Milestone 4.2: Recommendations for harmonisation of procedures and tools across the ACTRIS domains

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1 Background and purpose of this document

During the ACTRIS Preparatory Phase project (ACTRIS-PPP), the roles, concept and first implementation plans of the Central Facilities have been defined independently. The process for validating the activities planned at the Central Facilities has shown that, while the ACTRIS Head Office and the ACTRIS Data Centre are distinct in all aspects, ACTRIS Topical Centres have similar roles in the general structure, and much of their activities can be harmonized, by this increasing the clearness and efficiency of the research infrastructure. This document presents a set of recommended harmonization measures to be envisaged by the Topical Centres in their workflows.

2 List of acronyms

ACTRIS – Aerosol, Clouds and Trace gases Research InfrasStructure
API – Application Programming Interface
CARS – Centre for Aerosol Remote Sensing
CCRES – Centre for Cloud Remote Sensing
CF – Central Facility
CiGas – Centre for Reactive Trace Gases In-Situ Measurements
CIS – Centre for Cloud In-Situ Measurements
CREGARS – Centre for Reactive Trace Gases Remote Sensing
DC – Data Centre
ECAC/CAIS – Centre for Aerosol In-Situ Measurements
HO – Head Office
KPI – Key Performance Indicators
NF – National Facility
QA – Quality Assurance
QC – Quality Control
SOP – Standard Operation Procedure
TC – Topical Centre

3 Harmonization of the activities

A thorough analysis of the CFs' first implementation plans has shown that, regardless of the measurement technique and/or the variables covered by each Topical Centre, the planned activities can be harmonized if a certain degree of generality is accepted. This is because the Topical Centres have a similar role in ACTRIS: to support the operation of the associated National Facilities in terms of quality assurance and quality control, to offer technical services to the users and to develop the science and technology in their portfolio.

The CF leaders have discussed the best approach for harmonizing the activities of the Topical Centres in several meetings, during the spring 2020 and they decided to group all under seven major activities as follows.

These recommended harmonized activities will be used for the revised CF implementation plans.

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3.1 Management and coordination

This activity should comprise tasks for internal management of the CF and of each Unit, facilitating the interactions between the CFs, communicating with the other structures in ACTRIS, participating in different ACTRIS bodies, monitoring the KPIs, reporting of activities, finances and work plans, participating to outreach (including through web development), and ultimately building the ACTRIS community.

3.2 Links with associated communities

This activity should comprise tasks for maintaining a good collaboration with the enlarged scientific community, more specifically: participation in expert groups, dissemination of ACTRIS technical achievements, exchange of expertise with external communities, enhancing and promoting the different TCs' communities, participation of the TCs at different events (national and international level), developing external relations, links with other networks and organization of community building workshops. The perimeter of the scientific community is specific to each TC.

3.3 Training and consultancy

This activity should comprise tasks for training of the staff and of the instrument operators, organization of intensive courses, webinars and summer/winter schools, provision of consultancy for setting up observation sites and technical consultancy for stakeholders, users and private companies. The topics and subjects, as well as the target group of the events are specific to each TC.

3.4 Measurement and data procedures and tools

This activity should comprise tasks for development and update of the SOPs, calibration methods, instrument, measurement and data processing guidelines, definition of QA criteria, development of QA tools, definition of target uncertainties of the instrument (including closure studies) and development and update of central processing components as applicable. Tasks in this activity are essentially dependent of the measurement technique / variables covered by the TC, as such a large variety is expected.

3.5 Measurement and data quality monitoring

This activity should comprise tasks for development of housekeeping data real time analysis tools, of data evaluation procedures and plausibility tests, quality control of the measurements and of the data, organization of workshops for reviewing the quality of the data, of intercomparison campaigns and instrument performance tests, ensuring measurements traceability and technical maintenance and updates of TC units. Tasks in this activity are essentially dependent of the measurement technique / variables covered by the TC, as such a large variety is expected.

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3.6 NF labelling and evaluation

This activity should comprise tasks for evaluation of the application from the candidate NFs during the initial process for NF labelling, as well as tasks for labeling verification trough audits for the labelled NFs. The operation support to be provided to the NFs during and after the labeling process belongs to the other activities described above.

3.7 New scientific and technological developments

This activity should comprise tasks for improving, developing, assessing and implementing new techniques and technologies, coordinating demonstrations and studies, development and testing of prototypes, development of new measurement strategies, new retrieval algorithms, and new methods for SOP and best practices, implementation of metrology and standardization and dissemination the scientific and technical achievements. Tasks in this activity are essentially dependent of the measurement technique / variables covered by the TC, as such a large variety is expected.

