Recent VLBI Activities at CRL

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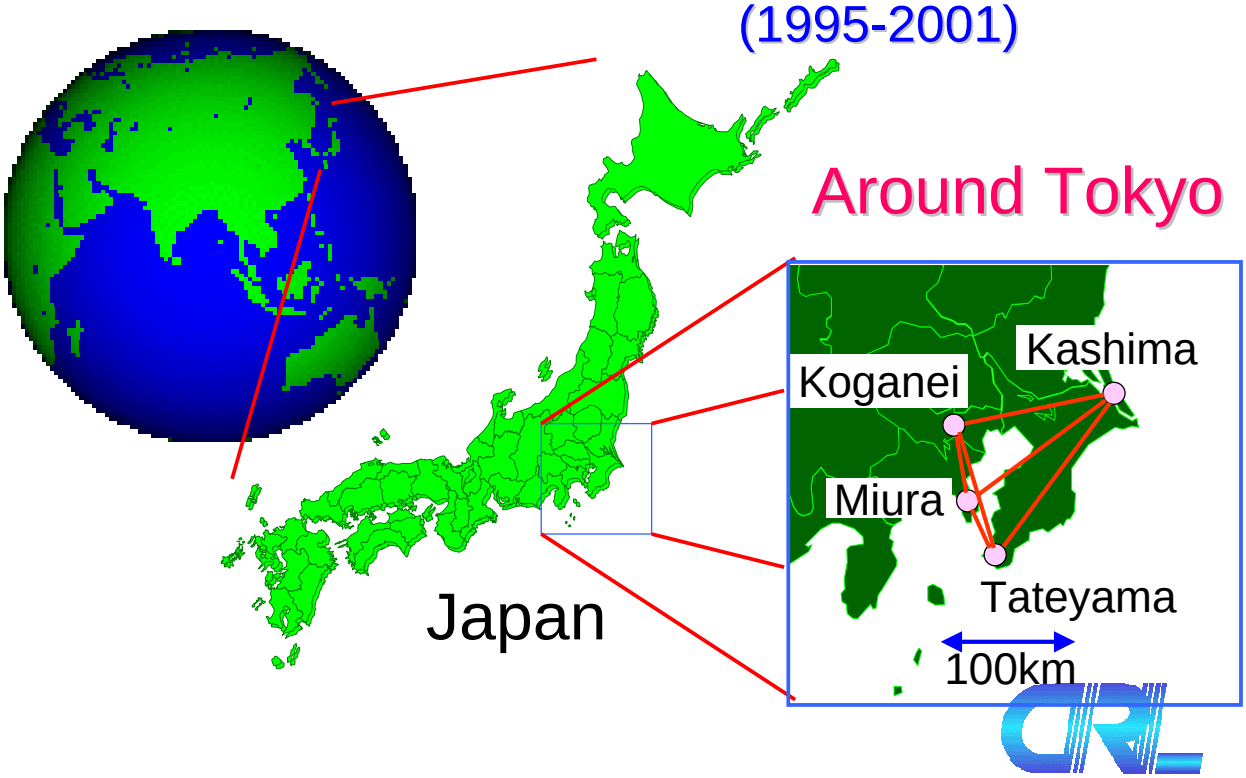
Communications Research Laboratory
Japan

Recent VLBI Activities at CRL

- Detection of unusual crustal deformation by Keystone (KSP) VLBI network
- Giga-bit VLBI observations
  - success in 1 Gbps real-time VLBI
  - success in 2 Gbps tape-based VLBI
- Development of the Internet VLBI
- Development of the VLBI Standard Interface (VSI) system

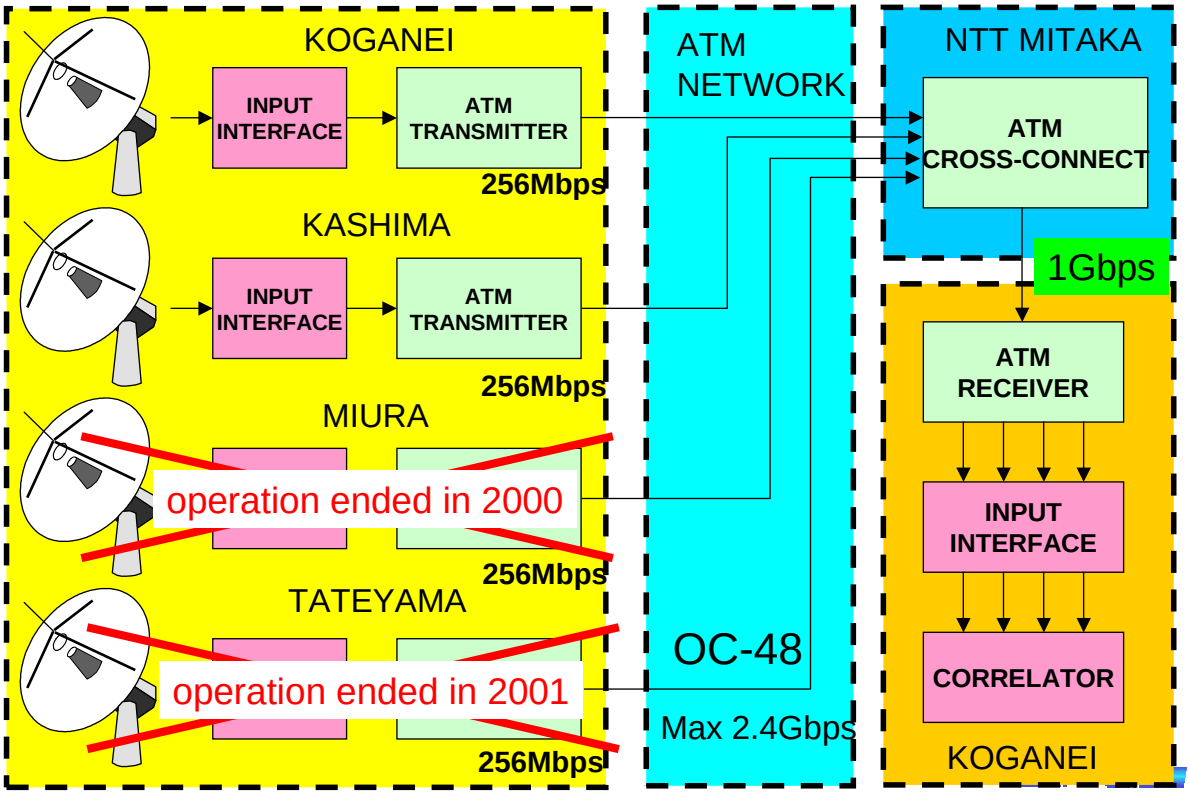
KSP VLBI network

(1995-2001)

