

Masers and Molecules

RSB65

The origins of the EVN
(and its subsequent development)

The origins

? 1974

letter from Roy Booth to Marshall Cohen at Caltech
about US plans for a VLBI Network

7 Apr 1975

MPIfR cafeteria Bonn (Booth, Pauliny-Toth, Preuss,
Miley) discussion on European VLBI Network

1975-1979: The early days

- Sep 1975 first meeting of interested astronomers, Bonn
- Mar 1976 second informal European VLBI meeting in Bonn
- Oct 1976 first intra-European observations Onsala-Dwingeloo-Effelsberg (ODE) on 3C236 and NML Cygnus
- Oct 1976 third “EURO-VLBI” meeting in Onsala

V.L.B.I. in EUROPE

On September 26th 1975 an informal meeting on the possibilities for very long baseline interferometry in Europe took place at the Max Planck Institut für Radioastronomie in Bonn. The following 8 point statement was agreed by the participants (list enclosed).

1. There is great interest in setting up a European VLBI network and several observatories are considering the installation of VLBI terminals.
2. The funding of these projects in individual observatories is not yet clear.
3. The possibility of approaching national and international bodies for support will be explored with the heads of individual observatories.
4. We should go ahead with the NRAO Mk II VLBI system at present, especially since Bonn and Onsala already have Mk II terminals.
5. We want to encourage the Onsala Observatory to complete their processor and we will examine ways of helping the venture.
6. We should keep in touch with MIT and NRAO in terms of Mk III development.
7. Some European VLBI projects have been started and we should continue with these and propose new ones.
8. We should meet again in a few months. Provisionally Friday, February 6th in Bonn.

R.S. Booth
October 1975

1975

Sep 1975

Mar 1976

Oct 1976

Oct 1976

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Bonn

wingeloo-
us

V.L.B.I. in EUROPE

On September 26th 1975 an informal meeting on the possibilities for very long

List of participants at informal meeting on European VLBI, October 1975

| | | | |
|----------|---|-----------------|--------------|
| 1975 |  | J.W.N. Baars | Bonn |
| | | B. Baud | Leiden |
| | | J. Bieging | Bonn |
| Sep 1975 |  | R.S. Booth | Jodrell Bank |
| | | W.N. Brouw | Dwingeloo |
| | | J.A. Casse | Dwingeloo |
| | | H.J. Habing | Leiden |
| | | H.E. Matthews | Munich |
| Mar 1976 |  | G.K. Miley | Leiden |
| | | I. Pauliny-Toth | Bonn |
| | | E. Preuss | Bonn |
| |  | B. Rönnäng | Onsala |
| Oct 1976 |  | G. Setti | Bologna |
| | | W. Wiedenhöver | Bonn |
| | | R. Wielebinski | Bonn |
| |  | A. Winnberg | Bonn |
| | | A. Witzel | Bonn |
| Oct 1976 | | R. Wohlleben | Bonn |
| | | W. Zinz | Bonn |

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EUROPEAN VLBI MEETING - 5 MARCH 1976

R. S. Booth

On March 5, 1976 a second informal meeting of radio astronomers interested in VLBI observations, and in particular such observations within Europe, was held at the Max-Planck Institute in Bonn

Early discussion centred on the available facilities in Europe. Data recording facilities with the NRAO Mark II system are available at two European observatories (Onsala and Effelsberg) and strong interest was expressed in acquitting this system at other observatories. At least eight U.S. observatories have the MkII system which represents the current state of the art.

It was clear that a generally available playback terminal in Europe would considerably speed up the data reduction, and avoid time-consuming excursions to the United States to use the already overloaded NRAO processor.

In this respect the meeting paid tribute to the pioneering VLBI work in Europe by the Onsala group and discussed their processor development. The participants agreed that the updating and operation of the Onsala processor as a generally available facility was urgently needed. This would require assistance, both in terms of manpower and financial support, and this need should be brought to the attention of the heads of the interested observatories for this consideration.

Dr. K. Kellermann of NRAO discussed the future development of VLBI systems. The design is planned of a so called MkIII system which is capable of wider bandwidths and faster playback. This system should come into use in the early 1980's. It is felt that, in order to catch up with the U.S., Europe should collaborate in this development. It was suggested that the Max-Planck Institute should consider such participation with the view to the eventual provision of a MkIII processor in Bonn.

