

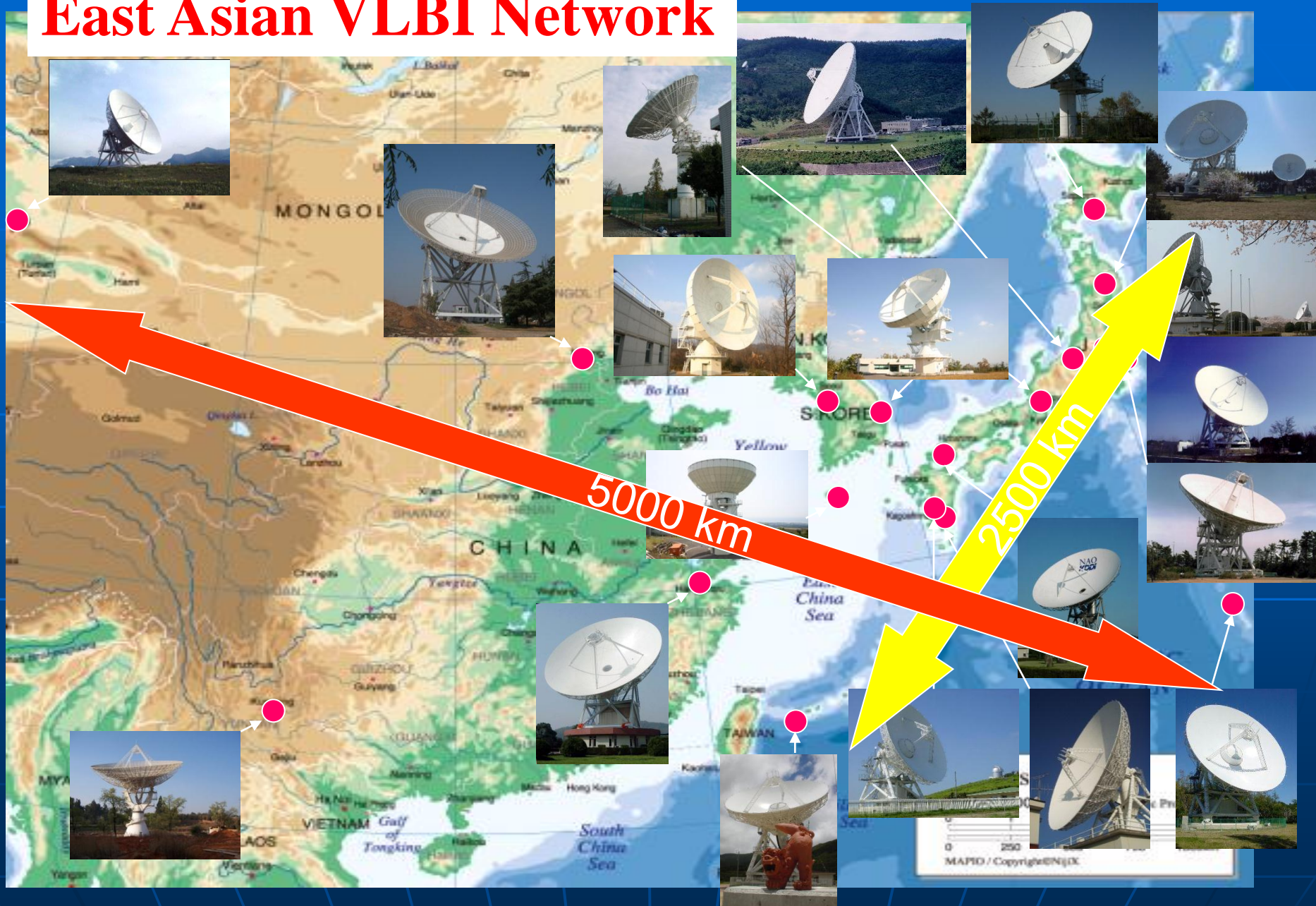
East Asian VLBI Network

H.Kobayashi(NAOJ)

