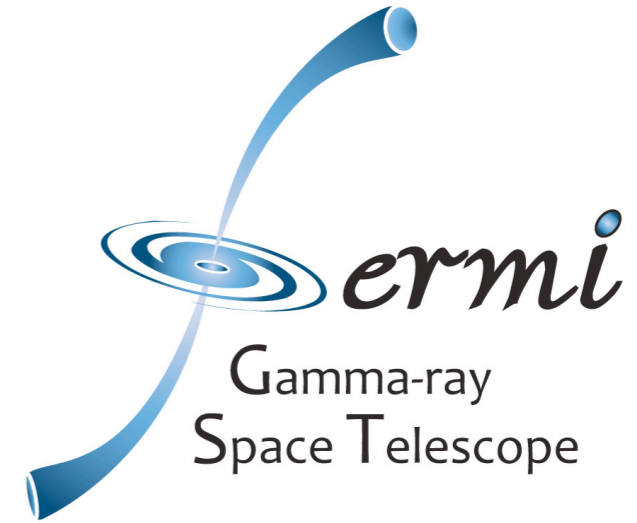


# The French Gamma-Ray Community and Its Connections with Latin America

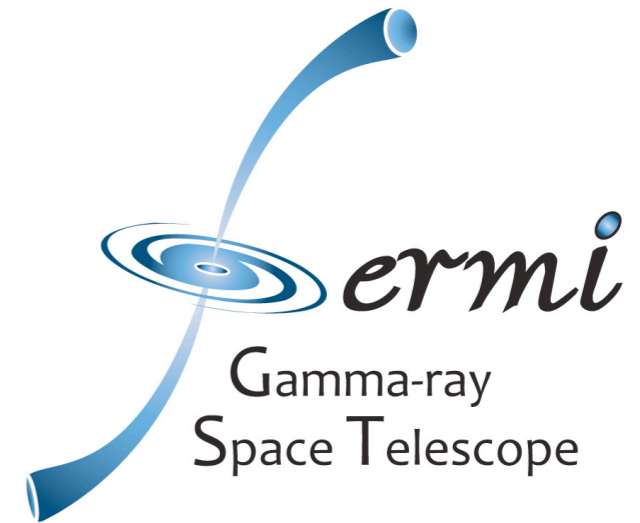
CLAF-CNRS Workshop April 2026

Pierre Cristofari, Anne Lemière

# The French Gamma-Ray Community and Its Connections with Latin America



# The French Gamma-Ray Community and Its Connections with Latin America





Cherenkov Telescope Array Observatory (artist view)

CTAO

CONSORTIUM

How it's going: the array is real !

# CTAO Status update

September 2025

LST

LST



# The CTAO 'French' community

Funding institutions: CNRS (INSU, IN2P3), CEA

- French 'representatives' :

**T. Stolarczyk : co-spoke & M. DeNaurois vice chair board ERIC**

- Coordinators French 'community' :

**F. Acero, P. Cristofari, S. Fegan**

≈13 French teams/laboratories involved in CTAO:

APC (Paris), CPPM (Marseille), IJCLAB (Orsay), IPAG (Grenoble), IRAP (Toulouse), IRFU (CEA Saclay: DAp, DPhP, etc.), LAPP (Annecy), LLR (École polytechnique); LP2I (Bordeaux), LPNHE (Paris), LUPM (Montpellier), Observatoire de la Côte d'Azur, Observatoire de Paris

80 - 100 permanent researchers

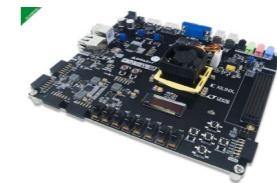
30 - 40 Postdocs/ PhD candidates



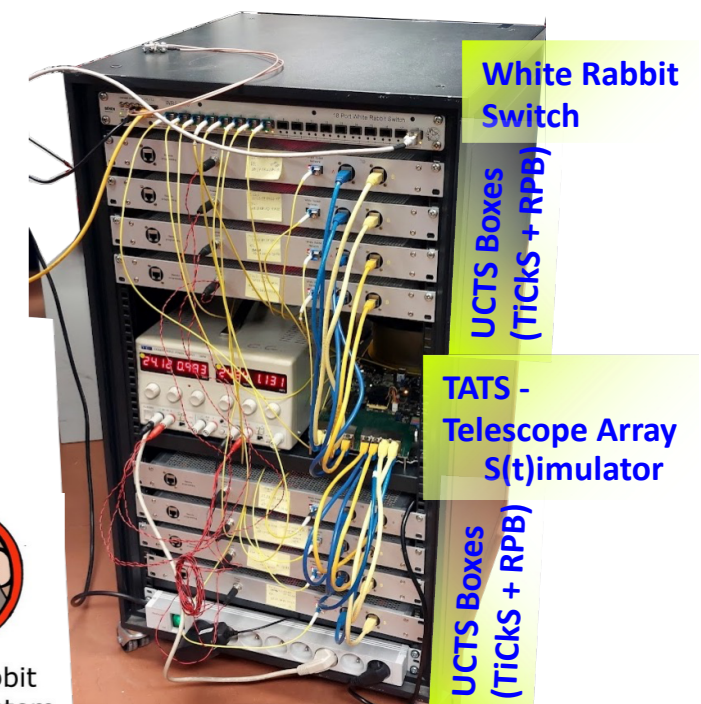
# Implications on multiple levels: construction LSTs

