# EU-Solaris ERIC Quality Assurance plan

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## Executive Summary

This document represents the Quality Assurance Manual for the EU-Solaris ERIC. The aim of this document is to describe the mechanisms to be used within the ERIC to ensure the quality level of the KPIs and outcomes associated with the operation of the European Research Infrastructure for Concentrated Solar Power (CSP) and Solar Thermal Energy (STE).

This manual will serve as a guide for the EU-Solaris ERIC management, particularly for the General Assembly and National Nodes, ensuring that quality reviews occur at appropriate points throughout the ERIC's operations. It will also act as a reference for all member and affiliated entities, detailing their responsibilities regarding the ERIC's deliverables and outcomes. Quality control mechanisms are defined to help identify important tasks and dependencies that are critical to the success of the EU-Solaris ERIC.

This document also provides a detailed guide to the EU-Solaris ERIC consortium, promoting effective cooperation and ensuring the highest level of quality across all documentation, outcomes, and infrastructure coordination. Furthermore, it outlines the success criteria for each action, defines the structure of each output, and describes the quality review mechanisms and change control procedures.

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## Table of acronyms

| Acronym | Full Form |
|---------|-----------|
| ERIC | European Research Infrastructure Consortium |
| GA | General Assembly |
| DMS | Document Management System |
| STC | Scientific and Technical Committee |
| CST | Concentrated Solar Thermal |
| DLR | Deutsches Zentrum für Luft- und Raumfahrt e. V. (German Aerospace Center) |
| PROMES-CNRS | Centre National de la Recherche Scientifique – PROMES |
| CIEMAT-PSA | Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas – Plataforma Solar de Almería |
| NREL | National Renewable Energy Laboratory |
| CYI | The Cyprus Institute |
| LNEG | Laboratório Nacional de Energia e Geologia |
| IMDEA | Instituto Madrileño de Estudios Avanzados |
| QA | Quality Assurance |

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# 1 Introduction

## 1.1 Purpose and Scope

The purpose of this document is to facilitate cooperation among the partners of EU-Solaris ERIC by establishing a set of rules and guidelines for the organization and delivery of objectives. This QA plan outlines the necessary procedures for quality control that EU-Solaris ERIC will implement as a whole. It serves as a guide for partners preparing technical reports, publishing research, or reporting progress.

This document derives content from the ERIC regulations and governance structure as defined in its legal framework, as well as specific guidelines developed for this quality assurance manual.

## 1.2 Quality Control of Key Activities

This section outlines the procedures for monitoring progress and reporting to ensure that the EU-Solaris ERIC achieves its objectives on schedule and within budget. It includes the control methods applied to ensure a high-quality outcome, as well as the responsibilities of EU-Solaris ERIC partners regarding the key activities listed below:

- **Single-Entry Point for Services:** Ensure efficient access to research Facilities, R&D services, testing services, and training programs through regular reviews and feedback mechanisms.
- **Standardization of Testing Protocols:** Promote and lead the joint definition and standardization of testing protocols, with internal project reviews and stakeholder engagement to ensure relevance.
- **Sectorial Inputs to European Stakeholders:** Provide high-quality inputs aligned with strategic research agendas through established review mechanisms and continuous feedback.
- **Mobility and Staff Exchange Actions:** Monitor and evaluate participation in exchange programs to enhance partner integration, collecting feedback for improvement.
- **Joint R&D Project Applications:** Implement a structured proposal review process to optimize joint project submissions and develop metrics to assess success rates.
- **Optimization of Research Facilities:** Conduct regular assessments to identify specialization opportunities and foster collaboration among partners.

- **Development of e-Infrastructure:** Ensure interoperability and continuous improvement of e-infrastructure through technical reviews and user feedback.
- **Implementation of a Communication and Dissemination Plan:** Track key performance indicators for C&D activities and gather feedback to assess strategy effectiveness.
- **Annual Meetings and Events:** Organize annual meetings, user meetings, and summer schools to gather participant feedback and evaluate agendas.
- **Annual Prize Award:** Promote quality and innovation through a transparent evaluation process for award selection.

