

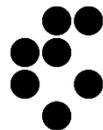


**EMUG**

**The 14th Meeting of the  
„European MELCOR and MACCS User Group“**

**Organised by the Reactor Engineering Division, Jožef Stefan Institute, Slovenia  
In support of the Cooperative Severe Accident Research Programme (CSARP)**

**will be held in  
Ljubljana, Slovenia  
12<sup>th</sup> – 14<sup>th</sup> April, 2023**



**Jožef Stefan  
Institute**



**Reactor  
Engineering  
Division**

**With special thanks to EMUG's permanent stake holders:**

**United States Nuclear Regulatory Commission (US NRC)  
Sandia National Laboratories (SNL)  
Paul Scherrer Institute (PSI)**



## **Announcement and Call for Presentations**

Deadline for registration to the meeting  
(including indication of presentation(s) title(s) and duration)

**24<sup>th</sup> March 2023**

Presentation(s) in PowerPoint or in PDF format up to

**7<sup>th</sup> April 2023**

On-line information is available at

<https://r4.ijs.si/emug>

or

<https://www.psi.ch/emug/>

## **1. ORGANIZATION AND HOST**

The 14th Meeting of the European MELCOR and MACCS User Group will be held at the Jožef Stefan Institute, Jamova cesta 39, Ljubljana, Main building, Large lecture room, on 12<sup>th</sup> to 14<sup>th</sup> April 2023.

- The meeting will start on Wednesday 12<sup>th</sup> April. The first day will be devoted to MACCS technical presentations.
- The next two days (13<sup>th</sup> – 14<sup>th</sup> April) will be devoted to MELCOR technical (SNL and NRC) and user presentations.

Final details and a final draft agenda will be sent to registered participants shortly before the meeting.

## **2. BACKGROUND OF THE MEETING**

The MELCOR and MACCS severe accident and consequence codes have been developed by Sandia National Laboratories (SNL) for the U.S. Nuclear Regulatory Commission (NRC) in the USA, and are provided to various European organizations through bilateral agreements under the ‘Cooperative Severe Accident Research Program’ ‘CSARP’ between US-NRC and the European organizations. The codes have been used for many reactor safety applications by these organizations. Some of these organizations also continuously assessing the codes with data available from Severe Accident Research programs. A few organizations have also developed models for certain critical issues, which appear in local versions of MELCOR for testing and with the goal of implementation in future releases from SNL.

The main interests in establishing the user group are to foster experience and information exchange among European organizations through organized annual meetings and to establish common needs on further model and correctional development of MELCOR and MACCS. The first meeting of the EMUG hosted by PSI was held in December 2008. PSI is acting as coordinator of the group.

### **AIMS OF EUROPEAN MELCOR and MACCS USER GROUP**

- To provide a forum for the presentation and discussion of the experience gained by:
  - MELCOR assessment using integral and separate-effect tests leading to presentation of performance of models and related issues, including sensitivity to selected model parameters and model uncertainties;
  - Model development efforts;
  - Application of MELCOR for plant safety studies, including Level 2 PSA, which demonstrates strengths and weaknesses of MELCOR models in reproducing the individual severe accident phenomena, and interactions between them occurring in the nuclear part and balance of plant systems, and the effect of operator actions on the accident progression through user input as introduced in the code input models;
  - Application of MACCS for accident consequence calculations including Level 3 PSA;
  - Use of codes with different compilers and operating systems.
- Prioritization of user error correction and model development needs, to be transmitted to the code developers and the US NRC.
- To minimize the efforts required to obtain an adequate knowledge of optimum use of MELCOR and MACCS, through sharing of experience.
- To support the gaining of MELCOR and MACCS knowledge and experience, particularly concerning the younger and less experienced users.

### 3. SCOPE, CONTENT AND OUTLINE OF THE MEETING

One day of the meeting will be devoted to MACCS code and two days to MELCOR code. Both parts of the meeting (MELCOR and MACCS) are divided into two sections:

#### 1. NRC and SNL Presentations

About one day will be devoted to presentations from NRC and SNL / MACCS developers and about one day will be devoted to presentations from NRC and SNL / MELCOR developers. Each of the following four topics could be given by one presentation for each code:

