



# IQPILOT @ FFI RESULTS CONFERENCE

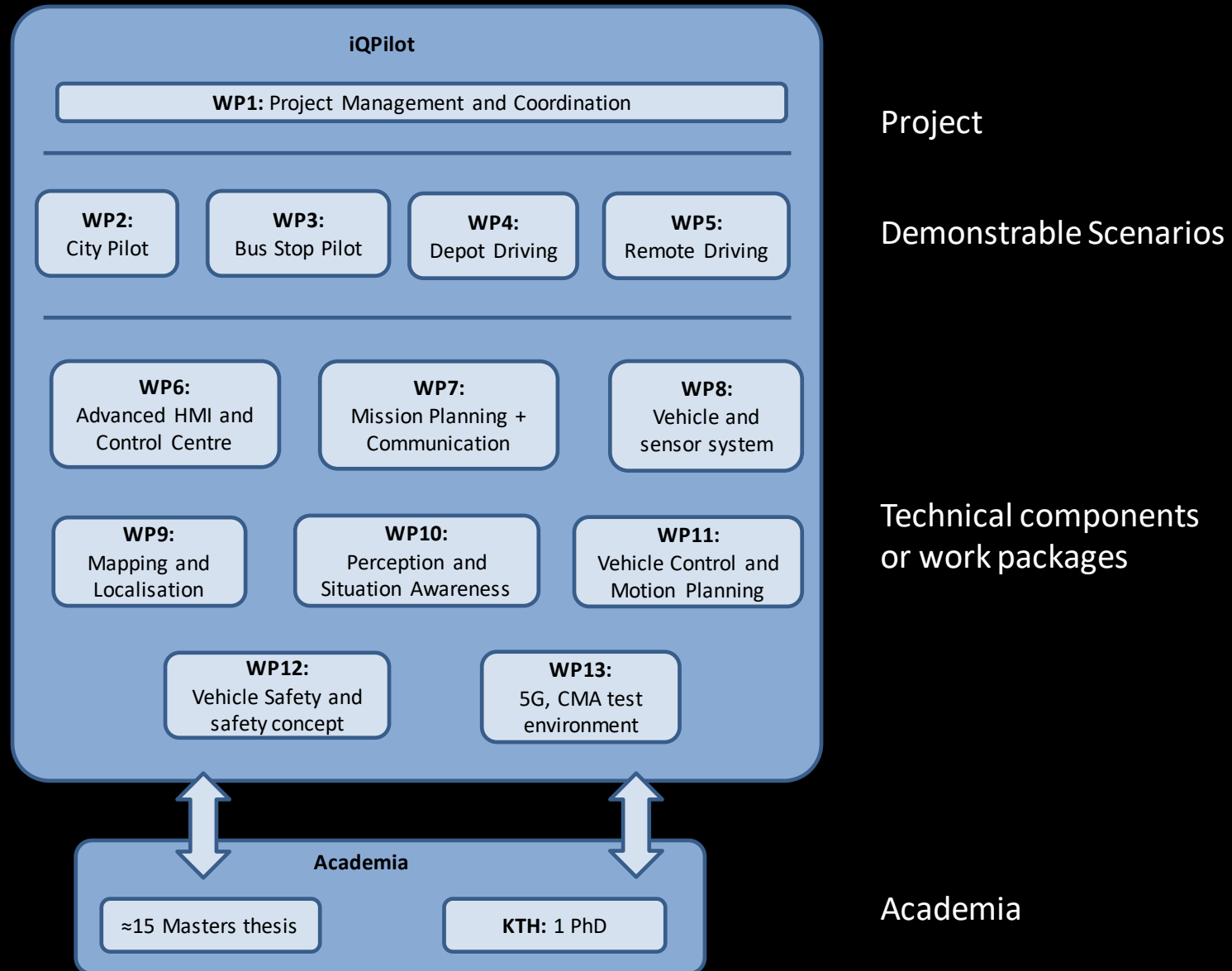
# SCANIA

# iQPilot – Key Aims

- To build up 2x autonomous buses for research and demonstration purposes
- To demonstrate some of the fundamental technology towards autonomous driving in urban / city areas
- To demonstrate ability of an autonomous bus to handle bus stop situations
- To demonstrate the feasibility of running an autonomous bus in an autonomous transport system (with partner project iQMobility)
- Why autonomous (driverless) vehicles;
  - Around 60% of total cost of operating a bus is the cost of the driver...
  - Shortage of drivers in many markets
  - Industry generally progressing towards autonomous across the automotive industry



