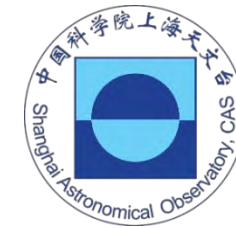


精勤司天 诚信修文

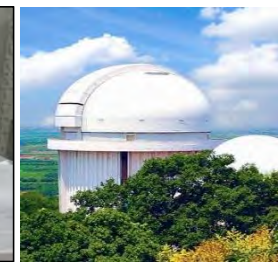
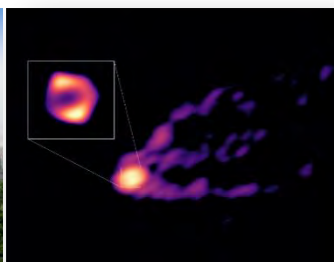


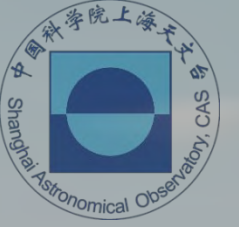
BINGO progress update (happy construction)

Jiajun Zhang

2024/July/22@Hangzhou

On behalf of the BINGO/ABDUS collaboration

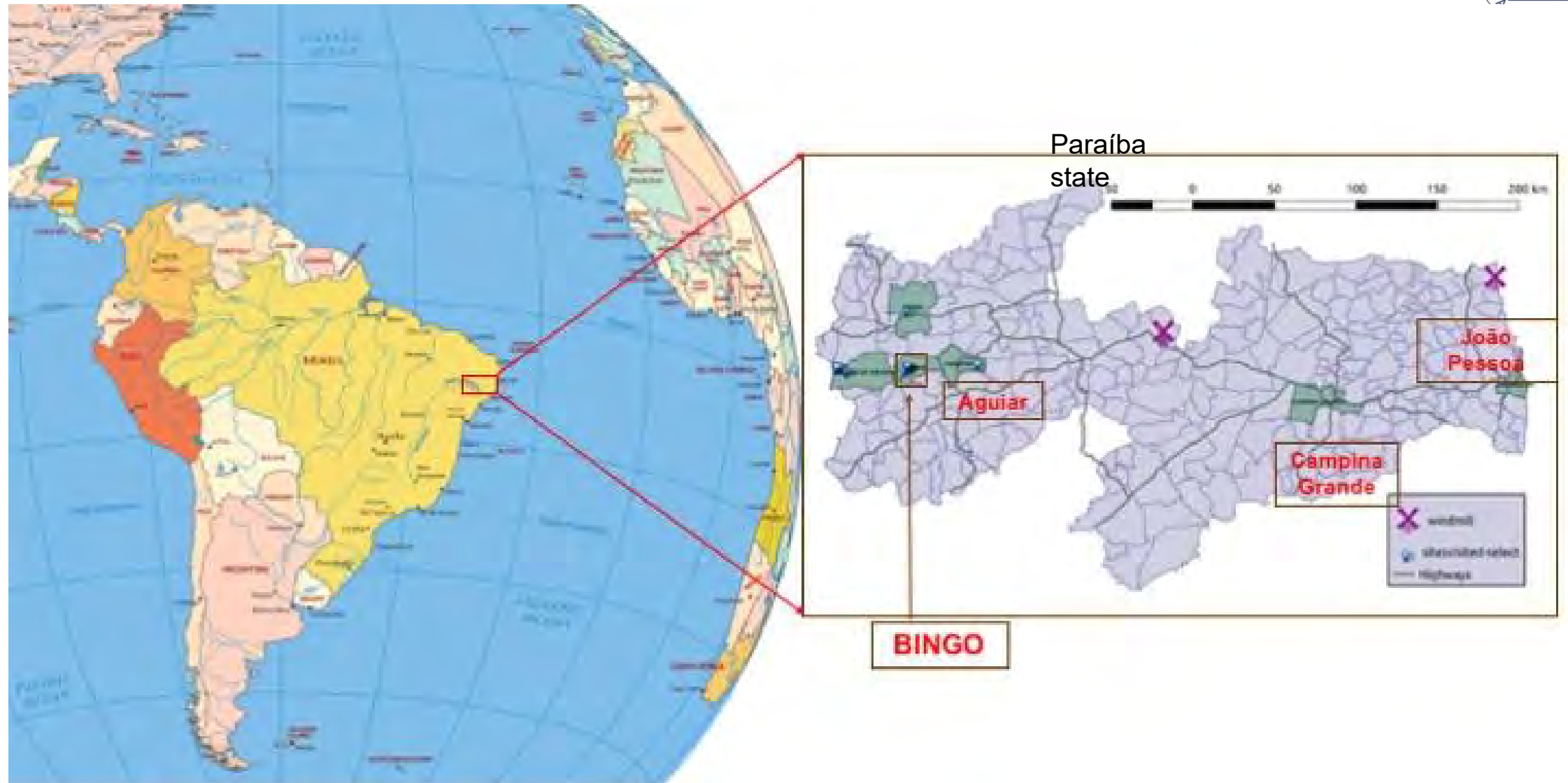




What is BINGO looking for? Cosmology!

1. 21cm intensity mapping at 980MHz - 1260MHz
2. FRBs
3. with 40m primary mirror, 39m secondary mirror, 28 horns

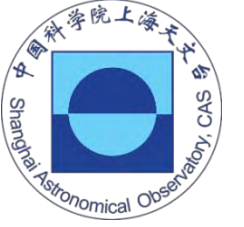
Localização do BINGO: Coords: 7° 2' 27.6" S; 38° 16' 4.8" W











