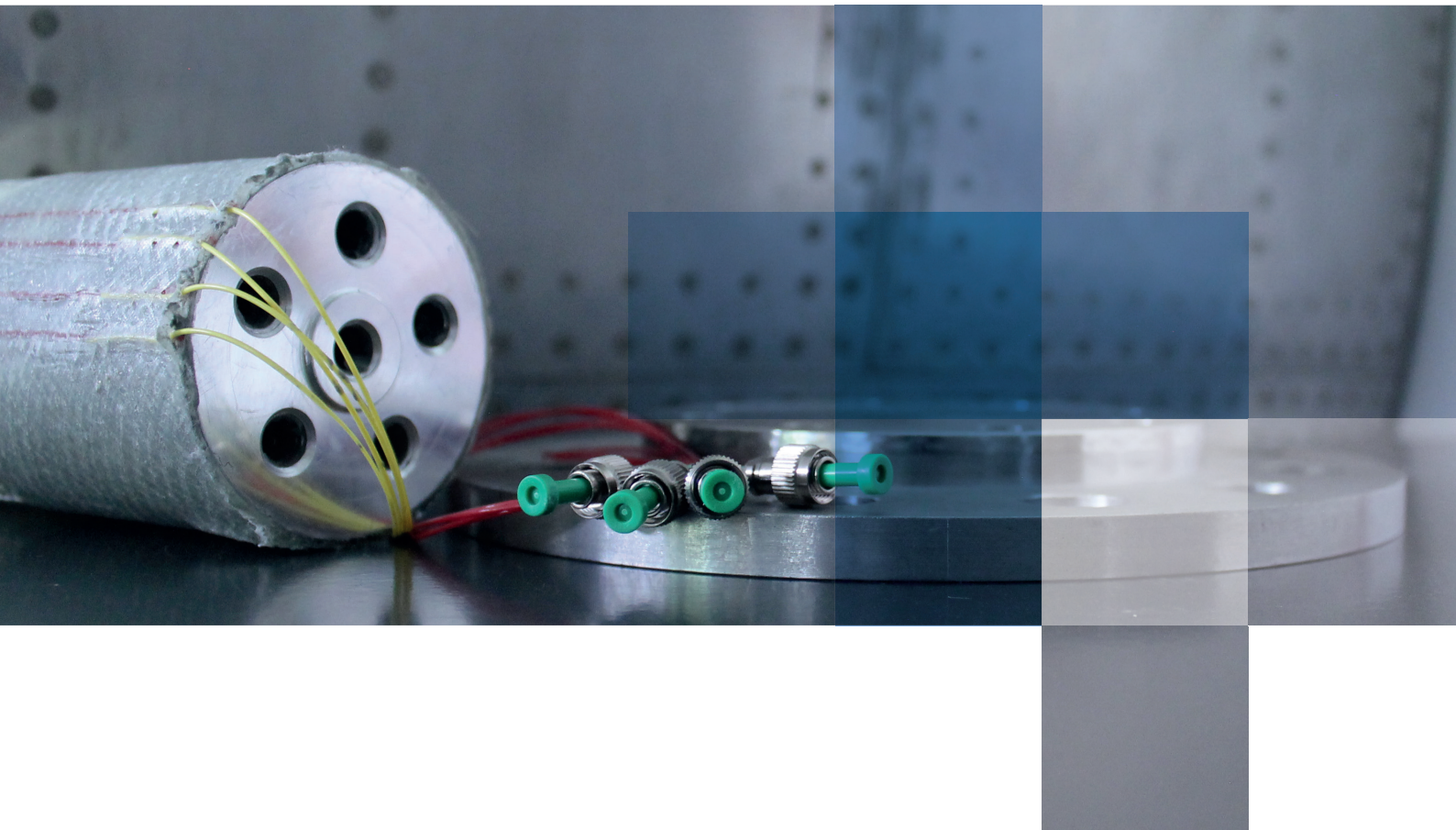




**SMART  
SENSING  
SYSTEMS**



Consortium Project

# Artificial Intelligence for Smart Sensing Systems

# Artificial Intelligence for Smart Sensing Systems

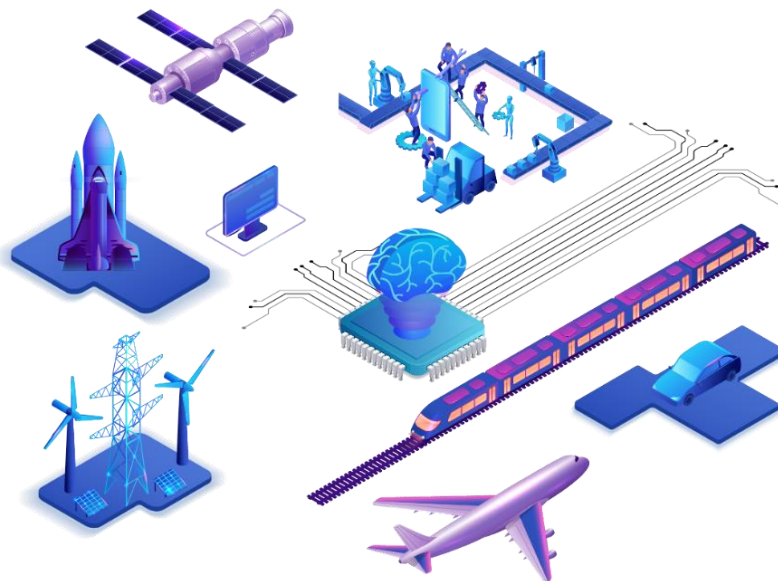
In the course of digitalization in the context of Industry 4.0, a new class of technical systems is needed: "Smart Sensing Systems" (S3) - consisting of "sensing" components. In fact, in an effort to exploit the full potential of automated measurement methods, other smart functionalities and services that are created by way of sensor integration are holistically observed. Such complex systems can only be realized with simulation models (Digital Twins) and progressively with the use of Artificial Intelligence (AI). AI enables "smart sensing systems" to learn independently and to act autonomously.