- NRC MELCOR / MACCS Activities
  - Code applications
  - Code perspectives, possibility of distribution to international partners, status and future areas of CSARP program
  - New considerations of code development
- MELCOR / MACCS input
  - New features of input conversion
  - New input capabilities in MELCOR 2.2
- Current MELCOR / MACCS development thrust areas
  - Quality assurance
    - Code assessment work and regression testing
    - Code distribution and issue management
  - New MELCOR / MACCS Models – discussion of new modelling and experience using new models
  - Current code development
- Applications
  - MELCOR / MACCS best practices
  - Guidance for plant applications

#### 2. User Presentations

About one day will be devoted to presentations from all of the European organizations for MELCOR and for MACCS. For those who would like to present their experience in plant applications of MELCOR 1.8.6, MELCOR 2.2 and MACCS, the organizers of the meeting express their wish to see presentations not only on specific aspects of the plant applications evaluating safety aspects of the plants in interest but also the experience in use of the models, input parameters, nodalization aspects which have certain bearing on the performance of the code, as well as the quality of the code estimates. Encouraged are presentations about SMR modelling.

MELCOR presentations, amongst other covering the following topics, are warmly welcomed:

- User experience with nodalization regarding simulation of different issues with preference to focus on RCS, core and RN inventory and release modelling;
- Modelling features (early and late phase core degradation, corium pool formation, lower head behaviour, RN release, SFP, etc), new modelling efforts and nuclear fusion application;
- Model development and assessment, integral assessment, sensitivity studies, code to code comparison (different MELCOR versions or comparison to other codes), plant applications (link to uncertainty analysis, PSA Level 2 and PSA Level 3, etc.);
- Post-processing of results (including possibility of sharing of tools developed by users), run time performance.

A special session will be offered for the European MACCS users to exchange knowledge with their colleagues from other institutes. The MACCS presentations will be scheduled on 12<sup>th</sup> April.

Discussion of all participants

- Feedback from the participants – user suggestions to further code development (it could be included in presentations) and organizational aspects: next meeting(s)

## 4. PRACTICAL ARRANGEMENTS

### Participants:

Participation at the meeting is open to experts of the European organizations actively using the MELCOR or MACCS code in any of its versions. EMUG meeting is by invitation only open to European CSARP members. Also note that in order to attend either of the code user workshops you need to be an authorized user of that specific computer code. The success of the meeting is very much dependent on the active participation of those present, especially by presentations on their own experience with the code.

### Registration:

All the participants should fill in the [Meeting Registration Form](#) that is attached to this document, including the title(s) of presentation(s), and send it before the 24<sup>th</sup> March 2023 to:

Organizer e-mail: [janez.kokalj@ijs.si](mailto:janez.kokalj@ijs.si)

Coordinator e-mail: [mateusz.malicki@psi.ch](mailto:mateusz.malicki@psi.ch)

- A registration **fee will not be required**.
- **The participants bear the cost of travel and accommodation**.
- **Lunch is not provided** by the organizers, but there is a lot of possibility, either in Institute's canteen or outside. Details will be provided on site.
- **Self-paid social dinner** on 12<sup>th</sup> April will be organized and announced in the final agenda.

### Language:

All presentations and discussions will be in English.

### Presentations:

Presentations (in MS power point or Acrobat pdf format), should be sent to [janez.kokalj@ijs.si](mailto:janez.kokalj@ijs.si) and [mateusz.malicki@psi.ch](mailto:mateusz.malicki@psi.ch) at latest on 7<sup>th</sup> April. The presentations will be uploaded with permission of the participants to the EMUG group website after the meeting. **IMPORTANT:** If you do not want to publish your presentation on the EMUG webpage, ([www.psi.ch/en/emug](http://www.psi.ch/en/emug)) you need to directly mention it to the organizer and coordinator in advance via email.

### Passport and Visa:

Non-EU participants will need to have a valid passport to enter Slovenia.

The participants coming from all countries that require Slovenian entry visa do need to apply for visas. The participants are advised to check for the Embassy or Consular Office of Republic of Slovenia which covers their country.

If you need a visa, we kindly ask you to contact us and we will send the invitation letter, which is obligatory document in order to issue a visa by the Embassy.

### Arriving in Ljubljana:

#### By plane

Ljubljana is primarily served by the [Ljubljana International Airport](#) and complemented by five cross-border airports (Graz, Klagenfurt, Trieste, Venice, Zagreb) in the region providing more non-stop destinations and low-cost air carriers. The Ljubljana Airport is located at 25 km from the city centre.

