



# **PATHFINDER**

## **The Army GPS Newsletter Since 1994**

An informal electronic newsletter published for the GPS user community by PM GPS. Information presented is based on published and submitted news items of interest to the general user. Widest dissemination and reproduction is encouraged. Newsworthy items are solicited for inclusion. Editor Don Mulligan at PM GPS, Ft Monmouth NJ DSN 992-6137 or (732) 532-6137 or email: [Donald.Mulligan1@us.army.mil](mailto:Donald.Mulligan1@us.army.mil)

Volume 16 Issue 01

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Jan 2009

## **The Key Always Counts!**

### **From The Product Manager**



#### **Hello GPS Users!**

I can't emphasize this point too often! The Key Always Counts! Please read and heed the advice provided in the article at right.

Things have been busy at PM GPS!

Some of my staff moved from New Jersey to Maryland as part of the pending closure of Fort Monmouth; We are awarding a new contract to continue production of the DAGR to support ongoing fieldings and we continue to expand the use of embedded GPS across the Army.

Our fielders and NET instructors are on the road supporting DAGR and our logistics and engineering staff continue to respond to field users queries about all of our GPS receivers.

We are busy but we always have time to hear from soldiers so please contact me or anyone in my organization via the contact info on the back page.

**Jay Spencer**

**LTC, QM,  
Product Manager, GPS**



**The full PS Magazine article, "The Key's the Key" which addresses the importance of using COMSEC crypto-variable keys with military GPS receivers, is available at the PM GPS website.**

GPS New Equipment Training (NET) instructors are often asked: "Is it really a big deal to use keys in a military GPS receiver?" The answer is "Yes, it is!" The Secretary of Defense mandates the use of keyed Precise Positioning Service (PPS) rated GPS for all combat, combat support and combat service support operations!  
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**Only a keyed military GPS receiver can provide you with SECURE GPS.**

## **Part One: Review of March 2008 DAGR Software Update**

In coordination with the US Air Force Logistics Center at Warner Robins GA, PM GPS released the last DAGR software update in March 2008.

At that time, the new DAGR software versions were:

**984-2461-015 / 984-3006-005**

The governing MWO/TCTO: **MWO 11-5802-1172-20-3**

Questions and Answers about the March 08 update:

### **Why was this MWO marked "Urgent"?**

The "Urgent" rating related to Field Artillery users who identified a problem with the prior version of DAGR software (984-2461-012, 984-3006-002). When that version introduced the Advanced Gun Laying function, it did not reflect current Army Field Artillery Tactics, Techniques and Procedures (TTP).

This created potential improper use of information generated by the Gun Laying function so correcting that glitch resulted in the new software. The Gun Laying function was re-titled **Azimuth Determination**.

For users that do not use the Gun Laying or Azimuth Determination function, the update could be handled as "Routine". If you use this feature we recommended the new software be loaded at the earliest opportunity.

You should also download the updated DAGR Operator's manual. See the revised operation sections at 14.6 and 14.7. The manual is available (softcopy) at the GPS website, DAGR product page.

### **Where can we get the cable listed in the MWO?**

Most units received DAGR-PC cables at a ratio of one cable for every ten DAGRs. If none are available in the unit, you can requisition part # 987-5012-001. The NSN is 5995-01-521-3198. NOTE: If your unit also has PLGR, you can use the PLGR-PC cable, NSN 6150-01-375-8664 to connect DAGR to a PC since both cables use the same connectors.

### **Does this MWO fix the problem we read about in CECOM GPA 2008-003?**

No, the correction for the accuracy drift problem reported in that GPA (see box on facing page) is provided by the next DAGR software update (see facing page as well).

### **This MWO is identified as "number -3". Do I need to apply the software associated with versions "-1" and "-2" versions before applying this one?**

No, the content in each DAGR software update covers all previous updates so regardless of which version software is in DAGR, when you connect it to a PC with the DAGR

### **WHAT YOU GET**

#### **in DAGR -015/-005 Release:**

- Numerous improvements for Gun Laying and Azimuth Determination functions include the ability to create & manage up to 20 data sets and transfer data sets via serial port. Fewer key-strokes are required for common tasks.
- Update to 2005 version of the World Magnetic Model which enables DAGR to more accurately translate "true" and "magnetic" north references.
- Improved field update capabilities. DAGR users will now be able to apply future updates faster via the serial port, including WMM, almanacs and user default settings. This change also allows users to customize DAGR default settings
- Improved Laser Range Finder (LRF) operations. Now allows for selection of data from up to 3 LRF shots; also accepts larger range inputs.
- Name change for marked waypoints: Waypoints created with the "Mark" function will have a default name of "Markxxx" instead of "MKxxx". This makes DAGR consistent with PLGR operation.

reprogramming software, the program will automatically load all appropriate updates to bring your DAGR up to current version software.

