University of Applied Sciences and Arts Northwestern Switzerland

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

e-Callisto status report/news-letter #39

100 % coverage after 11 years of this IHY2007 and ISWI related project:

A new Callisto system NA-014 (**N**orth **A**merican version of Callisto) has recently been deployed in Roswell New Mexico, USA. The instrument was installed and configured by Stan Nelson KB5VL funded by his own means. The instrument was built and tested by non-profit company Witham Reeve in Anchorage Alaska, according to the documentation on our instrument website.
For more information got to: http://www.reeve.com/Solar/e-CALLISTO/e-callisto.htm
For more information about Callisto itself go to: http://e-callisto.org/

Fig. 1: The antenna is a commercial LPDA (Logarithmic Periodic Dipole Array) from CREATE CLP5130-1N on top of a pole. The antenna is connected to a low noise preamplifier Mini-Circuits ZX60-33LN with about 20 dB of gain and ~1.1 dB of noise figure (TMA **T**ower **M**ounted **A**mplifier from W. Reeve in Anchorage). Data files (ROSWELL-NM*.fit) are already transferred in real time to the e-Callisto data archive at FHNW (Fachhochschule Nordwestschweiz) in Switzerland.

Welcome Roswell on board of the e-Callisto network!

Roswell is a very important node in the e-Callisto network together with Anchorage and Mexico. They mainly cover the American/Pacific region of the network. With this station we get now 100% coverage assuming all instruments are working as expected. I hope we soon can get some more instruments in this area (Hawaii-Washington and Peru – Cuba) to get some redundancy in time and frequency. Also Ecuador and/or Uruguay and/or Argentinia would be of great value for the network. Unfortunately we don't get data from Callisto-instruments in Costa Rica and Brazil. They would really help to get more redundancy in solar radio observations and rfi-monitoring. Sadly, the funding situation is very bad to support redundant stations in view of ISWI and/or outreach activities.

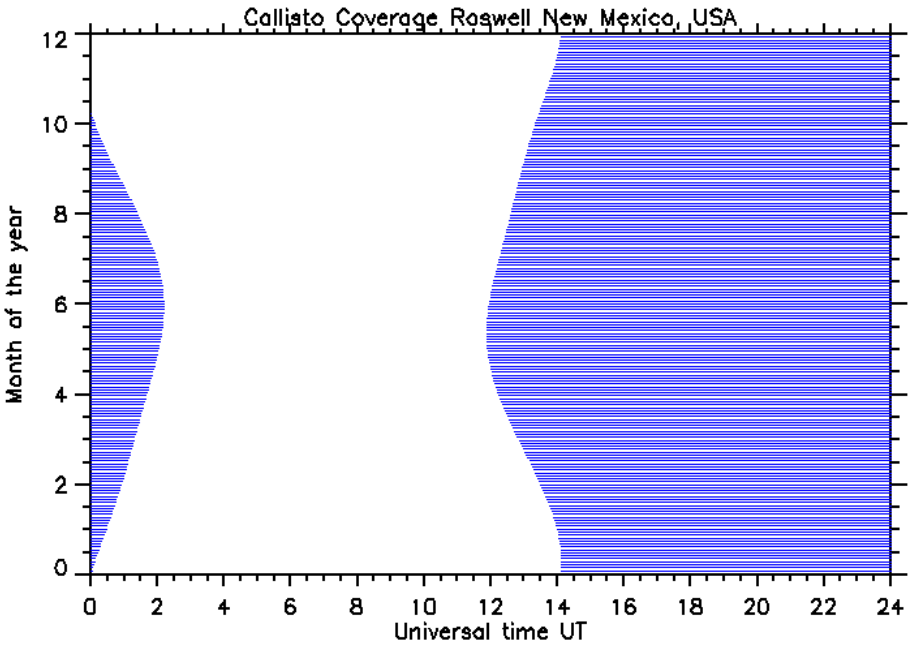


Fig. 2: Coverage for solar radio observation in Roswell NM, USA.
Blue area: instruments can 'see' the sun while the white area shows the data-time-region with no observations. It perfectly compensates the missing area from the European-Asian region.

