

Milestone 9.2: Identification of collaboration models between ACTRIS and the private sector

Authors: Simone Gagliardi (CNR), Giuseppe Gargano (CNR), Rosa M. Petracca Altieri (CNR), Carmela Cornacchia (CNR), Ariane Dubost (CNRS), Matilde Olivieri (CNRS)

Work package no	WP9
Milestone no.	MS9.2
Lead beneficiary	CNR
Deliverable type	<input checked="" type="checkbox"/> R (Document, report) <input type="checkbox"/> DEC (Websites, patent fillings, videos, etc.) <input type="checkbox"/> OTHER: please specify
Dissemination level	<input checked="" type="checkbox"/> PU (public) <input type="checkbox"/> CO (confidential, only for members of the Consortium, incl. Commission)
Estimated delivery date	M12
Actual delivery date	29/04/2021
Version	Final
Reviewed by	Pirjo Kontkanen (UHEL), John Wenger (UCC)
Accepted by	Eija Juurola
Comments	

Table of contents

1. Introduction.....	3
2. ACTRIS collaboration with private sector	4
3. Collaboration models between ACTRIS and the private sector	7
3.1. Upstream business model - Industry as a supplier	8
3.2. Downstream business model - Industry as a user	10
3.3. Co-creation business model – Industry as a full partner	13
4. Recommendations for harmonized documents and legal templates to support research - industry collaboration	16
5. Annex 1 – Private sector companies collaborating with ACTRIS.....	22
6. Annex 2 - Model agreements for research-industry activities.....	26
7. References.....	27

1. Introduction

The objective of this document is to give an overview of the different type of collaborations between ACTRIS and the private sector with a view to providing a conceptual framework for sound interactions with industry in all possible models for technology and knowledge transfer.

It describes ACTRIS efforts in partnering with the private sector in previous ACTRIS funding projects, and highlights results within the different identified collaboration models (Industry as a supplier, Industry as a user, Industry as a full partner), giving recommendation for exploring possible model agreements to allow and support actions for effective technology and knowledge transfer.

The document was prepared in the context of the activities of the ACTRIS IMP project (Aerosols, Clouds and Trace Gases Research Infrastructure Implementation Phase Project) which is aimed at taking ACTRIS into a new level of maturity supporting the implementation of the organizational, operational and strategic frameworks of the RI.

In particular, Work Package 9, coordinated by CNR, deals with the positioning of ACTRIS in the European innovation ecosystem with the main aim to increase the interest of the private sector towards ACTRIS as an innovation platform, and promote actions for an effective technology and knowledge transfer.

The document is structured in 5 different sections and 2 Annexes.

After this introduction, Section 2 describes ACTRIS partnership with the private sector in the frame of past ACTRIS funding projects. Section 3 analyses the different possible collaboration models between research and the private sector highlighting ACTRIS performance in engaging with the private sector. Possible model agreements to allow and support actions for effective technology and knowledge transfer are explored in Section 4. Annex 1 provides the list of private sector companies that collaborated with ACTRIS within past projects, while Annex 2 provides standard model Agreements as samples for contractual design to define the best possible approach in order to structure fruitful collaborations and ensure the needed protection for industry and Research Infrastructures (RIs). Finally, Section 5 provides the list of references.

2. ACTRIS collaboration with private sector

ACTRIS is a distributed Research Infrastructure with a long history of joint technological developments with private sector and links, more or less formalized, with several companies.

The distributed nature of the ACTRIS RI poses particular challenges unlike larger, centralized, single-sited RIs, which benefit from being naturally close to industry.

Past projects paving the way mostly design and preparation but also the construction of the ACTRIS RI (ACTRIS-2, EUROCHAMP-2020, ACTRIS I3, EARLINET, Cloudnet, and EUSAAR) strongly promoted innovation through partnerships with the private sector.

In particular, within ACTRIS-2, ACTRIS was named for the first time as an Innovation Platform and it was established in order to structure a mutual support concept allowing for a fair and productive bilateral exchange of expertise and information with the private sector¹.

The ACTRIS-2 Innovation Platform was a web-based tool devoted to foster co-operation in innovation between the ACTRIS community and the private sector, especially European SMEs. The Platform ensured a continuous exchange of expertise and information through the project website and through the use of a specific mailing list for dedicated communication with private sector, advertising several opportunities:

- Continuous and specific calls for *Associated Partnership* with the private sector;
- Opportunities for private sector access to calibration facilities and observation facilities with (and without) the support of the TransNational Access (TNA) programme.
- Available documentation on technological standardization;
- Specific tools, software etc. available through virtual access;
- Specific technical meetings and workshops.

A specific Confidentiality Agreement was developed together with the private sector to guarantee that the exchange of expertise and information respected both parties' intellectual property rights and classified information from the private sector.

Within ACTRIS-2, the Confidentiality Agreement was used as primary model to regulate possible legal issues related to collaboration since the first specific call for associated partnership with private sector, launched in October 2015. Since then, a continuous open call for associated partnership with private sector was maintained until the end of the project.

At the end of ACTRIS-2 (April 2019), 22 SMEs were associated to ACTRIS (15 EU-based, 3 based in Switzerland, 2 based in UK, 1 based in Australia and 1 based in USA)².

Not all private sector companies collaborating with ACTRIS-2 were Associated Partners.

Several companies have approached ACTRIS as users of the calibration facilities for technological developments, hardware improvements and software updates and developments, and/or suppliers of instrumentation and components (*Collaborative Partnerships*).

Overall, more than 50 European and International companies were involved in ACTRIS-2 activities, as

¹ ACTRIS-2, 2015-2019, H2020, G.A. N. 654109, WP4 – ACTRIS Innovation Platform

² ACTRIS-2, Deliverable D4.4: Final report on innovation

Associated Partners or Collaborative Partners, as users and/or providers of services and instrumentation, leading to technological developments, continuous cooperation and exchange for hardware improvements, software updates, developments and supply of instrumentation and components. Exchange of expertise and information with the private sector also benefited from specific technical meetings and workshops focused on specific technologies, as well as part of inter-comparison campaigns open to the private sector which were organized within different ACTRIS-2 work packages.

The lists of private sector partners which collaborated with ACTRIS-2 as Associated Partners or Collaborative Partners are given in Annex 1.

In the frame of [EUROCHAMP-2020](#), a great effort has been devoted to foster innovation through cooperation with industry, in particular with European SMEs.

An Innovation Platform has been created to inform new users from the private sector about the diversity of the EUROCHAMP chambers³.

