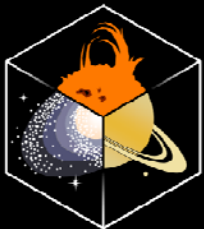




Solar Instruments

- Callisto as ETH - contribution to IHY2007 and ISWI

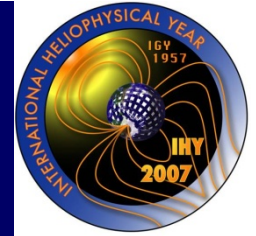
**Compound
Astronomical
Low cost
Low frequency
Instrument for
Spectroscopy and
Transportable
Observatory**



ETH Zurich
Institute of
Astronomy

Christian A. Monstein
Institute of Astronomy
Wolfgang-Pauli-Strasse 27
8093 Zürich
Switzerland



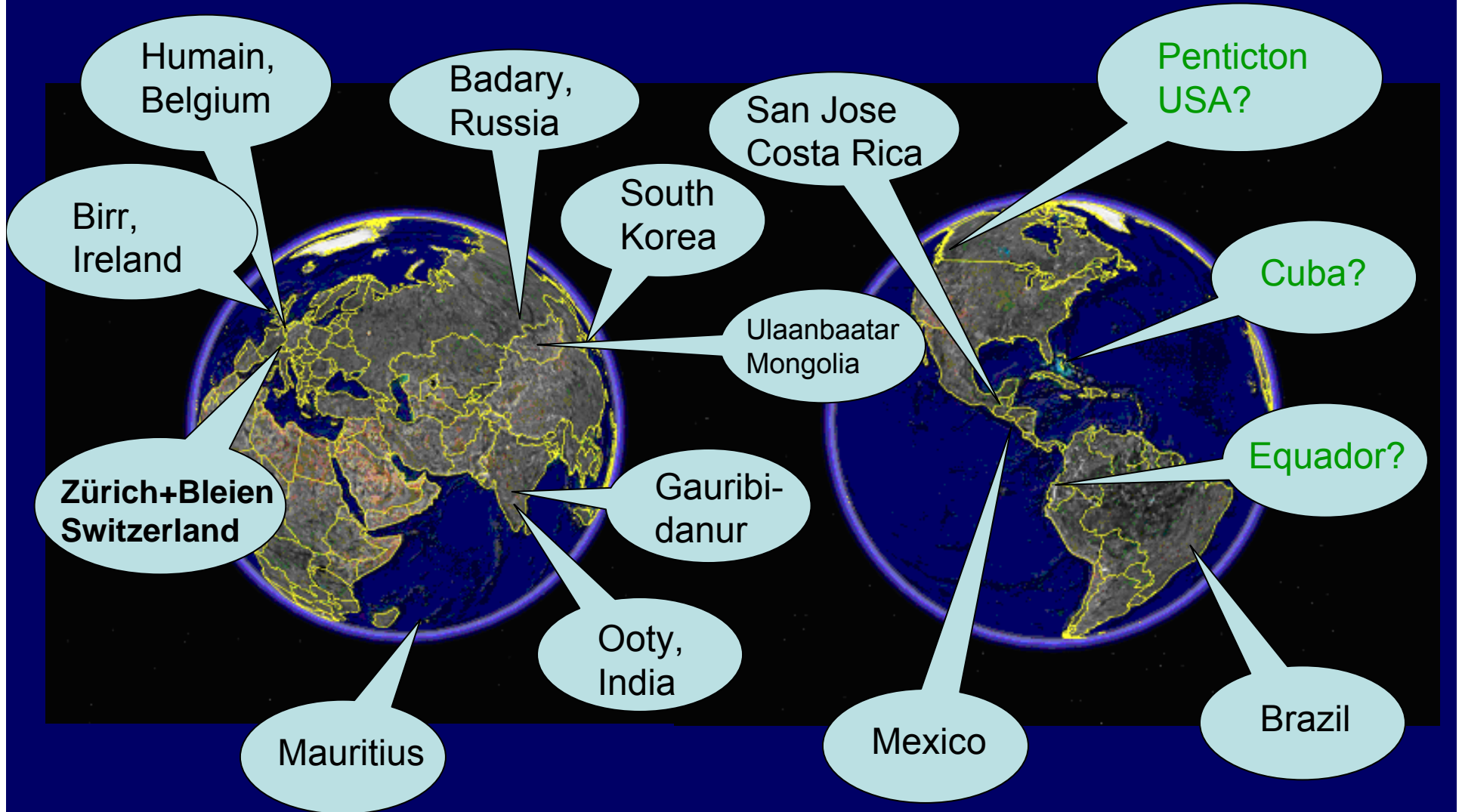


Specification Callisto

<u>Parameter</u>	<u>Main Specification</u>
Frequency range	45.0 MHz ... 870.0 MHz any other range, using heterodyne/homodyne converters
Frequency resolution	62.5 KHz
Radiometric bandwidth	300 KHz
Dynamic range	~ 50 dB
Detector gain	25 mV/dB
Noise figure	(9 ± 1) dB
Measuring rate	800 samples/sec max.
Number of channels	1...400, nominal 200 frequencies per sweep
Power consumption	12 V / ~225 mA
Weight	~ 1 kg
Dimensions	110 mm x 80 mm x 205 mm
Material cost	< 200 €(time needed for production + test ~ 1 week)
Inputs	3 configuration files (config, frequency, scheduler)
Outputs	1 x FITS-file per 15 minutes and 1 x logfile per day

