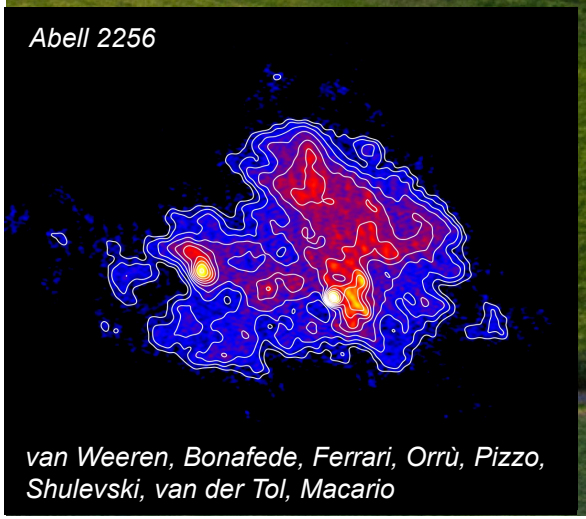
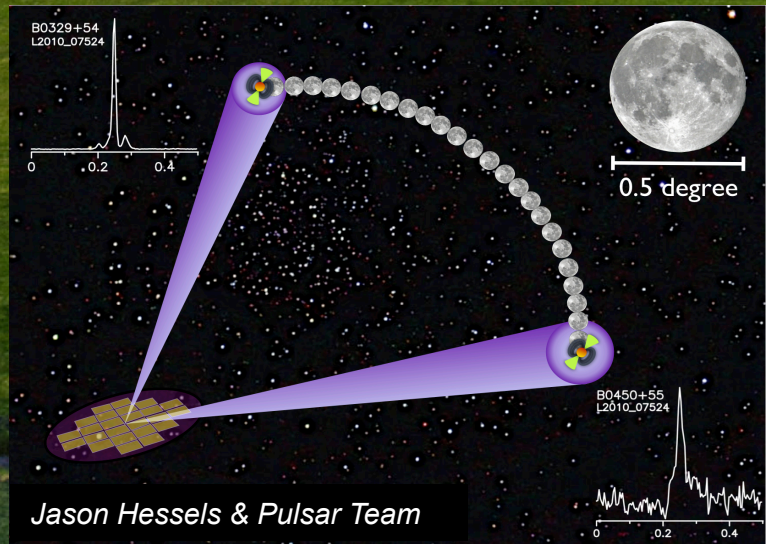
ILT Organization and Access

