

CTAO in Zeuthen

Update of previous status report, Liebenberg Retreat, 23 September 2024

Previous slides from May 2024 appear as spare slides



CTAO high-level status – brief update

- Main DESY contributions: Computing, MSTs, SST cameras, Simulations, Science preparations
- Upcoming highlights: pre-assembly of 2 MSTs due to start in our hall in Bohnsdorf later this year, for installation in Chile in 14-18 months
- CTAO ERIC (final legal entity): ESO council approved privilege waiver (EU court of justice...), foundation expected for January 2025
- Italian commitments for ESO infrastructure construction imminent (...)
- The running cost riddle:
 - 2021 estimate: about 6 M€ from Germany
 - Current view of our ministry (BMBF): 50/50 split between DESY and Max-Planck (MPG)
 - Negotiations (BMBF, DESY, MPG) ongoing
 - Similarly Helmholtz negotiations ongoing
- The construction cost riddle:
 - MST telescope costs up by 56% since 2021
 - Negotiations (?) with ministry hopefully starting soon

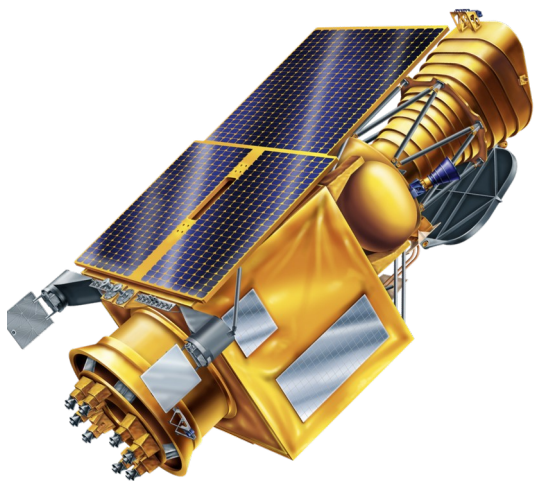
Spare slides (from Liebenberg meeting in May 2024)

CTAO in Zeuthen

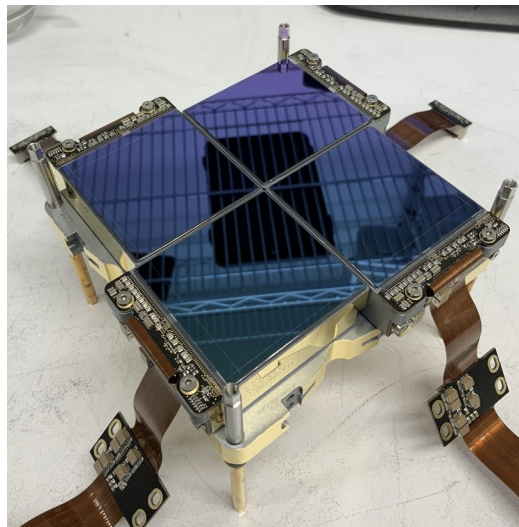
Liebenberg Meeting 13 May 2024



One group – two priorities at the moment



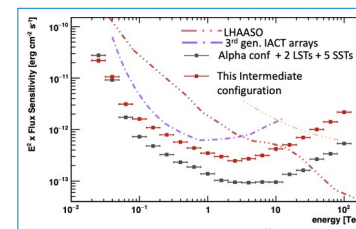
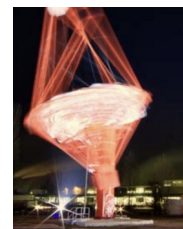
DESY UV camera mosaic



- UV transients, see science discussion next session
- First DESY satellite contribution
- Longer term strategy: maintain satellite expertise (e.g. MeV gamma mission...)



- DESY-wide priority / one of our flagship projects
- DESY co-host of observatory (SDMC!)
- Germany biggest contributor, DESY lead contributor in Germany
- Lead Medium-Sized Telescope (MST) Structure project
- Lead partner in Array Control and Data Acquisition software project (ACADA)
- 1 of 4 off-site data centres
- Major role as provider of computing infrastructure, software, simulation pipeline
- Contributor to Small-Sized Telescope (SST) cameras
- Significant contributor to German operations costs share (painful!)



CTAO Numbers

2021 costing and status (costs and spendings are changing...)

- Total value observatory: 330 M€
- German contribution: 52% BMBF, 23% MPG, 21% DESY, 4% Universities
- BMBF cash still available (minus some running costs that are already spent): 46 M€
 - Of these, 19 M€ are nominally agreed to be used for telescopes (2 M€ / 10 M€ / 7 M€ for LST / MST-Cam / MST-STR)

Country	Offers of total
Germany	27,5%
Italy	19,7%
France	17,1%
Spain	13,8%
Japan	9,3%
Poland	4,7%
Switzerland	2,2%
Czech Republic	1,9%
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- Person power at the moment:
 - 40% of the Gamma DESY + HU group, 12 FTE
 - 12 FTE EL + MECH + DV
 - Plans: 3 hires for DV started; **EL + MECH: Δ 4-5 FTE**

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- CTAO construction phase: 5 years (beginning not well defined...)
- Funded through 2021 agreement for ERIC application documents (read: by now at least 30% underfunded)
- Operations phase: funded in proportion to CTAO share, 28% for Germany
- Current estimate operations budget (dating back to 2021...): 20 M€ per year
- **German share 6 M€**

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- German deal (10 years ago, only partly documented): operations 3 : 3 : 4 between DESY : MPG : Ministry
- Open 'discussion' between our ministry and DESY/MPG about our actual share (50%, 30%, 25% ???)
- 'Pakt' negotiations between Helmholtz and ministry started (Pakt für Innovation und Forschung, 2026-30); we hope for 3 M€ annually

