VLBI Observation Systems Based on the VLBI Standard Interface Hardware (VSI-H) Specifications

Yasuhiro Koyama, Tetsuro Kondo, Junichi Nakajima,
and Mamoru Sekido

Kashima Space Research Center, Communications Research Laboratory

What is VSI-H?

To be precise, it specifies functions of DIM (Data Input Module) and DOM (Data Output Module)

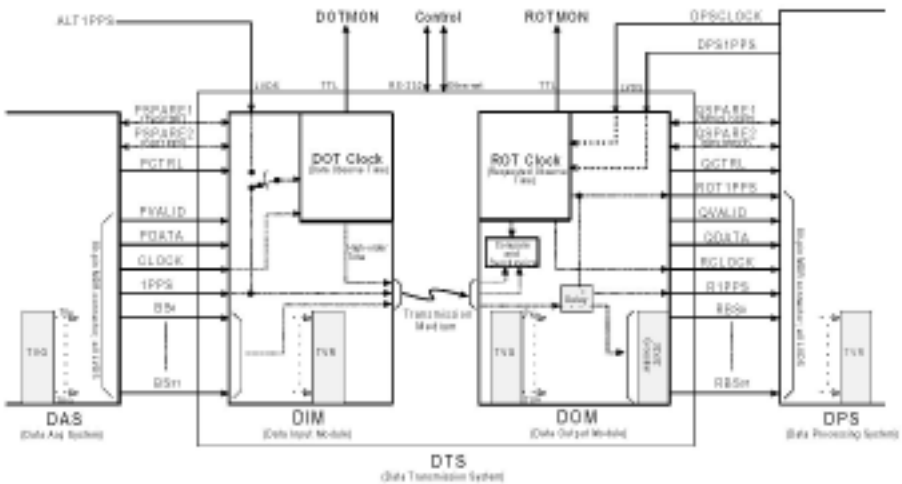
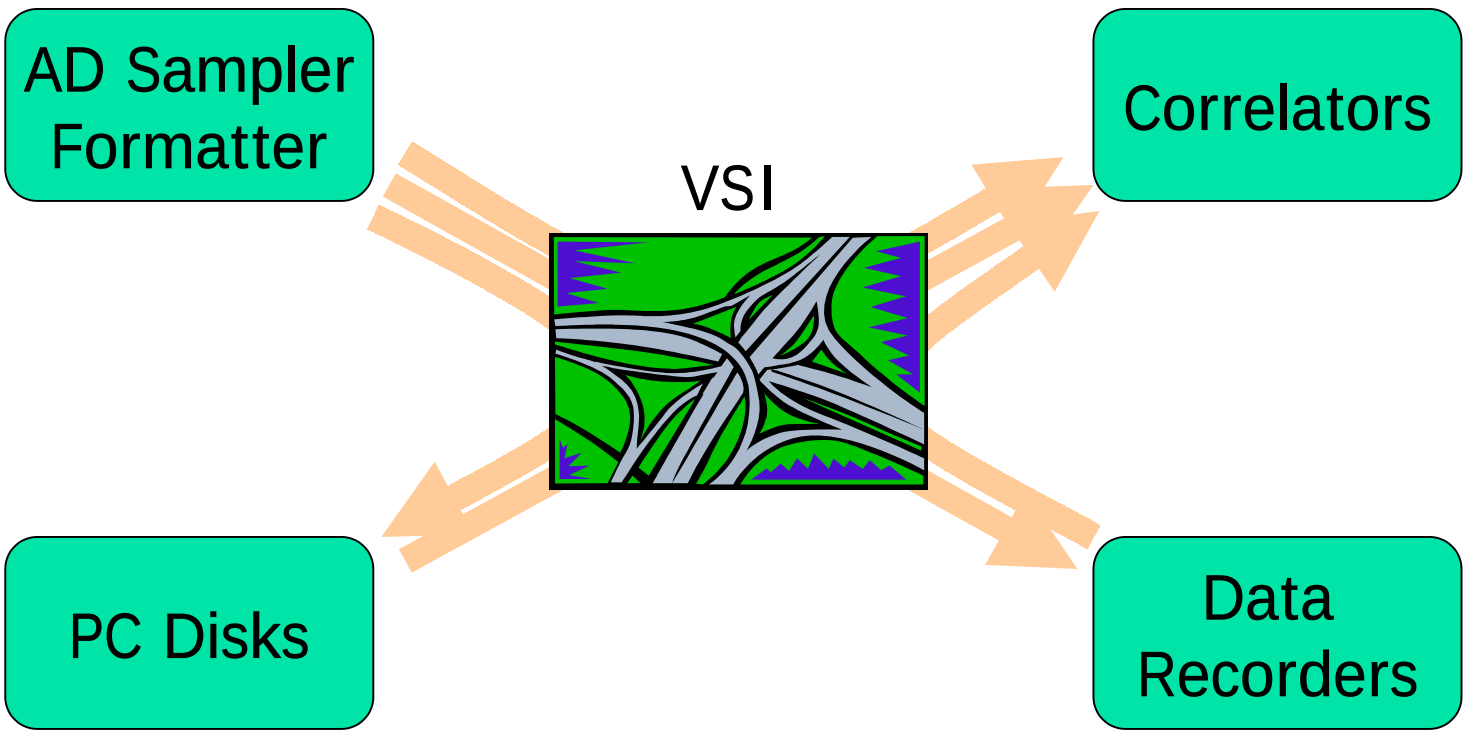