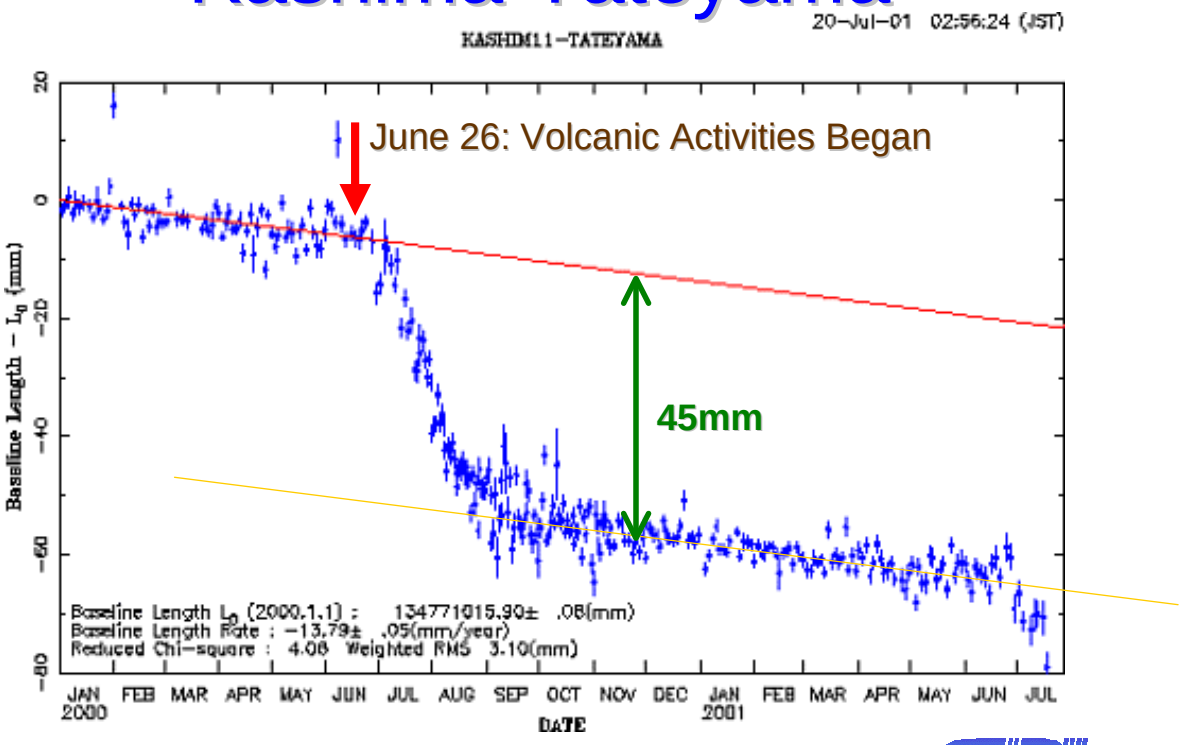


Real-Time VLBI System

256Mbps(=16Mbps × 16ch)/station



Kashima-Tateyama

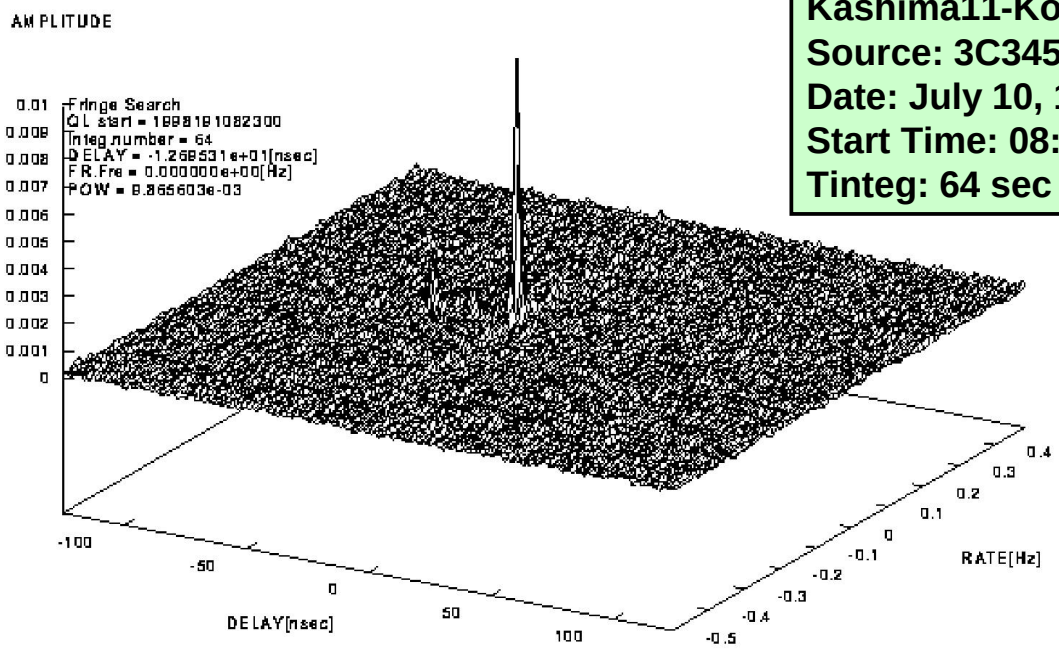


Giga-bit VLBI System

as of 2000

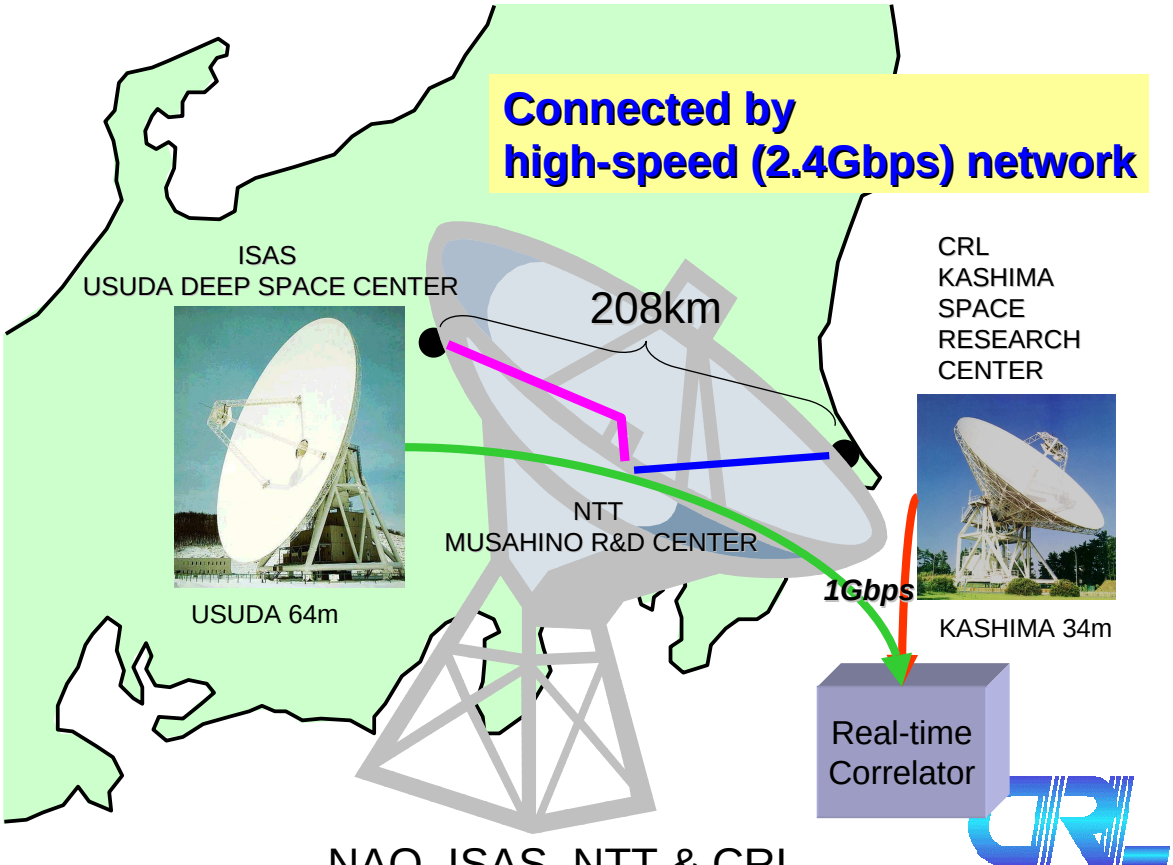
KASHIM1-KOGANEI 3C345

The First Fringes



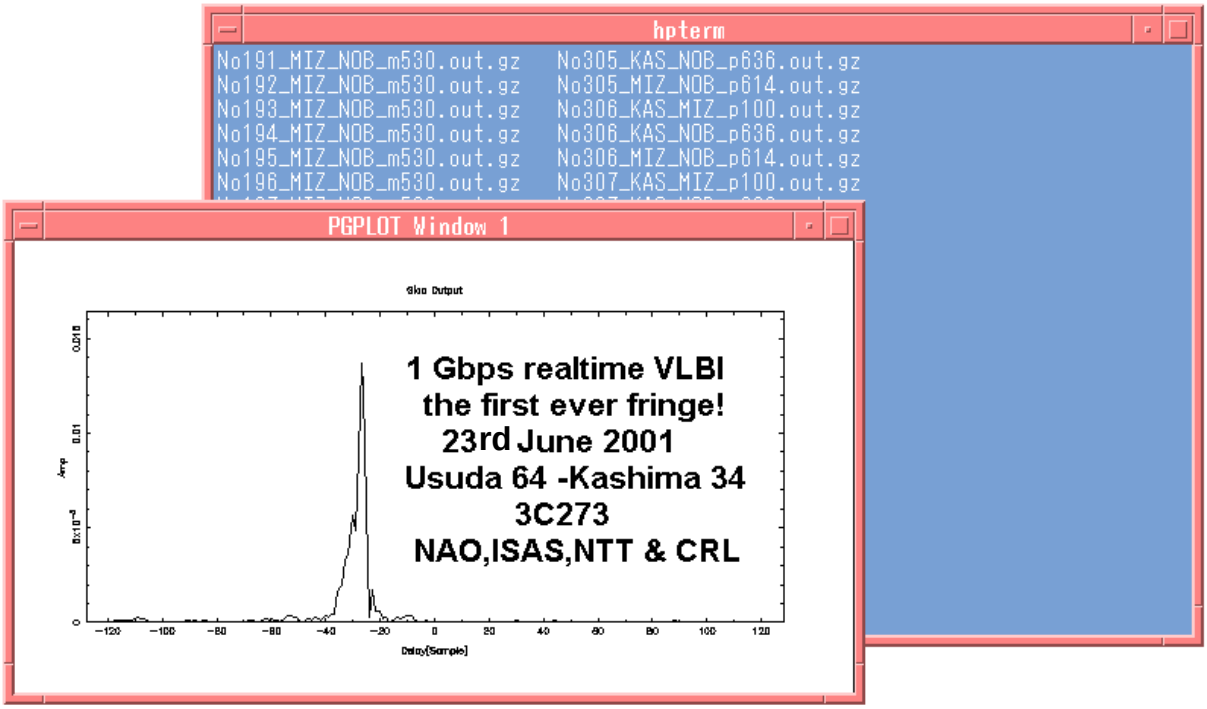