### **My current DAGR software version ends in -012 or -002. The new software ends in -015 or -005. What happened to the versions in between?**

The intervening version numbers were never released to the field. The -013/-003 versions updated one function to support the new Vehicle Anti-Jam Accessory that has so far only been fielded to a few users so there was no need for a mass update. (The AJA software support was rolled into the next update). The -014/-004 versions were not released due to a problem found in testing. We corrected that and ended up going to the -015/-005 update.

### **So, what do I get in version 015 005?**

See the WHAT YOU GET box above!

### **Sorry, we didn't load this software yet.**

Too busy? If you haven't loaded 015/005 by now, and you aren't using DAGR for Gun Laying or Azimuth Determination missions, you might wait for the next software update which will be released in the near future (see next page). Visit the PM GPS website for actual release date!

## Part Two: The Next DAGR Software Update (2QFY09 Release)

In coordination with the US Air Force Logistics Center at Warner Robins GA, PM GPS will soon release another DAGR software update!

The new DAGR software versions will be:

**984-2461-016 / 984-3006-006**

The governing MWO/TCTO is: **MWO 11-5802-1172-20-4**

Check back at the website for release date. We will post the new software as soon as it is approved for release. There will also be an announcement under "Breaking News" and your MWO Coordinators will also get the new software.

Read on to understand WHY YOU NEED the software update.

### Ground Precautionary Action (GPA) Message affects both Commercial and Military GPS Receivers!

**GPA 2007-007** (Apr 07)

Advised users of the potential for temporary error in GPS receiver signal accuracy due to multi-path conditions (when a receiver tracks a signal bouncing off a nearby hard surface and mistakes it for a satellite signal).

The 2007 GPA contained work-around solutions and stated that revised Tactics, Techniques and Procedures (TTP) were scheduled to be published in Aug 2007.

**GPA 2008-003** (Jan 08)

Updated the first GPA by stating that new software version to reduce the multipath effect would be released for DAGR in the Fall of 2008 and that TRADOC publication of the revised TTP was delayed from Aug 07 to Jun 08. (Jan 09: Release date for revised TTP slipped to Jun 09).

NOTE These GPA apply to both commercial and military GPS receivers! Users are advised to read the complete GPAs which are available at the GPS website and your local CECOM LAR or Safety Offices.

### Why Are There Two Versions of Software?

The reason is internal product configurations.

#### **Don't worry about it:**

The reprogramming software "interrogates" DAGR when you connect it and then downloads the correct version of software. Early DAGR (# 822-1873-001) AN/PSN-13 use software version 984-2461-xxx while newer production DAGR (# 822-1873-002) AN/PSN-13A use software version 984-3006-xxx.

### WHAT YOU GET

#### In DAGR -016/-006 Release:

- All of the improvements listed on the facing page for version 015/005 plus the following:
- Most of the changes in software version 016/006 relate to fixing the "multi-path" situation in order to reduce the chance that DAGR might mistake a bounced signal for that of another satellite.
- Added Buffer Alerts to certain screen displays.
- You can now transfer new DAGR software from one DAGR to another DAGR.
- Improved low-battery warning.

#### Questions & Answers about the 2QFY09 update:

#### **Does this MWO fix the problem reported in the CECOM GPA 2008-003?**

Yes, this software release addresses the 'multi-path' issue that resulted in the GPA (see box at left below). The multi-path condition can create temporary errors in any GPS receiver because the signals 'bounce or reflect' off a hard surface, e.g., a large building, before they reach your receiver. That very slight change in the path of the signal can mislead a receiver to think the signal came from a different satellite than the one that actually sent it and therefore create an error.

#### **Do we need to load the 015/005 software before we load the 016/006 software?**

No, the latest version will include all of the 005/015 updates in addition to resolving the multi-path issue.

