



The status of Korean VLBI Network K-band geodesy

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Korean VLBI Network (KVN)

Three 21m shaped Cassegrain antennas, ~500km baseline

Surface accuracy of primary reflectors $\leq 150\mu\text{m}$

Aperture efficiencies (K/Q) : S.S.Lee et al.(2011)

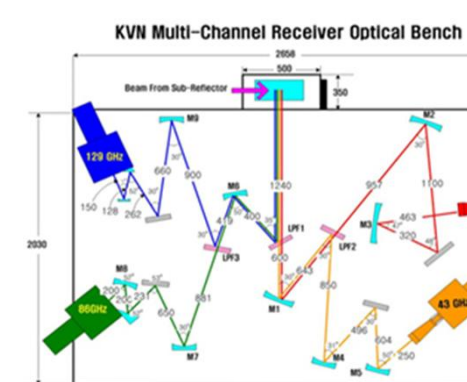
65%/67% (Yonsei), 62%/59 (Ulsan), 66%/60% (Tamna)

22/43/86/129GHz receiver :

installed at YS and US, Installation at Tamna underway

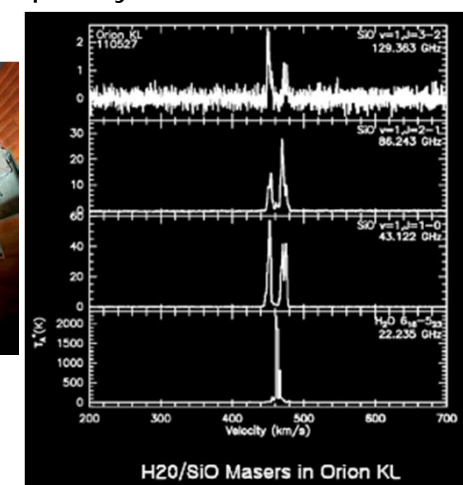
4-frequency fringe simultaneously at Dec. 2011

1Gbps sampler, H-maser clock, Mk5B recorder



Schematic view of Multi-frequency beam transporting system and installed photo

4-channel simultaneous multi-frequency observation result



Delay variation experiment

• Goal

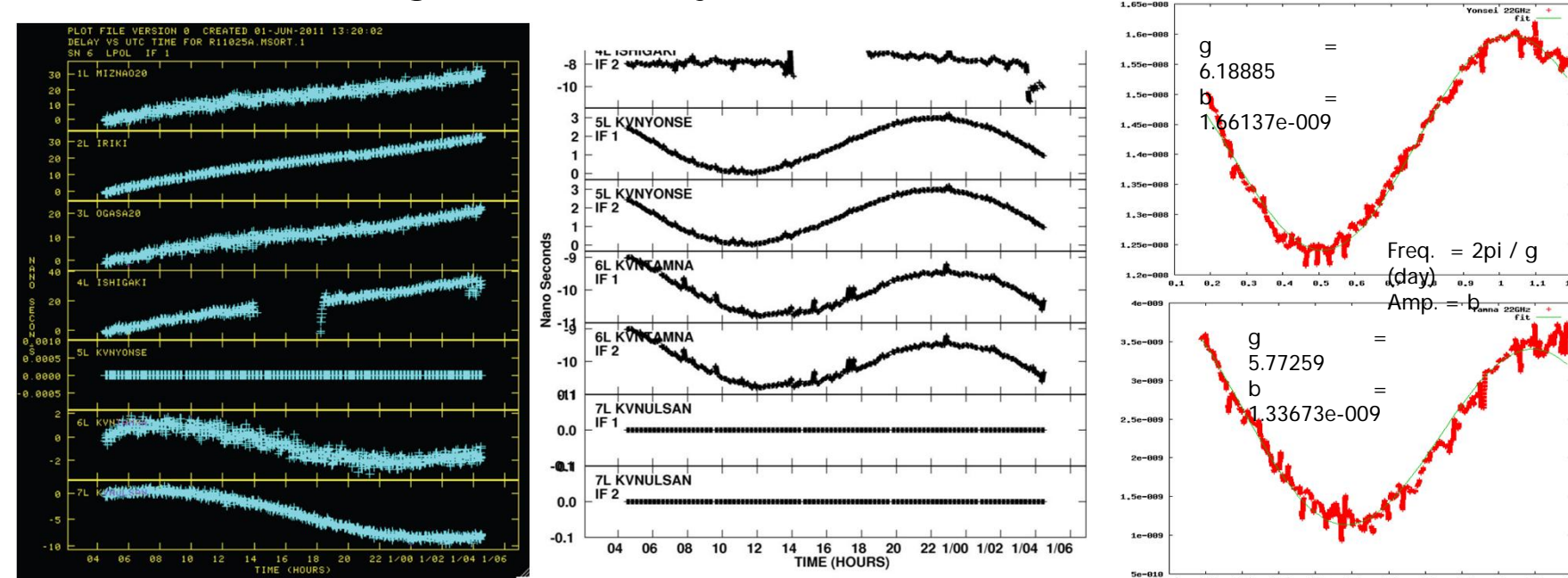
Analysis of large delay drift reported from previous experiments

