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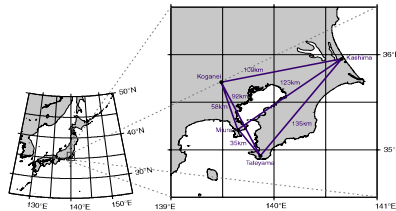


Abstract
Recent progress of e-VLBI technique and the increase of network speed made rapid UT1 measurements possible. On June 30, 2004 we performed a one-hour e-VLBI session with the baseline between Kashima and Westford stations to estimate UT1 as rapid as possible. Observation data were recorded with the K5/VSSP system at Kashima and the Mark-5 system at Westford. Immediately after the session was finished, Mark-5 data were transferred to Kashima through the Internet. The Mark-5 data were then converted to K5 format data. In the next step, the converted data were correlated with those recorded at Kashima by using the K5 software correlator combined with the network-distributed processing system named VLBI@home. Finally we succeeded to obtain estimated UT1 value in as short as 4.5 hours after the session was over. To shorten the turn-around time of UT1 estimation further, we are improving the K5 software correlator so as to correlate K5 data with Mark-5 data directly. We are also developing software to send K5 data over network according to the standard data format (VSI-E). In addition to the rapid UT1 measurement results, we will report about current status of these software developments.

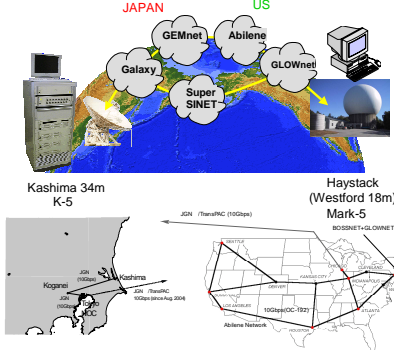
VLBI Systems for e-VLBI



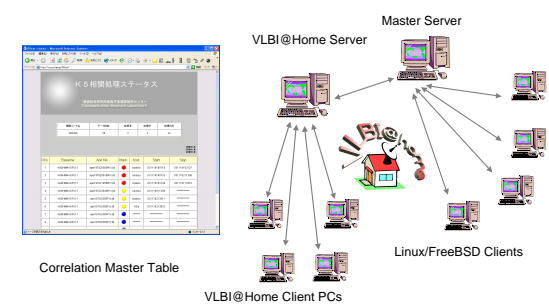
Key Stone Project VLBI Network (1994-2001)



KASHIMA-WESTFORD e-VLBI Experiments



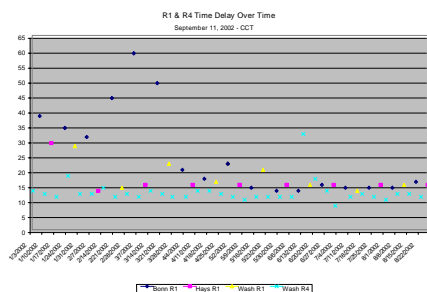
CPU array for Software Correlation



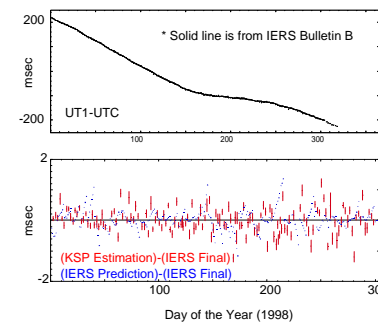
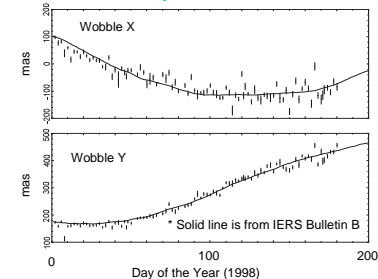
IVS Products Status and Goals (some examples from WG2 Report)

Products	Status	Goals(2002-2005)
• polar motion x_p, y_p	accuracy	$x_p \sim 100 \mu\text{as}, y_p \sim 200 \mu\text{as}$
	latency	1 - 4 weeks - 4 months
	resolution	4 - 3 days - 1 day
• UT1-UTC	accuracy	$x_p, y_p: 50 - 25 \mu\text{as}$
	latency	1 day
	resolution	1 day - 1h - 10min
• celest. pole $\Delta\alpha, \Delta\delta$	accuracy	100 - 400 μas
	latency	1 - 4 weeks... 4 months
	resolution	4 - 3 days - 1 day
• TRF (x,y,z)	accuracy	50 - 25 μas
	latency	1 day
	resolution	1 day - 10 min
• CRF(a, d)	accuracy	5 - 20 mm
	latency	~3 d/week
	resolution	~7 d/week
• CRF(a, d)	accuracy	0.25 mas (improved distribution)
	latency	1 year
	resolution	3 - 1 month(s)

Number of Days Required to Deliver Products Situations in 2002 (January to August)

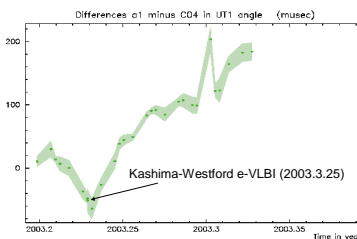


EOP Estimation by KSP Network



Feasibility check to estimate UT1

UT1-UTC estimation compared with NEOS Intensive VLBI sessions



UT1 challenge #1 (tsev6) : June 27, 2003

- Time Sequence (JST)**
- 22:00 Observations Started
 - 00:00 Observations Finished
 - -04:20 File extraction and transmission
 - ◇ From Kashima to Westford : 107Mbps 41.54GByte in 51m 35s
 - ◇ From Westford to Kashima : 44.6Mbps 41.54GByte in 2hr 04m 02s
 - -08:10 File Conversion (Mark5 to K5)
 - -20:30 Software Correlation
 - -21:20 Bandwidth Synthesis Processing, Database Generation, Data Analysis

UT1 challenge #2 (tsev8) : June 29, 2004

- Time Sequence (JST)**
- 04:00 Observations Started
 - 05:00 Observations Finished
 - 05:13 Data transfer started (from Haystack to Kashima)
 - 06:28 Data transfer finished (~30Mbps)
 - 09:16 Correlation Processing Completed (used 20 CPUs)
 - 09:30 Data Analysis Completed: UT1-UTC sigma=22 microsec

New World Record!!
4.5 hours

Tsukuba-Wetzell Intensive Experiments : August 29, 2004-



- Saturday weekly K4 Intensive sessions are on-going.
- Second Intensive session series on Sundays just started from August 2004
- Sunday sessions are intended to be e-VLBI
 - Initially, one e-VLBI session every month (the other sessions using K4)
 - Will migrate into weekly e-VLBI
 - Plan to do e-VLBI in both Saturday and Sunday sessions

Conclusions

- ◇ Rapid turn-around estimation of UT1-UTC within a few hours was successfully demonstrated.
- ◇ Regular/Routine Intensive e-VLBI sessions for UT1 will become operational and smooth as experiences accumulate.
- ◇ Next targets will be
 - to demonstrate real-time UT1 estimation
 - larger scale IVS sessions with e-VLBI

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