

Activity Report on Tsukuba VLBI Correlator

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- GSI activities in IVS
- Tsukuba VLBI Correlator
- Future prospects

GSI is involved in IVS as

Network Station (1999-): Ishioka, Tsukuba, other
small regional stations

Correlator (1999-): Tsukuba VLBI Correlator for
INT2 and AOV (and
Japanese domestic sessions)

Analysis Center (2010-): Tsukuba VLBI Analysis
Center for INT2
(gsiint2*.eopi series)

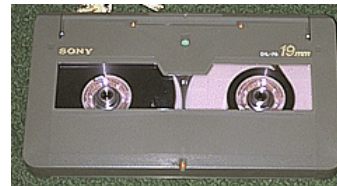
- 1999 Started as IVS correlator for Japanese domestic VLBI sessions (JADE)
- 2002 INT2 started with Wettzell-Tsukuba baseline
- 2005 Operation with software correlator (K5)
- 2007 Ultra-rapid UT1 estimation experiment
- 2010 IVS Analysis Center for INT2
- 2015 AOV started

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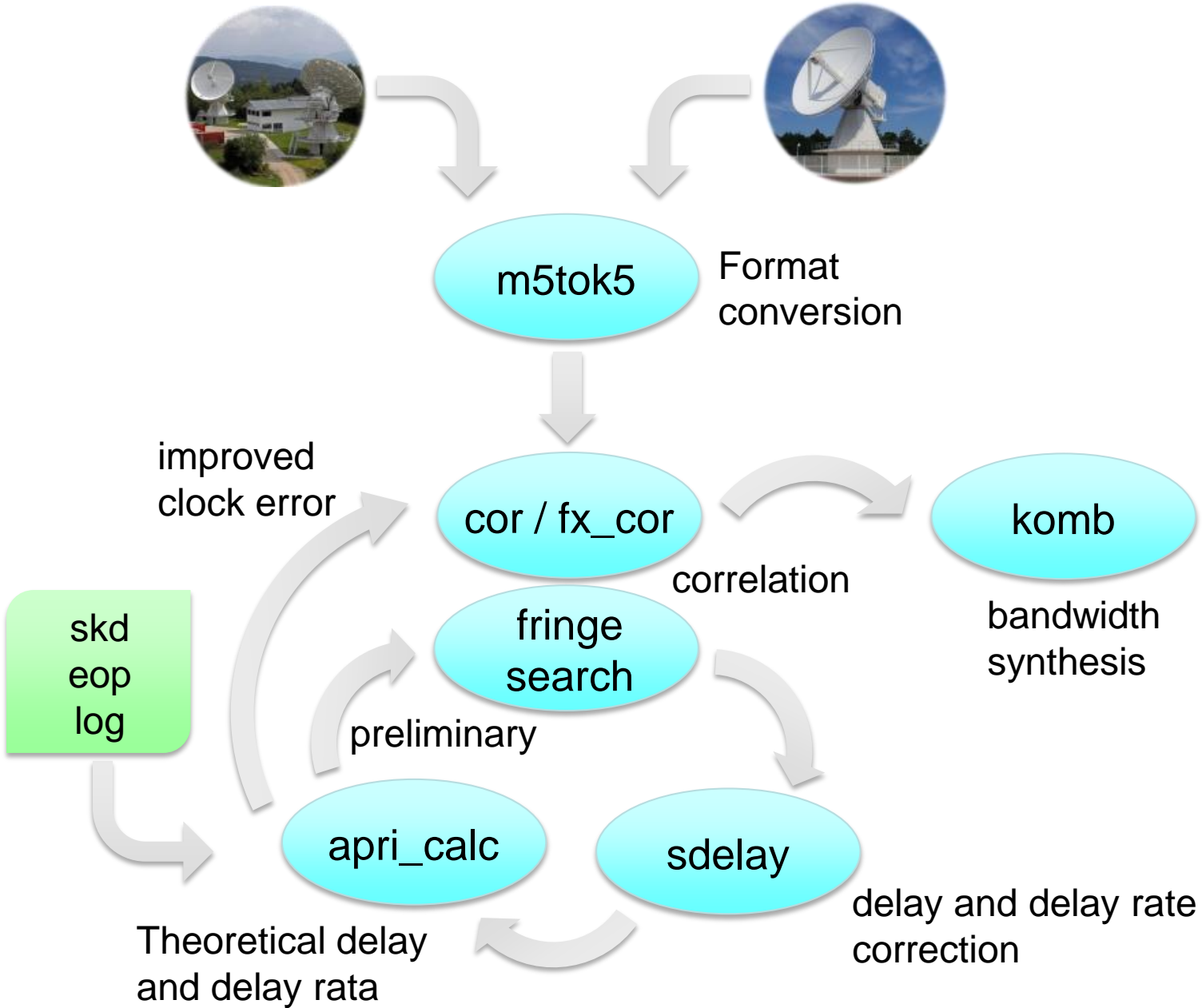
	AOV	INT2
Number of Stations	- 10	2
Duration	24 hours	1 hour
Purpose	Geodesy / Astrometry	UT1 - UTC
Data Rate	- 1 Gbps	256 Mbps
Frequency	monthly (share with SHAO)	every weekend
Data transfer	e-transfer	e-transfer