## Construction :

- 4 LSTs almost completed in La Palma
  - All mirrors in place, all cameras installed by spring '26
- First two MSTs and SSTs in the South in 2026 (foundation contracted)
- Timing & clock stamping for the trigger system
  - Modules delivered for LST-North+LST-South+NectarCam



TATS based on  
GeneSys  
FPGA board

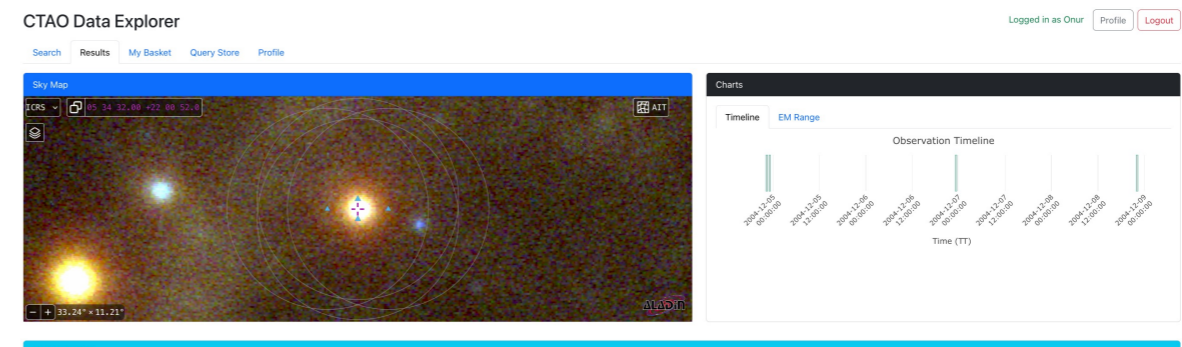


WhiteRabbit  
Timing System

# Implications on multiple levels: Software, data analysis, data access

## Software :

- Gammapy v2.0 was released last month (official CTAO science tool)
  - Major Long Term Release. Many improvements
- Array control software implemented & operational
- Data processing : first end to end chain being implemented
- Data portal being prepared for the Science data challenge



- **SUSS: Archive of bulk data, Portal access to data**

# Implications on multiple levels: Small size telescopes

## SSTs in France

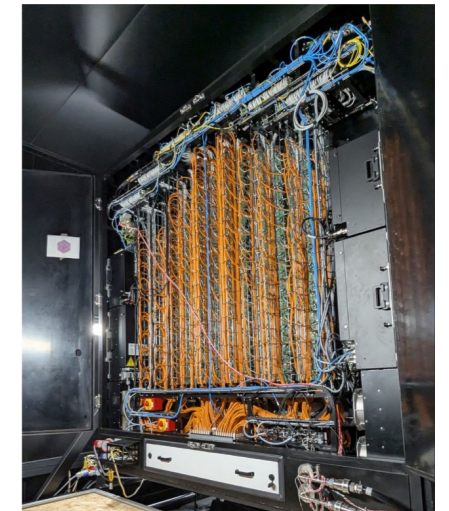
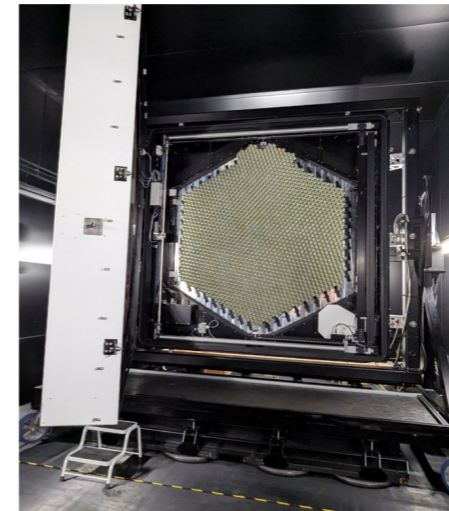
- Start of industrial phase for SST telescopes
- 2026: assembly, shipping to Chili
- 2027: first batch of 5 SSTs on site + 2 MSTs
- ~2028 : 15 SSTs
- ~2029 : 25 SSTs



# Implications on multiple levels: NectarCAM MSTs

## NectarCAM : a camera for MSTs

- First camera is complete.
- Under extensive tests at CEA/IRFU
- Many technical improvements in the last few years.
- Goal : first camera ready to **be shipped by summer**
- Integration of second camera has started.



