RAO Related Projects in China

Chenzhou CUI

National Astronomical Observatories, China

LAMOST

Large sky Area Multi-Object fibre Spectroscopy Telescope

Clear aperture:ϕ 4m

Field of view: ϕ 5°

Focal plane: ϕ 1.75m

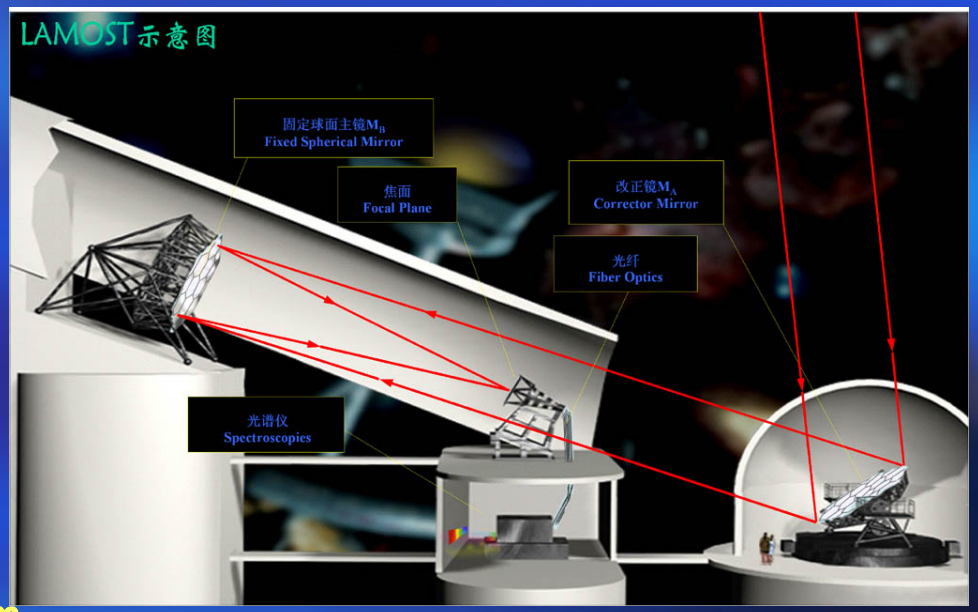
Focal length:20m

Number of fibers:4000

Spectral ranges:370 ～ 900nm

Spectral resolution:1 ～ 0.25nm

Sky coverage:Declination -10 ° to+90°