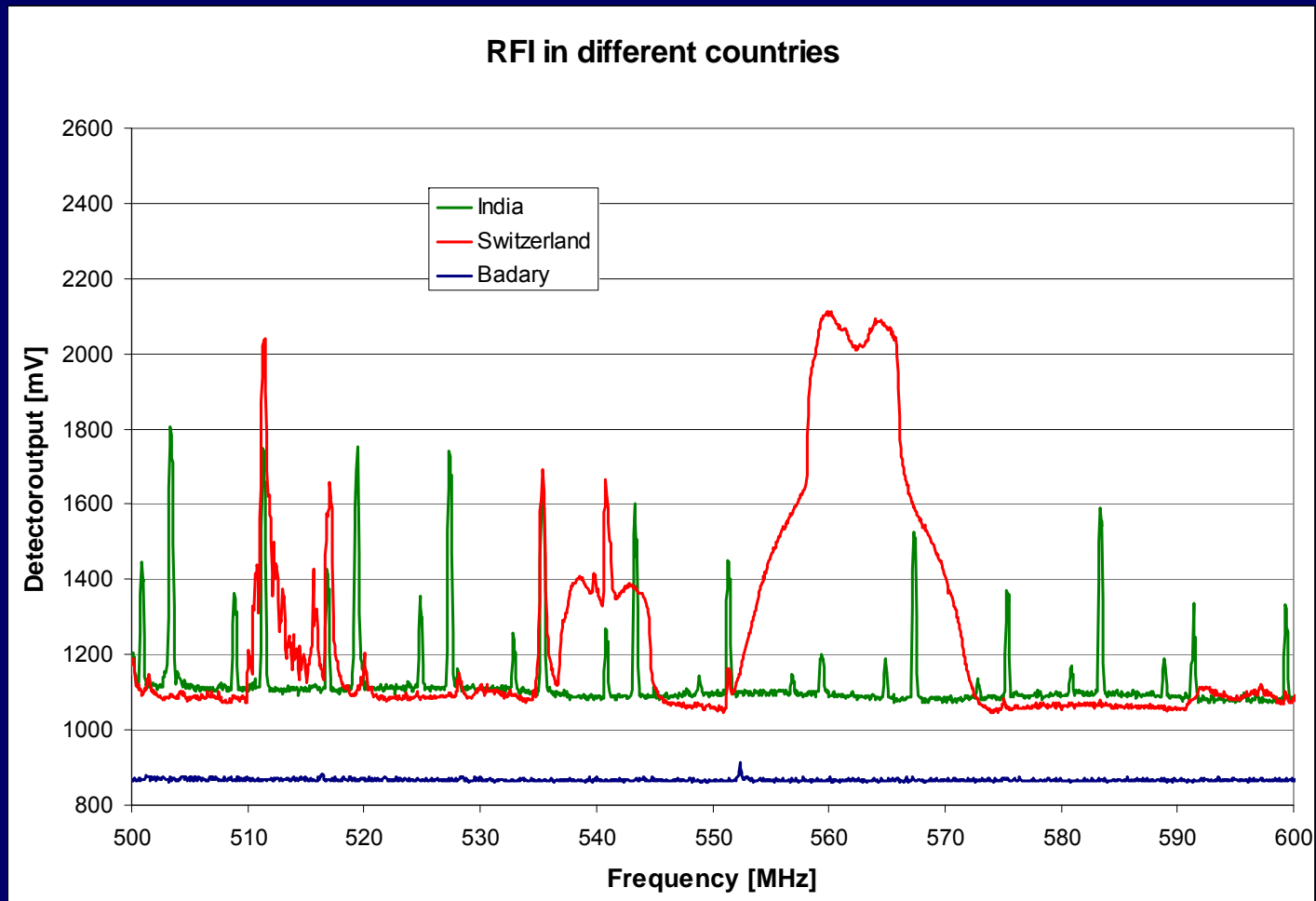


IHY2007 24h observation



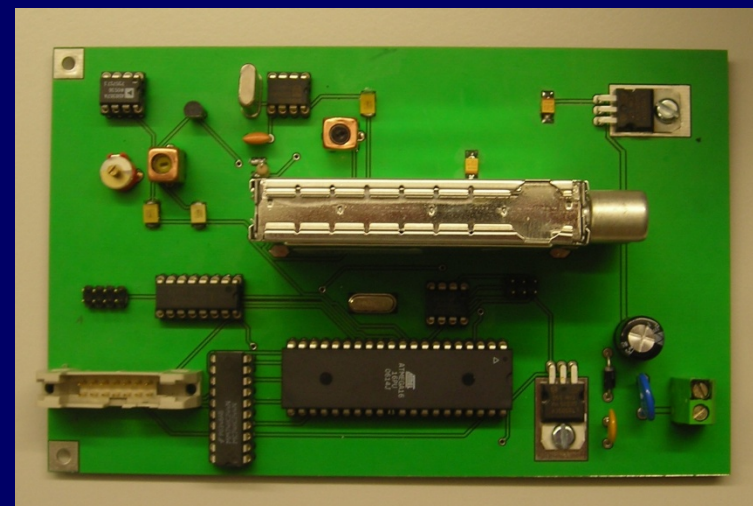
