

Post-ODE History:

Key elements of the development of the EVN and JIVE as organisations

Richard Schilizzi

University of Manchester

Post-ODE, the EVN concept continued to take form

European meetings held in Onsala (1976), Jodrell Bank (1977), Heidelberg (1978) and Bonn (1979)



1977 Sept Jodrell Bank- 4th informal meeting of interested astronomers and engineers from Germany, Italy, NL, Soviet Union, Sweden, UK, USA

ODE was followed by JODE in 1978

processed on the new MPIfR 3-station Mk II correlator



1978-1992
MK II, 3-stations
4 Mbps



1982-1990
MK III, 3-stations
112 Mbps



1990-1999
Mk IIIa, 10-stations
112 Mbps
thin tape



1999-2000
MK IV, 8-stations
512 Mbps
primarily mm-VLBI
and Geodesy



2002 →
Disk packs (Mk V,
(1 Gbps), Mk VI, 64 Gbps)
Broadband internet (1Gbps)

courtesy of Eduardo Ros

The 1980s

1980 was the start of a two-decade long period of enormous growth in European VLBI
telescopes, correlators and operations - via national funding

From 1990 onwards, national funding was complemented by EC Framework Programs grants
and by the move towards the European Research Area

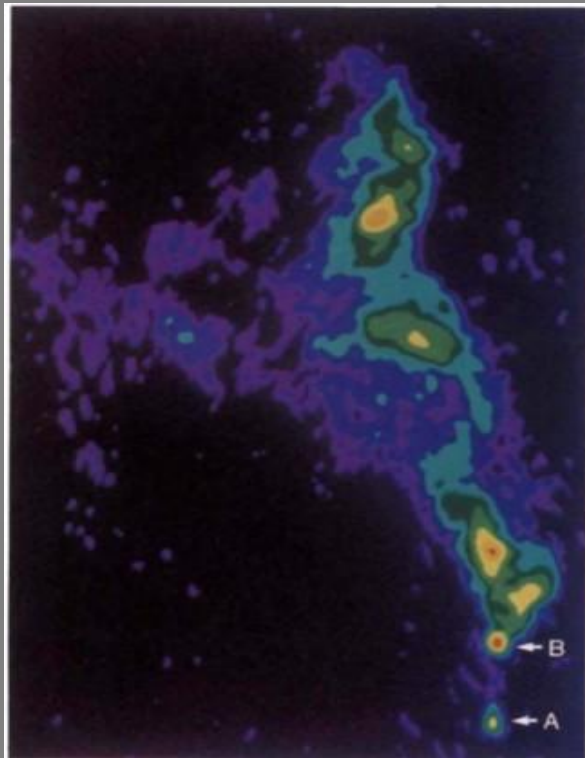
We were ambitious and there were opportunities. These were exciting times!

All four current elements of governance in European-led VLBI had their roots in the
period from 1980 to 2000

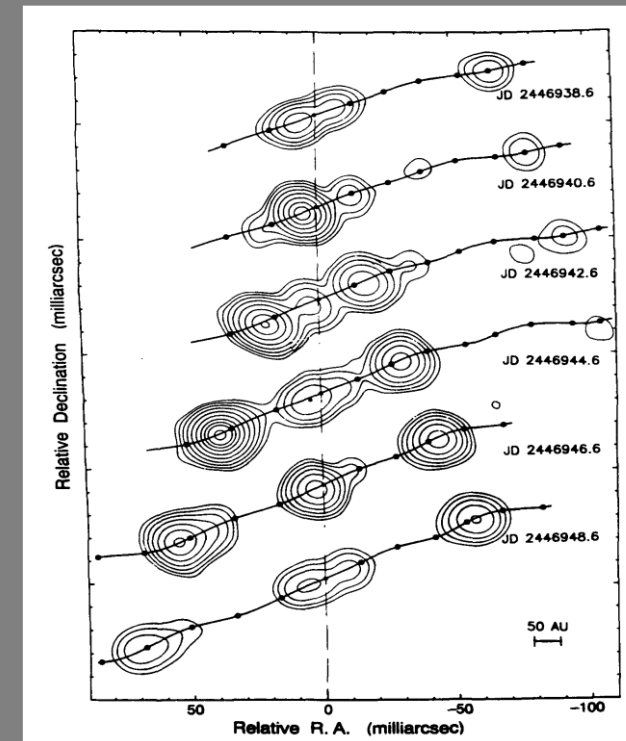
- European Consortium for VLBI
- JIVE-ERIC
- RadioNet Consortium
- LOFAR-ERIC

