

# Välkommen till

# A

## Bredd och Impact

# Agenda spår A - del 2

13.00

- Inledning Fredrik och Staffan
- 5G Edge Innovations for Mining, Karl Andersson
- End-to-end AI för kvalitetssäkring, Pasqualina Potena
- 5D5GE Utvecklarmemenskap, Tor Björn Minde
- Continuous Digitalization, Malin Rosqvist och Hanna Svantesson
- A digital twin Framework (D-RODS), Tiberiu Seceleanu
- Testbed Air Mobility, Johan Sehlstedt
- NexSos, nätverksstött utbyte av kritisk information, Ulrika Engström och Mattias Wildeman
- ADAPT - Advanced Digital Skills Policy Labs, Mattias Wiggberg
- Summering

15:00

Menti: 1688 4975

Projekt

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5G Edge Innovations for Mining, Karl  
Andersson



Funded by the  
European Union

NextGenerationEU

# 5G EDGE INNOVATIONS FOR MINING

LULEÅ  
TEKNISKA  
UNIVERSITET

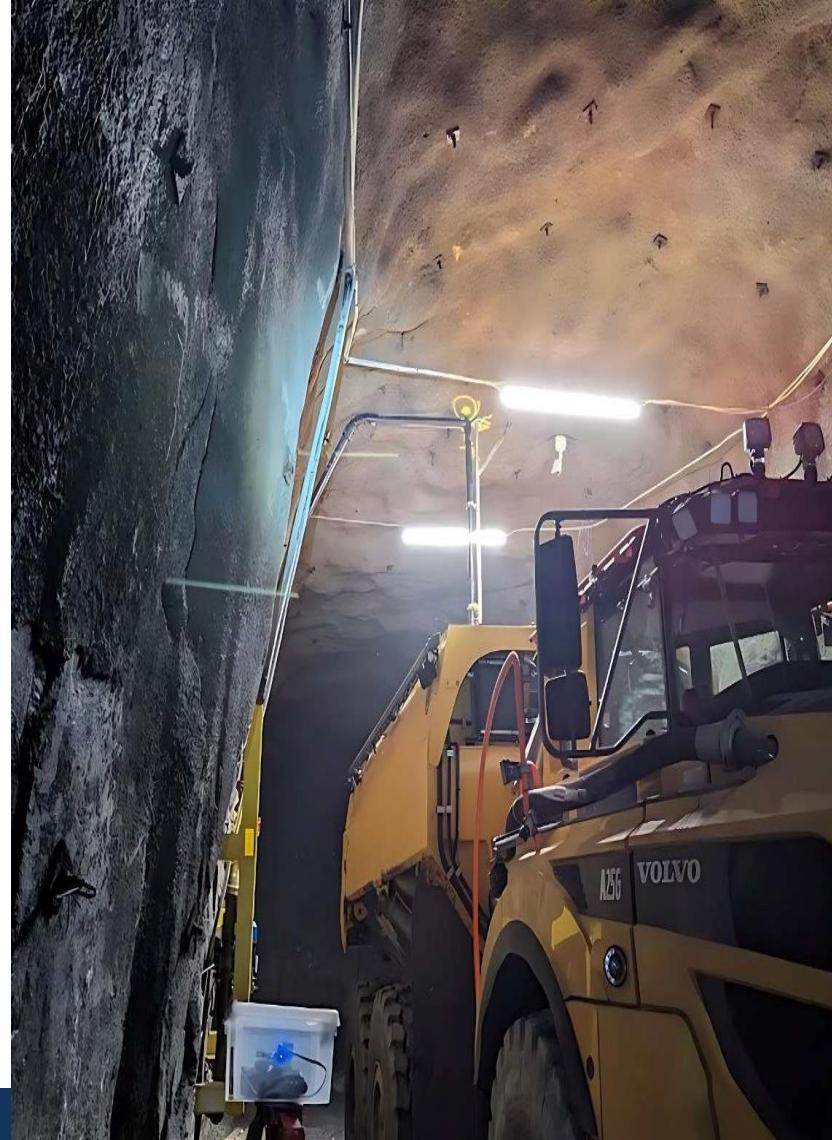


5G rullas ut på bred front i Sverige och innebär snabbare överföringshastigheter och lägre fördröjning.

När 5G kombineras med Edge computing kan en mjukvara driftsättas nära slutanvändaren istället för i molnet, vilket ytterligare förbättrar prestandan.

## Fördelar för gruvautomation

- Snabbare och mer responsiva  
realtidsapplikationer
- Ökad effektivitet och säkerhet i driften





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## Projektet har utvecklat och demonstrerat

- Säkerhetslösningar som kombinerar 5G och Edge computing
- Detektering och visualisering med 3D-LIDAR
- 5G-uppkopplade bergbultar och drönare
- Metodik för att mäta fördröjning och luckor i dataöverföring i 5G-nät med verlig applikationslast

# Partnerskapet



I nära samarbete med



## ThingWave: Säkerhetslösning med 5G-uppkopplade bergbultar

- Traditionella förstärkningsbultar utrustas med integrerade sensorer
- Bergbultarna övervakar deformationer från sprängning och markrörelser
- Bultarna kopplas upp till en 5G-stödd IoT-gateway via ett mesh-nätverk
- Realtidsövervakning och 3D-visualisering av rörelser i berget ger ökad personsäkerhet och minskar risker
- Optimering av stödsystem för högre produktivitet



## Flasheye: Robotcell

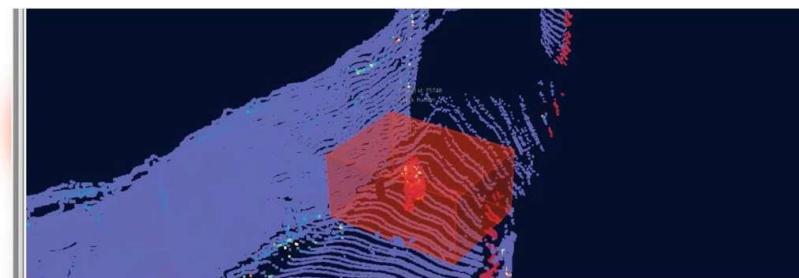
- **Realtidsövervakning**

Visualiseringar personalens position och säkerställer att individer inte befinner sig i farliga områden (markerade i rött).



- **Automatisk varning**

Ökar säkerheten både ovan och under jord genom att skapa tydliga säkerhetszoner. Systemet aktiverar en varning om någon kliver in i en säkerhetszon.



- **Avancerad LiDAR-teknik**

Stationär LiDAR används för objekt- och säkerhetszonsdetektion.

## BI NORDIC: Mätmetod och visualisering

- **Mätning och prestandaanalys**

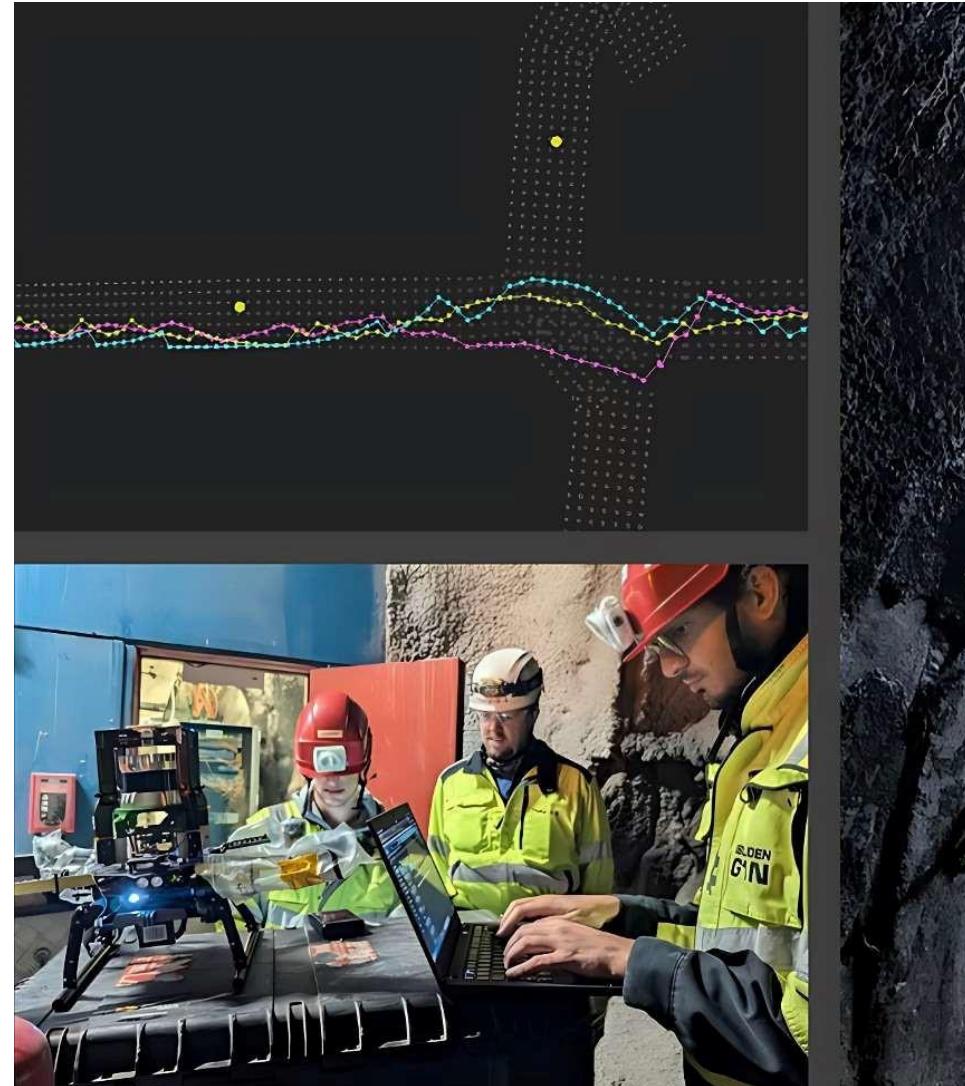
Utvärdering av prestanda mellan uppkopplade enheter och Edge-noden

- **Visualisering**

- Presentation av tillgänglig bandbredd på en detaljerad karta över gruvan
- Ger insikt i nätverkets kapacitet och prestanda

- **Effektivitet**

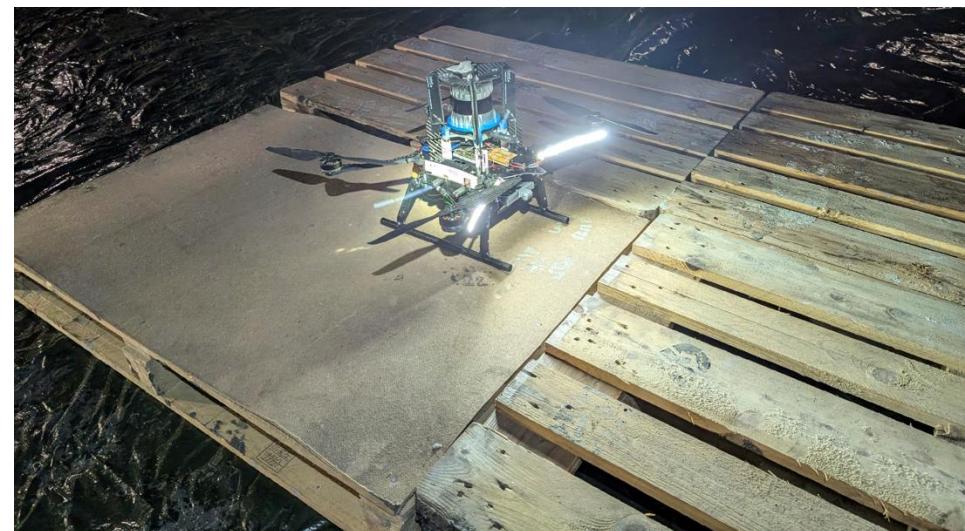
Möjliggör dynamisk och överskådlig analys av nätverksresurser i realtid



## LTU: Drönare

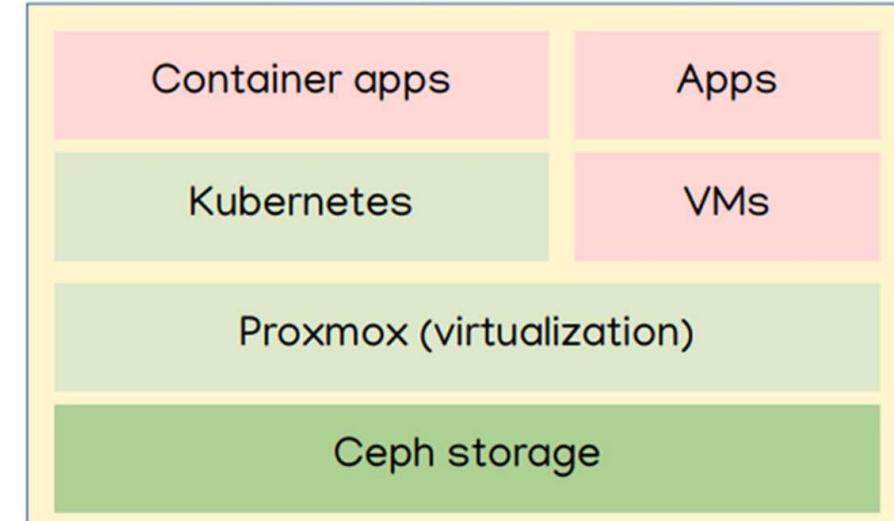
Drönaren är ansluten till Edge-noden och molnet via 5G och styrs av en mänsklig operatör

