Sensor informatics and Decision-making for the DIgital Transformation (SEDDIT)

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A Vinnova Competence Center

Workshop 2025

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SEDDIT

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Program

9.30 – 9.45 Coffee

9.45 - 10.00 Welcome & Introduction

10.00 – 10.45 Heidi Kuusniemi, Tampere University, *Resilient PNT (positioning, navigation, and timing) : emerging challenges and future directions*

10.45 – 11.15 PhD student project course

11.15 – 11.45 Project overview and poster teaser

11.45 – 13.45 Lunch and poster session

13.45 – 14.30 Frank Willems, TU Eindhoven, *Risk-aware auto-calibration strategies for accelerating the transition towards green transport*

14.30 – 15.00 Coffee

15.00 – 15.20 Gustaf Hendeby, Linköping University, *Some initial experiences of quantum sensors*

15.20 – 16.00 About the upcoming 2-year follow up

16.00 – 16.15 Sum up and closing

16.30 – 17.30 Board meeting

19.00 Dinner at Smak & Tak

Introduction

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Background

- SEDDIT is a Competence center funded by Vinnova
- SEDDIT started 1 Jan 2024, with funding for five years and with chances for extension.
- SEDDIT is part of the Vinnova program Advanced Digitalisation
- Purposes of a competence center:
  - Carry out research of high academic quality and importance for the industrial partners
  - Contribute to networking and exchange of knowledge between the partners
  - Support innovation and competitiveness of the industrial partners.





Center partners

Linköping University
Uppsala University
Saab Aeronautics
Saab Dynamics
Scania
Volvo Cars
Atlas Copco Industrial Technique
Väderstad
Actia Nordic
SafeLine
UMS Skeldar
Sensorbee





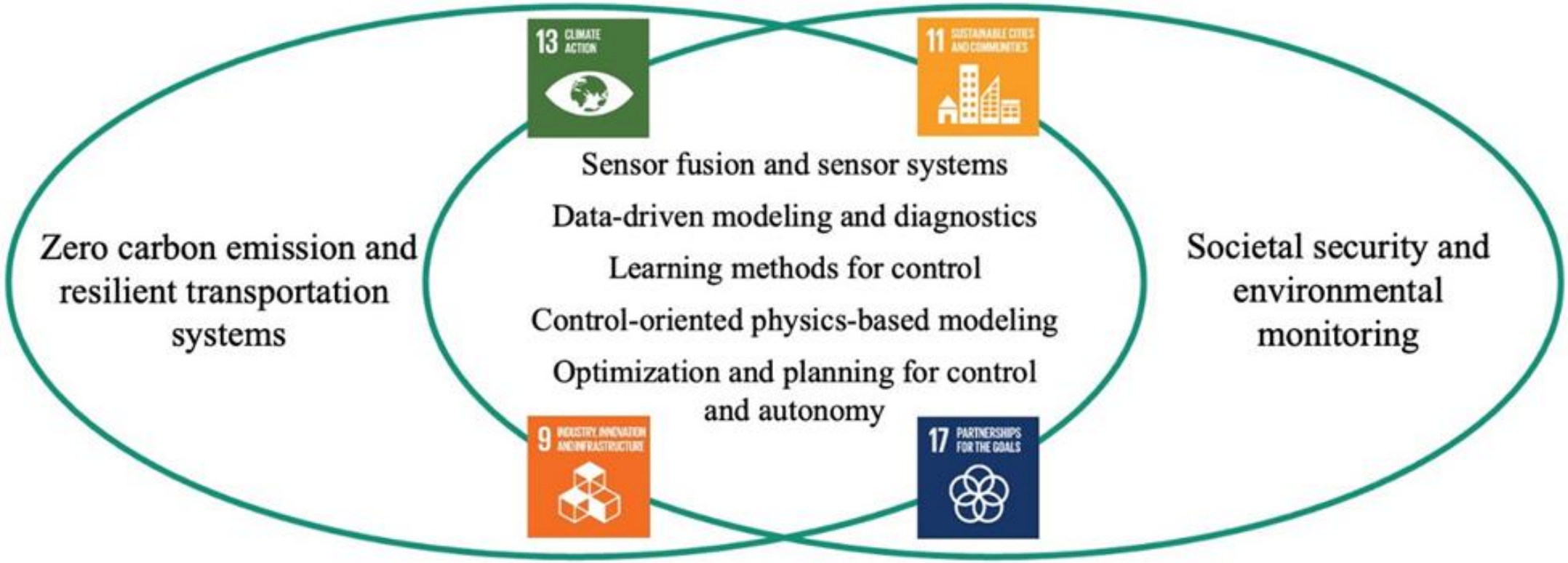
Core competences

- Sensor fusion and sensor systems
- Data-driven modeling and diagnostics
- Learning methods for control
- Control-oriented physics-based modeling
- Optimization and planning for control and autonomy

Focus areas

- Zero carbon emission and resilient transportation systems
- Societal security and environmental monitoring

Focus areas and core competences in a sustainability perspective



Keywords

- **People** – PhDs and MScs with the required knowledge and skills for the field.
- **Processes** – Tools and methods for an improved and more efficient product development process.
- **Products** – E.g. algorithms for improved performance of the product of the company.