4 Harmonization of the workflows

ACTRIS CFs are interlinked in three ways:

a) the TCs are linked with the Data Centre, the quality assurance and quality control of the ACTRIS data products is shared, and the way of sharing differs, being specific to each measurement technique / variable;
b) the TCs and the DC are linked with the Head Office, which is responsible for coordinating ACTRIS as a whole (work plans, KPIs, finances);
c) some of the TCs are linked to each other, i.e. a measurement technique covered by a TC is used also in the workflow of another TC (current example: automatic low-power lidars and ceilometers covered by the Centre for Aerosol Remote Sensing are used in the Cloud Remote Sensing NFs, which are overlooked by the Centre for Cloud Remote Sensing; it will evolve in the future for increasing the synergy in ACTRIS).

In addition, ACTRIS CFs are linked with the National Facilities and with the Users, including the scientific community at large.

4.1 Harmonization of the workflows between the CFs

The workflows between the TCs and the DC are too specific and cannot be harmonized. These are technical, depend on the measurement technique / variable, and are extensively worked out by each TC and the associated DC unit. These workflows are described in the ACTRIS Data Management Plan. The same applies to the technical links between two TCs (e.g. CARS and CCRES), which is still under work and not documented as such.

However, all TCs and the DC are linked with the HO at managerial level, and harmonization is necessary and possible, leading to increased efficiency. The most practical way to ensure both the harmonization

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and the increased efficiency while working remotely (the CFs summarize a total of 48 units operated by 38 RPOs in 12 countries) is through a customized ICT management tool. The tool is currently (as in late 2020) in the design phase. The design is done at ACTRIS ICT task force, founded in 2020, led by HO and consisting of representatives of HO, all TCs and DC-components.

The purpose of the tool is to automatize the management processes as much as possible to avoid duplication of work and to prevent discrepancies in the information. As an example: when an operation support activity towards a NF is marked as completed at a TC, this will automatically be included in the TC reporting and counted in the respective KPI. Similarly, the calendars of the CFs can be automatically synchronized, documents worked on and made available in one place without various versions around, and the NF information to be all in the same data base.

The tool is foreseen to be constructed of both commercially available and custom-made modules interlinked with each other via APIs. This allows also flexible linkages between the main tool and the various tools in use at the TCs and DC and in their host organizations. The Head Office will be responsible for maintaining the ICT tool functionalities but linking the TC and DC internal tools to the main tool APIs as well as the TC and DC related information content are in responsibility of the respective TC or DC.

4.2 Harmonization of the workflows between the CFs, NFs and users

The interaction between the CFs, NFs and users are expected to be complex. The interaction through scientific and technical events, face-to-face meetings and training, standard communication tools (e.g. emails, telephones, teleconferences, etc.) is out of the scope of this action, as it is impossible to be harmonized.

However, a significant part of this interaction could be harmonized by means of the ACTRIS website. ACTRIS website represents the main interface for external and internal communication.

As an interface between ACTRIS consortium and ACTRIS users and stakeholders, the website offers visitors the possibility of discovering ACTRIS services by browsing the Catalogue of Services, a comprehensive description of ACTRIS services, and to easily access ACTRIS services through a dedicated single-access platform, managed by the SAMU. The website provides a guided approach that will point external visitors that are not familiar with the ACTRIS organisational structure and activities to relevant pages. These pages will be mini-hubs of information for the respective audiences. Strong emphasis is given to section dedicated to the promotion of ACTRIS Science and Innovation with focus on success stories, collaborations, and scientific impacts.

Furthermore, from an internal communication perspective, the website functions as an access point to ACTRIS Intranet, a reserved area for ACTRIS bodies and task forces, functioning not only as a document repository but also, and more importantly, as an lively workspace fostering the internal communication and interactions among ACTRIS components. Additionally, ACTRIS website also provides links to webpages dedicated to ACTRIS National consortia and Topical Centres.

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Each TC will have its own webpages, with administration rights. The recommendation is that the main structure of the TC webpages is harmonized as follows:

- **Home:** mission, Units (laboratories and teams), instruments/variables covered, activities (short description)
- **Calendar:** workshops, training, campaigns, calibrations, etc.
- **Our National Facilities:** map with the associated NFs, tasks dedicated to operation support, links to relevant documents (guidelines, SOPs, etc.), links to software tools, links to other interfaces (e.g. data submission), open calls (event page for each, including registration and access to related documents, restricted to NFs)
- **Our Users**: who are our users, services open to user, open calls (event page, link to SAMU for access)
- **Our Partners**: description of linked networks and organizations (links), joint events and projects (list)
- **Science & Technology:** main focus, recent achievements, publications, patents, etc
- **Intranet** – restricted place for working documents
- **Contacts**

These webpages will facilitate the interaction with the associated NF and users in an organized manner, giving access to the most important documentation and calendar of events, which will be further consolidated in the general ACTRIS webpages.

5 Conclusions

Although it is not possible to harmonize all aspects of the CF workflows, mainly because of the technical specificity but also because of the inherited developments (ACTRIS emerged from several European networks which already have established procedures and tools), harmonization can be applied to: a) activities to be implemented at the TC (to be considered in the revised implementation plans); b) workflows between the TCs and the HO (through the implementation of the ICT management tool); c) workflows between the CFs, NFs and users (partially through the ACTRIS website).

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