A meridian reflecting Schmidt telescope

Completion ceremony, Oct 16, 2008

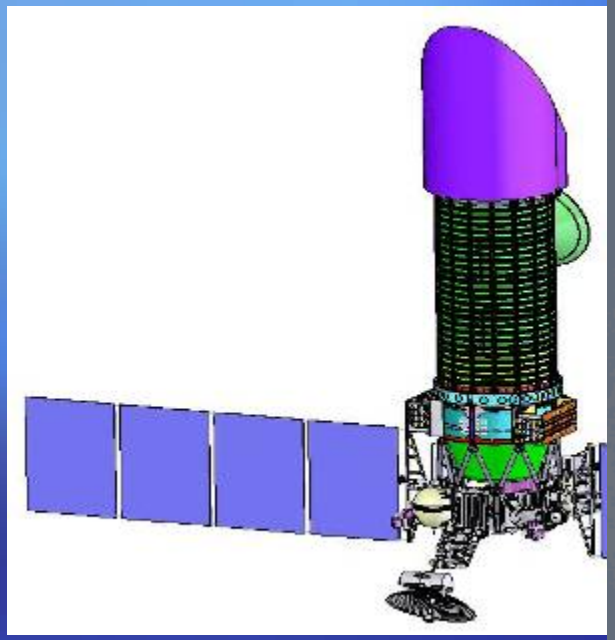
Undergoing projects

opes

YNAO 2.4m

XMT

International Collaborated Projects

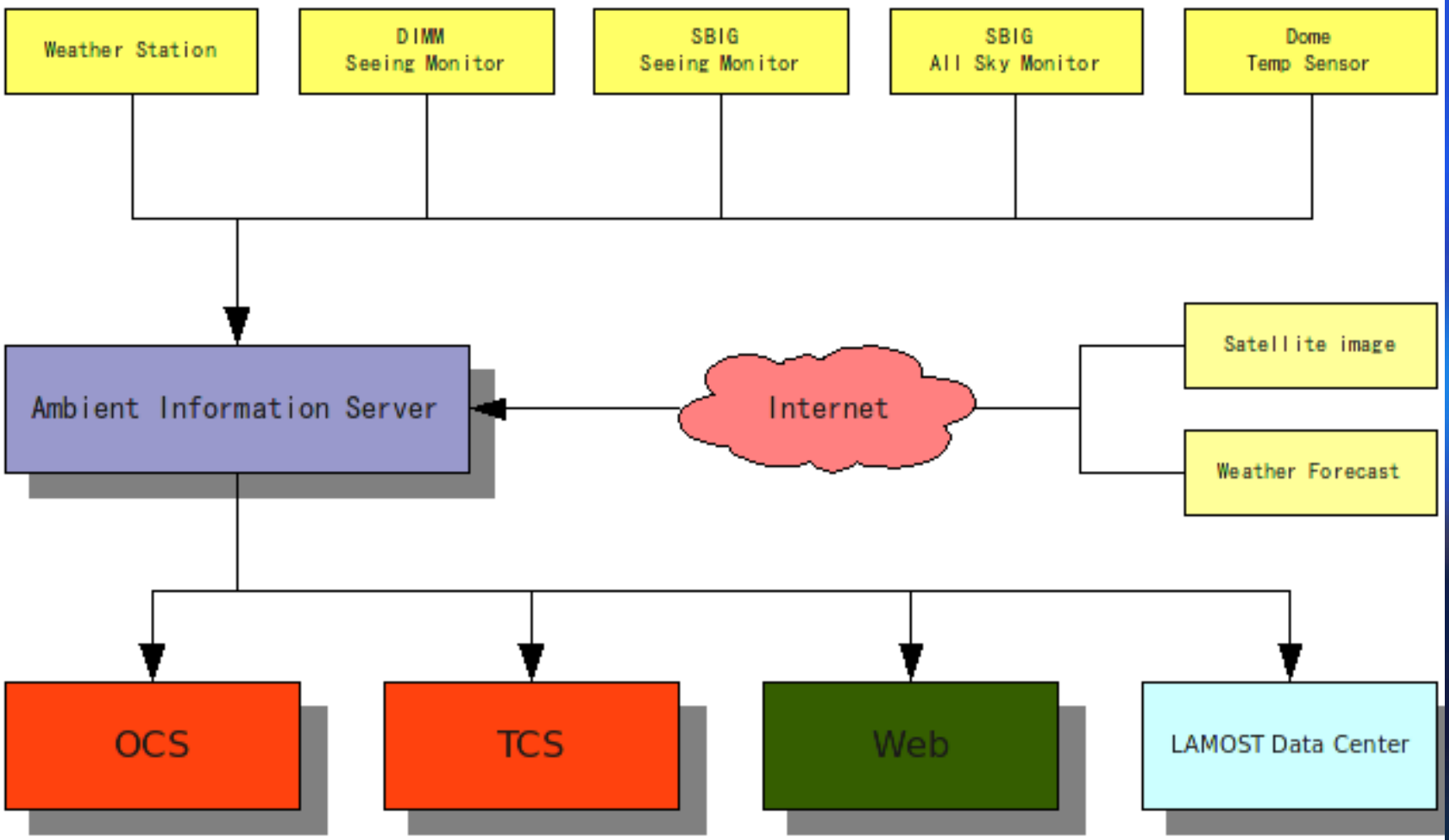


World Space Observatory - Ultra
Lead by Russia, participated by

SVOM: Sino-French satellite

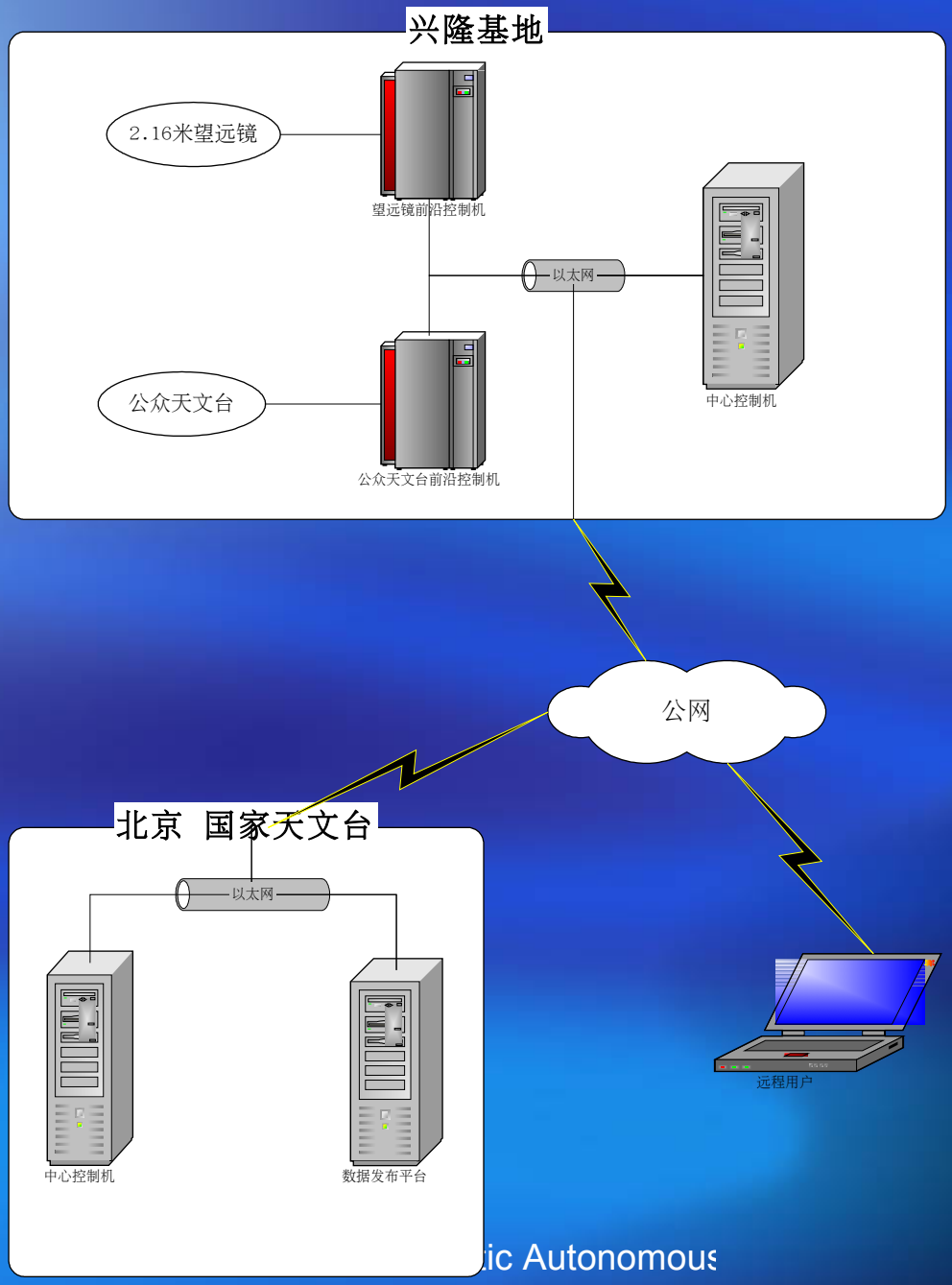
LAMOST Differential Image Motion Monitor (DIMM) System