网络
设备

太阳
能板

生活区与
控制中心

直升机停机坪

道路通向馈源





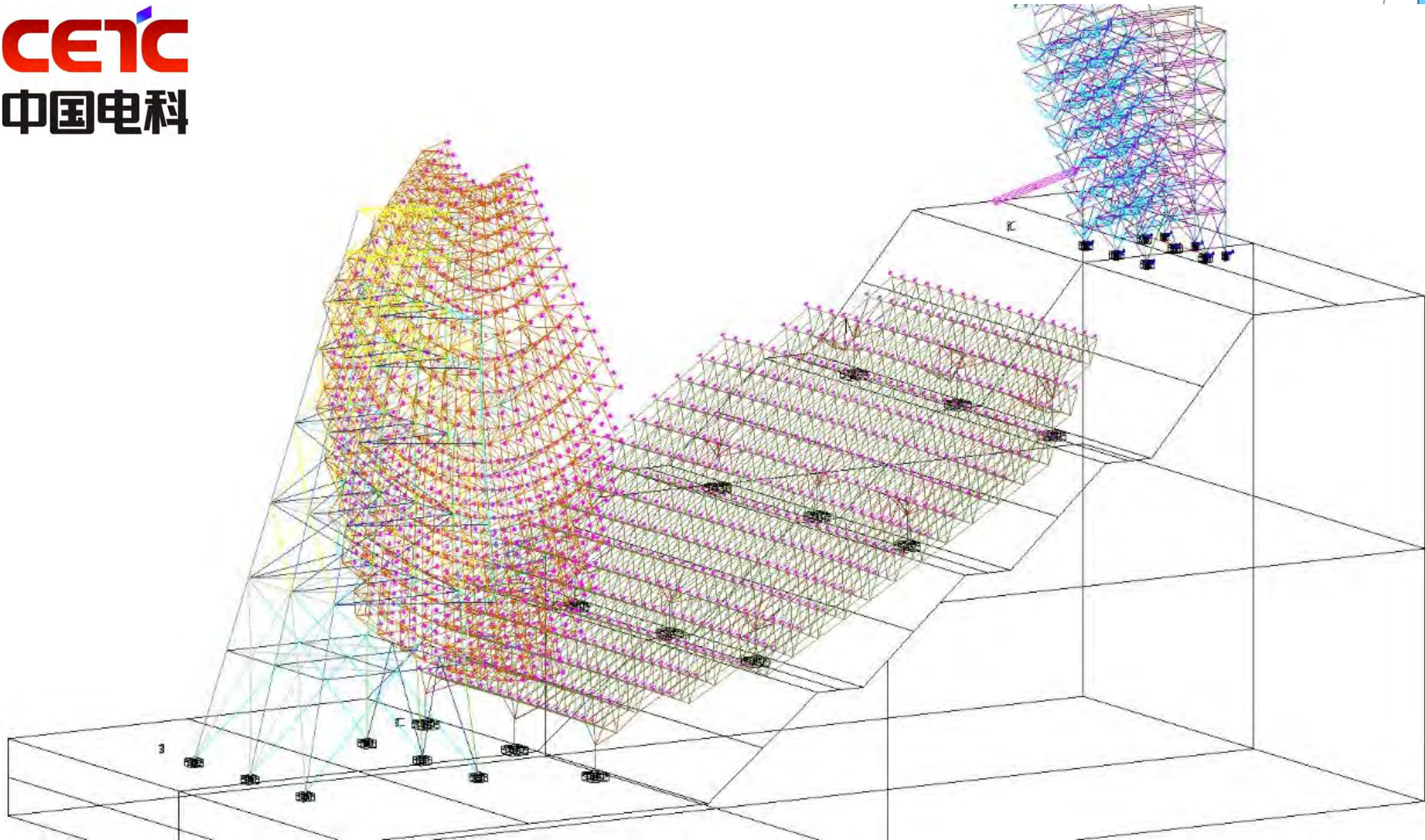
馈源

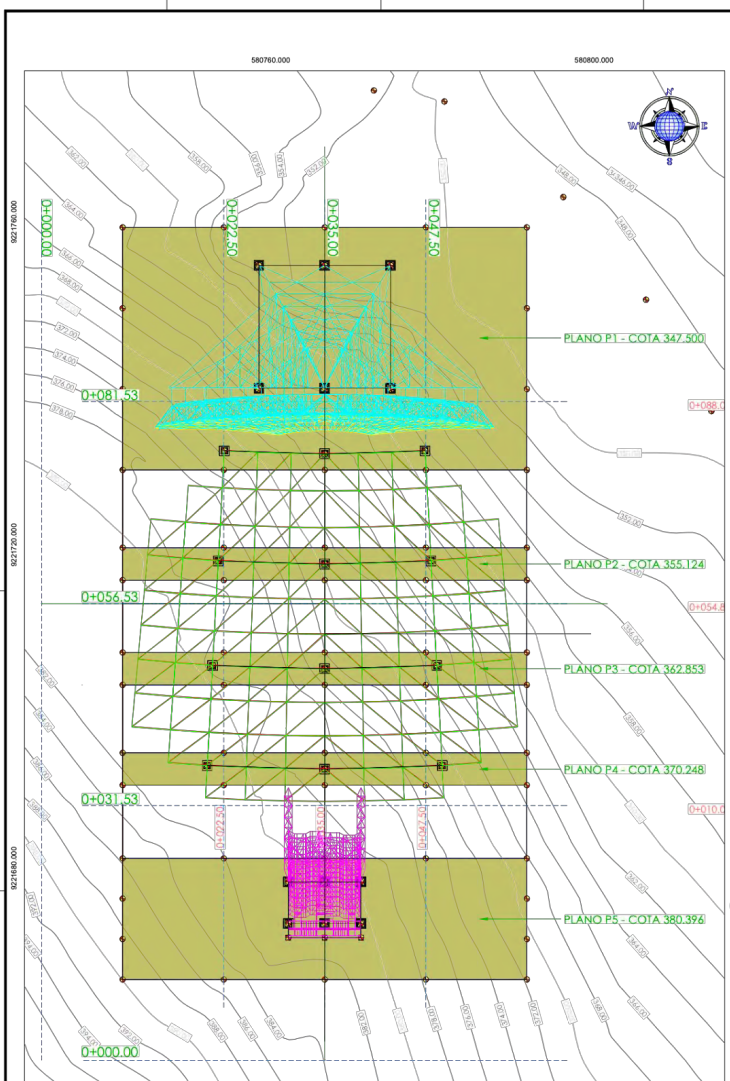
二级反射镜

主反射镜

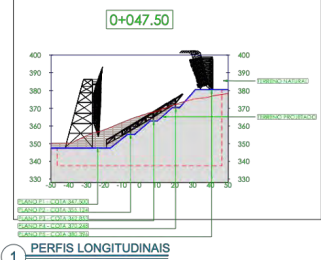
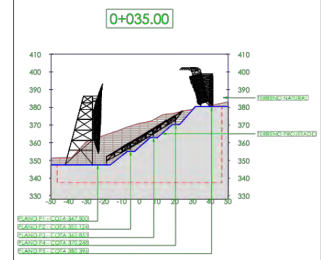
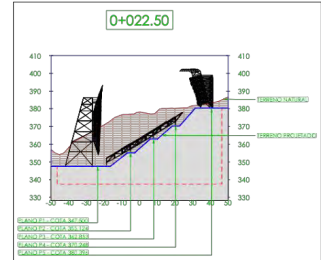


CETC
中国电科

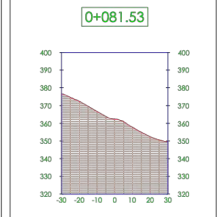
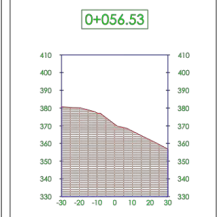
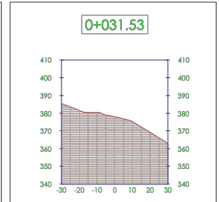