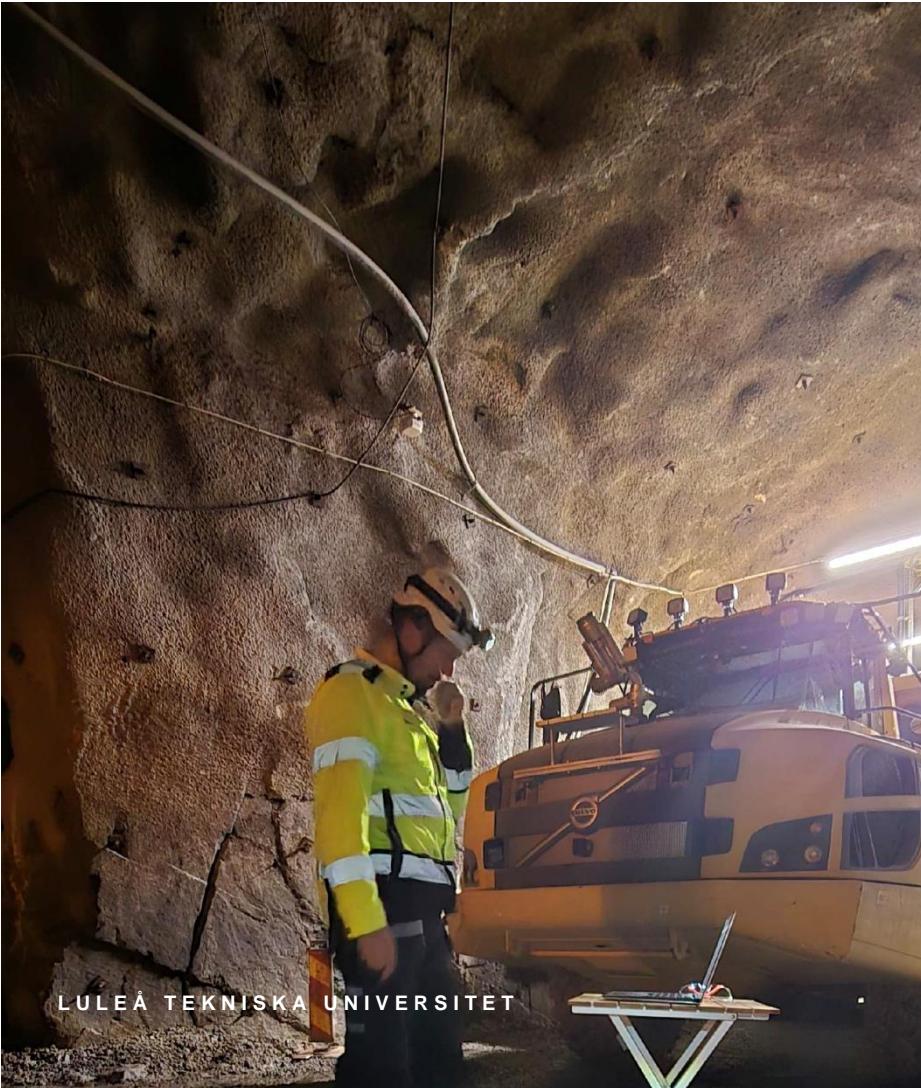
Den startar från en angiven plats och navigerar autonomt, medan operatören kan definiera nya waypoints i realtid



## RISE: Privat Edge Cloud lösning

- Edge Cloud lösning i kundens lokaler
- Tillhandahåller infrastruktur som tjänst och container som tjänst
- 100% öppen källkod
- Utformade för att fungera i ö-drift, isolerat från andra nätverk





## Projektresultat

- **Metod för nätverksövervakning**  
Utvecklad och förfinad metod för att mäta latens och överföringsluckor används nu brett i gruvor via en Android-applikation.
- **Samarbete med Volvo CE**  
Metodiken för nätverksövervakning implementerad för att identifiera nätverks-, tele-operations- och maskinproblem, vilket uppskattas högt av användare.
- **Samarbete med Boliden**  
Edge-nod installerades framgångsrikt i nära samarbete med Boliden och projektets andra arbetspaket.



LULEÅ TEKNISKA UNIVERSITET

**VINNOVA**  
Sveriges innovationsmyndighet

[www.5gedgeinnovations.se](http://www.5gedgeinnovations.se)



Projekt

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End-to-end AI för kvalitetssäkring,  
Pasqualina Potena

# (End-to-End) AI för Kvalitetssäkring Inom Tillverkningsindustrin (AI4QAM)

*Vinnova, Avancerad och innovativ digitalisering 2024 - första utlysning*

*Diarienummer: 2024-00285*

Enodo Robotics AB, Husqvarna AB, PVI Hydroforming AB, Scania CV AB, Tekniska Högskolan i Jönköping AB,  
Thule Group AB, **RISE Research Institutes of Sweden AB**

Mötesplats Avancerad Digitalisering 2025

World of Volvo - Göteborgs

Pasqualina Potena (RISE)

*23 January 2025*



Vi är finansierade av innovations- och  
forskningsprogrammet Avancerad Digitalisering



Arbetet utförts med stöd från Vinnova (på engelska återges namnet med Sweden's Innovation Agency inom programmet Avancerad digitalisering).

# Agenda

- Problem Statement and Scope
- Project Consortium
- Implementation
- Outcomes
- Impacts
- Conclusions and reflections

# Problem Statement and Scope

**The manufacturing industry is undergoing a rapid transformation**, driven by increasing complexity, customization, and competition. **Quality assurance** is a crucial aspect of this process, but **it often relies on costly, time-consuming, and inflexible methods**

We aim to **increase the performance and competitiveness** of the manufacturing industry **and reduce its environmental impact and resource consumption**

The AI4QAM project will create user-friendly  
**End-to-End AI for automated quality control (QC) of manufactured components**  
that can adapt to different environmental conditions and product designs



# Participants in the project

	Swedish research institute and innovation partner (collaborating internationally with companies, academia, and the public sector). RISE leads the project, develops the AI QC methods and models. <b>(Coordinator)</b>
	Enodo is a company that aims to bridge the gap between current industrial robot applications and the potential seen in research and development. In the Scania use case, Enodo's focus is on the robot and its peripherals. One area of interest for Enodo is inline quality control in a high variability production setting, where robot motions need to be adaptable and generated online.
	Global leader in outdoor power products, robotics, and construction equipment. Project success will drive AI integration into Husqvarna's production. Advancements will be applied to chainsaw automation, improving quality and efficiency. These will also extend to other Husqvarna products and lines.
	Part of PVI Industries, is a company specializing in hydroforming steel profiles and pipes for the automotive industry. They aim to automate their manual quality inspection process. In the project, they will contribute with process and product expertise, camera installations, robot programming, and AI model evaluation.
	Global manufacturer of commercial vehicles, is investigating the use of a robot and computer vision system to inspect cylinder block channels, a task currently done manually. The goal is to identify defects within a set time, and Scania aims to gain multiple long-term effects from the project. One is the potential automated computer vision of the cylinder head in the foundry.
	Jönköping School of Engineering (JTH), part of Jönköping University, is a partner with expertise in AI, automation, robotics, and computer science. In the project, JTH will evaluate AI algorithms, develop programs, and simulate solutions on platforms like Isaac SIM.
	Global company offering sports and outdoor products, is planning to improve its quality assurance using AI in this project. The focus will be on feature recognition for visual defect detection in their Hillerstorp painting line, which deals with various item variants and surface issues. The benefits from this project will be applied across all nine Thule factories worldwide. Initially, the findings will be implemented on a Polish factory's painting line that uses a different powder coating.

# Implementation

- Applying multimodal LLM, zero-shot defect detection methods, and public datasets to create a new system for quality control
- Exploring the potential of synthetic data, as well as the possibility of using sound as a complement to image data
- Addressing the need for smart robot motion planning, which is very important in cases where use of robots for QC is highly desirable, but where it is not feasible to manually program the motion path

## □ Different domains

- Outdoor power products, robotics, and construction equipment industry  
Husqvarna's **outdoor products, robotics, and construction equipment domain**
- Hydroforming and 3D cutting steel profiles and pipes mostly for the automotive industry  
PVI's **EGR cooler manufacturing domain**
- Commercial vehicles industry  
Scania's **truck manufacturing domain**
- Active lifestyle products industry  
Thule domain's **outdoor and transportation domain** including sport, cargo and bike carrier for automobiles and other outdoor and storage products for your family



Source:  
<https://www.scania.com/se/sv/home/products/attributes/fuel-efficiency.html>

The AI4QAM project will support Scania in further development of quality assurance methodology in our manufacturing processes. Our use case involves automated endoscopy inspection of forged cylinder heads.



Source: <https://www.thule.com/sv-se/articles/guides>

The AI4QAM focus will be on feature recognition for visual defect detection in Thule's Hillerstorp painting line, which deals with various item variants and surface issues. The benefits from this project will be applied across all nine Thule factories worldwide.



Source: [PVI Hydroforming](#)

PVI Hydroforming main processes are Hydroforming, 3D laser cutting, laser welding and pressing.



Source:  
<https://www.husqvarna.com/us/discover/crown-commitment/>

AI4QAM: Advancements will be applied to chainsaw automation, improving quality and efficiency.

# Outcomes

- **Computer vision-based and audio analysis-based prototype systems for QC** that can adapt to changes in the production environment and handle many different product designs without a need for extensive real-world data collection and retraining
  - **The computer vision-based system starts at TRL 4 and ends at TRL 6. Commercialization time is 2 years after the project**
  - **The audio analysis-based system starts at TRL 4 and ends at TRL 6. Commercialization time is 1 year after the project**
- **A demonstrator of a robotic solution for autonomous endoscopy** that uses an integrated computer vision system for QC to inspect component internals
  - Starting point is **TRL 3 and expected end point TRL 5. Commercialization time is 1 year after the project**
- **Publicly shared source codes for foundational models for defect detection, and datasets containing images and sound for training of such models**
- **A publicly shared practical guide – a “cookbook” – on how to implement AI QC in the factory** that will help companies outside of the consortium to implement AI in their manufacturing lines

# Impact

- **Develop next-generation, advanced End-to-End AI QC solutions** with reduced setup times and cost
- **Strengthen the ability of Swedish industry to attract R&D investments** by showing that Sweden is a leader in the field of applied industrial AI QC
- **Increase the competence and implementation ability in Swedish industry within the area of advanced digitalization** through collaboration and dissemination of results, data, and code
- **Increase the competitiveness of Swedish manufacturing companies** through better and cheaper QC, which leads to higher and more consistent product quality without increasing the price
- **Accelerate the digital transformation, sustainable development, and the work to realize Sweden's environmental goals** through wide-spread automation of QC, which decreases energy consumption, resource utilization, and CO2 emissions in manufacturing

# Conclusions and reflections

The project consortium is a collaboration between **seven partners from industry** (PVI hydroforming, Scania, Enodo, Thule, Husqvarna), **academia** (Jönköping university), and **research** (RISE) sectors, who **represent the Swedish manufacturing ecosystem**

- ✓ Complementary skills and roles, and the consortium is therefore very well equipped to develop and implement End-to-End AI-based quality control for use in a wide variety of manufacturing processes

# Conclusions and reflections – Achievements

- Activities have been performed for “Use Case & Equipment Requirements Definition”. Companies' visits have been performed to define equipment (cameras, microphones, and other sensors (if necessary) at each company) for data collection
- Worked on (i) Definition of Baseline solutions (supervised mode) that can further be improved based on the companies' data and (ii) Literature Review
- AI4QAM Workshop at JTH - 4 Dec 2024
  - The purpose was to share and discuss materials related to the initial and intermediary objectives set in the project proposal, including state of the art algorithms and methods used for data collection and analysis

# Conclusions and reflections – Project's Long-Term Goals

- **Scalability Across Applications:**  
While the initial focus is on specific use cases, the developed solutions are designed to scale seamlessly across various manufacturing lines and product categories, ensuring adaptability to a wide range of industries and scenarios
- **User-Friendly Solutions:**  
A core goal is to create AI systems that are intuitive and operator-friendly, minimizing the learning curve for production teams and enabling smooth integration into existing workflows
- **Sustainability and Efficiency:**  
The project emphasizes the importance of AI-driven solutions in reducing waste, optimizing energy consumption, and enhancing overall efficiency, contributing to the broader goals of sustainable and responsible manufacturing

# Conclusions and reflections – Next Steps - Results being utilized and disseminated

- Ensuring the **alignment** of the project activities with the needs and expectations of the participating organisations and the financier
- Providing **guidelines** and **documentation** for deploying and maintaining an End-to-End AI-based solutions in industrial settings
- Publishing **scientific papers**, **open source tools**, **trained models**, and **datasets** to share the project findings and resources with the research community and the public
- Organizing **workshops**, **webinars**, and **training sessions** to educate industry professionals about AI for manufacturing and to foster collaborations with other relevant organisations

# Thanks a lot!

Please, visit the **Project Webpage**:

<https://www.ri.se/en/what-we-do/projects/end-to-end-ai-for-quality-assurance-in-manufacturing>

Enodo Robotics AB, Husqvarna AB, PVI Hydroforming AB, Scania CV AB, Tekniska Högskolan i Jönköping AB,  
Thule Group AB, **RISE Research Institutes of Sweden AB**

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5D5GE Utvecklargemenskap,  
Tor Björn Minde

The background of the slide features a dark blue gradient with a subtle grid pattern. Overlaid on this are several large, semi-transparent binary digits (0s and 1s) of varying sizes, creating a sense of depth. In the top left corner, there is a network graph with teal-colored nodes and connecting lines. In the bottom right corner, there is another smaller network graph. The overall theme is digital connectivity and data.

INTRODUCTION TO

# ED5GE Dev Com

ED5GE Developer Community

Tor Björn Minde, Director ICE Datacenter RISE

RI.  
SE



” Strengthen the Swedish position in edge computing and 5G with a developer community where need owners and developers can meet around solutions of the future.”