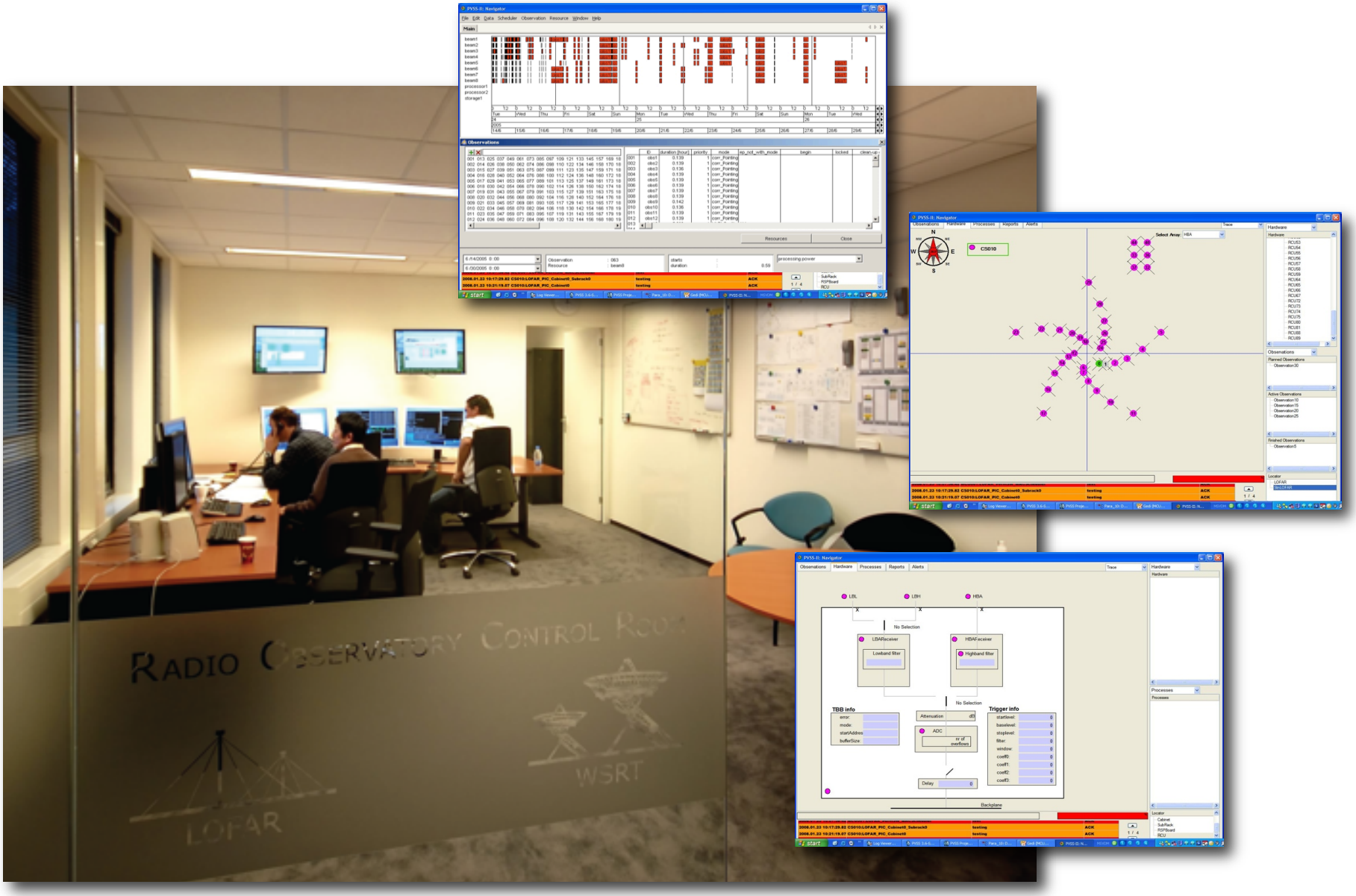
René Vermeulen

Director ILT





Coordinated Operations




early July 2008


late July 2008


September 2008


October 2008


14 August 2009


24 August 2009
© AEROPHOTO EELDE


9 March 2010


23 May 2010

LOFAR was opened on 12 June 2010 by H.M. queen Beatrix

Attendance of the Chairmen of the (inter)national LOFAR consortia

LOFAR Stations Across Europe

Formation of the International LOFAR Telescope

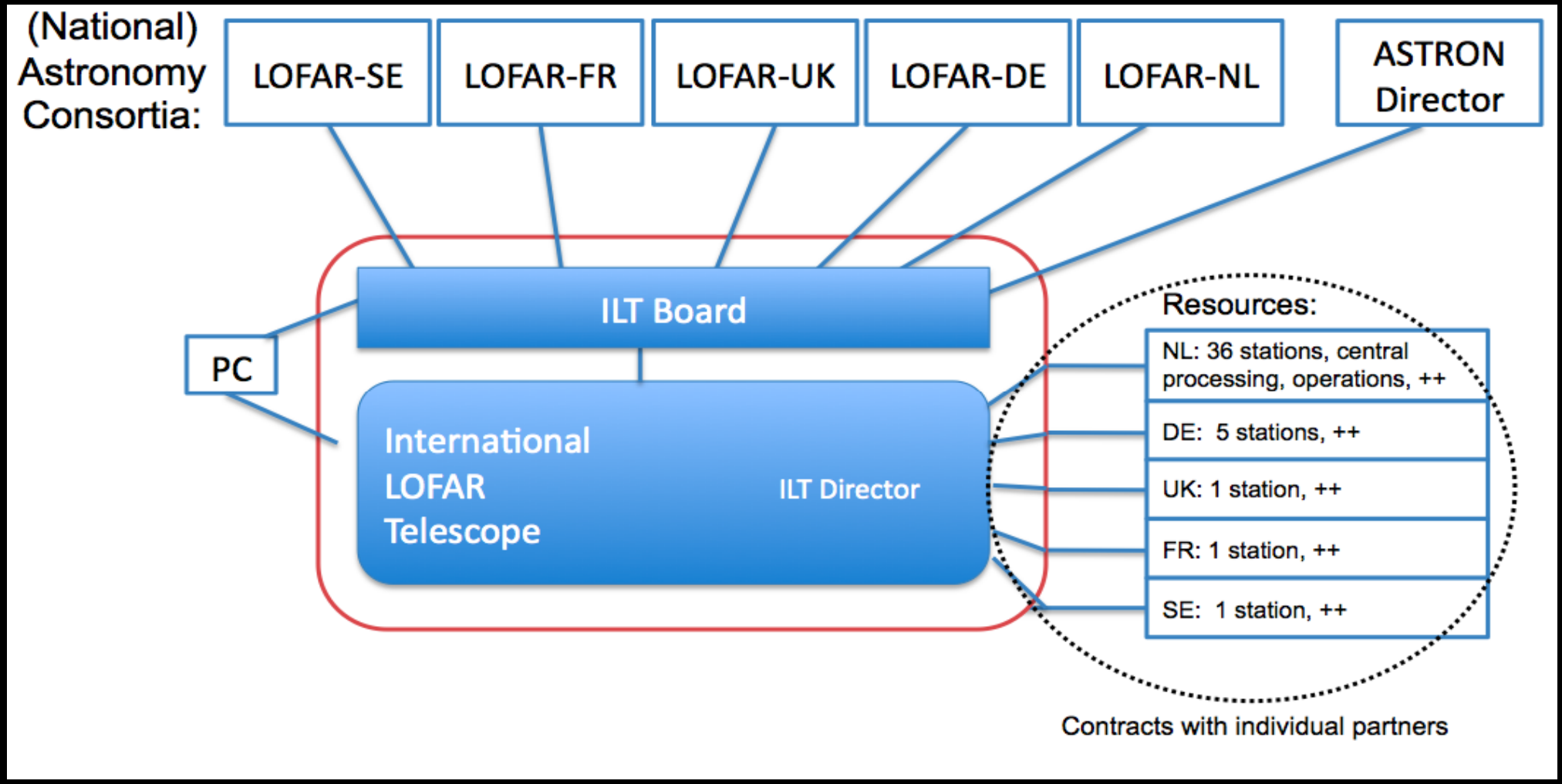
- International Working Group
  Many meetings Jan 2009 – June 2010
  NL, DE, ES, FR, IR, IT, PL, SE, UK

- MoU at LOFAR opening ceremony 12 June 2010
  NL, DE, FR, SE, UK
- Founded by NL in November 2010
- Formal accession of DE, FR, SE, UK in June 2011
- Last 4/8 international station contracts to be signed September 2011
- New developments in many countries, as I speak … watch this space

The ILT

- Individual owners contribute their
  - Stations: 90% for ILT operations, 10% for private use
  - Networks, Archives (now: Groningen, Amsterdam, Jülich)
  - Money and In-kind contributions (sum € 89000 p.a. per station in 2011)
- ASTRON provides central operational organisation
- National LOFAR Astronomy Consortia involved in
  - Science and operations policies of ILT (board membership)
  - Observing time allocations (Reserved Access shares)
  - Bundle interests of stakeholders in each country

The ILT Foundation



DE, FR, SE, UK 1 seat each, NL 2 seats + 1 seat ASTRON
1 seat = 1 vote

ILT board members

ASTRON: Mike Garrett

GLOW: Marcus Brüggen

FLOW: Michel Tagger

NL-LAC: Heino Falcke (Chair), Ralph Wijers

LOFAR-Sweden: John Conway

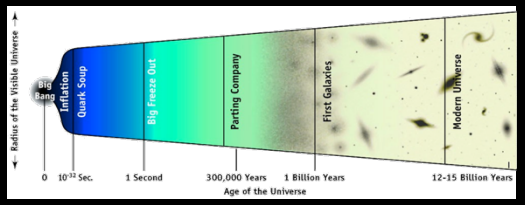
LOFAR-UK: Philip Best

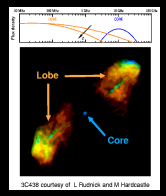
ILT: Observatory Model

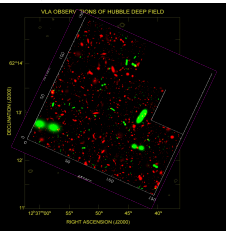
- (Inter)national institutions and consortia organise
  - Operations
  - Science policies
  - Independent proposal review
  - Reserved access shares + Open Skies fraction
- Individual user groups
  - Focus on one or more specific research topics
  - Form groups/collaborations to fit their science
  - KSP groups contribute to software, commissioning

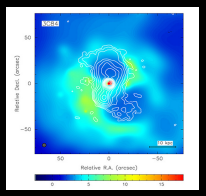
LOFAR- The Key Science

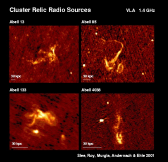
- Epoch of Reionisation
- Surveys
- Transients
- Cosmic Rays
- Magnetism
- Sun, Space Weather

