# The Effelsberg LOFAR Station of the MPIfR, Bonn

Status March 2010

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*and the MPIfR LOFAR group*

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Radio Observatorium Effelsberg

## International Station Germany 1

# IS-DE1

Installation of LBAs end of 2006:

Flattening of 65m x 65m (+/-6cm)

22 km cabel digged in the ground

Placement of LBAs

Container 60db shielding 9m x 5m / LOFAR cabinett inside

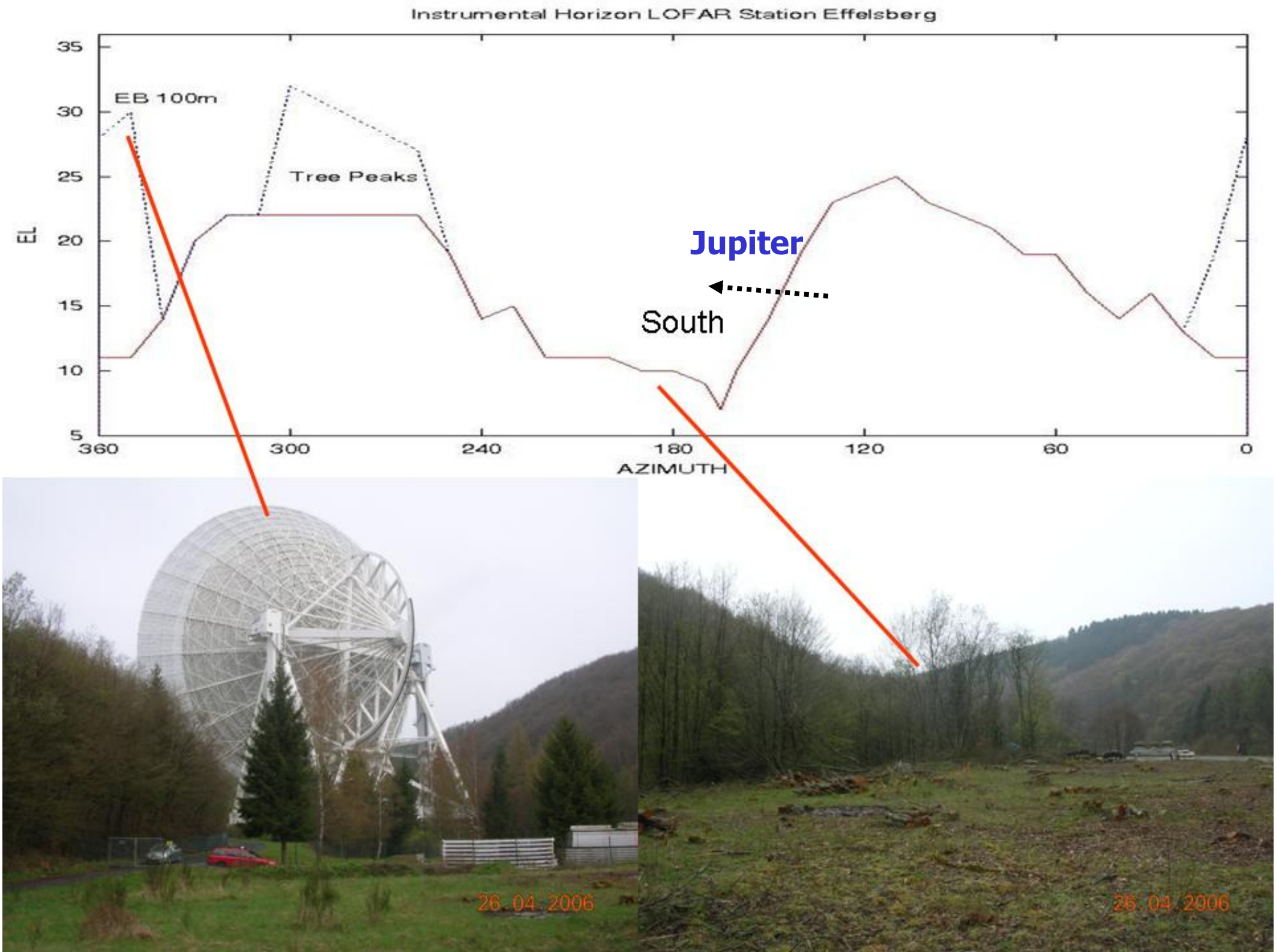
192 amplifier made operational, cable + connector problems

Electronic delivery complete Sept. 2007

„Stand-alone" operation  Nov. 2007

Fibre-connection to Bonn Nov. 2007


100m telescope
construction site
before 1970


Instrumental Horizon LOFAR Station Effelsberg
EB 100m
Tree Peaks
Jupiter
South
EL
AZIMUTH
35
30
25
20
15
10
5
360
300
240
180
120
60
0
26.04.2006
26.04.2006


