

# ETSON PROGRESS REPORT

2016



# FOREWORD

ETSON is now more than 10 years old as it was founded in 2006 by GRS, IRSN and Bel V (then AVN). It is time now to reflect on what we have achieved, what we want to achieve and how our environment has changed. It is time to update our strategy.

The documents produced by ETSON's technical groups, known as technical safety assessment guides, are earning ever-greater recognition and wider use. The expertise and the contacts consolidated within ETSON contain a very high potential to achieve the best technical results in the interest of safety and to support harmonisation and the growing-together of the Member States of the European Union.

One very successful activity of ETSON is the Junior Staff Program (JSP). The young ETSON researchers participating in the JSP represent the future of nuclear safety activities in Europe. It is important to continue to promote this action and to encourage the networking between these young researchers, and reinforcing contacts between them should be a major objective. The yearly summer workshop organised by and for the junior staff of the ETSON members is instrumental in this regard. The yearly ETSON Award is also a visible initiative with the aim to promote the work of young experts.

The Group on Nuclear Waste and Decommissioning organized an International Workshop in collaboration with IAEA in July. The workshop was dedicated to the processes for the sustainable management of radioactive waste including innovative techniques.

The ETSON Research Group (ERG) proposed a research program among members on code benchmark on H2 deflagration vs. ENACEFF-2 experiments. This proposal has been accepted by the General Assembly.

The JSP organised its annual summer workshop in the United Kingdom, hosted by AMEC-RSD. The subject was structural integrity in nuclear safety.

ETSON participated actively in several activities of the IAEA: the General Conference, the Steering Committee of the TSO Forum, and the writing of a TECDOC on the TSO function.

A Memorandum of Understanding has been signed between ETSON and FORO.

In 2016 ENEA from Italy joined the network.

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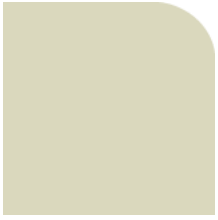
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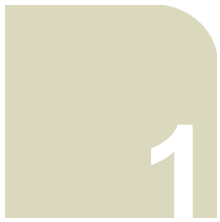
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# ORGANISATIONAL MATTERS

## 1.1 ETSON network extension

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During the General Assembly meeting in Garching, 9th of November 2016, ENEA (Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile), from Italy and represented by Mr. Paride Meloni, formally joined ETSON. ENEA is the representative of the Italian institutes with TSO capacities.

Unfortunately, due to fee payment problems, INRNE-BAS, the Bulgarian TSO, joins the network only until end of 2016.

End of 2016, 16 members and associated members belong to ETSON (BEL V, GRS, IRSN, AMEC-FW, CV Rez, ENEA, INRNE-BAS, JSI, LEI, MTA-EK, PSI, VUJE, VTT, Associated: SSTC NRS, NRA, SEC NRS).

Discussions are engaged with other European TSOs to enlarge the network..



ETSON General Assembly Meeting, Garching (Germany), 9 November 2016

## 1.2 General Assembly and Board meetings

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The year 2016 was an opportunity to further strengthen the overall functioning of the association.

Two General Assemblies coupled with Board meetings were held:

- On the 9<sup>th</sup> and 10<sup>th</sup> of June 2016 in Manchester (United Kingdom);
- On the 9<sup>th</sup> of November 2016, in Garching (Germany), on the fringe of the Eurosafe Forum 2016;
- Due to retirement of two Board members in 2016 (MM. Frank-Peter Weiss and Jacques Repussard), they have been replaced by their successors (MM. Uwe Stoll and Jean Christophe Niel).

The Board is composed of the following:

- Mr. Benoît De Boeck (Bel V): President
- MM Uwe Stoll / Hans Steinhauer (GRS): Vice President
- Mr. Alexander Khamaza (SEC NRS): Vice President
- Mr. Jean-Christophe Niel (IRSN): Secretary
- Mr. Leon Cizelj (JSI): Treasurer

## 1.3 Accounting and fee payment

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The Association has collected the annual fees of 2000 Euros from the ETSON members (except INRNE BAS). The

money is dedicated to the ETSON award, the promotion of ETSON and limited research actions.