The main objective of the project

# ONE TESTBED

# ONE DEVELOPER COMMUNITY

Initially at 4 geographical locations

Powered By



ICE Connect



North Star



Funded by  
the European Union

Infrastructure built in CEF2 ED5GE project

Smart Recycling



Smart Agriculture



Smart Harbor/Safety

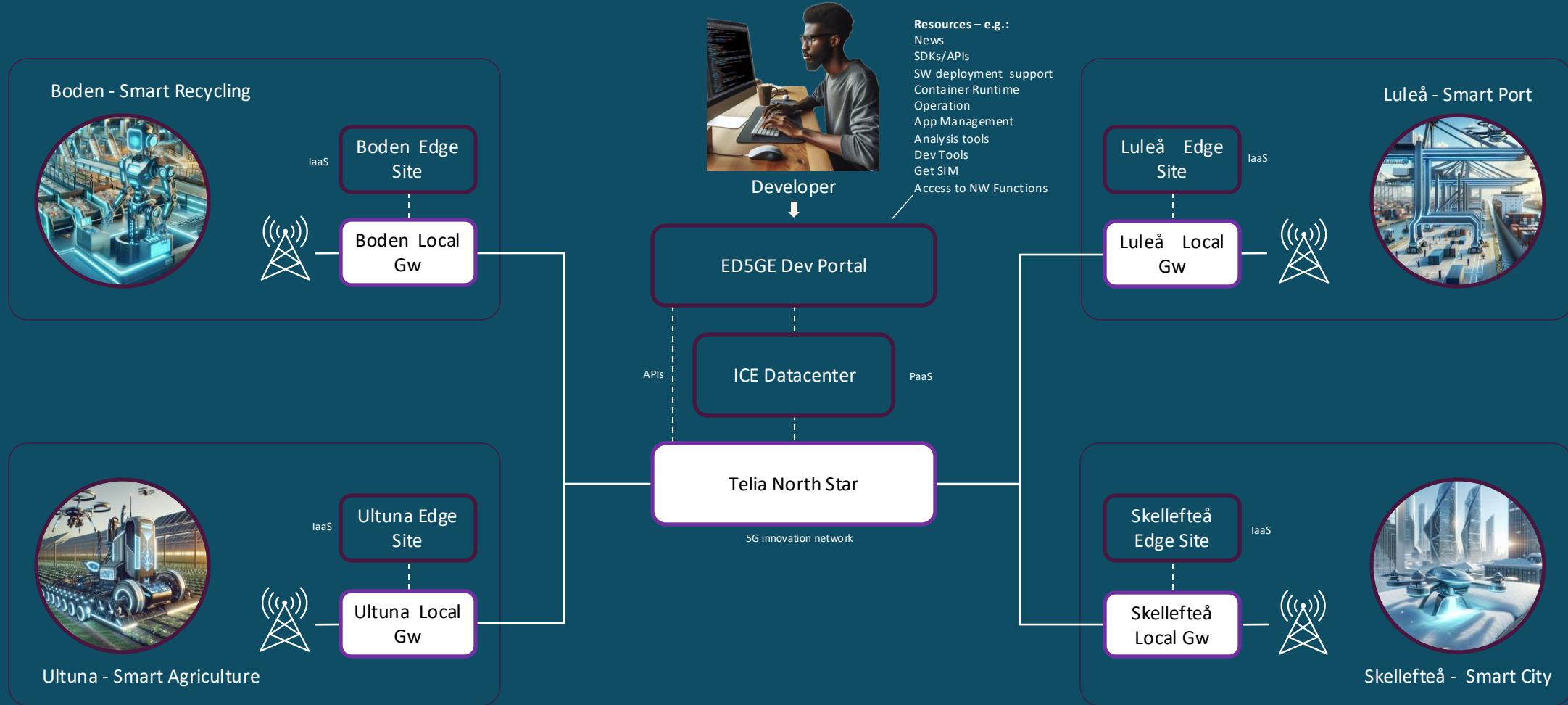


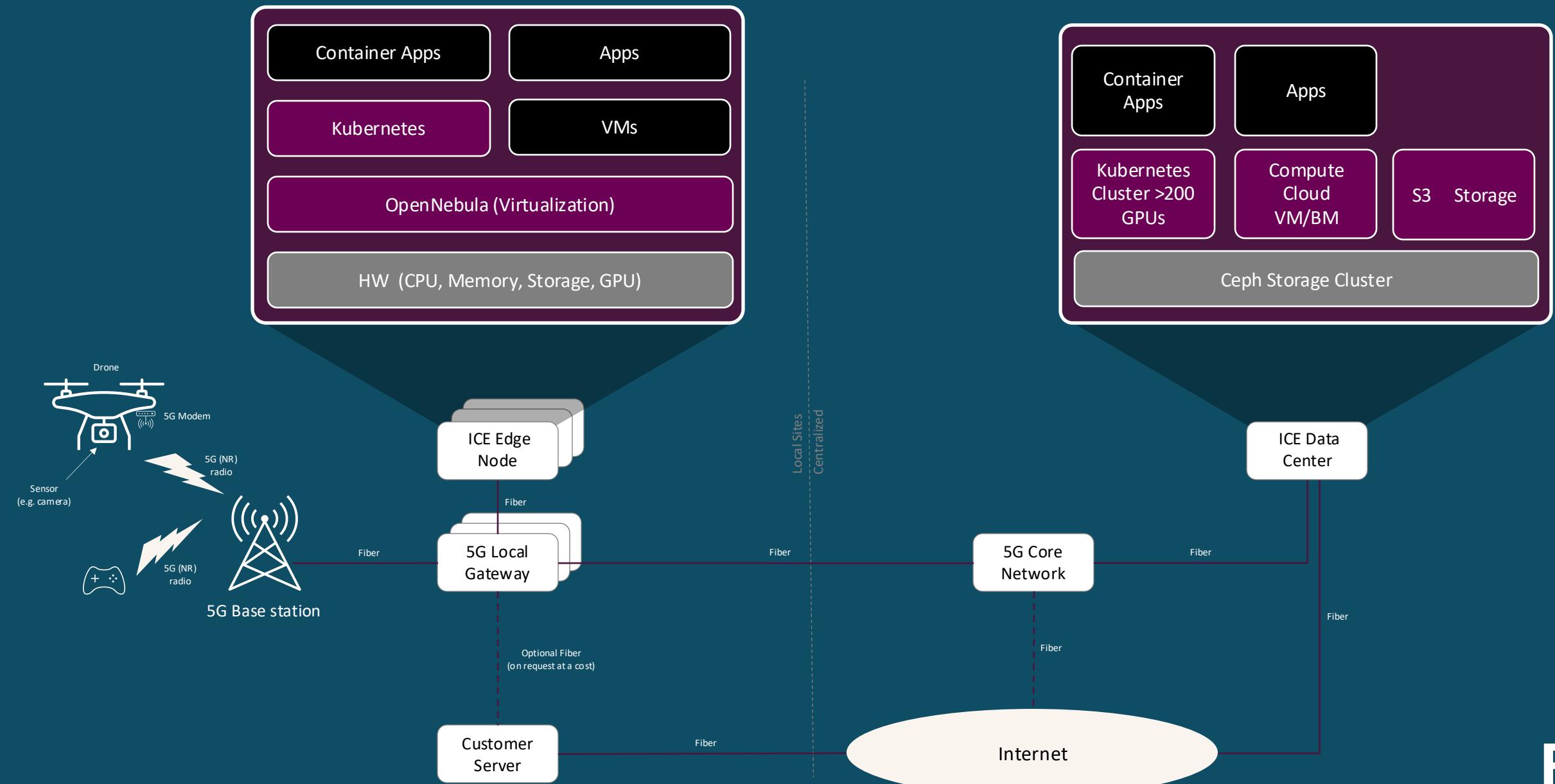
Smart City

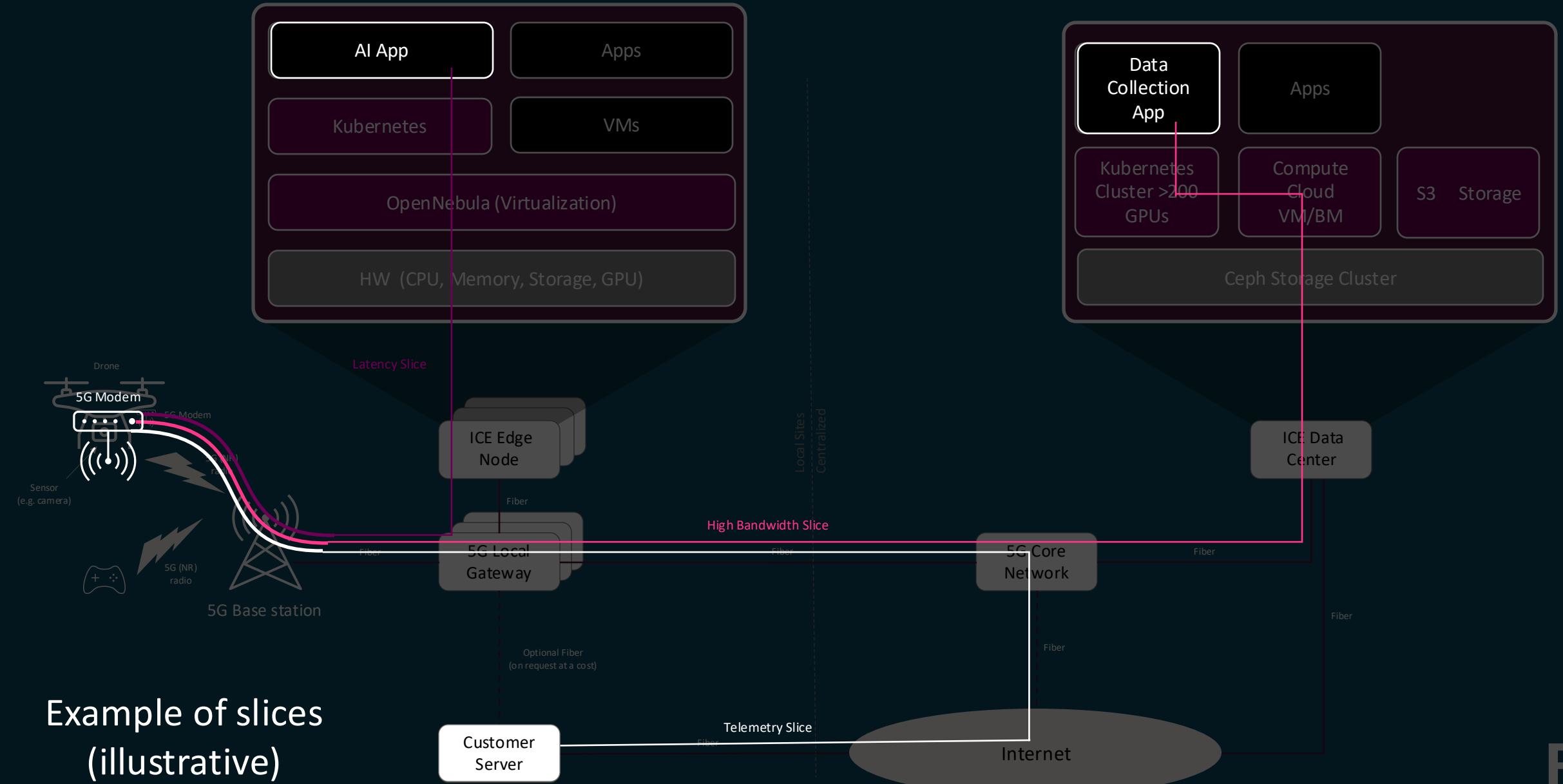
Avancerad Digitalisering

R.  
I.  
S.E

# Testbed overview







Example of slices  
(illustrative)

# What we plan to do 2024-2026



WP2  
Facilitate and run information tour and workshops to get developers and companies to join the community and start building advanced applications and use the testbed.



WP3  
Provide a developer portal to facilitate access to testbed and provide information, code, tools etc where developers can build and test their applications.



WP4  
Assist in the development of pilots/demos on each of the four sites. Provide advice on how to build and collect insight on common functions that could be brought into the developer portal/testbed.

# Community Portal



Place to find information about research and innovation activities around (initially) 5G and Edge activities in Sweden



Place where need owners such as public authorities, municipalities and private companies can post problems and ideas and get researchers and companies to act on



Place where developers and researchers can find tools, SDKs/APIs, code that make it easier to build advanced services and then test and evaluate them on the testbed

Mockup to provide a feeling for how it could look like

# Target users and the value props



Get access to state-of-the-art open standard infrastructure, supporting tools and expertise and lower the threshold to build advanced digital services. Test at a low cost.

Developers



Understand what can be done with new network technologies and edge infrastructures. Engage community on your problems and learn from others.

Need Owners



Get access to powerful infrastructure to aid your research and simulation activities.

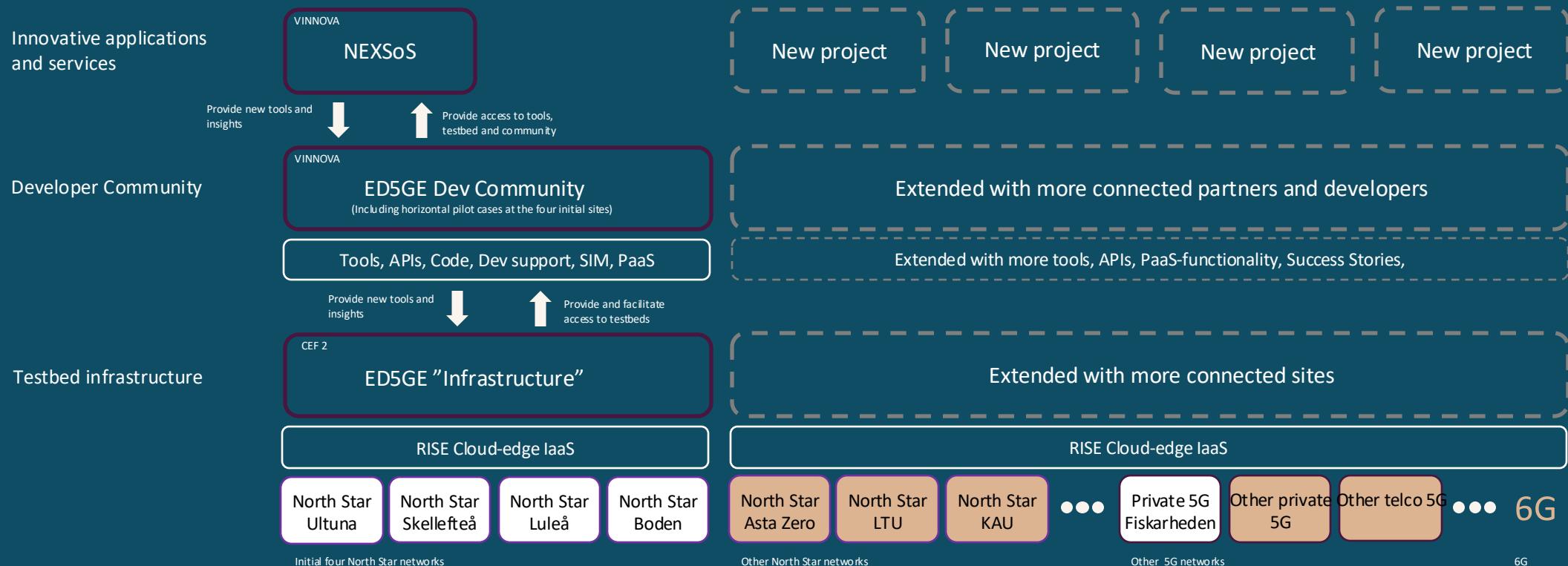
Researchers



Join the community and integrate and expose your platforms and technologies to reach developers and get valuable feedback.

Tech Providers

# Relation to other projects and plan forward



# Contact Us



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**ALEX JONSSON**  
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Participating partners: RISE, Telia, Ericsson, Avassa, Bodens kommun, DeLaval, Edeva, Flashey, Luleå kommun, Mobilis, Rejlers, ShoreLink, Skellefteå kommun, Skellefteå Kraft Fibernät, Stream Analyze, TH1NG and Tietoevry



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Continuous Digitalization,  
Malin Rosqvist och Hanna Svantesson



## The CoDig competence center

January, 2025

Malin Rosqvist & Hanna Svantesson

# The Software Center & CoDig partnership

**CHALMERS**



UNIVERSITY OF GOTHENBURG

**Malmö  
UNIVERSITY**



**GRUNDFOS**

**LiU** LINKÖPING  
UNIVERSITY

**MDU**  
Mälardalen  
University



**BOSCH**

**JEPPESEN**  
A BOEING COMPANY

**ERICSSON**



**zenseact**

**AXIS**  
COMMUNICATIONS

**advenica**



**SIEMENS**



**SAAB**



**SCANIA**

# Organization



**Jan Bosch, Chalmers**  
Director, Software Center & CoDig



**Mikael Sjödin,**  
Mälardalen University  
Vice director, CoDig



**Hanna Svantesson, Saab**  
Chair, CoDig Steering Committee



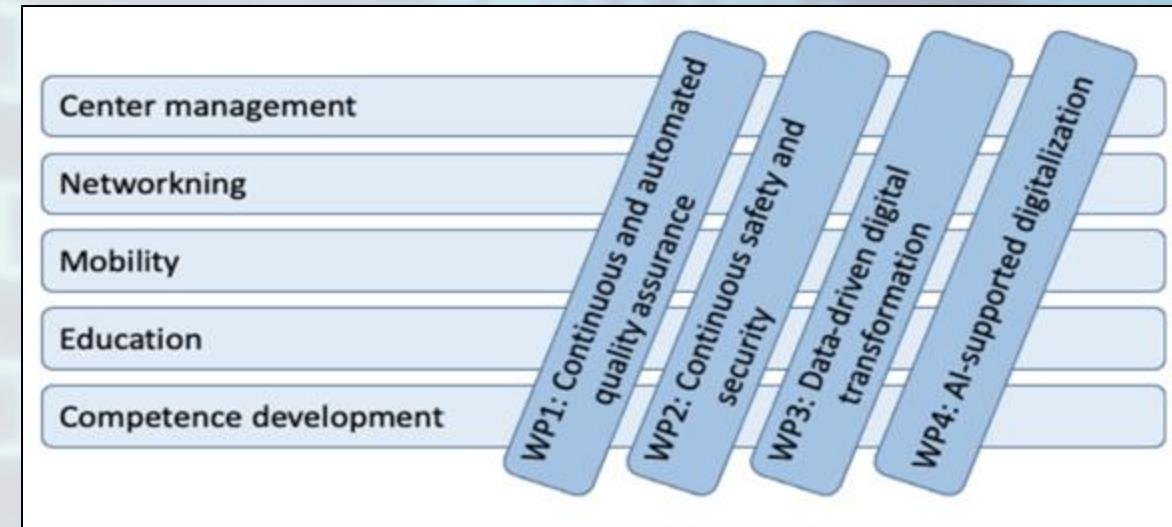
**Anders Caspár, Ericsson**  
Chair, Software Center  
Steering Committee

# CoDig: an introduction

Vision:

to **significantly increase the competitiveness of the Swedish industry by enabling transformation of the software-intensive systems industry** into a modern world-leading digitalized industry that fully embraces continuous value delivery by taking advantage of the next generation computing and communications infrastructure.