Figure 1: VSI-H Functional Block Diagram

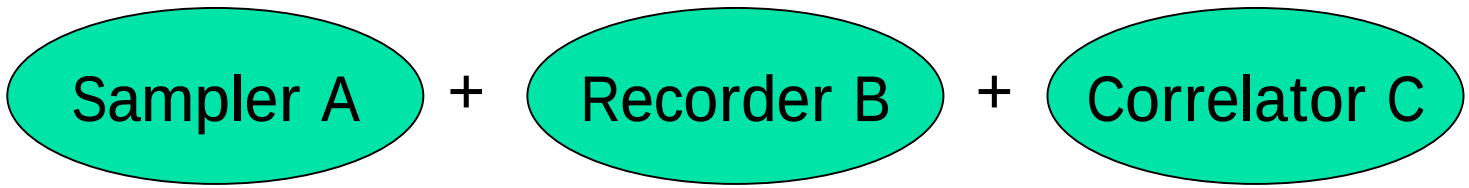
What is VSI-H?

In other words, “intersection of various data streams”

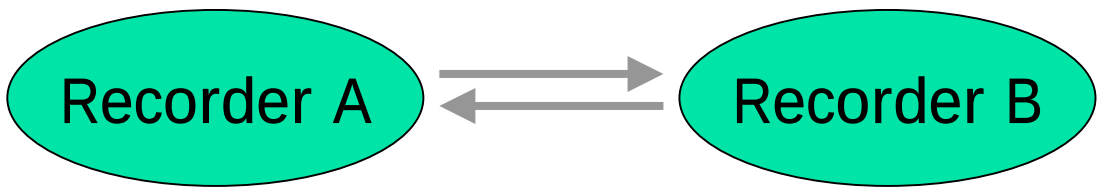


With VSI-H...

- Compatibility among components



- Media conversion



- Multipurpose
  - Spectrometer, radar, pulsar timing, high energy physics, …

A/D sampler - BBC signals to VSI -

ADS1000

1024Msample/sec
1ch
1 or 2 bit /sample

ADS2000

64Msample/sec/ch
16ch
1/2 bit /sample

Recorders - VSI ⬌ magnetic tapes -


GBR2000D (front)


S2-VSI-DOM
K4-VSI-DIM

DIR1000
+ Tape Changer


GBR2000D (rear)

