



# the Progress of Seshan VGOS Station

Guangli Wang

中国科学院上海天文台

Shanghai Astronomical Observatory  
Chinese Academy of Sciences



# the Determination of Seshan VGOS Station Location



ShVGOS station located near Tianma 65m telescope

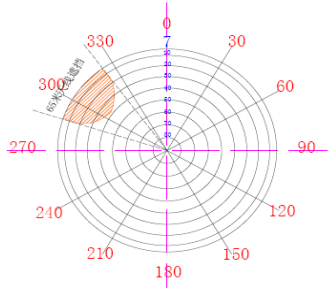
Seshan25 VLBI station location

中国科学院上海天文台

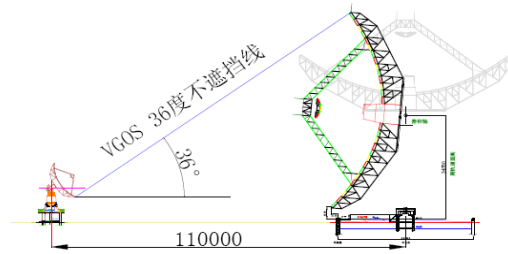
Shanghai Astronomical Observatory  
Chinese Academy of Sciences

**Earlier planned to place**

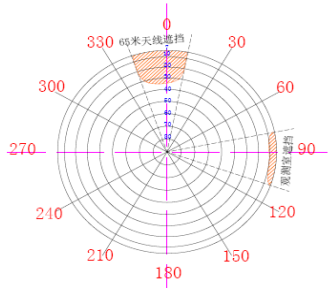




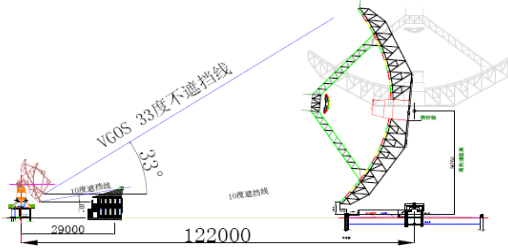
1号点遮挡区域



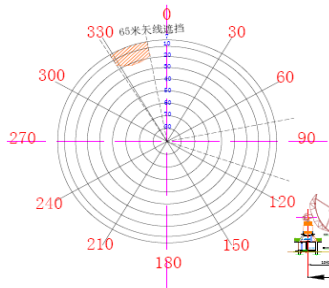
