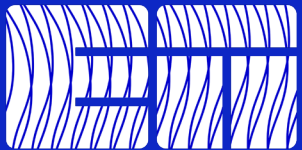


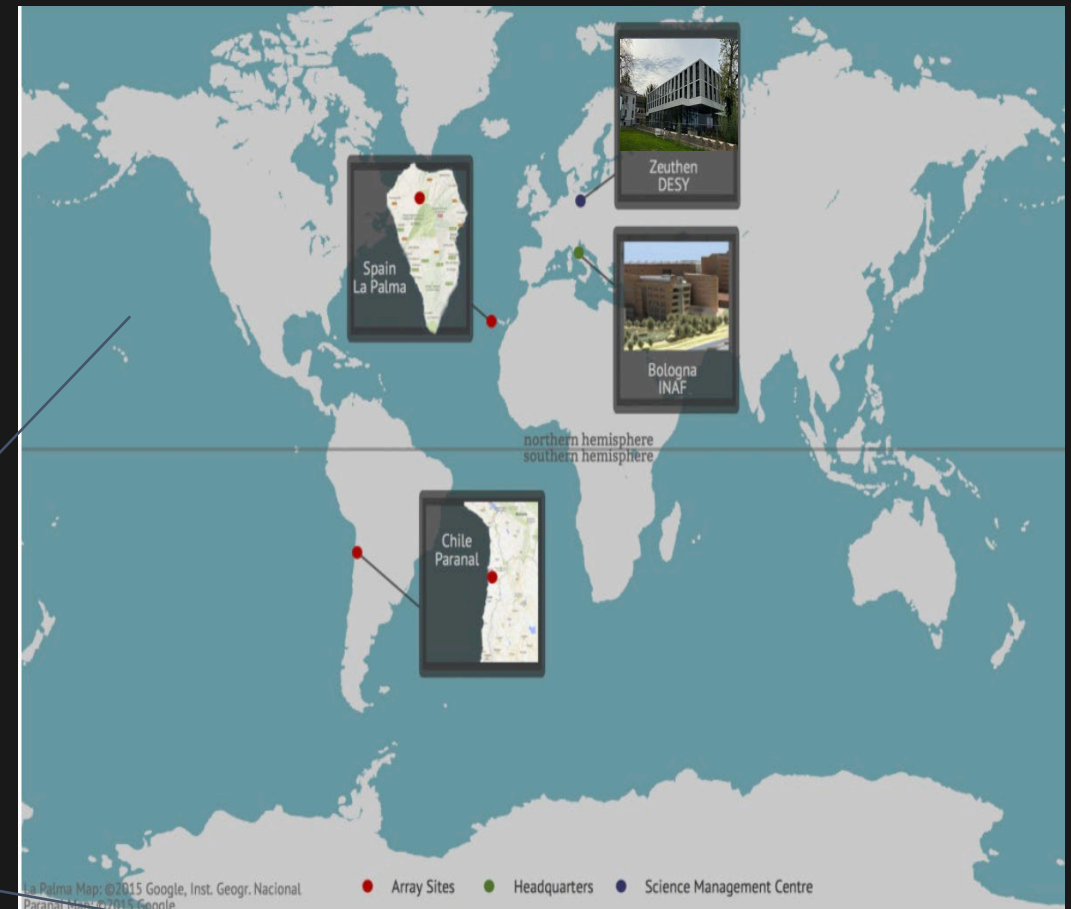
# Multi-site RI CTAO ERIC example

Federico Ferrini, Amsterdam – ET PP - WP 2, 9/10 April 2025



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# CTAO: a distributed facility



# CTAO 4 sites, 4 countries

1. Headquarters (**Bologna, IT**) – Managerial, Administrative, Technical and Scientific Direction (at regime approx. 70 FTE)
2. **SDMC (Zeuthen, DE)** – Data management, Software development, Science operation and user interface (at regime approx. 30 FTE)
3. **CTAO-North (La Palma, ES)** – North site management, 13 telescopes (at regime approx. 15 FTE)
4. **CTAO-South (Paranal, CL)** – South site management, 57 telescopes (at regime approx. 25 FTE)

