

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



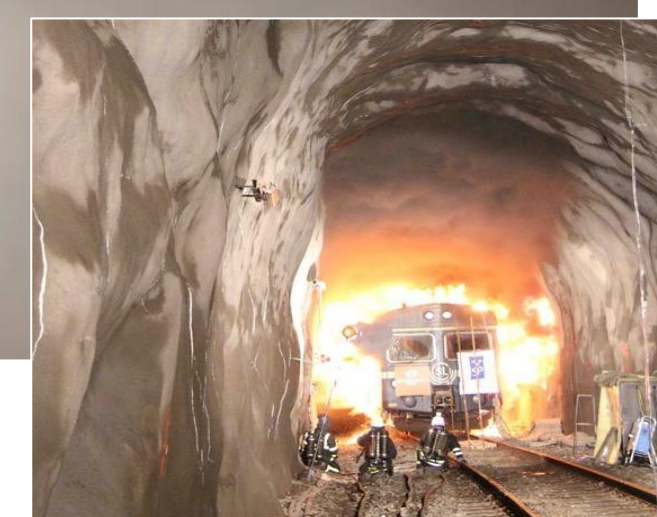
Goals of Radarize

Perception and navigation in low-visibility conditions

1. Accurate navigation in low-visibility conditions

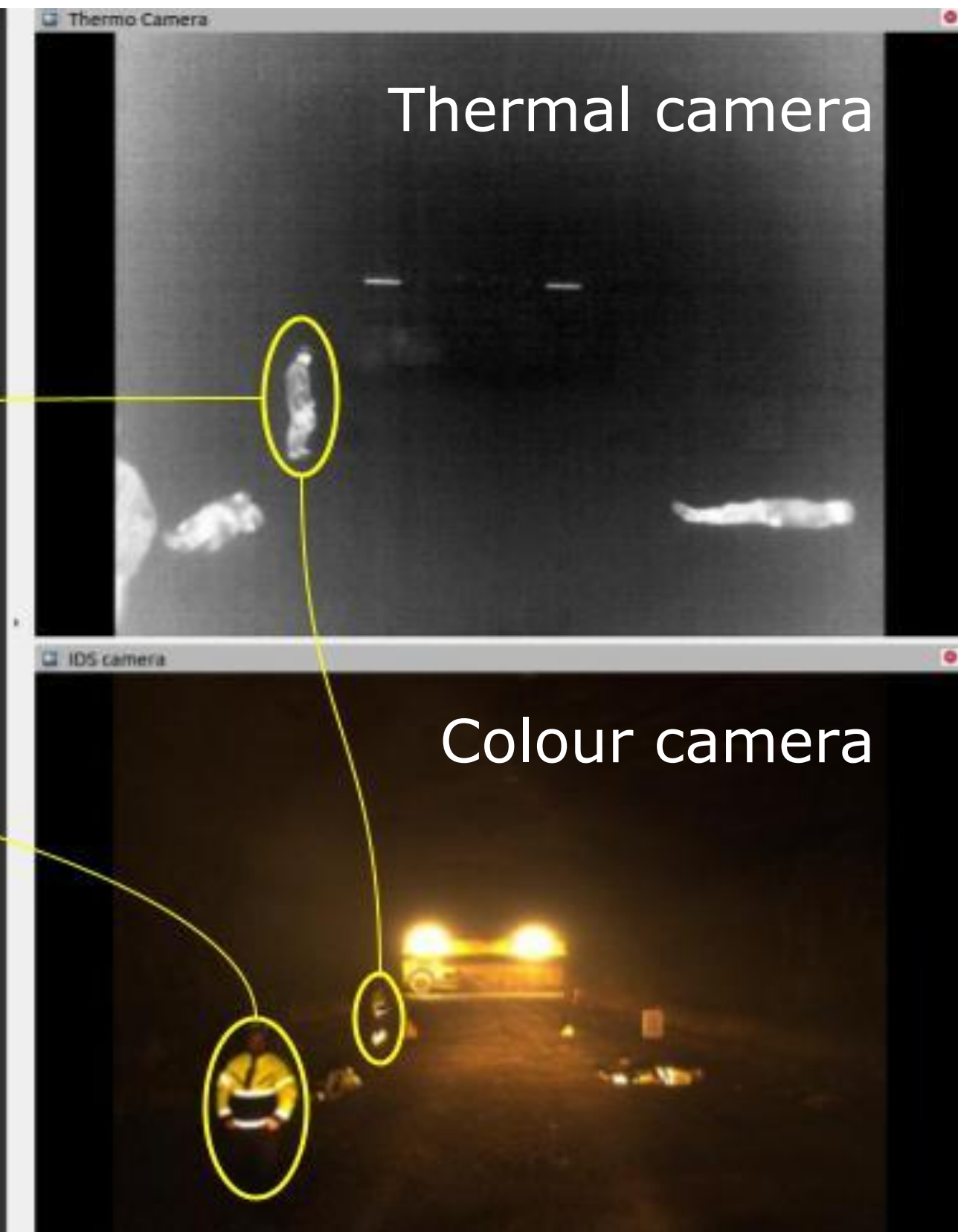
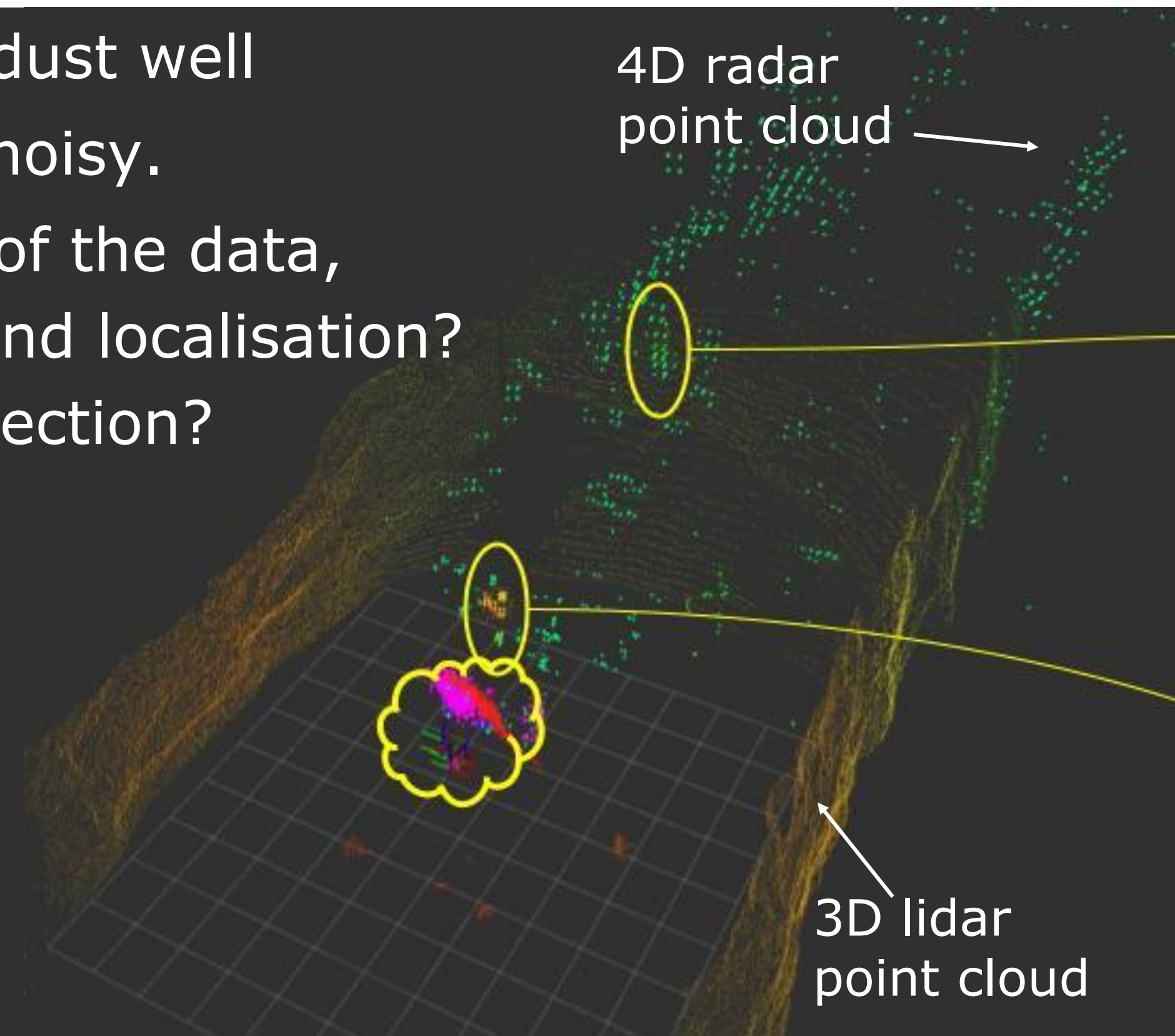
2. Human/obstacle detection in low-visibility conditions

