

British Astronomical Association Radio Astronomy Group

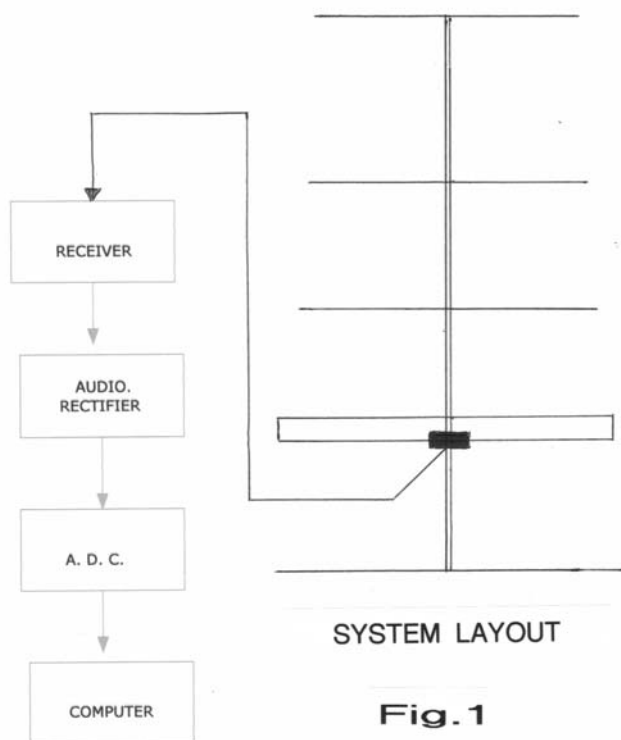
April 2011 Update

Welcome to the 4 new joiners to the baa-rag list since the last Update, although one of those is an entire school Physics Department. For this edition I'm using the individual mail addresses listed for RAG members, plus a few others who have asked to be included. Please let me know if there are any duplicate addresses or if you prefer not to receive Updates in this way.

Following the last edition I've received three contributions describing work that members are doing, which are all very welcome. Please consider whether there is anything that you have available that others may be interested in. One of the purposes of RAG Update is to provide an informal forum for exchanging ideas and reporting results.

Please note the details of the forthcoming Northampton meeting. All are welcome and tickets are now on sale – please contact me for details.

Work at 81 MHz – Colin Clements



Colin has provided a description of a basic Total Flux Radiometer for 81 MHz, intended primarily for the beginner. The full paper appears under the Projects section of the BAA RAG website and the following text and illustrations have been extracted from it.

The instrument uses an Eddystone 990R receiver, examples of which can often be found on eBay, together with a 5-element, folded dipole Yagi (Figs 2) with a calculated gain of 8.3dB and an estimated horizontal beam width of around 50 degrees. The aerial is fed directly to the receiver using UR67 RF cable; the audio output from the 990R is then fed into a rectifier / integrator / DC amplifier of basic design.

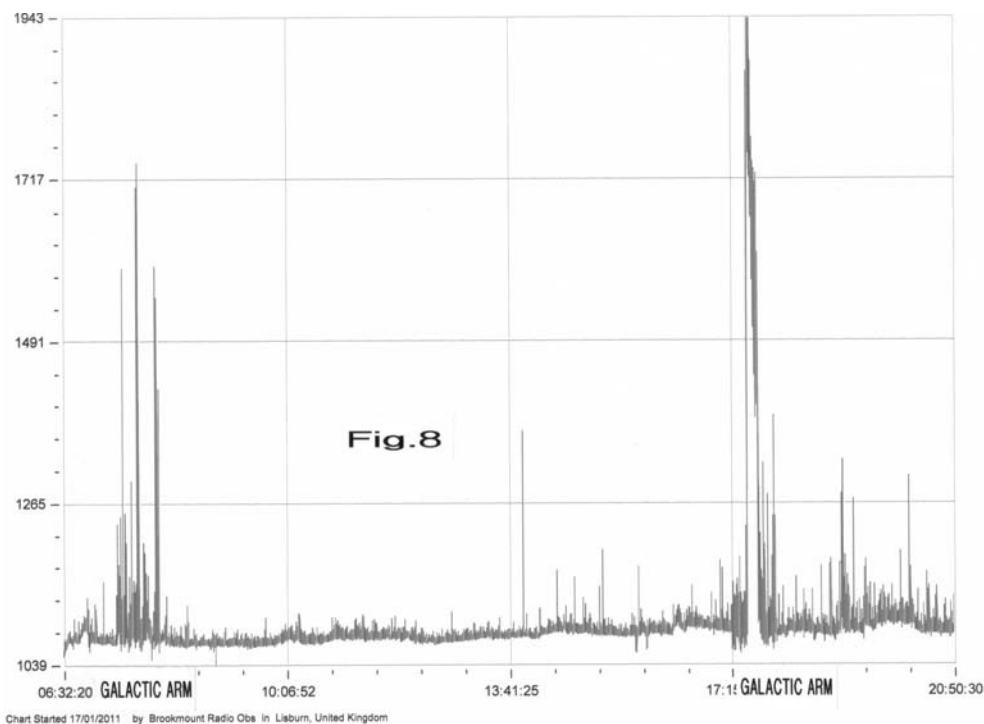
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For operational testing the aerial was orientated vertically upwards towards the local zenith (54 degrees 31 minutes north) and vertically polarised. This would allow the Radiometer to 'see' the Plane of the Galaxy, the radio sources' Cassiopeia A, and possibly Cygnus A.

