



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

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Soldiers Talk, We Listen - Feedback on DAGR

From The Product Manager



Hello GPS Users!

Since the start of combat operations in Afghanistan and Iraq, several members of the PM GPS team have served in theater. Some have deployed as GPS equipment specialists while others

have served as a result of being called to active duty as members of the National Guard or Reserves.

In this issue, Travis Dennis, our most recent GPS team member to return from Iraq shares his perspective as a deployed soldier.

This issue also shares some feedback from the DAGR New Equipment Team (NET) program. "Yes it matters". Several DAGR improvements are the direct result of soldier feedback. We like hearing from you. Contact me or anyone in my organization via the contact info on the back page.

Jay Spencer

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



PM GPS employs a cadre of 18 civilian New Equipment Training (NET) instructors who provide DAGR NET to soldiers across the globe. All of our NET instructors are former military. (Above) Senior NET instructor Lorenzo Agostinelli explains DAGR features to soldiers at a NET course. The standard NET course provides a solid knowledge of basic DAGR operations.

The Total Package Fielding program for the AN/PSN-13A DAGR handheld GPS receiver soon enters its 4th year of operation. To date, over 95,000 DAGR have been fielded to handheld users and over 11,000 soldiers have received basic course NET training.

One of the best parts of this job is the interaction with soldiers. While NET instructors have "subject matter expertise" in DAGR operations, soldier feedback on the use of GPS in the 'real world' is a steady source of ideas that lead to product improvements. Our NET instructors get great questions from the students. They also appreciate hearing students say that DAGR NET has made them more effective soldiers. That's a good bottom line.

Only a keyed military GPS receiver can access the Precise Positioning Service (PPS) signal to provide you with SECURE GPS.

First DAGR Software Update for 08 Is Released!

In coordination with the GPS Joint Service Support Management Office, PM GPS released the first of two 2008 DAGR software updates. The second DAGR software update will be released late in the calendar year.

The new DAGR software versions are:

984-2461-015 / 984-3006-005

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

We encourage users to update DAGR to current version software. (Why 2 versions? See box at bottom of page)

Questions and Answers about this software update:

Why is This MWO marked “Urgent”?

The “Urgent” rating relates to Field Artillery users who identified a problem with the prior version of DAGR software (984-2461-012, 984-3006-002). That version introduced the Advanced Gun Laying function but it turns out the software 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. The new DAGR software corrects this problem and retools the Gun Laying function which has been re-titled **Azimuth Determination**. For users that do not use the Gun Laying/Azimuth Determination function, this update can be treated as “Routine”.

Should we take DAGRs out of service immediately to apply this MWO?

No, but if you use DAGR for **Azimuth Determination**, we recommend you load the new software at the earliest opportunity. You may also find it useful to download the updated Operator’s manual. Read the revised operation sections at 14.6 and 14.7. The manual is available 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: The PLGR-PC cable, NSN 6150-01-375-8664, is functionally identical so you can use that cable to connect DAGR to your PC.

Why There Are Two Versions of Software:

There are always 2 DAGR software versions due to internal production configurations. Don’t worry about it: Our 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 units (# 822-1873-002) AN/PSN-13A use software version 984-3006-xxx.

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 will be provided by the second DAGR software update schedule for release later this year.

This MWO is identified as “number -3”. Do I need to apply the “-01” and “-02” versions before applying this one?

No, the content in DAGR software updates are cumulative so you only need to apply the latest update.

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?

The -015/-005 release implements several changes in the vendor’s Pre-planned Product Improvement (P3I) cycle. In brief, these changes include:

- Sweeping changes to Gun Laying/Azimuth Determination functionality, including the ability to create & manage up to 20 data sets, transfer data sets via serial port, reduced keystrokes for common tasks.
- World Magnetic Model (WMM) 2005 incorporated. This provides more accurate translation between “true” and “magnetic” north references and the ability to load WMM via the serial port. This allows quicker fielding of the next WMM update
- Ability to load new defaults via serial port. 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.

For more information about DAGR software functions, contact us via the website User Request link or call the Army GPS Senior Software Engineer in Georgia at (478) 926-9511 or DSN 468-9511.

PM GPS Citizen/Soldier Reports from Iraq.

Travis Dennis, a contract employee of ARINC Inc. and a 1LT in the US Army National Guard, recently returned from a 12-month deployment to Iraq.

In his civilian position at PM GPS, Travis is a member of the DAGR fielding team, responsible for planning and executing the delivery of AN/PSN-13A DAGR handheld GPS receivers at military installations worldwide.

What was your principle function in Iraq?

I had two major functions.

First, I was the Officer-in-Charge for mortuary affairs at my Forward Operating Base (FOB). It was my duty to ensure that fallen soldiers were returned to their families as expeditiously as possible and that their remains were handled with reverence. This duty made the sacrifice of soldiers a very personal experience for me.