List of participants at informal meeting on European VLBI, 5 March 1976

| | |
|-----------------|--------------|
| A. van Ardenne | Dwingeloo |
| B. Baud | Leiden |
| J. Bieging | Bonn |
| R.S. Booth | Jodrell Bank |
| R. Bösel | Bonn |
| J.A. Casse | Dwingeloo |
| R. Denzel | Bonn |
| K. Kellermann | NRAO |
| H.E. Matthews | Munich |
| D. Mathieson | Slough |
| G.K. Miley | Leiden |
| I. Pauliny-Toth | Bonn |
| E. Preuss | Bonn |
| B. Rönnäng | Onsala |
| G. Sandel | Helsinki |
| M.E. Tiuri | Helsinki |
| K. Weiler | Bologna |
| W. Wiedenhöver | Bonn |
| R. Wielebinski | Bonn |
| A. Winnberg | Bonn |
| A. Witzel | Bonn |
| R. Wohlleben | Bonn |

19

Sep 1975

Mar 1976

Oct 1976

Oct 1976

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High Resolution Observations of the Compact Central Component in the Giant Radio Source 3C 236

R. T. Schilizzi¹, G. K. Miley², A. van Ardenne¹, B. Baud^{2,*}, L. Bååth³, B. O. Rönnäng³, and I. I. K. Pauliny-Toth⁴

¹ Netherlands Foundation for Radio Astronomy, Radiosterrenwacht, Dwingeloo, The Netherlands

² Sterrewacht, Huygens Laboratorium, Leiden, The Netherlands

³ Onsala Space Observatory, Onsala, Sweden

⁴ Max Planck Institut für Radioastronomie, Auf dem Hügel 69, D-5300 Bonn 1, Federal Republic of Germany

