



I-LOFAR

Exploring the Radio Universe from Ireland



I-LOFAR Roll-Out

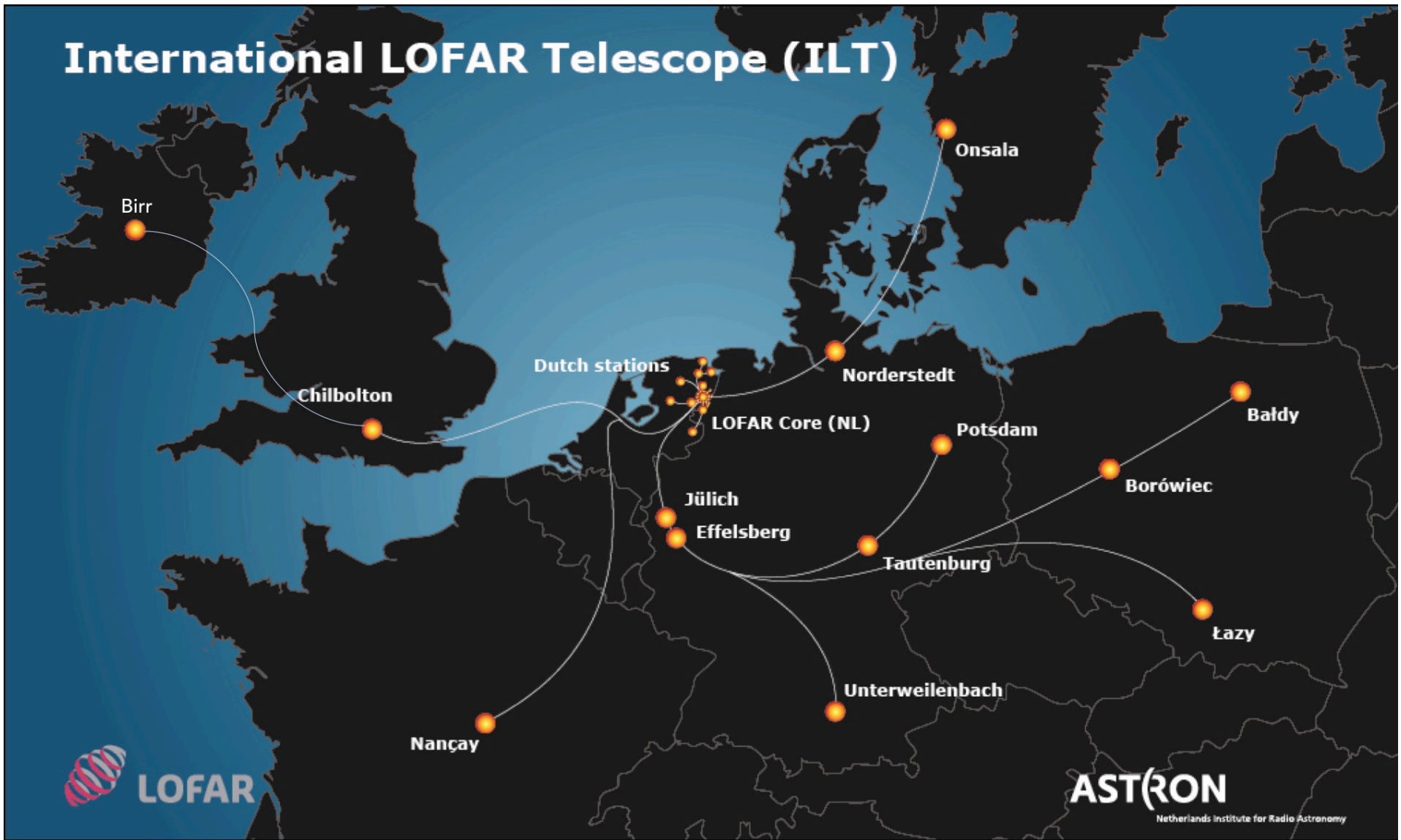
Peter Gallagher and Joe McCauley

I-LOFAR Consortium

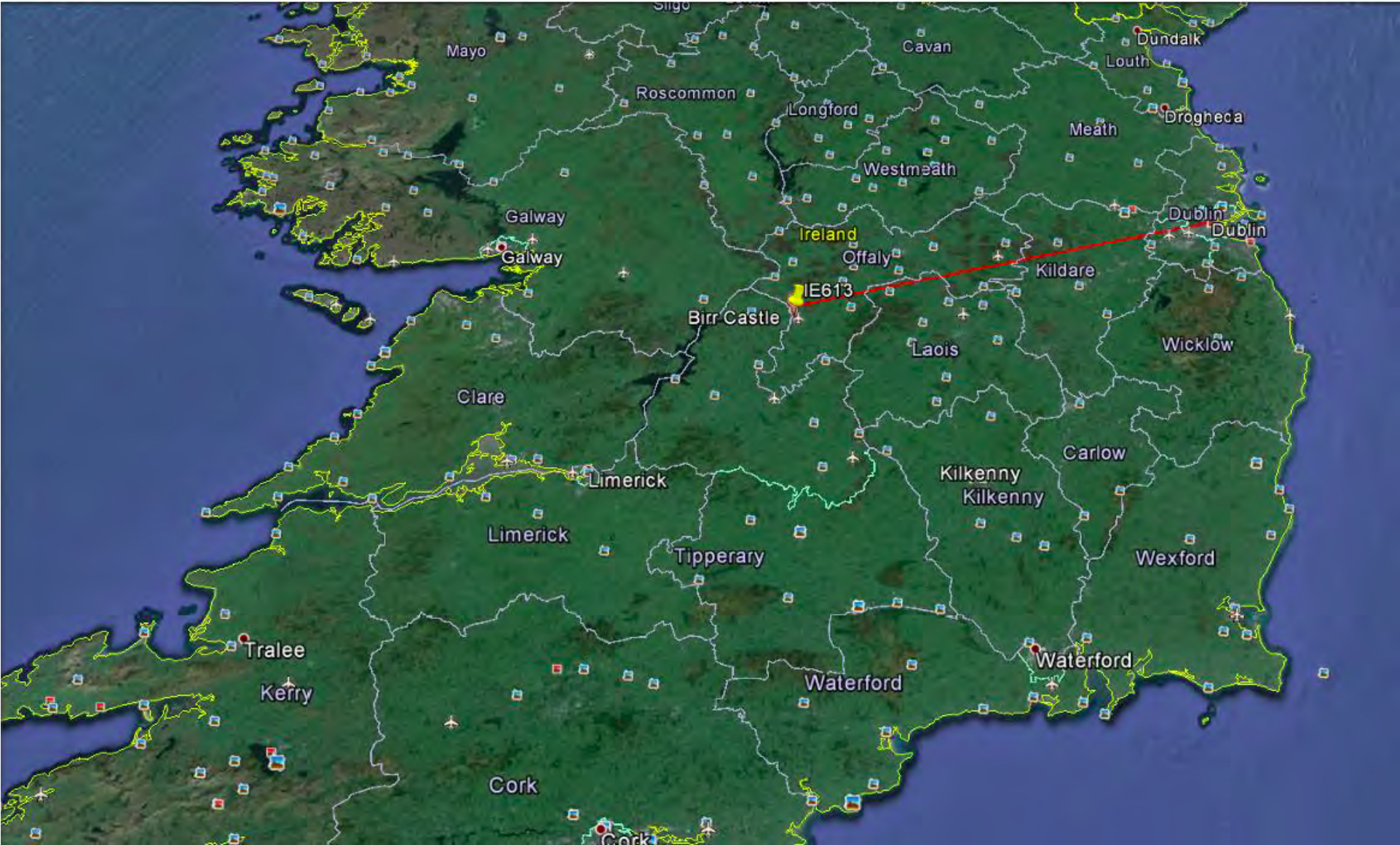
www.lofar.ie

peter.gallagher@tcd.ie

International LOFAR Telescope (ILT)



← ~1900 km East-West Baseline →







Welcome to the
Rosse Solar-Terrestrial Observatory
Operated by the School of Physics, Trinity College Dublin

The Rosse Solar-Terrestrial Observatory (RSTO) was established by Trinity's School of Physics in Birn Co. Cilliey to study solar activity and the effects of space weather on the Earth's geomagnetic field, upper atmosphere, and ionosphere. Space weather can cause interruptions in communications and navigation systems such as GPS, damage satellite electronics and cause problems in electrical power networks.

The Rosse Observatory is part of a global network of space weather observatories in Europe, Africa, India, China, Russia, and many other locations around the world. All our data are streamed live to the global scientific community at www.RosseObservatory.ie

Solar Radio Bursts



Solar radio bursts can cause interruptions in communications systems on Earth.

A storm warning (left above) and a L2/L3 Low Band storm warning (right above) are shown. A high-power antenna (center) works at 100-200 MHz.

The antenna measure radio bursts caused by solar storms and tell us when a radio burst happens and what speed it is traveling at, therefore warning us to predict its arrival at Earth.

