Potential collaboration and challenge between SYISR and EISCAT

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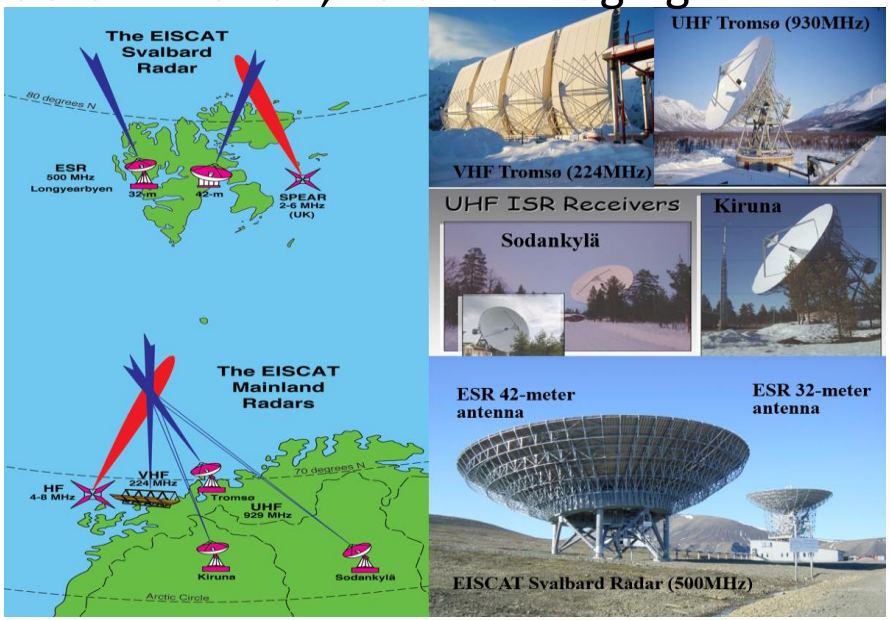
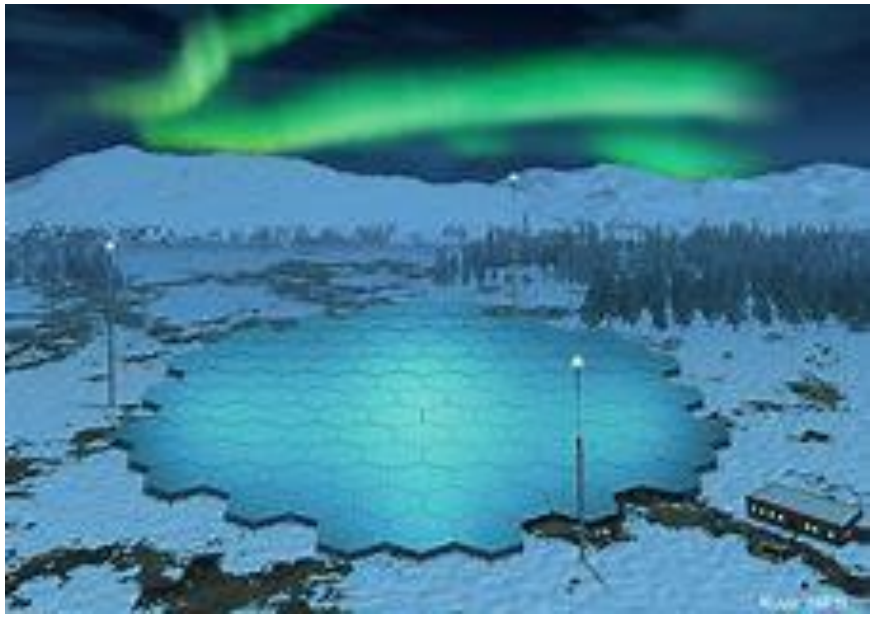
Introduction to EISCAT/EISCAT-3D

- Incoherent Scatter Radar (ISR) is the most powerful ground based instrument for ionosphere monitoring: large aperture, high power (1Mw-10 Mw),very expensive (hundreds of M dollars)
- It could measure: ion densitycomposition/velocity/temperature; 60->2000 km
- EISCAT: European Incoherent Scatter Scientific Association, owns 3 of total 10 ISRs all over the world; ionosphere, space debris, aurora, etc…;EISCAT has been a brand of European in space physics community
- EISCAT-3D： next generation of EISCAT, phased array radar, totally 5 receivers, vector determination, volume imaging