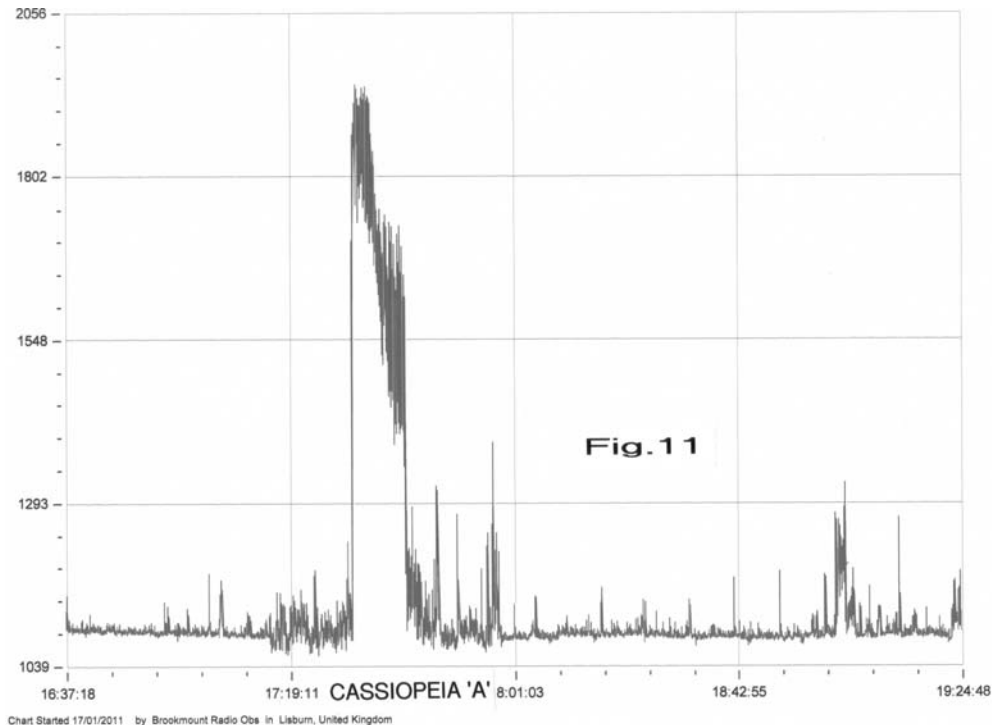
Fig. 8 is a chart showing a drift scan obtained on 2011-1-17. What is believed to be the outer edge of the Galactic Plane can be seen to transit the aerial beam in the early morning with the Cassiopeia 'A' radio source registering prominently in the early evening. Other charts (see the main article on the BAA RAG website) provide confirmation.

The remaining charts are expanded examples showing one transit of a Galactic arm with the radio source Cassiopeia 'A'. Figure 11 shows the Cass 'A' transit in more detail and similar results were obtained on two other dates (see main article.)



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No attempt has been made to identify other radio sources that may be present on these charts, but a general sky survey is eventually planned for this Radiometer, as part of a programme of on-going tests.