There are various options for getting to and from the airports. [Bus transfer](#) is available from the Ljubljana Airport. [Shuttle transfers](#) are available from the Ljubljana Airport and also other airports (Graz, Klagenfurt, Munich,

Trieste, Venice, Zagreb) to Ljubljana.

#### By train

Direct train services connect Ljubljana with Italy, Austria, Germany, Hungary, Croatia, etc. If travelling by rail, once you are at the Ljubljana (Central) Railway Station, you are actually in the heart of Ljubljana, only a 10-minutes-walk from the main city square (Prešernov trg).

Slovenian Railways: <https://potniski.sz.si/en/>

#### By bus

Ljubljana (Central) Bus Station is situated just near the Ljubljana Railway Station.

Ljubljana Bus Station: <https://www.ap-ljubljana.si/en/>

#### By car

There are highways towards Ljubljana from 4 directions (Graz, Villach, Trieste, Zagreb). To use highways and motorways in Slovenia, the e-vignette is needed.

#### Transport in Ljubljana:

Those wishing to travel on [Ljubljana city buses](#) should purchase the Urbana public transport card. The Urbana card is available from LPP ticket offices, tourist information centres and most of the city's newspaper kiosks, news-stands and post offices.

The card is priced at €2.00 and can store up to €50.00 of credit to be spent on city bus fares.

The Urbana card can be topped up with cash at all the above-mentioned sales outlets and the green Urbanomat ticket machines located across the city, mostly next to bus stops. The ticket machines accept both cash and credit and debit cards.

Visitors to Ljubljana who purchase their Urbana card from a Tourist Information Centre and keep the receipt can return the card to the place of purchase when they no longer need it and claim a €2.00 refund.

A single journey fare is €1.30. It covers an up to 90-minute journey regardless of the number of buses needed to be changed to reach the destination. Map of bus lines is available [online](#).

#### Taxi:

In the centre of Ljubljana, you can easily find a vacant taxi. Some taxi services are listed below, more of them are available [here](#).

##### Metro Taxi

T: 080 11 90

M: + 386 (0)41 240 200

E: [info@taximetro.si](mailto:info@taximetro.si)

W: <http://www.taximetro.si>

##### Taxi Rondo

T: 080 900 900

M: +386(0)41 970 970

E: [info@taxi-rondo.si](mailto:info@taxi-rondo.si)

W: <http://www.taxi-rondo.si>

##### Taxi Laguna

T: 080 11 17, +386 (0)1 511 23 14

M: +386 (0)31 492 299

E: [taxi.laguna@siol.net](mailto:taxi.laguna@siol.net)

W: <http://www.taxi-laguna.com>

### **How to get to Jožef Stefan Institute?**

The closest bus route to the Jožef Stefan Institute is the route 1 with the bus stop “Jadranska” (Figure 1). Bus stop “Hajdrihova” is about 6 min walk from the Institute, accessible by the bus route 1 and 6 (Figure 2).