# Implications on multiple levels: Training Cherenkov Astronomy Data School (CADS, Paris)

November 2-6th 2026

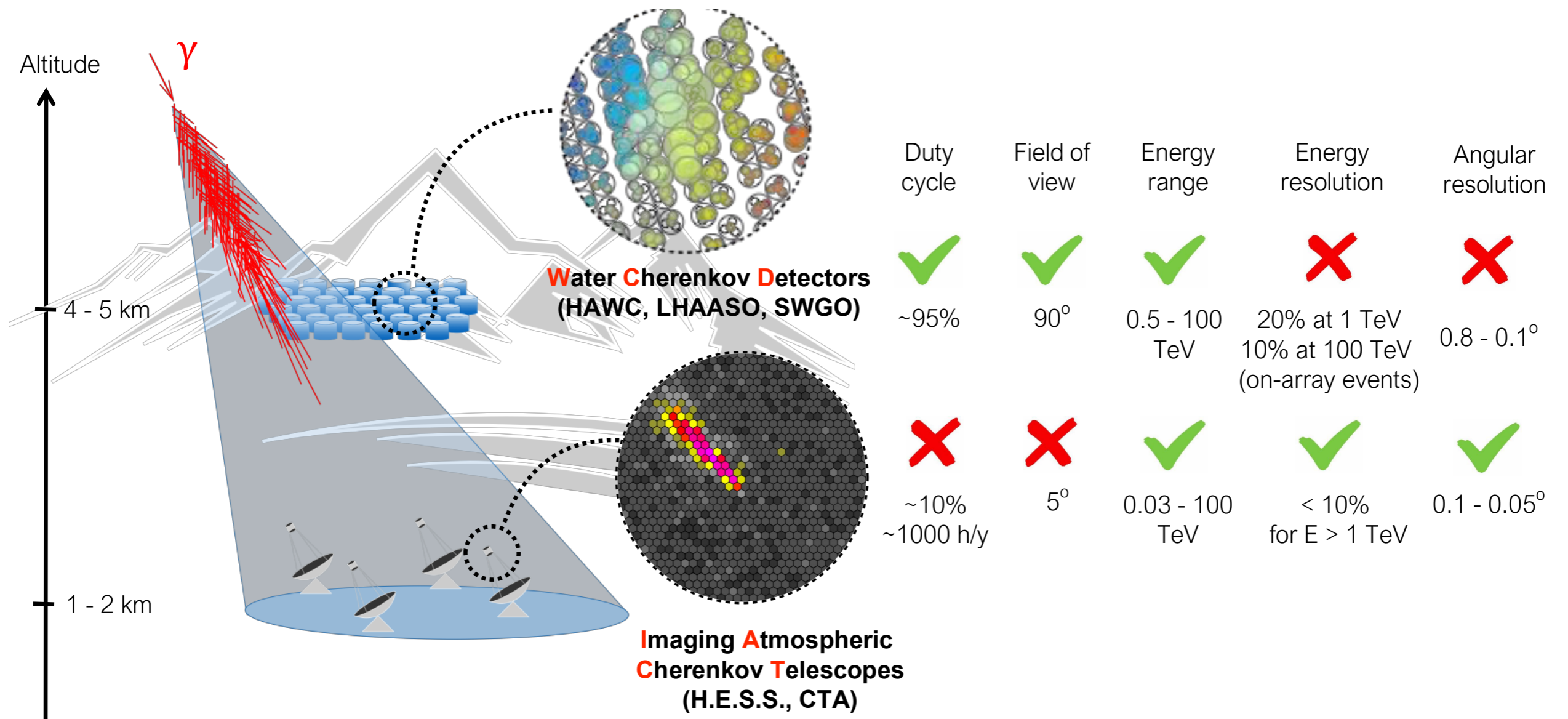
(3rd edition, 35 slots, Lectures and Hands-on session beginners and advanced users Gammapy, registration thanks to Observatoire de Paris.

<https://indico.obspm.fr/event/2993/>



# SWGGO

The Southern Wide-field Gamma-ray Observatory



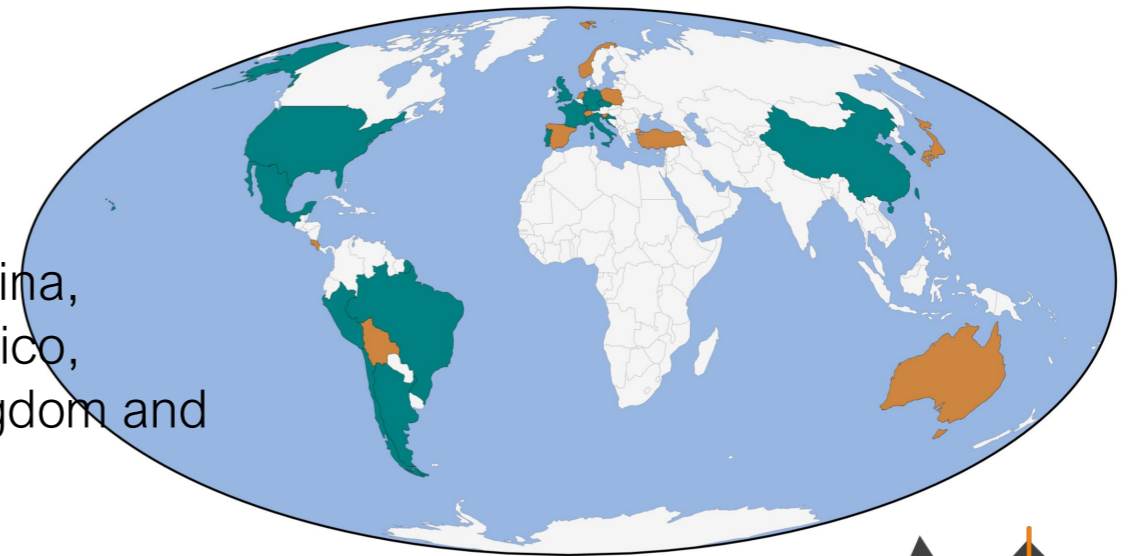


## SWGO : The Southern Wide-field Gamma-ray Observatory

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The SWGO collaboration

- ▶ Founded in 2019
- ▶ 90 research institutions from 16 countries
- ▶ **Full partner institutes** in Argentina, Brazil, Chile, China, Croatia, Czech Republic, France, Germany, Italy, Mexico, Netherlands, Peru, Portugal, South Korea, United Kingdom and United States
- ▶ **Supporting scientists** in 10 additional countries



