



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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GPS Passes the Quarter Million Mark!

From The Product Manager



Hello GPS Users!

The fielding of handheld DAGR and embedded GPS receivers continues at an accelerated pace and the total count of military GPS receivers fielded to date now surpasses a “quarter million” units!

This is a significant milestone in our history and it demonstrates the importance of military GPS as an essential element in nearly every major weapon system today.

The Secretary of Defense has issued a series of GPS policy statements over the years. They can be summed up very briefly: All weapons systems used for combat, combat support and combat service support shall use GPS and the “right GPS” is military GPS, currently defined as SAASM-based GPS. One of my top priorities for 2008 is to expand the use of embedded military GPS to get away from cable-connected DAGRs in many weapons systems.

If you have questions, please contact me or any member of my staff!

Jay Spencer

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



Current military GPS receivers are (from left) the embeddable GPS receiver GB-GRAM, the handheld DAGR and handheld PLGR. See page 2 for more product information.

Both military GPS receivers currently in production, the handheld AN/PSN13A Defense Advanced GPS Receiver (DAGR) and the embeddable GPS receiver Ground-Based GPS Receiver Applications Module (GB-GRAM) have state-of-the-art SAASM security technology. The legacy Precision Lightweight GPS Receiver (PLGR) uses PPS-SM security technology. When properly keyed, all three models access the Precise Positioning Service (PPS) signal to provide superior battlefield performance.

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Military GPS uses the Precise Positioning Service (PPS) signal to provide soldiers with SECURE GPS. Commercial GPS does not!

GPS Product Line for 2008

SAASM-based Receivers DAGR and GB-GRAM Embeddable Receiver



The AN/PSN-13A DAGR is the premiere military GPS receiver today. DAGR uses SAASM security technology. It is in full-rate production and fielding continues worldwide. As of Jan 08, over 116,000 DAGRs have been fielded to Army units for handheld use or delivered to weapon systems who install it to provide GPS data to their mission equipment.

PM GPS plans 2 DAGR software upgrades in

2008 and continues work to resolve supply shortages of some DAGR accessories. A new production contract is in the works to ensure a supply of DAGRs to meet the total Army requirement over the next 5 years.



The embeddable military GPS receiver uses SAASM security technology. GB-GRAM stands for Ground Based GPS Receiver Applications Module. GB-GRAM provides

the equivalent of a DAGR in terms of a GPS source for weapon systems that don't need handheld or user interface features. GB-GRAM is the GPS receiver of choice for many low dynamic weapons systems. This includes communication, command and control, IEW sensors and a variety of unmanned vehicles, both air and ground versions. The list of over 40 systems now using GB-GRAM is too long to include here!

PM GPS has initiated the design evolution to a new version of GB-GRAM with a reduced size that will allow GB-GRAM to fit into even more host systems including handheld devices. PM GPS also placed a new contract to ensure the availability of GB-GRAM to support DoD weapon systems for years to come.

Non-SAASM-based Receivers AN/PSN-11 PLGR and AN/ASN-175 CUGR



The legacy hand-held GPS receiver was introduced back in 1994. At the peak, there were over 100,000 PLGRs in service. Today, DAGR is replacing PLGR in many units and PM GPS is working on a plan to retire PLGRs while continuing to provide lifecycle support to ensure that every PLGR still in service gets depot support when needed. PLGR uses PPS-SM security technology (the predecessor security technology to SAASM) since retrofit to SAASM is not practical. Like DAGR, PLGR gets an operational software update in 2008.



CUGR is the only remaining aircraft navigation system supported by PM GPS. CUGR was introduced in 1998 to equip legacy rotary wing aircraft with a

military GPS capability. The number of these aircraft remaining in operation is slowly decreasing. CUGR uses PPS-SM security technology (predecessor to SAASM) to provide GPS-based navigation capability in integrated (UH-1) and stand-alone (OH-58) configurations. CUGR depot repair is currently suspended pending the award of a new CECOM contract. CUGR is supported through standard supply procedures managed by the CECOM Logistics Readiness Center at Fort Monmouth, NJ.