## 2   Quality Management

EU-Solaris ERIC operates as a distributed research infrastructure, connecting national nodes across four countries. The primary objective of this QA plan is to ensure the quality of coordination between these nodes and to guarantee that research outputs, reports, and infrastructure operations meet the highest standards.
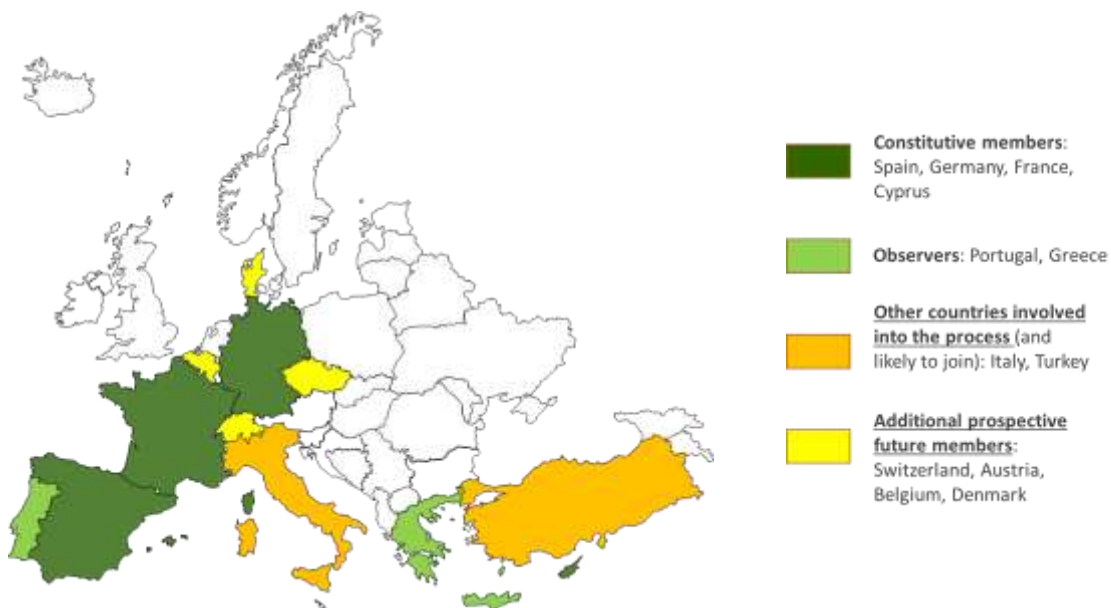
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*Figure 1: EU Solaris ERIC membership*

### 2.1   Management Bodies and Key Responsibilities

The management structure of EU-Solaris ERIC, illustrated in Figure 1, ensures effective governance and quality assurance throughout its operations. Each management body plays a distinct role in maintaining quality standards.
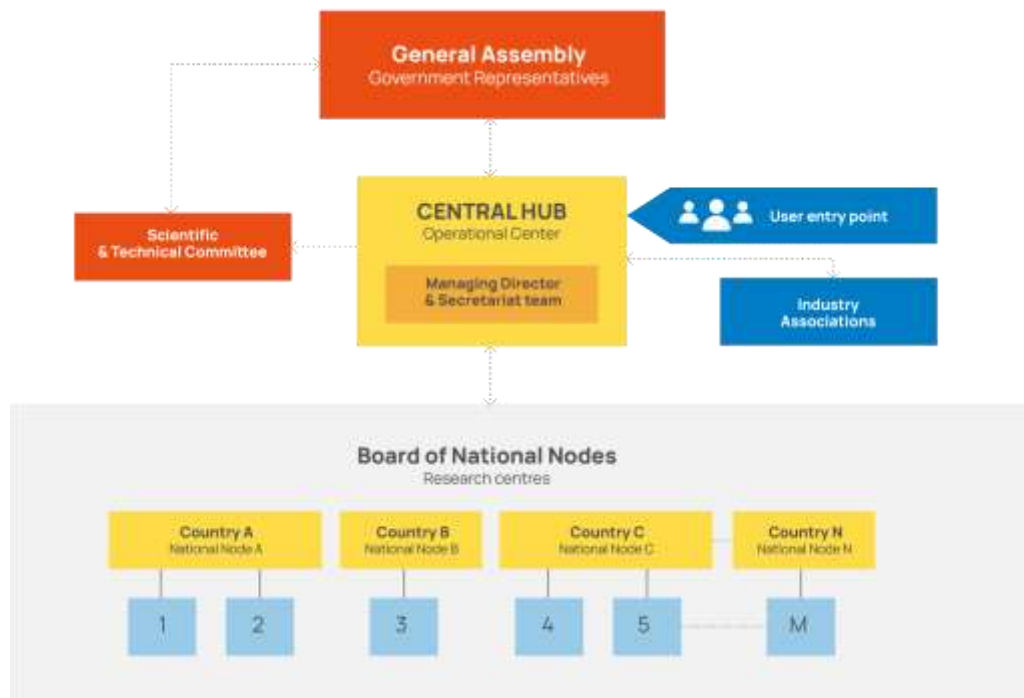
*Figure 2: EU Solaris ERIC governance diagram*