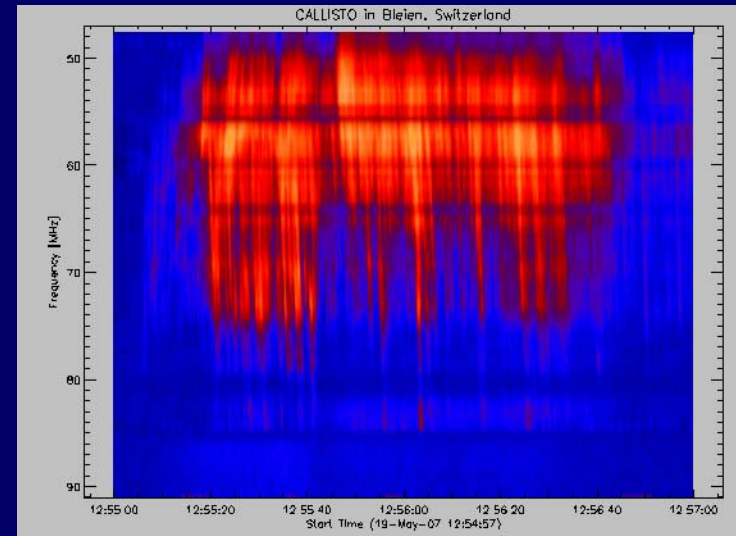
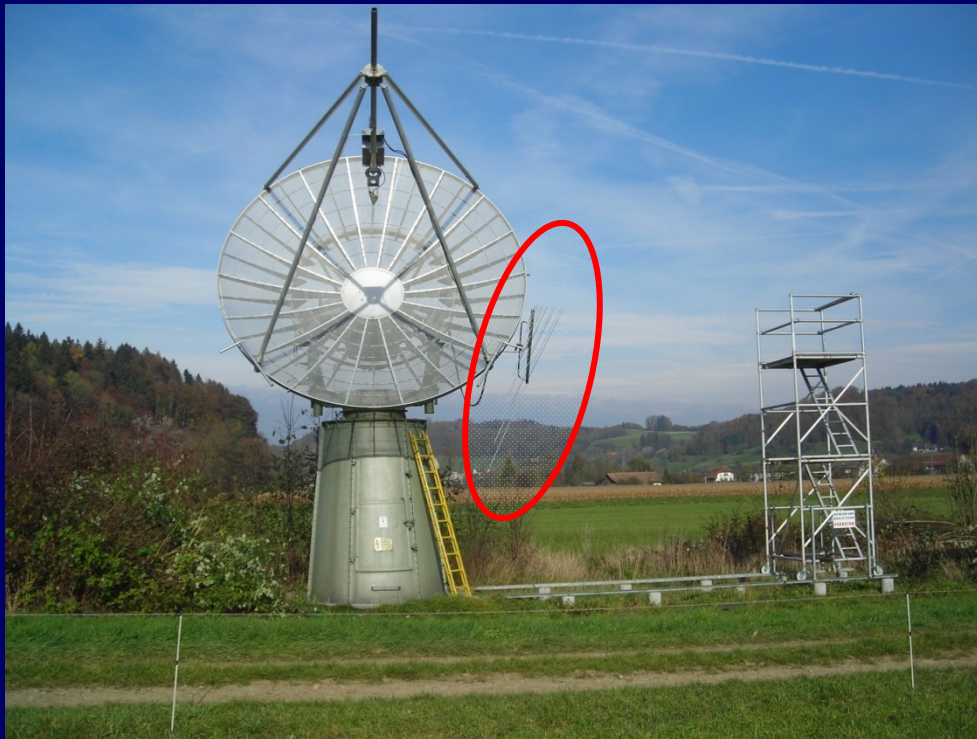