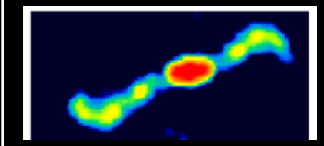


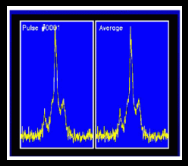


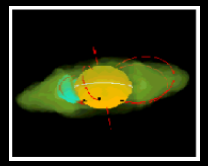


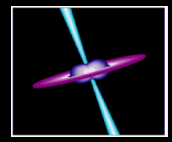


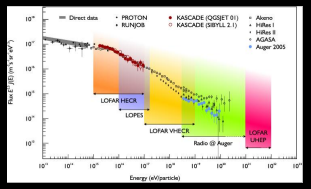


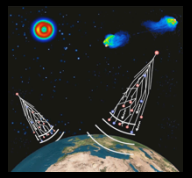


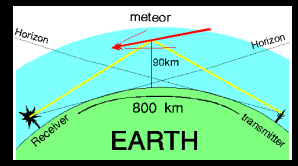


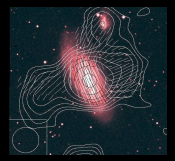


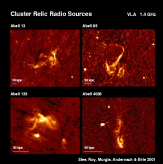


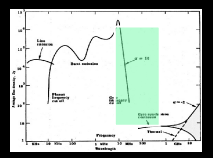


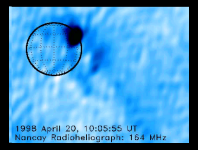


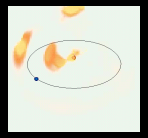


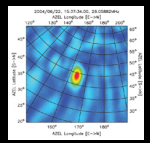






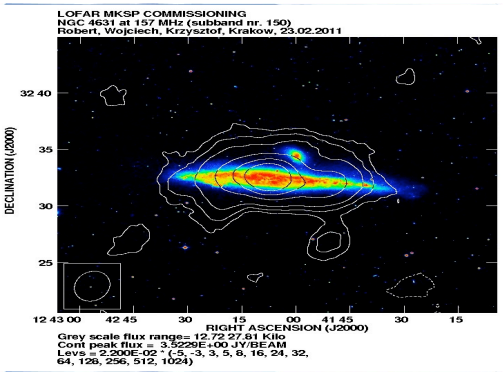


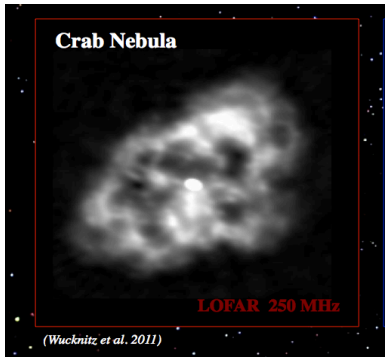




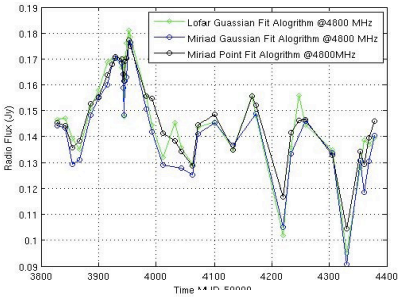
Observing Modes

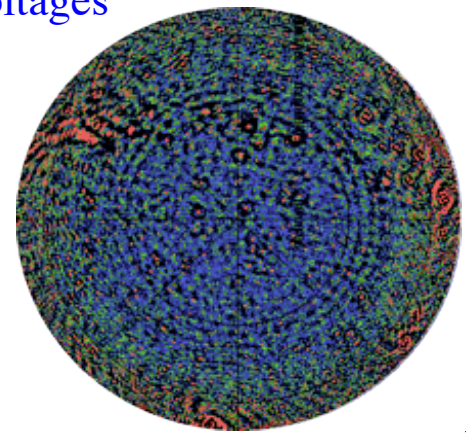
- Interferometric
  - Pointed observations and surveys



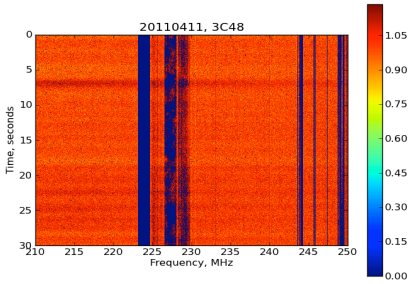


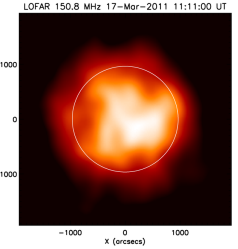
- Tied Array
  - In/coherent beam-forming or raw voltages



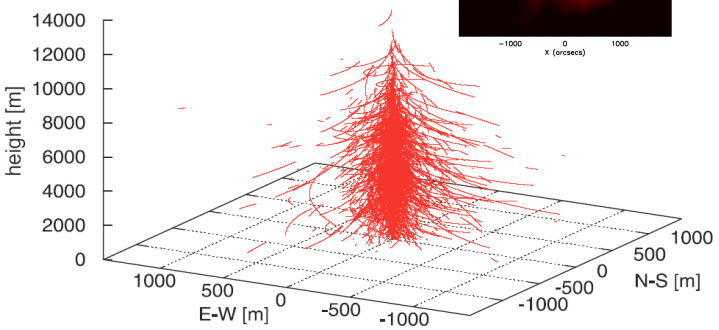


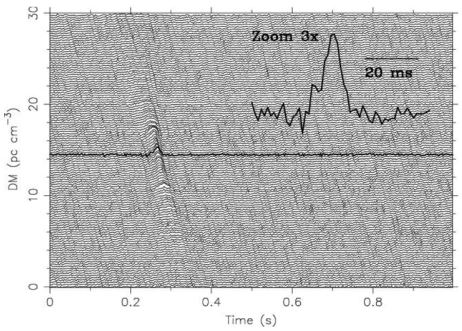
- Single Station
  - Station-level beamforming





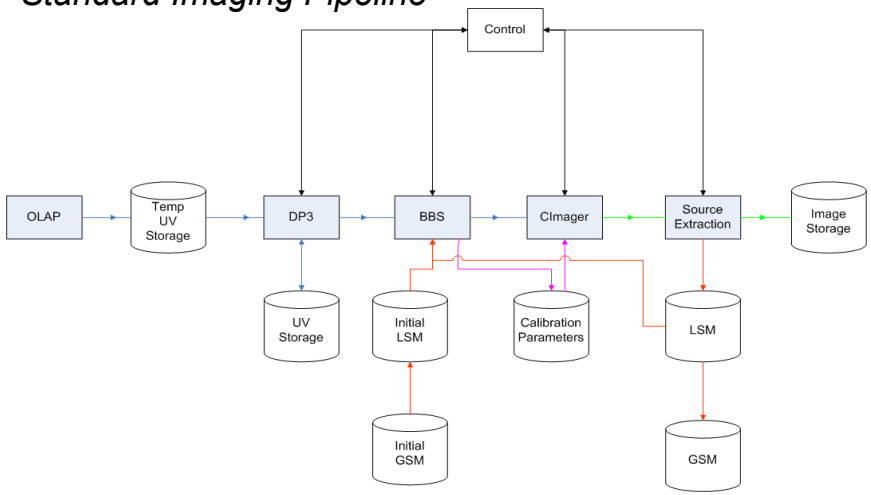
- Direct Storage
  - TBB dumps (raw voltages)