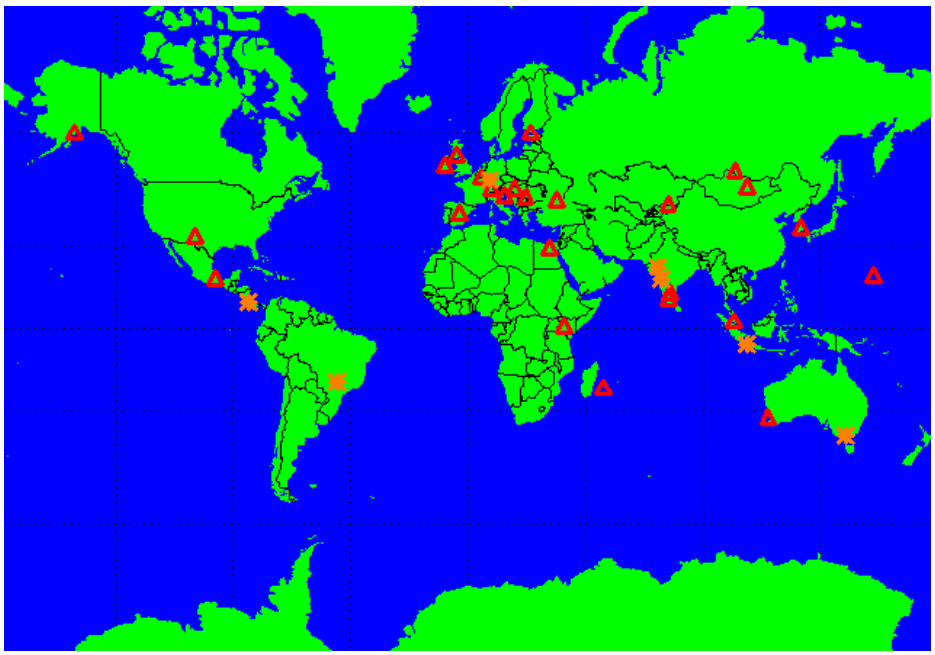


Fig 3: Current distribution of instruments.
Red triangles denote to observatories which provide data to the network.
Orange stars denote to observatories which do not yet or do not anymore provide data.

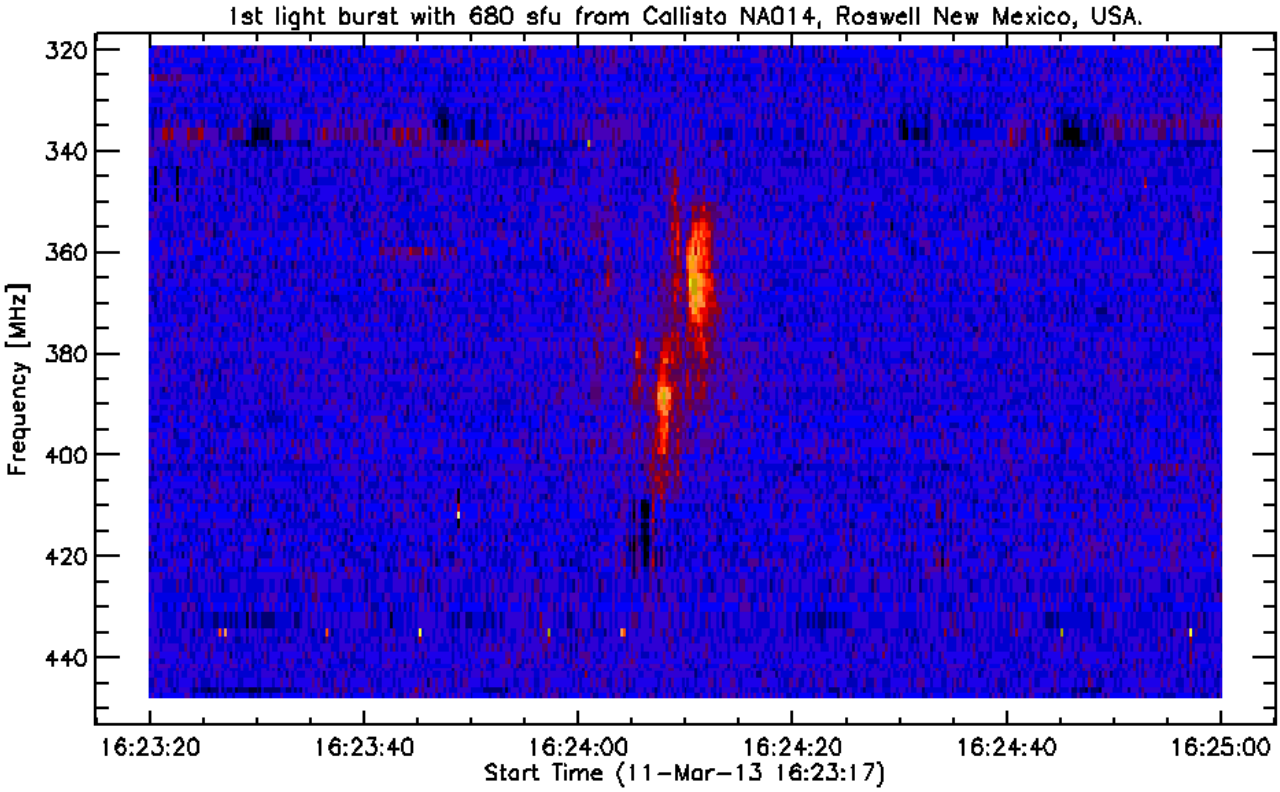


Fig. 4: 1st light depicting a solar noise storm (type I burst) at the station of Stan Nelson in Roswell. The interference level in this band is extremely low; we only 'see' some blips from a remote sensor at 435 MHz.