### 2.1.1 General Assembly

The General Assembly serves as the highest decision-making body of EU-Solaris ERIC and is composed of representatives from member countries. Its roles and responsibilities include, among others:

- Agreeing on the composition of the Scientific and Technical Committees and Board of National Nodes.
- Assessing the overall activities of the ERIC.
- Preparing EC audit reviews.
- Making decisions on new members.

Members of the General Assembly:

- Spain
- Germany
- France
- Cyprus

Observers:

- Portugal (expected to become a full member in 2025)
- Greece

Meeting Frequency: The General Assembly holds meetings twice a year, with email voting conducted for urgent matters.

### 2.1.2 Scientific and Technical Committee (STC)

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The Scientific and Technical Committee is responsible for providing strategic guidance and oversight of the scientific and technical activities of EU-Solaris ERIC. Its roles include:

- Evaluating research proposals and ensuring alignment with the strategic vision of EU-Solaris.
- Overseeing the scientific quality of research outputs of the ERIC's internal projects.
- Supporting coordination of R&D collaborations, through EU-SOLARIS, among member countries and stakeholders.
- Meeting Frequency: The STC holds an online meeting once a year. Their primary task is to evaluate internal projects and ensure they align with the goals of EU-Solaris ERIC.

### 2.1.3 Board of National Nodes (BNN)

The Board of National Nodes consists of representatives from each member country, facilitating coordination and advocating for national interests within the EU-SOLARIS framework. Its roles include:

- Serving as primary contacts between the EU-Solaris ERIC and national nodes.
- Coordinating participation in EU-SOLARIS and managing related resources at the national level.
- Promoting collaboration and funding opportunities nationally.

### 2.1.4 Central Hub

The Central Hub is a pivotal element in the management structure of EU-Solaris ERIC, responsible for the coordinated operation of research centers associated with EU-Solaris partners in Concentrated Solar Power/Solar Thermal Energy (CSP/STE) technologies. When referring to 'national' research centers, this pertains to the centers within the member states that participate in the EU-Solaris initiative, such as BNN. Its functions include:

- Facilitating collaboration among national research centers.
- Managing shared resources and knowledge related to CSP/STE technologies.
  Overseeing the development of joint research initiatives and projects.
- Searching for funding opportunities relevant for EU-Solaris and its members and preparing proposals if possible.

## 3 Quality Control for Key Activities

## 3.1 Single-Entry Point for Access to Services Provision

To ensure effective, efficient, and adaptable access to services, EU-Solaris ERIC will establish a Single-Entry Point for the provision of the following services.

- **R&D Services:** Quality control will involve continuous, flexible review processes and feedback mechanisms to assess the effectiveness and relevance of R&D services. Performance indicators will be defined to measure the success of these services, such as user satisfaction surveys, outcome assessments, and the ability to quickly adapt services based on evolving research priorities. The review cycle will have annual periodicity to incorporate changing needs and emerging research trends.

- **Access to Research Infrastructure:** A dynamic process will be implemented to manage access requests and track usage statistics of research infrastructure. This process will be flexible, allowing for adjustments based on demand, special project requirements, and availability of resources. Additionally, the access process will remain responsive to the needs of both partners and external stakeholders, ensuring fair and efficient use of resources while allowing for flexibility in responding to high-priority needs or urgent requests.

- **Research Infrastructure Testing Services:** Quality standards for testing services will be established, with periodic audits conducted by external advisors, if needed, to ensure compliance. However, the standards will be flexible enough to accommodate evolving technological developments and varying testing conditions. Peer reviews and assessments by external experts will validate the quality and accuracy of testing outcomes, with feedback loops that enable the continuous improvement of testing procedures and the incorporation of new best practices as they emerge.