GBR2000D
1024Mbps
DIR1000
64/128/256/1024Mbps

GBR2000D

Former GBR

New VSI Data recorder

Tape Capacity
62 minutes

Format
D6 standard

Tape Changer
Support 24 tapes

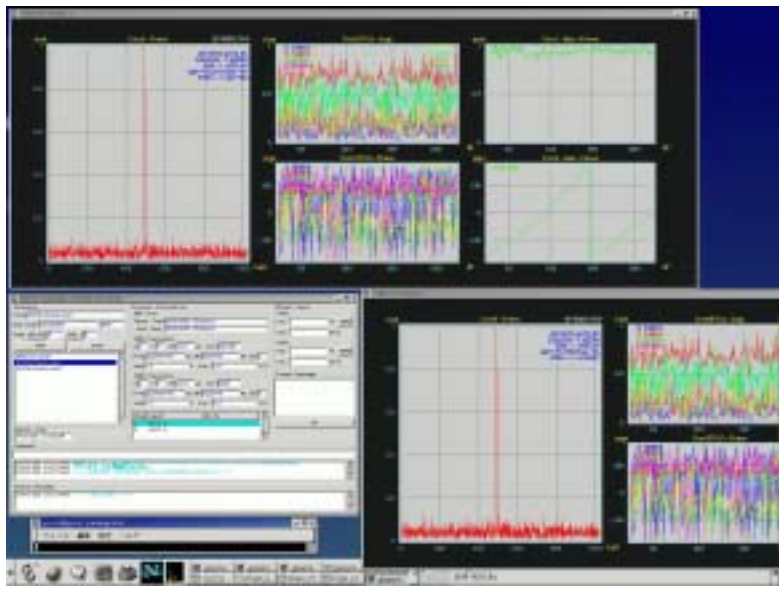
PC - VSI ⬌ PC disks -

PC-VSI2000-DIM (CRL)

Mark-5 (Haystack)

PC EVN (Metsähovi)

Correlator

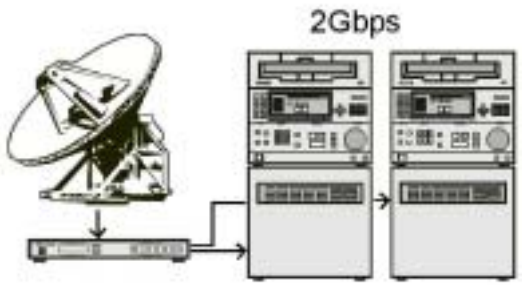


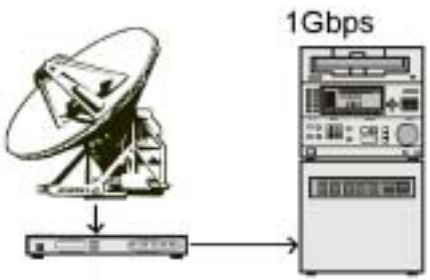
GICO-2 “The first VSI correlator”