Kashima11-Koganei
Source: 3C345
Date: July 10, 1998
Start Time: 08:20:00
Tinteg: 64 sec

Large Virtual Telescope (GALAXY)



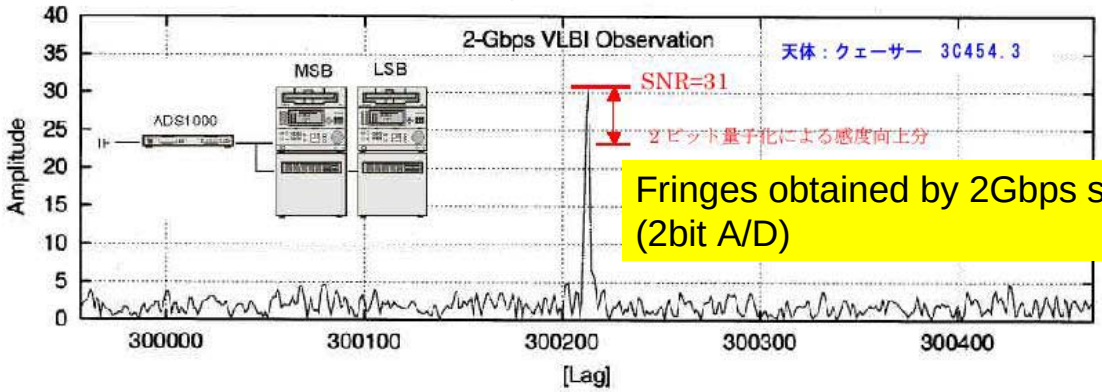
NAO, ISAS, NTT & CRL

Successful Detection of 1Gbps real-time VLBI fringes

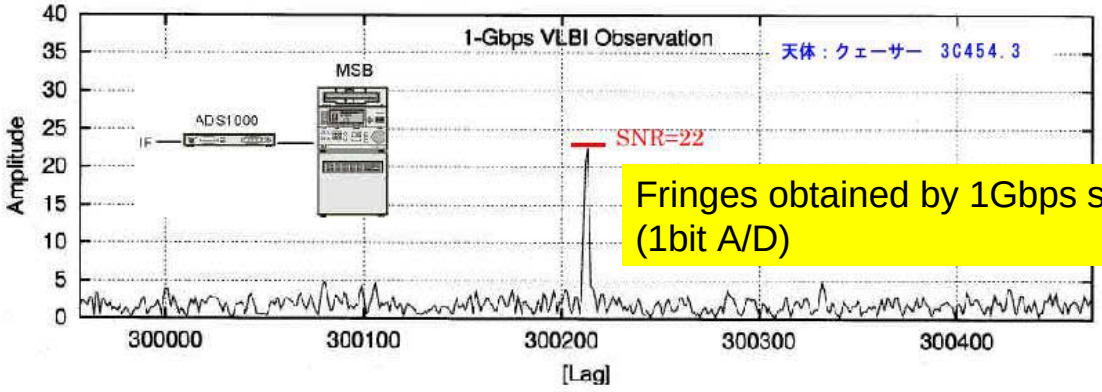


Success in 2Gbps VLBI (tape based)

