



中国科学院  
CHINESE ACADEMY OF SCIENCES

上海天文台

Shanghai Astronomical Observatory



# The Development of VLBI Technologies in SHAO

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Shanghai Astronomical Observatory  
Chinese Academy of Sciences

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6th IVS General Meeting, Feb. 8-13, 2010



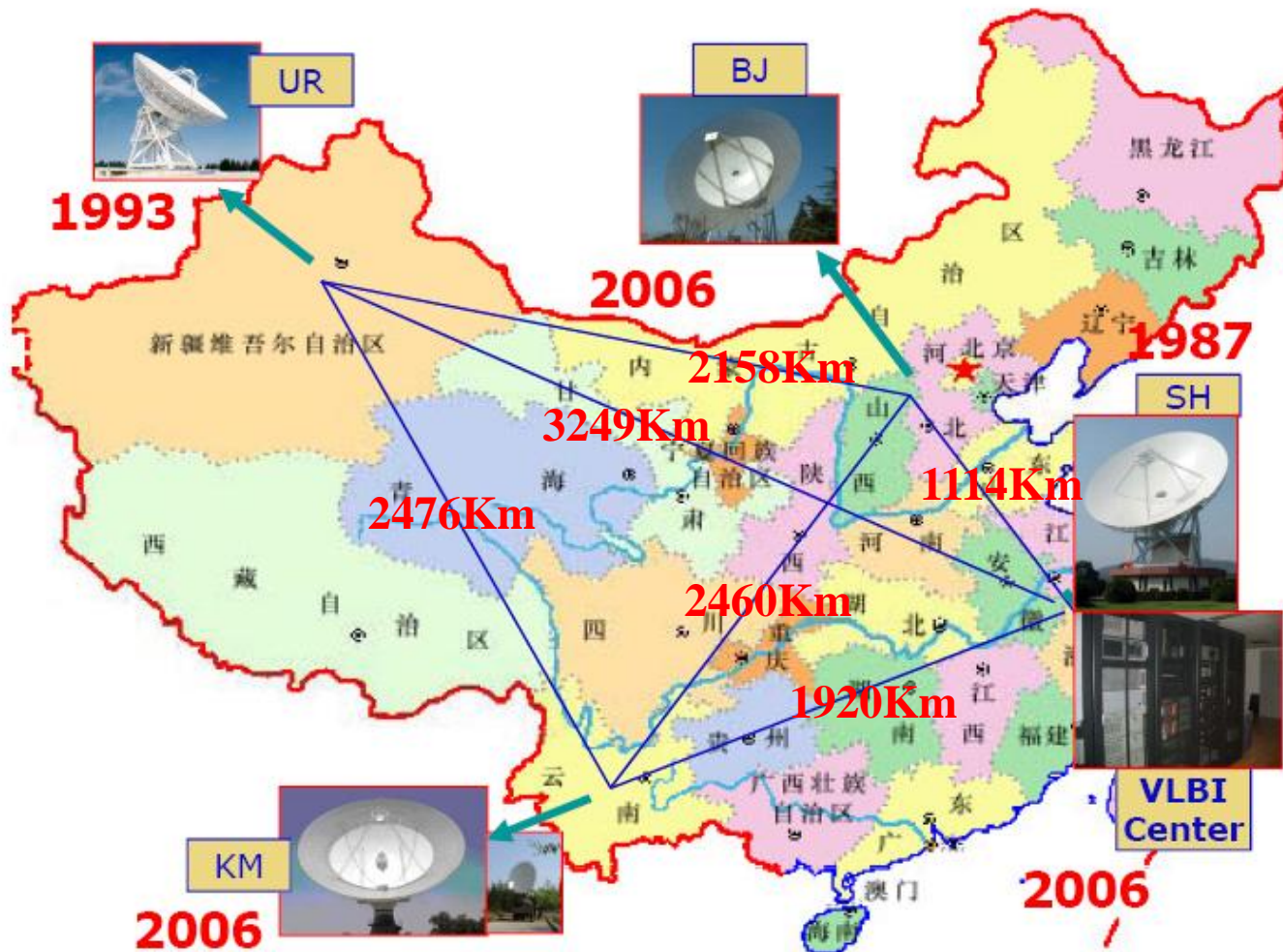
# Outline

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- 1. VLBI Network in China**
  - 2. The Data Acquisition System**
  - 3. The Correlators**
  - 4. New Antenna**
  - 5. eVLBI**
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# 1. VLBI Network in China