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



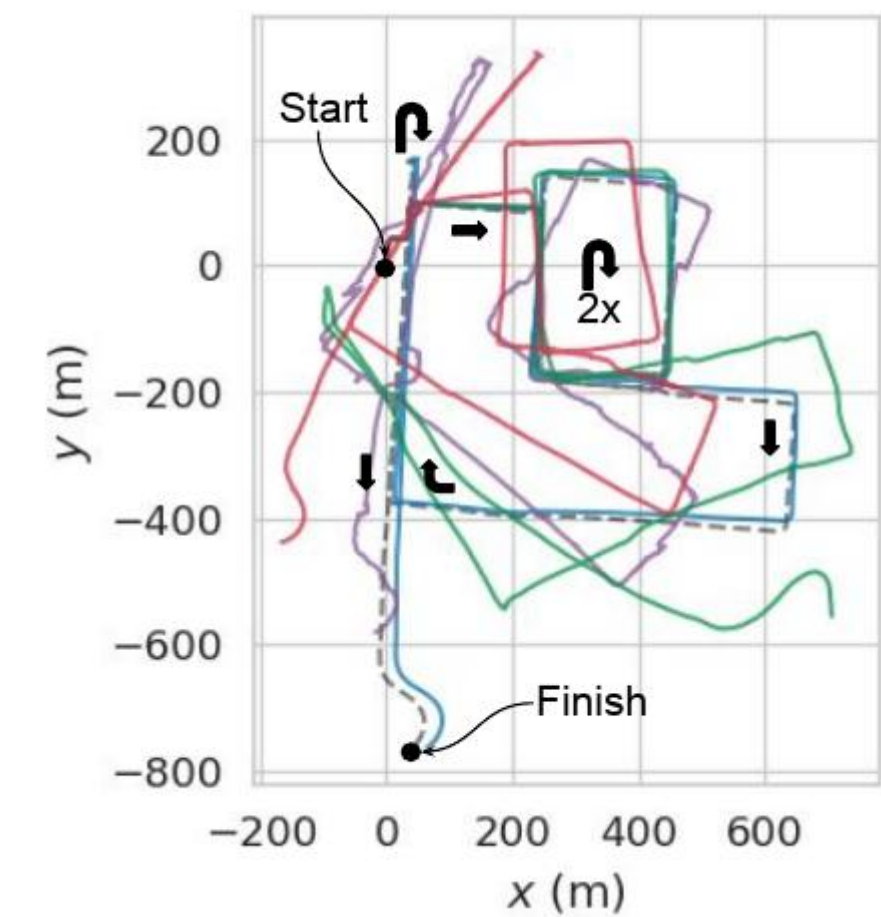
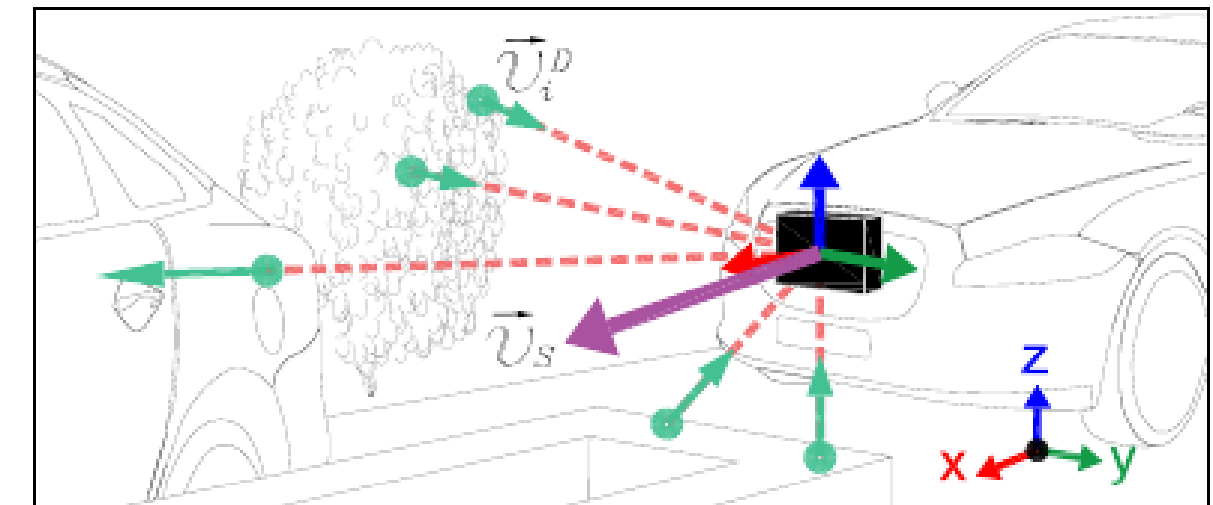
Radar vs other sensor modalities