(Kashima-Koganei Dec.12, 2001)



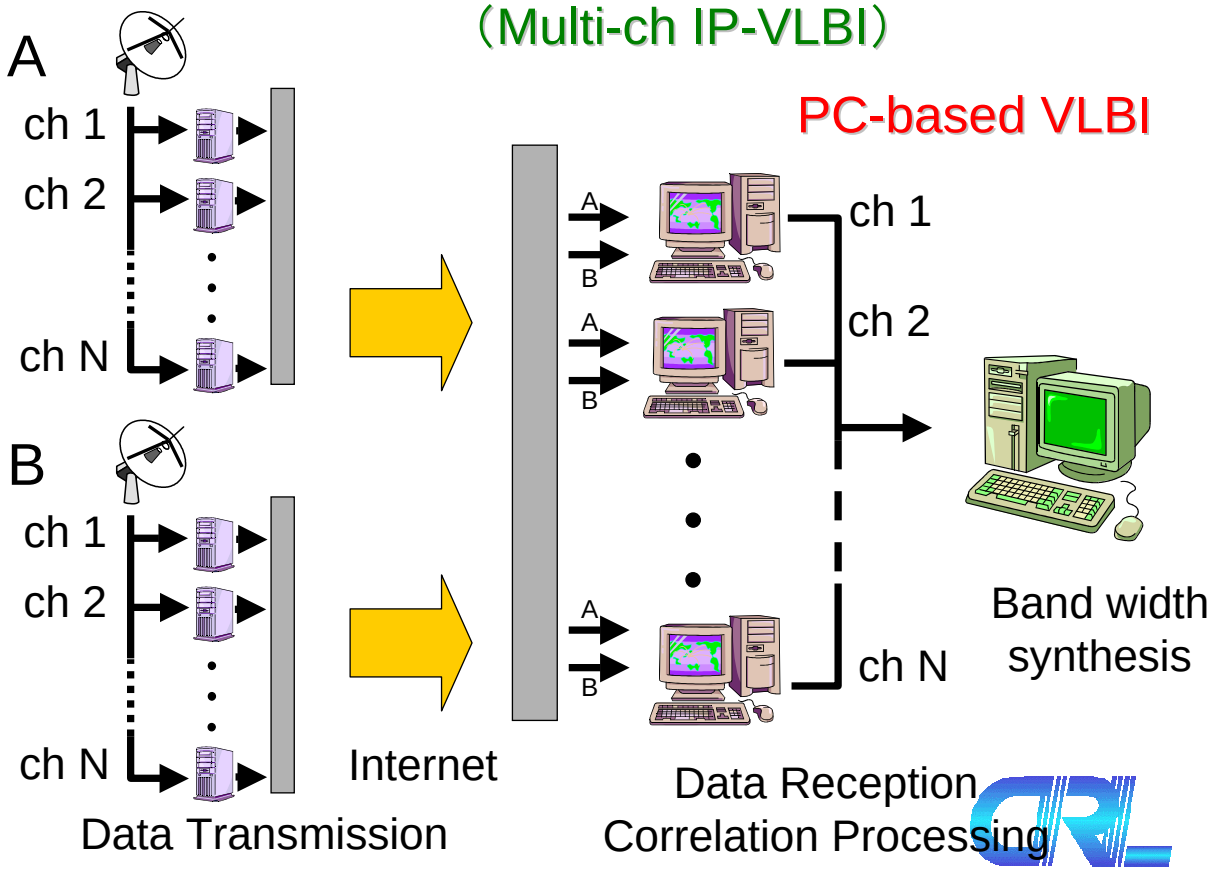
Fringes obtained by 2Gbps system (2bit A/D)



Fringes obtained by 1Gbps system (1bit A/D)