For more information on GPS User Equipment, visit the PM GPS website and click on the Products Tab. If you don't see the answer, click on the Help tab to send your question!

DAGR In The Zone: Modifications to Support MRAP

Mine Resistant Ambush Protected (MRAP) vehicles are the top military priority today. Led by the Marine Corps, the MRAP program consists of a family of armored vehicles designed to allow the crew to survive IED attacks and ambushes. The AN/PSN-13A DAGR provides the onboard military GPS receiver, an essential component of all MRAP vehicles.

PM GPS recently had the opportunity to assist with the resolution of a problem with DAGR installations to the primary Army MRAP vehicle, the International Military Government (IMG) Category I vehicle known as the Maxx Pro (at right).

As delivered, the DAGR was installed on the vehicles center console in such a way that the power cable was susceptible to breakage (below left). PM GPS assisted in the quick redesign of the mounting (below right).

This improved the protection of the power cable but created a sudden need for a longer antenna cable. Splicing or stretching cables was no good. The right answer was to substitute the longer 10m RA-1 cable (5995-01-521-4244); These antenna and power cables were already in short supply across the Army, nevertheless



The IMG Category I MRAP is the most widely used such vehicle by Army forces operating in Iraq today.

PM GPS challenged the members of the DAGR team in four states to expedite the procurement and delivery of the needed antenna cables ASAP. In short order, the first shipment of new cables was received at Camp Arifjan, Kuwait where FBCB2 contractors began relocating the DAGRs. Problem solved by a great team effort!



The initial DAGR installation as seen from vehicle commanders view, looking down at center console. Note the remote power cable extending alongside the seat edge which makes it prone to being snagged as crew enters or exits the front seat. This location also requires the crew to lean forward and twist to see the DAGR display! Also note the remote antenna cable at top of DAGR hangs over the master antenna switch (green box).



The improved installation of the DAGR as seen from approximately the same camera angle as shown at left but now the DAGR is seated against the center console in the same orientation as the antenna switch box. The 90 degree antenna cable on right side presents a smaller target for unintentional contact and the power cable on the left side is better protected as well.

DAGR Product News: Software Update and GPA Messages!

SOFTWARE UPDATES COMING IN '08

PM GPS plans to issue two DAGR software updates in 2008. We would prefer to present a single combined software update but here's why the software will be issued in two phases during 2008:

984-2461-015/ 984-3006-005

MWO 11-5802-1172-20-3

The first release is a safety priority that resolves problems reported by the Marines when using DAGR with the Gun Laying System (GLS). Testing will soon be completed so this update will be available in Mar/Apr 08 for distribution and update.

The second release is a software solution to a problem first reported last year that could affect GPS position reporting accuracy. Ground Precautionary Action (GPA) messages were issued (synopsis at right) and a software solution is being developed. Until this software is fully tested and released, users are advised to review the GPA messages to understand how best to avoid the potential problem in the first place.

Because testing of this second software update won't be completed until mid-year, PM GPS does not want to hold the GLS corrections until then; hence two software updates during 2008.

If there is any good news in two software updates in one year (besides the benefit of providing field users with software corrections), it is that the DAGR software update process is relatively painless.

DAGR reprogramming details are provided in the MWO/TCTO but the simple description is that you download the software patch to a desktop or laptop from the PM GPS website, connect the DAGR, follow the on-screen instructions and "Bam!", it's done.

Expect to see the first software patch posted to the PM GPS website in Mar/Apr 08 and the second later in the year. If you have any questions you can always contact the PM GPS logistics manager or the PM GPS software engineer at DSN 992-5758 or DSN 468-9511 respectively.

