VTT TECHNICAL RESEARCH CENTRE OF FINLAND LTD

Autonomous vehicle technologies

TransSmart: Final Event

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Key enabling technologies

Components

- *Sensors (radars, lidars, cameras, positioning, inertia unit)*
- *V2X communication (ITS G5 / 5G)*
- *HMI and driver monitoring/interaction*

Intelligence

- *Sensor data fusion (local dynamic maps)*
- *Scene understanding*
- *Control functions*

Support functions

- *Cloud based IoT*
- *ITS infrastructure*

Project portfolio 2017 - 2020

URBANAUTO TEST

- TEKES
- Control functions

Celtic-Plus SARWS

- CELTIC-TEKES
- AV functions

5G-SAFE

- TEKES
- 5G applications

AutoDrive

- EU-ECSEL
- Inertia unit

DENSE

- EU-ECSEL
- Radar & FPI

Robust SENSE

- EU-ECSEL
- LiDAR

TRANSFORMING TRANSPORT

- EU-ICT
- Big data

AUTOPILOT

- EU-IoT
- IoT-AV pilot

L3PILOT

- EU-ART02
- L3 function evaluation

TrustVehicle

- EU-ART04
- HMI

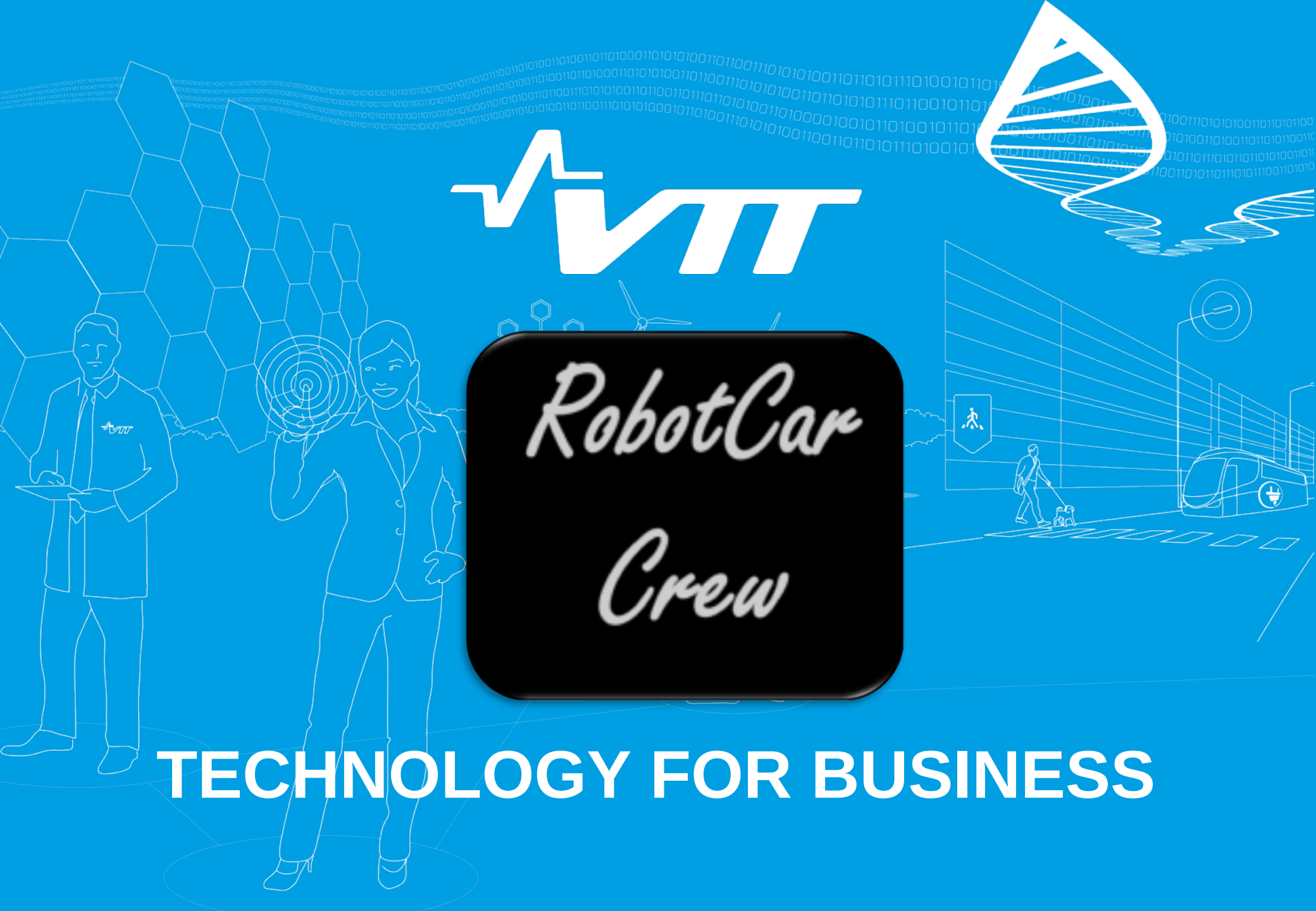
KEY FIGURES

4 M€ - 3 large FI industry, 6 FI SMEs - 7 new products

Technological challenges ahead…

- **Cameras cannot see more than 40 m** ahead => *the best option in urban area but not in a highway*
- Short range **radar (24 GHz) does not suffer dust and dirt** => *resolution is poor and no pattern recognition for human detection*
- **Long range gives distance up to 150 m ahead** => *not reliable in heavy rain*
- Multi-layer **LiDAR have good horizontal resolution up 200 m ahead** => *due to eye-safety regulations, power is limited and therefore, transmission in fog is poor*
- ITS G5 would **allow interaction between vehicles** => *deployment was intended to start on 2010 and we still waiting for….*

!!!Implementation of **multiple sensors and artificial intelligence** is the must-win-battle for real autonomous cars!!!


VTT
RobotCar
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DENSE
Robust
SENSE
AUTOMOTIVE SENSOR TESTING
14-16 Dec 2016
Cerema, Clermont-Ferrand, France