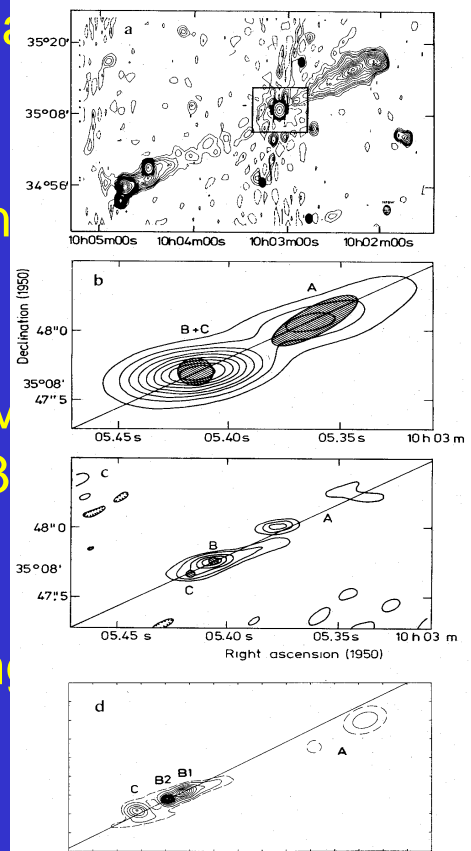
Received October 16, 1978

ODE EXPERIMENT

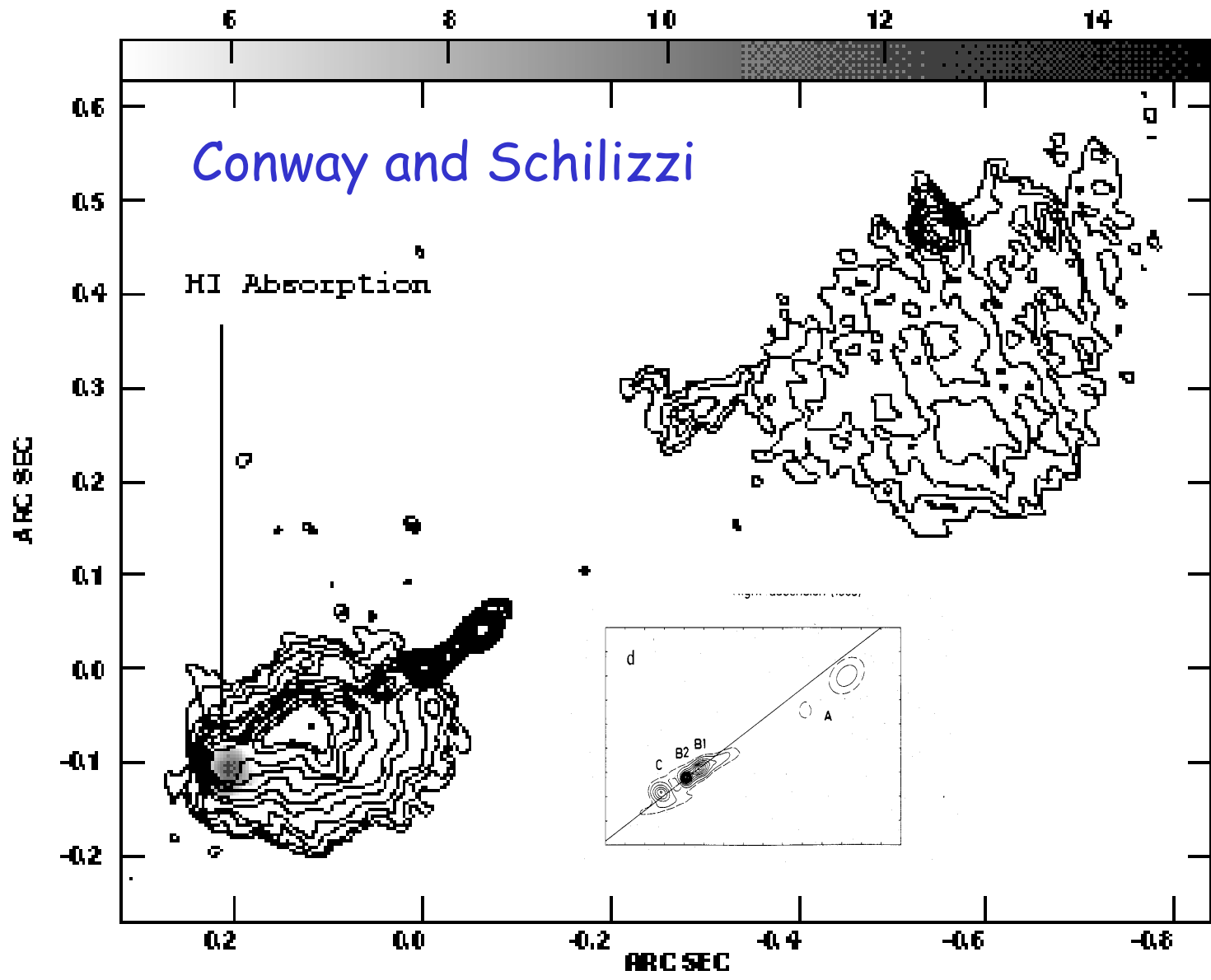
OCTOBER 1,2

[A] CONTINUUM. F = 1610. MHz. BW = 2. MHz. STATION B = EFFELSBERG, C =

| SOURCE | SCAN # | START | | | STOP | TAPES | | | SCAN TIMES | | |
|---------|----------|----------|----------|----------|-------|---------|---------|--------|------------|-----|-----|
| | | B | C | A | | B | C | A | B-C | A-C | A-B |
| 3C273 | 275-1530 | 15 02 32 | 14 59 55 | 15 00 00 | 15 30 | MPI-151 | MPI-76 | OSO-1 | 27% | 30 | 27% |
| 3C315 | -1600 | 15 36 45 | 15 35 55 | 15 33 10 | 16 00 | " | " | " | 23% | 24 | 23% |
| 4C39.25 | 276-0230 | 02 02 00 | 02 00 00 | 02 01 00 | 02 30 | MPI-041 | MPI-018 | OSO-7 | 28 | 29 | 28 |
| A00235 | -0300 | 02 35 00 | 02 38 06 | 02 35 18 | 03 00 | " | " | " | 22 | 22 | 25 |
| 3C22 | -0330 | 03 04 30 | 03 04 40 | 03 03 07 | 03 30 | " | " | " | 25% | 25% | 25% |
| 3C 84 | -0400 | 03 35 00 | 03 35 15 | 03 33 15 | 04 00 | " | " | " | 25 | 25 | 25 |
| 3C263 | -0430 | 04 07 06 | 04 08 05 | 04 06 20 | 04 30 | MPI-042 | MPI-019 | OSO-8 | 22 | 22 | 23 |
| 4C39.25 | -0500 | 04 40 15 | 04 34 33 | 04 32 15 | 05 00 | " | " | " | 20 | 25% | 20 |
| 3C236 | -0600 | 05 02 30 | 05 04 11 | 05 01 14 | 06 00 | " | " | " | 56 | 56 | 57% |
| - | -0700 | 06 06 10 | 06 07 46 | 06 05 42 | 07 00 | MPI-043 | MPI-015 | OSO-9 | 52% | 52% | 54 |
| " | -0800 | 07 02 10 | 07 02 33 | 07 00 27 | 08 00 | " | " | " | 57% | 57% | 58 |
| " | -0900 | 08 05 00 | 08 08 25 | 08 05 18 | 09 00 | MPI-053 | MPI-012 | OSO-10 | 51% | 51% | 55 |
| " | -1000 | 09 00 00 | 09 02 39 | 09 00 25 | 10 00 | " | " | " | 57% | 57% | 59% |
| " | -1100 | 10 06 30 | 10 09 33 | 10 05 00 | 11 00 | MPI-055 | MPI-013 | OSO-11 | 50% | 50% | 53% |
| " | -1200 | 11 00 00 | 11 03 44 | 11 00 48 | 12 00 | " | " | " | 56% | 56% | 59% |
| " | -1300 | 12 05 30 | 12 07 00 | 12 06 07 | 13 00 | MPI-056 | MPI-014 | OSO-12 | 53 | 53 | 54 |



