Belgian Institute for Space Aeronomy

Space Physics Department

BRAMS Project

BRAMS Station Manual

BRAMS Station Manual

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1 General Remarks

1.1 Purpose and Scope

This document describes a typical BRAMS station and provides recommendation settings for the software and hardware that compose this station.

1.2 Acronyms and Abbreviations

BISA   Belgian Institute for Space Aeronomy

BRAMS   Belgian Radio Meteor Stations

GPS   Global Positioning System

IMO   International Meteor Organization

NTP   Network Time Protocol

PPS   Pulse Per Second

SL   Spectrum Laboratory

UTC   Coordinated Universal Time

VMO   Virtual Meteor Observatory

2 Hardware

The hardware consists of the following components: a Yagi antenna, a ICOM IC-R75 receiver, a Garmin 18x GPS, a Beringher UCA222 USB audio interface and a computer. All material, except the computer is provided by the Belgian Institute for Space Aeronomy (BISA).

2.1 Personal Computer

The PC shall have Windows XP or further installed on it. The PC shall have at least one free USB port to power the GPS.

The ideal station should come with a serial port (COM) used to connect the GPS to the computer for synchronizing the system time.

If your PC is no longer equipped with a serial port, you can consider one of the following solutions (in decreasing order of preference).

Solution 1: Even if the computer does not have an external serial port, it might still have an

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on-board connector. Then it is possible to buy a cheap serial slot bracket to lead it out.
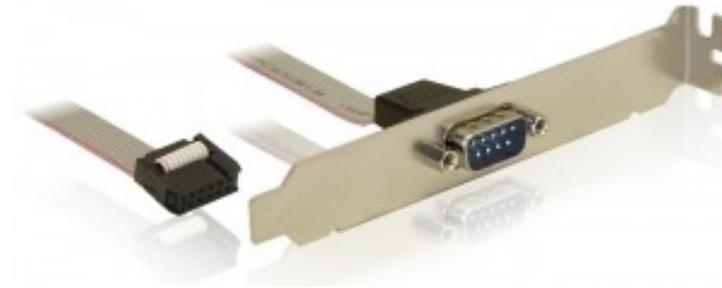
Solution 2: Add a serial card in one of the available PCI slot of your computer.

Solution 3: Use a USB/Serial converter. This solution requires an additional free USB port. Some converters are not suitable for this project. We recommend to use the UC232A converter (http://www.aten.com/products/productItem.php?model_no=UC232A) from the ATEN company.

Note: be sure that opening your computer case is not part of the warranty-void conditions of your PC vendor. It should normally not: you should have the right to add an extension card to your PC.

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2.2 Antenna

The antenna is a 3-element Yagi with adjustable inclination. The elevation of the antenna is chosen to point it toward a point approximately 100 km above the radio beacon in Dourbes (50.80° North & 4.43° East). The azimuth of the antenna is the direction of the beacon.

The antenna is connected to the receiver with a coaxial cable of type RG213.

2.3 Receiver

The receiver is a commercial radio receiver, type ICOM R-75. The automatic gain control (AGC) must be switched off.

For those not familiar with this receiver, here are a few hints on how to use it for BRAMS observations:

- Connect the RG213 cable to [ANT1] connector.

- Antenna selection: Push [ANT(SET)] for 2 seconds to select ANT1. "ANT1" appears on the screen when the [ANT1] connector is in use.

- Frequency selection: Enter 49.969 MHz for the frequency. Push the numerical keys on the keypad to enter the MHz digits (49). Push [.] on the keypad. Push the numerical keys to enter the frequency digits below 1 Mhz (969). Push [ENT]. If a key is mistakenly pushed, push [CLR] and start again from the beginning.

- Mode selection: Push [SSB] to toggle between LSB and USB. Choose USB.

- Automatic Gain Control: Push [AGC] for 2 seconds to turn the AGC circuit OFF. "AGC OFF" appears on the screen when the AGC circuit is turned off.

- Preamplification: Push [P.AMP] to toggle between pre-amp1 and pre-amp2. Choose pre-amp2 which has the largest gain. "PREAMP2" appears on the screen while pre-amp2 is activated.

- Dial Lock function: this function prevents accidental changes and electronically locks the dial. Push [LOCK] momentarily to ON. "LOCK" appears in the screen when the lock function is activated.

Below is a picture of the screen of the ICOM-R75 when in use at the Uccle station.

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The *REC OUT* output of the receiver is connected to the left channel (white or black connector) of the *line-in* entry (light blue) of the PC using a RCA/Jack adapter (See figure below). The right channel (red connector) is used for the GPS.
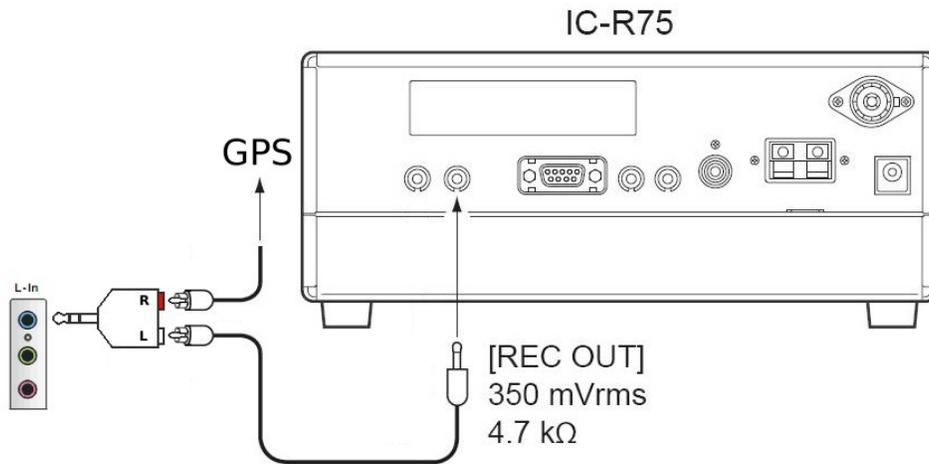
2.4 Garmin GPS 18x LVC Sensor

2.4.1 Description

The Garmin 18x LVC is a serial GPS with one-pulse-per-second (PPS) output[1]. The rising edge of the PPS is aligned to the start of each GPS second within 1 µs for all conditions in which the receiver has reported a valid and accurate position for at least the previous 4 seconds.