October,4,2012

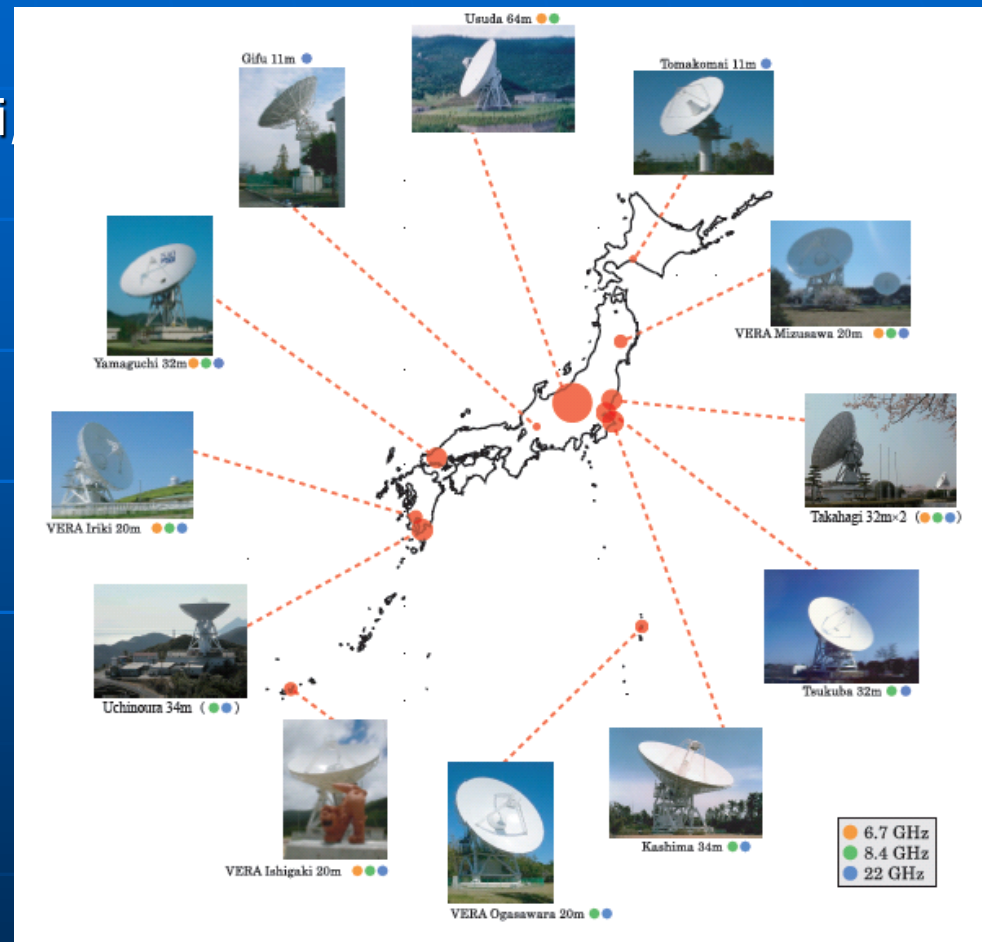
VERA users meeting@Mizusawa

East Asian VLBI Network

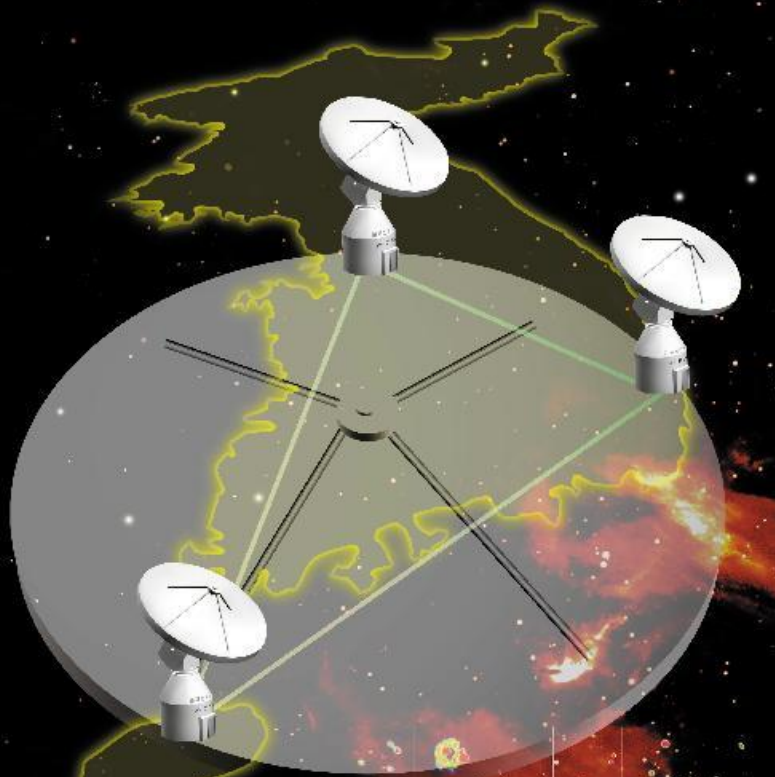


Japanese VLBI Network (JVN)

- Collaboration
 - NAOJ (VERA)
 - Hokkaido, Ibaraki, Tsukuba, Gifu, Osaka-Pref, Yamaguchi, Kagoshima university
 - JAXA, NICT, GSI
 - 13 telescopes (11m ~ 64m)
- Purpose
 - A new, characteristic VLBI array
 - A Base of East-Asian VLBI
- Progress
 - Started in 2004
 - Steady Observation in 2005
 - First Paper published in 2006
 - Observing time ~200 hr/yr
 - **EAVN test observation**



KVN 한국우주전파관측망 Korean VLBI Network



한국천문연구원
내셔널파인분해 KVN사업부



Constructions of three stations
were completed on Dec. 2008 !

Simultaneous Multi-Frequency Obs. -
Phase Compensation, mm-VLBI

VLBI in China

L,C,S/X,K

S/X

L,C(5/6G),S/X,K



21CMA



Delingha 13.7m



Urumqi



Miyun 50m



Shanghai 25m



Correlator



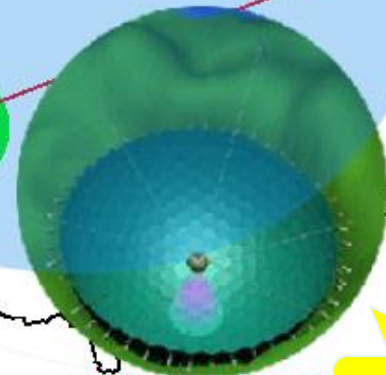
Shanghai 65m



Kunming 40m

S/X

L,C:2012
K : ?