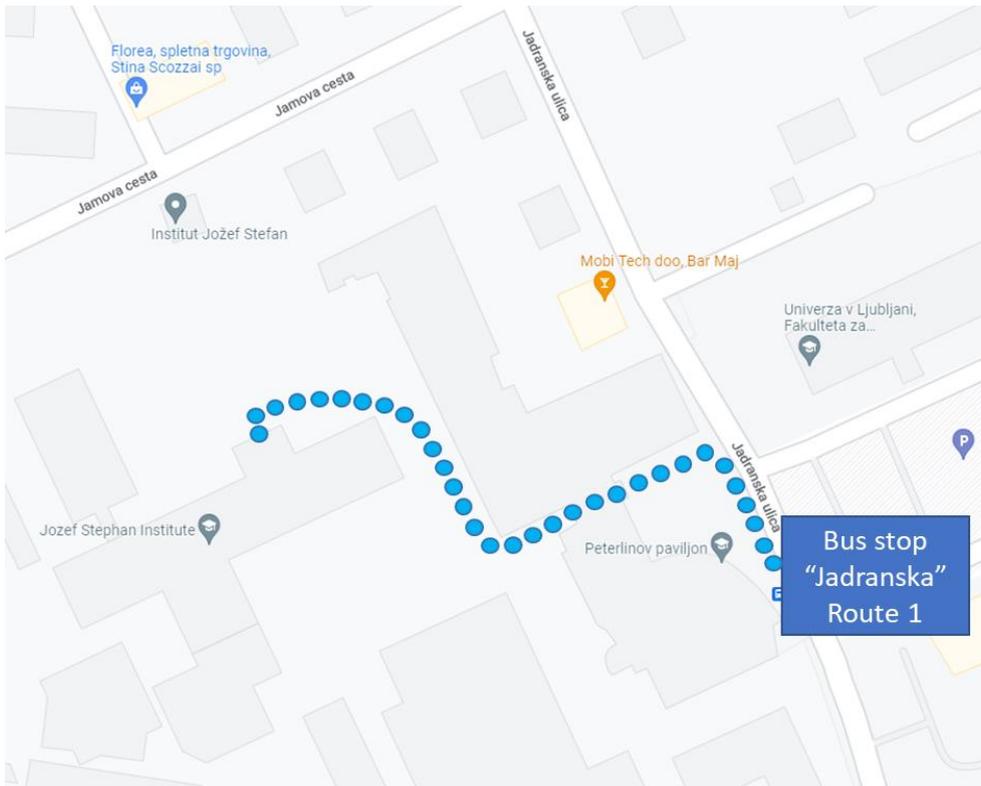


Figure 1: Path from the bus stop "Jadranska" through the side Institute entrance towards the main building.

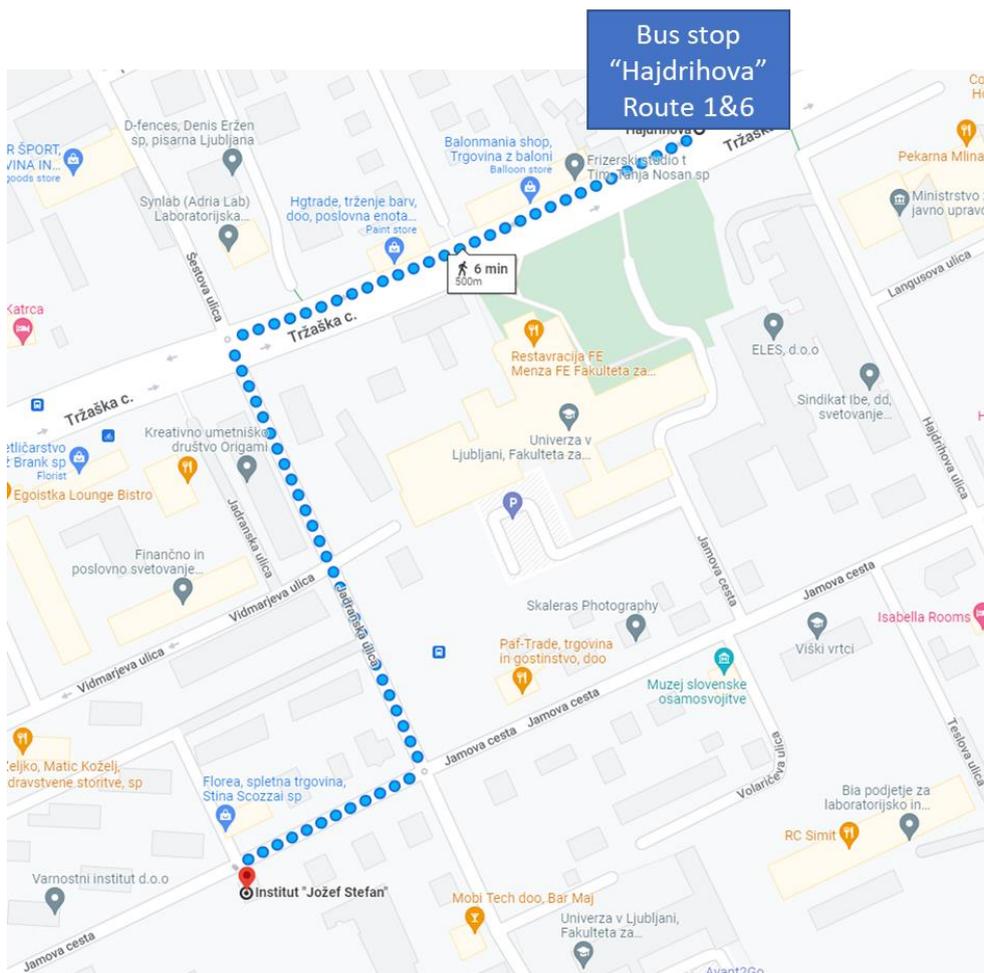


Figure 2: Path from the bus stop "Hajdrihova" to the main Institute entrance.

