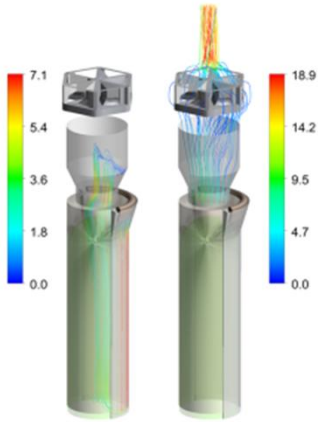
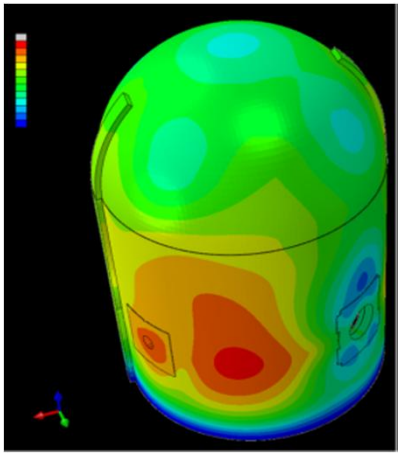
SAFIR2018

The Finnish Nuclear Power Plant Safety Research Programme 2015-2018

Plant safety and systems engineering



Reactor safety

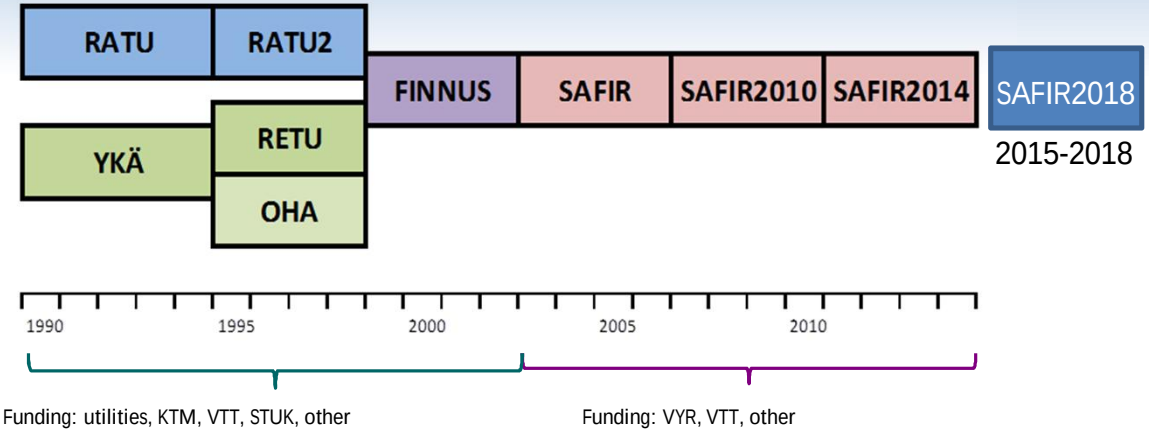


Structural safety and materials

Jari Hämäläinen

SAFIR2018 Programme Director

Finnish Nuclear Power Plant Safety Research



The nuclear facility operator shall be obliged to participate in financing research aimed at ensuring that, should such new factors concerning safe operation of nuclear facilities emerge that could not be foreseen, the authorities have such sufficient and comprehensive nuclear engineering expertise and other facilities at their disposal that can be used, when necessary, to analyse without delay the significance of such factors. (Nuclear Energy Act Chapter 7a, Section 53a)

- The objective of SAFIR2018 is in accordance with Chapter 7a of the Finnish Nuclear Energy Act enacted in 2004, i.e., to ensure that should new matters related to the safe use of nuclear power plants arise, the authorities possess sufficient technical expertise and other competence required for rapidly determining the significance of the matters.
- National research programmes have had a significant role in NPP safety research since 1990 and from 2003 the programmes have been known as SAFIR programmes.
- The nuclear facility operators are obliged to participate in financing and they fulfil the obligation by paying an annual fee into the Finnish State Nuclear Waste Management Fund (VYR) that finances research projects in the programmes.
- Finnish Research Programme on Nuclear Waste Management KYT2018 is also going on.
- The research projects shall be of a high scientific standard and their results shall be published.

