

Thematic topics wave 1

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Abstract

This document serves primarily as a record for the SESAR3 JU of the selection process of the Thematic Challenges. The Thematic Challenges will address research topics not currently (sufficiently) addressed by SESAR3 (and its predecessor programs like SESAR and SESAR2020), and will be supported by dedicated workshops. The call for thematic challenges was open on the Engage 3 website between July and October 2023, with proposals submitted via an on-line form. 21 proposals were received and were all subsequently evaluated by members of the Engage 2 Awards Board. Evaluation criteria including weights and thresholds are presented.

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¹ Representatives of all the beneficiaries involved in the project

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Engage 2

THE SESAR 3 KNOWLEDGE TRANSFER NETWORK

Engage 2

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1 Introduction

Engage 2 is the SESAR3 Knowledge Transfer Network (KTN). It is managed by a consortium of universities and industry partners, with the support of the SESAR3 Joint Undertaking, to promote and facilitate the development of air traffic management research in Europe. Its focus is two-fold: inspiring new researchers and helping to align exploratory and industrial research, through a wide range of activities and financial support actions. This document describes the process used by the KTN to select the thematic challenges central to the network and how these are being used to define its first set of workshops.

This document serves primarily as a record for the SESAR3 JU of the selection process of the Thematic Challenges. The Thematic Challenges will address research topics not currently (sufficiently) addressed by SESAR3 (and its predecessor programs like SESAR and SESAR2020), and will be supported by dedicated workshops. The call for thematic challenges was open on the Engage 2 website between July and October 2023, with proposals submitted via an on-line form. 21 proposals were received and were all subsequently evaluated by members of the Engage 2 Awards Board. Evaluation criteria including weights and thresholds are presented.

Four themes were identified which covered most of the submitted topics. The four selected themes are (order does not reflect any prioritization):

- (1) Climate impact analysis and mitigation for ATM-related non CO₂-emissions;
- (2) The passenger-centric digital airport;
- (3) Disruptive ATM system modernization;
- (4) The integration of new entrants.

The following chapters will describe the process that led to the collection and selection of these four Thematic Challenges.

2 Thematic Challenges and selection protocol

2.1 Purpose of the Engage 2 Thematic Challenges

At the core of the KTN are ‘thematic challenges’, for research topics not currently (sufficiently) addressed by SESAR3 or the predecessor programs (namely SESAR and SESAR2020, but also outside of SESAR), to be supported by dedicated workshops. These challenges may embrace two areas. Firstly, whereby problems and needs exist for operations and policy development, more aligned with applied research. Secondly, other thematic challenges may be more aligned with exploratory research. Over the duration of the KTN, domination of the former type will be supported, since the latter area will also be addressed by the PhDs/theses supported by the KTN.

To further promote cooperation between industry and academia, between ER and applied research, ‘catalyst’ funding will support focused projects, stimulating the transfer of exploratory research results towards ATM application-oriented research. This funding will be awarded to applicants to conduct and fast-track specific activities in support of developing solutions to the challenges and moving closer towards industry goals and objectives. In certain cases, catalyst funding may be awarded to develop more exploratory concepts, where these show particular promise and are not suitable to be addressed by a PhD or thesis. The launch for calls for catalyst funding and the precise relationship with the thematic challenges will be detailed in subsequent KTN reporting.

2.2 Thematic Challenge Call

The call for Thematic Challenges was open on the Engage 2 website between August and October 2023, with proposals submitted via an on-line form. Additionally, input via e-mail were also accepted.

Notifications of this opportunity were sent directly by Engage 2, the ASDA newsletter, various partner/SJU social media accounts and through a link distributed in the September edition of SESAR e-news.

Table 1 shows the requested information for each proposed Thematic Challenge.

