LOFAR and LOFAR-UK

Rob Fender (University of Southampton)
on behalf of LOFAR-UK

Station/Item	Cabinet	LBA	HBA	Fibre	CEP connection	Validated
CS302						
RS307						
RS503						
RS106						
RS208						
CS030						
CS401						
CS021						
CS032						
RS306						
CS301						
CS501						
RS509						
CS103						
CS001						
CS002						
CS003						
CS004						
CS005						
CS006						
CS007						
CS024						
CS201						
CS101						
CS026						
RS205						
CS017						
CS011						
CS013						
CS028						
CS031						
RS104						
RS210						
RS310						
RS404						
RS406						
RS407						
RS409						
RS410						
RS508						
Effelsberg						
Tautenburg						
Garching						
Potsdam						
Juelich						
Nancay						
Onsala						
Chilbolton						
Totals	39	36	35	31	30	27

LOFAR technical progress

48 Stations

39/48 Cabinets complete

36/48 LBA fields complete

35/48 HBA fields complete

31/48 Fibre connections complete

30/48 CEP connections complete

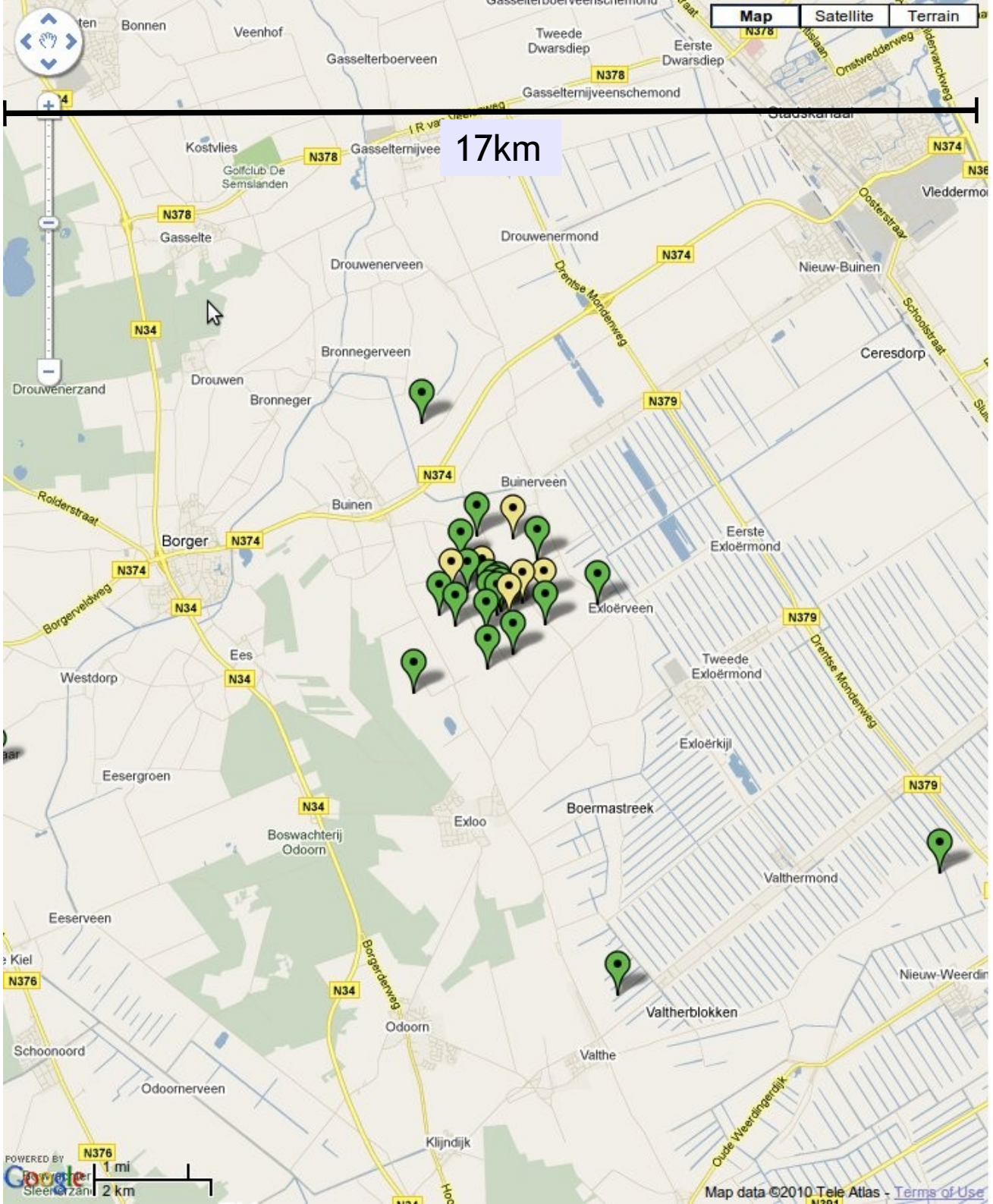
27/48 Stations validated

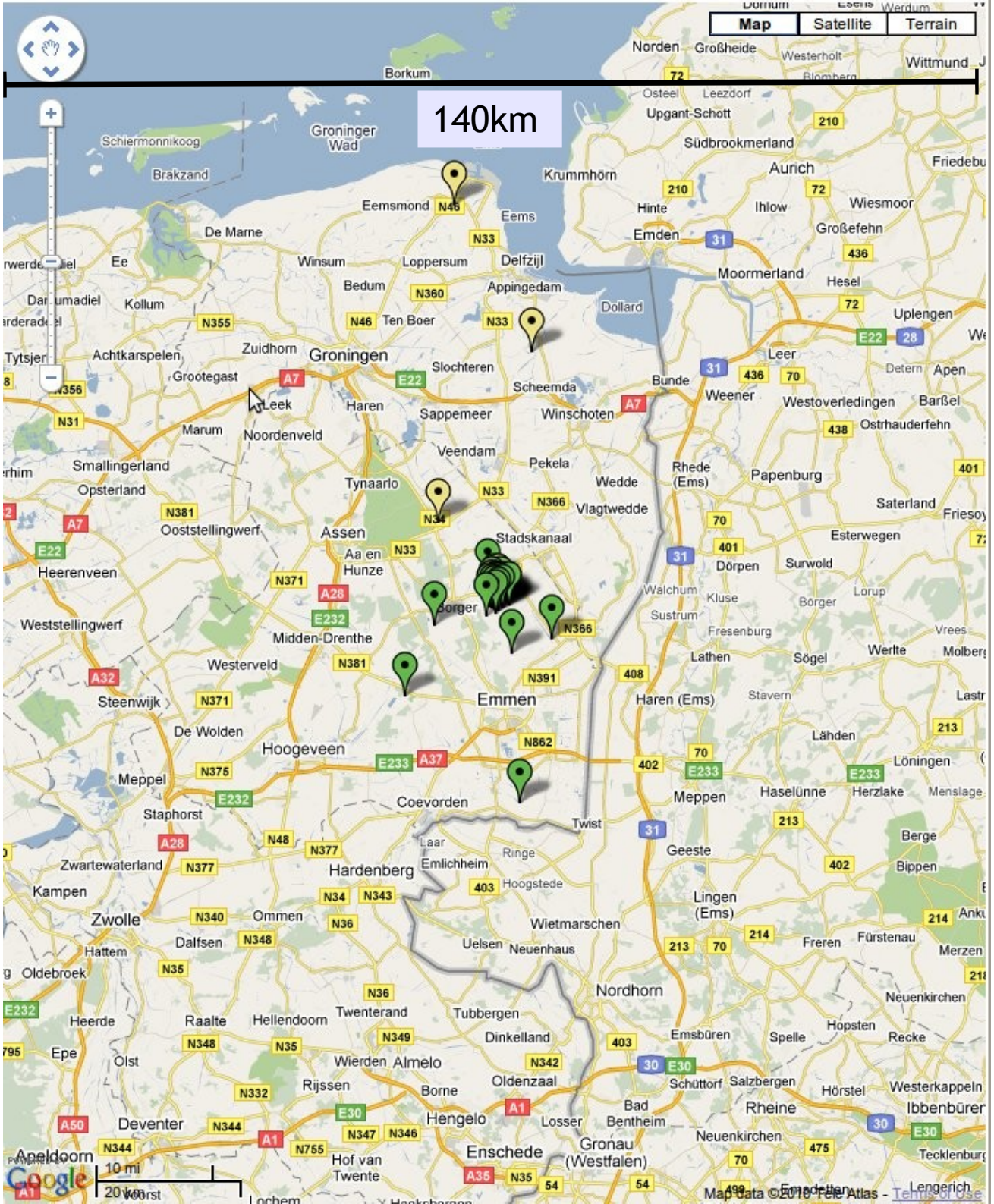
LOFAR

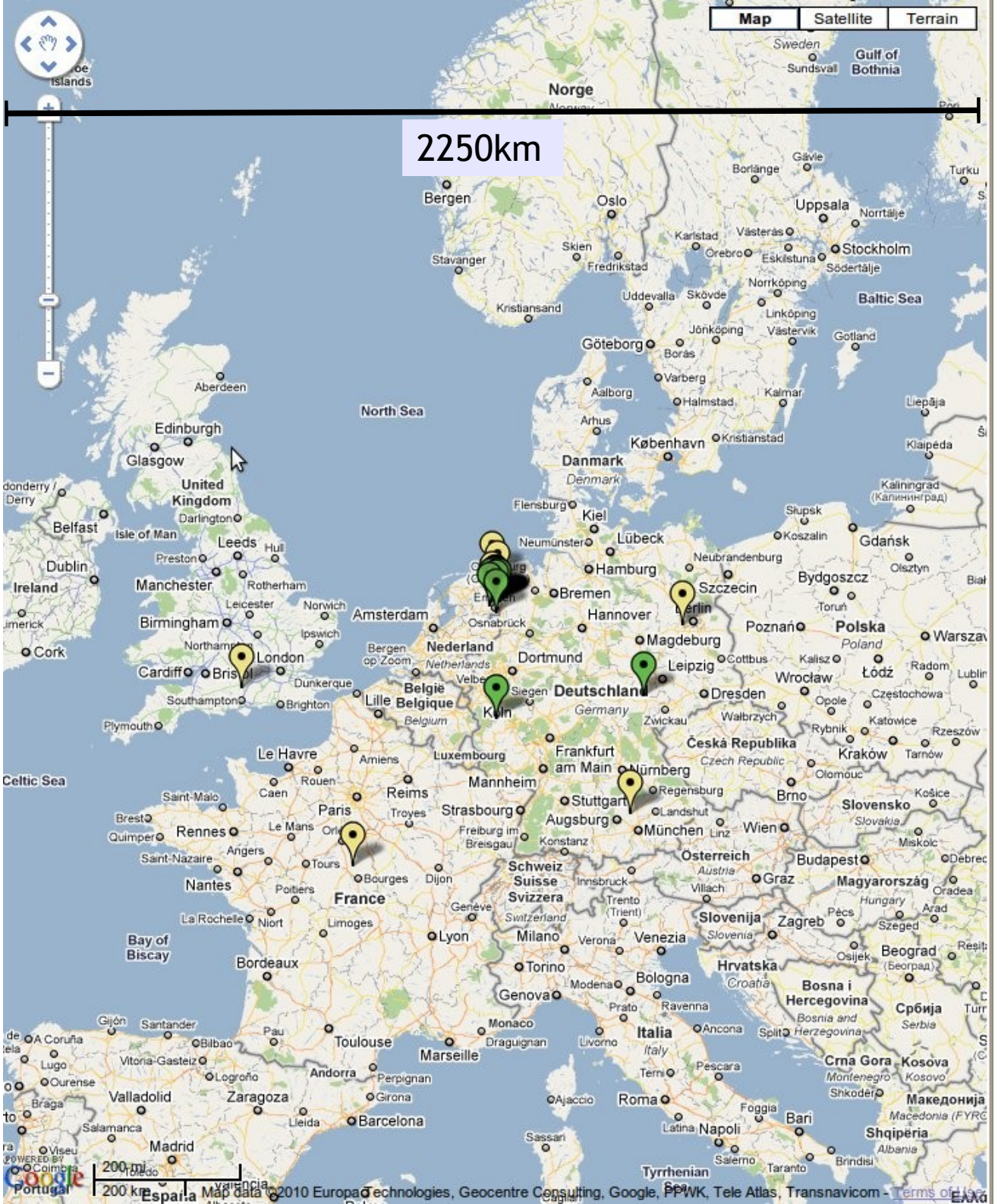
ASTRON


The SuperTerp
576 Low Band Antennas, 288 High Band Tiles


The SuperTerp
576 Low Band Antennas, 288 High Band Tiles
96-antenna LBA fields and 24-tile HBA fields
300m