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



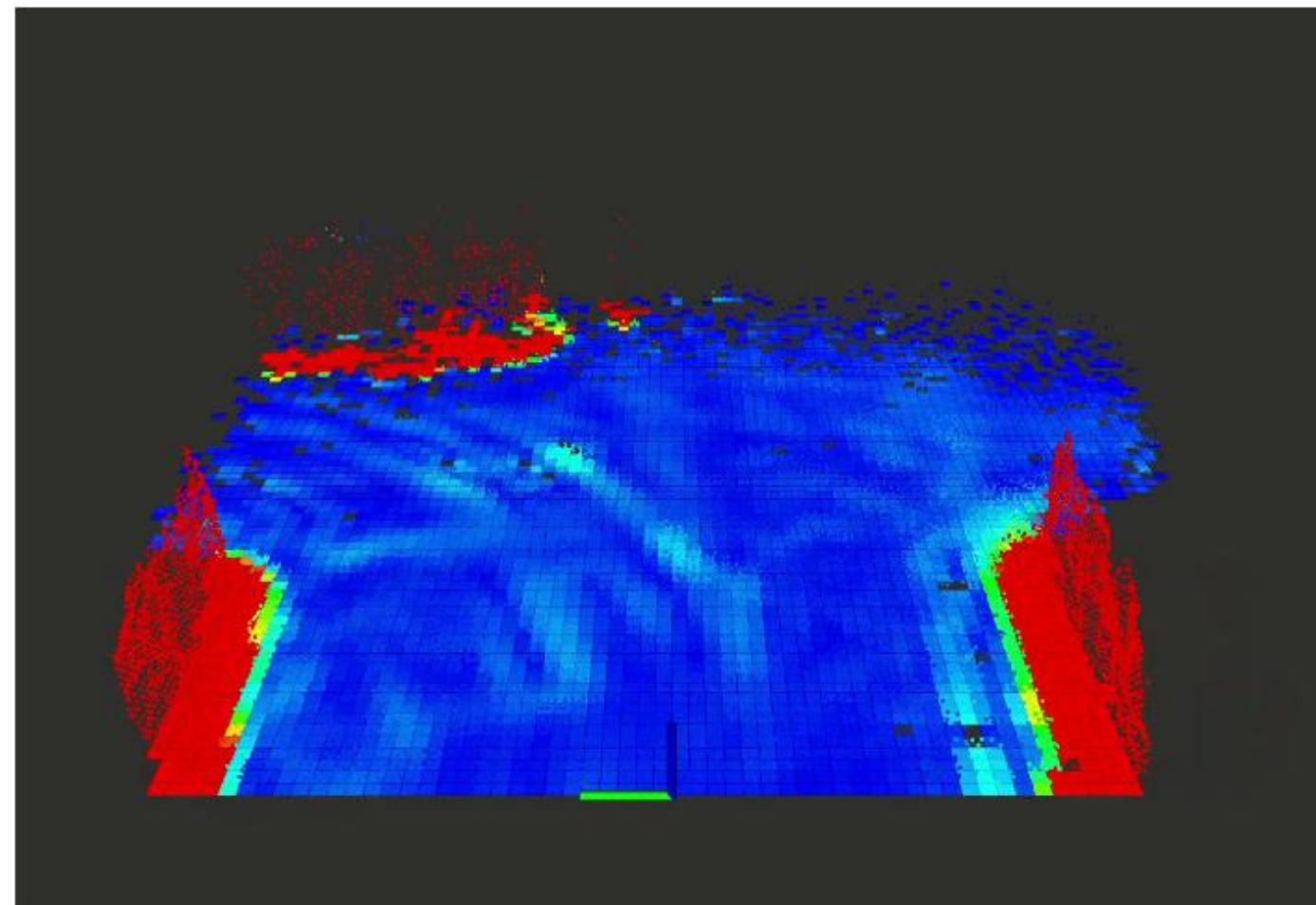
Main results: state-of-the-art radar SLAM and odometry