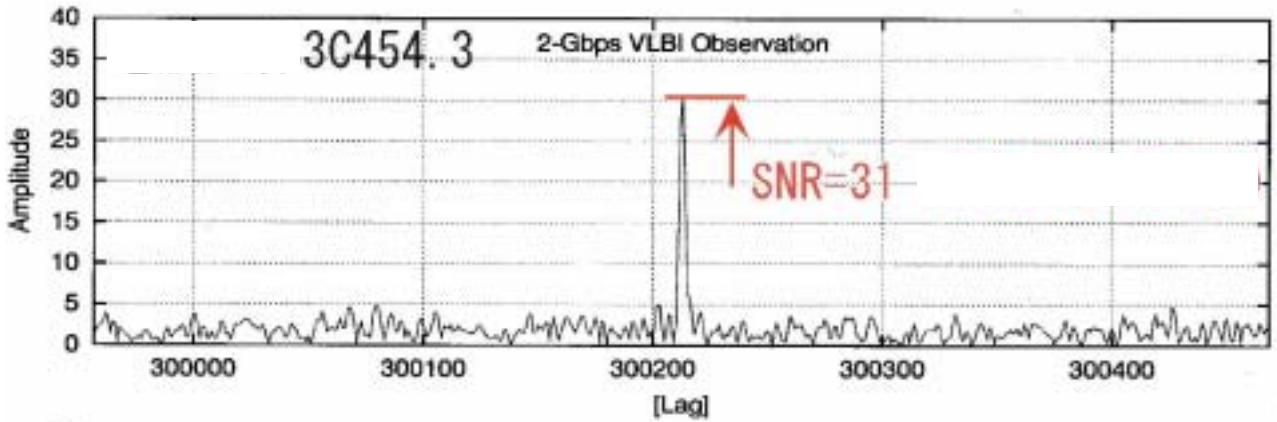
1024Mbps/1ch

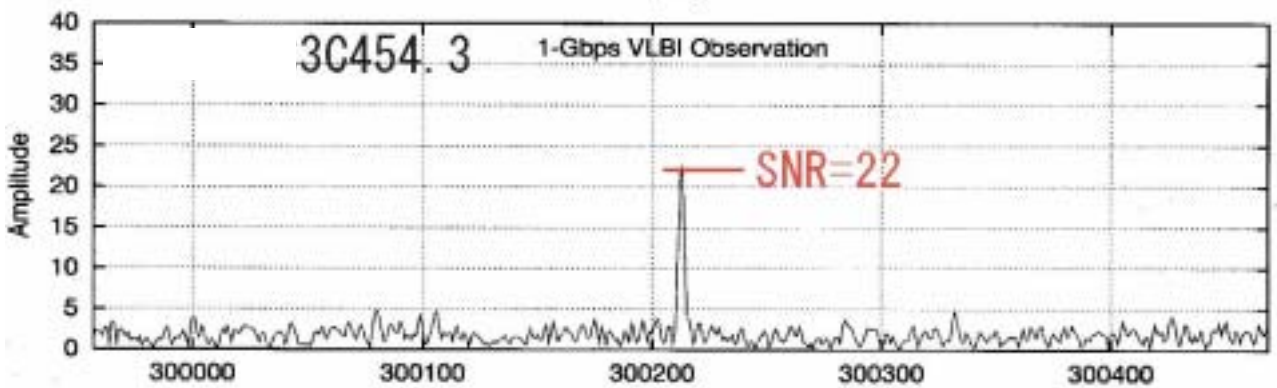
2 baselines@512lag or 1 baseline@1024lag