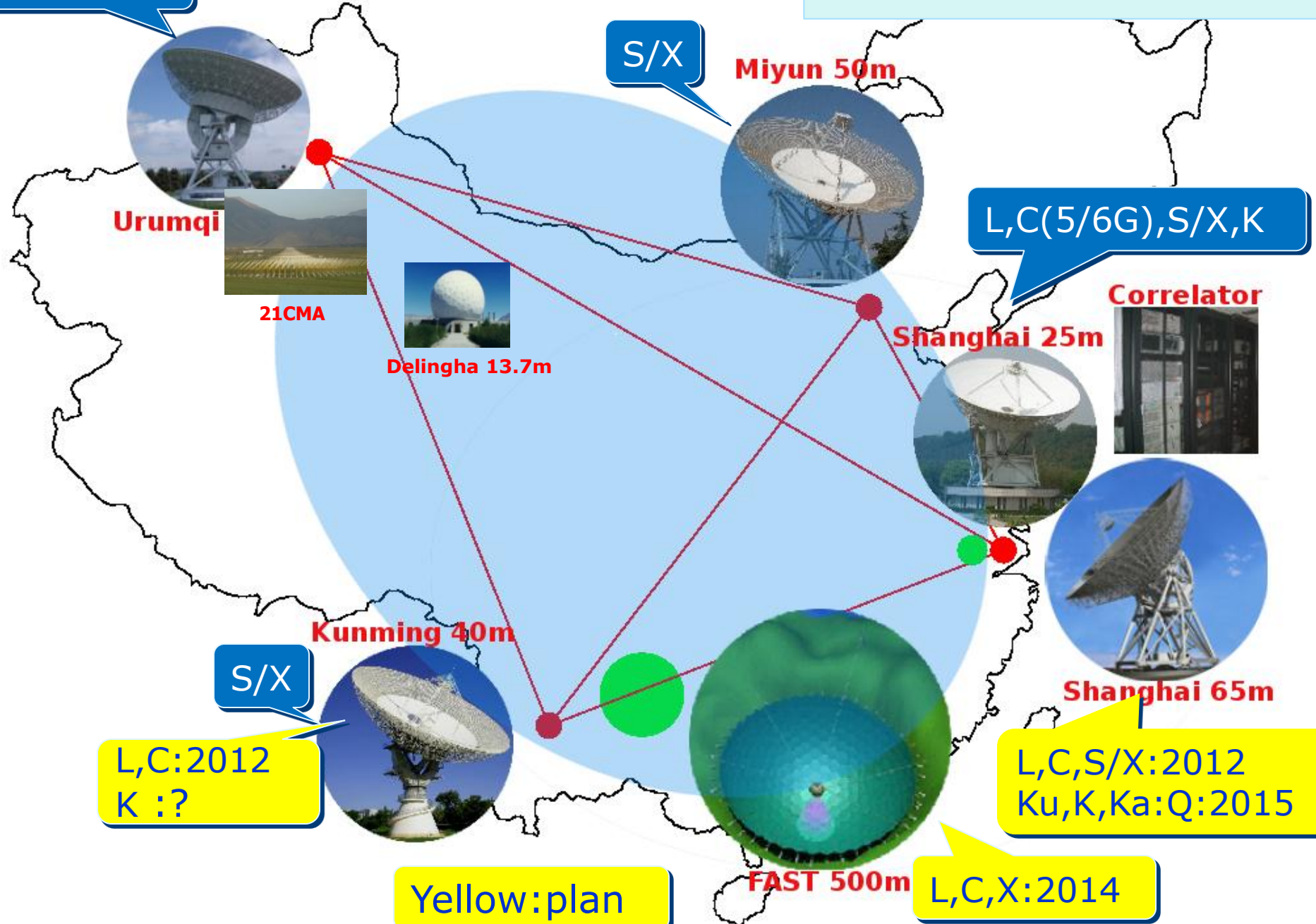


FAST 500m

L,C,S/X:2012
Ku,K,Ka:Q:2015

L,C,X:2014

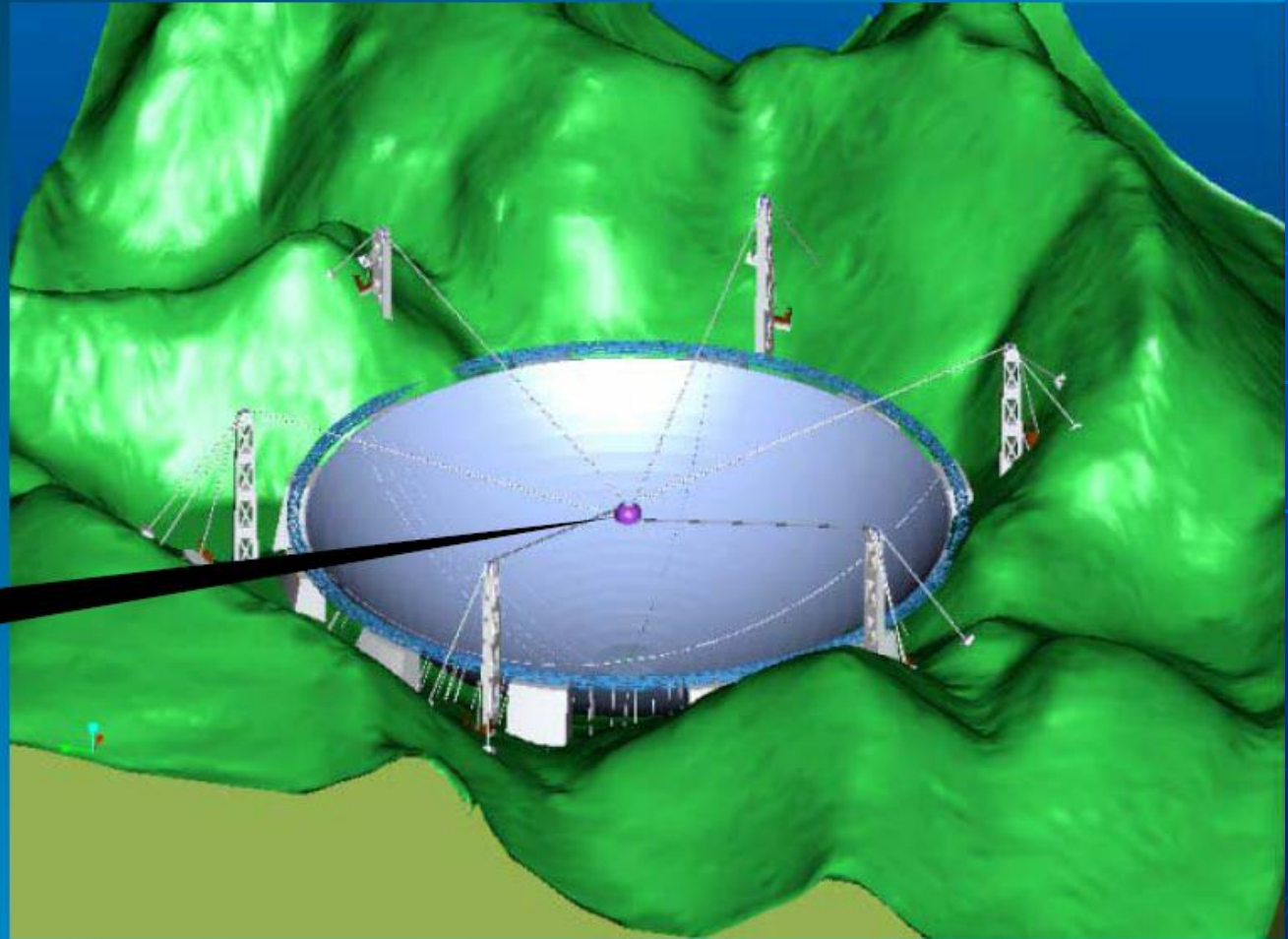
Yellow: plan



FAST

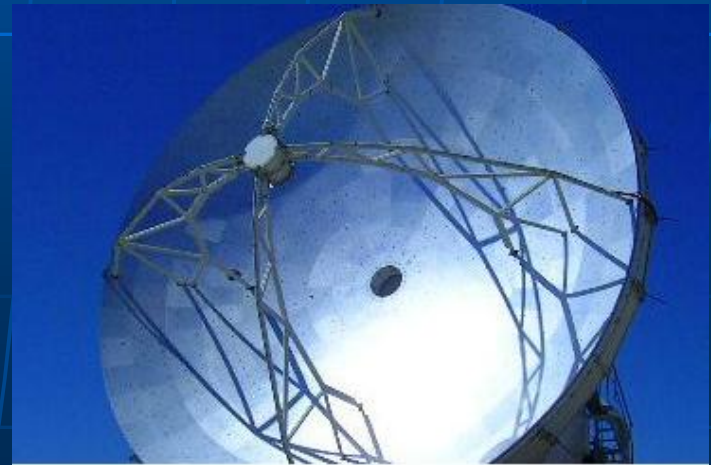
(Five hundred meter Aperture Spherical radio Telescope)

Site
Active reflector
Feed support
Measurements
Receiver



Taiwan

- Project of Submillimeter VLBI
 - ALMA prototype antenna (12m, $\sim 30\mu\text{rms}$) will be moved to **Greenland**.
 - 230/350 GHz VLBI
 - ALMA, SMA, LMT, CARMA.....