SBIG Seeing Monitor & All Sky Camera


Weather Station
DIMM
Seeing Monitor
SBIG
Seeing Monitor
SBIG
All Sky Monitor
Dome
Temp Sensor
Ambient Information Server
Internet
Satellite image
Weather Forecast
OCS
TCS
Web
LAMOST Data Center

NAOC 2.16m Telescope

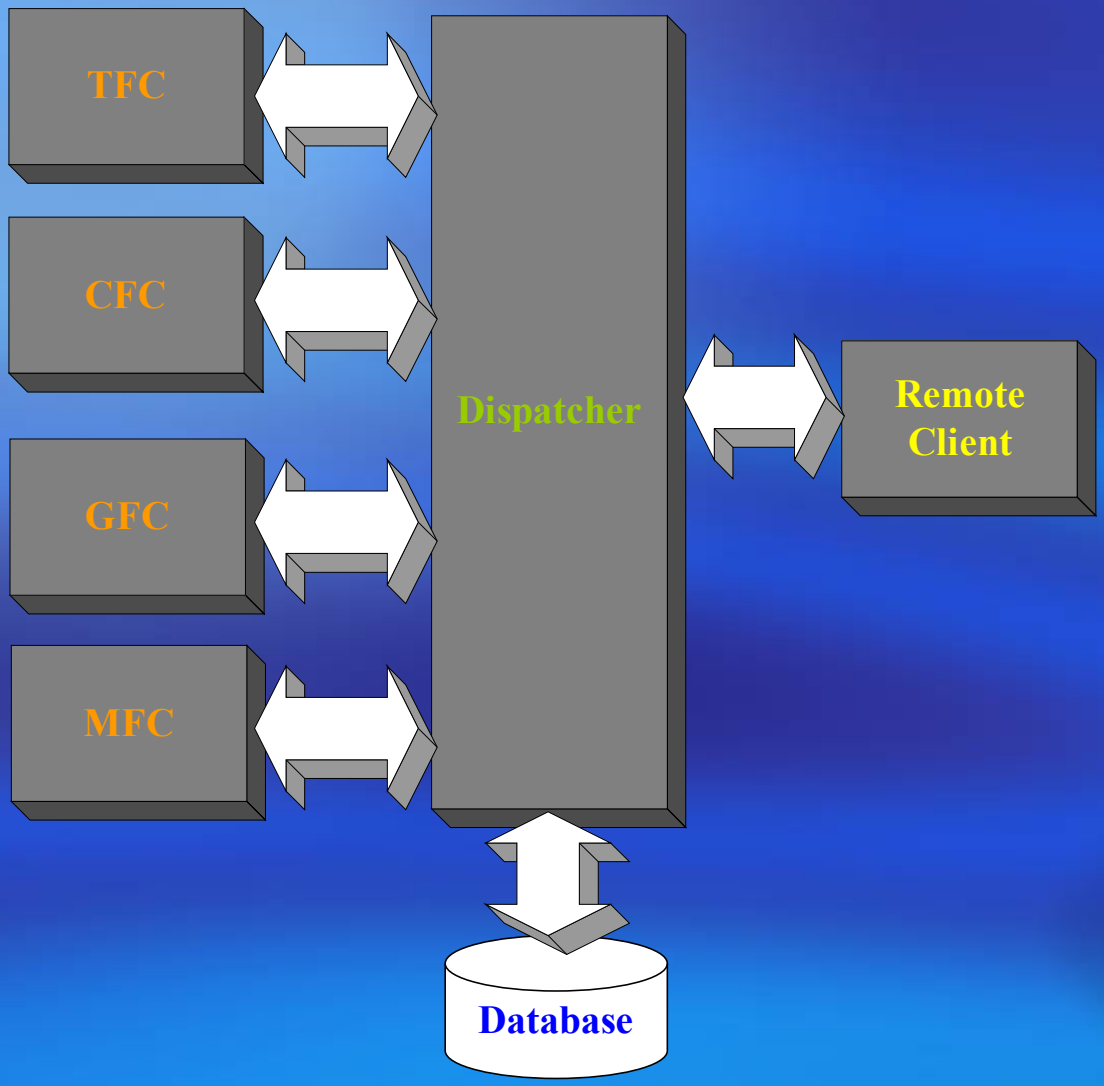
Telescope completed in 1989
Made in China