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1 Only serial devices provide the very accurate Pulse Per Second (PPS) output.

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2.4.2 Installation

The GPS shall ideally be installed outside, at a location with a clear view of the sky. If it is not possible to locate the GPS outside, try to install it next to a large window.

The GPS must be powered by one of the USB ports of the PC. Plug the DE9 connector into the serial port (or USB/Serial converter) and the RCA connector into the right channel of the line-in entry of the sound card.

It is possible that Windows incorrectly interprets the output of the GPS as the output of a Microsoft Serial Ballpoint mouse. When that happens, Windows loads drivers for the Serial Ballpoint Mouse. This causes the cursor to move erratically across the display, clicking when moving.

The easiest solution to solve this problem is to disable the Serial BallPoint mouse in the device Manager. When erratic mouse movements occur, follow the steps below.

1. Unplug the DE9 connector.

2. Right-click on the *My Computer* icon on your desktop and select *Properties* to open *Device Manager*.

3. Go to the hardware tab of the resulting pop-up window and click on the *Device Manager* button.

4. Right-click on *Serial Ballpoint Mouse* and choose the option to *Disable* (not *Uninstall*) this device.

2.4.3 Configuration

In order to send the PPS and the NMEA data to the same line input, the two signals must not overlap in time. To fulfill this requirement some of the NMEA sentences sent by the GPS must be disabled. This can be achieved with Garmin's configuration software.

	Note that you should have received the GPS already configured. This section has been added for completeness only.

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The Garmin Sensor Configuration Software (*SNSRCFG.exe*) is available from the Garmin Web site. To download the software, start at http://www.garmin.com/oem, select the GPS 18x, and then click on *Software* in the *Quick Links* menu. If you experiment troubles with new versions, there is an old one at http://brams.aeronomie.be/files/SNSRXCFG_2.60.exe.

After the software is installed and running on your computer, follow the steps below to disable NMEA sentences:

1. Select the *GPS 18x PC/LVC* from the list of sensors and Click *OK*.

2. Select *Comm > Setup* to open the Comm Setup Window.

3. Select the serial port to which the GPS is connected. Select *Auto* to let the program automatically determine the baud rate, or select *Manual* to manually select the baud rate of the GPS. Click *OK* when done.

4. Click the *Connect* icon, or select *Comm > Connect* to connect to the GPS.

5. Select *Config > Get Configuration from GPS* to retrieve the current programming of the GPS.

6. Select *Config > Sensor Configuration*. In the *System Configuration* panel, enter an identification string (BISA inventory number for instance) in the *Device ID* field to avoid a bug in the configuration software.

7. Select *Config > NMEA Sentence Selections*. Uncheck all NMEA sentences, expect *GPGGA* and *GPRMC*. Click *OK* when done.

8. Select *Config > Send Configuration to GPS* to send the new programming to the GPS.

2.5 BERINGHER U-CONTROL UCA222

Beringher UCA222 is an USB audio interface with two RCA inputs. It gets its power from your computer's USB bus, so no external power supply or batteries are required. The UCA222 requires no special setup or drivers, just plug it into a free USB port and it should be automatically recognized by Windows.

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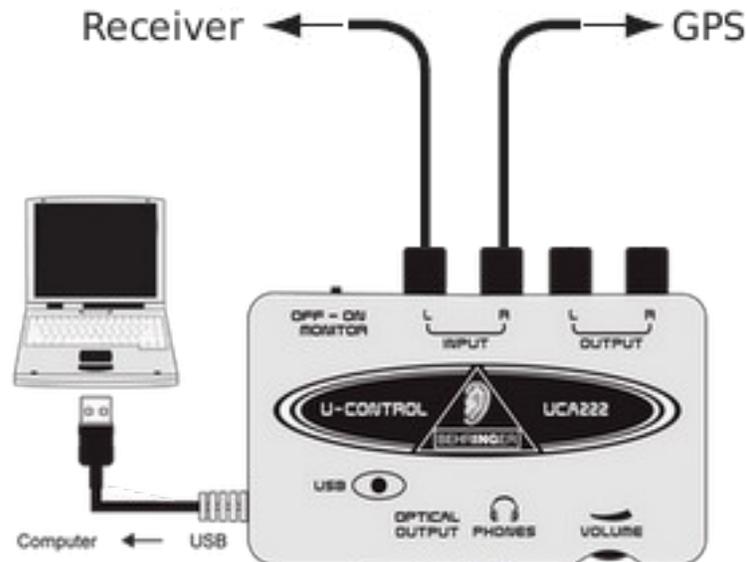
Connect the receiver to the left RCA input of the audio interface with the help of the RCA-RCA cable and the Jack/RCA adapter provided by BISA. Connect the GPS to the right RCA input.

Install the USB audio driver corresponding to your operating system:

1. Download the driver that corresponds to your operating system. For 32-bit Windows http://brams.aeronomie.be/files/BEHRINGER_2902_WIN32_2.8.40.zip For 64-bit Windows http://brams.aeronomie.be/files/BEHRINGER_2902_X64_2.8.40.zip

2. Right-click on the downloaded file and select *Extract All...* This will open a dialog box asking you where you want to extract the files.

3. Keep the default location *...\Desktop\BEHRINGER_2903_X64_2.8.40* and click on the *Extract* button.

4. Go to *...\Desktop\BEHRINGER_2903_X64_2.8.40\BEHRINGER_2903_X64_2.8.40*. If you are logged in with administrator privileges, double-click on the *Setup.exe* program. If you are logged in as a normal user, right-click on the *Setup.exe* program and select *Run as administrator* to start installing the driver.

5. Select your preferred language and click on *Install the driver*. The program will eventually ask you to plug the USB sound card if it is not already connected to your PC.