Map
Satellite
Terrain
17km
Bonnen
Veenhof
Gasselterboerveen
Tweede Dwarsdiep
Eerste Dwarsdiep
Gasselternijveenschemond
Kostvlies
Golfclub De Semslanden
Gasselternijvee
Gasselte
Drouwenerveen
Drouwenermond
Nieuw-Buinen
Ceresdorp
Drouwenerzand
Drouwen
Bronnegerveen
Bronneger
Buinerveen
Buinen
Borger
Eerste Exloërmond
Exloërveen
Tweede Exloërmond
Westdorp
Ees
Exloërkijl
Eesergroen
Boermastreek
Exloo
Boswachterij Odoorn
Valthermond
Eeserveen
Valtherblokken
Odoorn
Schoonoord
Valthe
Odoornerveen
Klijndijk
Nieuw-Weerdinge
Sleenerzand
N34
N374
N378
N379
N376
Rolderstraat
Borgerveldweg
Drentse Mondenweg
Oosterstraat
Schoolstraat
Onstwedderweg
Oude Weerdingerdijk
Borgerderweg
1 mi
2 km
Map data ©2010 Tele Atlas - Terms of Use


Map
Satellite
Terrain
140km
Borkum
Schiermonnikoog
Groninger Wad
Brakzand
Eemsmond
Eems
Krummhörn
Norden
Großheide
Westerholt
Wittmund
Osteel
Leezdorf
Upgant-Schott
Südbrookmerland
Aurich
Hinte
Ihlow
Wiesmoor
Großefehn
Emden
Moormerland
Hesel
Uplengen
De Marne
Ee
Winsum
Loppersum
Delfzijl
Bedum
Appingedam
Dollard
Kollum
Ten Boer
Zuidhorn
Groningen
Achtkarspelen
Grootegast
Slochteren
Scheemda
Bunde
Leer
Weener
Westoverledingen
Barßel
Ostrhauderfehn
Leek
Haren
Sappemeer
Winschoten
Marum
Noordenveld
Veendam
Pekela
Wedde
Vlagtwedde
Rhede (Ems)
Papenburg
Smallingerland
Opsterland
Tynaarlo
Oosterstellingwerf
Assen
Stadskanaal
Esterwegen
Saterland
Aa en Hunze
Dörpen
Sunwold
Heerenveen
Walchum
Kluse
Sustrum
Borger
Lorup
Weststellingwerf
Midden-Drenthe
Fresenburg
Westerveld
Lathen
Sögel
Werlte
Steenwijk
Emmen
Haren (Ems)
Stavern
De Wolden
Hoogeveen
Lähden
Löningen
Meppel
Haselünne
Herzlake
Menslage
Meppen
Staphorst
Coevorden
Twist
Geeste
Berge
Bippen
Zwartewaterland
Hardenberg
Laar
Emlichheim
Ringe
Hoogstede
Kampen
Zwolle
Ommen
Wietmarschen
Lingen (Ems)
Dalfsen
Uelsen
Neuenhaus
Freren
Fürstenau
Merzen
Hattem
Oldebroek
Nordhorn
Neuenkirchen
Heerde
Raalte
Hellendoorn
Twenterand
Tubbergen
Hopsten
Recke
Dinkelland
Emsbüren
Spelle
Epe
Olst
Wierden
Almelo
Oldenzaal
Schüttorf
Salzbergen
Hörstel
Westerkappeln
Rijssen
Borne
Bad Bentheim
Rheine
Ibbenbüren
Deventer
Hengelo
Losser
Neuenkirchen
Apeldoorn
Hof van Twente
Enschede
Gronau (Westfalen)
Tecklenburg
Emsdetten
Lengerich
10 mi
20 km
Google
Map data ©2010 Tele Atlas - Terms of Use


Map
Satellite
Terrain
2250km
Norge
Sweden
Gulf of Bothnia
Bergen
Oslo
Uppsala
Stockholm
Baltic Sea
Göteborg
North Sea
Aberdeen
Edinburgh
Glasgow
United Kingdom
Belfast
Dublin
Ireland
Manchester
Leeds
Birmingham
London
Cardiff
Bristol
Cork
Amsterdam
Nederland
Belgie
Belgique
Belgium
Netherlands
Danmark
Denmark
København
Kiel
Lübeck
Hamburg
Bremen
Hannover
Berlin
Szczecin
Gdańsk
Bydgoszcz
Poznań
Polska
Poland
Warszawa
Magdeburg
Leipzig
Dortmund
Deutschland
Germany
Dresden
Wrocław
Łódź
Česká Republika
Czech Republic
Kraków
Katowice
Frankfurt am Main
Nürnberg
Stuttgart
Mannheim
Strasbourg
Augsburg
München
Wien
Brno
Slovensko
Slovakia
Österreich
Austria
Budapest
Graz
Magyarország
Hungary
Slovenija
Slovenia
Zagreb
Hrvatska
Croatia
Beograd
Bosna i Hercegovina
Bosnia and Herzegovina
Србија
Serbia
Italia
Italy
Milano
Venezia
Torino
Genova
Bologna
Roma
Napoli
Bari
Crna Gora
Montenegro
Kosovo
Македонија
Macedonia (FYROM)
Shqipëria
Albania
Celtic Sea
Bay of Biscay
France
Paris
Le Havre
Rennes
Nantes
Bordeaux
Toulouse
Marseille
Lyon
Reims
Amiens
Lille
Luxembourg
Schweiz
Suisse
Svizzera
Switzerland
Monaco
Andorra
España
Portugal
Madrid
Barcelona
Zaragoza
Valladolid
Tyrrhenian Sea
200 mi
200 km
Map data ©2010 Europa Technologies, Geocentre Consulting, Google, PPWK, Tele Atlas, Transnavicom - Terms of Use