Flattening +/- 6cm
29.11.2006


LOFAR cabinett
16.01.2007


Antenna positions marked better than +/- 3cm
12.01.2007


Preparing the individual antenna locations
07.02.2007

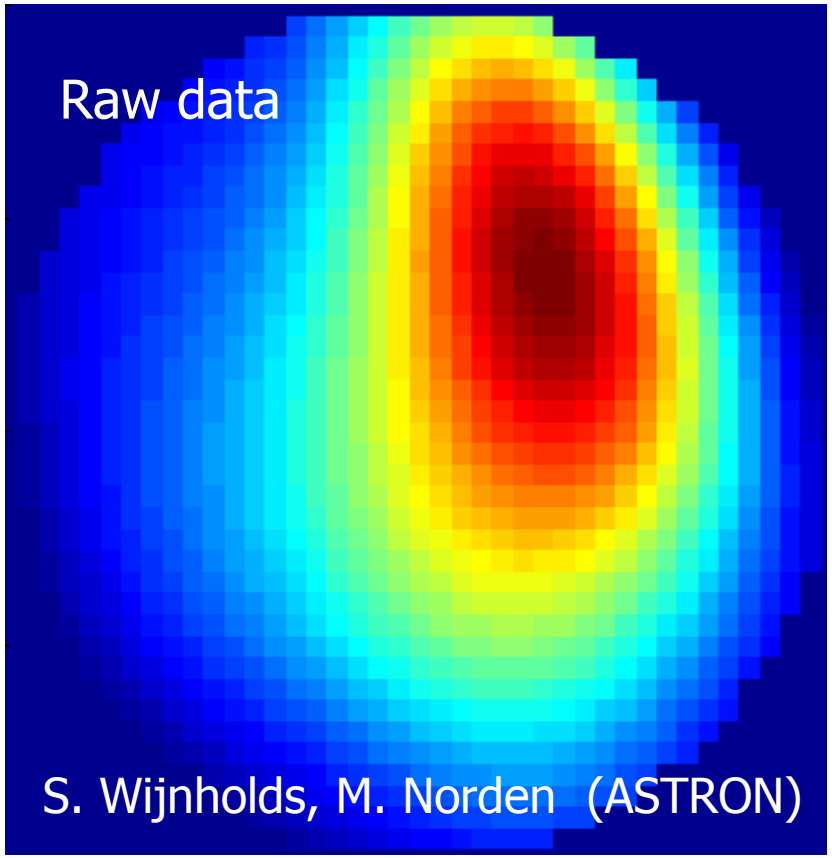

22.01.2007


Wooden fence to avoid reflections