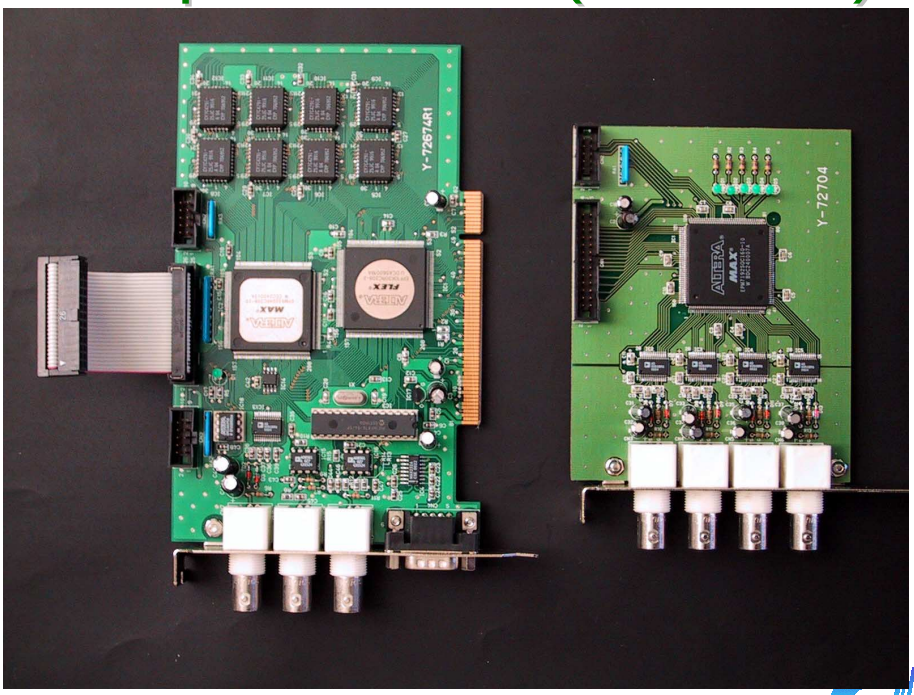
IP－VLBI for Geodetic Use

（Multi-ch IP-VLBI）



IP-VLBI

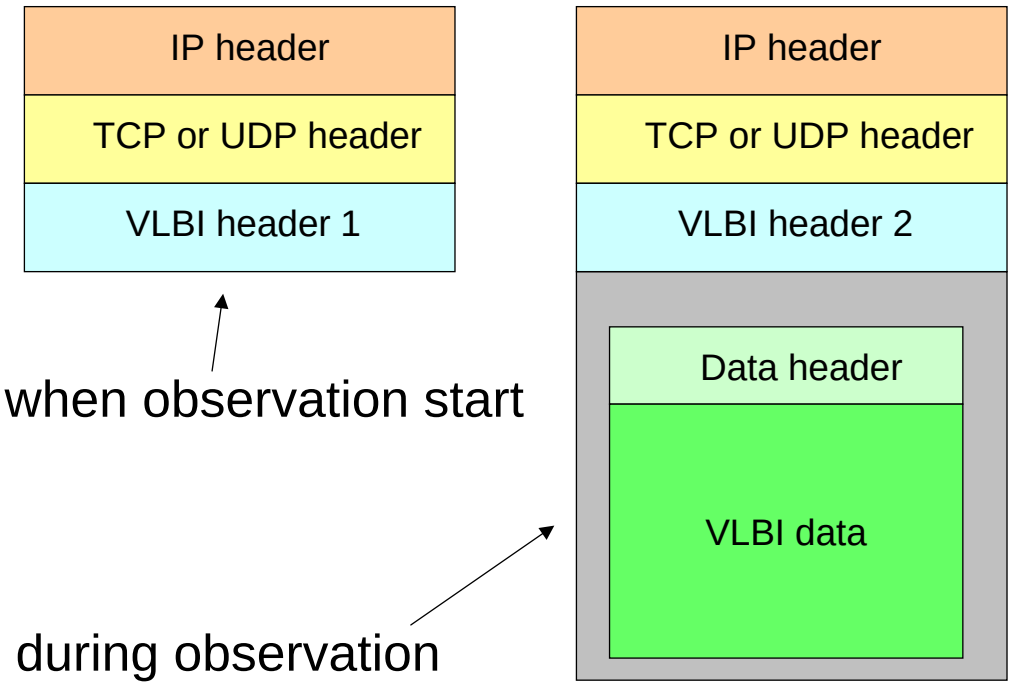
Sampler Board (PCI Bus)



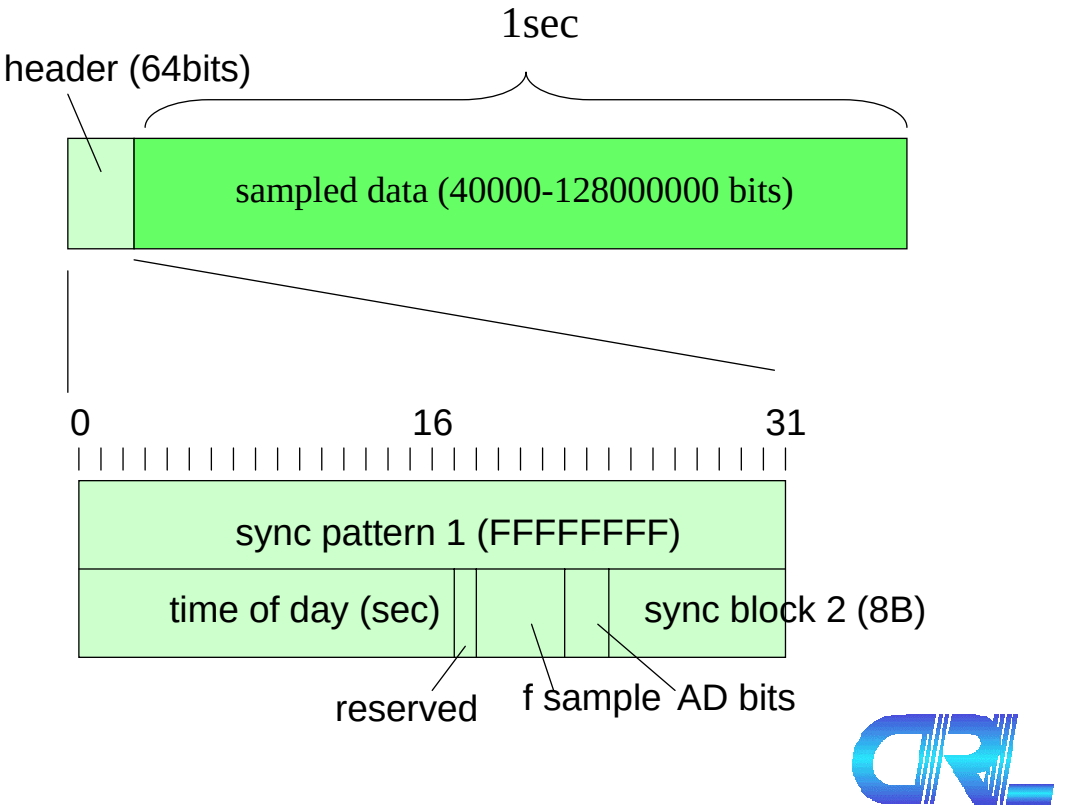
Specifications of Sampler Board

Reference signals	10MHz (+10dBm), 1PPS
Number of INPUT CH	1 : main board only 4 : with auxiliary boad
A/D	1, 2, 4, 8 bits
Sampling Freq.	40kHz, 100kHz, 200kHz, 500kHz, 1MHz, 2MHz, 4MHz, 8MHz, 16MHz

