



IAEA

International Atomic Energy Agency

Atoms for Peace and Development

**International Conference on Topical Issues in
Nuclear Installation Safety: Strengthening Safety
of Evolutionary and Innovative Reactor Designs**

IAEA Headquarters

Vienna, Austria

18–21 October 2022

Organized by the

International Atomic Energy Agency (IAEA)

In Cooperation with the

European Commission Joint Research Centre (EC-JRC)

European Technical Safety Organisations Network (ETSON)

OECD Nuclear Energy Agency (OECD-NEA)

World Nuclear Association (WNA)

Announcement and Call for Papers

A. Background

The IAEA International Conference on Topical Issues in Nuclear Installation Safety (TIC) is organized periodically bringing together nuclear safety regulators, plant designers and operators, technical support organizations and other stakeholders from interested Member States, as well as other international organizations to discuss current practices and challenges related to nuclear installation safety. The first in the TIC series was organized in 1998. Subsequent conferences took place in Vienna, Austria (2001, 2013, 2017), Beijing, China (2004) and Mumbai, India (2008). These conferences have contributed significantly to the exchange of information and experiences related to the latest advances in the field of nuclear installation safety. At the same time, the recommendations made at the conferences have provided and guided the IAEA with valuable insights on activities to be undertaken to further to strengthen nuclear safety globally.

The focus of the previous conferences covered the areas from continuous safety improvement and ensuring safety for existing nuclear installations to the issues related to safety demonstration of advanced water cooled nuclear power plants (NPPs).

After the March 2011 Fukushima Daiichi NPP accident, the IAEA focused its efforts on revision of the IAEA Safety Standards to address lessons learned from this accident. The feedback gathered from previous TIC conferences and review missions to the Member States have also contributed to the Agency's efforts to assess the applications of the IAEA Safety Standards mainly in relation to the safety of existing reactors designs.

In recent years, the Member States' spotlight has been shifting towards safety of the evolutionary and innovative¹ reactor designs. The growing interest of Member States for the deployment of these reactors, in particular advanced small modular reactors (SMRs) and next generation nuclear power plants, is notable.

In light of these rapid developments, the robust safety demonstration and suitable regulatory framework are paramount prerequisites for the safe and successful deployment of these advanced reactors and public acceptance. Responding to these dynamic developments in the Member States, the IAEA is currently implementing a wide spectrum of activities related to the safety of evolutionary and innovative reactors. These activities are mainly aimed at the application of IAEA Safety Standards for evolutionary and innovative reactors, providing platform to discuss safety related challenges and experiences as well as on potential safety interfaces with security and safeguards considerations in the context of evolutionary and innovative reactor designs.

During the recent IAEA General Conferences, the Member States have requested the IAEA to promote and support the implementation of the IAEA Safety Standards and strengthen them by addressing scientific and technological innovations.

Member States have also reiterated their request to the IAEA to continue organizing meetings and activities on the safety and related technology aspects of evolutionary and innovative reactors — stressing the importance of ensuring the highest standards of safety and performance.

The TIC2022 Conference is organised to respond to these emerging trends and needs. Specifically, the conference is designed to comprehensively address the issues related to the safety of evolutionary and

¹ Evolutionary and innovative reactor designs as defined by the IAEA:

- *Evolutionary design*: is an advanced design that achieves improvements over existing designs through small to moderate modifications, with a strong emphasis on maintaining proven design elements to minimize technological risks
- *Innovative design*: is an advanced design which incorporates conceptual changes in design approaches or system configuration in comparison with existing practice

More information on evolutionary and innovative designs are found in the IAEA's Advanced Reactors Information System (ARIS), a web-accessible database <https://aris.iaea.org>.

innovative reactor designs, and thus foster harmonization of safety approaches in this area and further enhance regulatory frameworks to cope with these challenges. In addition, specific emphasis is laid on the practices and challenges of utilizing the holistic approach to safety, security, and safeguards in the design of evolutionary and innovative reactors.

B. Purpose and Objectives

The purpose of the Conference is to foster the exchange of information on wide-ranging aspects, capturing the progress and challenges in safety and licensing of evolutionary and innovative reactor designs.

