Minutes of the TWG meeting

6/7 October 1994

in Effelsberg/Bonn

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AGENDA

Thursday, 6th October

8.00		meeting at the institute
8.15		departure to Effelsberg
9.00	(1)	opening of the meeting
9.30	(2)	Improving Recording Quality(Blaschke & Boesel)
		-please be prepared to discuss all the questions you might have on recording quality-
12.00		lunch
13.00		EMU (Richard Schilizzi takes over)
17.00		return to Bonn
19.00		Dinner (planing still in progress)

Friday, 7th October

8.30	(3)	station reports
9.30	(4)	CAL reports, the 1st Year(Sanghera)
10.00	(5)	correlator status reports
		a) Bonn(Rioja)
		b) Soccorro(van Langevelde)
10.30	(6)	Special Topics
		a) GPS clocks(van Langevelde)
		b) Interference and how it affects EVN data/maps (Garrett)
		c) MKIII Tsys measurements and ANCAL format files (Sanghera)
		d) scheduling software(van Langevelde)
		e) space VLBI scheduling(van Langevelde)
13.00		lunch
14.00		EMU

18.00 closing the meeting

DISCUSSIONS OF TOPICS

(1) Opening of the meeting

The meeting was opened by its chairman Klaus Ruf after arrival at Effelsberg. All participants introduced themselves, as a number of us were new. Shanghai Observatory and Yebes were represented for the first time. Hartebeesthoek, Simeiz and Wettzell had sent their apologies for not being able to attend.

(2) Improving Recording Quality

In the first session means of quality controll of the MKIII recording were discussed. The following points were identified as most critical:

- head calibration

- head current adjustment

- head wear

- exchanging heads

- mechanical wear of tape guiding parts, namely damper roller, idler rollers, and grooved precision plates

It was decided to set up a procedure to prepare and test the terminals at all stations before each session. Most stations have a standard routine, which takes account also of their specific terminal and environment. These routines will be written down and sent to Paul Burgess, NRAL, who will combine all relevant information to form an EVN standard procedure to be followed before each session.

The Haystack memo series were said to be a valuable source of information. They should be available and carefully read at each station. But it was also felt that this source is excessively productive, and some kind of a filter is needed to separate out the few really important memos.

The Haystack tape path modifications were critically commented. Several modifications have been withdrawn only after all stations implementing them. The upgrade of tape paths is one action of the MKIV upgrade team to be accomplished during 1995. This was discussed in more detail at the EMU meeting, which was held during the afternoons.

Haystack strongly recommends to control the relative humidity at the headstacks in order to increase their lifetime. While this may be easy to achieve under air conditioning, many stations are running the recorders without precautions. Noto has developed a system to blow dry nitrogen into the tape path, keeping the relative humidity - which is monitored - at or below 30%. A description/drawing will be made available.

At that point the meeting was split. Some technical friends went to the MKIII/VLBA terminal room to discuss specific problems with H. Blaschke and R. Boesel. The others continued discussing recording problems.

P&G offers Metrum compatible headstacks at a lower price and with a guaranteed lifetime of 5000 hours. There is not very much experience with these headstacks, but P&G seem to be interested to improve their design. It was felt desirable to have a second source for headstacks even though the prices are now as close to the Metrum prices as is their headstack contour to the Metrum design.

The question of forming a pool for expensive parts with long delivery times, such as headstacks, inchworm motors, and capstans, was again discussed. It was decided that the director of JIVE buys one Metrum headstack, to be purchased from him by the first station that needs it.

The proposal to order headstacks mounted on the head block was discussed after the warning that P&G headstacks are mechanically more critical. It turned out, however, that this is impractical, as the head block has to be aligned before the headstack is finally mounted.

(3) Station Reports

Station reports were given by the technical friends. Some reports were already available in written form. Additionally a report from Hartebeesthoek had reached the chairman by e-mail, who read it to the meeting. The reports are attached to these minutes.

