IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Technical Meeting on Digital Instrumentation and Control Systems and the Use of Advanced Technologies for Research Reactors

IAEA Headquarters
Vienna, Austria

20-24 July 2026

Ref. No.: EVT2503234

Information Sheet

A. Introduction

Digital instrumentation and control (I&C) systems play an increasingly critical role in ensuring the safe, reliable and efficient operation of research reactors. As facilities plan upgrades or transitions from ageing analogue systems to modern digital platforms, Member States must address a number of interconnected technical, operational and regulatory considerations. These include system architecture and qualification, cybersecurity, human–machine interface modernization, integration with existing reactor systems, configuration management and sustaining workforce competence.

The IAEA publications provide an essential framework for these modernization activities. **SSR-3**, *Safety of Research Reactors*, establishes the fundamental safety requirements for the design and operation of research reactors, including those related to I&C systems and safety functions. **SSG-37**, *Instrumentation and Control Systems and Software Important to Safety for Research Reactors*, offers specific guidance for implementing I&C systems in accordance with SSR-3, addressing system design principles, software lifecycle considerations, reliability, diversity, and defence-in-depth. Complementing these, **NR-G-5.1**, *Digital Instrumentation and Control Systems for New and Existing Research Reactors*, further supports Member States by providing practical guidance for the safe planning, design, implementation and

integration of modern digital I&C systems in research reactors in accordance with IAEA safety requirements.

At the same time, rapid advancements in digital and emerging technologies—such as advanced sensors, data analytics, artificial intelligence, enhanced visualization tools and online monitoring techniques—present significant opportunities to improve reactor performance, support predictive maintenance, strengthen operator decision-making and enhance overall safety margins.

Against this backdrop, the IAEA is convening the Technical Meeting on Digital Instrumentation and Control Systems, and the Use of Advanced Technologies for Research Reactors, scheduled from 20 July to 24 July at IAEA's Headquarters in Vienna, Austria.

The meeting will serve as a platform for Member States to exchange experiences, share lessons learned from ongoing modernization projects, discuss the application of advanced digital technologies, and identify common challenges and good practices. It will also promote collaboration among research reactor operators, technical experts, regulators and technology developers, supporting the safe, effective and standards-compliant implementation of digital I&C solutions across diverse research reactor programmes.

B. Objectives

The objective of this Technical Meeting is to provide a forum for Member States to exchange experiences, good practices and lessons learned related to the modernization of digital instrumentation and control (I&C) systems in research reactors. Additionally, the meeting will facilitate discussions on the adoption of advanced technologies, promote collaboration among research reactor stakeholders, and help identify common challenges and capacity-building needs to ensure the safe and effective implementation of digital solutions in research reactor facilities.

C. Target Audience

Participation in the workshop is subject to designation by Governments or national organizations. The workshop is open to participants from all IAEA Member States with existing or planned research reactors.

The meeting is intended for professionals involved in the operation, modernization and regulatory oversight of research reactors. This includes research reactor managers and operators, instrumentation and control (I&C) engineers, reactor designers, technical experts from research organizations, regulators and licensing specialists, as well as representatives from industry and technical support organizations engaged in digital I&C system development or modernization.

Member States are strongly encouraged to identify suitable women participants.

D. Working Language

The working language of the event will be English.

E. Topics

The topics that are expected to be covered include:

Digital I&C Systems:

- IAEA publications (SSR-3, SSG-37, NR-G-5.1) related to Digital I&C Upgrades
  – Safety requirements, guidance, and implementation pathways.
- Experiences and Case Studies related to Modernization projects from Member States
  – Lessons learned, challenges encountered, schedules, costs, and outcomes.
- Digital I&C System Architecture and Design Principles
  – Defence-in-depth, redundancy, diversity, and qualification criteria.
- Testing, Validation, and Qualification of Digital I&C Systems
  – Factory acceptance tests, site acceptance tests, simulator use, and reliability assessment.
- Software Lifecycle Management and Configuration Control
  – Verification & validation, quality assurance, documentation, and change management.
- Regulatory and Licensing Challenges for Digital Modifications
  – Safety assessment methodologies, documentation expectations, and approval processes.
- HMI, Cyber Security, Capacity Building and Training aspects related to Digital I&C systems.
- Long-Term Operation (LTO) and Digital I&C Considerations
  – Obsolescence management, maintainability, and lifecycle planning.

