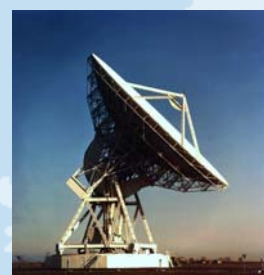
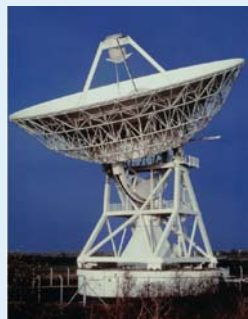


RadioNet: Advanced Radio Astronomy in Europe



RadioNet is an Integrated
Infrastructure Initiative funded by
the EU through Framework
Programme 6

Activities in mm/submm astronomy

Partners and mission

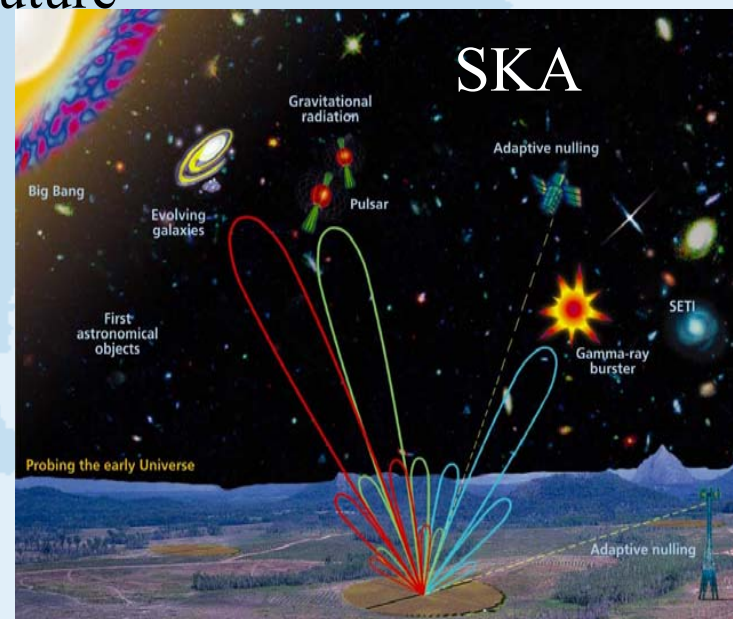
- RadioNet has 20 partners: all of the major radio astronomy facilities and the laboratories involved in technology development.
- Coordinated by the University of Manchester, UK.
- Remit is to support the European astronomy community and to enhance the European radio astronomy facilities.
- RadioNet was awarded €12.4M by the EC.



- Europe has some of the largest radio telescopes on Earth. These facilities are working together more closely than ever under the RadioNet umbrella.
- Telescopes:
 - European VLBI Network (EVN) is the most sensitive VLBI array on Earth.
 - **IRAM: runs Plateau de Bure (FR) and Pico Veleta (ES: largest mm dish in world);**
 - **JCMT in Hawaii, largest sub-mm capable dish in world;**
 - MERLIN: UK's 7-telescope array, being upgraded using fibre optics.
 - MPIfR – Effelsberg (DE) 100-m; 2nd largest steerable dish in the world;
 - **OSO-20m; highly capable mm dish in Sweden;**
 - WSRT – recently upgraded, 14 –element interferometer in NL

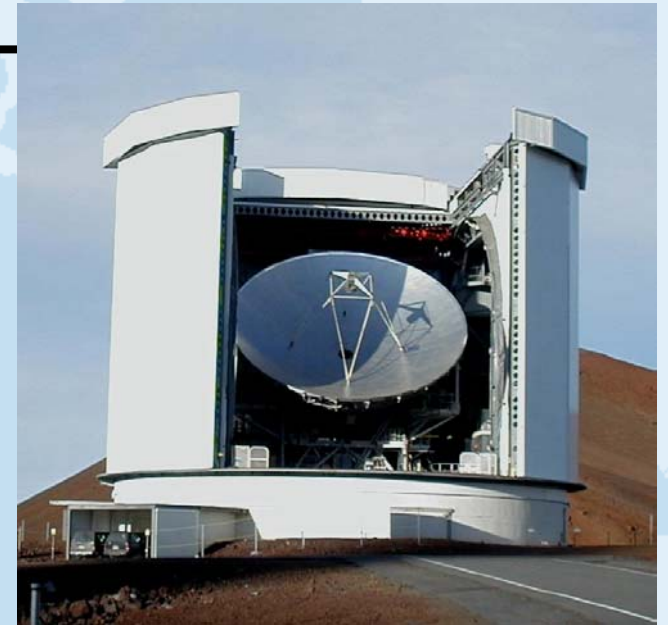
Joint Research Activities (JRAs) and Networking

- RadioNet has three Joint Research Activities:
 - ALBUS: developing advanced software for interferometers
 - AMSTAR: developing new mm-wave devices
 - PHAROS: developing focal plane phased-arrays
- Networking – linking the scientists, engineers and the next generation:
 - 6 networking activities: science, engineering, software, ALMA, spectrum management; planning for the future