6. Once the installation finished, the program will ask you to reboot your computer.

This will install both the Windows Driver Model (WDM) and Audio Stream Input/Output (ASIO) drivers.

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3 Software

We use Spectrum Lab (SL) to record the radio signal. SL runs under Windows XP, Vista, Windows 7 and Linux/WINE (not tested).

3.1 Windows

Windows XP needs 512 MB RAM to work properly. More recent Operating Systems need even more memory.

- It is strongly advised to dedicate the PC to this specific task to avoid disturbing the real-time capture of the radio samples.

- Install the latest Service Pack and all relevant updates.
- Configure Windows Update to download updates only manually.
- Stop unnecessary programs. Press the "Control," "Alt," and "Delete" keys at the same time. Select "Task Manager" from the screen that comes up. Click on the "Applications" tab. Choose running programs that you are not using and click the "End Task" button. Close all running programs that you are not using.
- Disable startup programs. Click "Start" and choose "Run." Enter the command "msconfig" without quotes. Select the "Startup" tab. Uncheck the boxes next to any program you don't want to run at startup.

- Ensure that your computer is free of malware (spyware, viruses, …).

3.1.1 Time Zone Configuration

SL uses the local time of your PC to create timestamps. Using the *Timezone, Clock source, Timer calibration* settings of SL, it is possible to adjust the local time, but this probably does not take daylight saving time into account.

So the only possibility is to set your Windows system clock to UTC. Do not forget to do this before starting the recording otherwise some of your data files might be overwritten.

1. Open *Date & Time* in *Control Panel*.

2. To change your time zone, click on the *Time Zone* tab. In the box above the map, click the drop-down arrow, and then click on *(GMT) Coordinated Universal Time.* With some versions of Windows this option may not be available. Use then *(GMT) Casablanca* instead.

3. Click *OK* when done.

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3.2 Meinberg NTP

NTP (Network Time Protocol) is a background process which synchronizes the system time of the computer to one or more external reference time sources which can be either another computer on the network, or a GPS clock which is connected locally to the computer.

The official public domain NTP application does not support Windows operating systems, but Meinberg, a company specialized in time synchronization, provides a Windows package built from the original sources.

The Meinberg package can be downloaded at http://www.meinberg.de/english/sw/ntp.htm. The latest version is 4.2.4p8 and runs on Windows NT, 2000, XP, 2003/2008 Server, Vista and Windows 7 (either 32-bit or 64-bit version). Older versions are not supported because of missing features in the Windows kernel.

> Note that other time synchronization programs (e.g. Dimension 4) do not work with the GPS. Therefore you MUST install the Meinberg package.

NTP installation is straightforward: just keep the default settings. When it will ask you to specify your configuration settings, enter the address of the official Belgian time server

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(ntp.oma.be), which is hosted by the Royal Observatory of Belgium (ROB).
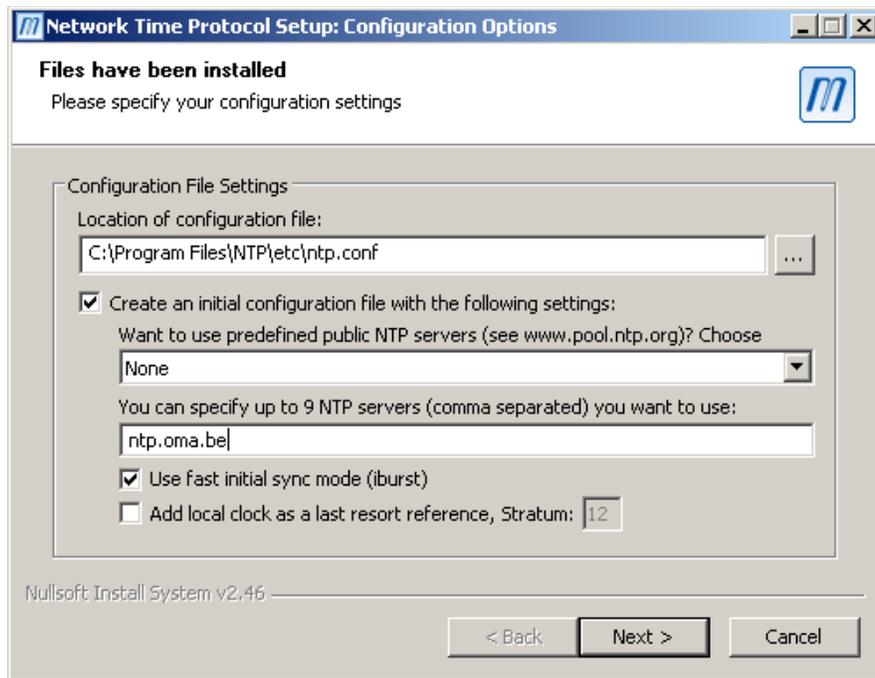
After NTP is installed and running on your computer, you have to replace its default configuration file by the one we have pre-configured to use the Garmin GPS as primary time source:

1. Go to *Start > Programs > Meinberg > Network Time Protocol > Service Control* and click on *Stop NTP Service* to close the NTP service. Note that, on Windows 7, you have to right-click on the menu entry and select *Run as administrator* even if you are logged in as a user with administrator privileges.

2. Download the *ntp.conf* file from http://brams.aeronomie.be/files/ntp.conf and copy it to C:\Program Files\NTP\etc\ntp.conf. If Windows 7 prevents you to replace this file even logged in as administrator, follow this procedure to bypass the problem:

   ◦ Open the http://brams.aeronomie.be/files/ntp.conf link in your browser and copy the content to the clipboard.

   ◦ Open the *Notepad* editor with administrator privileges: go to *Start > All Programs > Accessories*, then right-click on the *Notepad* entry and select *Run as administrator*.

   ◦ Open the file *C:\Program Files\NTP\etc\ntp.conf*.

   ◦ Select all (Ctrl+A) the file, replace it by the contents of the clipboard (Ctrl-

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V) and save it.