22.02.2007

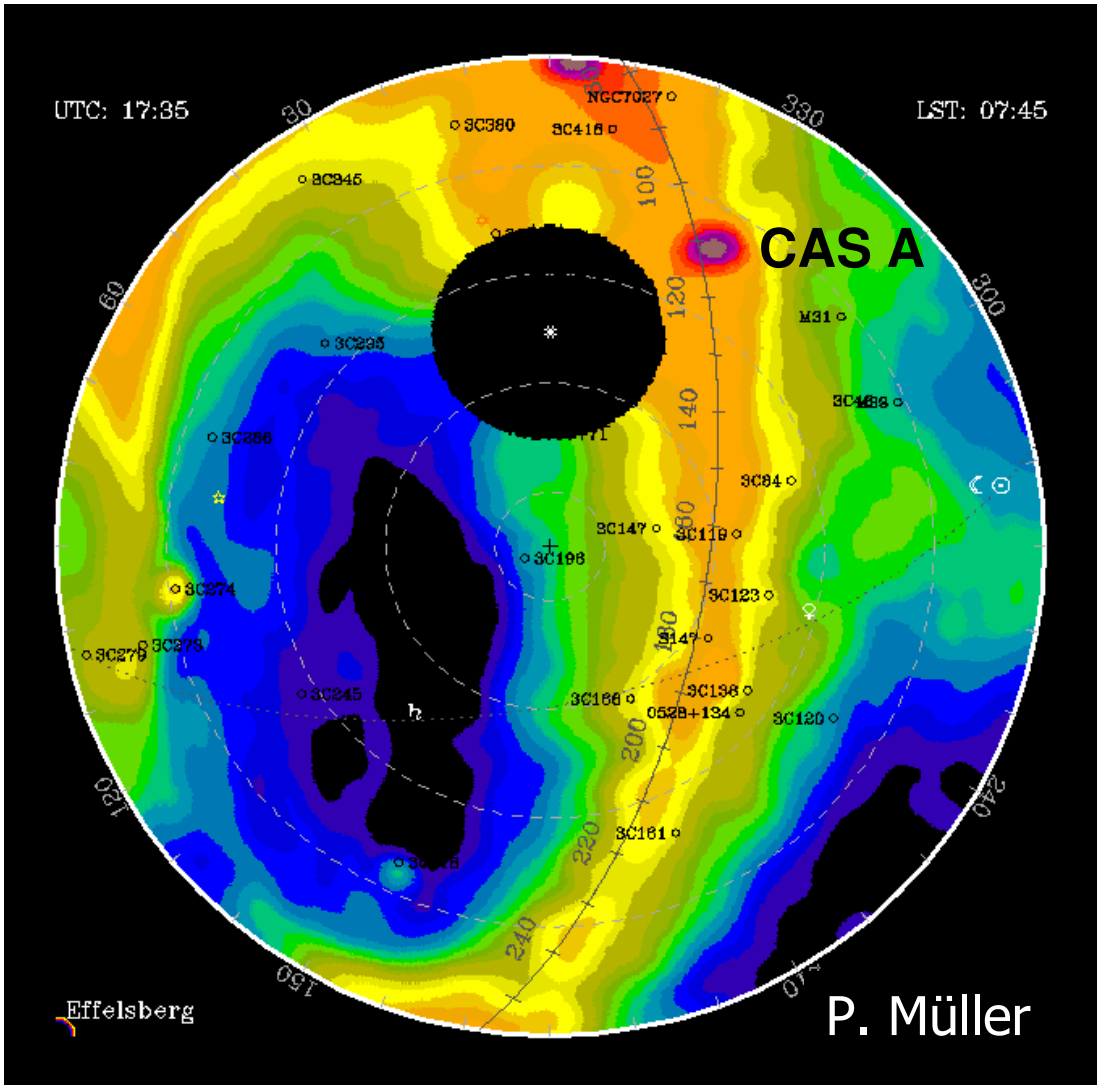

Digging cabel canals – after heavy rainfall
ZEPPELIN
PELZER-BAUZENTRUM.DE
PELZER
07.03.2007

**March 2007 „First Light“:**

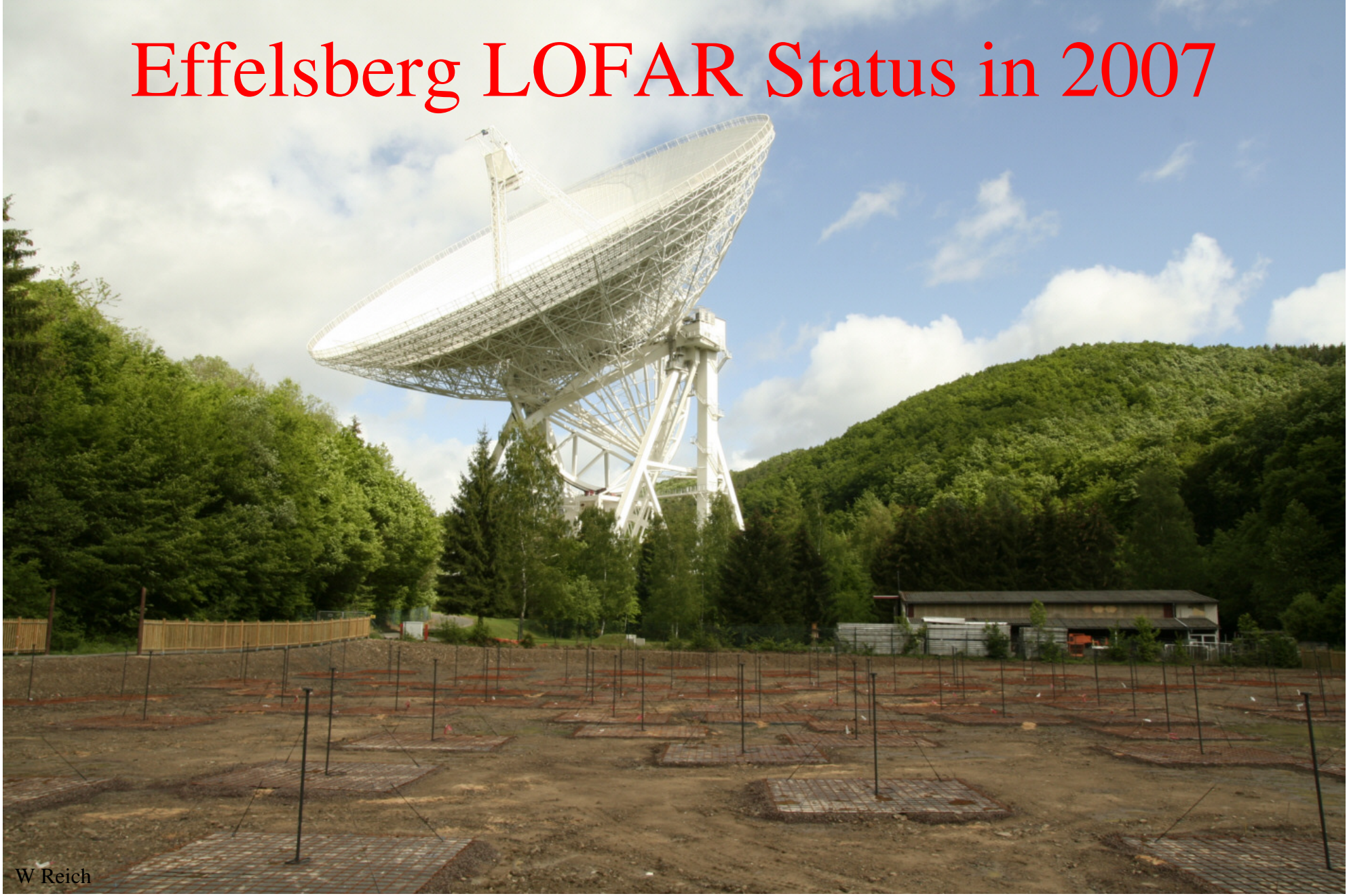
**25 MHz map (HPBW ~22°) „Stand-alone“ mode**