M-flare of 2013-03-15 produces nice burst activity after a long period of silence:

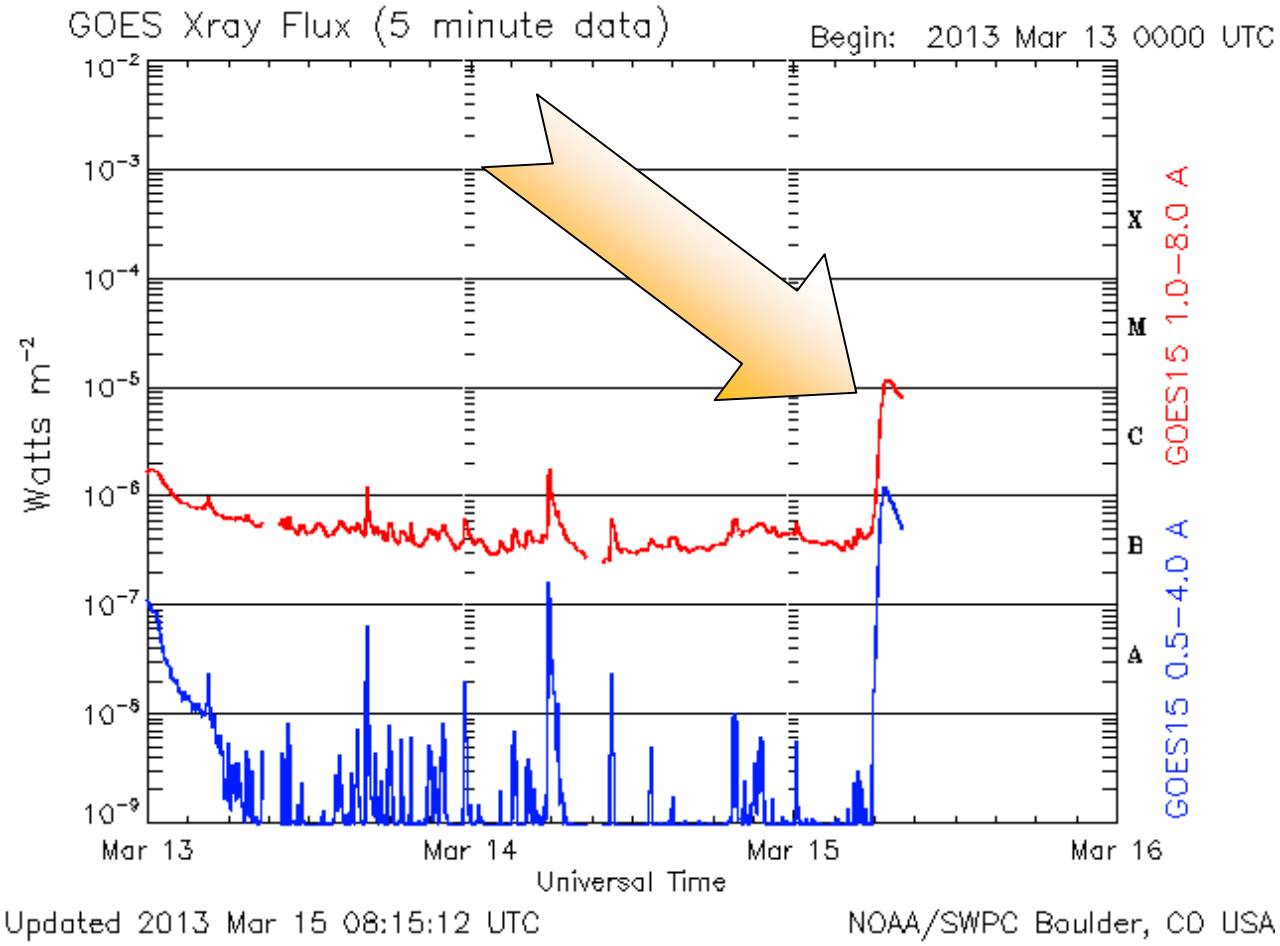


Fig. 5: X-ray activity around 6 o'clock UT on March 15th. This x-ray event is connected to quite some solar radio activity, see plots below observed at different stations of the e-Callisto network.

