Radarize

Project leader
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Partners
Örebro University, Retenua AB, Epiroc Rock Drills AB, Volvo Construction Equipment AB, Boliden Mineral AB

Project duration
April 2022 – March 2025

SWEDISH MINING INNOVATION

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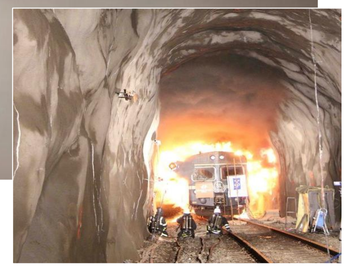
Goals of Radarize

Perception and navigation in low-visibility conditions

1. **Accurate navigation** in low-visibility conditions
2. **Human/obstacle detection** in low-visibility conditions

… in other words, **radar** for perception and navigation



ÖREBRO UNIVERSITY

RETENUA
Intelligent Sensor Systems

Epiroc

VOLVO

NEW BOLIDEN

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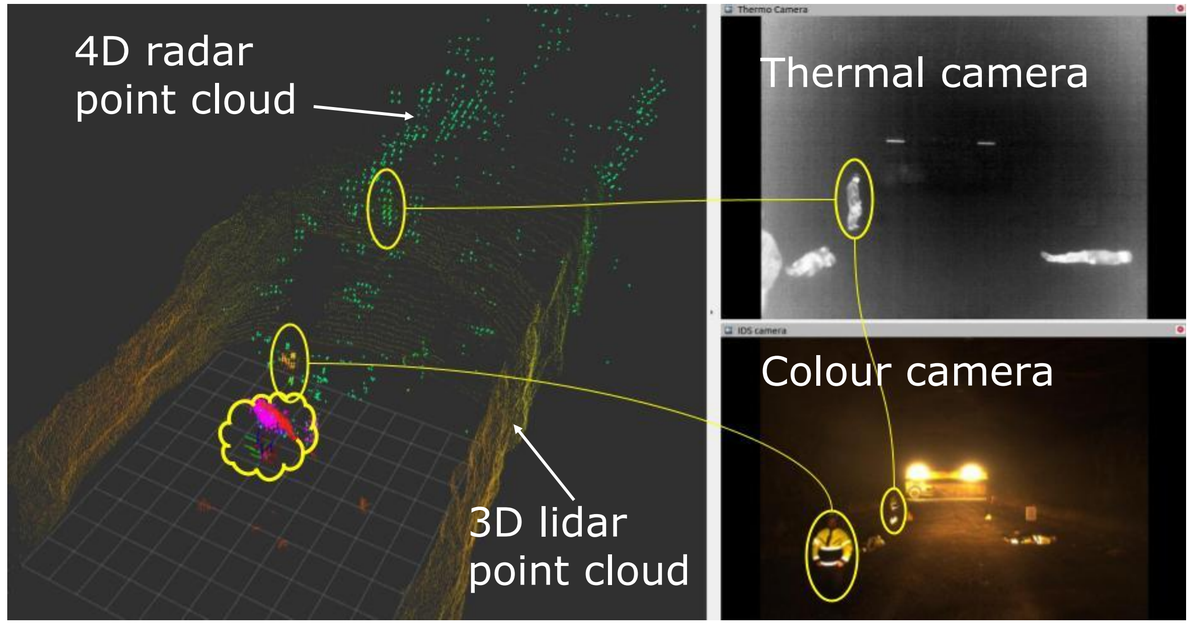
Radar vs other sensor modalities

- Radar penetrates dust well
- but is sparse and noisy.
- How to make use of the data,
  for mapping and localisation?
  for people detection?



