

AirNav RadarBox

Mike Richards

Following September's introduction to ADS B radar systems, it is time to take a closer look at AirNav's exciting new RadarBox. This has caused quite a stir since its introduction as it combines the expertise of AirNav with the radical new radar systems being used by increasing numbers of airlines across the world.

Installation

The RadarBox is supplied boxed with the very compact hardware receiver/decoder, all the interconnecting leads, software on CDROM and even an antenna with a 3m connecting lead. This is really everything you need to get started, which makes a pleasant change from some manufacturers who seem to

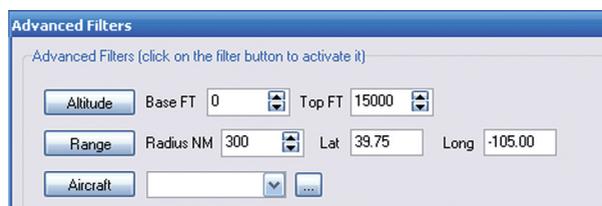
BNC adaptor to make the connection of an alternative external antenna very simple.

The installation was a breeze – just plug in the RadarBox, run the CDROM and follow the instructions! The whole operation was very quick and trouble free. On completion of the installation, the software asks for your user name and password and this is supplied on the sticker that holds the CD packaging – you just need to be careful not to tear this when you rip open the packet!

The supplied antenna was very neat, as you can see from the photos. It has a magnetic base that is designed to fix onto the supplied ground plane plate. However, the magnetic base is very useful if you want to use RadarBox in the car as the magnetic mount means the antenna will stick to most car roofs. It's not strong enough for mobile operation but it is certainly fine for static use at your favourite airport or local viewing point.

Antenna Choices

Whilst the supplied antenna is an excellent choice to get you started, an external antenna is a must for serious listeners. I had the opportunity to try an alternative antenna from Sandpiper. This is rather like the AirNav supplied antenna but it uses three radials in place of the ground plane plate. Construction of the Sandpiper unit is much more robust as it's been designed specifically for external use. The antenna base socket is a standard N type to help minimise losses at the 1GHz frequency used for ADS-B. The antenna mounts directly on



Advanced Filtering Options.



Typical RadarBox Alert Pop-up.

regard connecting leads as optional extras.

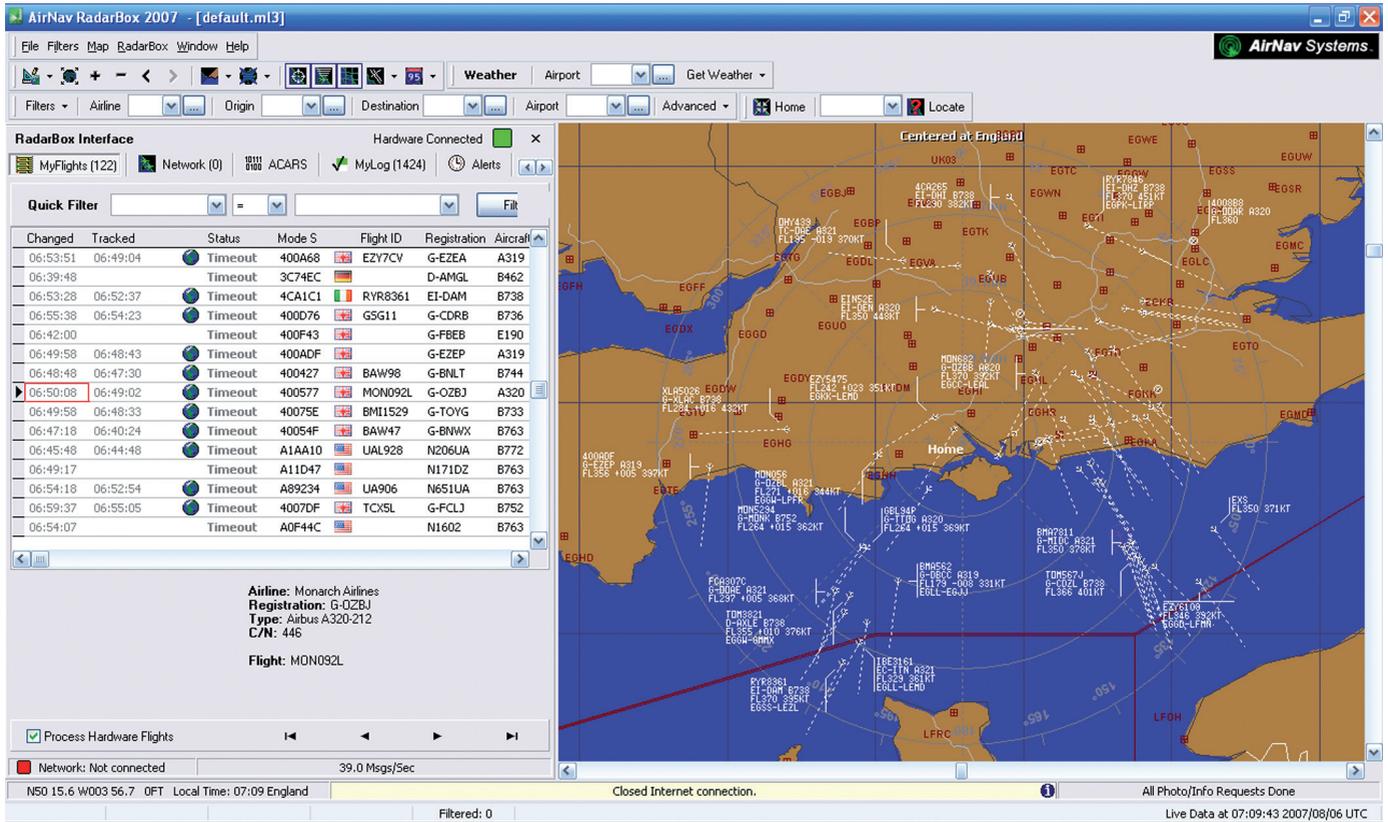
I'm always impatient to get going with any new equipment, so I was pleased to see that AirNav have included a quick-start guide with the CDROM packaging.