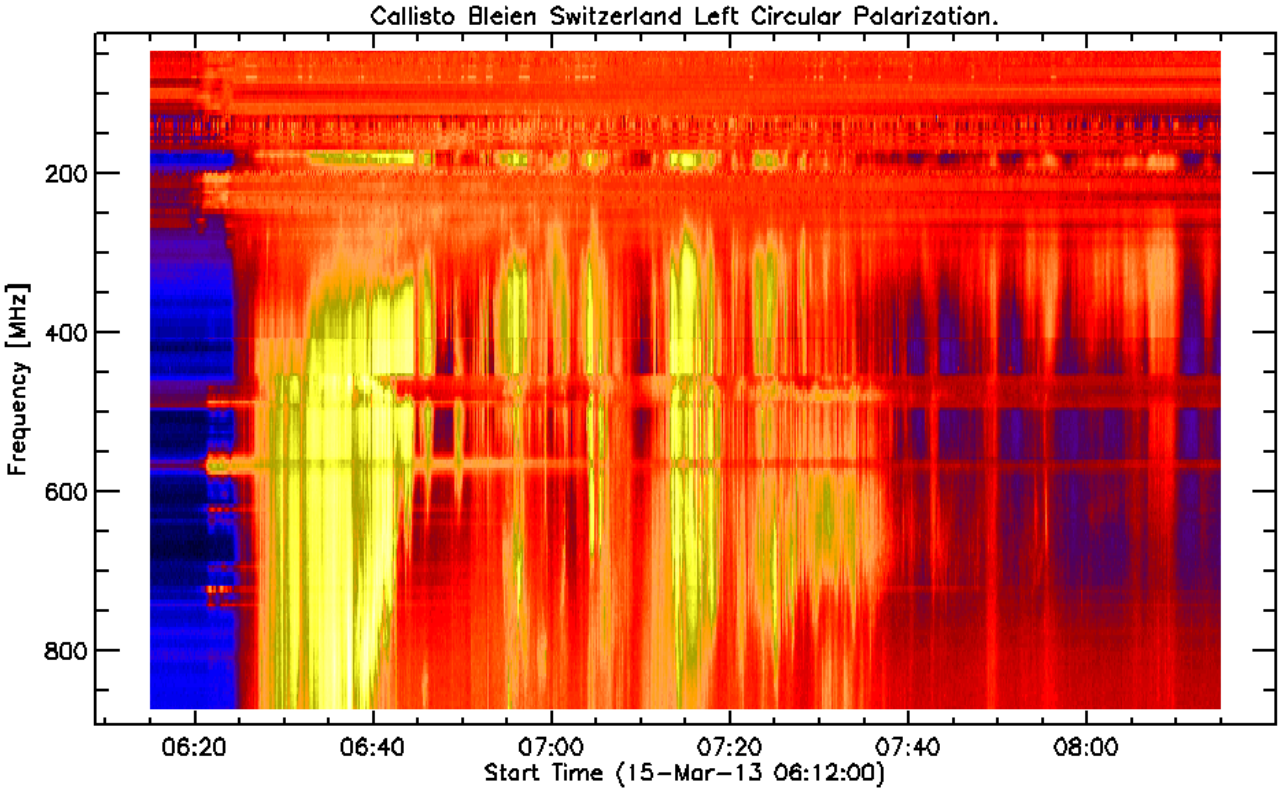


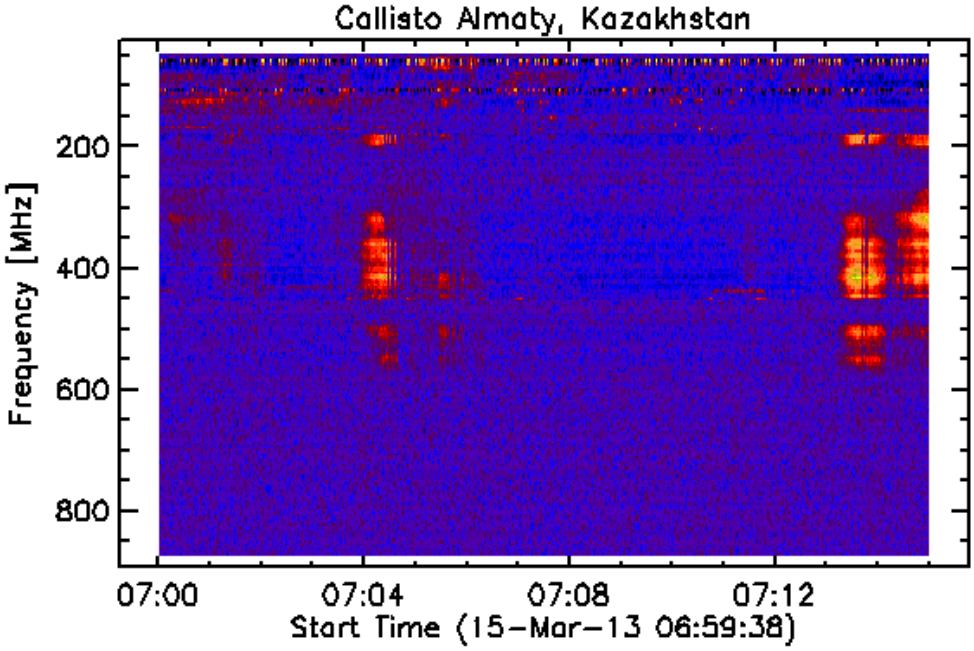
Fig. 6: Two hours of observation at Bleien observatory. Strong activity mainly in LHCP. RHCP burst activity is relatively low. Blue color means no burst, only background noise. Red means hot and yellow denotes to very hot radiation. Horizontal structures denote to strong local radio interference from DVB-T.

