Connecting PilotAware to Mode S Transponder.

Positional information, from the PilotAware Glonass GPS, can be shared with a suitable Mode S transponder(s) with extended squitter to convert it to provide ADS-B Out at 1090MHz.

Why would you want to do this?

If you currently have a Mode S transponder with extended squitter ES, this can be converted to ADS-B Out Functionality by adding a GPS source. In the UK it is now acceptable to use a none certified GPS, like the one used in PilotAware, to achieve this. The advantage of this is that your Transponder transmits at a considerably higher power than PilotAware possibly at 70W rather than the PilotAware maximum of 500mW so 140 times more powerful. This will give you considerably more range for the price of a lead and soldering the ends to the plug of your transponder. You will need to set a couple of data settings to show that you have done this and apply for approval from the LAA or BMAA but this is not arduous or expensive. So the question really is not why would you want to do this but why would you not want to do this when you get such a great advantage. NATS will be able to see you as well as everyone on PilotAware so you will be future proofed at a very low cost.

Also don't worry about transmitting your position over ADS-B at 1090MHz and over the PilotAware radio (3PI) at 895.5MHz at the same time, the PilotAware software will sort this out so you don't get detected twice.

So how do you get connected?

1. **You will need a lead between the PilotAware and your Transponder**

You need to connect the spare PilotAware USB output using a USB to RS232 lead. The lead used must have an in-built converter using a PL2303 chipset installed to give the correct RS232 +/-12V signals to the transponder.

The following lead is suitable for use as it has the correct chipset and the other end of the cable is bare, tinned wire that can be customised for use with your transponder if suitable. The physical connection to various manufacturers will differ and so their handbook should be consulted. This may involve opening up the input connector and soldering to the correct pins 0V and +12V.

http://uk.farnell.com/ftdi/usb-rs232-we-1800-bt-0-0/cable-usb-a-rs232-serial-convertor/dp/1686450

The connections are, TXD (orange wire) to transponder serial input, Ground (black wire) to transponder ground.

2. **Find the information on how to connect to your Transponder**

Information how to connect an uncertified GPS position source to the f.u.n.k.e. AVIONICS transponder TRT800H or TRT800A for ADS-B Out via Mode S ES can be found here

Information on how to connect an uncertified GPS position source to Trig transponders can be found here . Trig recommended the Farnell USB-RS232-WE cable, costing about £15. The connections are, TXD (orange wire) to transponder serial input, Ground (black wire) to transponder ground.

3. **To comply with the permission to use a non-approved GPS such as PilotAware you will need to change the data settings**

Data settings will need to be changed to SIL=0 and SDA=0 as per the configuration guide of your transponder.

4. **Following the installation, you will need to gain approval from your licensing Authority**

BMAA members wishing to transmit ADS-B from a non-certified GPS source connected to an Extended Squitter-capable Mode S transponder, should contact the BMAA Technical Office (technical.office@bmaa.org).

LAA members wishing to transmit ADS-B from a non-certified GPS source connected to an Extended Squitter-capable Mode S transponder, should ensure the modification is conducted by a competent party and inspected and released for flight by an LAA Inspector, using engineering mod form MOD 14. A functionality check will also be required. The mod form is sent to LAA HQ so that the mod can be cleared. No charge is made for this service, as it is hoped that it will increase the number of aircraft using the equipment with a commensurate enhancement to flight safety. The MOD 14 form can be downloaded here:
http://www.lightaircraftassociation.co.uk/engineering/StandardForms/LAA-MOD-14- ADS-B.pdf
http://www.lightaircraftassociation.co.uk/engineering/StandardForms/LAA-MOD 7- Avionics Installation.pdf

It is very important that you get your installation approved as the response from TCAS equipment will depend on the settings transmitted and received.

More information can be found at FASVIG here.

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