Advanced technologies:

- IAEA activities on the use of AI in the nuclear industry.
- Application of Data Analytics, Artificial Intelligence (AI) and Machine Learning (ML)
  – Use cases for predictive maintenance, anomaly detection, operational optimization and automated data interpretation.
- Digital Twins and Advanced Simulation Tools
  – Real-time reactor modelling, scenario evaluation, system validation, and training applications.
- Online Condition Monitoring and Predictive Maintenance Strategies
  – Health monitoring of key components, vibration analysis, thermal fatigue prediction and equipment life assessment.
- Advanced Visualization and Human–System Interface Technologies
  – Virtual reality (VR), augmented reality (AR), interactive control room tools and enhanced operator training methods.
- Modern Computing Platforms and High-Performance Computational Tools
  – Advanced neutronics, thermal-hydraulics and multi-physics modelling capabilities.
- Experience Sharing and Case Studies from Member States
  – Lessons learned, implementation experiences and demonstration projects in research reactors.
- Regulatory and Licensing Challenges Associated with Advanced Technologies
  – Safety assessment methodologies, qualification pathways, and regulatory expectations.

F. Participation and Registration

All persons wishing to participate in the event have to be designated by an IAEA Member State or should be members of organizations that have been invited to attend.

In order to be designated by an IAEA Member State or invited organization, participants are requested to submit their application via the InTouch+ platform (https://intouchplus.iaea.org) to the competent national authority (Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or organization for onward transmission to the IAEA by **1 June 2026**, following the registration procedure in InTouch+:

1. Access the InTouch+ platform (https://intouchplus.iaea.org):

- Persons with an existing NUCLEUS account can sign into the platform with their username and password;
- Persons without an existing NUCLEUS account can register here.

2. Once signed in, prospective participants can use the InTouch+ platform to:

- Complete or update their personal details under 'Complete Profile' and upload the relevant supporting documents;
- Search for the relevant event under the 'My Eligible Events' tab;
- Select the Member State or invited organization they want to represent from the drop-down menu entitled 'Designating Authority' (if an invited organization is not listed, please contact InTouchPlus.Contact-Point@iaea.org);
- If applicable, indicate whether financial support is requested and complete the relevant information (this is not applicable to participants from invited organizations);
- Based on the data input, the InTouch+ will automatically generate the Participation Form (Form A) and/or the Grant Application Form (Form C);
- Submit their application.

Once submitted through the InTouch+, the application, together with the auto-generated form(s), will be transmitted automatically to the required authority for approval. If approved, the application, together with the applicable form(s), will automatically be sent to the IAEA through the online platform.

For additional information on how to apply for an event, please refer to the InTouch+ Help page. Any other issues or queries related to InTouch+ can be sent to InTouchPlus.Contact-Point@iaea.org

Selected participants will be informed in due course on the procedures to be followed with regard to administrative and financial matters.

Participants are hereby informed that the personal data they submit will be processed in line with the Agency's Personal Data and Privacy Policy and is collected solely for the purpose(s) of reviewing and assessing the application and to complete logistical arrangements where required. The IAEA may also use the contact details of Applicants to inform them of the IAEA's scientific and technical publications, or the latest employment opportunities and current open vacancies at the IAEA. These secondary purposes are consistent with the IAEA's mandate. Further information can be found in the Data Processing Notice concerning IAEA InTouch+.

Selected participants will be informed in due course on the procedures to be followed with regard to administrative and financial matters.

G. Papers and Presentations

The IAEA encourages participants to give presentations in PowerPoint on the work of their respective institutions that falls under the topics listed above. Maximum duration of individual presentation should be 20 minutes including questions and answers.

Participants who wish to give presentations at the event are requested to submit an abstract of their work (maximum 300 words) and complete the Participation Form of a Paper - Form B (see attached).

The abstract and the signed copy of Form B must be uploaded at InTouch+ as supporting documents of the event selected and send to their competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or their organization for onward transmission to the IAEA not later than **1 June 2026**. Authors will be notified of the acceptance of their proposed presentations by **15 June 2026**.

H. Expenditures and Grants

No registration fee is charged to participants.

The IAEA is generally not in a position to bear the travel and other costs of participants in the event. The IAEA has, however, limited funds at its disposal to help meet the cost of attendance of certain participants. Upon specific request, such assistance may be offered to normally one participant per country, provided that, in the IAEA's view, the participant will make an important contribution to the event.

The application for financial support should be made clear indicating in the corresponding box at InTouch+**.** and should be submitted together with the application, by **1 June 2026**.