These antennas form part of the e-Cadmus global network of radio receivers operated by ETH Zurich in Switzerland.

Ionospheric Disturbances

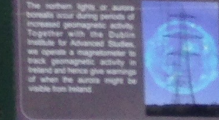


Solar ionospheric storms can disturb the ionospheric structure of Earth's atmosphere 60-80 km above us. This can interfere with radio communications on the day side of the Earth.

Our custom designed ionospheric measurement system was designed by the Dublin Institute of Technology (DIT) and is used to continuously monitor very low frequency (VLF) radio signals from the ionosphere.

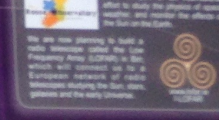
These antennas form part of the e-Cadmus global network of radio receivers operated by ETH Zurich in Switzerland.

Geomagnetic Storms



The northern lights or aurora borealis occur during periods of increased geomagnetic activity. Together with the Dublin Institute for Advanced Studies, we operate a magnetometer to track geomagnetic activity in Ireland and hence give warnings of when the aurora might be visible from Ireland.

The Future of RSTO



RSTO is part of an international effort to study the physics of space weather and monitor the effects of the Sun on the Earth. We are also planning to build a radio receiver with the Low Frequency Array (LFA) in Birn Co. Cilliey which will connect us to a European network of radio magnetometers during the Sun 100th anniversary and the early 2020s.



