Easy installation Russian Meteor M2-3 and M2-4 weather satellite

*(MeteorGIS **v2.25**, August, 2026)*

(Image copied from https://russianspaceweb.com)

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1. Preface

It is important to mention that this described installation was done on a clean PC with Windows10 operating system, but after installing MeteorGIS 2.25 on my 2e PC, running Windows 11, turned out that Windows 11 has no problem with that.

2. Introduction.

First of all, a word of thanks to Les Hamilton and Rob Bale, without whose help I could never have written this adjusted manual.

Here is a description of Russia's Meteor satellite reception. In about 6 minutes, for example, it flies into orbit from Tunisia to Greenland. Below an example of the (ex) Meteor M2-2† live recording, fig.1.

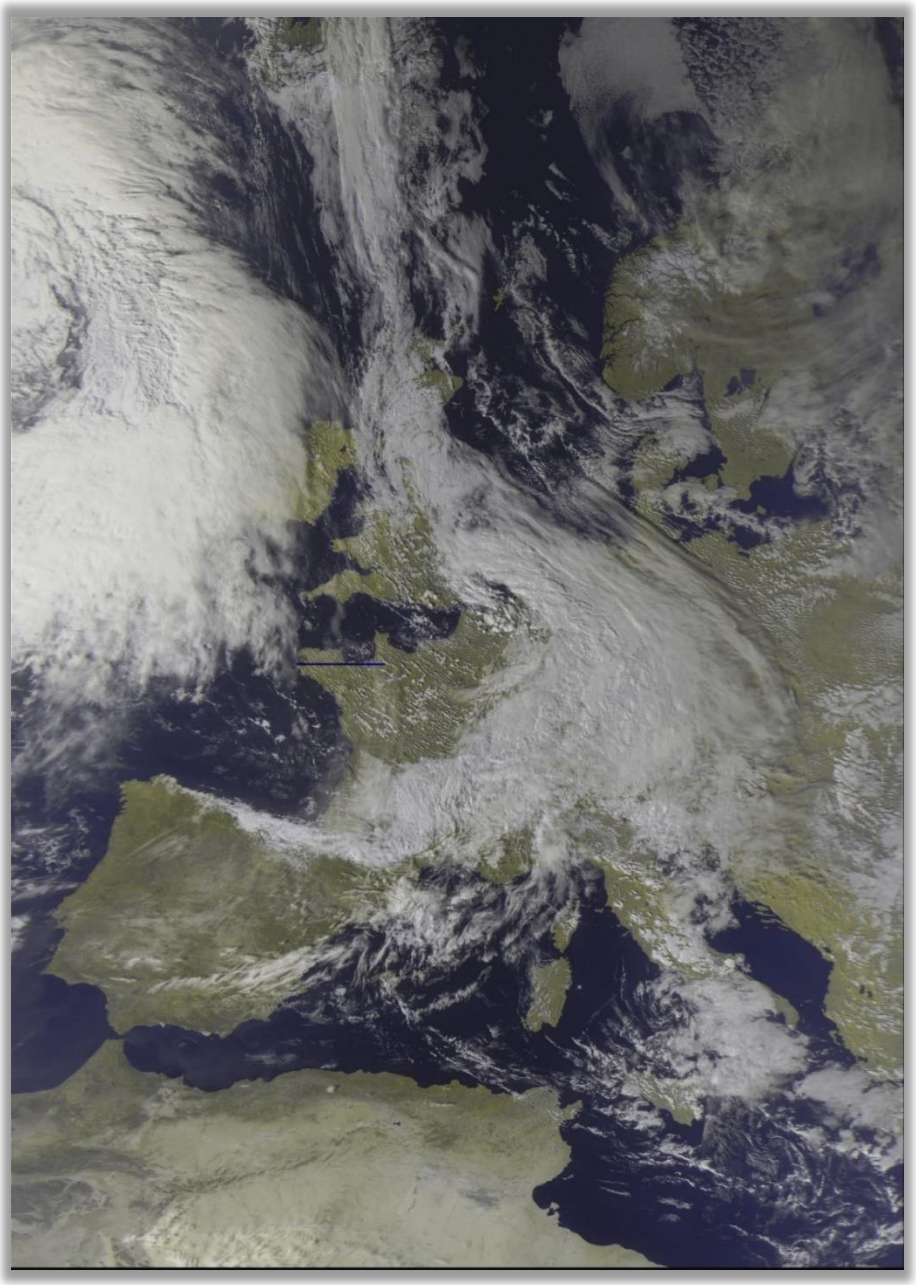


Figure 1, Live Recording of the Meteor M2-2†

You should have sufficient skills to perform basic PC operations such as downloading and extracting files, installing software, moving and copying files. Also have the motivation to learn to deal with new software. This manual aims to provide support where possible.
In this article I have chosen the simplest way to set up a configuration to receive live satellite recordings. You can then get started relatively quickly. If you want to delve deeper into this matter later, you can create a completely different setup yourself, based on the basic program URLs and the many plug-ins that are available.

The Russian weather satellite takes wide-angle images of the Earth to observe the clouds and the ice sheets. The high image resolution makes it interesting to also receive live weather images from this satellite.

The digital signals are, in contrast to those of the NOAA analog signals, very sensitive to surrounding obstacles and therefore hardly or impossible to receive with an indoor antenna.

Recent developments have caused many problems to arise when setting up a working Meteor LRPT receiving station. The name LRPT (Low Resolution Picture Transmission) is misleading in that the images are still much sharper than the analog NOAA images. The image resolution is 1km/pixel.

Below a beautiful Meteor N2 detail enlargement of the volcano Etna, which shows a large plume of smoke during the eruption, fig.2.

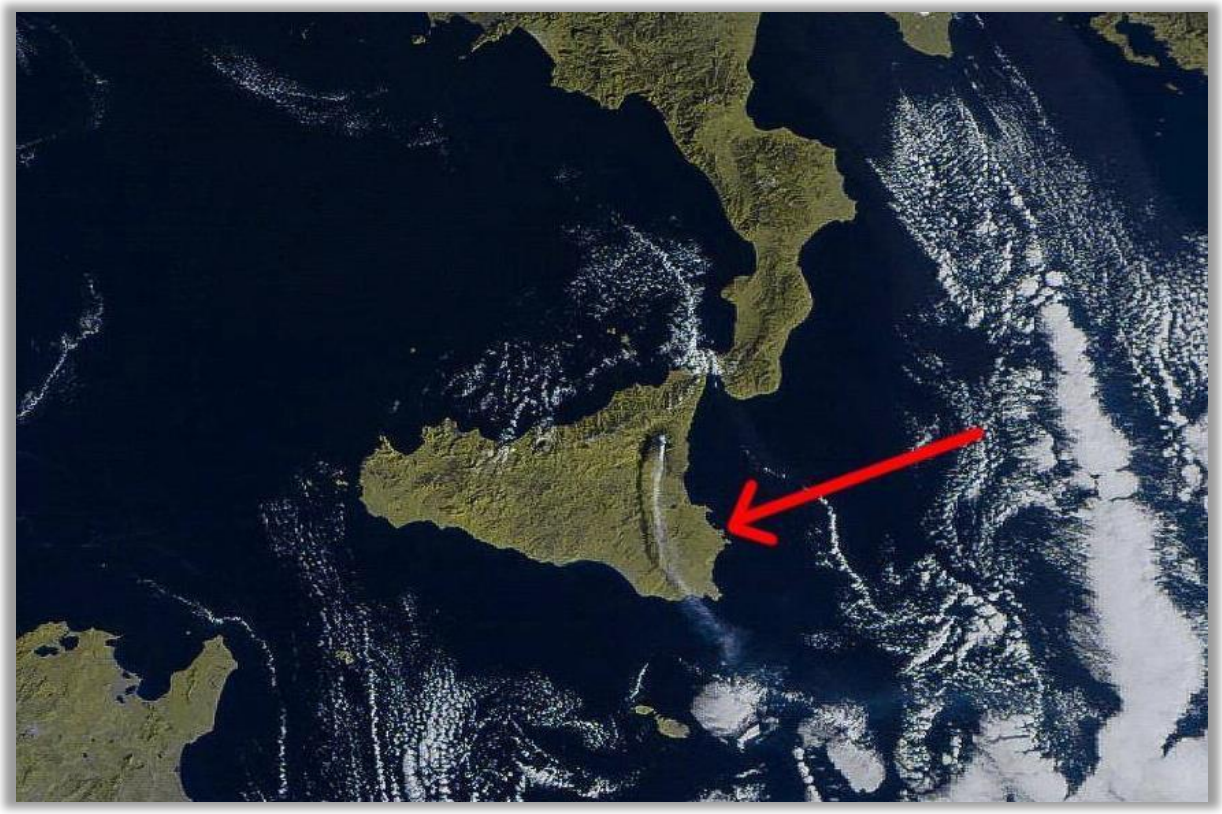


Figure 2, Detail live recording M2 received by Vitor Jacinto, Liège

Another detail shot of the Pyrenees, in November 2018, fig.3.

Figure 3, remnants of snow in the Pyrenees.

Many of the software download URLs have changed. As SDRSharp and its plug-ins evolve rapidly, incompatibilities arise that can lead to system failure resulting in the end of support for Windows XP. Current versions of SDRSharp and its plug-ins require Windows Vista, -7, -8, 10, or -11 to function. They cannot run in Windows XP. Over the years, a lot has changed with the new versions of the SDRSharp program and modified plug-ins.

Let's go back in time:

The launch of the Meteor **M2** took place July 8, 2014. Unfortunately the LRPT adapter is not functioning correctly, which is why a so-called glitch occurs every 6 minutes in the form of a white bar. This is known and cannot be fixed. The cause is, as claimed, cosmic particles of an occurring Solar storm. Some published images don't show these stripes and are then photoshopped away.

July 5, 2019 the launch of a second meteor satellite, the zo mentioned **MN2-2**, but January 2020, there will be only short-term power-ups in the radio visibility zone and battery life will be reduced tenfold. Of particular concern are the batteris they are very quickly overheated and switching from regular to backup. Onfortunately the power supply features do not allow the 137MHz transmitter to bu used in abnormal power, mode (from solar panels) which is use now although technicalli it is working fine.

There will be no LRPT transmission’s anymore.
The Meteor MN2-2 can still be received in the X-band 61.44MS/s QPSK on 8128MHz (MSU-MR instrument).
The Meteor M2-3 has been launched and active on June 24, 2023, albeit in the test phase with the necessary reception problems.
Recently, on February 29th, the Meteor M2-4 was launched. The images provided immediately, seemed successful.

MeteorGis 2.25 has therefore been adapted to also receive the M2-4.
The December 2023 manual only described the Meteor M2-3, so I have adjusted this manual.

3. Necessary hardware.

On to practice.
Which components do you need at least for a reasonable reception:

- RTLSDR USB stick.
- QHF, or equivalent antenna.
- Een 137 LN- amplifier.
- Possibly a bandpass filter, 137 MHz, fig.7and 8.
- Computer (Windows 11/10/8/7)

Antenna.

For weather satellite reception you should think of a QHF or Turnstile antenna, fig. 4 and 5, in the range of 137Mhz. Googling the internet provides sufficient information about this. Make sure to place it as high as possible against a metal surface for best results. Try it first with a high placed antenna, if the signal is still too weak, then you will have to buy an expensive LNA (Low Nois Amplifier) fig.6 and place it close to the antenna.

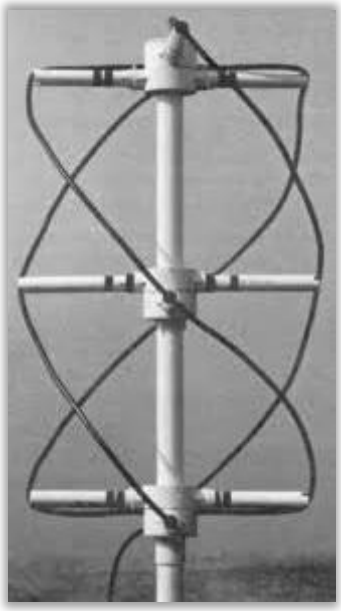


Figure 4, QHF antenna.

Figure 5, Turnstile antenna.

Figure 6, Amplifier.

Figure 7, Helical bandpass filter, Meteosat 137 MHz

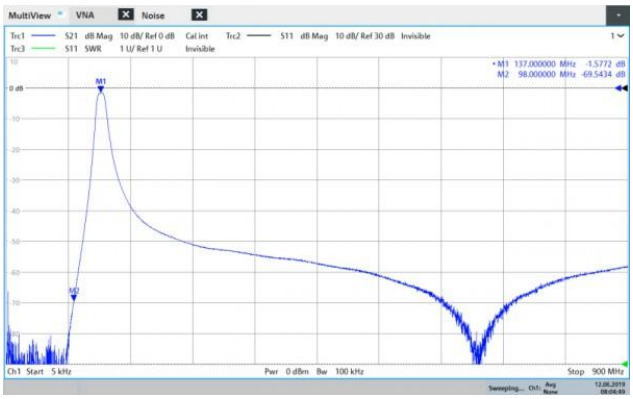


Figure 8, bandpass curve, filter

RTLSDR USB stick

(tested on Windows 11/10/8/7 32/64 Bit)

Currently the most common RTL-SDR USB sticks are the R820T/R820T2, usually for sale for about 30 Euro. fig.9. I have bad experiences with a Chinese-made RTL sticks. In general, at least a modern fast PC processor is needed to run most SDR software smoothly.

Before we start with the installation, *put the RTL-SDR USB stick aside* for a while and the usually supplied CD can go in the trash.

Figure 9, ***RTL-SDR USB sticks.***

4. Download all files.

first of all:
The manual described here, is based on the downloadable MeteorGIS installation file from **Les Hamilton's** site. He has already preinstalled almost all settings in the necessary programs, which considerably simplifies the installation.
However, there are still some things to adjust during the installation, and to gain a better understanding of the entire installation process. That is what I have tried to achieve with this guide

The simplest and quickest way to get the required setup for receiving the Meteor-M2-3 **and** M2-4 signals can be found at Les Hamilton's URL:

https://leshamilton.co.uk/MeteorGIS.htm
(download the MeteorGIS Suite Installer)

In this page, press **Click this button** to download the zip file. Place the unzipped **MeteorGIS** folder in a root directory, *not in a subdirectory*, in my case **C:/**, fig.10.

At this point **MeteorGIS 2.25** is installed correctly, fig.10.

NB: *It is also wise to copy and paste the hole MeteorGIS folders into a USB stick, because you can fall back on it in case of any PC problems*.

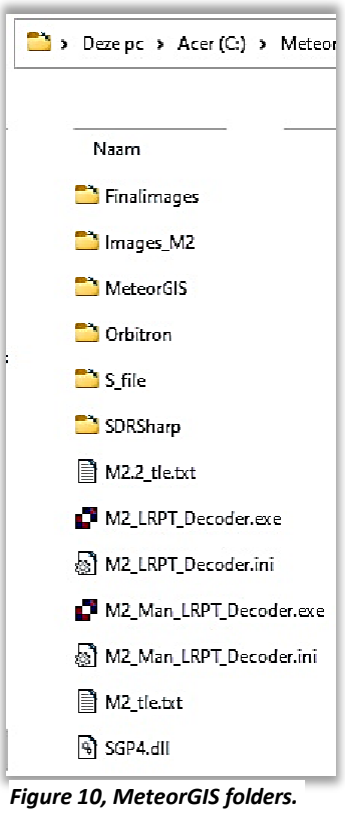


Figure 10, MeteorGIS folders.