A nuisance? Yes, but plan to update your DAGRs! The new software will be released by MWO through the usual channels. PM GPS will notify all registered GPS website users when the software is available. If you aren't one of the 4,000+ users registered at the site, why not join us at <https://gps.army.mil> ?

Ground Precautionary Action (GPA) Messages!

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) would 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 will be released for DAGR this Fall and the TTP updates were delayed from Aug 07 to Jun 08.

Users are advised to read the complete GPAs which are available at the GPS website and Safety Offices.



DAGR reprogramming is relatively painless! Download the software to your laptop or PC, connect the DAGR-to-PC cable NSN 5995-01-521-3198, follow the on-screen instructions and record the update per your local maintenance procedures.

CURRENT SOFTWARE

AN/PSN-13 SW # 984-2461-012

AN/PSN-13A SW # 984-3006-002

Released March 2007

NEXT SOFTWARE

AN/PSN-13 SW # 984-2461-015

AN/PSN-13A SW # 984-3006-005

Expected Release March/April 08

FUTURE SOFTWARE

AN/PSN-13 # To Be Determined

AN/PSN-13A # To Be Determined

Expected Release Fall 2008

“Try to Look Unimportant, they may be low on ammunition” Wisdom from the Infantry Journal

DAGR Logistics: Whose DAGR is That?

Tracking DAGR in the Property Book Unit Supply Enhanced (PBUSE) System



Project Manager, Logistics Information Systems (LIS) at Fort Lee VA maintains the PBUSE website at:
<https://www.pmlis.lee.army.mil/tls/pbuse/pbuse.htm>

PM GPS reminds users to keep Property Books updated. These days, that means the PBUSE account! For those of you not familiar with supply, PBUSE stands for "Property Book Unit-Supply Enhanced".

GPS isn't getting into the supply business but we thought we might share some information about how the lack of a property book transaction can affect a DAGR thousands of miles from you.

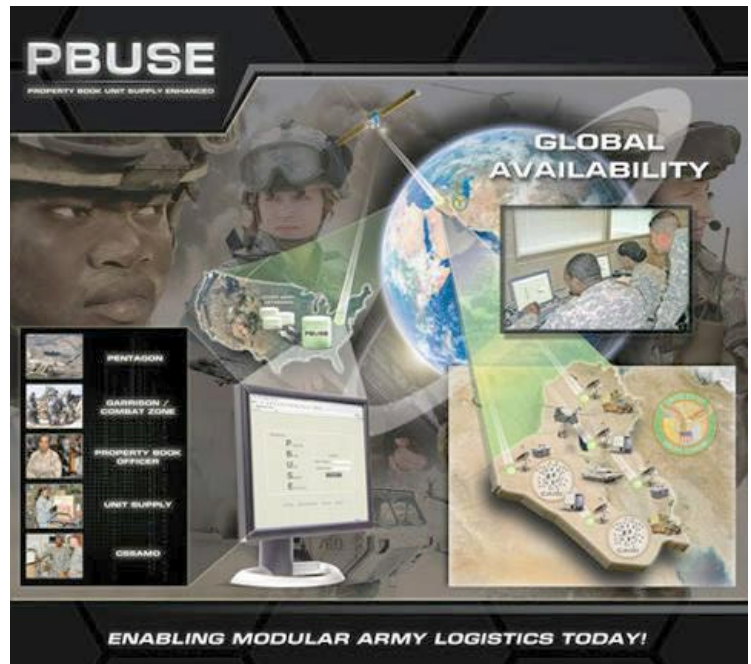
The DAGR is a rugged, reliable military GPS receiver but like any piece of equipment subject to heavy usage, "things happen". Maybe the keypad gets messed up or the display screen is cracked. There is no organic repair capability but DAGR comes with a 10-year warranty so the solution is easy: Send the DAGR in for depot repair!

