

21 cm Cosmology Workshop 2023 & Tianlai Collaboration Meeting (Shen Yang)

PROPOSAL FOR THE WHOLE SKY MULTI-BEAM SURVEY ARRAYS IN THE SOUTH CHINA SEA

Hai-Jun Tian (HangZhou Dianzi Univ.)

Proposed by: Feng-Quan Wu(NAOC), Le Zhang (SYSU), Ju-Yong Zhang(HDU), You-Gang Wang(NAOC), Zhi-Gang Li(NYNU), Zhi-Ping Chen(HDU), Xue-Lei Chen(NAOC) etc.

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A Preliminary Idea

OUTLINE

- **The Motivation**
- **The Preliminary Design**
- **The Scientific Goals**
- **Your Comments and suggestions**

MOTIVATION

(HAINAN AND SOUTH CHINA SEA)



**Hainan and South China Sea:
The area of lowest latitude
in China**

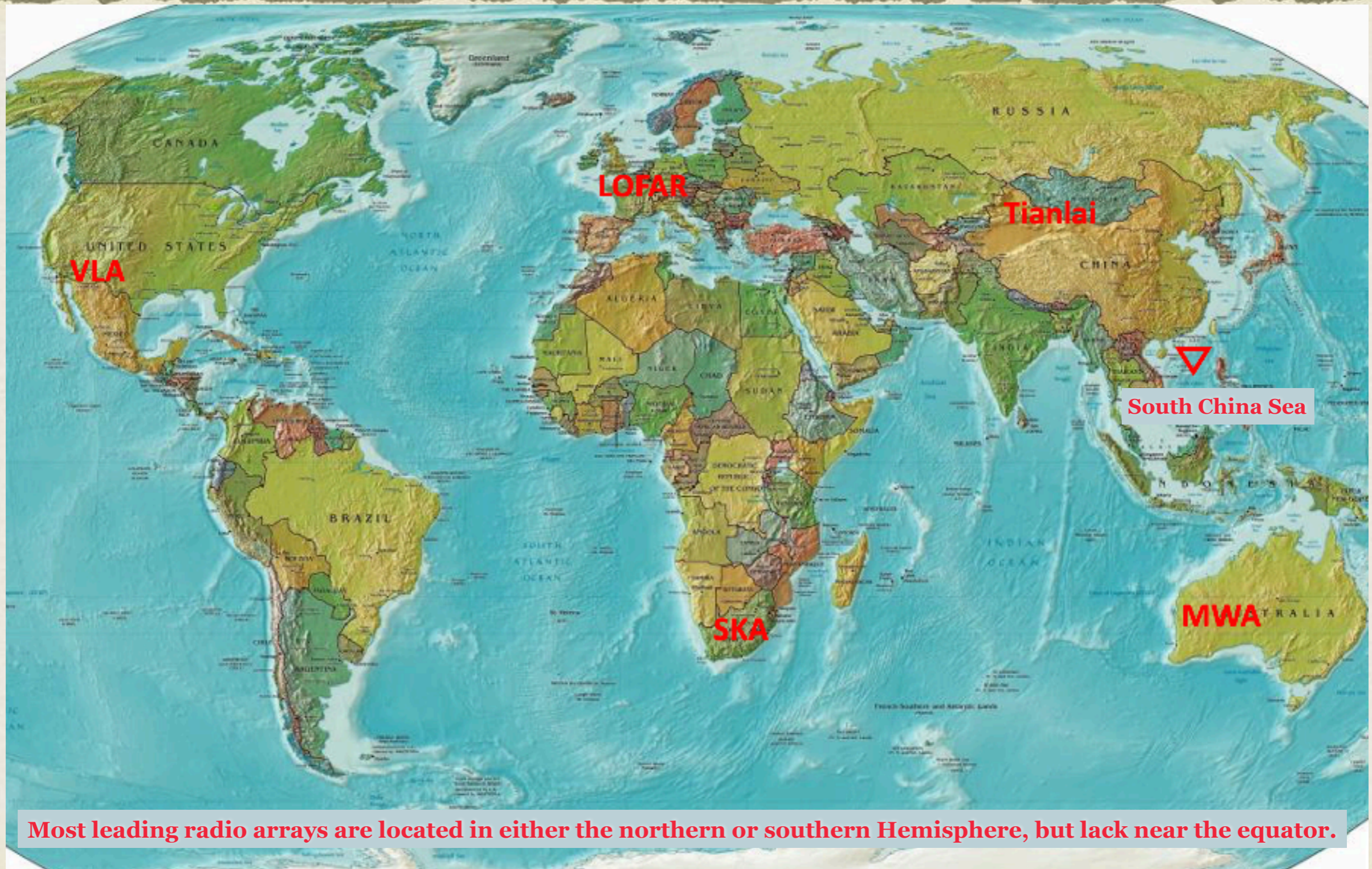
**A large sky area (>15000
square deg) is observable**

