

Designated Director General /
Managing Director
Report & CTAO Project Path Forward

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Some Context and Today's Discussion



- Lack of ERIC structure is problematic and needs to be solved
 - ESO and Ministries working on solutions
- Can move forward with hiring, site preparation, and overall in-kind support within the statutes of the gGmbH
- Delaying moving forward would be disastrous
 - General agreement last time to move forward in principle

Today:

- Budget for the year and longer-term commitments
 - Supporting hiring to meet project goals
 - Longer term commitments to south site infrastructure / ESO
 - Includes updated (ERIC-like) organizational structure and staff rules to be efficient and competitive
- Hiring details and process

Management Focussed Changes Since Sept.



- AFC (joint) reviewed the budget and staff rules
 - Favourable response
- Announced position vacancies for Project Manager, Lead Systems Engineer, Senior HR Manager
 - Promising candidates for all positions
- Staff leaving/left CTAO – need to replace
 - Stephan Haid (Dir of Admin) last day 31/12
 - Wolfgang Wild (PM) last day 31/10
 - Implementing org changes to bridge gaps
- Emphasis on new organizational structure and developing project schedule

Top Level Goals For This Year



- Essential to have integrated project plan for all efforts
 - Currently developing integrated schedule including input from in-kind contributors
- Need to prepare organization
 - Organizational readiness: hire staff, re-structure organization, implement ERIC staff rules; construction focus
 - Formalize/update necessary agreements with IKCs, hosting
- Project milestones fit in Cost Book first year top level goals
 - Develop south site infrastructure
 - Mature ACADA software (real world demonstration)
 - Prepare acceptance for first telescope (LST-1)

Budget and Commitments for 2024



- Require budget and commitments for 2024 (more details later)
 - € 9.4 M to support staffing, other expenses
 - € 20.6 M commitment to build infrastructure
- Estimate based on what is required to move project forward
 - Assumes new organizational structure and ERIC staff rules/policies
- Hiring is the minimal level that can adequately support the IKCs, define interfaces and requirements, ensure safety, and develop software. *Staffing levels to date have been inadequate.*
- Infrastructure needed now to ensure telescopes currently under development are not put into containers because site is not ready

How We Developed Hiring Approach



- Hiring guided by CTAO's mission:
 - Provide project leadership and management
 - Technical leadership: systems engineering, software development, IKC support
 - Infrastructure development
- Hiring goals
 - Replace retiring / leaving personnel (PM, Lead Systems Eng., **Dir of Admin**)
 - Build organizational competence (Senior HR, Legal Officer, Communications)
 - Change systems engineering, increase computing
 - Create expanded Telescope Element group with "IPT" structure
- Integrated Product based Technical (IPT) teams for SST/MST/LST
 - Lead by an Interface Lead with support from systems engineering and computing with specialist engineering as needed
 - Simpler one stop organizational interface between CTAO teams and IKCs
 - Extra systems and computer engineering staff dedicated to supporting IKCs
 - Follows philosophy that the project will only be successful working together

Hiring Process Provides Thorough Review



- All hires must go through a public call
 - Using multiple platforms, own site, and communicating with partners
- Highest level of new senior staff (e.g. Dir of Admin)
 - Internal selection of long list
 - Small panel review (virtual by logistical necessity) including internal and external expert reviewers to develop short list
 - In person on site reviews
 - Selection by DG/MD with subsequent presentation to BGR/Council
- Other staff
 - Streamlined version of above with limited external participation (working with IKCs as needed)
 - Selection by DG/MD

It Takes A Long Time to Hire Good Candidates



- Order driven by timing of replacing retirees, build hiring/org infrastructure, restructuring technical organization

Approximate timing for 29 new job announcements including:

- Closing in November
 - PM, Lead systems engineer, Senior HR – already receiving applications

- Autumn
 - Director of Administration
 - Legal officer
 - Requirements jockey, systems engineer
 - South and North Site staff - start
 - IPT leads - start
 - Software engineer



Stephan Haid is leaving on 31/12. Need replacement

- December/January
 - Project Controller
 - South and North Site staff remainder
 - Software engineers
 - IPT engineers