# iQPilot Working Areas



# iQPilot Timescale 2016 to 2020



Sensor / perception demos



Remote Drive Demos



Autonomous Drive Demos

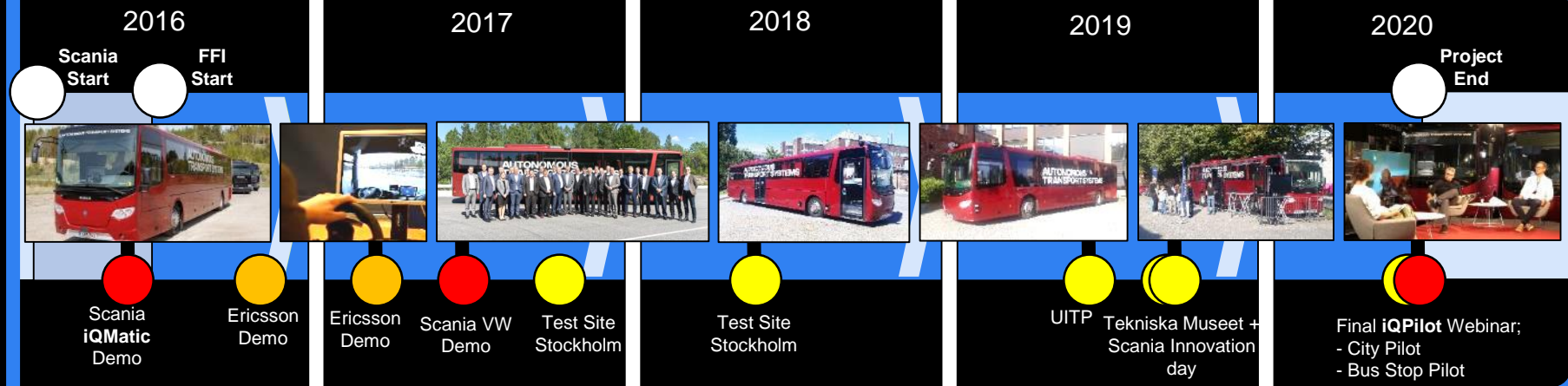


Control Centre Demos

## iQPilot



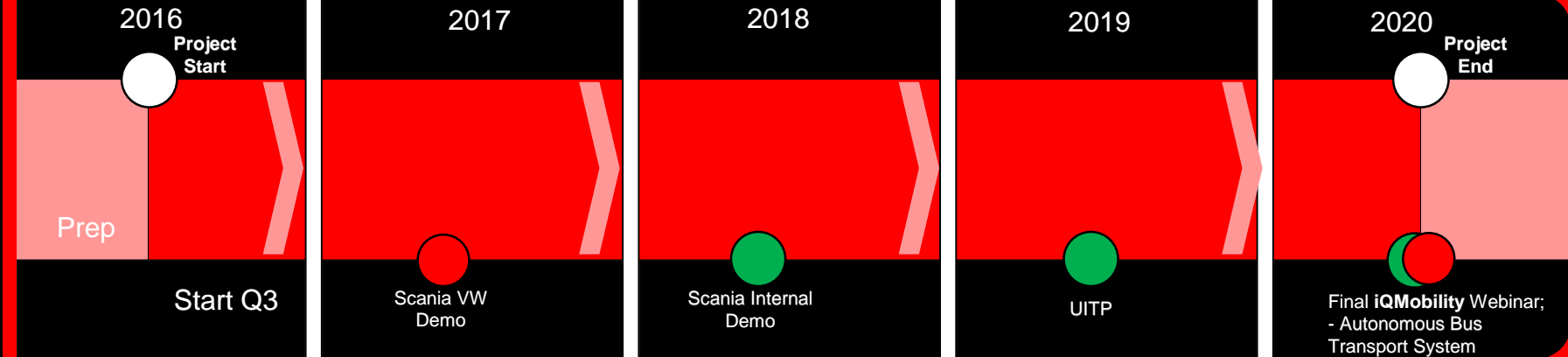
Autonomous Drive Technology (Bus/Urban)



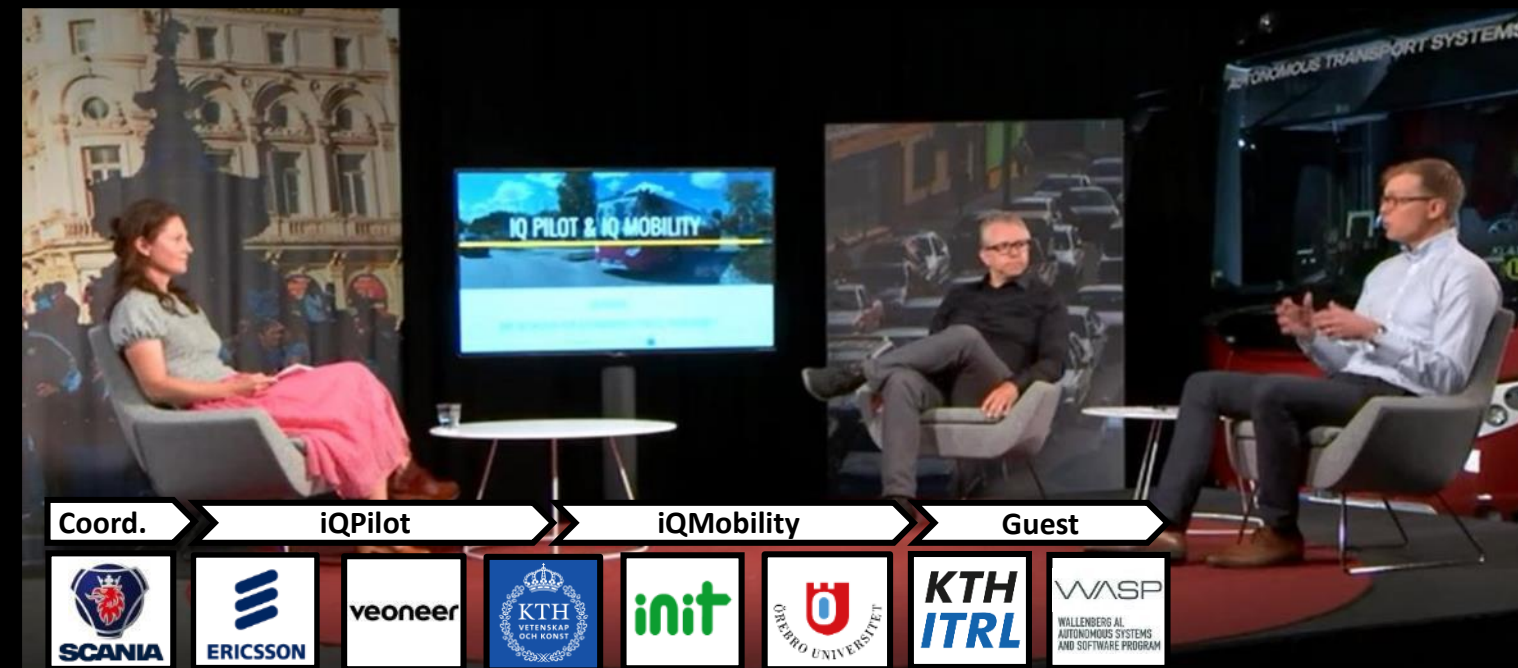
## iQMobility



Autonomous Bus Transportation



# iQPilot Final Results Demo / Webinar



iQPilot + iQMobility's end (30<sup>th</sup> June 2020) marked with a 2 part webinar

- Part 1;
  - Live studio talks and discussion on broadcast
  - Guests from Scania, project partners and KTH ITRL
  - Pre-recorded video demonstrations on key areas / showcases
- Part 2;
  - Live presentations + discussion for each project partner / technical work package area with presenters in Zoom
  - Guests from iQDeep + WASP funded PhD students