Advent of global observations and transition from Mk II (2 MHz) tape recorders to Mk III (56 MHz)
→ two spectacular results in the 1980s

3C48, 18 cm, Wilkinson et al (1991)
global 17 stations, observed in 1984, MkII
correlated at Caltech



SS433, 6cm, Vermeulen et al (1987)
EVN 5 stations, observed in 1985, MkIII
correlated at MPIfR



6 observations
spaced at 2-day
intervals.

Used almost all of the
MkIII tape supply in
Europe!

EVN, large correlators

- 1980** EVN established – Effelsberg, Westerbork, Jodrell, Onsala, Bologna
annual meetings of Directors (Giancarlo Setti, 1st Chair, 6 observing sessions/year)
EVN Program Committee established (Ivan Pauliny-Toth, 1st chair)
- 1980-2** discussed a multi-station, wide-band, *real-time* correlator for satellite-linked VLBI
this failed but was the start of a decade long effort → JIVE and MPIfR MkIV correlators
- 1983** proposal by Setti et al to EC for expansion of MPIfR Mk3 correlator to 12 stations
not successful
- 1983-5** discussed alternative proposals for large data processors
- upgrade 3-station Mk3 processor at **MPIfR** to 8 stations (€5 M)
- develop new generation (12 station), service-oriented data processor at **NFRA** in Dwingeloo (€7.5 M)
- 1984** European Consortium for VLBI established (5 members, 4 associates).
- Consortium agrees to seek funding for new generation processor in Dwingeloo.
- MPIfR Directors decided to upgrade their 3-station correlator to 5-stations



EVN Directors meeting
Noto, 1988



15th EVNPC meeting
Onsala, 1984

First formal meeting of the European Consortium in Bonn in February 1985

1980

1980-2

1983

1983-5

1984



On the other side of the fence...

1983-6 Discussions with EC D-G Research → **proposal** for 12-station data processor in Dwingeloo
Circulated to European Science Ministries. Not funded.

1987 EC Framework Programme (FP1) approved

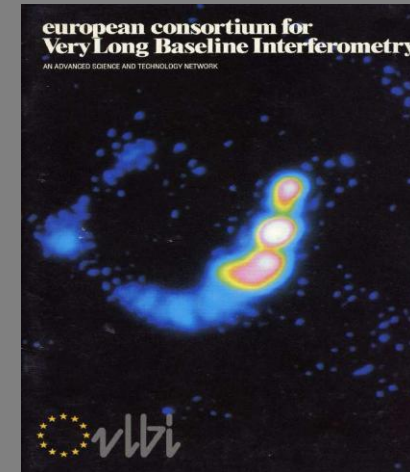
1988 **proposal** to EC for 1st phase of a 20-station correlator (17.8 M€).
Also unsuccessful, but...

NL Science Minister discusses VLBI with French counterpart
Initiated an ESF report on VLBI priority within ground-based astronomy

1989 A little bit of pressure
on our part was applied



“An acid test of the European Community's intentions in support of science after 1992 is its willingness to respond to an imaginative proposal from radioastronomers”



By this time, the EC began to realise that the EVN could be an example of a distributed research infrastructure!

Funding at last!

1992

€1M for Access to Large Scale Facilities, for the EVN

(European Commission)

€6.35M for data processor design and construction

(NL Ministry of Education and Science, CNRS in France, and Swedish Wallenberg Foundation)

1993

JIVE formally established as a Foundation (legal entity) in the Netherlands. Roy Booth 1st chair of the Board

1993-8

Design and construction of 16-station MkIV processor at JIVE by international consortium (€8.7M including manpower).