Not in the package: **Smoothmeteor v 1.68.** SmoothMeteor is a development from the SmoothMODIS program which stretches Meteor images laterally to compensate for the foreshortened view from satellite.

5. Folder structure.

The folder configuration then looks like this and it is useful to also include Smooth Meteor, fig.11.

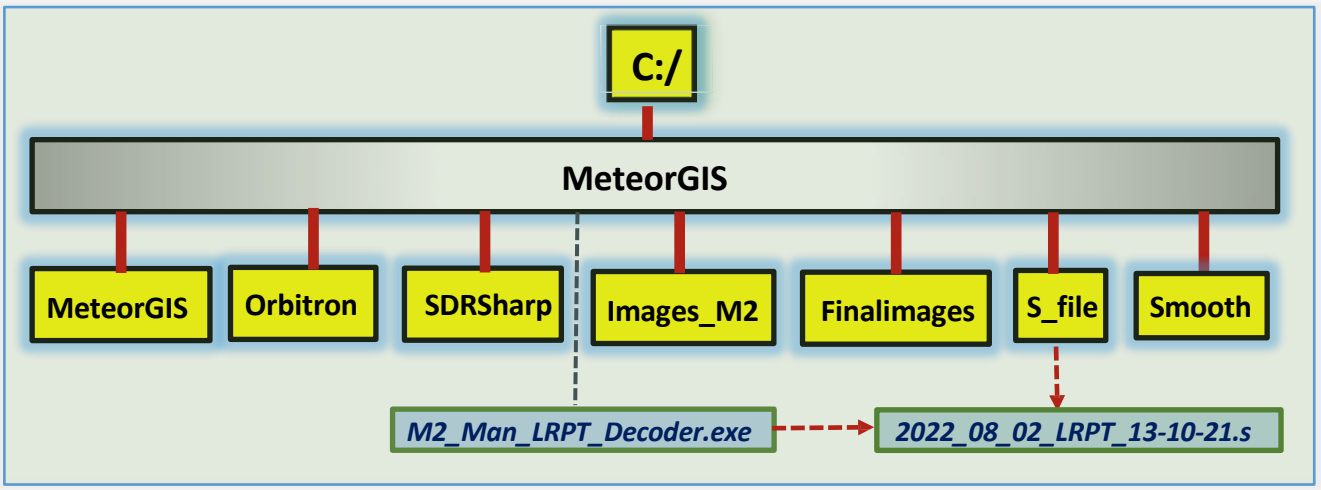
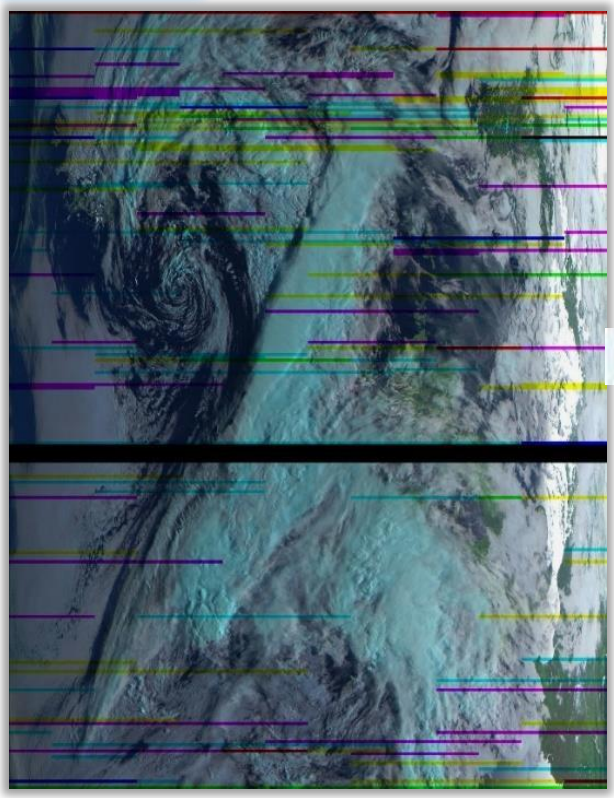


Figure 11, folder structure.

Explanation storage folders with images, to get an idea of where which picture is stored, here's a short summary:

- **Images_M2** decoded raw LRPT images, fig.12.



for example :

2021_11_12_LRPT_17-41-10.s_64.bmp

Fig 12, raw LRPT Images_M2.

- **Finalimages** MeteorGIS images, fig.13 and 14.

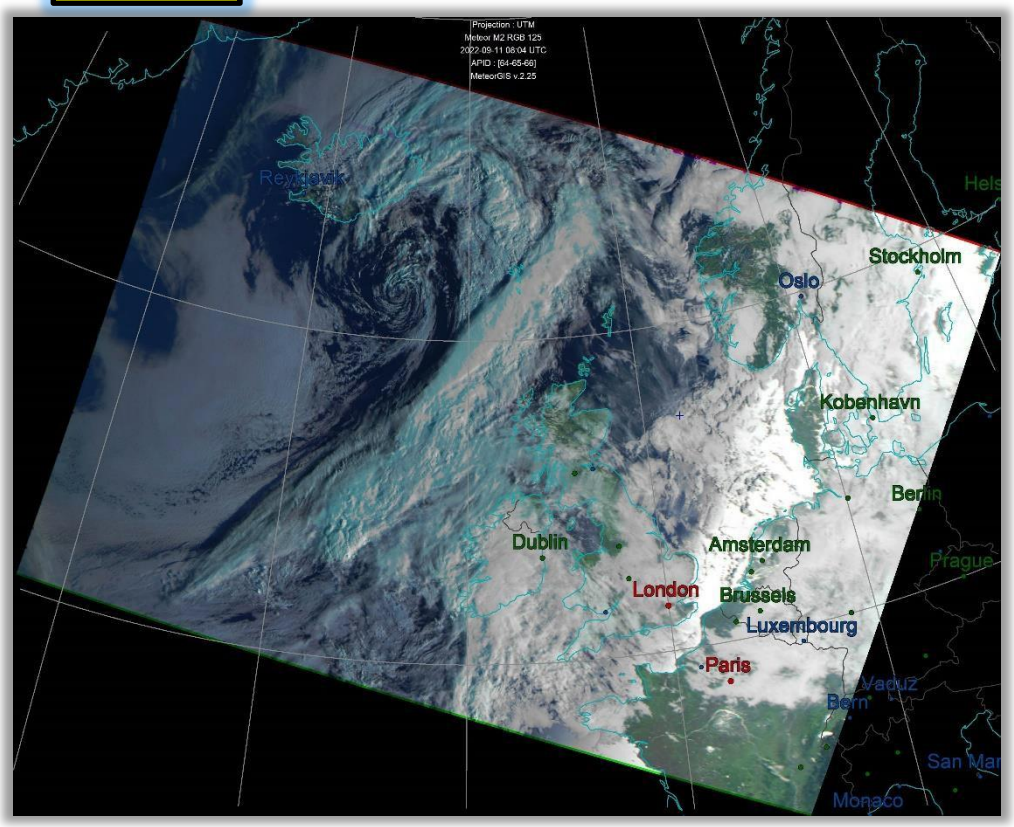
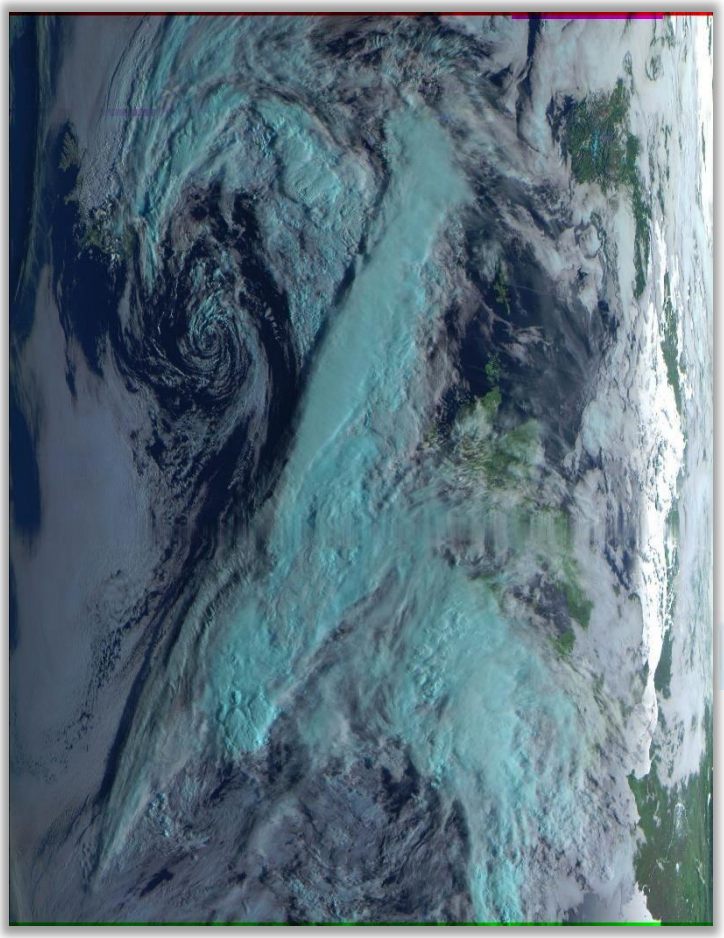


Figure 13, with clearly visible position positions.



for example :

UTM-2022-8-5-18-49-37-750_RGB.jpg

Figure 14, Treated image.

Smooth

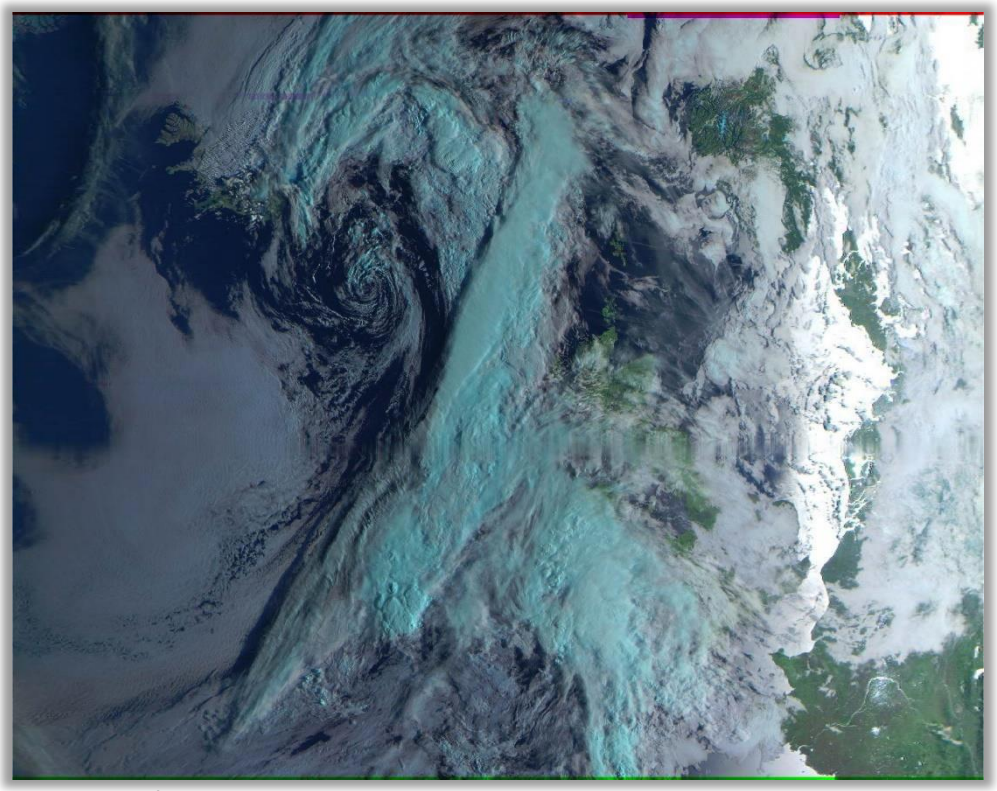
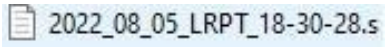


Fig. 16, Smooth Meteor Images.

- **S_file**

With the M2_Man_LRPT_Decoder present in the Meteor folder can later possibly be de-coded the S-Files. *for example :*



It is now time to start the installation.

Important:

- *Windows 11 ranks a number of MeteorGIS components as unknown Publishers, what to do: see appendix A, page 44.*
- *If you are installing under a recently installed Windows 11 and are having problems, specifically no SDR# Meteor signals, see Appendix B, page 44.*

6. SDRSharp.

Now Start up **SDRSharp:** 'C:\Meteor\ \SDRSharp\SDRSharp.exe

(Fig.17)

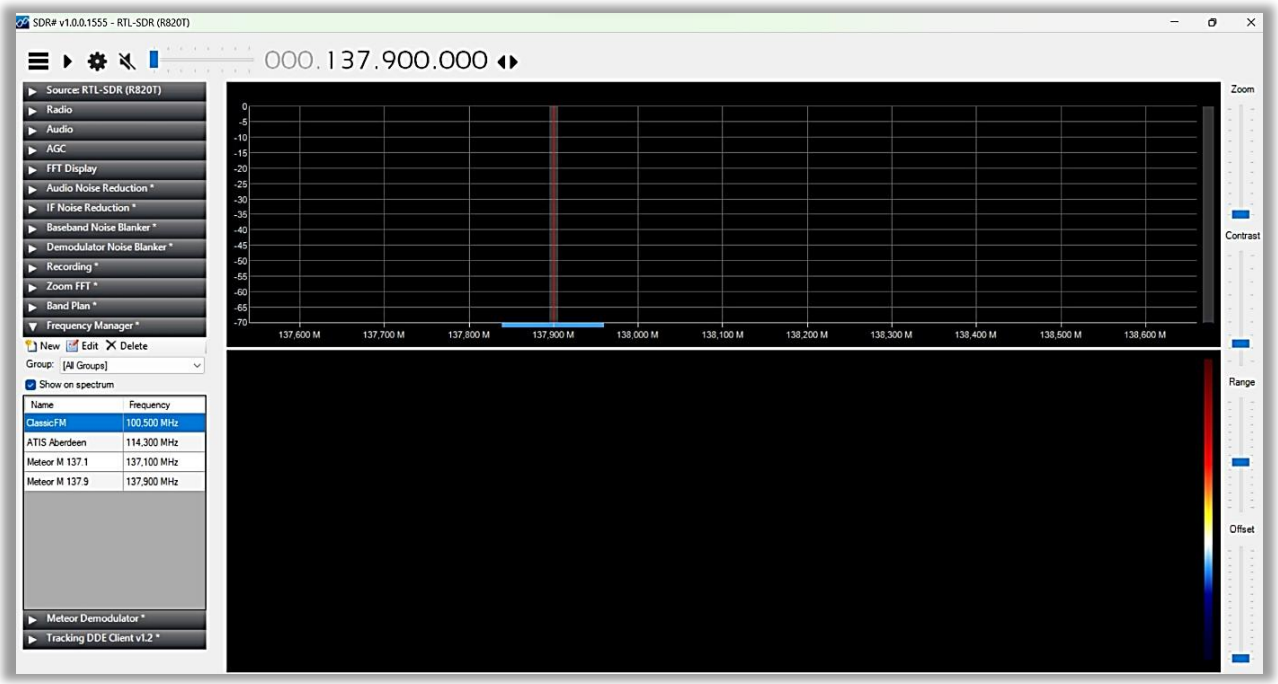


Figure 17, Main Window.