1 PLANTA DE GEORREFERENCIAMENTO
LEVANTAMENTO PLANIMÉTRICO ESCALA 1:250

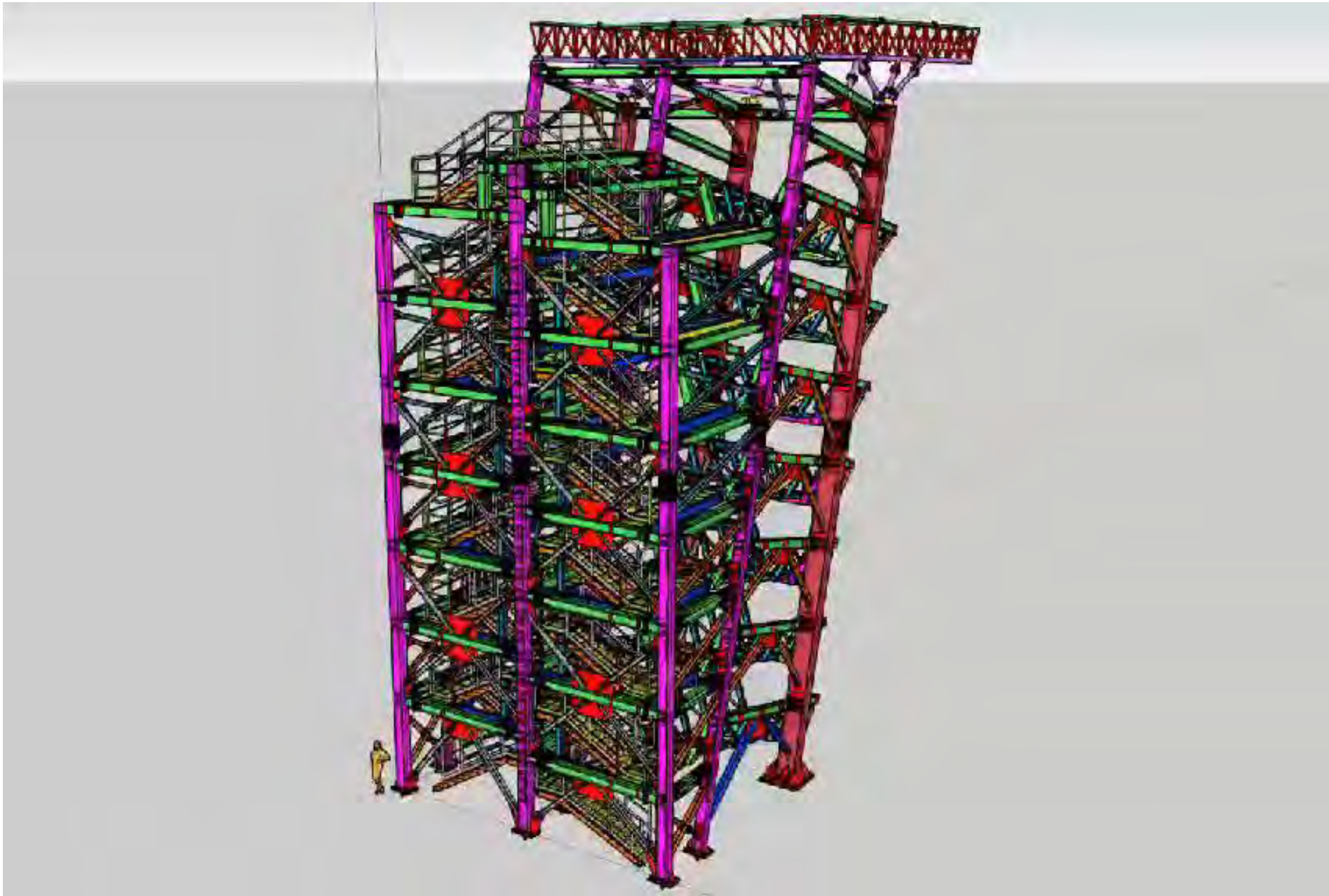


1 PERFIS LONGITUDINAIS
TELESCÓPIO BINGO SEM ESCALA

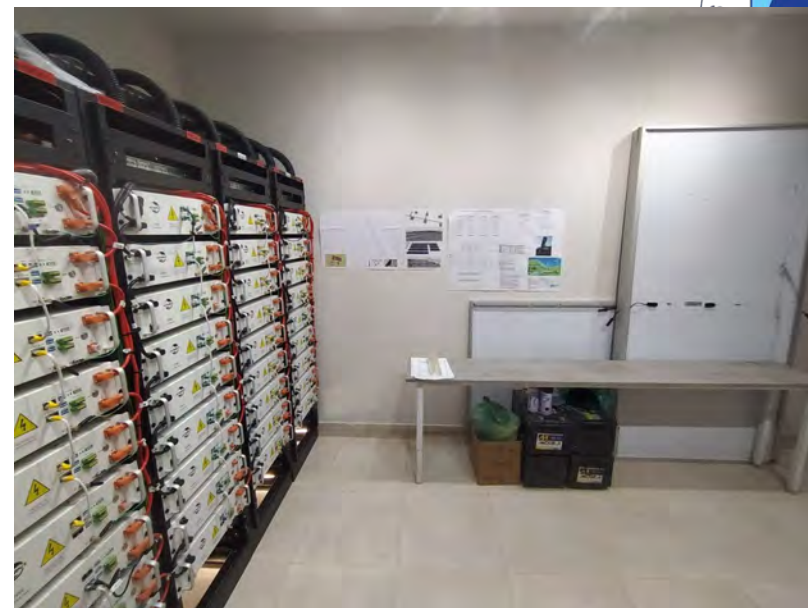


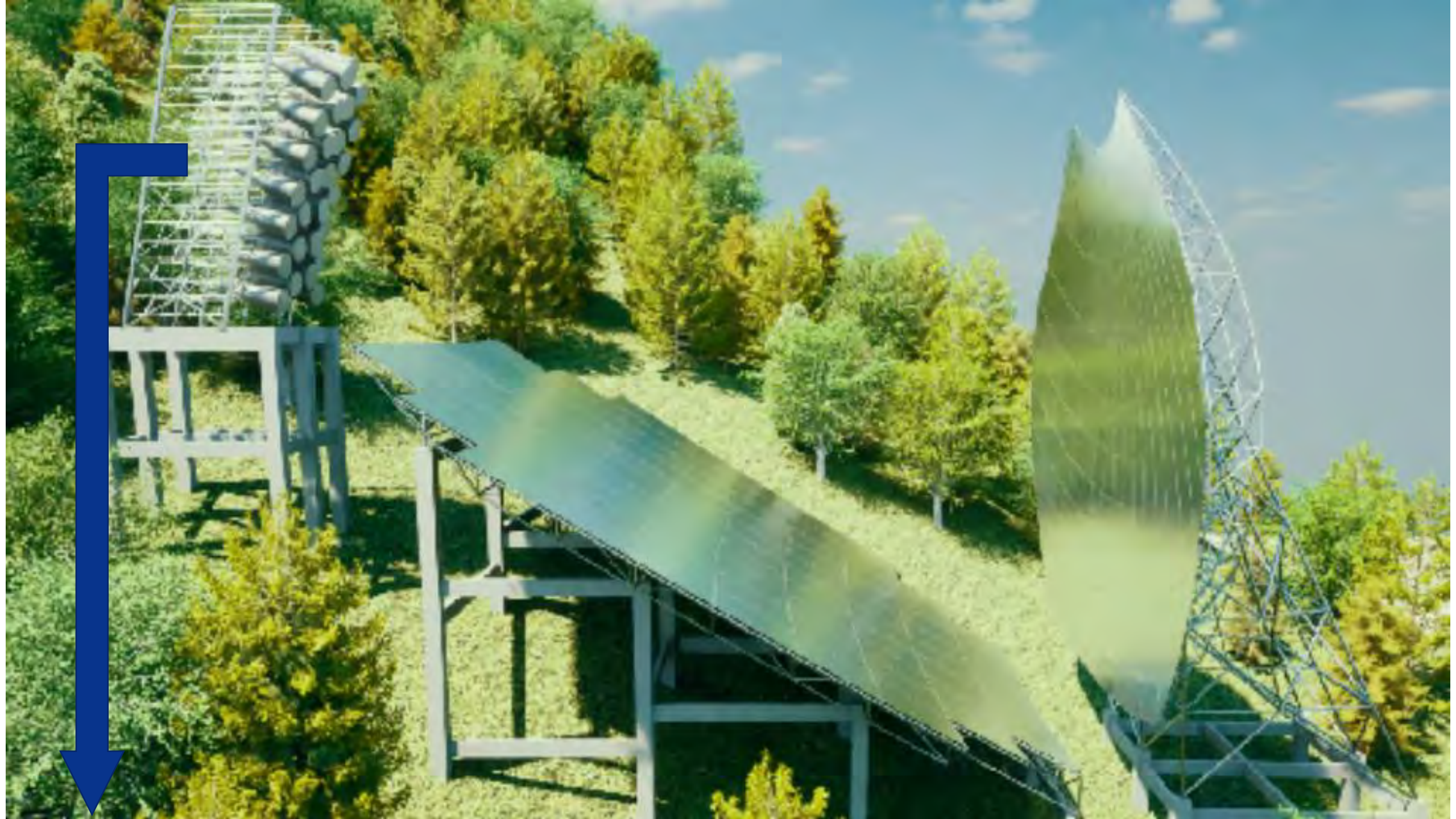
2 PERFIS TRANSVERSAIS
TELESCÓPIO BINGO SEM ESCALA

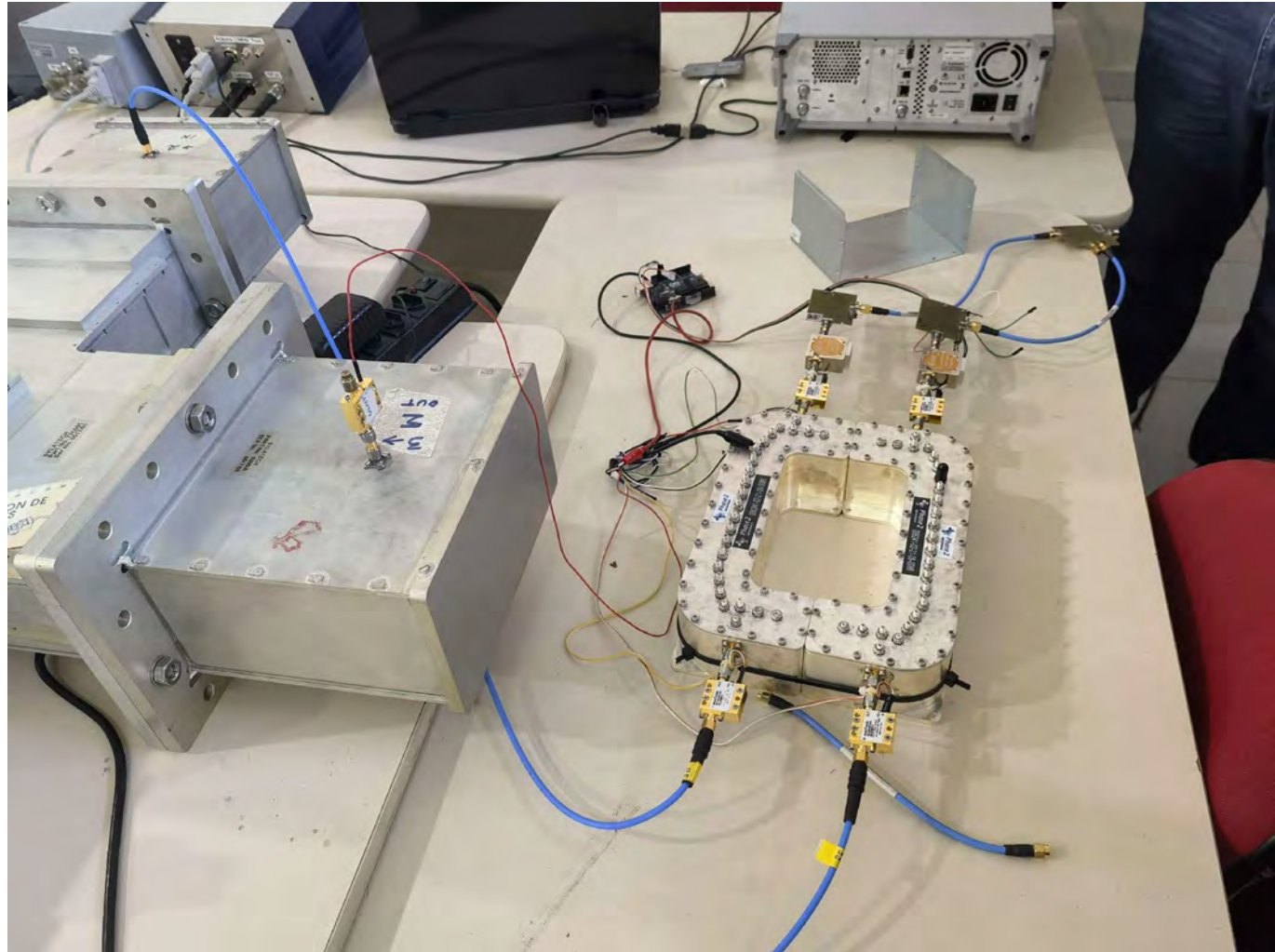
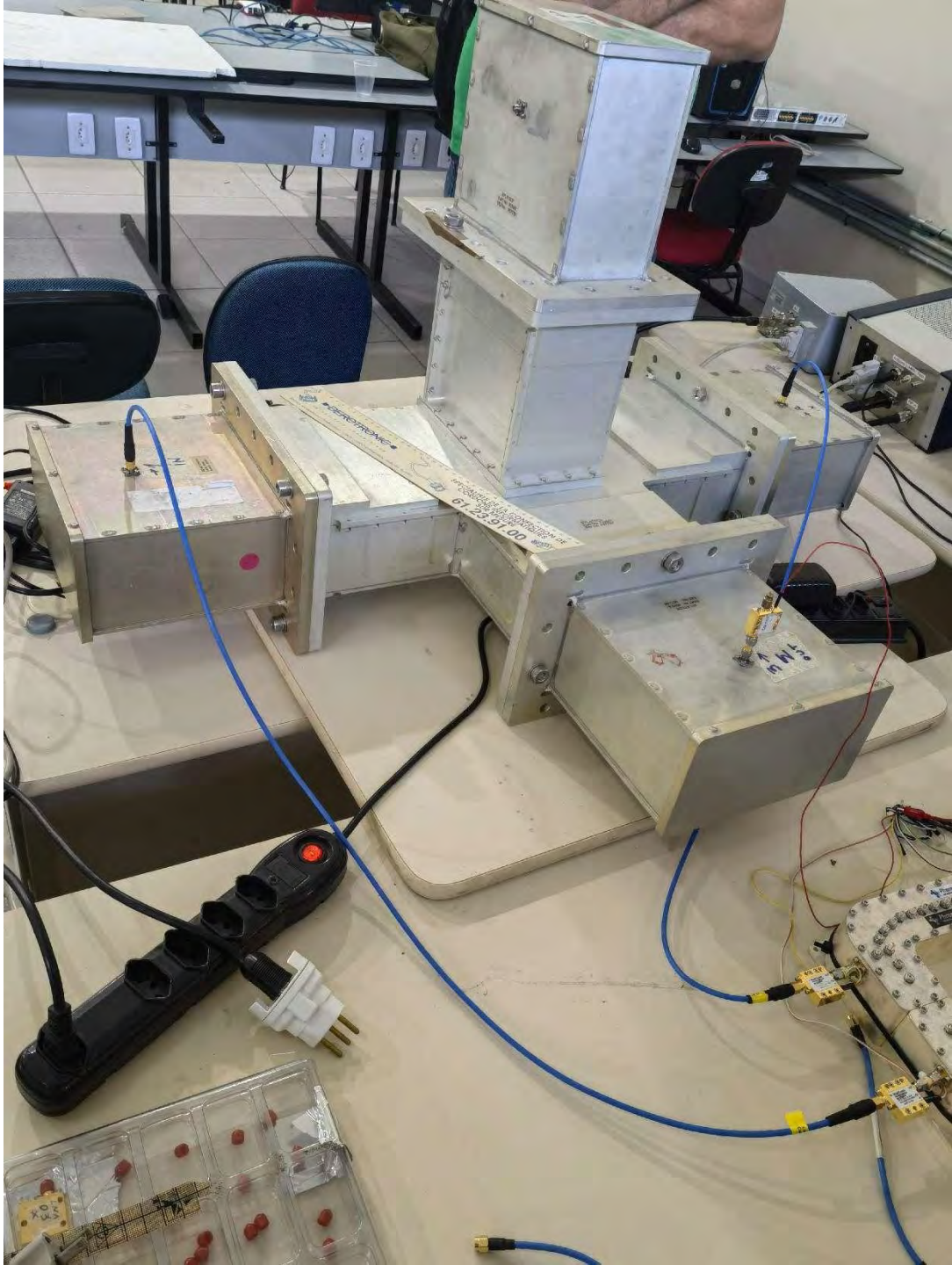
Substrato: AREIA, INDÚSTRIA E CONCRETO DE ESTRUTURA METÁLICA E RECOMBINAÇÕES	
Endereço: SÍTIO LANCHAS I, AGUAÍPE - PB	
Projeto: GEORREFERENCIAMENTO BINGO	Informações Gerais: Número do projeto de referência:
Forma: 01/01	PA-002 DE 03-00-04
Composto: 1 PLANTA DE GEORREFERENCIAMENTO - BINGO	PA-002 DE 03-00-04
1 PLANTA DE SITUAÇÃO	PA-002 DE 03-00-04
Escala: INDICADAS	Data: JANEIRO/2024

