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Scope of this document

This document describes the work done and outcomes related to the Regional Partner Facility (RPF) concept in ACTRIS. It presents the European Strategy Forum for Research Infrastructures (ESFRI) definition of RPF, the reasoning behind this definition, and the applicability of this definition in the framework of ACTRIS. It also describes the ACTRIS approach to RPFs and the expected outcomes and benefits ACTRIS could gain through an RPF program. Towards the end, this document describes the process and conclusions of adapting the ESFRI definition of RPF into the framework of ACTRIS. The work and this document have been performed under the framework of the ACTRIS IMP project.

The actually planned and realized communication and support actions towards the identified potential RPFs are not in the scope of this deliverable, as they are described in ACTRIS IMP deliverable 5.3 “Report on support activities for NFs and RPFs” and deliverable 5.5 “Report on training of NF and RPF operators”.

The regional partner facility concept as defined by ESFRI

ESFRI has introduced the concept of Regional Partner Facilities in 2008 to boost research activities in the less research-intensive countries and regions of Europe and thereby to increase the competitiveness of the European Research Area (ERA) as a whole. It has also been concluded by ESFRI that the RPF status of research facilities should be considered when distributing EU structural funds, even though the distribution of this funding is decided at national level.

In the “2012 Progress Report of the ESFRI Regional Issues Working Group”, section “Increasing regional competitiveness in Europe – Strategy for development of regional RI capacity”, ESFRI has defined RPFs in the following way:

A “Regional Partner Facility” (RPF) to a Research Infrastructure of pan-European interest must itself be a facility of national or regional importance in terms of socioeconomic returns, training and attracting researchers and technicians. The quality of the facility including the level of its scientific service, management and open access policy must meet the same standards required for pan-European Research Infrastructures. The recognition as an RPF should be under the responsibility of the pan-European Research Infrastructure itself (or the members of a to-be ERIC) based on a regular peer review.

It was further anticipated by ESFRI that RPFs would represent extensions of the overall capacity of the RIs by contributing with preparatory experiments, complementary methods, and by training of young researchers, technologists, and managers, who would then benefit from the experience and international contacts available at the RI it is connected to.

Adopting the Regional Partner Facility concept in ACTRIS

Adopting the ESFRI definition of RPFs for a highly distributed research infrastructure such as ACTRIS is not straight forward, as ACTRIS itself has a number of facilities in all of its member and permanent observer countries. This has caused difficulty in bringing the RPF concept to ACTRIS. If a facility in any ACTRIS ERIC member or permanent observer country would want to be included in ACTRIS, the primary method of inclusion would be to become a National Facility (NF) or a Central Facility (CF) Unit. The concept would be, therefore, applicable mainly to facilities located in a country that is not member or permanent observer of ACTRIS ERIC but is within the perimeter of European Research Area.

In the ACTRIS IMP proposal and Grant Agreement, the RPFs in ACTRIS are defined in a vague way:

“ACTRIS envisages four different types of Regional Partner Facility actions in ACTRIS IMP:

1) support of national-level development of RPFs such as legislation-driven monitoring networks to meet the technology and service standards of ACTRIS (target community building and training activities planned);

2) collaboration with RPFs that have complementary capacities and experience in different science disciplines, which will help ACTRIS in developing new services (e.g. cross-RI service development);

3) collaboration with RPFs in countries that have not yet joined the ACTRIS but could be potential new members (ACTRIS IMP actions on training, consultation, and technical workshops to meet ACTRIS NF standards); and

4) support of regional and local activities that benefit from ACTRIS but do not need to be directly linked to the pan-European RI.”

This definition is not fully in line with the ESFRI definition presented in section 2, but rather describes a wide list of potential collaboration parties to ACTRIS. Such collaboration is needed, has taken place, and will continue taking place in the future beyond ACTRIS IMP. Some of the collaboration activities taken place during the ACTRIS IMP project are listed in the ACTRIS IMP deliverable 1.2 “Summary report of organized community building events”. It was, however, clear all along that the definition of RPF in the concept of ACTRIS needs to be more concrete to serve the needs of the research infrastructure. After a long process, the definition of RPF in ACTRIS was formulated in May 2023 in following way:

“Regional Partner Facility in ACTRIS is a facility hosted by a country not being a member or permanent observer of ACTRIS ERIC, but the facility is filling or in the process to fill all other requirements of ACTRIS National Facilities (measured parameters, data provision, instrument QA/QC procedures, and RPO commitment for funding).”