Spokesperson : Jim Hinton, MPIK Heidelberg, Germany

Vice-spokespersons :

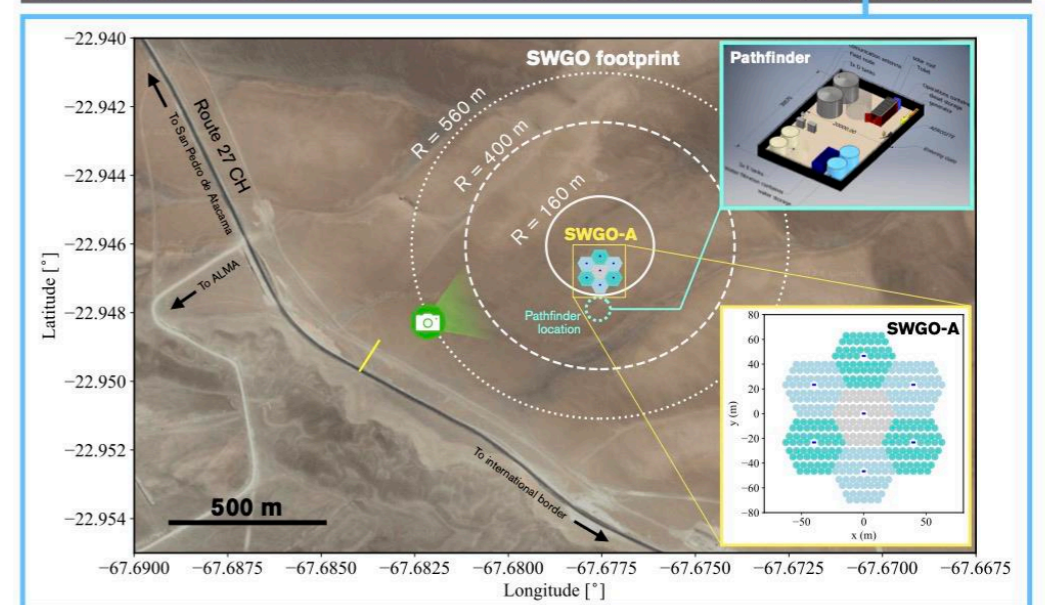
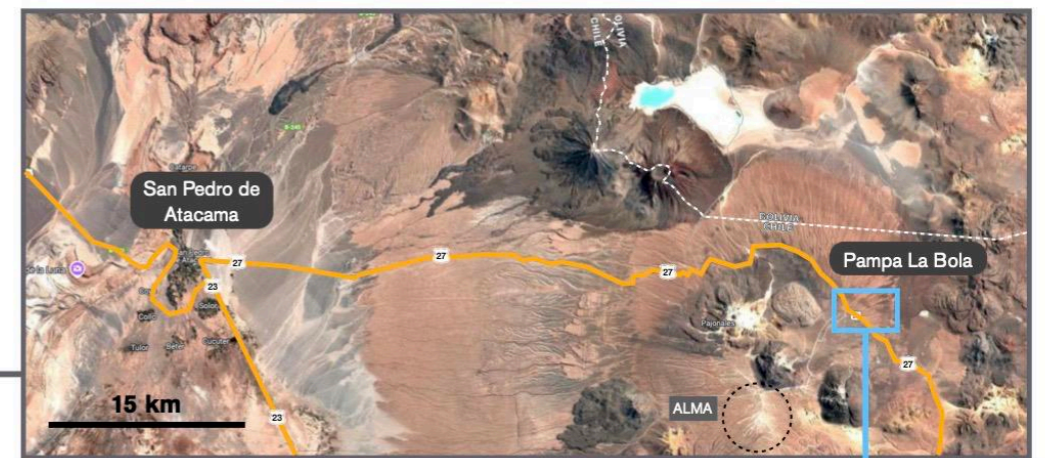
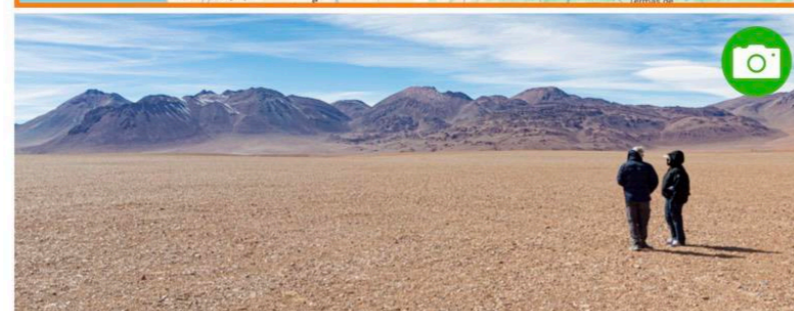
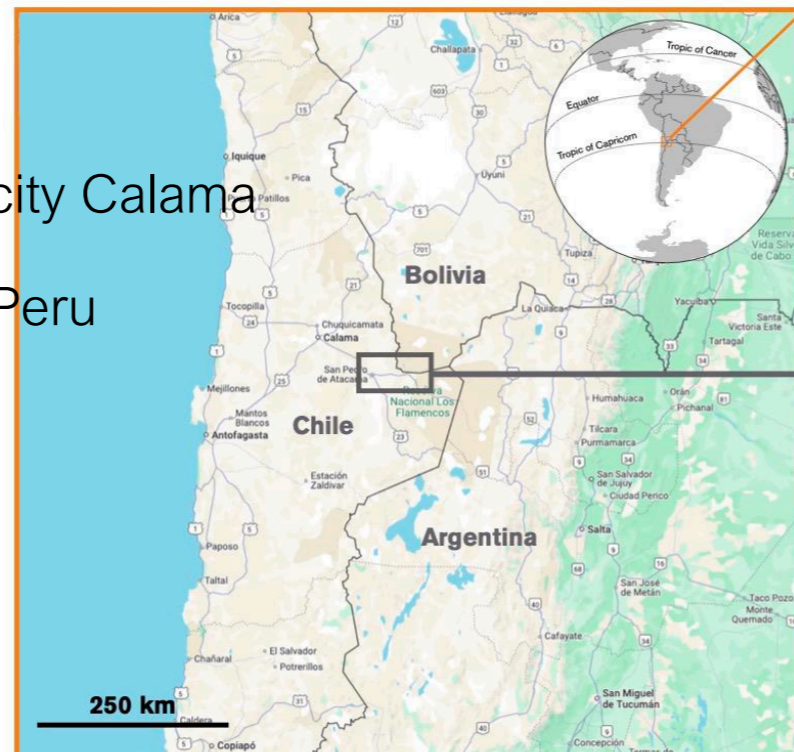
Petra Hüntemeyer, MTU, Michigan, US

