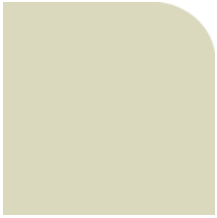


**ETSON**

EUROPEAN  
TECHNICAL SAFETY  
ORGANISATIONS  
NETWORK



ETSON  
ANNUAL REPORT  
2021



# FOREWORD

The Covid-19 pandemic didn't leave us alone in 2021 either. Nevertheless, we continued our networking activities as best under these conditions. This includes, that the Eurosafe could finally take place again in November 2021 as an attendance event, together with the ETSO award. The time out was used, among other things, to rethink the conference schedule and to try out new ways. For the first time, the technical sessions, which are typically organized in several parallel sessions, were held on the first day, while the panel discussions and keynote speeches were scheduled for the second day. This made it possible to present the findings and topics of the technical presentations to all Eurosafe participants in one of the panel sessions. This new format was very well received by the participants, who participated extensively in the corresponding panel discussion. Also, they enjoyed talking face to face again after the long break.

Our communication group used the time withdrawn to produce a video clip with which ETSO can present itself even more strongly in the future. It was shown for the first time at the IAEA General Conference in September and was also part of the Eurosafe programme.

The expert groups have been idle either and have completed several reports over

the past year that are now going into final editing for publication, e. g. a report on "fatigue evaluation in nuclear power plants" and a report on "lessons learned on, from and for PSA". In addition, the preparation of further reports has started. The topics include fuel assembly bowing, warm pre-stress and requirements and assessment of external hazards. Also, a TSAG on hydrogen risk assessments in light water reactors is in preparation.

After these two years of dealing with Covid-19-measures, which we spent primarily in digital meetings and events, we are now looking forward to the time when we can carry out our network activities in presence again.

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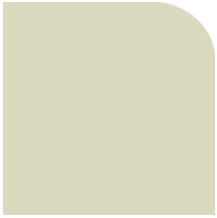
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# CONTENTS

1 ORGANISATIONAL MATTERS	4
1.1 <b>ETSON Membership</b>	4
1.2 <b>General Assembly and Board Meetings</b>	4
1.3 <b>ETSON Strategy</b>	4
1.4 <b>Accounting and Fee Payment</b>	4
2 ETSON ACTIVITIES	5
2.1 <b>Technical Board and Reactor Safety - Expert Groups</b>	5
2.2 <b>ETSON Research Group</b>	6
2.3 <b>ETSON Communication Group</b>	6
2.4 <b>ETSON Knowledge Management Group</b>	6
2.5 <b>Junior Staff Programme</b>	6
2.6 <b>EUROSAFE Forum</b>	7
2.7 <b>Workshops</b>	8
3 EXTERNAL RELATIONS	9
3.1 <b>IAEA</b>	9
3.2 <b>European Commission</b>	9
3.3 <b>WENRA</b>	9
4 ANNEX	10
4.1 <b>ETSON organization 2021</b>	10



# ORGANISATIONAL MATTERS

## 1.1 ETSON Membership

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In 2020, a total of 16 technical safety and support organizations (TSO), mainly from the European Union but also from Japan, Russia, UK and Ukraine, belonged to the ETSON network.

No new TSO joined the ETSON network. However, discussions with several European TSOs and Safety Authorities with embedded TSOs regarding an accession to the ETSON network continue.

## 1.2 General Assembly and Board Meetings

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Two General Assembly meetings together with Board meetings were held on 17 June 2021 and on 23-24 November 2021, in the aftermath of the Eurosafe. Additional Board meetings were held on 06 May and 14 September 2021.

All meetings except the meetings in November took place as virtual meetings.

## 1.3 ETSON Strategy

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ETSON continues to develop and deepen relations with international nuclear safety organizations such as DG ENER, JRC, SNETP and WENRA in order to increase the effective use of ETSON expertise in technical safety assessments and nuclear safety research management in Europe.

After the forced break due to the Covid-19 pandemic, the Eurosafe Forum took place again in November 2021 in Paris, France as an attendance event. During the Eurosafe, the JSP organized also the ETSON Award.

ETSON members plan a common project on harmonization of licensing procedures, codes and standards for future fission and fusion plants within the HORIZON-Euratom-Programme. 12 Institutions mentioned its interest, including 9 ETSON members.

## 1.4 Accounting and Fee Payment

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The Association collected the annual fees of 2000 Euros from the 16 ETSON members. The funds are dedicated to the ETSON Award, the promotion of ETSON and limited research actions among ETSON members.