Remove, if desired: ClassicFM with :

When you press this icon the following window, fig.18, should appear SDRSharp then communicates with your RTL stick, 19.

Figure 18, R820T.

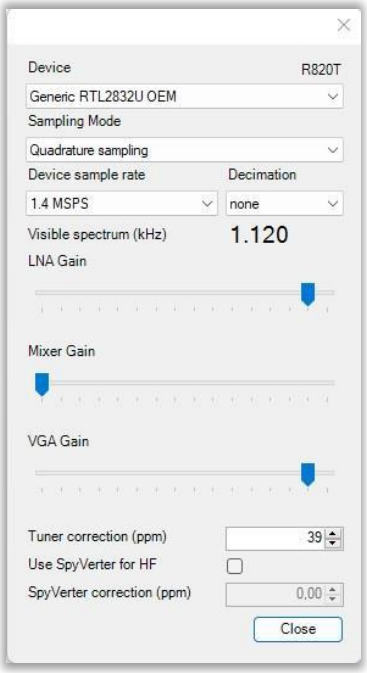


Figure 19, RTL device.

- **Frequency Manager setting.**

With this plug-in, you can pre-set reception frequencies of M2-3 and 2- 4 satellites to later select this satellite with a simple click. fig.20 and 21.

Under the Meteor group you will find all pre-programmed setting values.

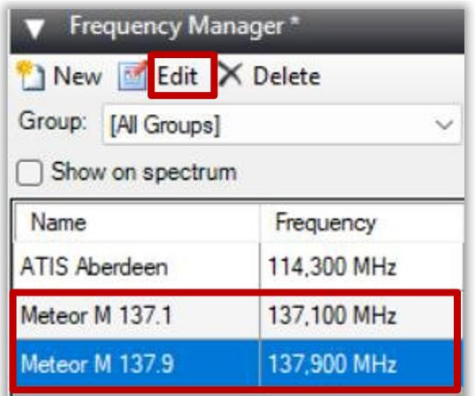


Figure 20, Edit Meteor M 137.9.

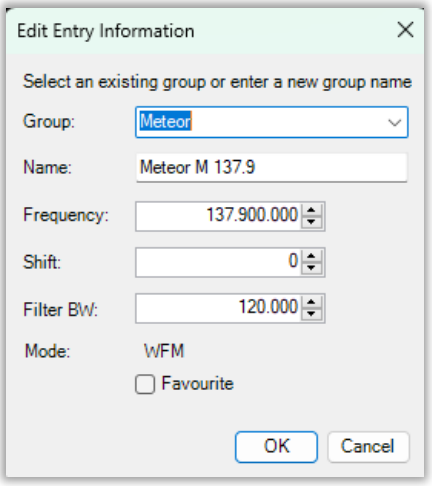


Figure 21, Edit Meteor M 137.9.

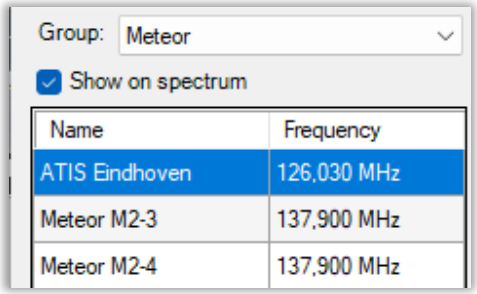
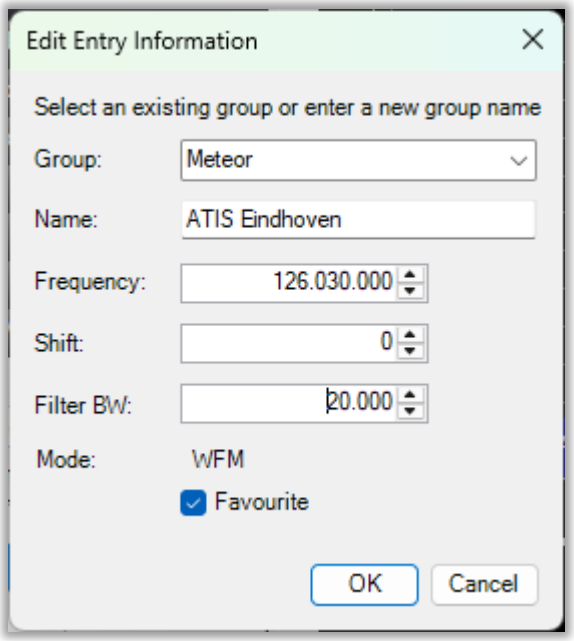


Figure 22, Edit to recognizable satellite names.

With "Edit" you can replace the frequencies with the corresponding Meteor satellite name., fig. 22.

ATIS.

RTLSDR USB sticks are manufactured in large numbers and therefore show small frequency deviations. In my 'Frequency manager' I also selected an ATIS. The ATIS (*Automatic Terminal Information Service*) signal is sent out by the local airport in Eindhoven, 126.030 MHz.



An ATIS frequency is useful for accurately calibrating an RTL-SDR USB stick using the 'Tuner Correction' option of the RTL Controller. In my case I can use the ATIS Eindhoven signal, which I can receive well, but maybe you have a different frequency calibration point.

Click on **'Edit'** in 'Frequency Manager', fig.20 and then adjust the data suitable for you, fig.23.

Start SDRSharp.

The signal appears, in SDRSharp, as a sharp peak at a precise frequency, fig. 26. If you want, you can already connect your USB stick to the antenna and perform the correction by setting SDRSharp to receive, and looking for a known calibration frequency. Zoom in on it and adjust exactly to the signal peak using the RTL-Drivers 'Tuner Correction option', fig.24.

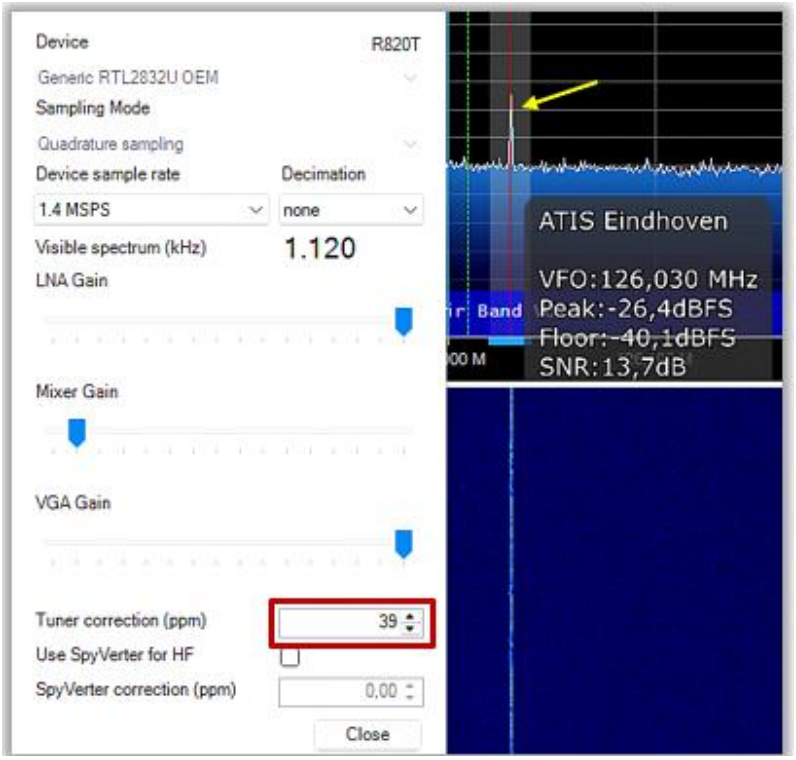


Figure 24, tuner correction and ATIS signal

In ‘Meteor Demodulator ‘select Config’ and then in ‘QPSK Config’ to folder: 'C:\MeteorGIS\S_file’ folder, fig.25. In it SDRSharp stores the unencrypted data of Meteor M2, the so-called S-files, You don't have to change anything, it's already pre-installed.

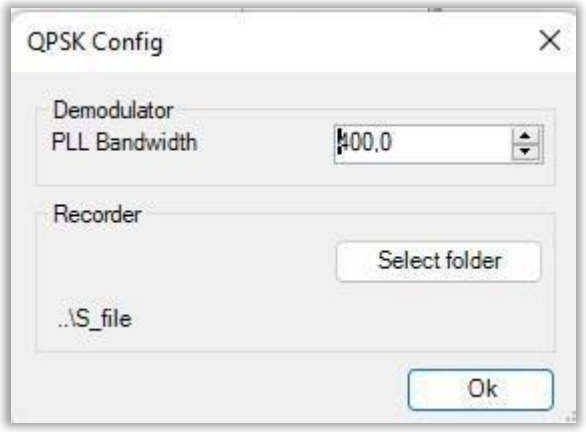


Figure 25, S_files folder.

NB. *The installation is not yet complete, after the MeteorGIS installation a final SDRSharp installation will follow.*

Close SDRSharp.

7. Orbitron.

Orbitron, fig.26, is a satellite tracking system for radio amateurs who want to receive images from the Russian weather satellites and was developed by Sebastian Stoff. (http://www.stoff.pl/)

The application shows the positions of satellites at any time (in real or simulated time). It's FREE and, according to thousands of users around the world, it is probably one of the easiest and most powerful satellite trackers.

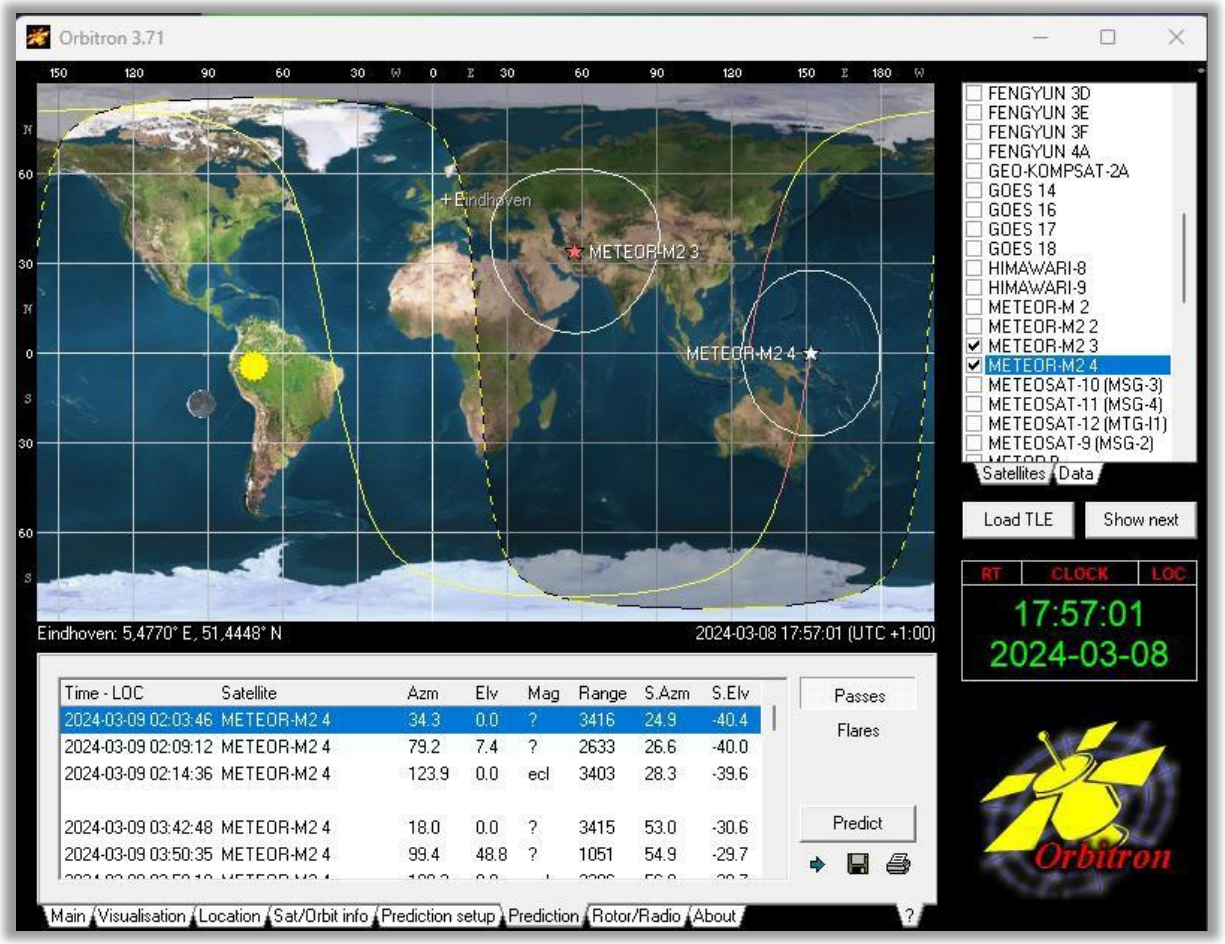


Figure 26, Orbitron, Entry Window.

Installation.

Beforehand: you will probably come across the abbreviation TLE in the Orbitron windows. What does 'TLE' mean and what is the purpose of 'TLE' anyway?

Very briefly:
TLE is a standard mathematical model for describing the orbit of a satellite and is the abbreviation of: Two Line Elements. These are processed in a computer program, which produces predictions for the viewing time and position of the satellite. The program determines the location of selected satellites above the horizon from a chosen (in your case your antenna position) observation location.

Much is pre-installed, but a number of settings you have to adjust yourself and are described below:

Start Orbitron: Orbitron.exe

NB. If you get an error message, check whether the following lines are in your C:\MeteorGIS\Orbitron\Config\setup.cfg of Orbitron.

```
[Drivers]
SDRSharp =..\SDRSharp\SDRSharp.exe
```

Figure 27, Orbitron script.

Check whether RTL-SDR (R820T) is in the Source, fig. 27 and 27a.

Normally SDRSharp will start automatically afterwards, if not look under [Extra]

```
[Extra]
AutostartDrv=1
```

Figure 27a, Orbitron script.

- **Preduction setup**

Note!: *After the first installation, 'Lighting required' and 'Elevation sun' may be checked. If that's the case, remove both checks, otherwise things won't work*, fig.28.

Select 'Prediction Setup' see both satellites in the Predict list.

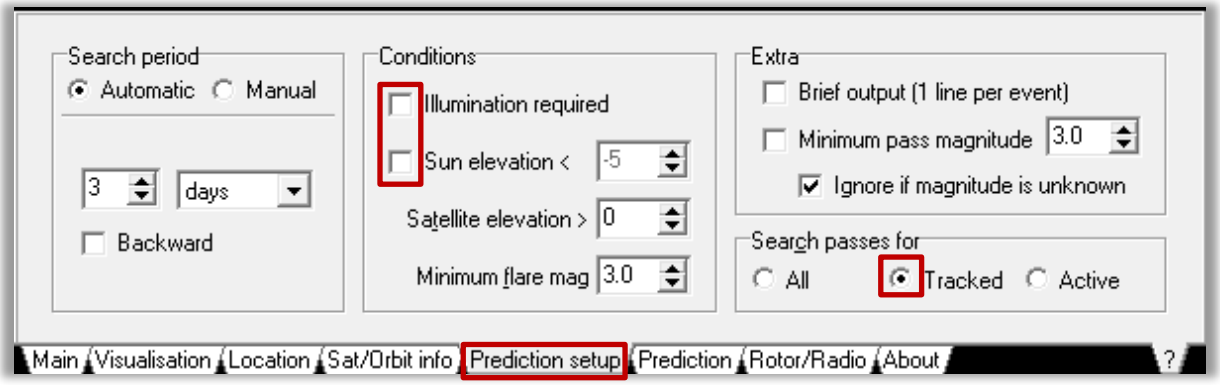


Figure 28, Prediction setup: uncheck both windows if necessary.