1号点VGOS遮挡示意图



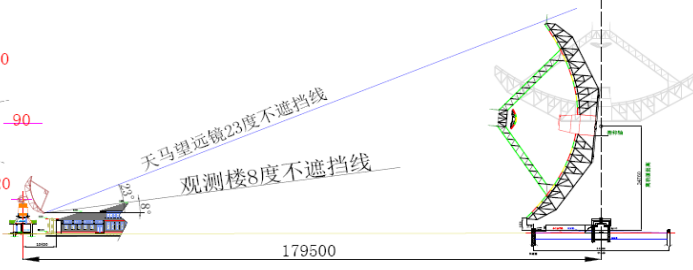
2号点遮挡区域



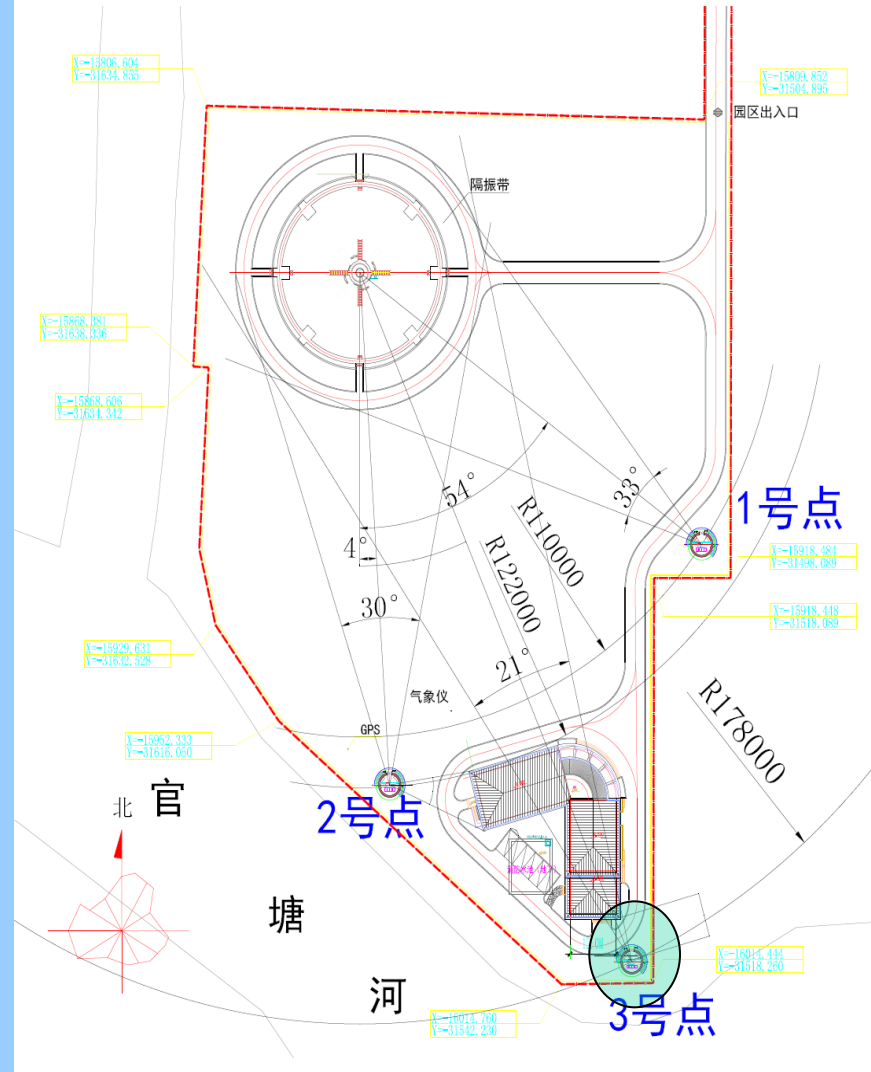
2号点VGOS遮挡示意图



3号点遮挡区域



3号点VGOS遮挡示意图

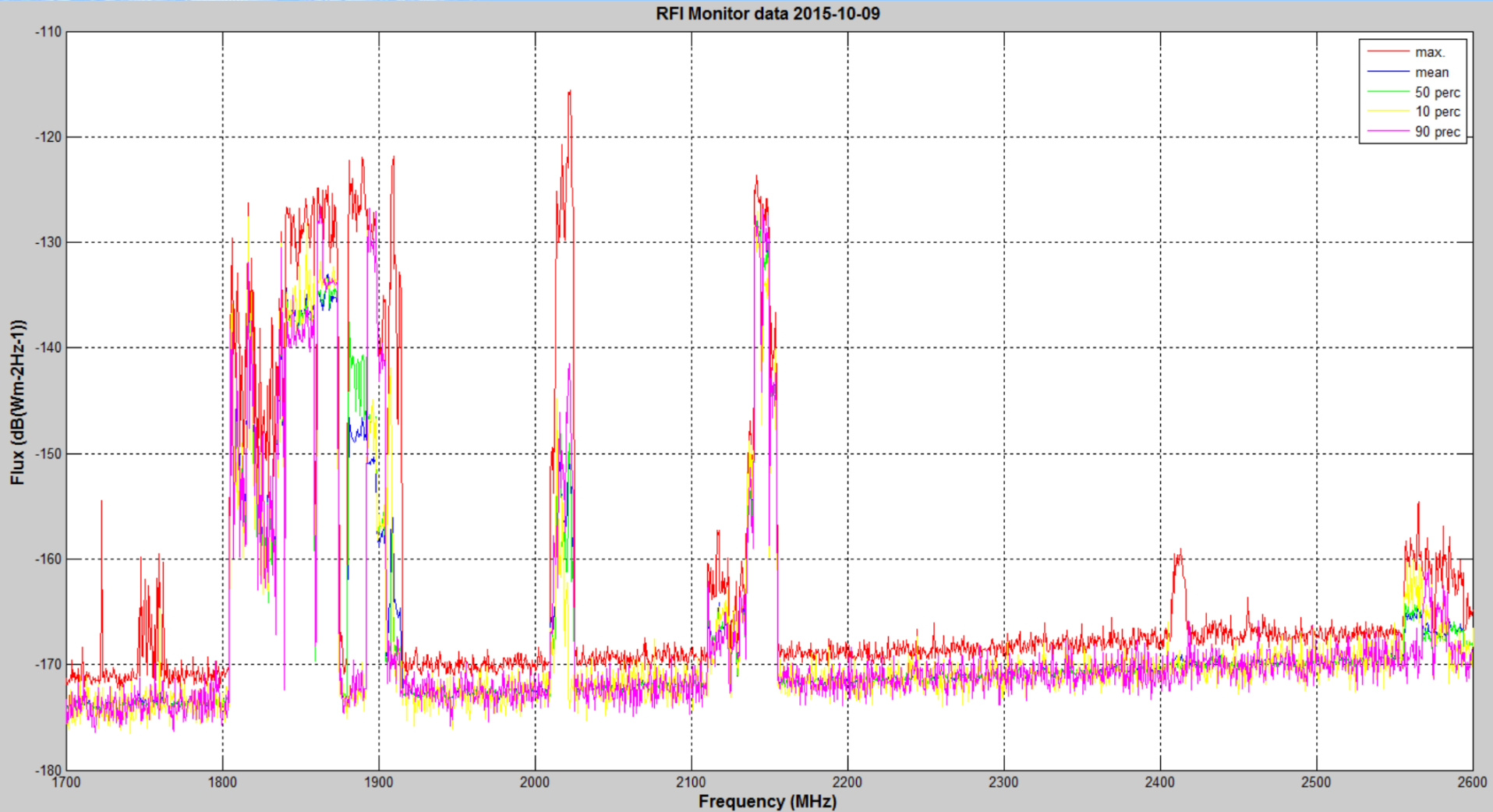


**Ant. Tower High: 11.3m**  
**Distance from 65m telescope: 178m**  
**Sight blockage: H21° V23° @23° NW**



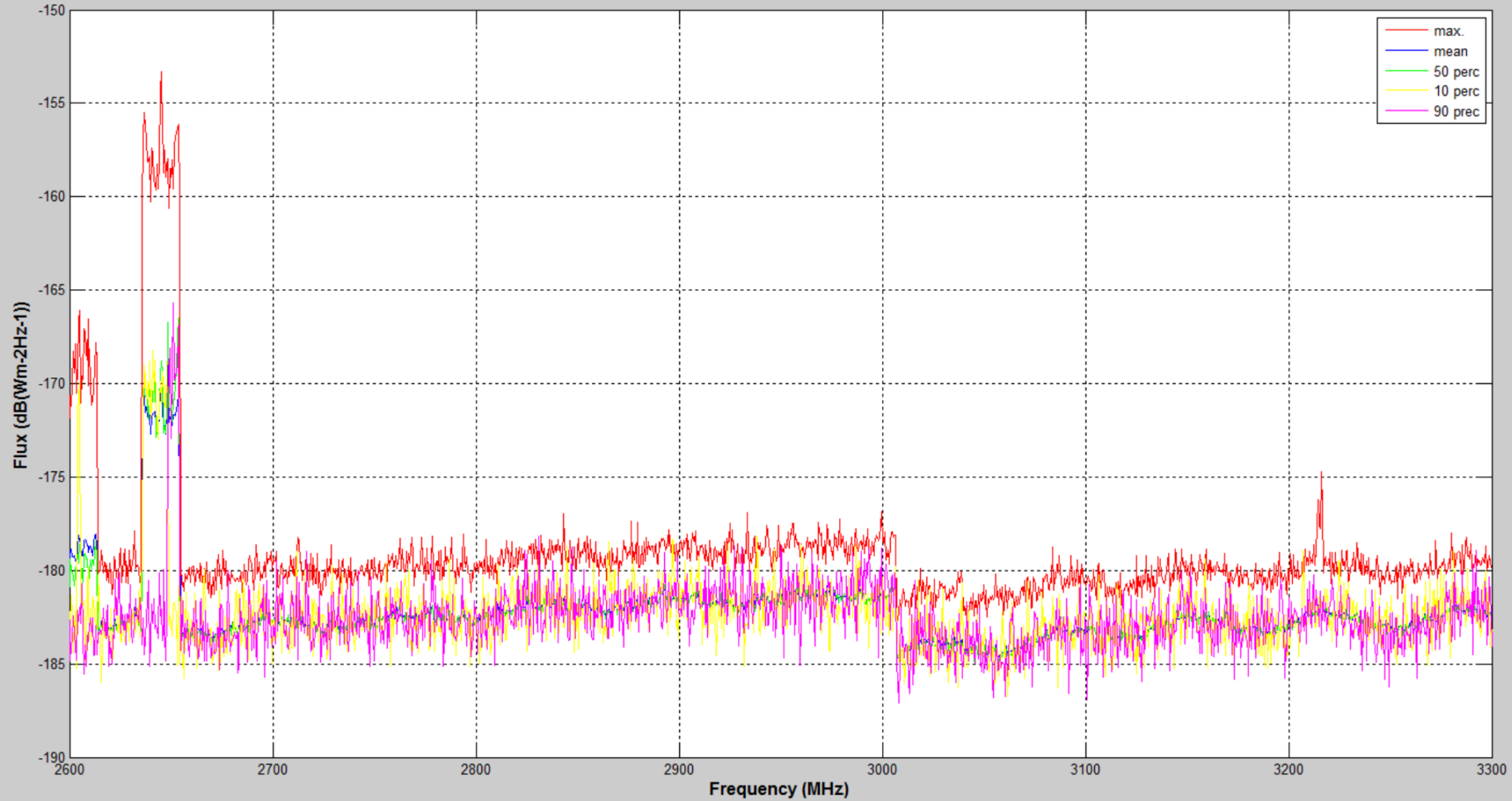