Why outside of Switzerland?



Radio frequency interference Switzerland compared to India and Russia

Callisto in Bleien, Switzerland



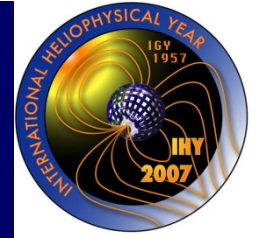
Top left: Antenna
Top right: Meter wave spectrum
Bottom right: PCB Callisto

Callisto in Gauribidanur, India



Left: Self built antenna.

Right V. C. Kathirvaran at
Indian Institute of Astrophysics
Gauribidanur / Bangalore



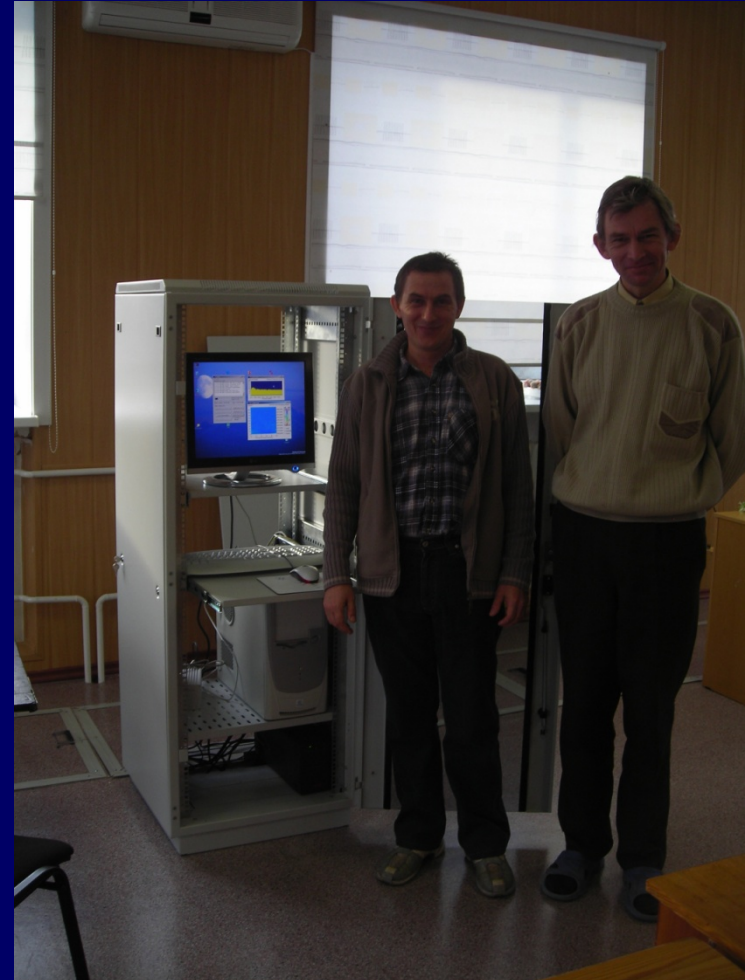
Callisto in Badary/Siberia



Antenna farm at SSRT



Antenna attached to dish



Sergey and Andrey in Badary/Siberia



Callisto in Daejeon, South Korea

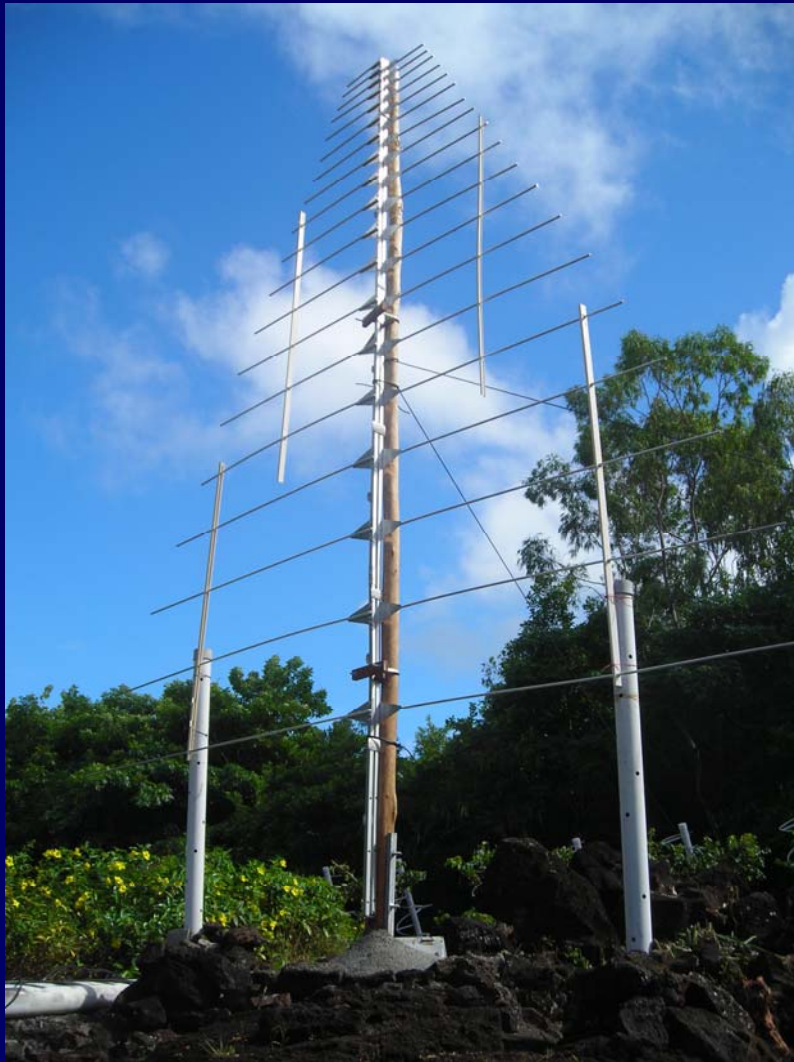


Antenna tower of Solar and Space Weather Group of Korea Astronomy and Space Science Institute (KASI)