Alaskan Magnetometry – Whit Reeve

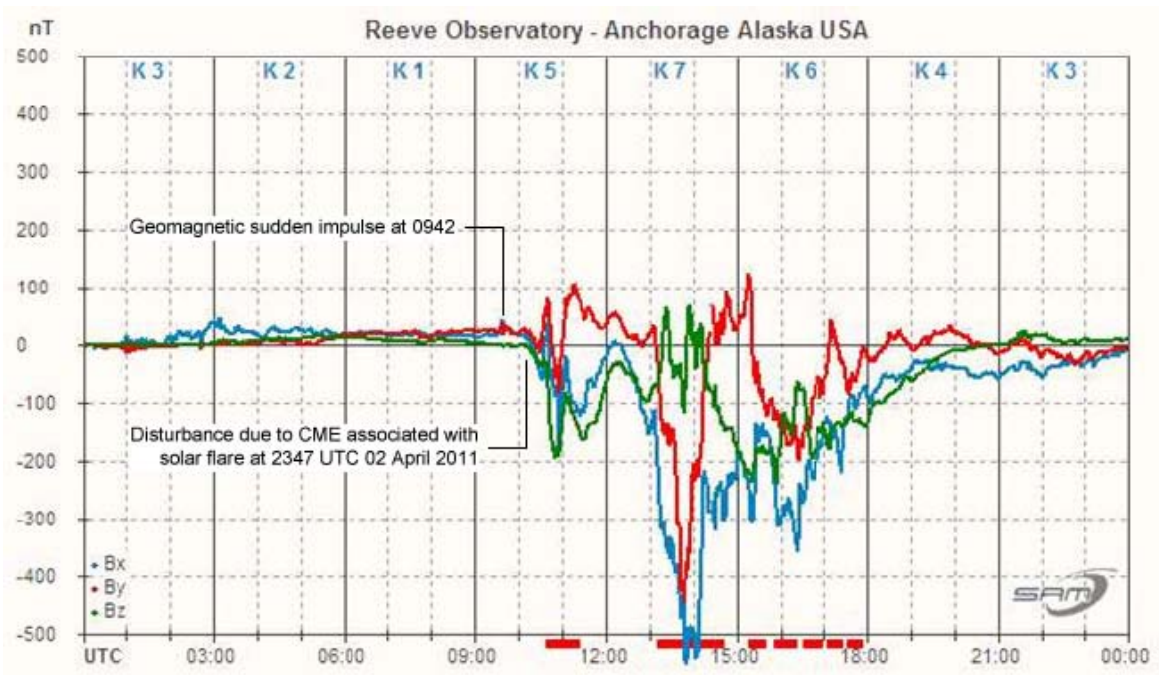
Whit is both a BAA member and a major contributor to, and Board member of, SARA. Located in Anchorage, Alaska (61N) Whit has undertaken much work on RA projects, including receiving both Jupiter and Solar emissions at HF frequencies. You can find further details on his website.

He also monitors the magnetosphere and has published a series of reports on geomagnetic activity based on measurements from his SAM-III magnetometer. Whit has also written an excellent tutorial on geomagnetism which can be found at www.reeve.com/Documents/SAM/GeomagnetismTutorial.pdf

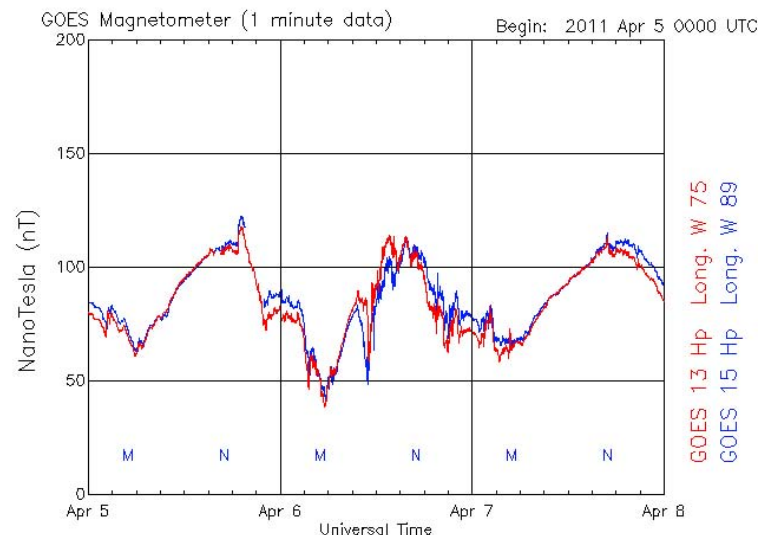
The following is an extract from one of his reports, all of which can be found at <http://www.reeve.com/MagnetometryReports.htm> The full paper carries a more detailed analysis than given here. Whit also adds that he would be interested in seeing comparisons between the RAG magnetometer and the SAM-III, comparing daily as well as mag event magnetograms, so please get in touch if you want to help out.

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Whit notes: "The sudden impulse event occurred at 0942 on 6 April 2011 and was identified as such by SWPC in their daily RSGA. CME impact was indicated by the onset of significant geomagnetic disturbance starting 20 min. later at around 1000. The CME was thought to be associated with a flare on 2 April. As indicated above, a geomagnetic storm ordinarily does not follow a sudden impulse; however, in this case, the disturbance reached storm level during the 0900~1200 time period with further increased disturbance in the 1200~1500 time period. The disturbances lasted 8 to 9 hours."



GOES data for this period

Updated 2011 Apr 7 23:59:02 UTC NOAA/SWPC Boulder, CO USA

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12 GHz experiments – William Williamson



The RAG bulletin board carried a recent exchange on sourcing waveguide components. The initiator was William Williamson who lives near Lerwick, almost as far north as Whit. William has been experimenting with microwave for some time and notes:

“The great thing with this, specifically Ku band, is that equipment is readily and cheaply available and results are virtually certain from day 1. Of course you soon realise the limitations of the simple set-up and start to think of improvements, but that’s part of the fun!