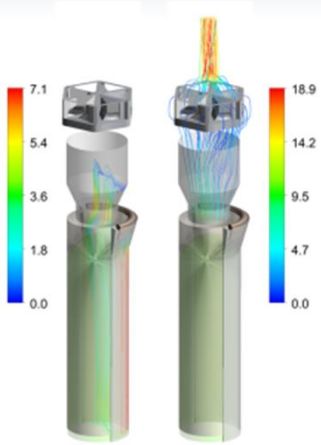
SAFIR2018 General objectives

- Development and maintenance of know-how
  Public research based on actual research needs offers an excellent environment for educating new experts.
- Development and renewal of research infrastructure
  The programme also supports the development of research infrastructure so that the analysis, measurement and testing equipment remain up-to-date.
- International and high level research
  Nearly all SAFIR2018 projects have real international co-operation. The results of SAFIR2014 (2011-2014) were reported in over 1000 research reports, journal articles and conference papers.

SAFIR2018 Research Areas

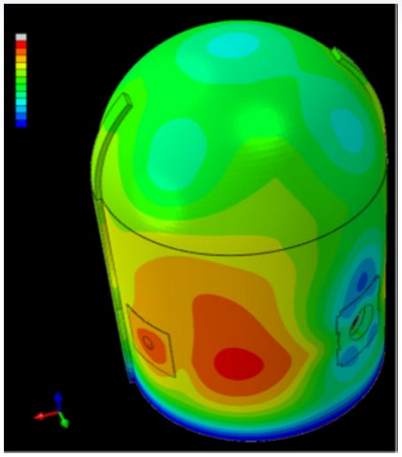
Plant safety and systems engineering

- Overall safety throughout the life cycle of nuclear power plants
- Operational resilience
- Management principles and safety culture
- PRA and Defence-in-Depth (DiD)
- Safety assessment of automation (I&C) and electrical systems
- Extreme weather conditions.



Reactor safety

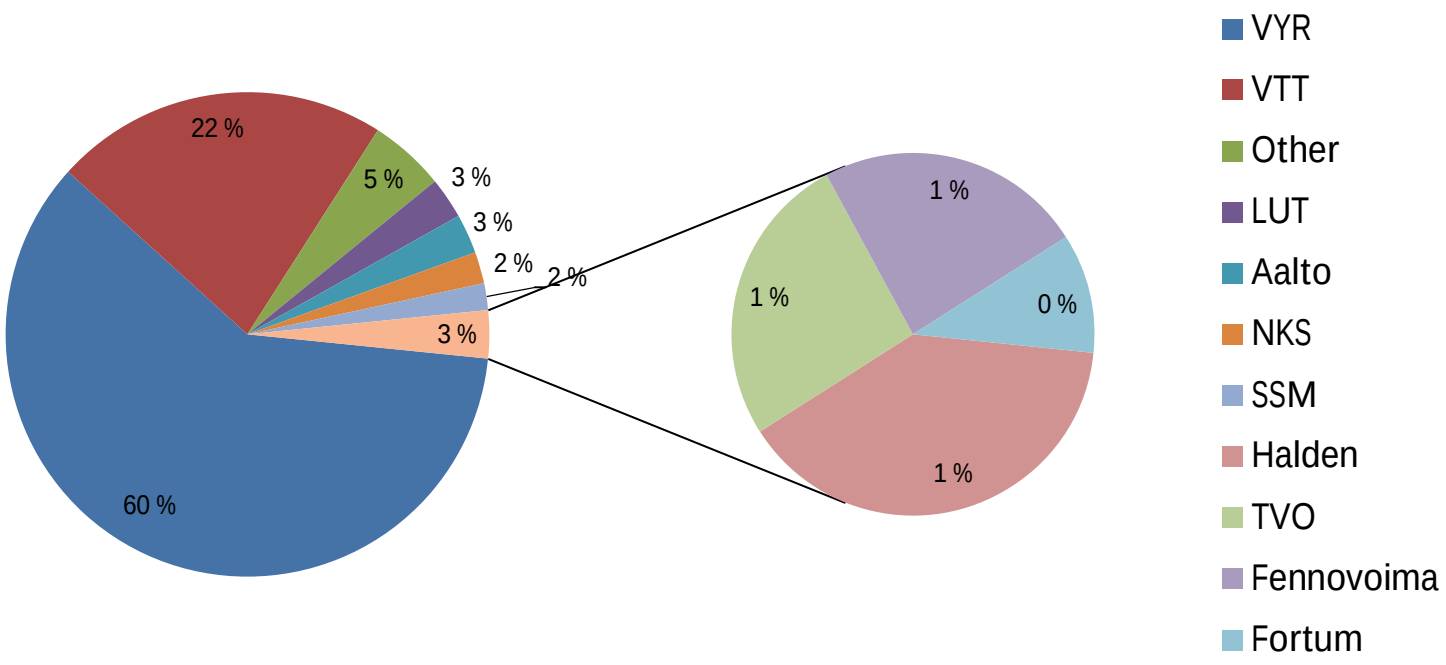
- Experimental and computational methods for ensuring the safety requirements
- Thermal-hydraulic problems, CFD methods
- Reactor core safety analyses
- Fuel behaviour studies, reactor dynamics
- Severe accidents and fission product transport
- Uncertainty and sensitivity analyses.