Ulisses Barres de Almeida, CBPF, Brazil



## SWGO - Site selection !

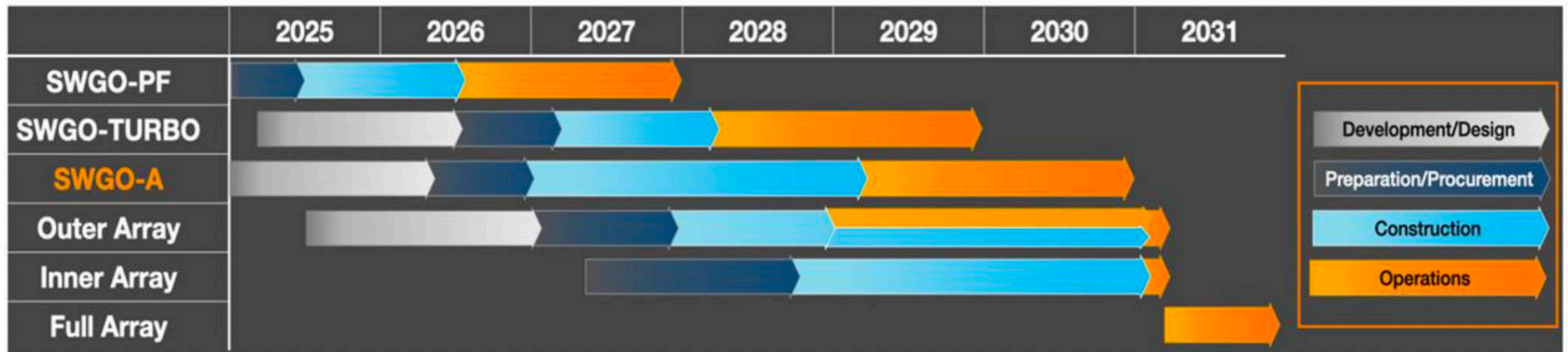
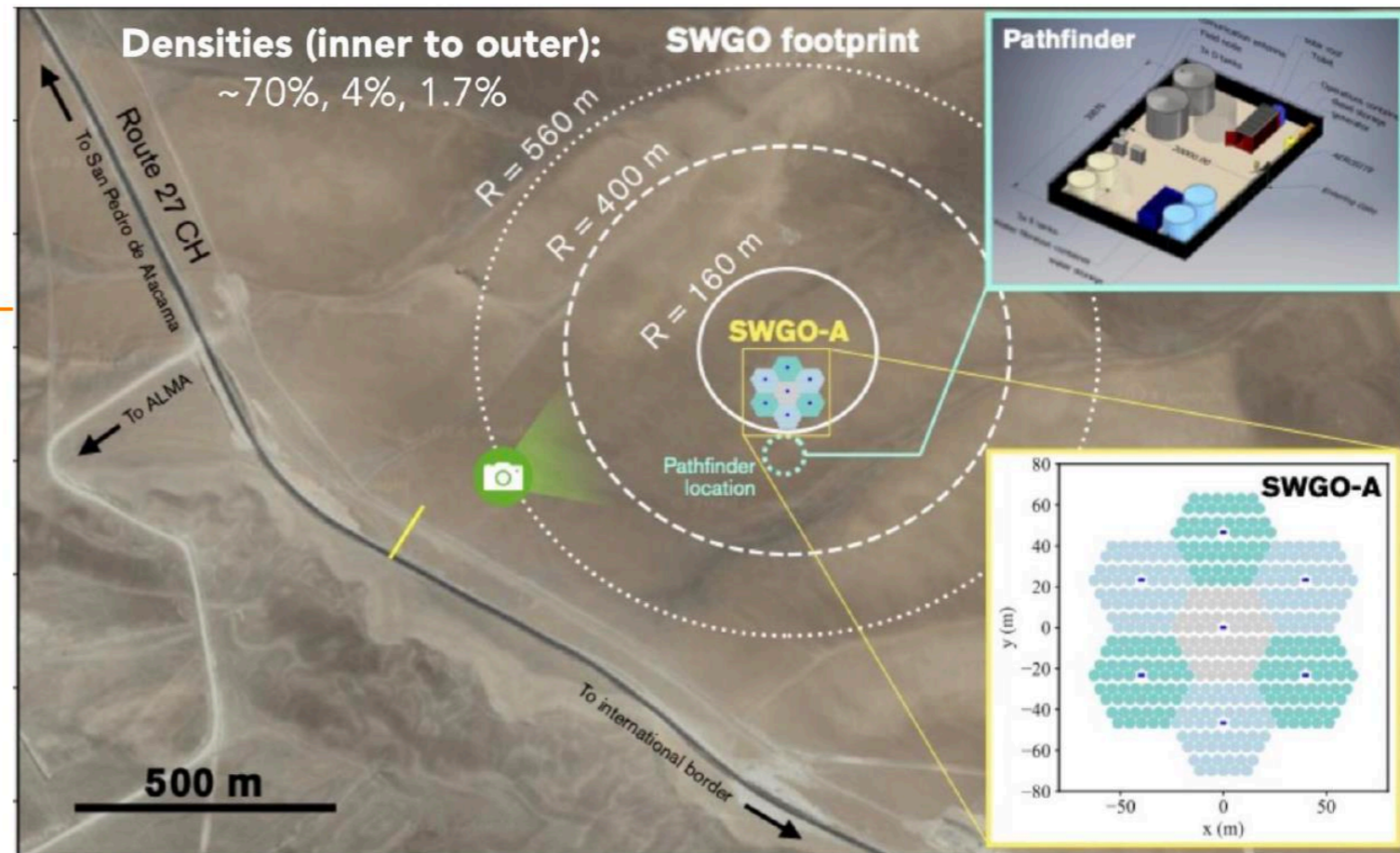
- ▶ July 2024: preferred site identified: Pampa La Bola, Atacama Astronomical Park, Chile (neighbour of ALMA)
- ▶ altitude : 4700 m
- ▶ water from the nearby city Calama
- ▶ back-up site : Imata in Peru