3. Review the configuration by selecting Start > Programs > Meinberg > Network Time Protocol > Edit NTP Configuration.

4. If you do not have a permanent Internet connection, comment the lines corresponding to the time servers with the sharp (#) character:

```
# Pick up some random servers in neighbouring pools.
# server 0.be.pool.ntp.org iburst
# server 1.be.pool.ntp.org iburst
# server 1.fr.pool.ntp.org iburst
# server 2.fr.pool.ntp.org iburst
# server 1.nl.pool.ntp.org iburst
# server 2.nl.pool.ntp.org iburst

# Use specific NTP servers
# server ntp.oma.be iburst
```

5. If the GPS is not connected to the first serial port, replace 1 by the number of the right port in the following line:

```
server 127.127.20.1 mode 0 iburst minpoll 4 maxpoll 6 prefer
```

For instance, `127.127.20.4` corresponds to a serial GPS connected to COM4.

6. Save the configuration file and restart the NTP service by selecting *Start > Programs > Meinberg > Network Time Protocol > Service Control > Start NTP Service*. Note that, on Windows 7, you have to right-click on the menu entry and select *Run as administrator* even if you are logged in as a user with administrator privileges.

To check that NTP runs correctly, wait a few minutes and go to *Start > Programs > Meinberg > Network Time Protocol* and select *NTP Quick Status*. You should see a command window that looks like the one below.