## Why AI?

- Processing of enormous amounts of data
- Modelling of complex physics
- Technology is ready to use
- Combining different effects with dissimilar physics.

## Why is AI not yet more widespread?

- Unknown Black Box
  - Which method is suitable?
  - Is the effort worthwhile?
- Various training data is required
- Suitable interfaces to previous models are unclear
- Reservations and lack of trust



# Project content and process



## Phase 1: AI from S3 perspective

- Which methods are suitable in the context of SHM and Digital Twin?
- Where are strengths and weaknesses of each method?
- What are the optimal areas of application?
- What are the general requirements?

## Phase 2: Definition of suitable interfaces

- Integration of AI in the context of hybrid structural monitoring
- Integration of AI into a Digital Twin

## Phase 3: Definition of the integration process

- Creation of example processes for the integration of AI for Smart Sensing Systems

## Results and benefits for the partners

- The AI Matrix
  - Overview of suitable methods with example use cases, advantages and disadvantages
- Definition of suitable interfaces and your requirements for integrating common AI methods into digital twins and their structural models
- Process flow of AI integration based on example processes
- AI workshop at the final meeting
- Right of codecision with regard to relevant use cases

## Project Summary



**Kick-Off Meeting:** Q1 2022 in Aachen

**Duration:** 8 Months



**Challenges:**

- AI as an unknown black box
- Missing interfaces



**Project Goals:**

- AI study from S3 perspective
- Consideration of possible interface
- Example process for AI integration



**Benefit for the partners:**

- AI matrix, interface and sample process
- AI-Workshop
- Codecision with regard to relevant use cases

Participation fee per partner:  
**6500\* €**

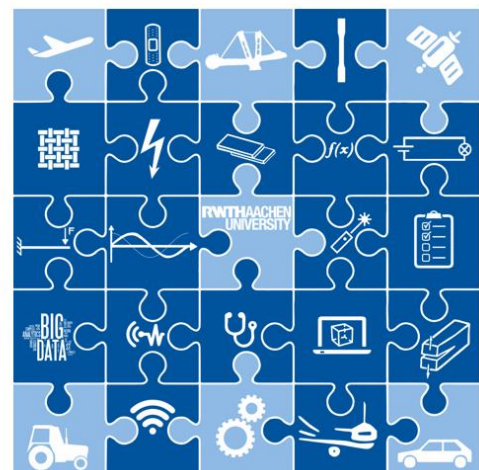
Center members receive discount

\* (excluding the travel costs)



## Why to be a partner by Consortium projects of Center Smart Sensing Systems?

Our action	Your benefit
<ul style="list-style-type: none"> <li>▪ Providing innovative and short-term projects in the field of Smart Sensing Systems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cooperation in the formation of the consortium projects based on the need of your company</li> </ul>
<ul style="list-style-type: none"> <li>▪ Considering the focal points of the joint partners in the projects</li> </ul>	<ul style="list-style-type: none"> <li>▪ The multifaceted impact on partners occurring during a collaborative effort</li> </ul>
<ul style="list-style-type: none"> <li>▪ Organising and implementing the projects by the Center Smart Sensing Systems experts</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cost sharing of the projects</li> </ul>
<ul style="list-style-type: none"> <li>▪ Providing review process at different phases of the project</li> </ul>	



## Contacts



**Dr.-Ing. Andreas Janetzko-Preisler**  
Institute of Structural Mechanics and  
Lightweight Design  
Email: [andreas.preisler@sla.rwth-aachen.de](mailto:andreas.preisler@sla.rwth-aachen.de)  
Phone: +49 241 80 98632  
[Website](#)



**Dr.-Ing. Zamaan Sadeghi**  
Directing Manager Smart Sensing Systems  
Email: [zamaan.sadeghi@sla.rwth-aachen.de](mailto:zamaan.sadeghi@sla.rwth-aachen.de)  
Phone: +49 241 80 96837  
[Website](#)

**Center Smart Sensing Systems**

c/o Institute of Structural Mechanics and Lightweight Design

RWTH Aachen University

Wüllnerstraße 7 52062 Aachen

Phone +49 241 80-96837

E-mail [zamaan.sadeghi@sla.rwth-aachen.de](mailto:zamaan.sadeghi@sla.rwth-aachen.de)

[www.rwth-campus.com/cs3](http://www.rwth-campus.com/cs3)