



CLIMATE COMMITMENT

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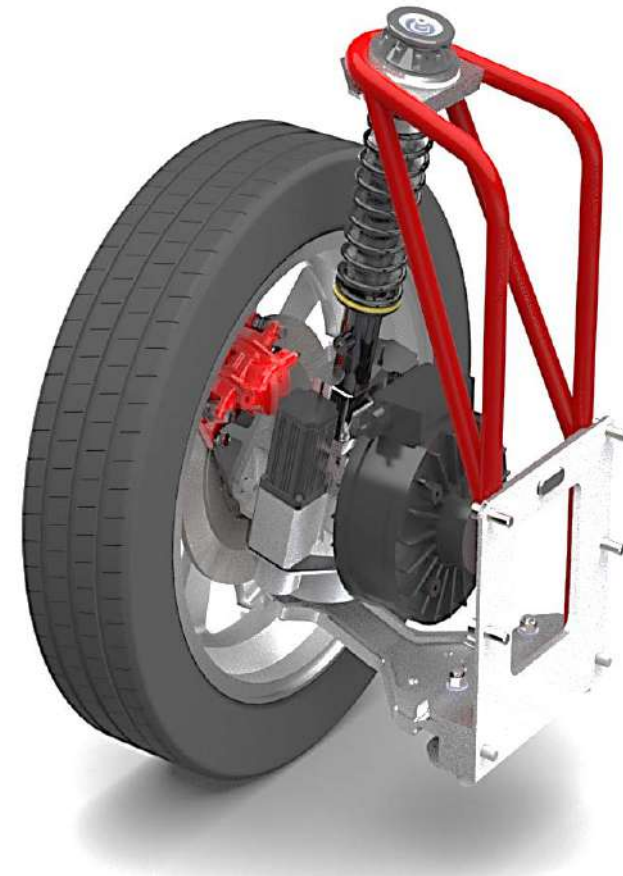