The JCMT

- Telescope:
 - Diameter 15m, surface accuracy $24\mu\text{m}$
 - Altitude 4092m, summit of Mauna Kea
- Instruments:
 - SCUBA: imaging bolometric array for continuum observing at $450\mu\text{m}$ & $850\mu\text{m}$
 - Three heterodyne receivers for line observing (230,345,460/690 GHz)
- Funding:
 - Tripartite partnership:
 - United Kingdom 55%
 - Canada 25%
 - Netherlands 20%



JCMT Development Programme

- Objective:
 - Completely replace the current suite of instruments by 2006/7
 - New instruments will be optimised for wide-field astronomy
 - Comprehensive JCMT Survey Programme is currently being developed by JCMT observing communities in the partner countries
 - JCMT will be complementary to ALMA, providing zero-spacing large-area maps
 - Will also collaborate with CSO and SMA to perform limited submm interferometry beginning in 2005

JCMT Development Programme

- New instrumentation suite:
 - ACSIS: multichannel backend spectrometer Dec 2004
 - HARP-B: heterodyne array receiver at 350GHz Apr 2005
 - ROVER: polarimeter for use with HARP-B Dec 2004
 - SCUBA-2: next-generation bolometric imaging photometer, 450 μ m & 850 μ m, FOV >50 arcmin² May 2006
 - FTS-2: Fourier transform spectrometer for imaging spectroscopy with SCUBA-2 2007
 - POL-2: polarimeter for imaging polarimetry with SCUBA-2 2007

The IRAM Telescopes



Pico Veleta 30-metre
Since 1985



Plateau de Bure Interferometer
1990: 3 antennas

2002: 6 antennas and long baselines

SENSITIVITY - FLEXIBILITY - FREQUENCY COVERAGE

Heterodyne / Bolometer

[3, 2 & 1mm] [1.2 mm]

Polarimetry

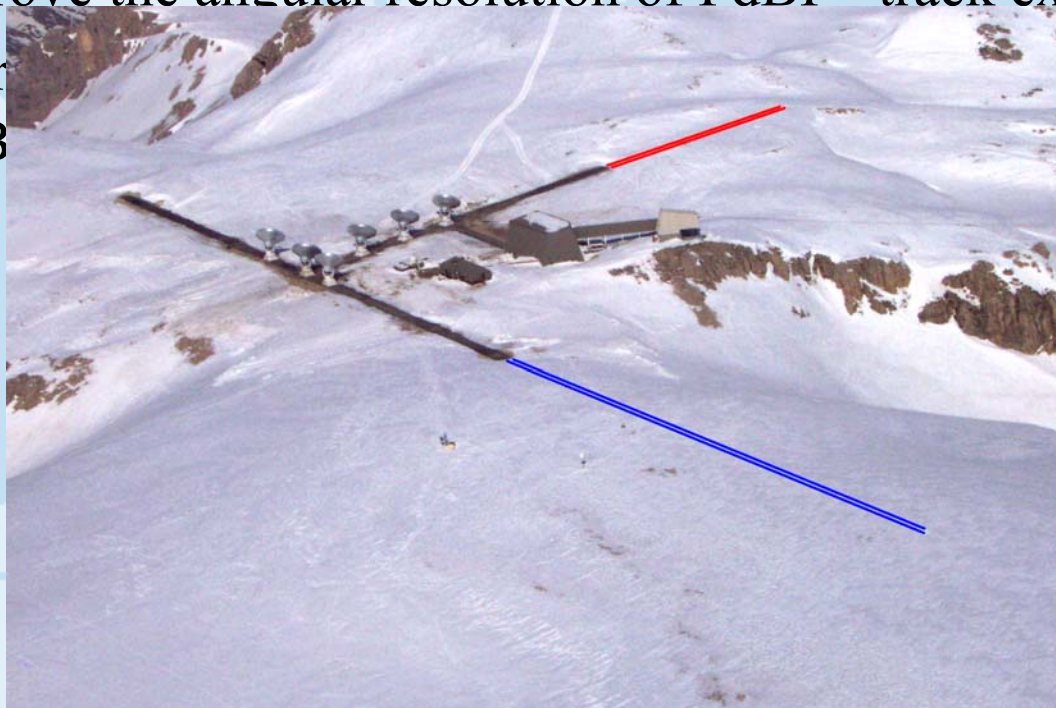
Heterodyne

[3 & 1 mm]

Major technical improvements foreseen in the mid term

Aims:

- Improve sensitivity and bandwidth: 4 GHz bandwidth, new SSB/2SB rcvrs; upgrade telescope surfaces; optical fibre data transport; new correlator at PdB, new IF processor at PV – factor of 2-5 improvement in sensitivity.
- Improve frequency coverage, polarisation capability
- Improve the angular resolution of PdBI – track extensions
- Improve the angular resolution of PdBI – track extensions, copy of LAB



2003-200



A mm/submm view of the future