(3a) EVN Upgrade

A short report was given on the results reached at the EVN upgrade (phase II) meeting at Jodrell Bank in July. Upgrading of receivers at all stations to state-of-the-art in sensitivity as well as in polarisation performance has received high priority. An application for EU money to finance the upgrade is in preparation.

Reliability of the EVN was an other matter of concern. Improvement is sought in recording quality, installation of GPS receivers and logging of clock offsets, and work on terminal control software.

(4) Cal Reports

Cal experiments have been performed in mode A at as many stations as were available. They are correlated with priority to allow fast feedback to the stations. Nevertheless the Cal experiments are not suitable to detect malfunctions early enough to eventually save at least part of the running session. It was therefore discussed to record test tapes well in advance of the sessions and send them to the correlator for verification. This shall be tried for the November session.

(5) Correlator Reports

(5a) Bonn

A status report of the Bonn correlator is attached to these minutes.

During the discussion of the correlator report it was decided to unify the names of the experiments.

(5b) Soccorro

The VLBA is now moving to steady production. Starting this November the VLBA will process one project/day and drop scrutinizing. Tapes will be cycled at a rapid rate.

Global experiments are currently processed 1/2 weeks (Mode E). They will move to 1/week before the end of this year. Mode B/C need software work, therefore Mode E has priority. Also new experiments have priority (last in - first out !).

Currently 55 projects are waiting for correlation, corresponding to 1000 hours of correlation and more than 1000 thick tapes.

The VLBA is a homogeneous array. The clock offsets as compared to GPS time are logged; therefore no fringe search is required for VLBA only experiments at the VLBA correlator. EVN stations in global experiments cause the trouble of 50% more correlation time and 200% more manpower even in mode E.

An e-mail from Jon Romney was discussed, with complaints about confusing MKIII set ups at EVN stations. The problem seems to be the assignment of frequencies to BBC's. A recommendation to EVN stations will be worked out after necesary clarification by Alef and Ruf.

(6) Special Topics

(6a) GPS Clocks

Again the high priority of GPS time logging was stated, also for EVN only purposes. The VLBA system cannot simply be copied, because the EVN is not an homogeneous array. Westerbork and Effelsberg are already working on systems and are willing to, share their experience. Stations are requested to formulate their specific needs.

(6b) Interference

An example of interference at Jodrell Bank in the 18 cm band was shown. However, if the receiver was not saturated and Tsys measurements were made 1/min in each VC, upper and lower sideband, useful data could be recovered.

Even though the interference by a fixed link occurs in the middle of a frequency band, which is allocated to Radio Astronomy on a primary basis (i.e. Radio Astronomy must not suffer interference), the possibility of using the 21 cm band instead was discussed again. This band is passive ("all emissions are prohibited"), but sky noise can be high due to HI emission.

(6c) Tsys

Tsys values are not provided the same way for all stations. During discussion the wish was expressed to have Tsys measurements every minute in each channel. Stations shall work on implementation into their field system, but a recommendation for the format has to be given.

(6d) Scheduling software

The software project GNOMES was presented. (General NRAO Observing Multipurpose Experimental Scheduler). These are the main features:

- VLBA, MKIV, VLA, MKIII compatible

- goal to make user access easier

- knows all observing modes and correlator specifications

- takes account of full antenna characteristics and frequencies, incl. non standard

For that purpose all relevant information shall be given to Huib van Langevelde.

(6e) Space VLBI scheduling

It was asked, which format EVN stations prefer for future space VLBI schedules. The answer: "snap" was found after very short discussion.

LIST OF ACTION ITEMS

1.)Friends of VLBI to send Paul Burgess their routine of preparing and testing the VLBI terminal before sessions. Paul Burgess to combine the information to an EVN Standard Test Routine.

2.)Noto to provide a description/drawing of their system to blow dry nitrogen into the tape path.

3.)The director of JIVE to buy one Metrum headstack, to be purchased from him by the first station that needs it.

4.)VLBI friends to record test tapes in advance of the November 1994 session to be correlated for verification.