XiongLong Station

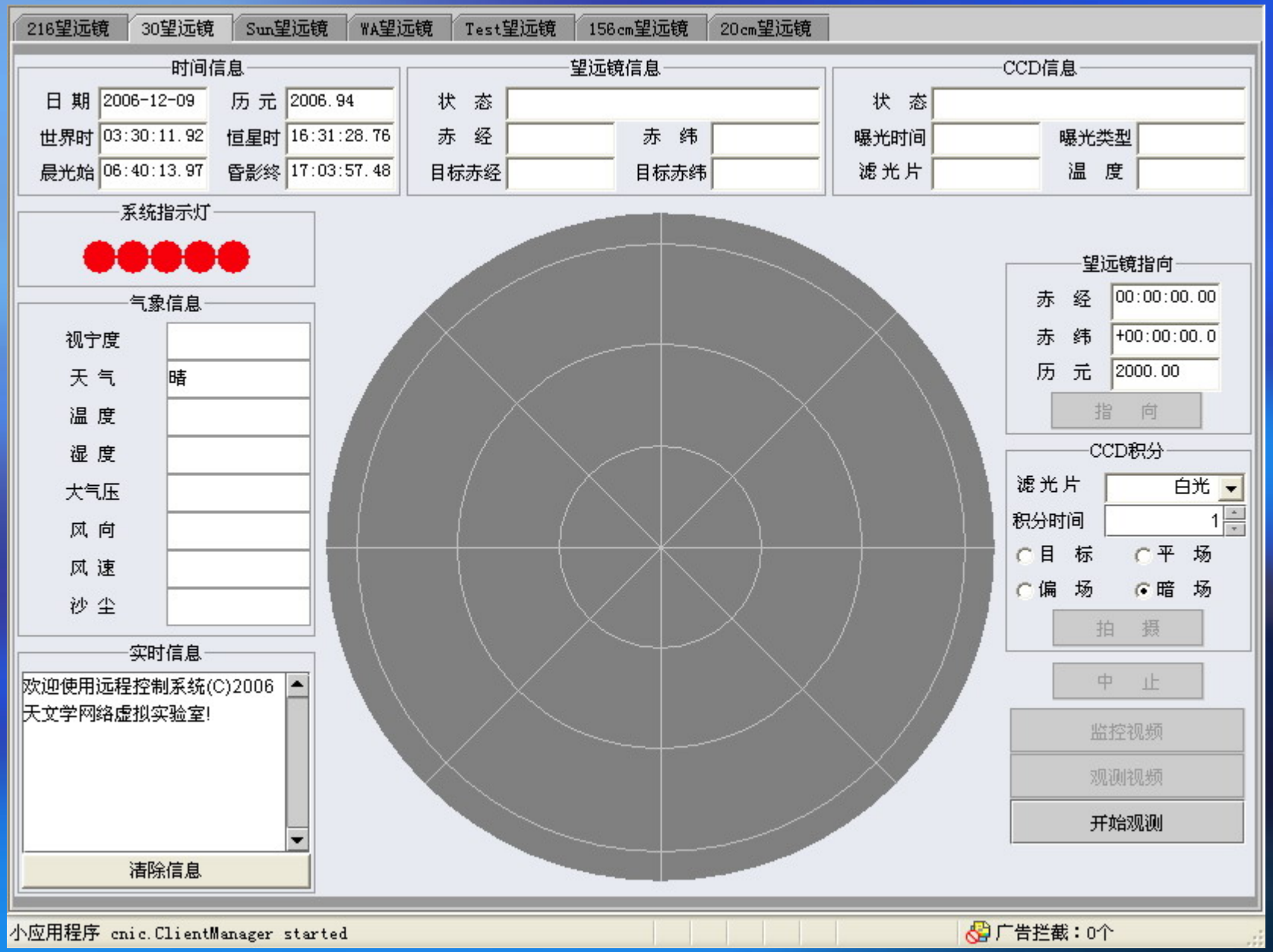
NAOC Hq

ic Autonomous

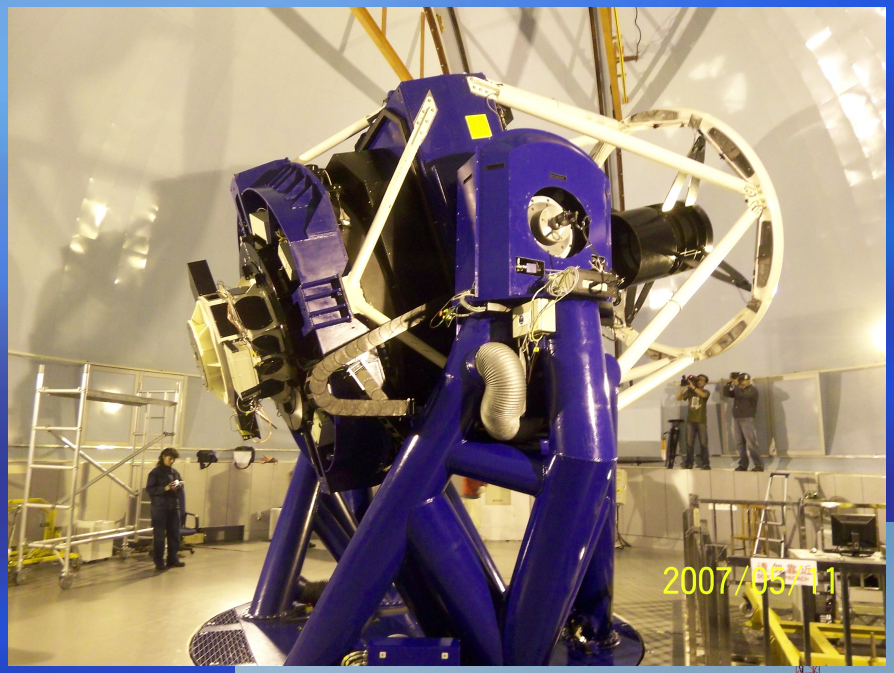


Components :

- Dispatcher server
- Front Controller
  - Telescope
  - Camera
  - GPS
  - Monitors
- Database
- Client


216望远镜
30望远镜
Sun望远镜
WA望远镜
Test望远镜
156cm望远镜
20cm望远镜
时间信息
日 期 2006-12-09
历 元 2006.94
世界时 03:30:11.92
恒星时 16:31:28.76
晨光始 06:40:13.97
昏影终 17:03:57.48
望远镜信息
状 态
赤 经
赤 纬
目标赤经
目标赤纬
CCD信息
状 态
曝光时间
曝光类型
滤 光 片
温 度
系统指示灯
气象信息
视宁度
天 气 晴
温 度
湿 度
大气压
风 向
风 速
沙 尘
实时信息
欢迎使用远程控制系统(C)2006
天文学网络虚拟实验室!
清除信息
望远镜指向
赤 经 00:00:00.00
赤 纬 +00:00:00.0
历 元 2000.00
指 向
CCD积分
滤 光 片 白光
积分时间 1
目 标
平 场
偏 场
暗 场
拍 摄
中 止
监控视频
观测视频
开始观测
小应用程序 cnic.ClientManager started
广告拦截：0个

LiJiang 2.4m Telescope
Yunnan Observatory
National Observatories, C.A.S.