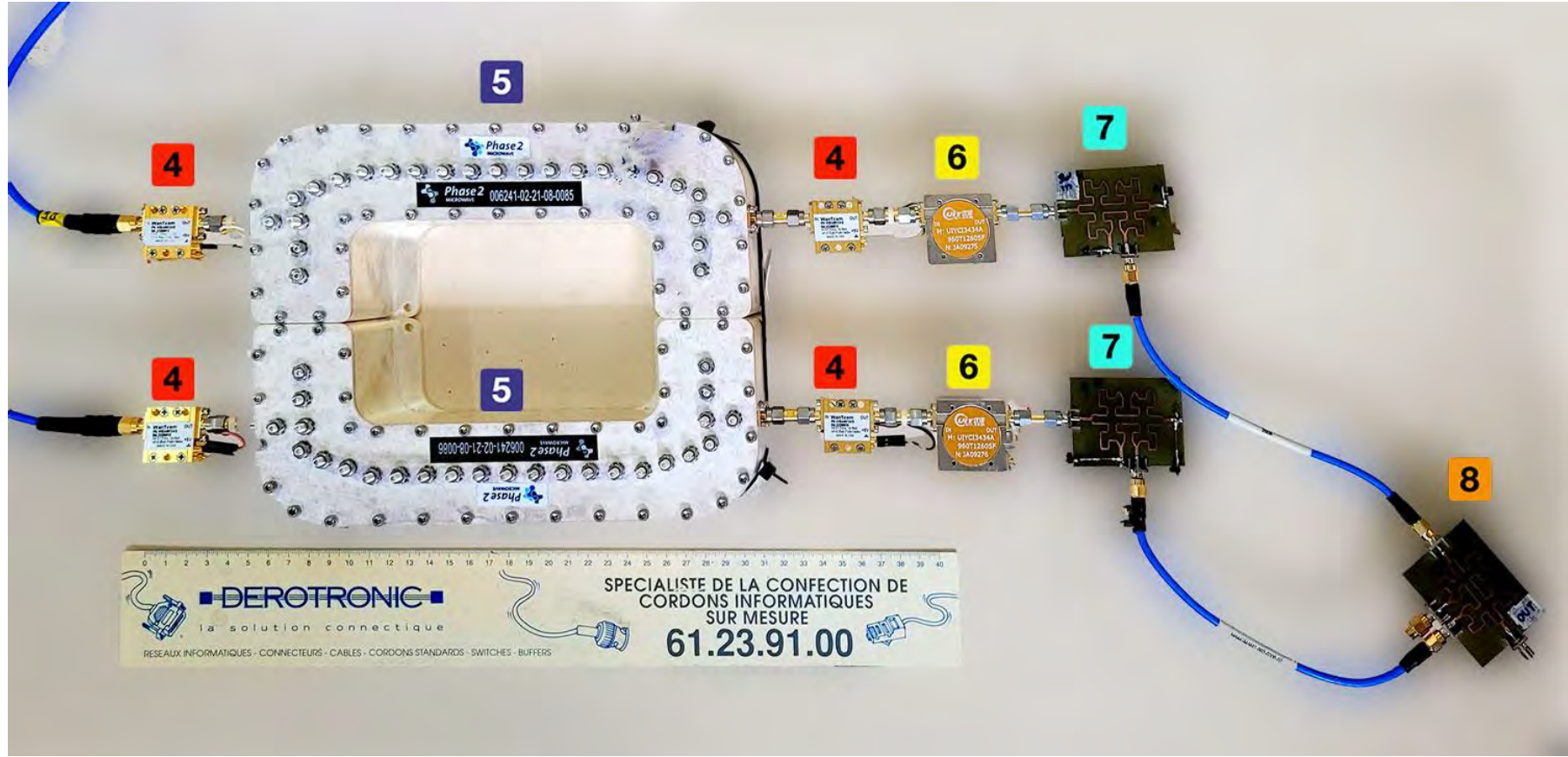




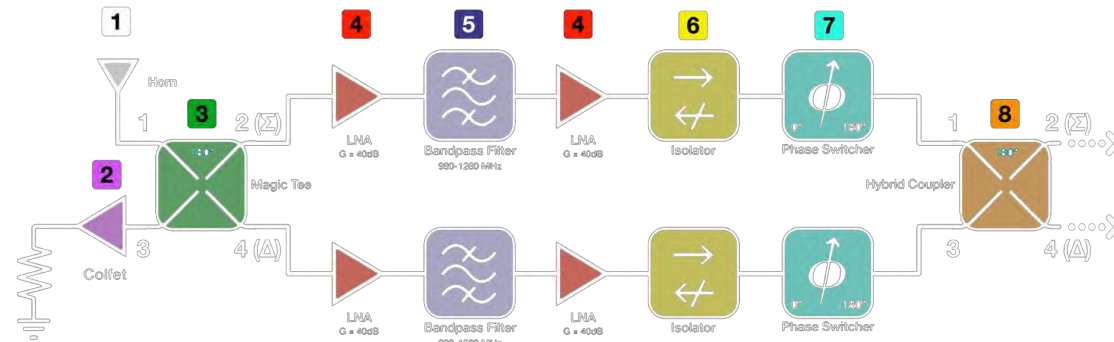








BINGO Radiometer





What need to be done in this box?

1. amplify the signal
2. digitize the data
3. channelization
4. calculate power spectrum

Integrate over time, save storage space.

Data Center about 1Gb/s

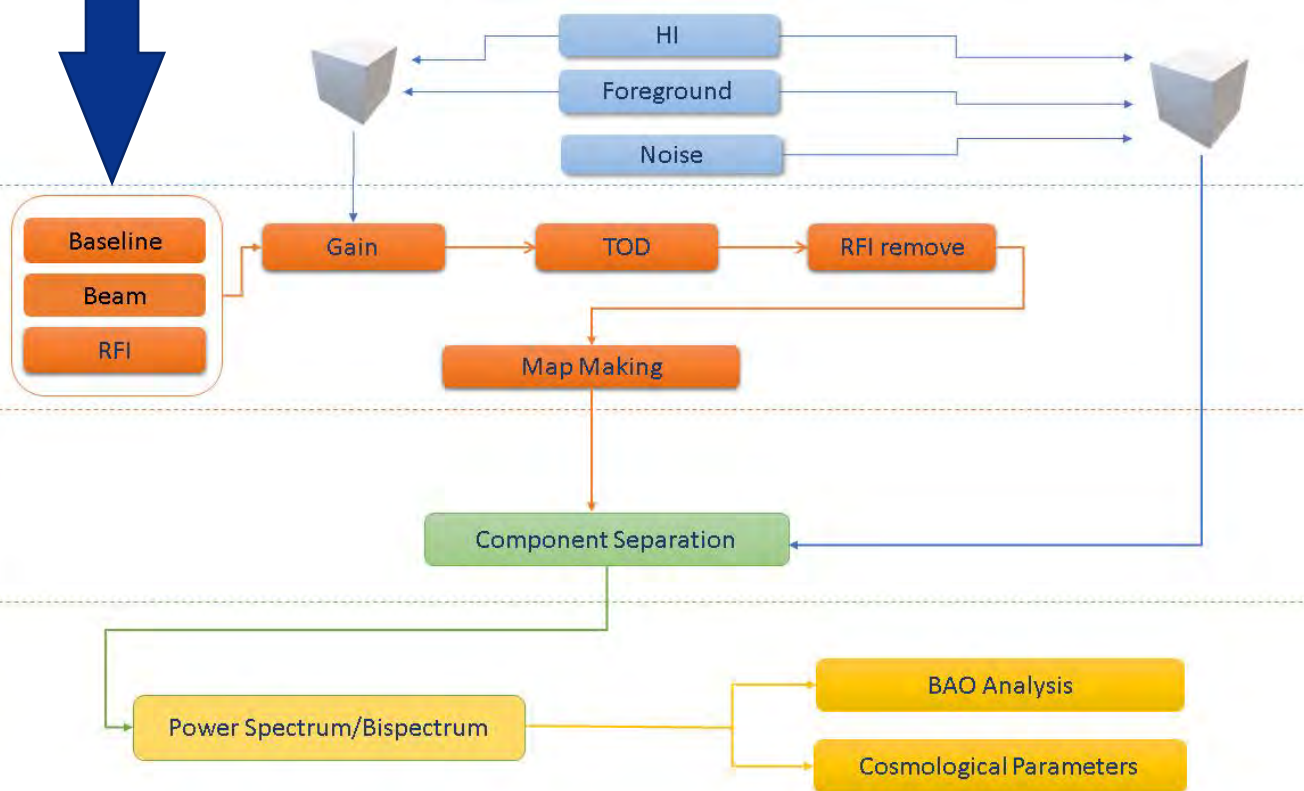
Delete useless data, save storage space.