The correlator design gurus



Albert Bos,
NFRA



Alan
Whitney,
Haystack
Obs



Sergei
Pogrebenko,
JIVE



Bryan
Anderson,
Jodrell

Official opening of EVN Data Processor at JIVE

October 1998



JIVE → European Research Infrastructure Consortium



- JIVE was inaugurated as an ERIC on 21 April 2015



Signing the end of JIVE Foundation. 2016

Radio astronomy funding via the EC 1989-2026

FP2-FP4 - Science stimulation, access to large scale facilities, research & technical development, cooperation with Hungary and Poland, **1989-1999** (8.2 M€)

RADIONET – Trans-National Access, Joint Research Activities, and Networking Activities, a strong cohering force in European radio astronomy, **2000-2020** (42.2 M€)

EXPRes, NEXPRes - e-EVN development, **2005-2014** (7.4 M€)

Other programs including SKA Design Study SKADS, **2004-2009** (≥ 24 M€)

OPTICON-RadioNet Pilot 2021-2025 (€7.5M)

Radio Blocks 2023-2027 (€8.9M)

ACME, 2024-2028 (€2.8M)

TOTAL ≥ 101 M€

RadioNet Consortium
2021 →



RadioNet (2000 → present)

RadioNet has been, and remains, Europe's collaborative framework for radio astronomy



RTS

Phil
Diamond

Anton
Zensus

Mike
Garrett

FP5-1

FP6

FP7-2
H2020
ORP

FP5-2
FP7-1



Rob Beswick
Spokesperson



Aga Slowikowska
Vice-Spokesperson

2026 →

e-EVN

2000-2002

Concept presentations to NRENs, EC, European Science Foundation, CERN,...