# ETSON ACTIVITIES

## 2.1 Technical Board on Reactor Safety - Expert Groups

The Technical Board on Reactor Safety (TBRS) provides Technical Safety Assessment Guides (TSAGs) and technical reviews of proposed publications and workshops. It also provides recommendations on the technical programme and strategy of ETSON.

The TBRS oversees the 14 expert groups (EG) of ETSON. Each EG is dedicated to a specific field of competence where ETSON members seek an in-depth exchange of knowledge and experiences:

N°	Technical issue
1.	OEF Including Incident and Precursor Analysis
2.	Mechanical Systems
3.	External Hazards (Man-Made, Natural)
4.	Severe Accidents
5.	Environmental Safety Related Qualification of Components
6.	Safety Fluid Systems, including Auxiliary Systems
7.	Human and Organizational Factors
8.	Probabilistic Safety Assessment (PSA)
9.	Decommissioning
10.	Thermal Hydraulic Analyses
11.	Safety Concepts, Defense-in-Depth
12.	Fuel Behaviour (operational & accident conditions)
13.	Emergency Preparedness and Response
14.	Waste Management

The expert groups focus in particular on safety assessment practices in the respective areas and identify common approaches. These common approaches are then published as TSAGs which serve as reference point for safety as-

essments performed by member TSOs and others. TSAGs also contribute to the harmonization of safety assessment practices. Safety assessment principles that are more general are described in the Safety Assessment Guide (SAG). Both the SAG and TSAGs can be downloaded from the ETSON webpage ([www.etson.eu/](http://www.etson.eu/)).

In 2021, the chair of the TBRS changed. The following actions were done in the different expert groups:

- EG N° 2 finalized a report related to fatigue evaluation in nuclear power plants. As a next step, the preparation of a report on warm pre-stress was initiated. This report is expected to be finalized in 2024.
- EG N° 3 worked on a report on the requirements and approaches for the assessment of external hazards impacting the safety of nuclear power plants. The work is still ongoing.
- EG N° 4 prepared a TSAG on Hydrogen risk assessments in light water reactors. The work is still ongoing.
- EG N° 6 elaborated a questionnaire on how each TSO is facing the passive systems implementation in present and future reactors.
- EG N° 7 started to prepare an operational technical report based on concrete cases with regard to human and organizational factors.
- EG N° 8 continued working on a report about lessons learned on, from and for PSA. Its finalization is expected in 2022.
- EG N° 10 started to work on the topic “best estimate approach and uncertainty analysis”.
- EG N° 12 started to prepare a report on fuel assembly bowing.



# ETSON ACTIVITIES

## 2.2 ETSON Research Group

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The ETSON Research Group (ERG) shares information on the member's research programmes. Based on that, they coordinate research activities as well as identifies and prioritizes research needs within the ETSON network. The ERG also develops common positions on research strategies that are communicated towards international organizations.

In 2021, two internal ETSON research projects were carried out. One project was on hydrogen flame propagation. The other project was about the benchmarking on assessment of radiological consequences (BARCO). Both projects started in 2020 with a duration of 12 months. The reports on the projects were finalized.

The ERG started to develop a position paper on research needs. A dedicated workshop was held in November 2021 to allow the ETSON members to exchange on the research and development strategy.

## 2.3 ETSON Communication Group

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The ETSON Communication Group (ECG) was fully established in 2019 in order to increase the recognition of ETSON's values and activities at the international level as well as to support ETSON's internal and external communication.

In 2021, the main task of the ECG was the production of an ETSON video clip. It was presented for the first time at the IAEA General Conference in September as well as on the Eurosafe in November.

## 2.4 Knowledge Management Group

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The Knowledge Management Group (KMG) is tasked to develop, implement, maintain and manage common knowledge and cooperation tools for exchange of assessment and research and development results among the member TSOs. In addition, KMG aims at developing good practices for knowledge management based on experiences gained in member TSOs.

In 2021, a kick-off meeting was held, and a three-years plan of work had been accepted by the group. Several objectives have been defined for short and long term.

The KMG proposed a self-assessment tool which allow to have a global view on the different states of knowledge management among ETSON members and then to allow to fill the gaps between the different TSOs.

## 2.5 Junior Staff Programme

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The Junior Staff Programme (JSP) brings together young experts from all ETSON members. The JSP aims to improve the long-term partnership of the member TSOs, to build a network for cooperation between young experts from different countries, and to promote intercultural interaction.