MEMBER OF BASQUE RESEARCH
& TECHNOLOGY ALLIANCE



MOBILITY

iRobotWheel



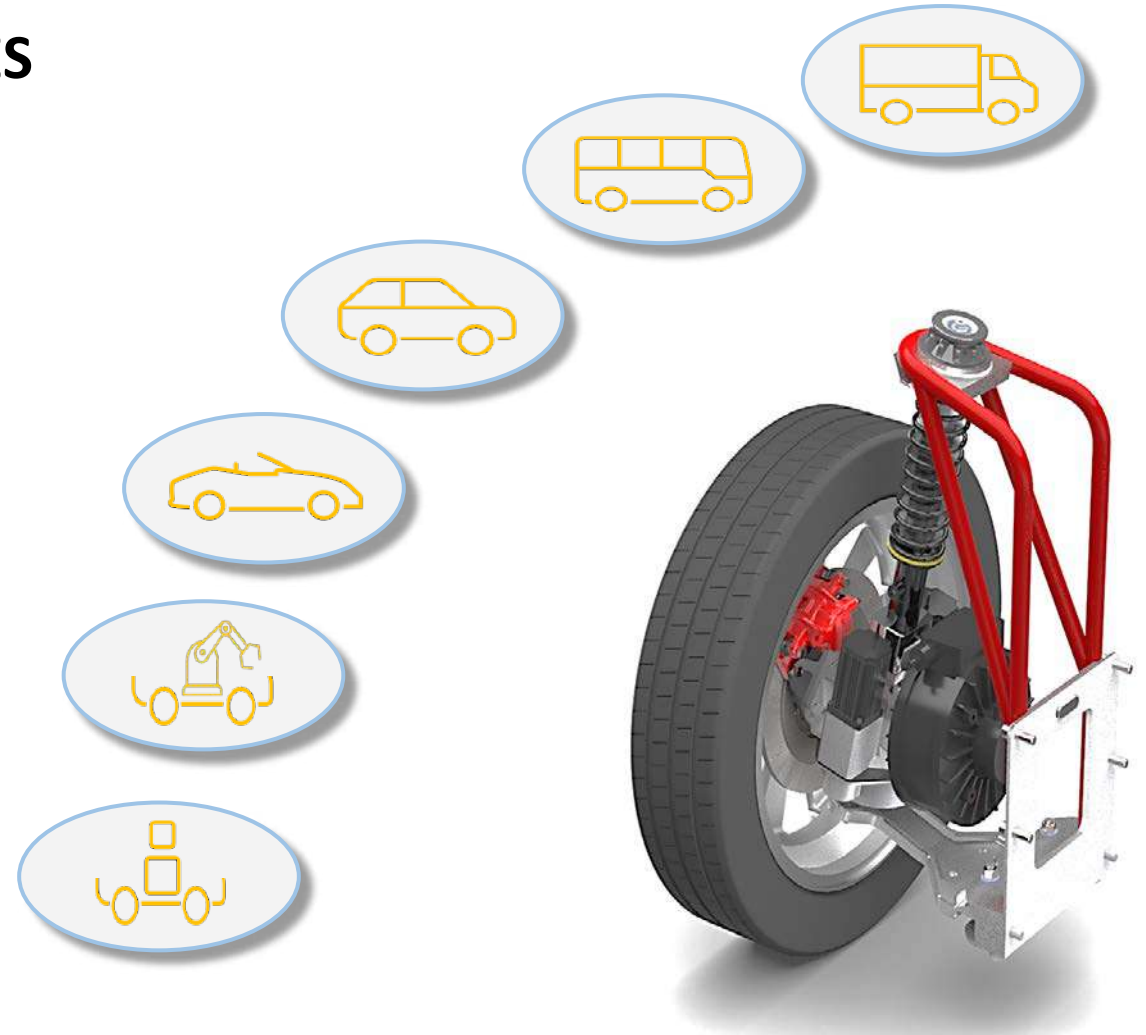


iRobotWheel

ONE ROBOTWHEEL MANY VEHICLES POSSIBILITIES

iRobotWheel

Is an advanced Drive-By-Wire Robot Wheel technology for a wide range of Power Train and vehicles applications , improving the energy transmission efficiency to the wheel as well as the better space distribution in the vehicle and the easy maintenance.





iRobotWheel



iRobotWheel

Standard & Custom iRobotWheel for PowerTrain applications.

iRobotWheel

The **iRobotWheel** integrates the complete mechanics and electronic components for the reliable and efficient operation : **Control & Power ECU - Electric Traction Motor - Electric Steering System Motors – Gear Box - Brake - Shock absorber – Wheel**. Allowing a wide range of vehicle applications in a fast and reliable way.



RELIABILITY

Developed under Automotive standards.

COMPACT & RELIABLE



3 PATENTS

MECHANICS

Compact and robust electro-mechanic system for the best powertrain efficiency.

ELECTRONICS

Power & Control, electronic modules .



COMMUNICATIONS

CAN Bus & I/O.



DRIVING

Singular manoeuvrability for a wide range of vehicles types.

iRobotWheel REFERENCES

- Up to 7 standard **iRobotWheel** configurations.
- Custom **iRobotWheel** under demand.



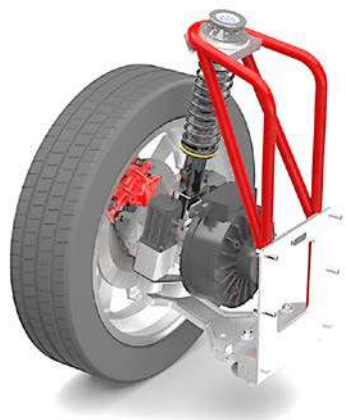
MAINTENANCE SERVICE

Hardware and Software maintenance services.
Product innovation.