## Shanghai (sheshan station)

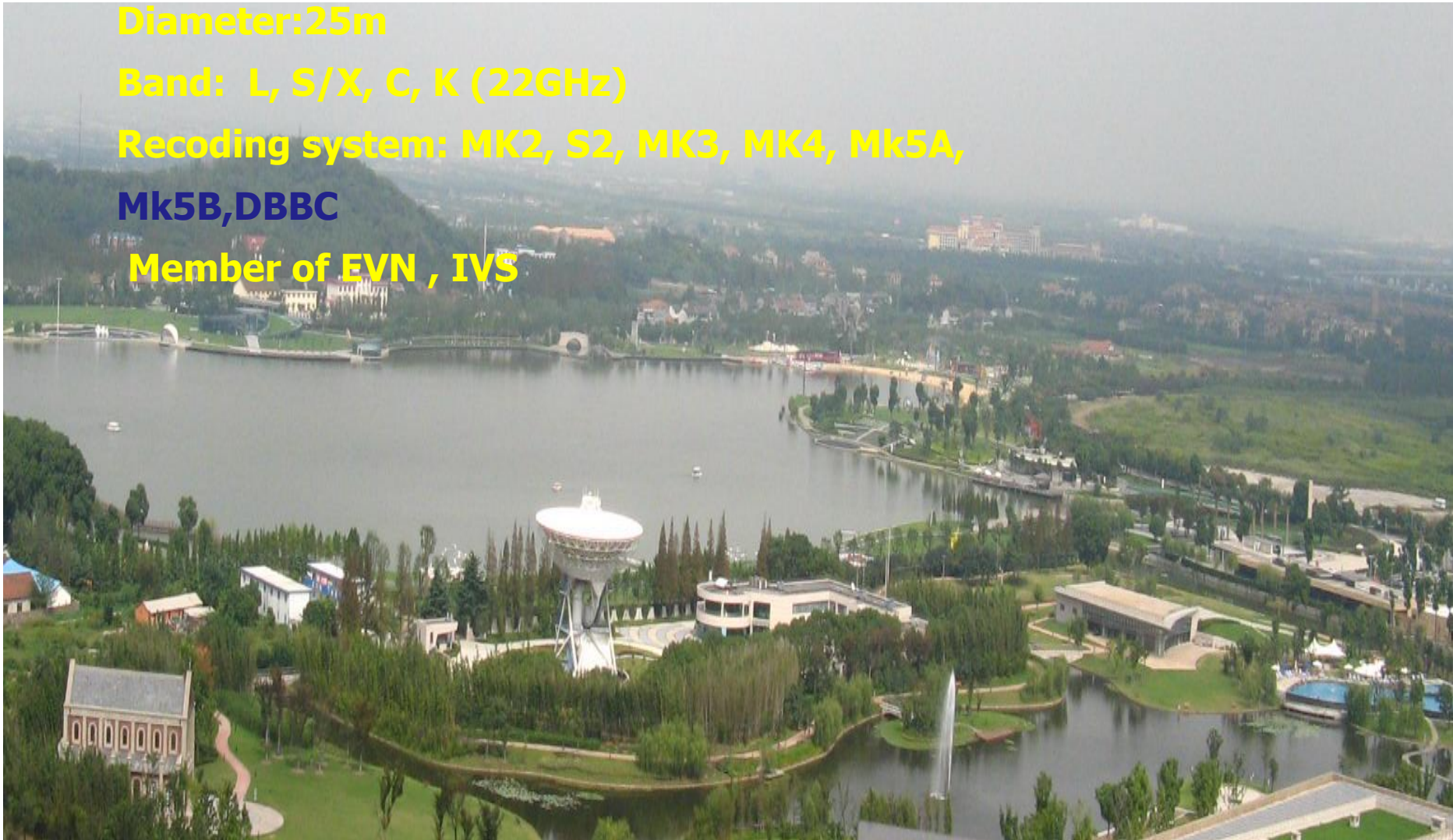
**Diameter: 25m**

**Band: L, S/X, C, K (22GHz)**

**Recording system: MK2, S2, MK3, MK4, Mk5A,**

**Mk5B, DBBC**

**Member of EVN, IVS**



**Diameter:25m**

**Band: P, L, S/X, C, K(22GHz),  
also 30 and 49 cm**

**Recoding system: MK2, MK3, MK4,**

**K-4, K-5, Mk5A ,Mk5B,DBBC**

**Member of EVN , IVS**





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# The Kunming 40-m Radio Telescope