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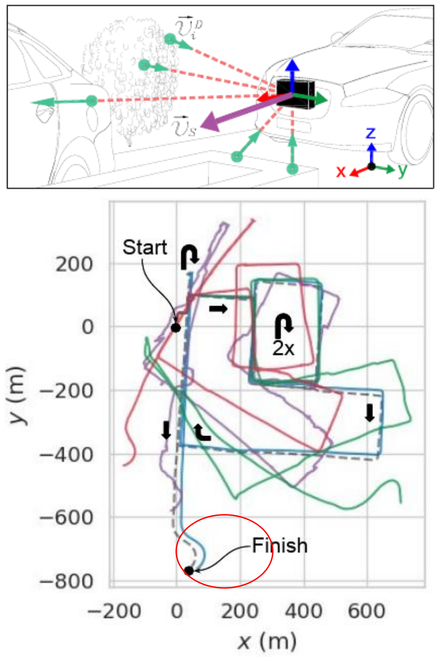
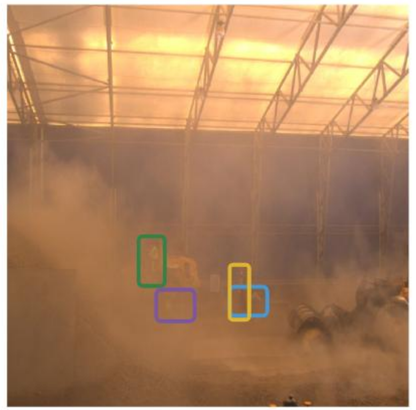
Main results so far

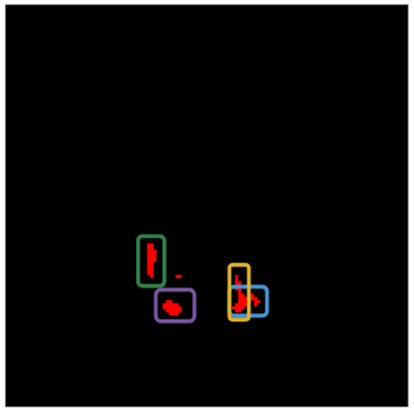
- State-of-the-art
  2D radar SLAM ("TBV-SLAM")
- Correspondence-free 4D radar odometry