Conway and Schilizzi



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3rd Informal European VLBI meeting, Onsala 22 October 1976

Summary of discussion

1. Terminals

It was reported that Jodrell Bank, SRC Appleton Laboratory, the Max-Planck Institute, Bonn, and the Netherlands Foundation for Radio Astronomy, Holland, are going to build Mk IIc recording terminals. All these groups have ordered Format units from Caltech and delivery is now expected about mid-1977. The final dates of availability of the terminals depend on funding but most should be completed by late 1977.

A question was raised about the frequency of the input power supply to the tape recorder. I have checked with Dr. Ewing and it turns out that we need the IVC 825A recorder which is a 60 Hz machine. However, IVC supply a conversion power unit which takes an input supply of 230V, 50 Hz and converts it to 120V, 60Hz. This costs about \$1000.

2. Processors

a) Onsala Space Observatory

Professor Rydbeck announced that his observatory will soon be diverting engineering effort back to the Onsala processor. This will be a 2-station machine and will have facilities to run 2" tapes but also combination of 1" and 2" tapes. It will have 30 resolution channels for line work.

List of participants at informal meeting on European VLBI, 22 October 1976

| | |
|------------------|----------------------------|
| A. van Ardenne | Dwingeloo |
| L. Baath | Onsala |
| B. Baud | Leiden |
| R.S. Booth | Jodrell Bank |
| J. Campbell, | Geodetische Institut, Bonn |
| J.A. Casse | Dwingeloo |
| J. Elder | Onsala |
| B. Hoglund | Onsala |
| A. Hyalmarson | Onsala |
| L.E.B. Johansson | Onsala |
| S. Lidholm | Chalmers University |
| G.K. Miley | Leiden |
| I. Pauliny-Toth | Bonn |
| E. Preuss | Bonn |
| M.H. Quigley | Appleton Laboratory |
| B. Rönnäng | Onsala |
| O.E.H. Rydbeck | Onsala |
| G. Sandel | Helsinki |
| R. Schilizzi | Dwingeloo |
| A. Wolszczan | Torun |

Apologies were received from:

The early days (2)

- Sep 1977 Fourth informal meeting in Jodrell Bank
- Oct 1977 European Study of satellite linked VLBI using L-SAT (Olympus) initiated
- Jan 1978 Second observation session J-O-D-E (resulted in 2 baselines!)
- Jun 1978 3-station Mk2 correlator in Bonn started operation
- Nov 1979 Fifth meeting in Bonn. Future instrumental developments (MkIII, H-masers) discussed.