# RFI measured on Oct.9 2015





RFI Monitor data 2015-10-09

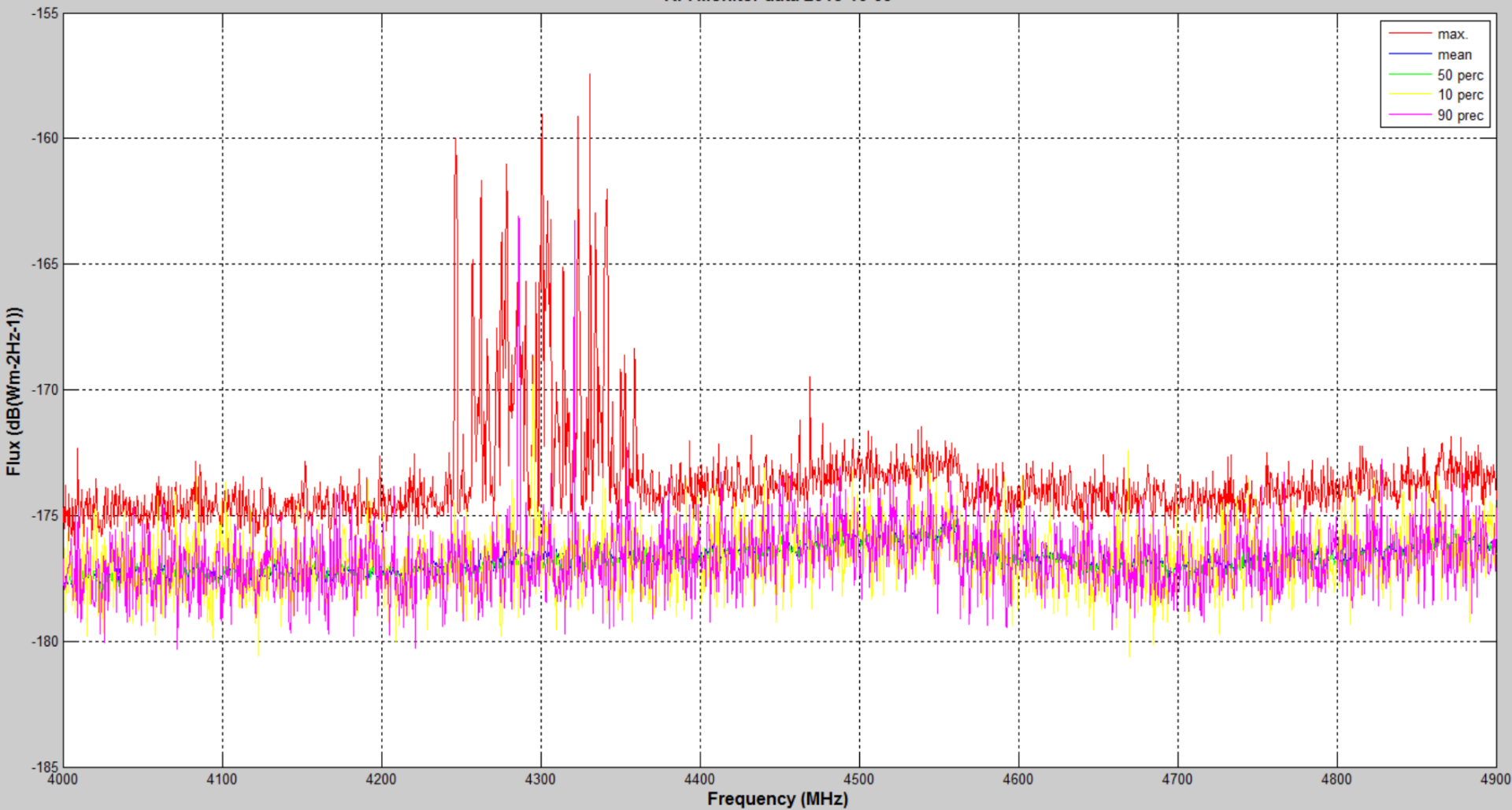


中国科学院上海天文台

Shanghai Astronomical Observatory  
Chinese Academy of Sciences



RFI Monitor data 2015-10-09



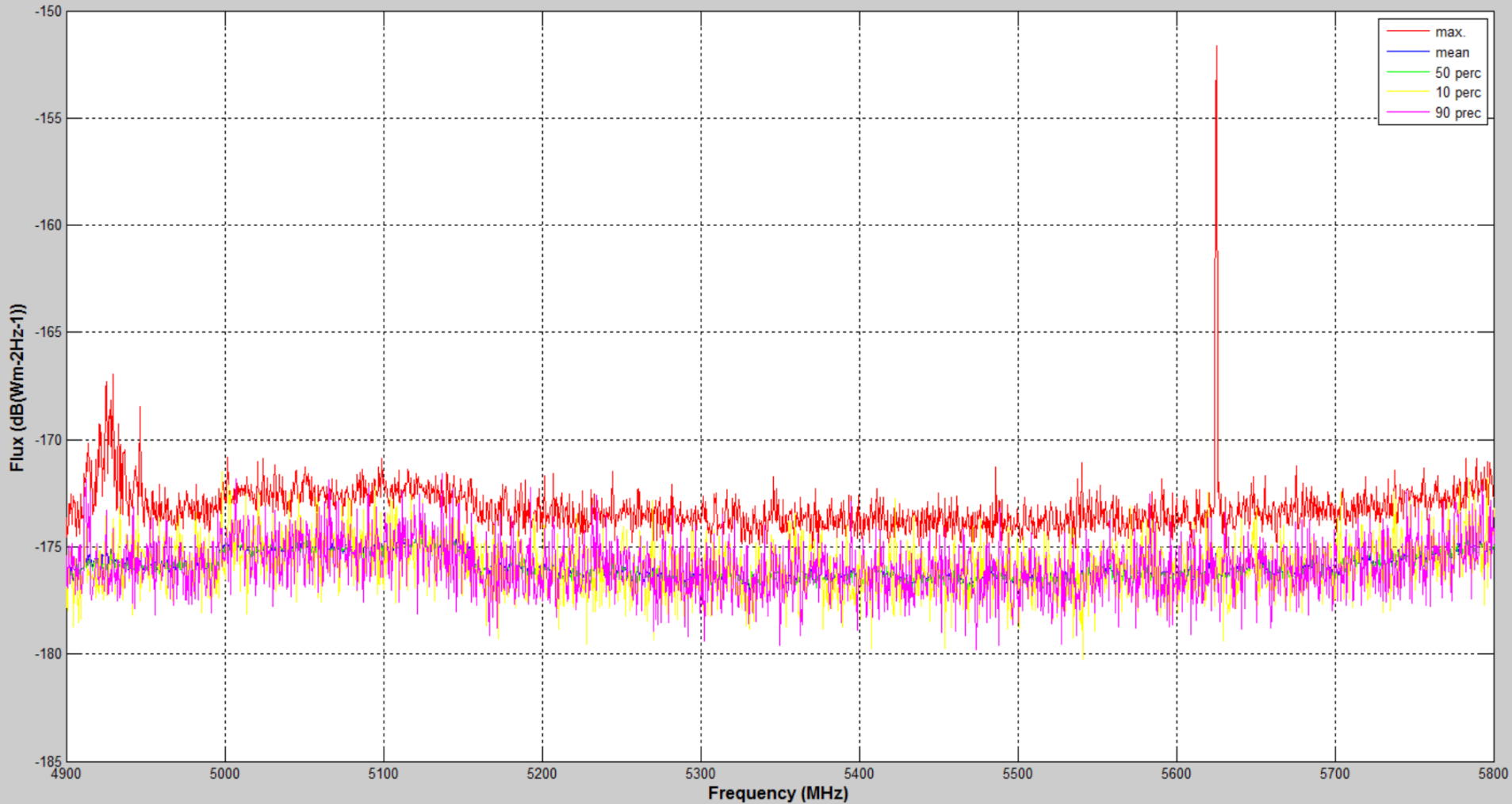