- "TBV" radar **SLAM**
- Correspondence-free radar **odometry**

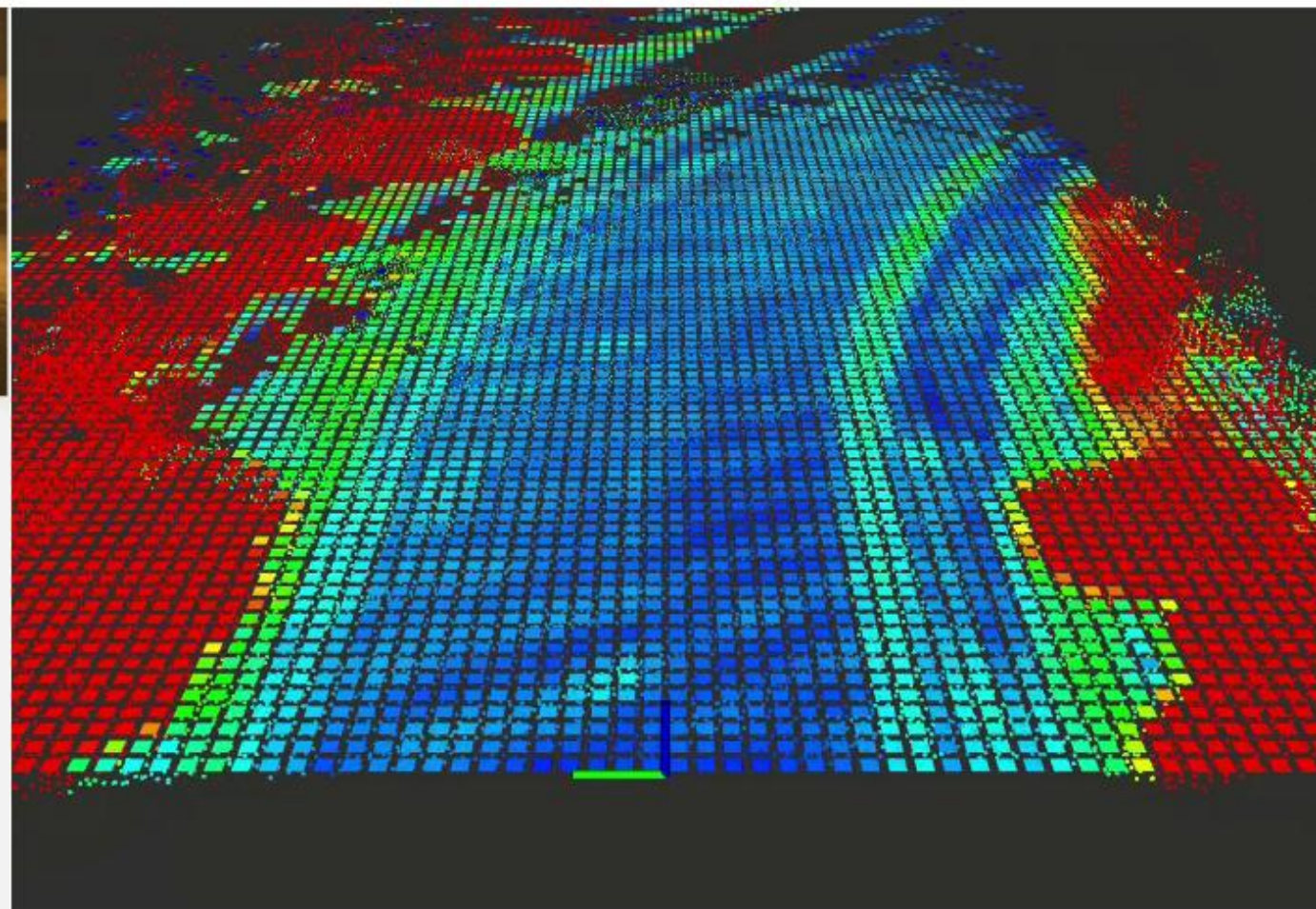


Main results

- **Traversability** analysis from radar



Powered by 

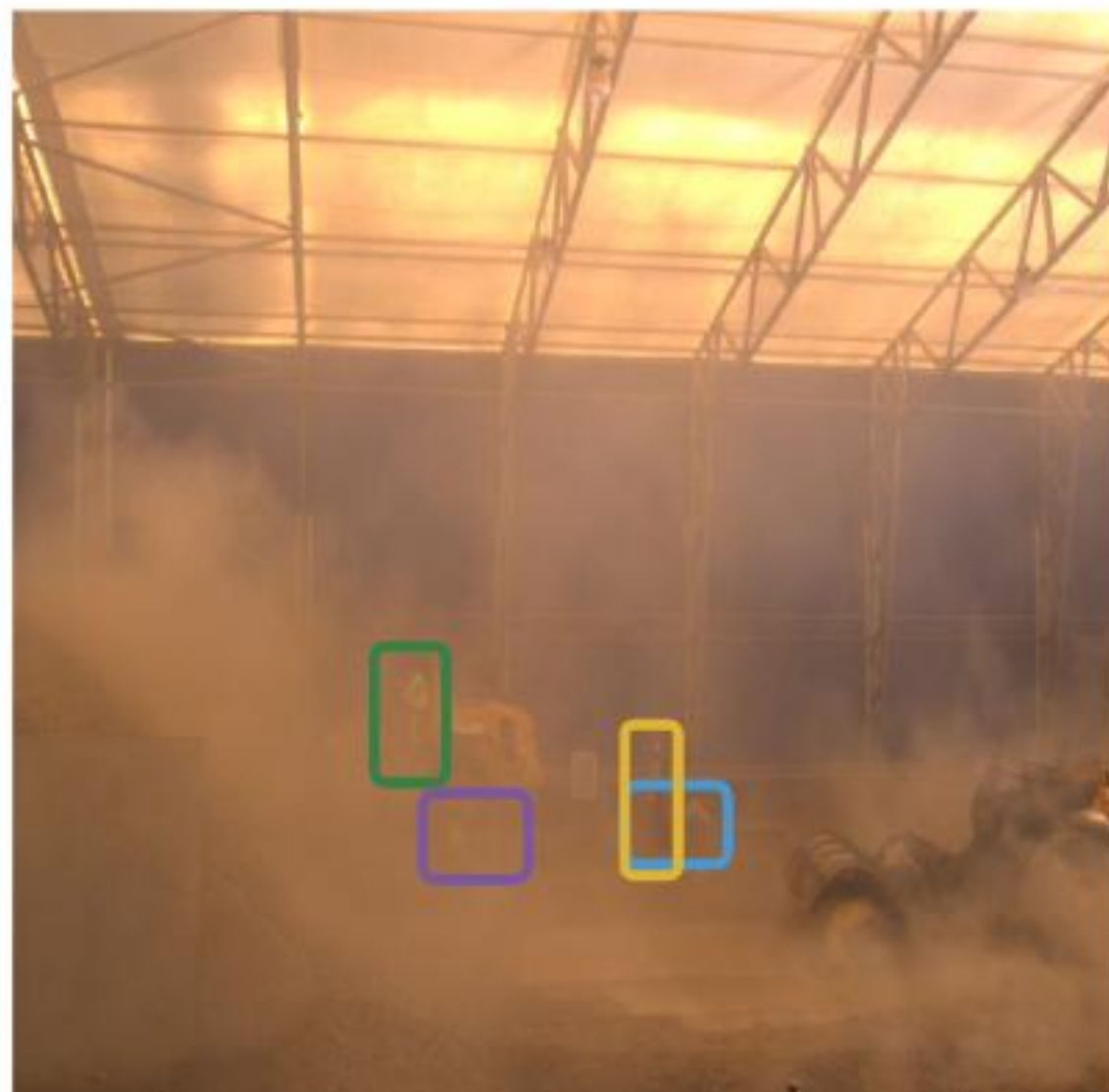


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Main results: semantic segmentation in 4D radar

