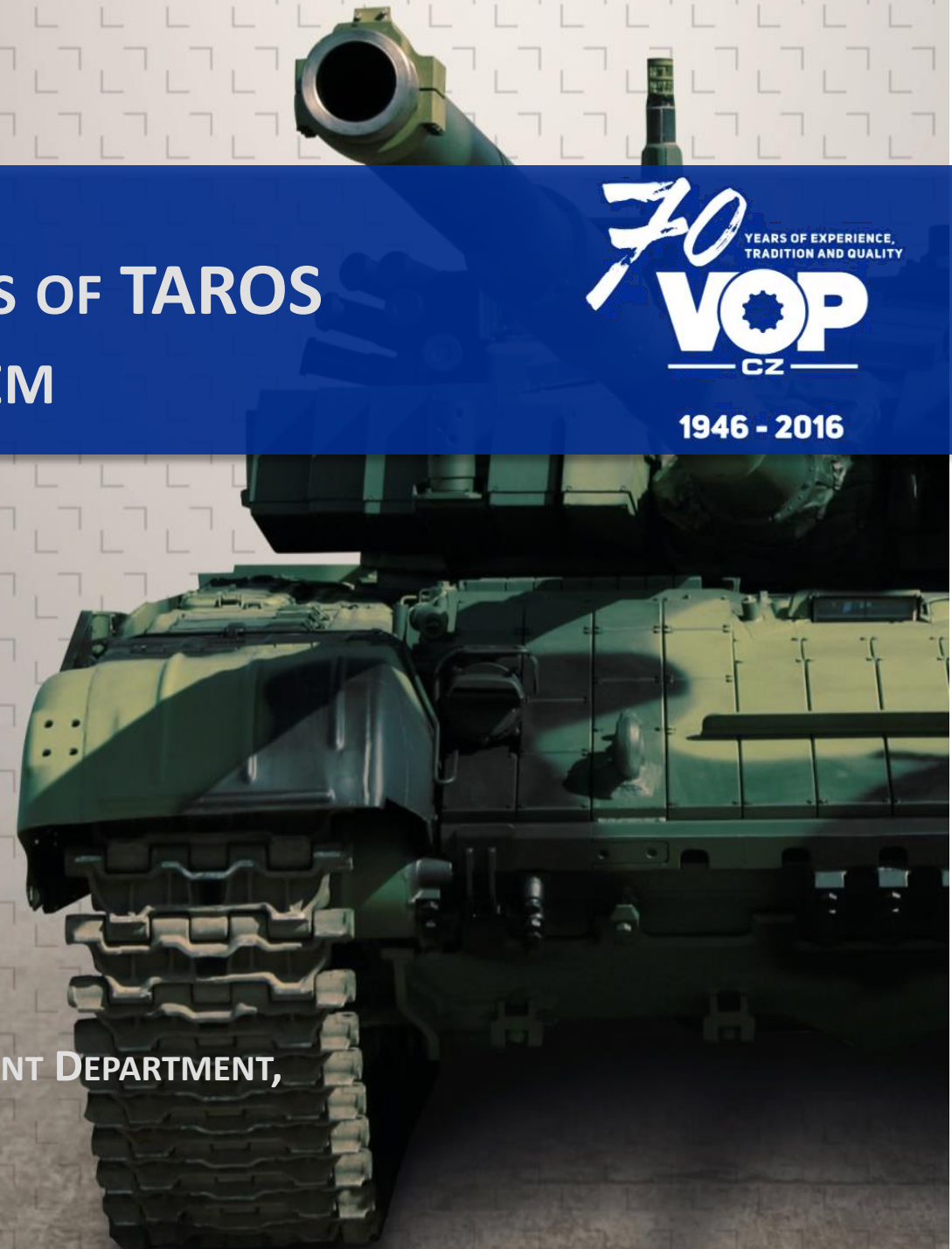
Autonomous Functions of TAROS - Tactical Robotic System

70 YEARS OF EXPERIENCE, TRADITION AND QUALITY
VOP CZ
1946 - 2016



Pavel Mikunda
Director of Research and Development Department,
VOP CZ, s.p.