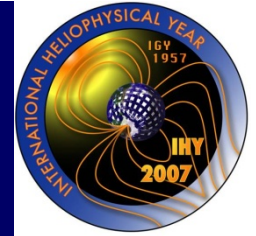
Student Hee-Sun reproducing a Callisto-spectrometer as a semester work in physics.

Callisto at MRT in Mauritius

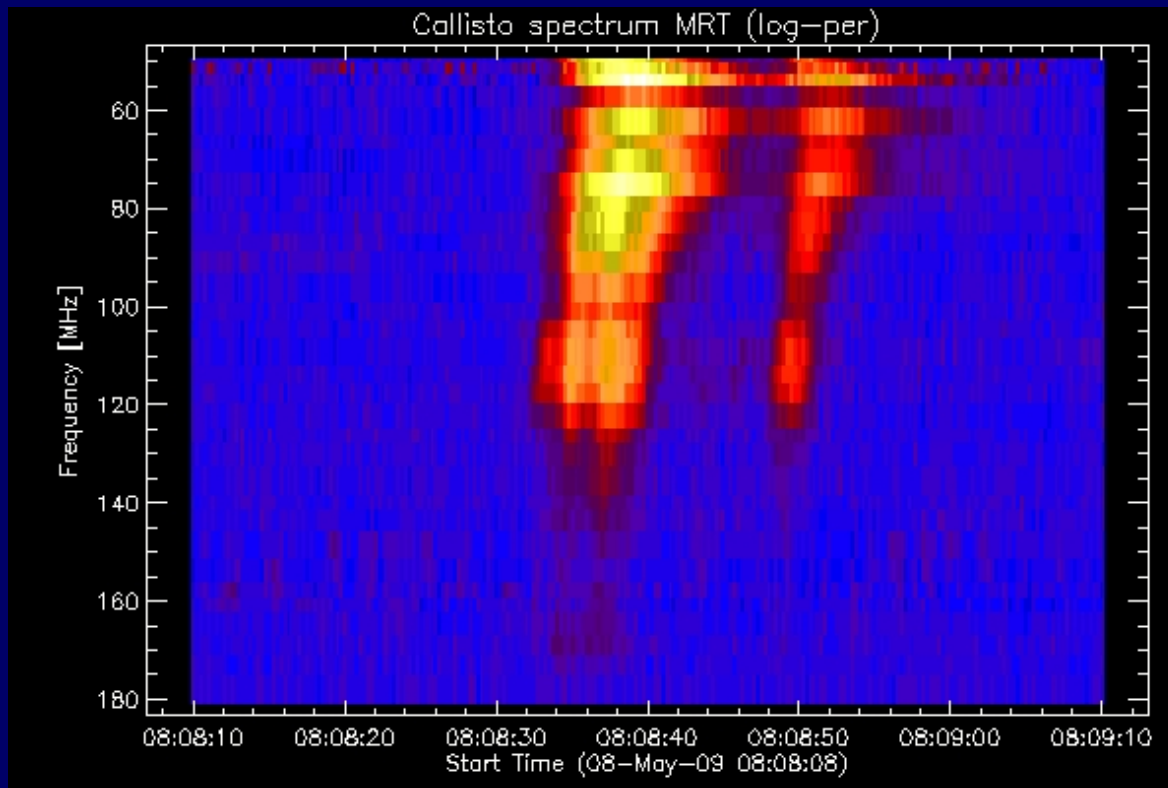


Self built log-per 20MHz ... 860MHz and

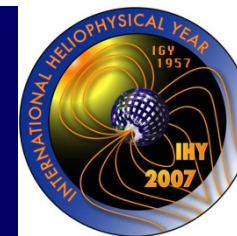
Callisto in air-conditioned receiver room
in Bras d'Eau, Poste de Flacq, Mauritius