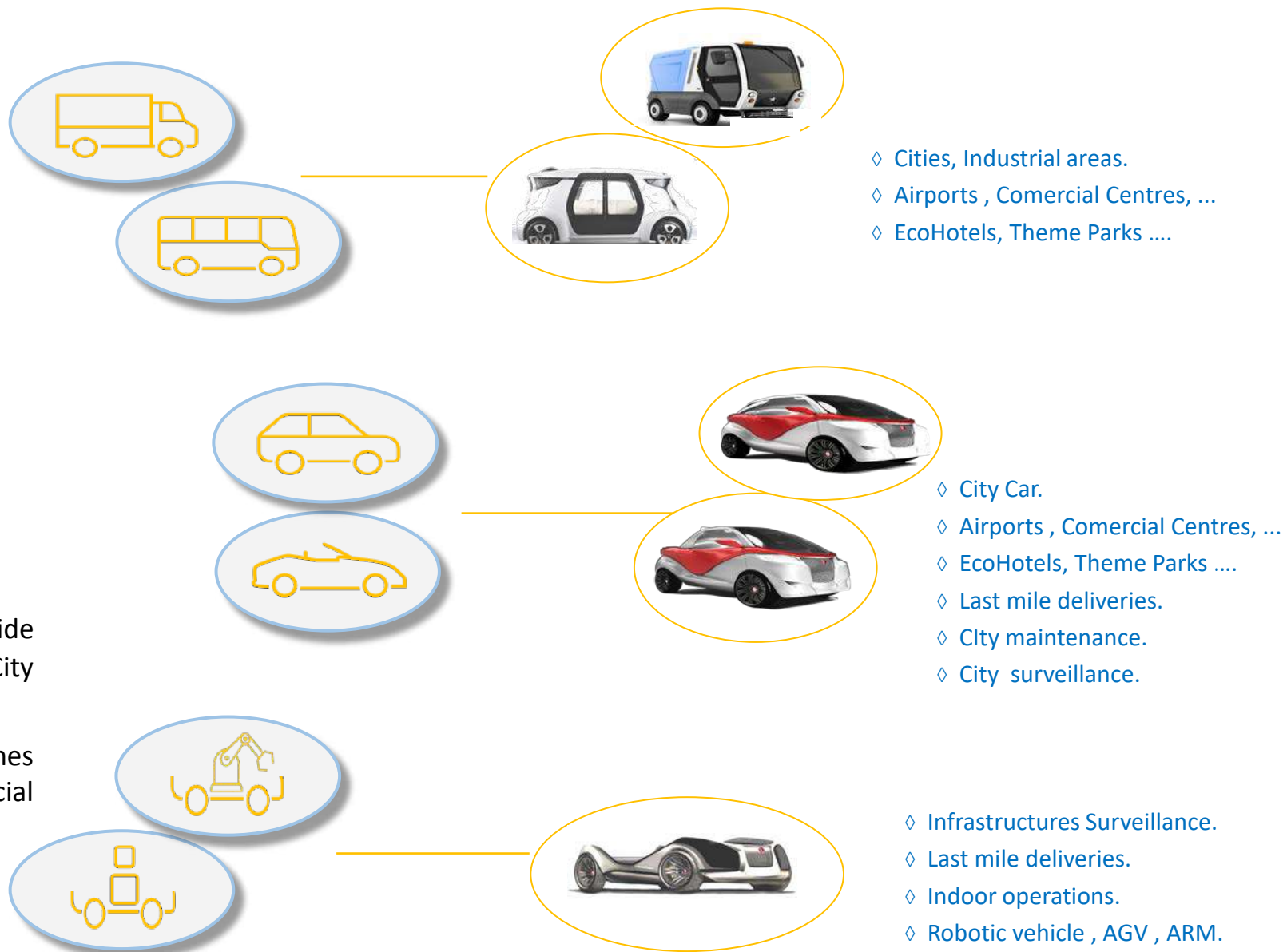
iRobotWheel

YOU DESIGN THE LIMITS



iRobotWheel allows the development of a wide range of vehicular platforms for Robotics & City Vehicles applications.

The singular conception of the **iRobotWheel** combines its standard use for City Car vehicles and the special ones requiring extreme vehicular maneuverability.





iRobotWheel

MAIN CHARACTERISTICS

iRobotWheel Operation :

- ◇ Maximal speed : 90Kmh
- ◇ Singular maneuverability : turning angle -70° _ $+70^{\circ}$.

iRobotWheel Driving System :

- ◇ Drive By Wire technology.
- ◇ Interface with Vehicle's Dynamics ECU.

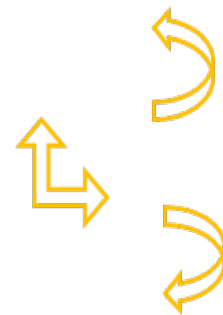
iRobotWheel Electrics & Electronics :

- ◇ Control & Power ECUs _ iTMC & iSMC.
- ◇ Traction motor : from 3,75 to 7,5KW / 330VDC.
- ◇ 2 motors for the Electric Steering System.

iRobotWheel Mechanics :

- ◇ Up to 7 standard iRobotWheel configurations.
- ◇ Traction motor Gear Box.
- ◇ Steering System Gear Box.
- ◇ Brake & Shock absorber.
- ◇ Mechanical Interface with the chassis.

