

Personal Mobility Vehicles Monitor system and method

DESCRIPTION OF INVENTION

The variety and intense use of Personal Mobility Vehicles (PMV) are rapidly growing in cities and urban environments. This invention provides an improved monitoring beyond the state-of-the-art detectors.

The basic technologies in this invention are the magnetic loops and electronic circuits applied to detect vehicles. These technologies are well established for current traffic detectors for motorized vehicles (cars, motorbikes, buses, trucks) and are in use for a variety of parameters: presence, speed, sense of circulation and type of vehicle. Not in PMVs.

Current detector solutions are installed in single, double or dual loops configurations and with a typical size in the range of 1 or 2 meters, and with resonance working frequency of 100-200 kHz.

But these state of art solutions, when applied to Personal Mobility Vehicles (PMV), only detect presence

To overcome this limitation, the innovation of this invention has the following characteristics:

- Double magnetic loop with size less than 0.5 meters

BUSINESS APPLICATIONS

The system and method of this invention are designed and developed for PMV in urban environments and can be installed in streets and roads where traffic of PMV is planned or expected, with reserved or shared lanes. The information parameters obtained with this invention include:

- Class and Type of PMV vehicle
- Speed and length of the passing vehicle
- Sense of circulation
- Vehicle traffic density in the area

The monitoring of these parameters enables a better law enforcement and adequate planning of street / roads / lanes for new construction or remodeling.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The special design of this invention, based in the characteristics mentioned above, provides a greater and reliable information of PMV presence and traffic with a rich set of parameters (see below).

There are other technologies for traffic monitoring and characterization like laser radar and image recognition cameras, but are expensive and not reliable when cost/performance optimization is needed.

The use of magnetic loops in this invention provides a rough, reliable and well tested technology with an affordable cost. The invention brings a new richness of information.

The agents and operators in city infrastructures installation and exploitation have a large experience with magnetic loops, being this an additional advantage.

- Resonance working frequency of 400-800 kHz

The system design is implemented with five **functional blocks**:

- 1) Double magnetic loop (interconnected with [2] and [3])
- 2) Oscillator circuit (interconnected with [1] and [3])
- 3) Phase-Locked Loop PLL circuit (interconnected with [1] and [2] and output to [4])
- 4) Conditioning circuit (input from [3] output to [5])
- 5) Signal processor circuits (input from [4])

The development of this invention with these blocks is designed and tuned for PMVs.

The functional flow has the following steps: (a) vehicle presence detection (b) magnetic profile of the vehicle (c) electric voltage induced (d) derivative of electric voltage (e) Maximum and minimum calculations. With these steps a rich set of parameters is obtained, as detailed below.

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STATE OF TECHNOLOGY DEVELOPMENT

The technology has been validated in laboratory. Basic prototype has been made and tested in laboratory with a limited set of PMVs. TRL-4 is the current technology readiness level.

INDUSTRIAL PROPERTY RIGHTS

Patent pending: P202230017

Priority Date: 2020/12/18

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