**An opportunity to move to an
University in Hainan
province**

South China Sea

MOTIVATION

(LOCATIONS OF THE LEADING RATIO ARRAYS)



Most leading radio arrays are located in either the northern or southern Hemisphere, but lack near the equator.

PRELIMINARY DESIGN (THE MULTI-BEAM SURVEY ARRAYS IN CHINA SOUTH SEA)



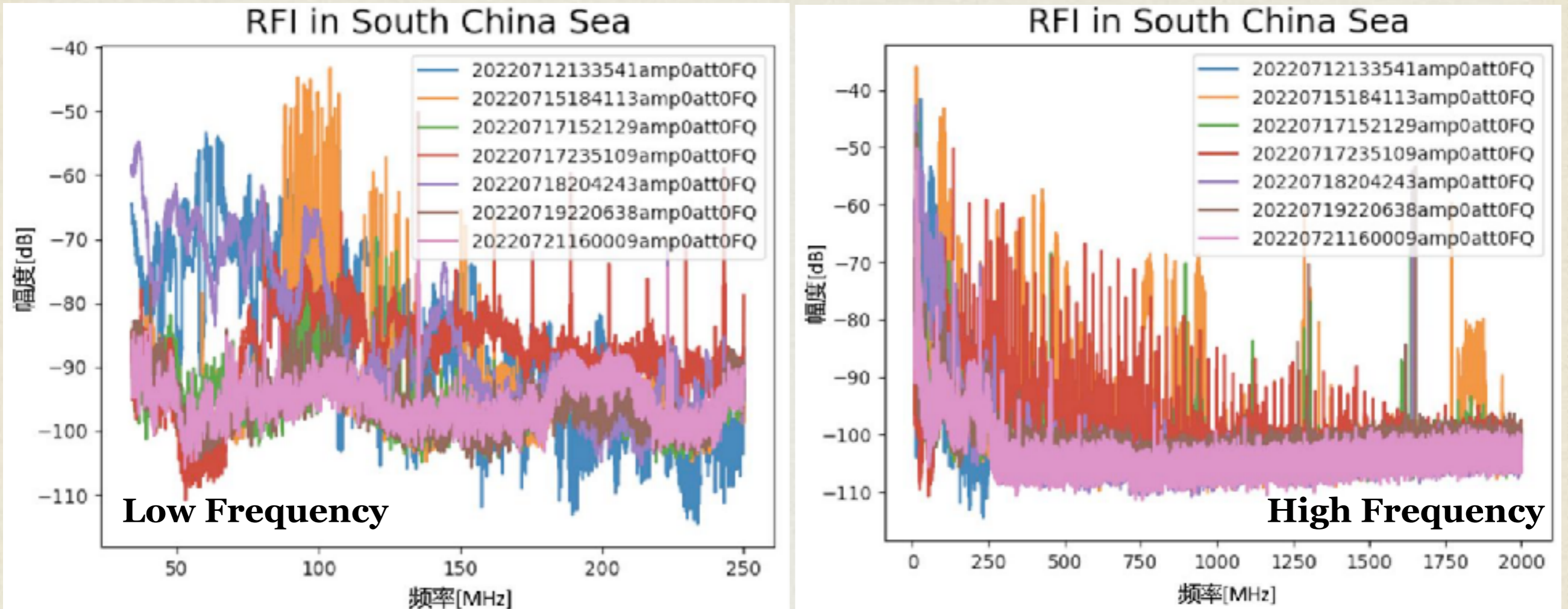
There are many islands in the South China Sea.