5.)Alef and Ruf to clarify complaints about Mark III set ups confusing operators at the VLBA correlator.

6.)Technical friends to ask for help in installing GPS timing equipment.

7.)VLBI friends to implement Tsys measurements 1/min in each channel into their field systems.

8.)Friends of VLBI to give detailed station information to Huib van Langevelde to support creation of the universal scheduling program GNOMES.

9.)The Chairman to remind technical + VLBI friends of their tasks.

DATE AND PLACE OF THE NEXT MEETING:

8/9 September 1995 in Dwingeloo

The chairman strongly recommends not to question this last decision!

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MEDICINA STATION REPORT 1994

A new L band (21cm and 18cm) receiver has been mounted on primary focus of the 32m dish. It has been allocated inside the triple receiver band (S,X,K) box so is not cooled. In this way we can switch fast between four frequencies and seven possible configurations. The measurements of the performance of the new receiver are in progress; the Tsys is 58K but it will be around 50K when the second version of the preamplifier will be available (before the end of the year).

In the same time the project to place aside the subreflector on primary focus to avoid to dismount it and gain fast receiver switching in secondary focus is started.

The prototype of a polarimeter is ready and laboratory measurements are good but tests on antenna are not yet started.

The old electronics of the antenna encoder position converter has been substituted with a new one designed at Medicina.

The new field system has been installed on PC, it remains to transport our own antenna control programs and so definitively remove the HP1000.

Measurements of antenna deformations due to temperature effects continue, last October antenna was repainted and the deformation coefficient dropped from 16"/C to 10"/C.

Waiting for to repair the very degraded rail under which the antenna moves we correct the pointing for the systematic errors due to this cause.Further, tests about a real time correction for the nonsystematic errors will be performed when antenna is free from observation.

About MKII block 0 correlator: the cooperation with chinese collegues was successful and the correlator is now full operative. Correlation tests were good and software to make user friendly the machine has been written.

Alessandro Orfei

NOTO STATION REPORT

In the beginning of 1994 the HP1000 disk died (it was a usual problem arising about every year). The decision was taken not to repaire. Since that date antenna is driven by the PC system developed in the last years.

An interface software has been developed for the PC field system in order to adapt the 'SOURCE', 'ONSOURCE', 'AZELOFF', 'RADECOFF' commands to the antenna driving software needs. Now all the pointing functions, including calibration are performed with the Field System PC + Antenna PC.

For a mistake in the antenna driving software the pointing was not accurate under about 22 degree of elevation. This was particularly relevant for 22 GHz observations. The problem was fixed before the September VLBI session.

The high density recording heads was substituted and nitrogen was inserted in the tape path, including a small moisture gauge, to keep humidity at low levels. This could help to have longer headstack life.

The S/X receiver used in Noto is now the old Medicina one, not cooled. The receiver has about a Tsys=110 K, in comparison with the previous (Nasa) receiver with about 180 K (X) and 140 K (S).

Temperature sensors have been designed and inserted in the antenna legs.A study will follow in order to associate the temperature informations with the pointing offsets.

Gino Tuccari

ONSALA

The control of the 25 meter antenna has been transferred from the old Modcomp system to the new PC system, which has been used since the second EVN session this year. Although a number of bugs have been found, the system has behaved well in general. The Modcomp computer will now be taken out of service permanently.

The new control system for the 20 meter antenna has also been completed. The user now have all telescope information available on the dedicated work station with an easy-to-use window-based system.

All problems with the new PC-based field system is now supposed to be sorted out, and it is expected to be used beginning with the fourth EVN session 1994.

Studies of new polarization filters to be used at 6~and 18~cm have begun. If everything proceeds according to plans, we hope to have them installed by mid-1995. The main reason for upgrading the polarization filters is the desire to reduce the cross-talk between the channels.

The VLBA terminal to be used at SEST has been tested at Onsala during the early autumn. It is now down in Chile for installation, and is expected to be used for the first time this December, when SEST is to participate in a global 3~mm experiment. The Smithsonian hydrogen maser is also down at SEST.

