

Design and Implementation of a Long-term Scheme for joint Maintenance Repair and Operations of the above

Work Package 2 – Deliverable 5.2

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Abstract

This document presents a sustainable Maintenance, Repair, and Operations (MRO) plan aimed at ensuring the long-term usability, reliability, and strategic alignment of the integrated Research Infrastructure (RI) Catalogue and the Technology Transfer Organisations (TTO) Directory databases developed within the Unite! Widening project. Building on the successful initial population of these digital assets, this deliverable tackles both technical and content-related challenges to maintain data accuracy, system performance, and user accessibility during and after the aUPaEU project period, which is currently set to conclude in December 2027.

The MRO system is built on three main pillars: the legacy of the Horizon 2020 infrastructure sharing policy, the usage rules of the Agora platform, and the best practice guidelines developed collaboratively by partners. It introduces new features, including an Application Programming Interface (API), which facilitates content updates and automates quality checks. Additionally, the responsibility for data governance is delegated to designated institutional managers within the Unite! universities. The deliverable also highlights the importance of ongoing user engagement, error reporting, and coordination across institutions to ensure the platform's sustainability and development. It acknowledges the complexities and risks involved in expanding access to external research infrastructures and sets the stage for an upcoming risks-benefits analysis and governance framework that aims to balance openness with security and operational sustainability. By emphasizing compliance with GDPR and FAIR principles, providing multilingual access, and promoting shared responsibility between the Unite!Widening project and technical teams, this deliverable contributes to the establishment of a collaborative European research infrastructure ecosystem.

This deliverable contributes to the smart objective 1 of the Unite!Widening project, by enabling access to shared infrastructures and TTO facilities, which contributes to sustainable and longer term cooperations between widening and non-widening partners. The deliverable is expected to support medium term impacts related to enhanced research and innovation capacity of partners in widening countries.

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1 | Introduction

1.1 | Context and history

Following the successful completion of Deliverable 4.4 under technical Work Package 2, which resulted in the integration of relevant data from two new project partners, TUGraz and WrocławTech, into the RI Catalogue and also the creation of the TTO's Directory, the focus now shifts towards ensuring the long-term usability and sustainability of this resource. The database is intended to serve as a long-term asset, extending during and beyond the anticipated duration of the Unite!Widening and the aUPaEU project, which enabled its creation. According to the current terms of the Agora Agreement, the aUPaEU project is supposed to last until December 2027,¹ after which time users will still be able to access the uploaded resources.

The Unite!Widening project seeks to enhance scientific excellence and maximize the impact of knowledge by fostering broad, effective collaboration across European universities and partners, with a particular emphasis on integrating widening countries such as Poland and Portugal. This deliverable contributes directly to these strategic objectives by ensuring the sustainability and continued usability of the RI/TTO databases, a critical digital infrastructure that supports inter-university collaboration, resource sharing, and innovation across the Unite! Alliance.

By maintaining and evolving this database, the project strengthens the research infrastructure backbone necessary for cross-border collaboration, promotes inclusivity by bridging gaps between widening and non-widening countries, and supports the establishment of a seamless inter-university campus in line with the broader vision of Unite!Widening, contributing to its objectives, in particular the smart objective 1.

It is important to note that this document is not the sole reference concerning the Maintenance, Repair, and Operations (MRO) of Deliverable 4.4. The continued functionality of the database depends on the timely identification and reporting of content-related errors and inconsistencies. In this context, section 1.6 of the Agora Acceptable Use Policy explicitly obliges users to report any known or suspected security breaches, credential compromises, or cases of misuse to the appropriate issuing authorities.²

Security breaches are not the only challenge that needs to be dealt with – the primary challenge concerning the operation of the database lies in ensuring that the stored information remains up to date. This is particularly important given that the database relates to the research offers of European scientific institutions and their capacity to share research infrastructures. The strategy for achieving this objective will be outlined in a subsequent section of this document.

¹ <https://cordis.europa.eu/project/id/101095314>

² <https://aupaeu.widening.eu/legal>

It is also important to note that the sharing of infrastructures among Unite! partners is supported by relevant documentation. The specifics of this arrangement were addressed during the Horizon 2020 project, specifically in Deliverable 3.2.