A dedicated [webpage on innovation](#) has been published with four key areas of interest:

- *Associated Partnership programme* with an open call for Associated Partnership which allowed the association of 15 Associated Partners, 8 of which from the private sector;
- *Innovation Advisory board* composed of five experienced innovation managers from different industry sectors to provide advice on how EUROCHAMP-2020 can best develop and promote a culture of cooperation with industry;
- *Innovation Platform* to help EUROCHAMP partners to develop an effective communication strategy in order to attract users from the private sector and to help them in identifying the most suitable service in line with their specific needs.
- *Success stories* to highlight successful collaborations between EUROCHAMP-2020 partners and the private sector and to demonstrate how chambers and calibration centers can be used for TNA visits and collaborative research.

A Database of Potential Industry Users has been generated to capitalize on the extensive network of contacts built up by each partner and to help identify industry users for TNA visits and potential collaborations. The database covers a total of 55 companies and includes information on the industry sector, interest in use of different facilities, website and contact details⁴.

A Protocol for the Exchange of Knowledge and Expertise between EUROCHAMP-2020 partners and the private sector⁵ has been developed in the form of a Confidentiality Agreement for ensuring that the exchange of knowledge and expertise respects the intellectual property rights on both sides. The Confidentiality Agreement is part of the documentation required to become an Associated Partner.

The list of private sector companies collaborating with EUROCHAMP-2020 is given in Annex 1.

³ EUROCHAMP-2020, 2016-2021, H2020, G.A. N. 730997, WP4 – Innovation Platform

⁴ EUROCHAMP-2020, [Deliverable 4.1](#)

⁵ EUROCHAMP-2020, [Deliverable 4.4](#)

In cooperation with the [ENVRI](#) community, ACTRIS-2 and EUROCHAMP-2020 organized the 1st EU Environmental Research Infrastructures–Industry Partnering Forum, held in Grenoble on 18-19 May 2017. European and International industries and SMEs working in environmental science were invited to the Forum in order to explore directions and opportunities to promote new partnerships and joint actions. More than 80 people from the private sector and 70 people from Research Infrastructures and Research Institutes attended the event, that highlighted the importance of exploring synergies and opportunities for joint innovation activities.

In 2018, EUROCHAMP-2020 participated in two key industry events, [Analytica](#) and [Pollutec](#), which are large-scale international trade fairs in analytical scientific equipment and environmental technologies respectively.

In 2020, travel restrictions due to the COVID-19 pandemic made it impossible to organize events with the private sector for exchange of expertise and networking.

However, collaboration with the private sector continued, for instance in the frame of EUROCHAMP 2020 the AIREAMOS initiative (www.aireamos.org) has been put in place to reduce the risk of COVID-19 infection by promoting ventilation and monitoring of CO2 indoors, especially in schools and crowded spaces.

ACTRIS and the Eastern Mediterranean and Middle East Climate and Atmosphere Research Center ([EMME-CARE](#)) are organizing a [virtual event](#) in May 2021 to discuss the latest innovations in atmospheric science technologies and to exploit the potential for new opportunities, R&D collaborations and networking.

An [ENVRI-FAIR](#) meeting - co-organised by ACTRIS and [EMSO](#) - with industrial stakeholders initially planned in Spring 2020, will be held in June 2021. The meeting aim is to discuss how to better unlock and exploit the innovation potential of Research infrastructures and how to boost ENVRI's cooperation with industry as providers of advanced services, procurers of leading-edge technologies and partners in the development of new data driven products and applications.

These projects-related experiences should be considered as a starting point for the design of the innovation strategy of the ACTRIS RI. WP9 aims to take stock of these experiences in order to translate individual project-based innovation actions into a comprehensive, innovation RI-based, approach.

3. Collaboration models between ACTRIS and the private sector

This section explores the different collaboration models between the RI and the private sector with a focus on ACTRIS performance in partnering and fostering collaborations with the private sector.

The ESFRI (European Strategic Forum on Research Infrastructures) Working Group on Innovation⁶ identifies two main models for Research – Industry collaboration⁷:

- the ***upstream business model*** (Industry as a supplier) which sees the private sector involvement as *supplier* of innovative technologies, components, designs and methodologies to RIs (an outside-in approach);
- the ***downstream business model*** (Industry as a user) which sees the private sector involvement as *user* of RI facilities and data, whether for early stage basic research or more applied industrial research, for testing innovative processes and products (an inside-out approach).

Alongside these two main models, the ***co-creation business model*** sees RIs and the private sector acting as *innovation partners*, generating an ecosystem of innovation in which the purchase of technologies and equipment pushes companies to innovate, and to look for state-of-the-art facilities to test new innovative technologies and solutions to be placed on the market.

This ecosystem triggers a virtuous circle where RIs act as technological innovation driving forces with a clear return with regards to technology transfer in the short term (as well as a direct benefit of the private sector in terms of procurements), and knowledge transfer in the medium-long term for the benefit of both partners. A win-win approach in which the sharing of technological needs and solutions leads to mutual benefits

⁶ [ESFRI Working Group on Innovation, ESFRI INNO WG](#)

⁷ [ESFRI, 2018: Innovation oriented Cooperation of Research Infrastructures](#)

3.1. Upstream business model - Industry as a supplier

State-of-the-art research facilities require state-of-the-art technology, equipment and services at the cutting-edge of the technological possibilities.

In the construction and implementation phases, as well as in major infrastructure upgrades, RIs seek the best available technology on the market. Collaboration with the private sector sometimes only involves the provision of new technologies, components or software by companies via supply contracts. In this sense, a real co-operation is missing and the technology transfer mainly acts one-way.

RIs are drivers of procurement for innovative technology as the technical needs for the construction or upgrade of RIs often greatly exceed what is available on the market⁸.

When a procurement contract is signed between the RI and the supplier, a closer collaboration starts in order to meet technological needs in a short time frame. In this sense, technology transfer runs in a non-conventional “co-solution” mode in which industrial and scientific partners develop joint solutions to shared problems⁹.

Procurements drive innovation from the demand side. This offers the RI the chance to acquire tailored state-of-the-art equipment in a short time frame and to increase the scientific outreach of the infrastructure via publications in scientific journals. At the same time, it gives the private sector a valuable opportunity of acquiring new advanced “free of charge” knowledge and skills, improving their technology performance and sales.