# CTAO Data Management

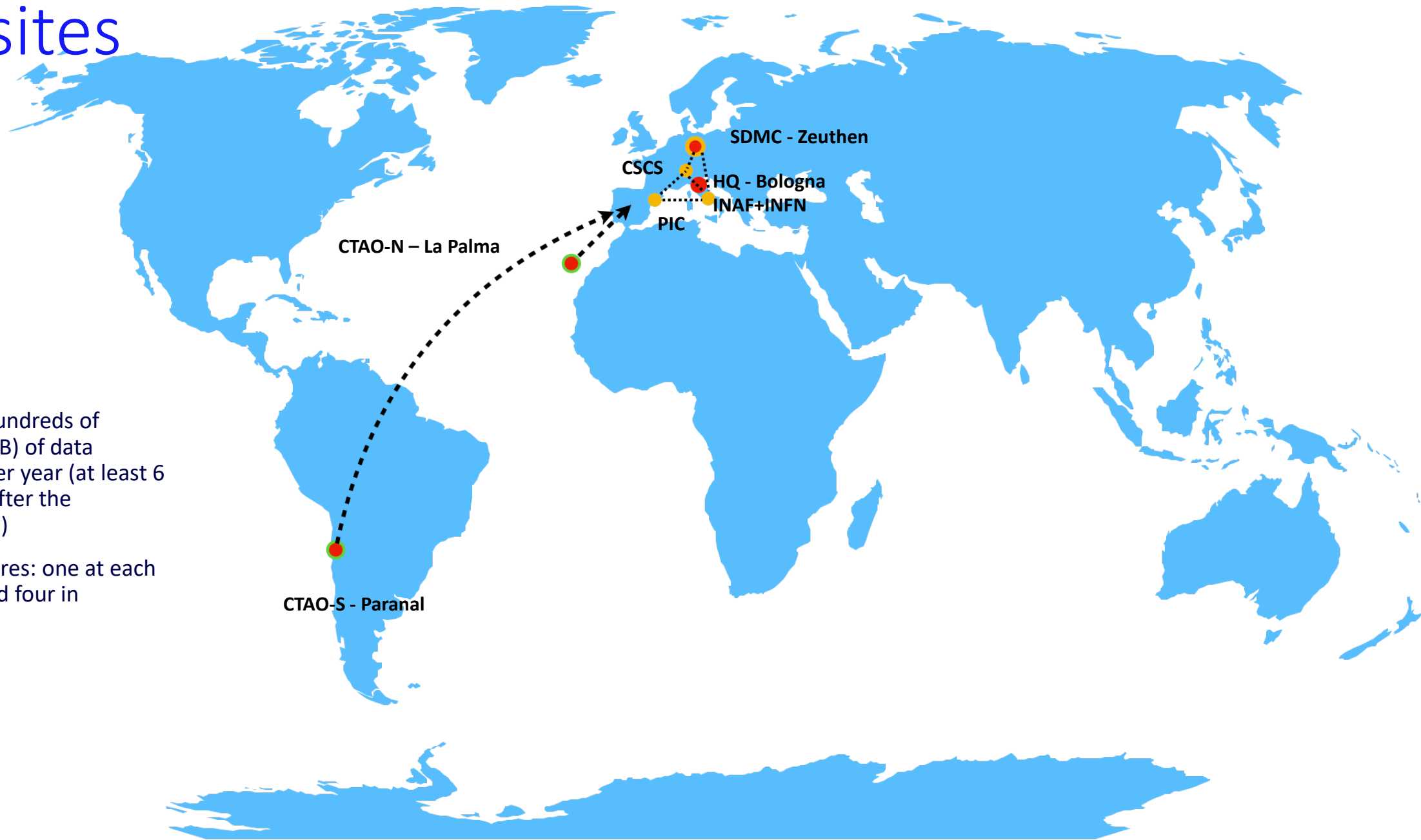
On CTAO-N and CTAO-S, data collection and first treatments **Onsite Data Centers** at the sites.

Data are transferred to a system of **four “regional” data centers**, with embedded redundancy for safety and performance, which are responsible for the archival and processing of the data.

The **SDMC (DE)** is responsible for driving the data management operation at the data centers, including data quality checking, observation preparations, and the distribution of science-ready data to users (CTAO is an observatory, so time allocated according to proposals, and 1yr of property of data before open access)

# CTAO sites

- BIG DATA: Hundreds of petabytes (PB) of data generated per year (at least 6 PB per site after the compression)
- Six data centres: one at each array site and four in mainland



# CTAO multi site complexity

One organization and one orgchart: centralized administration and reporting.