### The Conference Venue:

Jožef Stefan Institute – JSI

Address: Jamova cesta 39, Ljubljana

The meeting will take place in the Main building (2<sup>nd</sup> floor), Large lecture room (Figure 3)

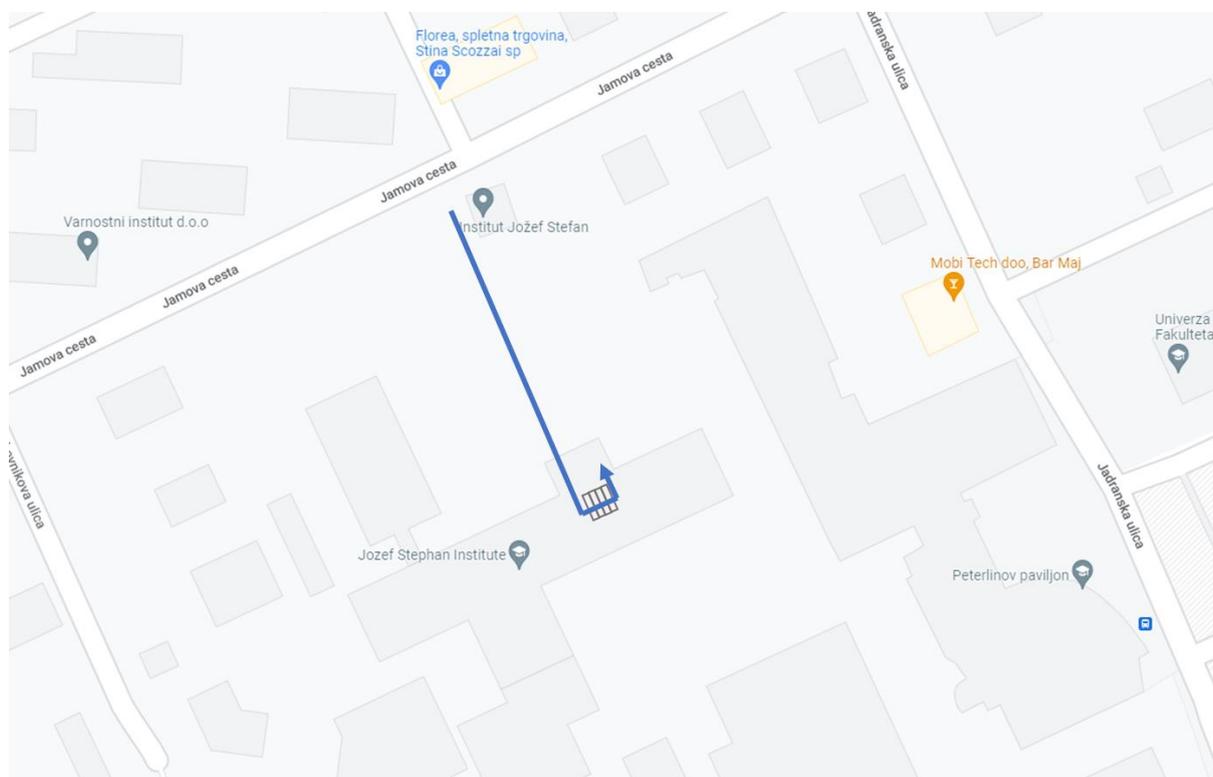


Figure 3: Path from the main Institute entrance to the Large lecture room.

### General information:

Time zone:	GMT + 1:00 hour
Weather in Ljubljana in April	Average 15°C (5°C in the morning), rain is common
Currency	EURO
Electricity supply	220 V, 50 Hz
Water	Tap water is drinkable throughout the country

### Meeting organization

Dr. Matjaž Leskovar  
Tel: +386 1 5885 271  
Email: [matjaz.leskovar@ijs.si](mailto:matjaz.leskovar@ijs.si)

IJS

[www.ijs.si](http://www.ijs.si)

Dr. Janez Kokalj  
Tel: +386 1 5885 348  
Email: [janez.kokalj@ijs.si](mailto:janez.kokalj@ijs.si)

Dr. Mateusz Malicki  
Paul Scherrer Institut  
Email: [mateusz.malicki@psi.ch](mailto:mateusz.malicki@psi.ch)

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