In summary, the maintenance, repair, and operation (MRO) of the database are based on three foundational pillars:

1. The infrastructure-sharing policy established as a legacy of the Horizon 2020 framework (Agreement of Use),
2. The rules governing the use and data management of the Agora cloud-based platform,
3. The set of best practices developed by the authors of this deliverable.

1.2 | Goal

The core goal of this deliverable is to design and implement a sustainable Maintenance, Repair, and Operations (MRO) system that prevents safety risks, ensures system performance, and maintains the accuracy and relevance of two databases: the [Research Infrastructure Catalogue](#) and the [TTO Directory](#), thereby safeguarding key digital assets that facilitates collaboration and knowledge sharing among Unite! partners. This aligns with Unite!Widening's ambition to maximize knowledge impact by ensuring researchers across the Alliance can reliably access and share critical research infrastructures and innovation support services.

Deliverable 4.4 (*Enhanced, extended and updated online catalogue of RIs + directory of TTOs*) marked the population and initial completion of the RI and TTO database, a central hub designed to connect researchers and institutions with vital resources, particularly access to research infrastructures that may not be available at their home institutions.

However, Deliverable 4.4 represents a starting point rather than a final stage. Ensuring the continued proper functioning of the database requires ongoing effort, both to prevent technical issues and to keep the information accurate and up to date.

Thus, Deliverable 5.2 addresses this long-term commitment by outlining the sustainable MRO system to safeguard the database's reliability, accessibility, and content integrity.

1.3 | Scope and objectives

MRO stands for Maintenance, Repair, and Operations, which in this context refers to a set of processes and activities aimed at:

- Minimising the risk of technical failures,
- Promptly correcting any errors that may arise, and
- Ensuring that the information presented remains accurate and up to date.

These objectives encompass two technical goals and one related to content management. To achieve the desired level of functionality, new features are being introduced to enhance the user experience and reduce the likelihood of errors.

One of these features is the Application Programming Interface (API), which is currently being tested at UPC. The API streamlines the content update process and introduces the potential for automated functions, such as checking URL validity and identifying duplicate entries.

Responsibility for the database's technical maintenance lies primarily with the aUPaEU project, which developed the Agora hub that hosts the database. Members of Task 2.3 from WP2 work closely with the aUPaEU development team to ensure smooth operation and to plan future enhancements.

In terms of content, the database primarily highlights the research capabilities of Research Infrastructures (RIs) and Technology Transfer Offices (TTOs) across Unite! universities. While this information tends to remain relatively stable, reflecting the continuity valued by academic institutions, occasional updates will be necessary. These may occur, for example, when laboratories acquire new equipment, or broaden their areas of expertise.

To ensure data accuracy, appropriate mechanisms must be in place. Each university appoints a designated individual or team responsible for managing the upload of RI-related information. All updates, modifications, and corrections should follow a standardised process, as the individuals best equipped to verify the accuracy and relevance of the data are the RI managers themselves or their designated intermediaries.

2 | Methodology

2.1 | Methodology for preparing the deliverable

The Maintenance, Repair, and Operations (MRO) plan was developed following a simple and practical approach:

- We analysed the data collected for the tools developed—the TTO directory and the RI catalogue, to understand the main maintenance needs, possible risks, and what is required to keep the systems running smoothly.
- Input from experts was essential. The aUPaEU technical team and the non-academic partner Aavanz from the Unite!Widening project gave valuable input. We also looked at examples of good practices in maintenance and operations from other similar projects.
- Draft versions of the plan were shared with all partners, who reviewed and helped improve the content.
- Our methodology was based mostly on established database maintenance practices, aiming to find a balance between what is technically possible and the resources available. Particular attention was given to existing limitations, such as heterogeneity among partner databases (in terms of structure, technology, and language) and varied levels of technical infrastructure across institutions.

2.2 | Risk-benefit consideration for external users

As part of the future work in work package 2, a separate deliverable will focus on conducting a full **risk-benefit analysis**, considering the diverse contexts and institutional frameworks of the participating and potential future RIs, each of which may be governed by different legal, institutional, technical, or strategic constraints. While broader access could offer benefits (increased visibility, collaboration opportunities, etc...), it also introduces risks that must be carefully assessed. These include data protection concerns, misuse of access, legal, contractual, reputational, or operational risks.