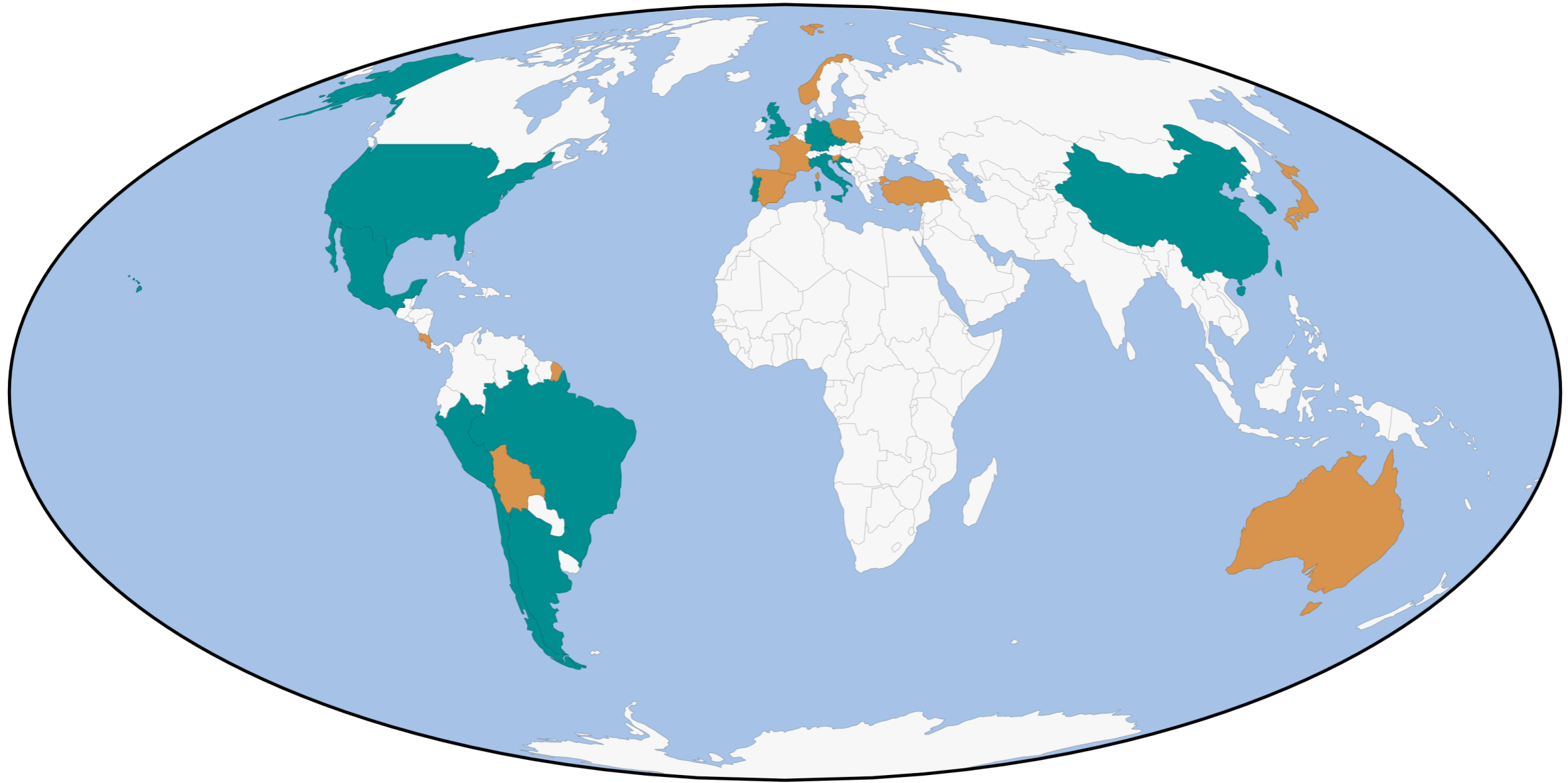


# SWGGO Stages

## ⊙ Beyond the pathfinder:

- SWGO-A – 385 WCDs in inner array
- Outer WCD engineering array ~50 tanks
- 800 radio antennae array (SWGGO-TURBO)
- Construction to full scale as funding allows





16 countries

2 Laboratories in France : LP2I Bordeaux, APC



