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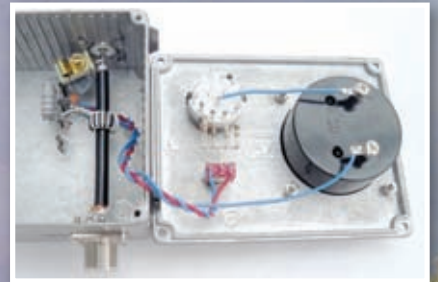
Reviewed

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The AvMap Geosat 6 APRS

The GPS Solution for APRS operations

Tim Kirby G4VXE takes a break from preparing *The World of VHF* to try out some APRS operations using a Kenwood rig. And it seems he's really enjoyed himself!

If you've been reading *The World of VHF* over the last few months, you'll recall that we have mentioned Automatic Packet Reporting System (APRS) on a few occasions.

Wikipedia says of APRS, *Automatic Packet Reporting System (APRS) is an amateur radio-based system for real time tactical digital communications of information of immediate value in the local area. In addition, all such data is ingested into the APRS Internet system (APRS-IS) and distributed globally for ubiquitous and immediate access. Along with messages, alerts, announcements and bulletins, the most visible aspect of APRS is its map display.*

Interesting eh? Anyone may place any object or information on his or her map, and it is distributed to all maps of all users in the local radio frequency (r.f.) network or monitoring the area via the Internet. Any station, radio or object that has an attached GPS is automatically tracked. Other prominent map features are weather stations, alerts and objects and other map-related Amateur Radio volunteer activities including Search and Rescue and signal direction finding.

The Development Of APRS

The APRS in use today has been developed since the late 1980s by **Bob Bruninga WB4APR**, currently a senior research engineer at the United States Naval Academy. He still maintains the main APRS website. The acronym APRS was derived from his callsign!



The Avmap Geosat 6APRS unit looks to all intents and purposes like a 'normal' SatNav unit, but couple it to a Kenwood transceiver and it comes into its own!

If you've not done so before, go to your web browser and go to <http://aprs.fi> and move the map to cover where you live. You can zoom in and out and see many of the APRS stations around you. You'll find some of the icons do different things if you click on them. You'll find weather stations on the map that you can click on, which tell you the state of the weather in a particular location.

How does the information get on the map? Well, some of it comes from the Internet. We'll ignore that for the purposes of this review. Some of it comes from real r.f. operations! In practice APRS on v.h.f. (and there is some h.f. APRS too) is largely centred on 144.800MHz.

Although 144.800MHz is our UK APRS frequency and I believe it's also

used in some other countries – but isn't 100% international. So the frequency may not be correct for all our overseas readers. **Note:** 144.800MHz in the UK carries other valid packet signals as well as APRS, so not every data burst heard there will be an APRS beacon. If you tune your receiver to that frequency it's likely you will hear 1200baud AX25 packet bursts and the chances are that these could be APRS activity.

When you've looked at the map of activity you'll have probably noticed that some of the icons were moving, representing a travelling vehicle. There are various parts of such a system; you need a GPS receiver to determine your position, a packet terminal node controller (TNC) to encode the data as AX25 and send it to your 144MHz transmitter.

The equipment described in this review is one way of achieving a very fully featured APRS system. So, what's the AvMap Geosat 6 APRS like in action? Let's take a look at a the list of what it can do.

New High Performance Software

The Geosat 6 APRS unit comes with a slim and stylish design, featuring a metal chassis, a 4.8in full colour display in 16:9 widescreen format and a smart magnetic mount that makes it is very easy to place the navigator in the car. It has a re-engineered interface with a 50 channel -160dBm tracking sensitivity u-blox GPS engine for fast and highly accurate fix.

New navigation functions have been added, such as the 'Trip Computer' that shows overview of the journey, with speed graphs, info about average speed, highest speed reached, stop time, etc. Turn-by-turn vocal instructions announce complete street names thanks to the Text-to-Speech technology.

Full Bi-Directional RS-232 APRS Communication

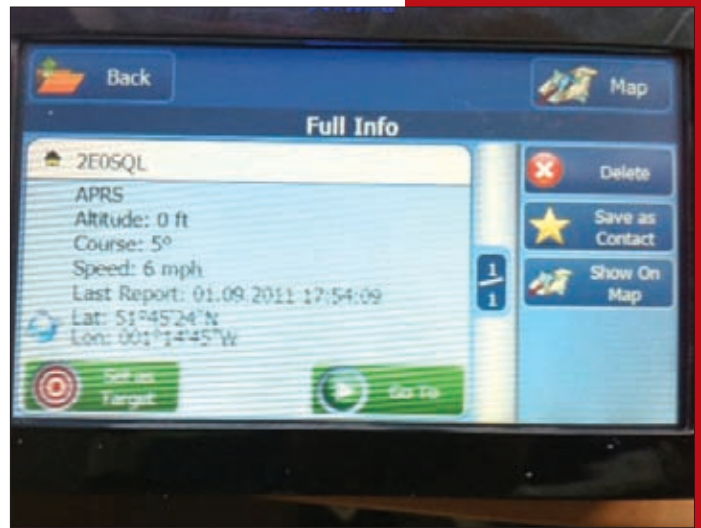
The Geosat 6 APRS comes with a Kenwood-ready cable and exclusive APRS bi-directional RS-232 APRS interface compatible with ALL current APRS ready Kenwood Radios, including the new TH-D72A/E. The system provides GPS location information for your transmitted APRS beacons, and it shows received APRS information on its map display. The unit can store up to 1000 APRS contacts and display them on the map.