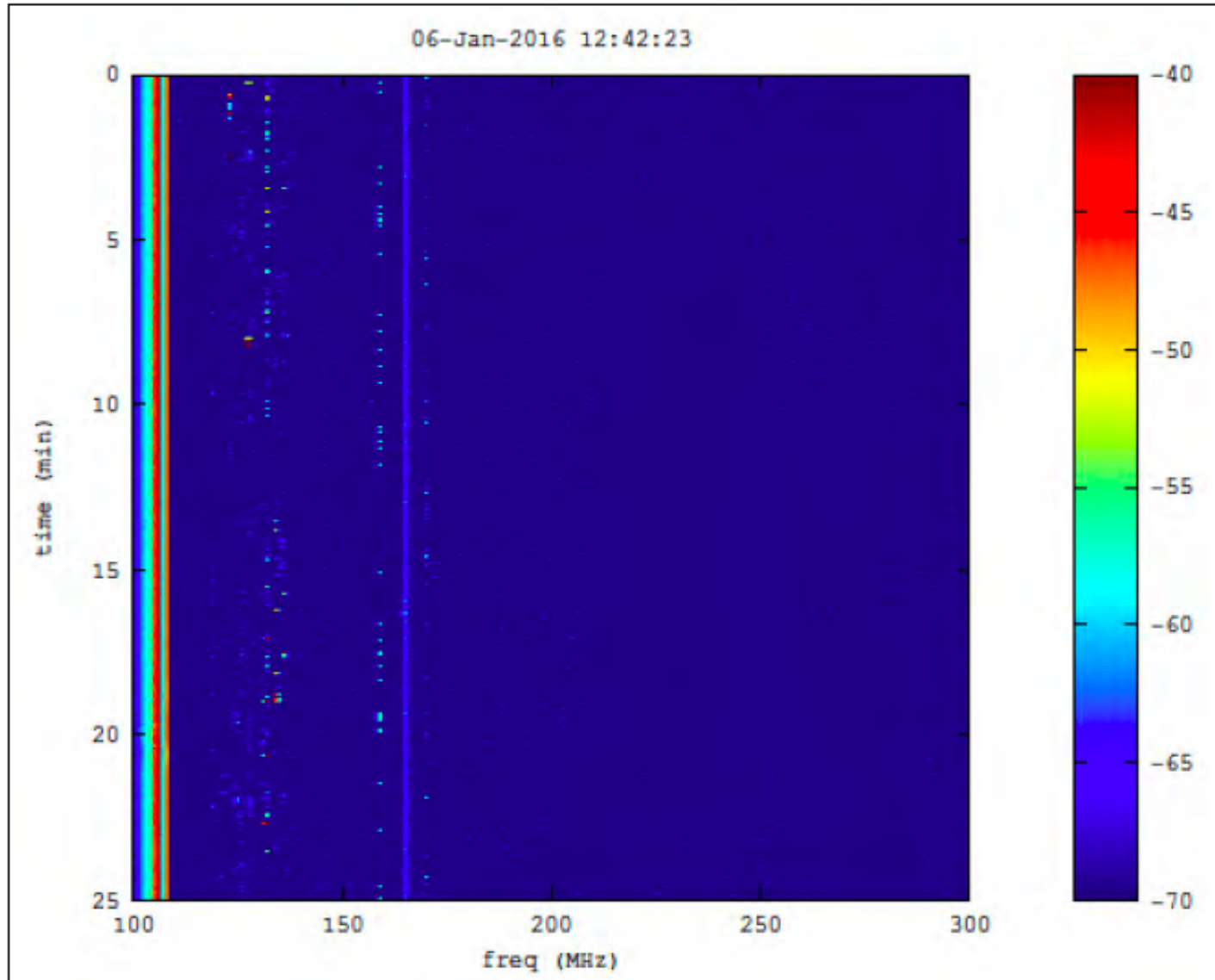
Ground Anchoring Test (Jan 2016)