April, 2017, Japan

CAFR - CENTER FOR ADVANCE FIELD ROBOTICS

CAFR
CENTER FOR ADVANCE FIELD ROBOTICS

- independent bodies under one roof
- new possibilities for solving demanding robotic problems
- civil, security, industrial and millitary applications
- since 2014




RESEARCH **DEVELOPMENT**

Czech Technical University in Prague

VŠB 1849 Ostrava Technická univerzita

Brno University of Technology

University of Defence

VOP CZ

TACTICAL ROBOTIC SYSTEM – V2

THE FUTURE IS NOW

- length: 2 740mm, width 1 770mm, tread: 1 410mm
- electric/hybrid drive (all axles steerable)
- modular concept (4x4, 6x6, 8x8)
- autonomous functions
- since 2012

4x4 TCX G2 2012

TAROS 6x6 FURBO 2013

TAROS V2 2014

TAROS V2 – Optional Modules

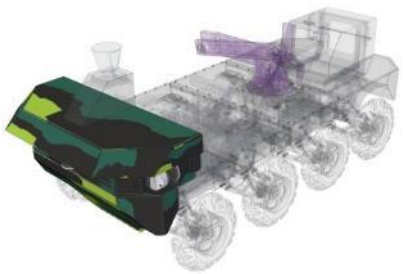
Robotic Arm

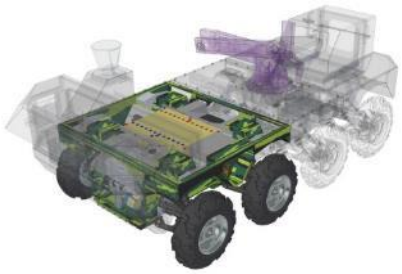
- 6 degrees of freedom
- control using stereovision
- additional light and lasers sights for better control

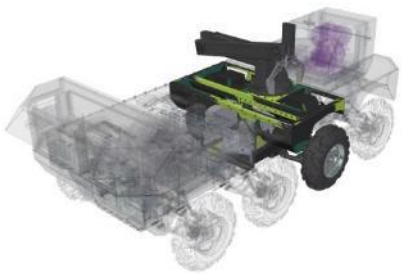
Charging Agregate NS 6050D

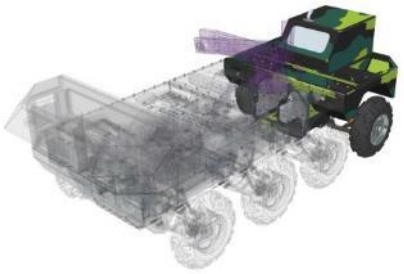
- possibility of charging batteries while driving
- operating range increase

Modular Concept









Possibilities of Operator Control

Control Terminal

- extended capabilities of control and setting
- allows to monitor vehicle status – temperatures, battery capacity…
- setting of vehicle parameters – speed, acceleration…
- tele-operated vehicle control by use surveillance cameras

Built-in Army Tactical Vest

- basic control
- requires direct visibility between operator and vehicle

Mobile Device

- basic control
- modern tablet with clear GUI
- used mainly for activate/deactivate autonomous functions

Navigation Modes

By GPS Coordinates

- autonomous driving through previously saved GPS coordinates

Using Velodyne Sensor

- requires a previously generated 3D map of environment
- self-localization and autonomous driving through learned route
- new object detection and its analysis
- anticollision system