Table 1 Required information per proposed Thematic Challenge

Form Field	Description
Your suggestion for a thematic challenge	500 words max, please describe the challenge itself including (if available) past approaches and why they may have failed supported by relevant literature
Your Name and Surname	Optional but recommended to get back to you in case of remaining open questions
Your Institution	Optional but recommended to get back to you in case of remaining open questions
Your Email address	Optional but recommended to get back to you in case of remaining open questions
I confirm that I have checked for duplication or undue overlap with current or previous SESAR research activities	Mark only one oval
We could host a workshop	Please note that indicating that you are unable to host a workshop will not affect the selection of the thematic challenge you propose Mark only one oval
Do you want to receive future update about Engage 2 activities?	Mark only one oval
After reading the information sheet above I hereby give my consent to the processing of my personal data needed for the application to the first call for Thematic Challenges, I understand that my personal data will be held and processed in confidence and in accordance with the principles laid out by GDPR	
I provide my consent to be contacted by the Engage 2 consortium in the next 4 years for matters related to project activities	
I provide my consent to be contacted by the Engage 2 consortium members for matters related to scientific research	

The following text had been published as explanatory introduction as well. A screenshot of the online forms is given in chapter 6.

Suggest a Thematic Challenge

This invitation is open until 31st of October, 2023.

Engage 2, the new Knowledge Transfer Network (KTN) of SESAR3, has launched its first call for Thematic Challenges. Engage 2 is the predecessor KTN of Engage which run from 2018 to 2022 within SESAR2020. The Thematic Challenges will help to identify important fields of interest in the ATM domain, which will support the call for PhDs and the call for Catalyst Project funding. Both will be launched by Engage 2 in the upcoming months. The Thematic Challenges might also have influence on upcoming Exploratory Calls, if they turn out to be of high relevance.

Defining the Thematic Challenges

Engage 2 through its different interactions will help to identify new ideas, not already included within the scope of an existing SESAR project, to bring changes in the ATM landscape. This call for Thematic Challenges, combining applied and exploratory research, will give the community the chance to participate in the identification of crucial challenges in ATM setting the stage for new topics in the future SESAR calls. The Thematic Challenges embrace both applied and exploratory research with a focus on current and future operational challenges. Thematic challenges will be defined based on the proposals received below in a collaborative effort of the partners of Engage 2 in consultation with the SESAR 3 JU. Each thematic challenge will have one or more dedicated thematic workshop(s). Furthermore, dedicated session(s) at the SESAR Innovation Days will also be organised (e.g. building on the best work from the workshops). Three to five thematic challenges will be running at any one time, and may be adapted and refined during the lifecycle of the KTN (e.g. some could be replaced by new ones). The first announcement of selected challenges will be made in autumn 2023, with workshops being organised from January 2024 onwards.

Thematic workshops supporting the challenges

Each thematic workshop will last one day, organised by the consortium members with those proposing the corresponding thematic challenge and, potentially, with (other) KTN industry partners and external/interdisciplinary experts. The workshops are fully open to anyone interested in the thematic challenge, particularly welcoming delegates and students from outside the consortium, and will be free of charge to attend. The workshops will have a strong emphasis on discussion regarding the maturing of the challenges, with facilitated discussion, rather than simply packing in a series of presentations. If you would like to host a workshop associated with your proposed thematic challenge, please indicate this below. Attendance is expected to be around 30 participants, with some budget available from the network for catering and external/interdisciplinary experts and speakers. No budget is available for room hire or equipment. Please note that indicating that you are unable to host a workshop will not affect the selection of the thematic challenge you propose. If you are unable to host a workshop, or prefer not to, a consortium member will gladly host it for you. We will also write up and disseminate a public report afterwards.

Please submit your proposal of a Thematic Challenge through this [GoogleDoc](#) or with an email to t.feuerle@tu-braunschweig.de (please include “Engage 2 – Thematic Challenge” in your topic line of the email). The description of the Challenge should be done with 500 words max. Please describe the

challenge itself including (if available) past approaches and why they may have failed supported by relevant literature.