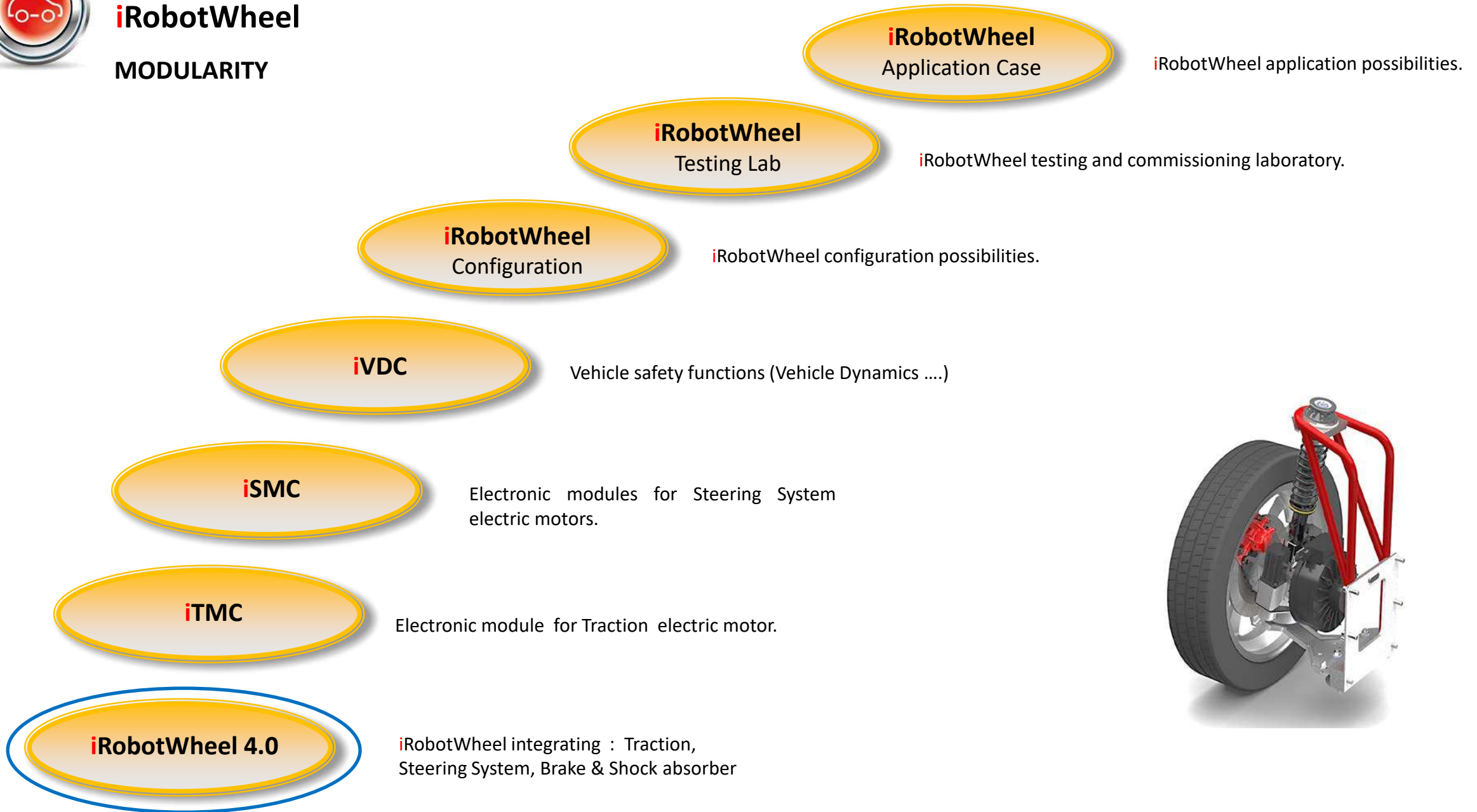
3 PATENTS





iRobotWheel

MODULARITY





iRobotWheel



3 PATENTS

iSMC _ ECU for 2 Steering System Electric Motors

iVDC _ ECU for Vehicle Dynamics Management
Optional

iTMC _ ECU for 1 Traction Electric Motor



Chassis

Wheel

Chassis Interface

Traction Motor

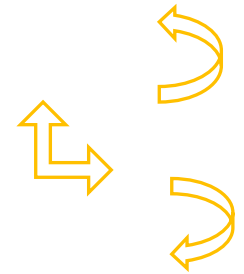
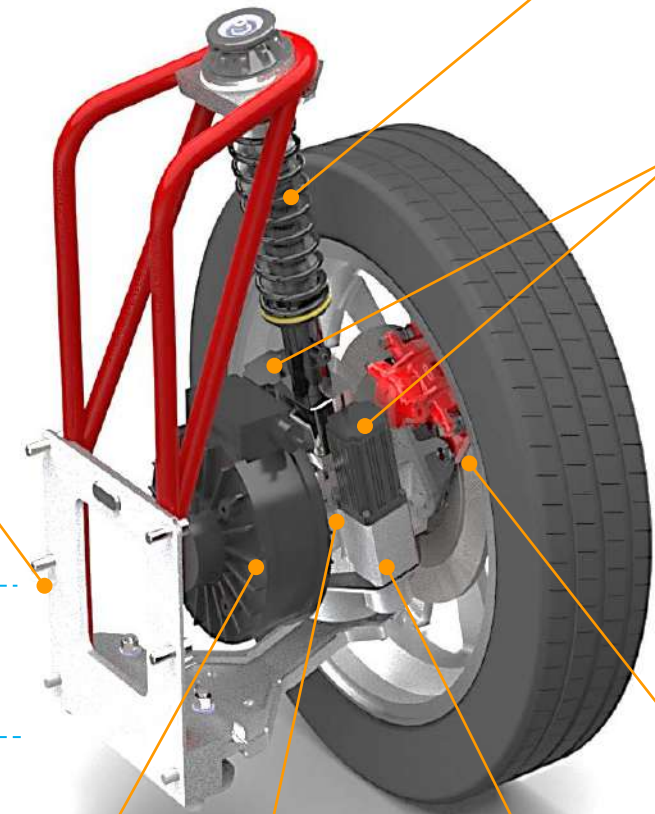
Traction Gear Box

Steering Gear

Shock Absorber

Steering System 2 Motors

Brake Disc
Brake Caliper





iRobotWheel

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iRobotWheel
Application Cases

iRobotWheel
Testing Lab

iTMC _ Power & Control ECU for PWM & PMSM motors.

iRobotWheel
Configuration

Power Train Traction Motor application based in Automotive standards.

Power & Control ECU for Sinusoidal or Trapezoidal control for 4-Quadrant PWM and PMSM motors, allowing remote : positioning, speed and torque control via CANBUS commands.

iVDC

iSMC

iTMC

iRobotWheel 4.0

HARDWARE iTMC :

- ◇ Power Supply _ Power : 330 /12 /24 VDC
- ◇ 1 power output up to 8KW for PMSM motors
- ◇ 1 Incremental & absolute encoder input
- ◇ 1 Hall sensor input
- ◇ PWM 15 Khz
- ◇ Sensor Speed range : Up to 10K RPM
- ◇ 2 Digital inputs _ 2 Analogic inputs
- ◇ CANBUS com _ up to 1MBs
- ◇ Operation temperature range : -20°C to +85°C



Sensors types :

- Sensorless motor
- Hall sensors
- Incremental Encoder

SOFTWARE iTMC :

- ◇ User interface
- ◇ Parameters configuration (Autotuning)
- ◇ Calibration
- ◇ Main parameters monitoring and diagnostics



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Application Cases

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Configuration

iVDC

iSMC

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iRobotWheel 4.0

iSMC _ Power & Control ECU for PMSM & BLDC motors.

Power Train Steering System application based in Automotive standards.

Power & Control ECU for PMSM & BLDC motors, allowing remote :
positioning, speed and torque control via CANBUS commands.