A study¹⁰, conducted in 2017 within ACTRIS PPP WP8 (Socio-Economic Impact Analysis), showed that over 2008-2016, more than 200 procurement contracts were signed by the ACTRIS Research Performing Organisations with 97 private companies to develop and upgrade the research infrastructures. In line with this study, an additional 90 contracts were foreseen in the 2017-2019 period.

The same study analysed the spending for the development, maintenance, upgrading and operation of the ACTRIS RI within the period 2008-2016.

However, a more recent and focused estimate of the ACTRIS “upstream” business volume can be derived from the ACTRIS cost book, the specific document prepared during ACTRIS PPP, and updated afterwards in ACTRIS IMP. The cost book gives a clear identification, definition, and realistic planning of the overall infrastructure costs for the entire ACTRIS lifetime and is built upon the estimations provided by the experts working on the implementation and operation of the CFs and NFs.

More specifically, a reasonable proxy of the upstream business volume can be found in the cost category “Equipment” of the cost book. This category mainly relates to the purchase, replacement, upgrade and

⁸ [EC, 2020: Supporting the Transformative Impact of Research Infrastructures on European Research](#)

⁹ [ESFRI, 2018: Innovation oriented Cooperation of Research Infrastructures](#)

¹⁰ ACTRIS PPP, [D8.1: Report on KPIs for the quantification of ACTRIS direct impact](#), aiming at exploring the socio-economic impact generated to the ACTRIS consortium and associated business from the development, operation, and maintenance of the ACTRIS infrastructures.

maintenance of scientific equipment and machinery, including advanced research modules or mobile units and ICT systems.

The cost book tables below show the relevance of equipment cost for the construction of the ACTRIS facilities from the ground up and the implementation of their activities. The business volume connected to the equipment is about 26 M€ for the Central Facilities and 285 M€ for the National Facilities.

	Central Facilities		National Facilities	
Construction and implementation costs	Spending (in € millions)	(%)	Spending (in € millions)	(%)
Personnel	19,0	32,0	102,1	20,9
Equipment	26,3	44,0	285,3	58,5
Other costs	13,9	23,0	100,3	20,6
Total	59,2	100,0	487,8	100,0

The upstream business volume connected to the equipment can also be envisaged for the operation phase, which is planned after 2025 when the implementation of all the activities will be completed. It will be connected to the use and maintenance of the equipment, their upgrade and technological foresight and to the possible needs for replacing them at the end of useful life or due to substantial damages.

However, since these latter relevant needs will fall only in specific years and are difficult to plan, an estimate for the upstream business volume cannot be easily provided at this stage. These needs have been foreseen in the long-term planning and will be specifically addressed in the specific periodic plans to ensure the continuous development and operation of the facilities over the long period of ACTRIS operation life-cycle.

3.2. Downstream business model - Industry as a user

Innovative companies need state-of-the-art research facilities to test their new products.

The costs associated with innovation are sometime prohibitive for small and medium-sized companies with the result that a crucial component, industrial training, is often lacking.

In this context, RIs act as incubators of innovation, giving to the private sector the possibility of accessing cutting edge infrastructures to carry out early stage basic research, more applied industrial research, for testing innovative products/solutions, and for training of private sector personnel in close collaboration with RI operators.

Compared to the innovation potential of the upstream business model (Industry as a supplier), the innovation potential of access to the RIs *is less direct and only partially reflected* in patents and their exploitation by industry. This happens because knowledge transfer is something acting in the medium-long term and aiming to create new technology (and knowledge) which takes time. Usually in the operational phase, RIs are mature enough to offer access to a range of services which are vital for the private sector: product / process testing, calibrations with reference instruments, alignment with reference standards, quality assurance, refinement of new methodologies, access to reliable data, etc.

The involvement of the *private sector as users* of ACTRIS already started during the construction phase and has been constantly reinforced through the work done in past projects.

In most cases, the TNA programme allowed free-of-charge physical, remote and virtual access to ACTRIS facilities and services for several private companies, while also guaranteeing financial support for travel and subsistence.

ACTRIS-2 strongly contributed to enhanced access from private companies. During the project (2015-2019), 24 leading companies operating in the field of atmospheric monitoring used ACTRIS facilities in more than 30 different projects, for calibration of commercial instruments, testing/calibration of new instruments, and instrument development (including performance testing, software updates, and hardware improvement)¹¹.

Standardisation activities, and the definition of reference standards, have also played a key role in promoting the interest and use of ACTRIS facilities by the private sector¹².

Within the first 3 years of EUROCHAMP-2020 project activities (2016-2019), 7 different companies accessed the infrastructure via TNA¹³.

In the framework of the ACTRIS IMP Pilot transnational access program, 2 companies have so far expressed an interest to access ACTRIS IMP facilities.

It may also be worth mentioning the ATMO-ACCESS project (2021-2025) aiming at ensuring sustainable access to the 3 atmospheric research infrastructures [ACTRIS](#), [ICOS](#) et [IAGOS](#). Specific actions in the project

¹¹ ACTRIS-2, Milestone [MS4.5: Final report on the use of ACTRIS facilities and calibration centres for testing novel instruments](#).

¹² ACTRIS-2, Milestone MS4.4: Final report on standard-making process

¹³ EUROCHAMP-2020 Deliverable [D4.5: Progress Report on Engagement with the Private Sector](#)

will target new and customized trans-national access modalities that are specifically adapted to innovators in industry, thus fostering exchange of interest between RI partners and the private sector companies.

It is worth to underline that TNA statistics do not provide a complete picture of RI usage by the private sector as many companies also accessed ACTRIS facilities outside the TNA programme through a wide range of research collaborations. Indeed, when market competition factors are taken into account, there is a strong tendency to organize the access in the same country as the company. In this sense, the use of Confidentiality Agreements appears not be sufficient to compete with the trust that a company builds with its national scientific environment.

Moreover, this potential limitation of the transnational nature of the TNA, is combined with the “hidden” private sector use of RIs through academic access in the framework of partnerships with private sector companies. Indeed, direct private sector user access to ACTRIS facilities has been around 10% of total access, but there is most likely a wider industry involvement within these partnerships.

RIs can increase the potential of direct usage by private sector by offering *tailored access modes* for industry, possibly including training and data exploitation support whilst preserving the often-demanded competitive secrecy¹⁴.

In line with the ACTRIS access and service policy¹⁵ and Access Management Plan¹⁶, ACTRIS offers *Physical*, *Remote* and *Virtual* Access to research facilities, data and tools. The access may be *free* (free-of-charge), *wide* (aiming at guaranteeing the broadest possible, e.g. free virtual access to ACTRIS data and digital tools) and *competitive* (when a selection process is needed given the not unlimited available resources in terms of facilities and services).