As a final note, the email address to the observing friend of VLBI at Onsala is:

vlbi@oso.chalmers.se

Biörn Nilsson & Mikael Lerner

YEBES

The Centro Astronomico de Yebes has recently completed a new S/X receiver for the 14m dish. The receiver is cryogenically refrigerated and is mounted in a special structure designed at the Observatory which allows both, the mm receiver and the S/X receiver be at the telescope permanently. Receiver temperatures are 20 K and 45 K for X and S respectively at the laboratories. When including the feed and polarizer the receiver temperature rises to 50 K and 100 K respectively. We are studying some modifications of the feeds and polarizers in order to improve these figures. A phase cal unit for the S/X receiver will be built next year.

The installation procedure for the new S/X subreflector has already been tested at the telescope. Operations to change the mm subreflector by the S/X subreflector will take several hours (1 day).

The Yebes VLBA terminal was moved to Plateau de Bure in September where it will stay for several months. It will be used in the 3mm and 1mm VLBI tests between the 30m in Pico de Veleta and one of the antennas from the Plateu de Bure this autumn. The CNRS hydrogen maser on loan in Yebes was sent to France in June for maintenance. It will be sent back to Yebes before the end of the year.

Pablo de Vicente

MPIfR/EFFELSBERG

1) A major renovation of the azimuth track of the 100m telescope is now necessary; the epoxy layer between track and concrete base is decaying and must be replaced. As a temporary measure, work on grinding down identifiable bumps in the track started in October. The azimuth drive servo-loop has been loosened,
and the maximum azimuth drive rate has been lowered to 15 deg/min. A new azimuth track is being fabricated. In 1995, probably in the summer, the telescope will be jacked up, and the new track laid. The azimuth wheels will be removed for grinding, and all the bearings will be replaced. We expect the telescope will be out of action for 2 months.

2) We will replace the present telecope drive computer(s) with new faster machines, running under VMS to minimise the need for software modification. This is planned for 1995.

3) As announced on the vlbi e-mail "exploder", the VLBA record terminal and control computer are essentially ready. They are installed in a new VLBI observing room, together with the Mk3 terminal. Initial testing has established Mk3 "fringes" between the VLBA terminal, controlled using NRAO software and the Mk3 terminal using SNAP control. Further tests are planned during the later part of 1994. We will use the VLBA terminal for joint VLBA-Effelsberg experiments in 1995.

4) Work is progressing on the new 6 cm receiver and the 3-frequency receiver. Both should be in operation in 1995. We also plan to install a separate, 15 GHz, secondary focus receiver, primarily for single-dish continuum work, but it will also have VLBI capability.

5) Much of the hardware is now in place for implementing computer-controlled frequency agility, i.e. rapid switching (ca. 1 min) between secondary focus receivers in Effelsberg.

6) We will shortly purchase a new GPS receiver to monitor the VLBA terminal clock, and write the offset in the log.

7) Bonn Correlator: see separate report from Klaus Ruf

R.W.Porcas 11 October 1994

HARTEBEESTHOEK

Here are some brief comments on our status which can be reported to the TWG if you wish.

HartRAO continues to support requests for observing as part of EVN or GLOBAL VLBI proposals. Our main criteria are that inclusion of HartRAO will significantly improve the experiment, as for example improved u-v coverage for low declination or southern sources, and good rating by the network committes. We aim at closer links with the EVN and VLBA, and in this regard we plan to participate in wherever possible in EVN calibration sessions, and participated in both the 6cm and the 3.6 cm sessions in September, although we only observed one proposal at 3.6 cm. By joining in all calibration sessions we hope to be able to ensure a high standard of performance at HartRAO.

The Mark IIIA (on long term loan from NOAA) continues to perform well. Over the past year the IF3 module was installed, allowing for the recording of wider spanned bandwidths. New heads were installed in April 1994 to replace worn heads, and for the past three months the terminal has been controlled by the Mark IV field system running under VENIX in an Intel 486 PC. For VLBI, the telescope is controlled by another 486 PC, with communications over an IEEE486 bus.