Three Islands:
Such as Xi Sha, NanSha, and HuangYan

The distance between each two is ~700 km

The Sketch Map of the Multi-beam Survey Arrays

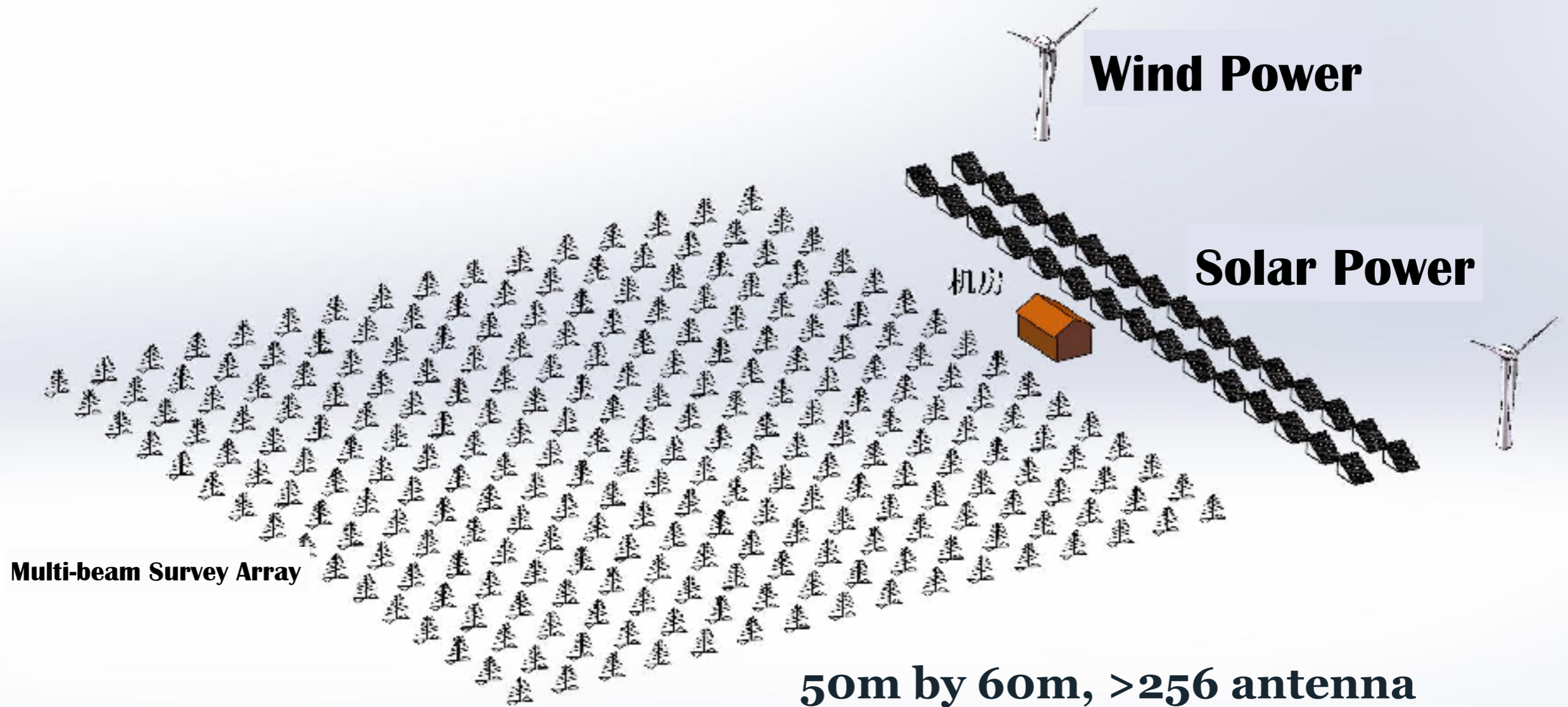
PRELIMINARY DESIGN (EXCELLENT RADIO ENVIRONMENT)



The different color illustrates the radio signal in the different date by a ship from Zhuhai to XiSha islands. The date indicates the distance away from the land.