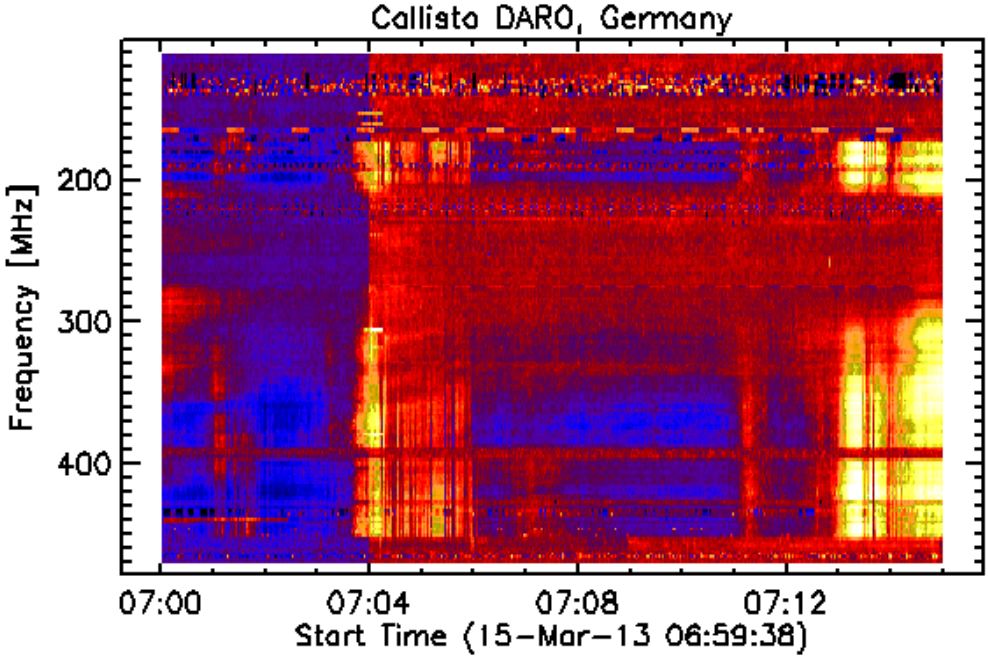
Following plots show only 15 minutes of the 'hottest' part of the radio burst observed at different locations of the e-Callisto network. Only those data are shown which were available on March 15th. Some other files (India, Finland, South Korea etc.) will arrive later this week.
Be aware that the frequency ranges differ from station to station, so the y-ranges are not comparable.
In all SSWIDL plots an statistical background {zz = constbacksub(z, /auto)} has been subtracted.

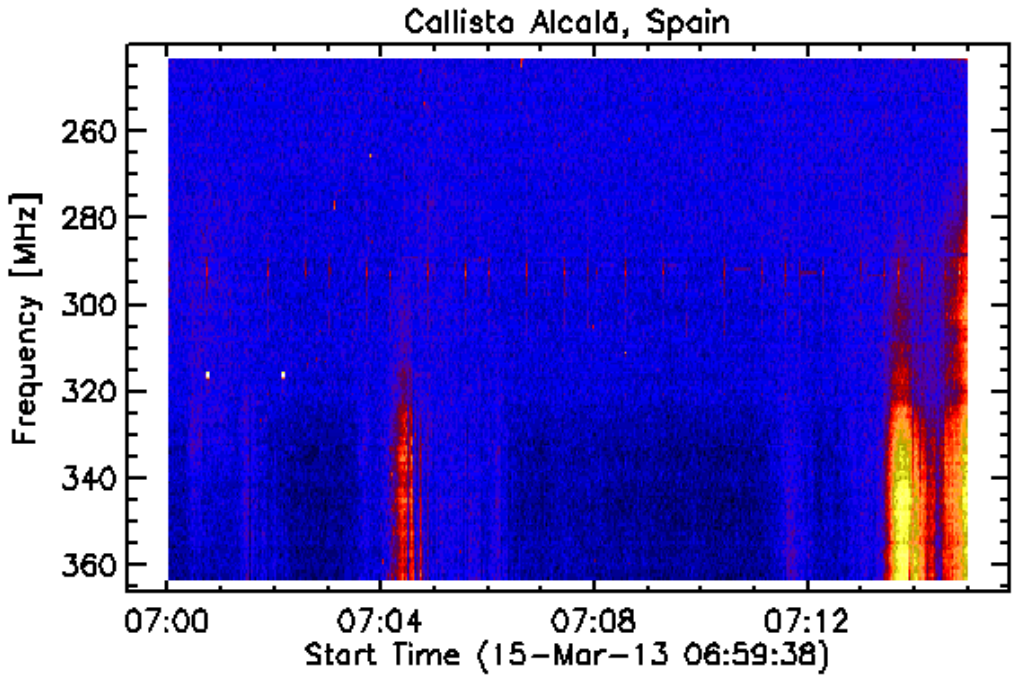
Also the data quality is varying extremely due to the following facts:

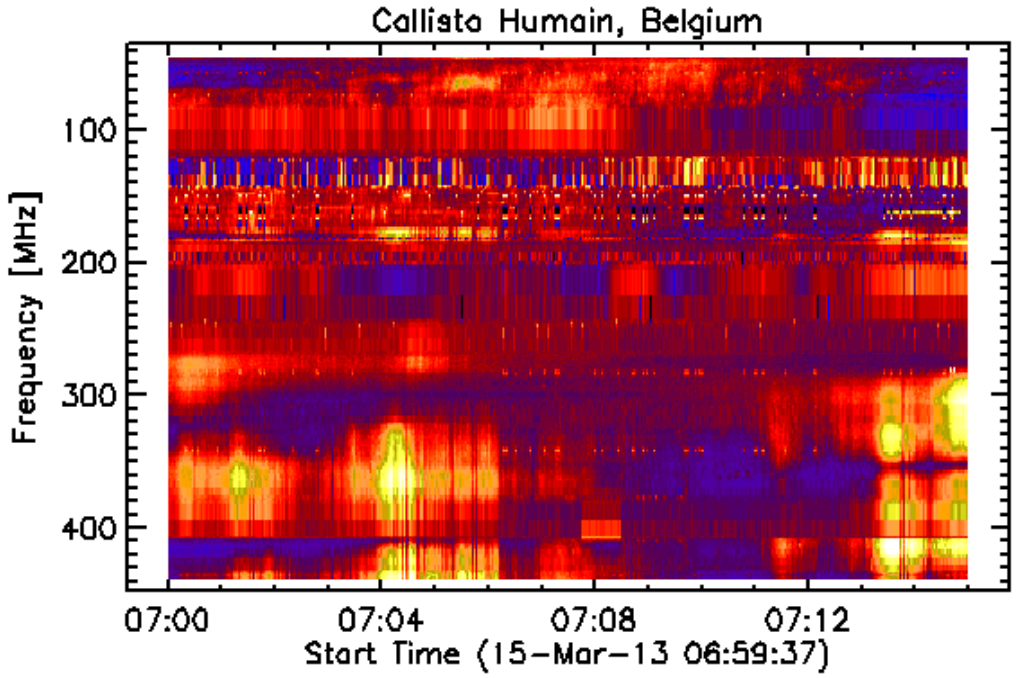
- Antennas have different gain
- Many antennas do NOT track the sun, therefore low intensity when burst is out of the beam
- Not all low noise pre-amplifiers have the same sensitivity or gain-variations
- Radio interference is very local and so very different. Some are very noisy, others are very clean.

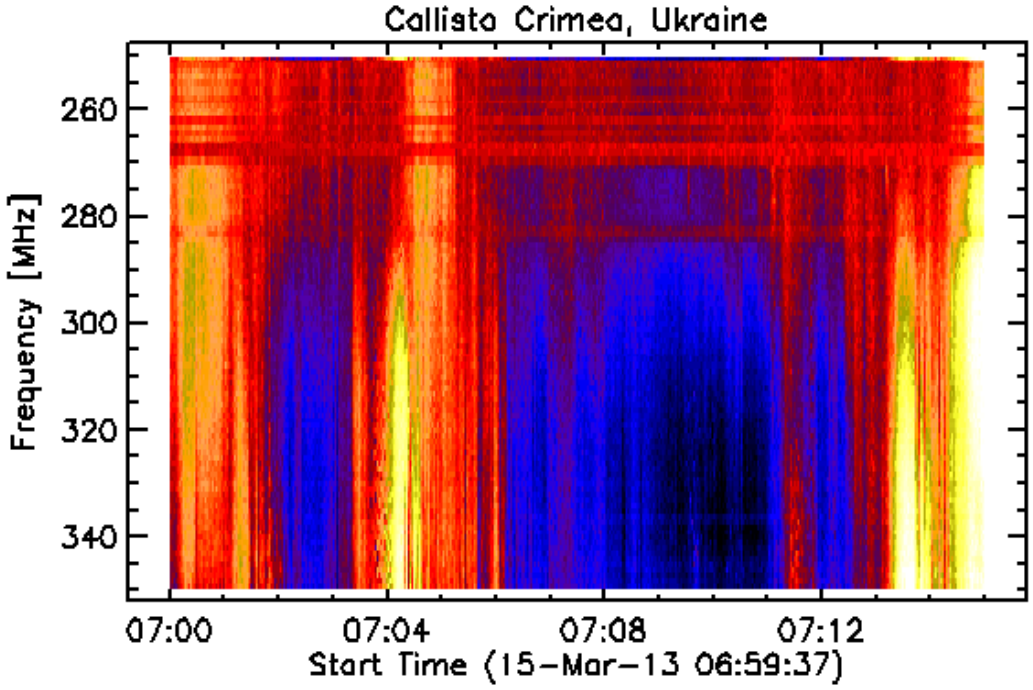
This is a big advantage of the e-Callisto network; the scientist can choose the best quality data out of the network.