LOFAR commissioning and MS^3

Commissioning observations and software development continues apace in preparation for the MS^3

Examples include

pulsar multi-beaming and multi-arraying

simultaneous pulsar timing and imaging modes

rapid response to trigger events from LIGO/VIRGO, HESS, ATELs

In addition: testing of new beam server, testing of station calibration routines, beam model characterization, improvements in RFI flagging, automatic pipeline processing, procurement for second batch of cluster hardware underway, testing of connection to LOFAR archive...

MS^3 should commence by the end of 2010 – will provide first proper sky model for LOFAR and first large survey for the LOFAR scientific community

Transient follow-up in action

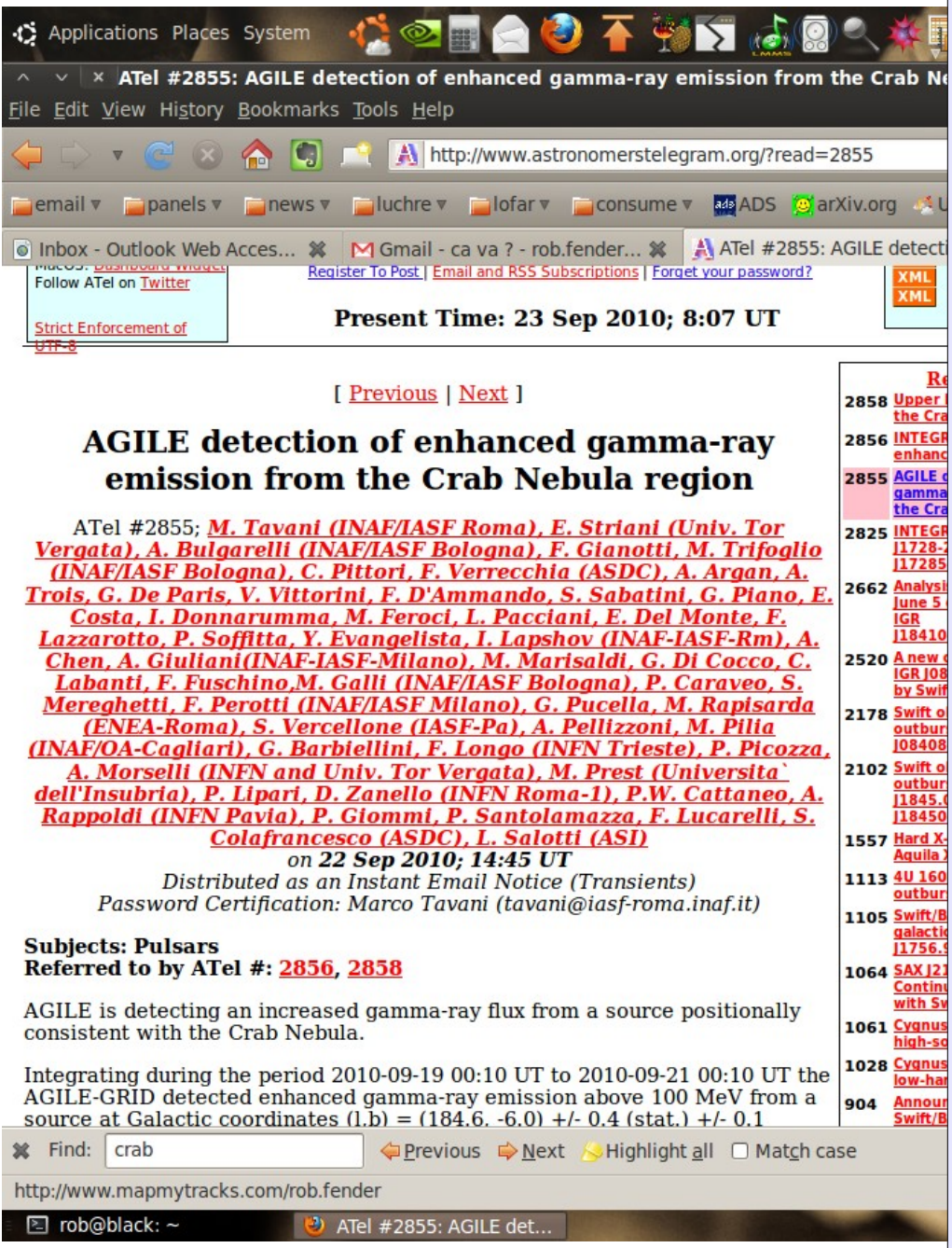
Yesterday, AGILE reported an increase in the gamma-ray flux from the Crab nebula.

Within hours we had scheduled LOFAR observations.

Testing rapid response mechanisms (as well as new beam former).

6 hr of data taken with 14 stations in simultaneous imaging (1 sec) and pulsar timing mode.

Total data **1650 GB** !!
(could have been up to 10x more if we had wanted high spectral resolution and used more stations)



LOFAR
political progress

June 2010: At the LOFAR inauguration, the International LOFAR Telescope (ILT) Memorandum of Understanding was signed by the founding partners – The Netherlands, Germany, France, Sweden and The UK.

Future possible international partners – Poland, Italy, Spain (and others) continue to pursue funding possibilities.

September 2010: The Foundation which will be the basis of this new structure is currently in the process of being created.

The first ILT board will meet in the near future.

LOFAR will soon formally become an international (rather than a national) telescope.