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```
Quick NTP Status                                              _ □ ×
Checking current status of NTP service with ntpq -p
     remote           refid      st t when poll reach   delay   offset  jitter
==============================================================================
-79.99.122.29    193.190.230.65   2 u   60   64   377   3.568   -7.751   2.986
-eriador.org     193.79.237.14    2 u   49   64   377  20.719   -6.785   2.871
-wtf.roflcopter. 195.83.222.27    2 u   38   64   377  18.248   -7.171   2.983
xdigi00161.digic 195.13.1.153     3 u   34   64   377  17.694    4.844   4.822
-vpn.cumquat.nl  131.188.3.221    2 u    4   64   377   7.129   -5.388   1.476
+chime5.surfnet. .PPS.            1 u   11   64   377   9.454   -8.567   2.896
+ntp2.oma.be     .PPS.            1 u    2   64   377   1.312   -8.722   2.911
*GPS_NMEA(1)     .GPS.            0 l   11   16   377   0.000   -8.634   0.760
(Auto-Refresh every 10s  --- CTRL+C to Cancel)
```

Look at the line corresponding to the GPS. The *reach* value should be 377. If it has not yet reached this value, wait a few more minutes and check again. You should see a star (*) at the beginning of this line, which means that the GPS has been selected as the primary time source. The offset should be a few milliseconds (Note that values in the offset column are expressed in milliseconds) and the *when* value should never become greater than the *poll* one.

3.3 Spectrum Lab

Spectrum Lab started as a simple FFT program running under DOS a long time ago, but it is now a specialized audio analyzer, filter, frequency converter, hum filter, data logger, etc.

Please use version 2.76b26 available on the BRAMS website, so everybody will use the same version (http://brams.aeronomie.be/files/speclab_v2.76b26.zip). Even though it is a *beta* version, it is stable. If you already have an old version installed on your PC, please consider upgrading to this version.

At http://brams.aeronomie.be/files/SETTINGS.INI, you will find a standardized setting file. This file shall be stored in the installation directory of SL (by default C:\Spectrum).

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3.3.1 Directory Settings

The default location for storing WAV files is *C:\Data\WAV*, the default location for storing images is *C:\Data\JPG*. You might also choose another location (the procedure is explained below) depending on the free storage of your local disks. One day of recording represents one gigabyte of data and it would be good to have free space for a few months.

> 💣 Note that you have to manually create the *C:\Data\WAV* and *C:\Data\JPG* directories. Otherwise the files will not be stored.

To prevent those directories from being overwhelmed by the huge amount of files (8640 per month typically), the setting file has been pre-configured to save data files in *year\month\day* subdirectories below the C:\Data\WAV and C:\Data\JPG locations.

To create this hierarchy of subdirectories, follow the steps below:

1. Download the file available at http://brams.aeronomie.be/files/2011_2015.exe.

2. Double-click on the file, click on the 3-dot button and go to the *C:\Data\WAV* directory. Then click on the *OK* button.

3. Click on the *Extract* button to create the subdirectories. This operation can take several minutes depending of the power of your PC.

4. Repeat the procedure for the *C:\Data\JPG* directory.

> 💣 Do not forget to unzip the archive for both C:\Data\WAV and C:\Data\JPG directories.

This will create the *year\month\day* structure up to year 2015. Of course, you are free to use your own data organization, but do not forget to modify the setting file according to your preferences.

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3.3.2 System Settings

3.3.2.1 Audio Settings

The audio interface to use with SL is stored in the *MCONFIG.INI* file which is specific to each installation. So you must manually select the UCA222 interface as input device:

1. Select *Audio settings, I/O device selection* in the *Options* Menu.

2. Select *USB Audio CODEC* or *Line In (BEHRINGER USB WDM Audio 2.8.40)* in the *Audio Input Device* combo box. Always select the Windows Driver Model (WDM) and not the ASIO driver (BEHRINGER USB AUDIO).

3. Click on *Apply* button.
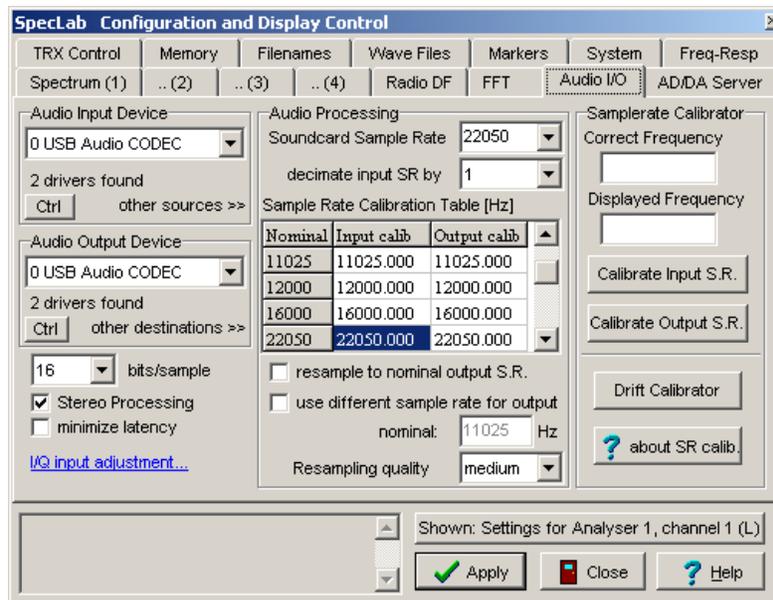
Note that it is still possible to listen to the meteor echoes using the internal audio card of the PC as output device; but since the GPS signal is recorded in stereo, it is advised to push the audio balance to the left. The other solution is to connect external speakers to the USB interface.

