

# Avancerad och innovativ digitalisering

## PLENUM

Plenary multi-user development arena  
for future industrial workspaces

Start 2022 September 15

End 2025 September 14



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UNIVERSITY  
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RI  
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Research  
Institutes  
of Sweden



SCANIA

CEVT

FRAUNHOFER CHALMERS  
RESEARCH CENTRE FOR INDUSTRIAL MATHEMATICS

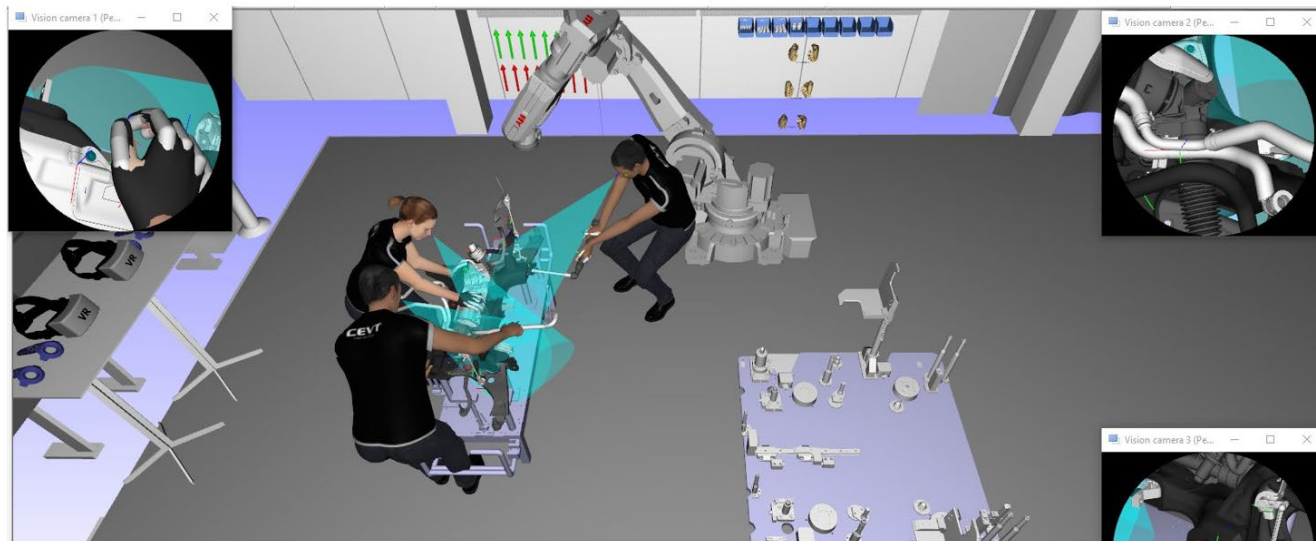


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Sveriges innovationsmyndighet

# Agenda

- Industrial Challenge & Scope
- Partners
- Research Approach
- Expected Results
- Examples
- Next Steps
- Contact Information



## Industrial Challenge

Development of factories and workplaces needs to be done **collaboratively with several stakeholders**

- Operators
- Logistic personnel
- Managers
- Maintenance engineers
- etc.

Involved to create **sustainable:**

- Environment
- Work life
- Economy

## Project Scope

The PLENUM will develop a multiuser **digital twin solution** to address the industry need for model- and simulation driven development, assessment, and optimization of production systems. Core drivers are:

- *Workplace design optimization*
- *Biomechanical, cognitive and social ergonomics*
- *Scalable multi-user XR environments for training*
- *Increased multi-aspect sustainability*