This definition was selected with the aim of serving two goals, one being a scientific goal and the other being a political one. The scientific goal was to get the data from key facilities in other than ACTRIS ERIC member or permanent observer countries, regardless of whether the facility is within or outside Europe, and to make it available through the ACTRIS Data Centre with the same quality as the ACTRIS data provided there. It was also considered during the project that a CF unit could be located in a non-member (or non-permanent-observer) country as RPF, but this was abandoned to keep clarity in the concept and to keep the Central Facility activities better connected to ACTRIS ERIC. The political goal was to attract new countries in Europe to join ACTRIS by first bringing their key facilities into ACTRIS and have them serviced by ACTRIS as RPFs, and then to get the country to join ACTRIS ERIC once the benefits for their facilities have been demonstrated.

Identification of the potential RPFs in ACTRIS

After the RPF definition in the concept of ACTRIS was agreed upon, the search for potential ACTRIS RPFs started. This was done by first contacting the ACTRIS TC leaders in March 2023 and asking them to identify potential RPFs in their respective domains. The same request was later made to the National Contact Persons in ACTRIS to seek more potential RPFs. Even though a relatively large community was approached, the total amount of potential RPFs identified was small. It is possible that there would be more facilities especially in Eastern European countries (such as Slovakia, Croatia, Serbia, Hungary, Montenegro, etc.) that would like to be connected to ACTRIS as RPFs. Representatives of these countries were contacted but no potential RPFs were identified. The definition also allows ACTRIS to have RPFs worldwide, even though the ESFRI definition focuses on Europe, and one potential RPF was identified in South America. The identified potential RPFs are listed in Table 1. It is to be noted that even though Greece and UK are not members or permanent observers of ACTRIS ERIC at the time of writing this deliverable, they are in the process aiming to join ACTRIS ERIC in near future. They have already identified their proposed National Facilities and are therefore excluded from this search of potential RPFs, even though the agreed RPF concept would be valid for those facilities as well in case the hosting country does not join ACTRIS ERIC.

Table 1: List of identified potential RPFs to ACTRIS

Facility name	Platform type	Hosting RPO	Hosting country	Linked TCs
EVASO	Observational	Evora University	Portugal	CARS
SMEAR-Estonia	Observational	Tartu University	Estonia	CiGas, CAIS-ECAC
Mace Head	Observational	University of Galway	Ireland	CiGas, CAIS-ECAC
UCC Atmospheric Monitoring Station	Observational	University College Cork	Ireland	CiGas, CAIS-ECAC
UCD Dublin Urban Monitoring Station	Observational	University College Dublin	Ireland	CAIS-ECAC
IASC	Chamber	University College Cork	Ireland	CiGas, CAIS-ECAC
Chacaltaya	Observational	La Paz University	Bolivia	CAIS-ECAC
Several platforms	Observational	Agricultural University of Iceland	Iceland	CAIS-ECAC
Otlica	Observational	University of Nova Gorica	Slovenia	CAIS-ECAC, CARS
GLWF airplane	Mobile	University of Nova Gorica	Slovenia	CAIS-ECAC

The principal investigators (PIs) or other contact persons of the identified potential ACTRIS RPFs were identified and contacted for more detailed information on the current status of their research facilities and the support they need and have already received from ACTRIS. This is described in ACTRIS IMP deliverable 5.3 "Report on support activities for NFs and RPFs". The plan is to also approach them about the feasibility of paying the potential fee they would need to pay for the continuous ACTRIS services once the fee is defined.