中国科学院上海天文台

Shanghai Astronomical Observatory  
Chinese Academy of Sciences





RFI Monitor data 2015-10-09



Feed Frequency: 2.7GHz—15.5GHz

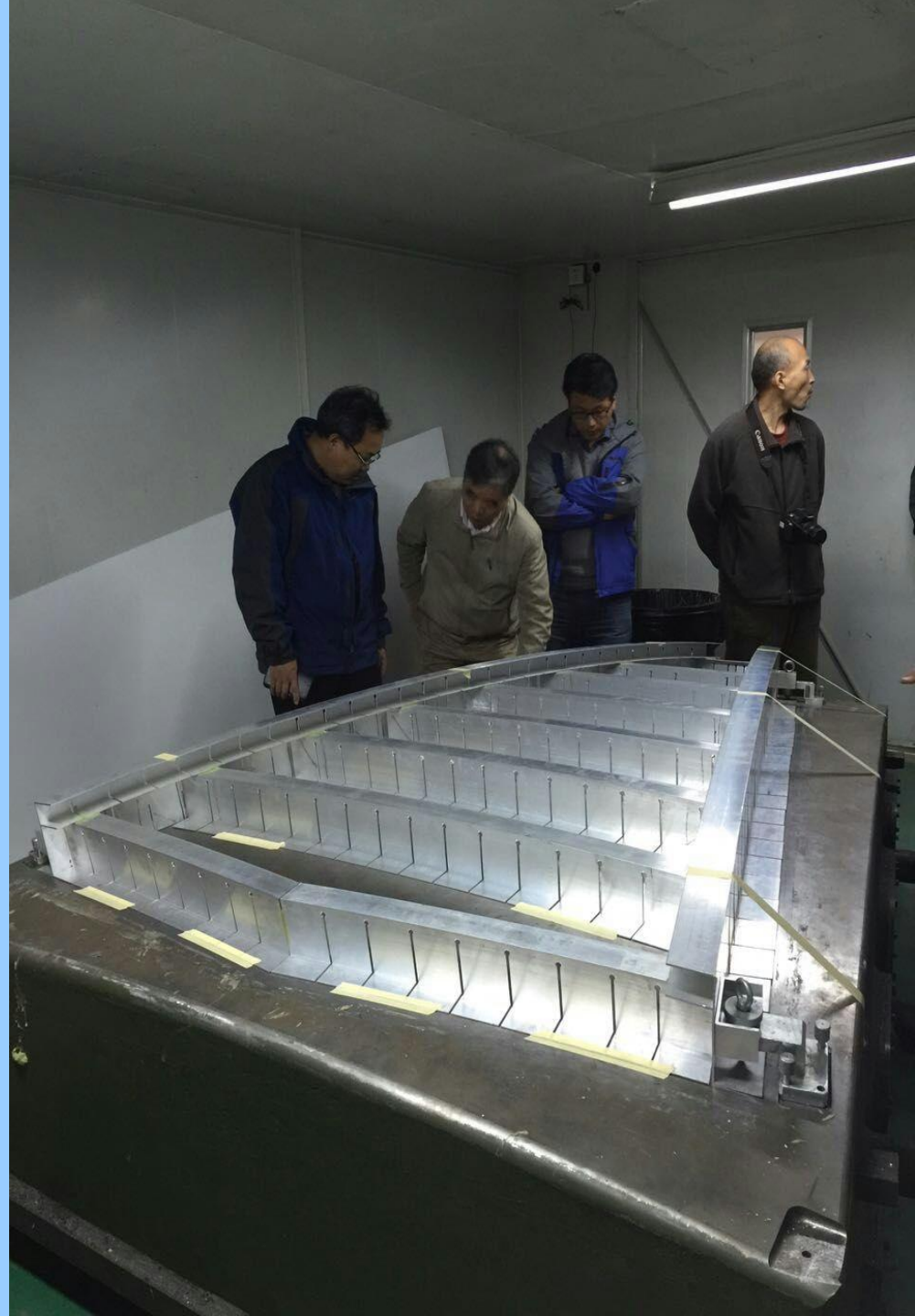
中国科学院上海天文台

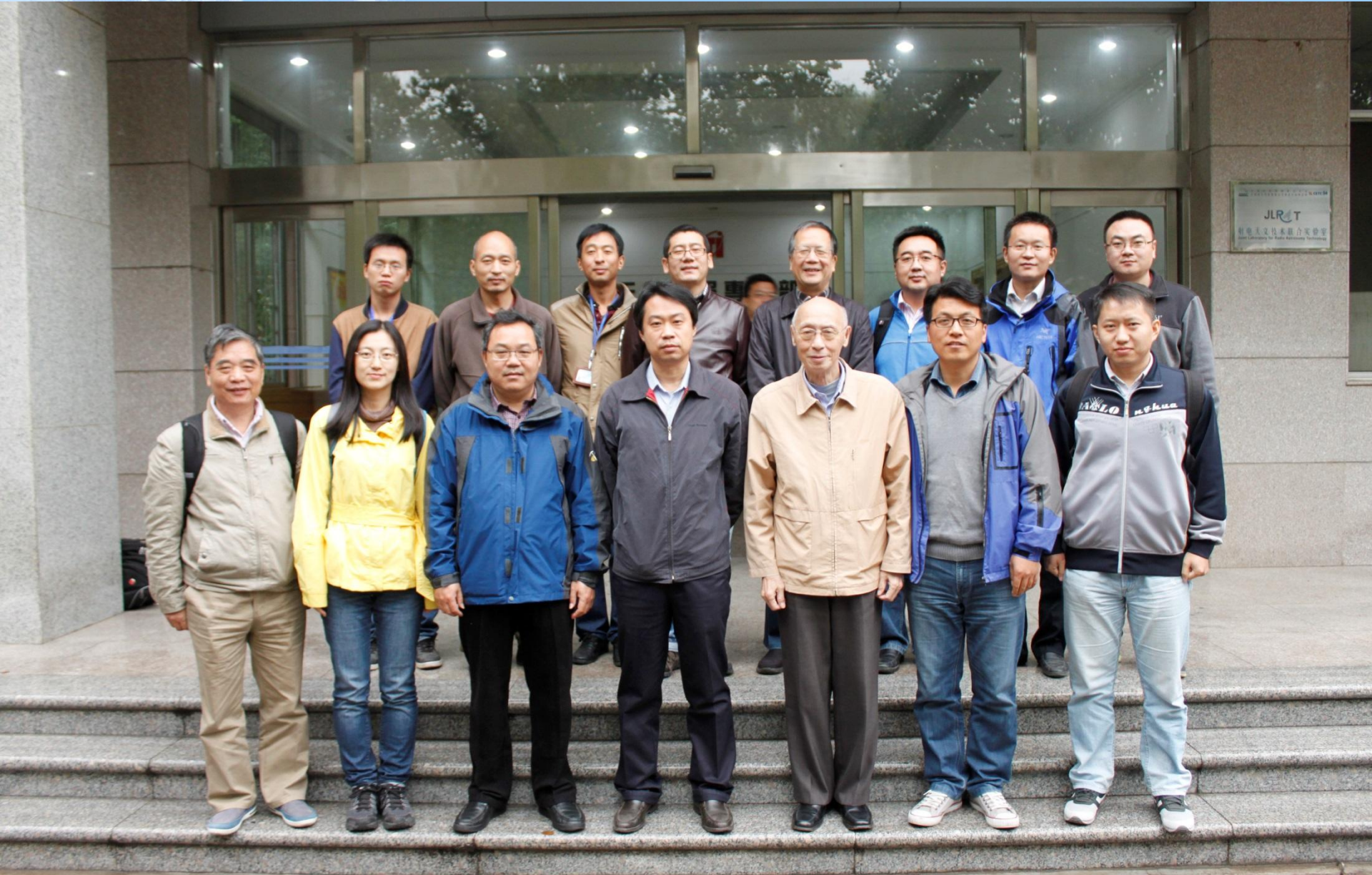
Shanghai Astronomical Observatory  
Chinese Academy of Sciences