Assuming it takes >6 months to hire, more for senior positions

- February/March
 - Deputy PM, deputy PS

It will take a year to fill these positions

Transition to New Org Structure and New Staff



- Staff leaving and incorporating new hires presents challenge
 - Maintain functionality while looking for replacements
 - Incorporating new hires quickly into existing culture and structure

- Maintaining functionality
 - Project manager – dividing up and delegating PM responsibilities between task managers, planning effort now led by Stefan S., implementing new reporting, remaining top level sign-off by MD
 - Director of Admin – identified interim lead – Nadia Defrancesco. New senior HR manager will help eventually. FF help with staff rules and organizing hiring process

- Incorporating new hires
 - Developed plan and timescale for interviewing and hiring staff
 - Updating onboarding process

New Hires Will Support North Site Continued Development



- LST efforts moving forward quickly
 - Significant progress by IAC developing foundations
 - Successful ACADA demonstration working with LST-1
- Need to jointly work with IKC on integration/acceptance of LST
 - Identify and work together on any issues
- Work with IAC and MST IKC to support schedule development
- Hiring plan to meet these needs – new personnel:
 - South site interface manager
 - Engineering, safety, administration personnel
 - LST interface/eng. lead (Telescope group)
 - MST interface/eng. lead (Telescope group)
 - Software eng. to support LST (Software group)



Funding Commitment Would Support South Site Infrastructure Development



- Enables ESO to move forward with infrastructure procurement process
 - Array interconnection roads, foundations, earthing grid, trenches, power distribution
- Scope as originally defined in cost book work packages (P04.10.x, 04.11.x, 04.12.x)
 - 25% indexation for these specific procurements only
- Need indication of commitment to ESO to support their internal November finance committee review
 - Last chance to approve tenders as otherwise infrastructure will not be ready to receive SSTs which will therefore be put in containers
 - This timeline does not provide margin to account for tender delays, non-compliant bids etc – probable we will be delayed

Long Term Organizational Structure



- gGmbH works in the short term but does not allow broad involvement nor is it a good platform for long term support
 - Last meeting resolution extended gGmbH by three years
- ESO working on multiple paths to resolve EC Legal Services objection and demand to use ECJ
- If ERIC cannot be approved, need to quickly move to some broadly acceptable alternative structure
 - Should not think about this too much now -- distraction
 - BUT should set a timeline by when we start looking at alternatives
 - Reconfirms our commitment to make CTAO work as a broadly international effort in a tangible way and will avoid losing time

Mostly Straightforward Transition to The ERIC



- Always the plan to transition gGmbH assets to the ERIC.
 - Implementing policies, structures (e.g., employment framework), and agreements will make this simpler.
- Timing of contracts/infrastructure transition
 - ESO is continuous interface with contractors eliminating any disruption
- Hiring and existing staff
 - Transfer, minimal alteration to contracts
 - Cannot legally promise transfer but joint agreement last time that this would happen
- Agreements
 - Transfer, minimal alteration to contracts
 - IKC all but signed
- Organizational structure, staff policies
 - Minimal alterations

Direction/Decisions Needed from This Meeting



- Review and approval of next year's budget
 - Follows recommendation by joint AFC (review in October)
- Strong indication of commitment to fund southern infrastructure
 - ESO will only start agreed procurement process if this is provided
 - The stronger the message, the easier to get the internal ESO approval to move forward – ideally show the availability of funds
 - Schedule development shows that infrastructure is critical path for SST deployment
 - Need a **joint resolution** in this meeting to show commitment
- Support for the new staff rules – used in the coming year budget, template for how to run the company and hiring, sends clear message to staff, and basis for ERIC
 - Already reviewed positively by AFC

Backup Slides



Potential Effects on gGmbH



- The tasks planned for 2024 do not require a rewrite of the gGmbH articles of association
 - “Equip the sites” – build infrastructure
 - “Prototyping” – first telescopes are prototypes/pathfinders
 - “Preparation” – agreements etc
 - No issue of pre-construction versus construction

- Will require a Council vote to establish an Italian branch of the gGmbH
 - Only way to hire non-EU people into the Bologna HQ due to Italian visa restrictions

Plan Independent of Organizational Type



- Use the gGmbH to support development and implement overall ERIC structure/policies...
- Hiring and existing staff
 - Can hire into gGmbH with public call
 - Existing staff matched to future ERIC positions as appropriate
- Agreements
 - Can update existing site agreements
 - Develop IKC agreements in Spring/Summer as far as signing (determine accepting organization when we gain new insight into ERIC progress)
- Organizational structure, staff policies
 - Change to match ERIC as much as possible
 - IPT org structure
 - Staff rules and policies
 - Best to discover any issues early

MD-FF Report:



FEDERICO FERRINI

Provide input for policies and regulations that complement the statutes of the CTAO ERIC to the BGR.