## 2 Laboratories in France : LP2I Bordeaux, APC

Gammapy (joint analyses), **Extended source analysis** in development (CTAO synergy), theoretical prospects

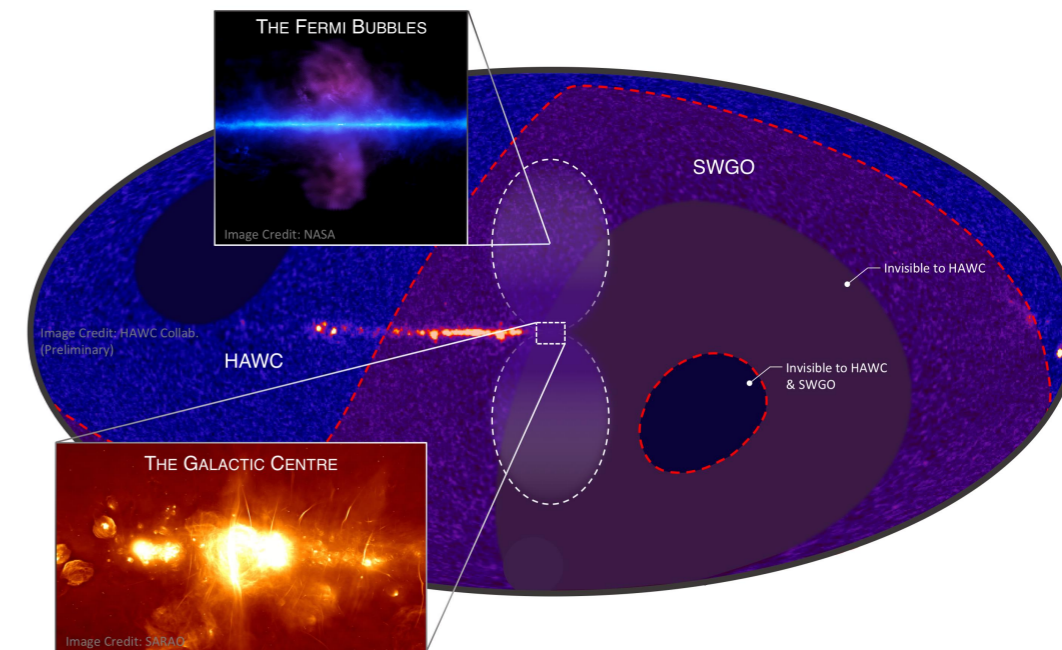
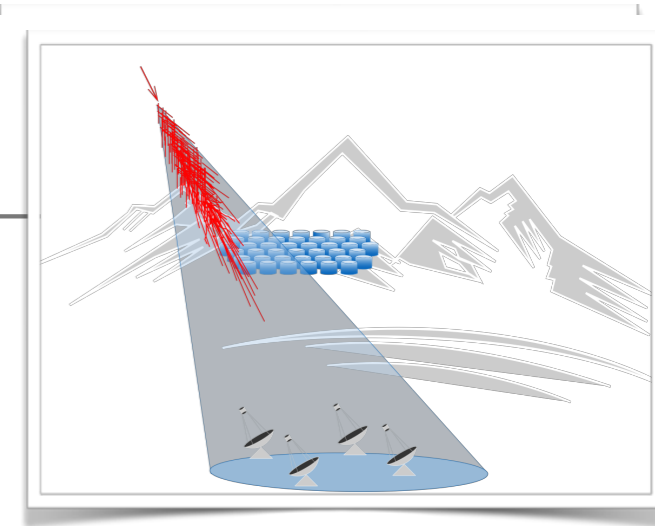
Technical developments : **Bladder tests** in wave basin (resistance & motion under waves)