Simulation

Instrument

Component Separation

Science Goals

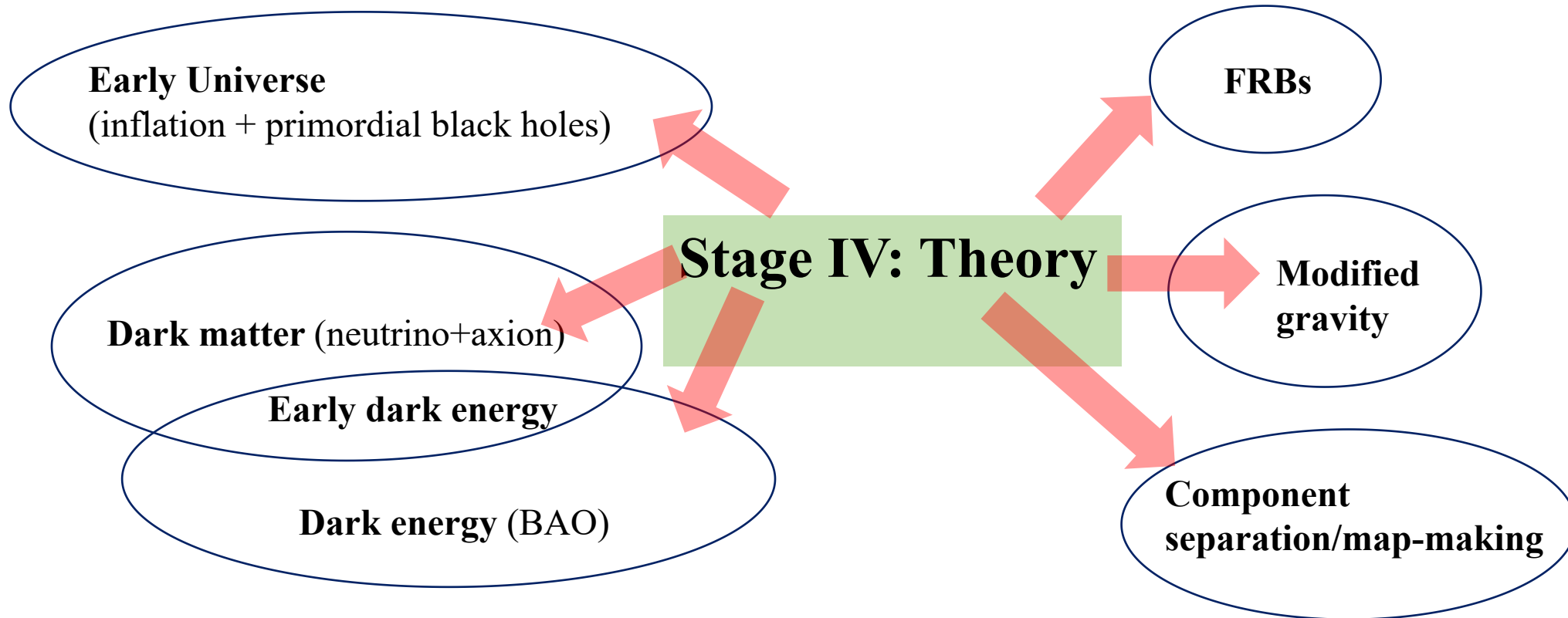


Time domain feature outrigered (Fast Radio Burst)

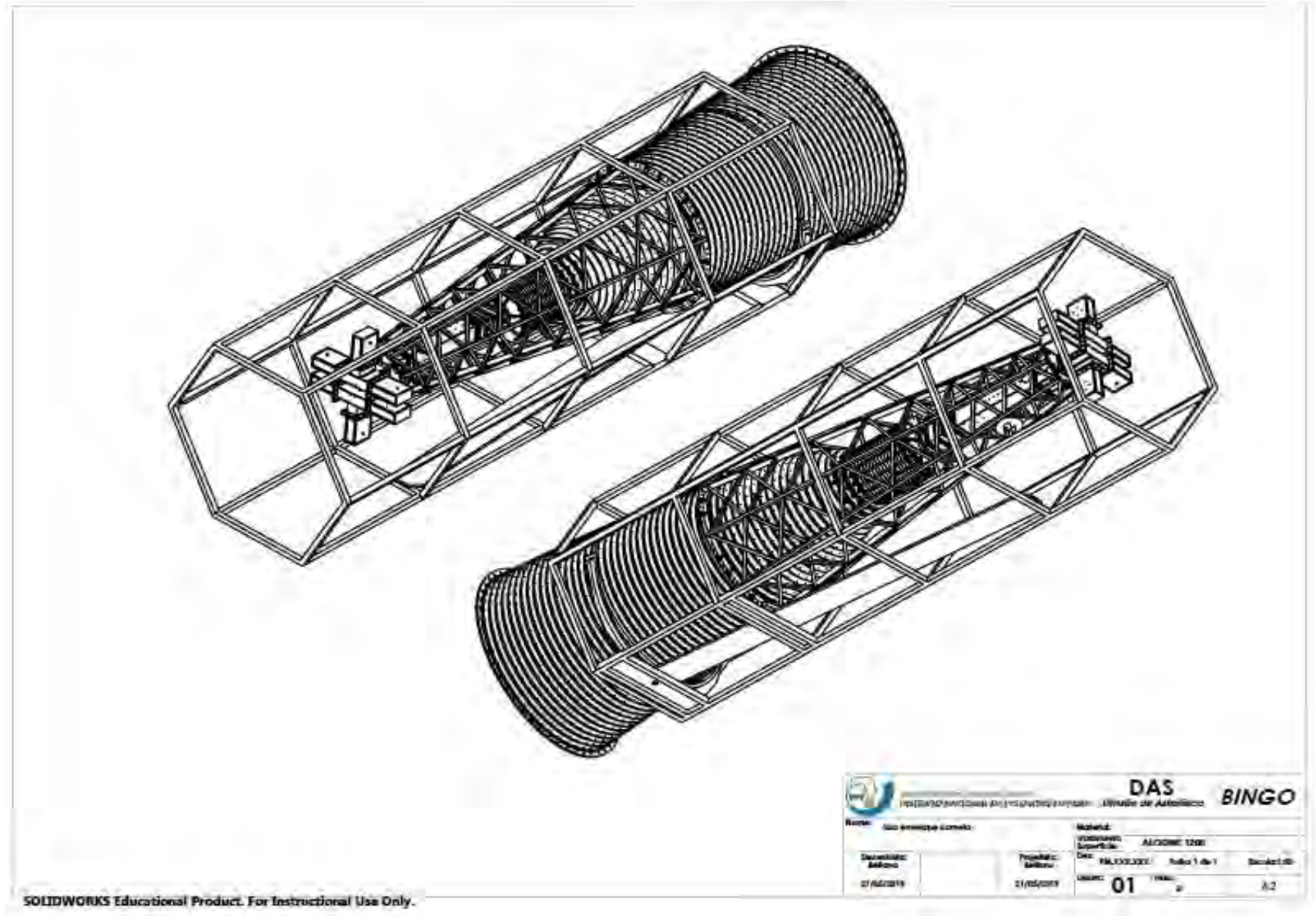
Multiple observations at different locations, interferometry, get DM

Localize FRBs, find optical couterparts

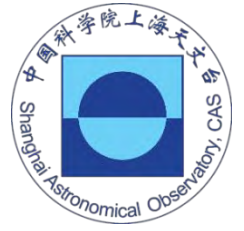
Focusing on new cosmological and astrophysical models in a broad scope of intensity mapping including BINGO



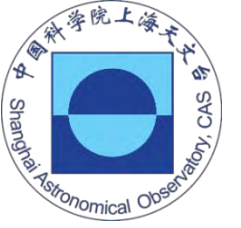
New models/New physics/New approaches



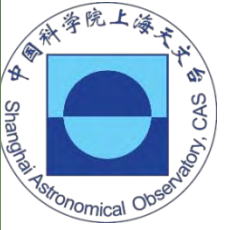
Design and manufacture in Brazil

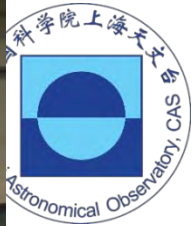


At INPE in 2019!

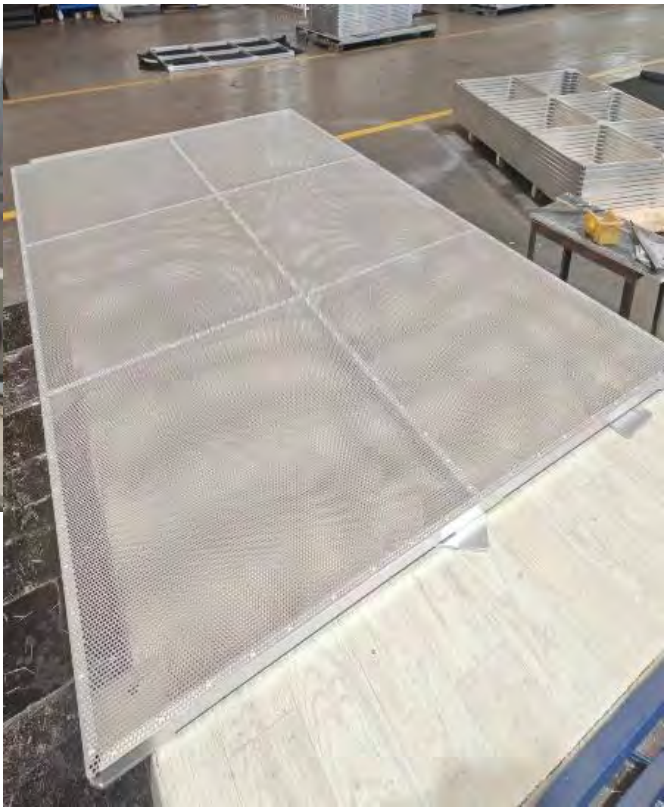
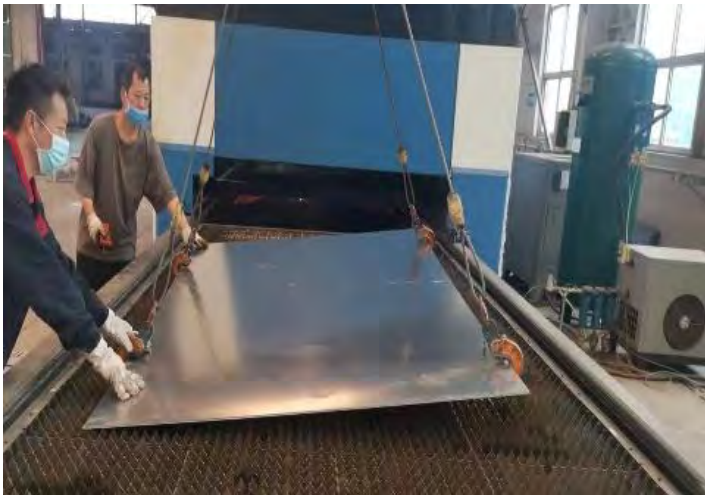


At UFCG in 2021!





