

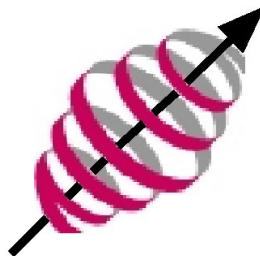
Getting An Ex—Ef Fringe

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On behalf of LOFAR
and the LLBWG
and the Network Group
and...

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für Radioastronomie



LOFAR



MAX-PLANCK-GESELLSCHAFT



LOFAR

Important Things First

- Regular ASTRON-JIVE football game tonight
- Those of you who regularly travel with your cleats are welcome to join
- Even if you forgot your football outfit, you are still welcome to join
- Pick, or be picked by, your teams carefully

Lessons to Learn for All of Us

- ≥ 7 other International stations to hook up as well
 - Un/Fortunately we are all different
- Problems, failures, issues on both sides
 - Dwingeloo/Groningen and Bonn/Effelsberg
 - **Communication, communication, communication**
- Most International stations have LOFAR as only a **minor** part of the local site activities
 - LOFAR network must be shoehorned into existing infrastructure
 - People have other projects/responsibilities (Intl and ASTRON)
 - LOFAR network meetings (**slide on this later**)
 - Need to have realistic expectations
- Hopefully we all learn from the experience with Ex—Ef and things go more smoothly with everyone else

No LOFAR—LOFAR Long Baseline Fringe

- ITS—Nancay did see fringes for Jupiter bursts in 2004—2005
- CS-1 fringes for many years now
- No fringe from 302 to CS-1 as of 2009 May 13
- 2007 Nov fringe tests Exloo—Dwingeloo
 - No fringe detected
 - Sheep fence detected
- Effelsberg—Exloo testing since 2008 Mar in low band
 - Single baseline sensitivity about 50 Jy in 10 s
 - 2008 Mar and Apr testing failed for various reasons
 - Clocks set to different time standards
 - Groningen correlator replaced starting 2008 June
 - Network hardware redesign, new hardware to connect Effelsberg installed in Groningen 2009 Feb, Effelsberg changes ongoing

2009 Fringe Testing

- Jupiter burst tests with Jean-Mathias Griessmeier
 - Includes Nancay, CS-1, and Ef
- Information copied from last week's LOFAR Status talk by Jean-Mathias Griessmeier
 - tried 10/04/2008 (many problems, got to know system)
 - planned 30/03/2008 (was forgotten)
 - tried 06/04/2009 (encountered a clock frequency bug)
 - planned 21/04/2009 (problems, had to be cancelled)
 - planned 08/05/2009 (cancelled)
- Fringe detected between CS-1 and Nancay
 - See last week's CS-1 meeting
- Network changes in Effelsberg last week and yesterday
 - Changes made, lots of angry people, not quite done?
 - **Should have Ef connected to Groningen within hours to days**



Fringe Calibrators

- Have been using the Crab pulsar (Tau A) for test source
 - No pulsar gating
 - High brightness on short baselines
- Low Frequency VLBI from the 1970s
 - 50 to 2000 km baselines (such as Greenbank to Arecibo)
 - 74, 118, ... MHz
 - ~ 1 Jy sensitivity
 - **Small number of 3C sources detected on long baselines, all < 10 Jy**
 - Challenge to get fringe at this level, especially with single subbands
 - Large number pulsar survey, only the Crab detected
 - Scattering in the ISM likely cause
 - Crab scattering may (likely) have changed over past 30 years
- Switched to Jupiter bursts for fringe testing for now
 - HBA fringe testing will be easier from sensitivity/source property view