Second, I was the Officer-in-Charge for the LOGCAP contract OIC at the brigade. I ensured the prime contractor, KBR, and its subcontractors performed to the standards set in the contract Statement Of Work (SOW). I worked with 12 Subject Matter Experts in 18 functional areas who performed regular audits and evaluations of contractor performance. My reports were consolidated monthly to provide a performance baseline analysis that was used by the Army and DCMA to determine the amount of bonus that KBR earned during the reporting period.

Knowing what you do about GPS and the use of handheld GPS receivers, what was your impression of how GPS is used in Iraq?

My Area Support Group pushed supplies to Forward Operating Bases across the theater of operations. The convoy commanders checked in every hour and reported their locations using the DAGR handheld GPS receiver. I also saw the DAGR in use when a vehicle was disabled on the roads. The convoy commander sent in the grid coordinates and the recovery vehicle used those coordinates to find the vehicles.

Did you find the DAGR and PLGR handheld GPS systems in wide use?

As far as I know, the DAGRs were in use in every convoy.

Did you see a lot of commercial GPS receivers being used? What was the typical soldier opinion of military versus commercial GPS receivers?

Based on what I read about the use of commercial GPS before arriving in theater, I expected to see them in common use. However, in my experiences I didn't see anyone using a commercial GPS. I don't doubt that some were in use but in my travels I didn't see any being used for Army mission work.



1LT Travis Dennis onboard a C-130 for the first leg of his return to CONUS after a tour of duty in Iraq.

Did anything surprise you about soldier familiarity or lack thereof regarding military GPS and the importance of using a keyed receiver?

Before I deployed I was very surprised that people not only don't know that they need to key the DAGR, they don't even know what "key" means.

What was the best part of being stationed in Iraq?

The best part of the deployment was knowing that everything I was doing had a real impact on people. I constantly felt that my efforts were important and that I was part of something very big.

What did you like the least about being in Iraq?

As the area support group, we had many units under us that had several convoys out on the roads every night. Many of the soldiers in those units were very young. It was difficult to watch them go out and to worry about their safe return every day.

Did your tour of duty change your perspective on fielding DAGR or give you any new ideas on how to make the DAGR a better product?

It changed my perspective on DAGR training. I don't think adequate training is being conducted. Basic Training should be updated to reflect the technology and tools of the day. For example, every soldier is shown how to use a lensatic compass before they deploy but lensatic compasses are almost never carried. But the basics of operating a DAGR are apparently still not part of the Basic Training curriculum. It shows: I did not meet very many soldiers who knew how to key or even use a DAGR properly even though most vehicles are now equipped with DAGRs.

Travis Dennis, 1LT, US Army

BEST OF NET! WHAT SOLDIERS ASK US!

Feedback from DAGR New Equipment Training (NET)

This article shares several of the many questions presented to our instructors by soldiers attending DAGR New Equipment Training (NET) classes. An expanded list of DAGR Frequently Asked Question (FAQ) and answers will soon be posted at the GPS website.

In most cases, a technically correct answer may be found in the current edition, DAGR O&M Manual, TM 11-5820-1172-13, Change 3 dated 1 October 2007.

However, we realize that not everyone has easy access to a current copy of the TM or the time to read sometimes lengthy explanations provided in the TM. Hence we try to capture the most common issues in the shorter FAQ format.

Even so, we recommend that if possible, you access the current TM to be sure you have the 'whole story' whenever you can. If you don't have the DAGR TM in your supporting technical library, you can download a copy from the GPS website. If your internet connectivity is limited, click on the tab for GPS Support/Download and Order Tech Docs to request a CD copy by mail.

Okay, let's start with one of the most complex issues that soldiers ask questions about: Crypto keys!



Up Close and Personal operating DAGR during NET. Classroom instruction is essential but 'hands-on' field exercises translate theory into personal expertise.

How do I know what type of crypto is loaded? I need to confirm if I have a monthly (CV) key, annual (GUV) key or no key at all.

A: Access the DAGR receiver status display by pushing the STATUS key. You may have to scroll vertically to view all information. The "CV LOADED" line should display either NONE, GUV, CV, or GUV & CV.

What do the CV status messages on the DAGR Crypto Fill Page mean?"

A: Go to the **DAGR Crypto Fill Page** to see status of crypto variable (CV) keys: Click on: Status Key/ Receiver Setup Menu/

The CV status will display one of these entries:

- No CV Keys Loaded
- Have today's CV Key
- No CV for Today
- Waiting for SV info.

The first two displays mean just what they say: Either you have keys loaded or you don't.

The third display could mean several things. (We'll address that in the following question/ answer).

The fourth display indicates your DAGR has a Group Unique Variable (GUV) key but has not collected enough satellite (SV) data to generate the daily key. The fix here is to leave your DAGR in tracking mode and wait about 15 minutes. Check the display again to see if the receiver has now collected enough data to

WHAT IS NET?

