



*High-Performance Advanced Methods and Experimental Investigations
for the Safety Evaluation of Generic Small Modular Reactors*

– Manual –

McSAFER Mobility Programme



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Introduction

Interest in the development and deployment of Small Modular Reactors (SMR) has increased in the last years in Europe and worldwide. SMRs have a great potential for safe, flexible and CO₂-free power generation, salt water desalination, and process heat generation. They are currently considered in various countries as an alternative to large nuclear power plants and as part of the future energy-mix to achieve the low-carbon power generation goals with low risk and cost in a competitive energy market. However, the new small core design, the integral concept, the innovative heat exchangers, and passive heat removal systems as well as the novel containment designs represent new challenges for the safety demonstration in the frame of a licensing process. The design peculiarities of SMR-cores are challenging the prediction capability and accuracy of legacy analysis tools. Instead, the use of multi-dimensional numerical tools and novel approaches is needed. The validation of these numerical simulation tools is of paramount importance for the acceptability and use by regulators, industry, and policy makers within a licensing process.

The aim of the McSAFER project is to advance the safety research for SMRs by combining safety-relevant thermal hydraulic experiments and numerical simulations of different approaches for safety evaluations.

The neutron physical, thermal hydraulics and safety related investigations are focused on four SMR-designs: CAREM, SMART, Nuward and NuSale. In McSAFER, researchers and industrial partners will perform experiments on existing European thermal hydraulic test facilities. The goal is to develop and improve simulation tools for SMRs and to validate the applied simulation tools with the experimental data generated within McSAFER. The simulation tools will then be applied to the four selected SMR-designs. The outcome of the tests and simulations will contribute a valuable step to demonstrate the advantages of high-fidelity codes in practical licensing processes.

The McSAFER project officially started in September 2021 with a scheduled runtime of three years.

McSAFER mobility programme

In order to support education in the field of SMR, safety analysis and multi-physics simulations, the McSAFER project offers a mobility programme for PhD students, postdoc researchers and staff members. The goal of the programme is the promotion of mobility between the McSAFER partners to create synergies between the organizations and to disseminate knowledge to the next generation of nuclear experts. The McSAFER project will grant up to 10 mobility grants with a total budget of 18.000€ during the runtime of the project.

The McSAFER mobility programme is managed by the project coordinator, Dr. V. H. Sanchez Espinoza from the Karlsruhe Institute of Technology (KIT), Institute of Neutron Physics and Reactor Technology (INR).

What is funded?

The McSAFER mobility programme offers funding for research focused exchange stays at the McSAFER organizations. The mobility programme will fund the temporary stays in McSAFER partners' labs and research facilities.

The exchange stays can last (at least) 2 weeks up to 3 months, depending on the proposed exchange programme.

The foreseen mobility grant will cover accommodation and travel expenses (approx. 500€/800€ for European travel) and an economic endowment (approx. 1200€ per month). However, the amount of the mobility grant is not fixed but depends on the lengths of the exchange stay and the location of

the host institution. The total amount of the grant will be decided on a case by case basis by the Project Executive Board of the McSAFER project.

In total, around 6 to 10 mobility grants will be awarded depending on the lengths and subsequent costs of each mobility.

Who can apply?

The McSAFER project will publish calls for application on the McSAFER website as well as on the partners various communication channels.

Participation in the McSAFER mobility programme is open for candidates with an interest in the field of SMR, safety analysis and multi-physics simulations. This includes:

- Master students in study programmes related to the McSAFER research scope;
- First Stage Researchers R1 (up to the point of Ph.D., this includes doctoral students)¹;
- Recognized Researchers R2 (PhD holders or equivalent who are not yet fully independent)²
- (Junior) engineers and technicians.

The participation in McSAFER mobility programme is subject to the following conditions:

- Temporary stays can only be hosted by partners of the McSAFER project³.
- A supervisor at the host organization has to approve the temporary stay.
- Applicants have to be a member of one of the McSAFER partners (e.g. employment or another formal arrangement).

How to apply?

Applicants have to send all necessary documents to the Project Management Office (mcsafer@for.kit.edu) and only complete applications will be considered by the selection committee. Applications can be submitted at any time.

The application must include:

- (1) McSAFER Mobility Programme application form (see Annex 1)
- (2) Curriculum vitae (max. 2 pages)
- (3) Certificate of employment at one of the European McSAFER partners
- (4) Letter of motivation (max. 1 page)

Please explain your motivation for applying for a temporary stay at a McSAFER institution and how and why the temporary stay is important for your professional development. What is the added value for the host institution, considering the McSAFER objectives?

- (5) Description of the proposed activity (max. 1 page)

Please describe the proposed temporary stay activity, consisting of a summary, methods and anticipated results.