**So what are we getting when we load 006/016?** See the WHAT YOU GET box above!

#### **How do we get the new software?**

You can get the latest software from your MWO coordinator, CECOM LAR or download it directly from the Army PM GPS website once it has been released. Just check the numbers to be sure you are getting 016/006 software.

If you don't have good internet connectivity, you can request a mail-out copy on a CD: Check off the request for mail-out copy on the website software download page.

#### **Need help with DAGR reprogramming?**

**Use the website User Request link or call (478) 926-3518 or 9511, DSN 468-3518 or 9511.**



## WHO ELSE IS USING MILITARY GPS?

**Ground-mobile troops carrying DAGR and PLGR are not the only users of Military GPS!**

This information from the internet presents a sampling of public information about who else is military GPS today.

A Success Story: GPS-guided Artillery.

Self-propelled howitzers (photo at right) as well as towed 155mm howitzers operated by Allied forces, have entered the GPS age with the use of Excalibur artillery shells that are produced by a joint US-Swedish program. Artillery units fire shells just as they have done since the days of horse-drawn cannons. However, when a GPS-equipped Excalibur round reaches peak altitude, it deploys a set of fins and GPS kicks in to assist in navigating the round towards a pre-set target location. Result? The Queen of Battle is more accurate, uses fewer shells and reduces collateral damage.

Another Success Story: Unmanned Aerials.

Unmanned Aerial Vehicle systems or UAV have really come into their own since 2003. DoD operates a variety of UAV designs from the strategic USAF Predator (photo below left) to a family of tactical UAV flown by Army units including the small Raven model (photo below right).

The Raven uses the Army's current embedded military GPS receiver which goes by the long name of Ground-Based GPS Receiver Applications Module. GB-GRAM for short. The UAV presents technical issues that were not anticipated when the GB-GRAM first entered production so Army PM GPS is working with the GB-GRAM manufacturer to enhance GB-GRAM to meet UAV needs. Ongoing tactical operations provide the GPS and UAV teams with real world feedback that expedites the improvements.

An ongoing initiative: Reduced GB-GRAM.

Army PM GPS is developing the next-generation of embedded GPS that will be about 50% smaller than the current 2.5 X 3.5 inch card. It will also weigh less and use less power making it a good fit for the upcoming "Future Warrior" program. The smaller GB-GRAM will provide soldiers with situational awareness and targeting functions integrated into their personal gear. If you have a question about future GPS applications, contact MAJ Robert Canaday at our Los Angeles office at (310) 653-3678.



**(Above) The M109A6 Paladin Self-propelled howitzer fires a GPS-aided Excalibur round (inset) making artillery support more accurate with less risk of collateral damage. The M109A6 shares the GPS-aided munitions with the towed howitzer system.**

**(Below) The RAVEN reconnaissance UAV in service with deployed Army and USMC units uses a keyed GB-GRAM for optimum use of the military GPS signal.**



**Above, A Predator UAV is checked out prior to flight.**



## *The Key Always Counts!*

### ***Continued from Page One***

The official document directing the use of keyed PPS GPS receivers is the 2007 Joint Chiefs of Staff Navigation Policy, CJCSI 6130.01D, dated 13 April 2007. The document is marked FOUO. Most field unit won't have a copy. You can take our word that the policy mandates the use of keyed GPS receivers or you can go through Command channels to see the document.

**"We don't have GPS keys but we use DAGRs which are military receivers so we are OK, right?"**

No, a military GPS receiver without crypto will not receive the military-only L2 signal and therefore will not provide the accuracy and signal protections that come with that signal. Operating a military GPS receiver without a key is really no better than using a commercial GPS receiver!

## *User Survey—Future Military GPS*

Army PM GPS and the USAF GPS Wing are developing the next-generation of military GPS receivers. We would like to hear what features you like or dislike about today's DAGR and what features would you like to see in tomorrow's military GPS receiver.

Known as Modernized User Equipment or MUE, the new GPS receivers will be supported by a whole new constellation of next-generation satellites broadcasting a powerful new multi-frequency military GPS signal.

Technical MUE details cannot be discussed here but we want your feedback about features to be included in the next generation of military GPS receivers.

Use the DAGR User Survey link at the homepage!

By the time you read this, there will also be a link to a new 'short' DAGR survey at the homepage. Use either one but let us hear from you!

