Status Report of 20m-Radiotelescope-Wettzell

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Abstract

This report presents the activities of the 20m-radiotelescope in Wettzell since our last meeting in Hoenefoss/Norway in 1996. Our telescope is fully dedicated to geodetic application and participates only occasionally in astrometric or astronomical observations, if telescope-time allows it. The report has a section dealing with the observations Wettzell has participated and a section describing hard- or software changes.

1 Observations

A fully geodetic focussed VLBI-telescope has no big changes in its observing program over the years. Table 1 shows our VLBI-activities since the beginning of regular observations in 1983.

In spite of this two major changes will happen in our geodetic observations in the next future. Starting at July 1st, 1999, 20m-RT-Wettzell shall participate in Wednesday-CORE-session every week; there is still a strong question mark behind it, since Wettzell does not have its Mark-IV formatter (ordered from and paid to GSFC in 1995); assuming this problem can be solved, participation in Wednesday-CORE-session has the consequence for Wettzell (and the users), that we run observations every week through the following years:

- from Tue, 18:00 until Wed, 18:00 NEOS-A,
- from Wed, 18:30 until Thu, 18:30 CORE-3.

Additionally it is planned, that 20m-RT-Wettzell will increase the amount of observations with Japanese telescopes after having a K-IV DAT and the ability to run it with the Field System. Up to now we participated with a K-IV unit on loan from CRL in VLBI-time transfer observations and 24h-sessions to improve the connection of RT-Wettzell with the Japanese telescope family. Thereby we operated the K-IV-DAT with an old HP computer and the antenna including IF-distributor and VC's with the Field System PC.

Regarding the already mentioned daily Intensives with Greenbank and the ability of running K-IV sessions at Wettzell there are plans to combine 2 INTENSIVE-sessions:

- INTENSIVE: between RT-Greenbank and RT-Wettzell, Mk IIIA > Mk IV, recorded on magn.tape, with correlation at USNO, as done since 1984,
- INTENSIVE: RT-JAPAN and RT-Wettzell, K-IV, recorded on cassette, with correlation at TOKYO, (the telescope in Japan still has to be determined; RT-Tsukuba or 26m-RT-Kashima).

Attempting to realize two INTENSIVES Gb-Wz and Wz-Japan following aspects could be considered:

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1. Both INTENSIVES should run as simultaneously as possible, to have a
   - better comparison of the two INTENSIVE series,
   - smaller interupt of parallel observed 24h sessions (a smaller hole in Europe, IRIS-S).
2. That means INTENSIVE Wz-Japan should precede INTENSIVE Gb-Wz. (This helps avoiding regular observations during inhuman observing times . If we cannot avoid it totally, is our technique safe enough to try an unattended observation?)
3. Can sources with high declination (or all sources visible from all three places) be observed with Mark-IIIA/IV on tape and simultaneously with KIV on cassette? (thereby reducing observing time and leading to a better comparison of the two techniques?)
4. Can we add a third INTENSIVE between Gb and Japan to close a ring of daily) UT1-UTC measurements? (Greenbank would need a K-IV DAT.)
5. In the future: Can we run INTENSIVE in real time transferring the observed data via fiber link to the (or better one) correlator?

Anyhow Wettzell follows a project REAL TIME VLBI ([1], [2]) having in mind the Japanese KEYSTONE project, where 4 VLBI-telescopes are connected with the correlator by 2,5 Gbps ATM communication link. The Japanese have successfully performed fringes during observation. This technique seems to be a desirable alternative for projects, as daily INTENSIVE, to determine UT1 – UTC in the fastest way.

2 Hard- and Software Changes

Regarding hard- and software changes I should mention, that we replaced

- antenna pointing computer by VERTEX-ACU, (With this change the antenna pointing software has been adapted. Also we experienced a lot of ACU-computer failures after the upgrade. Meanwhile with the aid of our crew (Mr. Kronschnabl) we reached an even tolerable level of failures.)
- CAMAC interface unit by serial interface, (between FS-PC and antenna pointing computer; with this change the communication software between FS-PC and the pointing computer (ACU) had to be programed new. This task has been solved by Mr. Zeitlhöfler excellently.)
- Az+El-encoders ROC-Dual 63.6 by Az+El-encoders RCN 723.5 DSK, resolution 20 bit resolution 23 bit
- analog rotation speed control by digital rotation speed control of the motors.

Regarding Field System we have implemented version 9.3.25 with Debian Kernel 2.0.34 into 2 new PC's; Ed Himwich kindly assisted Wettzell in these days to adapt the K-IV DAT (Wettzell has presently on loan) to the Field System. Then Wettzell can run K-IV VLBI-sessions or Mk-IIIA or Mk-IV sessions with the same FS-software and schedules made by DRUDG from SKD-files. Our Mark-IIIA DAT will be upgraded to Mark-IV at the end of February 99 by Haystack to be compatible with the requirements of a participation in CORE-3 in July 99.

Tab. 1: Summary of VLBI-Sessions observed at the 20m-Radiotelescope Wettzell 1983-1998

Observations	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Σ(1998)
IRIS-A, NEOS-A+B	3	67	72	72	72	73	73	73	59	48	60	62	52	53	52	45	936
Intensive Δ(UT1)	-	73	211	276	281	282	287	287	292	236	281	225	287	200	277	247	3742
IRIS-S	-	-	-	4	5	3	3	12	12	12	12	12	12	12	12	10	121
EUROPE	-	-	-	-	-	5	2	4	3	5	4	6	6	6	6	5	52
NASA-Geodesy	-	2	12	12	12	5	1	-	21	22	15	23	15	33	5	6	184
NASA-Astrometry	-	-	-	-	2	2	-	-	-	-	-	-	2	-	8	3	17
USNO	-	-	-	-	-	-	-	-	1	11	6	14	4	4	-	-	40
Uni, MPIfR	-	-	-	-	-	-	-	3	5	-	2	2	3	5	2	4	26
Mobile Campaigns	-	-	-	-	-	-	10	-	4	21	4	4	-	-	-	-	43
$1 \dots 8$ h Measurements	-	16	13	25	27	1	19	23	22	1	1	2	6	10	1	-	167
Other 24 h|Mk2	-	-	1|-	-|-	1|-	7|3	18|3	3|4	9|1	13|-	-|-	2|-	-|-	2|-	-	-	56|11
Wettzell staff [h]	344	2640	3688	3908	4032	3976	3408	3976	3842	2921	2703	3468	2957	3140	2701	2203	49.907
Students [h]	-	-	-	192	224	56	1140	56	443	1690	1365	808	390	504	214	175	7.457
Total Obs. [h]	344	2640	3688	4100	4256	4032	4548	4232	4285	4611	4068	4276	3347	3644	2915	2378	57.564

References

[1] Hayo Hase, Wolfgang Schlüter, Reiner Dassing, Richard Kilger: Proposal: Real Time for VLBI-Intensive-Series, in: Real-Time VLBI Forum, Proceedings of A Discussion on Emerging Opportunities Using Data Network Technologies For Very Long Baseline Interferometry, held at MIT Haystack Observatory, Westford, Massachusetts, U.S.A., May 3, 1998

[2] W. Schlüter, J. Campbell, H. Schuh: Neuantrag eines Forschungsvorhabens zur Breitbandübertragung von VLBI-Daten