45 MHz Survey (HPBW~5°)



# Effelsberg LOFAR Status in 2007



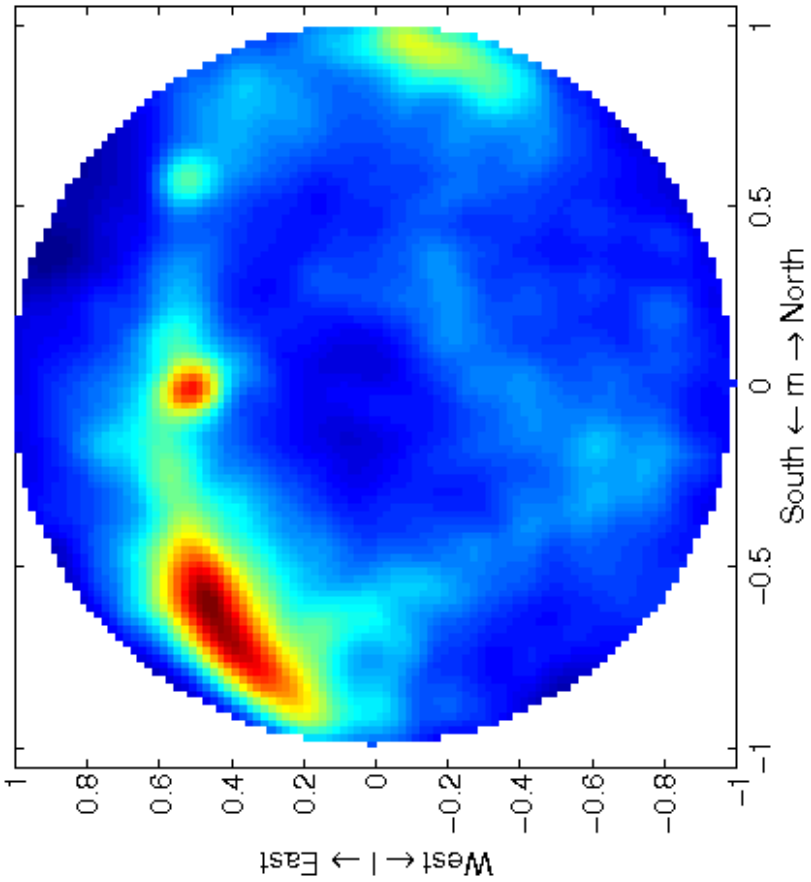

- Low band antennas (LBA) and electronics container in place
- Station acceptance November 2007