• Observation

K/Q 24h sessions of J1927+73 (January, 2011)

• Result :

- Linear delay drift due to frequency offset : a few 10ns/24h
- ✓ Solved with new synthesizer
- 24h periodic Sinusoidal pattern at Yonsei and Tamna
- ✓ Larger priori-position error than other stations
- Astronomical data reduction package is not suitable for further geodetic analysis



Left: delay from raw data, middle: delay after removing linear drift, right: Periodic delay at YS, TN

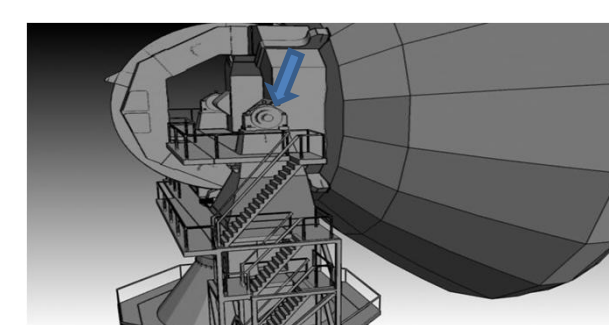
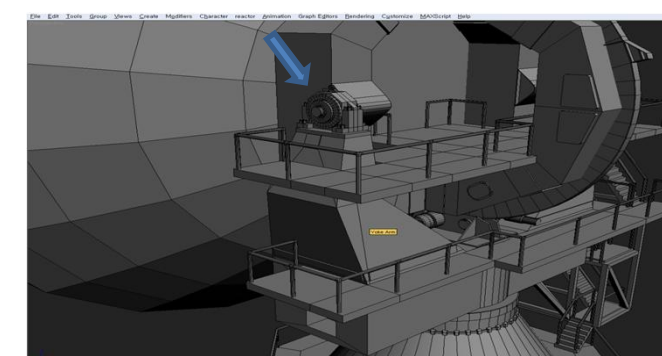
Direct GPS measurement of Invariant position (IVP)

1st measurement in Feb. 2011 at Yonsei station : ~10 m error due to multi-path signal

Photo taken from Feb. measurement



2nd measurement in 27th Sep. 2011 at Yonsei station :



Position (m)	Results (ITRF2008)
Point 1	X : -3042277.4649 Y : 4045905.2406 Z : 3867374.2857
Point 2	X : -3042284.3622 Y : 4045900.0878 Z : 3867374.2861
Average Values	X : -3042280.9135 Y : 4045902.6642 Z : 3867374.2859

K-band geodetic experiment

◇ 12.2hrs in 30th November 2010

◇ 560 scans (fully correlated with DiFX correlator in Seoul)

◇ Estimated parameters :