GSI uses correlation system developed by
NICT "K"ashima VLBI Group

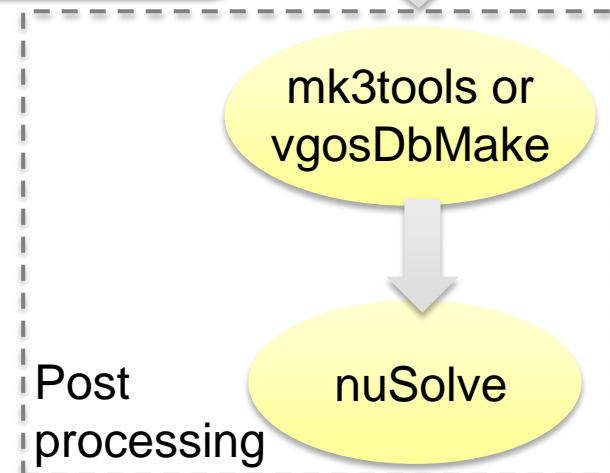
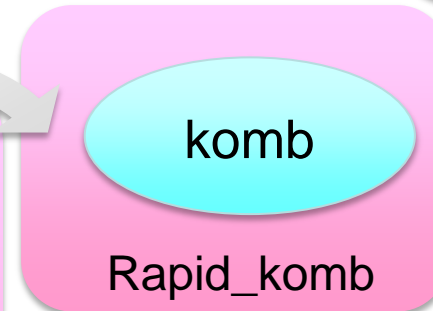
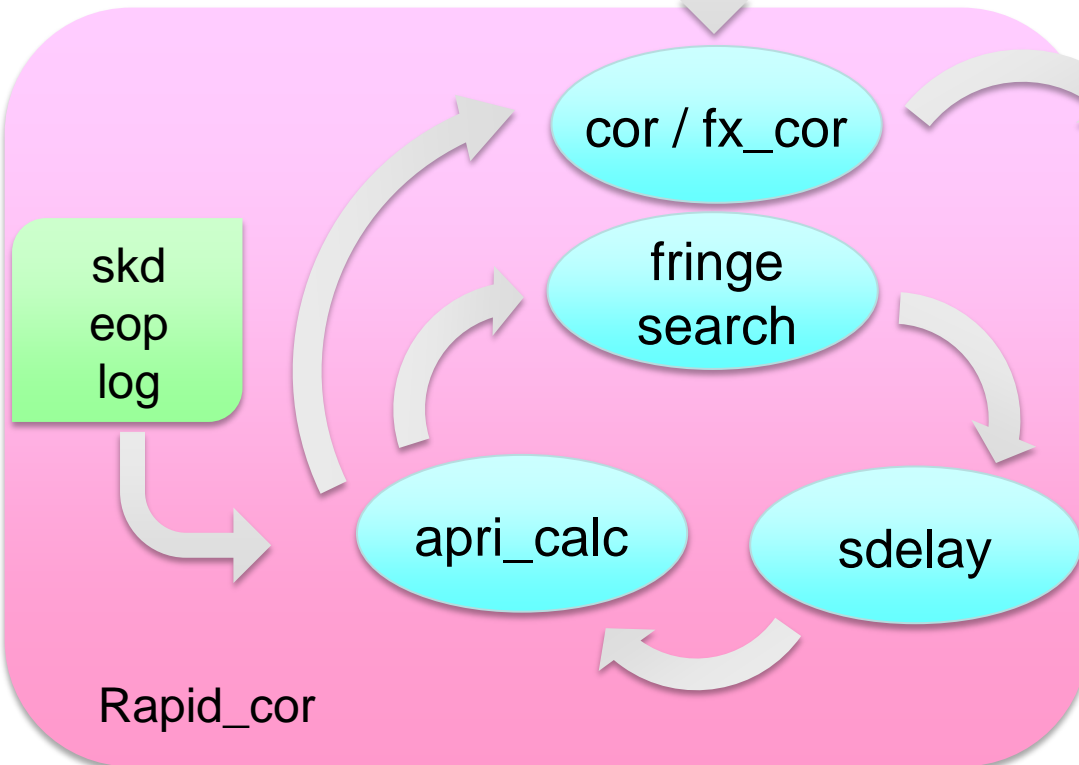
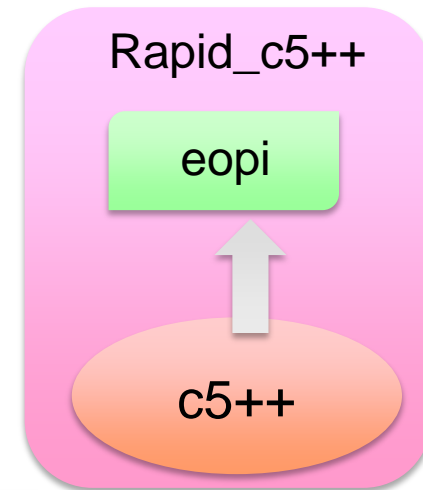
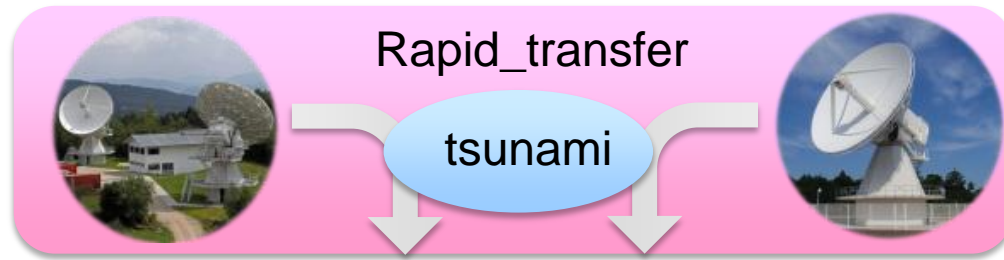
- K4 (-2004)
 - ✓ Hardware Correlator
 - ✓ Magnetic Tapes (D1 Tape)
 - ✓ 3 stations / 3 baselines
- K5 (2005-)
 - ✓ Software Correlator written in C
 - ✓ Work on Linux Distributions
 - ✓ e-transfer