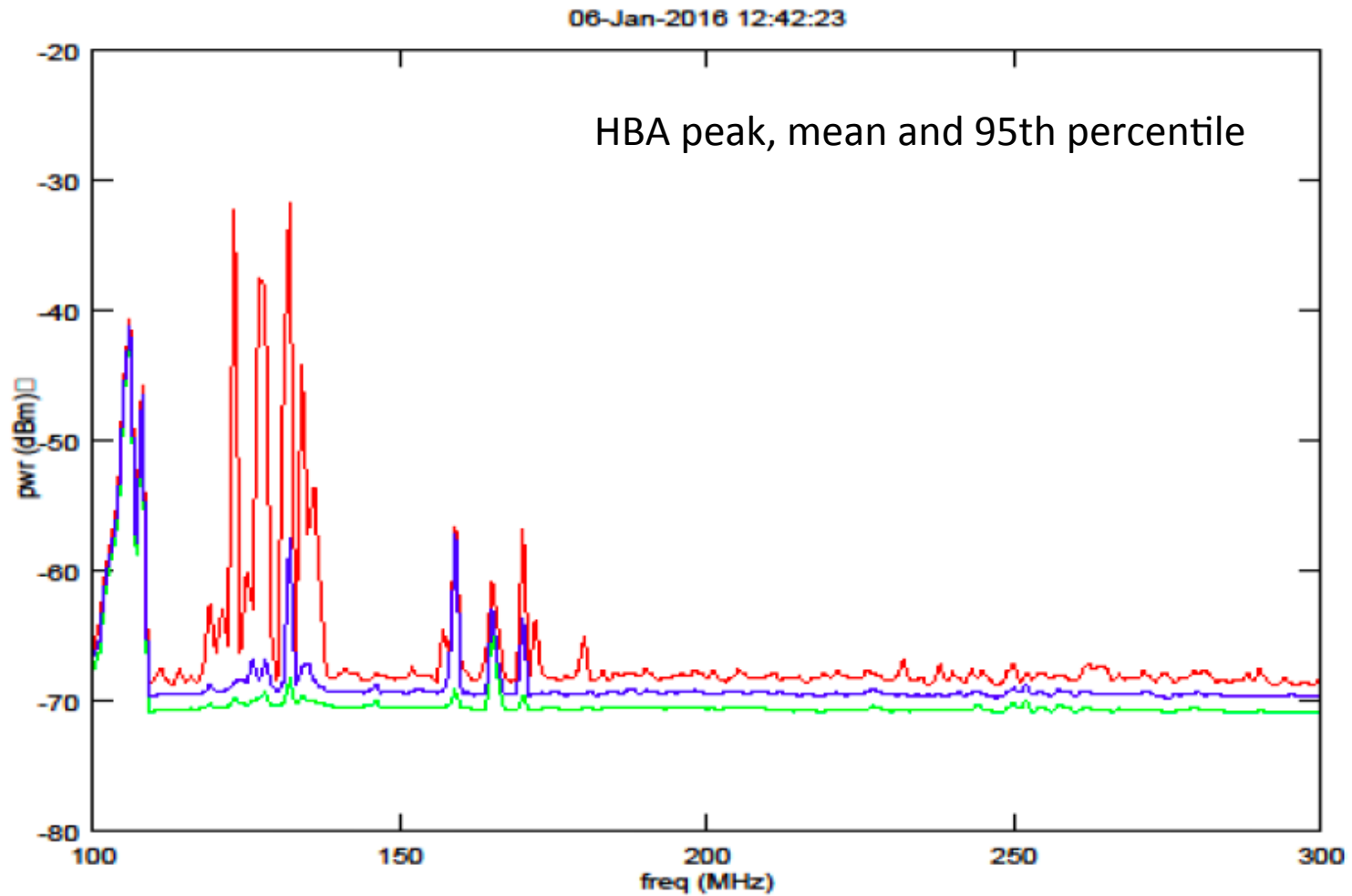
RFI Test (Jan 2016)