- Semantic segmentation of humans in 4D radar data



RGB image



TMVA4D prediction

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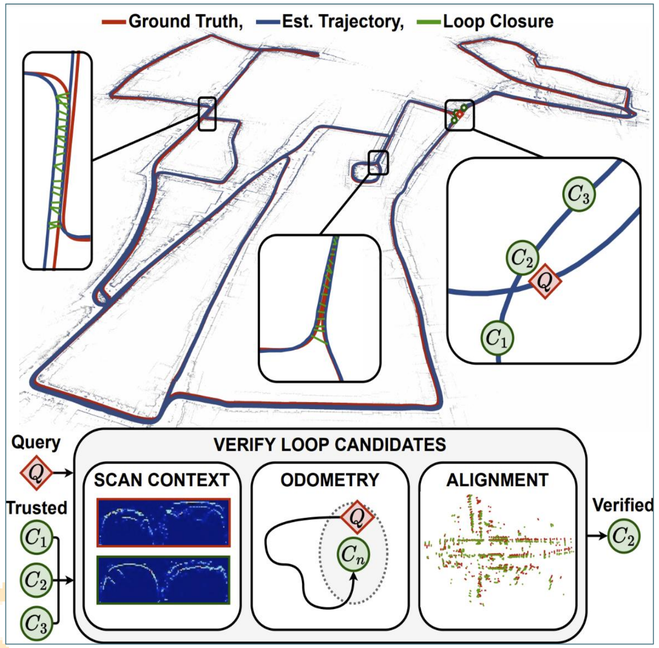
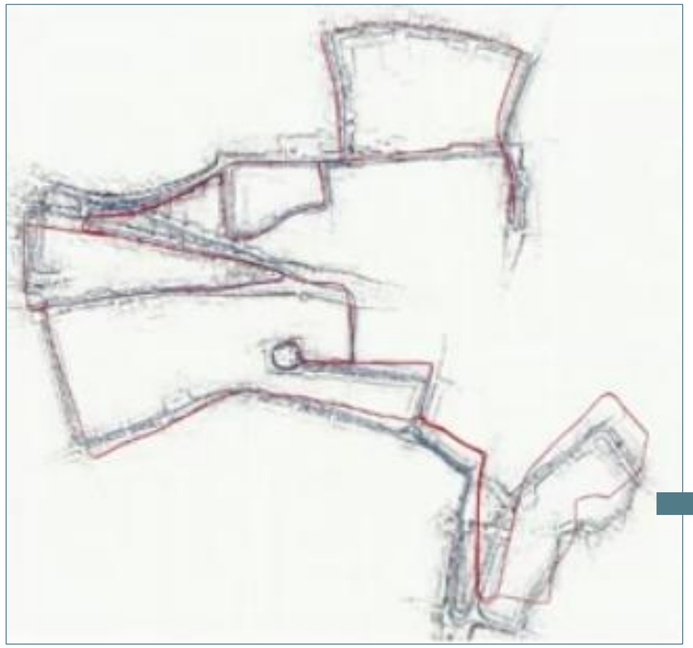
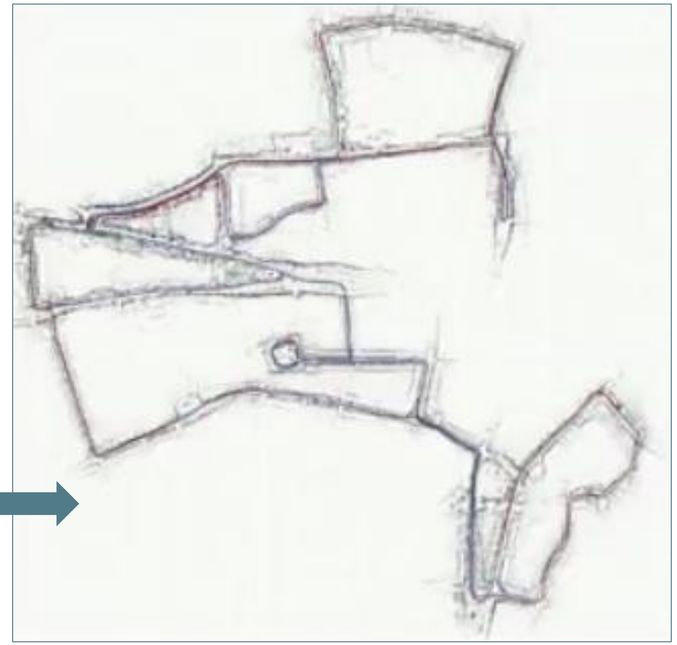
Radar navigation

- State-of-the-art 2D radar SLAM ("TBV-SLAM")