When access is competitive, a selection procedure is foreseen in line with 3 different selection modes and access regimes: *Excellence-driven*, *Technical need-driven* and *Market-driven*.

In the Market-driven mode, the access to facilities and services is tailored to the needs of the private sector user and is defined through an agreement between ACTRIS and the user. Although this access mode is defined as “competitive” for the above reasons, it does not necessarily involve peer-review selection, but rather the establishment of a panel which negotiates access for private sector users in line with agreed assessment criteria. The access may lead to a fee that may remain confidential.

Detailed assessment criteria, composition and role and of the negotiation panel as well as timeline for the access negotiation process will be given in the ACTRIS IMP Deliverable D6.5 “ACTRIS Access and Service Management Plan” which will be released at the end of the project together with the on-line Access Management Platform.

¹⁴ [EC, 2020: Supporting the Transformative Impact of Research Infrastructures on European Research](#)

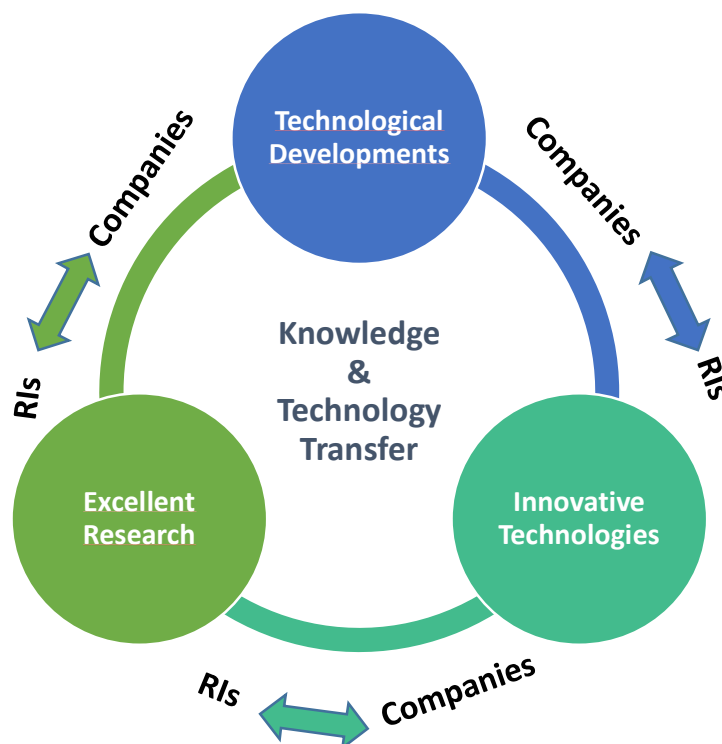
¹⁵ The ACTRIS access and service policy gives guidelines and sets general principles for access to ACTRIS facilities and services. The last version has been developed within ACTRIS-PPP, WP2, [Deliverable D2.6: ACTRIS access and service policy](#)

¹⁶ The ACTRIS Access Management Plan (AMP) is meant to define rules, processes, roles and workflows for the management of user access. The last available release of the AMP has been prepared within ACTRIS-IMP, WP6, [Milestone MS6.5: 2nd draft of the ACTRIS Management Plan](#)

ACTRIS Data and data products also have potential for further collaboration with industry in the exploding downstream data products market. The Near Real-Time data transmission of some ACTRIS data initiated notably in some operational projects with public agencies drive the development of those robust data products. We can notably mention the Copernicus [CAMS_21](#) contracts (CAMS_21a coordinated by the CNRS for the provision of surface in-situ aerosol data and CAMS_21b coordinated by CNR for the provision of profile aerosol data). The potential of the ENVRI data use by industrial stakeholders will be analysed further in the frame of the ENVRI-FAIR project.

3.3. Co-creation business model – Industry as a full partner

The co-creation model emphasizes the importance of creating a collaborative system where RIs and the private sector act as *innovation partners*, generating an innovation ecosystem that triggers a virtuous circle. Technological developments enable innovative technologies which, through knowledge and technology transfer, support excellent research, which can stimulate further technological developments.



In this sense, the upstream and downstream business models can be considered as pieces of this puzzle where RIs are major drivers of industry innovation, enabling companies to be immersed in an active ecosystem of innovation based on their wide complementary range of knowledge, cutting-edge facilities and skills.

The “hidden usage” of RIs by means of academic access in the framework of partnerships with private sector suggests that RIs should promote more extensive and structured cooperation with industry to put in practice the concept of *industry as a full partner* (both as a provider and as a user).

This can be done by enhancing the association programme, streamlining public procurement bureaucracy, encouraging direct access by companies through tailor-made access modes including clear rules for the management of IPRs and for the publication of results, fostering exchange and training programs as well as creating more opportunities for bilateral exchanges between researchers and the private sector.

The European Commission’s independent Expert Report [*“Supporting the Transformative Impact of Research Infrastructures on European Research”*](#), acknowledges ACTRIS’ efforts in implementing the

Innovation Platform and services that are being used by industry. It also states that *“ACTRIS still needs to put the ensemble of these activities as a central part of the RI governance structure”*.

The identified *“major bottleneck”* is that *“ACTRIS does not have enough resources to develop innovation activities as hoped”* because the *“initial costs to set up this type of activity are not seen as necessary by the Member States/Associated Countries and therefore it is not supported as a core activity of the RI”*.

Among other things, the EC recommends to:

- *Seek project-based resources to initiate innovation activities and recruit the necessary expertise;*
- *Widen the user community also exploiting the huge innovation potential of technology development via co-design and co-creation projects with industry, so as to provide market-driven services to the private sector.*

Within ACTRIS IMP WP9, a series of activities are foreseen to advance the innovation offer of ACTRIS and to establish an ad-hoc Liaison Office within the Development and Relations Unit of the HO (DEVU). An *ACTRIS Innovation Portfolio* will be drafted to advertise the distinctive services and opportunities provided by ACTRIS for innovation provided to the private sector.

A strategy to widen the user community will be designed in close collaboration with WP6 (Implementation of the user access to ACTRIS services) where an in-depth analysis of user needs is ongoing to enhance the user strategy and to give recommendations to the ACTRIS facilities.

Some flagship actions will be carried out, possibly in the frame of TNA pilots in WP7, to demonstrate the useful potential of joint collaborations with the private sector and to highlight results, best practices and issues arising from this experience.