- **Set-up Orbitron.**

NB. *Most settings are already pre-selected, but it doesn't hurt to check a few things anyway.*

From 'Main' > 'Settings', settings can be made with the various tabs, fig.29.

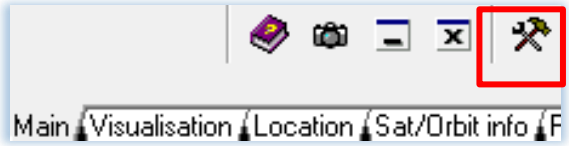


Figure 29, Settings.

- **Miscellaneous, language**

If desired, set the your language with the tab 'Miscellaneous' and then copy the values stated in fig.30. If "Play Sound" is checked in this, an alarm will sound as soon as the satellite rises above your horizon and will sound again when the satellite is out of sight.
Then click on, 'Apply'.

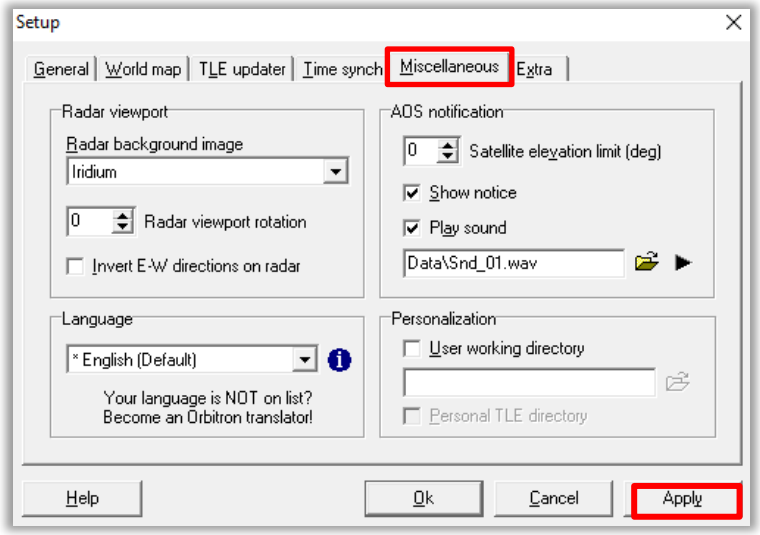


Figure30, Tab Miscellaneous.

General, Time.

First, make sure your computer clock is right. Absolute accuracy is not necessary, but should indicate the correct time within seconds. It's a good idea to check that regularly or use a sync program to maintain accuracy.
Set your Local time zone, fig.31.

Local time in summer is UTC +2. To be on the safe side, check whether the winter time is UTC+1, select "Auto" and "Autodetect".

Then click on 'Apply'

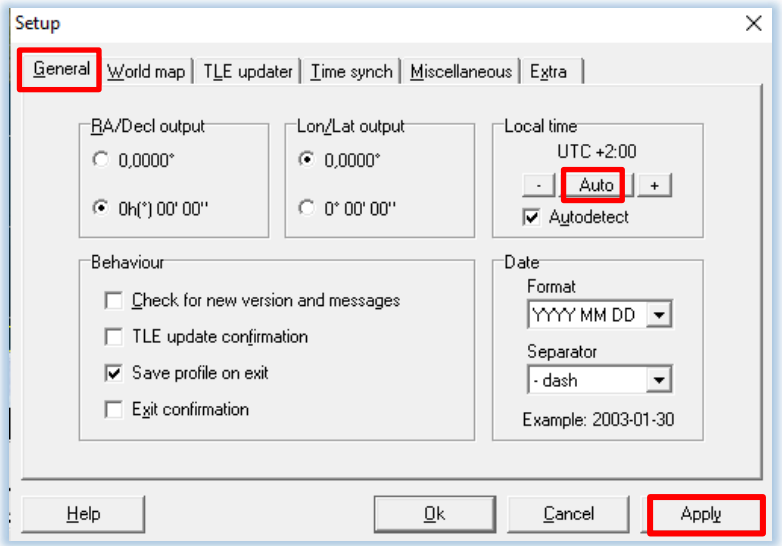


Figure 31, Local Time.

- **General, Time synch**, fig.32.

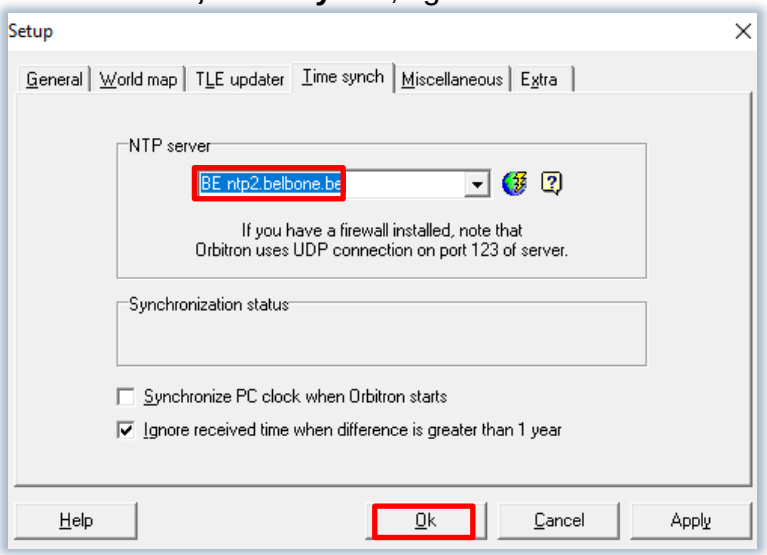


Figure 32, select NTP server for time synchronization. (Network Time Protocol)

Then click on Ok.

- **Location.**

In the main screen, open 'Location' and under 'Name' enter your city.
If it is not listed in the menu, you must enter these latitude and longitude coordinates manually, fig.33. Enter the height of your antenna and click on 'Choose'.

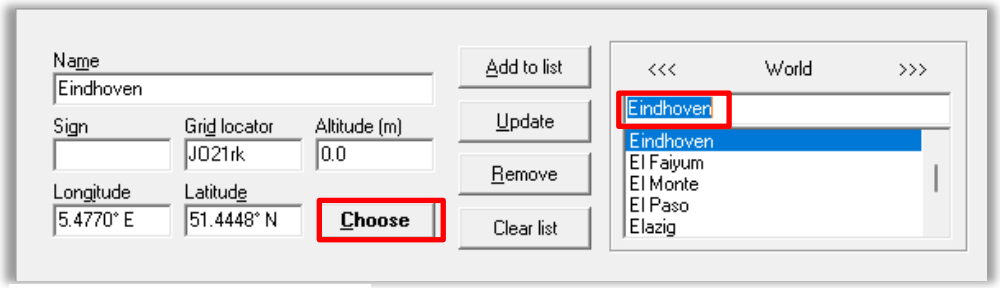


Figure 33, Location determination.

- **Prediction/Predict.**

After 'Prediction/Predict', fig.34, the position and times of the transitions of **both** satellites, if selected, are calculated, fig.35, as seen from your antenna position..

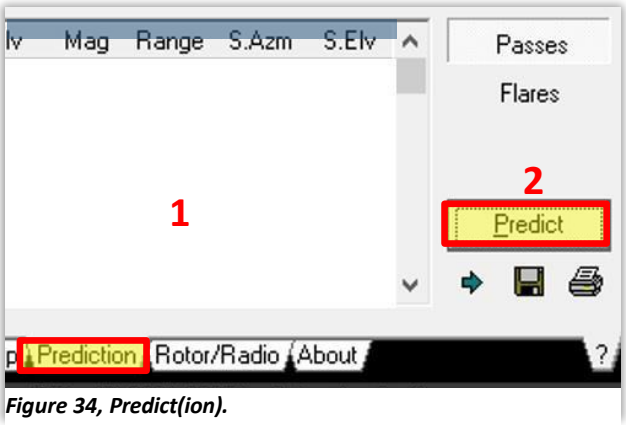
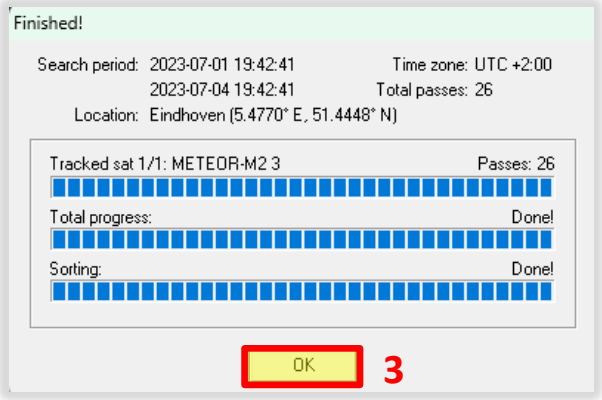


Figure 34, Predict(ion).



Figure, 35, transition calculated.

- **Rotor/Radio.**

Rotor/Radio lets you adjust de Dlink/MHz frequency of Meteor M2-3, fig.36, for the Meteor 2-4: 137.100000MHz.

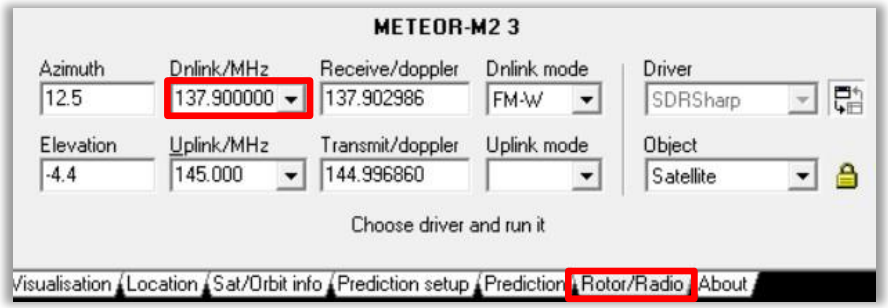


Figure 36, Rotor/Radio, Dlink/MHz.

Satellite position and transition times and how does it work.

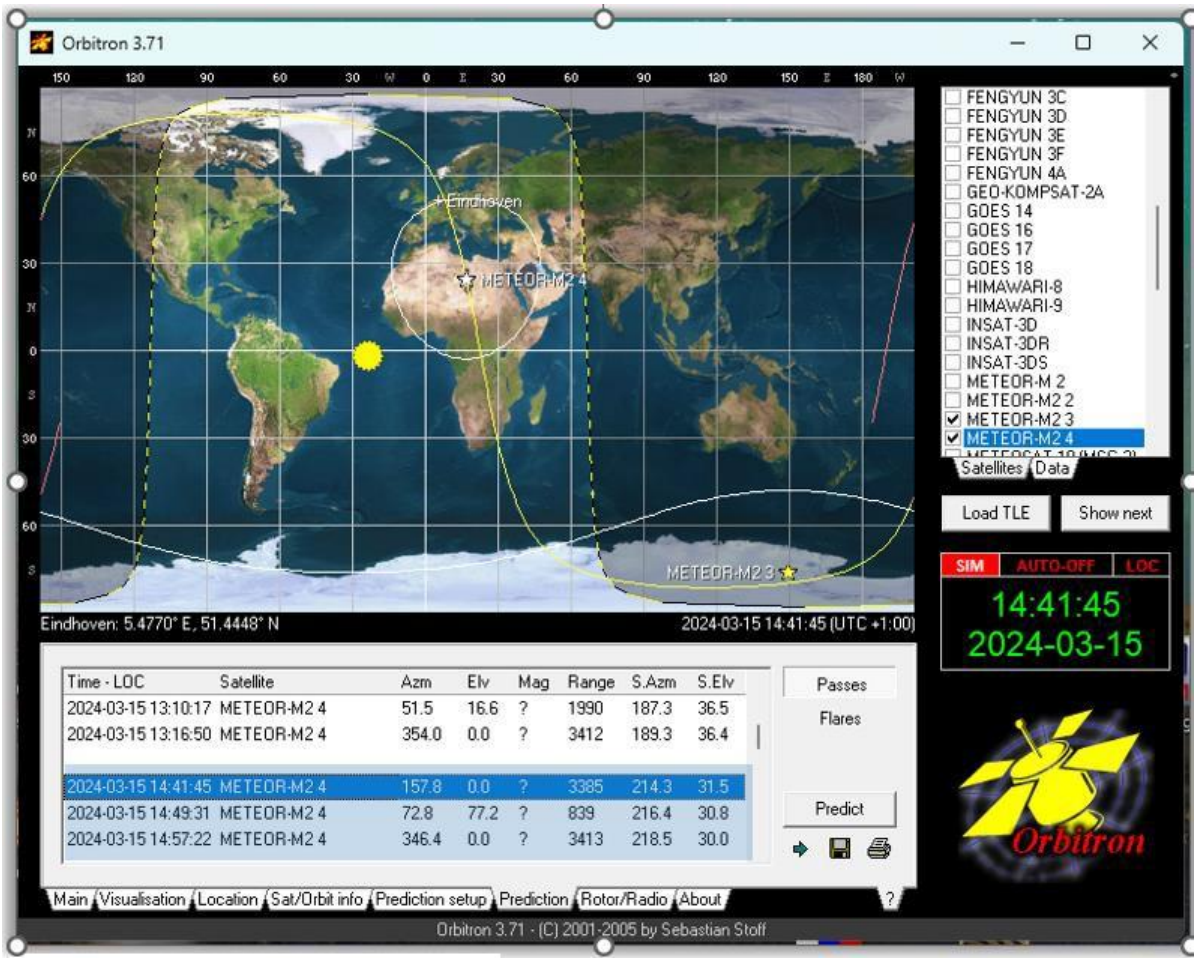


Figure 37, Satellite position and transition times.

In the Satellites window, on the right, is the Meteor M2-3 that can be checked as desired, fig.38.

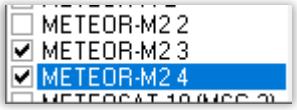


Figure 38, M2 4, double click.

Interpreting this data needs some explanation. At the moment this action is made, the local time is 15:14:41 hours, fig.37. The satellite is still a long way from my hometown Eindhoven and its orbit does not bode well for a long recording time. How do you find the orbit for the most optimal recordings.
The Elevation value plays a determining role in this. The greater the Elv value, the longer the time interval that the Decoder can decode the signals, in this example a maximum elevation of 77.2, fig.37.

Figure 39, optimal orbit.

In the list you can scroll all orbits of that day and in the list above I've looked up the most suitable time to turn on my computer and start the recording procedure.

NB.*The whole start-up procedure is explained point by point at the end of this manual, pag.33.*

Close Orbitron, SDRSharp will also be closed automatically, all settings of both programs are ready and in principle you should now be able to receive live recordings from the Meteor satellites.

The next and last program is MeteorGIS, this program processes the live images in its own way and is even capable of connecting multiple satellite orbits seamlessly, as it were.

8. MeteorGIS 2.25, designer, Christophe Marchand.

MeteorGIS is a free program for georeferencing images send by the Russian M2 weather satellites. What the program actually does is best described by the images below.

We are now ready to install the third and final program.

Once everything works, you can start the recording process in two or three clicks. In that time you can do other other things, the program does the rest. Later in the day you can retrieve and edit the recording.

Installation MeteorGIS.