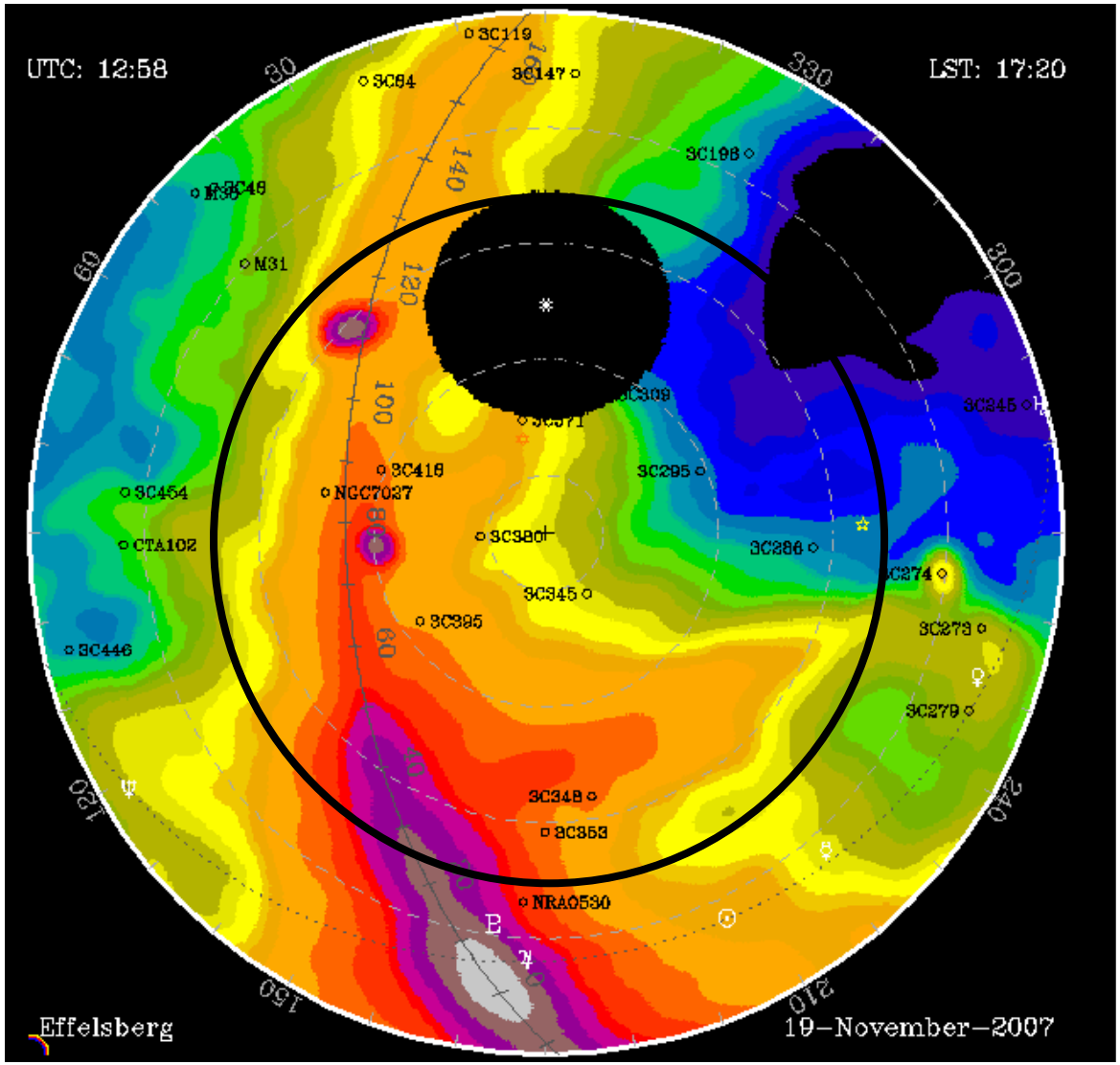
# Acceptance procedure completed !!