3rd European VLBI meeting at
Jodrell Bank, September 1977



The early days (2)

- Sep 1977 Fourth informal meeting in Jodrell Bank
- Oct 1977 European Study of satellite linked VLBI using L-SAT (Olympus) initiated
- Jan 1978 Second observation session J-O-D-E (resulted in 2 baselines!)
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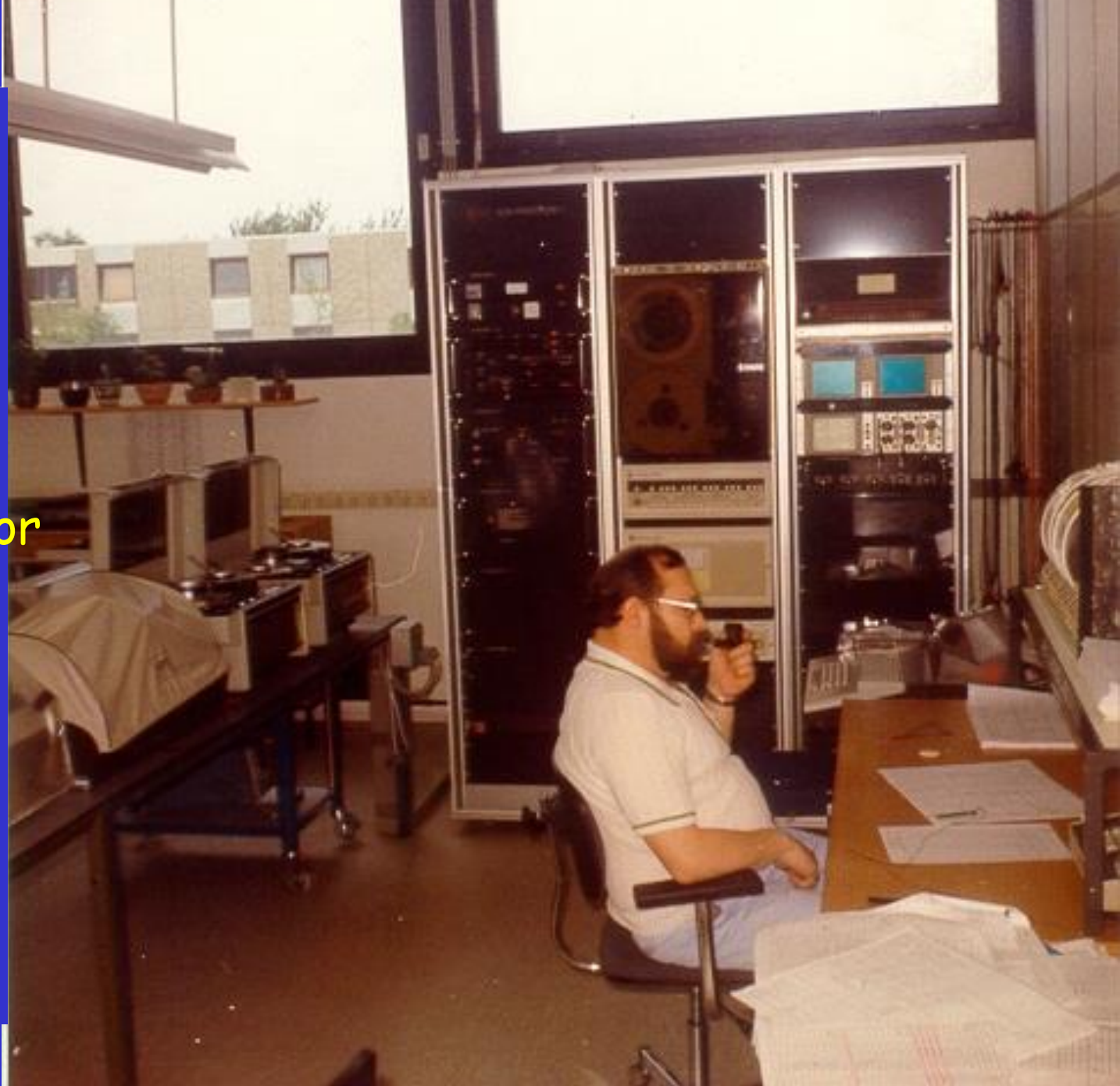


Mk 2
correlator +
playback
systems at
MPIfR

Horst Blaschke

chief operator
MPIfR correlator

Peace and calm
personified!



