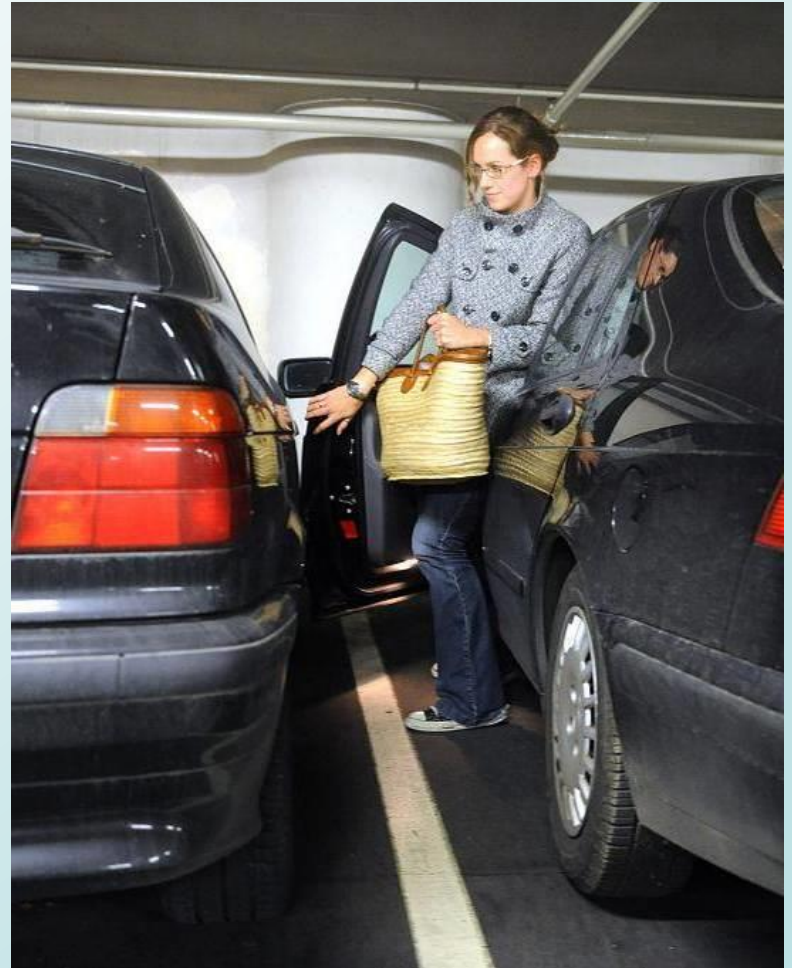# Remote Control Parking (RCP)