2002

Test of concept

2005

EXPreS, e-EVN operational, Coordinator: Mike Garrett

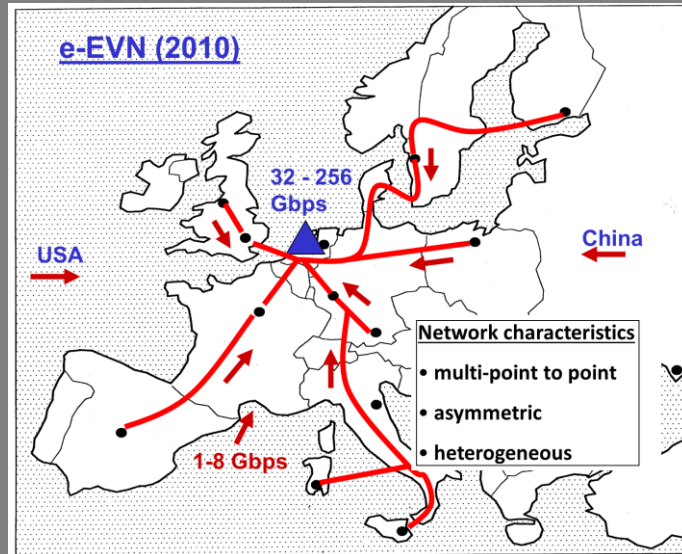
2009

NEXPreS, Coordinator: Huib van Langevelde

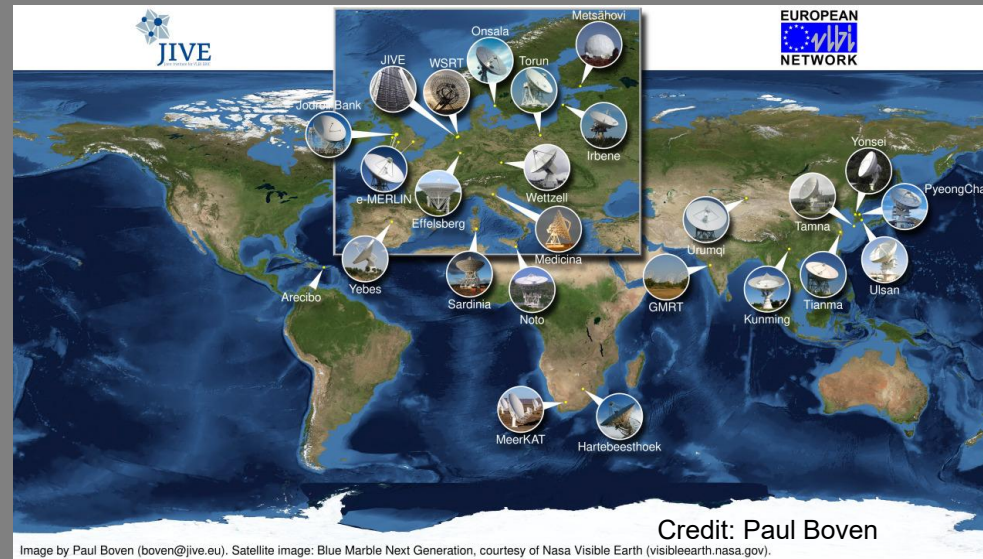
2015 →

Access to generic routed NREN network around Europe and dedicated “light-paths”

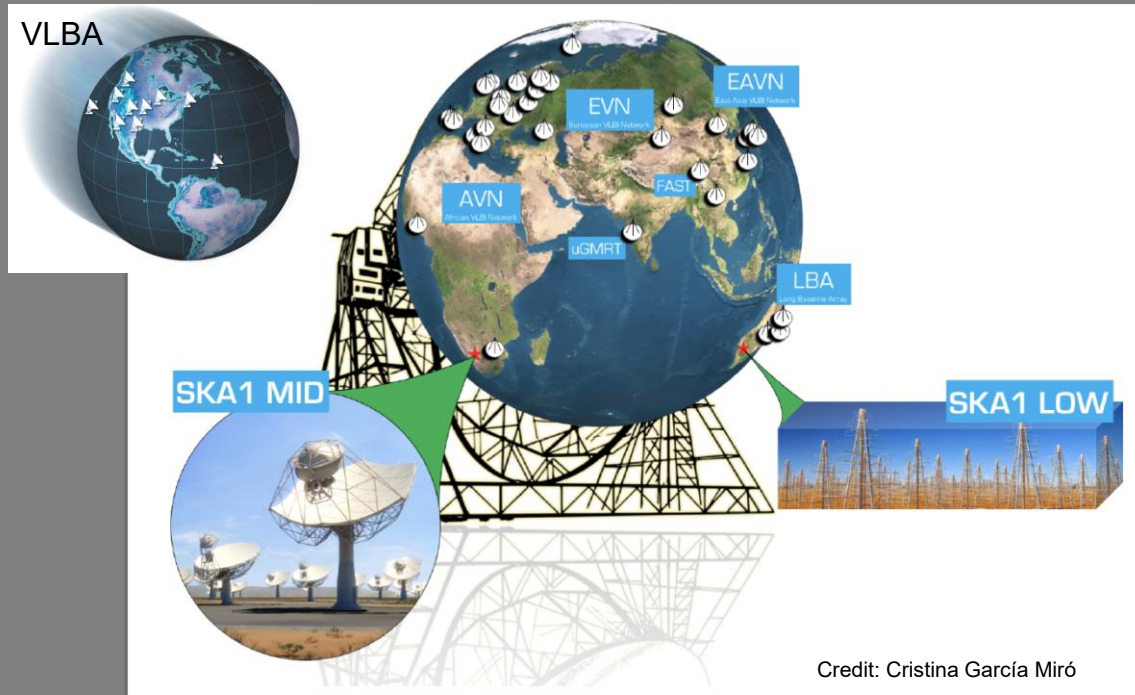
2001 concept for e-EVN in 2010



operational network



VLBI → SKA



EVN

12 countries

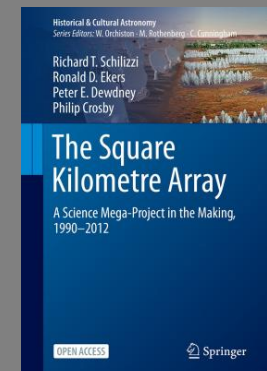
20+ telescopes

Global VLBI

17 countries

40+ telescopes

- culture of successful “grass-roots” international collaboration, effective science diplomacy, and interaction with multiple funding agencies
- set the scene for SKA development in the 1990s
- many of the people who grew up in that culture played, and still play, leading roles in the SKA