The Conference aims to generate an increased understanding of the safety approaches and practices used in evolutionary and innovative reactor design and their licensing strategies. Specifically, the Conference is focused on the safe use of the evolutionary and innovative technologies in relation to fuel, plant systems and components, materials and design concepts (e.g. covering both water cooled and non-water cooled reactors, including SMRs and microreactors). There is an increasing interest in achieving harmonization of design related safety standards and a more consistent approach to licensing. It is thus expected that the Conference could be of interest to organizations such as regulatory bodies, utilities, research organisations, and vendors by facilitating international collaboration and exchange of experiences.

The Conference will also provide the IAEA with valuable insights for its activities related to the safety of evolutionary and innovative reactor designs. In particular, the feedback from the Conference is important in directing the IAEA work on the applicability of the IAEA Safety Standards to these reactors, and facilitating the IAEA support to Member States by focusing capacity building activities, strengthening advisory and peer-review services, and further enhancing international cooperation in this area.

C. Themes and Topics

The main theme of the Conference is the safety of evolutionary and innovative reactor designs, which implies covering the wide range of related topics, from applicability of current safety approaches to these reactors, their design safety and safety assessment issues as well as utilization of advanced modelling tools and experiments.

The proposed papers and discussions during the Conference are expected to be related to the following topics:

Topic 1. Applying safety approaches and standards for evolutionary and innovative reactor technologies

- Regulatory experiences in licensing or preparation for licensing of innovative reactor technologies
- New regulatory approaches for licensing of innovative reactor technologies (regulations, new safety approaches, revision of current frame)
- Application of current safety standards and regulations to the design assessment of innovative technologies (good practices, experiences, identified gaps and non-applicability)
- International cooperation: harmonisation of safety standards and guidance for innovative reactor technologies and sharing of regulatory reviews
- Holistic approach to safety, security and safeguards for innovative reactor technologies (safety-security-safeguards organizational interfaces and related challenges)

- Fusion power plant design safety requirements and licensing.
- Capacity building on safety of innovative reactors

Topic 2. Enhancing safety by innovative design features

- Safety by design: defence in depth implementation in innovative reactors.
- Advanced nuclear fuels: design, operation, qualification and back-end conditioning for recycling or disposal.
- Design safety challenges for non-water cooled reactors (e.g., containment, coolant, fuel, chemistry, radiation protection)
- Innovative structural materials
- Safety-security-safeguards by design
- Codes and standards for non LWRs
- Inherent safety features of reactor cores
- Passive safety design options.
- Advanced instrumentation and controls and human-machine interfaces.
- Application of general design requirements: safety classification, design/protection for internal and external hazards, etc.

Topic 3. Supporting integrated decision making through safety/risk analyses

- Trends in deterministic safety analysis for evolutionary and innovative reactor designs (determination of PIEs, acceptance criteria, approaches, internal and external hazards)
- Trends in probabilistic safety assessment for evolutionary and innovative reactor designs (multi-unit/multi-module risk, risk-informed applications, risk communication, internal and external hazards)
- Integration of deterministic and probabilistic approaches for decision making
- Analysis of design extension conditions and demonstration of margins to cliff-edge effects
- Analysis of conditions to be practically eliminated
- Analytical support of accident management of innovative reactors
- Safety demonstration utilizing operational experiences
- Integrated risk-informed decision making (deterministic/probabilistic considerations, organisational aspects, security interfaces, cost benefit analysis and economic factors)

Topic 4. Accelerating innovations for safety assessment through the advanced simulation and modelling, and experimental programmes

- Application of advanced modelling techniques for assessing safety performance of the evolutionary and innovative reactors
- Development of advanced multi-scale , multi-physics methods applicable to safety analysis of evolutionary and innovative reactor designs
- Experimental facilities and programmes to support demonstration of evolutionary and innovative reactor designs (safety, instrumentation,)
- Use of innovative solutions in advanced modelling and simulation (artificial intelligence, big data processing, robotics, machine learning,....)
- Developments of nuclear power plant simulators and part task simulators demonstrating safety features of evolutionary and innovative reactor designs
- Innovations in and lessons learned from trainings (especially virtual) on advanced simulation and modelling tools

D. Structure

The opening session will include welcome address by representatives from the IAEA followed by a keynote presentation on the conference's overall theme. The conference will have both plenary and topical sessions. Plenary sessions are aimed at addressing general aspects related to the conference theme and serve as panel discussions. A series of four topical sessions will cover topics outlined in

Section C. The topic of each session will be introduced by a Chairperson, followed by oral presentations that will be selected based on papers submitted to the Conference Secretariat. Each session will comprise a common discussion. Finally, during the concluding session, the Chairpersons of the topical sessions will summarize their sessions and the Conference President will consolidate the Conference findings, conclusions and recommendations on the way forward.