# Partners and their interest



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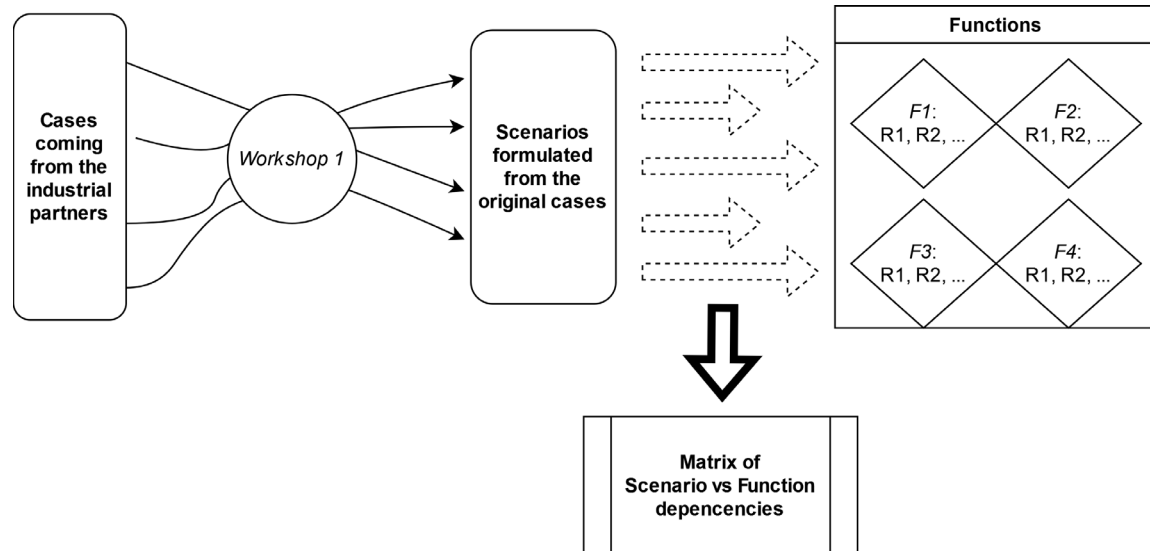
- **SCANIA**, take steps to implement solutions developed for commercial software, identify and test optimization in these software.
- **CEVT**, method (use multi-user software) development and testing in real factories
- **RISE**, develop support and methods for remote collaborative environments with digital twins and XR
- **AB Volvo**, take steps to implement solutions developed for commercial software, identify and test optimization and benchmarking.
- **Volvo Cars**, evaluating and implementing new XR capabilities that drives towards better decision-making in early engineering phases, preparing sustainable industrial workplaces.
- **University of Skövde**, manikin development and implementation (E.g., Haptics, ergonomic assessment), XR collaboration
- **FCC**, industrialization, launch new features in IPS demonstrators
- **Chalmers University of Technology**, project lead and research on XR, pointcluds, multiuser development and methodology for industrialization of solutions



# Research Approach

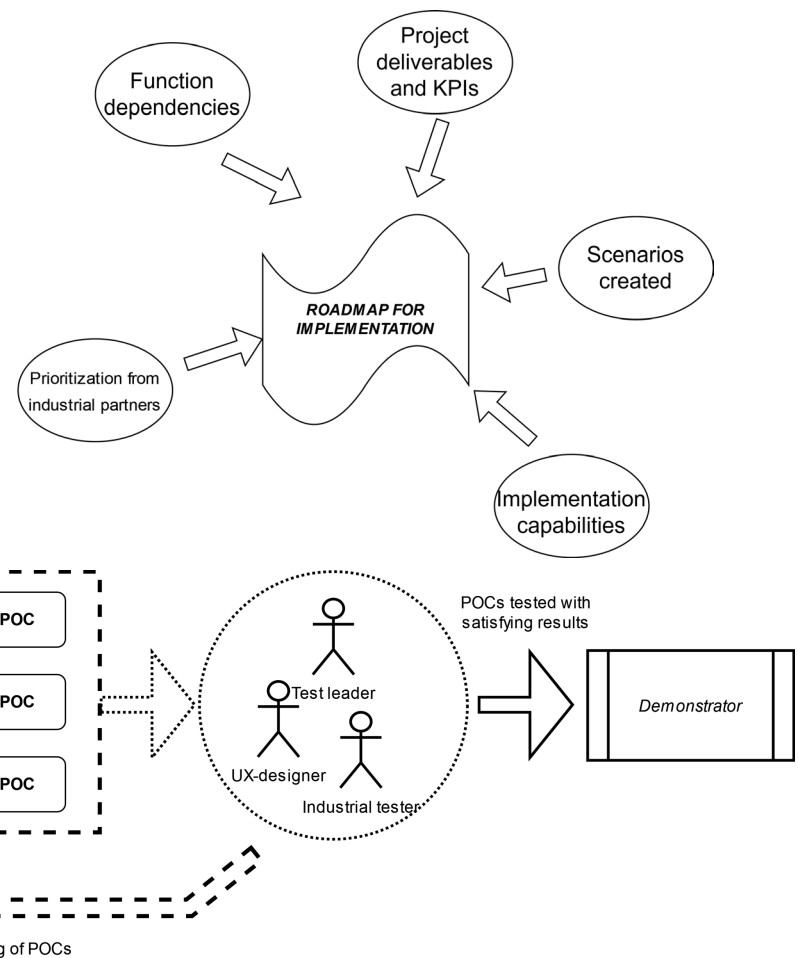
Using an agile research and development methodology – based on the needs of the industrial stakeholders:

- Current state of industrial requirements (Workshops)
- Demonstrate future state functions
- Function dependencies and implementation capabilities



# Research Approach

- Industrial partners prioritize functions to be implemented (voting)
- Creating roadmap for implementation
- Begin prototyping and creating POCs
- Test and iterate
- Create demonstrators
- Validate

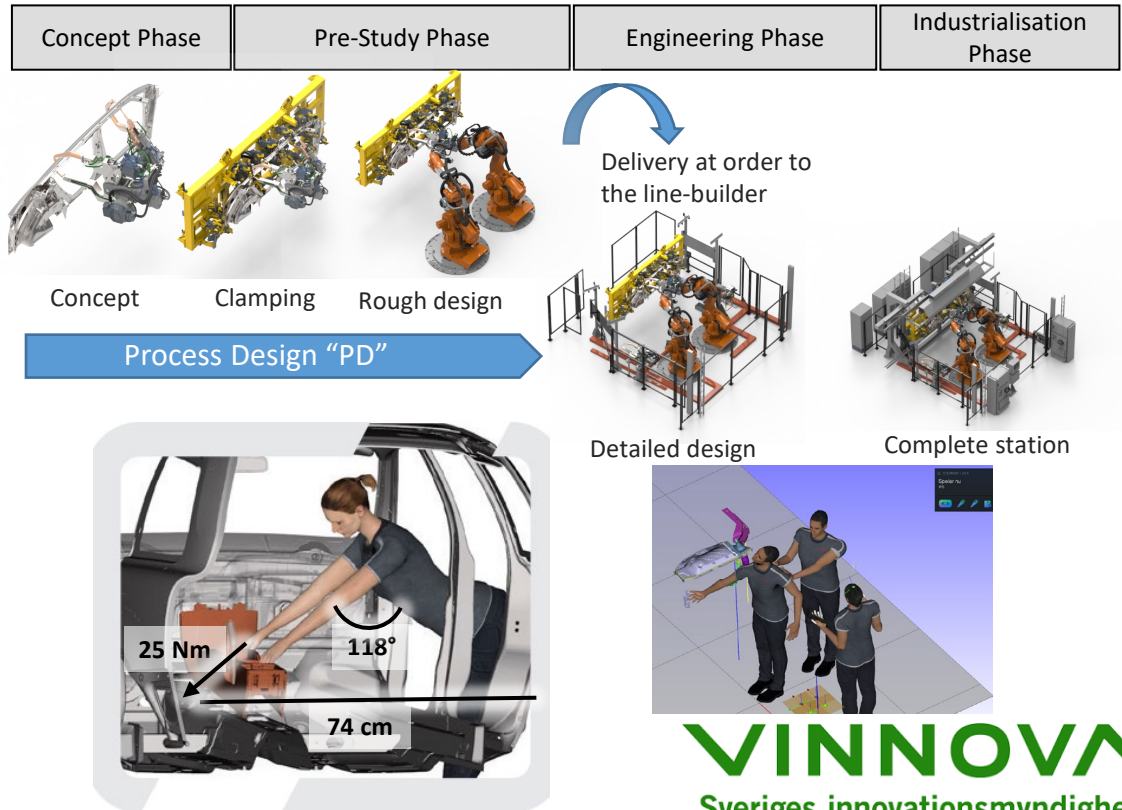


# Expected Results

- Five Demonstrators
- Six Publications
- Four External Workshops
- One Multiuser VR Software
- Reduce Travel
- Upskill Workforce
- Decrease Cost