- **Configuration MeteorGIS.**

In the MeteorGIS/MeteorGIS folder you will find the file 'MeteorGIS_Configurator', fig.40, with which you can easily create and save the configuration.

- **MeteorGIS Configurator.**

Start 'MeteorGIS_Configuration.exe', from the folder MeteorGIS/MeteorGIS.

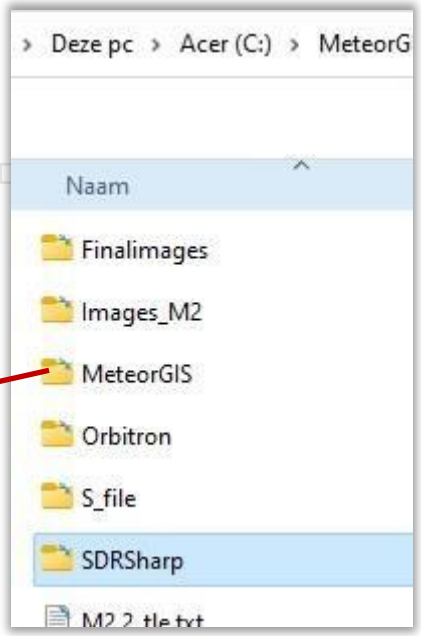


Figure 40, root folder contents.

- **Open the 'default.ini' file**.

After which the configuration window appears, fig.41.

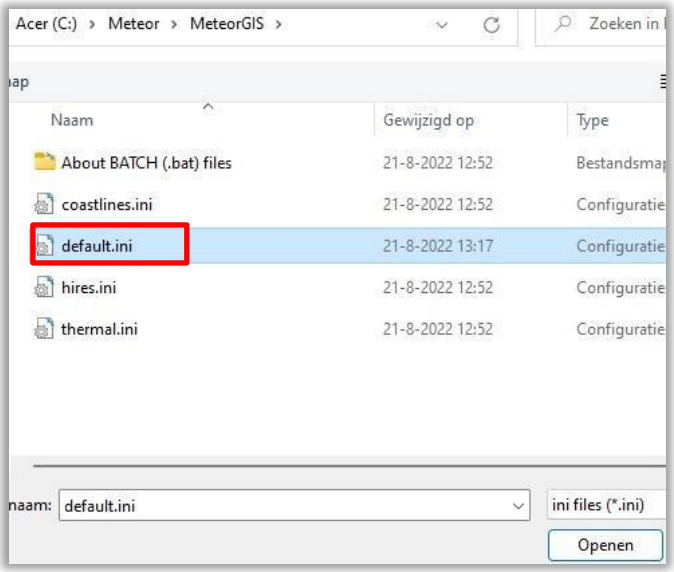


Figure 41, open de default.ini file.

In the following MeteorGIS configuration window, fig. 42, all data can be entered in Program, M2_LRPT_Decoder and Shapes.

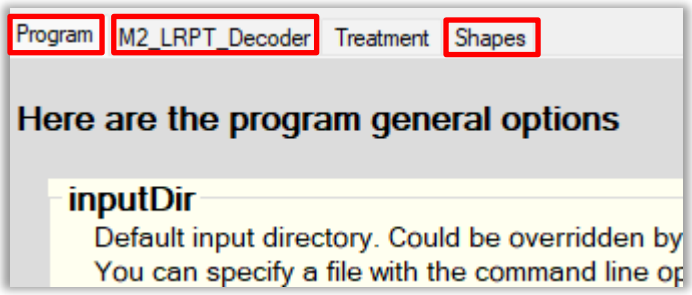


Figure 42, MeteorGIS configurator.

All options are already pre-filled, some of them can be adjusted to your own liking. These possible adjustments are listed below.

[Program]

- **watermark:** Yes
- **watermarPlace:** top_right *(your choice)*, fig.43.

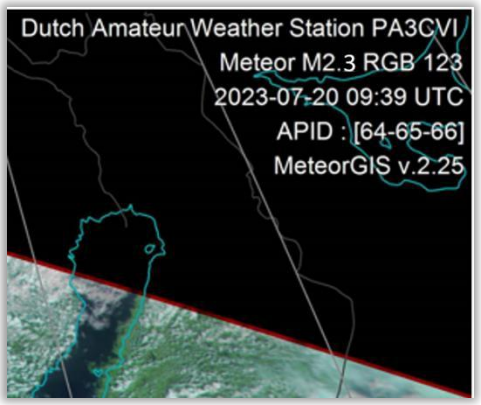
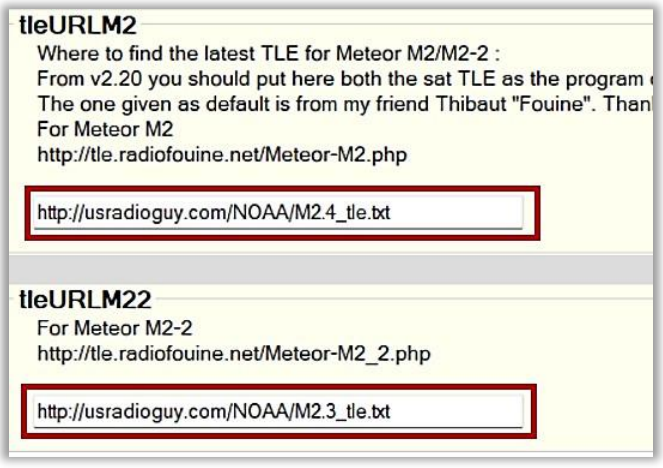


Figure 43, Watermark.

- **watermarkFileOrText:** *(my station description).*
- watermarkFileOrText=Projection : Dutch Amateur Weather Station PA3CVI\r\n%sat% RGB 122%textCompo%\r\n%dtu% UTC\r\nAPID : %apid%\r\nMeteorGIS v.2.25
- **drawtLocation:** **yes** (marks your position with a cross).
- **LocationLatitude:** *(take the coordinates from Orbitron).*
- **LocationLongitude:** *(take the coordinates from Orbitron).*
- **LocationSize:** 45

[M2_LRPT_Decoder]

(*check for correctness)*



[Shapes]

[ShapesNumber] : 4

Don't forget to save the file!

1. Explanation Shapes.

The designer has created an excellent opportunity to position towns in the image, among other things. This is very easy to achieve in the Shape setting.

This Shape overlay offers 5 options that can be set with the slider and is automatically transferred to the default.ini list.

Shape 0: no overlays.
Shape 1: coastlines.
Shape 2: boundarylines.
Shape 3: latitude en longitude grid.
Shape 4: position places,towns.
Shape 5: indicate major mountains and high elevations

Note *that all previous shapes, except shape zero, are included. For example, you cannot set a single shape.*

- Adopt all other settings unchanged.

This file will be **Saved** as: 'default.ini', (overwrites the old one, which is renamed to 'default.bak').

A handy tool is the Manual_M2_GIS.bat file with which you can check whether your settings are satisfactory.

With de MeteorGIS v2.25 it is possible to change the font size of the places in the **default.ini** list.

To adjust the font size, you can open the default.ini with a text editor fig. 44, fontSize=60 already gives a reasonable size, but you can change it yourself in the default.ini

Don't forget to save the file.

```
[Shape3]
filename=ne_50m_populated_places.shp
form=circle
latitudeField=LATITUDE,N,19,11
longitudeField=LONGITUDE,N,19,11
rupturesField=POP_MAX,N,9,0
ruptures=500000,1000000,5000000
colors=#004590,#006000,#BF0000
sizes=15,18,21
fontSize=120
fontSize=30
nameField=NAMEASCII,C,100
drawName=fromfield
fromField=FEATURECLA,C,50
contain=Admin-0 capital
containType=strict
```

Figure 44, fontSize adjust.

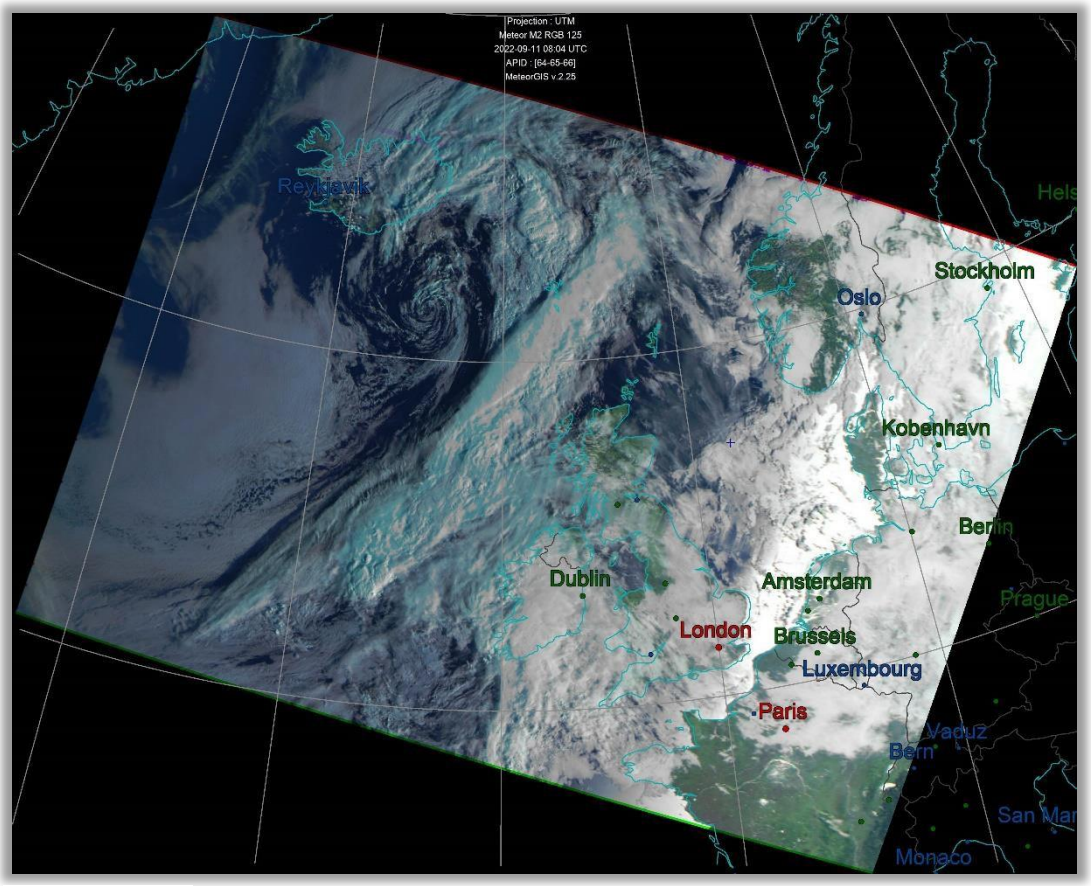


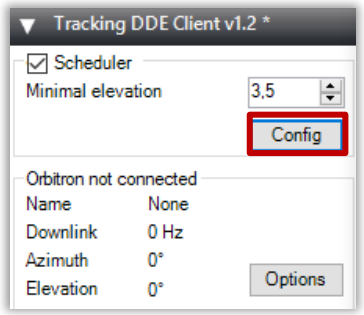
Figure 45, Places.

SDRSharp, continued.

Let's go back to **SDRSharp** for a moment and **start** this program again.

- **Scheduler,** *already preset*, (*check for correctness).*

SDRSharp contains a so-called 'Scheduler'. The Scheduler is a kind of scheduler that automatically executes commands. In this case, among other things, the automatic handling of the start and stop time of the recording.
For those who are interested, the commands in the Scheduler can be made visible as follows:



The Scheduler can be called up by clicking on 'Config' in 'Tracking DDE Client v1.2', fig.46, but this Scheduler is already properly preprogrammed.

Figure 46, config scheduler.

In the window then displayed, fig.48, the 'DDE Tracker' must be programmed to perform the tasks correctly when a Meteor signal is first detected, (AOS: Acquisition of Signal) and at the end of the passage (LOS: loss of Signal). AOS contains, among other things, the transmission frequency, type of modulation and bandwidth.

There should be no spaces in the command lines. All available commands can be selected with the mouse and copied to the center panel using the arrow keys.

Meteor-M 2-3, fig.47.
You do not need to save the Scheduler commands. All quotes and changes are automatically saved to a file called 'DDESchedule.xml', which can be found in the SDRSharp folder.

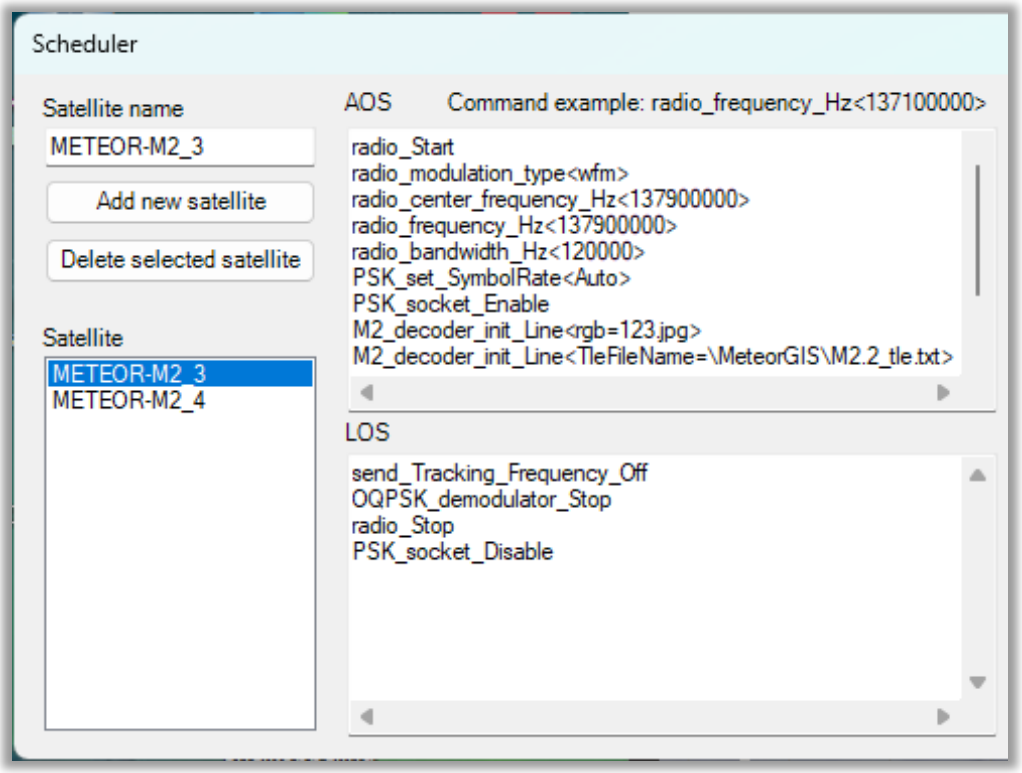


Figure 47, Meteor M2-3

Meteor-M 2-4, fig.48.