- (6) Reference letter by the supervisor of the sending institution

¹ <https://euraxess.ec.europa.eu/europe/career-development/training-researchers/research-profiles-descriptors>

² <https://euraxess.ec.europa.eu/europe/career-development/training-researchers/research-profiles-descriptors>

³ <https://mcsafer-h2020.eu/partner/>

- (7) Reference letter by the supervisor of the host institution confirming the willingness to host the applicant for the proposed temporary stay

The Project Executive Board of the McSAFER project is responsible for reviewing and evaluating all applications. Applications that don't meet the above-mentioned criteria and conditions will not be considered for approval. To avoid conflicts of interest, members of the General Assembly/Project Executive Board that are directly involved with an application (e.g. supervisor at the sending/host organization) will not participate in the evaluation.

Applications will be evaluated considering the following criteria:

- the academic qualification of the applicant (documented by curriculum vitae, reference letter)
- the overall quality of the application (documented by letter of motivation, presentation of research project)
- the requested budget is well justified including reasonable transport and accommodation costs

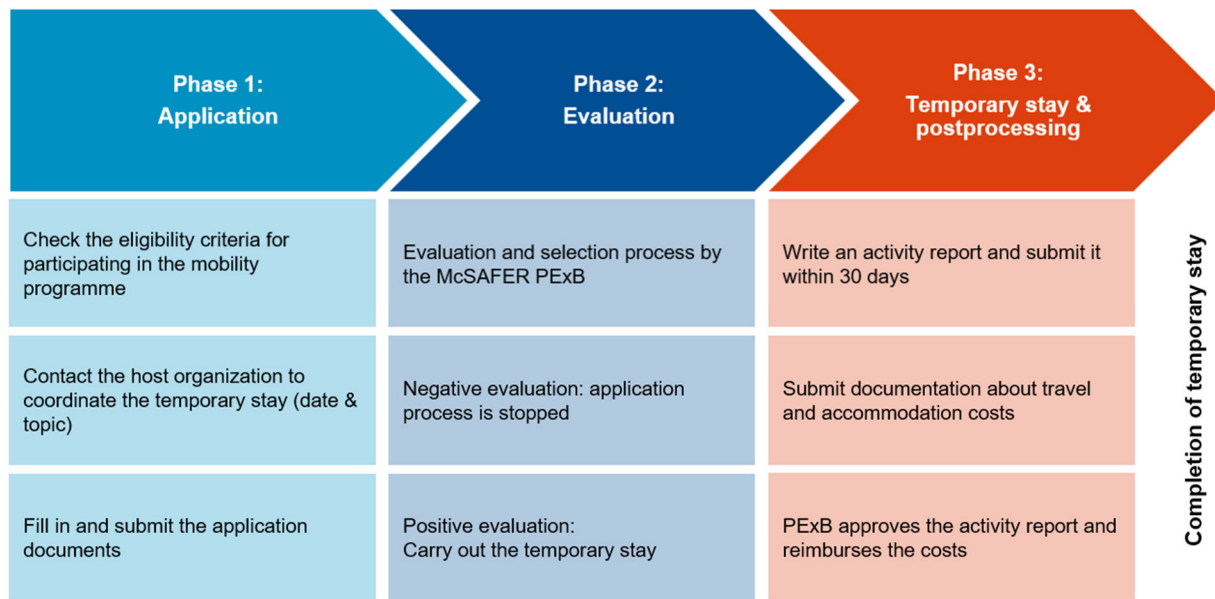
Cost reimbursement rules

To receive the reimbursement of costs, the applicant has to submit a short activity report (4-10 pages) about the temporary stay to the project coordinator at the latest 30 days after the end of the exchange stay. The activity report should summarize the lessons learnt and the results obtained during the temporary stay.

Additional to the activity report, the applicant has to submit documentation about the costs associated with the temporary stay (e.g. travel and accommodation costs). Only costs that are supported by original receipts can be reimbursed by the McSAFER mobility programme. The total reimbursed costs have to be lower or equal to the total amount that was allocated by the Project Executive Board at the time of the approval of the temporary stay action.

The Project Executive Board of the McSAFER project will evaluate the activity reports. If the Project Executive Board approves the activity report, the temporary stay activity is considered closed and the applicant receives a reimbursement of costs.

Annex-1: McSAFER Mobility programme process



Annex-2: Application form – temporary exchange stay

APPLICANT	
Family name:	Position:
First name:	E-mail:

SENDING INSTITUTION	
Name:	Contact person:
Institute:	Contact person e-mail:

HOST INSTITUTION	
Name:	Contact person:
Institute:	Contact person e-mail:

EXCHANGE STAY – PRACTICAL INFORMATION	
Date of application:	Start date:
Duration of the proposed stay (in weeks):	End date:
Topic of the temporary stay:	
Estimated costs (in Euro)	

SIGNATURES	
Applicant:	Contact person (sending institution):