Setting-up the hardware receiver/decoder is simplicity itself as there are only two connections: an SMA antenna socket and a mini-USB PC socket. The mini-USB provides both the data connection and the power feed for the receiver, so there's no power unit to worry about. The antenna socket connects directly to the supplied antenna lead but you can always get a

The AirNav RadarBox showing what you can see on the computer screen.



The introduction of ADSB by the aviation authorities has revolutionised aircraft surveillance and spawned a new range of communication equipment such as the AirNav RadarBox.



RadarBox main screen in action.

to a 25mm diameter tube that can then be attached to the main mast as appropriate. The quality of construction was excellent and I particularly liked the fact that it could be completely dismantled for cleaning.

Achieving optimum reception of 1GHz signals is really all about height as the signals travel by line of sight at this frequency. When choosing your antenna position, you should ensure that it is as high and clear of obstructions as possible. Ideally, the antenna needs a clear 360 degree view of the horizon. To give you an example of the difference, I tried the RadarBox at home (15m above sea level) with the supplied antenna mounted on the conservatory roof (3m). With this arrangement I was able receive aircraft over a 70 mile range and typical message reception rates were around 100 per second. However, moving just up the road to a local high spot (95m above sea level) with the Sandpiper antenna and a clear panorama transformed that to a range of 200 miles plus and a message reception rate of over 400 per second – quite a difference! From this location, I was able to track aircraft as far away as Southern Ireland from my base on the central South coast. RadarBox even includes a propagation tool that shows a polar diagram of the range you've managed to achieve.

Ready-To-Go

With the installation complete the RadarBox immediately starts decoding and plotting all the received messages. The number of messages you are able to receive depends very much on your location but if you are anywhere near an airport or flight path, you will find huge quantities of reports appearing very quickly. These will be automatically plotted on the map.

However, the initial task is to set your home location so that the map and all the reports are referenced back to that point. There are a number of ways to do this, the simplest of which is just to find your home on the map, right click on it and choose the option to set the home location. To help find the correct point, the maps are fully zoomable and can also be scrolled around the screen. An alternative is to set the home location via the Preferences menu where you can enter lat/long, use a city search or even use the ingenious auto-detect to find your location. This latter feature works by interrogating your Internet connection.

Main Interface

With the hardware and software running, you are presented with a well set-out screen showing the map to the right, the menu at the top and an information panel running down the left-hand side. The information panel contains details

of all the received ADS-B messages and also includes photos of the aircraft thanks to a linkup with Airliners.net who have a fantastic online database of aircraft photos.

Maps

The map screen is one of the main features of RadarBox and is where the aircraft tracks are plotted. Because of its importance, AirNav have made the interface highly customisable so you should be able to set it to suit your style of monitoring. To facilitate customisation, the map uses layers for all the different elements and these can be switched on and off at will. For general information you have the option to show railways, cities, highways, major roads, regional roads and so on. The Aviation FIX, NDB, Stations, Boundaries, Airways and Outlines. Add to that the range of colour options and the choice of map projections and you can see the RadarBox has a huge range of controls available.

Multiple Sources

Whilst the direct reception of ADS-B reports is a good starting point, RadarBox includes lots more options. Perhaps the most powerful is the RadarBox Network. This is an online network that gathers ADS-B loggings from all over the world and makes them available to all who

connect to the network. This makes tracking of flights over longer distances a reality and is particularly useful if you happen to live in a poor reception area for ADS-B. Linking-up to the network requires just a button press so is very easy – no complex network set-ups to negotiate. You do need an Internet connection for this to work but the network appears to be very quick and the information is updated very regularly. The only point you need to watch is that the Network reports have a 5 minute delay added for commercial reasons. This can lead to a bit of confusion if you're monitoring both network and live flights with the map zoomed in.

In addition to live and Network flights, RadarBox can be configured to accept and plot ACARS messages from a separate decoder and also includes the ability to playback from a log file.