LOFAR inauguration

June 12, 2010

Twitter never forgets...:

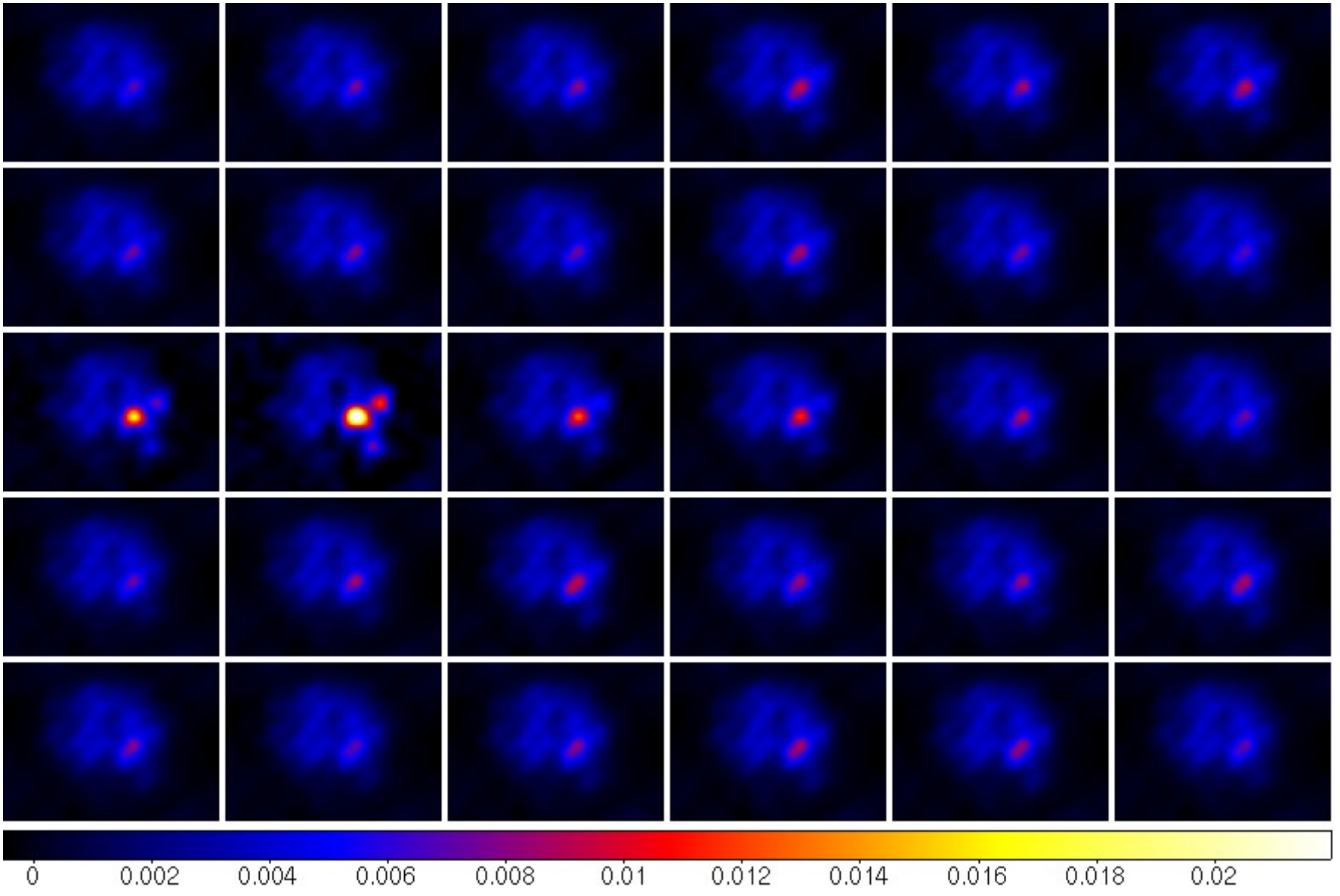
“Brian Boyle gently informed kilt worn back-to-front on Saturday -I'm afraid the Queen also noticed immediately!”

Heigh Ho...

Rene(e), Scotty, Grumpy, Smiley, Ah-Oui, Me-ee and Doeie

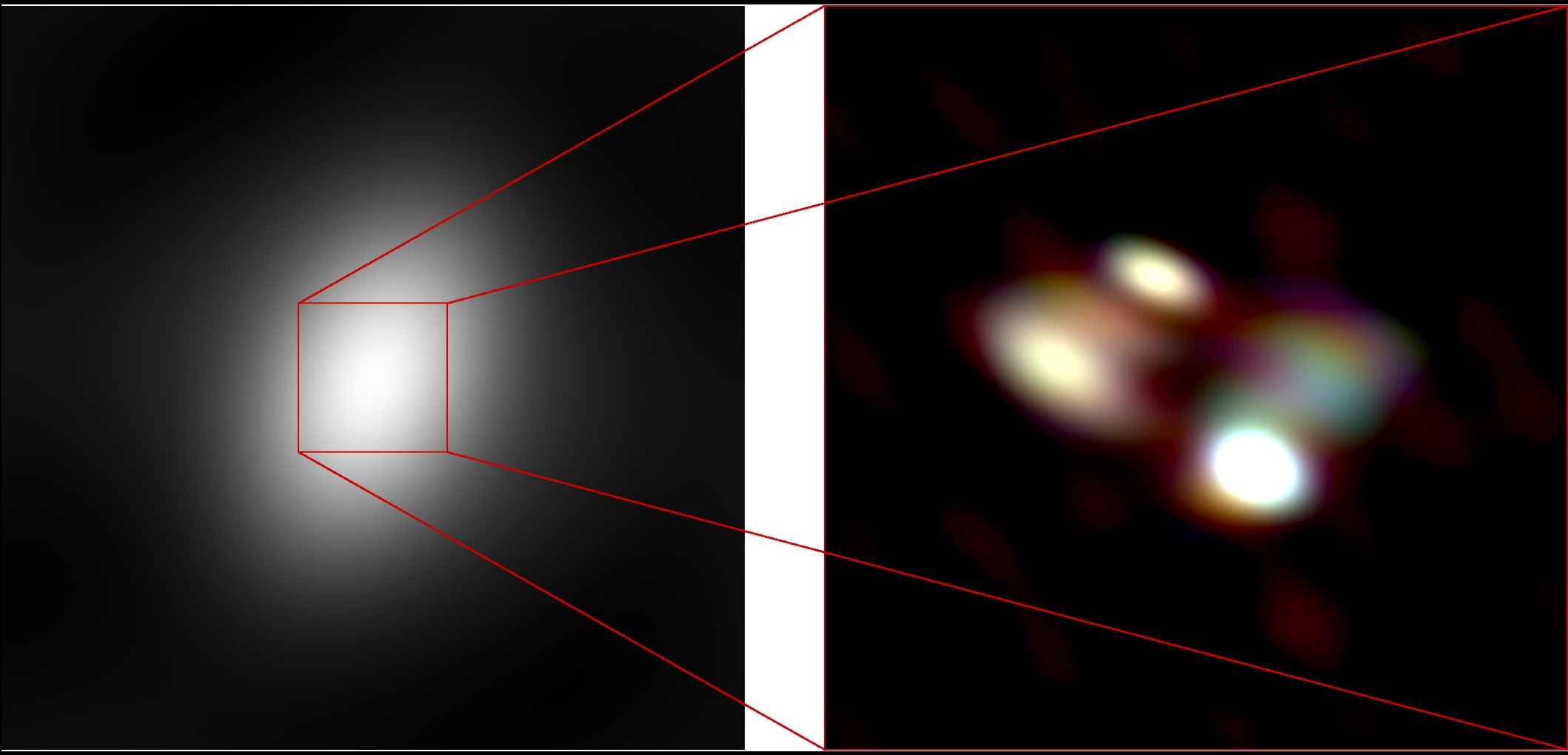
Results already: Radio flaring on The Sun