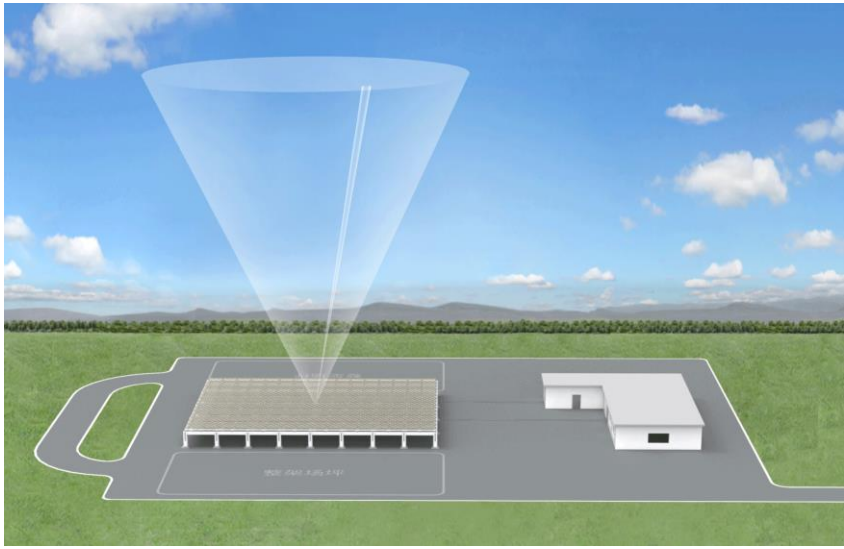




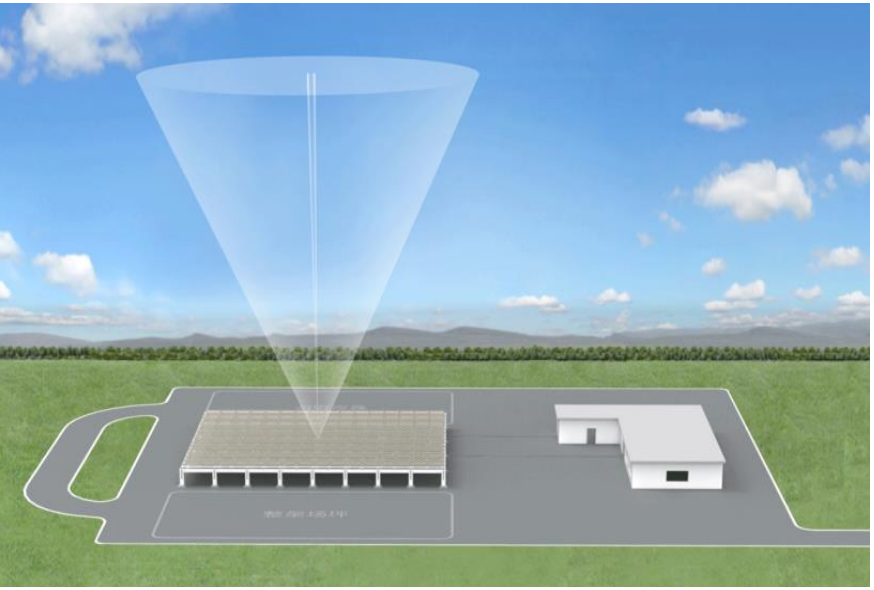
See Ingemar’s presentations for details

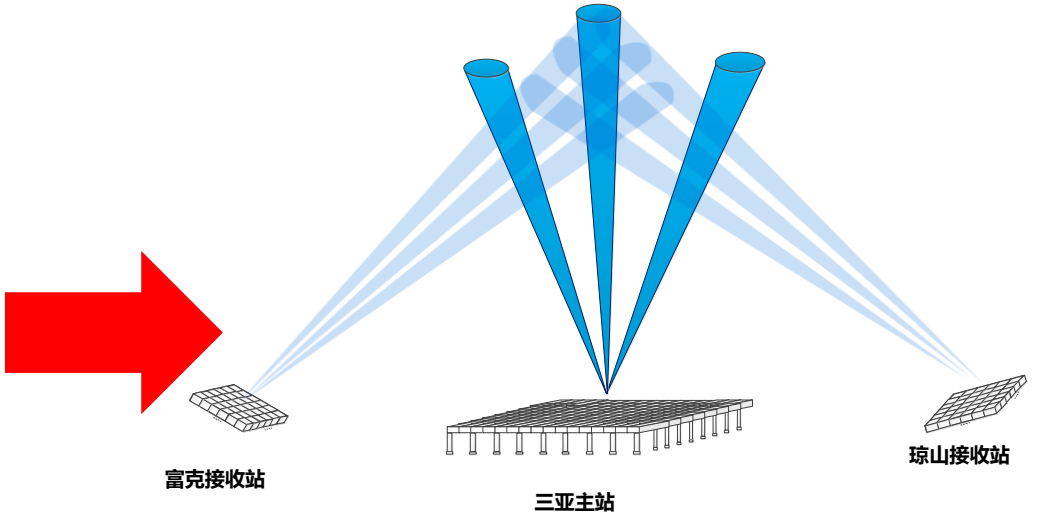
Introduction to SYISR

Scientific Goal: Understanding Atmosphere-Ionosphere-Magnetosphere Coupling at Low Latitude & Ionospheric Scintillation
Sponsors: National Natural Science Foundation of China (NSFC)
Project Implementation: IGGCAS
Schedule: 2015-2020
Geo. coord.: 18.3ºN,109.6ºE
Magnetic dip latitude: 12.6ºN
Local time: UT+8
Radar Feature: modular active electronically scanned phased-array & all-solid state transmitter &all-digital receiver
Completed by the end of 2020!