2.3 Responses to Thematic Challenge Call

In total, 21 proposals from 16 different organisations have been received. The organisations are covering the following areas:

- Industry;
- Research institutions;
- Universities;
- Consultancies.

The majority of the participants are available to hold a workshop.

2.4 Selection criteria

All 21 proposals were subsequently evaluated by members of the Engage Awards Board – note that in accordance with the Grant Agreement [1], members with potential conflicts of interest abstained from the decision-making process. Evaluation criteria including weights and thresholds are depicted in Table 2. The feedback from the Award Board members formed the input to an online Award Board Meeting, where the results have been discussed and assessed collaboratively. In the Award Board meeting 14 members of the Board did participate.

Table 2: Selection criteria

Criteria	Threshold	Weight	Comments
Operational relevance	3/5	40%	-
Focus of challenge	3/5	30%	Is the challenge sufficiently focused/clear so we can hope to take it forward/solve it? Is the challenge likely to generate sufficient interest for a workshop and dedicated SIDs session?
Likelihood solving the challenge	3/5	30%	Likelihood that the challenge can be solved and supported by the network and/or proposer (Are there bottlenecks preventing the scientific community from approaching the challenge (e.g. availability of data))?

3 Final Selection

As expected, there were several links between the 20 different proposals (one was submitted two times); we attempted to identify these links so as to group the challenges into ‘themes’. With 14 evaluators providing feedback on 20 proposals, it was not obvious that this would readily fall into place, although it eventually did so. An initial description of the content and the research questions of the Thematic Challenges have been discussed already during the Award Board meeting. A fine tuning took place offline with an additional feedback round by e-mail.

The four selected themes are:

- Climate impact analysis and mitigation for ATM-related non CO2-emissions
- The passenger-centric digital airport
- Disruptive ATM system modernization
- The integration of new entrants

The following chapters gives some insight on the topics and research questions that are expected to be answered.

Climate impact analysis and mitigation for ATM-related non CO2-emissions

Topics should address climate friendly trajectories and flow management (like Continuous Descent Operations (CDO), formation flying, etc.).

Focus on

- contrails and other non CO2-emissions
- Observation, data collection, modelling
- Harmonizing metrics and assessment methods
- Determining uncertainty for aviation non-CO2 impacts
- Incentivise greener ATM and model multimodal solution impacts
- Business Models/Policy/Regulation

Remark: Impact of air-rail connection on climate impact can also be addressed, but we have to keep recent joint call of S3JU and EURail in mind, where already some of these multimodal impacts are addressed.

The passenger-centric digital airport

Topics should address the data-driven airport, modelling passenger flows/movements at airports and virtual queueing.

Focus on:

- Multimodality: connectivity of passenger air-rail or other modes of transportation
- Smart DSTs based on data, digitalization and automation (airside and landside)
- Virtual queueing should include operational considerations and business constraints
- Integration of strategic and tactical planning (airport but also ATM)
- Human-systems integration in the era of AI

Remark: This topic can, if the applicants are creative enough, also address the understanding and prevention of ramp/airside incidents.

Disruptive ATM system modernization

Topics should address a rethinking of ATM architecture without worrying about evolution/change management/transition. Proposals can include everything: ATM paradigm, services, new entrants, airspace management, flow management, AIM and vertiports.

Some ideas/hints, which could be covered:

- “As a service” architecture (simulation as a service, ATM as a service)
- Business Models/Policy/Regulation
- Quantum Computing as part of the digital ATM system
- Data sensitivity
- Human-systems integration in the era of AI
- (Cyber-)Security

The integration of new entrants

The topic should address airspace classes and flight planning, de-confliction as well as business models, incentivizing or regulatory aspects.

Focus could be on

- UFR mission description
- New aircraft types and propulsion systems
- Intermodal modes of transportation (for passengers as well as for cargo)
- Business Models/Policy/Regulation
- Integration of vertiports or other means of passenger/cargo loading places in the overall traffic system

Remark: Within this Thematic Challenge we are asking for topics/ideas, which are not covered so far (difficult task!). For example, a holistic business model for IAM could be developed. Due to the nature of a very dynamic environment, there might be additional ideas out that will create new insights to the overall topic.