Intercept To Target

You can set your Geosat 6 APRS to navigate to your favorite APRS mobile



Two photographs of the Avmap Geosat 6 APRS unit's screen in operation. The banding shown on the screen is a problem of taking a photograph, rather than a problem with the screen itself.



station. You can also get re-routing instructions when the new position is reported!

The APRS Icons

In use you can watch APRS activity right on the screen and you can distinguish between fixed and mobile APRS stations. Static positions are represented by blue 'bulls-eye' icons along with the associated call-sign. If used with a Kenwood TM-D710E rig and if it's set in the KENWOOD format sentence, the Geosat 6 APRS supports standardised APRS icons.

Tactical Mode

The Geosat 6 APRS system takes full advantage of the Kenwood format sentence. The Tactical mode allows you to select an APRS contact to see on the full info page its speed, course and altitude in addition to its callsign and position.

Contacts Management

Thanks to the new APRS contacts smart management, Geosat 6 APRS can auto-delete the received APRS contacts' positions after a set time-out. You can also sort your APRS contacts by alphabetical order or receiving time.

On The Air With APRS

David Wilkins G5HY from Kenwood UK kindly supplied the review model of the Geosat 6 APRS and also a Kenwood TM-D710E 144/432MHz APRS enabled mobile transceiver. My first task was to get the Kenwood TM-D710E set-up and receiving APRS data.

Setting-up the system proved very straightforward although I had never used a TM-D710 previously, it was a simple matter of connecting the rig to 12V, the antenna to my V2000 vertical and tuning one of the variable frequency oscillators (v.f.o.s) to 144.800MHz and

enabling the TNC. Within seconds the rig was beeping loudly and frequently as APRS data was received and decoded. To avoid complaints from the rest of the household, the Kenwood TM-D710 Manual was hastily consulted about how to turn the beep off!

What amazed me was just how much data I was receiving! As an APRS data packet is received, the information decoded from the packet is displayed on the front panel of the TM-D710. There's a 'compass rose' to the right of the display that shows a distance and bearing to the station being decoded, assuming that it carries positional information – and of course, that the rig knows its' position. Clearly, because I'd not yet connected up the GPS, it didn't have any idea of its location at that moment!

A SatNav With Extras!

The Geosat 6 APRS is to all intents and purposes a SatNav device with some additional functionality built-in. So getting it going as a SatNav was entirely straightforward. I got it out of the box and even inside (albeit close to a window) it was able to get a 2D and 3D fix. Out in the clear, it obtained a 3D fix in about 75 seconds – which is pretty good.

As the device boots up, you have the choice to start it as a SatNav device or an audio player! For mounting in the car, there's a suction mount with quite a long arm. The suction mount is solid and unlike some GPS mounts I have encountered, not liable to fall off the windscreen. The downside of the long arm was that it made the unit prone to some vibration – at least on some of our more rural Oxfordshire roads anyhow!

The mapping was fair quality – though I noticed a few errors on road

Purchasing AvMap In The UK

Bjorn Nagelhout of AvMap writes: Suggested End User Price in UK is £349 (VAT included). In Europe the End User Price is 399 Euro (Vat included). At the moment in the UK no dealer is selling our Geosat 6 APRS, which can be purchased directly from our shoonline: <http://www.avmap.it/index.php?swt=05> For Technical Support the user can contact us directly through our website or E-mail address. Bjorn.
E-mail; bnagelhout@avmap.it

The Kenwood TM-D710E is a suitable companion to bring out the best APRS experience of the Avmap Geosat 6 APRS unit.



names as I drove around our village and our neighbouring village, Hinton Waldrist (quite a challenge for map makers!).

The map was easy to read, particularly in 3D mode and the unit was fast enough to keep up with the car's motion. The touchscreen interface is fairly intuitive and I didn't have any difficulty in making the unit do what I wanted.

The next challenge was to get the GPS talking to the TM-D710E. This was made really simple by virtue of the excellent PDF file provided on the AvMap website which includes details of how to interface the unit to Kenwood APRS enabled rigs, such as the THD-72 hand-held and the TMD-710E. The document tells you which menu options need to be set and what the values should be.

Having set everything up, the connection between the GPS and the TM-D710E is simply a lead with 2.5mm miniature jack plugs at both ends. But make sure you get it the right way round!