There is even a weather reports feature that downloads METAR and TAF reports from the Internet complete with a decoder to turn the reports into readable English.

Filters

With so much information available via direct reports and the RadarBox network, the map and report list can very quickly become cluttered. AirNav have provided a solution with some neat filters to make sure you only see what you want to see.

There are essentially two filter sets. The first works on the map and the second filters the report list. Let's start with the map filters. These are arranged as a menu bar towards the top of the screen and provide filtering by Airline, Origin, Destination or Airport. This is supplemented by a couple of extra buttons, one of which provides access to a quick list of pre-set filters and the other accesses the Advanced menu that allows filtering by Altitude, Range or Aircraft. The map filters worked extremely well and even include a Show All button, which was a very quick way to disable all the filters. I found the filter by Airport to be particularly useful as you could enter the code for the airport you want to monitor and only flights to and from that airport would show on the map, colour coded to differentiate between arrivals and departures. Another nice extra was the prompts and search facility by the side of each of the filters. You didn't need to know the airport code as you could search on the name and the software uses its internal database to locate the appropriate code.

Alerts, Reports & Recordings

The Alerts facility was extremely useful and could be set to play a sound, launch a pop-up message or send an E-mail in response to a trigger condition. The triggers can be set for range, registration, flights ID, aircraft, and Mode-S data or combinations thereof. I found the Alerts very useful when keeping a lookout for a particular flight.

The reporting option provided the facility to produce a report file of all the loggings from yesterday or today. The file could either be saved to disk or sent as an E-mail.

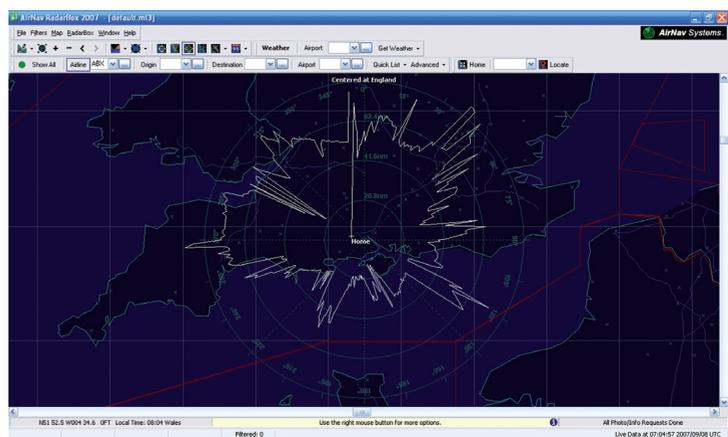
If you spot any particularly interesting traffic that you want to save, RadarBox can record live tracks and save them for playback later.

Teething Problems

If you've been considering buying RadarBox, you might have seen some reports on user forums regarding Windows crashes and disconnections. Whilst I did suffer some of these problems

The screenshot shows the RadarBox Interface window. At the top, there's a 'Quick Filter' section with dropdown menus and 'Filter' and 'Show All' buttons. Below is a table of flight reports with columns for 'Changed', 'Tracked', 'Status', 'Mode S', 'Flight ID', 'Registration', 'Aircraft', 'Airline', and 'Roll'. The table lists various flight events such as 'Climb', 'Timeout', 'Cruise', 'Departure', 'Landing', and 'Levelled' for different aircraft like 400C4A, 400A8E, 4009F1, 4CA2C9, 400FF4, 4011D5, 400FF2, 34154E, 400E4A, 44028F, 502C47, 4CA2C1, 3C78CA, 4008A4, and 400C41. Below the table, there are two photos of an Airbus A320-214 aircraft. To the right of the photos, the following information is displayed: 'Airline: Arkefly (Iberworld Airlines)', 'Registration: EC-JRU', 'Type: Airbus A320-214', 'C/N: 1537', and 'Flight: IWD3415'. At the bottom, there's a status bar showing 'Network: Not connected', '58.1 Msgs/Sec', 'Distance: 6.4 NM', and 'Bearing: 169°'.

The RadarBox interface showing individual reports and photos.



Reception range polar diagram.

with the initial software and firmware, AirNav have been very responsive and developed a robust fix for existing users and updated all the new software. In addition to fixing a few problems, the updated version includes an excellent height plotter that shows the height distribution of aircraft.

Conclusions

RadarBox is a fantastic aircraft monitor and makes full use of all the information available, not only via ADS-B, but also from the RadarBox Network and ACARS messages. The filtering and alert systems are a great help and make sorting through the vast amount of information available very simple.

The Sandpiper antenna system is also a good investment for an outdoor antenna system.

The AirNav RadarBox costs £469.95 and is available from **Martin Lynch & Sons Ltd, Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS. Tel: 0845 2300 599. www.hamradio.co.uk/**

The Radar base aerial costs £35 plus £6 P&P and is available from **Sandpiper Aerials Ltd, Unit 5, Enterprise House, Cwmbach Industrial Estate, Cwmbach, Aberdare, Mid-Glamorgan CF44 0AE. Tel: 01685 870425. http://www.sandpiper.entadsl.com/**