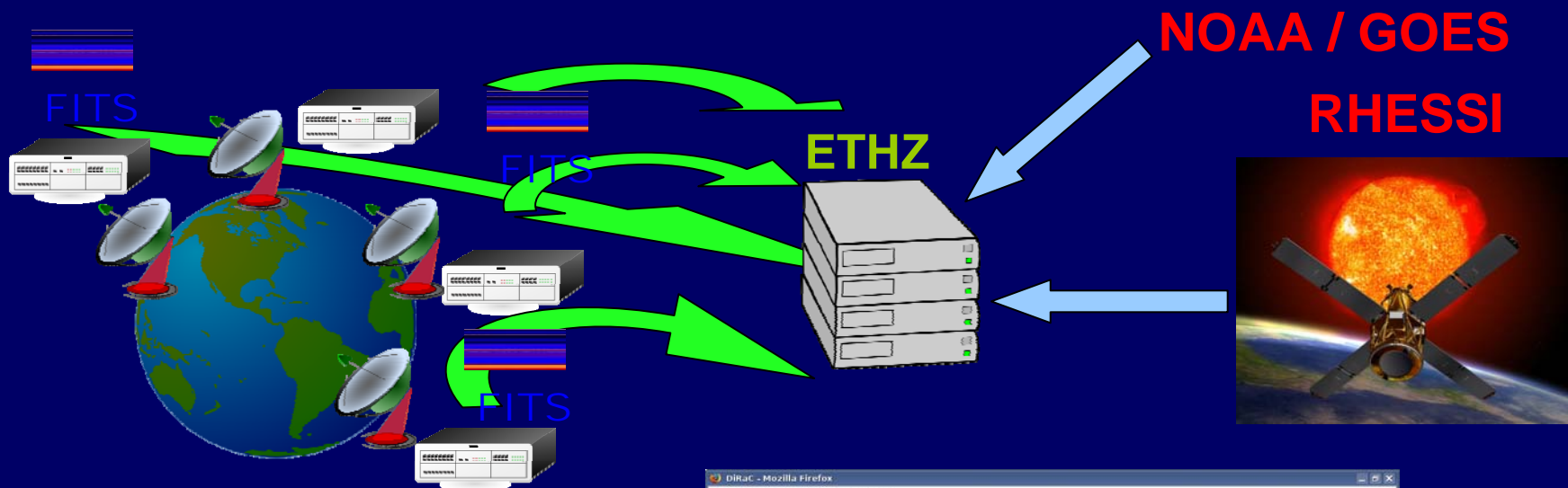
First result Callisto in Mauritius



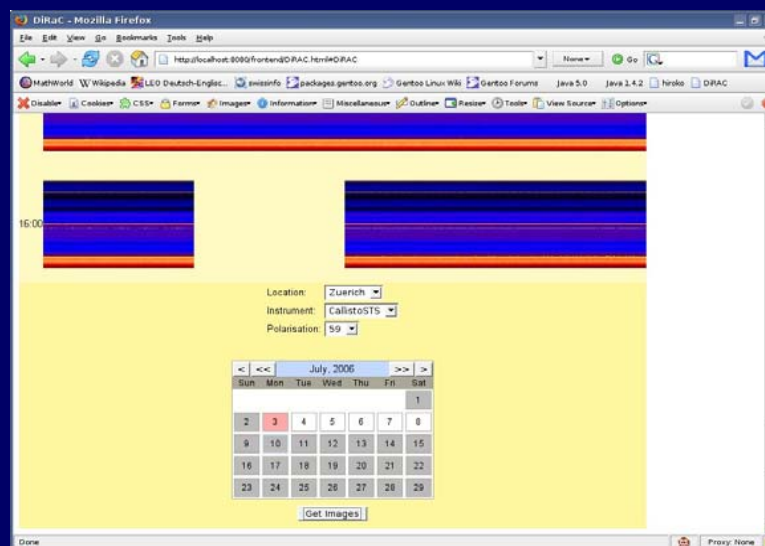
Astronomical outcome, group of type III flare as 'first light'
on May 1st 2009 08:08:30 UT