E. Expected Outcomes

The conference is expected to benefit various stakeholder organizations in the IAEA Member States (e.g. regulatory bodies, utilities, research organizations, vendors) considering that the interchange of experiences will allow them to:

- Gather the experiences and feedback for the application of IAEA Safety Standards for design safety and safety assessment of evolutionary and innovative reactors
- Strengthen international cooperation in the area of safety of innovative technologies
- Gain understanding of the need for a holistic approach to safety, security, and safeguards in the design of evolutionary and innovative reactors and how it can be achieved.
- Progress towards harmonizing the approaches and practices in the areas of safety design, and licensing of evolutionary and innovative reactors.

It is expected that the conference will also provide valuable recommendations for IAEA activities in the area of safety of evolutionary and innovative reactor designs. In particular, the feedback from the conference will allow the IAEA to:

- Tailor its efforts in the area of application of IAEA Safety Standards for evolutionary and innovative reactor designs,
- Further develop and apply IAEA design safety review services to support application of harmonized safety approaches in the assessment of innovative reactors.
- Further elaborate on the importance of a holistic approach to safety, security and safeguards in the design of innovative technologies and how it can be achieved.
- Enhance IAEA support to Member States by focused capacity building activities in the area of safety evolutionary and innovative reactor designs

F. Target Audience

Participation in the Conference is solicited from nuclear safety professionals from regulatory bodies, designers, operating organizations, technical support and research organizations as well as consultants who are engaged in activities related to the safety of evolutionary and innovative reactor designs. The Conference foresees the participation of the invited speakers to provide keynote presentations and/or take part in the panel discussions.

G. Call for Papers

Contributions on the topics listed in Section C are welcome as oral or poster presentations. All submissions, apart from invited papers, must present original work, which has not been published elsewhere.

G.1. Submission of Abstracts

Abstracts (approximately 150 to 200 words on one printed A4 page, may contain any charts, graphs, figures and references) should give enough information on the content of the proposed paper to enable the Programme Committee to evaluate it. Anyone wishing to present at the conference must submit an abstract in electronic format using the conference's file submission system ([IAEA-INDICO](#)), which is accessible from the conference web page (see Section Q). The abstract can be submitted through this system from **1 September 2021** until **31 January 2022**. Specifications for the layout will be available on IAEA-INDICO. The system for electronic submission of abstracts, IAEA-INDICO, is the sole mechanism for submission of contributed abstracts. Authors are encouraged to submit abstracts as early as possible. The IAEA will not accept submissions via email.

In addition, authors must register online using the InTouch+ platform (see Section H). The online registration together with the auto-generated Participation Form (Form A) and Form for Submission of a Paper (Form B) must reach the IAEA no later than **31 January 2022**.

IMPORTANT: The Programme Committee will consider uploaded abstracts only if these two forms have been received by the IAEA through the established official channels (see Section H).

G.2. Acceptance of Abstracts

The Secretariat reserves the right to exclude abstracts that do not comply with its technical or scientific quality standards and that do not apply to one of the topics listed in Section C.

Authors will be informed by **28 March 2022** as to whether their submission has been accepted, either orally or as a poster, for presentation at the conference. Accepted abstracts will also be reproduced in an unedited electronic compilation of Abstracts which will be made available to all registered participants of the conference.

G.3 Submission of Full Papers

Authors of accepted abstracts will be requested to submit a full paper in Word format, of about **5 to 12** pages in length. A compilation of full papers (in electronic format) will be made available to participants at registration.

Full papers must also be submitted through the [IAEA-INDICO](#) file submission system in Word format. Submitting the paper in the indicated electronic format is mandatory. Specifications for the layout and electronic format of the contributed papers and for the preparation of posters will be made available on IAEA-INDICO.

The IAEA reserves the right to exclude papers that do not comply with its quality standards and those that do not apply to one of the topics outlined in Section C above and those that do not meet the expectations based on the information in the abstract.

The deadline for electronic submission of the full papers as Word files is **27 May 2022**. The IAEA will not accept papers submitted after the deadline.