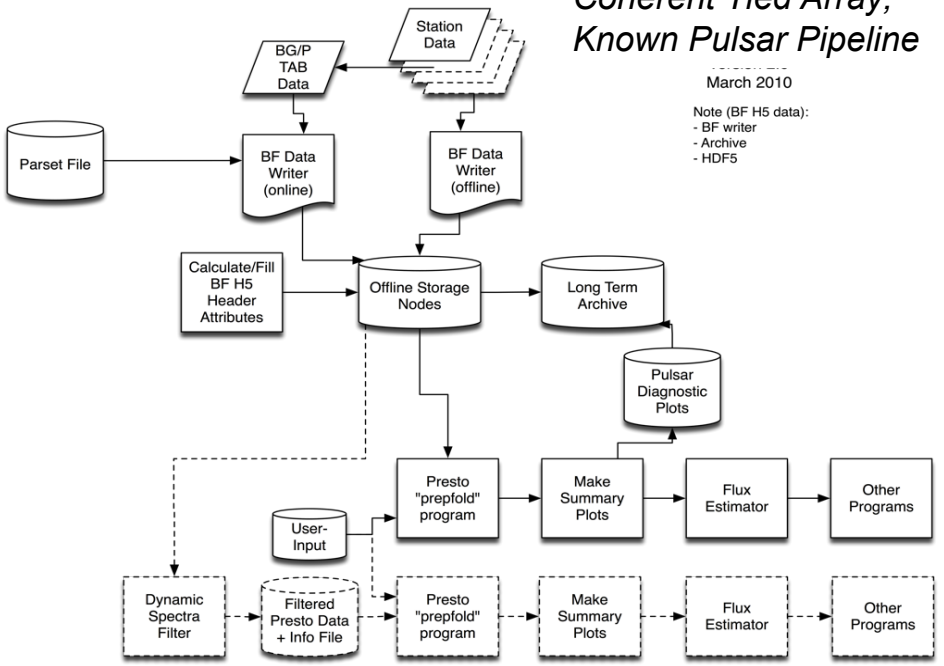


Software Pipelines

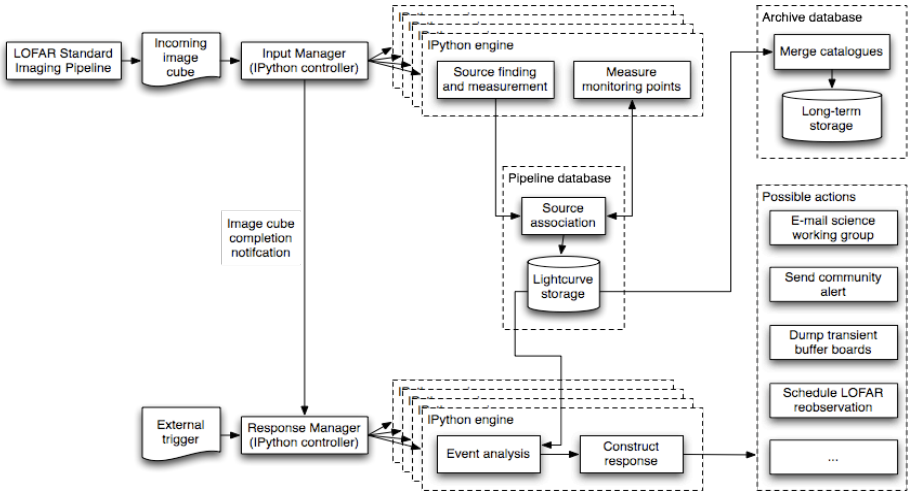
Standard Imaging Pipeline



Coherent Tied Array; Known Pulsar Pipeline

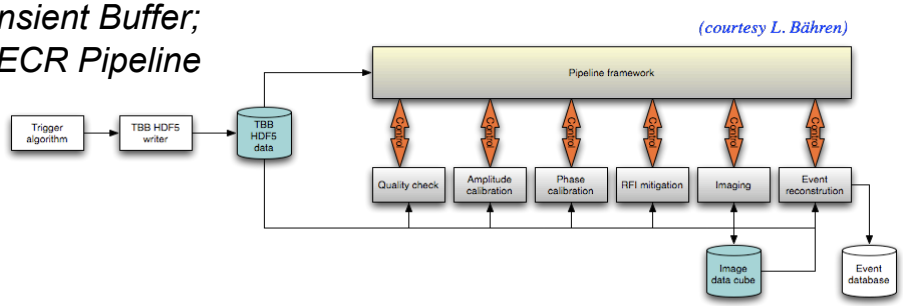


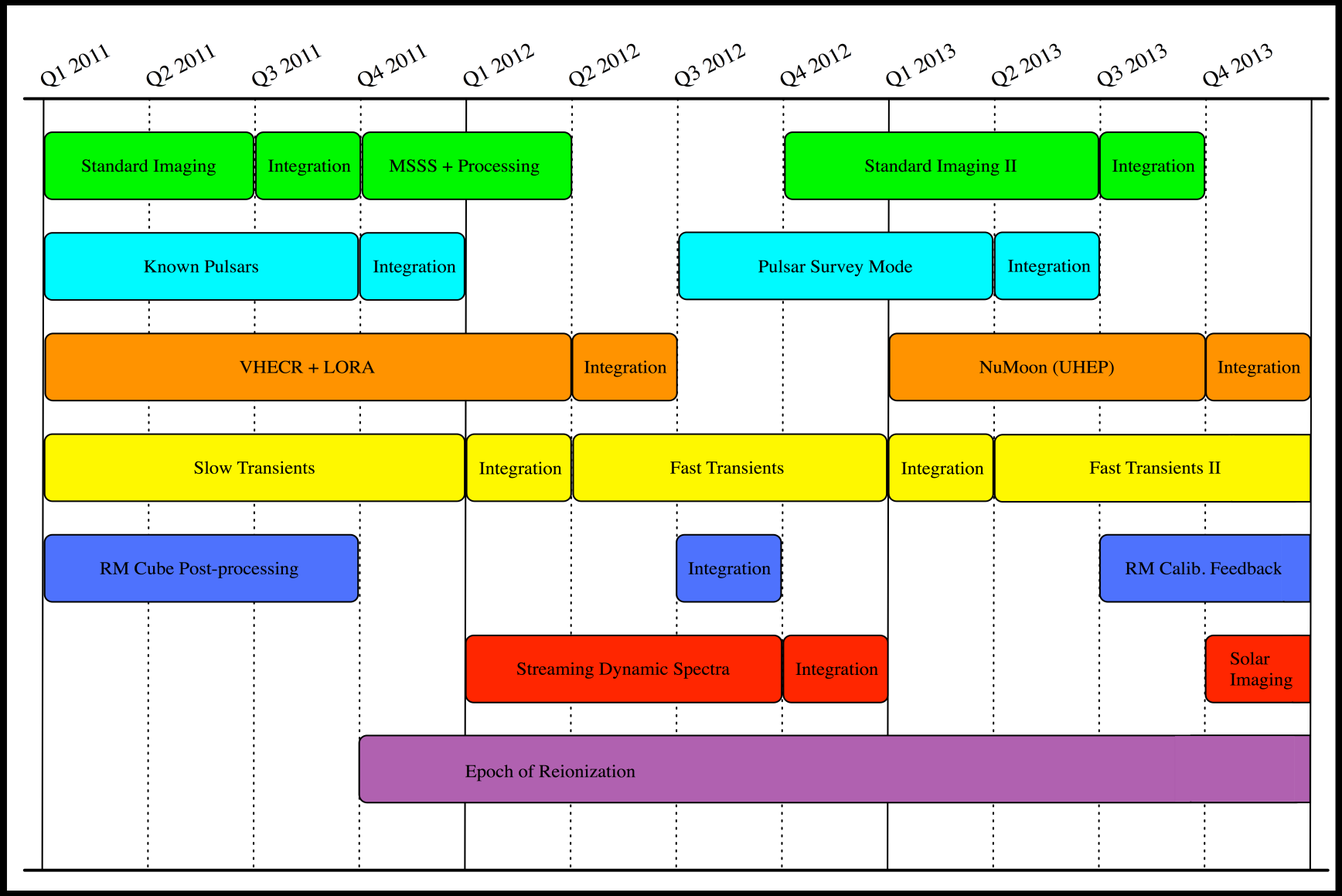
Transient Detection Pipeline



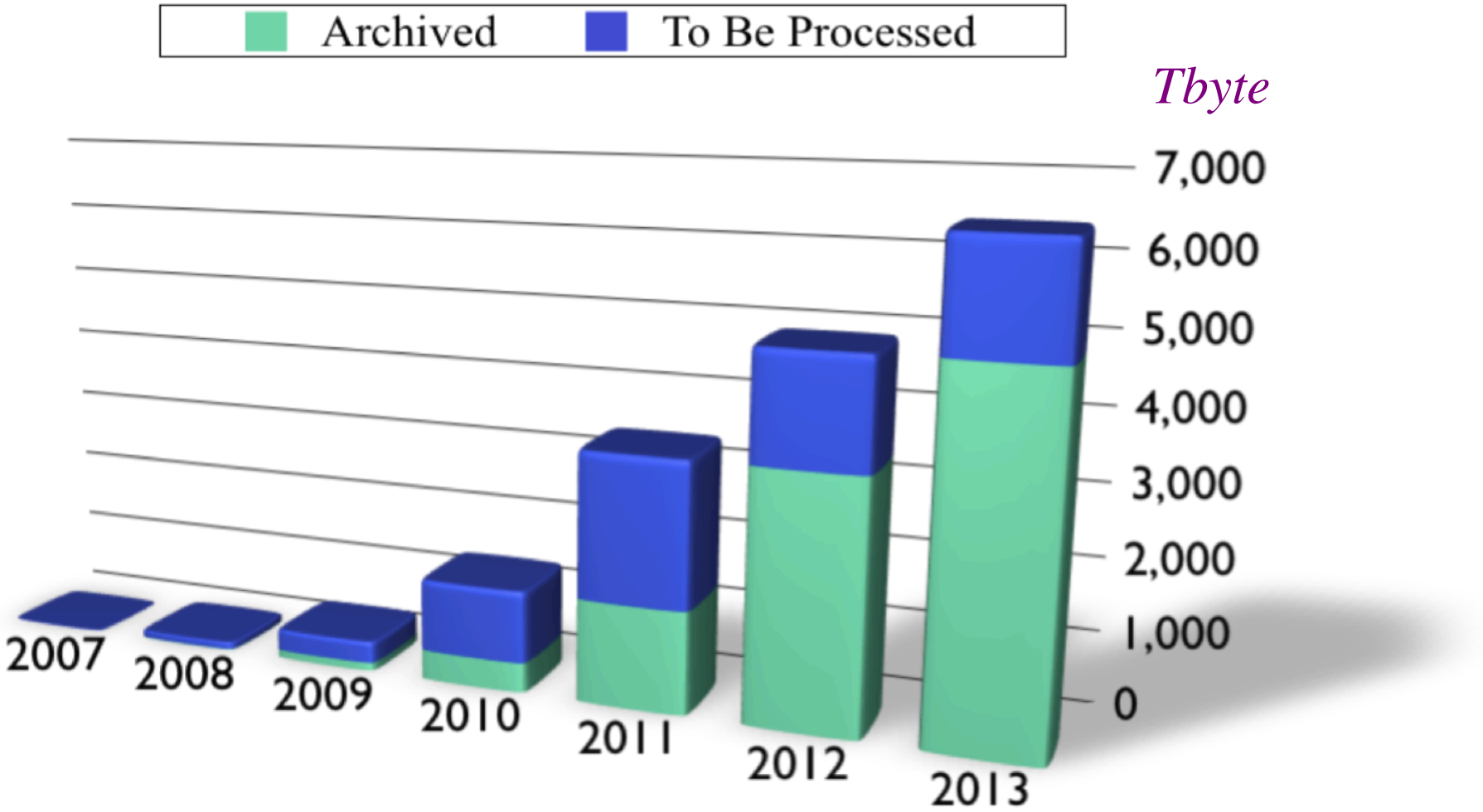
Transient Buffer; VHECR Pipeline

(courtesy L. Bähren)



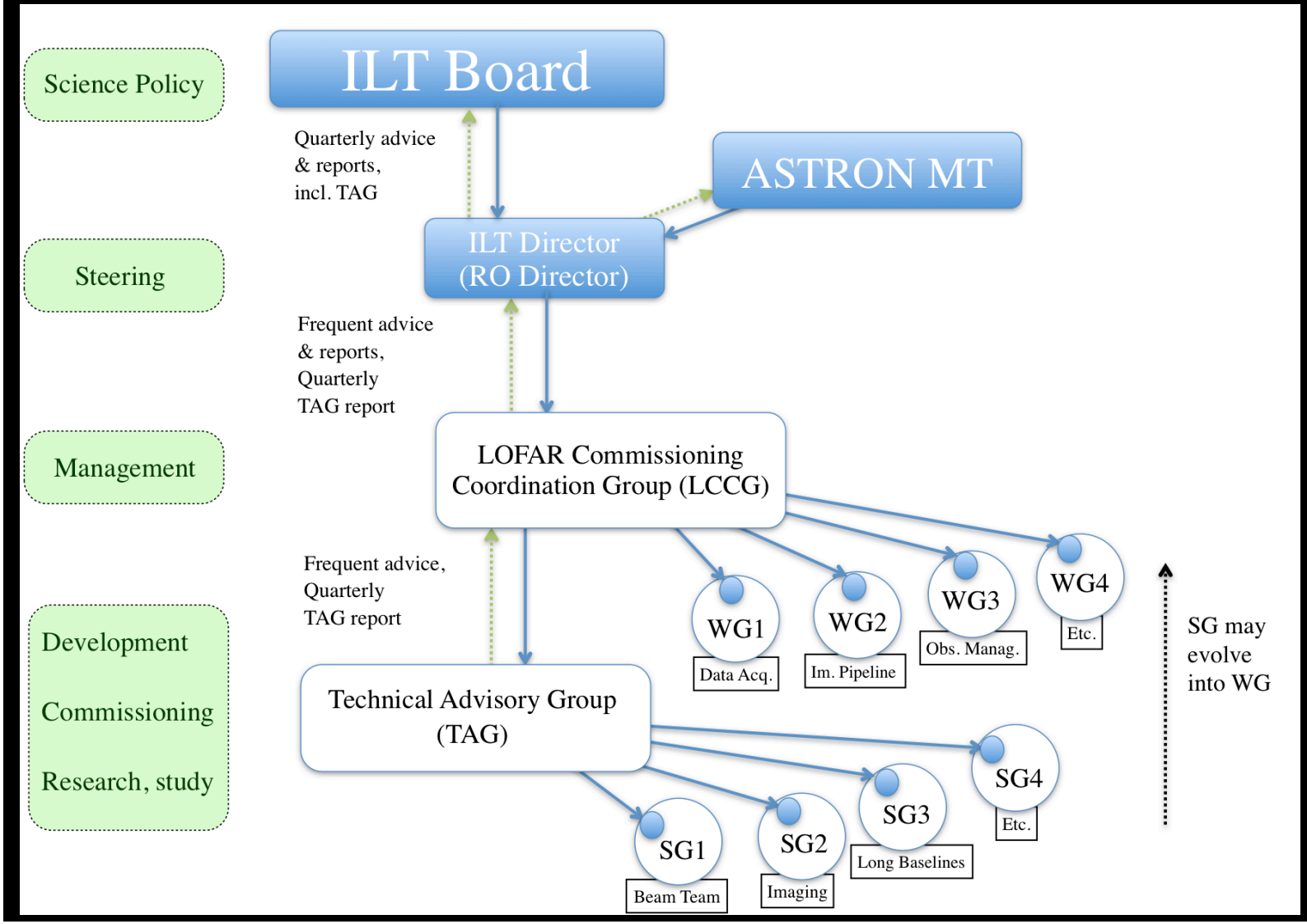

Q1 2011
Q2 2011
Q3 2011
Q4 2011
Q1 2012
Q2 2012
Q3 2012
Q4 2012
Q1 2013
Q2 2013
Q3 2013
Q4 2013
Standard Imaging
Integration
MSSS + Processing
Standard Imaging II
Integration
Known Pulsars
Integration
Pulsar Survey Mode
Integration
VHECR + LORA
Integration
NuMoon (UHEP)
Integration
Slow Transients
Integration
Fast Transients
Integration
Fast Transients II
RM Cube Post-processing
Integration
RM Calib. Feedback
Streaming Dynamic Spectra
Integration
Solar Imaging
Epoch of Reionization

LOFAR Storage Estimates



Estimated growth rate ~ 2 Pbyte/yr

Coordinated Commissioning:
The LCCG



LOFAR project scientist:

Michael Wise

Proposals, Time Allocation

- All proposals independently reviewed by PC; sets boundary conditions (overlap science, proprietary rights, etc.)
- Significant access (observing, processing time) is reserved
  for distribution via National Consortia,
  assigning time from their quota to any PC-approved projects
