

METHOD AND SYSTEM TO ASSESS THE OCCUPATION STATE OF A PARKING SPACE

Main technological area → Continuous Wave Radar / FMCW

Keyword → Parking Areas / Traffic control systems / Vehicles/ Proximity Sensors / Frequency Modulated Continuous Wave type (FMCW)

Method for determining the occupancy status of the car park . It is based upon proximity sensors placed on the ground, and a sensor on board the vehicle, and a TX/RX transponder on board the vehicle.

The proximity sensor is based upon a Frequency Modulated Continuous Wave Radar (FMCW) , using a 24 GHZ carrier frequency .



TECHNICAL FEATURES

The system includes

- A ground sensor
- A unit on board the vehicle
- A radio transmission module on board the vehicle
- An Access Point
- An operations center

The ground sensor includes a memory containing a parking space identification code, so that the determination system can detect the state of occupancy of the parking space.

Both on board units are linked to the vehicle.

The devices are placed in such a way as to communicate wirelessly with the Access Point. The Access Point is connected with a cable to the Operations Centre.

A vehicle identification code is associated with the equipment on board the vehicle.

When the ground sensor determines that the seat is occupied by the vehicle, it interrogates the equipment on board the vehicle and stimulates them to transmit their own identifier and that of the parking space.

Subsequently, the ground sensor transmits the following information to the Access Point

This makes it possible to check not only whether the seat is occupied, but also whether the vehicle occupies the seat assigned.

INNOVATION/BENEFITS

- *Enabling the implementation of seat occupation policies.*
- *Ability to check that certain seats are occupied only by authorised vehicles (e.g. ambulances, police, cars for the disabled).*
- *Correct operation regardless of the vehicle (motorcycle, car, van, bus, etc..) that occupies the stall.*

AREAS OF USE

Smart Cities

Management of various types of vehicle parking. Management of parking lots at airports, stations, industrial plants, military bases, stadiums

PATENT INFORMATION

Priority Date – 2011/08/08**Priority Number** - 13/205451**IPC Codes**– G01S13/34; G01S13/82; G08G1/14; H04L27/02**Active Worldwide Extensions**EPO - EP2418508B1; Filing Date : 2011/08/09 ; Grant Date 2013/04/03

Italy –Germany –France - United Kingdom -Nederland

USA US9013326 ; Filing Date : 2011/08/08 ; Grant Date 2015/04/21**Leonardo internal code**

LDO-0204

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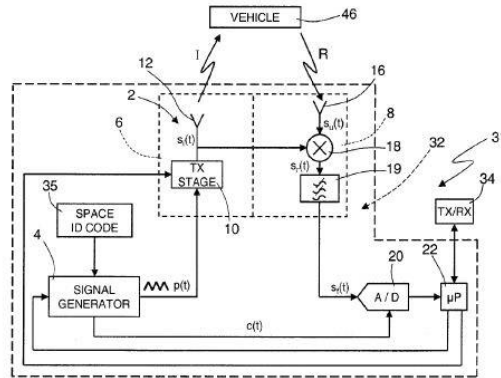
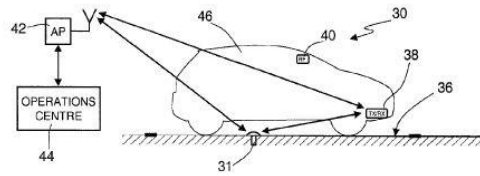


Figure 1 System Overview

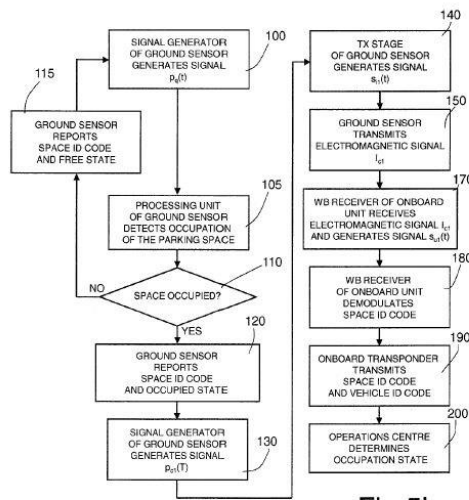
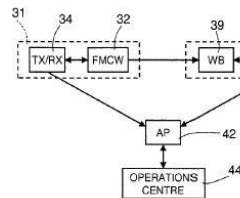


Figure 2 Logic flow of system operation