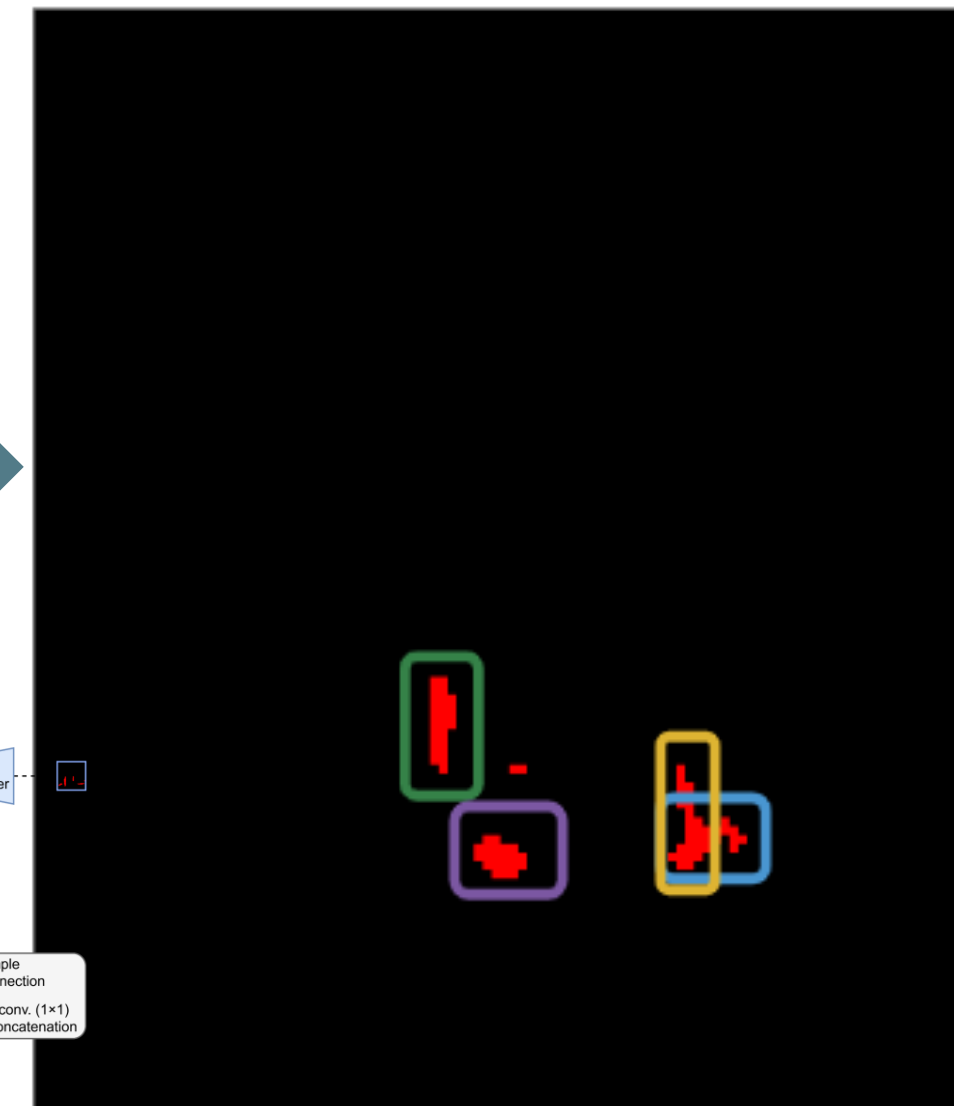
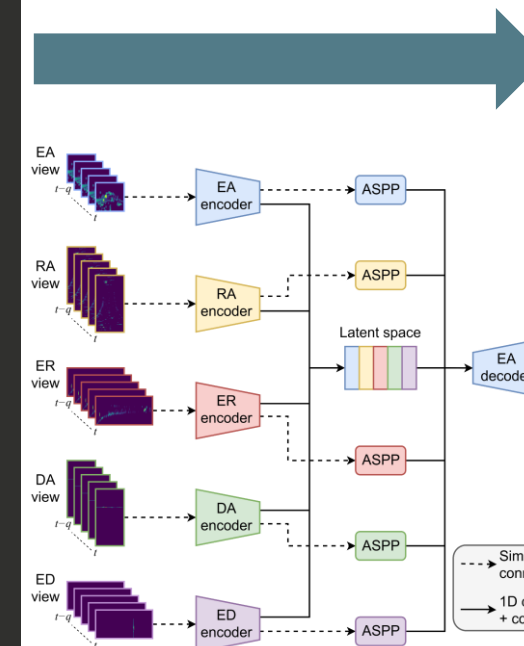
People detection in low visibility (standing, lying, sitting)