My apparatus is based on a redundant ships' satellite TV receiver system. It has a 1.2m dish in a radome.

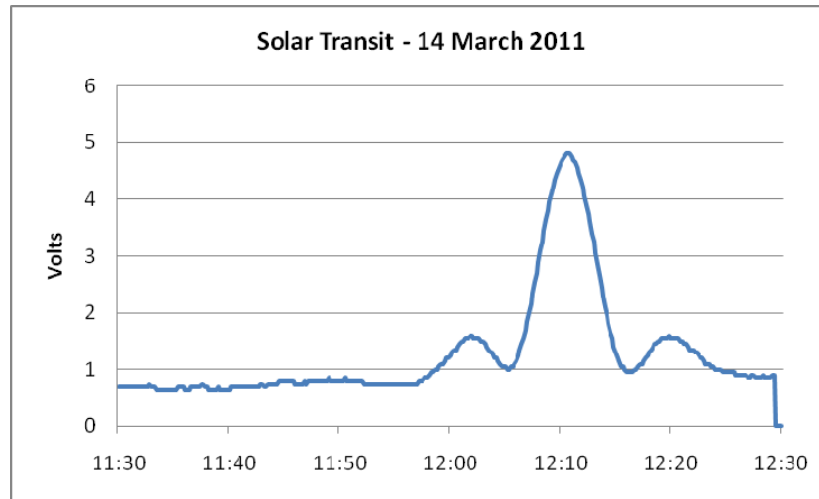
The feed is indirect. The subreflector is at the right corner, the long, narrow cylinder with a grey cone at the end is the feedhorn. The signal is fed to a waveguide arrangement called an orthogonal mode transducer which separates the horizontal and vertical components to separate outlets. The one nearer the top is coupled via my rather roughly made rectangular to circular waveguide adaptor to a domestic LNB. The other outlet is coupled to one of the original LNBS, unfortunately faulty. I intend eventually, to couple this outlet to an x - band receiver, to give a choice of frequency.



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Though not fully optimised it is sensitive enough to give useable results on the moon and I obtained the following curve from the sun.”



BAA RAG General Meeting – 12th November 2011

The BAA Radio Astronomy Group is holding a one-day General Meeting on Saturday 12th November at the Humfrey Rooms, Castilian Terrace, Northampton, NN1 1LD. The two keynote speakers will be Professor Paul Alexander who is Head of the Astrophysics Group at Cambridge and the project leader for the UK contribution to the Square Kilometre Array, and Dr Ben Stappers from Jodrell Bank who is Head of the Pulsar Science Working Group for the LOFAR radio telescope.

The plan is to have a number of short (15 minute) presentations on the work being carried out by members of the Radio Astronomy Group, plus displays of results and the equipment used to obtain them. Please let me know if you have anything to offer here, either a presentation or the display of results (it is six months away so you have the time!) Tickets are on sale now at £15, or £12 for BAA members, and include a buffet lunch and refreshments. Cheques should be made payable to “Radio Astronomy Group” and sent to P. Hyde, 25 Merton Road, Basingstoke, RG21 5UA. Please be sure to include your own address (or preferably an email address) for confirmation of receipt. Alternatively please contact me if you want to do a direct bank transfer.

Further information will be published on the BAA RAG website as it becomes available.

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Points of Interest

The BAA RAG Twitter feed has now accumulated over 100 followers. You don't have to be one of these to access items of interest, just visit the BAA RAG website and follow the link from there. The latest items are:

- Discovering exoplanets: <http://www.ras.org.uk/news-and-press/217-news2011/1945-astronomers-can-tune-in-to-radio-auroras-to-find-exoplanets>
- A view through radio eyes (APOD 13 Apr 11): <http://apod.nasa.gov/apod/astropix.html>
- Hot off the press - true purpose of the SKA: <http://www.thesun.co.uk/sol/homepage/news/3506806/Cheshire-is-centre-of-search-for-alien.html>
- Dancing dishes under a gorgeous sky: <http://www.almaobservatory.org/en/visuals/videos>
- 12,458km telescope maps gamma-ray source <http://www.jive.nl/astronomers-simulate-real-time-telescope-big-world-study-peculiar-active-galaxy>

If you do have anything that you are prepared to share, please get in touch with Martyn Kinder, the RAG webmaster. If you have any thoughts on how you would like to see the website developed, please contact either Martyn or myself.

As always, any comments or queries on the above are welcome! It is always good to hear of experiences in these and other RA-related areas.

Best wishes,

Paul Hyde
g4csd@yahoo.co.uk

BAA RAG Coordinator