- a) **Headquarters**: staff with an *ad hoc* employment framework, (company's collective bargaining agreement – CTAO CBA) satisfying **Italian labour law**.
- b) **SDMC**: staff with same CTAO CBA, with modifications to satisfy specific constraints of **German labour law**.
- c) **CTAO-N**: staff with same CTAO CBA, with modifications to satisfy specific constraints of **Spanish labour law**. The site is on the IAC ground (ORM), construction is provided as IKC by Spain, but difficult control and monitoring by Central Organisation.
- d) **CTAO-S**: staff recruited under ESO employment conditions (both local and international staff); site on ESO ground, actions implemented by ESO on CTAO mandate and funding.

## ESS ERIC multi site

ESS is one organization and has one orgchart.

The ESS Statutes list Lund and Copenhagen as the **two ESS sites**:

- **Accelerator**, laboratories and the main office are in Lund (SE)  
(approx. 550 FTE)
- **Data Management and Software Centre, DMSC**, is in  
Copenhagen (DK); DMSC is registered in Denmark as “other  
foreign entity” (approx. 50 FTE)

# ESS multi site complexity

- **ESS produces two separate tax reports.** From a tax perspective, ESS submits tax declarations both in Sweden and in Denmark. ESS is exempt from electricity tax in Sweden, currently investigating whether can get the same exemption in Denmark.
- **Staff:** ESS has to follow **Swedish labour law** in Lund and **Danish labour law** in Copenhagen. Most of the ESS employees have Swedish labour contracts in Lund and are paid in SEK. The colleagues at DMSC have Danish contracts and are paid in DKK.
- DMSC in Copenhagen is an integral part of ESS. Financially, DMSC is not a separate entity. The **“one ESS” financial set-up** works since Denmark and Sweden are very similar and the Nordic authorities trust each other.



## IGO examples: (a) ESO multi site complexity

Headquarters in Garching (DE), plus offices in Vitacura (Santiago, CL)

In Chile two physical concentration of telescopes, [La Silla and Paranal](#), managed as a single unit “La Silla Paranal Observatory”. ESO staff is distributed: 545 FTE for Garching and Vitacura, 165 FTE for Paranal and La Silla; many local FTE on the observatory sites

[Science Archive](#) Facility operational at ESO headquarters in Munich. It contains data from ESO telescopes at La Silla Paranal Observatory.

All raw data from the La Silla Paranal Observatory are stored together with the corresponding calibrations, as well as selected products both contributed by the community or generated at ESO

## IGO examples: (b) SKAO multi site complexity

Headquarters at Jodrell Bank, UK,

Two Telescope Sites in South Africa and in Australia.

**Staff:** On sites, SKAO staff + local people, partnership the respective **Hosting Agreements**; the vast majority of personnel at the sites is hired by the SKAO branch of SARA0 (in South Africa) and CSIRO (in Australia).

In total 320 SKAO Staff, about half in the Headquarters and the rest almost equally distributed on the two observing sites.

In South Africa in total about 500 FTE, while in Australia about 300 FTE.

**Data distribution:** The super computers near the sites (Cape Town and Perth) provide storage and science data processing. Data products are send to the **SRCs**, hosted by different countries, for further science processing.

# Commonalities multi site RIs

- Robust examples of multi-site governance structures.
- 1. **Data management and distribution** takes advantage from well consolidated solutions.
- 2. **Legal implementation** issues due to lack of experience by hosting countries – this is not the case for the EU countries interested in ET.
- 3. **HR scheme: harmonized labour contracts** easier in an IGO than ERIC: national labour law must be applied in ERIC case. But national labour law includes social security and pension schemes.

# Questions: weighting pro's and con's

1. Common understanding: what is seen as a multi-site configuration, what is seen as single-site configuration?
2. What would be in the best interest for the ET project?
3. What is seen as advantage or disadvantage of:
  1. a single-site configuration?
  2. a multi-site configuration?
4. What impact would the configuration have on:
  1. the availability of funds?
  2. the costing model?

# Acknowledgements

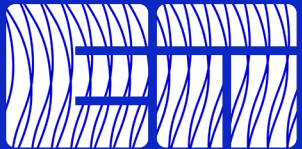
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On preparing both presentations: TAX exemptions & Multi Site

I got valuable information from:

- ❖ Nikolaj Gube – ESO
- ❖ Simon Berry - SKAO
- ❖ Florian Weissbach – ESS
- ❖ Simon Berge – CH delegate to ESS Finance Committee

# Thank you!



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