As reported in this document, despite the innovation *“bottleneck”*, project-based innovation activities in ACTRIS have proven to be efficient. The number of collaborations constantly increased during the construction and implementation phase of ACTRIS, showing that the interest in using the RI services is strong as well as the interest in supplying instrumentation to it.

The study in ACTRIS PPP WP8¹⁷, aggregating the data provided at national level from the participating countries, shows that the funds attracted within R&D projects commissioned by private sector in utilizing ACTRIS facilities have been about 16 M€ in the period 2008-2016, with an estimation of additional 12 M€ for the 2017-2019. The same data analysis shows that cooperation with private sector companies led to the creation of 9 start-ups/spin-offs in the period 2008-2016, and 3 more were expected for 2017-2019.

There is a huge potential behind these collaborations with industry in terms of new opportunities for cross-fertilization and knowledge transfer, but also with a view to achieving long-term sustainability of RIs. To exploit this potential, dedicated cooperation mechanisms and tools should be created as well as new initiatives to increase the attractiveness of RIs for industry. To this aim, other innovation initiatives like Climate KIC and links with clusters and industry associations should be strengthened given the multiplier effect of such networks and initiative to reach the private sector.

¹⁷ ACTRIS PPP, [D8.1: Report on KPIs for the quantification of ACTRIS direct impact](#)

Within ENVRIPLUS¹⁸ WP18 (Dissemination, Liaison and Collaboration), a RI Innovation and Industry Liaison Preparedness Roadmap¹⁹ was prepared, offering a set of guidelines and recommendations to help the RIs to become more proactive towards industrial users and to develop closer links with Industry, including:

- an overall strategic plan to liaise with Industry;
- hire skilled and qualified personnel with appropriate competences for the Liaison office and Communication office, and establish an Industry Advisory Committee;
- highlight Industry-cooperation success stories on RI' websites and in reports to the EC and ESFRI;
- make available via website standard model Agreements and IPR guidelines and policies;
- publish an online RI Services Catalogue, inclusive of specific services/opportunities for/with industry;
- make sure the Data Portal provides users open, user-friendly access to RI data and services;
- establish Training Programmes and talent-attraction Exchange Programmes in consultation with industry to bring together and train the next generation of young scientists, engineers and managers.

Many of these recommendations have already been implemented or are about to be implemented through ACTRIS IMP.

A new ACTRIS website has been launched. A [Science and Innovation](#) section has been set up to inform the private sector about the different opportunities offered by ACTRIS. A specific mailing link for private sector stakeholders has also been established in March 2021.

The ACTRIS catalogue of services is under development in WP6 and will be linked to the [CatRIS](#)²⁰ portal and accessible through the ACTRIS website.

WP9 will give recommendations²¹ for the operation of the ACTRIS Liaison Office that could also benefit from the experience of the [ENRIITC](#)²² project, aiming at building a permanent pan-European network of Industrial Liaison and Contact Officers and enable industry to become a full partner of RIs whether as a user, a supplier, or an innovation partner for co-creation.

Next section will explore possible model agreements to allow and support actions for effective technology and knowledge transfer.

¹⁸ ENVRIPLUS, 2015-2019, H2020, G.A. N. 654182

¹⁹ ENVRIPLUS, [D18.5 RI Innovation and Industry Liaison Preparedness Roadmap](#)

²⁰ [CatRIS](#) is an open, trusted and user-friendly portal to a harmonised and aggregated catalogue of services and resources provided by Research Infrastructures and Core Facilities across Europe.

²¹ ACTRIS-IMP, WP9, D9.2 - Means and recommendations for the operation of the ACTRIS liaison office

²² [ENRIITC](#), 2020-2022, H2020, G.A. N. 871112 - European network of RIs and Industry for collaboration.

4. Recommendations for harmonized documents and legal templates to support research - industry collaboration

RIs operate in complex innovation ecosystems where industry, and especially SMEs, play an increasingly important role.

The collaboration models analysed require harmonized IPR policies and legal models for all occurring technology / knowledge transfer situations, allowing to better attract, coordinate and exploit the full potential of RI-Industry cooperation.

The *Confidentiality Agreement* (or Non-Disclosure Agreement) has been used by ACTRIS as a primary legal model to regulate arising IPRs and disclosure of information with the private sector.

Confidentiality Agreements and Non-Disclosure Agreements are essentially the same legal model. The terms (and the agreements) are interchangeable but in practice they are used in slightly different circumstances even though the protection is the same. Both are aimed at protecting confidential information from becoming public or more widely known, or use it for any purposes other than those specified in the agreements, but:

- Confidentiality Agreements are used to keep bi-lateral or multi-lateral confidential information, when a higher degree of secrecy is required;
- Non-Disclosure Agreements are more frequently used when the obligation is unilateral, e.g. in third party engagement, spin-off creation, etc.

In fact, these types of Agreements offer good protection for both sides, as industry and RI perspectives are both included, and a great flexibility with provisions applied based on a case by case assessment.

This flexibility should be further explored to offer private sector partners (and to retain) the needed level of confidentiality. A tailor-made process is necessary to ensure that the needs of pure academic research and pure proprietary research can be met, and also to adapt in line with the objectives, sector and extent of cooperation.

To do this, better business-awareness should be promoted also concerning the needed skills and resources to adapt models on a very broad range of IPR issues.

Indeed, the RIs' co-funding projects requirements related to publication and/or exploitation of research results are very often in conflict with the industry need to protect IPRs. The need here is to find protection mechanisms that give incentives for industry to invest in research cooperation and to commercially exploit results when possible.

The ACTRIS Access and Service policy²³ regulates the management of IPRs and the ownership of access results. It gives some degree of flexibility and offers a good regulatory framework for RI-industry interactions in the frame of access (downstream business model - Industry as a user).

Ownership

²³ ACTRIS-PPP, WP2, [Deliverable D2.6: ACTRIS access and service policy](#)

Ownership and intellectual property rights to any product generated in relation to the access (data, data related tools, databases, software, prototypes, new tools and methodologies, etc.) belong to those who have generated them.

Joint ownership applies when access results have been jointly generated and the terms of this joint ownership are separately agreed between the parties.

Third party property rights

Third party rights are not owned, nor generated by the ACTRIS ERIC, National and/or Central Facilities, which, in case of use of such rights as part of their own intellectual property, have to ensure that the third party IPRs are respected and that they have the authorisation of the rights holder/s to grant access rights.

Access rights to data and exceptions

When users submit data to the ACTRIS Data Centre which have been generated in relation to the access, they shall give to the ACTRIS ERIC the right to use these data (and related documentation) for any purpose.