# The Antenna Construction

- The antenna is being constructed by a Chinese company CETC 54.
- Similar design as Onsala VGOS station with some modifications considering geological difference.





2015.10.22 @ CETC 54

中国科学院上海天文台

Shanghai Astronomical Observatory  
Chinese Academy of Sciences



# On-site Investigation for future antenna assembling and installation



中国科学院上海天文台

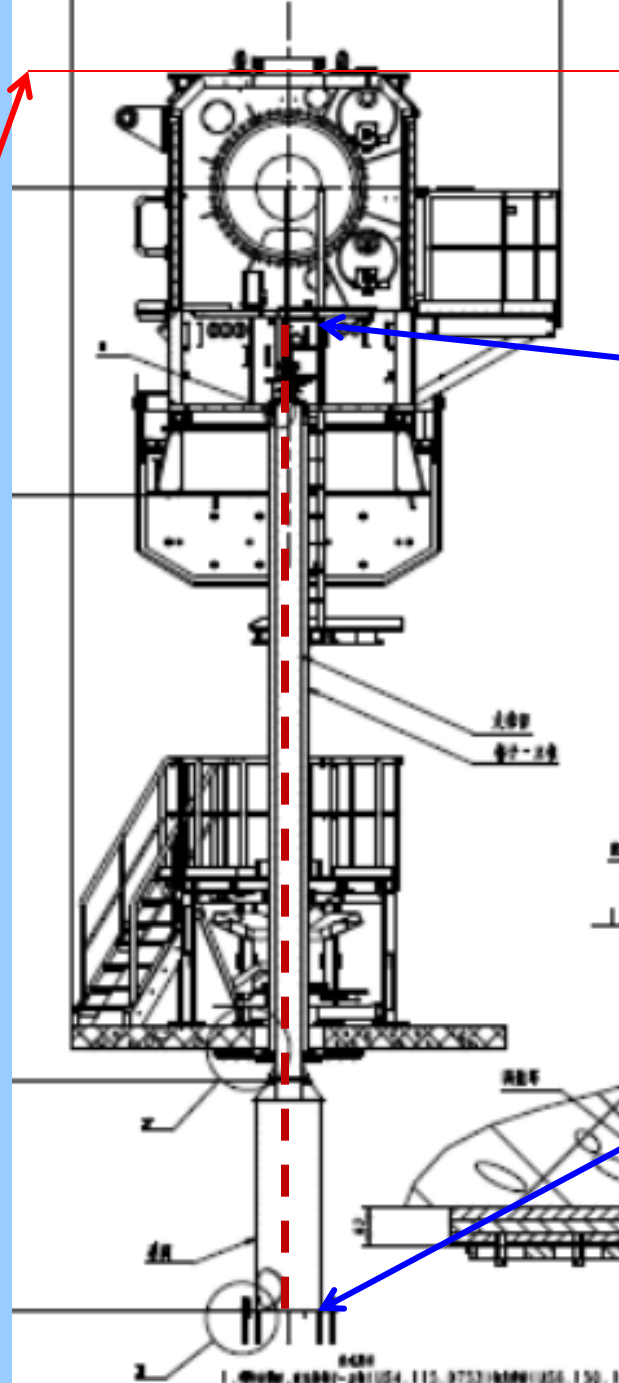
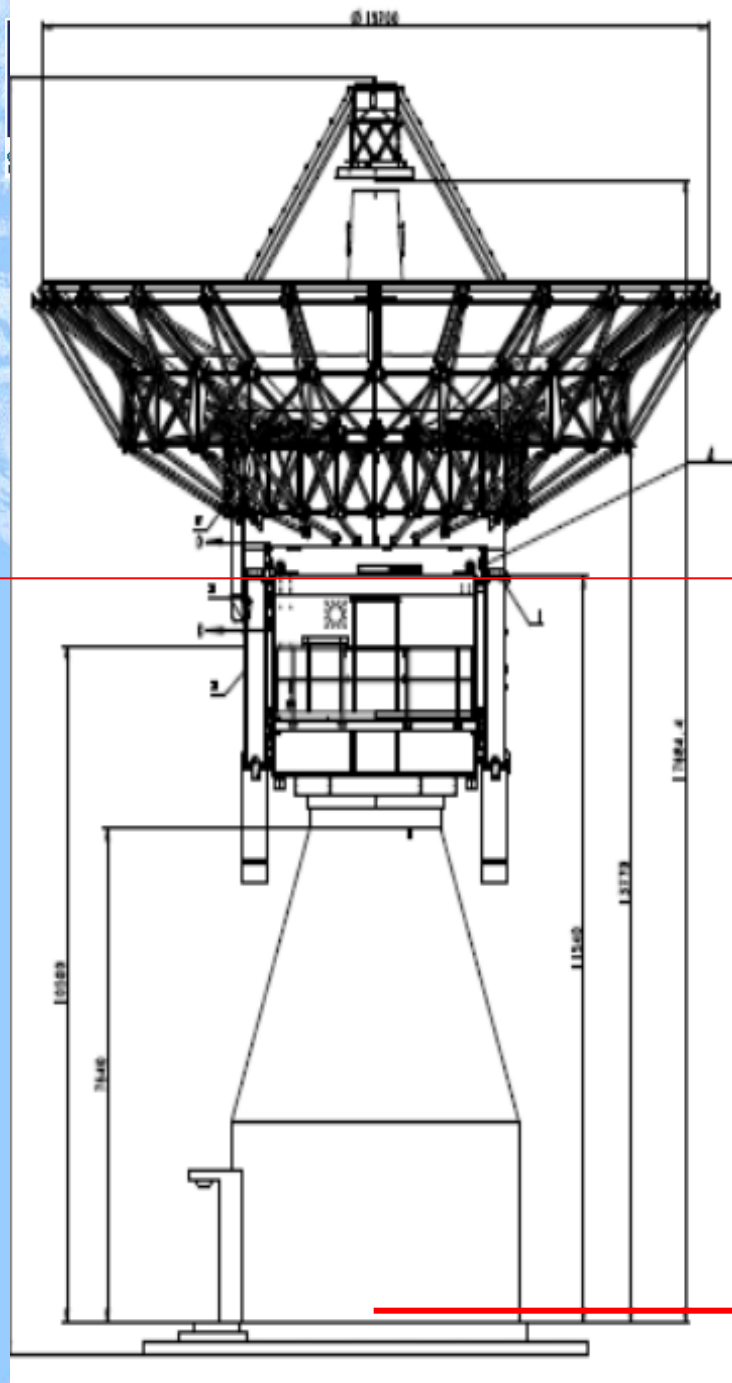
Shanghai Astronomical Observatory  
Chinese Academy of Sciences