From a methodological perspective, addressing the risks and benefits associated with external users is essential to ensuring the long-term governance and sustainability of the platform. While this deliverable does not provide a comprehensive analysis, it acknowledges the significant impact that user access policies—particularly for users outside the Unite!Widening consortium—can have on operational and maintenance processes. The joint MRO scheme presented here has been developed with these considerations in mind.

3. Operations

This section provides an overview of the tool's purpose (3.1), its day-to-day functioning (3.2), the governance of its operations (3.3), the measures in place for data protection and cybersecurity (3.4), the involvement of stakeholders in the process (3.5), and the procedures for incorporating new data into the platforms (3.6).

3.1 | Tool overview and functionalities

The tool operates with core functionalities defined according to the specifications and framework established in Deliverable 4.4. Its primary purpose is to facilitate streamlined access to Research Infrastructures (RIs) and Technology Transfer Organisations (TTOs) across Unite! universities. Through a user-friendly web portal, users can explore available resources, access relevant information, and submit requests for access or collaboration.

The main features currently include a searchable catalogue of RIs and a directory of TTOs. The tool supports integration with institutional databases and provides a centralised overview of available resources. At this stage, the primary functionalities enable effective navigation and user engagement. Access to contact forms is granted upon user registration, during which users must accept the applicable terms and conditions.

Both the RI Catalogue and the TTO Directory are equipped with an automatic translation tool covering all Unite! languages, significantly enhancing the platform's accessibility and multilingual usability for users across partner universities.

3.2 | Operational details

This section outlines the processes by which data is collected, integrated, and made accessible within the tool, with a focus on practical operations related to content management and user interaction. It also provides an overview of user access levels, assigned rights, and available feedback mechanisms.

Data Collection: Information on Research Infrastructures (RIs) and Technology Transfer Offices (TTOs) is collected directly from the participating institutions. Each university designates a contact person responsible for submitting comprehensive details about available resources, including services offered, access conditions, eligibility criteria, and relevant institutional policies.

Authorized institutional representatives, either from central university services or from the RIs and TTOs themselves, enter and update this information through the platform's content management interface. This process ensures a dynamic and up-to-date catalogue that accurately reflects current availability, access rules, and contact information, all without requiring technical intervention.

User access and interactions: Users may access the platform freely to explore and identify suitable infrastructures and organisations. The tool offers intuitive search, filter, and browsing functionalities based on various criteria such as thematic area, university, type of service, and access conditions. Users can also translate the page with the automatic translation tool.

Each entry in the catalogue includes a concise description, the services available, and a direct contact reference. This enables users to quickly assess relevance and facilitate direct engagement with appropriate institutional representatives. The contact functionality is secured through eduGAIN, ensuring authenticated and protected exchanges. To use the contact forms, users must also agree to the terms and conditions outlined in the [Legal Notice](#)

Feedback mechanism: A simple feedback form integrated into the platform enables users to provide feedback on the tool's functionalities. Users may report difficulties, suggest missing or improved features, and flag inaccurate or outdated information. This feedback is directed to the central coordination team and the relevant institutional contact points for review and follow-up.

In summary, the tool operates as a user-friendly, content-oriented platform designed to facilitate the discovery and use of RIs and TTOs. It also supports secure and direct communication between users and institutions. The technical infrastructure and IT-related support are managed externally through the aUPaEU project. All aspects related to data maintenance and update procedures are addressed in the following section of this deliverable.

To understand better how the user might navigate and use the tool, how it operates today, you can refer below to a simple user journey visual:

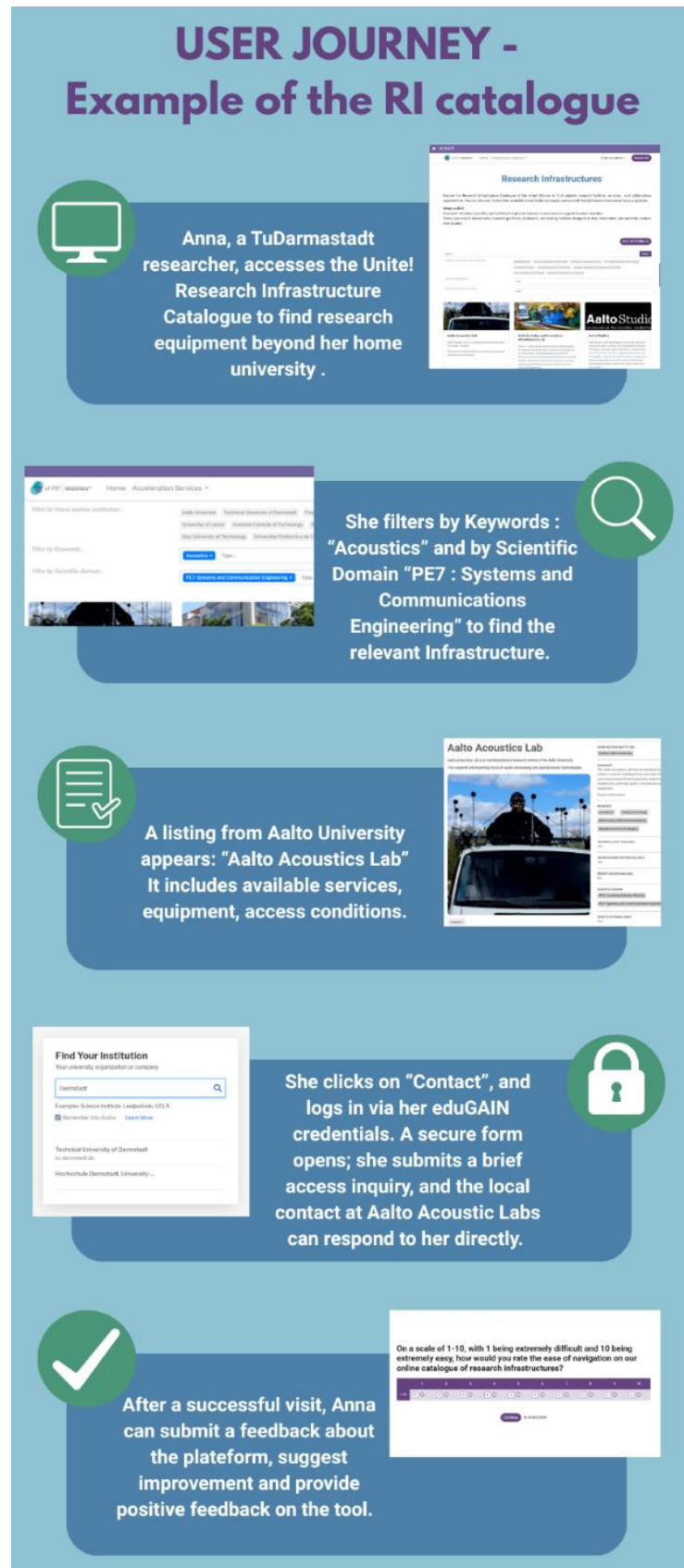


Figure 1 – User Journey for the RI catalogue

3.3 | Operation agreements between Unite!Widening and aUPaEU

The operational framework that settles the use of the Agora platform by the Unite!Widening project consortium is built upon a shared agreement structure established within the Unite! Alliance.

All universities within the Unite! Alliance have signed an Agora User Agreement, which governs the platform's use regardless of the specific project context, whether Erasmus+, Unite!Widening, or other Unite!-related initiatives and satellite projects. These agreements establish consistent terms and conditions for all users, fostering a collaborative environment for resource sharing and tool utilisation.

The operation and technical maintenance of the Agora platform, the digital “container” hosting the tool, are fully funded and managed under the aUPaEU project framework. In contrast, content creation, curation, and management, including the RIs catalogue and TTO directory, are independently funded and operated by the universities participating in the Unite!Widening project.

Key operational elements include:

- **User access and rights:** Governed by the Agora User Agreement, ensuring that users comply with data protection, usage policies, and intellectual property conditions.
- **Data privacy and security:** The platform is GDPR compliant, with cybersecurity and data protection protocols integrated to safeguard user data and institutional information.
- **Coordination and communication:** Regular collaboration between the Agora technical team and the Widening consortium ensures alignment on content updates, user support, and operational improvements.

This shared operational model allows for a clear division of responsibilities. The Agora team manages the technical infrastructure and platform security, while Unite!Widening focuses on content management and user engagement.

3.4 | Data protection measures and cybersecurity

The **Unite!Widening** project manages the content and data provision related to the RI catalogue and the TTO directory, while the technical aspects of data protection and cybersecurity are overseen by the **Agora team** within the aUPaEU project framework. The Agora platform fully complies with the **General Data Protection Regulation (GDPR)**, encrypted data transmission, and strict access controls to protect user and institutional data.