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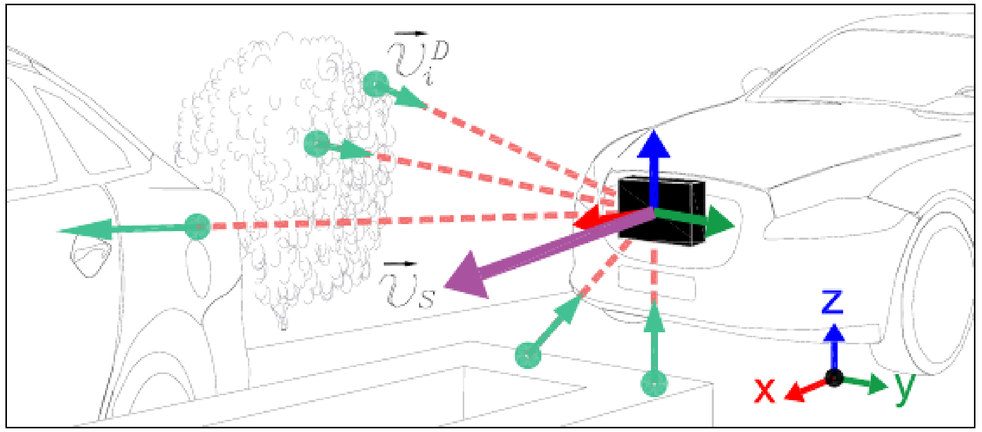
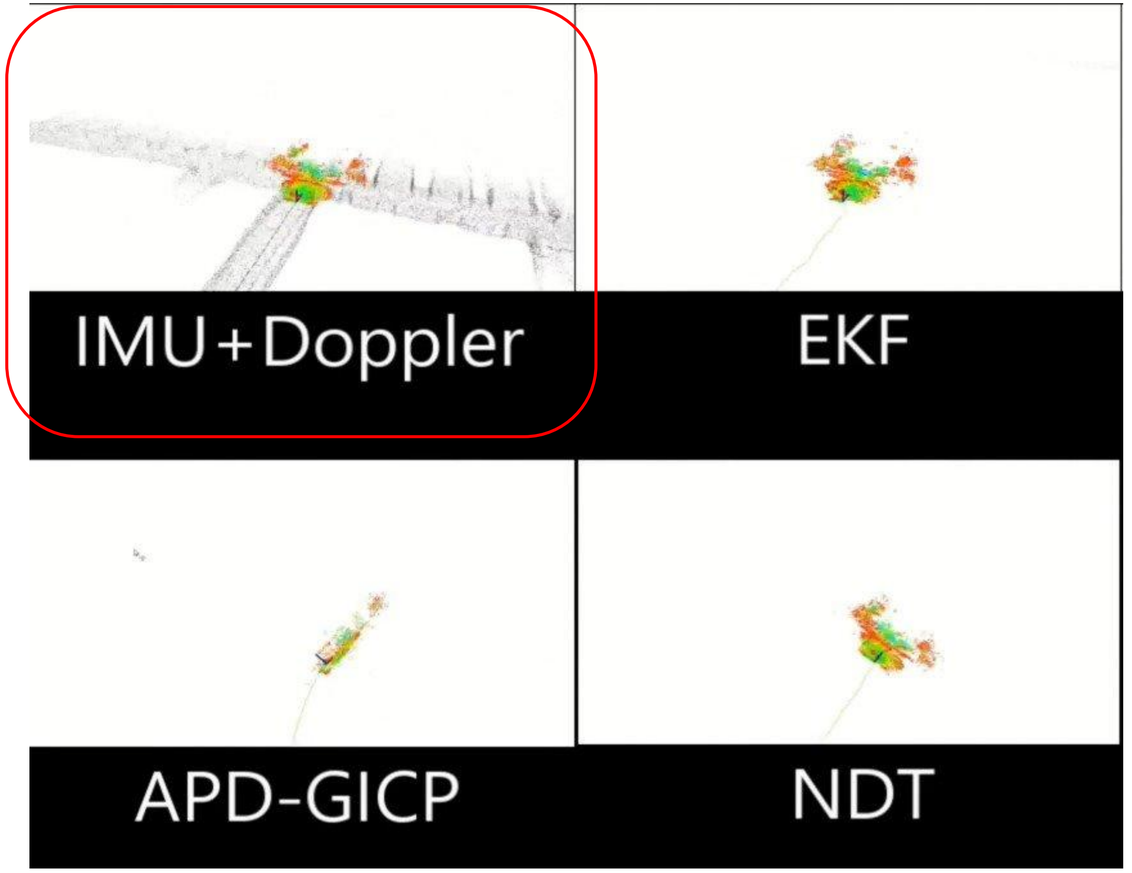
Radar navigation

- Correspondence-free 4D radar odometry (robust to featureless mine tunnels)