Update

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Since last workshop

- Three new PhD students (Emanuel, Abbas, Nils A) + one affiliated PhD student (Amir)
- One new postdoc (Rasoul)
- Four (+one) student summer projects
- PhD student project course
- Project day in May
- Sustainability plan developed
- Journal and conference publications
- Several international visitors
- PhD student seminars
- ……

Project overview

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Connections between activities, core competences, and focus areas

Question: How important are the core competences in the projects? Illustrate via number and color.

Projekt	Sensor fusion and sensor systems	Data-driven modeling and diagnostics	Learning methods for control	Control-oriented physics-based modeling	Optimization and planning for control and autonomy
Estimation and ...	5	1	1	1	5
Robust decision-making ...	5	1	1	2	5
Collaborative localization ...	5	1	1	1	1
Autonomous farming ...	2	5	3	1	2
Safe motion-handling ...	1	3	4	1	5
Foundation model ...	3	3	5	1	4
Collaborative decision ...	2	1	1	1	5
Robust large-scale est. ...	5	1	1	1	3
Optimal control of ...	4	3	1	5	4
Optimizing vehicle data ...	5	3	1	3	3
Humans senses mimicking ..	2	5	1	2	1
Thermotronic digital twins ...	3	3	1	5	3
Reinforcement learning ...	3	2	5	2	1

Observations:

- Several core competences are important in almost all projects.
- Potential for collaborations within the core competences.

Connections between activities, core competences, and focus areas

Question: In which focus area does the project belong? Illustrate with number and color.

Projekt	Zero carbon emission and resilient transportation systems	Societal security and environmental monitoring
Estimation and …	2	3
Robust decision-making …	1	4
Collaborative localization …	2	3
Autonomous farming …	2	3
Safe motion-handling …	3	2
Foundation Models and Reinforce	2	3
Collaborative decision …	4	1
Robust large-scale est. …	2	3
Optimal control of …	2	3
Optimizing vehicle data …	2	3
Humans senses mimicking ..	4	1
Thermotronic digital twins …	4	1
Reinforcement learning …	1	4

Observations:

- Some project have a natural belonging.
- Several projects are relevant in both focus areas.

Poster teaser

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Poster teaser (I)

PhD student projects:

- Erik Sevonius. *Collaborative Localization in GNSS Denied Environments*
- Viktor Uvesten. *Autonomous farming: Estimation and control*
- Nils Dressler. *Friction Mapping for Clamp Force Estimation*
- Carl Steen. *Modeling, control, and optimization of thermotronic systems*
- Filip Lindström. *Human Senses Mimicking: Mechanical Integrity Self-Assessment*
- Xiaojing He, *Optimizing Vehicle Data Transmission for Accurate Regional Temperature Mapping*

Poster teaser (II)

PhD student projects:

- Emanuel Herberthson. *Safe motion-planning with learning in the loop*
- Abbas Pasdar. *Foundation Model and Reinforcement Learning*
- Nils Axelsson. *Reinforcement learning for multi-agent systems under semantic and perceptual uncertainties*
- Amir Hosseini. *Human senses mimicking: Self-evaluating vehicles with focus on vibro-acoustics*

Postdoc project:

- Rasoul Atashipour. *Research in Structural Dynamics & Mechanics—from fundamental to applied industrial research*

Poster teaser (III)

Student summer projects:

- Matej Brtan & Zuzheng He (Actia). *BLE Channel Sounding Ranging*
- William Olsson & Ture Valtonen (Sensorbee). *Kalman Filtering for Baseline Calibration*
- Oscar Fischerström & Isaac Svensson (UMS Skeldar). *Velocity estimation from IMU and camera*
- Theodor Svensgård & Hemming Gong (Väderstad). *Improving a Simulator with Computer Vision*
- Emil Wallbom (Atlas Copco). *Clamp Force Estimation with EKFs*

About the 2-year follow-up

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2-year follow-up

Components:

- Documents to be sent in (deadline March 1):
  - Original application for the center
  - Annual report for 2024 and 2025
  - Self-evaluation
    - Context
    - Long-term goals and strategies
    - Management and organization
    - Research area and competence profile
    - Collaboration and industrial involvement and interaction
    - Communication strategy
    - Experiences and achievements so far