IS-DE1 „stand-alone“
operation
96 X-Dipole, τ=1s,
f=42 MHz

45 MHz:
Maeda et al. (1999)

S. Wijnholds, P. Müller



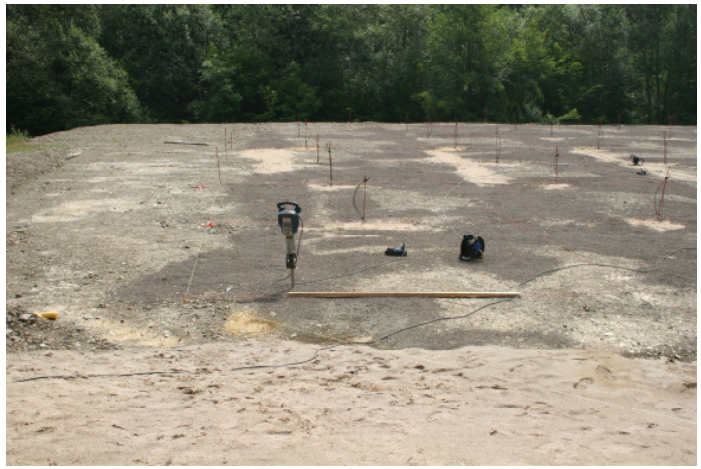


March 2008



after two storms in
March 2008

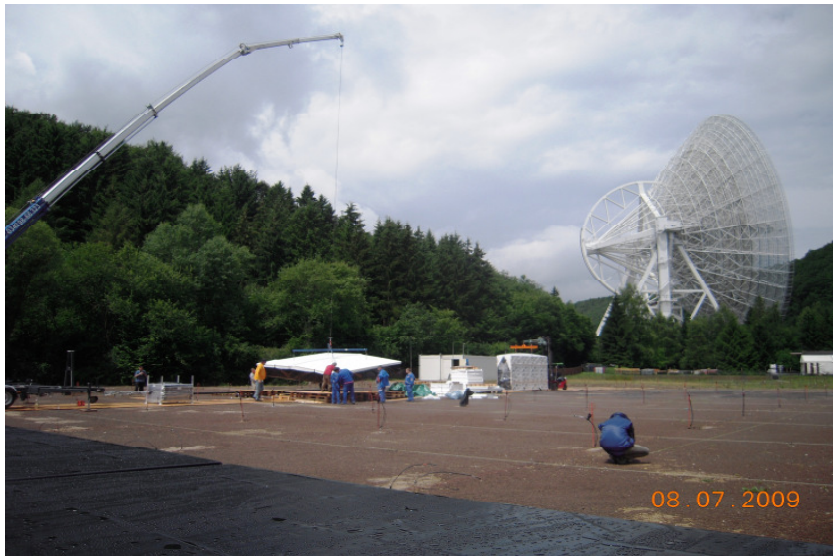
# High Band Antenna Field Construction



- HBA field construction 2009 March—June
- Involvement from EF Werkstatt, Bonn Uni geodetic group, and subcontractors

# HBA Construction 2





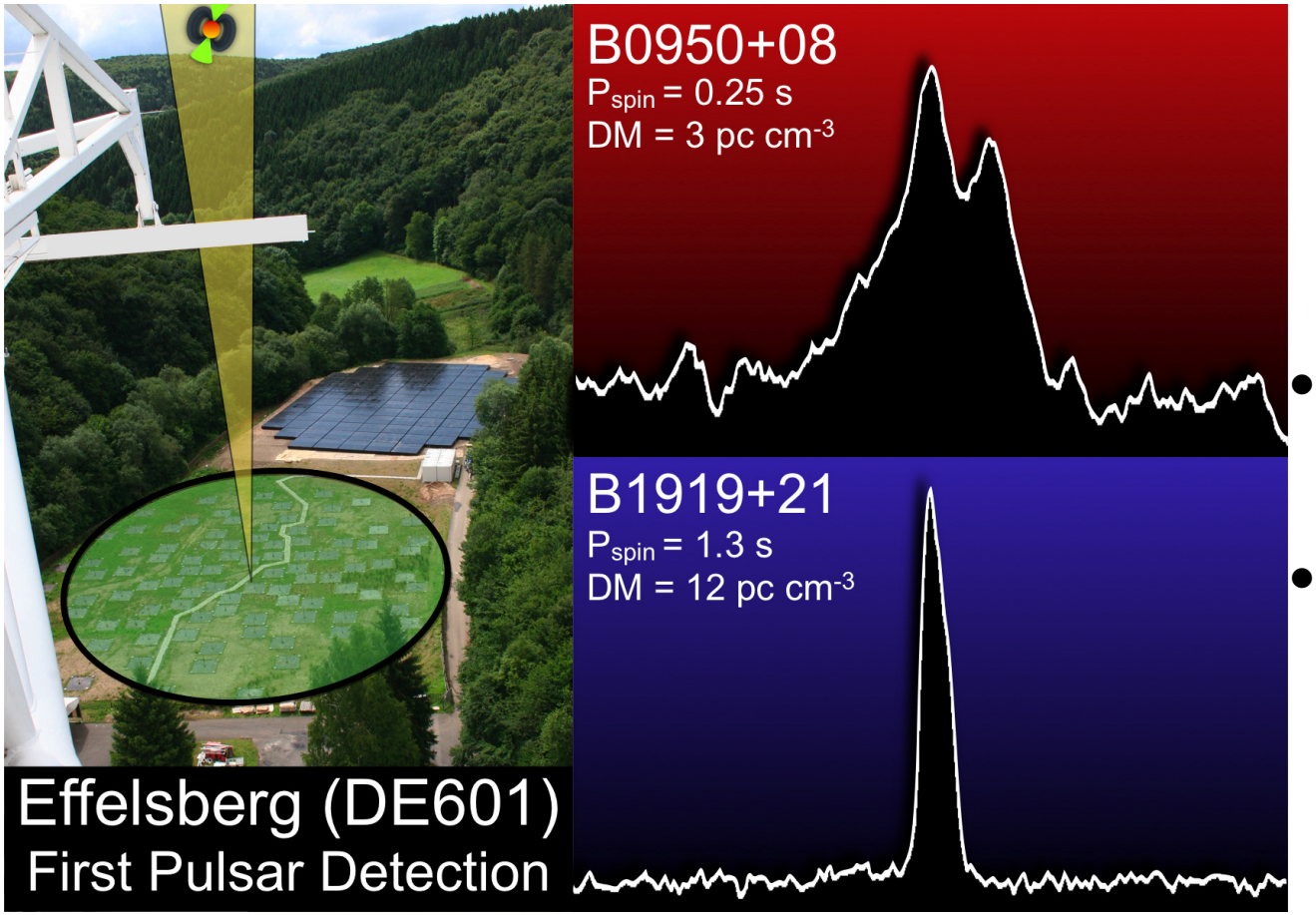

- HBA tile delivery and on-site construction different from NL
- Limited crane access also forced different installation techniques