In 2021, the JSP organized the ETSON Award during the Eurosafe.

As a first step to develop and organize a sustainable network for the young European generation, a side meeting during the Eurosafe was organized to discuss this topic.



# ETSON ACTIVITIES

## 2.6 EUROSAFE Forum

After the forced break due to the Covid-19 pandemic, the Eurosafe took place again for the first time this year. It was held in Paris on 22-23 November 2021 with the title “*Nuclear and radiation safety in a disruptive world – Scientific expertise, research and dialogue with society*”.

The Eurosafe Forum consisted of technical seminars and panel discussions. A TSO Café allowed an informal exchange. Also, the presentation of the ETSON award was part of the Eurosafe Forum.

For the first time, the order of technical seminars and panel discussions were changed: the technical seminars were held on the first day and the panel discussions on the second day. The session chairs summarized the findings and discussions from the technical seminars and presented them in one of the panel sessions on the second day of the Eurosafe. This allowed all participants to have a global overview of all topics presented. This new approach was very well received by the participants.

Topics of the technical seminars were linked with the 10<sup>th</sup> anniversary of the Fukushima Daiichi accident to highlight the work carried out by TSOs in terms of:

- Nuclear installation safety assessment
- Nuclear installation safety research
- Waste management, decommissioning and disposal
- Radiation protection, environment and emergency preparedness and response
- Nuclear installation and materials security.

It was also an opportunity to identify and share future challenges, both technical and opera-

tional, with the growing role of international and European organizations, as well as societal, with the need to reinforce the link with society.

The panel discussions revolved around the role of the society in nuclear safety and radiation protection as well as the upcoming challenges in nuclear safety cooperation in Europe and beyond.

A total of 207 participants from around 20 countries, including 44 speakers – technical experts and safety policymakers in the nuclear and radiology sectors, high-level contributors representing the European Commission, the IAEA, WENRA, various TSOs and agencies for dialogue with society such as the French High Committee for Transparency and Information on Nuclear Safety (HCTISN) and the French National Association of Local Information Committees and Commissions (ANCCLI)–, attended the Eurosafe Forum. 30 scientific and technical presentations as well as 3 impulse speeches were given. To be able to also include participants who didn't have the opportunity to be present in person due to the Covid-19 restrictions, recorded videos were shown. Additionally, there were 17 booths at the TSO Café where the participants could exchange in relaxed atmosphere with coffee and cake.



©Beffroi de Montrouge, Paris: event location of the Eurosafe Forum 2021



# ETSON ACTIVITIES

## 2.7

### Workshops

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The main yearly event of the JSP presents the summer school, which is hosted by the Ukraine as one of the ETSON members. Due to the Covid-19 pandemic, this summer school could not take place in 2020 and was therefore postponed to 2021. Since the Covid-19 restrictions didn't allow a summer school in 2021 either, it was postponed again to another year and is now planned for 2022. The topic of the workshop will be dedicated to emergency preparedness and response.





# ETSON EXTERNAL RELATIONS

## 3.1 IAEA

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### TSO Conference 2022

ETSON will be involved in the preparation of the next TSO conference of the IAEA in 2022. SEC NRS will host the conference in Russia (13-15 October in St. Petersburg).

ETSON representatives from BEL V and GRS are chair and vice-chair of the TSO Forum. This forum has the following goals:

- Strengthen the role of the scientific and technical capabilities in the member states,
- support technical and scientific capabilities in countries expanding or embarking on a nuclear program,
- promote the coordination and collaboration among the members,
- foster the scientific and technical capabilities,
- share safety and security research as well as the development, experiences and lessons learned,
- share feedback of the use of IAEA safety standards and other publications.

All ETSON members were encouraged to also become part of this IAEA TSO Forum.

### TOSCA

In the past, the IAEA TSO Forum has developed a self-assessment questionnaire to assess scientific and technical capabilities of a TSO focusing on the core technical areas as described in the TECDOC-1835. This questionnaire has, largely through the valuable and sustained input of ETSON members, evolved

with a tool for assessing the capabilities of TSOs, i.e., the TOSCA tool.

As a first prototype, this tool has been programmed within Excel. However, a first extensive usage at the South African national workshop showed that this Excel-based tool is very fragile. Therefore, it was decided to programme a new version of the TOSCA tool as a web-based database, which will be more stable and easier to handle.