- **Training and Dissemination:** Training programs will undergo annual evaluations and adjustments to ensure they meet the evolving needs of participants. They will be conducted by EU Solaris ERIC director managing and to be approved by the GA. Feedback from trainees will be systematically gathered to refine the content, delivery methods, and format of training sessions. The flexibility of training offerings will allow for both on-demand and periodic adjustments based on participant feedback, technological advances, and evolving scientific knowledge, ensuring that training remains relevant and responsive to the needs of the community.

### 3.2 Standardization of Testing Protocols

It will involve the following key activities:

- **Internal Project Reviews**: Regular assessments of internally funded projects to evaluate the effectiveness of protocols, procedures, and methodologies. Feedback loops will be established to continuously improve these standards based on practical applications.
- **Stakeholder Engagement**: Engaging with stakeholders to gather insights and validate the relevance and applicability of the defined protocols.

### 3.3 rovision of Sectorial Inputs to Reference European Stakeholders

To ensure high-quality inputs to European stakeholders, EU-Solaris ERIC will:

- **Implement Review Mechanisms**: Establish a process for reviewing and validating the sectorial inputs against strategic research agendas and technology roadmaps.
- **Feedback and Iteration**: Regularly solicit feedback from stakeholders to enhance the quality and relevance of contributions.

### 3.4 Mobility and Staff Exchange Actions

Quality control for mobility and staff exchange programs will include:

- **Monitoring Participation**: Track participation rates and outcomes of exchange actions to evaluate their effectiveness in promoting partner integration.
- **Surveys and Assessments**: Conduct surveys post-exchange to gather participant feedback on the benefits and areas for improvement.

### 3.5 Catalyst for Joint R&D Project Applications

To optimize joint project submissions, EU-Solaris ERIC will:

- **Proposal Review Process**: Implement a structured review process for joint project applications to ensure alignment with strategic goals and high-quality proposals.
- **Collaboration Metrics**: Develop metrics to assess the success rate and impact of submitted applications.

## 3.6  Optimization of Research Facilities

Quality control for optimizing existing research facilities will involve:

- **Specialization Assessment**: Regular evaluations of facility usage and capabilities to identify opportunities for specialization and improvement.
- **Collaboration Opportunities**: Foster partnerships and collaborations to enhance facility effectiveness and quality.

## 3.7  Development of e-Infrastructure

To ensure the successful development and implementation of e-infrastructure:

- **Technical Reviews**: Conduct thorough reviews and testing of e-infrastructure components to ensure interoperability and effectiveness.
- **User Feedback**: Gather user feedback to continuously improve the functionality and usability of the e-infrastructure.

## 3.8  Continuous Monitoring of Industry & Research Needs

Quality control measures for monitoring industry and research needs will include:

- **Regular Surveys and Reports**: Conduct regular surveys of industry and research stakeholders to gather insights on evolving needs and expectations.
- **Analysis and Adaptation**: Analyze data to adapt the research agenda and infrastructure accordingly.

## 3.9  Implementation of a Dissemination Plan

To ensure effective dissemination of information:

- **Performance Indicators**: Develop and track key performance indicators for dissemination activities, including audience reach and engagement metrics.
- **Feedback Mechanisms**: Implement feedback mechanisms to assess the effectiveness of dissemination strategies.

## 3.10 Annual Meetings and Events

Quality control for annual meetings and events will include:

- **Feedback Collection**: Post-event surveys to gather participant feedback for continuous improvement.
- **Agenda Evaluation**: Regularly assess the relevance and effectiveness of meeting agendas to ensure they meet the needs of stakeholders.

## 3.11 Annual Prize Award

To promote quality and innovation through the annual prize award:

- **Criteria Definition**: Establish clear and objective criteria for the award selection process.
- **Evaluation Process**: Implement a structured evaluation process involving a diverse panel of experts to ensure fairness and transparency.

# 4 Control of Documentation

Effective documentation control is vital to maintaining the integrity of quality assurance standards. This section outlines the procedures for the creation, review, approval, and revision of documents related to quality assurance, ensuring that all relevant documents are accessible, up to date, and aligned with organizational needs.