Procedure of K5



Procedure of INT2



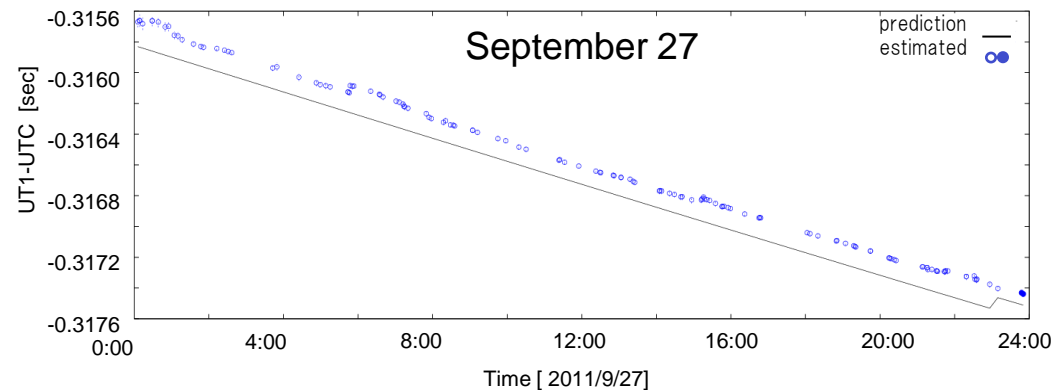
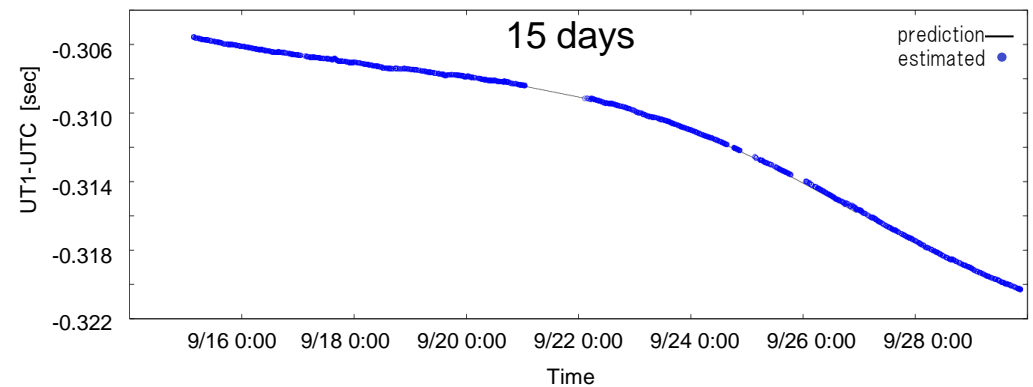
Ultra rapid experiments