East Asia VLBI consortium
(under East Asia Core
Observatory Association)
2004~

Japanese VLBI network

Korean VLBI network

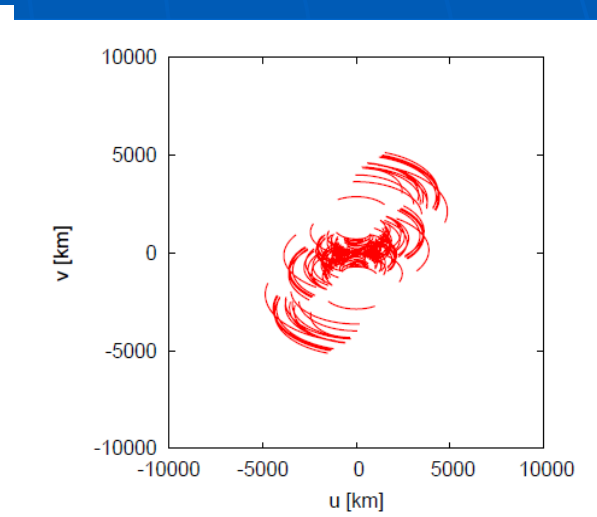
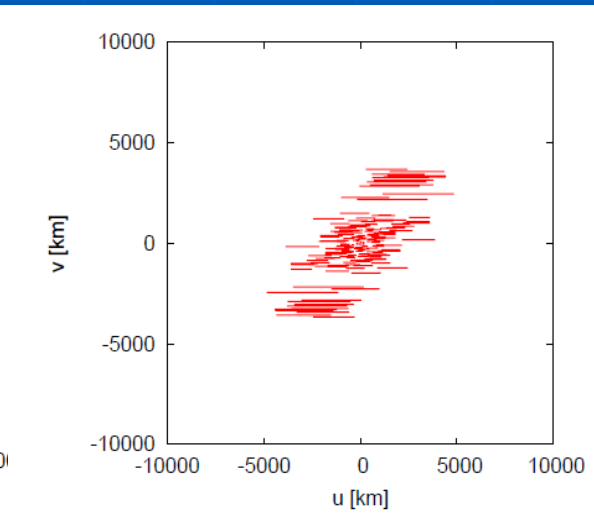
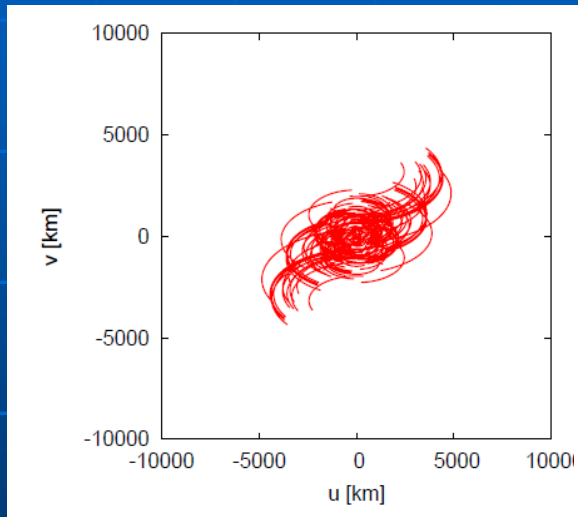
Chinese VLBI
network

VERA

Total effective aperture and baseline length

VLBI array	EAVN	VLBA	EVN
No. of Stations	20	10	12
Baseline length	5,000km	8,000km	2,000km-8,000km
Effective Aperture @8GHz	9,000m ²	3,700m ²	9,800m ²
Effective Aperture @22GHz	4,900m ²	3,200m ²	4,900m ²
Effective Aperture @43GHz	1,400m ²	2,900m ²	1,800m ²

UV-coverage by EAVN



Declination +30 deg.