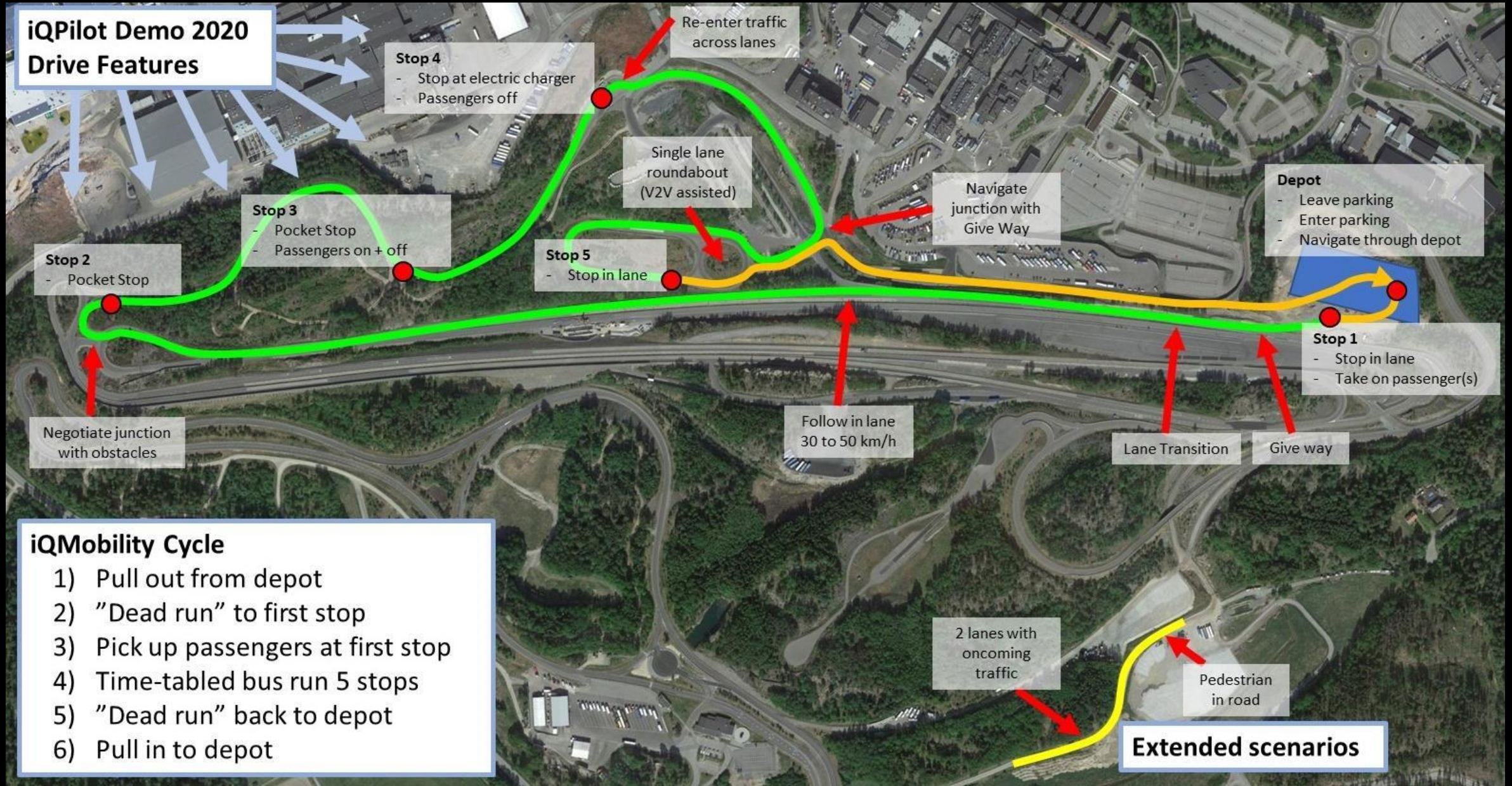




# SCANIA IQPILOT 2016 TO 2020

<https://www.youtube.com/watch?v=BtoZAb2FXGo>

# iQPilot / iQMobility Main Showcase – Strategic Overview



# iQPilot Main Showcase – Scenario Summary



1) Pull-out from depot parking



2) Passenger Pickup



3) Merge with faster moving traffic



4) Cross lanes to desired lane



5) Follow vehicle in front



6) Navigate sharp corners



7) Drive into pocket bus stop



8) Multiple passenger pick-up/drop off



9) Electric Charger Bus Stop



10) Navigate difficult junctions/corners



11) Negotiate single lane roundabout



12) Return to depot parking





# iQPilot + iQMobility = Autonomous Transport System

ICE MAP POINTS OF INTEREST VEHICLES

Version rev.8340,19.09.2017

## Vehicle Control System

SCNS TEST TRACK 10:19

Klasse

1 188°

2

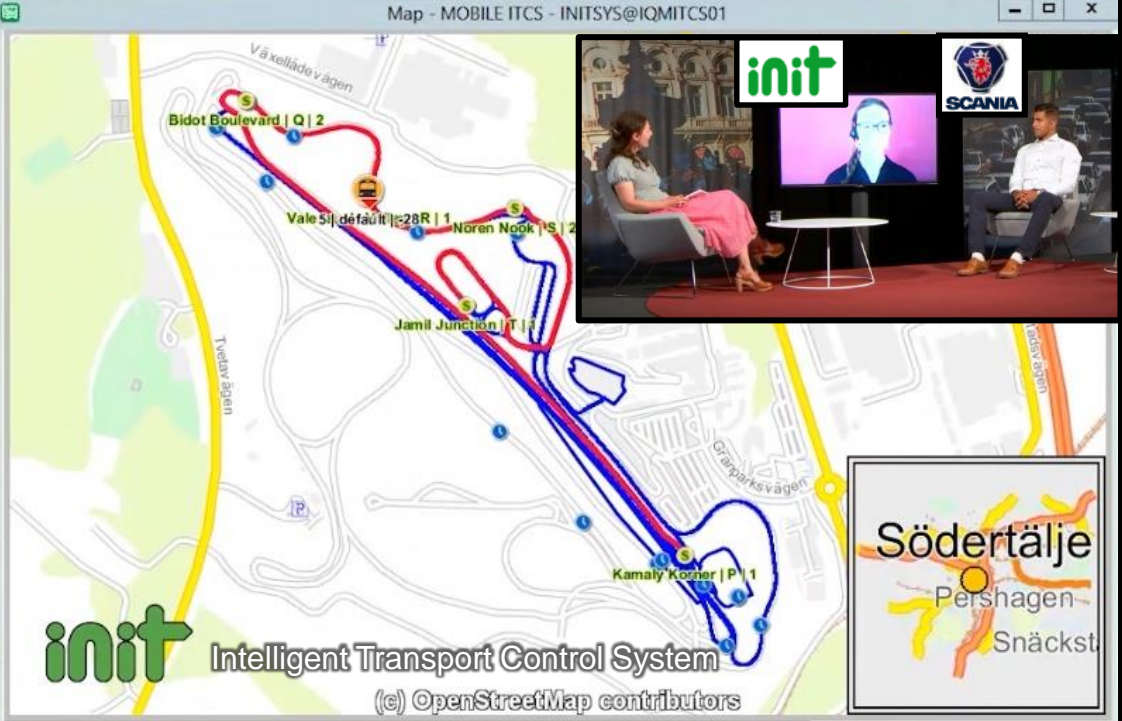
Drive

PERSONAL LOCK

HORN DRIVE

MISSION	METRICS	DETAILS
16:14:34	Stop for passengers	16:14:44
16:14:44	Drive	16:17:50
16:17:50	Stop for passengers	16:18:00
16:18:00	Drive	
	Stop for passengers	
	Drive	
	Stop for passengers	
	Drive	
	Stop for	

Map - MOBILE ITCS - INITSYS@IQMITCS01



init Intelligent Transport Control System

(c) OpenStreetMap contributors

Södertälje  
Pershagen  
Snäckst



Block display - MOBILE ITCS - INITSYS@IQMITCS01

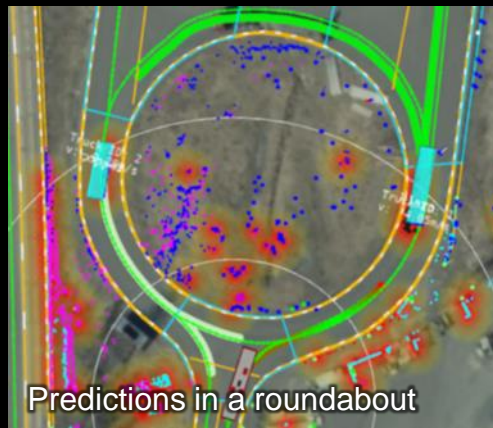
Display Help

Block **7123** Duty

	Description	Stop	...	DepTime	Real	Distance	Delay	Vehicle
0	- Kamaly Ko...			16:13:30	0	200 m		Vhc 5
T				16:13:30		200 m		AVL schedule
								VehicleType ScaniaBus
								Vehicle comment
7123	Kamaly Korn... Route 7			16:15:00	0	3215 m		Block
	Kamaly Korn... Stop 1	1		16:15:00	(16:15:00)	1528 m	0	Operating day Jun 15, 2020
	Bidot Boulev... Stop2	2		16:18:23	(16:18:23)	458 m	0	Block 7123
	Valenzuela V... Stop 3	1		16:20:22		361 m		Pull Out 16:13
	Noren Nook Stop 4	2		16:22:00		868 m		Pull In 16:31
	Jamil Junction Stop 5	1		16:25:43		0 m		DepNextTrip
0	Jamil Juncti...			16:27:43	0	1000 m		Line 7
								Trip 7123