HBA North-South

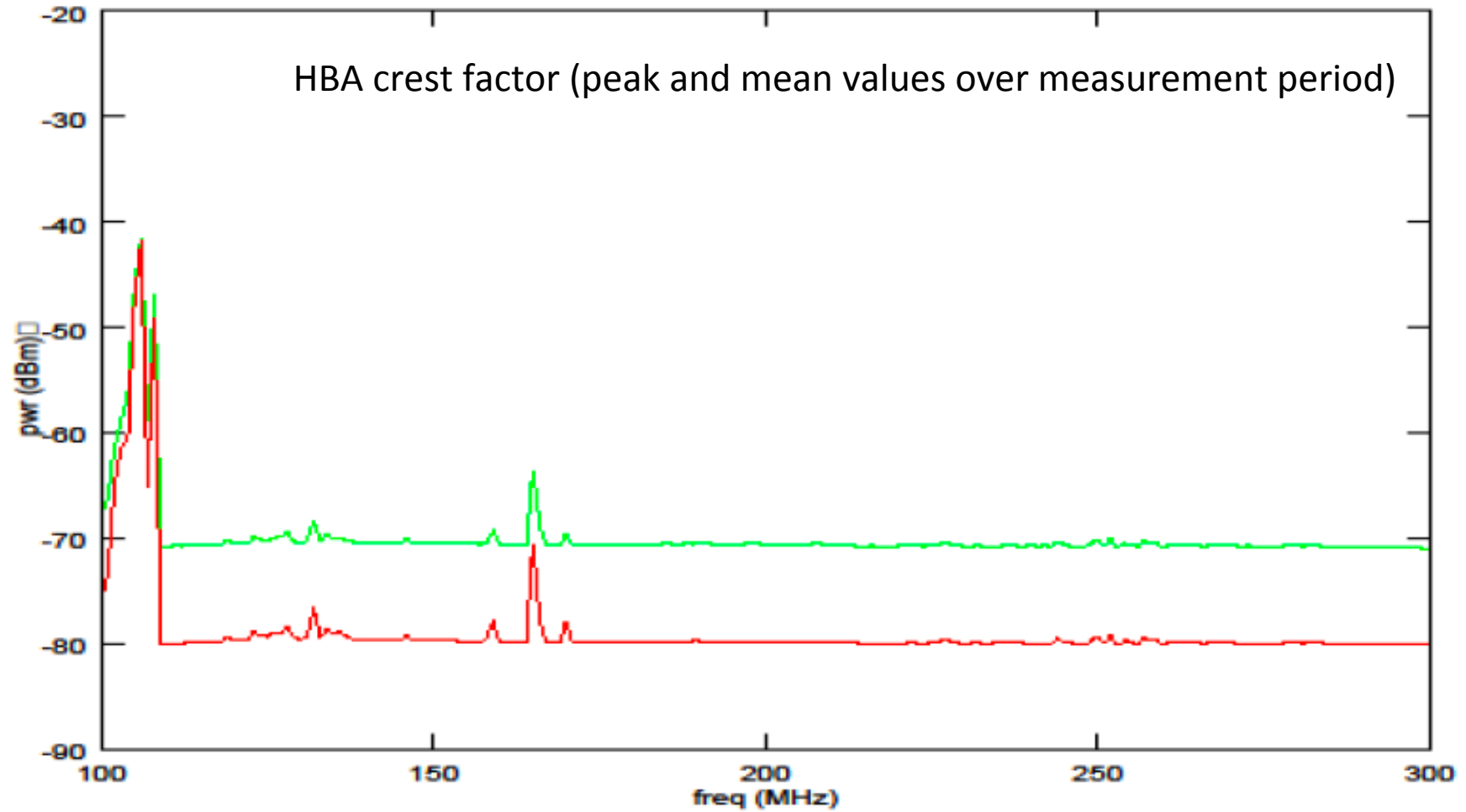


HBA North-South