# The Consideration of Reference Point Real-time Monitoring

中国科学院上海天文台

Shanghai Astronomical Observatory  
Chinese Academy of Sciences



omic  
temy

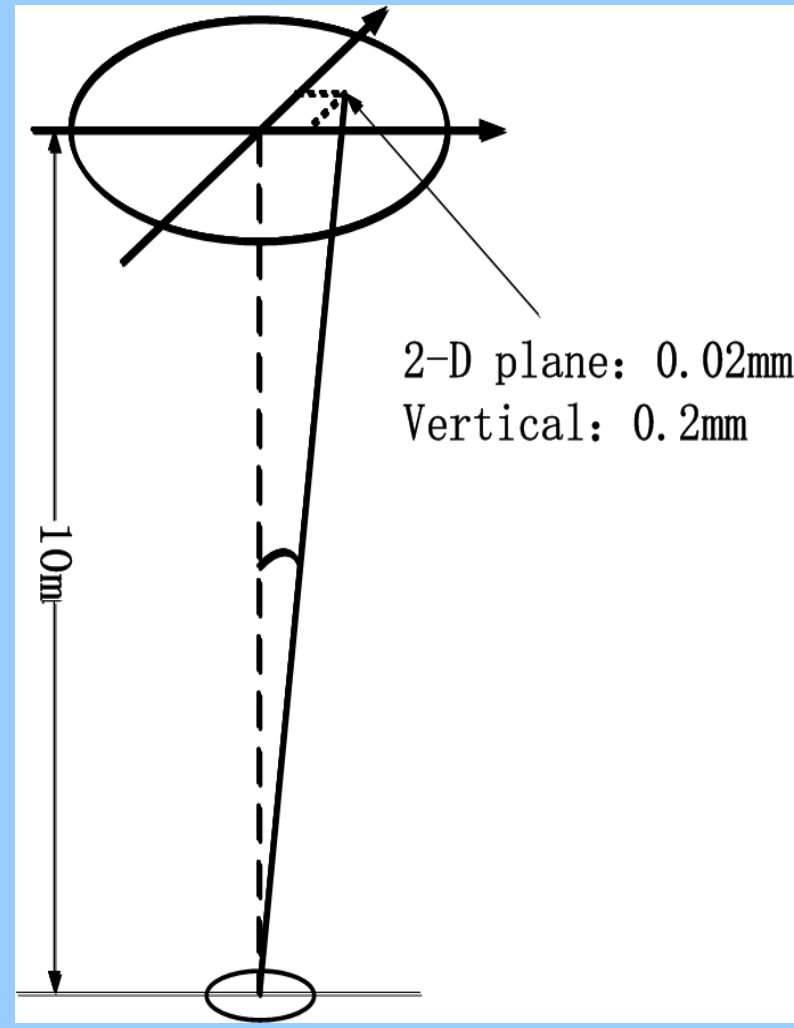


**Imaging Total Station:**

**Ranging: 0.2mm**

**Angular: 0".5**

**The monitoring system is now under verifying in a university in Zhengzhou.**







# The Equipment and the Signal Chain

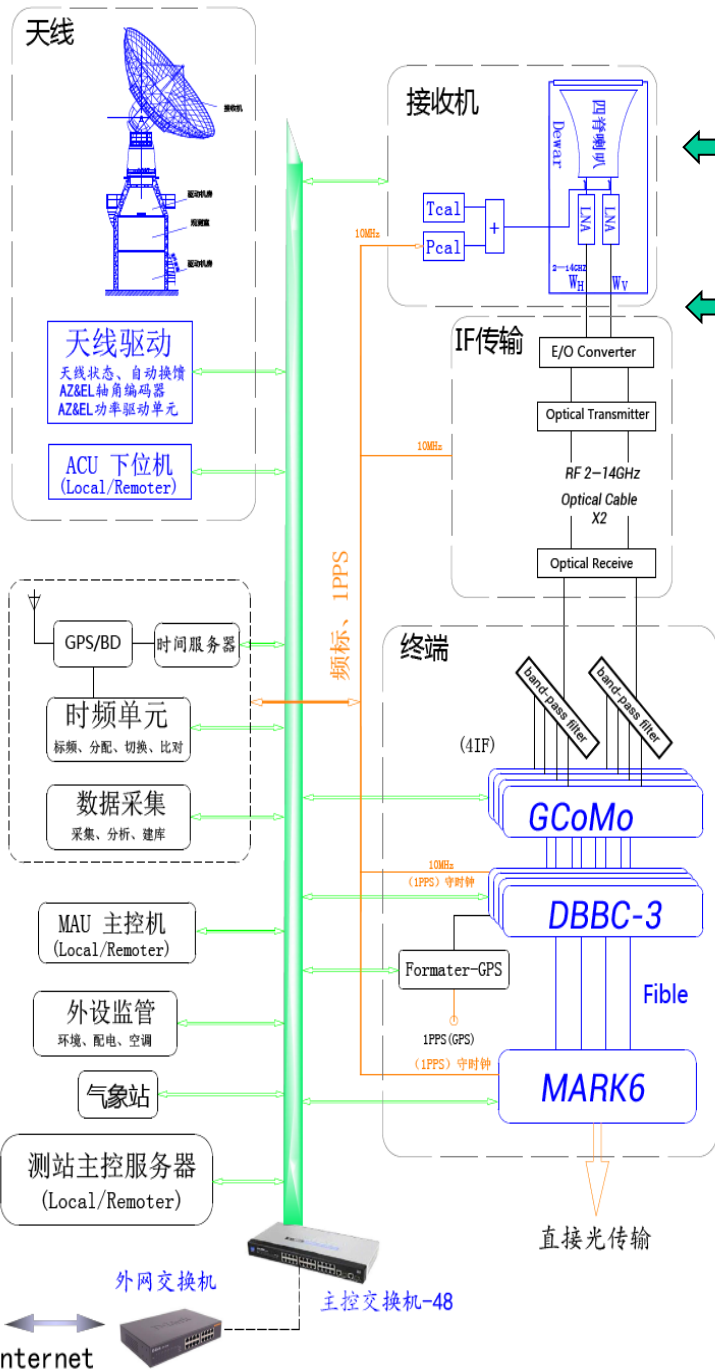
中国科学院上海天文台

Shanghai Astronomical Observatory  
Chinese Academy of Sciences



**Antenna:  
CETC 54**

**Time Freq.:  
H-maser imported  
(2017)**



**Feed + Receiver:  
SHAO+  
CETC 54/16**

**RF transferred  
by optic fiber**

**Terminal room:  
UDC+CDAS  
/DBBC3(2017)  
and Mark6**

远程管控

- ✓ VEX编译加载
- ✓ 远程观测
- ✓ dat 获取
- ✓ 系统维护

Internet

外网交换机

主控交换机-48

中国科学院上海天文台

Shanghai Astronomical Observatory  
Chinese Academy of Sciences



# Main technical Specifications of Antenna

- Diameter: 13.2m
- RF frequency range: **2.7-15.5GHz**, upgradable to Ka band
- Polarization: H&V Linear polarizations
- Optics: Ring focus
- Aperture efficiency:  $>50\%$
- Surface accuracy:  $<0.3\text{mm}$
- Pointing accuracy:  $<18''$