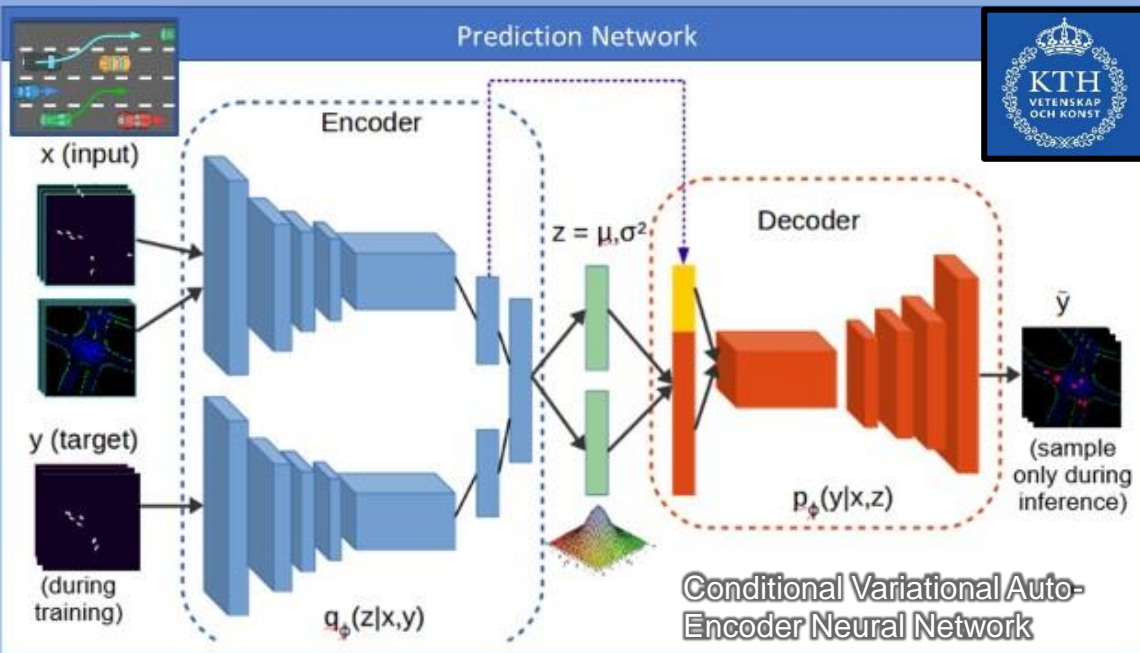
Bus route and departure time plan

# iQPilot Situational Awareness

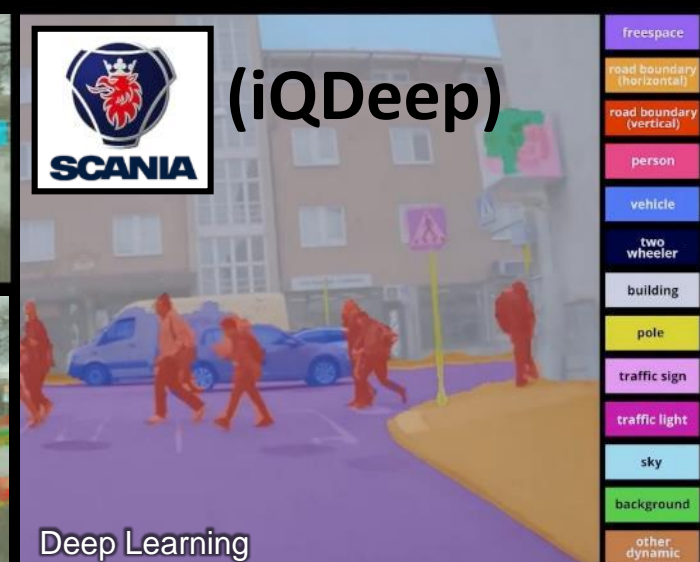
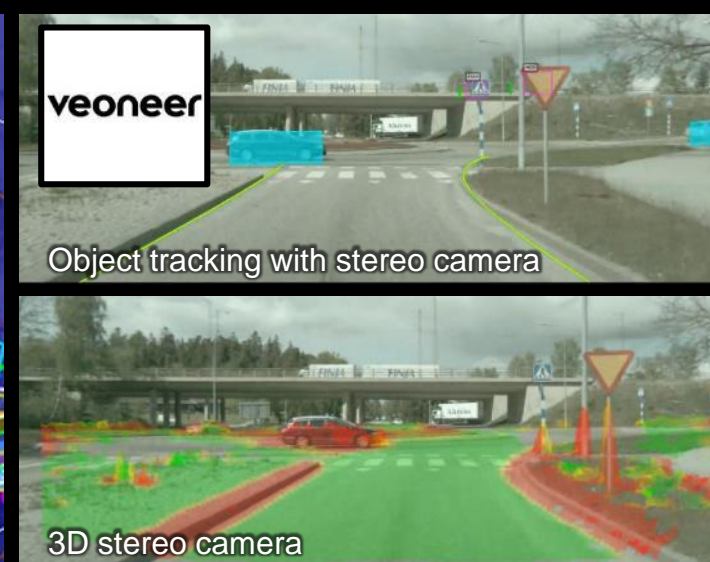
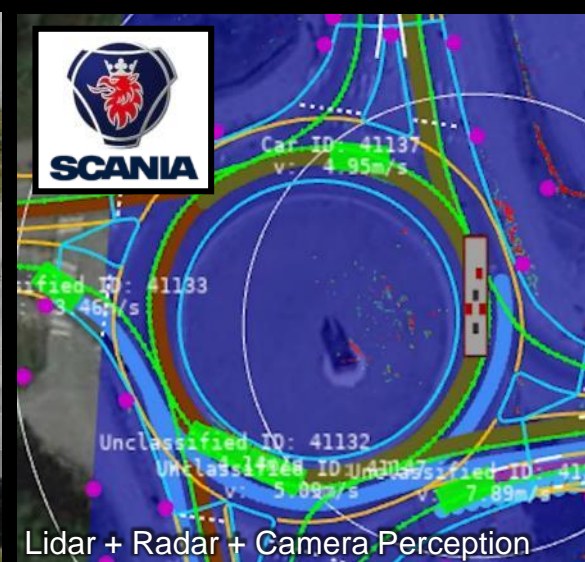