Diameter; 40m

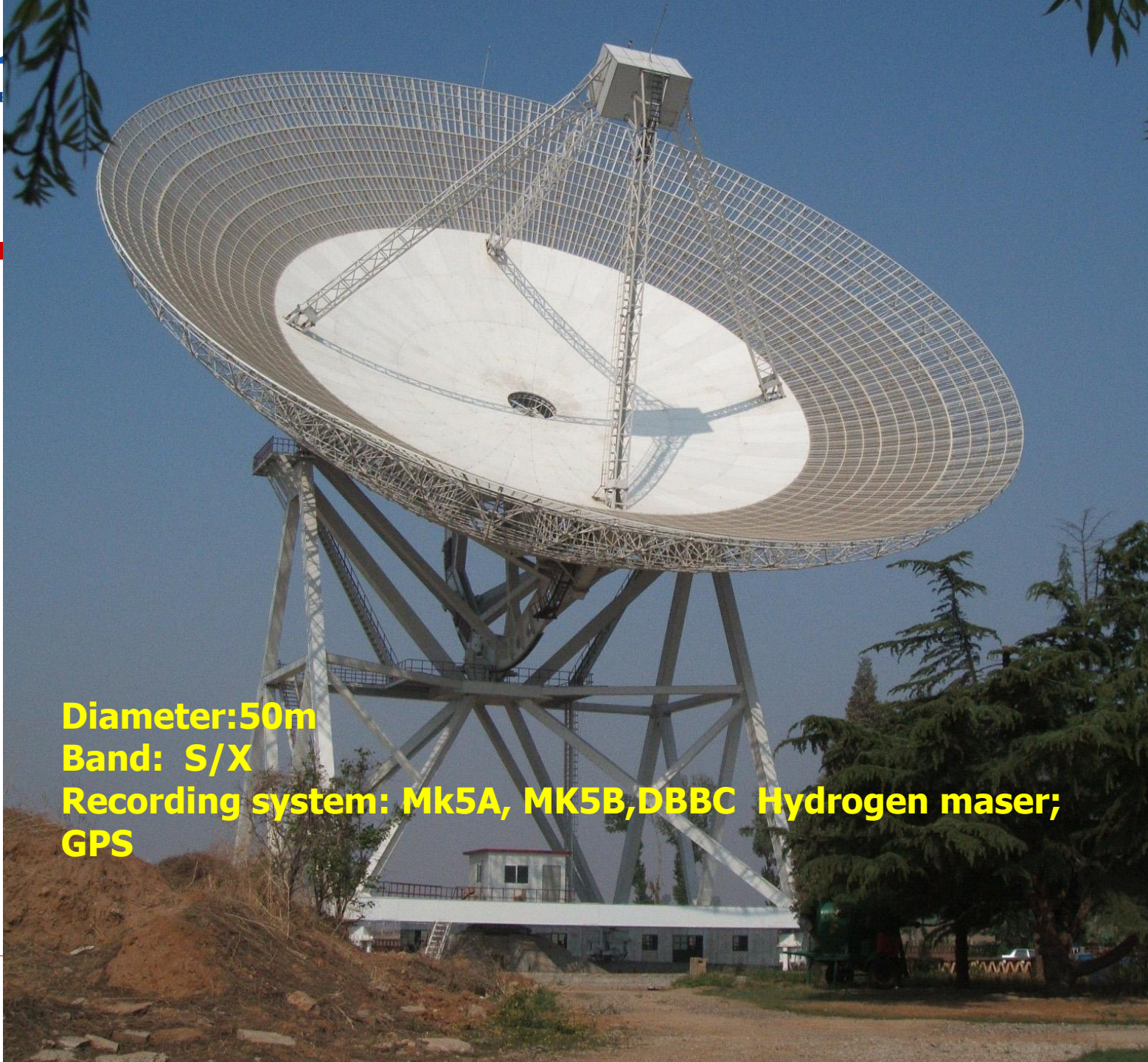
Band : S/X

Recording system: Mk5A,Mk5B,DBBC, Hydrogen maser;  
GPS





**Diameter: 50m**  
**Band: S/X**  
**Recording system: Mk5A, MK5B, DBBC Hydrogen maser;**  
**GPS**





# CVN --VLBI data processing center

**Hardware correlator (5 stations)**

**Software correlator (10 stations)**

**Output data: CE-1 format**

**FITS format**

**Software for CE-1 data processing**

**(near real time eVLBI, in 5 min.)**







## 2. The Digital Data Acquisition system

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Since year 2007 started to develop

Chinese VLBI Data Acquisition system (CDAS)

**Main characteristics:**

- **four channel Ifs input, bandwidth of each If : 512MHz,**
- **Min. frequency step: 1Hz**
- **two VSI-H interface to MK5B Disk Array**
- **full compatible FS interface of traditional DAQ (H&S)**
- **PCAL extract and auto-spectrum output**
- **Total power output (each BBC)**
- **cPCI interface for control**
- **Auto/cross - spectrum check for any two selected BBCs**