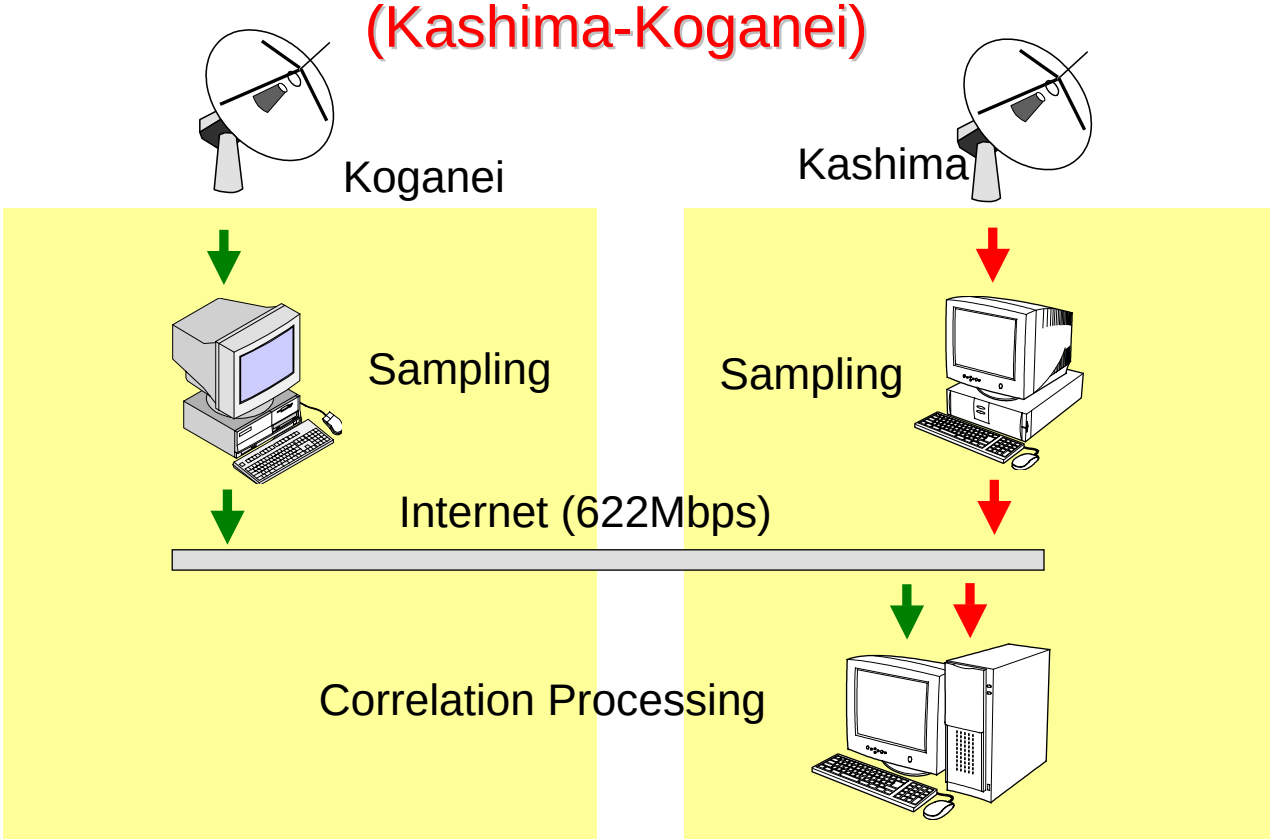
IP Data Format



IP-VLBI Data Format

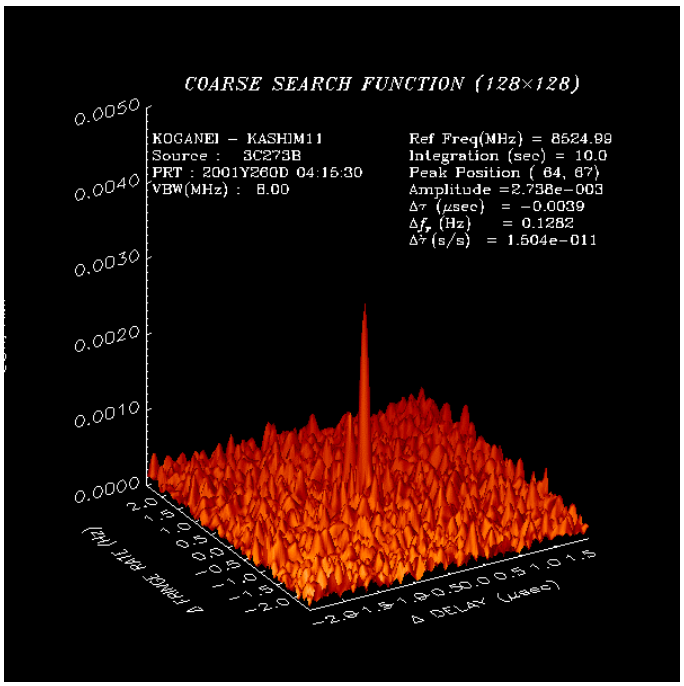


IP-VLBI Test Observation (Kashima-Koganei)