DAGR warranty turn-in instructions can be found in the DAGR Tech Manual and at the PM GPS website <https://gps.army.mil>

But when you send a DAGR in for repair, there are a couple of "supply details" that you should know:

First, you will not get the same DAGR back. That's because when the depot receives a 'broken' DAGR, a replacement receiver is shipped out within 5 working days. The DAGR you turned in goes to the repair line and then to the refurbished pool, ready to replace another broken DAGR in the future.

Second, when you get a replacement DAGR, you need to update your account at PBUSE. Until you delete the serial number of the turn-in and add the serial number of the replacement DAGR, the PBUSE database thinks you still have that "old" serial number and this blocks anyone from entering that serial number to their account.



The Property Book Unit Supply Enhanced (PBUSE) system is a Web-based property accountability application designed to deliver total asset visibility in real-time. The system facilitates ILS across the Army and enables joint interoperability with all DoD services. PBUSE provides access to up-to-date information regarding property accountability, asset visibility and management reporting.

We've seen several cases where a unit could not register a replacement DAGR with PBUSE for this very reason. So it may seem like a minor point to some but everyone needs to keep the PBUSE system current! For more information on PBUSE, we recommend you register at the PBUSE website and download the End Users Manual (EUM). PM LIS can be reached at (804) 734-7665.

Update on DAGR Maps



<https://tsunami.tec.army.mil/Products/DAGRMapSupport/index.cfm>

DAGR Map Toolkit + TEC DAGR Maps

In the July 2006 issue of PATHFINDER we reported on the DAGR Map Toolkit software package. This item can be downloaded from the PM GPS website to your desktop or laptop PC to serve as host software to work with maps for DAGR. The article also reported that the US Army Corps of Engineers Topographic Engineering Center (TEC) at Fort Belvoir VA was creating map files that could be downloaded to your PC; the Map Toolkit software would use these files to generate "GPS Map Files" for DAGR.

In the July 2006 article we also noted that "DAGR maps" are not color high resolution maps since DAGR was not originally designed to host them. The Toolkit and TEC maps are a step towards the future when GPS receivers can accommodate more detailed maps.

Visit the TEC website (URL above) to see available DAGR maps. They are produced in a variety of scales from MIM and City Graphics to TLM50 and TLM100. Select and download maps that offers the product to best suit your needs and Area of Operation.

If your computer capabilities are limited, you can ask TEC to mail maps to you on CD or DVD (Go to the TEC website to request maps by mail).

The current version of DAGR Map Toolkit Software, **984-3095-006** (available at GPS and TEC websites).

Use your DAGR-to-PC cable to transfer maps from your PC to your DAGR.

Today we have an update to report:

DAGR Map Creator

PM GPS is now working to bring another map product to field users: The **DAGR Map Creator** will allow DAGR Advanced Users to create custom maps in a format that is compatible and transferrable to other DAGRs. So if a needed map is not available from TEC, the Advanced User will have the ability to create a custom map.

The Creator project is ongoing with no firm release date yet but if you would like to be involved, we would appreciate your feedback!

Updates on **DAGR Map Creator** will be reported in future newsletters and at the PM GPS and TEC websites. To get involved or if you have questions, please call Bill (732) 532-6131, DSN 992-6131 or Frank at (478) 926-9511, DSN 468-9511.

Are there really two versions of DAGR? Why?

It's true there are two versions, the AN/PSN-13 and the AN/PSN-13A. Except for the data on the nameplate, they are externally identical.

The difference is the Selective Availability Anti-Spoof Module (SAASM), the core processing engine and security chipset that provides most of the DAGR's functionality while protecting sensitive data from compromise. During the first year of production, the DAGR vendor developed a major upgrade that reduced size, weight and cost of the SAASM. It also added a few features such as a higher speed serial port, a third timing output and the ability to work with the new USB adapter cable.