## 4.1 Creation of Documentation

- **Document Standardization**: Each document will follow a standardized template to ensure consistency in formatting and content, in compliance with applicable EU and Spanish regulations. This approach provides flexibility in content development while maintaining uniformity in presentation and structure.
- **Document Storage**: All documents will be stored digitally for easy access and management. The primary storage locations will include the EU-Solaris ERIC website and Google Drive. These platforms ensure authorized stakeholders can efficiently access the most current documents.
- **Document History**: Documents will be tracked for changes, with version histories maintained to document any updates.
- **Document Updates**: EU-Solaris ERIC is responsible for holding, updating, and ensuring the availability of the latest document versions.

The General Assembly will periodically review and validate documents to ensure their ongoing relevance and accuracy. Updates will be made as necessary, based on changes in regulations, organizational needs, or stakeholder feedback. While regular oversight is not required, documents will be updated in response to significant changes or improvements.

- **Access to Documents and Access Rights:** EU-Solaris ERIC will define and implement a clear access policy to manage document availability. This policy will establish different access groups with varying privileges, such as full access for modifying documents and view-only rights for others. It will ensure secure and consistent management of documents, with regular reviews to align with organizational needs. Document storage and access rights will be centralized through a secure platform, ensuring that the most current versions are readily available to authorized users. Access rights for document modifications will be based on roles and responsibilities within EU-Solaris ERIC, with only authorized individuals permitted to make updates. This approach guarantees both security and consistency in documentation management.

## 4.2 Review Process

- **Internal Review**: Draft documents will undergo an internal review by relevant teams to ensure their accuracy, completeness, and compliance with EU regulations and Spanish law. The review process will also ensure that documents align with the quality objectives of EU-Solaris ERIC.
- **Adaptable Review**: The review process is designed to be flexible and will be adjusted as necessary to accommodate changing project needs, priorities, or feedback. This flexibility ensures that the review process remains aligned with both current and future goals.

## 4.3 Approval

- **Approval Authority**: Documents must be approved by the relevant authority, typically the General Assembly (GA). While the approval process is flexible, it will be adapted based on the nature of the document and the urgency of the approval, it will follow the rules established for the decision making process of the relevant authority.
- **Document Logging**: Once approved, all documents will be logged into a Document Management System (DMS) to track their status, version history, and ensure compliance with legal requirements for record-keeping.

## 4.4  Revision

- **Revision Tracking**: Any revisions made to documents will be clearly tracked, including the date of revision and the individual responsible for the changes. This provides transparency and accountability in the document revision process.
- **Review Cycle**: Documents will be reviewed at least every five years, or sooner if required, to ensure their ongoing relevance and accuracy. If revisions are necessary, the same review and approval processes will apply, with flexibility for adjustments as needed.

## 4.5  Accessibility and Updates

- **Centralized Storage**: All quality assurance documents will be stored in a centralized Document Management System (DMS), accessible to all authorized stakeholders. The system will ensure that all relevant parties can access the necessary documents based on their roles and responsibilities.
- **Notification System**: A notification system will be in place to alert stakeholders of new or updated documents. This ensures that all parties have access to the latest information and reduces the risk of outdated documents being used.

## 4.6  Additional Notes on Flexibility

- **Flexible Management System**: The document management system will allow for periodic updates and flexibility, including the ability to adjust access rights, review cycles, and document update schedules based on evolving organizational needs, feedback, or external changes.
- **Ongoing Accessibility**: Documents will remain in digital format and be regularly accessible. Regular checks will be performed to verify their relevance, accuracy, and alignment with the current objectives of EU-Solaris ERIC.

# 5  Internal Audits and Reviews

Regular internal audits and reviews are vital to assess compliance with quality standards and to identify areas for improvement within EU-Solaris ERIC. This section outlines the schedule and processes for conducting these audits and reviews, ensuring adherence to EU regulations and Spanish law.

## 5.1 Internal Audit Schedule

- Internal audits will be conducted annually to evaluate compliance with quality assurance protocols and standards, as well as relevant EU regulations and Spanish legislation.
- The audits will cover all key activities, processes, and documentation relevant to quality assurance within EU-Solaris ERIC.

## 5.2 Audit Process

- A designated Internal Audit Team, comprising representatives from various national nodes, will be responsible for conducting the audits.
- Each audit will be held virtually and will include a review of documentation, interviews with staff, and observation of processes in practice, ensuring compliance with applicable regulations.

## 5.3 Reporting and Follow-Up

- After each audit, a report will be generated summarizing the findings, including strengths, weaknesses, and recommendations for improvement.
- The audit report will be presented to the General Assembly for review and action. A follow-up process will be implemented to track the implementation of recommended improvements.