#### 1.4

## ETSON Strategy

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Starting from 3 partners in 2006 (IRSN, GRS and Bel V), the network reached within 10 years 16 members.

Due to this increase in power, it has been decided in 2016 to renew the ETSON strategy. A first discussion started during the June's Board and General Assembly. A task force was created at this moment. The taskforce presented a draft for a new strategy during the November General Assembly.

The new strategy will be approved during the June 2017 General Assembly.

# ETSON ACTIVITIES

## 2.1 ETSON Technical Board on Reactor Safety - Expert Groups

All ETSON members stressed the importance of the ETSON expert groups. The Technical Board on Reactor Safety (TBRS) proposed generic terms of reference. The main role of the TBRS is to manage the different expert groups and to propose to the General Assembly the Technical Safety Assessment Guides for validation before publication. The ETSON organization is presented in Annex 1.

ETSON Expert Groups exist for the following topics:

EX N°	Technical issue
1.	OEF, including Incident and Precursor Analysis
2.	Mechanical Systems
3.	Electrical Systems
4.	Severe Accidents
5.	Environmental qualification
6.	Safety Fluid Systems, including auxiliary systems
7.	Human and Organizational Factors
8.	PSA
9.	Lifetime-Management
10.	Thermal Hydraulic Analyses (Transients, Accidents)
11.	Safety concepts, Defense-in-Depth
12.	Core Behavior (operational and accident conditions)
13.	Emergency Preparedness
14.	Decommissioning and Waste Management

The new ETSON member ENEA nominated experts for the different working groups.

The Group on Nuclear Waste and Decommissioning organized an International Workshop in collaboration with IAEA 4-6 July in Vienna

The workshop was dedicated to Treatment processes for the sustainable management of radioactive waste including innovative techniques

The work program was on :

- Reprocessing waste
- Decommissioning waste
- NPP operational waste
- Legacy waste including from major accidents
- Disused source management

The objectives were defined as:

- Inventories and current generation rates
- Overall management practices
- Specific types of treatment currently in use
- Safety, economic or technical problems identified with the current management approaches
- New treatment approaches under development or consideration
- Identifying safety or sustainability issues that need to be considered further
- and/or identify novel or innovative approaches that could be beneficial and more broadly adopted

The outcomes were defined as :

- Summary for each ETSON member of national waste management approach
- Identification of issues
- Description of possible new, innovative or novel approaches to address the issues.
- Identification of areas for future collaboration

The main conclusion of this workshop have been presented during the IAEA conference on the safety of radioactive waste (21-25 November, Vienna).

On the basis of the international workshop and international conference (where the conclusions of the workshop have been presented), ETSON will prepare a position paper on the TSO positions about waste management and decommissioning.

Status of the other groups :

The Expert Group 2 is working on mechanical systems (comparison of regulatory requirements and methodologies for Reactor Pressure Vessel fracture mechanical assessment). The report on how to learn from different practices should be released in March 2017.

The Expert Group 4 on severe accident relaunched the work on Filtered Containment Venting to produce at the end a state of the art report.

The Expert Group 5 on environmental qualification prepared a draft of the TSAG.

The Expert Group 8 on PSA proposed to organize a dedicated workshop on PSA linked to EUROSAFE 2017.

The Expert Group 9 on lifetime and ageing management focus on the topical peer reviews organized by ENSREG on ageing management.

The Expert Group 12 shifted the scope to focus on Fuel Behaviour. It is foreseen to work on fuel assembly bow and the impact of these phenomena on safety assessment.

The Expert group 13 on emergency preparedness works on the role of TSOs in emergency preparedness. A questionnaire is under preparation and

will be sent to all members to collect information and to compare practices between the members.

In 2017, it is planned to revise the Safety Assessment Guide, written 10 years ago.

A new group on external hazard will be created soon.

## 2.2

### ETSON Publications

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The TBRS organized in 2015 a dedicated workshop on earthquake, floods and strategies in case of "Loss of Offsite Power, Station Black Out or Loss of Ultimate Heat Sink".

The final report has been published on ETSON internet website beginning of 2016 and is downloadable for everyone (ETSON Workshop Overview on the assessments of Earthquake/Flood and Provisions in case of Station blackout (SBO) or Loss of ultimate heat sink (LUHS), in the light of Fukushima accident).