- Antenna mount: az-el turntable mount
- Slew rate: az  $12^\circ/\text{s}$ ,  **$2.5^\circ/\text{s}^2$** ; el  $6^\circ/\text{s}$ ,  **$2.5^\circ/\text{s}^2$**
- Slew range: az  $-270^\circ\sim+270^\circ$ ; el  $0^\circ\sim90^\circ$
- Reference point stability:  $<0.3\text{mm}$
- Signal path length stability:  $<0.3\text{mm}$



- Primary operating conditions:
  - Wind speed: 11m/s
  - Temperature:  $-10^{\circ}\text{C} \sim +50^{\circ}\text{C}$
  - Humidity: 0~100%
  - Rainfall: 50mm/hr
- Antenna reliability:
  - **Continuous operation: 3000 long slews per day more than 30 days**
  - Antenna mechanical structure's lifetime  $> 20\text{yr}$
  - Motors and gear boxes MTBF  $> 2\text{yr}$
  - Maintenance and repair  $< 10\text{days/yr}$
- System temperature:  $< 40\text{k}$  (excluding ATM noise)
- Receiver temperature:  $< 20\text{k}$  (cryogenic front end output)



# Timetable

- July-September 2016, Antenna installation and test; other instruments acceptance test
- October-November 2016, station systems integration and test experiments
- December 2016 international experiments



Thanks!

中国科学院上海天文台

Shanghai Astronomical Observatory  
Chinese Academy of Sciences