The first VSI fringes



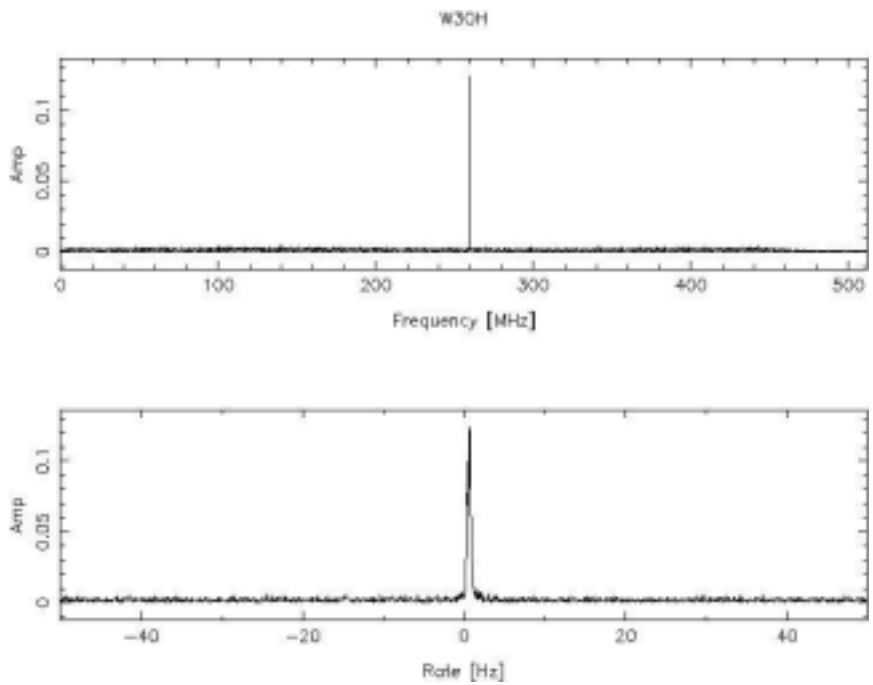




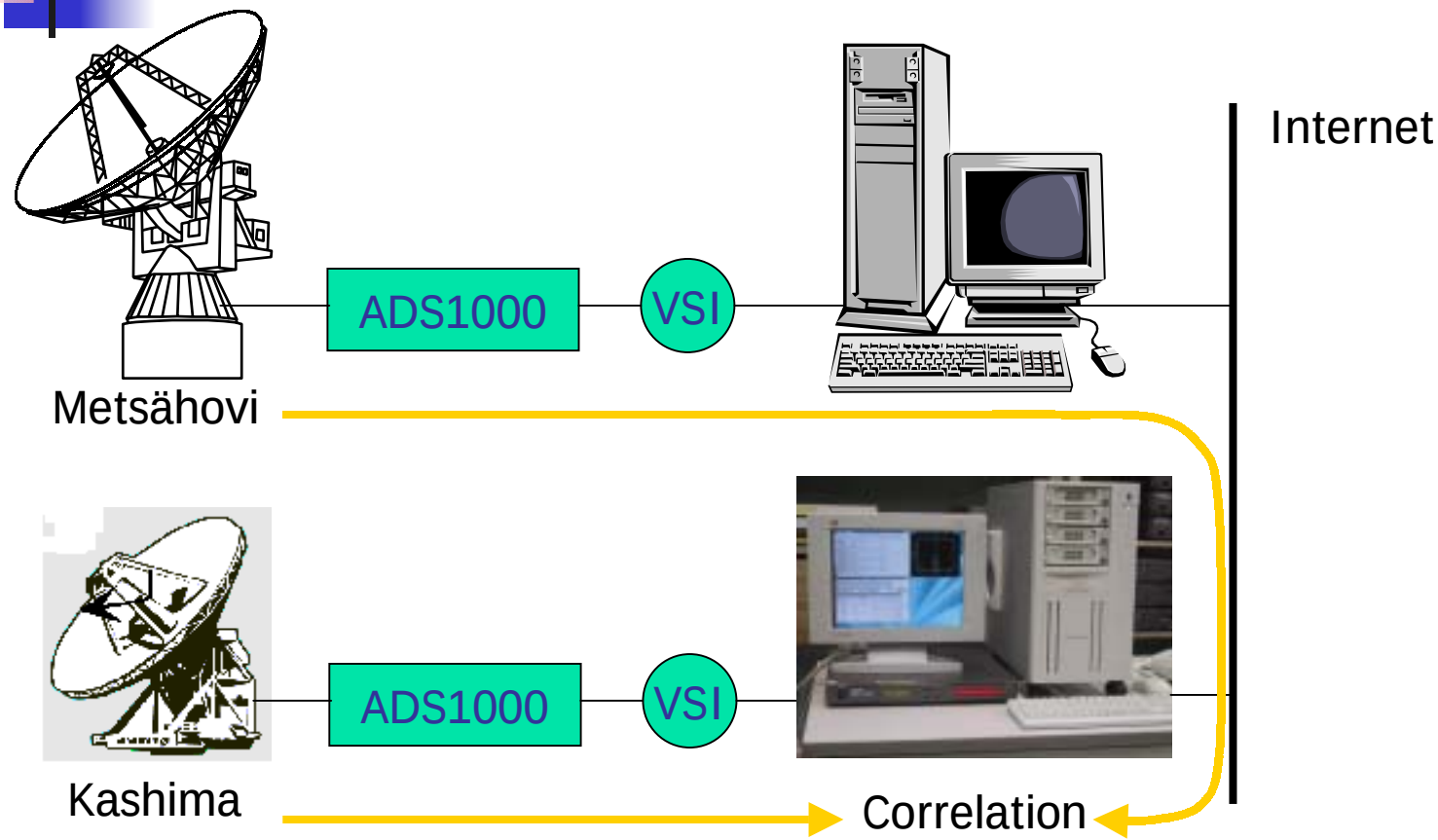


KASHIM11-KOGANEI baseline X-band

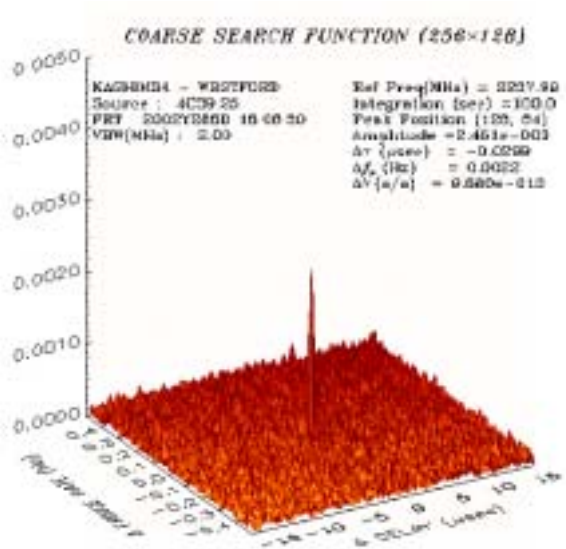
Kashima-Metsähovi VSI Fringes

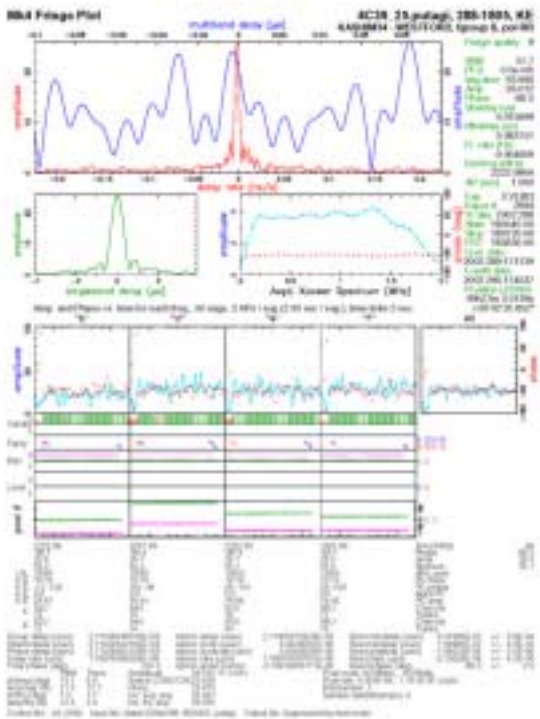


Kashima-Metsähovi VSI Fringes

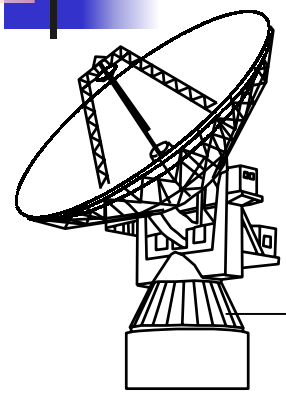


Kashima-Westford e-VLBI Fringes