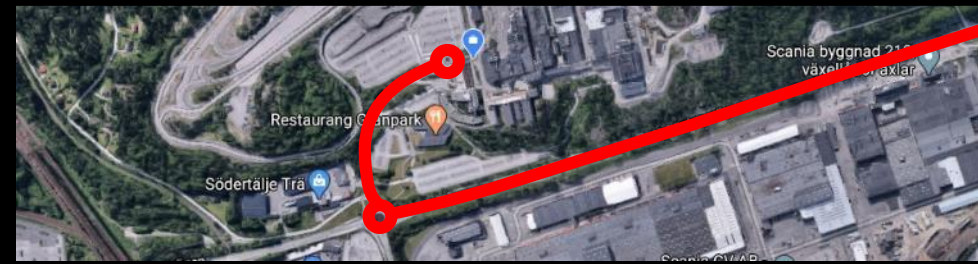


## iQPilot Situational Awareness PhD Project

Trajectory prediction in interaction-heavy environments [Joonatan Mänttari]



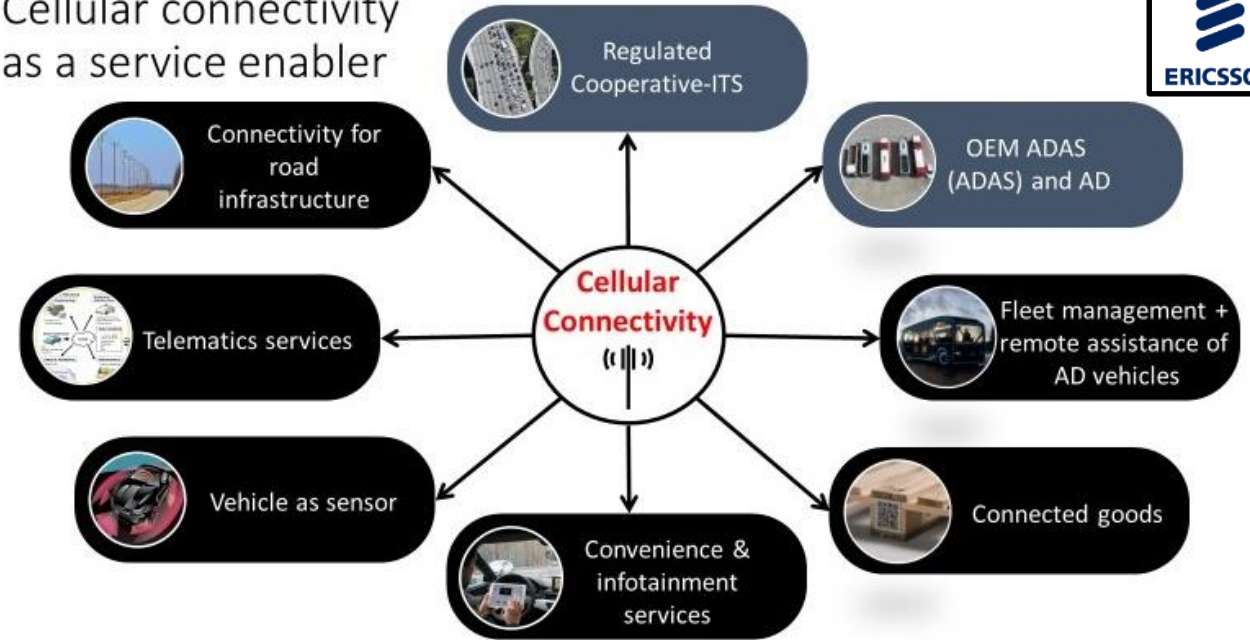
# iQPilot Perception and the Streets of Södertälje