# HBA Construction 3


- 96 HBA tiles installed from 2009 July 06—17
  - 2.5 times the NL installation rate at that time
- Significant student help from VLBI Group, Fundamental Physics Group, and Bonn Uni

# Effelsberg LOFAR Station

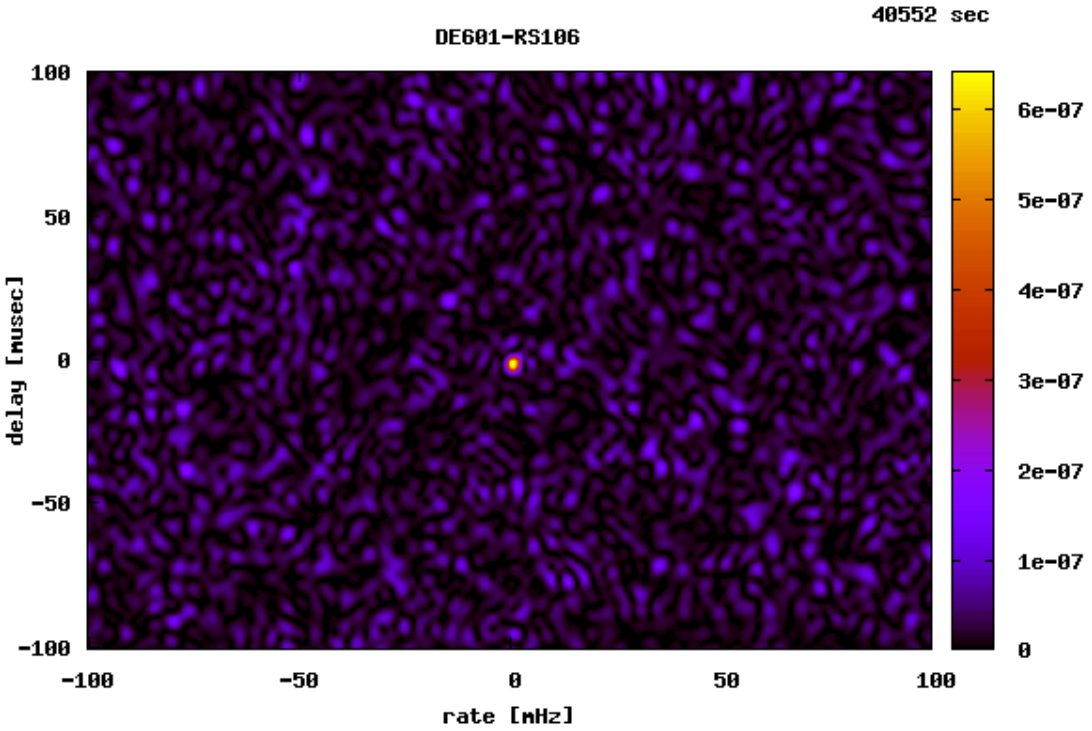
# First LOFAR LBA Pulsar Detection



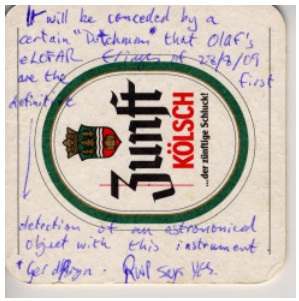

James M Anderson/MPIfR/Jason Hessels

- Pulsar observations to test correct data transmission over Effelsberg data link taken 2009 August 19
- Both of the strong test pulsars were detected
- First detection of pulsars using the LOFAR low-band system
  - Effelsberg has larger collecting area than NL stations