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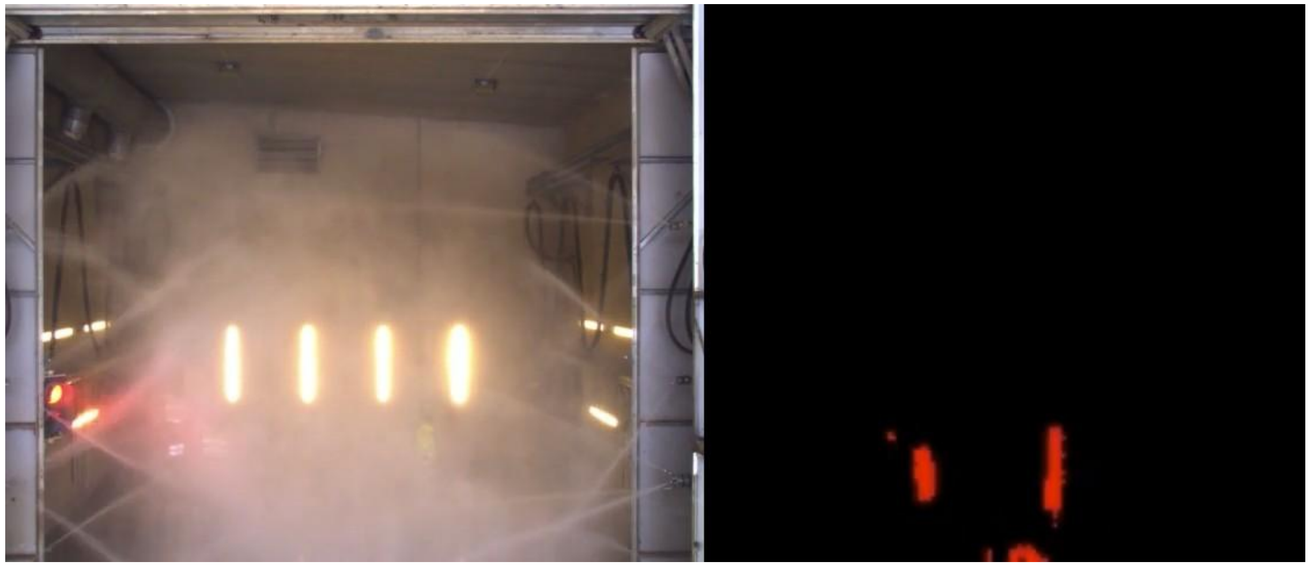
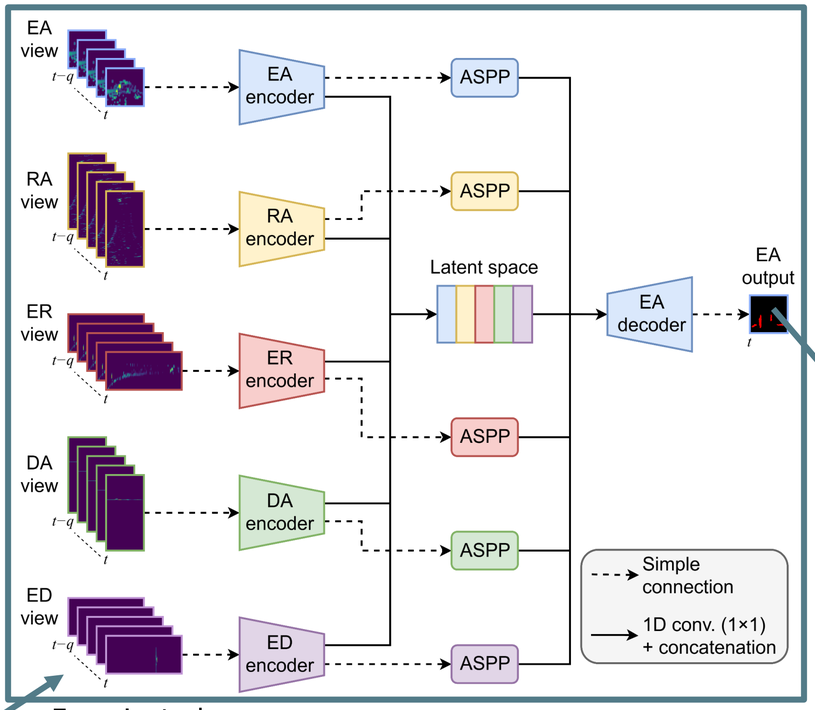
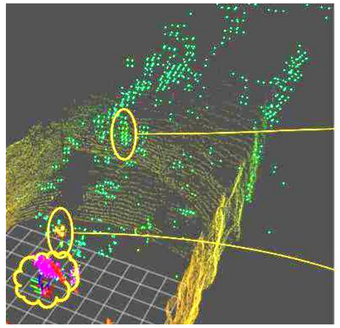
Radar people detection