  => plenty of scope for KSP groups!
  collaborations can be open & scientifically driven

  National quota first year: NL: 58%, DE: 17%, FR,SE,UK: each 5%
- Open Skies fraction to foster broad user base, best ideas
  - First two years 10%, 20%
  - Intended to grow after a few years

Reaching full operations

- Early 2009: Limited test observing with first stations
- 12 June 2010: LOFAR opening, first end-end processing
- 2011: Intensive commissioning observing
  First science paper published
  Station construction proceeds
- 14+15 Sep 2011: Workshop on first science results (Dalfsen NL)
- Autumn 2011: Survey for Global Sky Model (MSSS) starts
- Winter 2012: Beta-testing, preparation of initial modes
- 2012: Proposal call
  Operations with initial complement of modes
  Software development, commissioning continues
- 2013+: More and improved capabilities, regular cycles

Preparing Operations

- Beta-testing this winter:
  - MSSS dominant component
    - Global Sky Model (fluxes & spectra; positions)
    - Operational readiness of general observing software
    - Basic imaging pipeline
  - Several other KSP-related modes
    - E.g. non-imaging modes, deeper integrations, …
    - Defined by LCCG iterating with KSP groups
  - Gearing up to start with MSSS LBA in October

Preparation & execution needs

extensive community participation!