Imaging on one-second timescales



Credit: LOFAR Solar and Space Weather Key Science Project

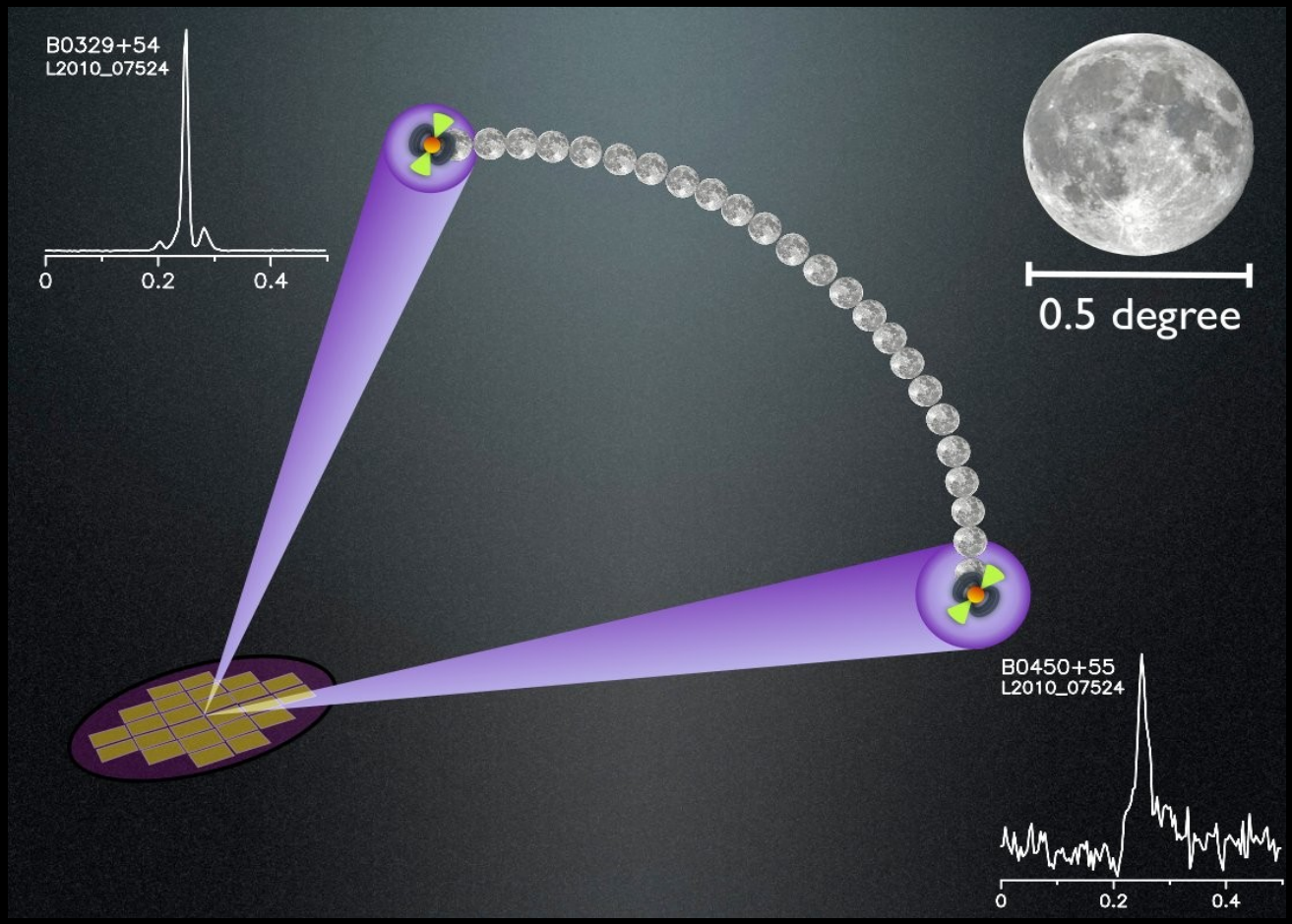
High-resolution images of distant supermassive black holes (3C 196 – 7 billion light years away)