Data confidentiality, integrity, and availability are guaranteed through established security protocols, regular monitoring, and continuous updates managed by the Agora IT team. Data minimisation principles guide the collection process, limiting data to only what is necessary to maintain the accuracy and relevance of the catalogues.

Roles and responsibilities are clearly defined between content management (Unite!Widening) and technical infrastructure (Agora team), ensuring effective governance and accountability.

For detailed technical and legal information, please refer to the Agora Legal Notice, the Unite!Widening Data Management Plan (DMP)³ and the Agora User Agreement.

The catalogues maintained within the Unite!Widening projects, comprising datasets related to RIs and TTOs and other relevant partner data, are managed in strict accordance with the guidelines and principles established in the Unite!Widening Data Management Plan (DMP).

1. **Data Collection and Processing:** The catalogues include only data that has been collected and processed with a clear purpose and explicit consent, in full respect of privacy and confidentiality. The nature, format, and scope of the data have been defined in advance to ensure alignment with the project's objectives and the ethical standards outlined in the DMP.
2. **FAIR Principles Implementation:** Each catalogue is designed to ensure that the data it contains are **Findable, Accessible, Interoperable, and Reusable** in accordance with the FAIR principles.
 - **Findable:** Data entries are indexed with naming conventions, enabling efficient search and discovery by consortium members and users.
 - **Accessible:** The catalogues are hosted on the Agora in an Open Science perspective, following GDPR compliance and secure authentication methods such as eduGAIN for accessing contact forms.
 - **Interoperable:** Data formats and vocabularies adhere to common standards (for example, RIs and TTOs scientific domains are classified following the ERC panel classification) that facilitate integration and exchange between partner systems and external tools, usability beyond the original use.
 - **Reusable:** Each catalogue entry is downloadable by the user to be used easily.
3. **Data storage and security:** The data of the catalogues are stored securely on centralised servers managed by the Agora IT team, benefiting from continuous monitoring and protection against cyber threats. Backup and recovery plans are in place to prevent data loss and maintain integrity over time.
4. **Ethics:** Sensitive information included in the catalogues is handled with the utmost care, in full compliance with GDPR requirements and the ethical guidelines outlined in the Unite!Widening DMP. The catalogues exclude any data that could compromise individual privacy or confidentiality unless explicit consent has been obtained, and appropriate safeguards are implemented.

The data protection and acceptable use framework of the Agora platform is detailed in its [Legal Notice](#), which comprises the **Agora Acceptable Use Policy (AUP)** and **Privacy Policy**. These documents, maintained by the Universitat Politècnica de Catalunya (UPC) as the Operating Unit and Data Controller, outline the conditions for lawful access and use of the platform, including:

- Permitted use of services and resources
- User obligations (e.g., IP rights, confidentiality)
- Prohibited behaviours
- Personal data rights (access, rectification, withdrawal)
- Contact details for the Data Controller and DPO

³ [DL1.1 - Data Management Plan](#)

3.5 | Inclusion of TTO/RI Managers

The active involvement of TTO and RI managers has been a central element in the design, governance, and operational integration of the RI catalogue and TTO directory. This inclusion ensures that institutional policies, technical requirements, and access conditions are fully respected and aligned across the alliance.

TTO and RI managers were not only consulted but have directly contributed through participation in the working group responsible for developing the tool. Their expertise was instrumental in identifying the type of information relevant to include, advising on access restrictions, and shaping the user experience to meet real institutional needs.

In the earlier H2020 project, a large-scale study was conducted across Unite! partner institutions, gathering extensive input from RI managers regarding access policies, governance models, data preservation practices, and openness to external users. This study revealed that RI managers play a decisive role in setting access criteria and ensuring alignment with their institutional objectives. It also emphasised the importance of clear, inclusive processes and the strategic role of RIs in promoting innovation and external collaboration.⁴

Building on this foundation, several TTO managers from different institutions were engaged to help design the TTO directory (tool and functionalities), and to validate the directory content. A draft version of the TTO directory was shared for institutional review under the subject line: *“Request for review and approval: publishing TTO directory on Unite! Agora Platform.”* This consultation process ensured that each entry met both the technical standards of the platform and the governance policies of the contributing institutions. For example, direct personal contact details were deliberately omitted, in favour of secure contact forms (as is also the case for RI listings), ensuring GDPR compliance and institutional security.