Preparing Operations

- When operational readiness demonstrated &

  Version 1 capabilities documented
- Make call for proposals

  Aim for publication early spring 2012

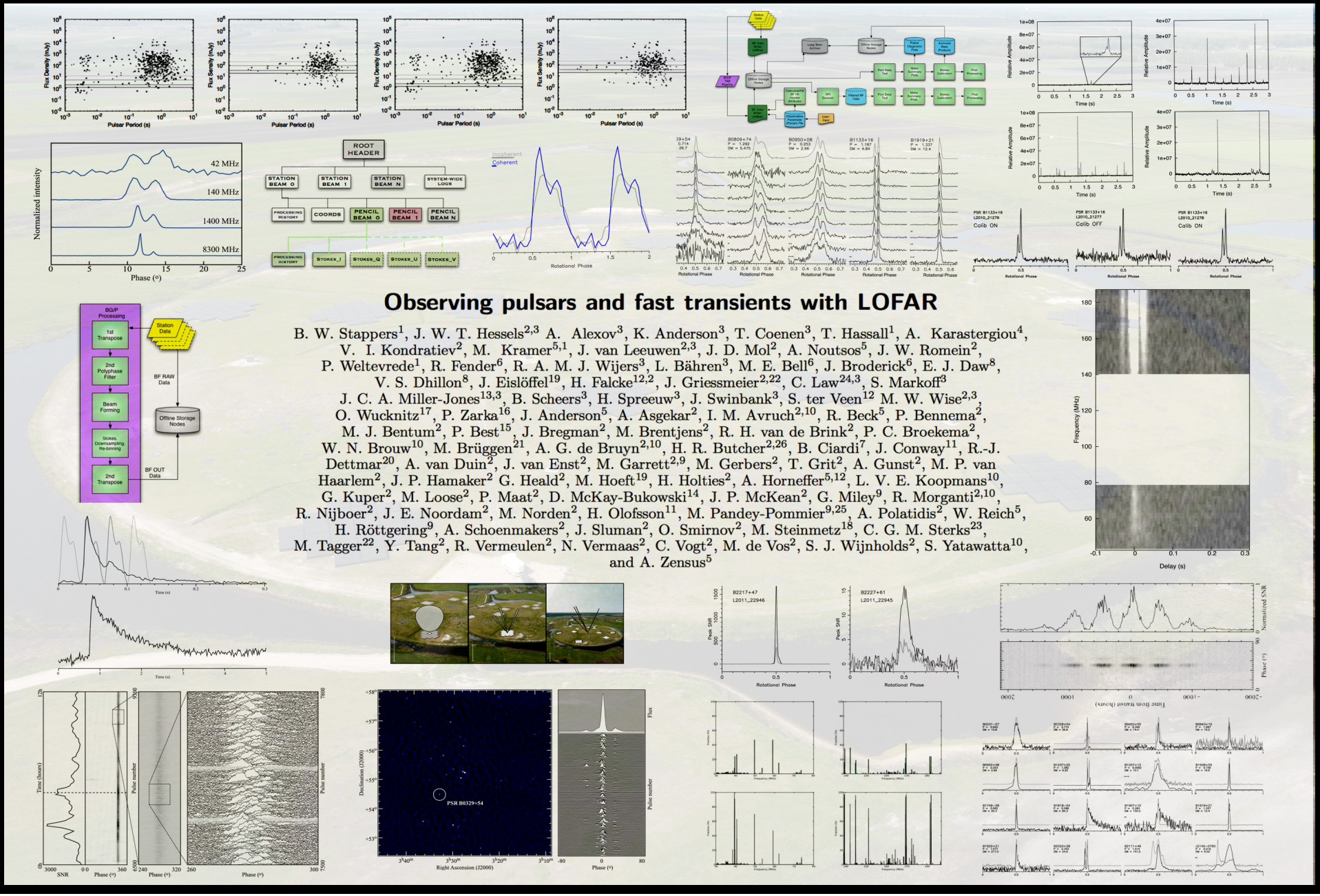
  First observing not before end summer 2012…
- Meanwhile continue with the KSP groups

  further development

  associated commissioning + early science observing
- Repeat cycle every 6 months:

  open access always follows early science demonstration

The first LOFAR science paper

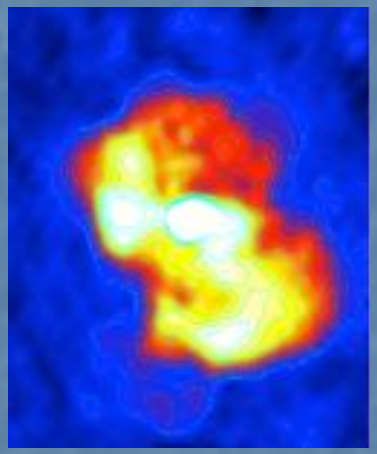
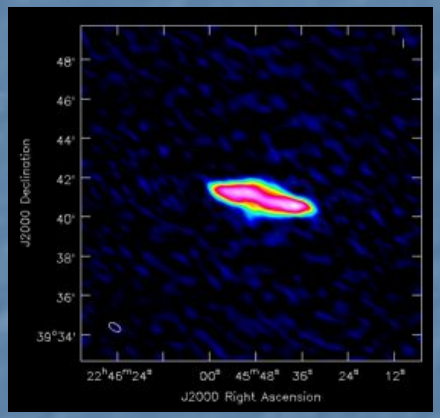


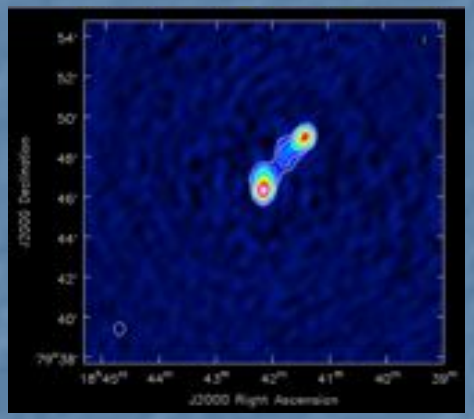
Observing pulsars and fast transients with LOFAR