Structural safety and materials

- Support of the long-term and reliable use of nuclear power plants
- Integrity of barriers and material issues
- Aging phenomena of structures and equipment
- Experimental and numerical methods for external event assessment
- Fire risk evaluation.

SAFIR2018 Total funding in 2015-2016 was 15,5 M€



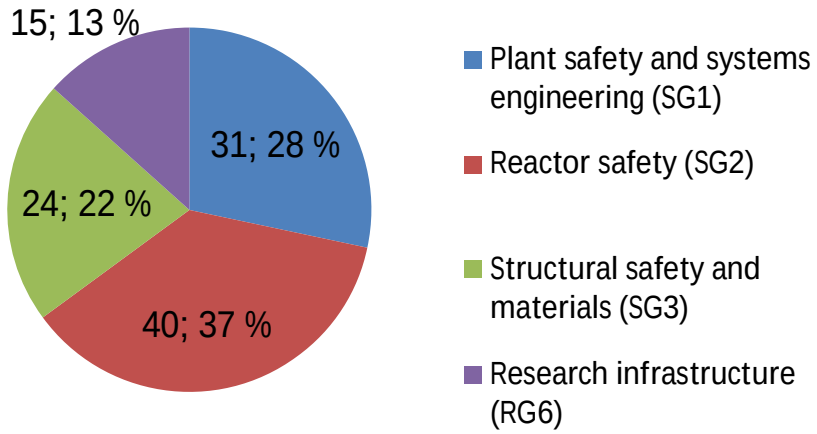
The main funding organisations were the Finnish State Nuclear Waste Management Fund (VYR) with 9,3 M€ and VTT with 3,5 M€.

SAFIR2018 Projects in 2015-2016

28 projects annually in 2015-2016:

- SG1 Plant safety and systems engineering
- SG2 Reactor safety
- SG3 Structural safety and materials.
- RG6 Research infrastructure

112 person years in 2015-2016



The research work in the projects was guided by six reference groups:

- RG1 Automation, organisation and human factors (SG1; 3 projects)
- RG2 Severe accidents and risk analysis (SG1, SG2, SG3; 7 projects)
- RG3 Reactor and fuel (SG2; 4 projects)
- RG4 Thermal hydraulics (SG2; 5 projects)
- RG5 Structural integrity (SG3; 6 projects)
- RG6 Research infrastructure (3 projects)

SAFIR2018 Results statistics

The projects of the programme have produced 552 publications during 2015-2016:

- 89 scientific articles
- 121 conference papers
- 216 research reports (SAFIR2018 research organisations)
- 126 other publications (theses, reports of other organisations, other)

17 higher academic degrees were obtained:

- 6 Doctors
- 11 Master's degrees.

Seminar practicalities

Posters are in the lobby during the coffee breaks and poster sessions. The presenters of the named session posters will be present.

Panelists – Feedback on SAFIR2018

Tomi Routamo, STUK
Hanna Virlander, Fennovoima
Sami Hautakangas, Fortum
Antti Tarkiainen, TVO

Enjoy the seminar and welcome to the seminar dinner today after the panel discussion.