3.3.2.2 GPS Settings

Open the *Options* and select GPS receiver. Then click on the *Configuration* tab. Chose *Soundcard* for the GPS port and *4800* for the GPS speed. Check *use GPS time, no local* and then click on the *Apply* button.

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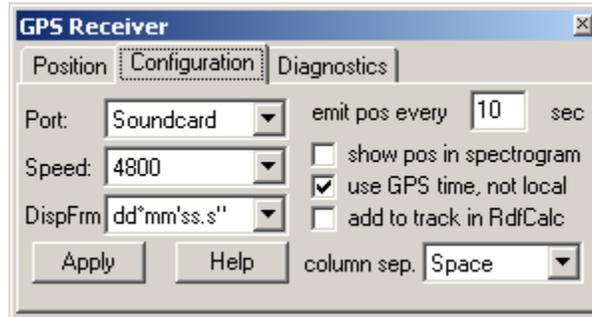
3.3.3 Data Settings

The important parameters in this file are:

- Stereo recording of the radio signal and the GPS signal.

- Continuous calibration of the sample rate of the audio card, using the PPS from the GPS.

- A sampling rate of 22050 Hz, 16 bit per sample.

- A new WAV file is started every five minutes.

- A JPG image of the spectrogram is captured every five minutes.

- Images are tagged with the frequency of the beacon and the time of capture.

By default, the setting file is configured for Uccle's station. You must substitute this with your own location:

1. Select *Periodic Actions...* in the *File* menu.

2. Substitute the value of the *location* variable with the VMO code of your location (see appendix).

3. Click on the *Test* button to check your syntax, then on *Apply* and *OK*.

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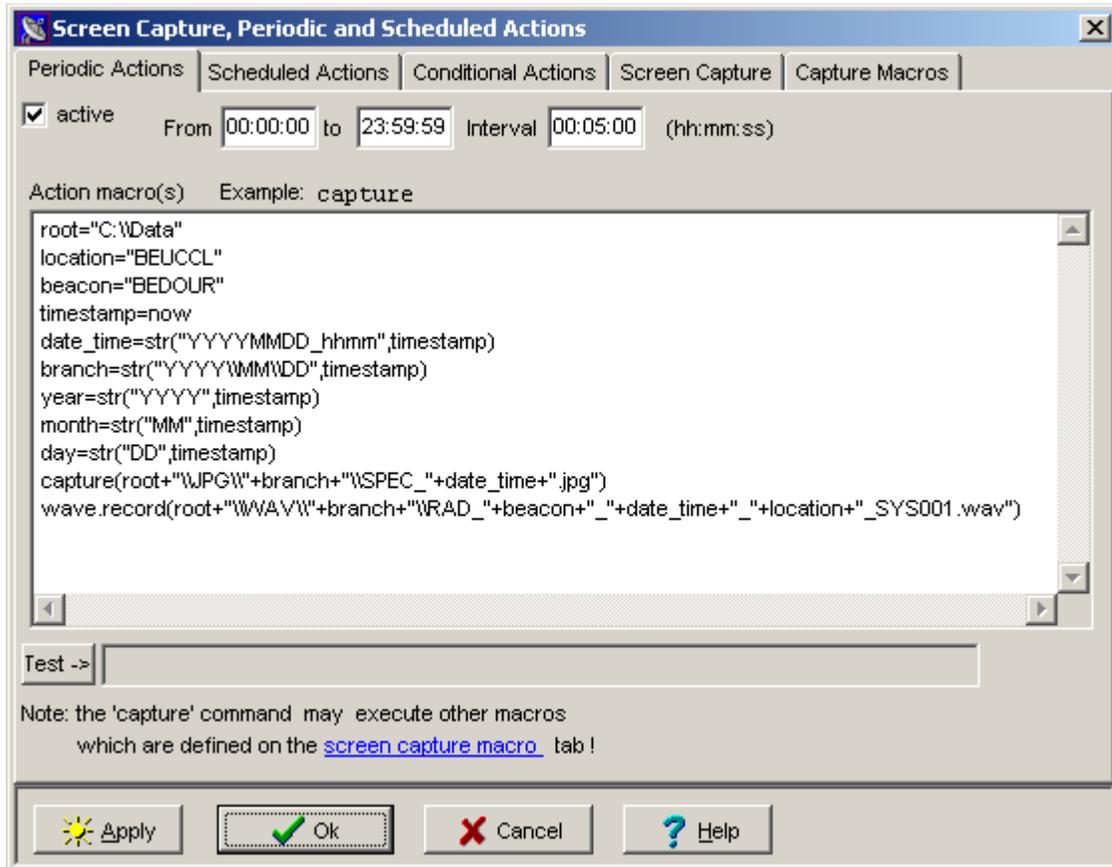
Note that you can change the default location where the data are stored by changing the value of the *root* variable.

> It is very important that you keep all other default data settings (sample rate, bit depth, etc) and the naming convention of the WAV files.
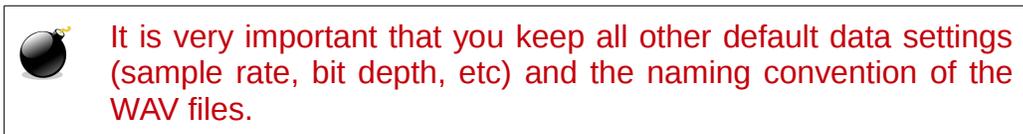
3.3.4 Visual Settings

The visual preferences that come with the setting file are:

- The spectrum graph and spectrogram (waterfall) are displayed from 500Hz to 1500Hz.

- The color palette is *sunrise*. The brightness is set to about 40% and the contrast to about 75%.

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- The amplitude range of the signal displayed goes from -120db to 0dB.

- The option *Vertical Frequency Axis* is checked, so the spectrogram (waterfall) scrolls from right to left with a horizontal time axis and a vertical frequency axis.

By default, the displayed part of the spectrum graph and spectrogram goes from 500Hz to 1500Hz. This has to be reduced to an interval of e.g. 200Hz centered on the carrier frequency. To do so, change the values of the *Min* and *Max* fields in the frequency control panel.
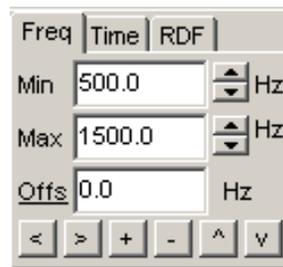
To add your specific location on the spectrograms generated every five minutes:

1. Select *Screen capture options* in the *Options* menu.
2. Replace *BEUCCL* by the VMO code of your location (see appendix) in the second line.
3. Click on the *Update preview* button to check that the capture looks fine, then on *OK*.

We suggest you to keep other parameters unchanged to ease the comparison of spectrograms issued from different stations.

3.3.5 Check SL Functioning

To be sure that SL keeps the modified settings, close it and open it again. This will force SL to write the current configuration in its setting file.

3.3.5.1 Check SL components

Open the *Components* menu and select *Show Components (circuit window)*. All the *SR cal*, *ADC*, *DAC* and *Spectrum Analyser1* components should be colored in green.

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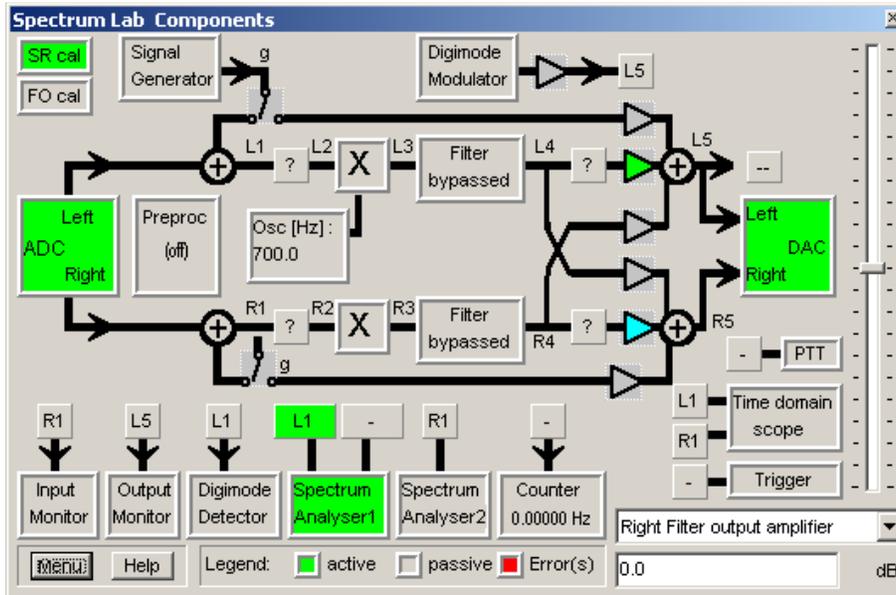
3.3.5.2 Check Time Source

Open the *Options* menu and select *System settings > Timezone, time source, timer configuration*. The primary time source should be *Use audio-sampling clock*.
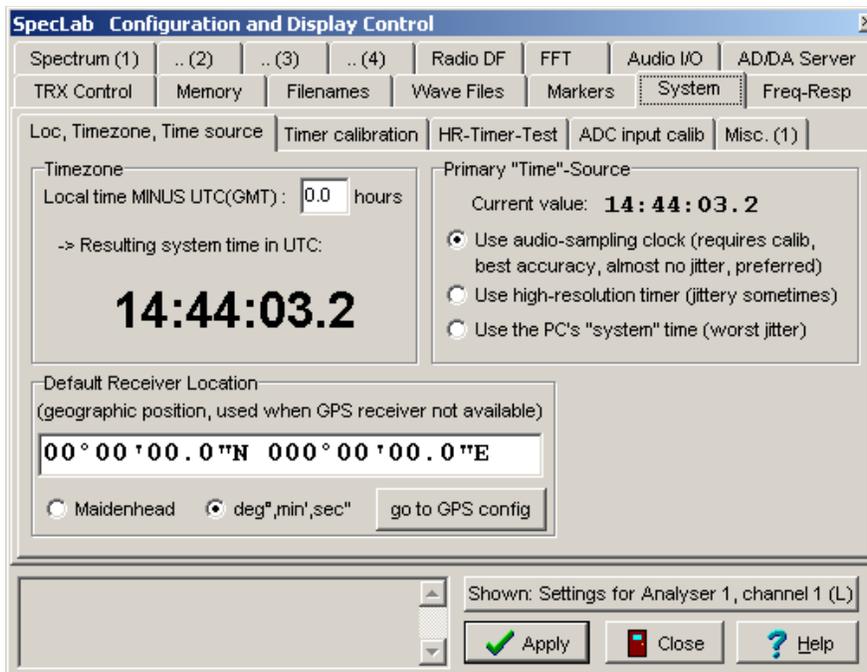
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3.3.5.3 Check Signal Amplitude

Open the *Components* menu and select the *Input Monitor* component. The signal can turn red for brief periods but should be green most of the time.
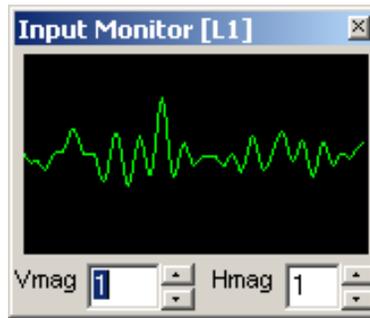
If the signal color is mostly red, decrease the audio gain of the line-in entry in the volume control panel of Windows.

3.3.5.4 Check Sample Rate Calibration

Open the *Components* menu and select the *Sampling Rate Detector (to compensate ADC clock drift)* component.

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The color of the *Status* line at the bottom of the dialog box should be green.

3.3.5.5 Check GPS Position

Open the *Options* menu and select *GPS receiver.*
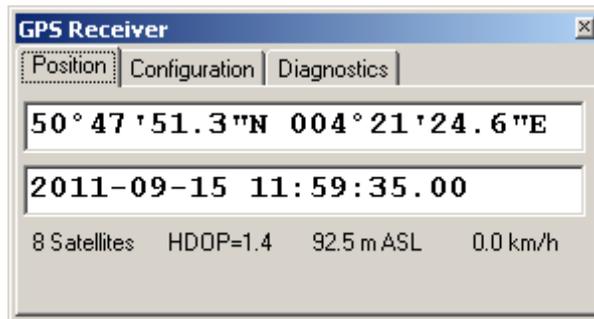
The dialog box should display the current GPS position and UTC time. High accuracy is achieved when the number of satellites is close to twelve and the HDOP value is close to one.

3.3.5.6 Check File Recording

Wait for the next five minutes frontier and check that SL creates the WAV and JPEG files in the corresponding directory.