Every DAGR produced since then has the newer module, but we continue to support the original version as well as the newer model. Because the new SAASM

design changed the way the DAGR software is partitioned, there are different software versions for the PSN-13 and PSN-13A. Thus, 984-2461-012 (PSN-13) is functionally equivalent to 984-3006-002 (PSN-13A).

When PM GPS distributes new software, the reprogramming "package" has both versions and it automatically selects the right version for the connected DAGR. To understand which advanced features are only supported by the AN/PSN-13A version DAGR please review the Technical Manual.

*So now you know why there are 2 versions of DAGR. Out of the 100,000+ DAGR built to date, only the first 10,600 or so were of the AN/PSN-13 version. When you turn in a DAGR for warranty repair you won't get the same DAGR but you will normally get the same **version** that you turned in.*

Advice to Weapon System Managers: Part I - Planning for DAGR

In addition to the Total Package Fielding (TPF) concept where PM GPS issues DAGR receivers and accessories tailored to handheld customer needs and then provides on-site New Equipment Training (NET), PM GPS also ships DAGR/accessory sets to Army weapon system managers who install DAGR on a semi-permanent basis to a wide variety of weapon systems.

This article show two examples of installed DAGR and reminds weapon system managers to keep PM GPS posted on changes in platform DAGR requirements!

Use the Data Interchange (DI) request process to submit platform DAGR requirements through the appropriate

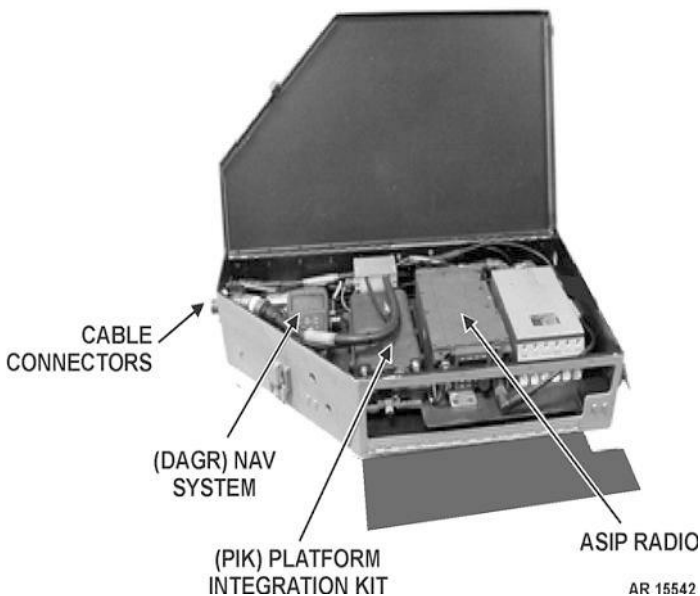


A typical DAGR installation is shown in the Stryker vehicle where the DAGR is connected to external power and antenna; The PC cable is used to provide GPS data to other Stryker mission equipment. In this case, the DAGR can be removed quickly and used by the crew for Situational Awareness if they evacuate the vehicle.

chain of command to PM GPS. If your system quantities or schedules change, make sure you update your DI requirements with PM GPS or you will come up short.

There is a two-year planning cycle to get Army funds to support other weapon system managers as they are not part of the handheld customer base for PM GPS!

Short notice changes in platform DAGR requirements will require host platform funding. For more information on the DI process please contact Dennis Rotenberry at DSN 992-6133.



Another DAGR installation is in the modification of the Paladin self-propelled howitzer which enables it to fire the Excalibur precision guided 155mm artillery shell. DAGR provides GPS to modify the host vehicle Fire Control System (shown here) while a separate GPS device in each Excalibur 155mm round provides "en-route" to target navigation.

CURRENT SOFTWARE FOR PLGR

MWO 11-5825-291-30-5

AN/PSN-11 (tan body) SW # 613-9854-006

AN/PSN-11(V)1 (green body) SW # 613-9868-009

Recently released updated PLGR software is now available for download from the GPS website or by mail-out CD upon request, either to the website or by email to PM GPS at the Georgia or New Jersey locations.