There are exceptions which need to be agreed with the ACTRIS ERIC case by case, in particular when use of the results by ACTRIS could:

- jeopardize a potential industrial/commercial use;
- violate the rules on personal data protection or on confidentiality for security reasons.

This policy gives to private sector companies (as well as to scientific users inside or outside the RI community) the opportunity to access ACTRIS facilities and services and retain (or co-own) IPRs. However, a continuous update can be useful for improving the efficiency of IPR policies, also through case studies in line with evolving experience to investigate different IPR scenarios related to various IP aspects (patent, copyright, database rights, co-ownership).

From the “demand side” of innovation (upstream business model – Industry as a supplier), procurements play a crucial role in driving innovation.

The different public procurement regulations applying in the EU member states often require an open call procedure to procure ad-hoc instruments or components. This can jeopardize background technological developments and leads companies to expose themselves in open call competitions, ignoring if they will have a reasonable return for their investments at the end.

To overcome this issue, improvements in public procurement aimed to better involve industry in pre-commercial research should be considered. This would allow RIs and private sector companies to share the technological risk behind the co-design and implementation of innovative products, preventing the dispersion of innovative ideas and solutions.

In this context, two EU funding instruments, Pre-Commercial Procurement (PCP) and Public Procurement of Innovative solutions (PPI) could play an important role in exploiting innovative breakthroughs and to better involve the private sector in pre-competitive research activities.

These instruments are targeted at potential public purchasers of innovative solutions, authorities and public entities that fall within the definitions of "contracting authorities" and "contracting entities" under the [EU public procurement Directives](#) and beyond, also considering ERICs as public procurers, as they are formed by several contracting authorities.

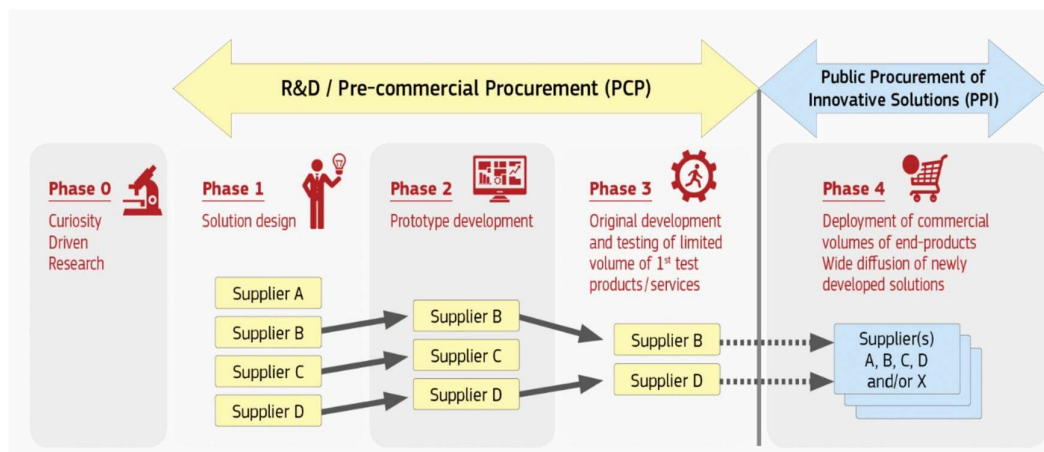


Table 4.1. overview of PCP and PPI, according to the European Commission (2020)

PCP is a public procurement procedure dedicated to innovative ideas which are at an early stage of concept/study and need more research activities to come close to the market.

PPI is a public procurement procedure dedicated to innovative solutions that are close to the market, or already in small quantity on the market, which would be deployed if clear requirements or sufficient demand is expressed by the market.

For the PCP and PPI, different funding scheme and conditions apply, which are briefly summarized in the table below.

	PCP	PPI
Funding	90%	35%
Consortium	<ul style="list-style-type: none"> ✓ minimum 3 participants from 3 different Member States /Associated Countries ✓ of which, minimum 2 public procurers ✓ ERICs can apply alone as formed by several public procurers (contacting authorities/entities) 	
When?	<ul style="list-style-type: none"> - need for R&D to get new solutions developed - no solutions close to the market yet - need to test and compare competitive solutions - no commitment to deploy 	<ul style="list-style-type: none"> - no R&D involved - innovative solutions that are close/in to the market - need for clear requirements/sufficient demand - commitment to deploy
What?	<p>procurers buy R&D to:</p> <ul style="list-style-type: none"> - steer development of solutions to their needs - compare and test alternative solutions 	<ul style="list-style-type: none"> - procurers act as early adopter/buyer of innovative solutions that are newly arriving on the market

How?	<ul style="list-style-type: none"> - procurers buy R&D from several suppliers in parallel - comparison/evaluation between alternative solution approaches - prototyping: suppliers develop their own solutions in parallel - testing: two suppliers are selected to ensure market competition and the solution are tested 	<ul style="list-style-type: none"> - a buyers/procurers group act as facilitator to bring products on the market with required quality/standards/price within a specific time - after testing, procurers group buys a significant volume of products/solutions
-------------	---	--

Table 4.2. PCP and PPI funding scheme and conditions

PCP and PPI are considered among the best tools for connecting applied research to the market, as the main aim is to accelerate the time to market for innovative solutions.

It should be further investigated how ERICs could make use of these funding instrument to better involve the private sector in pre-commercial research and prototype development.

The choice between different collaboration agreements should follow a case-by-case approach, taking into account financial, legal and ethical issues depending on the scope of the relationship and level of cooperation.

The following categories of model agreements, taken from the World Intellectual Property Organization²⁴ experience, can be useful to identify the most appropriate level of contractual agreement depending on the type of collaboration to be structured.

Confidentiality Agreements

As already reported, these agreements are designed to protect confidential information from becoming public or more widely known, or use it for any purposes other than those specified in the agreements. The obligation not to disclose confidential information may be mutual or unilateral. Parties have to specifically agree what would be considered as confidential information, how the information will be transferred and the duration of the confidentiality period. The terms should be set up in a way to protect information and the interest of the Parties, to provide an efficient communication based on the confidence.

Sponsored Research Agreements

Frequently used by the academic sector, such agreements describe the relationship between one or more "recipients" and commercial entities (the sponsors) from which recipients receive funding or other means to support their research. The sponsor gets preferential access and/or IPRs resulting from research results in return.