How does DiRaC work



Di = Distributed
Ra = Radio spectrometer
C = Control

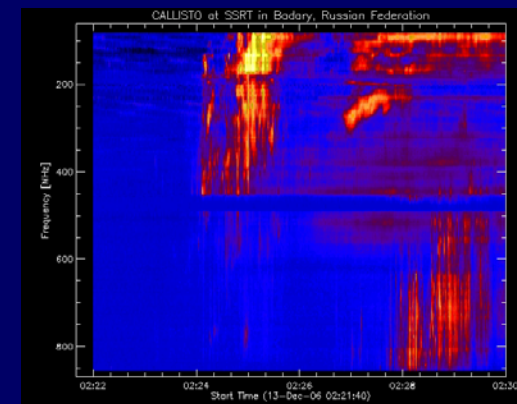
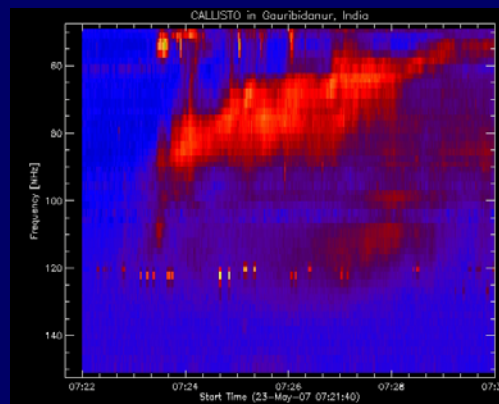
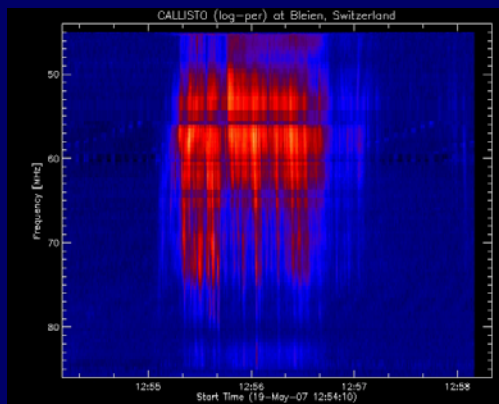


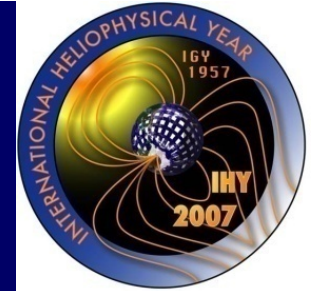


Publications

Scientific papers
(8 accepted and published)

CALLISTO A New Concept for Solar Radio Spectrometer, Arnold Benz et. Al. Kluwer Academic Pub. (2004)
On The Disk H α And Radio Observations of the 2003 Oct. Flare And Coronal Mass Ejection Event (2005)
Extended decimeter radio emission after large solar flares, Benz et. Al. (2005)
Astronomisches Praktikum der ETH Zürich auf Diavolezza 2980m.ü.M., ORION 335, 4 (2006)
Radio Spectrum Measurement at the Gauribidanur Observatory, C. Monstein, R. Ramesh (2007)
Construction of an e-CALLISTO Station in Korea, Su-Chan Bong et. al., C. Monstein (2008)
A World-Wide Net of Solar Radio Spectrometers: e-CALLISTO, Benz et. al. (2008)
Observations of the Solar Radio Emission with the Callisto Spectrometer, Kh. A. Monstein, S. V. Lesovoy, and A. I. Maslov (2009)





Info access

<http://www.astro.phys.ethz.ch/rapp/>

http://www.astro.phys.ethz.ch/instrument/callisto/callisto_nf.html

<http://www.astro.phys.ethz.ch/instrument/callisto/ecallisto/applidocs.htm>

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