Reprogramming PLGR is a little more involved than for DAGR, see the applicable MWO for details.

DAGR Cable Status

"We're working on it"

If you have requisitioned DAGR-to-RA1 Antenna cables or DAGR-to-DC Power (5 meter) power cables lately you already know they are in short supply. PM GPS is working with the GPS Joint Service Support Management Office (JSSMO) and Defense Logistics Agency (DLA) to remedy the situation.

The good news is that second sources have been identified and all the right folks are working to get the cables back in stock. The bad news is this still takes time. If you have an urgent situation, contact our Field Support engineers at DSN 468-1109 or 468-3518 for assistance.

"If the enemy is in range, so are you" Wisdom from The Infantry Journal

Advice to Weapon System Managers: Part II

Which is Right?, DAGR or GB-GRAM

Part I of this article on Page 7 points out the need for advanced planning when weapon systems using DAGR have a change in their requirements.

But what about 'new' platforms that need military GPS or existing platforms that need to comply with the Secretary of Defense mandate to install military GPS in combat, combat support and combat service support systems? (Read the policy tab at GPS website) What are your options for a military GPS solution for your system?

PM GPS has integration engineers responsible for providing technical assistance to help Army platform managers answer those questions. Although a detailed review of the operational and lifecycle criteria to evaluate GPS solutions is beyond the scope of this newsletter, we invite all interested PM shops to contact PM GPS for advice.

This article provides an overview of the process by which any Army PM shop can initiate a loan of GPS equipment to support Proof of Concept or prototype efforts and to help make the best decision on incorporating military GPS to their weapon system.

PM GPS maintains a stock of PLGR, DAGR and GB-GRAM assets available on short notice for loan to any authorized DoD weapon system manager. Loans are available for small quantities to support RDT&E activities subject to approval by PM GPS. A standard loan template for a 12 month loan is available from PM GPS at Fort Monmouth. Agencies loaning GPS receivers from Army PM GPS will also have direct access to PM GPS platform integration engineers and logisticians to provide a full range of assistance with hardware and software installations and interfaces and warranty support. Going through PM GPS for a military GPS solution gets you Subject Matter Expertise! Use it!

And in case our available "common user" GPS solutions "don't fit" your system, we have resources to develop a solution that does fit. So come to PM GPS for your military GPS solution!

Principle GPS Integration Engineers are Willie Jackson for DAGR and Mike Vincelli for GB-GRAM. (Contact info on back page) The Army PM GPS Loan Manager is Susan Vernoski at (732) 427-5899, DSN 987-5899.

GB-GRAM Integrations - The List Keeps Growing!



At left is one of the newer applications for GB-GRAM, the Joint Service Pocket-sized Forward Entry Device (PFED). GB-GRAM, the "military GPS card inside" PFED is shown on page 2.

PFED is a new military grade Personal Digital Assistant (PDA) application designed primarily for forward observers, artillery fire direction and target

acquisition missions. The PFED integrates GPS with radio communications enable RPDA and laser range-finding binoculars.



Another recent application for GB-GRAM are low-altitude Unmanned Aerial Vehicles (UAV) including the Shadow shown here.

User Feedback DOES Matter to Us!

The GPS website homepage has a link on the lower left corner 'GPS User Survey'. This link takes you to the Rockwell Collins DAGR homepage where you'll find a tab marked "GPS User Survey".

Please take a few minutes to provide constructive criticism of today's DAGR. We are soliciting real-world user input to develop the features for our next-generation handheld GPS receiver.

Your feedback does matter to us! In fact, all of the recent DAGR product improvements can be traced directly back to soldier feedback!

Now is your opportunity to tell us what you want to see in the next handheld GPS receiver. On behalf of future soldiers who benefit from your advice today, we thank you for your input!



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>