The 4 pole connector goes into the GPS' serial port and the 3-pole connector goes into the TM-D710E's GPS port. Make sure that both connectors are firmly pushed into the sockets (it sounds obvious, but I spent a few minutes wondering why I didn't have a connection!). Then switch on!

The GPS indicator on the front of the TM-D710E immediately started flashing, indicating that it was receiving GPS data and I was delighted to see that on the front panel of the TM-D710E I was now starting to see distance and bearing information from me to the various APRS stations that were being received – indicating that the rig was receiving GPS data.

Because in the set-up I had elected to send an APRS beacon, after a while the rig went into transmit sending a short transmission containing my callsign, location and various other bits of information. From the front panel of the TM-D710E, I could see that my beacon had been re-transmitted by several APRS digipeaters.

Even more exciting, by going to <http://aprs.fi> and searching for my callsign, I could see my position on the map as indicated by an icon and my callsign. If you zoom into the map, you'll see just how accurate it is – and if you haven't played with a GPS before – it **will** amaze you!

How About The Other Way?

So, that's the information flowing from the GPS to the rig. How about the other

way? I zoomed out the map on the GPS so that it would include an area where I knew there was APRS activity. Sure enough, positional markers with callsigns appeared on the screen! Excellent! I noticed however, that not all of the APRS stations I was decoding via the front panel of the TMD-710 were being displayed on the GPS.

I was puzzled for a little while, wondering if there was something that I had done wrong, or whether there was something about the 'missing' positions/stations that were causing them not to be displayed. Reading through the AvMap website, however, I discovered that this was a 'feature' and that a later release of the software for the Geosat 6 APRS would cure this. (More on this in a moment).

Something else that wasn't quite what I expected – was, that according to the AvMap manuals, the GPS unit should exhibit the ability to send and receive APRS messages when connected to a suitable compatible transceiver. However, after consulting with the manufacturers I understand that this messaging is only available if you connect the Geosat 6 APRS to a Bionics TinyTrack device (which I didn't test).

To try and enable the better display of all APRS stations on the GPS, I needed to upgrade the software on the GPS. To do this, I had to download some software called *GeosatSuite* from the AvMap website and install it onto my PC. This was simple enough to do and appeared to double as a product registration process. Having done that, I connected the GPS, via the USB cable supplied, to my PC. From a menu, I took the option for a 'Software update'.

The software took a couple of minutes to download on a broadband connection. I was then guided through the process of updating the GPS' software with the new version. This is always a nervous moment (particularly when you don't own the device in question!) but the software installed without a glitch and I was then instructed to re-set the device by means of two pinholes on the bottom panel. Having done that, a *Windows CE* boot screen appeared – but quickly vanished to the more friendly AvMap start-up screen.

Eagerly, I connected up the GPS to the TMD-710 and started monitoring APRS traffic on 144.800MHz. To my delight, I could instantly see on the GPS screen that many more stations were now being displayed on the device. Navigating through the GPS

menus, I was able to see a list of all the APRS 'contacts' (I found that sorting them alphabetically made most sense).

For each of the callsigns shown in the list, you can set them as a 'target' or set the GPS so that it will navigate to them! I thought this was an excellent feature – making it particularly easy to drive to APRS-enabled friends' locations. Or, you can opt to show them on the map – which I found quite interesting.

Thoroughly Enjoyed!

I thoroughly enjoyed my time using both the AvMap Geosat 6 APRS unit and the Kenwood TM-D710E. If you are after a SatNav unit **and** you would like to integrate it into your APRS station, it's a great way of doing so, particularly if you have one of the Kenwood APRS-enabled rigs. The unit is well constructed and straightforward to use.

The mapping wasn't the clearest I've seen, but it's more than adequate. There appeared to be some inaccuracies with street names – at least in our locality. The maps installed on the review device covered Europe and I browsed maps of France and Norway (as examples) and the mapping detail was identical to the UK.

The ability to see APRS enabled stations on the GPS was excellent! Imagine being able to navigate to your friends' house by means of their APRS beacon, or rendezvous with a friend who is out on a bike ride or a walk with an APRS enabled hand-held.

Astonishing APRS Activity!

I was astonished at how much APRS activity there is. From my (admittedly good v.h.f location), I saw around 100 APRS stations recorded by the TM-D710E's APRS list in around 2½ hours. If someone asks you where all the v.h.f. activity is – I think a good amount is on 144.800MHz!

This review has mostly been about the AvMap unit, but I should add that I found the Kenwood TM-D710E very easy to use. The TM-D710E/GeoSAT6 combination replaces the previous TM-D700E/GeoSat5 combination (so both are new models to the market). The TM-D710E 'street price' seems to be about £445 – and I thoroughly enjoyed the APRS functionality built into the rig. Many thanks to David Wilkins G5HY of Kenwood UK for the kind loan of the review equipment and also for his courteous and patient replies to my questions.