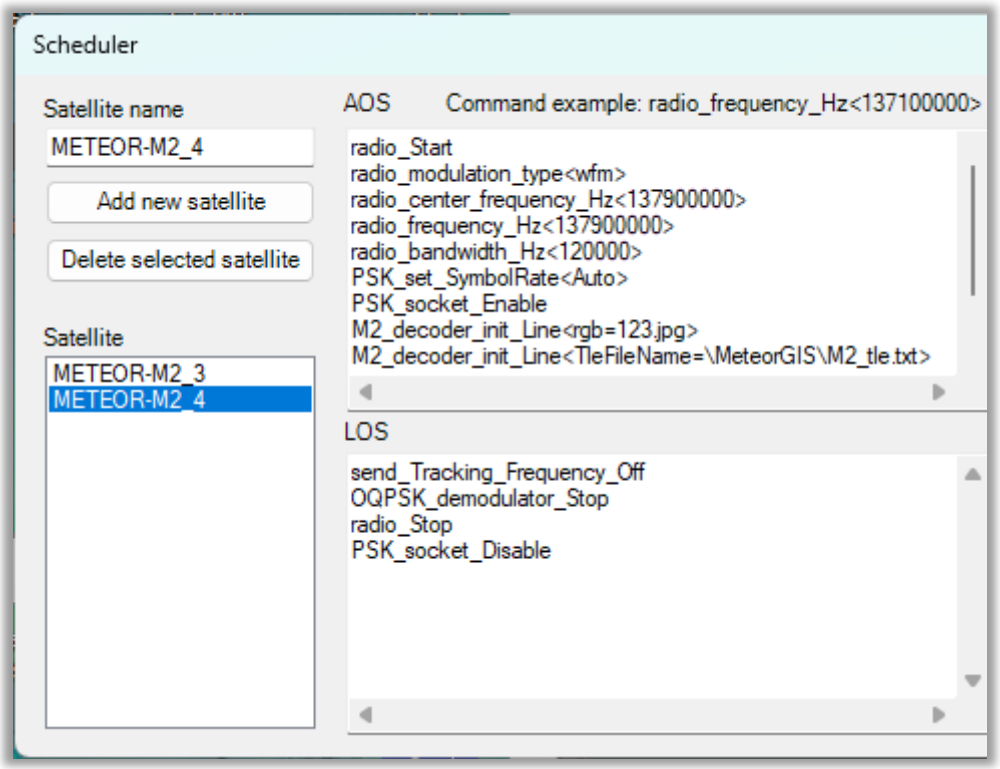


Figure 48, Meteor M2-4

If you check both, fig.51, SDRSharp will come to life when one of the two footprints passes through your location which saves the S-file and engages with LRPT Decoder to make the images, fig.49 and 50.

In real time, each satellite ticked, will start up SDRSharp with the correct parameters to receive its signals.

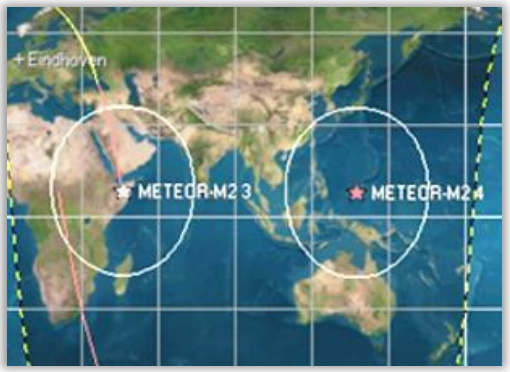


Figure 49, Meteor M2-3 comes to life.

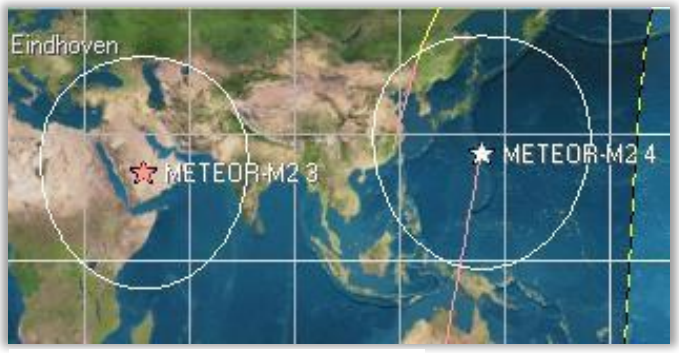


Figure 50. Meteor M2-4 comes to life.

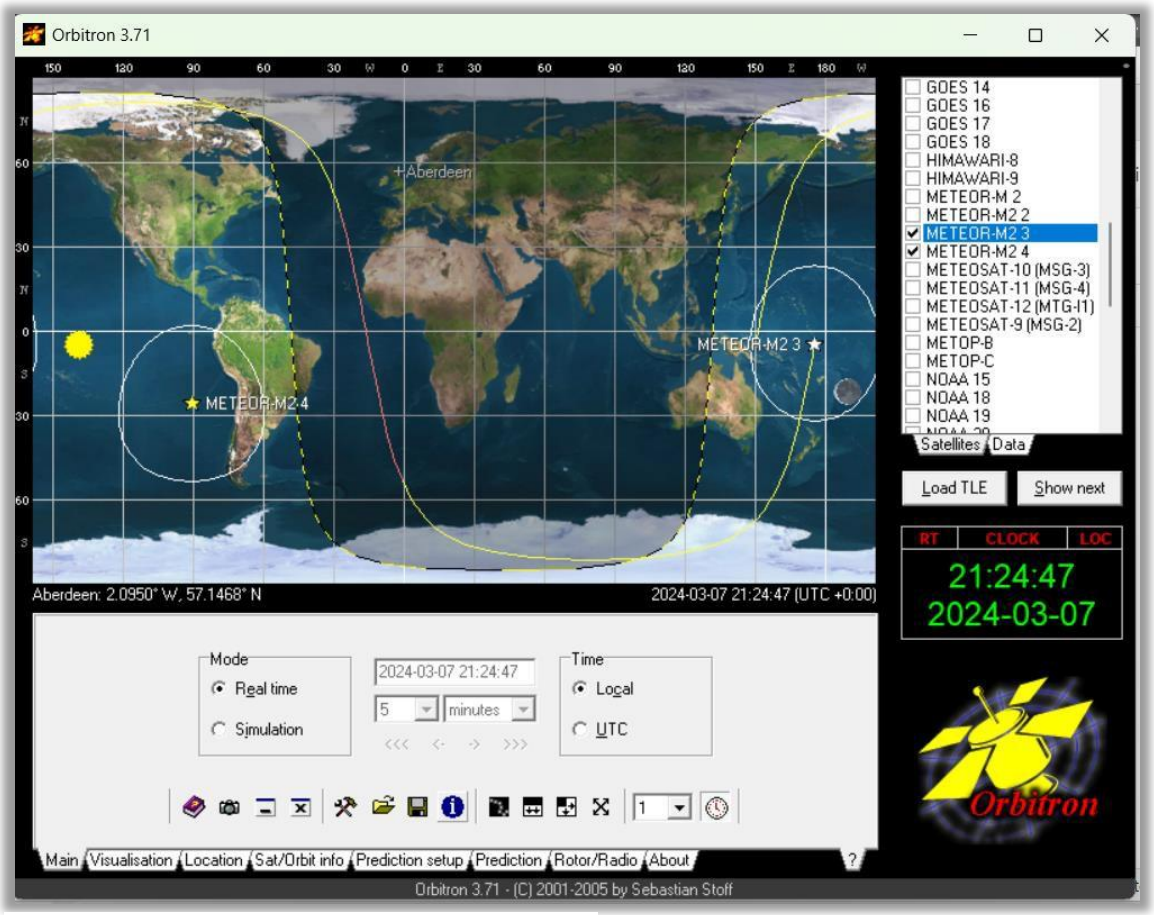
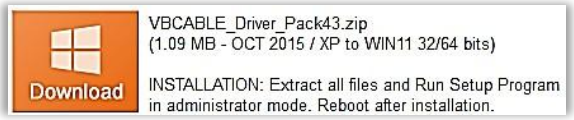


***Figure 51, Meteor M2-3/4; Meteor M2-3** in active phase.*

*SDRSharp needs an Audio input and Output, otherwise this program will not work. In some cases this is the case. If your **In** and **Out**tput windows have no- or no valid values, you can easily solve that with a virtual audio connection.*
VB-CABLE is such a virtual audio device that works like a virtual audio cable. Any audio coming in through the CABLE input is simply routed to the CABLE output. device. The program is free and can be downloaded via URL:

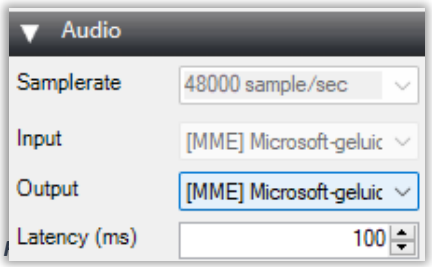
Exit SDRSharp

https://vb-audio.com/Cable/



Download and unzip the VBCABLE_Driver_Pack43.zip file.
Install VBCABLE_D_Setup_x64.exe

After restarting SDRSharp, the input and output now work properly.
This is how my Audio looks, fig.52.

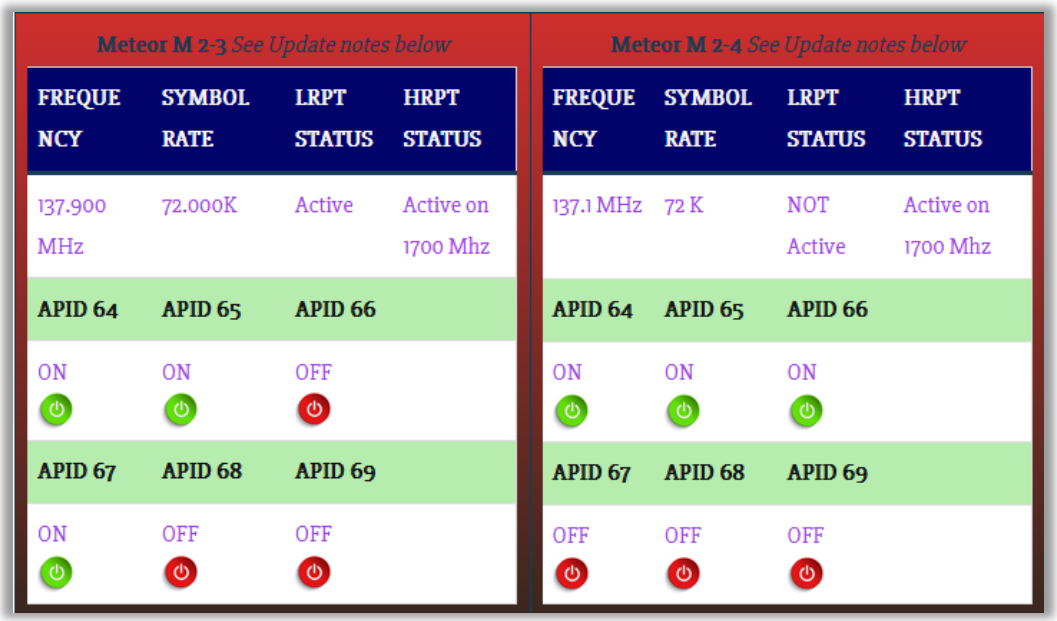


9. RGB settings.

The Russian Meteor satellites have three types of optical-mechanical TV sensors on board that operate in both the visible part of the spectrum and infrared. They can provide a global picture of cloud cover and the Earth's surface both during the day and at night.
The infrared camera is sometimes switched on and off
by the Russian satellite tracking station.
For this, regularly check the URL, fig.53.

Especially in the test period of the satellite, a number of settings can be changed.
Before making a recording, view the URL of Carl Reinemann's USRadioguy.

https://usradioguy.com/meteor-satellite/



Meteor M 2-3 *See Update notes below*

FREQUENCY	SYMBOL RATE	LRPT STATUS	HRPT STATUS
137.900 MHz	72.000K	Active	Active on 1700 Mhz
APID 64	APID 65	APID 66	
ON	ON	OFF	
APID 67	APID 68	APID 69	
ON	OFF	OFF	

Meteor M 2-4 *See Update notes below*

FREQUENCY	SYMBOL RATE	LRPT STATUS	HRPT STATUS
137.1 MHz	72 K	NOT Active	Active on 1700 Mhz
APID 64	APID 65	APID 66	
ON	ON	ON	
APID 67	APID 68	APID 69	
OFF	OFF	OFF	

Figure 53, an example of USRadioguy info.

Adjust Satellite settings.

In practice, the frequency of both satellites appears to be fixed. if not, you never know, then you will need to make the following changes:

1. Frequency.

1.1 SDRSharp: Frequency Manager setting, page 14.
1.2 SDRSharp: Scheduler, page. 28 and 29
1.3 Orbitron: Rotor/Radio, page 21.

2. RGB.

Red **G**reen **B**lue, The RGB value is a composition of 3 additional colors, red, green and blue, and when added together provide a wide scale of images.

(R)ed) : channel 1, visible light
(G)reen): channel 2, visible light.
(B)lue) : channel 4, medium infrared.

(R)ed) : channel 1, visible light
(G)reen): channel 2, visible light
(B)lue) : channel 3, visible light

There are 4 places where you must make this RGB change:

2.1 **Sharp,** Scheduler: **AOS:** M2_decoder_init_Line<rgb=12x.jpg, fig. 47 and 48.
2.2 **Folder:** C:\MeteorGIS**** M2_Man_LRPT_Decoder.ini**,** R=….. G=…. B=….
2.3 **Folder** : C:\MeteorGIS**** M2_Man_LRPT_Decoder.ini**,** R=….. G=…. B=….
2.4 **Folder:** C:\MeteorGIS\MeteorGIS\default.ini:

watermarkFileOrText=Projection :……r\n%sat% RGB 122%textCompo%\r\n%dtu% UTC\r\nAPID : %apid%\r\nMeteorGIS v.2.25

Small consolation, once the satellite is out of the testing phase, only the RGB value is adjusted, depending on summer or winter time.

```
[FAST]
FORMAT=jpg
R=1
G=2
B=3
```

Figure 54, A crop of the ini files list, B=2,3 of 4).

3. Symbole Rate.

Symbol **R**ate, also known as baud rate, is a measure of the speed of data transmission in a satellite communication system. No setting changes necessary, all notations are set to "Auto or auto"

12. Start recording.

How do you start receiving satellite images now? Well that has become a piece of cake. A recording will only succeed if all previous operations have been performed flawlessly!

- Start het Obitron programma, SDRSharp starts up automatically.
- Selecteer de Meteor satelliet, M2-3 or M2-4.
  - Prediction, 2x.
  - OK.
  - SDRSharp is not yet in recording (Start) mode and waiting for the start command from the Scheduler.
  - You don't have to stay with it, recording process starts and stops automatically.
  - Then, Orbitron will ring to indicate that the programmed start time has been reached and SDRSharp Starts.

  - The Meteor demodulator plugin start and wating for a lock, fig.55.