**Solar panels** to power the Pathfinder.

IN2P3 Master Project (pre-funded project stage)

# Summary

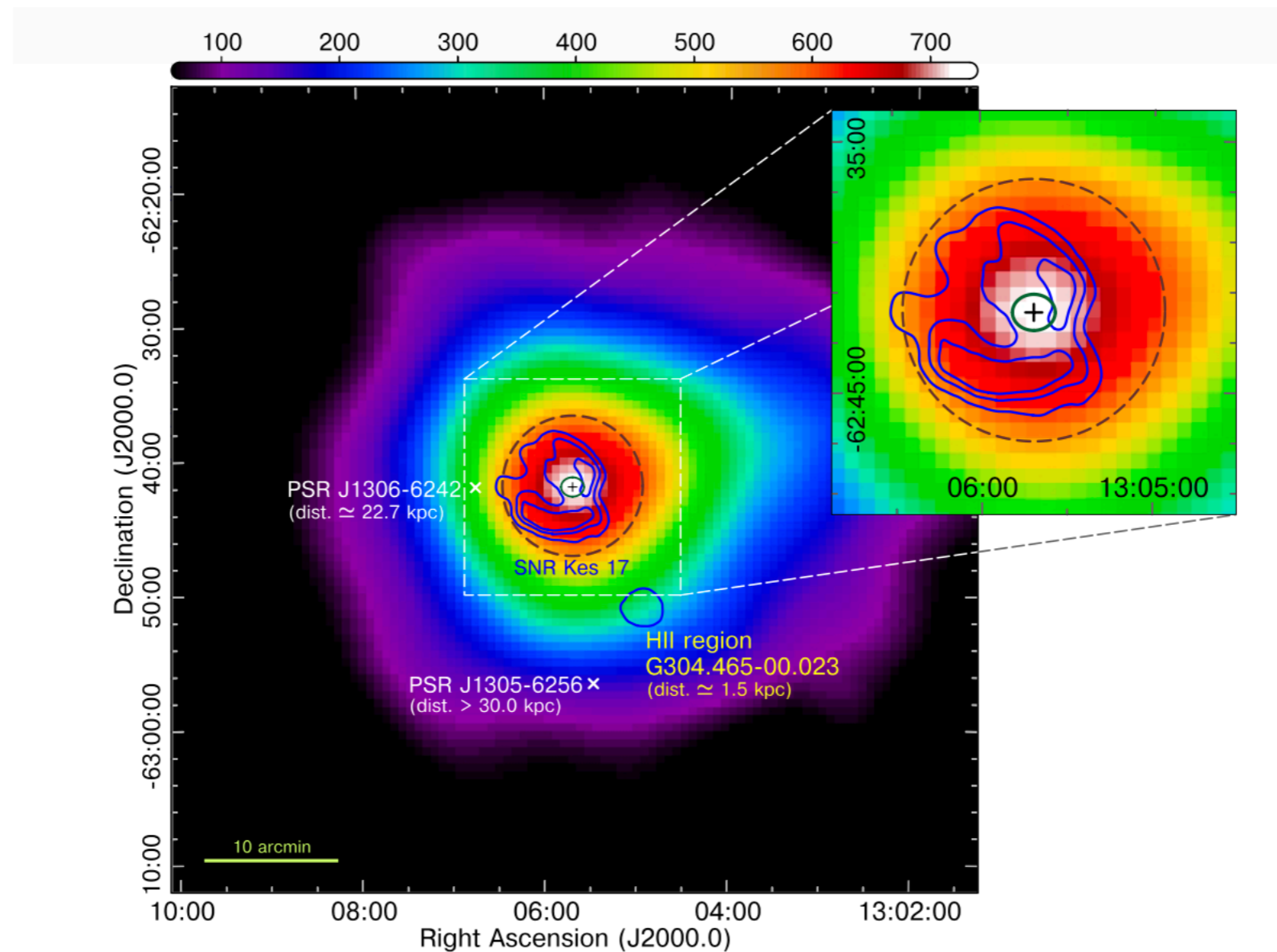
- ▶ Two complementary detection techniques to detect  $\gamma$  rays from the ground
- ▶ HAWC and LHAASO covering the Northern hemisphere. SWGO brings the successful wide-field gamma-ray approach to a new hemisphere ! First major instrument of this type in the South
- ▶ Complementarity with CTAO for transient, very extended sources and PeVatrons) ; synergy with neutrino and GW alerts
- ▶ NOW approaching construction:
  - Pathfinder in Pampa la Bola in 2026
  - SWGO-A construction from 2027 (with NSF support)



See science case white paper for details:  
<https://arxiv.org/abs/2506.01786>

# Other 'smaller' collaborations

Joint Radio-gamma analyses: supernova remnant Kes 17



+ Many others

Supan, Castelletti, Lemière 2023

Lemière, Castelletti, Maza 2025

IAFE & CNRS