Station position

Clock function : 2nd degree polynomial

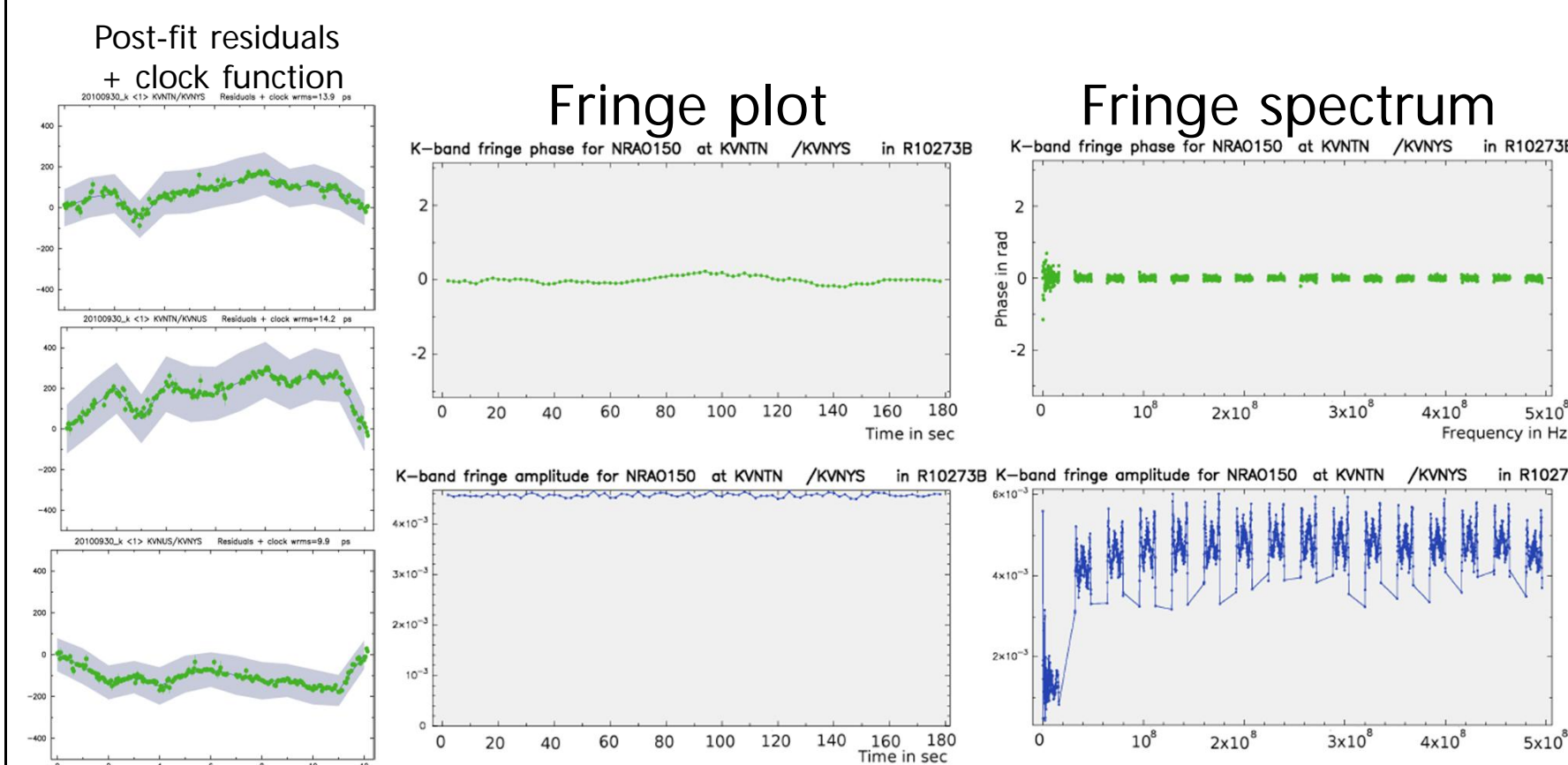
+ B-spline of the 1st order, 60min intervals

Atmospheric path delay : B-spline of the 1st order, 60m intervals

◇ wrms of post-fit parameters : 12.2 ps

◇ Software : PIMA, VTD/Post-Solve

Baseline	Length (m)
KVNTN / KVNUS	358342.5607±0.004
KVNTN / KVNYS	476351.7064±0.005
KVNUS / KVNYS	304829.5072±0.003



KVN-VERA K-band geodesy

Joined VERA K-band Geodesy session :

About 65 sources for 24h (822 scans)

16MHz x 16MHz mode

Scheduled by Dr. Jike

(1) 29th November 2011

No correlation because of a weather, troubles of correlation center and so on.

(2) 27th December 2011

Correlation is in progress (Mitaka correlation center).

K-band KVN geodesy

• Goal :

Relative positions among KVN baselines

Compared to the KVN-VERA geodesy

• Observation :

1st February 2012, 24h session

85 ICRF sources (678 scans)

Schedule with sur_sked

Correlation is in progress

(DiFX software correlator in Seoul).