Detected people (segmentation mask)



4D radar point cloud

5 projected heatmaps

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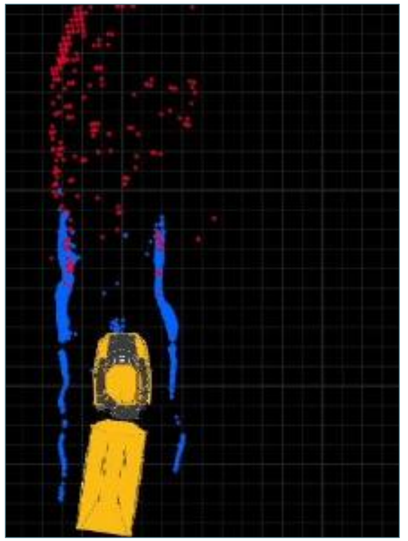
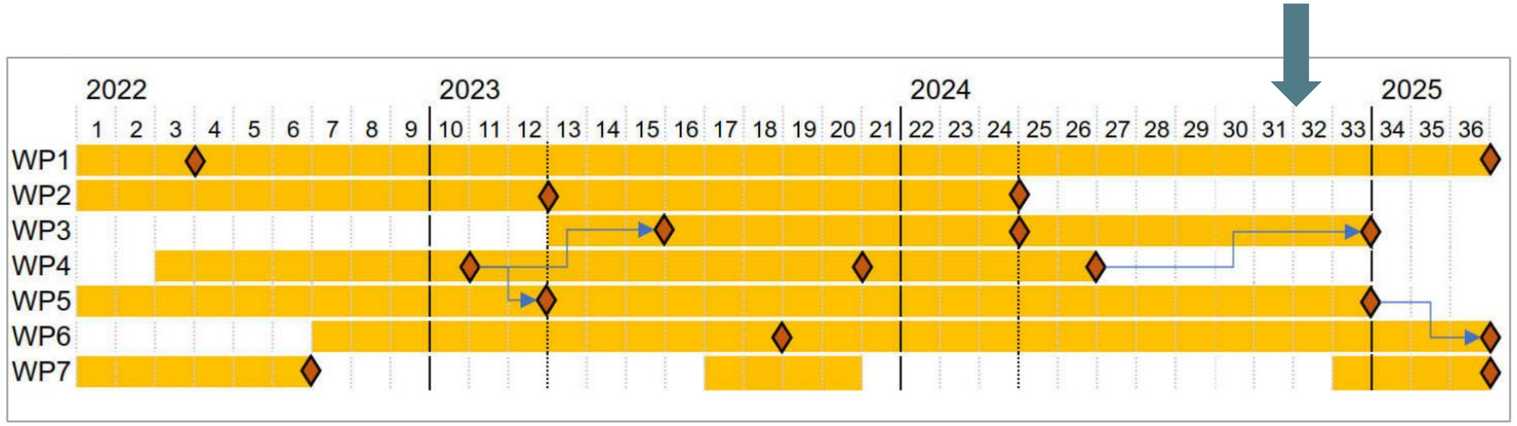
Upcoming activities and next step

- Final demonstration in March 2025
- Multi-class semantic segmentation (rocks, negative obstacles)
- Exploring point clouds vs heatmaps for object detection





Mining innovation for a sustainable future

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