## Structure



### Theme leaders:

- Kristian Sandahl, Linköping university
- Jan Carlson, Mälardalen University
- Helena H Olsson, Malmö University
- Miroslaw Staron, Chalmers/University of Gothenburg



# Status

- On-going recruitment of PhD students:
  - <https://www.software-center.se/recruitment/>
- 20 active projects in 6-months sprints
- Supporting the shaping of a European network for Software Engineering
- April 7-8: Conference on Fundamentals of Software Engineering 2025 (FSEN '25, Västerås)
- June 11-12: Reporting workshop, Gothenburg





The world will never again change as slowly  
as it does today

# Gripen – A Swedish Defence Legacy

*Disclaimer:* Hardware still matters!



Superior Combat  
Performance



Multi-Role  
Capabilities



Extreme Climate  
Resistance



Efficient Field  
Maintenance



Rapid Deployment  
Agility



Cost-effective Lifecycle  
Management

# The challenge

1-2 yr procurement

1-2 yr delivery time

30 yr in service

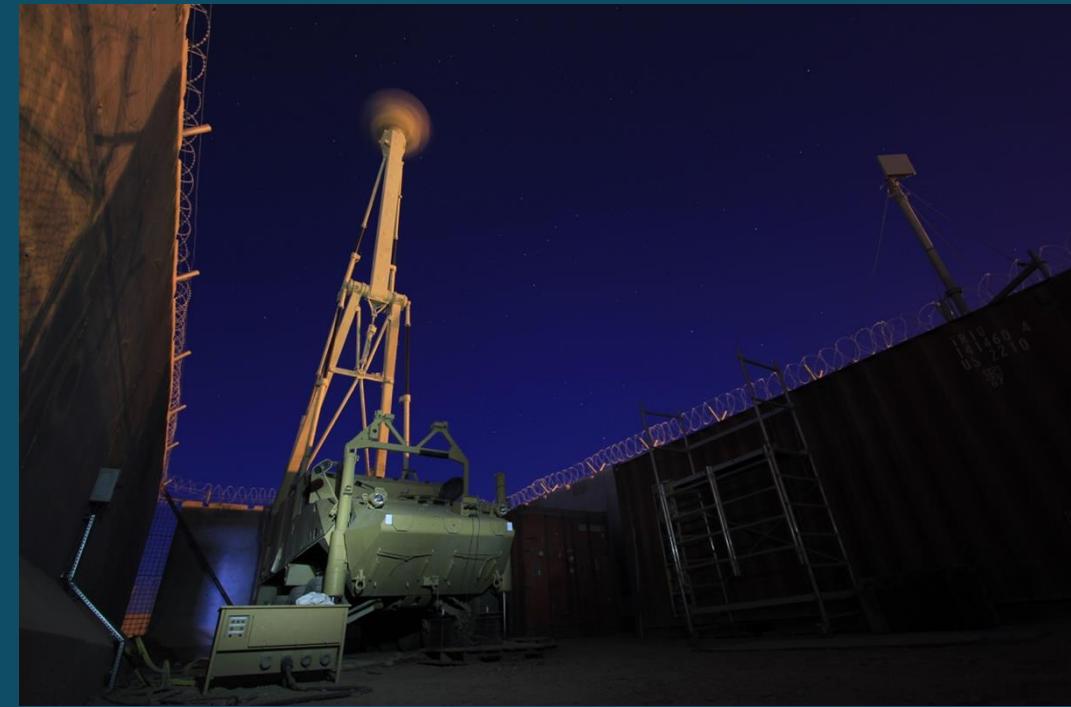
24/7 operation

10 sec alert time

Evolving threats; hypersonic and small/slow

Hybrid warfare; threats against the society and critical infrastructure

Shorter component life-cycles





# Avancerad Digitalisering

*It's all about speed*



SAAB



Teknikföretagen

VINNOVA

# Software Center | Continuous Digitalization

[www.software-center.se/](http://www.software-center.se/)

[www.software-center.se/codig/](http://www.software-center.se/codig/)

Projekt

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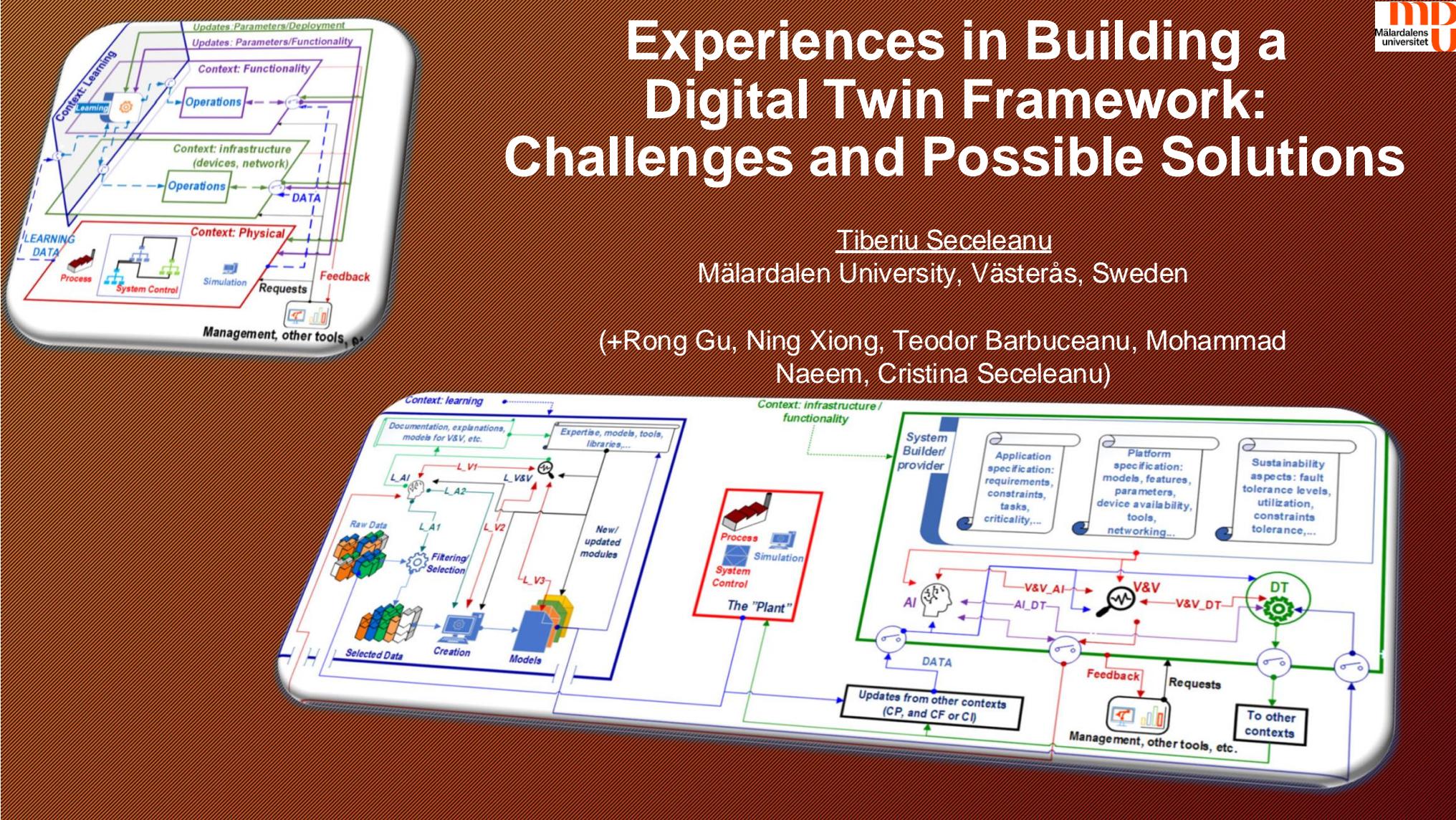
A digital twin Framework (D-RODS), Tiberiu  
Seceleanu

# Experiences in Building a Digital Twin Framework: Challenges and Possible Solutions

Tiberiu Seceleanu

Mälardalen University, Västerås, Sweden

(+Rong Gu, Ning Xiong, Teodor Barbuceanu, Mohammad Naeem, Cristina Seceleanu)



## A Digital Twin Framework for Dynamic and Robust Distributed Systems - D-RODS

**D-RODS** proposes and validates a **framework for a highly autonomous system testing & operation**, offering **optimal resource utilization** and **increased resilience** to faults via **increased system dynamicity**.

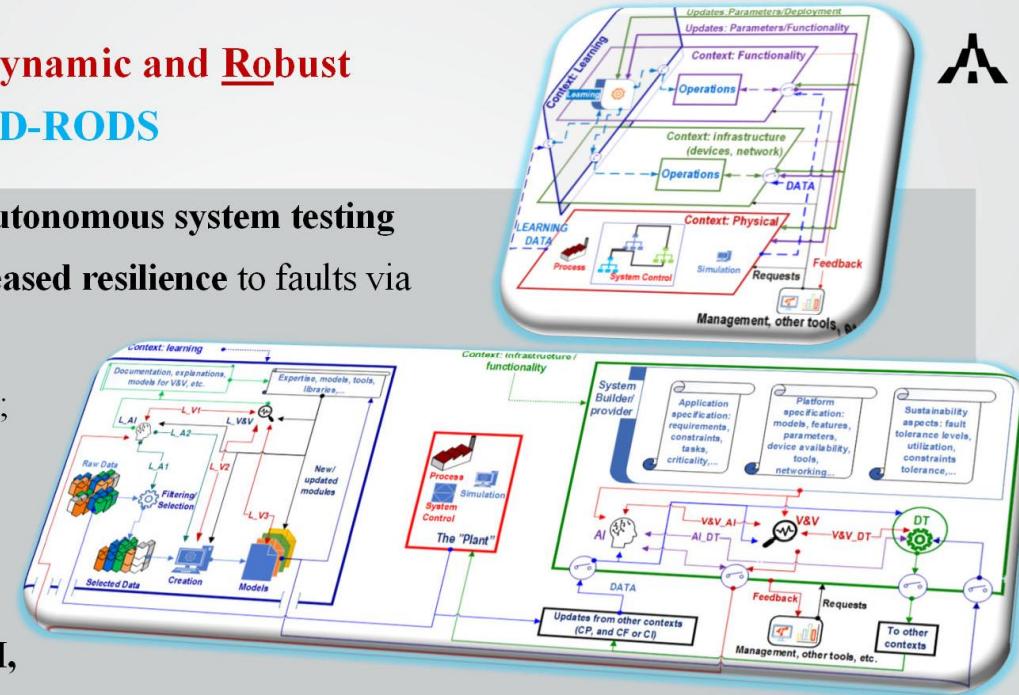
**PAINS:** minimize manual errors \* inclusion of legacy devices;  
 \* find optimal deployment solutions \* test-before-deploy  
 \* performance and robustness of complex systems  
 \* automation, etc...

**D-RODS** proposes a novel architectural set-up **uniting DT<sub>AI</sub>, V&V technologies**, catering for the accuracy and efficiency of employed models by continuous learning and verification.

It advances the state of the art by **increasing trustfulness in AI** approaches via formal assessments.

It aims to **optimize operations and resource usage**, improving maintainability aspects, increasing the **quality of design and system management**, thus **reducing production and operational costs**.

**D-RODS** delivers a set of **AI algorithms and V&V procedures** that generally support instantiating the proposed domains and the **application-agnostic framework**. It also provides prototype solutions to complement existing devices for inclusion in the framework, as technical add-ons to be used “as such” in future products.