## 5.4 QA Plan Review

- The effectiveness of the QA plan will be reviewed annually based on audit findings, stakeholder feedback, and changes in EU regulations or Spanish law.
- Modifications to the QA plan will be made as needed, and the updated plan will undergo the same review and approval processes outlined in the Documentation Control section.

# 6 Communication of Quality Assurance Plan

Effective communication is critical for ensuring that all stakeholders within EU-Solaris ERIC are aligned with the QA activities, objectives, and results. This section defines the strategies for communication, focusing on communication between EU-Solaris ERIC employees, the GA members, and, when necessary, the country members.

## 6.1 Communication Strategies

To maintain transparency and facilitate informed decision-making, EU-Solaris ERIC will adopt a multi-channel communication strategy that involves regular updates on QA activities:

- **Regular Updates:** Quality assurance activities, outcomes, and developments will be communicated to the GA, national nodes, and affiliated entities, as well as relevant research staff.
- **Communication Channels:** These updates will be shared through multiple channels, such as email updates, newsletters, and dedicated meetings, ensuring that stakeholders at all levels receive relevant information in a timely manner.
- **Targeted Communication:** Communication will be tailored based on the audience. For example, detailed reports and discussions will be directed towards the GA and national nodes, while general information will be shared with affiliated entities and other stakeholders as necessary.

## 6.2 Reporting Intervals

To ensure that quality assurance activities remain transparent and actionable, regular reports will be provided:

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- **Annual Reports:** An annual report will be shared at the General Assembly Meeting, providing a summary of the performance and outcomes of EU-Solaris's activities. Rather than detailing specific modifications to the QA plan, this report will focus on broader achievements, key performance indicators, and alignment with EU-Solaris's strategic goals. Detailed evaluations, including changes to the QA plan, will be reserved for presentation at the General Assembly to ensure appropriate transparency and oversight while maintaining relevance for stakeholders and RI users.

## 6.3 Stakeholder Engagement

Engaging with stakeholders is essential for gathering feedback and ensuring continuous improvement in QA processes:

- **Feedback Mechanisms:** Surveys, forums, and other tools will be used to actively solicit feedback from stakeholders. This will help assess the effectiveness of QA activities and gather input for future improvements.

- **Audit Findings and Actions:** The results of internal audits and reviews will be communicated to stakeholders, outlining any identified issues and the actions taken to address them. This ensures transparency and builds trust among all parties involved.

## 6.4 Meetings and Updates

Communication will be further strengthened through regular meetings:

- **General Assembly Meetings:** The General Assembly will meet twice a year to review the progress of QA activities, discuss findings, and make strategic decisions based on the reports and updates provided. These meetings will serve as key forums for decision-making and issue resolution.
- **Ad-Hoc Meetings:** In cases where urgent issues arise or significant changes need to be addressed, additional ad-hoc meetings will be scheduled as necessary. These meetings will ensure that any critical matters related to QA are promptly addressed and resolved.

# 7 Conclusions of the Quality Assurance Plan

The Quality Assurance Plan for EU-Solaris ERIC serves as a foundational framework to ensure the highest standards of quality in all our research activities and operational processes. This plan is designed to uphold the principles of transparency, accountability, and continuous improvement, aligning with EU regulations and Spanish law.

Throughout this document, we have outlined comprehensive strategies for key activities, documentation control, internal audits, and effective communication. Each element of the QA Plan has been tailored to promote a culture of quality within the organization, ensuring that all stakeholders, including our General Assembly, national nodes, and affiliated entities, are engaged and informed.

The QA Plan will be regularly reviewed and updated based on internal audit findings, stakeholder feedback, and changes in regulatory requirements. This iterative approach will allow us to remain responsive to emerging challenges and opportunities within the field of concentrated solar power and solar thermal energy.

As we move forward, the commitment of all members and stakeholders is crucial in implementing the QA Plan effectively. By adhering to these quality assurance processes, EU-Solaris ERIC aims to enhance the reliability and

impact of our research infrastructure and services, fostering collaboration and innovation in the European research landscape.

We look forward to the collective effort in achieving our mission and vision, ultimately contributing to the advancement of sustainable energy technologies and their applications. Together, we can build a robust foundation for quality that drives success and excellence in all our endeavors.