Sensors types :

- Sensorless motor
- Hall sensors
- Incremental Encoder

HARDWARE iSMC :

- ◇ Power Supply : 12 Redundant /24/48 VDC
- ◇ 2 power outputs for 2 PMSM - BLDC motors. Redundant topology.
- ◇ Max. Output Current : 15 A & 10 A , see versions
- ◇ 2 encoder / hall sensors inputs
- ◇ PWM : Up to 15 Khz
- ◇ Sensor Speed range : 10K RPM
- ◇ 4 Digital Inputs _ 2 Analogic inputs
- ◇ CANBUS com _ up to 1MBs
- ◇ Operation temperature range : -20°C to + 85°C

SOFTWARE iSMC :

- ◇ User interface
- ◇ Parameters configuration (Autotuning)
- ◇ Calibration
- ◇ 2 motors simultaneous control
- ◇ Main parameters monitoring and diagnostics



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Configuration

iVDC

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iVDC _ Vehicle Safety Functions ECU.
ECU for the vehicle safety functions (Vehicle Dynamics , EPS, ...)
Based in Automotive standards.

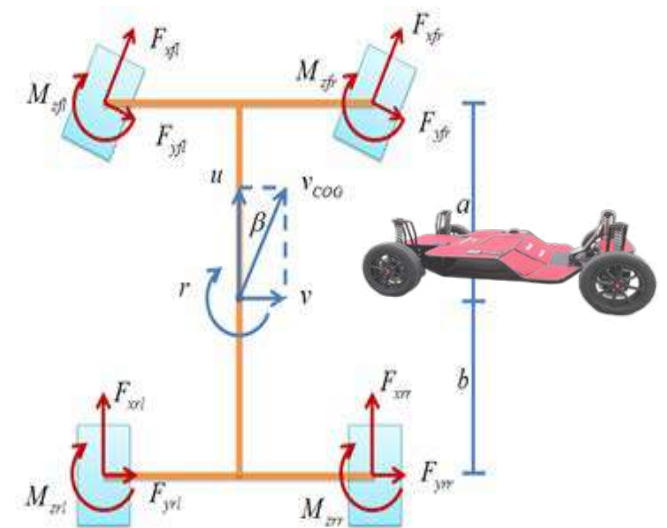
- ◇ Vehicle dynamics management
 - ◇ Powertrain management
 - ◇ Braking System management
- ◇ Driving Interface: Steering Wheel, Throttle, Joystick, SmartPhone, ADAS
 - ◇ Communications Gateway

HARDWARE :

- ◇ Power Supply : 12 / 24 VDC redundant
- ◇ Dual core microp certified for safety applications
- ◇ 4 x CANBUS com _ up to 1MBs)
- ◇ 1 x FLEXRAY com
- ◇ 2 Accelerometer & 2 Gyroscope
- ◇ 1 Incremental encoder input
- ◇ 1 Torque sensor input
- ◇ 10 Analogic inputs _ 3.3Vdc / 5 Vdc
- ◇ Operation temperature range : -20°C to + 85°C

SOFTWARE :

- ◇ User interface
- ◇ Parameters configuration
- ◇ CANBUS & FLEXRAY Commands
- ◇ Matlab / Simulink supported





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Application Cases

iRobotWheel
Testing Lab

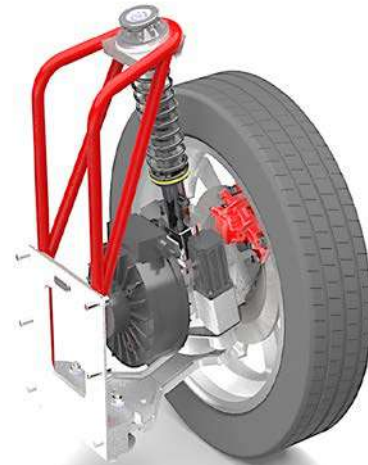
iRobotWheel
Configuration

iVDC

iSMC

iTMC

iRobotWheel 4.0



iRobotWheel v4.0 Option 1 :

- 1 Traction Motor
- 2 Steering System Motors
- Brake
- Shock absorber
- Control & Power ECU

iRobotWheel v4.0 Option 2 :

- 1 Traction Motor
- -
- Brake
- Shock absorber
- Control & Power ECU

iRobotWheel v4.0 Option 3 :

- -
- 2 Steering System Motors
- Brake
- Shock absorber
- Control & Power ECU

iRobotWheel v4.0 Option 4 :

- -
- -
- Brake
- Shock absorber
- -

iRobotWheel v4.0 Traction Motor Options :

- A) 3750 W
- B) 7500 W



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iRobotWheel
Application Cases

iRobotWheel
Testing Lab

Testing Laboratory for the fast and secure transformation of ideas in engineering activities with the objective to produce feasible and reliable iRobotWheels and robotic vehicular platforms.