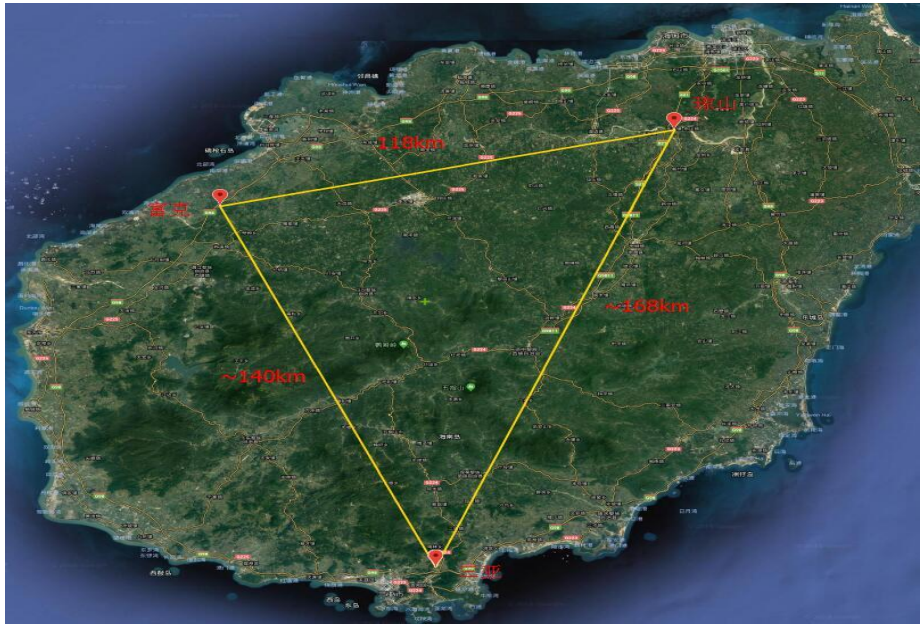


SYISR → SYISR Tristatic System





Under developing, 2020-2024



SYISR TS .VS. EISCAT-3D

Similarities

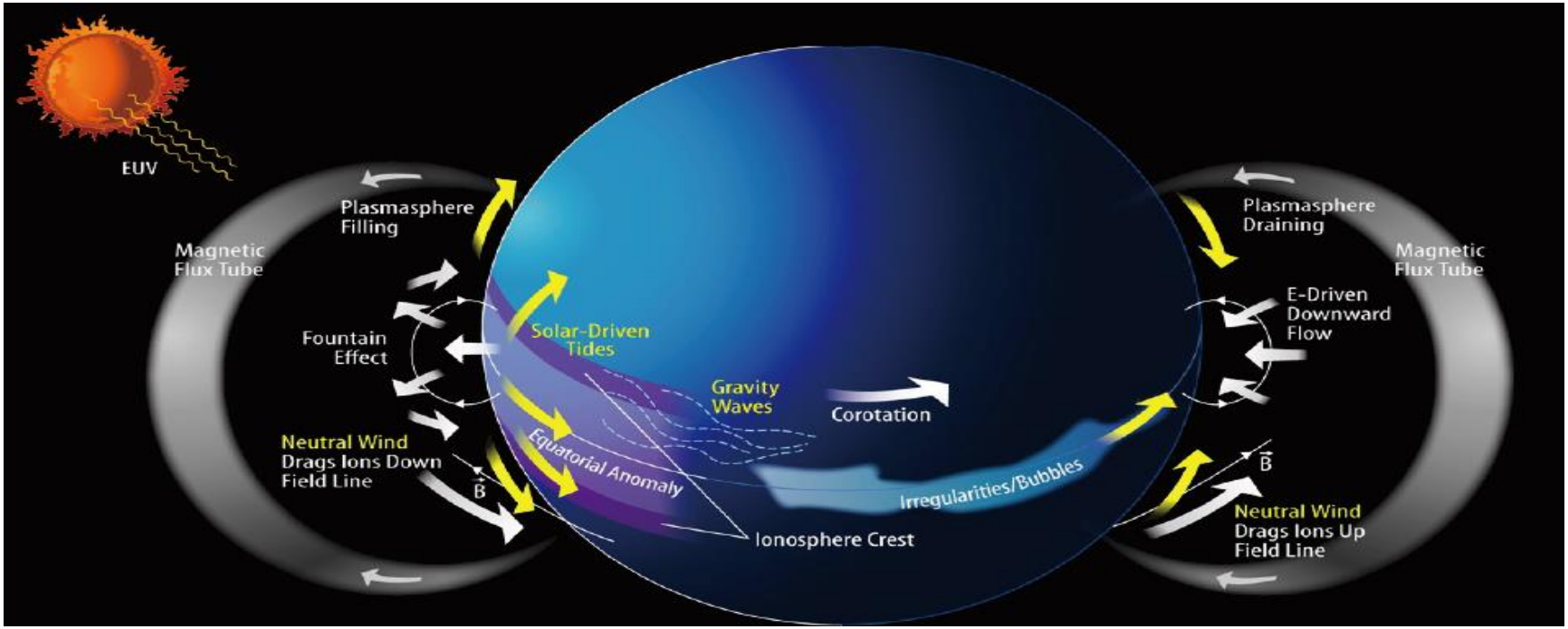
- Measure the same target: ionosphere
- The same technology: Phased Array radar
- The same algorithm in digital signal processing, data retrieval
- EISCAT is the first multiple stations ISR in the world
- SYISR TS will be the only multiple stations ISR in the equatorial region once developed

Complementary

- Geographic location is different, funded by different agency
- Scientific focus is different, EISCAT-3D cares high latitude (precipitation, aurora, etc..), SYISR TS cares low latitude ionosphere (EIA, dynamo)
- EISCAT-3D measure the origin of ionospheric weather, SYIS TS measure the results of space weather

Potential collaboration between EISCAT-3D and SYISR TS

- Technology: radar technology, digital signal processing, data retrieval
- Science: ioospheric physics, irregularity
- Data exchange, data sharing
- Campaign