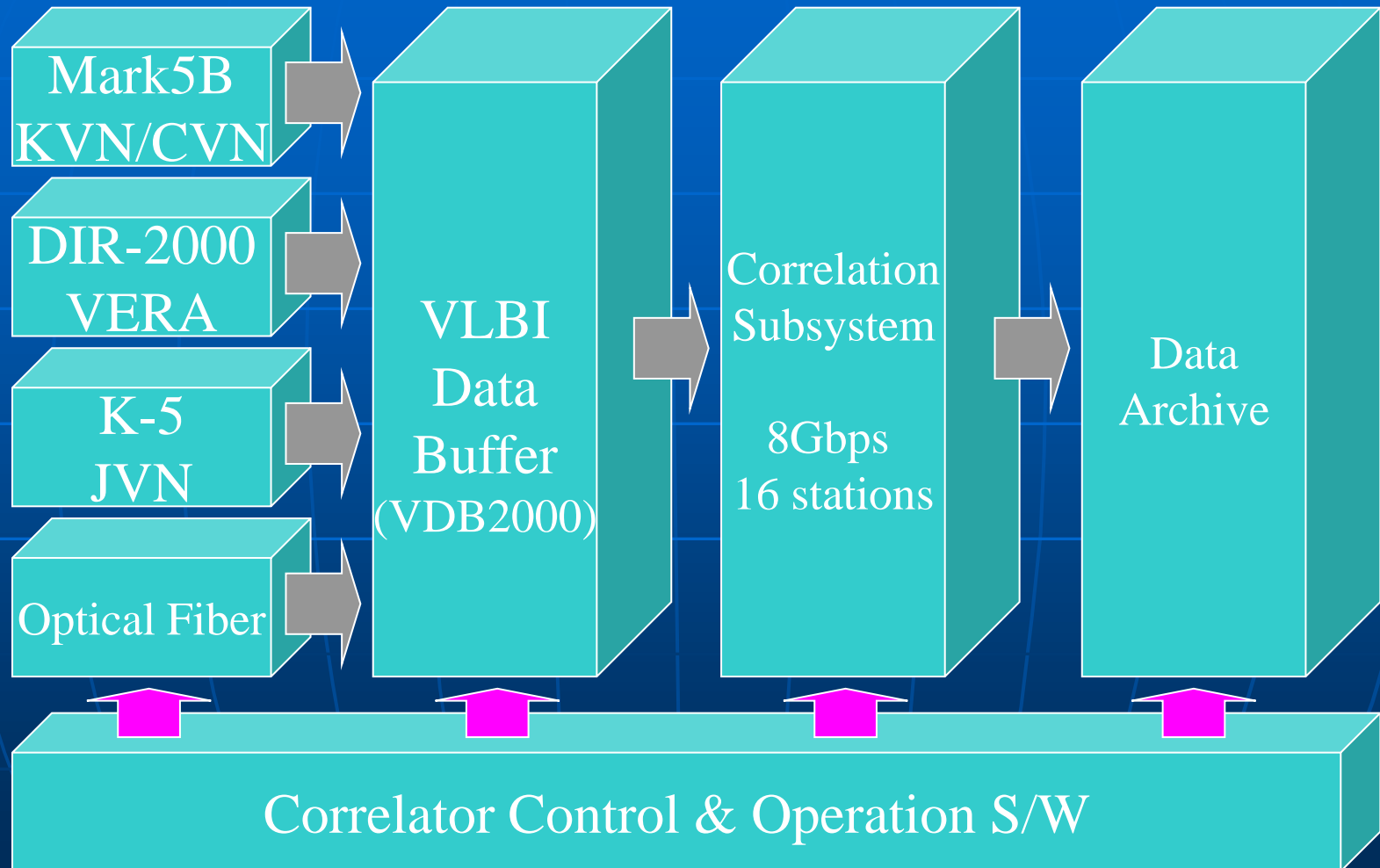
0 deg.

-30 deg.