All the published TSAGs can be freely downloaded on ETSON website ([www.etsongroup.eu](http://www.etsongroup.eu)).

A Russian translation of the TSAGs is now available, too.

## 2.3

### ETSON Research Group

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The ETSON Research Group (ERG) participated in June 2016 to a dedicated workshop "In-vessel Corium retention

strategy in the framework of the IVMR H2020 project”, organized by IRSN with fundings from JRC and ETSON. The question was to know if IVMR is a reliable option for high power reactors (1000 MWe and above). The IVMR meeting was funded by JRC and ETSON. More than 130 persons participated to the meeting (safety authorities, TSO, utilities, and vendors).

During the 60th IAEA General Conference in September in Vienna, an IVMR side event about the strategies for high power reactors was also organized with 40 participants also from ETSON.

The ERG is in charge of ETSON coordination concerning the H2020 call. ERG members exchanged information in order to have a coordinated answer to H2020 projects and to have a global view on safety programs. These discussions among ERG members allow reinforcing ETSON positions and visibility in the European programs.

The ERG still continues the mapping of the experimental structures and modelling team. A joint paper in a scientific journal is in preparation to highlight ETSON overall capabilities.

The ERG will update the position paper and rank the R&D priorities in conjunction with the NUGENIA Global Vision document.

The ERG proposed a research program among members on code benchmark on H2 deflagration vs. ENACEFF-2 experiments. This proposal has been accepted by the General Assembly and the project will start in 2017.

## 2.4

# ETSON Knowledge Management

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The ETSON Knowledge Management Group (KMG) organized a meeting the 9<sup>th</sup> of November 2016.

The ETSON intranet has been updated to improve the navigation on the website.

The draft version of a newly revised ETSON internet site has been presented and accepted during the last GA meeting. The new portal starts operation with begin of 2017.

An infopool section has been created to share general information, publications, events, conferences materials etc.). This infopool can be considered as a first step for the ETSON Database. Up to now, there are 176 general information and publications by 7 ETSON members available in English and/or in national languages. The infopool is still growing.

The KMG will collect the information from the ETSON members to propose an “identity table” with the relevant information (specialties, areas of expertise...).

## 2.5

# ETSON JSP

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The ETSON Junior Staff Programme (JSP) brings together young experts from all ETSON members. The JSP aims at improving the long-term partnership of the member TSOs, establish a network for cooperation between young expert



from different countries, and to encourage intercultural interaction. This network has long term objectives to allow young researchers to learn to work together and to maintain the contacts in the duration.

The main yearly event within this framework is the ETSON Junior Staff Summer Workshop.

#### JSP SUMMER WORKSHOP 2016 (4/09-9/09.2016)

- Subject: Structure integrity (RPVs and other NPP components; Accidental and beyond design conditions; External events; Ageing; Safety-related and procedural aspects)
- Attendees: 23 from 8 TSOs
- Lectures and working groups: around 20 presentations by the young experts themselves
- Location: Warrington, United Kingdom, hosted by AMEC FW

JSI (Slovenia) proposed to host the ETSON JSP Summer Workshop 2017.



JSP in United Kingdom (August 2016)

## 2.6

### ETSON Workshops

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The expert group on Nuclear Waste and Decommissioning organized a dedicated workshop in July 2016 (see 2.1 for more details).

IRSN with ETSON and JRC supports organized an international workshop on In Vessel Melt Retention in June 2016 (see 2.3 for more details).

## 2.7

### ETSON Award

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The contest for the ETSON Award – in a format like a science slam - takes place during the EUROS SAFE Forum.

In 2016, the rules for the ETSON Award have been modified. Now, the first two contributions are rewarded. But this year, two contestants were equally ranked and reached both the second position. In consequence, it has been decided to reward three winners who are:

- 1) François Xavier OUF (co-auteurs Simon Delcour, François Salm, Mickael Patry) « Fire-induced airborne release of radioactive particles: development and validation of a phenomenological model »
- 2) Marat Mustafin « Analysis of steam generator heat exchanger tubes integrity at station blackout with feedwater restoration scenarios for WWER-1000 »
- 3) Jérémy Bousquet (GRS) (co-auteurs Matias Zilly (GRS), Julien Taforeau (IRSN)) « Hot zero power results of

the BEAVRS benchmark using the  
DRAGON/PARCS and the  
SCALE6/QUABOX-CUBBOX code  
sequences »

The winner of the first prize received  
3000 € and the two seconds 2000 € each.