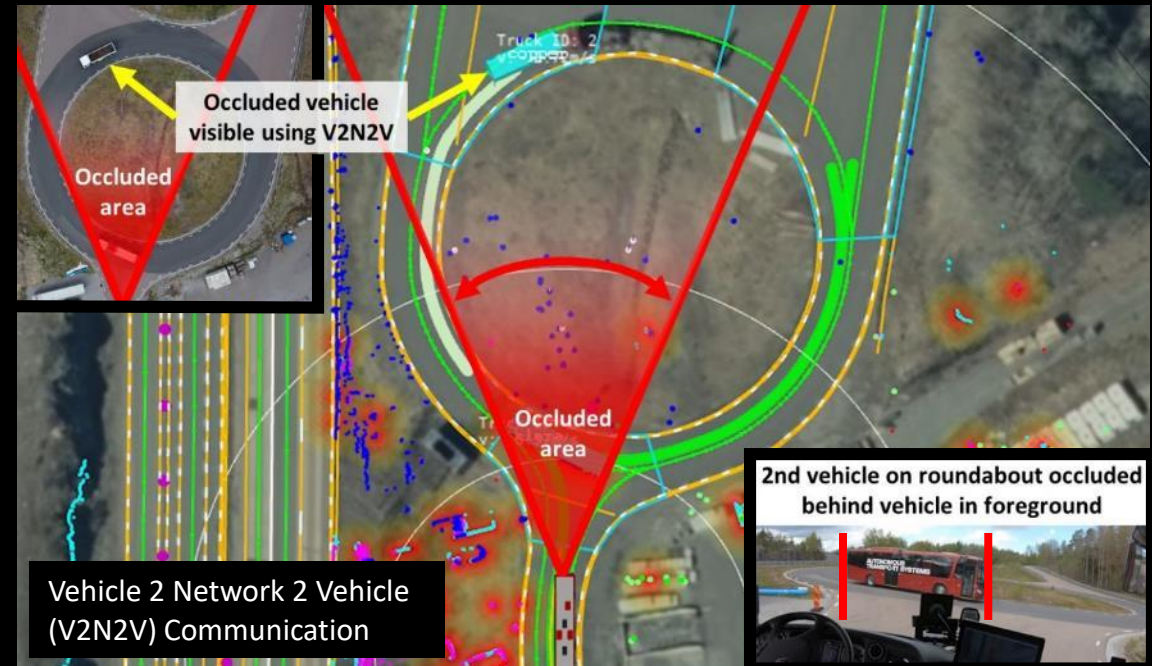
# iQPilot – 5G & Connectivity



## Cellular connectivity as a service enabler



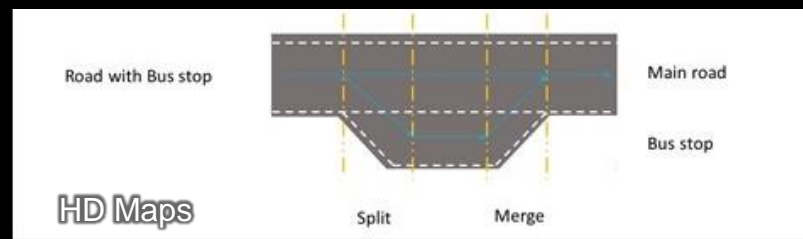
Remote Driving over 5G



# iQPilot – Other



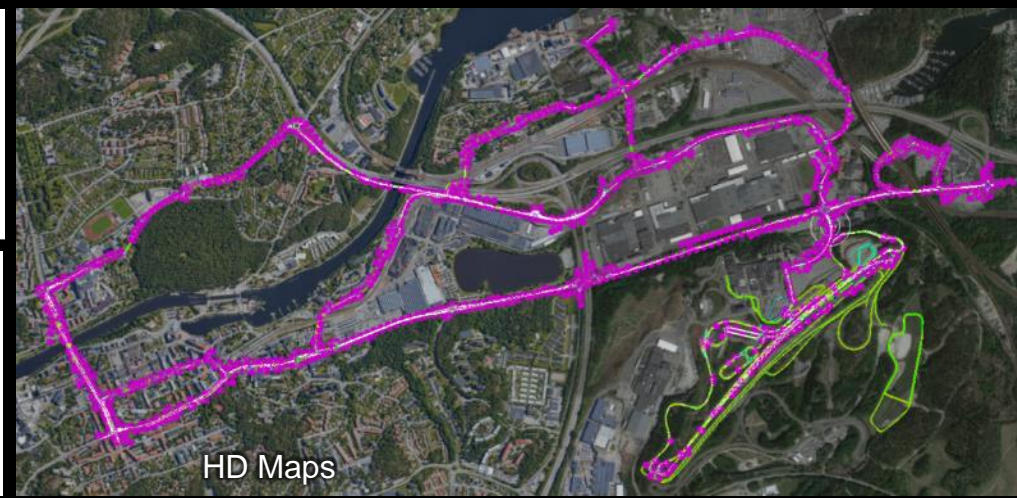
Depot Driving



HD Maps



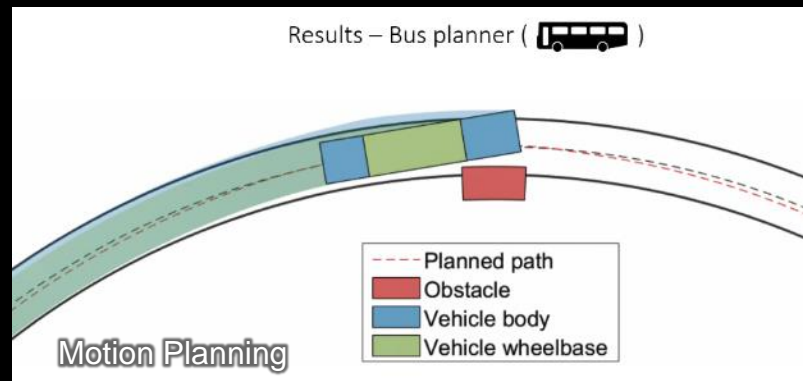
Vehicle controls



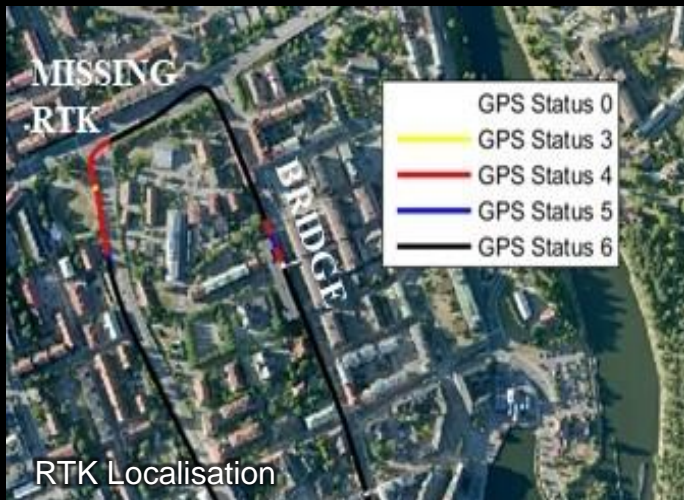
HD Maps



Open Area Depot Driving



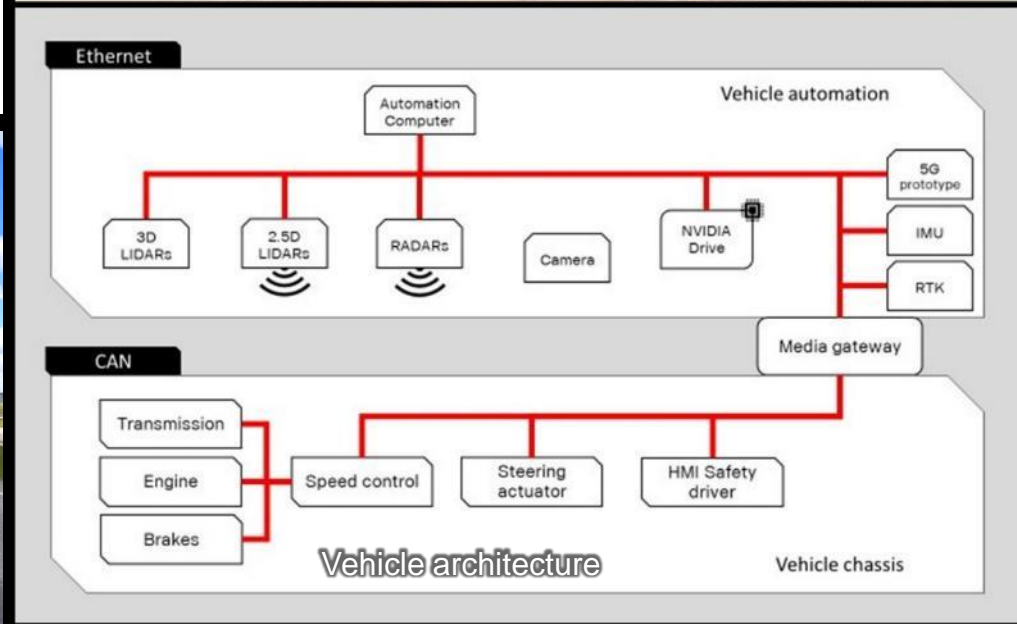
Motion Planning



RTK Localisation



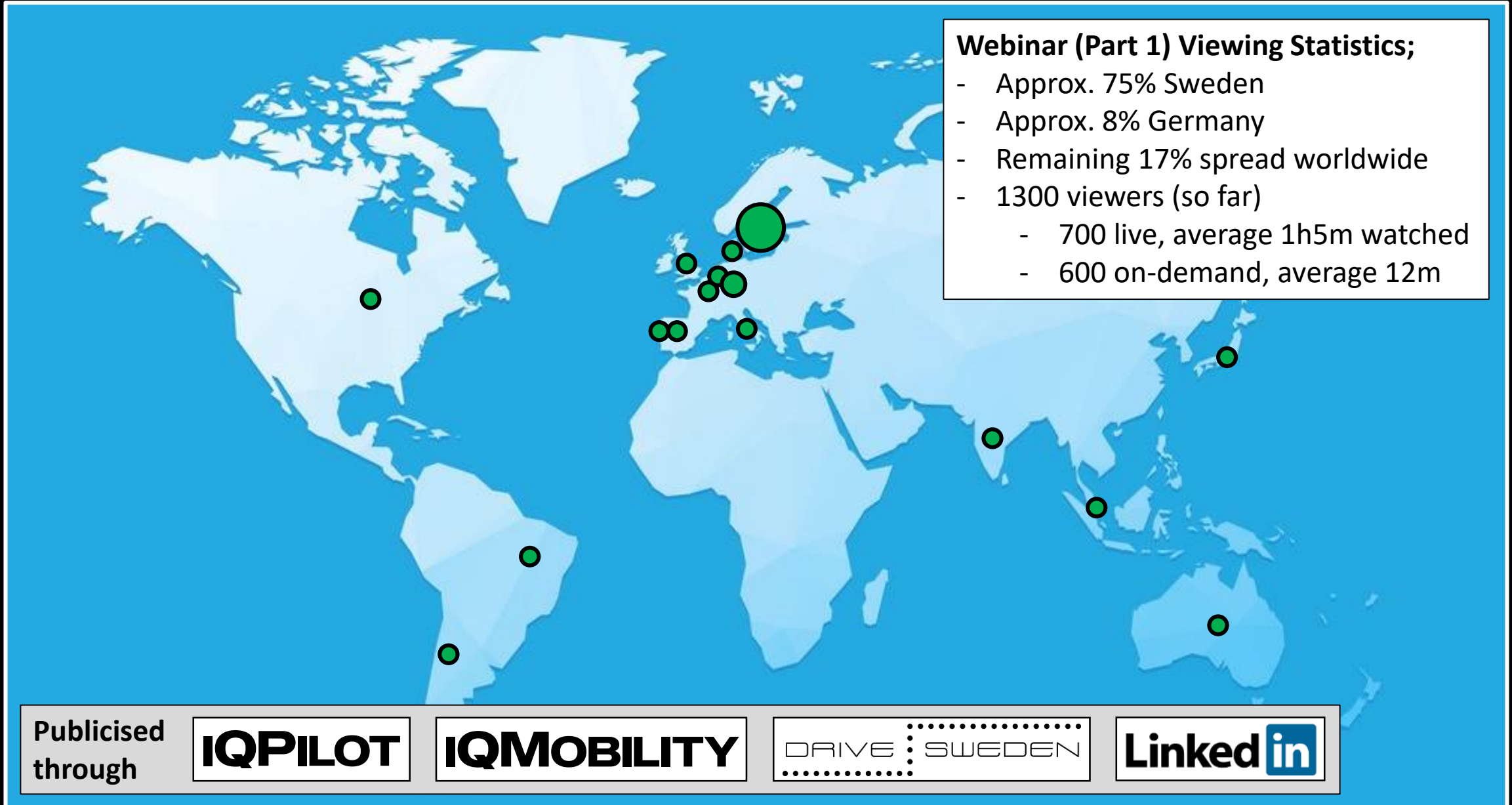
Landmark Based Localisation



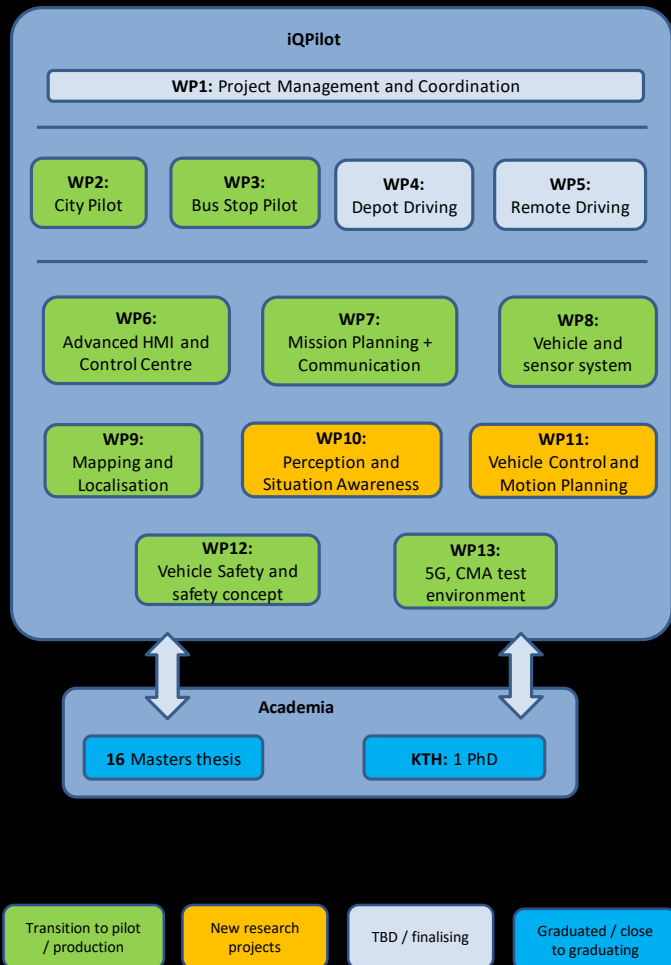
Vehicle architecture

Vehicle chassis

# iQPilot Results Webinar – Exposure Globally



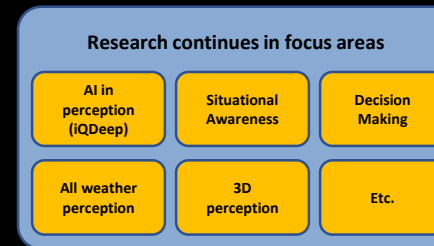