# Installation in 4 CVN VLBI Stations



SH

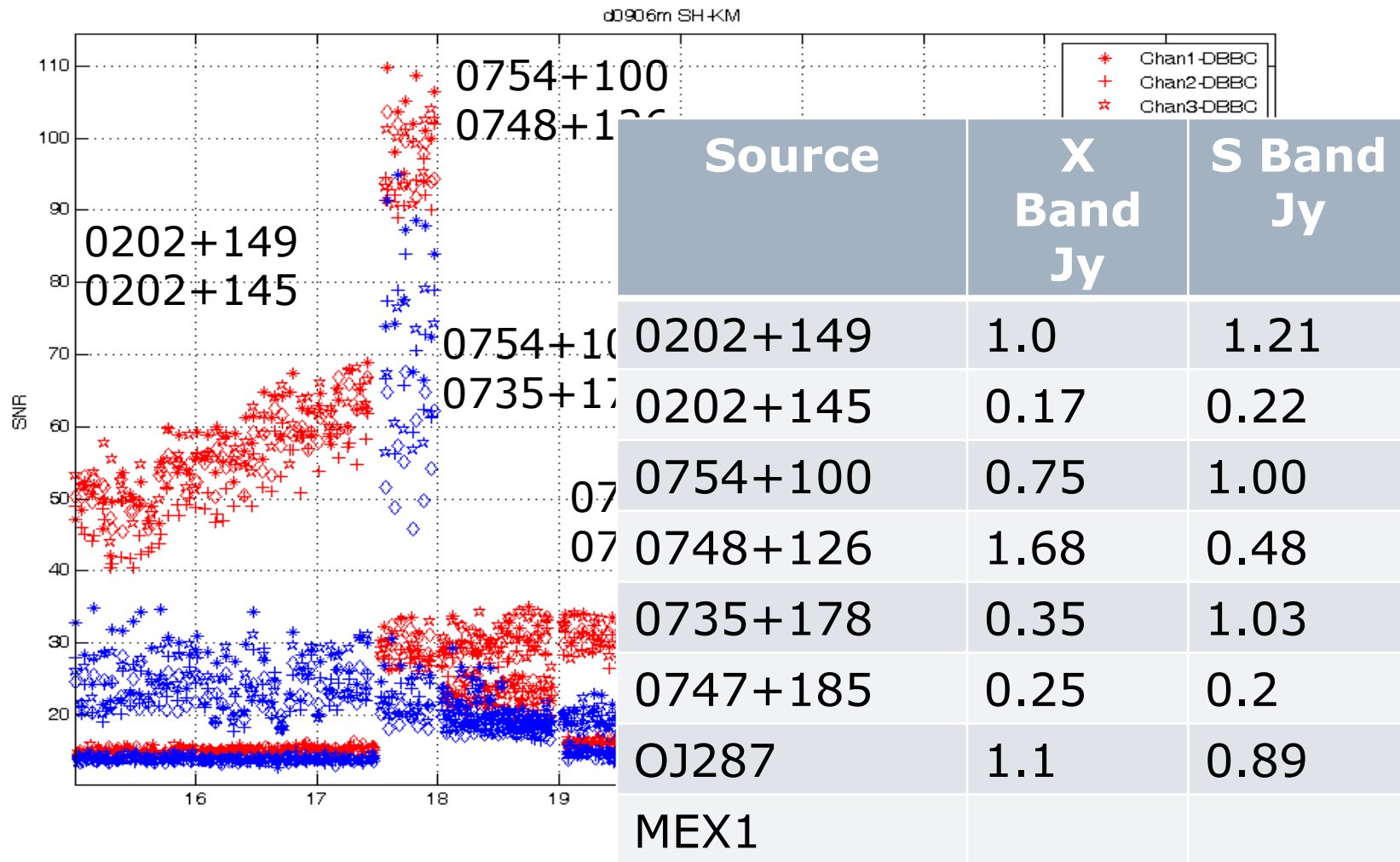
UR

KM

BJ



# SNR Results comparing of different radio source obs.



**More detail, next presentation (S5-T08)**



## 3. The Correlators

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**Existing correlator:**

**Software correlator , (S2-T12)**

**Hardware correlator (5 stations) for CE-1 project**

**For future, we need a new broadband correlator for  
astronomic and geodetic application**

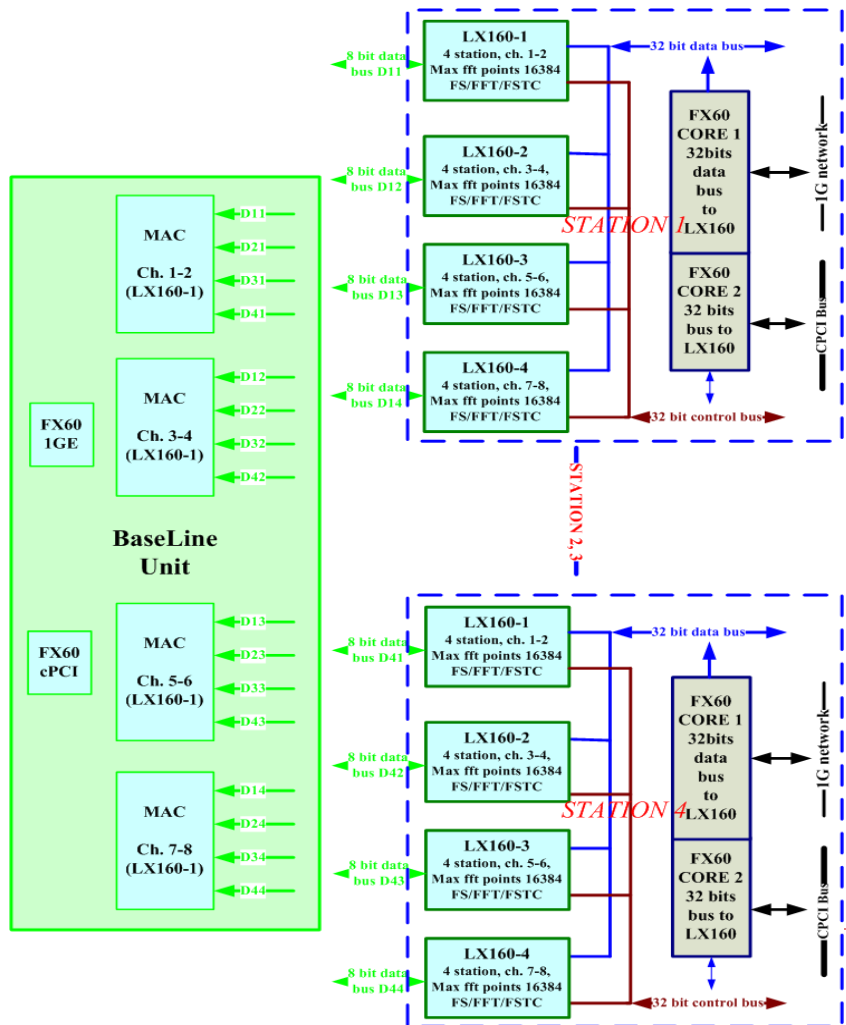