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1980-1992: initial expansion

- 1980 Bonn: first meeting of institute directors. Agreement on six observing sessions/year and setting up EVNPC. Mk3 terminals.
- 1981 Leiden: Director's Meeting discussed the data processor needs of the EVN in general terms. Demise of satellite-linked VLBI
- 1982 3 station Mk3 processor at MPIfR started operation
 - QUASAT was born in Toulouse
 - EVN Technical Working Group formed, Wolfgang Zinz first chair

EVN and EVN Program Committee

Draft agreement on setting up a European VLBI Network and Programme Committee

The following observatories,

The Max-Planck-Institut für Radioastronomie, FRG,

The Netherlands Foundation for Radioastronomy (Westerbork/Dwingeloo),
Netherlands,

The Nuffield Radio Astronomy Laboratories (Jodrell Bank, University of
Manchester), U.K.

The Onsala Space Observatory (Chalmers University of Technology),
Sweden

agree to cooperate closely in the field of Very Long Baseline Interferometry, by setting up a Programme Committee and coordinated observing periods, as follows:

(i) Coordinated VLBI observing periods

Provided that a sufficient number of high-quality, technically feasible programmes are submitted, 6 days every two months will be set aside for observations within the framework of the European VLBI network. These periods will be roughly the first weeks in February, April, June, August, October and December contiguous with the U.S. network sessions, to facilitate joint European/U.S. observations. The frequencies to be used will be decided at least 6 months in advance, by consultation between the chairmen of the U.S. and European committees and the participating observatories.

Time not used for VLBI during these periods will revert to the individual observatories. Individual observatories are, of course, free to organise VLBI experiments outside these periods.



EVNPC meeting in Onsala in 1984

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- 1982 3 station Mk3 processor at MPIfR started operation
- QUASAT was born in Toulouse
 - EVN Technical Working Group formed, Wolfgang Zinz first chair
- 1983 two alternative proposals for future processing needs in Europe
- upgrade Mk3 processor at MPIfR to 8 stations
 - develop new generation (12 station) data processor in Dwingeloo
- European Foundation for Radio Astronomy discussed
- Contact with ESF president Hubert Curien

1980-1992 (2)

- Jun 1984 EVN directors meet in Vienna before ESA QUASAT symposium in Grossenzersdorf (Austria), decide to establish Consortium
- Jul 1984 MoU establishing European Consortium for VLBI (Bologna, MPIfR, Jodrell Bank, Onsala, Westerbork)
- Feb 1985 Consortium meets for the first time in Bonn. Giancarlo Setti first chairman, Richard Wielebinski vice-chair.

Consortium agrees to seek funding for new generation processor in Dwingeloo as part of the EVN Upgrade Program
- May 1986 first contacts with EC in Brussels on funding

Relaxing after the big decision at Grossenzersdorf.....



1980-1992 (2)

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EVN Consortium agreement

Consortium of European Radio Astronomy Institutes for Very Long Baseline Interferometry

1. The European Radio Astronomy Institutes subscribing to this Agreement, recognising
 - (i) the importance of international collaboration in the use of Very Long Baseline Interferometry (VLBI) for scientific research in astronomy and geophysics
 - (ii) the need for coordinated observations using VLBI both within the European VLBI Network (EVN) and in conjunction with other radio astronomy institutes
 - (iii) the need for a coordinated programme of technical development of VLBI in Europe

agree to establish a consortium to be known as the Consortium of European Radio Astronomy Institutes for VLBI.

The Consortium will foster the coordinated use and development of VLBI in European radio astronomy institutes.

2. The member institutes agree to dedicate at least 45 days per annum to coordinated observations within the framework of the EVN, including joint observations of the EVN with other VLBI networks.
3. The Consortium shall agree a programme for the development of the scientific potential of the EVN and shall formulate proposals for new scientific and technological developments. These proposals may specify

Jun 198

Jul 1984

Feb 198

May 198

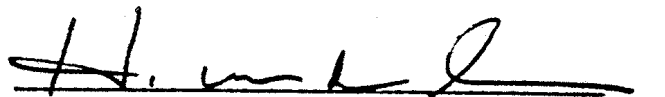
Onsala Space Observatory (Chalmers University of Technology), Sweden

July 24, 1984



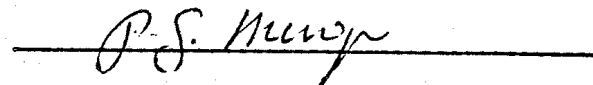
The Netherlands Foundation for Radio Astronomy (Westerbork), Netherlands

July 24, 1984



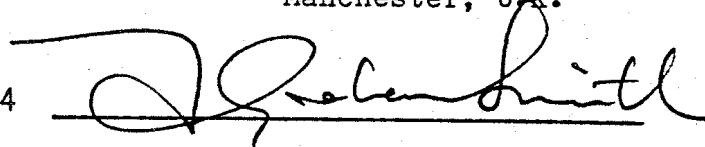
Max-Planck-Institut für Radioastronomie, Bonn, F.R.G.