PM GPS funds DAGR NET for Army organizations in support of DAGR fielding. Other services do not offer DAGR NET but may "buy in" to the Army DAGR NET program by contacting the Army NET Manager for scheduling and funding information.

The **Basic Course** is a 3-day program with 24 hours of instruction, focused on common user operations.

The **Advanced Course** is a 4-day program that adds Target Acquisition and Call for Fire training.

The **Senior Leader Course** provides a basic DAGR familiarization for leaders and is tailored to fit the available time and is scheduled case-by-case.

A fourth NET course (under development) will provide DAGR familiarization to soldiers who operate DAGR as a component of a Host Weapon System.

PM GPS currently employs 18 NET instructors with over 270 years of military experience and over 90 years of training experience. NET instructors work from geographically dispersed locations across the USA to provide training wherever it is needed.

NET Chief: Jorge.Pinargotte@us.army.mil

generate the key. Reference TM Para 7.2.2.2.

Now lets go back to that third display:

My DAGR Crypto Fill Page indicates "No CV for Today". What does that mean, and what can you do about it?

A: This message on the Crypto Fill Page means that you have a valid Monthly or Weekly key but that it is not a current key.

In the crypto world, "valid" and "current" mean different things. You could have a key that is valid but it does you no good because as of today's date it has not yet become effective or it has expired.

Your first corrective action is to ensure your DAGR is properly initialized and shows the correct date. If that's okay, then see your COMSEC custodian to get the proper key segment loaded.

Crypto status is also displayed on the DAGR Power-on Status Page but that flashes past quickly so for the purposes of this FAQ we are just referring to the **Crypto Fill Page**.

Sure, crypto can be a complicated topic! The bottom line is that we recommend you make time to read the detailed sections on crypto in the DAGR TM. Knowing how to confirm that your unit DAGRs are properly keyed is one of your most important pre-mission tasks.



Yeah, they're on the right track. NET students head off in search of a waypoint during NET instruction. Of course most real world missions don't include a convenient set of railroad tracks. But with a keyed military GPS receiver, who needs railroad tracks?

Is there only one way to load crypto?

A: No, there are two ways to load DAGR crypto keys: You can **hand-enter** Hexadecimal or Decimal crypto keys using the keypad or you can **electronically enter** keys by connecting the an external fill device to the DAGR J1 connector. Fill devices controlled by your COMSEC custodian include the KYK-13, KOI-18, AN/CYZ-10 and the AN/PYQ-10 Simple Key Loader (SKL). (Note: The Oct 07 issue of PATHFINDER has an article about the SKL on page 8).

Is a map Datum important?

A: Every map that shows a geographic coordinate system such as UTM or Latitude and Longitude with any precision will also list the datum used on the map.

The GPS system uses an earth centered datum called the World Geodetic System 1984 or WGS 84. WGS 84 was adopted as a world standard from a datum called the North American Datum of 1983 or NAD 83. For all practical purposes there is no difference between WGS 84 and NAD 83.

Most USGS topographic maps are based on an earlier datum called the North American Datum of 1927 or NAD 27. (Some GPS units subdivide this datum into several datums spread over the continent. In the Continental United States use NAD27 CONUS.)

In the Continental US the difference between WGS 84 and NAD 27 can be as much as 200 meters.

You should always set your GPS unit's datum to match the datum of the map you are using.

How do I make my DAGR stay on for more than 5 minutes?

A DAGR that keeps "turning itself off" is probably in Auto-Off Mode. You can turn this feature on or off. When you turn it on, you can set the timer within a range of 15 seconds to 30 minutes at the end of which the receiver will turn off. The Auto-off mode saves power when operating in handheld mode.

Reference TM para. 7.5.2.1.1.

Can I see other DAGR positions from my DAGR?

A: No, DAGR is just a receiver. It is not a transmitter, so it does not emit signals of any kind and cannot "communicate" with other devices. In practice FBCB2, Blue Force Tracking and other Situational Awareness devices utilize a GPS receiver to generate a position location and or time stamp that is used by their device when transmitting within their system net.

We invite you to see the growing set of FAQ topics at the PM GPS website. And let us know of other topics that you would like to see addressed as FAQs!

Highlights from Recent GPS Ground Receivers Integration Team (GRIT) Meeting



What is GRIT?

PM GPS periodically convenes meetings of the GPS Ground Receivers Integration Team (GRIT) to provide a venue for a wide array of DoD weapon system managers to present their use of military GPS in their systems and for technical interchange among GPS users.

Almost 100 representatives of DoD weapons systems, industry manufacturers and others involved in the use of either embedded or installed handheld military GPS receivers met at the Huntsville AL facilities of PM PATROIT for the most recent GRIT meeting.