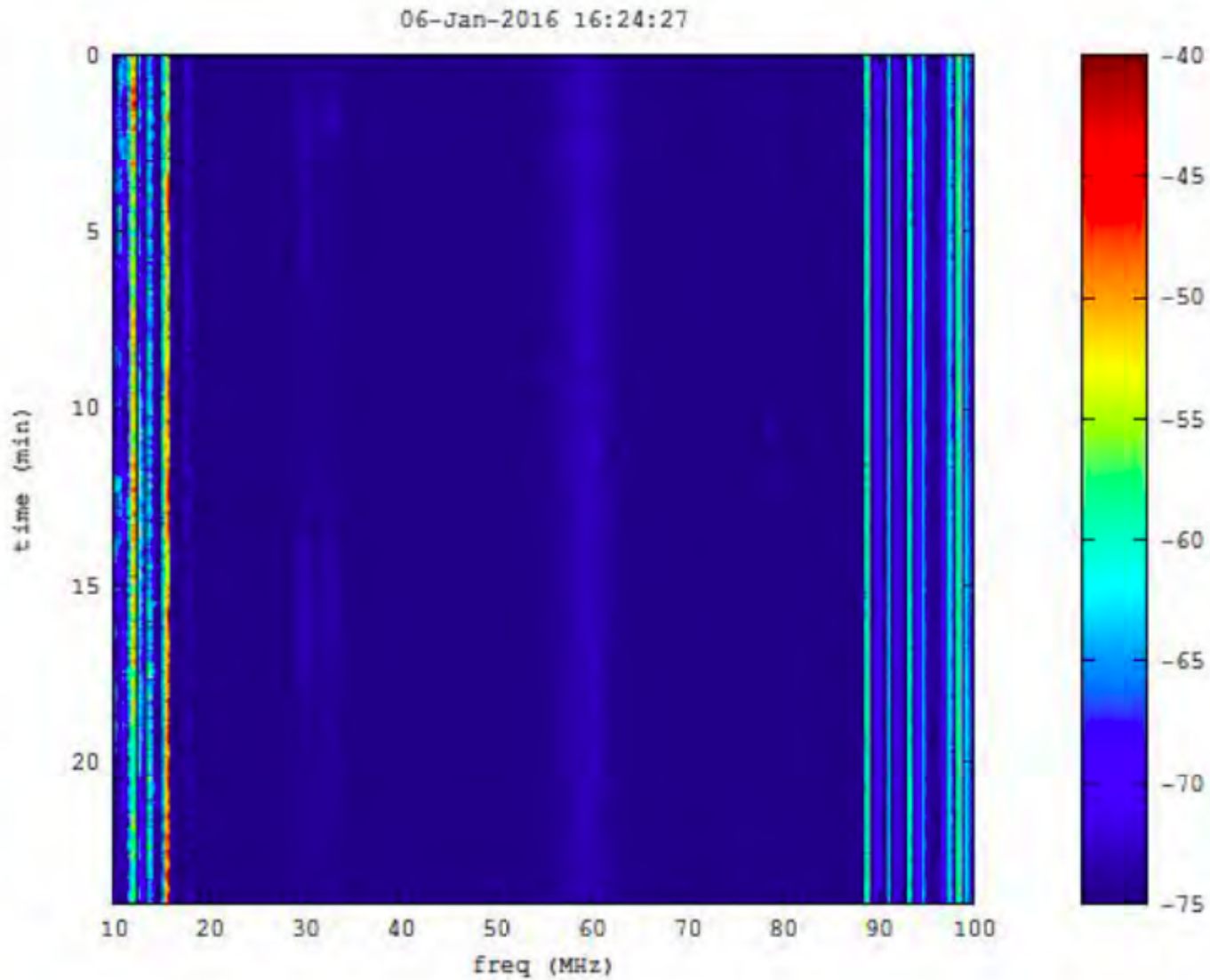


HBA North-South

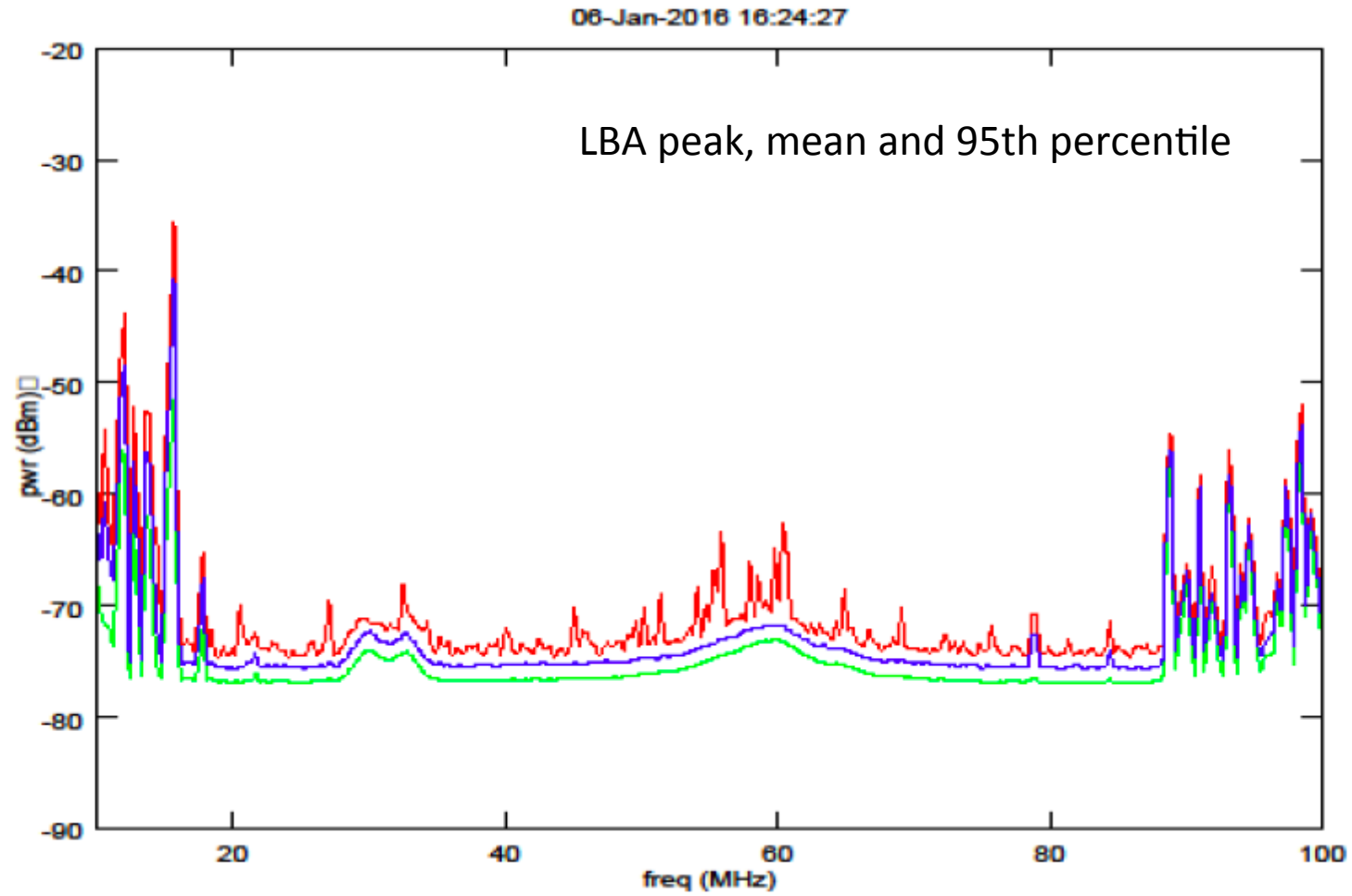