Dutch-only stations

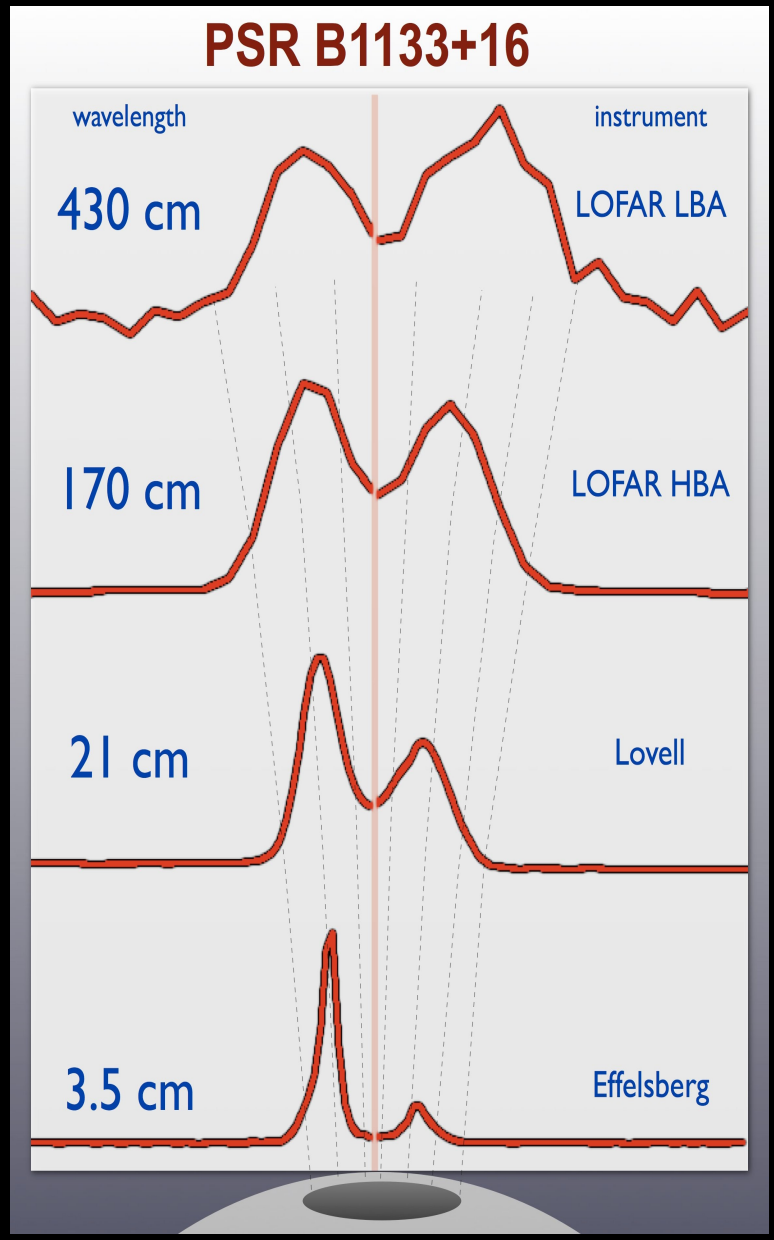
Dutch and international stations – factor of **40** improvement – adding Chilbolton will nearly double this !

Credit: LOFAR Surveys Key Science Project



Pulsars: simultaneous tracking of two pulsars widely separated on the sky using LOFAR's unique multi-beaming

Credit: LOFAR Transients Key Science Project



Broad-band coverage of pulses – influence of the pulsar magnetic field

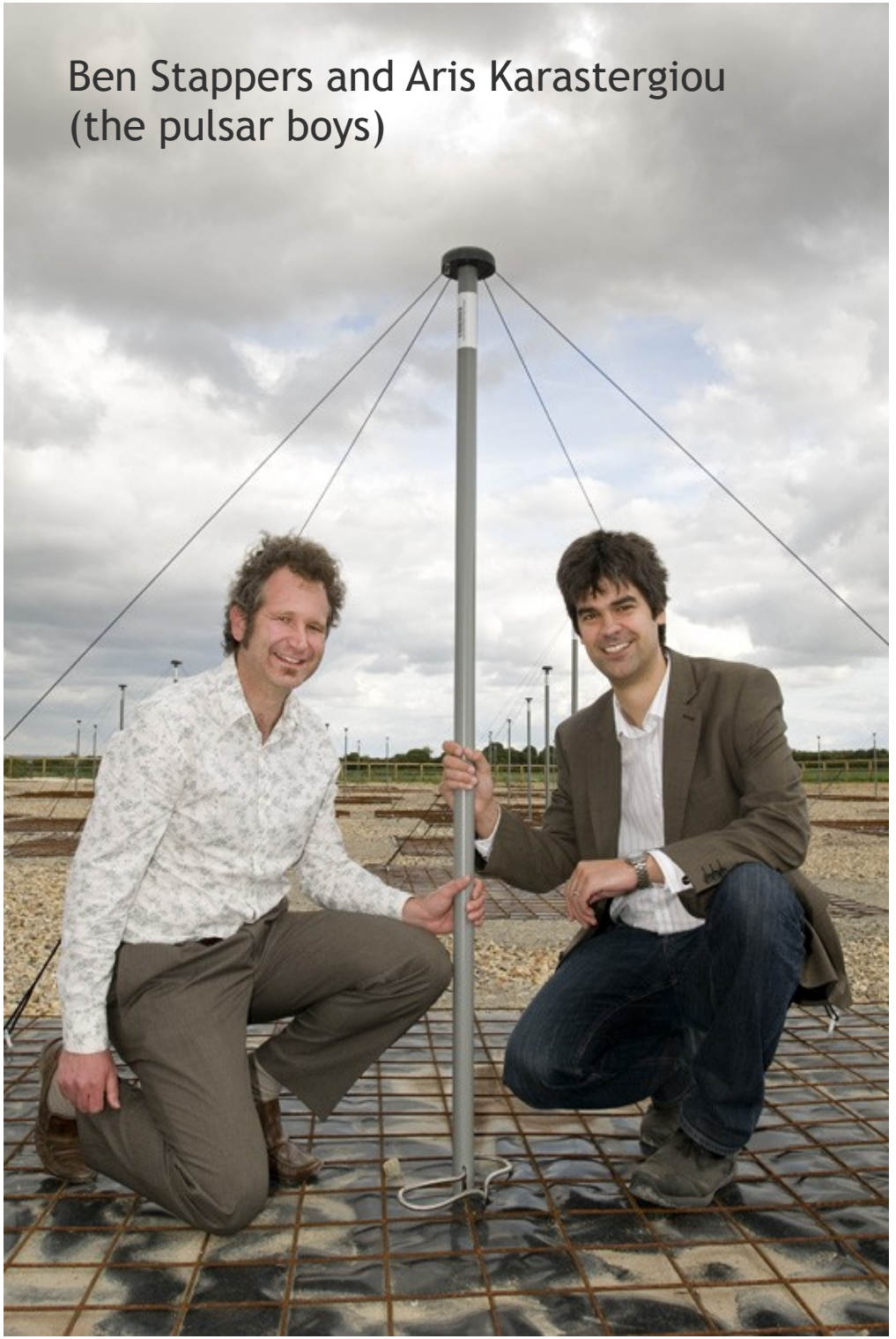
September 20, 2010: LOFAR-UK station at Chilbolton opened