IP-VLBI Sampler Board Test

First Fringes on Kashima-Koganei



16MHz sampling

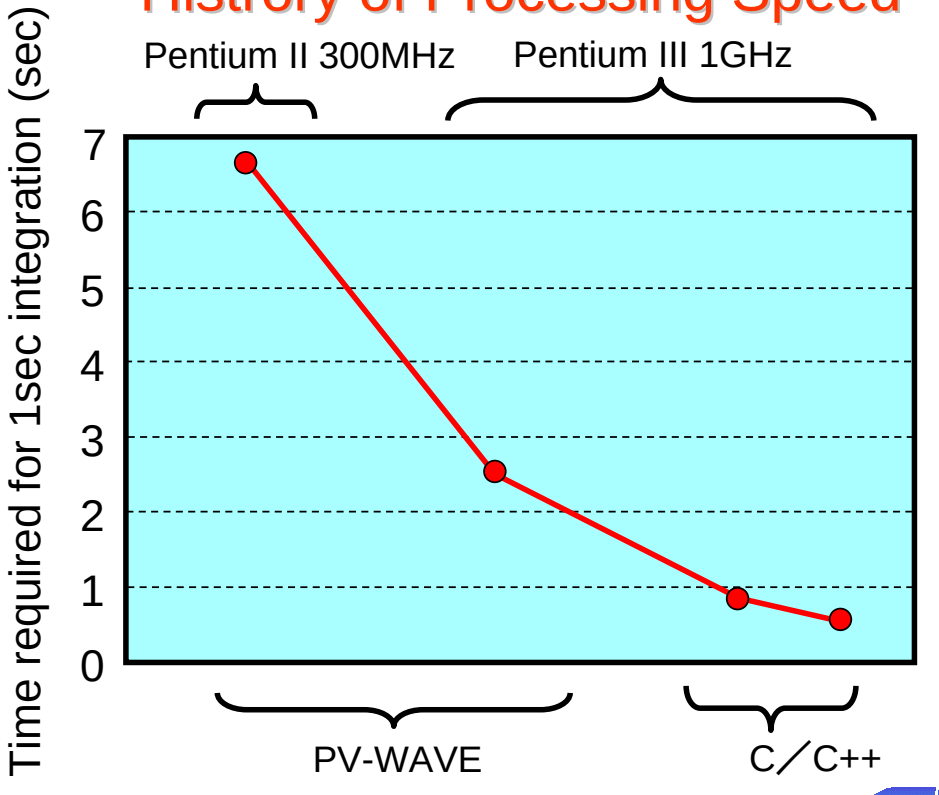
Sept. 17, 2001

3C273B

10sec integration

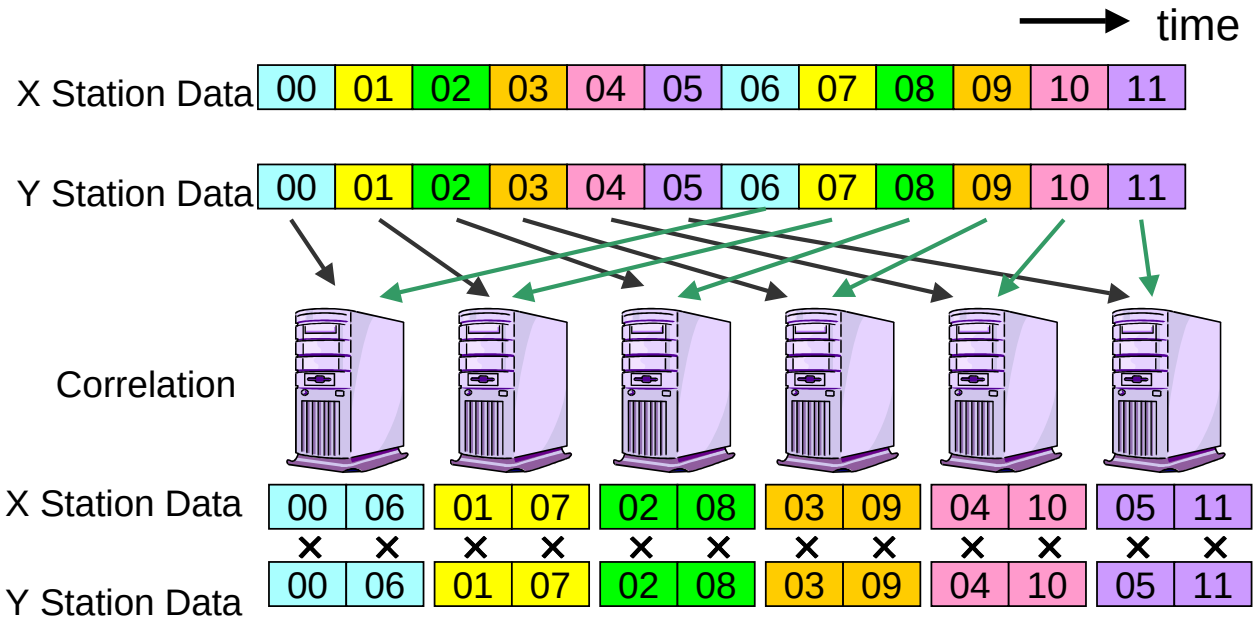
Note!
This is off line processing

Histrory of Processing Speed



4MHz Sampling • 16 lag

IP-VLBI Time Distributed Processing

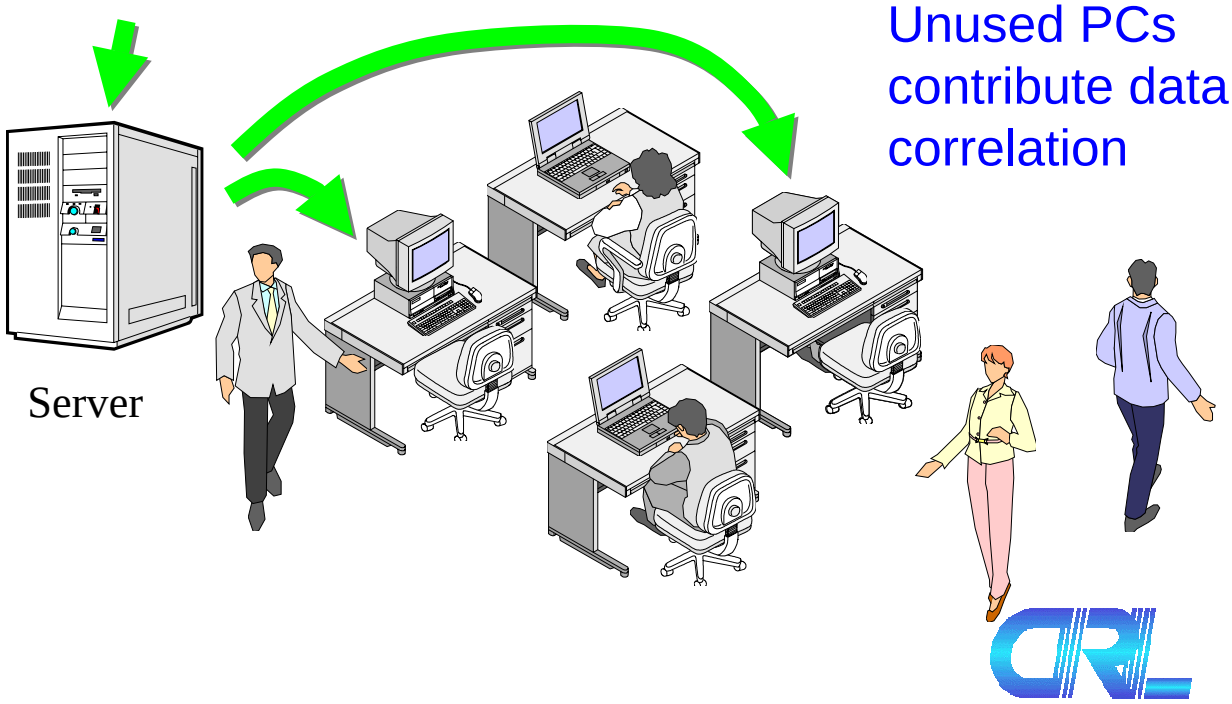


If proceesing time for 1sec data requirs 5 seconds, use of more than 6 PCs enables us to process in quasi real-time.

VLBI@office

(Ref. SETI@home)