# Key iQPilot Outcomes ( )



Starting platform and knowledge towards products, services and new pilot project(s)



Solid functional basis towards fully driverless buses (in the long term)



New / Continued research focus areas as dedicated projects



Expanded organisations with autonomous development and autonomous solutions

# iQPilot Information + Video Result Links

- **Contact [George.Dibben@Scania.com](mailto:George.Dibben@Scania.com) for information / links**
- Results Webinar Part 1;
  - iQPilot & iQMobility [1h 58] <https://www.youtube.com/watch?v=f-56Ekt1xtI>
- Results Webinar Part 2;
  - Stream 1 (iQPilot technology) [1h 58m] [https://www.youtube.com/watch?v=L8t\\_1\\_ee0G4](https://www.youtube.com/watch?v=L8t_1_ee0G4)
  - Stream 2 (iQPilot perception) [1h 34m] <https://www.youtube.com/watch?v=cyknLNHj3Aw>
  - Stream 3 (PhD students) [2h 3m] [https://www.youtube.com/watch?v=RT\\_0FVn1oDg](https://www.youtube.com/watch?v=RT_0FVn1oDg)
  - Stream 4 (iQMobility) [1h 42] <https://www.youtube.com/watch?v=HeL2dSbg8t4>
- Other videos;
  - Trailer iQPilot & iQMobility [45s] <https://www.youtube.com/watch?v=Cs5kCWrrYJs>
  - iQPilot & iQMobility Summary [9m] <https://www.youtube.com/watch?v=8Ma4GxbNWvI>
  - iQPilot Autonomous Bus in the System [6m 30s] <https://www.youtube.com/watch?v=PQ9hoWhkxy4>
  - iQMobility Autonomous Bus Transport [4m 30s] [https://www.youtube.com/watch?v=G5\\_oX\\_f0m9Y](https://www.youtube.com/watch?v=G5_oX_f0m9Y)
  - iQPilot & iQMobility 5min countdown [5m] <https://www.youtube.com/watch?v=pe0axv4jcgU>