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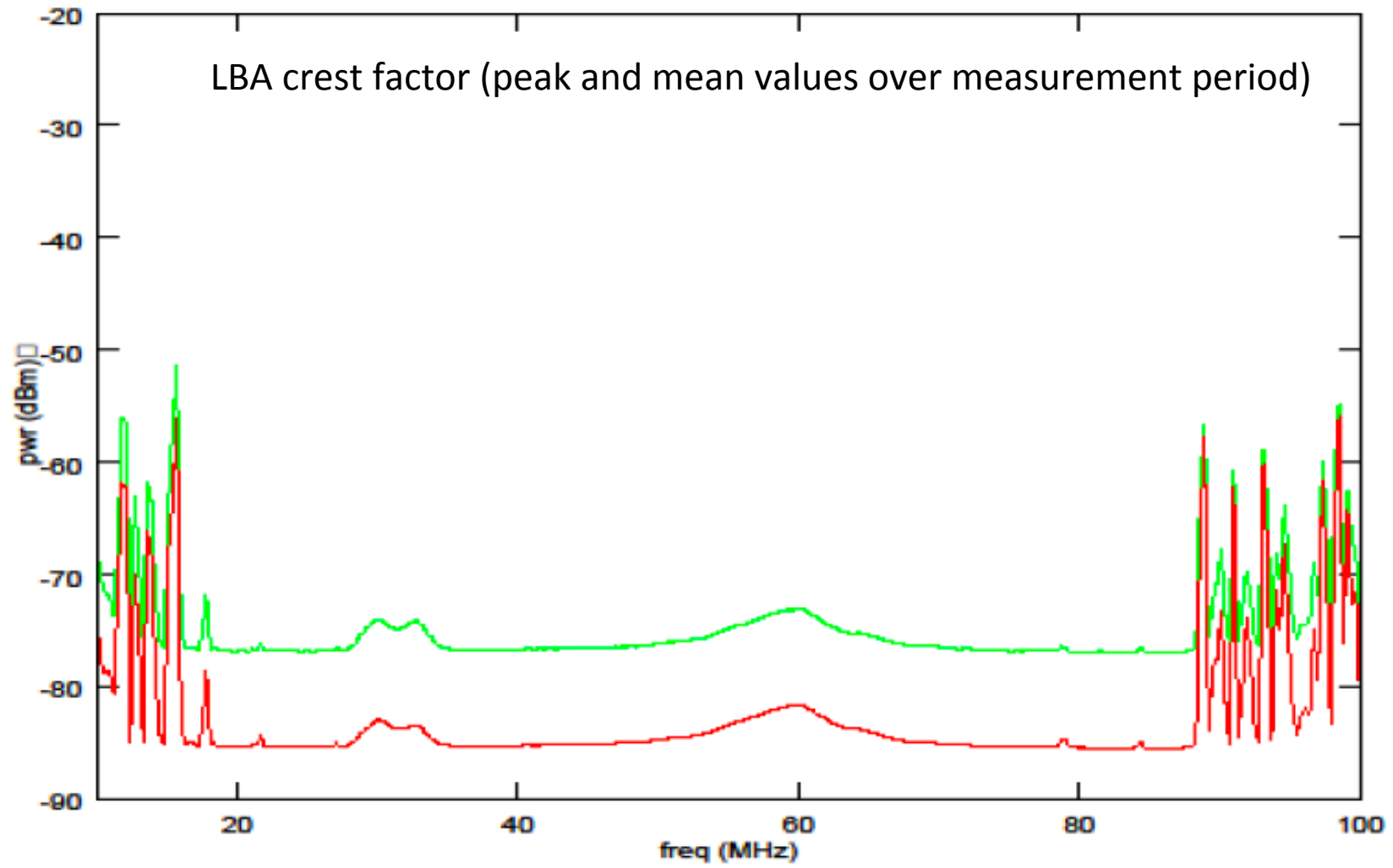
LBA North-South