## *There are Two Component Parts to every DAGR*



***Even though the DAGR battery pack has its own part number 987-6641-001 and NSN 6135-01-521-3064, the DAGR is not a complete item without a battery pack!***

The DAGR battery pack is detachable and has its own part number and NSN, so it's a separate item, right?

Yes and No. Even though it has its own "ID" and you can requisition additional battery packs as 'spares' to make swapping battery packs in the field faster, one battery pack always remains with DAGR as a Component Part!

So, when you return a DAGR for warranty repair or you execute a lateral transfer to move DAGR to a new owner, you must include one battery pack!

Returning a warranty item or transferring ownership of a DAGR without the battery pack is an incomplete transaction.

So what? In the case of DAGR returned to the OEM manufacturer depot for warranty repair, Uncle Sam has to buy a replacement battery pack to make the receiver "whole" again before it can be issued to a new owner. That is costing us \$.

In the case of lateral transfer of DAGR ownership, you need to include the battery pack along with any other items currently listed as BII by the DAGR TM. In the worst case you can attach a shortage list, DA Form 2062. You were issued a DAGR with battery pack so its not right to transfer it without one and expect the gaining command to buy a replacement.

Besides holding batteries and being a Component Part of the DAGR, the pack has another key function: When attached, it forms a moisture barrier to protect the DAGR's guts and power connections from environmental exposures.

So help us avoid unnecessary costs. Whether it is a repair or ownership transaction, always include a battery pack as a Component Part!



## GPS Integration Team Meeting News

Next Meeting planned for Picatinny Arsenal, Dover NJ

**Next Meeting  
scheduled for  
March 25 / 26  
2009!**



**Some of the 100 persons who attended the May 2008 GPS Integration Meeting at Huntsville AL.**

PM GPS periodically convenes meetings of the GPS Integration Team (formerly referred to as GRIT) to provide a venue for a wide array of DoD weapon system managers and platform integrators to exchange information on the use of military GPS in their systems and to meet with GPS users.

The most recent GPS Integration meeting was held in May 2008 with 100 attendees. Most of the briefings along with the agenda and attendance roster from that session are available for viewing or download by members of the GPS group at the PM GPS website.

There is a lot going on with regard to embedded GPS these days and the next GPS integration meeting will be another good opportunity to share knowledge.

Any government or contractor personnel affiliated with a military GPS program is welcomed to attend the next meeting which is scheduled for the week of March 23 at Picatinny Arsenal, Dover NJ. Picatinny is located 35 miles Northwest of Newark Liberty International Airport.

Registration details for the GPS Integration meeting will be distributed to current members and will be posted at the PM GPS website by the time you read this newsletter.

Contact Willie Jackson or Mike Vincelli (see back page for their contact info) or Kevin Lee at (732) 532-8428 or DSN 992 8428 to register or for more information.

### **PLGR SOFTWARE STATUS**

The last planned software update for the PLGR was released in March 2008. The update provided PLGR with the 2005 World Magnetic Model for accurate translation of "true" and "magnetic" North references.

For **Baseline 2** (most tan PLGRs)  
Software Version 613-9854-**006**

For **Baseline 3+** (mostly green PLGR)  
Software Version 613-9868-**009**

You should be able to get PLGR software from your MWO Coordinator or CECOM LAR. Or you can download it from the PM GPS website.

NOTE: Unlike DAGR, you need a reprogramming kit to update PLGR software. Borrow kit Number 5825 K311 8012 ANS from your MWO coordinator.

The MWO/TCTO is MWO 11-5825-291-30-5.

## ***DAGR Repairs, We need Your Help!***



***This DAGR has a cracked display screen. The liquid crystal material is gone, it's a mess! And it will cost the government \$481 to repair the damage.***

On average, about 200 DAGR returned for warranty repair each month. Lately, about 50% of the returns have been deemed "not covered by the warranty" or "Warranty Exclusions". In these cases the government pays a unit repair fee of \$481.00. That adds up pretty fast, so what can we do about it?

The most frequent sources of "Warranty Exclusions" are scratched or damaged screens and broken battery packs. If you can reduce the incidence of these damages, you will save Uncle Sam some money.

We realize that when equipment is used hard it is going to need repair support. A question we hear a lot: "Do we have to pay to get our DAGR repaired if the damage isn't covered by the warranty?"