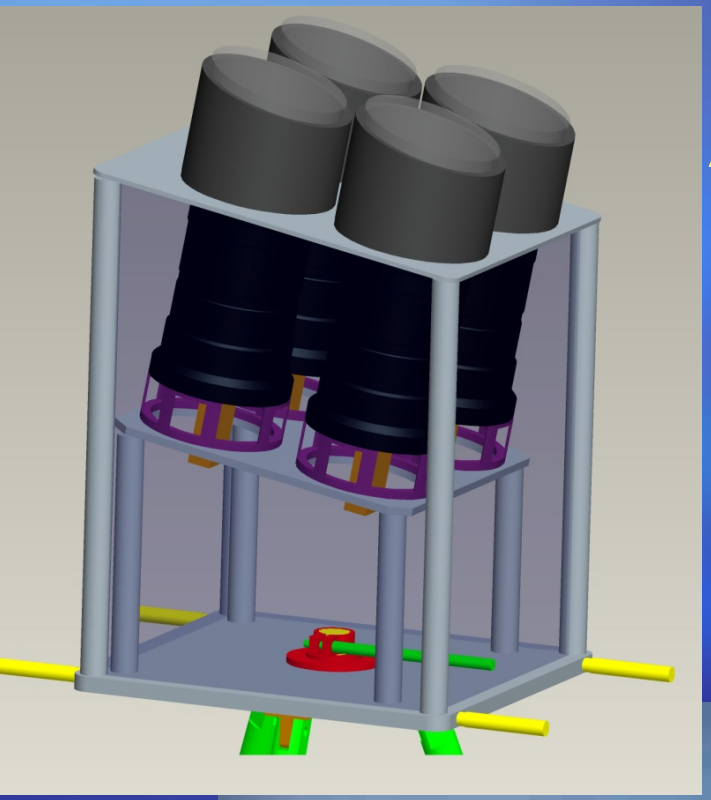
Telescope Specification

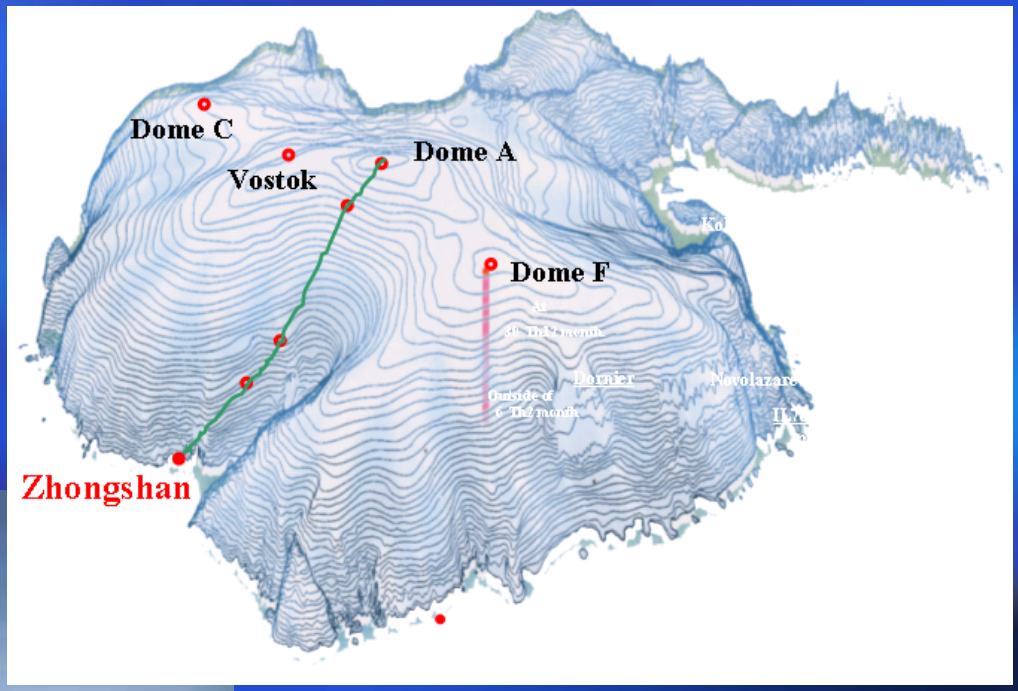
- Optical:
  - Ritchey-Chretien F/8
  - 2.4m clear aperture
  - 40 arc minutes corrected Cassegrain FOV
  - 10 arc minutes Nasmyth FOV
  - Image quality:
    - <0.35 arc seconds (on axis)
    - <0.5 arc seconds (full FOV)
- Alt/Az mount
- Pointing accuracy: <3 arc seconds
- Guided tracking accuracy: <0.5 arc seconds/hr
- Remote/Robotic mode

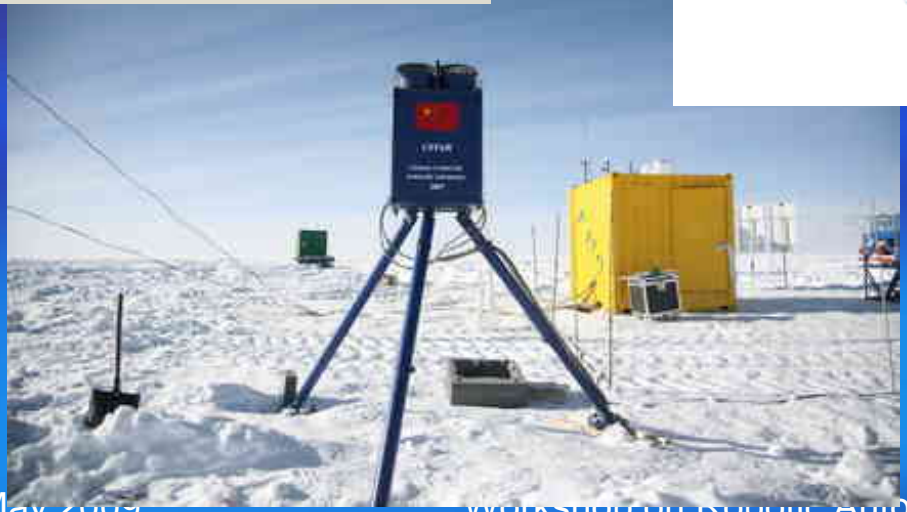
Remote/Robotic Control

- Same control prototype as Faulkes-telescope, Liverpool telescope, and other TTL, LCOGT 2 meter class telescopes.
- Network control interface
- OCS developed in C and Java
- Remote control of telescope, weather station, filter wheel, CCD camera and dome