Kashima-Westford e-VLBI Fringes

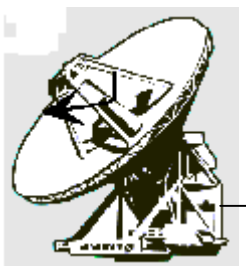


Westford

Mark-4 Formatter

K5/VSSP

Mark-4 Correlator



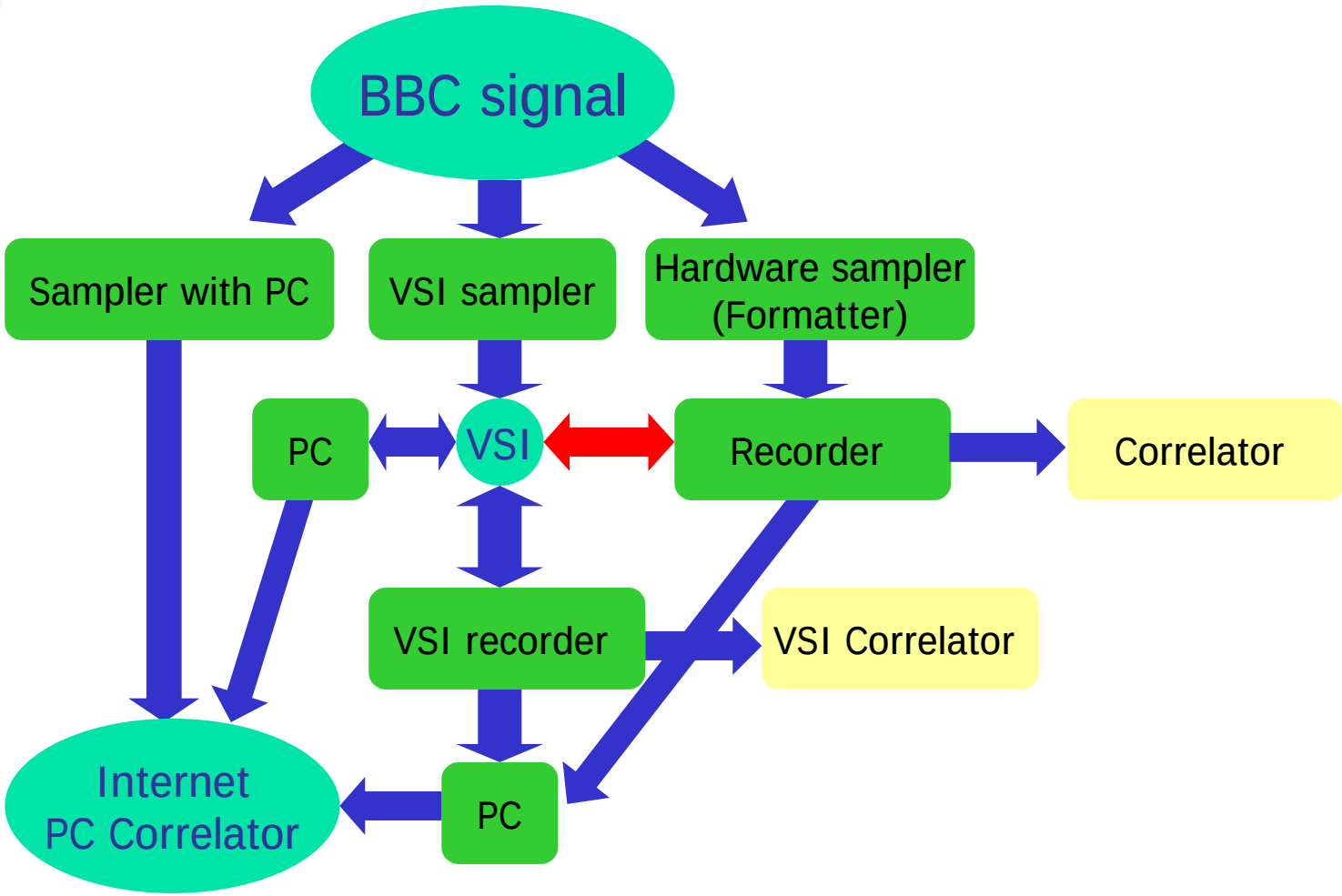
Kashima

K5/VSSP

PC Software Correlator

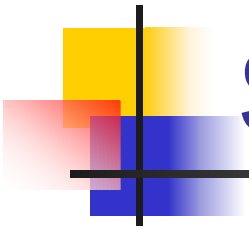
Correlation

Many routes to correlate data



PC correlator

- Easy to expand processing capacity
- Easy to upgrade software/model
- Can be used as Wide Band Digital Spectrometer
- Multiple correlation centers can process same data with different strategy



Summary

- VSI connects various components
- Many components have been developed and are in developments
- Compatibilities among hardware systems are being achieved
- There is no need to choose ONE system
- Standardizations of data format and control command are also important