A safe and comfortable parking solution

Submitted by the Experts of OICA
80th GRRF, Geneva, 2015

Outline

- Motivation

- Functional/system description

- The technical concept
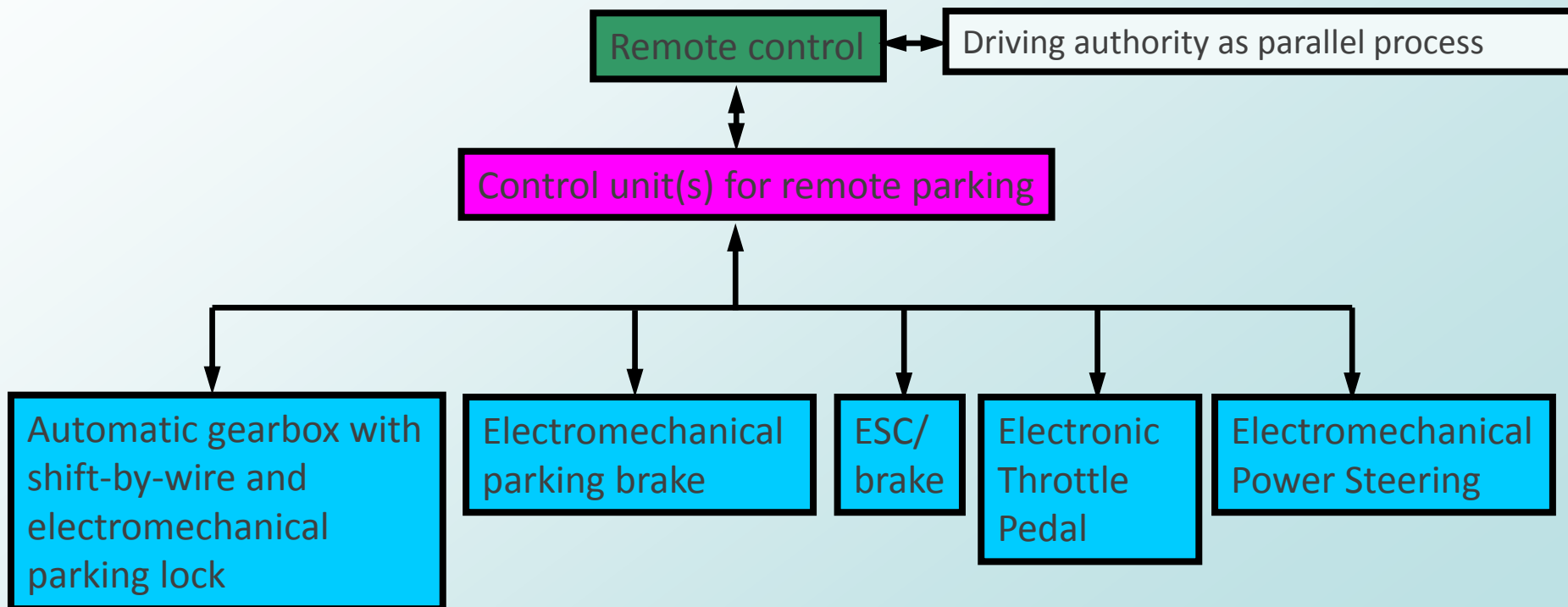
- Legal Aspects

Motivation for RCP

Benefits

- Automated parking on public parking space or in private garages
- Comfortable, because it is easy to get in and off the car
- The driver controls the manoeuvre by actuating a dedicated control on the key/smartphone, while continuously monitoring the manoeuvre (direct view) from a close distance
- The vehicle preforms the parking manoeuvre using its own sensors only if control signal is received from the key/smartphone
- The vehicle will be brought to an immediate halt when the control signal is no longer being received (e.g. driver stops actuating the control, the remote controller is not in proximity of the vehicle)
- Relief, especially for persons with reduced mobility
- Driver has an extensive overview of the parking scenario and can better overlook the situation
- Avoidance of parking damages (e.g. when opening the door)

Functional Description

- Automated parking by actuation of a control on a remote control

- Driver does not exercise steering control (e.g. joystick). Vehicle only follows automatically the on-board generated trajectory by using its own sensors.

- Driver is in control at all times
  - Permanent control by the driver is required and necessary
  - Vehicle stops as soon as the control is released

- Driver is outside of the vehicle and must remain in close proximity around the vehicle as to monitor the parking manoeuvre permanently

- Low vehicle speed (< 10 km/h)

- Due to low speed, the minimal risk condition (vehicle comes to a halt) is reached immediately

Example for the Technical Concept / System Description

- Measuring the parking lot and monitoring the vehicle's close surrounding by a suitable sensor technology
- Remote control as the interface and access authority for the RCP-function

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┌──────────────────┐        ┌────────────────────────────────────┐
│  Remote control  │ ◄────► │ Driving authority as parallel process │
└──────────────────┘        └────────────────────────────────────┘
          ▲
          ▼
┌────────────────────────────────────┐
│  Control unit(s) for remote parking │
└────────────────────────────────────┘
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| Automatic gearbox with shift-by-wire and electromechanical parking lock | Electromechanical parking brake | ESC/ brake | Electronic Throttle Pedal | Electromechanical Power Steering |

UN-R Regulations for RCP

UN-R 79 fulfilled: ✓

- The driver remains permanently in primary control of the vehicle (see 2.3.4)
- ACSF - the speed of 10 km/h is not exceeded (see 5.1.6.1)
- The requirements defined in Annex 6 („special regulations for the safety aspect of complex electronic vehicle control system") are fulfilled

UN-R 13-H fulfilled ✓

- The requirements defined in Annex 8 („special regulations for the safety aspect of complex electronic vehicle control system") are fulfilled

Other UN-Regulations are not specifically related to the function Remote Control Parking ✓

Traffic Regulations / Vienna Convention

Vienna Convention Article 8

- **Para. 1** *Every moving vehicle or combination of vehicles shall have a driver.*
  Conformity: Driver is not required to be seated inside the vehicle. In case of RCP the driver „drives" from outside the vehicle. ✓

- **Para. 5** *Every driver shall at all times be able to control his vehicle or to guide his animals.*
  Conformity: Driver can at all times immediately stop the parking manoeuvre by releasing the control. Analogy: Lead a horse from X to Y. ✓

Vienna Convention Article 13

- **Para. 1** *Every driver of a vehicle shall in all circumstances have his vehicle under control so as to be able to exercise due and proper care and to be at all times in a position to perform all manoeuvres required of him.[…]*
  Conformity: see Art. 8.5 – Driver is able to have his vehicle under control at all times during parking manoeuvres. ✓

Summary

- The function Remote Control Parking is safe and offers a significant benefit to the driver

- All existing regulations are complied with

- The function is attractive and requested by customers