**Prepare for next eVLBI Correlator in SHAO**

**Software Correlator technology (S2-T12)**

**FPGA based Correlator technology(S5-P11)**



# The FPGA based Correlator





# The FPGA based Correlator

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- ✓ **SHAO and JIVE Signed the MoU about SHAO joint the Design and Development of UniBoard in last week**
  - ✓ **UniBoard for a platform of next generation eVLBI Correlator**
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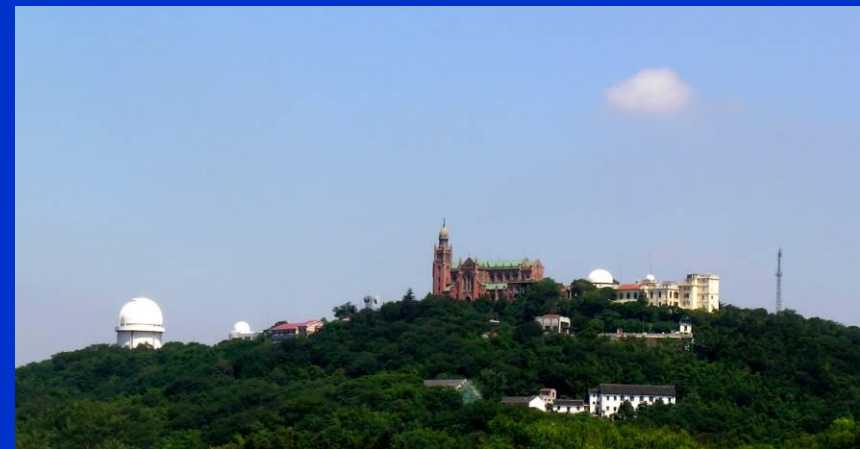