For Army units, it doesn't matter whether your DAGR damage is covered by the warranty or not. If it isn't, Army PM GPS has funds in place to pay for repairs and send you a replacement DAGR. So regardless of whether you think your damage is covered by warranty, your action is the same: SEND IT IN for repair. DAGR warranty repair return procedures may be found in the DAGR TM or at the website FAQ page.

For other services, each has a different process. Look up the DAGR repair FAQ for your Point of Contact.

**Who to Call to check on the status of Army DAGR returned for repairs**

We've had some personnel changes so check the back of this newsletter or the website on who to call to check on repair status.

## ***New DAGR Accessories***

Based on field user feedback, PM GPS is developing several new or improved DAGR accessories. The first new accessory to be introduced will be the Modular Lightweight Load-carrying Equipment (MOLLE) DAGR Case. It will provide handheld DAGR users with the same function as the current Personnel Case, 5995-01-521-3111 but with improvements:

- A padded flap for better protection of the DAGR display screen
- Side pockets to stash commonly used cables and spare batteries.
- MOLLE compatible attachments in lieu of the ALICE clips used on the current personnel Case.

PM GPS will begin distributing the MOLLE case at DAGR fieldings late in 2009.

We don't have the NSN or "Supply Availability Date" yet so we can't say for sure when you will be able to order it through the supply system.

Other new accessories include a right angle 90 degree power connector, a lockable installation mount and updated Computer Based Training (CBT) CD.

Check the Breaking News tab at the website for the latest status on all of these items.

## ***Don't "Pop" the DAGR battery case with a screwdriver!***



***When removing the battery pack, press in the bottom corners for release. Don't use a screwdriver to "pop" the middle of the latch because doing so is likely to damage the casting and prevent a tight weatherproof seal!***





## How to Contact PM GPS - <https://gps.army.mil>

### **Product Manager (PM GPS)**

Ft Monmouth, NJ, Warner Robins, GA and Aberdeen Proving Grounds, MD

LTC Jay Spencer  
(732) 532-3169, DSN 992-3169  
Ronald.j.Spencer@us.army.mil

### **Deputy PM GPS (DPM GPS)**

Mr. Chris Manning  
christopher.manning@us.army.mil  
(410) 278-9386, DSN 298-9386

### **Army Fielding Manager**

Mr. Eric Adair  
(410) 278-9372, DSN 298-9372  
eric.adair@us.army.mil

### **Logistics Manager**

*For Army Logistics Issues*  
Mr. Rodney Griffin  
(410) 278-9388, DSN 298-938  
rodney.griffin@us.army.mil

*For Other Service Logistics issues on DAGR, PLGR*  
Willie Jackson (478) 926-3518, DSN 468-3518  
willie.jackson@robins.af.mil

### **GPS Chief Engineer**

Mr. Frank Rowe  
(478) 926-9511 DSN: 468-9511  
frank.rowe@robins.af.mil

### **Army Weapon System Integrations—DAGR**

Mr. Willie Jackson  
(478) 926-3518, DSN 468-3518  
willie.jackson@robins.af.mil

### **Army Weapon System Integrations—GB-GRAM**

Mr. Mike Vincelli  
(410) 278-9391 DSN 298-9391  
michael.vincelli@us.army.mil

### **Who to Call for Army Issues?**

Call the Army Logistics Manager for:

- Army GPS User Equipment Policy
- User Equipment Authorizations & Procurement
- Maintenance Status or GPS Loans

Call the Army Fielding Manager for Army DAGR fielding and NET issues.

### **Other Service/Civilian Agencies?**

Contact our representatives at Warner Robins AFB, Georgia: Frank Rowe or Willie Jackson as listed in column at left.

### **Or use the User Information Request Form**

**Go to <https://gps.army.mil>**

**Open the request form at the “question?” icon on the front page or the User Request form at under the Help tab.**

### **Or use the GPS Help Line**

by contacting Mr Willie Jackson at Warner Robins GA

### **Please Note**

**We have some personnel changes pending. If you have trouble reaching anyone listed, please use the “contact PM GPS” link at our homepage and we will route your query to the right person.**

### **Why Use Military instead of Commercial GPS?**

**Soldier Safety! Mission Accuracy! Signal Protection!**

**View the video on the GPS homepage! <https://gps.army.mil>**