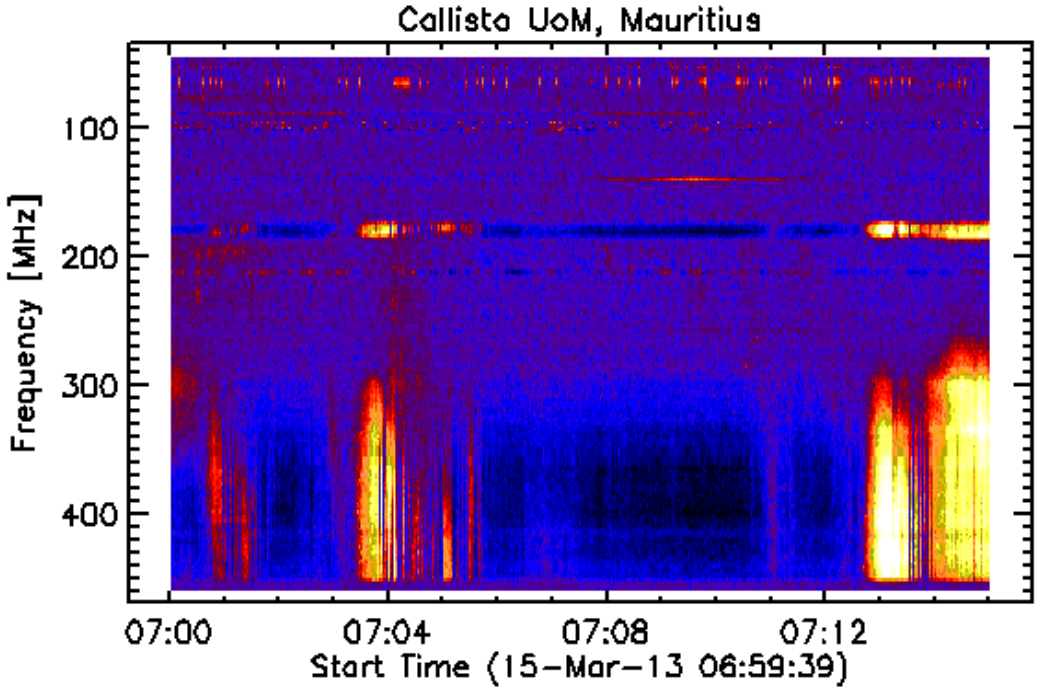

Callisto Almaty, Kazakhstan
Frequency [MHz]
200
400
600
800
07:00
07:04
07:08
07:12
Start Time (15-Mar-13 06:59:38)