Documents Contributed by CTAO to BGR

- Data Policy
- Access Policy
- Intellectual Property Rights Policy
- Rules of Procedures for the Council
- Scientific Evaluation Policy
- STAC Terms of Reference
- Third Parties Agreement Policy
- Strategic Partners Agreement Policy
- AFC Terms of Reference & Rules of Procedure
- IKC Framework
- Financial Rules
- Procurement Policy
- IKRC Terms of Reference
- Employment Policy
- Employment Framework
- *Glossary (almost ready)*

Transfer all relevant assets from CTAO gGmbH to CTAO ERIC



CTAO gGmbH Deliverables

- Excel Tables of Deliverables have been organised according to WBS packages
- More than 900 entries are present, almost all supported by accompanying documents
- Functional assets are included while almost all fixed assets are described into a separate list. Human Resources will be transferred according to the Employment Framework
- The draft version of Deliverables has been submitted to the External Review Panel on February 17. Synthetic Executive Summaries are introducing each WBS package. The documents have been collected in a repository to which the Panel members have access
- No special concerns from the External Review Panel have been received
- Under the guidance of the designated DG, the completion of further necessary documents is on going

Guidance of Project Management

- *Initiate further construction activities for the infrastructure on the sites, in particular the Power Conditioning System and the Power Overhead Line in the Southern site.*
- *Guarantee a good transition from the preparatory phase to the construction phase placing particular emphasis on the implementation of the project organization and the IKC agreements.*

CTAO Construction Schedule

PO held dedicated schedule meetings with several IKC groups to discuss and coordinate schedule topics and constraints

- CTAO-SST – 26 Sep, Bologna
- CTAO-LST-South – 27 Sep, Bologna
- CTAO-MST – 13 Oct, remote

Still to come

- CTAO-LST-North
- CTAO-Calibration equipment
- Software in terms of “need dates”

Next steps to be done at Berlin CTAO-CTAC General Meeting

CTAO-North



- LST foundations being built, completion anticipated for Nov
- MST-North Pathfinder communication needs a restart



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- Power distribution system (= large CTAO investments)
 - Power Conditioning System (PCS) procurement ongoing
 - Power Overhead Line (OHL) discussion ongoing
 - Preparing technical documentation for first large civil infrastructure contract (to be started in 2024)
 - Array road network
 - Telescope foundations (SST and MST)
 - Earthing grid
 - Updating annexes to ESO-CTAO Hosting Agreement
 - South Operations Plan
 - Construction Plan
 - Interface Definition document

- SST
 - CTAO placed contract for SST foundation design
 - INAF issued a Call for Tender for 25 SST structures
 - France contributes a further 12 SST structures
- MST
 - Much activity by MST@DESY to close out MST-STR review
 - NectarCAM review agreed to be closed out
 - FlashCam review documentation to be agreed (8 Nov)
 - MST foundation design contract pending
- LST
 - North: commissioning & construction ongoing
 - South: INAF preparing Call for Tender for structure

- Project reviews
 - ACADA – PDR passed, CDR scheduled (Jan 2024)
 - Telescopes CDRs – LST, NectarCAM, MST-Structure held
 - SST Engineering and Product Review held
- Infrastructure reviews
 - CTAO-South Access Road – Acceptance review held (23 Oct)
 - MSTN-3 Infrastructure Design Review – on hold, needs IAC PM
- Project Reviews expected in the coming 12 months
 - CDRs: FlashCam, ACADA, Clock, SST, LST-South (TBD)
 - PDRs: DPPS & SUSS