Observation features

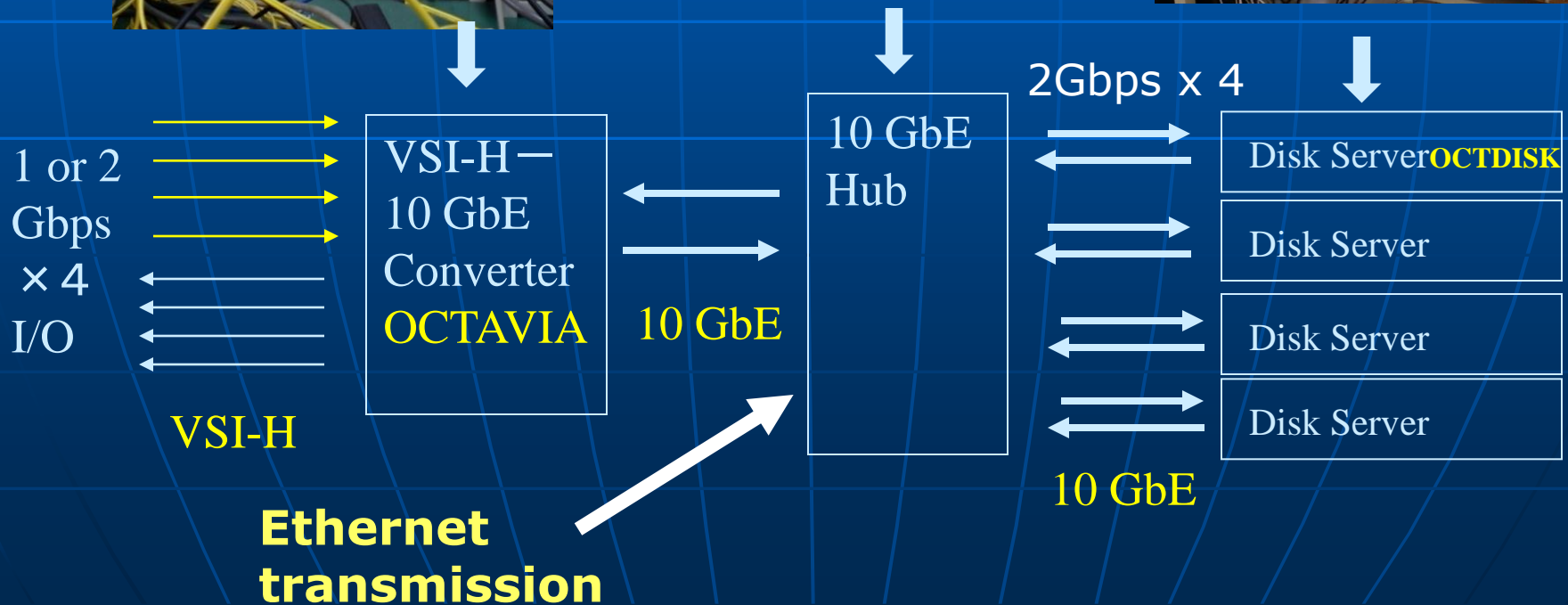
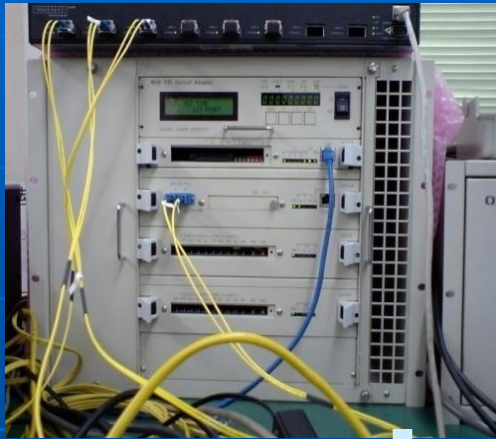
- Phase referencing observations
 - VERA 2 beam
 - KVN multi-frequency
 - Nodding
 - > high sensitivity observations for low Tb objects (RQQ, SNR, Galactic objects)
 - > astrometry for maser sources (H₂O, SiO, CH₃OH..)
- High dynamic range observations
 - 6GHz, 8GHz and 22GHz mainly
 - 86GHz and 129 GHz with 4(+1) stations

New Seoul correlator for KVN/EAVN



From 2012, operation was started !

OCTAVE (8Gbps Disc recorder)



Schedule

- 2010-2011
 - Test Observations with VERA+KVN, JVN+CVN
- 2011-2012
 - Start of science observations with Japan (VERA,JVN) +Korea (KVN), and Japan(JVN)+China(CVN).
- 2013
 - Start of science observations with Japan, Korea and China

Current Issues

- Some science commissioning has started.
 - Should we consider the open use soon?
- We need science operation policy between project based program and open use program.
- We need some scheme to organize project based program considering how non-VLBI scientists are involved and VLBI scientist can propose to other instruments.

propose observatory and correlator meeting as extended consortium meeting

- How much telescope/correlator time can be shared for EAVN?
- What observation bands/recorder are available?
- What is performance of each telescope? (T_{sys} , Antenna Gain,.....)
- What is the operational limitation for EAVN observations?

EAVN Consortium

Observatory and
Correlator meeting

Operation G

Engineering G

Call for
proposal/refereeing
Time
allocation/Scheduling
User support

Commissioning
Calibration

Conclusion

- East Asian VLBI Network is organizing with Japan, Korea and China.
- EAVN is comparable array to VLBA and EVN. It has good features for phase referencing and astrometry.
- From 2012, science array observation with Japan, Korea, and China is expected.
- An operation scheme of EAVN is needed soon.