Antarctic Observatory



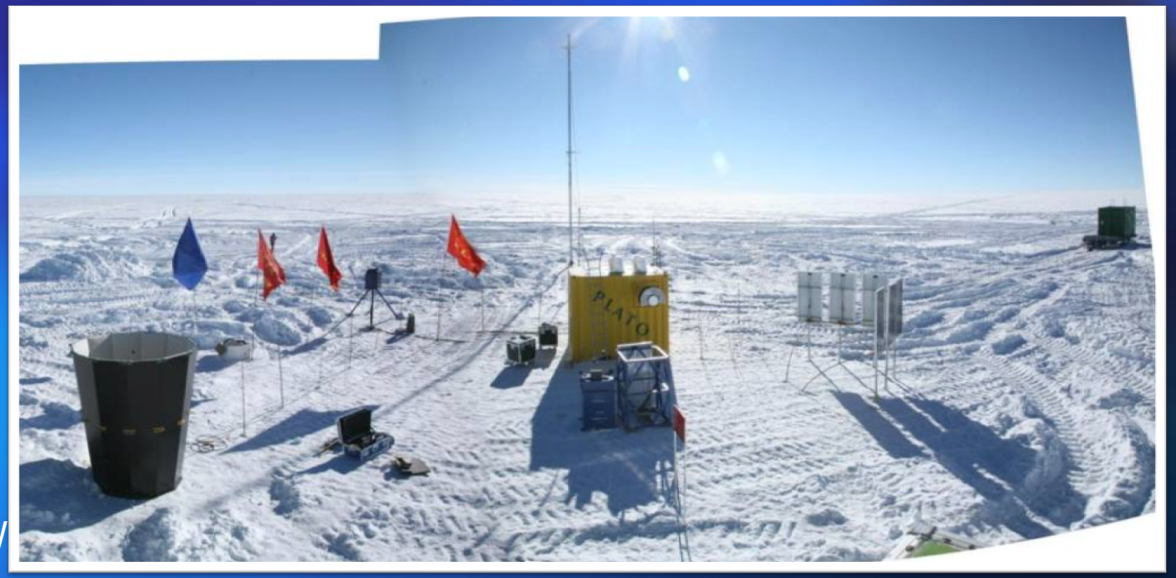




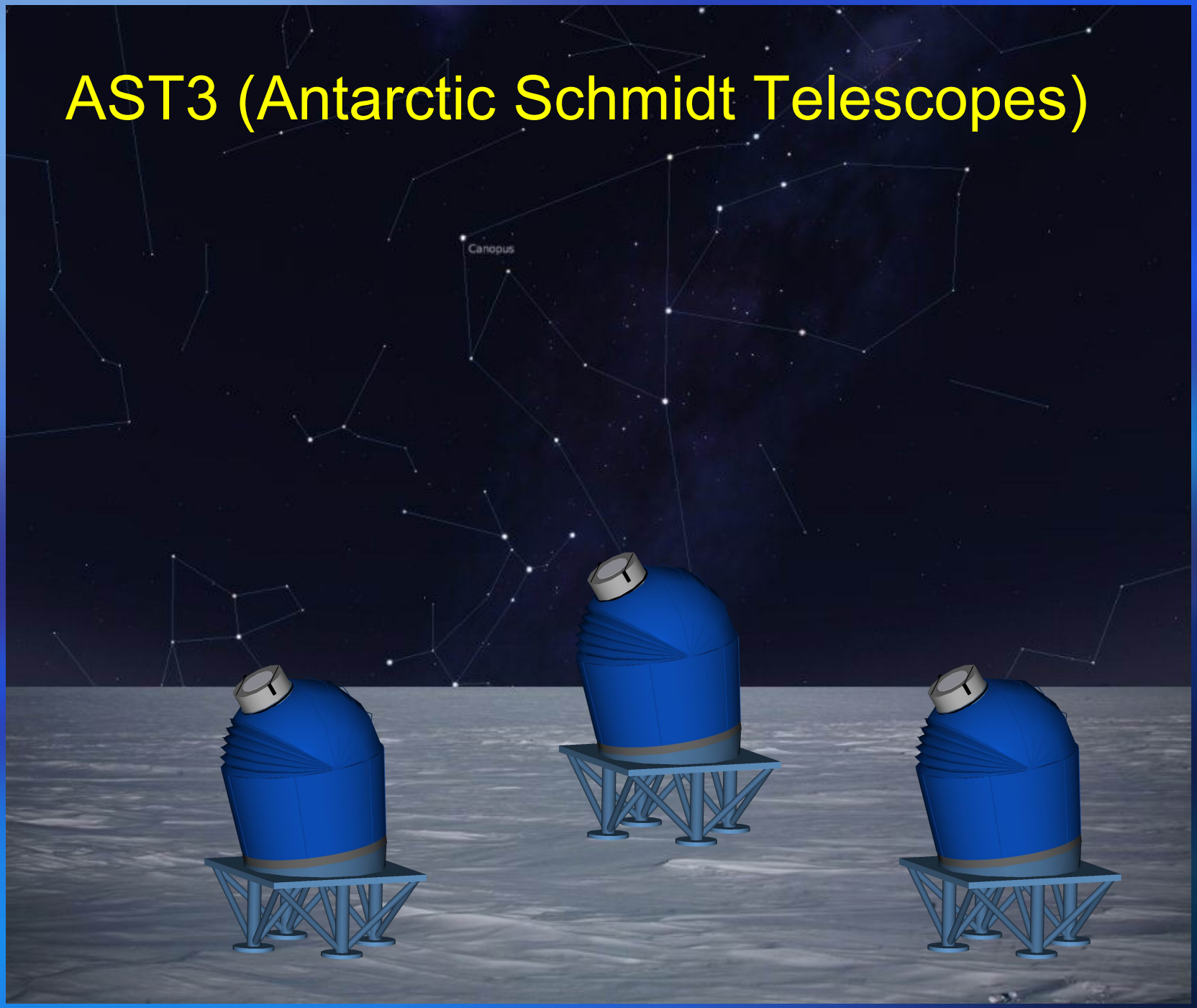
CSTAR 4x14.5cm

CSTAR- Scientific Purposes

- Measure atmosphere extinction;
- Measure sky brightness;
- Searching for variable stars;
- Searching for transit of exoplanets;
- Finding bright SNe, Novae, or afterglow of GRB.