2-year follow-up

- Questionnaire to all partners
- Virtual on-site visit (13-29 April 2026)
  - Follow-up team, representatives from Vinnova and external evaluators (generalists)
  - Centre mgt
  - Chairperson of the board
  - Representatives of partners
  - Researchers (junior and senior)
  - Doctoral students

Dinner tonight

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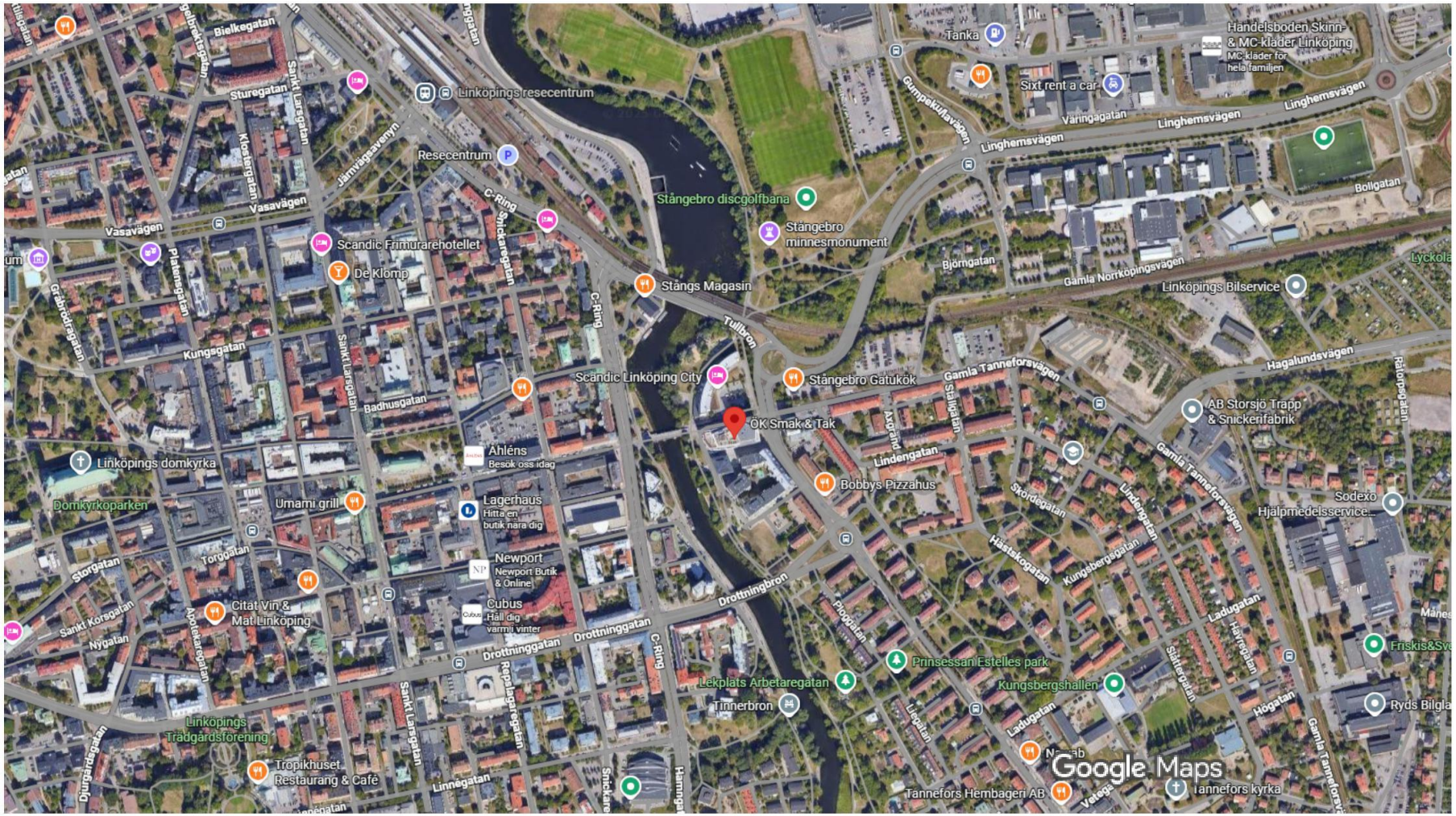
Dinner – Smak&Tak, Brandmannagatan 1



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Study visit to Actia and Sensorbee

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Study trip to Actia and Sensorbee

- Departure from Scandic City 8.30
- Departure from Linköping University, Zenit, 8.45
- Actia
- Sensorbee
- Back at Universitetsklubben around 12.00

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Med finansiering från:

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