3.3.6 File Naming Convention

The naming of files is based on the convention used in the Virtual Meteor Observatory (VMO).

Geographic locations are identified by the two-letter country code (BE – Belgium), followed by the first four letters of the location (UCCL – Uccle). In case of conflicts, the last letter of the code is replaced by the last letter of the location name. If a conflict remains, the last letter of the code is replaced by a number starting from 2.

The type of data is also standardized by the VMO:

- CAM is for camera observations (video or still).
- FIR is for fireball observations.
- ORB is for meteoroid orbits and trajectories.
- RAD is for radio observations.
- VIS is for visual observations.

Hereafter an example of the naming convention used in the BRAMS archive:

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RAD_BEDOUR_20110505_0800_BEUCCL_SYS001.wav

This file represents data from the Dourbes beacon, recorded at 8h00 UT on May 5th 2011 by the first antenna of the Uccle station.

The significant parts of the file are separated by underscores:

- RAD: file contains radio data.

- BEDOUR: location of the beacon. If several beacons exist at the place, duplicate rules of VMO are used to distinguish the beacon.

- 20110505: date of recording.

- 0800: start time of recording.

- BEUCCL: location of the station. If several stations exist at the same place, duplicate rules of VMO are applied.

- SYS001: code of the recording system. Most stations have only one antenna, but some have several antennas. (for instance, Uccle has two antennas and the interferometer at Humain has five antennas).

3.4 BRAMS Decoder

The BRAMS Decoder is a console application that decodes the GPS channel of the WAV files and resamples the radio signal from 22050Hz to 5512Hz. It also adds some metadata such as the station code or the calibrated sample rate to the file. The process is illustrated in the following picture.
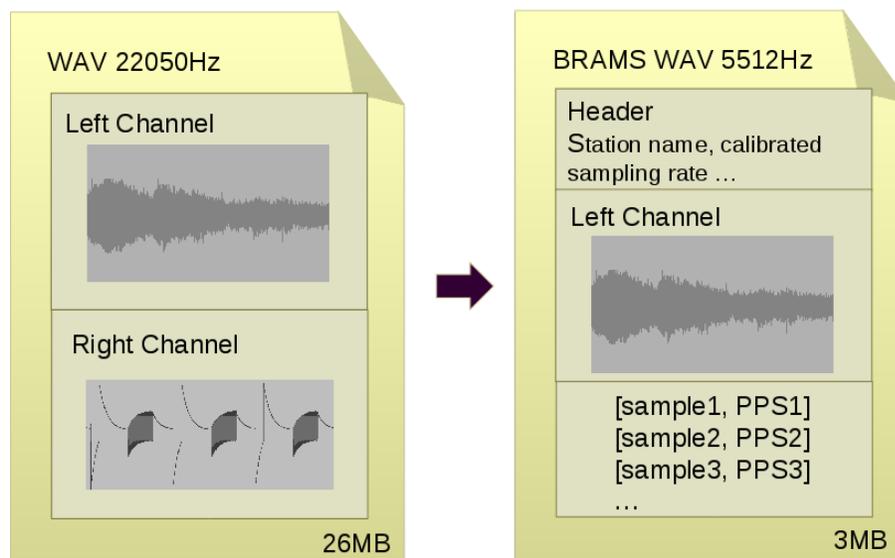
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The purpose is to reduce the size of the files (from 26MB to 3MB) while keeping precise information about the timestamping of the data.

The application runs every day at 2am and processes the files of the day before.

3.4.1 Installation

The BRAMS decoder can be downloaded at http://brams.aeronomie.be/files/brams-decoder-1.1-setup.exe. This package has been tested on the Windows XP SP3 and Windows 7 (32-bit). The installation is straightforward: the program asks you a few questions about your settings and create a scheduled task to run the decoding every day at 2am.

In case the scheduled task is not automatically created by the installer, here is the procedure to create it manually.

On Windows XP:

1. Open *Scheduled Tasks* in *Control Panel*.

2. Double-click on *Add Scheduled Task* and then click on *Next*.

3. Windows asks you the program you want to run. Click *Browse* and select *C:\Program Files\BRAMS Decoder\bin\brams-decoder.bat*. If you see two *brams-decoder* files without extensions in the list, choose the first one. The reason is that, by default, Windows hides extensions for file types such as *bat* or *exe*[2].

4. Select *Perform this task Daily*, then click *Next*.

5. Select 2:00 as starting time and the current day as starting date.

6. Windows asks you the name of the user that will run the task. Enter *SYSTEM* in the user name field and leave the password fields empty.

7. Check *Open advanced properties for this task when I click Finish* and then click *Finish*.

8. Go to the *Settings* tab and uncheck the two options in the *Power Management* section.

9. Click *OK* to finalize the creation.

On Windows 7:

1. In the *Control Panel*, click on *Administrative Tools*, then double-click on *Task Scheduler*.

2. In the *Action* menu, select *Create Task...*

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2   If like me you do not like this feature, It is possible to deactivate it in your Windows explorer:
1. Open the *Tools* menu and select *Folder Options...*
2. Then go to the *View* tab and uncheck *Hide extensions for known file types* in the advanced settings.
3. Then click *Ok*.

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3. In the *General* tab, enter *brams-decoder* in the *Name* field. Click on *Change User or Group...* and enter *SYSTEM* in the object name field, then click on *Check Names* to be sure the name you entered is correct. Click *OK* when finish.

4. In the *Triggers* tab, click on *New...*, select *Daily* and 2:00 as starting time. Then click *OK*.