## 4. New Antenna

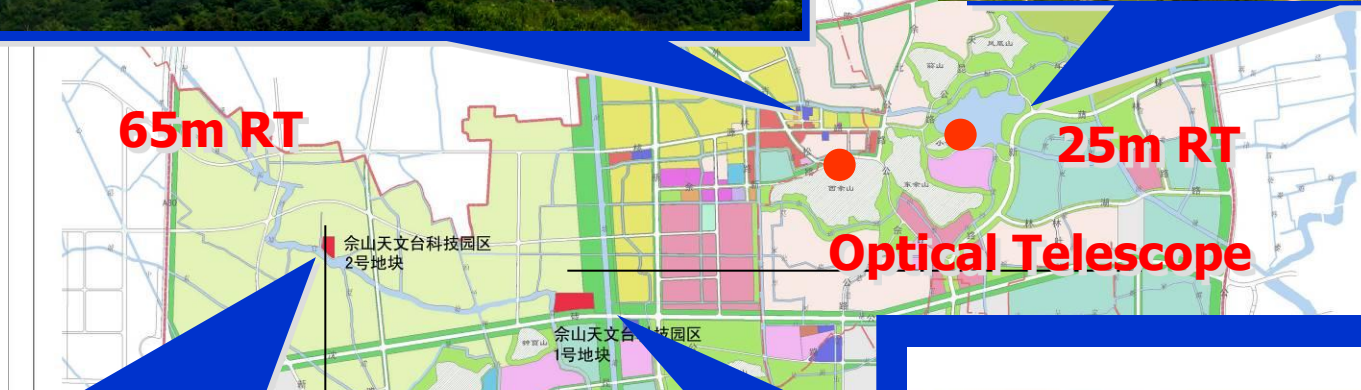
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**With the support of Shanghai local government, Chinese Academy of Sciences and Chinese Lunar project, SHAO will build a new telescope.**

- **2008 Project start**
- **2012.9 finish construction, start observation with  
S/X, L, C band**
- **2015.12 completed full bands and function**