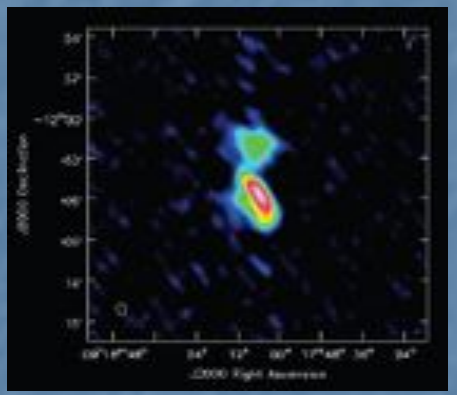
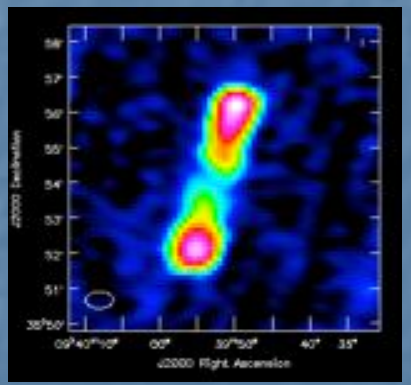
B. W. Stappers[1], J. W. T. Hessels[2,3] A. Alexov[3], K. Anderson[3], T. Coenen[3], T. Hassall[1], A. Karastergiou[4], V. I. Kondratiev[2], M. Kramer[5,1], J. van Leeuwen[2,3], J. D. Mol[2], A. Noutsos[5], J. W. Romein[2], P. Weltevrede[1], R. Fender[6], R. A. M. J. Wijers[3], L. Bähren[3], M. E. Bell[6], J. Broderick[6], E. J. Daw[8], V. S. Dhillon[8], J. Eislöffel[19], H. Falcke[12,2], J. Griessmeier[2,22], C. Law[24,3], S. Markoff[3] J. C. A. Miller-Jones[13,3], B. Scheers[3], H. Spreeuw[3], J. Swinbank[3], S. ter Veen[12] M. W. Wise[2,3], O. Wucknitz[17], P. Zarka[16], J. Anderson[5], A. Asgekar[2], I. M. Avruch[2,10], R. Beck[5], P. Bennema[2], M. J. Bentum[2], P. Best[15], J. Bregman[2], M. Brentjens[2], R. H. van de Brink[2], P. C. Broekema[2], W. N. Brouw[10], M. Brüggen[21], A. G. de Bruyn[2,10], H. R. Butcher[2,26], B. Ciardi[7], J. Conway[11], R.-J. Dettmar[20], A. van Duin[2], J. van Enst[2], M. Garrett[2,9], M. Gerbers[2], T. Grit[2], A. Gunst[2], M. P. van Haarlem[2], J. P. Hamaker[2] G. Heald[2], M. Hoeft[19], H. Holties[2], A. Horneffer[5,12], L. V. E. Koopmans[10], G. Kuper[2], M. Loose[2], P. Maat[2], D. McKay-Bukowski[14], J. P. McKean[2], G. Miley[9], R. Morganti[2,10], R. Nijboer[2], J. E. Noordam[2], M. Norden[2], H. Olofsson[11], M. Pandey-Pommier[9,25], A. Polatidis[2], W. Reich[5], H. Röttgering[9], A. Schoenmakers[2], J. Sluman[2], O. Smirnov[2], M. Steinmetz[18], C. G. M. Sterks[23], M. Tagger[22], Y. Tang[2], R. Vermeulen[2], N. Vermaas[2], C. Vogt[2], M. de Vos[2], S. J. Wijnholds[2], S. Yatawatta[10], and A. Zensus[5]

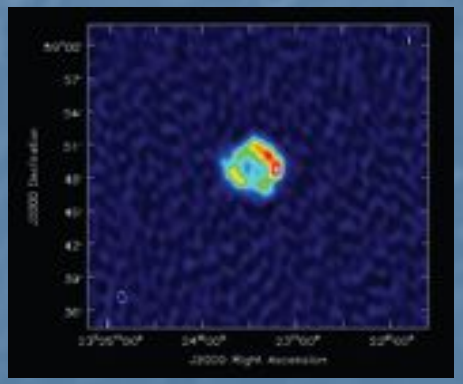
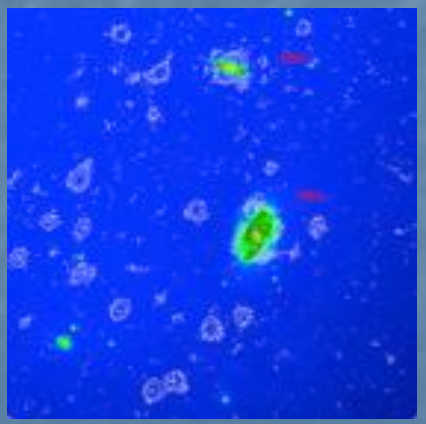
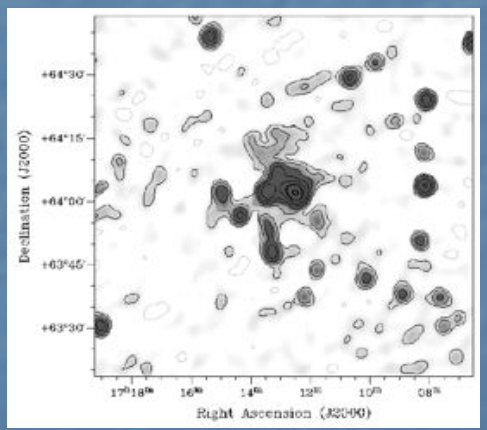
Report from Imaging Busy Week 11