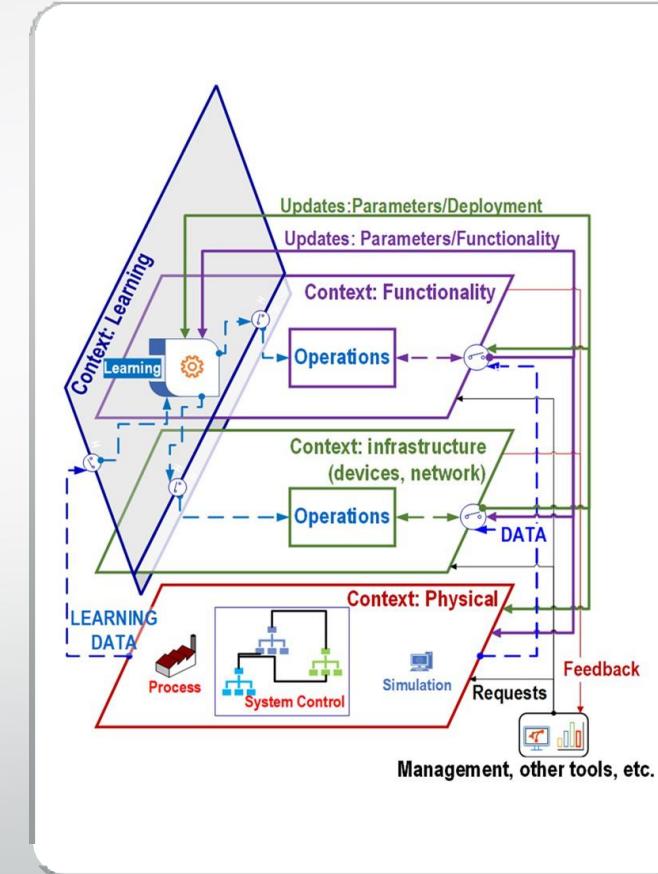


# D-RODS

**D-RODS** reaches the overall goal by building a strongly connected layered system perspective.

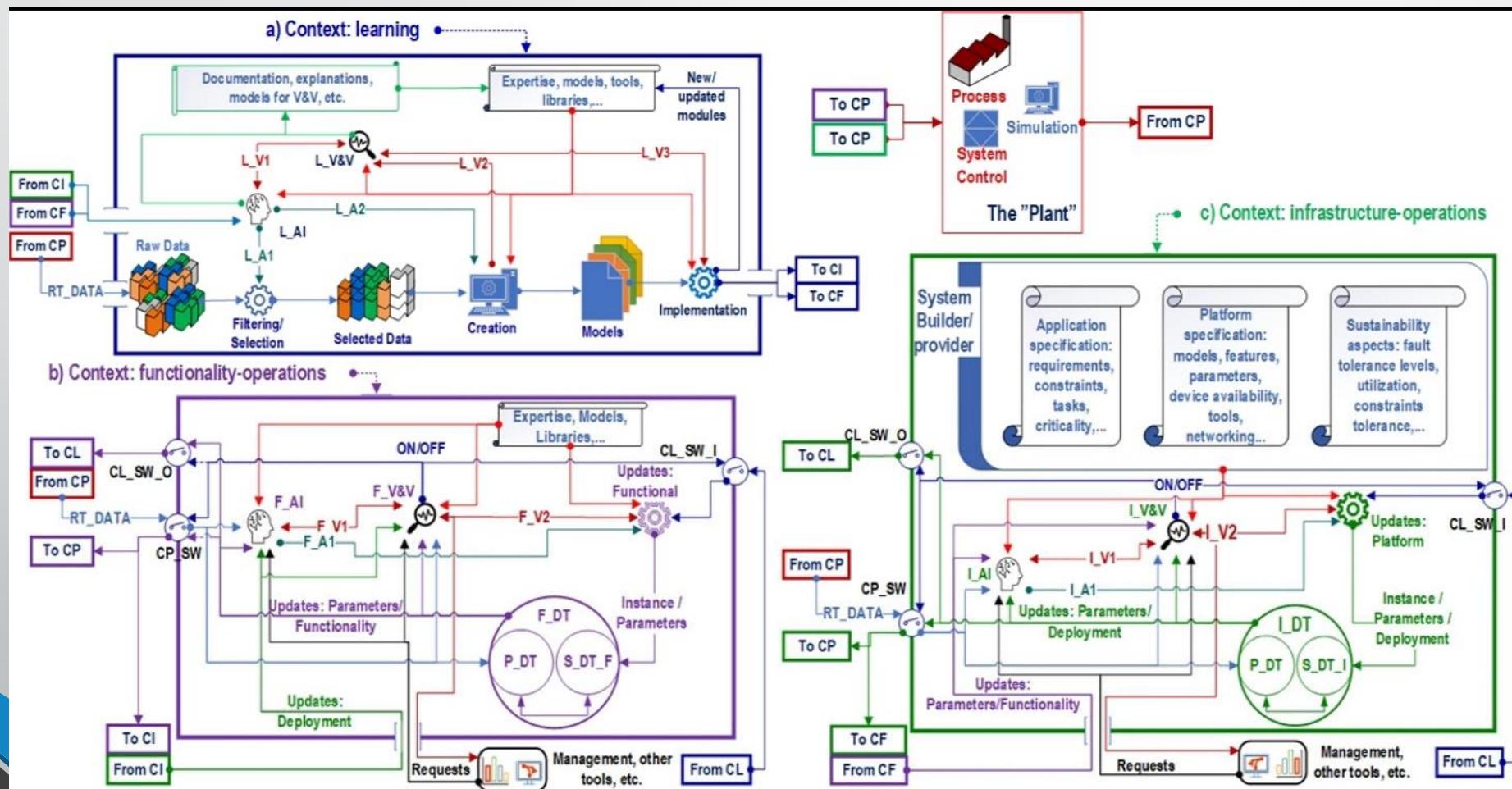
Above the plant level, each of the contexts employs a subsystem running AI algorithms and a subsystem performing V&V actions.

Each context also hosts a specific DT system and implementation tools, to assist with functional and infrastructure aspects.

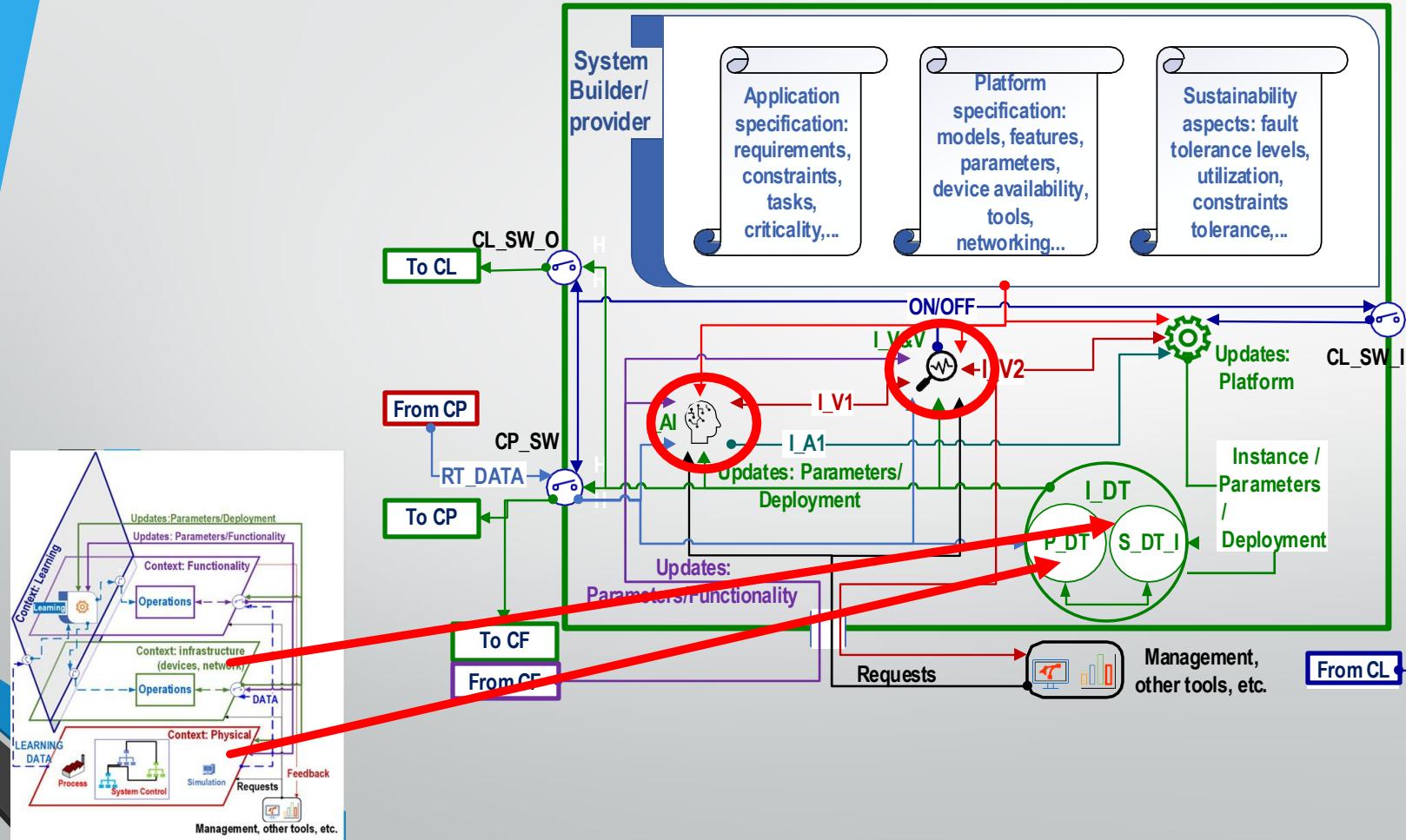


## Approach

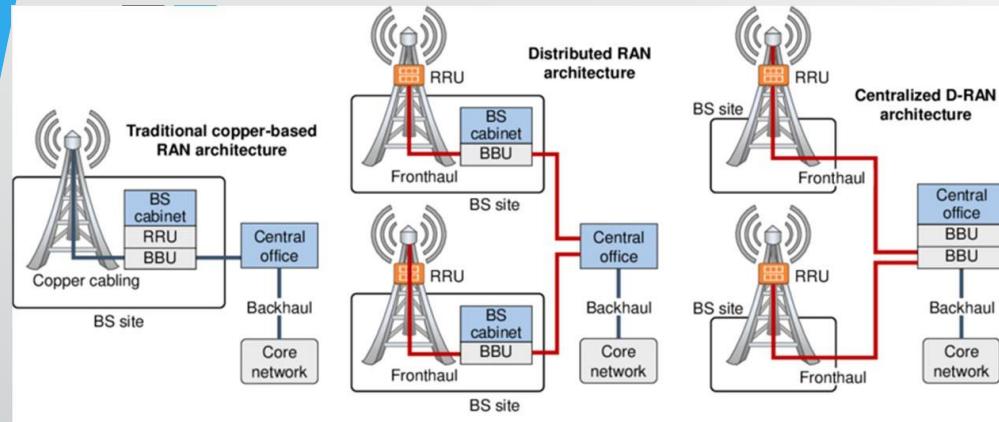
# D-RODS



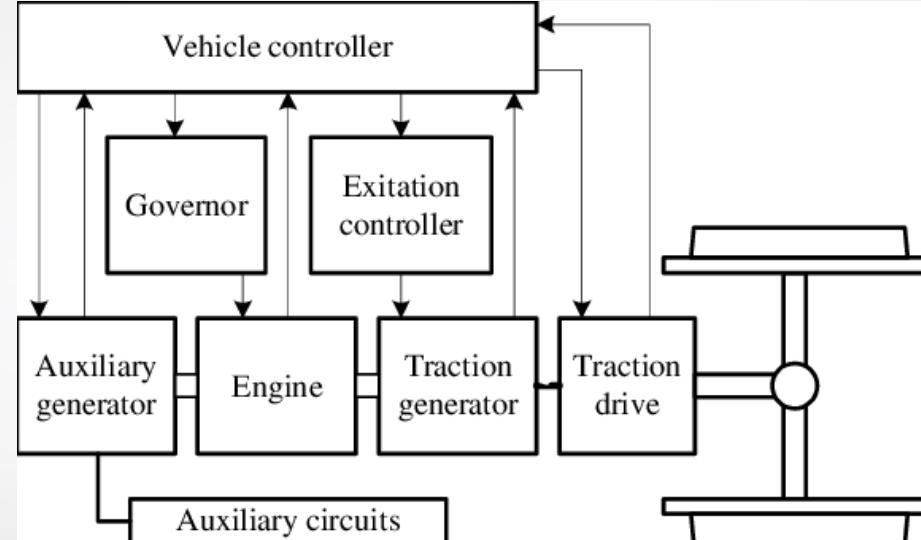
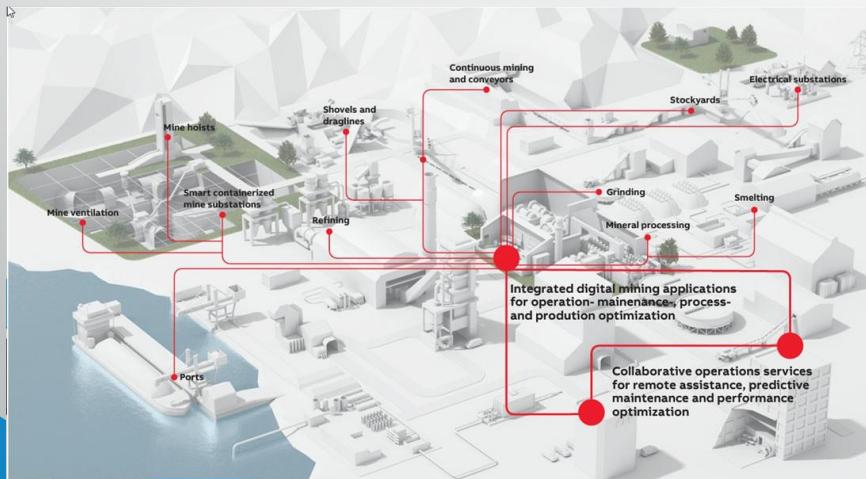
# D-RODS



# Use cases



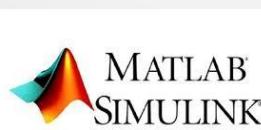
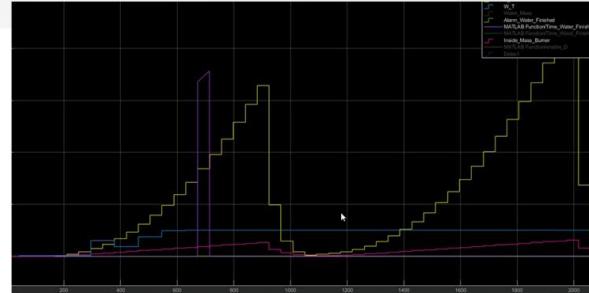
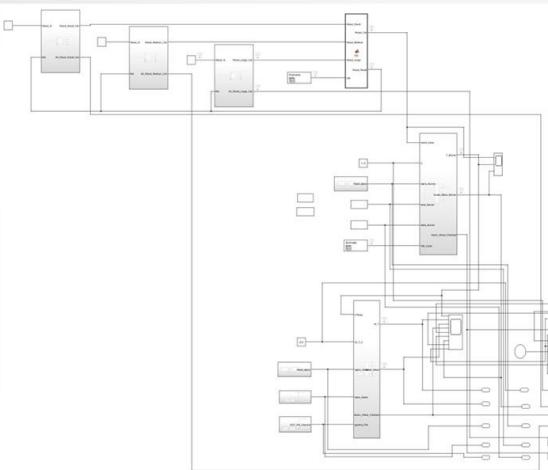
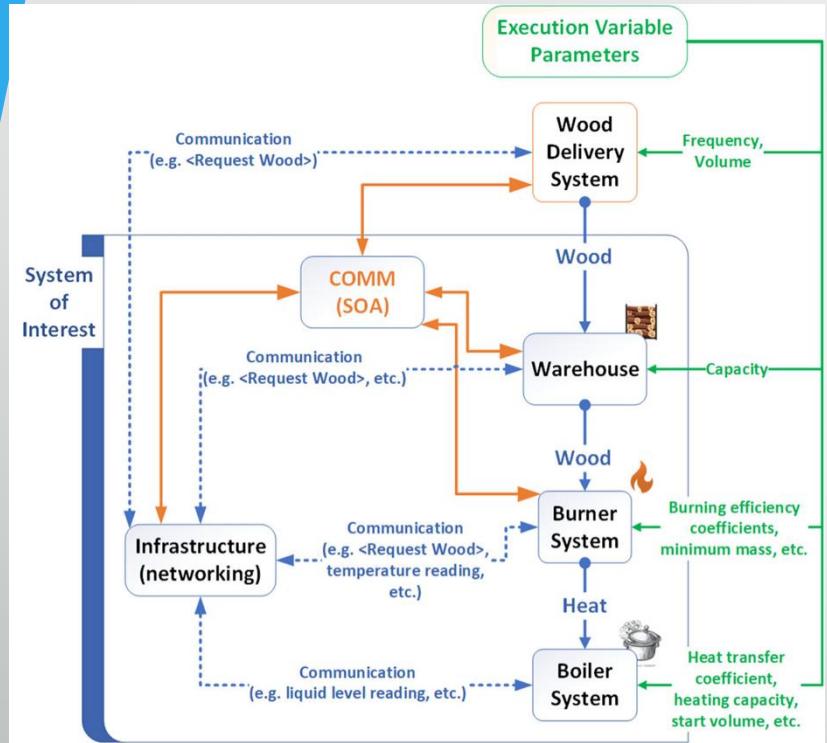
Lorincz, J., Klarin, Z., Begusic, D. Advances in Improving Energy Efficiency of Fiber-Wireless Access Networks: A Comprehensive Overview. 2023. 1-37. 10.3390/s23042239.