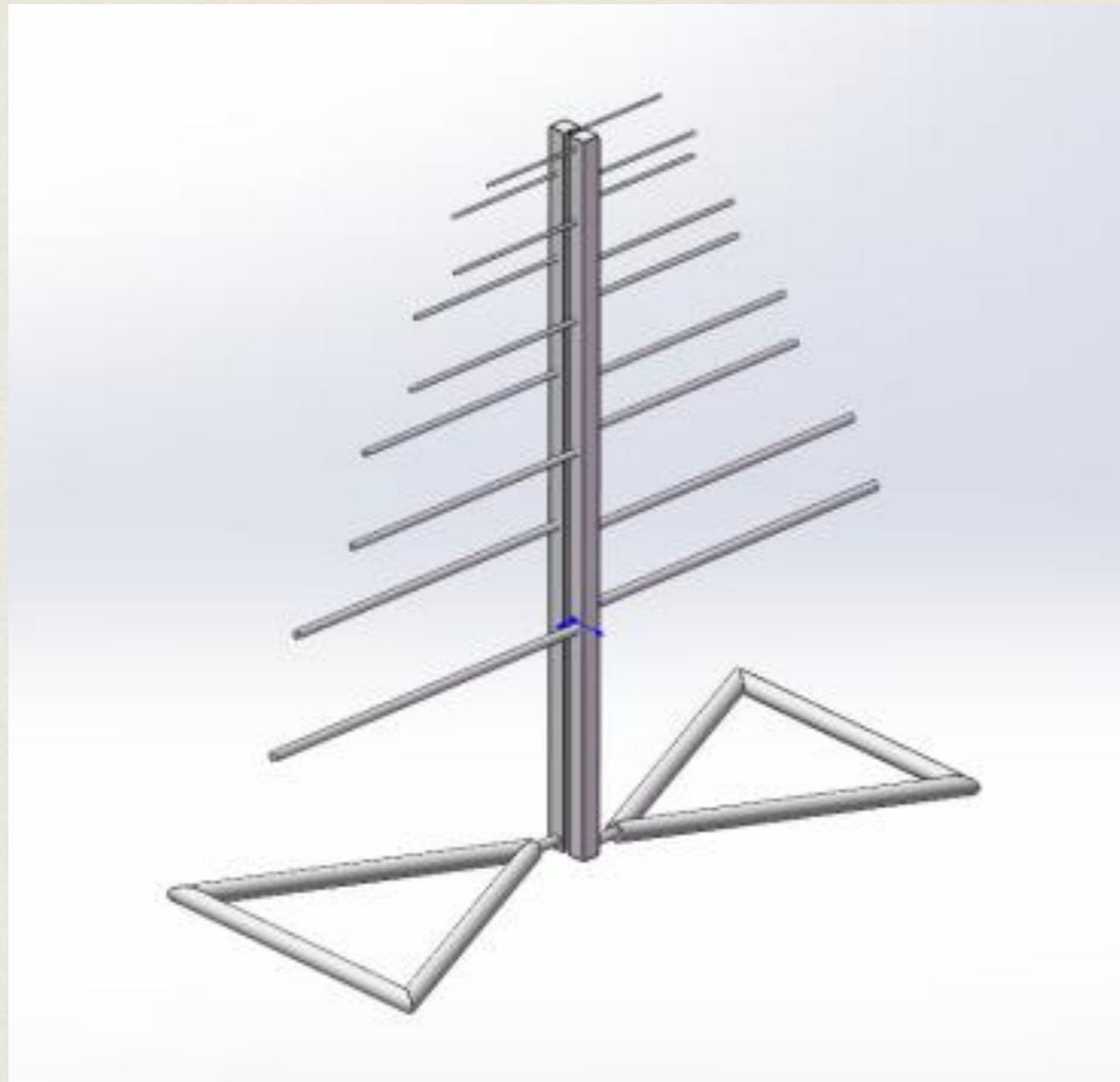
Provided by Dr. Zhang Le

PRELIMINARY DESIGN (THE ARRAY IN EACH ISLAND)



The sketch map of the array in each island

PRELIMINARY DESIGN (EACH ANTENNA)



The Antenna with low frequency

- **Very cheap**
- **Strong wind resistance**

300-800MHz, 1m by 1m,

PRELIMINARY DESIGN

(BASIC FACILITY)

Power (>5000 KWH):

- Wind
- Solar
- Tides

Data Transmission (intractable):

- Phase I: only the trigger signal or packed single beam (1 Mbit/s) by a satellite
- Phase II: fibre (10 Gbit/s)

Three arrays can work together or separately.

SCIENTIFIC GOALS

(PARTS)

- 1. The early cosmology**
- 2. The transient sources (Finding and monitor FRB, Pulsar, etc.)**
- 3. ...**

COMMENTS

But,

We have no any experiment on the island so far.

Any comment and suggestion is welcome!

Just do it!