4 References

- [1] Grant Agreement Project 101114648 “Engage 2”, Brussels, 2023

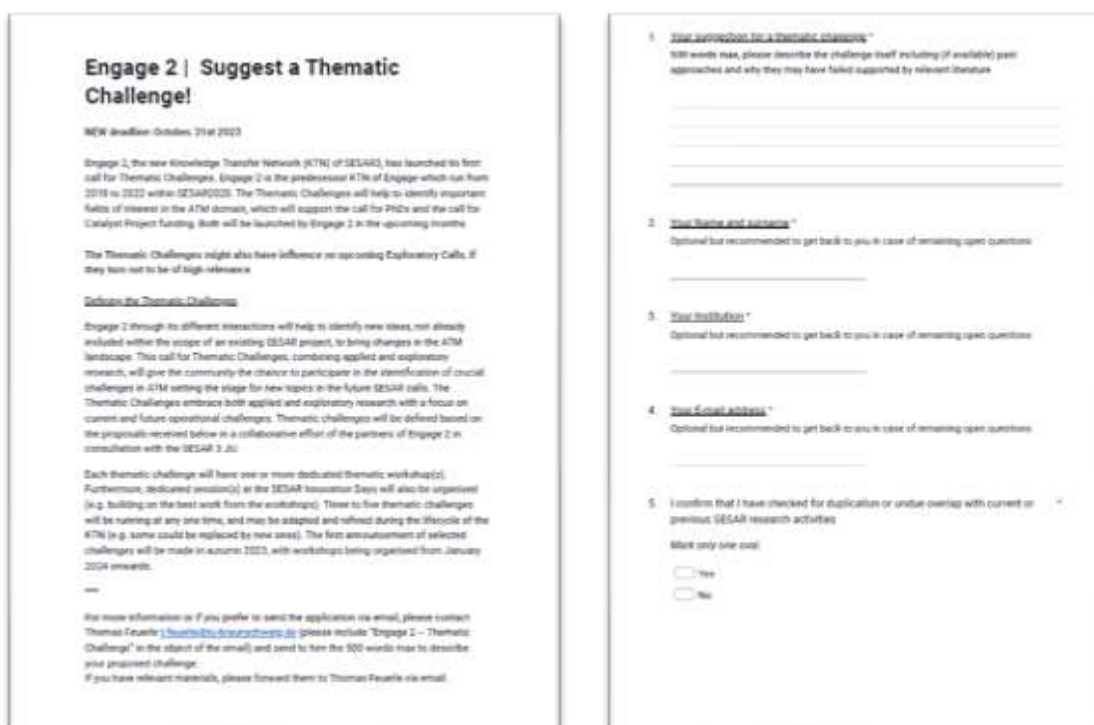
5 List of acronyms

Table 3: list of acronyms

Acronym	Description
AI	Artificial Intelligence
ATM	Air Traffic Management
IAM	Innovative Air Mobility
UAM	Urban Air Mobility
UFR	U-space Flight Rules

6 Appendix 1– Online Google Form of the Call for Thematic Challenges

The following screenshots give an impression of the Google Form as it was presented online during the call for Thematic Challenges was open.



Engage 2 | Suggest a Thematic Challenge!

NEW deadline: October 31st 2023

Engage 2, the new Knowledge Transfer Network (KTN) of SESAR, has launched its first call for Thematic Challenges. Engage 2 is the predecessor KTN of Engage which ran from 2018 to 2022 within SESAR0020. The Thematic Challenges will help to identify important fields of interest in the ATM domain, which will support the call for PhDs and the call for Catalyst Project funding. Both will be launched by Engage 2 in the upcoming months.

The Thematic Challenges might also have influence on upcoming Exploratory Calls, if they turn out to be of high relevance.