# ETSON RELATED 3 INITIATIVES

As part of their activities, ETSON members have been involved in different initiatives in 2016.

## 3.1 EUROSAFE Forum

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After what had been 15 Forums, the members of the EUROSAFE Initiative - the ETSON members and 3 Regulatory bodies - felt the desire to have a more modern concept for this event. The EUROSAFE Forum took place in Munich in November 2016 (7th and 8th) and presented itself to its almost 300 international participants with several innovative features. E.g. the newly established TSO Café, where 14 ETSON members presented themselves. In a casual atmosphere, participants were given the opportunity to socialise, have interesting discussions, and sample some traditional snacks from the different TSOs' countries of origin.

After interesting key speeches, the second half of the plenary session started with the premiere of the ETSON Award Science Slam including its public vote for the award.

The seminars on the second day started with impulse speeches about the technical subject, also a new milestone of the concept. ...

The new formula met a real success.

## 3.2 EUROSAFE Tribune

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ETSON members participated in the publication of one issue of the EUROSAFE Tribune in 2016:

- EUROSAFE Tribune #29, published in April 2016. The overall theme of this issue was: " 2014 nuclear safety directive: a driver for convergence".

It was the last publication under this format.

Now, the EUROSAFE Tribune has been replaced by a monthly newsletter that is under the responsibility of ETSON members. It is a rotating process, every month, an ETSON member will be in charge of the Newsletter redaction. The member has the choice in the topics selection.

# 4 ETSON EXTERNAL RELATIONS

## 4.1 IAEA

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ETSON took part in the following IAEA activities:

- TSO Forum: Vienna 30-31 March 2016

Six ETSON members participated to the 9th Steering Committee of the TSO Forum.

Several actions/recommendations have been defined after the TSO Forum with :

- In the framework of the redaction of the TECDOC on “Technical and Scientific Support Organizations (TSOs) and their Services provided in Support to Regulatory Functions”, the definition of a TSO has been approved by the TSOF Steering committee :

“A Technical and Scientific Support Organization (TSO) is an organization designated or otherwise recognized by a regulatory body and/or a government to provide expertise and services, to support nuclear and radiation safety and related scientific and technical issues, to the regulatory body.

In most cases, the activities of a TSO also include support to nuclear security and safeguards.”

The work on the TECDOC is still in progress.

- It has been discussed that the TSOs could propose services to the Authorities with two different level of action :

- The development of TSO experts missions for embarking countries intending to develop their TSO capabilities
- The development of TSO specific modules to be added in existing peer review missions such as IRRS and INIR.

- General Conference: Vienna 26-30 September 2016

An ETSON/ENSTTI booth was installed during the General Conference to promote the TSOs actions.

- TSO Forum: Vienna 27-28 October 2016

Six ETSON members participated to the 10th Steering Committee of the TSO Forum.

The TECDOC on “Technical and Scientific Support Organizations (TSOs) and their Services provided in Support to Regulatory Functions” is now undergoing an internal editorial review before its submission for approval to the internal Publication Committee. If the document is approved, the expected date of publication is March or April 2017.

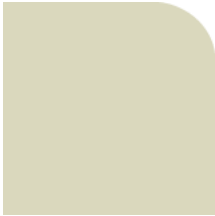
The IAEA TSO Conference will be organized in Brussel in 2018. ETSON will be involved in the preparation of this event. A practical arrangement between IAEA and ETSON will be prepared. The deadline for abstract should be in spring 2018 and the deadline for the papers one month before the conference.