Reference image



Radar point cloud



Detections

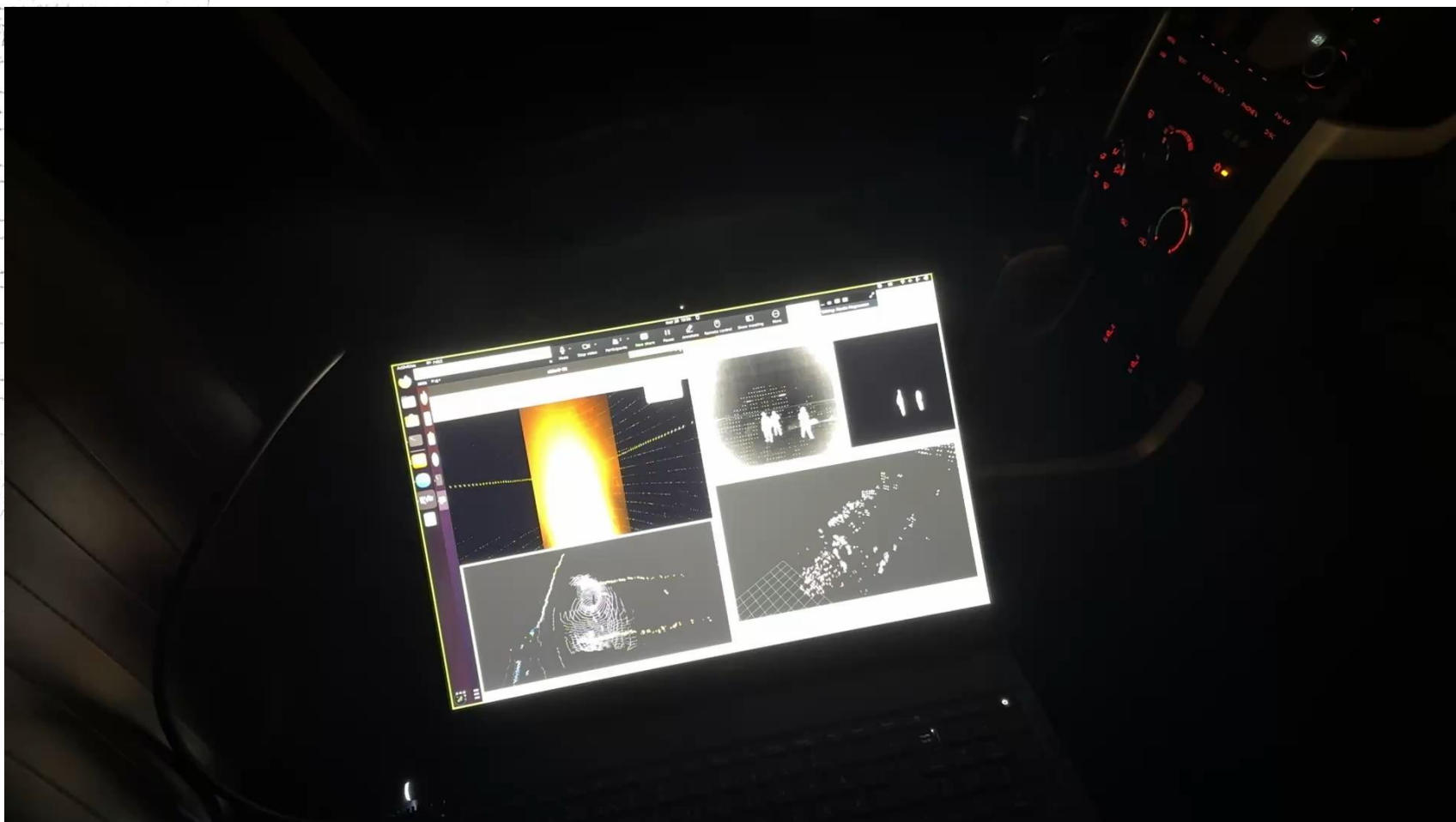
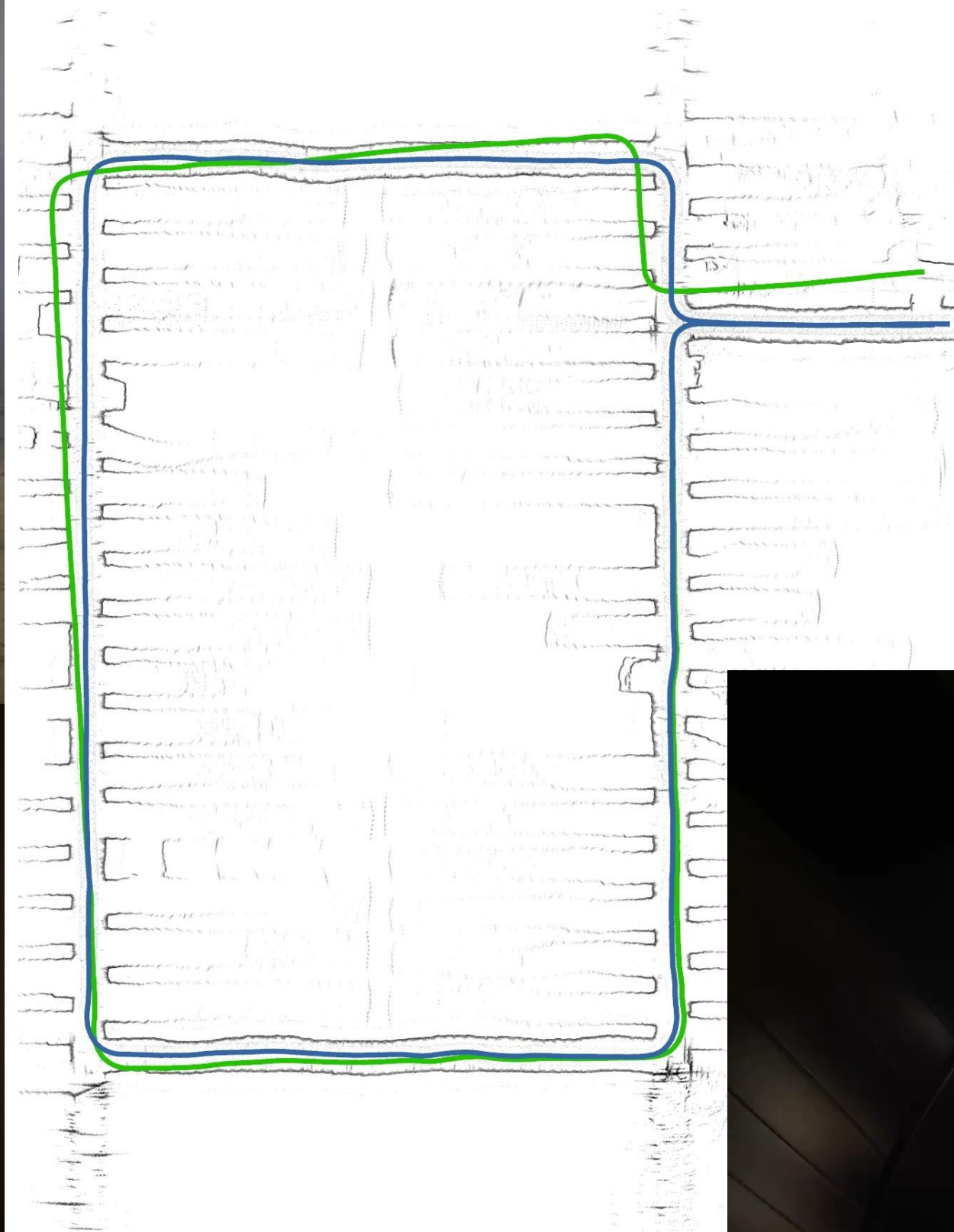