## 3.2 European Commission

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ETSON members plan a common project on harmonization of licensing procedures, codes and standards for future fission and fusion plants within the HORIZON-Euratom-Programme. 12 Institutions mentioned its interest, including 9 ETSON members.

### JRC – Joint Research Centre

Open Access to the JRC research infrastructures: JRC publishes two calls per year to finance projects. The ERG monitors these calls.

## 3.3 WENRA

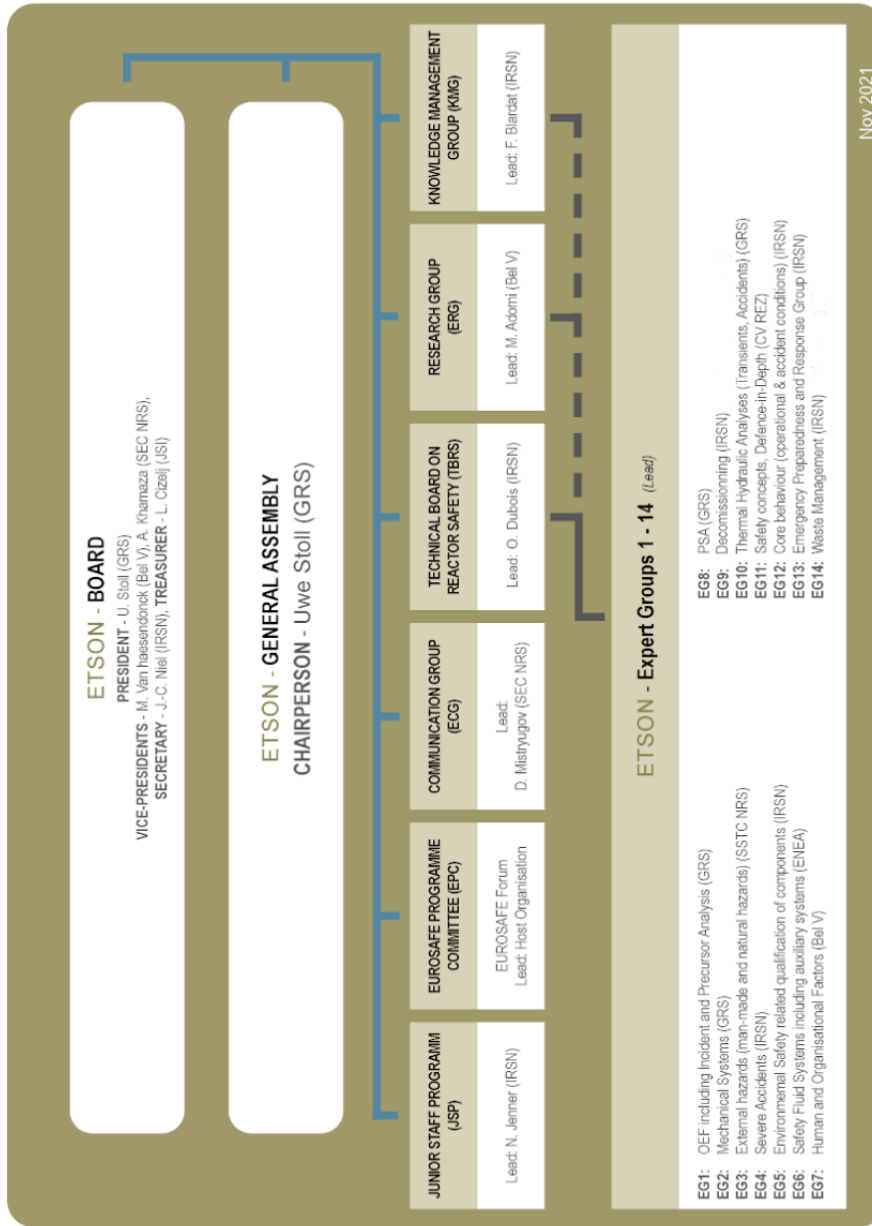
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In 2021, two reports were sent to WENRA:

- In collaboration with the Reactor Harmonization Working Group (RHWG) of WENRA, ETSON prepared a position paper regarding the state-of-the-art knowledge and TSO feedback on safety reviews to support the gap analysis for improving the WENRA reference level.
- Additionally, ETSON supported WENRA in the topical peer review on fire protection.

# 4 ANNEX

## 4.1 ETSON Organization 2021





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