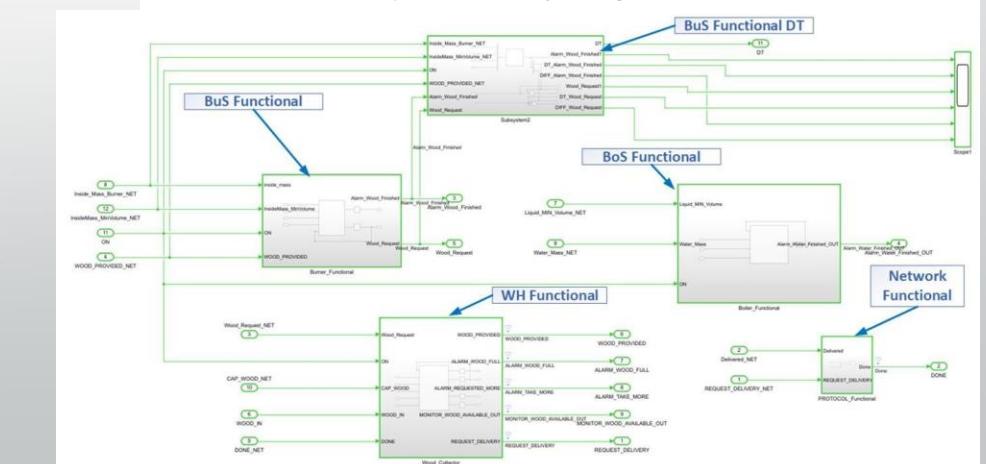
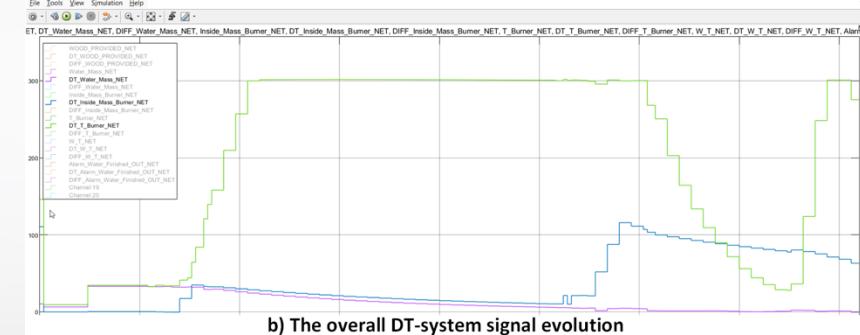
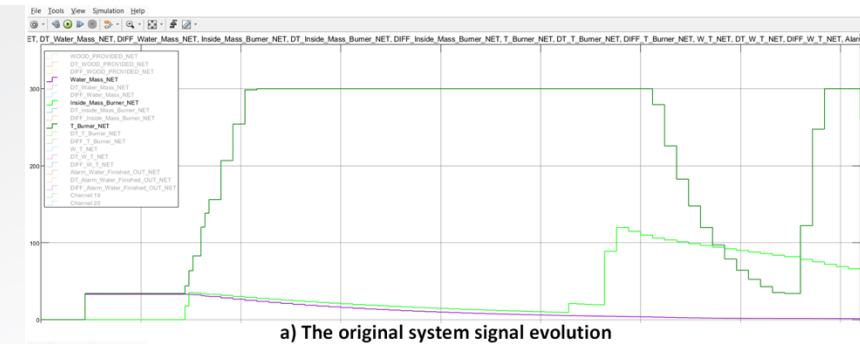
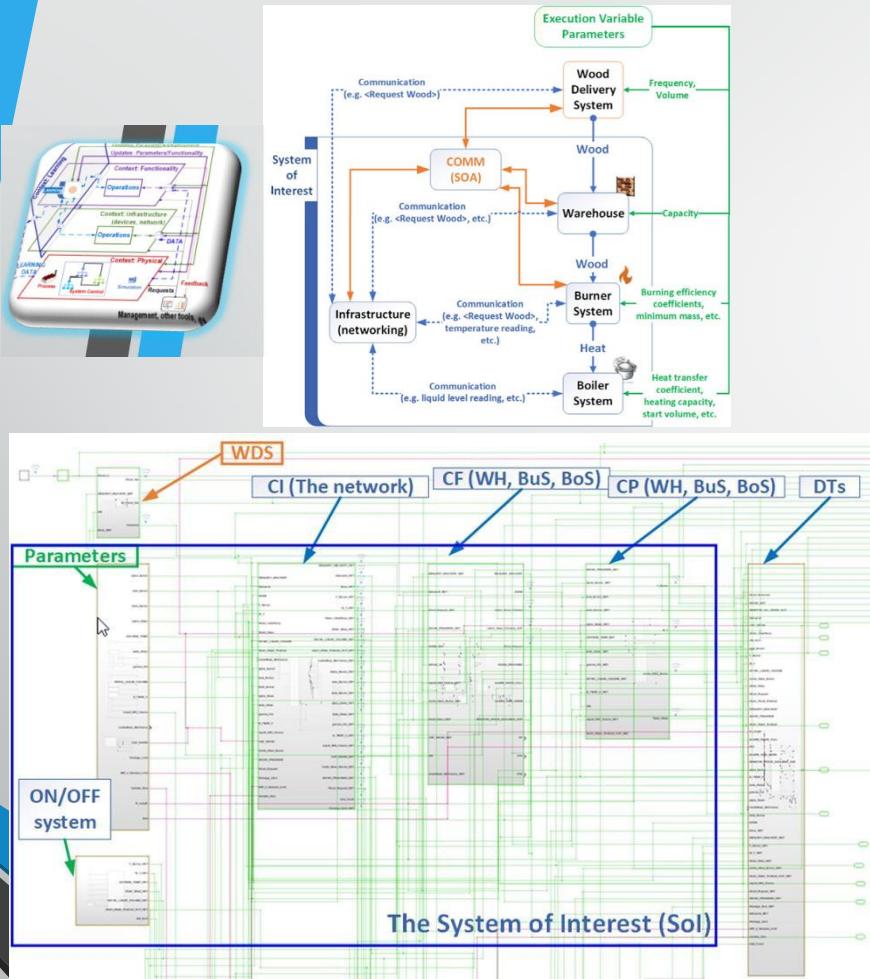
Höimoja, H., Jalakas, T., Rosin, A., Rassõlkin, A. (2010). Modernisation Issues of Diesel-Electric Shunting Locomotive Power Units. Scientific Journal of Riga Technical University: Power and Electrical Engineering. 27. 57-62. 10.2478/v10144-010-0021-3.

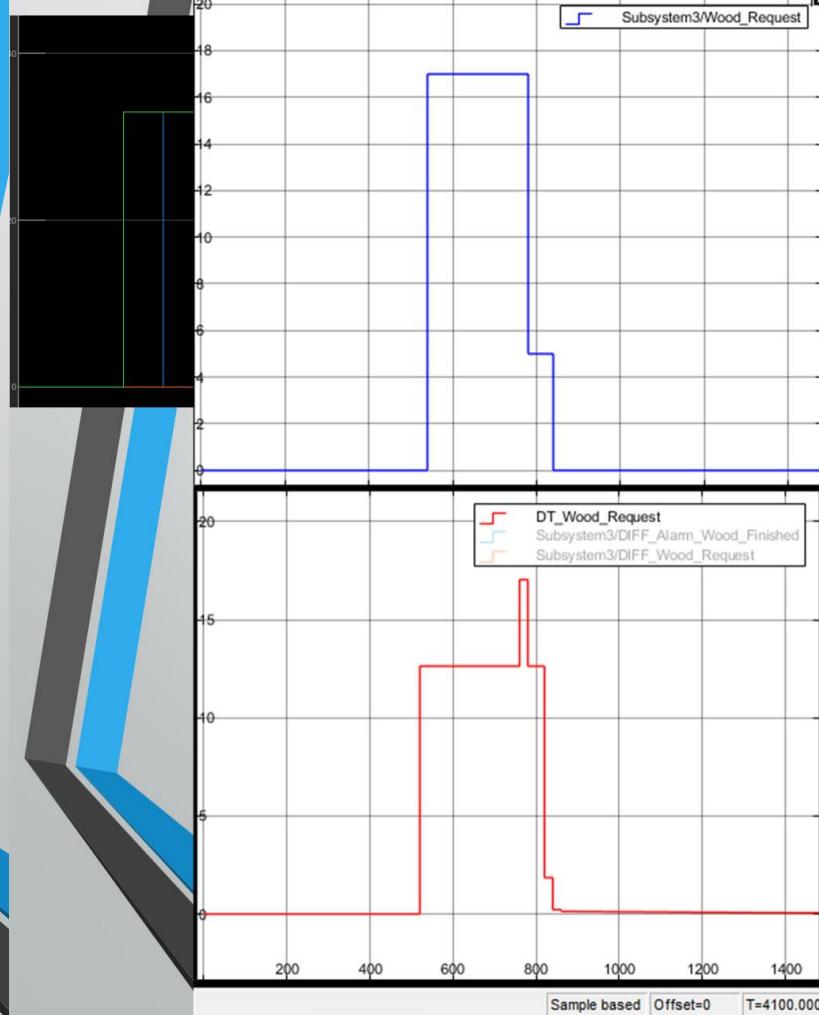
ABB Ability  
 Mineoptimize -  
 Transforming  
 Mining Performance  
 Through  
 Digitalization

# Use cases



# Digital Twins @work





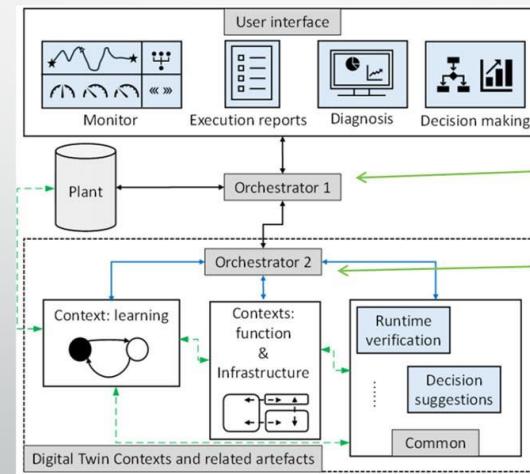
# Problems?

- Random values request
- Effect of the TD
- Synchronization failures
- ...



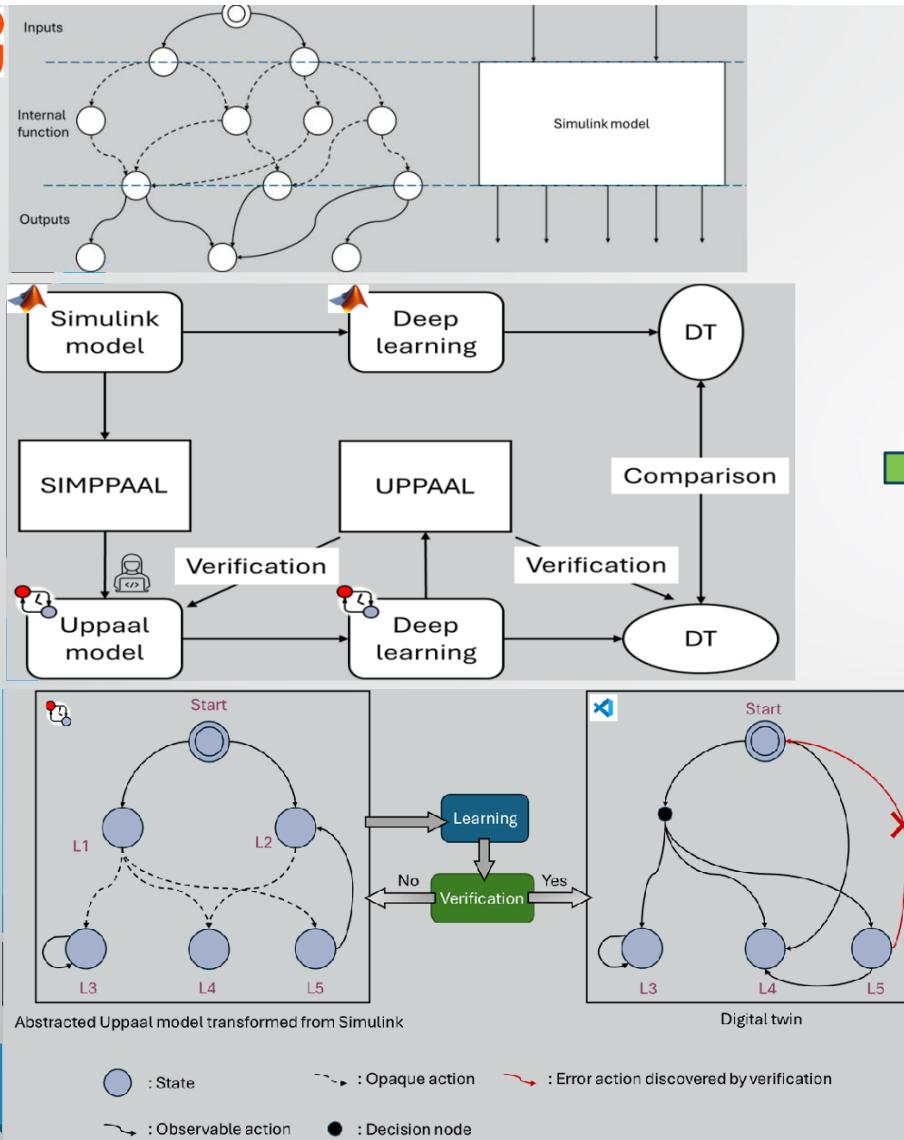
SoA  
+  
V & V

(+ deterministic values)