By Another Object

- convoying
- follow me

Additional

- combination of previous modes
- inertial Unit used to improve the accuracy

GPS waypoint navigation

Anticollision system

Convoying

Autonomous Functions

Navigation System

Automatic waypoint generation

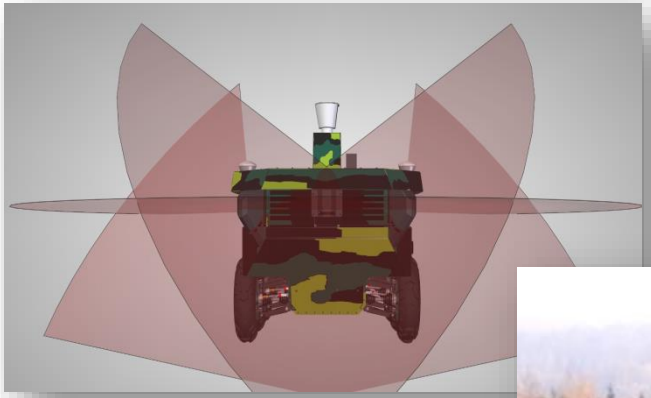
Waypoint – navigation

Cooperation mod

Convoying

Autonomous Functions

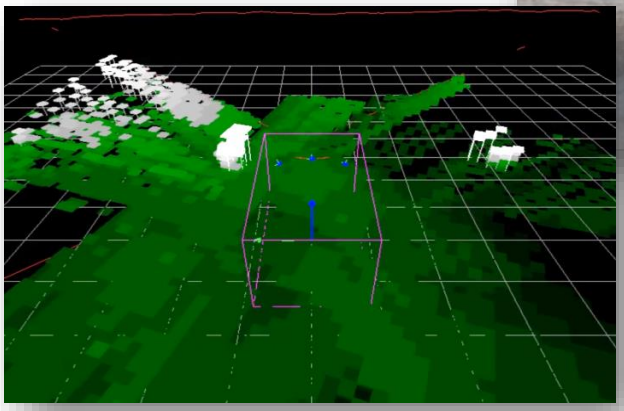
Anti-collision System



LMS senzors

Generate 3D view corridor

Preventing collisions

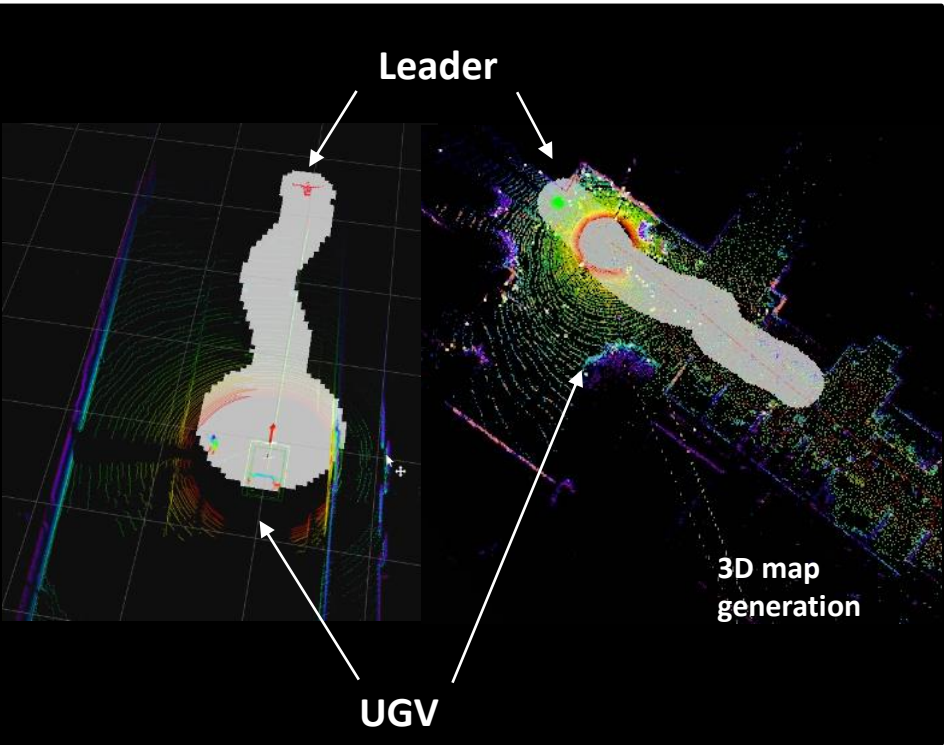