LOFAR Network Meetings

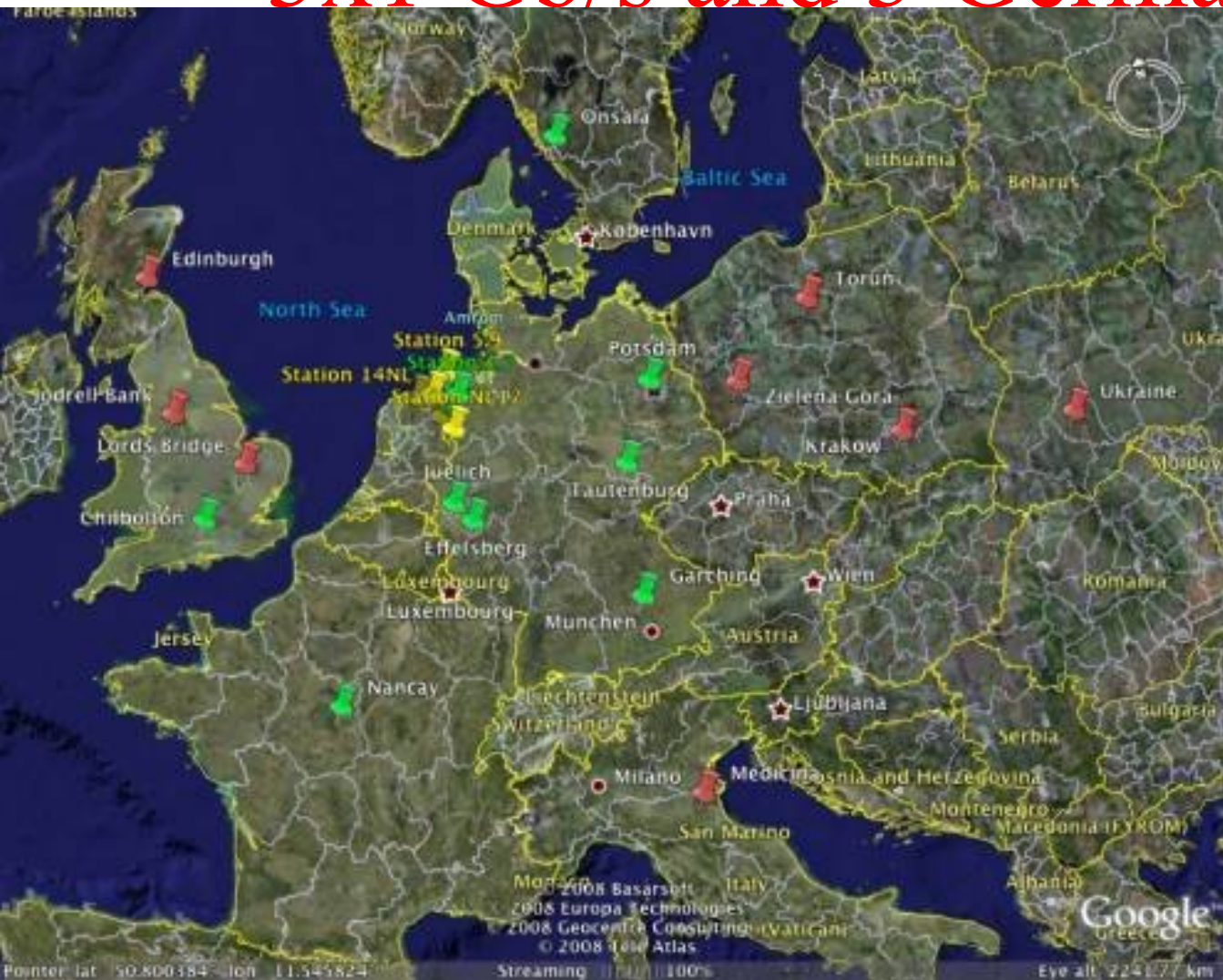
- 2009 Feb 05 (Groningen) and 2009 Apr 28 (Groningen)
 - Need to have next meetings in different locations
 - I suggest Juelich, Onsala, Frankfurt, Italy, ...
 - **Need to Doodle for the next meeting**
- Face to face meetings necessary for improved communications
- Lots of issues for the international network configuration(s)
 - Everyone has different constraints/problems/advantages
- Blue Gene/P shifted LOFAR to 10 Gb/s network
 - Major problems for German stations
 - **Ef shares LOFAR with 4 Gb/s eEVN, 4 Gb/s Pulsar experiment**
 - **On shares LOFAR with 4 Gb/s eEVN, 4 Gb/s eMERLIN**
 - **German station streams concentrated at Juelich to smaller number of 10 Gb/s streams going to Groningen**
 - On, Nc, Cb concentrated in Amsterdam?

Network Issues Continued

- International stations will have < 10 Gb/s available
 - 3.1 Gb/s for beamformed data, plus other stuff
 - **TBB data rate unknown, call went out from 2009 Apr 29 TWG meeting to submit TBB bandwidth/latency requirements by 2009 Jun 09 LAD meeting**
 - I am still working on Use Cases for MKSP and Ef pulsar observations
- VLANs
 - VLAN IDs were changed with change to Blue Gene/P
 - **Dutch LOFAR VLAN IDs not available at most international stations or Juelich**
 - Don't expect industry standard IDs to be unused by other people
 - Had to renegotiate all VLANs for international pathways
 - **QinQ used to pass LOFAR VLANs through VLAN allocations for many international stations**
 - LOFAR networking equipment following Blue Gene/P did not support this, had to wait for firmware update (put into the Effelsberg station last week)



3x1 Gb/s and 3 German Stations



- Pb, Tb, Uw all have issues going to 10 Gb/s and may end up at only 3x1 Gb/s

- Major pain in the ***

- Will result in < 30 MHz aggregate bandwidth

- 10 Gb/s stations have 48 MHz bandwidth

- Difficulty for scheduling observations

- Which subbands are on which RSP boards



- Continuum experiments probably ok

- Long baseline LOFAR effectively smaller

- Line experiments, including Faraday rotation may be severely compromised

The End