Economic feasibility analysis

The membership contribution a country pays to ACTRIS ERIC is composed of three parts. The first part is an equal-share-based contribution of 50 000 € / year from every member or permanent observer country. The second part is based on the size of the country's economy (GDP) and varies (as the agreed 2026 numbers) from 16 300 €/year (Cyprus) to 268 800 €/year (Germany). The third part is based on the number and type of the NFs (NF components) the country brings to ACTRIS to reflect the amount of operation support needed for supporting the facilities from that country. This part varies from 3 500

€/component/year (aerosol in-situ component) to 13 100 €/component/year (reactive trace gases remote sensing component).

Therefore, the cost of operation support to the NFs is covered by the membership contribution of the country hosting the NF. It was also clear from the beginning that to cover the cost of services provided to RPFs, the service package would come upon a fee. This fee would be paid by the RPO(s) hosting the RPF.

To define the amount of the fee for an RPF, an economic analysis was conducted. The most logical basis for the fee would be the different components of the RPF and the part of the ACTRIS ERIC membership contribution the countries pay for a facility with the respective component. As the countries also pay for the general services (e.g., ACTRIS Head Office and Data Centre), an additional part would be added to the component-based fee. Various multiplication factors or additional sums to the component-based part of the fee were tested to find a suitable fee for RPFs. Other means of defining the fee were also considered, but the result of the analysis remained the same, described below.

It is clear that for reaching the scientific goal, the fee for an RPF should be as low as possible (as long as it covers the costs related to serving the RPF). Finding the right fee for encouraging the hosting countries to join ACTRIS ERIC is more difficult to reach. In order to make it cheaper for the country to become a member or permanent observer of ACTRIS ERIC than to bring in one or even several RPFs, the annual fee for an RPF would have to be clearly above 50 000 €. This is too much for any individual facility hosting organization to pay even for a multi-component facility. If the fee was lower there would be no incentive for a country to join ACTRIS ERIC, but to rather stay out of it. Furthermore, it is unlikely that the ACTRIS ERIC member and permanent observer countries would approve a financial model in which countries outside of ACTRIS ERIC would get the same operation support than the member countries but for a smaller financial contribution.

Several options were considered to overcome this problem:

1. The number or quality of services provided to RPFs could be reduced significantly to separate them from NFs. This, however, would lead to a lower data quality or number of parameters provided, compromising the scientific goal for which the RPF concept was adopted in ACTRIS. It is also against the ESFRI definition of RPF stating that *“The quality of the facility including the level of its scientific service, management and open access policy must meet the same standards required for pan-European Research Infrastructures”*. The feasibility of this approach varies between the observational components of ACTRIS, as for some instruments the QA/QC needed for basic data processing and higher-level data product are more tightly connected than for other instruments.
2. The RPF concept could be limited to countries that cannot become members or permanent observers of ACTRIS ERIC, i.e., the countries that have not adopted the ERIC regulation. This would remove the negative incentive for countries to join ACTRIS ERIC, but at the same time this would be highly contradictory to the RPF goal of strengthening the ERA. Co-operation with such facilities is

foreseen to be beneficial in the future, but to avoid misunderstanding they should not be referred to as RPFs.

3. The time for a facility to be an RPF in ACTRIS could be limited to, e.g., three years, forcing the country to decide after that whether they want to join or not. This, however, would not encourage the facility hosting organization to invest in the facility and to bring it to ACTRIS standards, as the future status of the facility depends on a decision made outside the hosting organization and ACTRIS.

4. The number of RPFs could be limited to one RPF / country in order to keep the total number of RPFs low and to maintain an incentive for the country to join ACTRIS ERIC. This approach would not really solve the problem, as small countries with only one key facility could still get the benefits for a cheaper fee than by joining ACTRIS ERIC. In countries with several potential RPFs, ACTRIS would have to prioritize which facility to approve.

5. ACTRIS could decide to approve only facilities with 3 or more components as RPFs. This would enable the inclusion of many key synergetic facilities but would exclude facilities in key locations relevant to only one or two components of ACTRIS. Also, this would not remove the problem of countries outside ACTRIS ERIC getting the same service for a lower fee.