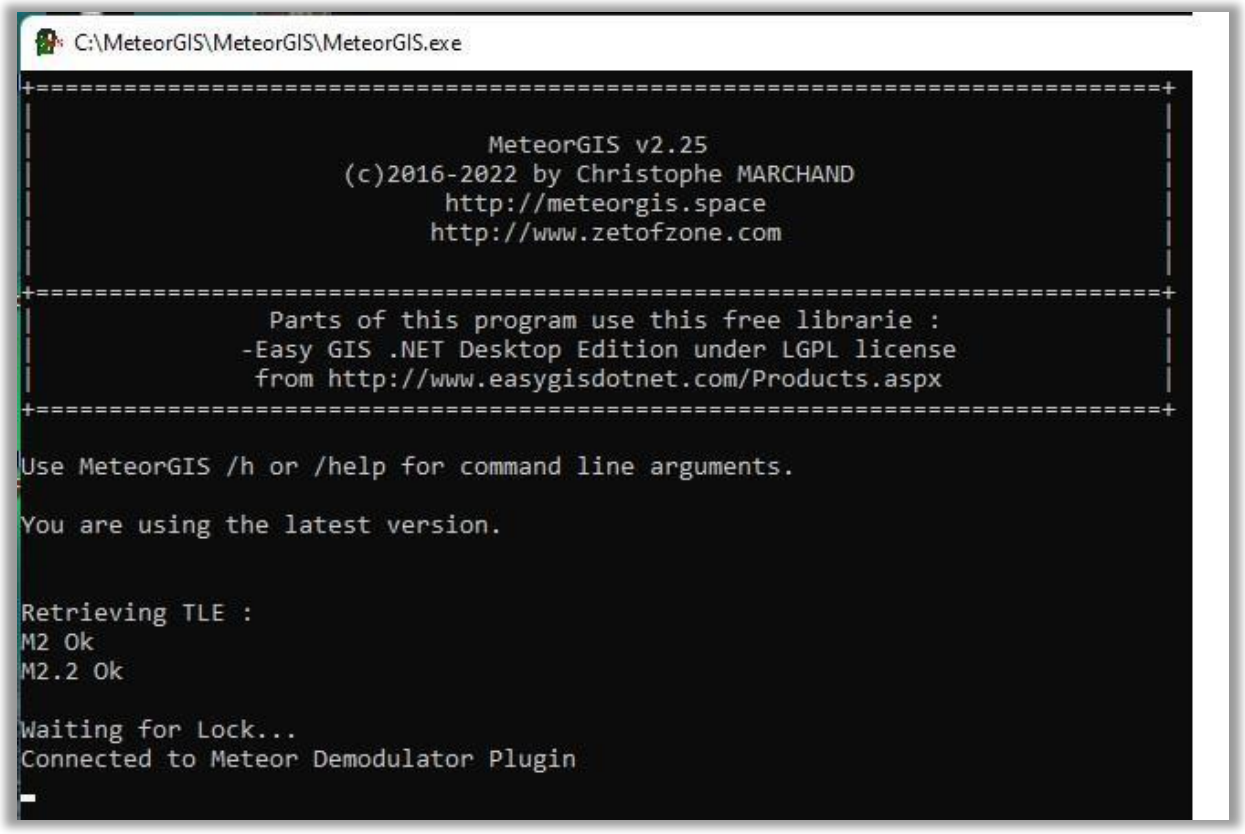


Figure 55, MeteorGIS waiting for lock.

Don't forget to set the sleep time, under 'System' / 'Power Options and Sleep mode' (Windows10) you can set this.

- In the SDRSharp window, during recording, an increasingly strong “bump-shaped” signal is displayed with a bandwidth of 110000Hz, fig.56 and the de-coder will write the data and display the current number of MBs.

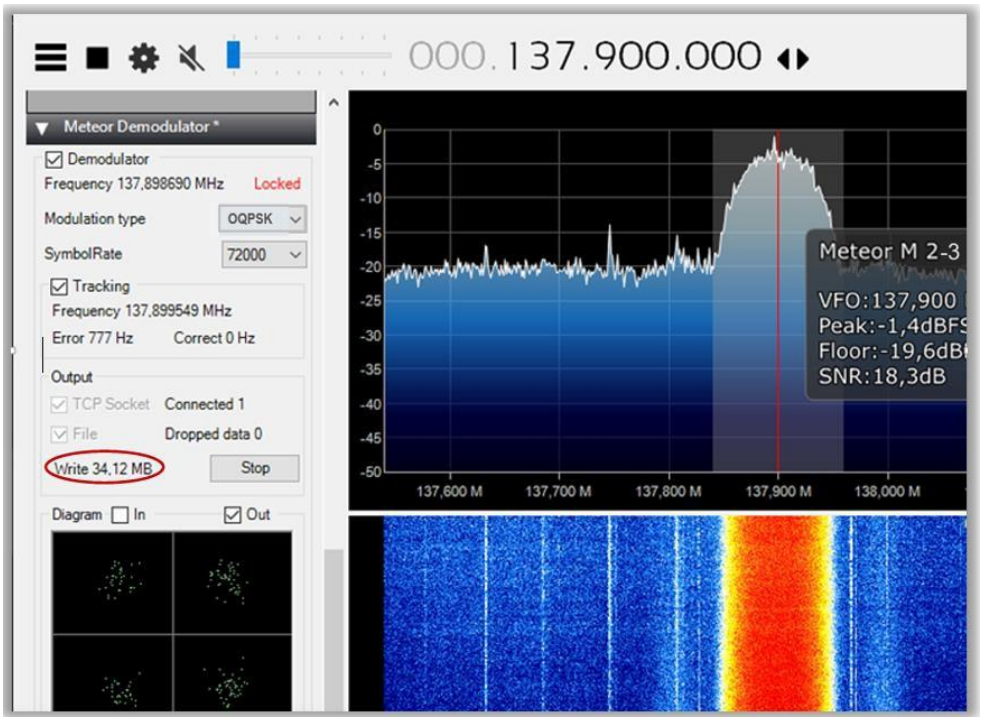


Figure 56, typical Meteor signal bump.

- The decoder has started up and the picture is built up line by line, fig.57.
- The compactness of the four round figures is a measure of the signal strength, the more compact the stronger the signal.

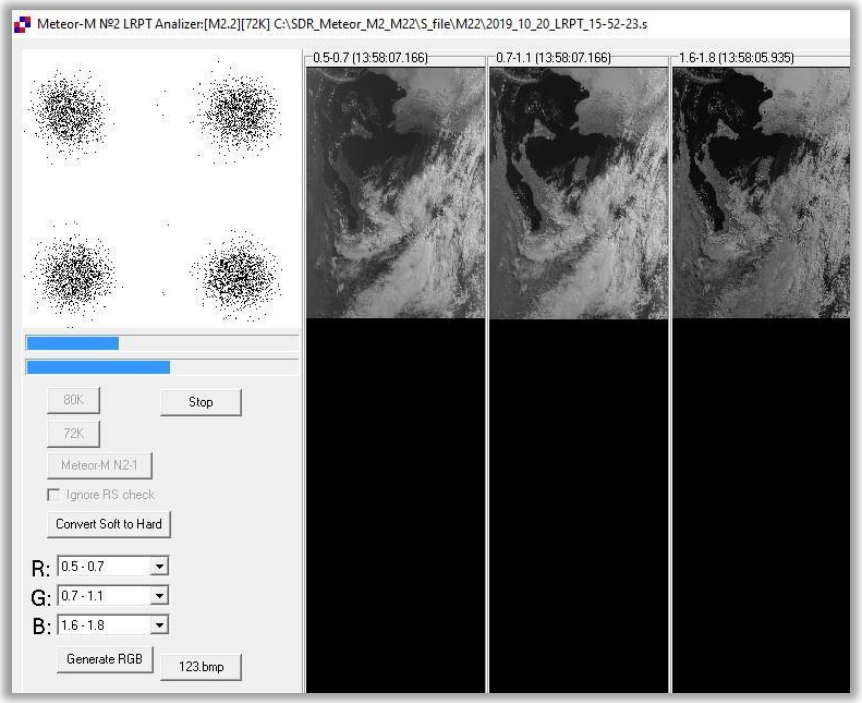


Figure 57, building the image.

The decoding will stop automatically when the signal strength has reached a lower limit, approx. 8dB.

- Then you have to wait for the end time set by Orbitron. First, the S files are saved.
- The MeteorGIS processing takes place and, depending on the PC processor and recording time, it may take some time, fig.58. Finally, the Orbitron and SDRSharp windows remain on the screen, waiting for the next pass.

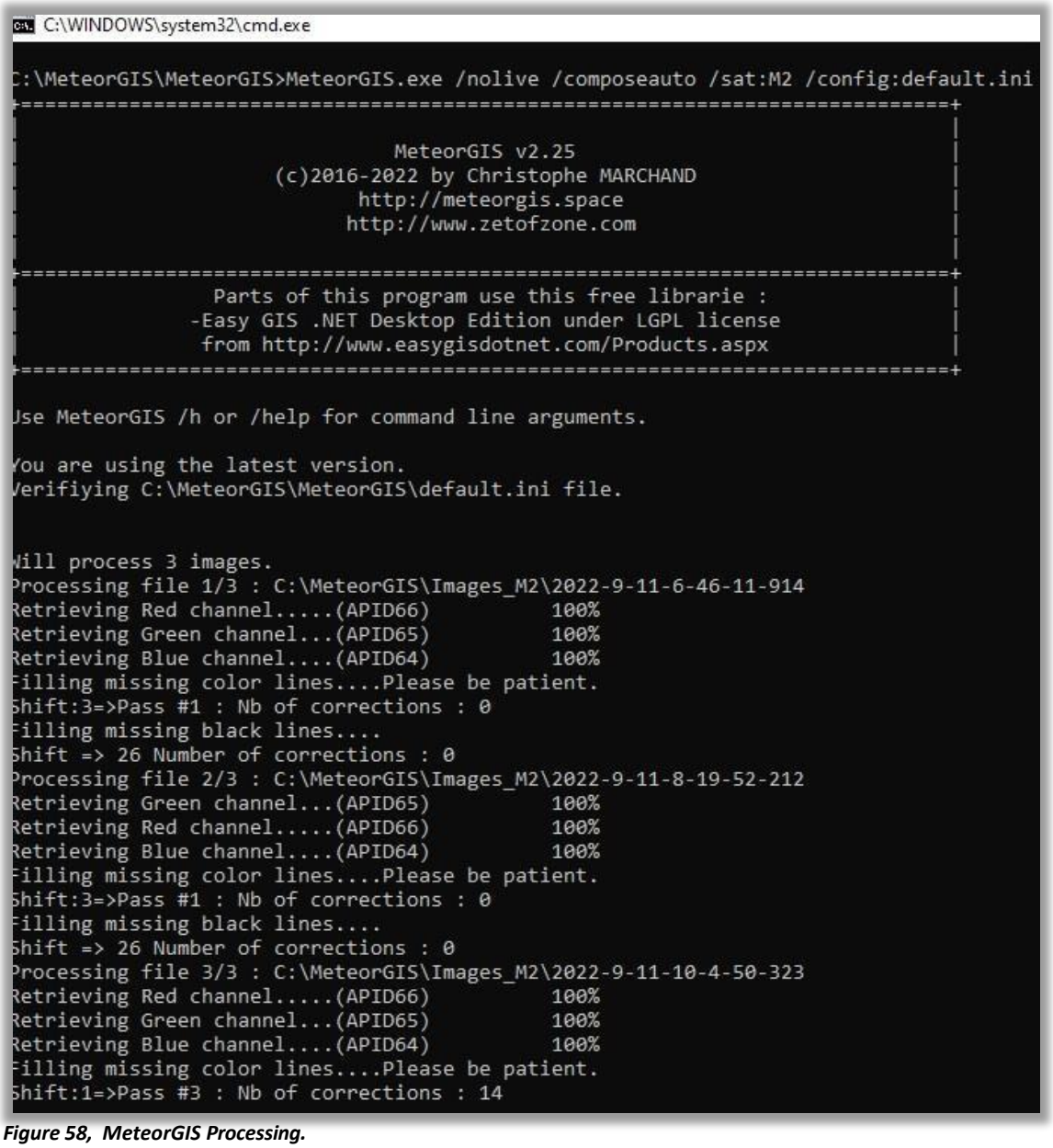


Figure 58, MeteorGIS Processing.

The saved images can be found in:

- Images_M2 ==> LRPT images.
- Final Images folder ==> MeteorGIS images
  (See also page 10, folder structure).

13. S-Files.

You may have noticed that the folder configuration also includes the folder S files. This is where the so-called 'S_files' are stored, fig.59.

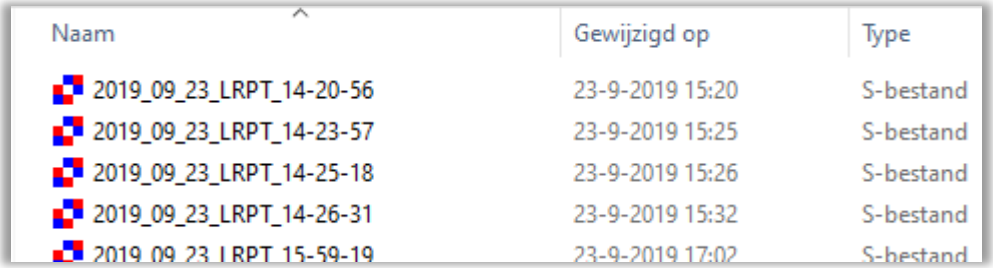


Figure 59, S_files.

In SDRSharp (QPSK) you have already defined where the S files are stored, namely in the folder 'C:\Meteor\S_file'.
This enables the system to store uncoded data in addition to the decoded images, which is useful for two reasons:

a. If the decoding of the LRPTimages does not go well, you can always fall back on the S files.
b. If you have such a file, you can check whether the decoding program works correctly.

To convert the S files to the basic images from the satellite, a so-called '***M2_Man_LRPT_Decoder***' is needed, located in the MeteorGIS folder, fig.60.

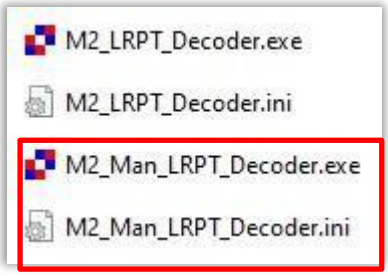


Figure 60, M2_Man_LRPT_Decoder.

Convert the S-files from the S_file folder.
These images are also in JPG format and can be opened with any suitable program. In the 'images' folder you can find the images edited by MeteorGIS from the satellite, in which small lines of interference have been cleverly removed.
The oblique arrangement corresponds to the orbit of the satellite, see previous image. The beauty of this program is that you can make small adjustments to the script from the MeteorGIS folder yourself. Although the program is written in C#, it is still reasonably understandable with the help of the explanations.

The use of existing S-files, fig.61.
Converting an S-file to a Meteor image is very simple:

- Go to: 'C:\MeteorGIS\ **M2_Man_LRPT_Decoder**'
- The M2_Man_LRPT_Decoder has been started.
- Click on 72K in the Decoder window.
- Select the S file, the image build-up will start and the image will be saved.

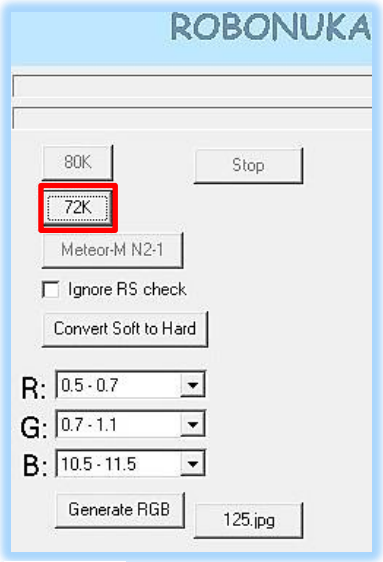


Figure 61.

14. SmoothMeteor.

The files are in JPG format and can be opened with any suitable program. With the program 'SmoothMeteor' you can stretch the images sideways so that the image gets a more "natural" appearance, fig.62.
Download and install ‘Smooth.exe’ in de Folder ‘Smooth’:

https://leshamilton.co.uk/meteor3m.htm

Smooth Meteor v 1.75(zip)

- Start SmoothMeteor.
- ‘Load an RGB Meteor Image.
- ‘Processing’ - ‘Rectify’.
- Save as: **.**JPG of **.**BMP file.
- Open the files from the LRPT_Images folders.