12:30 Station signed off by Corina Vogt, Michiel van Haarlem and Harm Munk. UK608 Chilbolton officially validated !

15:00 Station officially opened by Jocelyn Bell Burnell.

John Womersely (STFC) in his talk noting that 'LOFAR-UK is the only new astronomical initiative we've funded* in the current three-year time frame'.

(* partially ;-))


Ben Stappers and Aris Karastergiou
(the pulsar boys)


Professor Dame Jocelyn Bell
Burnell and Derek McKay-
Bukowski (station manager)


Philip Best (deputy leader, LOFAR-UK),
Malcolm Coe and Bill Wakeham

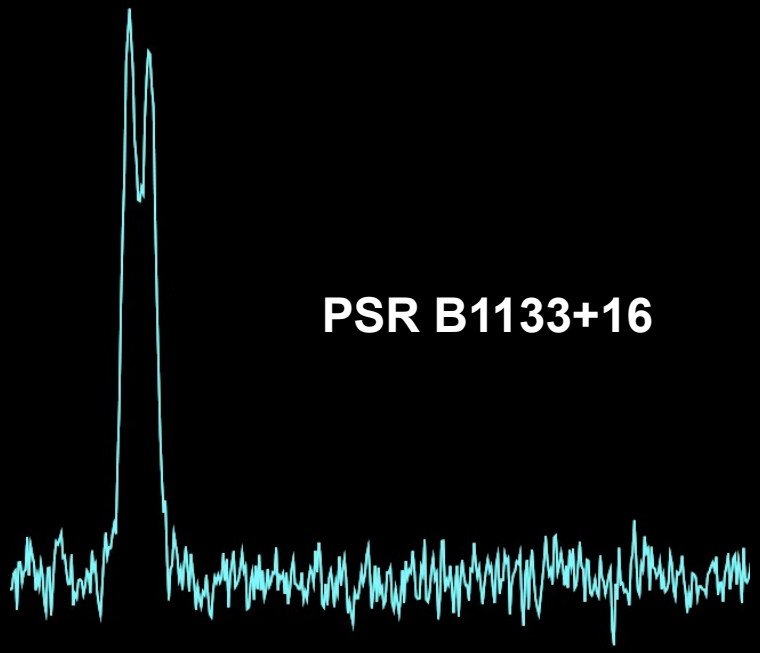
Chilbolton Pulsar first light

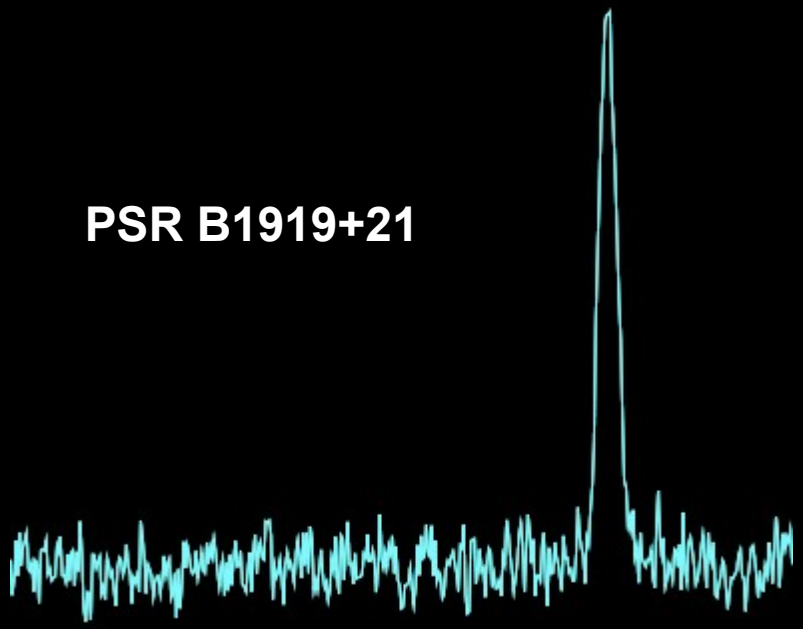
LOFAR UK608 Chilbolton is already doing science !

Custom software developed in UK :

Pulsar data stream from raw data through the PELICAN pipeline on an ARTEMIS server – processing 400 million bits of information per second

The 4 ARTEMIS servers will process the entire bandwidth and point towards up to 8 different directions in the sky, for broadband and multi-source observations





PELICAN (PrepSKA Oxford)
ARTEMIS (SEPnet)

LOFAR-UK

Britain's largest astronomy collaboration

Prifysgol Aberystwyth University
University of Birmingham
University of Cambridge
Cardiff University / Prifysgol Caerdydd
Durham University
The University of Edinburgh
University of Glasgow
University of Hertfordshire
University of Kent
University of Leicester
JMU Liverpool John Moores University
Manchester 1824
Newcastle University
The University of Nottingham
The Open University
University of Oxford
University of Portsmouth
Queen Mary University of London
RAL Space
The University Of Sheffield.
University of Southampton
University of Sussex
UCL
Science & Technology Facilities Council UK Astronomy Technology Centre
Science & Technology Facilities Council
SEPnet South East Physics Network