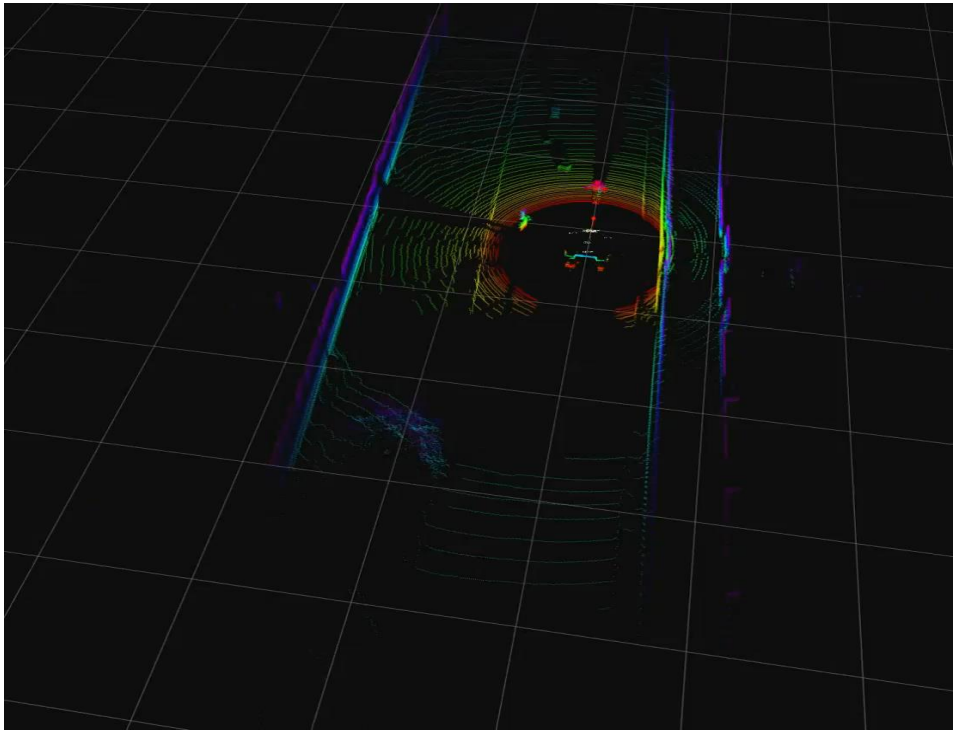
Path around an obstacle

Autonomous Functions

Follow-Me

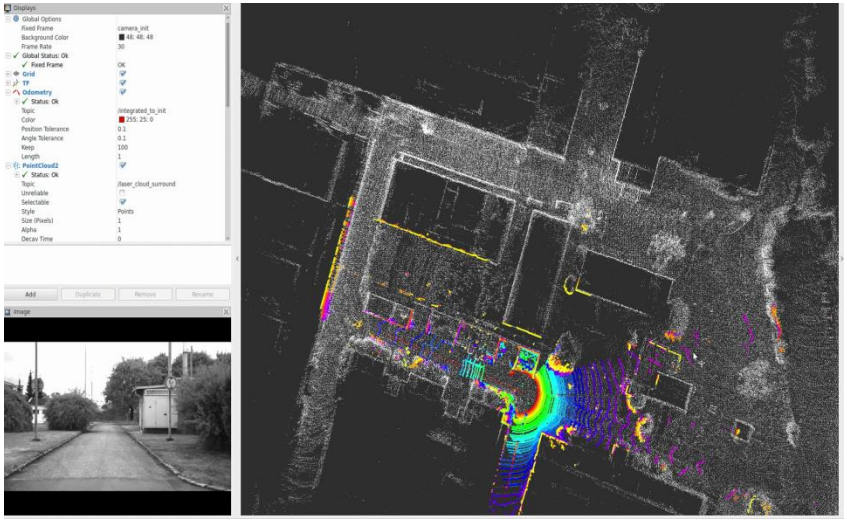
- The vehicle follows a leader in predetermined distance and corridor.
- The speed of a moving person will be variable e.g. from 6 to 10 km/h and vehicle will imitate this speed and also remain in safe distance.
- While moving the vehicle can generate a 3D map of the area and also checking terrain passability.
- This functionality is usable in open space where there may be both static even moving obstacles.