Quasi-real time estimation of UT1-UTC with 24-hour observation sessions

- Real-time data transfer, correlation and analysis
- Estimate dUT1 within 30 minutes from the end of each scan



CONT11 September 15 to 30, 2011



	Main system	Backup system
Number of Servers	8 - 2 for control - 6 for processing	3 - 1 for control - 2 for processing
CPU	Total 48 - Intel Xeon X5687 @3.60GHz quad CPU x 2 x 6	Total 32 - Intel Xeon Gold 6130 @2.10GHz 16 CPU x 2
Operating System	RedHat Enterprise Linux 6.3	CentOS 7
Storage Capacity	513 Tbytes	273 Tbytes
Storage mount type	SAN (Fibre Channel)	NAS (NFS)
External Data Rate	10 Gbps - Tsunami, jive5ab	1 Gbps - Tsunami, jive5ab

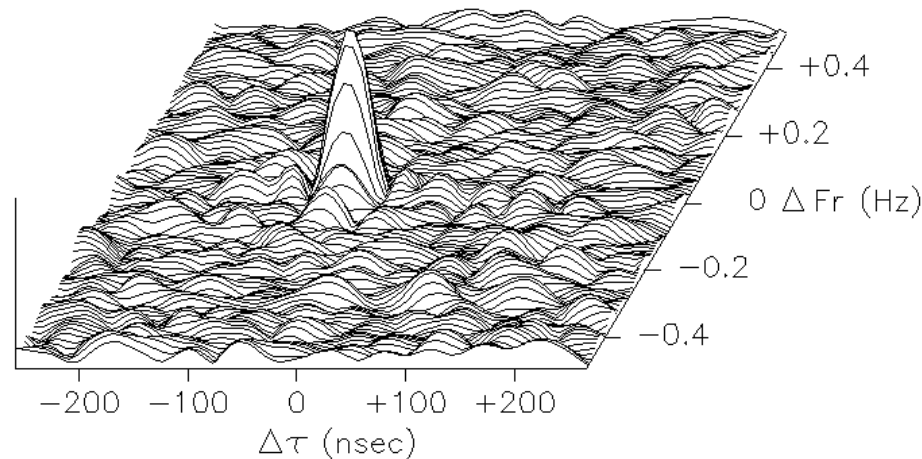
Staff

- Takahiro Wakasugi: Chief of Correlation Group
- Michiko Umei: Technical staff
- Tetsuya Hara: Operator

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How should GSI be involved in VGOS as an operational correlator?

- Test correlation of CONT17 data with K5
 - ✓ Capability of dealing with VDIF format
 - ✓ Fringes were detected on each channel



ISHIOKA - RAEGYEB
CH#:4 3224.40MHz L 2bit 64MHz sampling
Source : 0552+398, Integ(sec)=28.0, PRT:2017/342 22:43:16
Amp = 0.000433, SNR = 18.3 (no amp correction)
Delay Res (sec) : $-5.100e-08$ Rate Res(s/s) : $1.286e-13$

How should GSI be involved in VGOS as an operational correlator?

- K5 is developed for Legacy observation
- We are interested in proven DiFX !!
- Install DiFX on small system in next year?
 - ✓ Test with legacy observation
 - ✓ Compare the results with K5
 - ✓ Accumulate know-how

How should GSI be involved in VGOS as an operational correlator?

Please let me know...

- Hardware requirements (recommendation)
- Installation
- Procedure of correlation
- Check item of output
- Post-correlation processing (HOPS)?

Thank you for your kind attention.