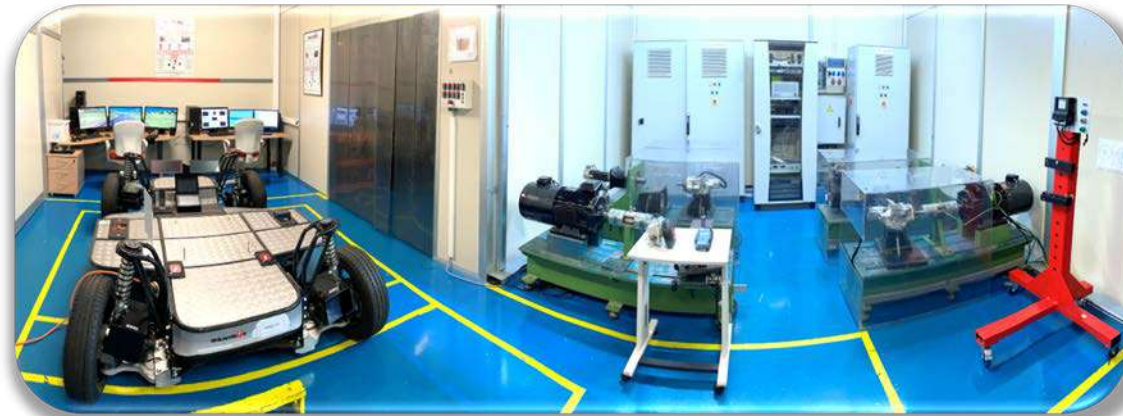
iRobotWheel
Configuration

iVDC

iSMC

iTMC

iRobotWheel 4.0



The electric power train laboratory allows the development of “Digital Twins” based in the “Virtual Graphic System for Environment and Driver in the Loop “ , interacting with the electric power train components in order to simulate the system as close as possible to real conditions.



iRobotWheel

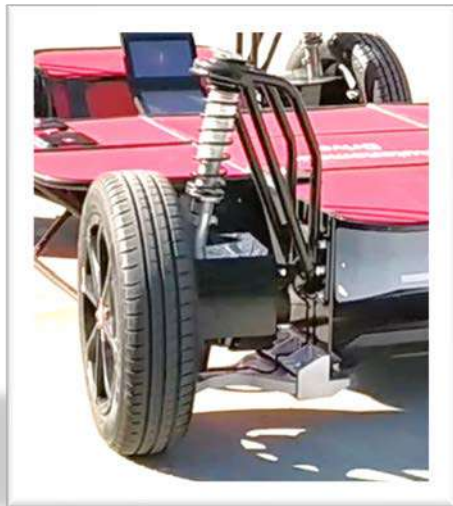
iOne experimental platform for iRobotWheel commissioning & testing procedures.



"iOne II" vehicular platform



"iOne III" vehicular platform





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iRobotWheel
Application Cases

iRobotWheel
Testing Lab

iRobotWheel
Configuration

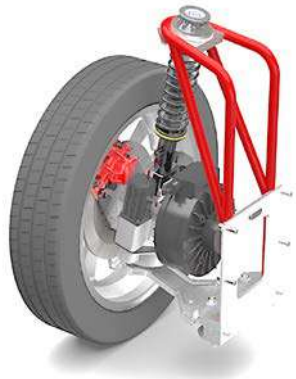
iVDC

iSMC

iTMC

iRobotWheel 4.0

YOU DESIGN THE LIMITS

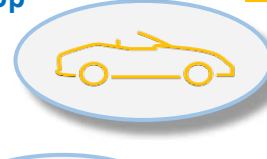


City Bus / Special Vehicles



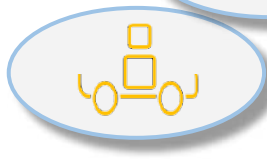
◇ iRobotWheel for small city bus ,
small lorries and special urban
vehicles.

City Car / Pick Up



◇ iRobotWheel for City Cars
and Pick Up vehicles.

Automated Guided Vehicles



◇ iRobotWheel for AGVs , ARMs
and Robotic vehicles.



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MOBILITY

iRobotWheel

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