



ESCAPE

European Science Cluster of Astronomy &
Particle physics ESFRI research Infrastructures

OSSR Final Workshop CTAO

Gareth Hughes
Matthias Fülling



- **Members**
 - Matthias Füßling, Gareth Hughes
- **General contributions of CTAO gGmbH**
 - Representation of the ESFRI CTAO (use cases, needs, requirements in WP3)
 - Coordinating role for CTAO partners (Consortium, user community, ...)
- **Task 3.1 – MAPS**
 - Requirements, use cases, needs of the CTAO ESFRI and in general for research software and repositories
 - Contribution to guidelines for software licenses
 - Contributions to Software lifecycles workshop
- **Task 3.2 – ESSC**
 - Helped coordinate the deployment and onboarding of CTA-related software to the OSSR
 - including gammapy and AGNpy (CTLean, hiPeRTA, hiPeRTA_Stream, GammaLearn, GammaHub, gLike, IstMCpipe)
 - Assisted in forming links between WP5/ESAP developed in these work packages
 - onboarding of ESAP to OSSR
 - metadata definitions
 - interactive & batch analysis
 - using the eOSSR library as archive on ESAP



● Task 3.3 – CASS

- Coordination with CTA and KM3NeT on common data formats and software tools
 - Work in collaboration with WP4 CEVO
- Integration of CONCORDIA project into WP5/ESAP as part of the batch processing tool
 - See talk by Cristiano Bozza

● Task 3.4 – COSSI

- Support for CTAO involvement in the Wavefier Project
 - See talk by Elena Cuoco

● Contributing authors to

- Open Source and Service Repository Policy
- White Paper – ESCAPE Work Package 3 (OSSR) Achievements and Future Prospects

● Represented OSSR/CTAO at the ESCAPE to the Future conference



CTAO Expectations: OSSR as a Repository

- CTAO is an open observatory aimed at the whole science community as CTAO users
 - committed to support open science and follow FAIR principles
 - CTAO software shall be discoverable and useable
- The OSSR as part of the EOSC is an additional service to the CTAO repositories and platforms
 - an additional path to discover CTAO software, data, and workflows
 - advantage: discover CTAO software and workflows in context with that of other ESFRIs
 - helps to extend the user community and users to discover new ways of using CTAO software and data
- Curation of research software in the OSSR requires continued cooperation between CTAO and OSSR
 - example: official CTAO software, associated software from other projects, or related software from the CTAO user community
 - links to software lifecycles (new official releases, long-term support, new developments)
 - evolution of software metadata
- Continuous Support for Workflows
 - becoming clear that finding workflow for an analysis is equally important as finding the software



CTAO Expectations: OSSR is more than a Repository

- OSSR common practices and guidelines
 - a set of **evolving** standards as input for CTAO
 - a forum for developers to develop new standards and common practices (e.g., also on software quality and performances)
- OSSR as a competence center
 - school and training events for user communities
 - training and development events for developer communities
- Common Software Developments
 - common developments with other ESFRIs on research software and data processing software
- Interoperability between CTAO and other experiment
 - support for multi-wavelength and multi-messenger analysis
 - aim for interoperability of data products, and science software
 - exchange of workflows, reproducibility



- CTAO has an interest to continue working together in future collaborations
- OSSR as a repository
 - Publishing official CTAO software and workflows
 - Continuing work on metadata and FAIRness
 - Extending work to include lower-level data processing software
 - for example CORSIKA, instrument response functions, etc.
- OSSR as a user forum
 - Training and schools
- OSSR as a developer forum / competence center
 - Continuing work on interoperability
 - software and data models
 - Software competence center (users/experts)
 - software quality and performance
 - more efficient, useable and potentially greener software
 - advanced topics such as multithreading, GPUs, ...
 - Software development
 - Common libraries, common frameworks and tools (e.g. multi-messenger tools, multi-purpose tools)
 - Joint analysis workflows (e.g. KM3NeT-CTAO)
 - Integration of research software with VO (pyvo, healpix, TMOC)



Future Perspectives: Some Caveats

- CTAO's core mission is to build and operate the Observatory
 - resources for additional efforts are limited
- Some CTAO software based on open community-based software products
 - benefit from the community, and give back to the community
 - increase chances of sharing of software across ESFRIs and communities
 - resources in community-based software projects are limited
- Need for good applications to show case
 - with user community and/or other ESFRIs
- Funding is essential for all the activities

