

Radio Science Day – May 17, 2011

Participants

Lamy Hervé, Ranvier Sylvain, Calders Stijn, Simon Cyril, De Keyser Johan, Magdalenic Jasmina, Marqué Christophe, Bourgoignie Bram, Aerts Wim, Gamby Emmanuel, Chevalier Andre, Stegen Koen, Equeter Eddy, Gunell Herbert, Darrouzet Fabien, Dekemper Emmanuel, Fussen Didier, Deprierre, Muller Christian, De Sadelaer Geert, Mitrovic Michel, Poelman Dieter, Ferange Christophe, Pottiaux Eric, Bergeot Nicolas, Verbeeck Cis, Lampens Patricia, Defraigne Pascal

Agenda: www.stce.be/news/Events/radioscienceworkshop.php

Lightning detection network at RMI: where we are to date – Dieter Poelman

Dieter presented the lightning network of RMI, consisting of 5 stations located in Belgium and equipped with SAFIR sensors. They are able to retrieve location, polarity, amplitude and multiplicity of the lightnings as well as to distinguish between CC and CG lightnings. They use VHF interferometry to retrieve the location with an accuracy of ~5km. Additional sensors located near Paris and in the Netherlands can be used to obtain a better accuracy.

Johan De Keyser: what is the requirement on timing for the interferometry?

Geert De Sadelaer: accuracy is now of 300 nanosec via the PPS of the GPS. In the previous operational system, this was of the order of the microsec.

Stijn Calders: can you see the difference between human made and real signals?

Geert De Sadelaer: the sensors can distinguish between those.

BRAMS: status, recent developments and perspectives – Hervé Lamy

Hervé presented the current status of BRAMS, a project initiated last year by BISA to detect and characterize meteors with forward scatter radio techniques. The technological developments of the network have been presented as well as the work yet to be done. The goal is to make a first test during the Perseids in August and to be fully operational for the expected outburst during the Draconids in early October.

Didier Fussen: is a reconstruction of the trajectory of the meteor possible with TOF techniques?

Hervé Lamy & Johan De Keyser: what is possible is to use the fact that the trajectory must be tangent to a number of ellipsoids whose foci are given by the emitter and each receiver. This has been proposed but never been done, we plan to implement this technique. Concerning the TOF, in practice it is more difficult since, for each receiver, the signal is coming from a different point of the trail since the specular condition is different for each configuration emitter-transmitter.

Detecting Whistlers with a VLF antenna located in Humain – Fabien Darrouzet

Fabien presented the AWDANet project and the final installation of the VLF antenna in Humain. The system is now fully operational and the first initial results have been shown.

Cis Verbeeck: on the spectrogram given as example, what are the signals with constant frequency?

Fabien Darrouzet: Most of these signals are man-made. Around 20 KHz, they are military signals sent to submarines. Between 10 and 15 KHz, the horizontal discontinuous lines are emissions coming from

the Eastern countries that are sent for triangulation. All these echoes are without scientific relevance. We focus on the the echoes with a Doppler effect which are the whistlers.

The monitoring station at Humain – Christophe Marqué

Christophe Marqué (ROB) and Sylvain Ranvier (BISA) are currently buying a hardware setup to monitor the electromagnetic perturbations that will be induced by the future development of the quarry in Humain. This material is paid by Lhoist, the company owning the quarry. The setup should be ready by end of June and the measurements should start in July for one year duration.

Hervé Lamy: If there is contamination by the quarry, I guess it will probably be more important in the VLF band. What can we do then?

Christophe Marqué: We have to negotiate with Lhoist, but the radio astronomy frequencies are in principle protected. So far, Lhoist representatives have been helpful and open to discussion to find solutions.

CRAF (Committee on Radio Astronomy Frequencies) – Christophe Marqué

Christophe Marqué is a member of this association and presented the goals and members of this association.

Discussion

- **The BRAMS team is interested in the project and hardware used in the lightning project of RMI.** In particular, their experience with VHF interferometry could be useful as BRAMS will also have an interferometric system in Humain. However, the scales considered are very different since the 5 SAFIR sensors are not located on the same site. The experience of the team with GPS and the use of PPS (Pulse Per Second) could also be valuable for the BRAMS team. Indeed, BRAMS will use multi-station observations of the same meteor and needs accuracy on the time measurements of the order of 1 msec. This will be achieved also with the PPS of a GPS.

A visit of one of the stations located on the roof of the RMI main building will be planned.

Geert De Sadelaer: in the lightning project, the time question is a black box imbedded in the hardware. But in a future LF project, this question will become relevant.

- **Discussions about the internet link in Humain:** *Johan De Keyser* mentions that the lack of a fast internet connection in Humain is problematic. He wonders if any other remote site such as the SAFIR locations uses a fast internet connection. The answer is no: they use rather low rate lines. Christophe Marqué has contacted Belnet to obtain an offer to install a high debit fiber line in Humain. It will probably be very expensive since the site of Humain is too far away from a physical connection point. Other companies would probably be as expensive and would maybe even not provide the service. However, Christophe will still continue his investigations and each group operating an instrument at Humain can communicate him their needs.

Geert De Sadelaer points the attention to VPN-systems (telenet). Emmanuel Gamby proposes a satellite connection. But people are a bit skeptical about the reliability of this connection. Koen Stegen notes that the site of Dourbes will get a new fiber connection. Belnet provides a nice service in this case.

- **A communication platform** will be created on the European Space Weather portal (www.spaceweather.eu). It offers the possibility to upload and download files. Stijn Calders and Petra Vanlommel will take care.

Meanwhile, Stijn Calders has done it and here are the informations sent by Petra: this group can act as a repository for documents and know how within the field of radio science carried out within the STCE. In this group, you can retrieve and post documents, once you become a member (see below for the procedure). Two documents have been already posted:

- A list of names+emails of people from the plateau that expressed their interest in radio science.
- The minutes of the Radio Science Day of 14 October 2010.

We want to make a list of the software and hardware available in each institute and associate it with one contact person. To get such a list ready, we need your input. So, please provide us with the following information:

- Name of the hard/software
- A brief description
- Location
- Contact person.

This list will be posted in the portal group 'STCE Radio'. Deadline for this input - May 26 (next week). Only one week from now, but it doesn't need to take a lot of time to edit a few lines. We want to make it ready before the annual STCE meeting.

About the 'STCE Radio' group

How to become a member?

- Log in by filling your username and password in the left menu/bottom.
- If you don't have a login yet, register a new account - also left menu/bottom.
- Click on groups - left menu.
- Click on 'join' in the line 'STCE Radio' - main page next to menu
- Once your membership is approved, you have access to the documents posted in this group.

How to upload documents:

- Log in
- Click on Repository - left menu
- Click on 'Add a document' - main page next to menu
- Use the security group 'STCE Radio'. This means that only members of this group have access to these documents.

How to retrieve documents:

- Log in
- Click on Repository - left menu
- Click on 'Show the index' or 'Search for a specific document' - main page next to menu
- Follow your instinct and the buttons.

- Stijn added a function which allows to retrieve documents per group.