huge VLBI data

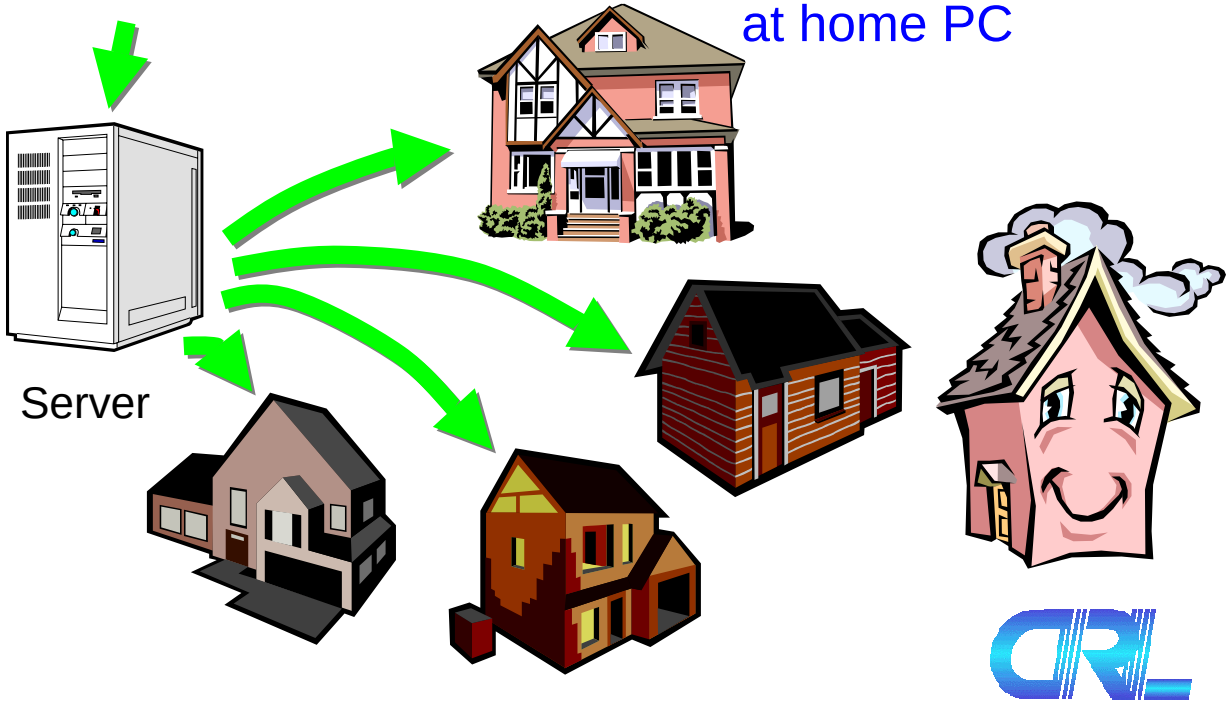


Unused PCs contribute data correlation

VLBI@home

huge VLBI data

Correlation Processing at home PC



VLBI@university

Large Antenna

Broadcasting received signals

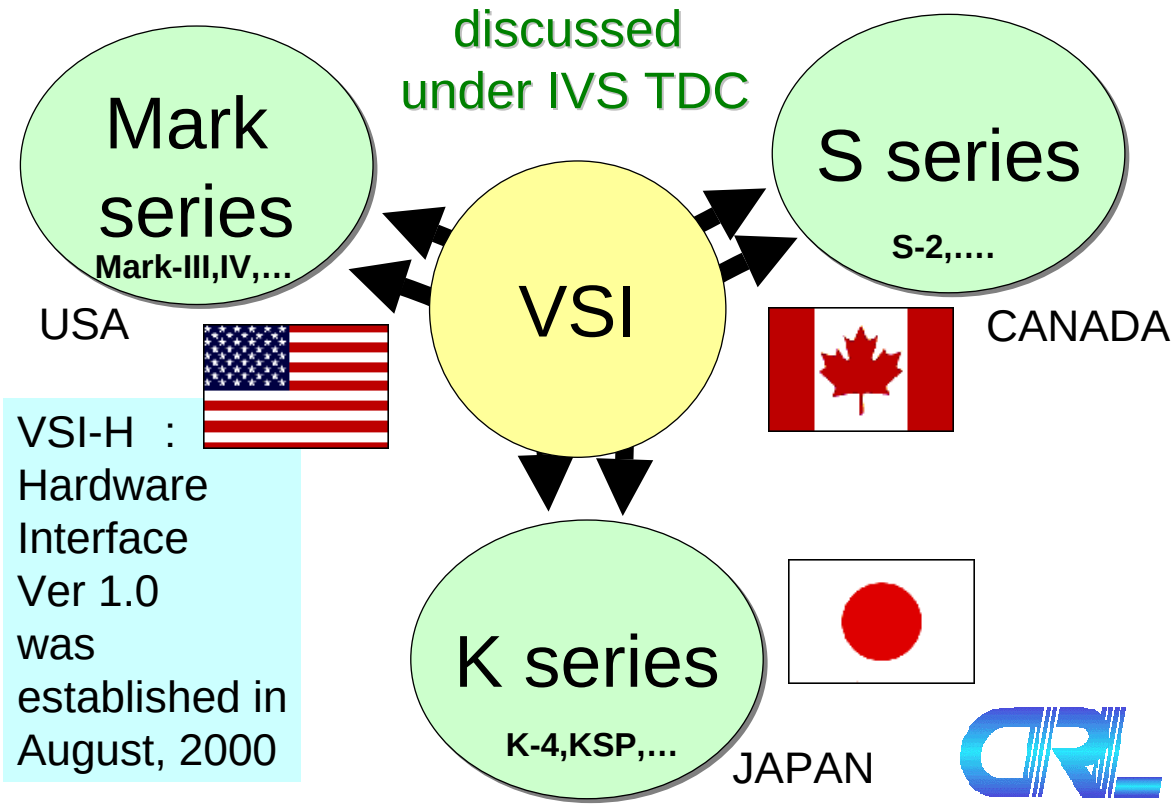
Internet

Small Antenna at University

Receiving broadcasted data

+ correlation with each antenna data

VLBI Standard Interface (VSI)



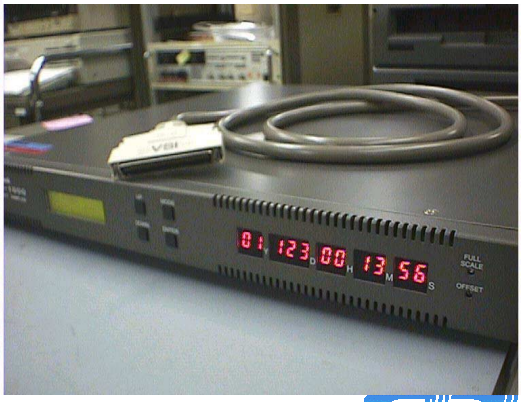
VSI-H : Hardware Interface Ver 1.0 was established in August, 2000

VSI Gbit recorder

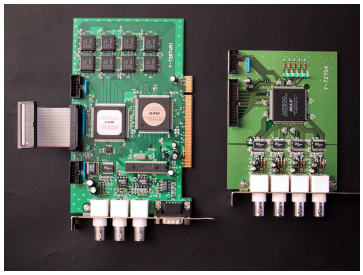
VSI interface in it!

VSI AD sampler

- ADS1000 Small 2 Gbps AD sampler (VSI-DAS)
- 1/10 size, 1/5 cost, reduced AD jitter by PLO



Future Plan



IP-VLBI

Gigabit VLBI

PC-VSI

IVS 2002 General Meeting

Second IVS General Meeting
February 4-6, 2002
Tsukuba, Japan

hosted by GSI and CRL

http://ivscc.gsfc.nasa.gov/

IVS Receives Award from Japanese Ministry on "RADIO DAY" (June 1, 2001)

Certificate of Commendation

Awarded
To
The Directing Board of the
International VLBI Service
for Geodesy and Astrometry

I commend you for your work in developing an international interface standard that enables data to be interchanged among different types of VLBI observation systems.
Your achievement has greatly contributed to the progress being made in the use of radio waves, such as the improvement in VLBI observation accuracy, and will contribute to the precision measurement technology of the future.
In appreciation of your efforts, I commend your achievement on this Radio Day.

June 1st, 2001

片山虎之助

Toranosuke KATAYAMA
Minister of Public Management, Home Affairs, Posts and Telecommunications, JAPAN

Ministry of Public Management, Home Affairs, Posts and Telecommunications

Conclusions

- VLBI observations to evaluate a GPS time and frequency reference receiver were carried out on the Kashima-Koganei baseline.
- Good correlation (fringe) was successfully detected at 8 GHz as well as 2 GHz.
- Integration up to 100 seconds was available by using a third-order fringe search method.
- These results are as same as those expected from a phase stability measurement result before VLBI observations.