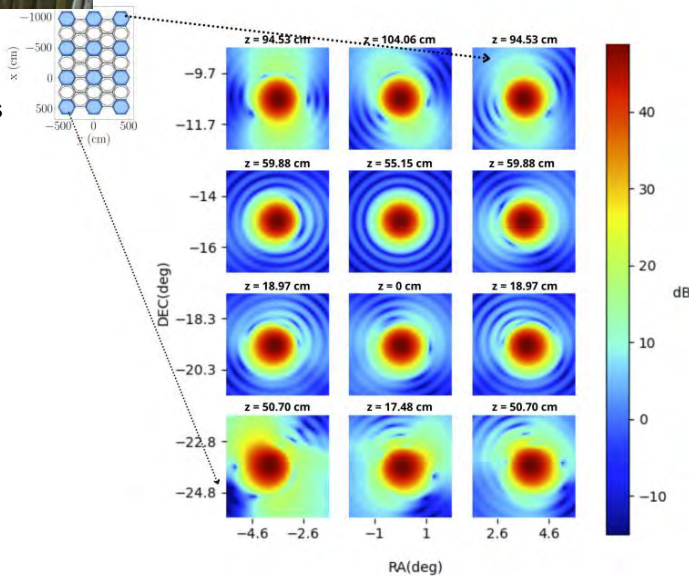
Design and manufactured in China by BINGO team



BINGO Pannels at CETC54 factory

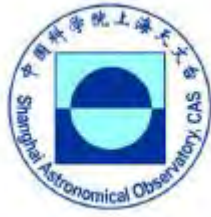


BINGO Chinese CETC54 horns





Due to ship in July/Aug 2024
Finish Assembly in Nov/Dec
2024



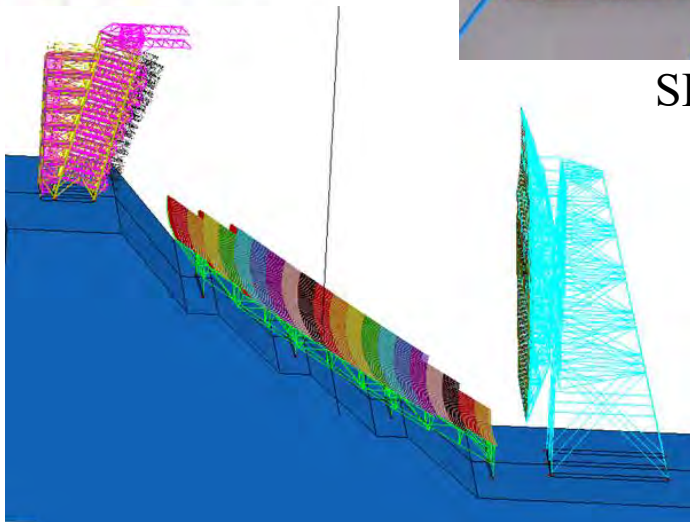
SHAO digitizer.



**National Astronomical Observatories
Chinese Academy of Sciences**

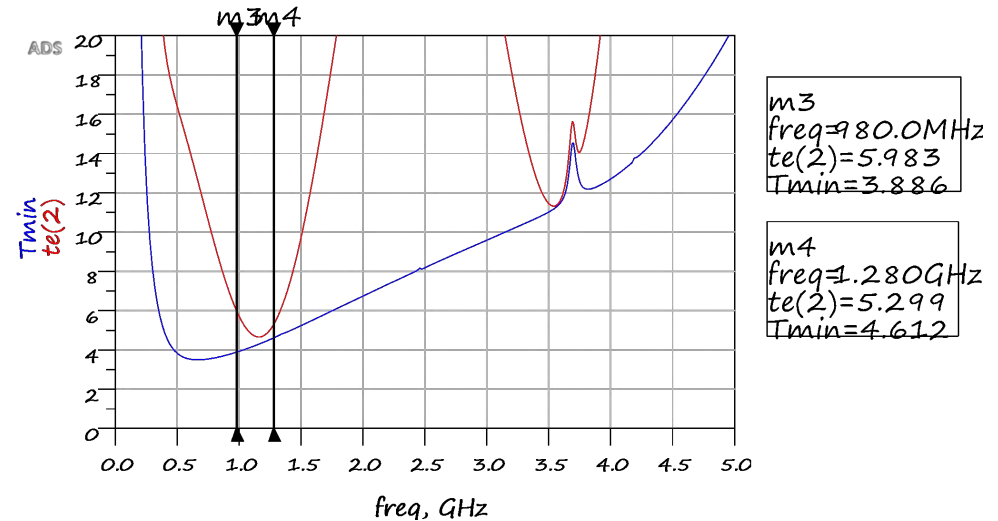
Noise temperature is below 6 K

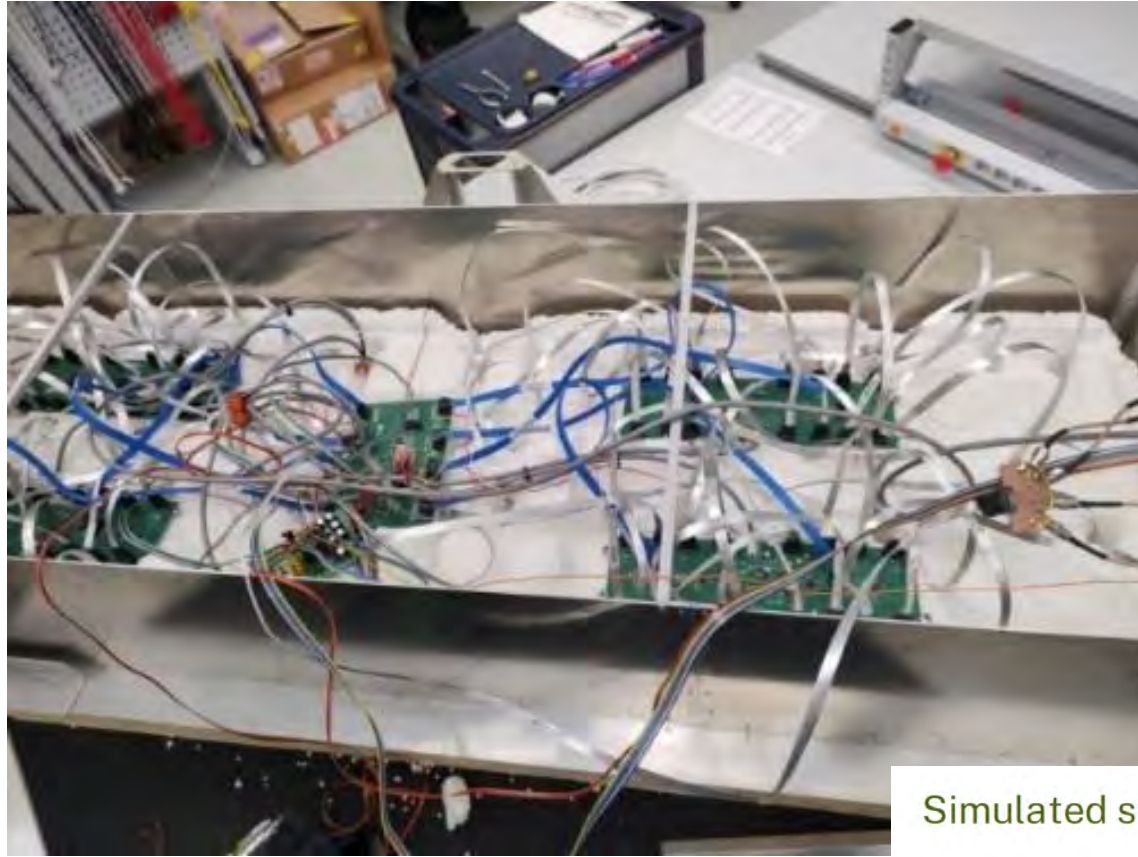
CETC 中国电科



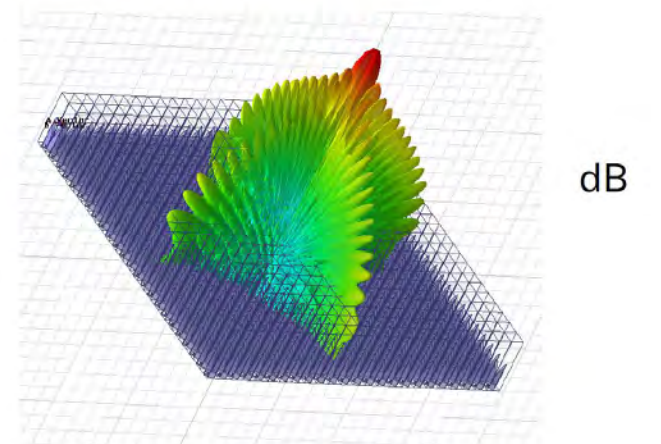
Coordinated by myself and other PIs:

- Telescope structure to be delivered by **CETC54**
- New LNA prototype to be delivered by **NAOC**.
- Discussions with **SHAO** for digitisers for Phase2.





Simulated station - 3d

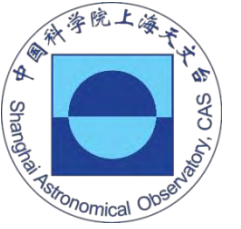


Phase Array Feed for the future

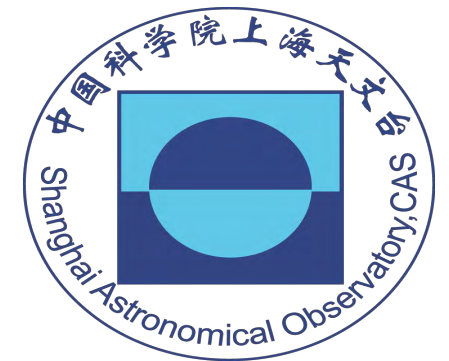


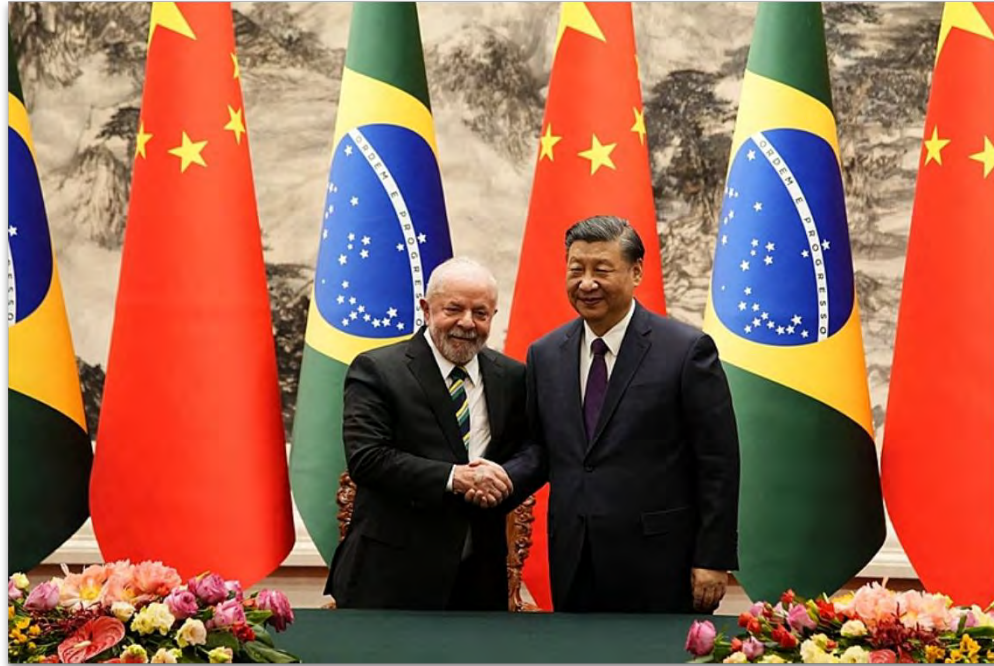
GOVERNO DA PARAÍBA





BAO from Integrated Neutral Gas Observations





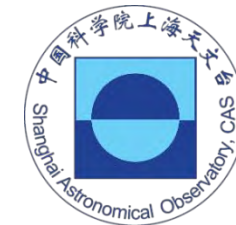
BINGO project was included in the joint statement for the strategic cooperation between Brazil and China by President Lula and President Xi Jinping.

Being implementing this agreement providing solid supports to BINGO project.

https://www.gov.br/mre/pt-br/canais_atendimento/imprensa/notas-a-imprensa/declaracao-conjunta-entre-a-republica-federativa-do-brasil-e-a-republica-popular-da-china-sobre-o-aprofundamento-da-parceria-estrategica-global-pequim-14-de-abril-de-2023

33. The parties recalled the success of the China-Brazil Earth Resources Satellite Programme (CBERS), established in 1988, and renewed their commitment to strengthening and expanding bilateral cooperation for the peaceful use of outer space, with emphasis on the joint development of new technologies and projects with elements of technology transfer. They expressed great satisfaction with the signing of the Complementary Protocol for the Joint Development of CBERS-6 and the Space Cooperation Plan 2023-2032 between Brazil and China. They agreed to accelerate the research and development of CBERS-6 and the implementation of projects in the Space Cooperation Plan, as well as to deepen the evaluation of CBERS-5 and to expand cooperation in areas such as lunar exploration and deep space. Furthermore, they supported the development of the BINGO Radio Telescope, currently under construction in Brazil, aimed at research on dark matter. They also highlighted the relevance of the BRICS Remote Sensing Satellite Constellation, an example of South-South cooperation with benefits for all involved. They stressed that the peaceful use of outer space, including deep space exploration, must have international law as its basis and must be conducive to the promotion of international cooperation.

Memorandum of Understanding



This is a Memorandum of Understanding between the Tianlai project (PI: Professor Xuelei Chen), the Commensal Radio Astronomy FAST Survey (CRAFTS—a key science project of the Five-hundred-meter Aperture Spherical radio Telescope, PI: Professor Di Li), the BINGO/ABDUS project (PI: Professor Elcio Abdalla). The three projects agree to coordinate efforts of observations, aiming for a broader sky and for a wider range of science outputs. When the ABDUS project shall be a reality, the aforementioned projects will realize common sky coverage. Addition of FRB's and Pulsars observations, especially concerning cosmological constraints with a definition of the host galaxy in case of FRB's will provide a strong possibility of a breakthrough.

Professor Xuelei Chen

PI of the TianLai project



Professor Di Li

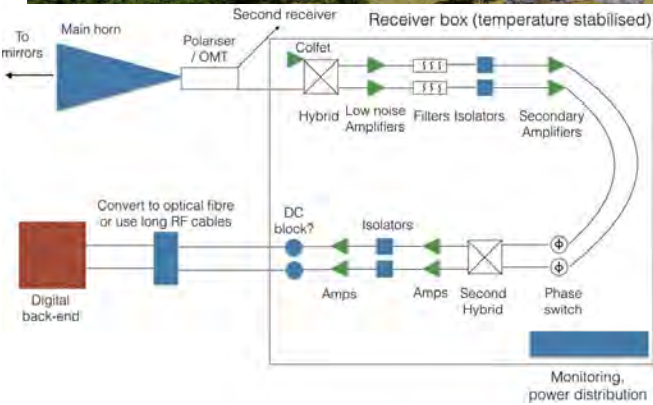
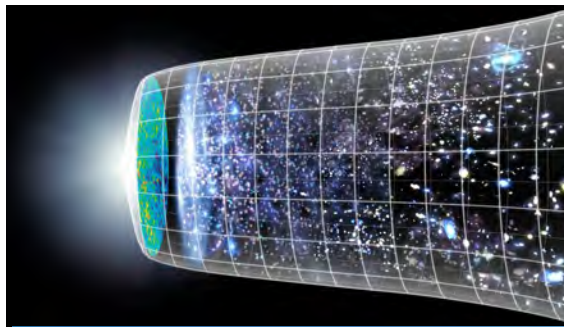
PI of the CRAFTS project



Professor Elcio Abdalla

PI of the BINGO/ABDUS project





Science, Technology and
EDUCATION