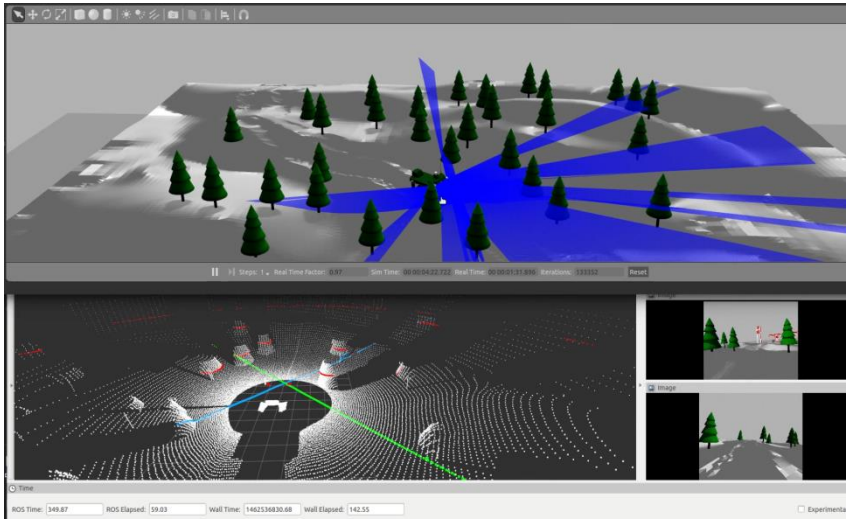




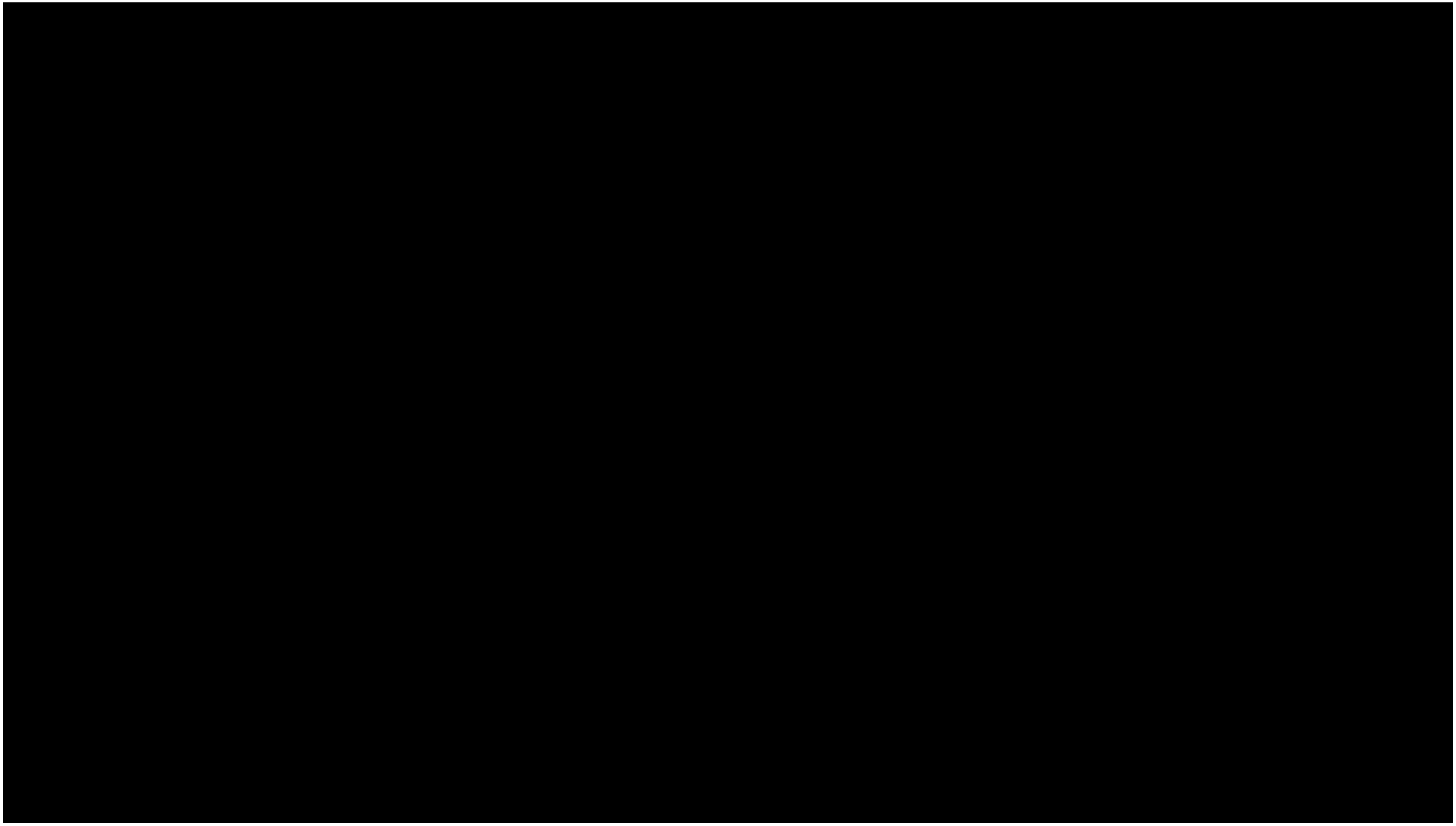
3D MODEL ENVIRONMENT

- Generating 3D maps environment by using laser scanner sensors (LMS).
- Mapping and localization of vehicle in structured environment based on obtained data from the LMS.
- The system is independent of GNSS module mentioned for waypoint navigation.
- Motion simulation in an unfamiliar environment with integrated laser sensors.





Generating 3D Maps



Thank you for the attention