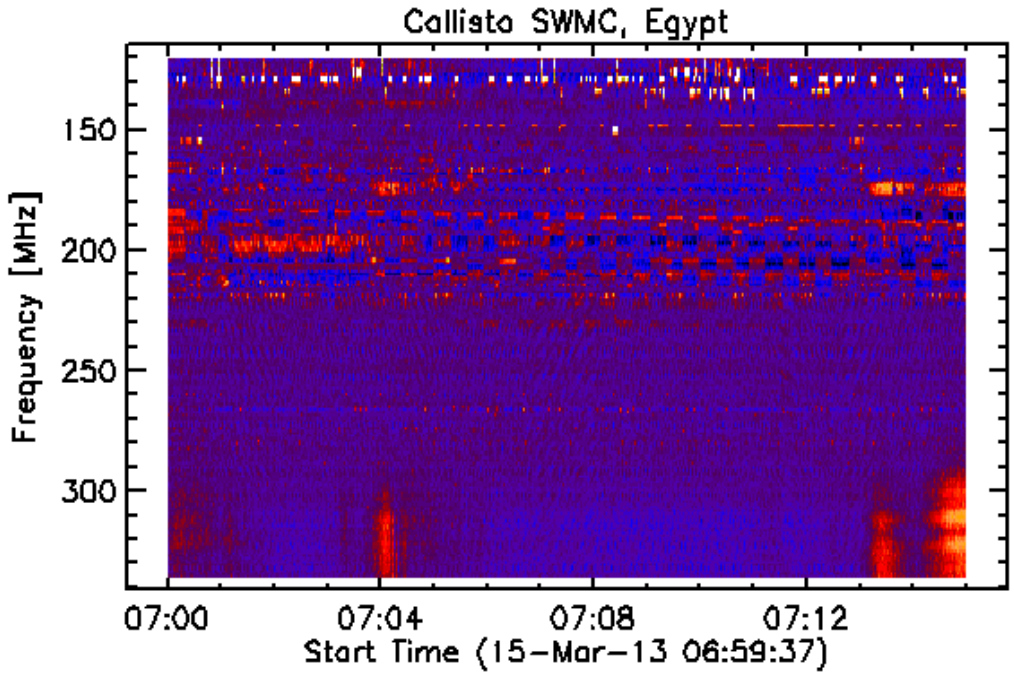

Callisto DARO, Germany
Frequency [MHz]
200
300
400
07:00
07:04
07:08
07:12
Start Time (15-Mar-13 06:59:38)

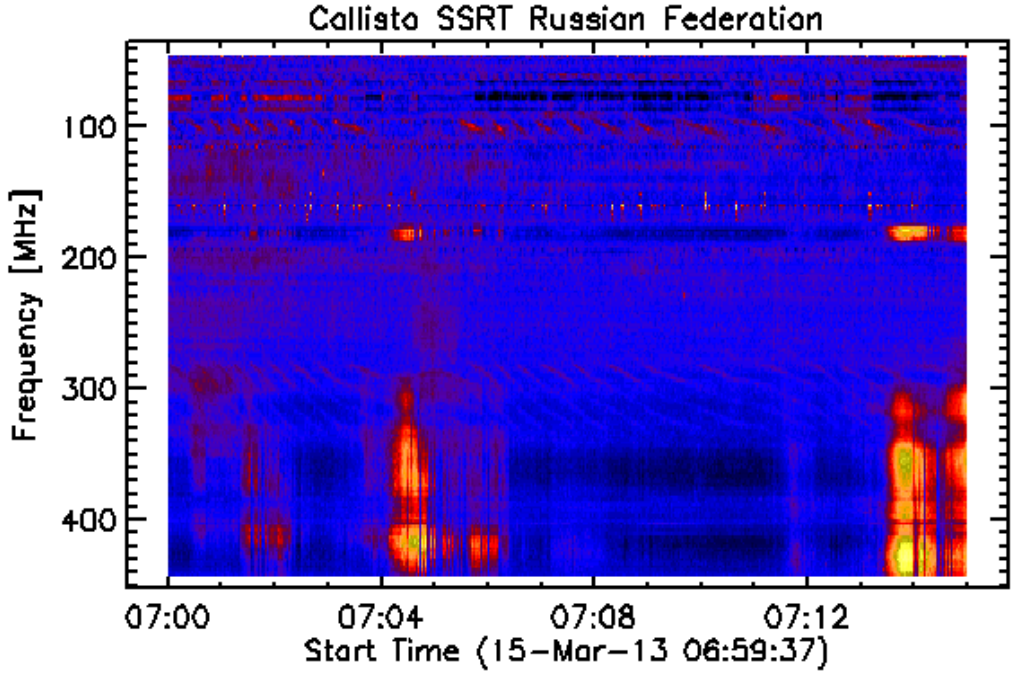

Callisto Alcalá, Spain
Frequency [MHz]
260
280
300
320
340
360
07:00
07:04
07:08
07:12
Start Time (15-Mar-13 06:59:38)


Callisto Humain, Belgium
Frequency [MHz]
100
200
300
400
07:00
07:04
07:08
07:12
Start Time (15-Mar-13 06:59:37)


Callisto Crimea, Ukraine
Frequency [MHz]
260
280
300
320
340
07:00
07:04
07:08
07:12
Start Time (15-Mar-13 06:59:37)


Callisto UoM, Mauritius
Frequency [MHz]
100
200
300
400
07:00
07:04
07:08
07:12
Start Time (15-Mar-13 06:59:39)


Callisto SWMC, Egypt
Frequency [MHz]
150
200
250
300
07:00
07:04
07:08
07:12
Start Time (15-Mar-13 06:59:37)


Callisto SSRT Russian Federation
Frequency [MHz]
100
200
300
400
07:00
07:04
07:08
07:12
Start Time (15-Mar-13 06:59:37)

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AOB:

CALLISTO or Callisto denotes to the spectrometer itself while
e-Callisto denotes to the worldwide network.

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