July 24, 1984



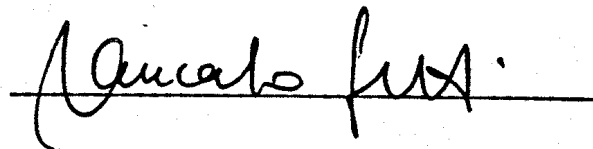
Nuffield Radio Astronomy Laboratories, Jodrell Bank, University of
Manchester, U.K.

July 24, 1984



Istituto di Radio Astronomia, Bologna, Italy

July 24, 1984



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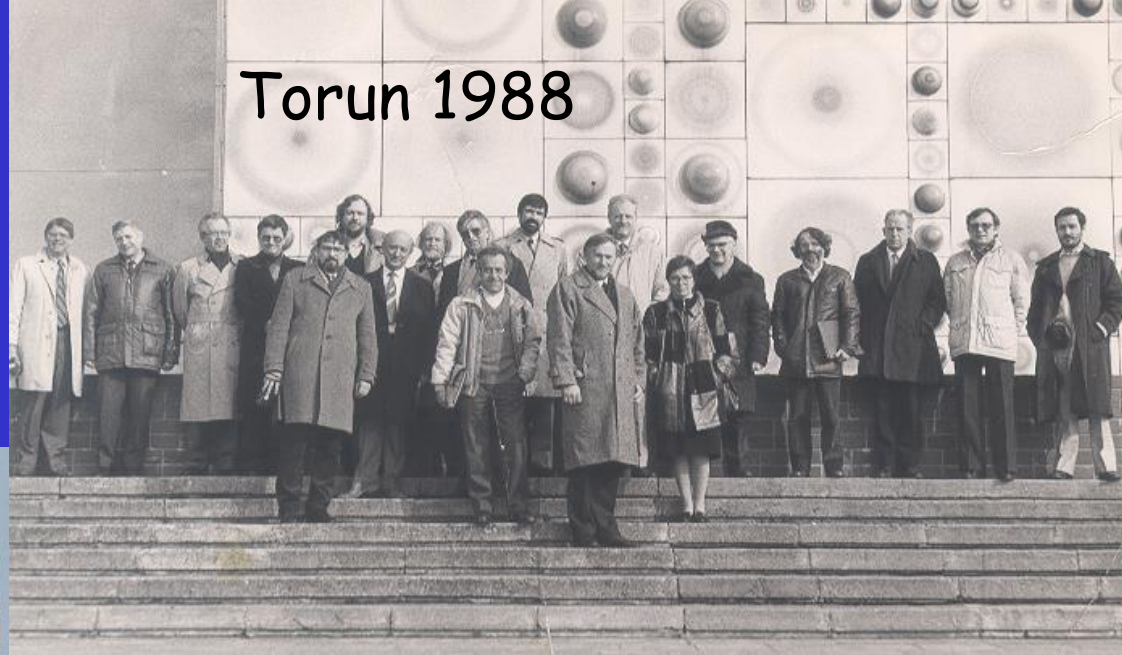
Consortium agrees to seek funding for new generation processor in Dwingeloo as part of the EVN Upgrade Program
- Nov? 1985 EVN telescopes outfitted with Mk3
- May 1986 first contacts with EC in Brussels on funding