Lorentz Center, 2-6 May 2011

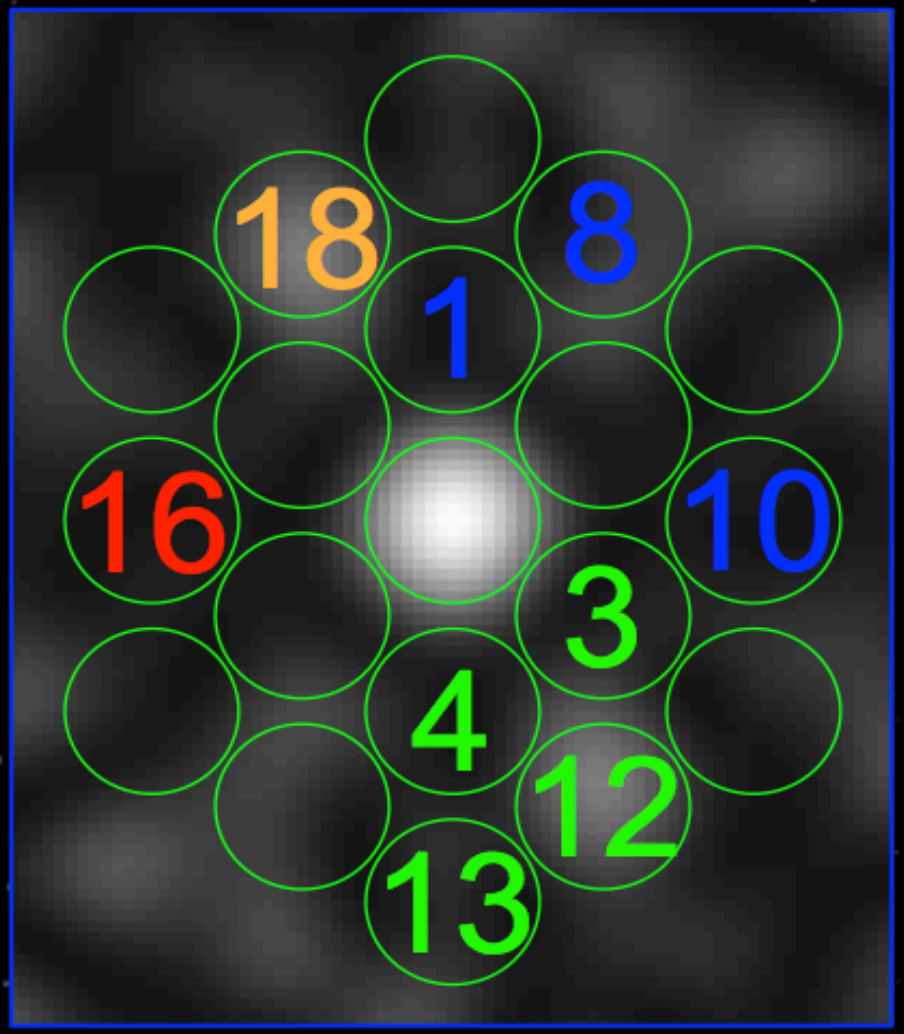


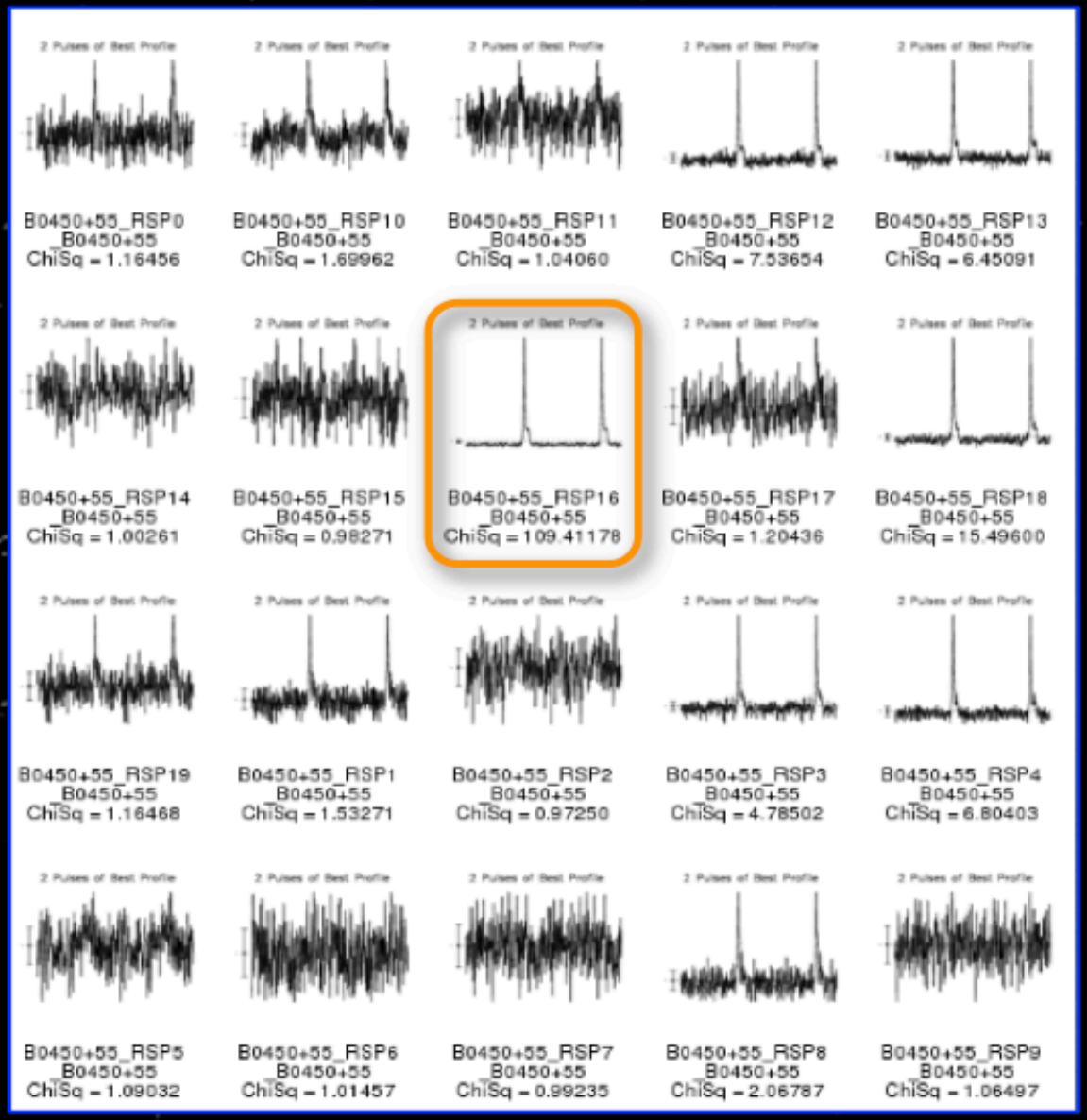



Roberto Pizzo, Huub Rottgering & John McKean

LOFAR Tied-Array Survey (LOTAS)



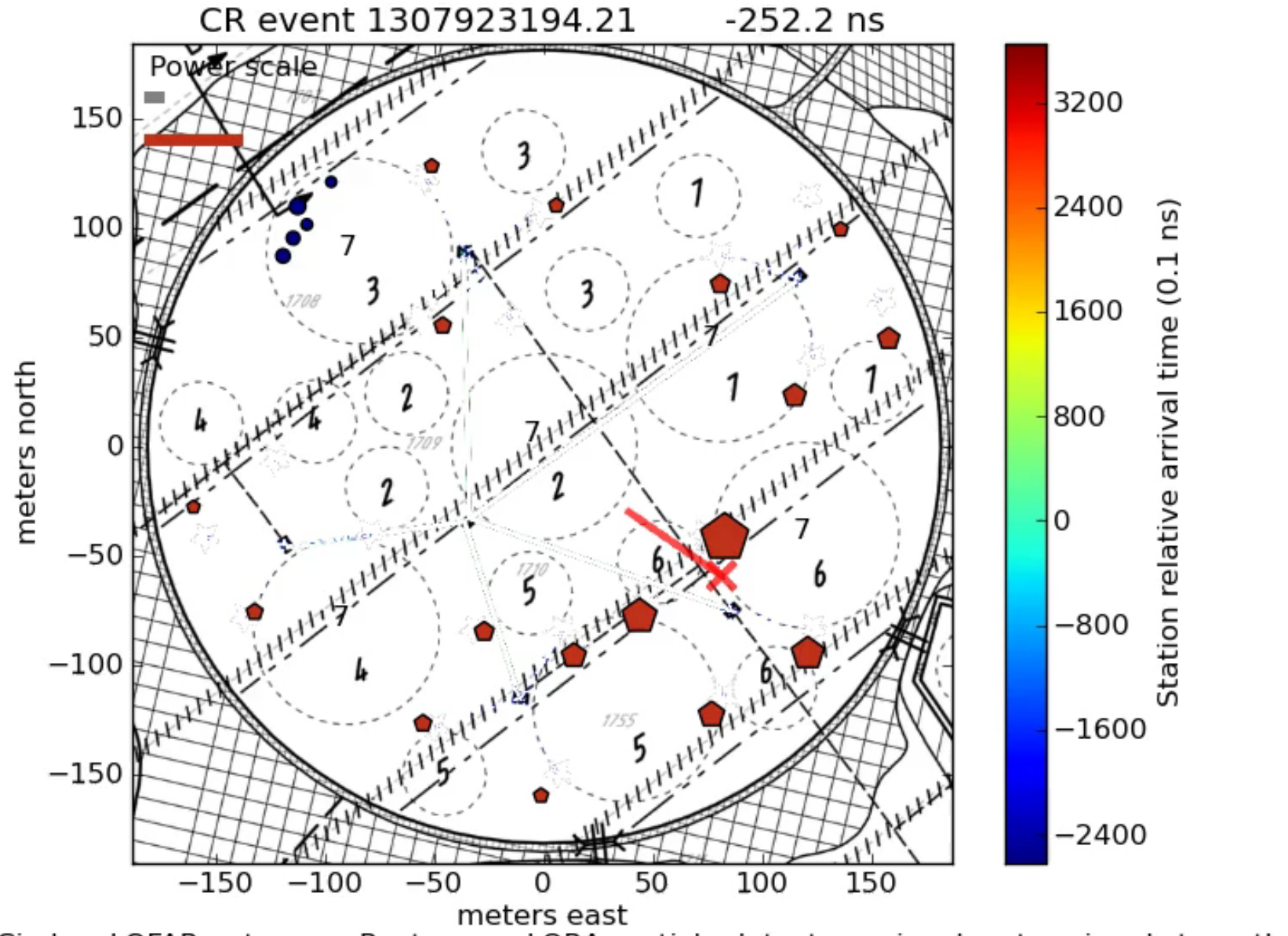


Unique LOFAR capability!

Crucial for pulsar survey work

(courtesy: J. Hessels & Pulsars WG)

LOFAR Cosmic Ray Detection



Circles: LOFAR antennas, Pentagons: LORA particle detectors, size denotes signal strength

Falcke et al.

ILT Organization and Access

René Vermeulen

Director ILT