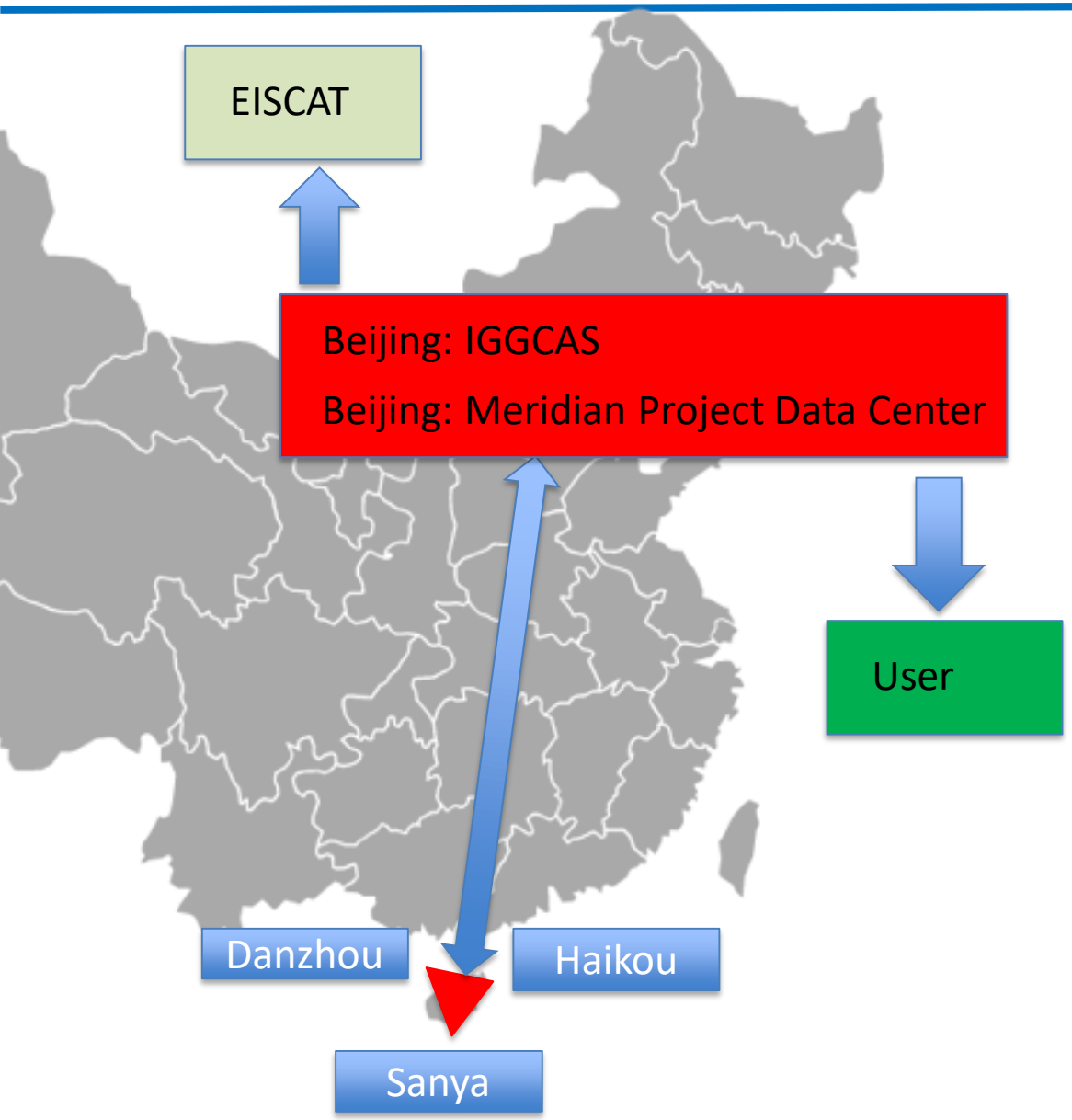
Main challenge

- Big data (GGB in minutes in original sampling)
- Big data processing, storage
- Big data transfer and sharing between China and Europe
- Online radar control, data processing, visualization

Technical Support Requirement for GOSC

- Computational Architecture design for SYISR TS
- Hardware, software, internet, storage
- Online system for data exchange, running campaign, training, etc
- Remotely control the radar through internet?
- Remotely view the radar through internet?
- ……

Preliminary Scenario



Support

- SYISR Project
- CNIC supported by CAS
- MOST-ESA Corporation Framework for Navigation