This inclusive approach positions TTO/RI managers as active stakeholders in the governance and future development of the tool, reinforcing a model of continuous collaboration, policy alignment, and trust.

3.6 | Conditions and requirements for including additional RIs/TTOs

Within the framework of a Maintenance, Repair and Operation (MRO) objective, the integration of new research infrastructures into the RI Catalogue must follow a strategy that **distinguishes between internal contributions from member universities and collaborations with institutions outside the**

⁴ Guidelines and recommendations for UNITE! RIs Handbook for Effective Access Management of Research Infrastructures: Insights, Strategies, and Best Practices Deliverable 3.2 Project Number: GA 101017408 Project Acronym: UNITE.H2020 Project title: Planning the Future of Research & Innovation in the European University Alliance UNITE!)

Alliance. This dual approach ensures both inclusivity and coherence, supporting the Alliance's long-term vision for a unified and accessible European research infrastructure landscape.

For the universities within the Alliance, the process of adding new Research Infrastructures to Agora is intentionally streamlined and operationally efficient. Leveraging the existing trust and shared governance among member institutions, each university is empowered to request the inclusion of new infrastructures, provided they meet basic informational and technical documentation requirements. Specifically, a partner institution can submit a request to the T2.3 leader for the TTOs, and to the institutional contact for the RIs, by completing a standardized form that captures key metadata about the infrastructure. These metadata include the infrastructure's name, location, technical description, scientific domains served, availability, access conditions, and contact information. Additional optional information may include affiliations to European or national infrastructure networks, openness to external researchers, and relevant usage policies.

This process does not require a formal approval by a technical or governance board, as the participating institutions are already aligned with the Alliance's strategic and operational framework. The RIs points of contact will perform a quality control over the submitted metadata, ensuring consistency, completeness, and clarity for users of the platform. Once verified, the infrastructure is promptly integrated into Agora and becomes visible in the catalogue with appropriate filters and search options. This minimal overhead process facilitates the continuous enrichment of Agora while preserving the platform's usability and scientific relevance.

Note regarding the inclusion of external Research Infrastructures - proposal under review

The team has also explored a potential approach for including RIs from universities or institutions outside the Unite! Alliance. While openness to external stakeholders remains a core principle of Unite!Widening, the integration of external RIs requires a more structured and evaluative procedure to ensure operational coherence and strategic alignment with the Alliance's objectives.

In this context, the candidate RI should contribute clearly to the objectives and scientific priorities of the Unite! Alliance and Unite!Widening project. It must demonstrate the capacity for sustained long-term engagement, supported by adequate human and technical resources. Furthermore, the RI should express a clear commitment to participate in joint activities and to share data and resources in alignment with the established governance model.

This proposed inclusion process would start with an expression of interest from the non-member institution, ideally endorsed by at least one Unite! partner university to confirm a cooperative relationship and internal advocacy. The external institution would then submit a full application including comprehensive information on governance, access protocols, compliance with open science and FAIR principles, and relevance to Unite!'s research and innovation priorities. This application would be jointly assessed by a board such as but not limited to the Governing Board of Unite! for scientific, technical, and strategic fit, including risk-benefit evaluation and sustainability considerations.

The strategic and political decisions would remain the responsibility of the alliance's governance bodies.

This process is currently at the proposal stage and remains under review. A detailed risk-benefit evaluation and consultations with relevant stakeholders are planned for the next deliverable. The procedure will be validated and updated accordingly before being formally integrated into the MRO framework.

This dual-track process, simple and agile for internal partners, structured and selective for external entities, ensures that RI Catalogue would remain a high-quality, strategically coherent tool that reflects the shared vision of the Unite! Alliance. It enables member universities to grow the platform organically and flexibly, while also allowing Agora to engage with valuable external resources through carefully managed inclusion pathways.

4 | Maintenance and repairs

4.1 | Avoidance and management of performance issue

To keep the platform running smoothly and maintain a positive user experience, we will implement a light and practical approach to monitoring and managing performance issues. Rather than relying on continuous, resource-intensive system checks, the focus will be on user-driven reporting of problems.