First formal meeting of the European Consortium in Bonn, in Feb 1985

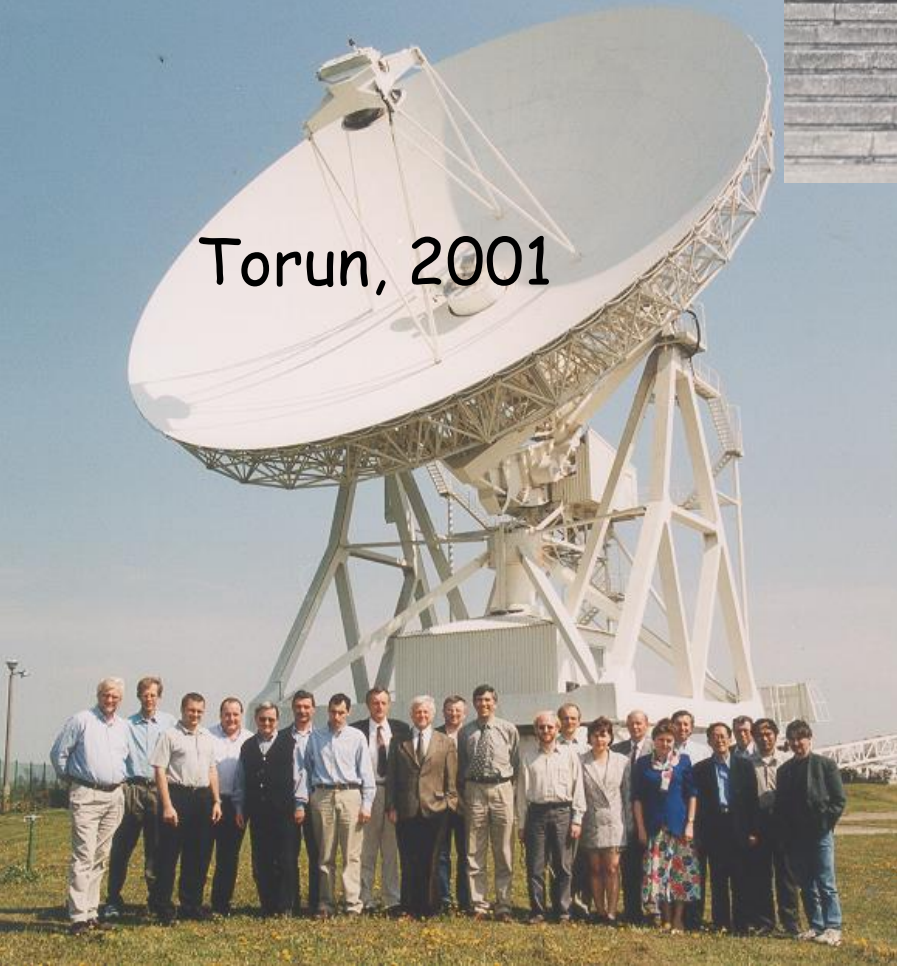


Consortium meetings

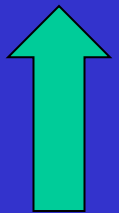
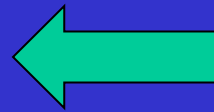
Torun 1988



Torun, 2001



Sometimes Roy is
there, and
sometimes not.....



(if he forgot
about visas)

1980-1992 (3)

1988-1991

QUASAT (R.I.P); International VLBI
Satellite (R.I.P.); VSOP/HALCA  (Japan)

1988 proposals to EC in Brussels (20 stations, 17.8 M€)

1989 ESF Space Science Committee endorses processor

1990 ESF Review Panel on ground-based astronomy gave strong support to processor

1992 FP3 HCM grant (1M€) to EVN for Access to Large Scale Facilities.

Triggered action by Ministries on funding for the data processor

1993-2002: Major expansion

1992 Funding at last!

- 5.5 M€ from Ministry of Education and Science in NL
- 0.3 M€ from CNRS in France
- 0.55 M€ from the Swedish Wallenberg Foundation

1993 JIVE formally established as a Foundation in the Netherlands

Roy Booth first chairman

1993 –1998

design, prototyping, and construction of EVN 16 station processor by international consortium (8.7 M€ including manpower)

22 October 1998

official opening of EVN Data Processor at JIVE

Chairman of the JIVE Board in contemplative mood at the opening of the EVN data processor, Oct 1998



The new JIVE Director
getting it from both sides!



Chairs of the EVN and JIVE Boards

EVN

- 1983 Giancarlo Setti
- 1985 Giancarlo Setti
- 1987 Richard Wielebinski
- **1989 Roy Booth**
- 1991 Rod Davies
- 1993 Harvey Butcher
- 1995 Lucia Padrielli
- **1997 Roy Booth**
- 1999 Anton Zensus
- 2001 Phil Diamond
- 2003 Willem Baan

JIVE

- **1993 Roy Booth**
- 1999 Alain Baudry
- 2003 Phil Diamond