# Effelsberg First Fringes



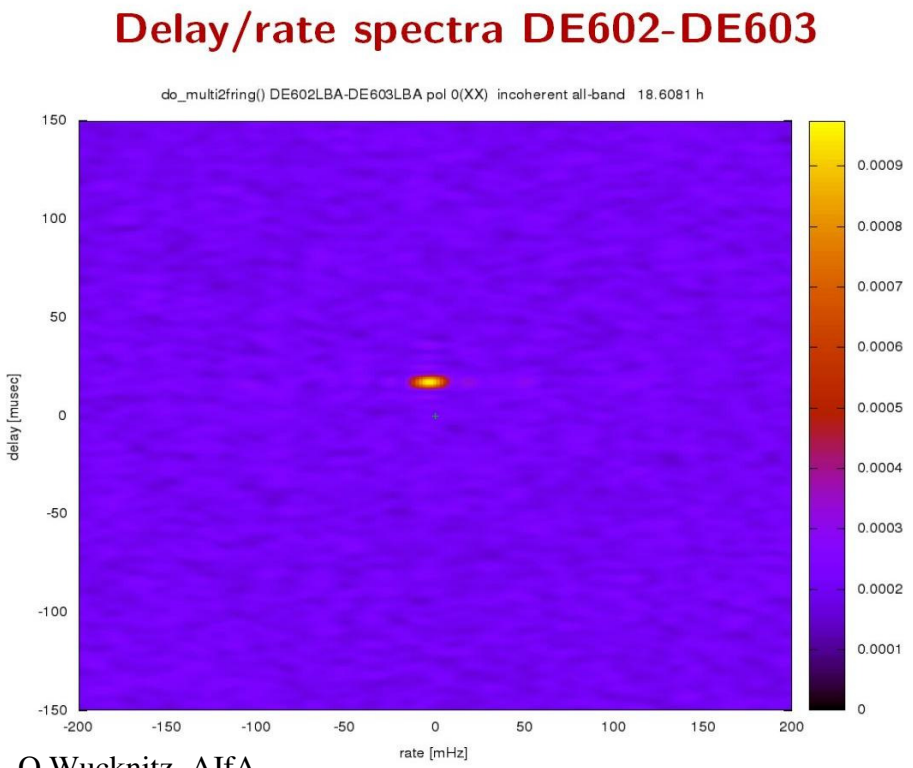

O Wucknitz, AIfA





- Observations of 3C196 taken 2009 August 20 including Effelsberg as part of LOFAR Survey KSP busy week
- Initial data analysis suggestive, but not conclusive
- Detailed analysis by O Wucknitz (AIfA, Bonn) showed conclusive detection of first fringes for EF, end of August 2009

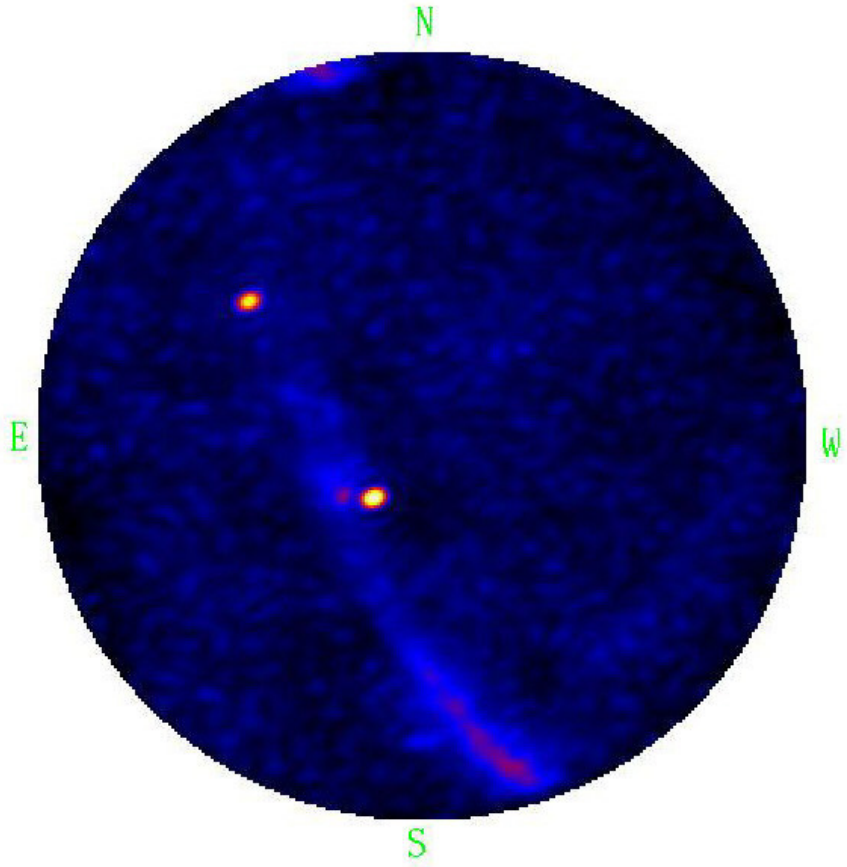
# German LOFAR Station Fringes




O Wucknitz, AIfA

- Tautenburg network connection 2010 January, Unterweilenbach network connection 2010 February
- **Fringes seen on all German and DE—NL baselines**
- Now we have to work on the details
  - 18 μs clock offset at Tb
  - Polarization swap at Tb?
  - Missing subbands from all stations
  - Incorporate fringe finding algorithms into LOFAR processing software

# HBA All-Sky Imaging




- HBA and station electronics checkout completed 2009 October
- First LOFAR all-sky image using standard HBA station made with Effelsberg on 2009 November 10
- International stations important for imaging large spatial scales for Milky Way and large objects
- Software development for this mode by Bonn, Oxford