MeerKAT core + proto-AVN + EVN



12 countries

20+ telescopes

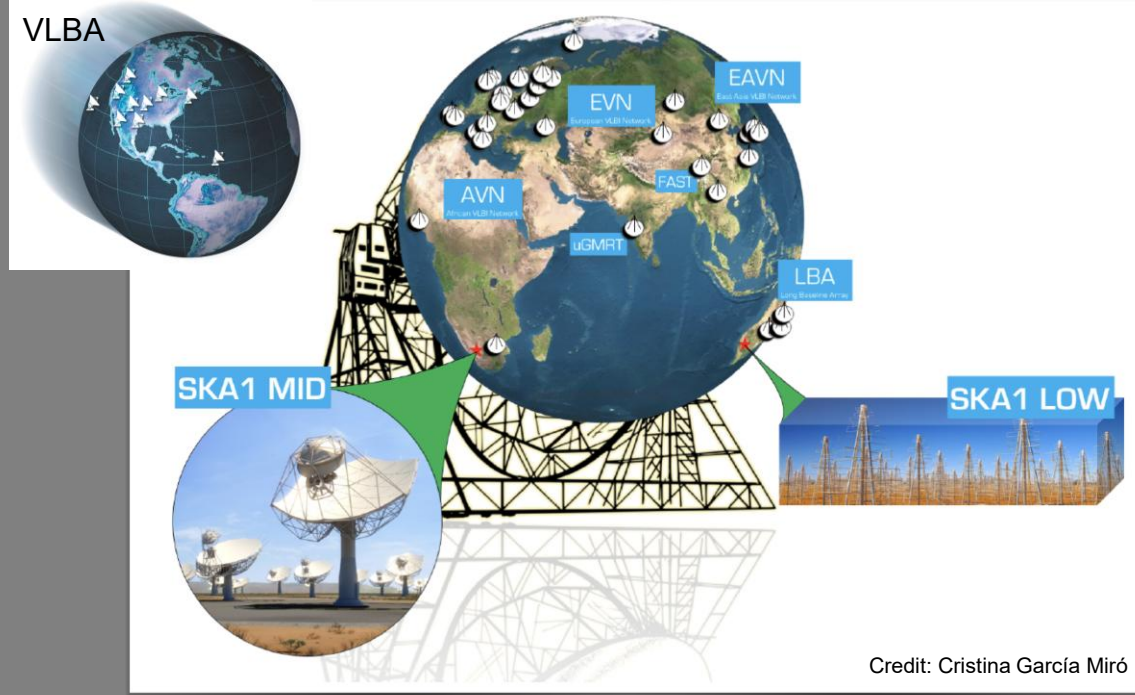
Global VLBI

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VLBI and SKA: SKA-MID core + AVN + EVN



EVN

12 countries

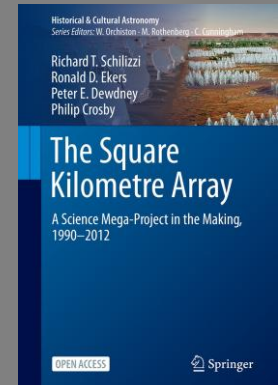
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Richard Porcas
Jack Radcliffe
Tim Robishaw
Eduardo Ros
Izabela Rottmann

Relevant Publications

Roy Booth (2012) Publications of Science
George Miley (2010) Publications of Science
Richard Porcas (2010) Publications of Science
Eugen Preuss (2002) Proc. 6th EVN Symposium

IAU-URSI WG Historical Radio Astronomy

<https://rahist.nrao.edu/HRAWG-talks.shtml>

many presentations, including individual observatory stories