## 4.2 FORO

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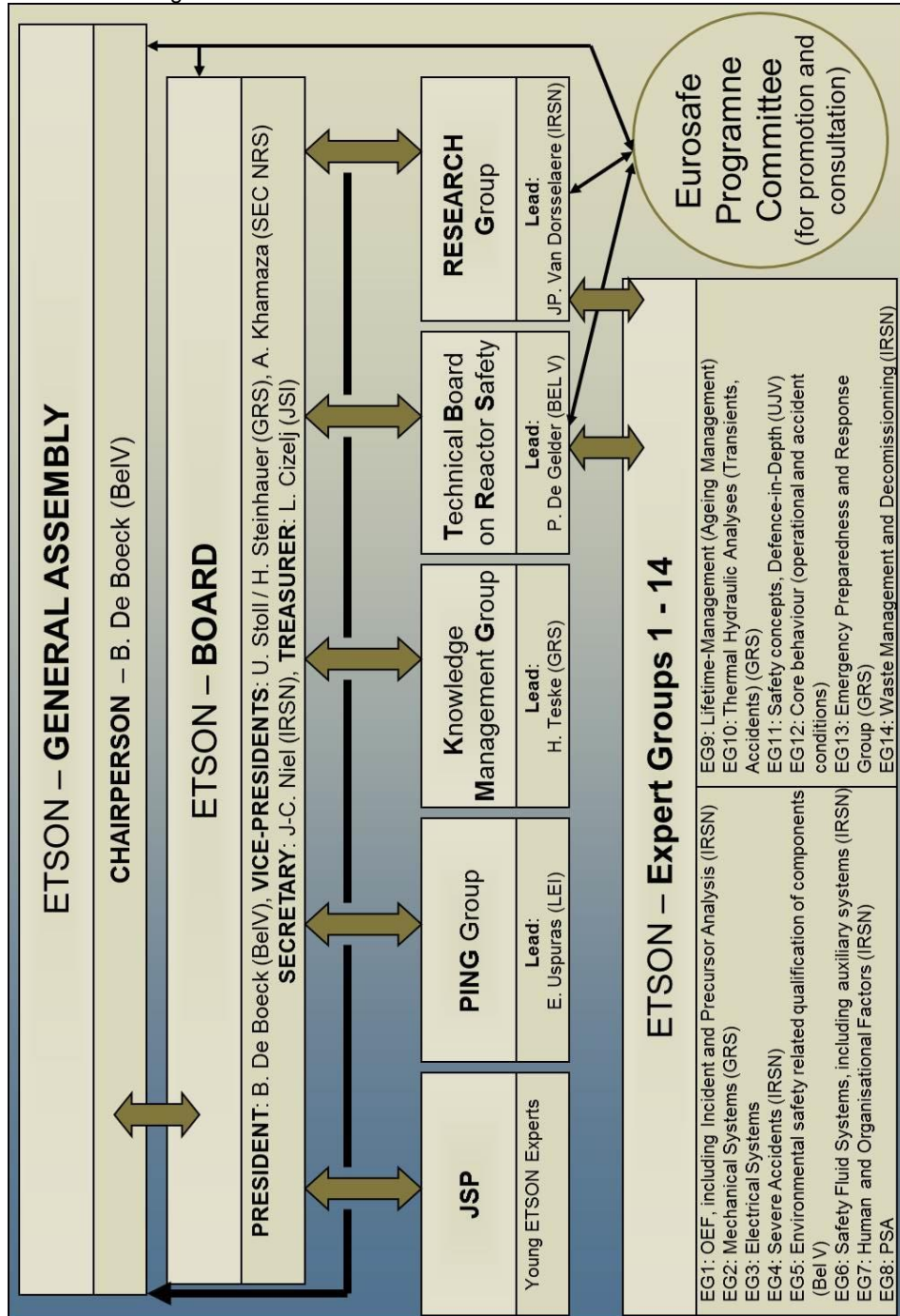
A Memorandum of Understanding has been signed during the 60th IAEA General Conference between ETSON and FORO. The main areas of cooperation are :

- Exchange of information on their activities, working groups' results, publications, among others
- Cross involvement to activities and meetings of each of the Participants.
- Capacity building and Training (FORO and ENSTTI)
- Translation and sharing of documents published by each of the Participants
- Knowledge management.



# ANNEX

2016 ETSO organization



**ETSON**

EUROPEAN  
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ORGANISATIONS  
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