Science Management & Science Operations preparation



- Science Operations preparation
 - definition of the science operation concept related to request, and schedule of observing time, science archive, science portal and science alert handling
 - support the preparation of a prototype science portal for the Science Data Challenge (SDC)
 - support the work for the SDC schedule preparation
 - definition of the sky brightness ranges
 - preparatory work to allow the installation of the illuminators of Northern Array (CCI approval –the GCT and NOT will host our devices)
- Science Management
 - organization of the 2nd CTAO symposium
 - organization of the 1st CTAO summer school
 - moving ahead the SDC
 - finalized the definition of the LST and illuminators for the Southern array
 - start working on early science definition
 - Monte Carlo prodv6 started

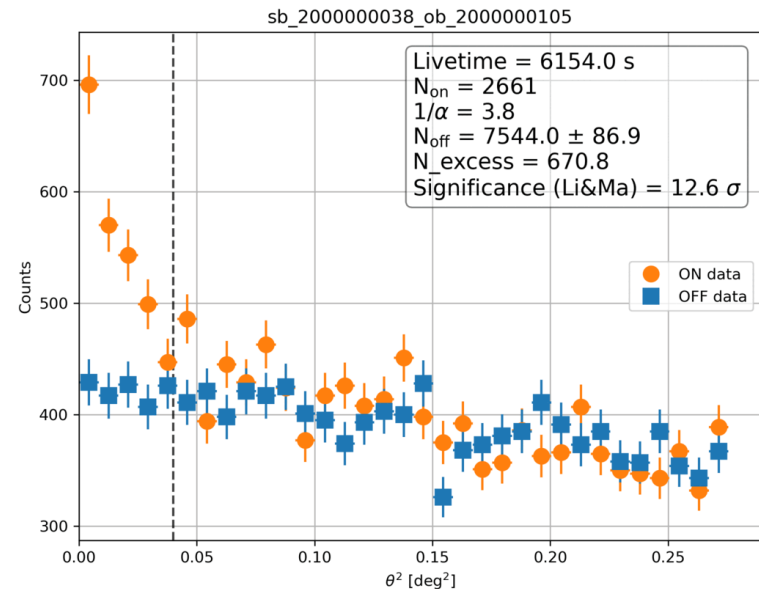
- ACADA **version 1 (REL1)** was released on July 20, 2023
 - Two years of work (started in June 2020)
 - Operate, acquire, and process data from a single CTAO telescope.
 - 79 ACADA level B requirements, 250 level C requirements, and 34 use cases implemented and formally verified.
 - 290k lines of code, with quality assurance reports for the products.
 - Collective effort from the team of about 50 colleagues from 7 IKC teams.
- With that REL1 **ACADA–LST1 integration** tests performed in La Palma in September and October 2023.
 - Great success, all test objectives were achieved.
 - Data acquisition, control, real-time analysis works for ACADA+LST1 .
 - Great teamwork and an example for future telescope integrations to follow.
- ACADA **CDR** late 2023 – early 2024
 - Documentation package delivered on Oct. 27: 74 documents, 2615 pages.
 - External reviewers from ESO, ESA, CERN, TMTO.
 - Review meeting on 10 and 11 January in Zeuthen.
- Next milestones: REL1.5 (Q1, 2024), REL2 (Q1, 2025).

ACADA – LST1 Integration in Sep-Oct 2023

- 1st campaign: September 28th to October 3rd 2nd
campaign: October 13th to October 17th
- Personnel: 10 ACADA, 7 LST, 1 DPPS, and 2 onsite data centre travelled to the ORM to run the tests.
- ~20 additional people supporting via remote participation.



2nd campaign: onsite test team in La Palma.



Detection of the Crab Nebula with the integrated LST1-ACADA system, Oct 13-17, 2023.

Computing Progress

- **Interfaces:** 17 ICDs ACADA with array elements and other Computing products released, Array Clock with telescopes and on-site ICT released, on-site ICT network with MST released - more under preparation
- Preparing **IKC** agreements:
 - ACADA based on the existing MoU
 - DPPS, SUSS, on-site ICT – discussion with teams ongoing
 - consider SLAs for four off-site data centres
- DPPS: significant progress → Release 0, PDR <summer of 2024
- SUSS defined >50% requirements (aligned with Operation Plan)
- On-site ICT: preparing requirements – discussing with CTAO-N IKC
- Off-site ICT: regular technical coordination – and MC production
- CLK: Standards released. Preparing CDR in 2024
- Data Models: R1, DL0, DL3, common released – metadata progressing

The CTAO Constellation