6. There are other benefits provided to the countries for joining ACTRIS ERIC instead of bringing in RPFs, such as participation in the decision making in ACTRIS ERIC by the General Assembly. These benefits, however, are quite limited, as ACTRIS data and services are provided to all users in the same way, regardless of the user's country of origin / residence / employer. It is therefore unlikely that the benefits would be enough to compensate for the difference in the fee.

Conclusions

Despite the discrepancy between the ESFRI definition for an RPF and the ACTRIS structure, the concept of RPF in the ACTRIS framework was analysed to find the best concepts that would serve both the ESFRI goals for RPFs and the scientific goal of ACTRIS to provide relevant high-quality data to its users. The economic feasibility analysis revealed that connecting facilities into ACTRIS with the agreed definition of RPF is difficult without significantly compromising either the ESFRI goal for the RPF concept, the ACTRIS scientific goal for including RPFs in the data and service provision or the ACTRIS political goal for attracting more countries to join ACTRIS ERIC as members or permanent observers. For facilities hosted by countries outside Europe the concept and fee structure for such partner facilities developed in ACTRIS IMP and presented in this deliverable could be used, with the condition that such a financial model is approved by the ACTRIS ERIC General Assembly representing the member and permanent observer countries of ACTRIS ERIC. For the sake of clarity, such facilities outside Europe should be called something else than RPFs as they clearly do not contribute to the development of ERA.

In conclusion, the ACTRIS RPF concept based on the ESFRI definition and described in this document is not feasible as such. The ESFRI definition of RPF states that *"The quality of the facility including the level of its*

scientific service must meet the same standards required for pan-European Research Infrastructures”, which in the work presented here is interpreted as meeting the minimum requirements for ACTRIS NFs. The work and analysis presented in this deliverable demonstrates that the ESFRI definition as such is not suitable for ACTRIS structure and funding model, and therefore does not serve the needs of ACTRIS. If the ESFRI definition was not considered ACTRIS could lower the threshold for the number and quality of measurements at the facility that is interested in connecting to ACTRIS one way or the other. For most of the facilities identified in this document the lower requirements would lower the threshold to engage to ACTRIS, as reaching the ACTRIS NF requirements often requires significant investments.

Many facilities in countries outside ACTRIS ERIC are already connected to ACTRIS via networks that ACTRIS is servicing, such as AERONET, EARLINET, Cloudnet, NDACC and GAW, and this connection could be emphasized more. The conditions and service provision from ACTRIS to these networks will be defined in contracts or MoUs between ACTRIS ERIC and the network coordinators. The nature and content of those contracts is better described in ACTRIS IMP deliverable 8.3 “Assessment of ACTRIS contribution to, and alignment of ACTRIS policies with, international networks and initiatives, incl. GEOSS and COPERNICUS”.

For the countries, scientific ACTRIS-related communities, and facilities outside the current member and permanent observer countries of ACTRIS ERIC it is often important that they can demonstrate a strong connection to ACTRIS, especially if they strive towards their country joining ACTRIS ERIC. This connection can be made either through engaging the facilities or by other means, such as connecting the research institutions or formally acknowledging the national ACTRIS consortium in the country. The needs of the facilities and countries vary case by case and there is no single approach that fits for all cases. Whatever the concept, ACTRIS should not present itself as a closed community but remain open for external people and facilities to participate. ACTRIS also provides services to any facility (other than NFs) via its access scheme, so the services are available regardless of whether the facility or its host institution has an official partnership with ACTRIS or not.

The aims and ways of connecting the remaining European facilities and facilities on other continents to ACTRIS are to be developed further. As the ESFRI definition for RPFs is not suitable for ACTRIS, other concepts are to be investigated. This also gives ACTRIS more freedom as the ESFRI definition for RPF would no longer limit the options. Many ACTRIS benefits (such as access to data and standard operation procedures) are free for any facility to use, benefitting the facility and connecting it to ACTRIS procedures even without any formal status. For formalizing this kind of connection, it needs to be investigated what ACTRIS can provide to the connected facilities with a reasonable cost and the resources available, and what the facility would need to commit itself to in order to formalize the connection to ACTRIS. This is work continuing outside and beyond the framework of ACTRIS IMP.