- **Monitoring approach:** There will be no real-time or manual monitoring of the system by the project partners, given the high stability of the data. Instead, the platform users are encouraged to report any issues they encounter, such as bugs, slowdowns, or outages. This approach reduces the workload for the technical team while leveraging the community's direct experience to identify problems promptly.
- **Issue reporting mechanism:** Currently, users can report problems informally by sending emails to designated contacts within the Agora team, by using the "Contact us" button on Agora. This contact acts as a central point for logging and managing software-related concerns. If the issue is related to the data itself the Agora team can contact the data owner.
- **System Management and Access:** The software is primarily managed by the aUPaEU technical team, who oversee system maintenance and address bugs or errors as they arise. Partner institutions have occasional access to the system backlog, enabling them to implement fixes or improvements when necessary.
- **Usage statistics:** Collecting and analysing usage data is planned to better understand how users interact with the platform. These insights will help identify patterns. Usage statistics will guide maintenance priorities and support targeted improvements over time.
- **Issue resolution:** Given the relatively low criticality of the platform's data and operations, maintenance will be performed on a **best-effort basis**, responding to reported issues as resources allow. While urgent problems will be addressed promptly, less critical fixes may be scheduled according to available capacity.

Table 1 – Management of performance

Item	Description	Responsible	Rationale	Time
Performance Monitoring	Light monitoring based on user-reported issues, no continuous checks	Users	Minimises resource use; relies on community feedback	Ongoing, as issues arise
Issue Reporting Mechanism	Informal reporting via email to a designated Agora contact	Users; Agora Contact System	Centralised issue logging and prompt handling	Ongoing, immediate upon issue
System Management	Software managed by aUPaEU; partners access backlog for occasional fixes	Agora Technical Team; Unite!Widening WP2	Ensures maintenance and timely resolution of bugs	As needed
Usage Statistics	Collection and analysis of platform usage data	Agora Technical Team (collection); Unite!Widening WP2 (analysis)	Helps identify trends and potential performance concerns	Periodic (e.g., yearly)
Issue Resolution	Fixes and maintenance performed on best-effort basis, prioritizing urgent issues	Agora Technical Team; Unite!Widening WP2 (content-related)	Efficient use of resources given system's low criticality	As problems arise and resources allow

4.2 | Maintenance and accuracy of the database

Maintaining the accuracy and currency of the tool's database is essential for ensuring its continued usefulness and reliability. A maintenance process will be employed.

- **Scheduled data reviews and updates:** An annual update cycle will be established during which partners review and confirm the accuracy of their respective data entries. The lead partner will coordinate this process through shared forms/emails for Technology Transfer Offices (TTOs) and reminder emails for Research Infrastructures (RIs).
- **Automation and API integration:** Importing and updating database contents automatically from primary sources would be preferred for accuracy but implementing such API and/or data source at each partner will require further effort. An API has been implemented for UPC, and research infrastructure information is automatically retrieved from [Serveis Científicotecnics](#). Similar automation for other partners, such as PoliTO, are under investigation but may face technical challenges. For example, Finland's national research infrastructure database⁵ was investigated but found infeasible due to technical limitations. Efforts to integrate additional automated data feeds will continue to improve data accuracy and reduce manual workload. Manual data entry is prone to errors and would benefit from e.g., automatic checking of hyperlinks to external material. While such a function is possible on the Agora platform, it has not been implemented yet and requires development of work. As of May 2025, a request for this feature has been added to the development queue for further analysis.

⁵ <https://research.fi>

- **Technical IT maintenance:** Beyond data content updates, technical maintenance includes the ongoing management of the database infrastructure, such as server health monitoring, backup management, software patching, and security updates, to ensure data integrity, availability, and protection against data loss or unauthorized access. The Agora team is responsible for this IT maintenance, including software updates, troubleshooting, and system upgrades. This division of responsibility allows the project partners to focus on content accuracy and user support while relying on Agora's technical expertise for system stability and security.
- **Roles and responsibilities:** Data stewards and designated partner contacts are responsible for ongoing data accuracy, including identifying errors and coordinating corrections. Each university has nominated a single point of contact in charge of the update process at their university, doing it either themselves or coordinating it in their institution.

4.3 | Costs, maintenance, and sustainability

The TTO directory and RI catalogue are hosted on the Agora platform, built on **Odoo**, an open-source ERP system that ensures flexibility, modularity, and long-term sustainability. This foundation allows the tool to evolve beyond the project lifecycle, enabling partners and future users to maintain and customize it independently.