License Agreements

²⁴ [The World Intellectual Property Organization](https://www.wipo.int) is a United Nations agency with the aim of encouraging creative activities and promoting the protection of intellectual property in the world

License agreements are granted by a party to another party to make, have made, use, sell, copy, display, distribute, modify, make derivative works, etc. There are several types of license agreements, among them the *Patent license* (waiver the right to exclude), *Copyright license* (waiver the right to control) and *Technology license* (may include different kind of IPs).

They can be used:

- for the access, use or commercialization of research results (licensing to an industry partner, or for the creation of a spin-off company based on the licensed technology);
- in the context of collaboration with an industry partner or a research partner.

License agreements have a great degree of flexibility and are suitable to explore win-win approaches

Research Services Agreements

Research service agreements are used to achieve commercial goals via contract research and service agreements. One party establishes objectives and pays the other party to conduct research toward the agreed objectives. IPs and research results may be exclusively owned by the paying party.

Usually, they are not used for long term collaboration, rather in specifically-designed projects and services, with a well-developed framework policy which guarantees the paying party to avoid undesirable results.

Development Collaboration Agreements

Development Collaboration Agreements are used between two or more parties, each contributing with its own skills and resources, cooperating to develop and possibly commercialize a new technology (product, process, methodology, etc.). Parties jointly define objectives, timeline, access rights, management and ownership of IPs, as well as jointly share benefits and risks.

Most of these collaborations are used to explore the feasibility of commercial applications. They are often based on the cross licensing of IPRs, needed for the implementation of the collaborative project or to license the developed technology. There is an overlapping between Research Service Agreements and Development Collaboration Agreement, as in some cases contractors are also collaborative partners.

Other useful insights can be found within the [CORBEL initiative](#)²⁵ and the [IPAG project](#)²⁶.

CORBEL provides advice and guidelines on the main aspects to consider when setting up collaborations, and offers free access to ready-made model agreements for setting-up collaboration with the private sector.

The IPAG project also provides model agreements that can be used at different stages of technology research and commercialization of research results.

Different model agreements for research-industry activities are listed in Annex 2. They can offer some useful ideas for the formalization of collaborations between ACTRIS and the private sector, considering that any collaboration will require a tailor-made approach.

²⁵ the [CORBEL initiative](#) is a cluster of infrastructures working in the life science domain which created a platform for harmonized user access to biological and medical technologies to deliver cross-advanced and multi-disciplinary research.

²⁶ IPAG (Intellectual Property Agreements Guide) is a project of Universities Austria and sponsored by the Austrian government providing standard contracts for dealing with R&D cooperations.

Confidentiality Agreements offer good protection on both sides and help in building a confidential communication, but they are correlated to project-based lifetime and thus not completely suitable to exploit the full potential of a long-term structured collaboration.

To this aim, Development Collaboration Agreements offer a wider, long-term, structured collaboration framework which is suitable to regulate different degree of cooperation, for early stage research or more applied research, to explore the feasibility, development and commercialization of a new technology.

The License Agreements can be used with great flexibility to achieve a specific objective, to exploit a specific research result up to deploy a new technology.

These types of agreements offer a broad spectrum of regulatory frameworks from which to draw upon. They are useful in defining the best possible approach to foster fruitful collaborations with the private sector, while also ensuring the needed protection for both industry and RIs.

5. Annex 1 – Private sector companies collaborating with ACTRIS

ACTRIS-2 (2015-2019)

The list of ACTRIS-2 associated SME partners is given in Table 5.1.

ACTRIS-2 Associated Partnership with SMEs	
Company	Country
Aerosol Consulting ML SarL	Switzerland
Abacus Laser	Germany
Aerodyne Research Inc.	USA
Aerosol d.o.o.	Slovenia
Air Lorraine	France
Airmodus Oy	Finland
Alpes Lasers S.A.	Switzerland
CIMEL Electronique	France
CNC Solutions	Greece
Ecotech Pty Ltd	Australia
GRASP SAS	France
GWU-Umwelttechnik GmbH	Germany
Licel GmbH	Germany
LuftBlick OG	Austria
Meteomodem	France
METEK GmbH	Germany
Raymetrics SA	Greece
Ricardo-AEA Ltd.	UK
RPG Radiometer Physics GmbH	Germany
Remote Sensing Consultants Limited	UK
TSI GmbH	Germany
TOFWERK AG	Switzerland

Table 5.1. List of ACTRIS-2 Associated Partnership with SMEs

The list of SMEs which collaborated with ACTRIS-2 is given in Table 5.2.

ACTRIS- 2 Collaborative Partnership with SMEs	
Company	Country
ADDAIR	France
Air Quality Design	USA
Airclip Service GmbH	Germany
Air Quality Design	USA
Andøya Space Center	Norway
Apel-Riemer Environmental Inc.	USA
Brechtel	USA
Campbell Scientific Ltd.	UK, France
Catalysts	Austria
Cooper Environmental	USA
Dekati Oy Finland	Finland
Droplet Measuring Technologies	USA
Ecophysics: CLD	Germany
EKO Instruments EUROPE BV	The Netherlands
Envicontrol	Belgium
EnviMeS: ICAD	Germany
Environnement S.A.	France
Halo Phototonics	UK
IONICON Analytik	Austria
LEOSPHERE	France
Los Gatos: CAPS, CEAS	USA
Lufft GmbH	Germany
Metrohm Applikon	The Netherlands
ML SaRL	France
Nicarnica Aviation	Norway
Palas GmbH	Germany
Perkin Elmer	USA
Sigma Space Corporation	USA
Sunset Laboratory Inc	The Netherlands
Teledyne Api CLD	USA
Teknocalor	Finland

Tenum	France
Tera Environnement France Consultancy services	France
Thermo Electronics: Thermo Fisher CLD	USA
TSI GmbH / TSI Inc.	Germany / USA
VAISALA	Finland

Table 5.2. List of ACTRIS-2 Collaborative Partnership with SMEs

EUROCHAMP-2020 (2016-2021)

- The list of EUROCHAMP-2020 associated companies is given in Table 5.3.

EUROCHAMP-2020 associated companies	
Company	Country
AIRMODUS	Finland
Plume Labs	France
Nanothinx	Greece
Biral	UK
Bilfinger Noell GmbH	Germany
Airlabs	Denmark
PM_TEN	Italy

Table 5.3. List of EUROCHAMP-2020 associated companies

- The list of companies collaborating with EUROCHAMP-2020 within TNA activities is given in Table 5.4

EUROCHAMP-2020 – private sector collaboration (TNA)	
Company	Country
Aerodyne Research	USA
Blue Industry and Science	France
ENOVEO	France

Environmental Physics Bologna	Italy
Ionicon Analytik GmbH	Austria
PM_TEN	Italy
Catalytic Instruments GmbH & Co.KG	Germany
Ente Nazionale Idrocarburi (ENI)	Italy

Table 5.4. List companies collaborating with EUROCHAMP-2020 within TNA activities

- The list of companies collaborating with EUROCHAMP-2020 outside TNA activities is given in Table 5.5.