This article highlights two of the many applications for military GPS that were presented at the GRIT. For more information on other platform applications, join the GRIT group at PM GPS website by contacting Willie Jackson, Mike Vincelli or Kevin Lee (see contact information at back page).

Attend the Next GRIT Meeting!

If you are a weapons system manager, a GPS manufacturer or vendor or an interested DoD user, consider attending the next GRIT meeting! For notice of the next GRIT meeting, contact the same individuals noted above via phone, email or send a note using the "Question" icon at the PM GPS website.

Quick-Materiel Express Delivery System (Quick-MEDS) is a recent application of the GB-GRAM embeddable GPS receiver. At top left is a rendering of the SHADOW™ 200 Unmanned Aerial Vehicle (UAV) with a delivery pod under each wing. At top center is a close-up of the installed pod. At top right is a rendering of the pod in flight with its fins deployed after being dropped by the UAV platform.

Quick MEDS Express Delivery System

Quick-MEDS (MEDS stands for Materiel Express Delivery System) is a small guided pod being developed by the US Army AMRDEC and Dynetics, Inc for Unmanned Aircraft System (UAS) delivery of critical supplies to troops in hostile areas which are not accessible by manned aircraft. Precision delivery is achieved via use of an onboard GPS/INS system. Drop coordinates are currently pre-programmed prior to UAS launch; In the future, drop coordinates will be updated during flight via a dedicated data-link system.

Wartime operations confirmed the need for a guided system that utilizes fielded UAS platforms to quickly deliver medical supplies (e.g. blood products and bandages) to support Combat Search and Rescue (CSAR) missions, and for the delivery of mission critical hardware (e.g. gun components and ammunition) to remote locations. The Quick-MEDS concept uses two 10 pound payload pods and is currently planned for initial deployment by the Shadow™ 200 Tactical UAV (see images above).

Shadow™ is a registered trademark of the AAI Corporation.

Quick-MEDS is also planned for



Operation of Quick MEDS delivery pod. Once released from the air vehicle, the payload pod deploys lattice fins and is guided to destination by an onboard navigation system that uses the GB-GRAM. The fins are individually activated by the autopilot, providing course corrections during flight. In the last few seconds of flight a parachute deploys to decelerate the pod prior to landing.

deployment using larger aircraft to expand its operational utility.

Recognizing the DoD requirement that all combat deployable systems utilize the Selective Availability Anti-Spoofing Module (SAASM) GPS resulted in Quick-MEDS use of the GB-GRAM embeddable GPS receiver.

GLADIATOR Unmanned Ground Vehicle



Another application of GB-GRAM as briefed at the recent GRIT meeting is the Gladiator Unmanned Ground Vehicle where the GB-GRAM is contained in the backpack (left above) allowing the operator to remotely control operation of the Gladiator UGV. At right, the Gladiator climbs a hill at a safe distance from the operator.

Gladiator is a Tactical Unmanned Ground Vehicle being developed by the Robotic Systems Joint Project Office to support missions that utilize tele-operation to minimize soldier exposure.

A key part of the Gladiator system is the Thermite tactical computer which serves as the Operator Control Unit (OCU). Along with a hand held controller, headset and helmet-mounted display, the Thermite based OCU allows the operator to 'drive' the vehicle via tele-operation into high-risk environments without exposing soldiers to the risk of direct fire or explosions.

As part of the OCU, the Thermite computer is carried in a backpack. In the Development Phase, Gladiator used a DAGR but in order to reduce size, weight and power consumption, the production version of Gladiator will use a GB-GRAM inside the computer. The rugged Thermite computer with embedded military GPS may be a great solution for

similar systems looking to integrate GPS as well.

The mobile base unit (MBU) also uses a GB-GRAM card for GPS information. The MBU has a Smiths inertial navigation system with the GB-GRAM integrated in the case. The MBU position is transmitted over the system's wireless data link so the operator can then display the position of both the MBU and OCU on a detailed map of the area of operations.



The Thermite computer (above) will host the GB-GRAM to support the Gladiator application.

What Is GB-GRAM? The Embeddable Military GPS Receiver!

The GB-GRAM is an embeddable military 12-channel, military GPS receiver intended for a wide variety of command, control, communications and computer systems. It is tailored to suit the needs of users with low dynamic characteristics including mounted and dismounted land users and waterborne vehicles. To date, over 50,000 GB-GRAM have been delivered to a wide range of weapons systems. The current form factor measuring 2.45"



X 3.40" X 0.6" will be replaced by a smaller form factor in late 2010.

Embedded GPS eliminates the need to power-up and monitor a separate GPS receiver and simplifies mission operation since the host device now operates the GPS receiver instead of the soldier.

Contact Mike Vincelli (see contacts at back page) for GB-GRAM technical details and availability.



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

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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>