A new feed was installed for 6cm and the SEFD at this frequency improved to 700 Jy. Progressive upgrades to dual polarization are proposed for the next year and further improvements in SEFD are anticipated.

In addition to cryogenic receivers at 18, 13, 6 and 3.6 cm HartRAO can also support VLBI at 5.0, 4.5 and 2.5 cm (6.0, 6.7 and 12.2 GHz) with ambient temperature receivers with SEFD's of 1800, 2000 and 3300 Jy respectively.

Dr Athol Kemball, previously VLBI friend at HartRAO has joined the NRAO staff at the AOC at Socorro. In future Dr Jonathan Quick will act as both technical friend and VLBI friend for HartRAO.

Best regards, and again apologies for the lateness of this reply.

George Nicolson

BONN CORRELATOR REPORT

Present BACKLOG at Bonn correlator:

This table lists up-to-date information on the number of experiments observed and correlated for a given session

		Observed	Correlated
May	1993:	10	10
Sep	1993:	14	14
Nov	1993:	6	4
Feb	1994:	18	17
May	1994:	26	12
Sep	1994:	12	0
Nov	1994:	17	0

The present backlog is about 4 months.

We expect that by February 1995 all the experiments observed up to November 1994 will have been correlated.

DATA LOST:

Most frequently observed reasons for loosing data at the correlator:

1 Station observed different schedule
2 No fringes found
3 No valid data on tape
  3.1 Tape overwritten
4 Station didn't observe
5 Correlated data affected by severe problems
  Bad quality tape

Session	Stat. Name	#exp. affected	% data lost	why?
Sep 1993	GB	5	100%	1
	Jodrell	1	100%	4 (formatter failed)
	Medicina	-	8%	3 (pass overwritten)
	Noto	-	50%	5 (forward passes high % of discarded data)
	Onsala	K/X band		5 (possibly pointing problems)
	WSRT	-	100%	5 (low sensitivity)
Nov 1993	Bonn	1	100%	5 (wrong filter)
	Medicina	-	8%	3 (pass overwritten - low rec. signal power)
	Noto	-	100%	5 (low rec. signal power - head worn out)
		1	100%	1

	Onsala	X band		5 (possibly pointing problem)
		1	100%	1
	WSRT	-	100%	5 (low sensitivity)
		1	100%	1
Feb 1994	Bonn	1	100%	1
	Cambridge			2 4 5
	Jodrell	-	100%	3
	Medicina	-	8%	3 (pass overwritten)
				5 (intermittant incorrect distribution of data)
	Noto	some	100%	5 (low amplitude)
	WSRT	-		5 (increasing parity errors with track number)
May 1994	Bonn	1	100%	1
	Cambridge	1	25%	3.1 (tape overwritten)
		-		5 (large parity errors)
	Jodrell			5 (low amp in some VC's)
	Medicina	1	33%	3.1 (1 tape overwritten)(+3)
	Onsala	1	100%	4 (intersection with geodesy program)
	WSRT	-		5 (increasing parity errors with track numbers)

-: all experiments in the session

WOULD BE DESIRABLE to make easier the work at the correlator:

- Use homogeneous nomencature for the files deposited in the Bologna VAX account

- Pay attention to missing entries in the logs. Editing of scan times, and correct footages are very time consuming.

- WSRT should allways include the number of antennas observing in each project. This makes easier the performance monitoring during the correlation.

- Values of the station clock offsets should be routinely included in the logs of each experiment.

- Highly recommendable to use TRACK including the project name together with the tape label.

- A conditioning pass should be run on all tapes before recording, otherwise first passes can contain bad quality data. The correct way to do that is: forward pass, clean, reverse pass, clean.

Others:

- Correlator efficiency increased from 46% in last year to 59% in the present year.

- By the end of October we expect that one of the MK3A drives be replaced by a MK4 drive.

- In the last two years, 1600 tapes out of 2500 have been copied to DAT. One more year needed to copy the rest of tapes.