I. Venue

The event will be held at the Vienna International Centre (VIC), where the IAEA's Headquarters are located. Participants must make their own travel and accommodation arrangements.

General information on the VIC and other practical details, such as a list of hotels offering a reduced rate for IAEA participants, are listed on the following IAEA web page: www.iaea.org/events.

Participants are advised to arrive at Checkpoint 1/Gate 1 of the VIC one hour before the start of the event on the first day in order to allow for timely registration. Participants will need to present an official photo identification document in order to be admitted to the VIC premises.

J. Visas

Participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria at least four weeks before they travel to Austria. Since Austria is a Schengen State, persons requiring a visa will have to apply for a Schengen visa. In States where Austria has no diplomatic mission, visas can be obtained from the consular authority of a Schengen Partner State representing Austria in the country in question.

IAEA Contacts

Scientific Secretaries:

Mr Sumanth Panyam
Division of Nuclear Fuel Cycle and Waste Technology
Department of Nuclear Energy
International Atomic Energy Agency
Vienna International Centre
PO Box 100, 1400 VIENNA, AUSTRIA
Tel.: +43 1 2600 21558; Fax: +43 1 26007
Email: S.Panyam@iaea.org

Mr Joseph Christensen
Division of Nuclear Installation Safety
Department of Nuclear Safety and Security
International Atomic Energy Agency
Vienna International Centre
PO Box 100, 1400 VIENNA, AUSTRIA
Tel.: +43 1 2600 22726; Fax: +43 1 26007
Email: j.christensen@iaea.org

Administrative Secretaries:

Ms Nisansala Nath-Sirimalwatta
Division of Nuclear Fuel Cycle and Waste Technology
Department of Nuclear Energy
International Atomic Energy Agency
Vienna International Centre
PO Box 100, 1400 VIENNA, AUSTRIA
Tel.: +43 1 2600 25809; Fax: +43 1 26007
Email: n.nath-sirimalwatta@iaea.org

Ms Sylvia Gogany
Division of Nuclear Fuel Cycle and Waste Technology
Department of Nuclear Energy
International Atomic Energy Agency
Vienna International Centre
PO Box 100, 1400 VIENNA, AUSTRIA
Tel.: +43 1 2600 22786; Fax: +43 1 26007
Email: s.gogany@iaea.org

Subsequent correspondence on scientific matters should be sent to the Scientific Secretaries and correspondence on other matters related to the event to the Administrative Secretaries.

Forms A and C: Via Intouch+ Platform

IAEA
Atoms for Peace and Development
International Atomic Energy Agency

Form for Submission of a Paper

Technical Meeting on Digital Instrumentation and Control Systems and the use of Advanced Technologies for Research Reactors at the IAEA Headquarters Vienna, Austria, from 20 - 24 July 2026

To be completed by the participant and sent to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA) either by email to: Official.Mail@iaea.org or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretaries S.Panyam@iaea.org and J.Christensen@iaea.org and to the Administrative Secretaries n.nath-sirimalwatta@iaea.org and s.gogany@iaea.org

Deadline for receipt by IAEA through official channels: 1 June 2026

Title of the paper:		
Family name(s) and first name(s) of all author(s) (same as in passport(s):	Scientific establishment(s) in which the work has been carried out	City/Country
1.		
2.		
3.		
Family name(s) and first name(s) of author presenting the paper (same as in passport):	Mr/Ms:	
Mailing address:		
Tel. (Fax):		

Email:

I hereby agree to assign to the International Atomic Energy Agency (IAEA):

☐ the copyright; or

☐ the non-exclusive, worldwide, free-of-charge licence (this option is only for those authors whose parent institution does not allow them to transfer the copyright for work carried out in that institution) granting the IAEA world rights for the use of the aforementioned material in this and any future editions of the publication, in all languages, and in all formats available now, or to be developed in the future (digital formats, hard copy etc.).

Please note: If granting the licence mentioned above, please supply any copyright acknowledgement text required.

Furthermore, I herewith declare:

☐ that the material submitted to the IAEA is original, except for such excerpts from copyrighted works as may be included with the permission of the copyright holders thereof, has been written by the stated authors, has not been published before, and is not under consideration for publication by another entity;

☐ that any permissions and rights to publish required for third-party content, including but not limited to figures and tables, have been obtained, that all published material is correctly referenced; and

☐ that the material submitted to the IAEA does not contain any libellous or other unlawful statements and does not contain any materials that violate any personal or proprietary rights of any person or entity.

Date: **Signature of main author:**