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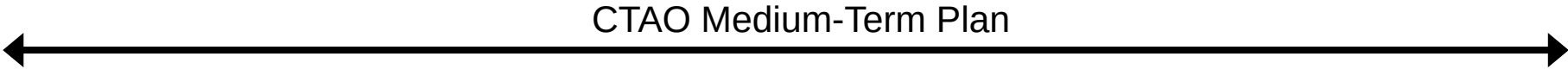
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- **If** german share 6 M€ and **if** 3 M€ from Pakt: 1.5 M€ for DESY
- **If** german share 6 M€ and **if** the old deal (30% DESY) accepted: 1.8 M€ for DESY
- **If** german share 6 M€ and **if** no additional BMBF money: 3 M€ for DESY
- Our strategy: reserve in base budget + person power as in-kind computing contribution

CTAO high-level status

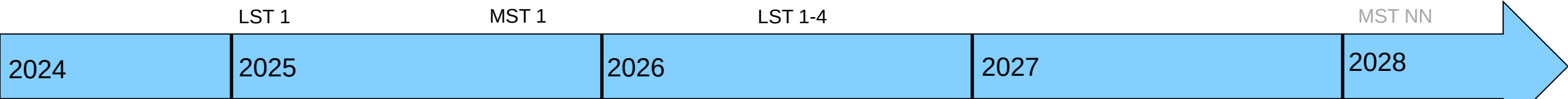
- Sticky point legal entity: planned ERIC with last minute issues for ESO, aim for decision at 4/5 June ESO Council
- Alternatives being explored in parallel
- Project nevertheless ramping up for construction, central organisation hiring crunch (30 → 60 FTE)
- Commitments for further Southern site infrastructure needed by November 2024, **Italian commitment still missing**, current main focus of our 'political / strategical' activities at Council and ministry level
- Drafts of In-Kind Contribution agreements planned for later this year
- Key Science Project (KSP) 'deal' being finalised now (CTAO Science Collaboration MoU negotiations ongoing)
- KSP time: 40% of CTAO time of first 10 years as reward for telescope builders
- Our science interests: everything we do now but much better and much more 😊

CTAO Medium-Term Schedule

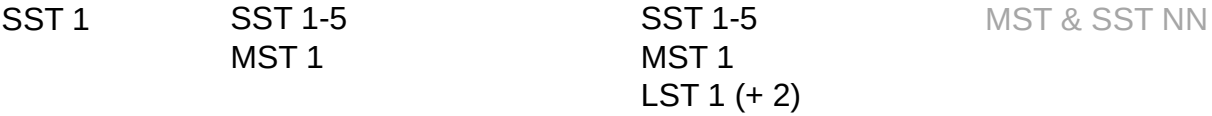
CTAO Early science with initial arrays within 1-3 years



North

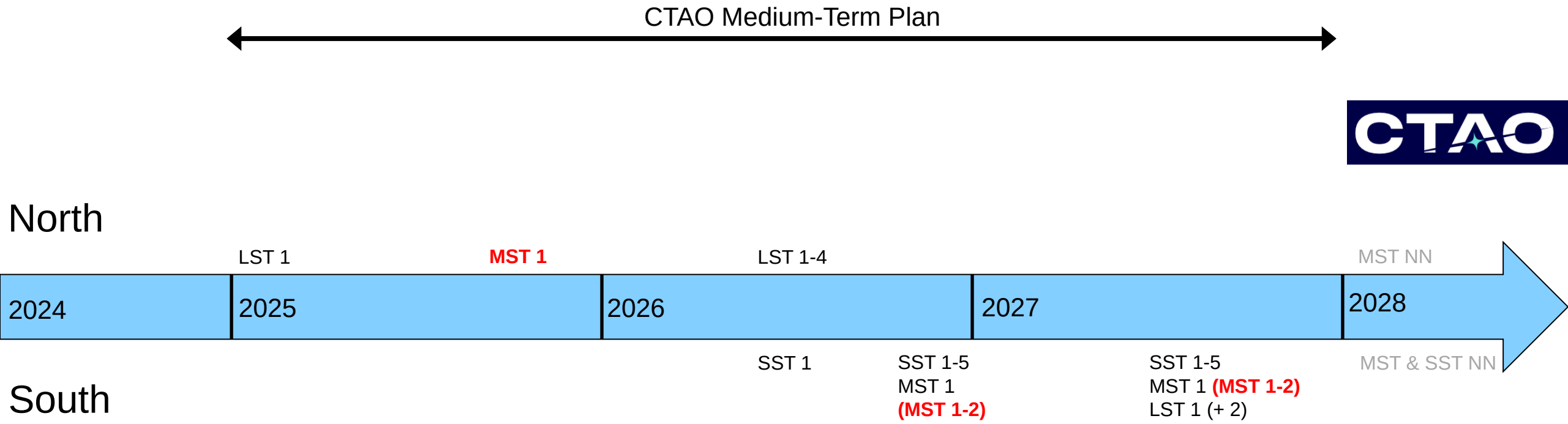


South



CTAO Medium-Term Schedule

CTAO Early science with initial arrays within 1-3 years



Southern MSTs our and German priority, cost increases challenge our plan of splitting the 2 MST pathfinders over North and South
→ Risk of jeopardising the more performant Southern site, unless Germany and Poland commit more funds, which is unlikely (definitely for Germany) before 2027....!