During the aUPaEU project (until December 2027), setup, customization, and maintenance are fully funded under its framework, so there are no costs for participating alliances. Post-project, the software will be released as open source, with optional paid support services for maintenance, upgrades, and development.

Ongoing maintenance, primarily managed by partner universities or their IT teams, requires an estimated **2 person-months per year**, approximately €10,000 for the entire Agora platform, of which the catalogue and directory are only a part of. Responsibilities are shared: the Unite!Widening consortium manages content updates and user support, while the Agora team oversees infrastructure and security. Integration with other funding like the next Unite! funding period will be an opportunity to include the funding of these tools.

5 | Conclusions

This deliverable lays the groundwork for the sustainable operation of the integrated RI and TTO databases, ensuring continuity, reliability, and strategic alignment beyond the project's lifetime. Built on an open-source, modular infrastructure (Odoo ERP), the system combines technical resilience with institutional oversight, offering a multilingual, secure, and user-friendly environment for accessing key research and innovation assets across Unite! universities.

The operational model is rooted in shared responsibility: content governance is driven by the Unite!Widening project and the institutional representatives, while technical maintenance is led by the aUPaEU team. Annual partner-led reviews, user feedback mechanisms, and the integration of new features, such as an API for streamlined data updates, enhance both accuracy and usability over time.

A central strength of this framework is its alignment with GDPR and FAIR principles, reinforced by active involvement from RI and TTO managers. This collaborative model strengthens institutional trust and ensures that expansion remains strategic and coherent, particularly regarding the inclusion of external infrastructures. This deliverable contributes to promote an inclusive cooperation between Alliances and enables the digital transition of the R&I dimension in the Unite!Widening and Alliance.

5.1 | Recommendations for long-term sustainability

To ensure the tool remains relevant, accurate, and well-supported over time, its operation should be anchored in practical, cross-alliance collaboration on Research Infrastructures (RIs). The creation of a dedicated subgroup on RI sharing within the Community of Practice on Research under the FOREU4ALL project shows a concrete step in this direction. Building on this, alliances should continue to coordinate efforts, exchange good practices, and align infrastructure needs to avoid duplication and make better use of existing resources. This shared approach increases efficiency and supports long-term use of the tool beyond individual projects. For funding sustainability, joint initiatives can be positioned to attract European-level support (e.g. Horizon Europe), especially when clearly linked to broader policy goals. The wide and strategic communication of the TTO Directory and the RI Catalogue is very important as well, as it will make the tools usable and effective.

5.2 | Upcoming deliverable

The next deliverable will focus on risks-benefits analysis, particularly addressing governance challenges related to external research infrastructures. It will propose strategies to balance openness with risks, security and data protection, further reinforcing the platform's sustainability and compliance.

Glossary

Agora: cloud-based platform developed within the aUPaEU project that hosts the RI and TTO databases, serving as a collaborative digital environment for European University Alliances, mainly Unite!.

API (Application Programming Interface): A set of programming tools and protocols that enables different software components to communicate with one another. In this context, used to automate content updates and improve data integrity within the database.

aUPaEU: An EU-funded project focused on creating interoperable and open digital infrastructures for universities. It developed the Agora platform used by the Unite!Widening project.

eduGAIN: A secure identity federation infrastructure that provides access to online services through institutional login credentials, ensuring verified user authentication.

FAIR Principles: A set of guidelines to ensure data is Findable, Accessible, Interoperable and Reusable

GDPR (General Data Protection Regulation): The EU regulation that governs how personal data is collected, processed, stored, and protected, ensuring privacy and security.

Maintenance, Repair, and Operations (MRO): A structured set of procedures designed to ensure the ongoing functionality, accuracy, and sustainability of the RI and TTO databases.

Research Infrastructures (RI): Facilities, resources, and services used by the scientific community to conduct research and foster innovation. This includes laboratories, equipment, and digital platforms.

RI Catalogue: A structured database listing the research infrastructures available across Unite! universities, facilitating access and collaboration.

TTO (Technology Transfer Organisations): Organisational units, services, subsidiaries or clusters within universities that support the transfer of knowledge, technology, and innovations from academia to industry or broader society.

TTO Directory: A digital catalogue detailing the services and contact points of the TTOs within the Unite! network.

Widening Countries: EU member states identified as having lower participation rates in Horizon-funded research, such as Poland and Portugal, and thus targeted for enhanced integration in EU research collaborations.