EUROCHAMP-2020 – private sector collaboration (outside TNA)	
Company	Country
AutoNaut Ltd	UK
BASF	Germany
Bilfinger Noell GmbH	Germany
Chromatotec	France
CONITECH Ltd	Romania
Fasmatech	Greece
GSM consortium (Renault, PSA, IFPEN)	France
PlumeLabs	France
PM_TEN & Dado lab	Italy
PORCELANOSA	Spain
Thermo Fisher Scientific	USA
TOFWERK	Switzerland
Unilever	UK
Waters Corporation	USA

Table 5.5. List companies collaborating with EUROCHAMP-2020 outside TNA activities

6. Annex 2 - Model agreements for research-industry activities

These standard models are samples for contractual design in the field of technology transfer. They can be downloaded and adapted in line with different circumstances to be contractually settled.

The user may modify the content, reproduce, distribute and publish it, make modifications and alterations, make other commercial use of it.

CORBEL Model Agreements

- [Confidentiality Agreements](#)
- [Collaboration Agreement](#)

IPAG Model Agreements

The IPAG Model Agreements are based on the World Intellectual Property Organization (WIPO) experience.

They include clauses in accordance with the WIPO established regulations, e.g. for the arbitration clause based on the WIPO Expedited Arbitration Rules.

- [Multilateral Confidentiality Agreement](#)
- [R&D Cooperation Agreement](#)
- [Research Assignment](#)
- [Letter of Intent - Spin-off creation](#)
- [Patent licensing Agreement](#)

7. References

- EC, 2020: [Supporting the Transformative Impact of Research Infrastructures on European Research](#), Report of the High-Level Expert Group to Assess the Progress of ESFRI and Other World Class Research Infrastructures Towards Implementation and Long-Term Sustainability EC, D.G. Research and Innovation, ISBN 978-92-76-19272-5 doi:10.2777/3423
- EC, 2020: [Innovation Procurement](#), Brussels, European Commission, 29 October 2020
- ESFRI, 2018: [Innovation oriented Cooperation of Research Infrastructures](#), ESFRI Scripta, Vol3
- OECD (2014-02-14), "Intelligent Demand: Policy Rationale, Design and Potential Benefits", OECD Science, Technology and Industry Policy Papers, No. 13, OECD Publishing, Paris. <http://dx.doi.org/10.1787/5jz8p4rk3944-en>
- WIPO, 2011: [Managing Collaboration between Research Institutions and Industry – IP Related Collaboration Contracts](#), National Workshop Innovation Promotion and Technology Transfer, Belgrade, 2011
- [EU Public Procurement Directives](#)
- WIPO - [The World Intellectual Property Organization](#)

Research Infrastructures, Projects, Initiatives

- ACTRIS I3, 2011-2015, EU FP7, G.A. N. 262254 - Aerosols, Clouds, and Trace gases Research InfraStructure Network
- [ACTRIS-2](#), 2015-2019, H2020, G.A. N. 654109 - Aerosol, Clouds and Trace Gases Research Infrastructure
- ATMO-ACCESS, 2021-2025, H2020, G.A. N. 101008004 - Solutions for Sustainable Access to Atmospheric Research Facilities
- [CatRIS](#), 2019-2021, H2020, G.A. N. 824173 - Catalogue of Research Infrastructure services
- [Cloudnet](#), EU FP5: Development of a European pilot network of stations for observing cloud profiles
- [CORBEL](#), 2015-2020, H2020, G.A. N. 654248 - Coordinated Research Infrastructures Building Enduring Life-science Services
- [EARLINET](#), EU FP6: European Aerosol Research Lidar network
- [ECMWF/COPERNICUS/2019/CAMS 21a CNRS-IGE](#) - Provision of ACTRIS in-situ aerosol variables in Near Real Time
- [ECMWF/COPERNICUS/2019/CAMS 21b CNR](#) - Provision of ACTRIS Observations - (Profiles)
- [ENRIITC](#), 2020-2022, H2020, G.A. N. 871112 - European network of RIs and Industry for collaboration.
- [ENVRI-FAIR](#), 2019-2023, H2020, G.A. N. 824068 - ENVironmental Research Infrastructures building Fair services, Accessible for society, Innovation and Research
- [ENVRIPLUS](#), 2015-2019, H2020, G.A. N. 654182 - Supporting environmental research with integrated solutions

- [EMSO ERIC](#) (European Multidisciplinary Seafloor and water column Observatory)
- [EUROCHAMP-2020](#), 2016-2021, H2020, G.A. N. 730997 - Integration of European Simulation Chambers for Investigating Atmospheric Processes – Towards 2020 and beyond
- [EUSAAR](#), EU FP6: European Supersites for Atmospheric Aerosol Research
- [IAGOS](#) (In-service Aircraft for a Global Observing System)
- [ICOS](#) (Integrated Carbon Observation System)
- [IPAG project](#) - Intellectual Property Agreement Guide

Deliverables, Milestones

ACTRIS-2

- [D4.2: Progress report on the use of ACTRIS facilities and calibration centres for testing novel instruments](#)
- [D4.4: Final report on innovation](#)
- [MS4.5: Final report on the use of ACTRIS facilities and calibration centres for testing novel instruments.](#)
- [MS4.4: Final report on standard-making process](#)

EUROCHAMP-2020

- [D4.1: Database of potential industry users updated on a regular basis](#)
- [D4.4: Protocol for the Exchange of Knowledge and Expertise between E2020 partners and the private sector](#)
- [D4.5: Progress Report on Engagement with the Private Sector](#)

ENVRIPLUS

- [D18.5 RI Innovation and Industry Liaison Preparedness Roadmap](#)

ACTRIS-PPP

- [D2.6: ACTRIS access and service policy](#)
- [D7.1 Recommendations for establishing level of contractual agreement with National, European, and global initiatives and programs](#)
- [D8.1: Report on KPIs for the quantification of ACTRIS direct impact](#)

ACTRIS-IMP

- [MS6.5: 2nd Draft of the ACTRIS Management Plan](#)