5. In the *Actions* tab, click on *New...* and then on *Browse....* Select *C:\Program Files\BRAMS Decoder\bin\brams-decoder.bat*. If you see two *brams-decoder* files without extensions in the list, choose the first one. The reason is that, by default, Windows hides extensions for file types such as *bat* or *exe*[3]. Click *OK* when finish.

6. In the *Conditions* tab, uncheck *Start the task only if the computer is on AC power*.

7. Click *OK* to finalize the creation.

3.4.2 Uninstallation

To remove the program, run the uninstaller located at *C:\Program Files\BRAMS Decoder\uninstaller.exe*.

3.4.3 Configuration File

The configuration file of the BRAMS Decoder is located at *$APPDATA\Brams Decoder\etc\brams_decoder.conf*, where *$APPDATA* is *C:\Documents and Settings\All Users\Application Data* on Windows XP or *C:\ProgramData* on Windows 7. Note that those directories are hidden by default.

The configuration file contains a list of parameters. Each parameter has a name and a value, delimited by an equals sign (=). Semicolons (;) at the beginning of the file indicates a comment. Comment and blank lines are ignored.

Default settings are usually just fine, but here is the list of parameters that you can modify.

Name	Description	Default Value	Mandatory
antenna_id	Id of the antenna in case the setup has several antennas.	1	
beacon	Code of the beacon.	BEDOUR	
beacon_frequency	Frequency of the beacon in Hertz.	49970000	

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3   If like me you do not like this feature, It is possible to deactivate it in your Windows explorer:

    4. Open the *Organize* menu and select *Folder and search options*.
    5. Then go to the *View* tab and uncheck *Hide extensions for known file types* in the advanced settings.
    6. Then click *Ok*.

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bit_rate	Number of bits per second of the GPS signal.	4800	
decimation_factor	Ratio between the old and new frequencies when resampling.	4	
data_directory	Root directory where the WAV files are stored.		Yes
destination_directory	Root directory where the WAV files are moved once decoded.		
email_log	If one, send decoder log by email. See SMTP parameters.	0	
gps_channel	Id of the channel with the GPS signal to decode.	2	
lo_frequency	Frequency of the local oscillator in Hertz.	49969000	
lock_file	Path to lock file to prevent multiple instances for running simultaneously.		Yes
log_directory	Directory where the log files are located.		Yes
mail_recipient	Decoder log will be sent to this email address.		
mail_sender	Email address used for sending the decoder log.		
nmea_delta	Minimum level for NMEA transitions. Between zero and one.	0.2	
pps_delta	Minimum level for PPS transitions. Between zero and one.	0.4	
pps_duration	PPS duration in seconds.	0.1	
station	Code of the station.	BEUCCL	
smtp_password	Password of the SMTP account for sending decoder log by email.		
smtp_server	Address of the SMTP server where sending the decoder log. The address must begin with 'smtp://' or 'smtps://'. By default, it connects to port 25, but another port can be specified with the following syntax:		

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	smtp://mail.example.net:587.		
smtp_tls	If one, issue the STARTTLS command when connecting to the SMTP server.	0	
smtp_username	Username of the SMTP account for sending decoder log by email.		
timestamp	Starting day from which the decoding must start. This parameter is updated every time the decoder runs.		Yes

3.4.4 Log File

Some diagnostic information about the decoding process can be found in the log file of the BRAMS Decoder. This file is located at *$APPDATA\BRAMS Decoder\log\brams_decoder.log*, where *$APPDATA* has the same definition than above.

4   References

- BRAMS – Belgian RAdio Meteor Stations

  http://brams.aeronomie.be

- GPS 18x Technical Specifications

  http://www.garmin.com/manuals/GPS18x_TechnicalSpecifications.pdf

- Meinberg NTP Package

  http://www.meinberg.de/english/sw/ntp.htm#ntp_nt_stable

- Spectrum Laboratory

  http://www.qsl.net/dl4yhf/spectra1.html

- U-CONTROL UCA222

  http://www.behringer.com/EN/Products/UCA222.aspx

- Virtual Meteor Observatory

  http://vmo.imo.net/

Appendix A: VMO Codes of the BRAMS Stations

Corbais   BECORB

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Dinant	BEDINA
Genk	BEGENK
Geraardsbergen	BEGERA
Grimbergen	BEGRIM
Harelbeke	BEHARE
Hove	BEHOVE
Humain	BEHUMA
Humbeek	BEHUMB
Jalhay	BEJALH
Kampenhout	BEKAMP
Kapelle-op-den-bos	BEKAPE
Langemak	BELANG
Lembeek	BELEMB
Leuze	BELEUZ
Liège	BELIEG
Mons	BEMONS
Neufchâteau	BENEUF
Ophain	BEOPHA
Ottignies	BEOTTI
Overpelt	BEOVER
Redu	BEREDU
Seneffe	BESENE
Tessenderlo	BETESS
Tintigny	BETINT
Uccle	BEUCCL