AST3 (Antarctic Schmidt Telescopes)



AST3—
3X 50cm/77cm Schmidt telescope array

- The same science subjects as CSTAR (4x14.5cm), but much more powerful.
- 0.5 meter (clear aperture) Schmidt system

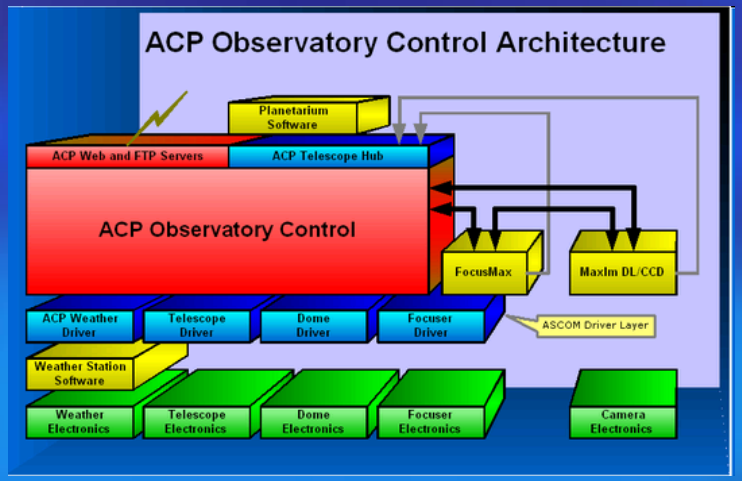
- **Clear aperture： 50cm；**
- **FOV： 4°**
- **Wave Band： 400nm-900nm;**
- **Scale： 1arcsec/pixel;**
- **Image quality： 80％ energy encircled in one pixel；**
- **Image size： 95.04mmx95.04mm;**
- **CCD: 9micron /pixel, 10k x 10k**

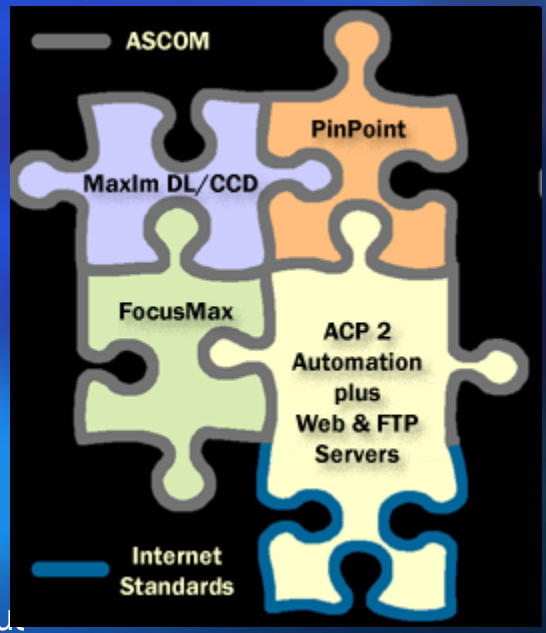
My Scenario of a RAO network/community

1. Looking for your interested objects from Google Sky or Worldwide Telescope
2. The network suggests one available telescope or more
3. You select telescope and submit observation proposal to the network
4. Observation executed after confirmation
5. Raw image is processed on-the-fly by VO-compliant services to add further information including WCS parameters
6. The applier gets one copy, another image copy goes to online gallery database
7. Shared images accessible for Google Sky, Worldwide Telescope, and other clients

Industrial package based solution

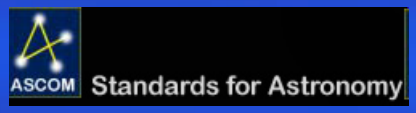
- Adopting industrial standards, mature software and technologies to ensure the stability and availability of the system.
- Software systems, such as ACP, ASCOM, MaxIm DL/CCD
- Google Sky, Worldwide Telescope, online gallery services, etc.
- Compliant hardware systems with above software, including telescope, doom, CCD camera, weather station, filter wheel, etc.
- More integration, less development





Related technologies and standards

- ACP Observatory Control Software
  - http://acp2.dc3.com/
- ASCOM Platform
  - http://ascom-standards.org/
- MaxIm DL/CCD
  - camera, filter wheel, and the auto guider
- FocusMax
  - focuser, telescope, and CCD imager via ASCOM
- VOEvent (IVOA)
- PLASTIC&SAMP (IVOA)



Thank you