LBA North-South



LBA North-South



RFI Survey Conclusions

- LBA:
 - RFI “relatively low”.
 - Low 32 MHz RFI. Source unknown => Should be monitored.
- HBA:
 - RFI “relatively low”.
 - No DAB observed => Should monitor development.
- See ASTRON RFI report at www.lofar.ie/local

Flooding

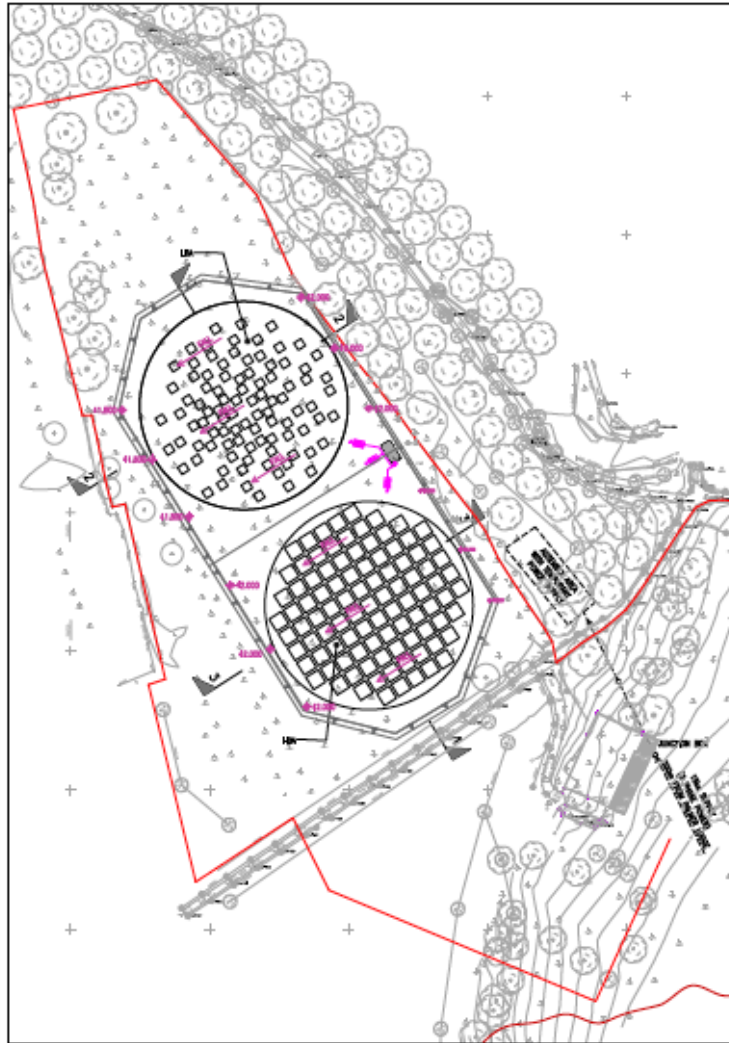
May 2013



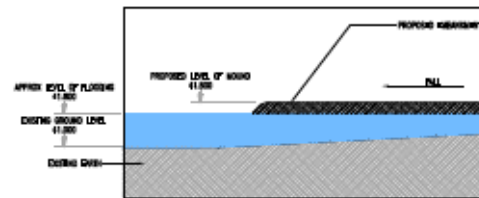
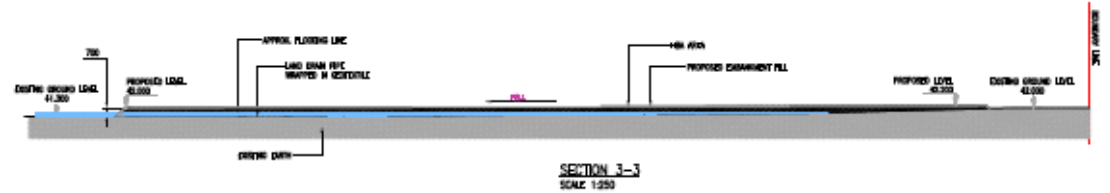
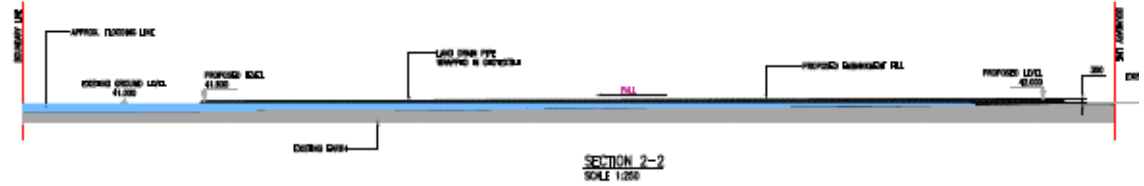
Jan 2016



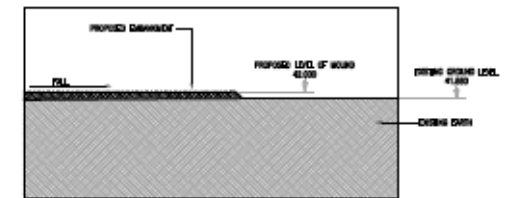
Flooding Solution: Raise Levels



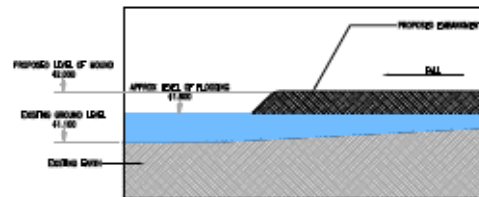
KEY PLAN
SCALE 1:1000



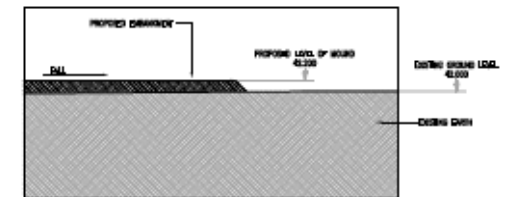
STAGE 1
PROPOSED DETAIL AT LOWEST EXISTING GROUND LEVEL
SCALE 1:500



STAGE 1
PROPOSED DETAIL AT HIGHEST EXISTING GROUND LEVEL
SCALE 1:500



STAGE 2
PROPOSED DETAIL AT LOWEST EXISTING GROUND LEVEL
SCALE 1:500



STAGE 2
PROPOSED DETAIL AT HIGHEST EXISTING GROUND LEVEL
SCALE 1:500

Timeline: July – August, 2016

Ground works

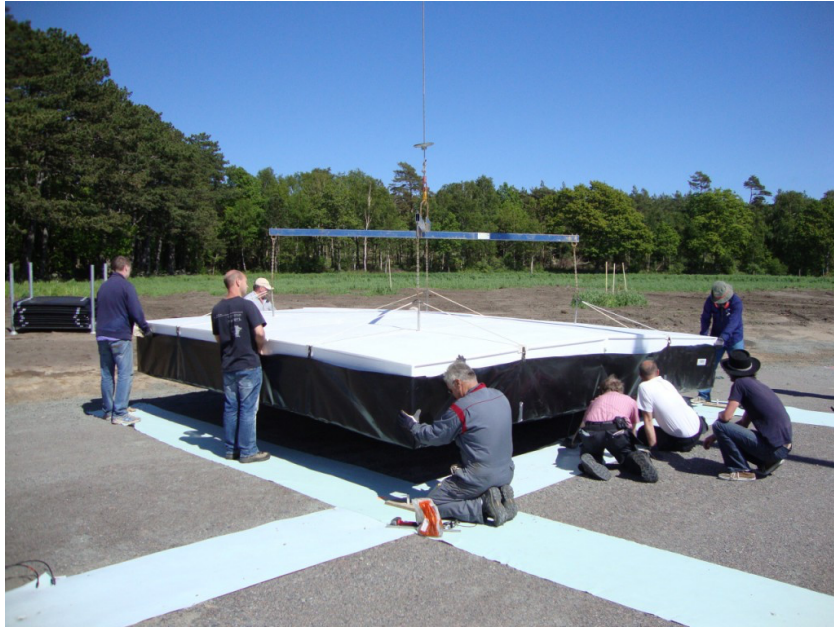


Timeline: September 2016

Cable installation



Timeline: October 2016



Timeline: November – December, 2016



Timeline: January – February, 2017

Operational!