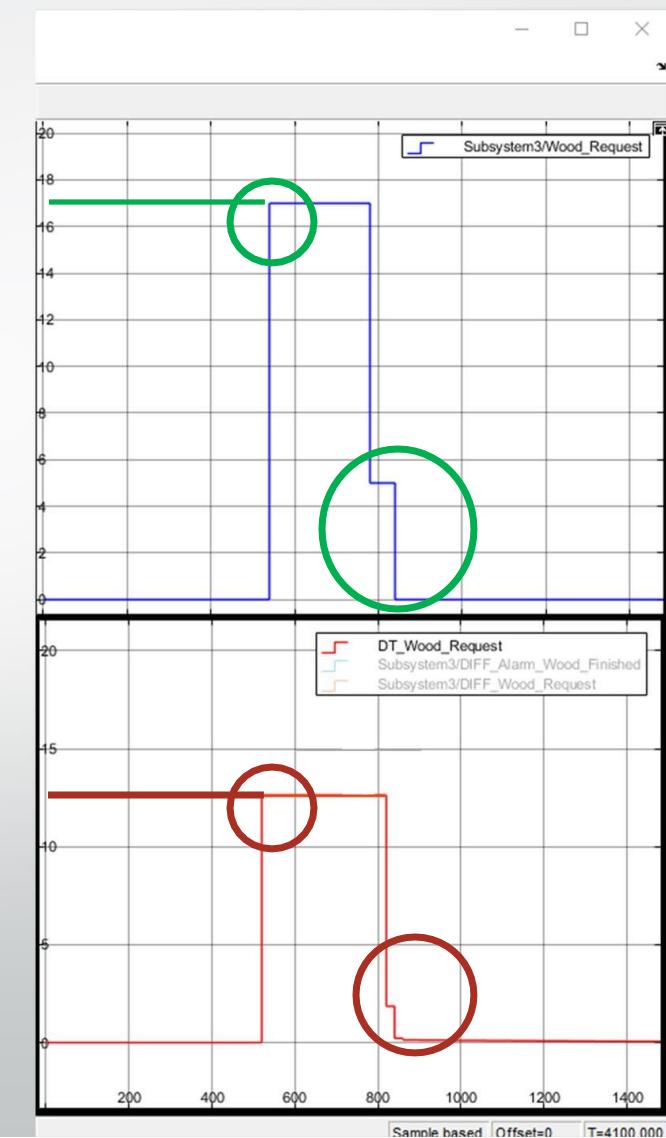


- "Normal" orchestrator
- Connects management levels to plant and operational elements
- Directs data and commands

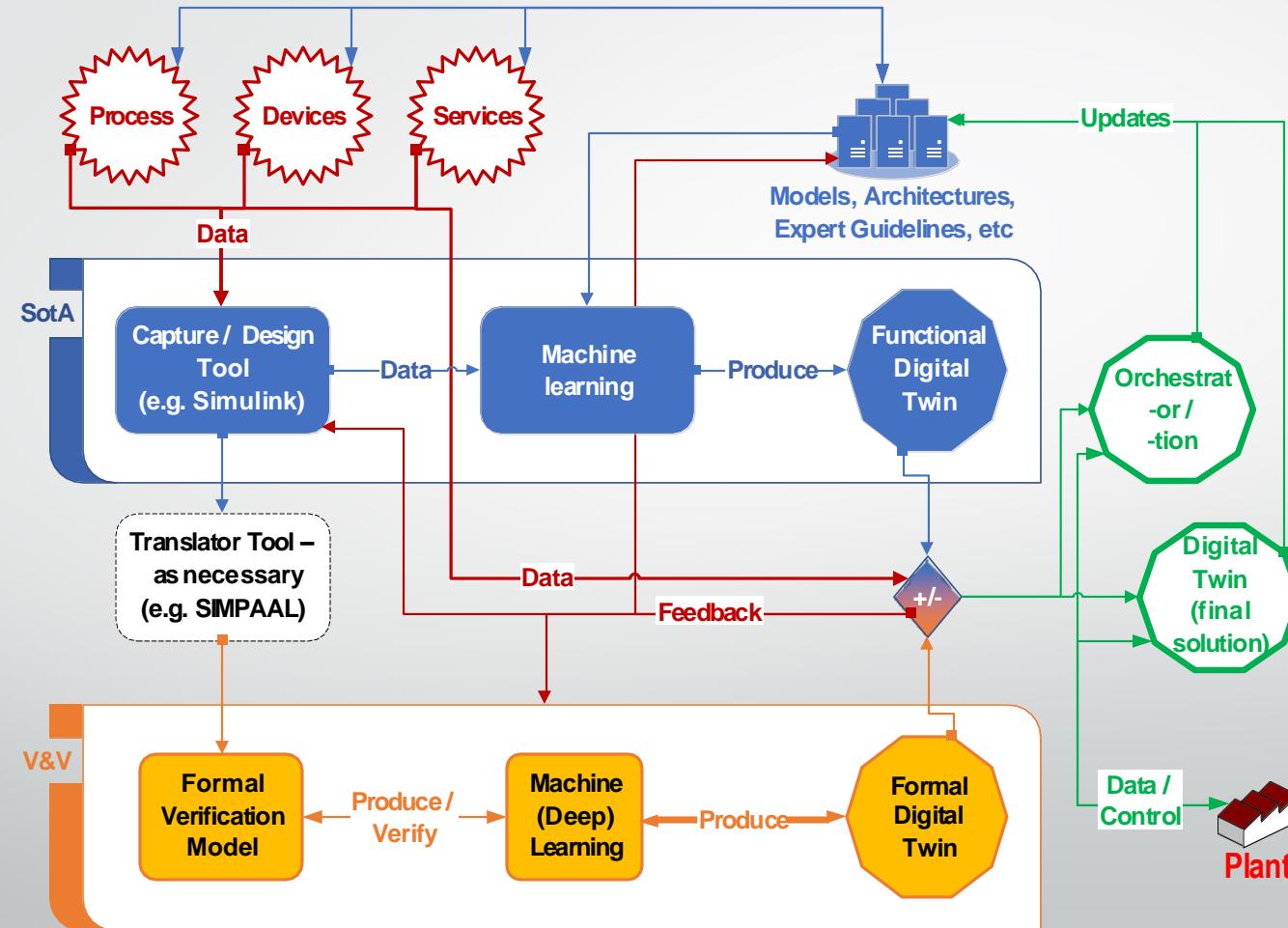
- "High performance" orchestrator
  - Required to have a good response time, providing fast synchronisation
  - Connects the various contexts when & where necessary
  - Makes the connection to V&V and "local" ML services



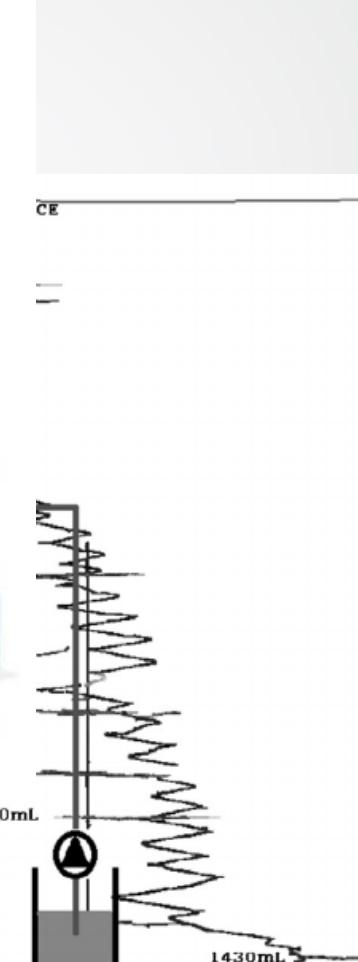
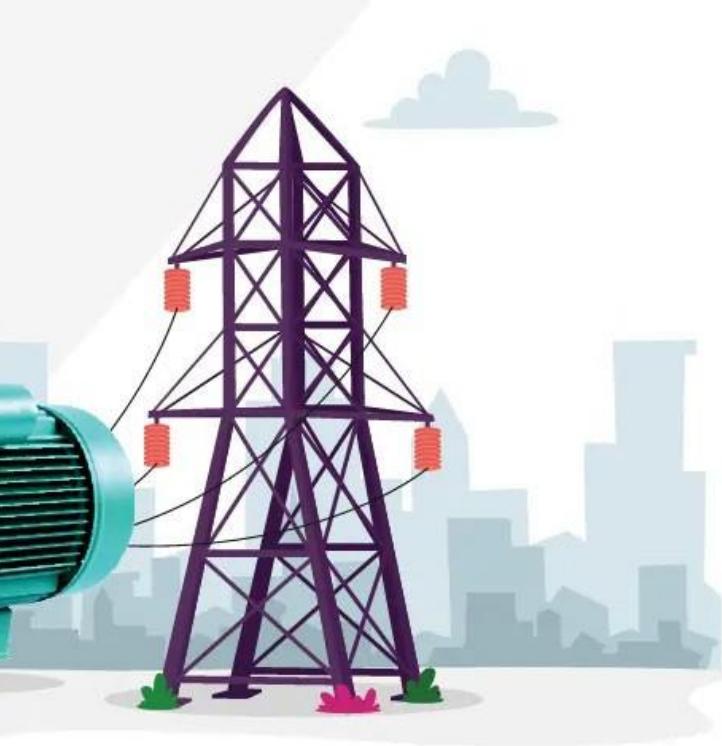
V&V



# The Framework



# UC: Mine Dewatering System



# Still (a lot) To Do ("big" picture)...

- Integration of the framework
- Clarify in detail (additional) V&V approaches
- Physical ("...") T  $\leftrightarrow$  Digital T communication
- Enrich prediction methods
- Extract common aspects (from UCs...)  $\rightarrow$  generalize (?)
- Develop other (secret!) ideas...
- ...

# Conclusions

- Building a (composable) DT is not easy ☺
  - Each output (may) need specific ML analysis
- Determinism is CRITICAL
  - SoA approach helps bring this in
  - ... where timing constraints are not high...
  - At the cost of
    - Additional components (orchestrators)
    - More complex DTs
- A SoA does not eliminate all the issues (and many systems may not allow for a SoA approach...)
- Replacing an actual device with the respective DT may provide local "bad" responses which also may be "smoothed out" at the overall system levels
  - How many of such "bad" responses can a system "take"?
- Solutions come (must be adapted) from V&V world

Projekt

Menti.com 1688 4975

Testbed Air Mobility,  
Johan Sehlstedt



# AIR MOBILITY

An open Testbed for research and development for Innovative Air Mobility.

Acollaboration between:

Drone Count

27

Drones Using DAA

0

Average DAA

%

Space

FL 660

C

FL 95

TMAC

G

2500ft

GND

CTRC



Space

FL 660

C

FL 95

TMAC

G

4500ft

GND

CTRC



U Space



A sleek, modern green sports car, possibly a Tesla Model S, is parked in a grassy field. The car is positioned in the upper half of the frame, angled slightly towards the viewer. The background features a clear sky and a range of mountains in the distance. The overall aesthetic is clean and minimalist.