The IAEA will notify authors of its completed review process of the full papers by **29 July 2022**. The deadline for revised papers to be submitted through IAEA-INDICO is **9 September 2022**.

IMPORTANT: The system for electronic submission of papers, IAEA-INDICO, is the sole mechanism for submission of contributed papers. Authors are encouraged to submit papers as early as possible. The IAEA will not accept submissions via email.

G.4 Proceedings

Following the conference, the IAEA will publish a summary report. The proceedings will be made available to read online.

H. Participation and Registration

All persons wishing to participate in the event must be designated by an IAEA Member State or should be member of an organization that has been invited to attend. The list of IAEA Member States and invited organizations is available on the event web page (see Section Q).

Registration through the InTouch+ platform:

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

- Persons with an existing NUCLEUS account can [sign in here](#) 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 ‘Basic Profile’ (if no financial support is requested) or under ‘Complete Profile’ (if financial support is requested) and upload the relevant supporting documents;
- Search for the relevant event (**EVT2005411**) 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 Conference.Contact-Point@iaea.org);
- If applicable, indicate whether a paper is being submitted and complete the relevant information;
- If applicable, indicate whether financial support is requested and complete the relevant information (this is not applicable to participants from invited organizations);
- Submit their application.

Once submitted through the InTouch+ platform, 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 form(s) will automatically be sent to the IAEA through the online platform.

NOTE: Should prospective participants wish to submit a paper or request financial support, the application needs to be submitted by the specified deadlines (see section O).

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.

If it is not possible to submit the application through the InTouch+ platform, prospective participants are requested to contact the IAEA’s Conference Services Section via email: Conference.Contact-Point@iaea.org.

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. Further information can be found in the [Data Processing Notice](#) concerning IAEA InTouch+ platform.

I. 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 conference. The IAEA has, however, limited funds at its disposal to help cover 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 conference.

If participants wish to apply for a grant, they should submit applications to the IAEA using the InTouch+ platform through their competent national authority (see Section H). Participants should ensure that applications for grants are:

1. Submitted by **31 January 2022**;
2. Accompanied by Grant Application Form (Form C); and
3. Accompanied by Participation Form (Form A).

Applications that do not comply with the above conditions cannot be considered.

Approved grants will be issued in the form of a lump sum payment that usually covers **only part of the cost of attendance**.

J. Distribution of Documents

A preliminary and final programme will be made available on the conference web page (see Section Q) prior to the start of the conference. The electronic compilation of abstracts will be accessible free of charge to participants registered for the conference.

K. Exhibitions

A limited amount of space will be available for commercial vendors' displays/exhibits during the conference. Interested parties should contact the Scientific Secretariat by email tic-2022@iaea.org by **31 January 2022**.

L. Working Language

The working language of the conference will be English. All communications must be sent to the IAEA in English.

M. Venue and Accommodation

The conference will be held at the Vienna International Centre (VIC), where the IAEA's Headquarters are located. 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.

Participants must make their own travel and accommodation arrangements. Hotels offering a reduced rate for participants are listed on <https://www.iaea.org/events>. Please note that the IAEA is not in a position to assist participants with hotel bookings, nor can the IAEA assume responsibility for paying fees for cancellations, re-bookings and no-shows.

N. Visas

Participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria as early as three months but not later than 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.

For more information, please see the Austria Visa Information document available on <https://www.iaea.org/events>.

O. Key Deadlines and Dates

Submission of abstracts through IAEA-INDICO	31 January 2022
Submission of Form B (together with Form A) through the InTouch+ platform	31 January 2022
Submission of Form C (together with Form A) through the InTouch+ platform	31 January 2022
Notification of acceptance of abstracts for oral or poster presentation	28 March 2022
Electronic submission of full papers through IAEA-INDICO	27 May 2022
Notification of review of full papers	29 July 2022
Deadline for submission of revised full papers submitted through IAEA-INDICO	9 September 2022
Submission of Form A only (no paper submission, no grant request) through the InTouch+ platform	No deadline

P. Conference Secretariat

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Subsequent correspondence on scientific matters should be sent to the Scientific Secretaries and correspondence on administrative matters to the IAEA's Conference Services Section.

Q. Conference Web Page

Please visit the IAEA conference [web page](#) regularly for new information regarding this conference.