a



区域分析图

图例

- 基地选址
- 公共旅游度假用地
- 体育休闲用地
- 度假宾馆酒店用地
- 旅游服务设施用地
- 一类住宅组团用地

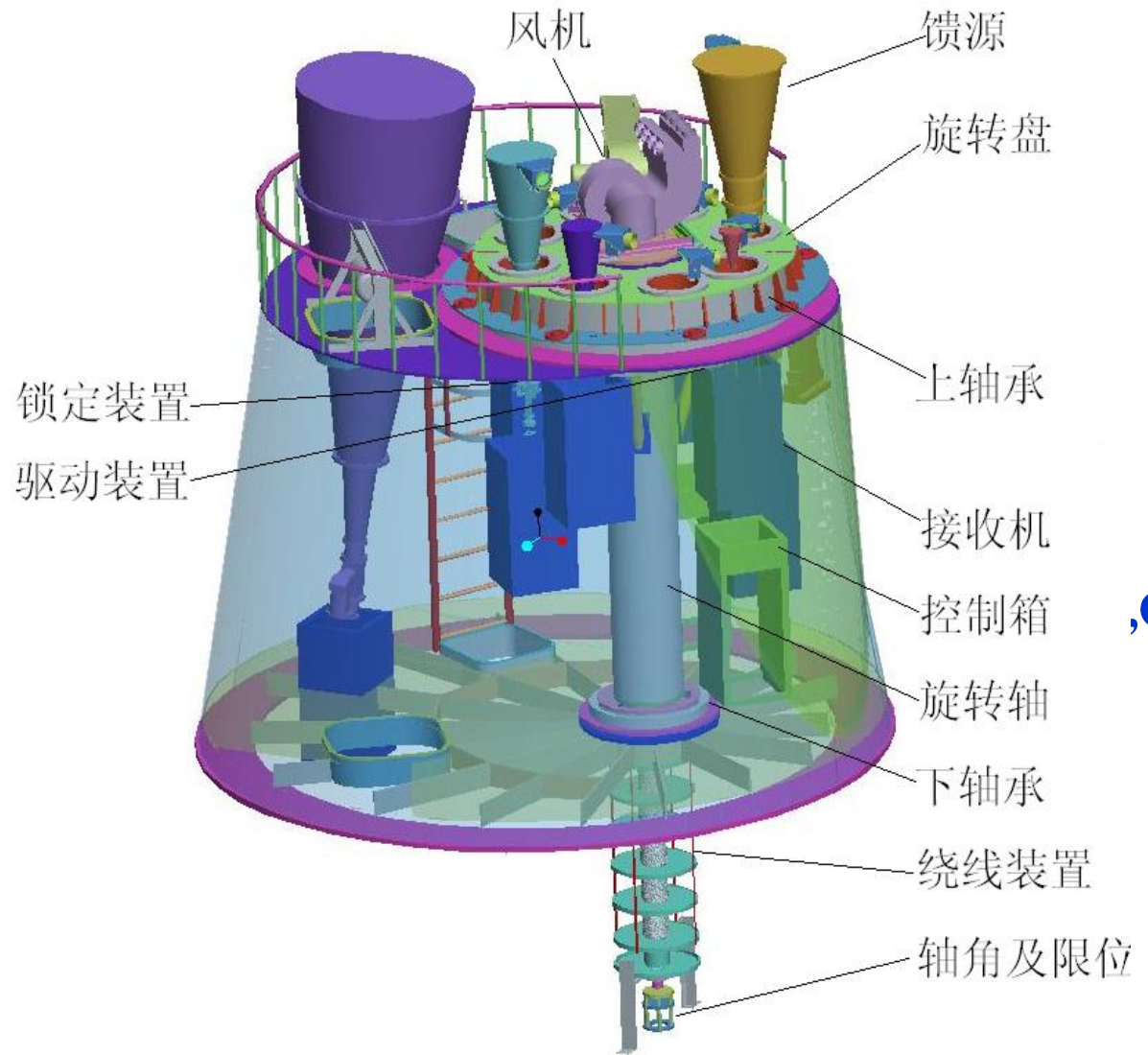
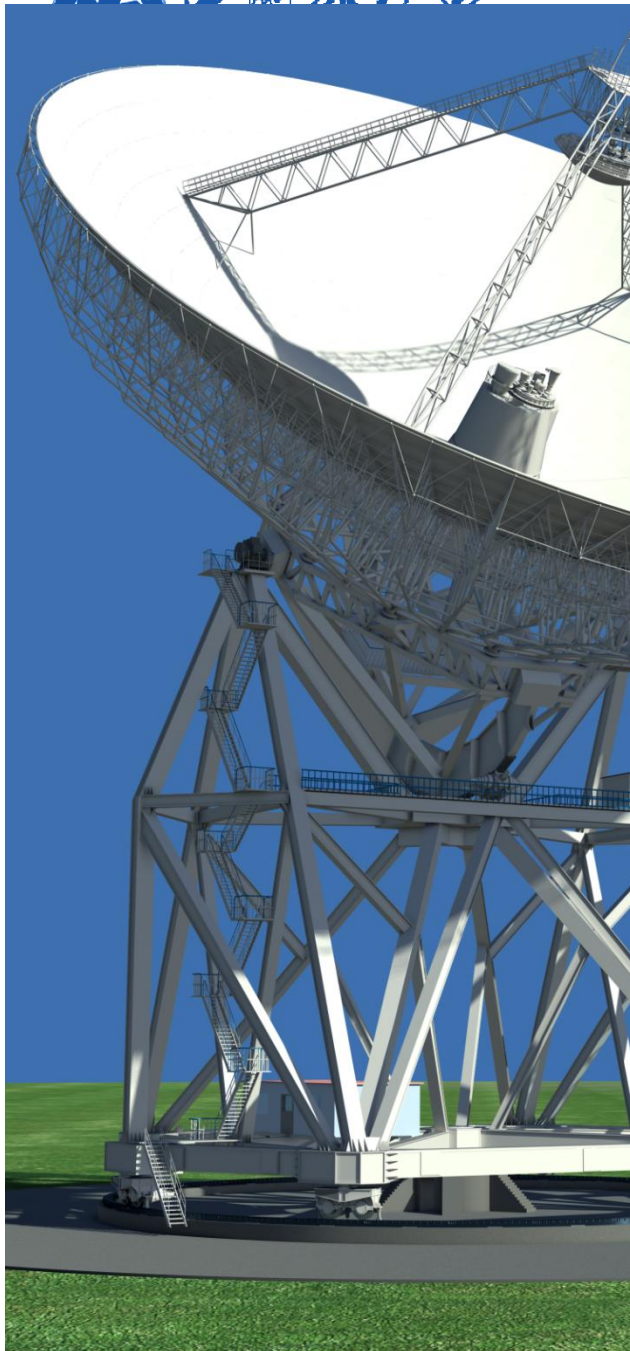


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### Main characteristics:

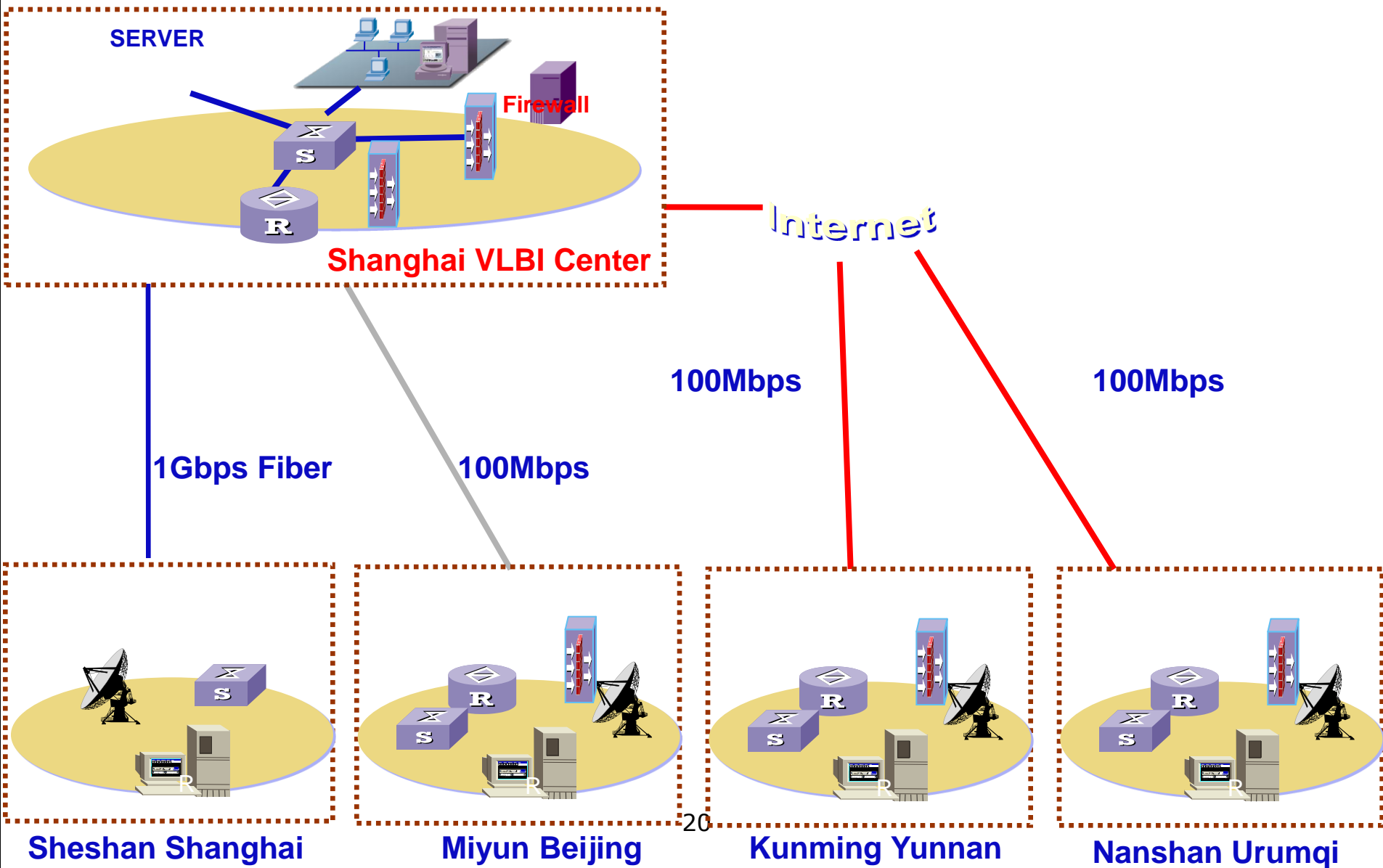




# Shanghai 65m radio telescope location



# 5. E-VLBI





# eVLBI Demo (Supported by CSTNET)



During 7<sup>th</sup>

**April 3, 2009 "100 hours of Astronomy" eVLBI Demo**  
<http://www.100hoursofastronomy.org/>



# EVN Monthly e-VLBI observation (Sheshan)

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DATE	CODE	BAND (cm)	TIME (UT)	DUR	CORRELATOR
20091201	eEVN-test	6	09:00--13:00	4	JIVE
20091210	eEVN-test	6	09:00--13:00	24	JIVE
	eEVN-EL039A	6	13:00--14:45	2	JIVE
	eEVN-EG047A	6	14:45--20:45	6	JIVE
	eEVN-EL039A	6	20:45--DEC11 00:15	4	JIVE
	eEVN-RP014C	6	00:15--06:15	6	JIVE
	eEVN-EL039A	6	06:15--06:45	0.5	JIVE
	20091221	IVS-R1410	13/3.6	17:00--DEC22 17:00	24
20091228	IVS-R1411	13/3.6	17:00--DEC29 17:00	24	BONN

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**Thank you**

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