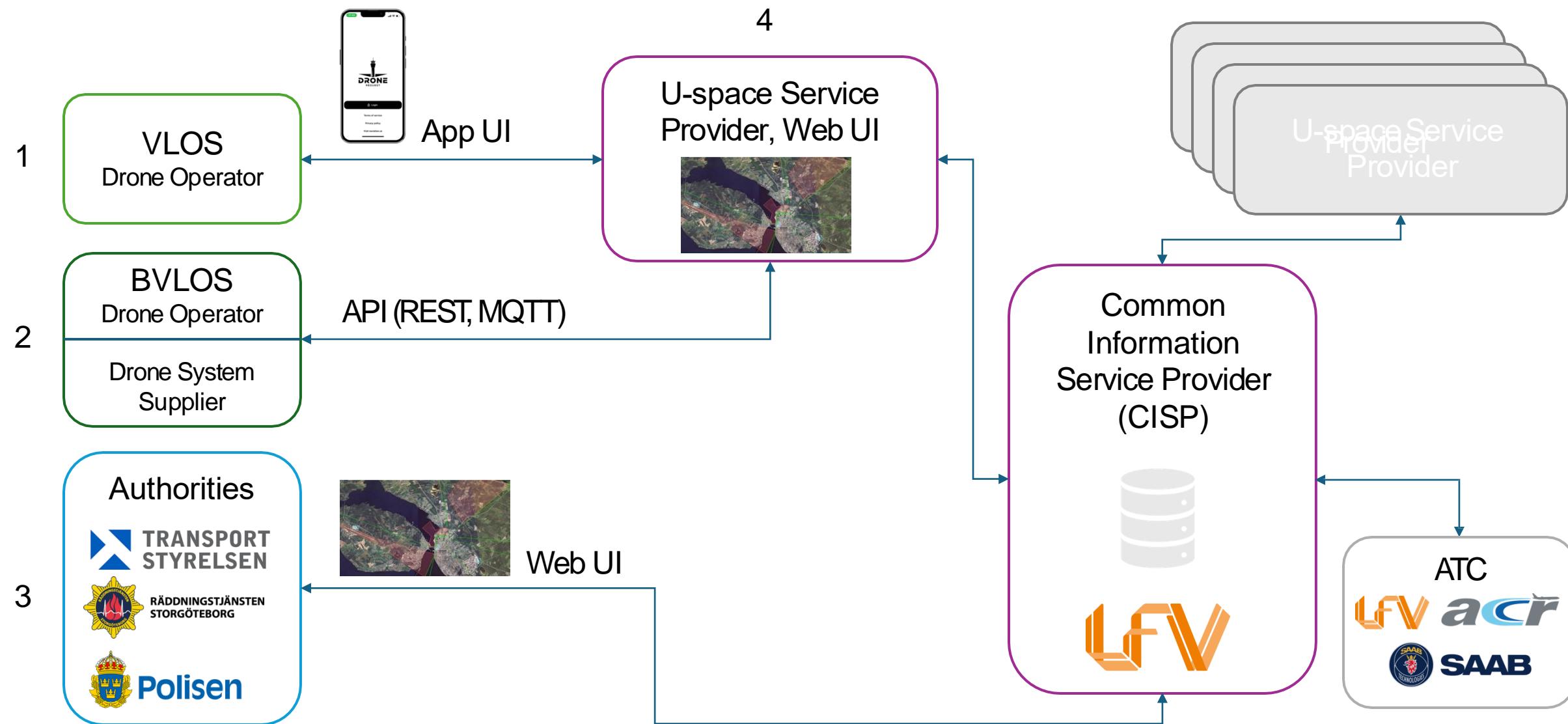
# NORROAD



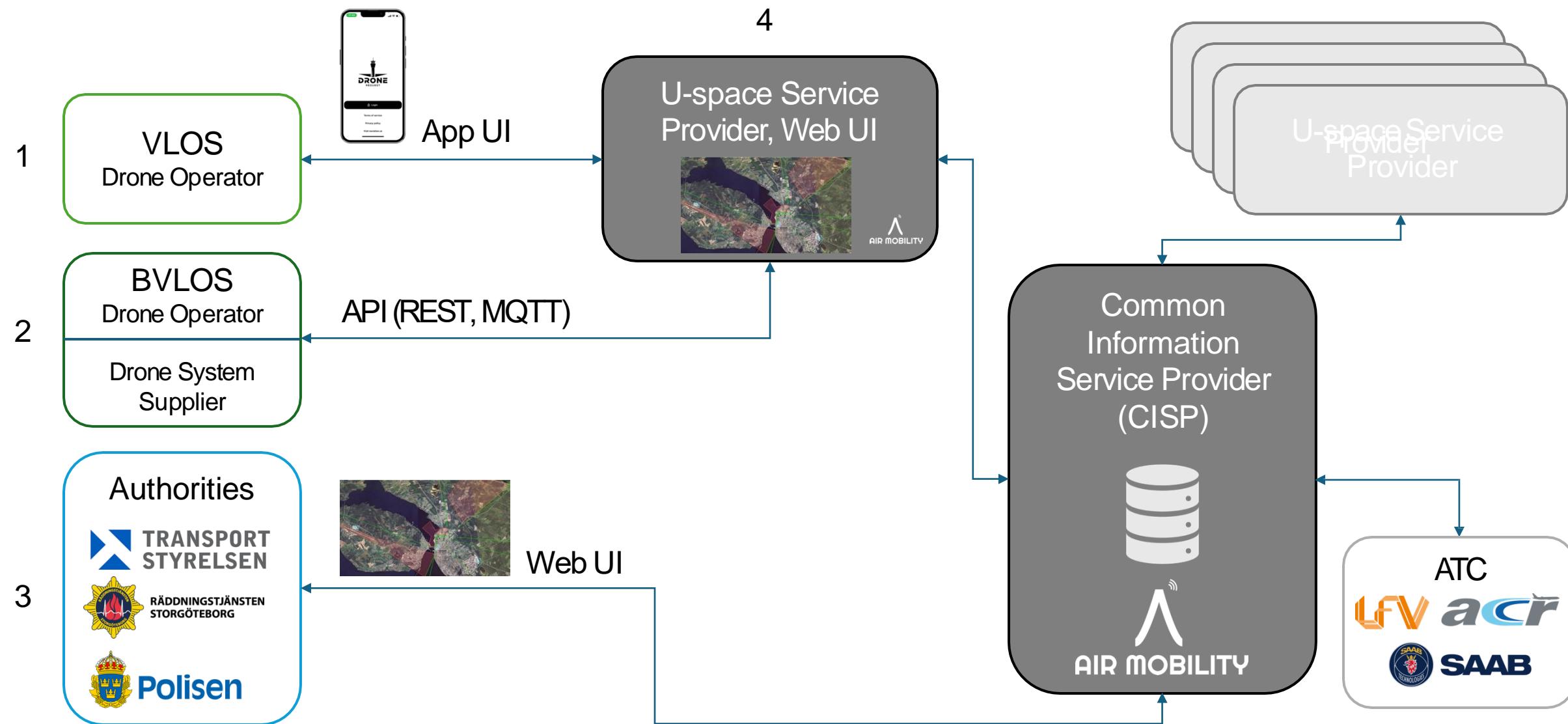
# How do we get a functioning drone ecosystem?

A white and black quadcopter drone is shown from a top-down perspective, flying over a rural landscape. The drone has four propellers and a camera mounted below it. It is positioned centrally in the frame, with its body angled downwards towards the ground. The background features a large, calm lake surrounded by lush green forests and rolling hills. In the foreground, there are several small, red wooden houses with grey roofs, typical of Scandinavian architecture. A paved road or path leads through the houses from the bottom left towards the center of the frame.

"See and be seen"



Final ecosystem late 2026



# Draft ecosystem early 2025



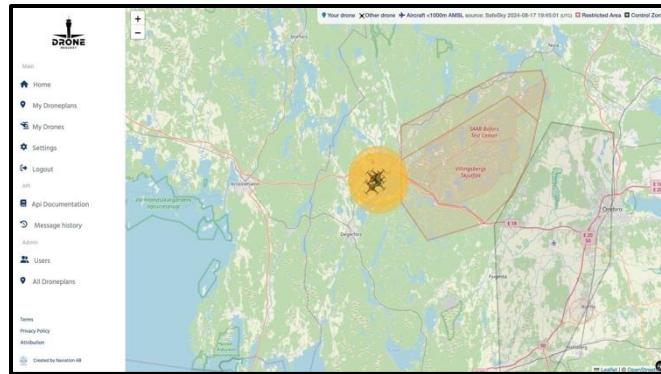
# 1 VLOS Drone Operator

- Photography and Videography
- Agriculture
- Surveying and Mapping
- Public Safety
- Inspections
- Recreational Use
- Environmental Monitoring

On board via



# 2 BVLOS Drone Operator



Delivery Services  
Pipeline and Power Line Inspections  
Agricultural Management  
Environmental Monitoring  
Disaster Response and Recovery  
Surveying and Mapping  
Security and Surveillance  
Maritime Operations  
Transportation and Logistic

On board via



Dronerequest PRO webapp & API  
Användare och ID:  
[mattias@naviation.se](mailto:mattias@naviation.se)



# Other stakeholders

2 Drone System Manufacturer  
(BVLOS)

3 Authorities

4 U-Space Service Providers

On board via



Johan Sehlstedt  
Concept Development  
[johan.sehlstedt@saabgroup.com](mailto:johan.sehlstedt@saabgroup.com)  
031-794 92 45



# AIR MOBILITY

# THANK YOU

Drone Count

27

Drones Using DAA

0

Average DAA

0%

<https://portal.airmobility.se>

- Fast Forward 13x
- Add Saved Content
- Add Manned Traffic
- Add Recorded Path
- Add Point-to-Area Service



NexSoS,  
nätverksstött utbyte av kritisk information,  
Ulrika Engström och Mattias Wildeman

The background of the slide is a photograph of a forest fire. In the foreground, several small fires are visible, with bright orange and yellow flames and thick white smoke billowing upwards. The surrounding trees are dark green pine trees. The sky above is a mix of blue and white clouds.

# NEXSoS\*

“Digitalisering av  
skogsbrandsbekämpning”

Ulrika Engström, Mattias Wildeman  
Ericsson Research

Bildkälla:[Kartor för krisberedskap och blåljus](#), nedladdad 2024-12-16

\*Network-Enabled eXchange of critical information in  
Systems-of-Systems

# 1. NEXSoS Vision och Scenario

## Vision

Förbättrad lägesbild för brandmän i fält och ledningspersonal genom framsteg inom nationell digital infrastruktur för att möjliggöra snabbare och effektivare insatser.

## Teknik

Den nya teknik som NEXSoS industripartner (Ericsson, Combitech, Telia) utvecklar kan ha mycket stort värde i samhällskritiska scenarion. Vi vill tillsammans utforska den potentialen.

## Applikation

Inom samhällskritiska scenarion har vi valt att fokusera på skogsbrandsbekämpning. Dels är samhällsnyttan stor vid effektivare insatser, dels anser vi att vår teknik kan tillföra stor nytta i detta scenario.

## Kontext

De senaste åren har extremt stora bränder inträffat runt om i världen med stor påverkan på människor och miljön. I framtiden kan vi förvänta oss en ökning av högriskperioder för skogsbränder i Sverige, enligt SMHIs analys av brandrisk i ett förändrat klimat.

## Utmattningar

Många aktörer (Räddningstjänst, MSB, Trafikverket, annan blåljuspersonal,...) med isolerad information.

Teknik finns men är sällan anpassad för användning i samhällskritiska scenario.

Regulatoriska hinder och lagstiftning.



# 2. NEXSoS Deltagare / Översikt



<b>Syfte</b>	Digitalisering av skogsbrandsbekämpning
<b>Projekttid</b>	Juni 2024-juni 2027 (3 år)
<b>Budget</b>	38 481 290 SEK (totalt över 3 år)
<b>Finansiering</b>	19 239 841 SEK från Vinnova



User Groups

**WASP** | WALLENBERG AI,  
AUTONOMOUS SYSTEMS  
AND SOFTWARE PROGRAM

**TECOSA**

- Telia Northstar
- ED5GE Developer Community

Forums



**ERICSSON**

**COMBITECH**



**RISE**

Partners

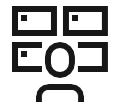
**VINNOVA**  
Sveriges innovationsmyndighet

Avancerad Digitalisering

# 3. NEXSoSHuvudarbetsätt och Nyckelleverabler



Tätt samarbete med användargrupper för att förankra och leverera relevant forskning.



Årlig djupgående utvärdering på WARA-PS testcenter "Gränsö"



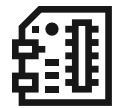
Iterativt arbetssätt: Tidiga koncept, tidig utvärdering, tidigt lärande, korta utvecklingscykler.



Demonstrera nyttan av ny teknik i samhällskritiska scenarion med höga och snabba behov av informationsdelning. Tidig påverkan av teknikutvecklingen så att den levererar på behoven från samhällskritiska scenario.



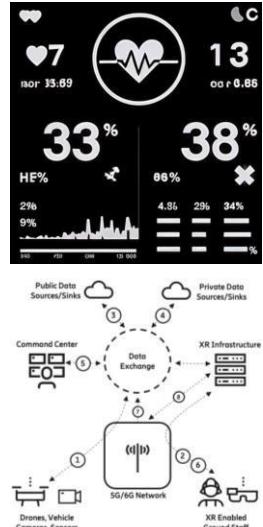
Förstå hur teknik och regulatoriska faktorer kan samspele, identifiera tekniska och regulatoriska förändringar som är nödvändiga.



Tre teknikhuvudområden: Datadelning, Robusta nätverk, XR som datakälla och användargränssnitt

# 4. NEXSoS Målbilder

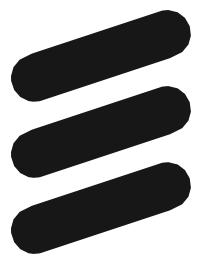
1. Kontrollrum med digitaliserad lägesbild, t.ex. sensorflöden, detaljerad hälsodata, "person i fara" identifikation, ...
2. Fältpersonal som fullvärdig konsument och producent av digital data
3. Privat och publik data- och nätverksinfrastruktur i full samverkan
4. Datainhämtning och analys av alla tillåtna datakällor
5. Enkel anslutning av nya resurser till pågående insats



Kontaktinfo/Mer att läsa:

[NEXSoS banar väg för effektivare datadelning genom nya standarder - Avancerad Digitalisering](#)

[Ulrika.engstrom@ericsson.com](mailto:Ulrika.engstrom@ericsson.com)



Projekt

Menti.com 1688 4975

ADAPT - Advanced Digital Skills Policy Labs,  
Mattias Wiggberg

# A D A P T

**Mattias Wiggberg ([wiggberg@kth.se](mailto:wiggberg@kth.se)), Digital Transformation & AI, Indek, KTH**

ADVANCED DIGITAL SKILLS  
POLICY LAB FOR ACADEMIC  
TRANSFORMATION



Vi är finansierade av innovations- och  
forskningsprogrammet Avancerad Digitalisering





ADAPT

ADVANCED DIGITAL SKILLS  
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TRANSFORMATION



KTH  
ROYAL INSTITUTE OF TECHNOLOGY



ÖREBRO  
UNIVERSITET

Where is the mass movement  
for competence renewal in  
relation to universities?



LJU  
LINKÖPING  
UNIVERSITY



CHALMERS

# Problems pointed out by the labor market

- Courses for professionals often have lower priority
- Slow pace of universities in terms of new education
- Difficult to find the right education
- Slow, complicated and inflexible admission
- Courses that are too long



ADAPT

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ROYAL INSTITUTE OF TECHNOLOGY



ÖREBRO  
UNIVERSITET

LU  
LINKOPING UNIVERSITY



CHALMERS  
UNIVERSITY OF TECHNOLOGY

# Problems pointed out by the universities

- Lack of incentives for teachers
- Poor financing models
- (Too) Strict laws and regulations
- Internal cultural norms
- Recognisability for teachers
- Focus on traditional education programs
- Formal admission processes
- Non-flexible course offerings/setups



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POLICY LAB FOR ACADEMIC  
TRANSFORMATION

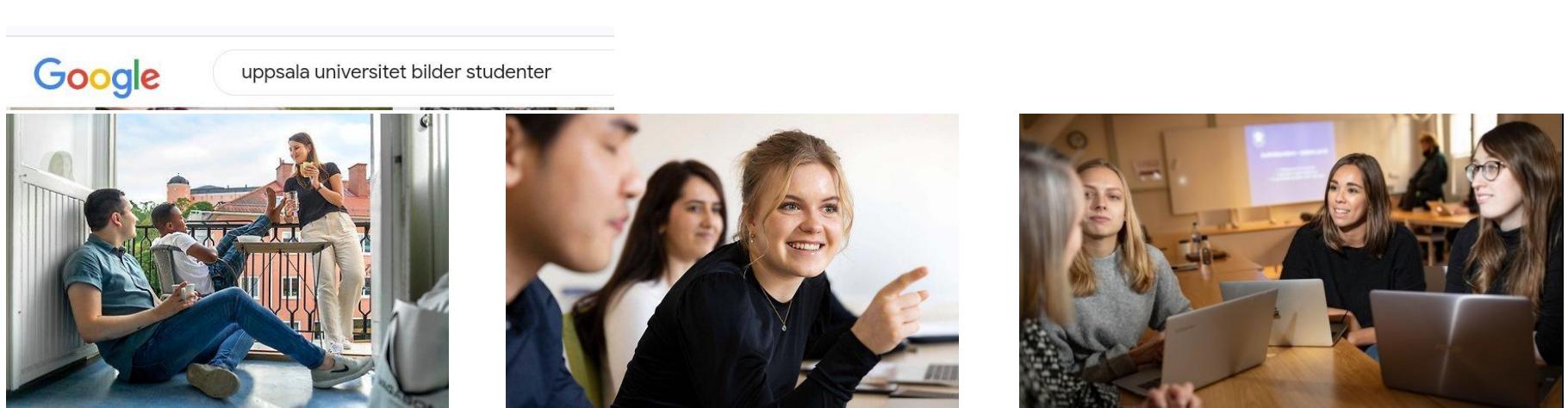




ADAPT  
ADVANCED DIGITAL SKILLS  
POLICY LAB FOR ACADEMIC  
TRANSFORMATION



# Traditional university model seem **unfit** for competence renewal needs



# ADAPT Vision



ADAPT

ADVANCED DIGITAL SKILLS  
POLICY LAB FOR ACADEMIC  
TRANSFORMATION



KTH  
ROYAL INSTITUTE OF TECHNOLOGY



Create a Swedish blueprint for a lifelong learning at HEIs (universities) aimed at developing competencies for advanced digitalization for industry.

# Expectations of ADAPT

## The ADAPT blueprint

An efficient, well adopted, timely and adequately financed lifelong learning system where universities and industry produce learning opportunities in the tech field directed to individuals in the workforce.



## *Guiding research question*

What actions and structural/cultural changes in the higher education institutions, their regulatory setup and their interaction with the surrounding industries are needed to create the ADAPT blueprint?

# Policy lab method

ADAPT aims for the vision through a policy lab that uses user-centric methods and competencies to test, experiment and learn to develop new policy solutions for higher education to support professional development.



# Some results, so far

- An outline and survey of policy lab methods
- Internationalisation collaboration initiated with Singapore (they started their journey 2006...)
- Catalogue and Mapping of LLL initiatives in Sweden
- Ongoing articles and analysis of
  - Elements of AI and empirical analysis
  - Sweden vs. Singapore comparison
  - <more to come>
- Five policy Lab experiments to run Spring 2025 (batch 1)



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TRANSFORMATION



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UNIVERSITET

# Thanks & Questions



# Summering

# Tack!

Nu dags för fika, utställning  
och gemensamt pass.