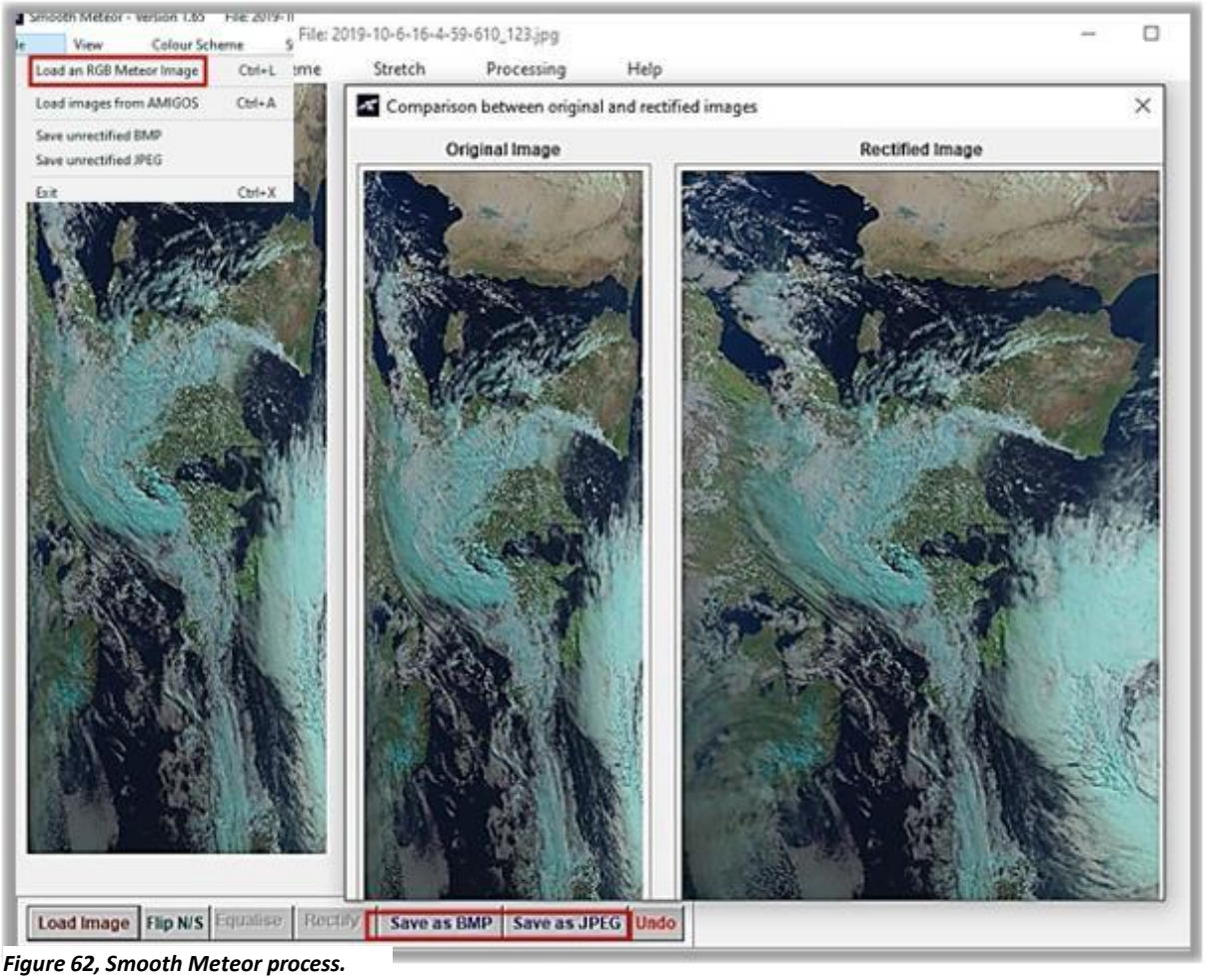


Figure 62, Smooth Meteor process.

15. NightMode Plugin.

On Facebook SDR pages, you will sometimes come across a "tinted black" SDRSharp main window. Some users find such a dark screen pleasant to work with, fig. 61 and 62. If you also want to have the choice, a so-called plug-in is available for this, fig.61a, which you can download via the URL below:

https://www.rtl-sdr.com/forum/viewtopic.php?f=5&t=2123#p5955

Figure 63a, NightModePlugin.

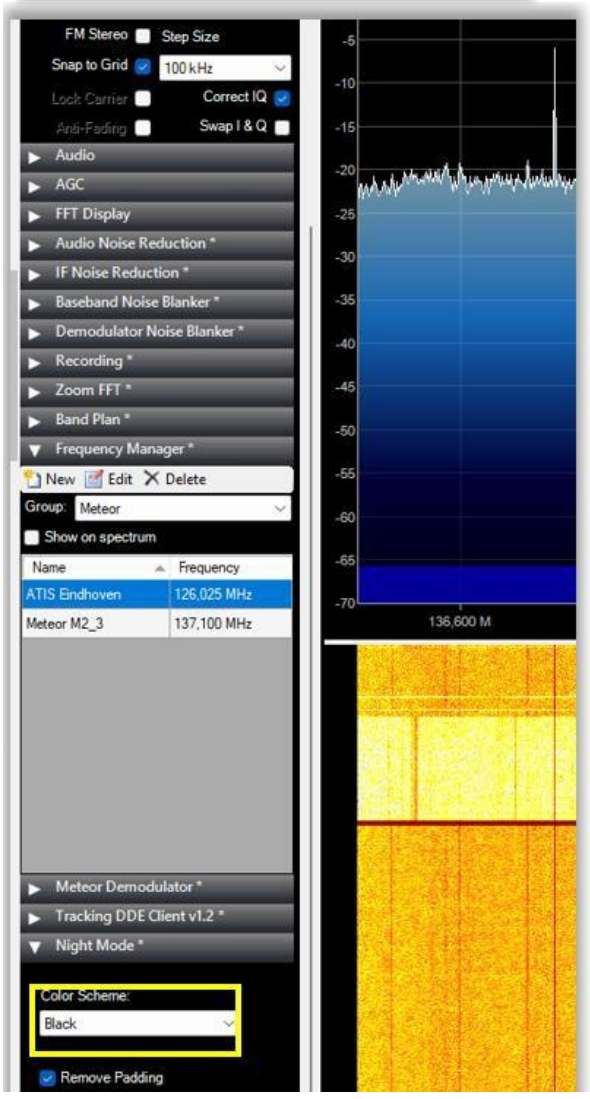


Figure 63, Black window.

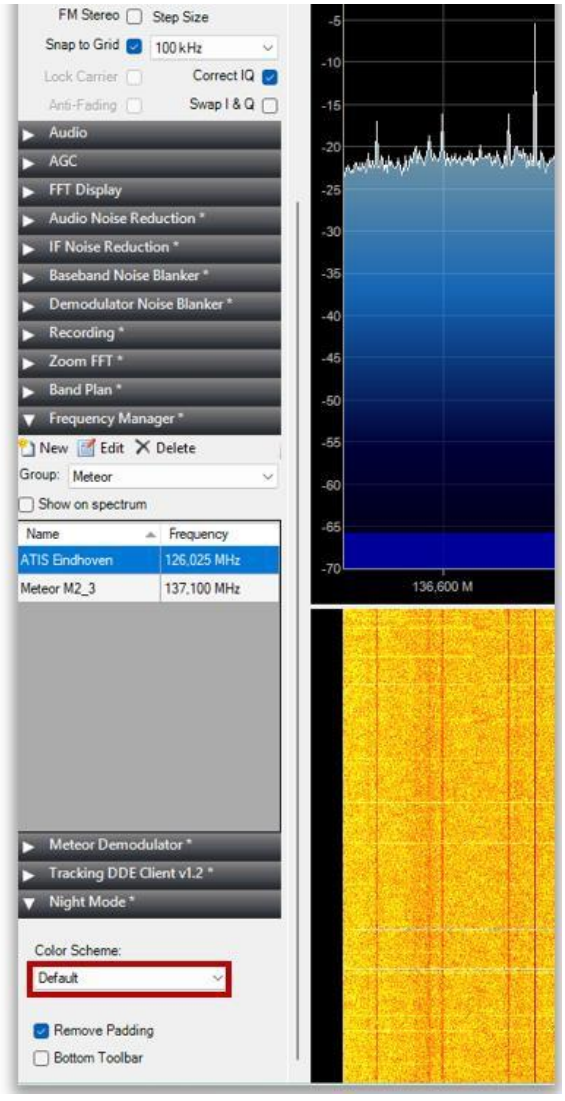


Figure 64, Default window.

How to do:

- Extract de ZIP file and looks like this, fig. 65.

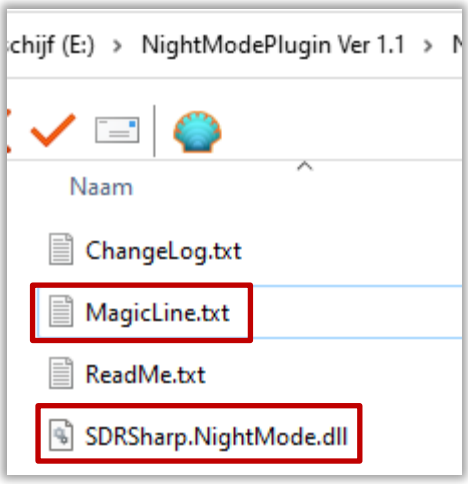


Figure 65, extracted ZIP file.

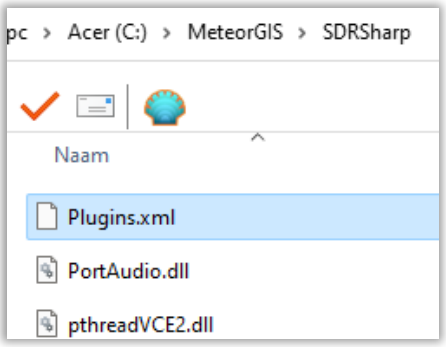


Figure 66, Open Plugins.xml.

- Open the MagicLine.text file, fig.65, with a text editor:

```
<add key="Night Mode"
```

- Open with a text editor the Plugins.xml file, fig. 66, copy and paste the line of the MagicLine.txt in it, fig. 67.

```
<add key="DDE Tracking Client" value="SDRSharp.DDETracker.Dde-
TrackingPlugin,SDRSharp.DDETracker" />
<add key="Night Mode" value="SDRSharp.NightMode.NightMod-
ePlugin,SDRSharp.NightMode" />
</sharpPlugins>
```

Figure 67, A piece of the modified Plugins.xml text.

- **Don't forget to save the file !.**
- Close and Restart SDRSharp.

16. Green colored to white clouds.

Several MeteorGis users will not like the green colored clouds, at least I don't.
The color, gray/white, of the clouds appears more natural.

a. Meteor GIS images with white clouds, 123 settings, May.
What you have to do is force MeteorGIS to produce RGB123 images instead of RGB124 images. This means using the channel 2 image twice.

1. Delete the two channel 2 files (the ones ending in '66').
2. Make copies of the two files ending 65
3. Paste these files into a preliminary created folder.
4. Rename filenames to end with '66'.
5. Copy and Paste this back into your Images_M2 folder.
6. Empty the FinalImages folder (because MeteorGIS will not override existing files).
7. In the MeteorGIS/MeteorGIS subfolder, run "default.bat" by double clicking it.

You will now find that the RGB image has the characteristics you require. You can achieve this conversion in a few seconds.

b. Meteor GIS images with white clouds, 124 settings, September.

You have to do that in a different way.

September 22, 2024 the Meteors m2-3/4 switched to infrared mode, see:
(https://usradioguy.com/meteor-satellite/#status)

- spread images:

1. Adjust Satelitte settings, see pag.32
2. Load the RGB124 image into the SmoothMeteor software.
   This will automatically produce the 122RGB image.
   Save the image using File/Save unrectified

- equidistant images:

Example:

My GIS image today was :
UTM-2024-10-02-13-36-23.s_RGB.jpg
I changed it to:
UTM-2024-10-02-13-36-23.s_RGB**124**.jpg
and produced the attached image with SmoothMeteor.
Just remember to use File - Save unrectified.
If you edit the equidistant image by adding 124, it works.

(thanks Les Hamilton for info)

17. Desktop arrangement.

Note: An example of a desktop arrangement, fig.68. Orbitron is the starting program with the other icons, the saved images and S files are easily and quickly accessible.

Figure 68 , example of my desktop layout.

18. Finally:

- The installation procedure in this article has been followed twice from the beginning to check for possible errors, with the end result being an error-free system.

- A group APT is present on Facebook, in which many enthusiastic members worldwide put their Meteor satellite images on the site. You can also ask your questions there.

It would be nice if your Meteor images also appear on the APT group soon.

Much more information can be found at:

- Les Hamilton Web page: https://leshamilton.co.uk/MeteorLRPTSuite.htm
- USRadioguy, Current M 2-3 and Meteor M2-4 Status: https://usradioguy.com/meteor-satellite/?fbclid=IwAR1c-mrC89_ey-aNbGgOGY1bLkjrwYX8rlwW-tevEThulH1BVdSXq7icE#test
- APT Group: https://www.facebook.com/groups/Satellite.apt.group/
- RTL-SDR.com: https://www.rtl-sdr.com/
- RTL-SDR.Com met plug-in Night mode: https://www.rtl-sdr.com/forum/viewtopic.php?f=5&t=2123#p5955
- Group for Earth Observation: http://www.geo-web.org.uk/GEO-nl.php

Last but not least, for those who want to delve deeper into the subject matter of Kunstmanen, there is the Kunstmanen working group, which focuses specifically on receiving weather satellites, with everything related to it (receivers, antennas, rotors, software, etc.). http://www.kunstmanen.net

19. Windows 11 Installation problems

Appendix A

SDR# does not display Meteor2-3/4 satellite signals.
Especially with more recent Windows 11 Home installations, you will notice that SDR# does not produce Meteor M2-3/4 signals, which is very annoying. The problem certainly **does not lie** with the installed package *"The MeteorGIS Suite Installer - updated for Meteor M 2-4"* by Les Hamilton, but in the Windows environment.
In Zadig, for SDR#, the **"Bulk-In, Interface 0"** option must be selected as the driver, but a recently installed Windows 11 Home version automatically overrides the WinUSB driver suitable for SDR# in Zadig with a 'standard' driver.
Even if you can select the desired interface 0, when you start SDR#, you will see that Zadig is set to the Windows default driver again. Fortunately, there is a handy one-time solution for this.

Step by Step:

- do not start SDR#
- Connect the SDR dongle to the PC.
- Open Zadig (right-click) and run the program as an administrator.
- Click 'Options' at the top and check 'Show all devices'.
- In the dropdown menu, select the option: **"Bulk-In, Interface 0"**, ***so not the (1.)*** *option*.
- Click 'Replace' driver.
- Briefly disconnect for a few seconds the USB dongle and then reconnect it.
- Start StartSDR# and open the Windows Start menu.
- Type 'Core Isolation'. Temporarily turn 'off' the 'Memory Integrity' switch. ***)**
- Restart the computer and start the MeteorGIS installation procedure again.
- Turn the 'Memory Integrity' switch back 'on'

*) *'Core Isolation' offers security features designed to protect Windows core processes from malicious software by isolating them in memory.*

Appendix B

Windows Security.
Windows ranks a number of MeteorGIS components as unknown Publishers.
Start the following program items in the MeteorGIS map and check if the security window below appears. If so, uncheck one-time the box.

- M2_LRPT_Decoder
- M2_Man_LRPT_Decoder
- Orbitron
- SDRSharp
- MeteorGIS

Figure 69, uncheck one-time the box

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