Main results: semantic segmentation in 4D radar

People detection in low visibility (standing, lying, sitting)



Since last time: final project demo



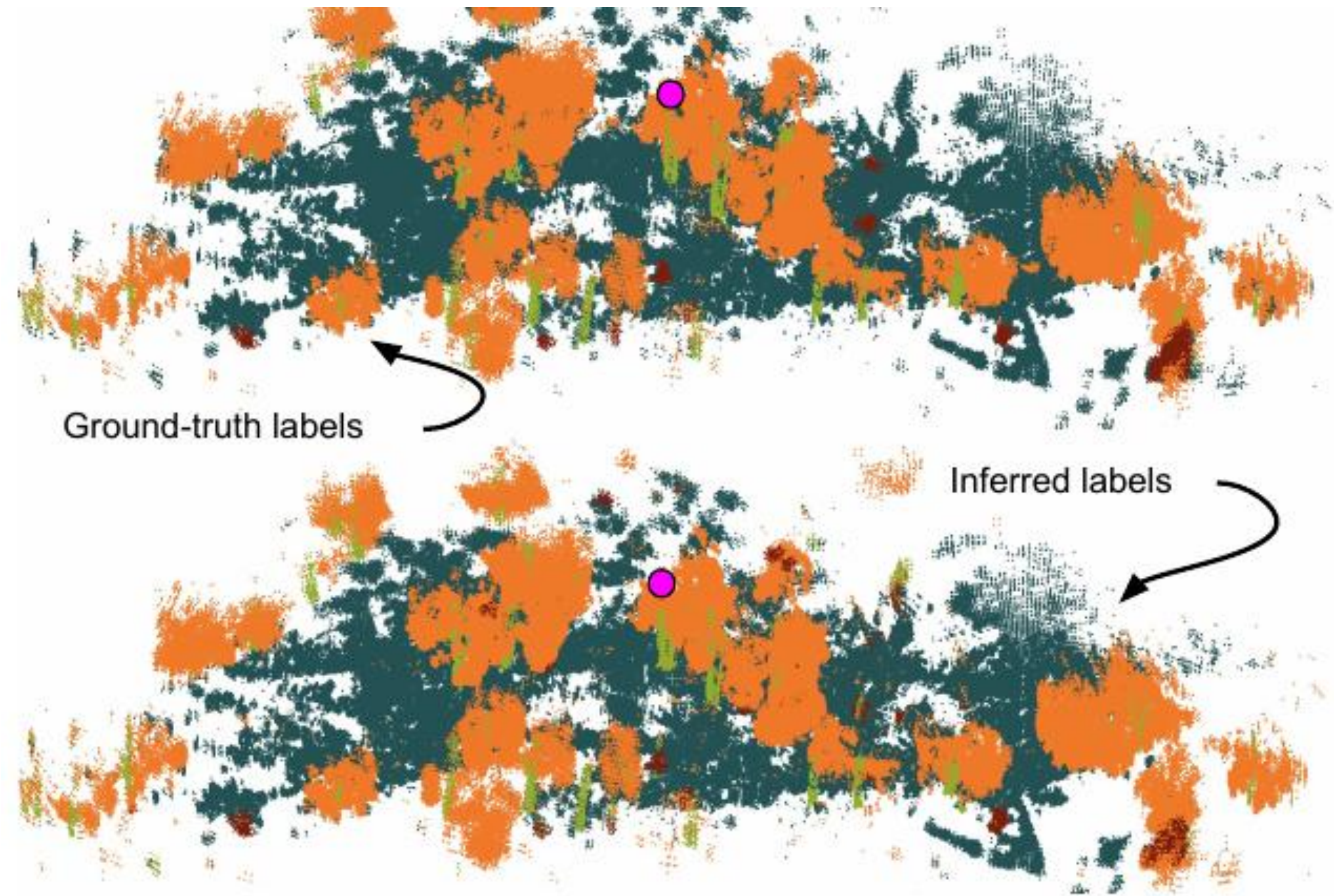
Follow-on project: CLEARPATH

- CLEARPATH – Multimodal Perception and AI for Safe Autonomous Navigation
 - (Vinnova avancerad digitalisering, industriell behovsdriven innovation 2025)
 - Sep 2025 – Aug 2028
- Leveraging **radar** contributions from RADARIZE, extend **multimodal** perception for navigation
- “Concretely, we will develop multimodal methods for **detecting obstacles** and people (including full-body pose recognition), **predicting the traversability** of uneven ground over time, and **failure-resilient 3D mapping** and localisation; all of the above from **4D radar, lidar, thermal and visual camera** data.



CLEARPATH first steps

- Developing MinkowskiUnet for segmentation of sparse radar point clouds. Ongoing: extending architecture to include the Doppler dimension
- Surveying literature on deep sensor fusion
- Preparing for large-scale long-term data collection



Mining innovation for a sustainable future