# Volvo Cars example: Multi user Reviewing factory designs and operator ergonomics

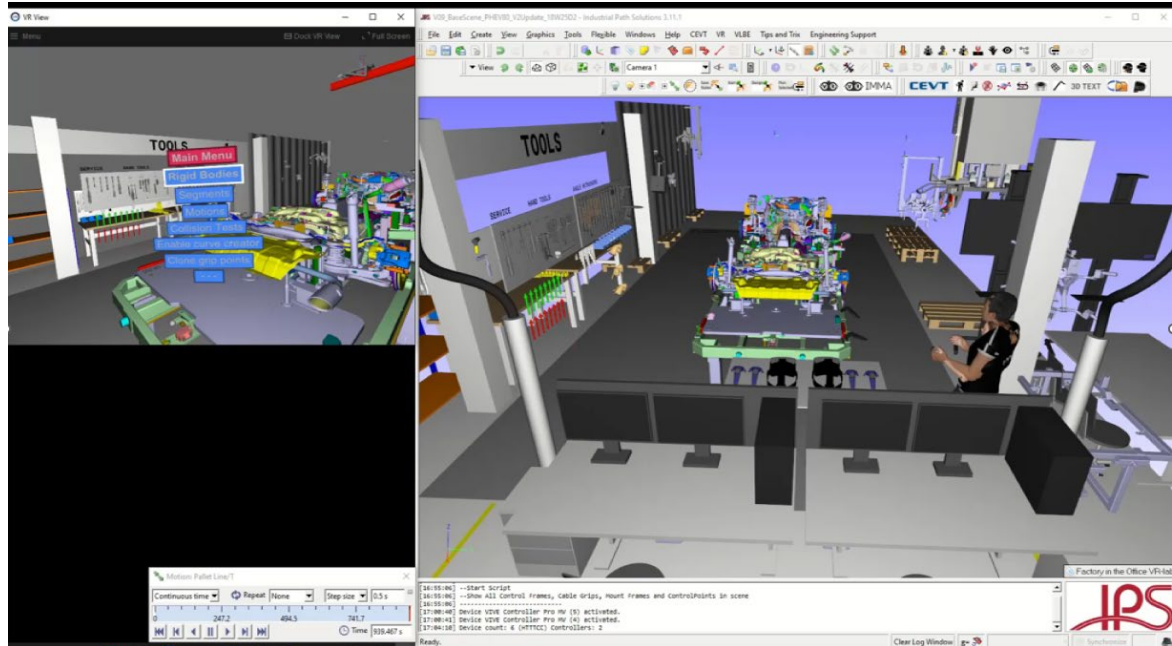
- New Capabilities
- Design Review Meetings
- Insights for assessments





# CEVT Example: Multi user Virtual build

- New Capabilities
- Design Review Meetings
- Insights for assessments



# Next steps

Development proof of concepts. → A new multi-user IPS demonstrator is planned to be released in the end of September 2023.

- Client-Server solution
- First version contains:
  - Multiple users
  - Possibility to manipulate objects
- Implementation of functions:
  - Basic annotations (ex: labels/notes)
  - Changing properties of objects (ex: transparency and color)
  - Add/remove measurements between object in the scene

# Thank you!

- **For all excellent work:**
  - Industrially driven from partner needs
  - Timely developments on digitalization
  - Method and software development
  - Several very good demonstrators upcoming
- **Good dissemination:**
  - Good impact for companies, industrial multiuser development (inclusive)
  - A lot of visibility in media e.g:  
<https://sverigesradio.se/artikel/3d-ska-fa-industrin-att-vaxa-nar-framtidens-motesrum-skapas?fbclid=iwar1g1vryiiap-ybtwnkngmyxnvghys4tkkxs0ll11wnjryx-awjq3uppq5q>
  - Many excellent publications in the pipeline
  - International collaboration with Oulu/VTT

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