMBER

PART NUMBER

2. Enter Owing Unit identification:

POC Name: _____
Commercial Phone Number (_____) _____
Commercial Fax Number (_____) _____
Organization: _____

Complete Shipping Address (include street and building number if applicable)

3. Description of Problem (provide as complete a description as you can)

Package the Item(s) and ship to:

**FOR GENERAL REPAIRS:
(ALL ITEMS)**

Trimble Navigation Ltd
RMA _____
485 Potrero Ave.
Sunnyvale CA 94086

**ONLY FOR RECEIVERS
NOT VERIFIED "ZEROIZED"**

Trimble Navigation Ltd
ATTN: Facility Security Officer
PO Box 62348
Sunnyvale CA 94088-2348