Define the Thematic Challenges

Engage 2 through its different interactions will help to identify new ideas, not already included within the scope of an existing SESAR project, to bring changes in the ATM landscape. This call for Thematic Challenges, combining applied and exploratory research, will give the community the chance to participate in the identification of crucial challenges in ATM setting the stage for new topics in the future SESAR calls. The Thematic Challenges embrace both applied and exploratory research with a focus on current and future operational challenges. Thematic challenges will be defined based on the proposals received below in a collaborative effort of the partners of Engage 2 in consultation with the SESAR 3 JU.

Each thematic challenge will have one or more dedicated thematic workshop(s). Furthermore, dedicated session(s) at the SESAR Innovation Days will also be organised (e.g. building on the best work from the workshop(s)). Three to five thematic challenges will be running at any one time, and may be adapted and refined during the lifecycle of the KTN (e.g. some could be replaced by new ones). The first announcement of selected challenges will be made in autumn 2023, with workshops being organised from January 2024 onwards.

For more information or if you prefer to send the application via email, please contact Thomas Feuerle: thomas.feuerle@sesar.eu (please include "Engage 2 - Thematic Challenge" in the subject of the email) and send to him the 500 words max to describe your proposed challenge. If you have relevant materials, please forward them to Thomas Feuerle via email.

1. **200 words max, please describe the challenge itself including (if available) past approaches and why they may have failed/supported by relevant literature**

2. **Your Name and surname ***
Optional but recommended to get back to you in case of remaining open questions

3. **Your Institution ***
Optional but recommended to get back to you in case of remaining open questions

4. **Your Email address ***
Optional but recommended to get back to you in case of remaining open questions

5. **I confirm that I have checked for duplication or undue overlap with current or previous SESAR research activities**

Mark only one oval

Yes

No

6. We could host a workshop *

Please note that indicating that you are unable to host a workshop will not affect the selection of the thematic challenge you propose

Mark only one oval

Yes

No

7. Do you want to receive future update about Engage 2 activities? *

Mark only one oval

Yes

No

Step in question 8

Privacy sheet

Engage 2 is a collaborative project involving Deep Blue Srl, University of Westminster, Technische Universität Braunschweig, Universität U Belgrad, Fundacion Instituto de Investigacion Innova, Frequentis, East Technology Innovation Services, Eumcontrol, and Università degli Studi di Trieste.

The project has received funding from the SESAR Joint Undertaking under the European Union's Horizon Europe research and innovation programme under grant agreement No 101114648.

Participants' personal data (first name, last name, organization name, country, email address) will only be used by Engage 2 for the purposes of the project. Only in case specific permission is given, they may also be used to invite the participants to take part in future research activities and commercial initiatives. Personal data will be collected, processed and protected according to the General Data Protection Regulation (GDPR) (EU) 2016/679. Participants will have the right to request access to and rectification or erasure of personal data or restriction of processing concerning the data or to object to processing as well as the right to data portability just sending an email to the responsible of data treatment listed hereafter. They will also have the right to lodge a complaint with a supervisory authority.

RESPONSIBLE FOR DATA TREATMENT IN ACCORDANCE TO THE GDPR (CONTROLLER)
Deep Blue S.r.l., Via Daniele Manin, 22 - 00185 Roma RM (Italy)

CONTROLLER'S REPRESENTATIVE IN THE SPECIFIC PROJECT
Micol Bisconti - Project Coordinator

8. After reading the information sheet above *

Check all that apply

I hereby give my consent to the processing of my personal data needed for the application to the Awards Board to the first call for Thematic Challenges

I understand that my personal data will be held and processed in confidence and in accordance with the principles laid out by GDPR

9. I provide my consent to be contacted by the Engage 2 consortium in the next 4 * years for matters related to project activities

Mark only one oval

Yes

No

10. I provide my consent to be contacted by the Engage 2 consortium members for * matters related to scientific research

Mark only one oval

Yes

No

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