H-GEAR:
High Performance
Galileo
Emergency
Anti-Theft
Rescue

01/12/2020
H-Gear is a project started in November 2019

Team:
Vitrociset Belgium SPRL (Coordinator),
Honda Italia SPRL,
SpaceEXE SPRL,
Antenna Provider Finland Ltd.

Objective: eCall and Antitheft system for Moped (cat.L3 two-wheeled vehicles >50cc, >45km/h).
Safety is not Luxury

Safety should not be reserved only to expensive vehicles

Ecall and Antitheft systems are today available only on high-end motorbikes of exclusive brands

Motorbike is the urban transport that is changing mobility patterns in congested cities worldwide, thanks to its dynamics, lower prices and greater fuel economy

H-Gear is an affordable eCall and Anti-theft system
Technical challenges

Device integration on the chassis of a small vehicle

Power consumption optimisation

Antenna performance for any bike lean angle (including horizontal)

Difficult operational environment due to vibrations, high engine temperatures, exposure to weather phenomena and electromagnetic interferences.
H-Gear High Level Architecture
The European Union published on 17.01.2017 the Commission Delegated Regulation (EU) 2017/79 on establishing detailed technical requirements and test procedures for the EC type-approval of motor vehicles.

This regulation lays down a general obligation for new types of vehicles of categories M1 and N1 to be equipped with 112-based eCall in-vehicle systems as of 31 March 2018.

*The H-GEAR project targets the L₃ vehicles category, that includes: two-wheeled vehicles with an engine cylinder capacity in the case of a thermic engine exceeding 50 cm³ or whatever the means of propulsion a maximum design speed exceeding 50 km/h.*

There is not a specific regulation regards the L₃ vehicles and eCall systems, so one of the H-GEAR objectives is also paving the way for the future regulations.

A tailoring of Technical requirements and Test Procedures described in Regulation (EU) 2017/79 must be performed for the benefit of the project.
Tailoring EU Requirements for H-GEAR

COMMISSION DELEGATED REGULATION (EU) 2017/79 of 12 September 2016

Original: Ref CELEX:32017R0079 pg1 point (6).

The 112-based eCall in-vehicle system needs to remain functional after a severe accident. An automatic eCall is most beneficial in a high-severity collision where the risk of occupants of the vehicle being incapacitated and not able to call for assistance without an eCall system is highest. The 112-based eCall in-vehicle systems, components and STUs should therefore be tested to verify their sustained functionality after being subjected to inertial loads similar to those that may occur during a severe vehicle crash.

Tailored requirement

The H-GEAR eCall in-vehicle system needs to remain functional after a severe accident. An automatic eCall is most beneficial in a high-severity collision where the risk of driver and passenger of the motorcycle being incapacitated and not able to call for assistance without an eCall system is highest. The H-GEAR eCall systems, components and device should therefore be tested to verify their sustained functionality after being subjected to inertial loads similar to those that may occur during a severe vehicle crash.
Req 2 original Ref CELEX:32017R0079 pg 1 point (10).
To ensure the provision of accurate and reliable position information, the 112-based eCall in-vehicle system should be able to use the positioning services provided by the Galileo and the EGNOS systems.

Req 2 tailored
To ensure the provision of accurate and reliable position information, the H-GEAR system should be able to use the positioning services provided by the Galileo and the EGNOS systems.

Req 3 original Ref CELEX:32017R0079 pg 2 point (12).
Manufacturers should ensure that the 112-based eCall in-vehicle systems are not traceable and not subject to any constant tracking. For that purpose, a test procedure should be set out to verify that the 112-based eCall in-vehicle system is not available for communication with the PSAP before the eCall is triggered.

Req 3 tailored
Manufacturers should ensure that the H-GEAR devices are not traceable and not subject to any constant tracking. For that purpose, a test procedure should be set out to verify that the H-GEAR device is not available for communication with the H-GEAR control center before the eCall or the anti-theft alert is triggered.
Annex VI

Annex VI - Technical requirements for compatibility of eCall in-vehicle systems with the positioning services provided by the Galileo and the EGNOS systems - requirements and test procedures applicable or applicable with changes to H-GEAR

Annex VI defines the Technical requirements for compatibility of eCall in-vehicle systems with the positioning services provided by the Galileo and the EGNOS systems.

It is considered the guideline for the requirements definition and testing procedures for the H-GEAR project.

All the requirements defined in this annex are applicable to H-GEAR.

GSA and JRC published on December 2017 a document titled: “EGNOS/GALILEO eCall conformance testing in EU Commission delegated regulation 2017/79 – Implementation guidelines for On-Board Unit manufacturers, test solution vendors and technical centres”.

The aim of H-GEAR project is to create an eCall device for L3 vehicles category with performance that can satisfy a type-approval authority. Therefore, the GNSS related requirements defined in Regulation (EU) 2017/79 are applicable to H-GEAR and the test that will be conducted in JRC, will strictly follow the guidelines defined in the above-mentioned document.
Innovative features of H-GEAR. Requirements and test procedures

Some of the innovative features of H-GEAR are not considered in Regulation 2017/79. Therefore some specific additional requirements and tests will be conducted. In particular, H-GEAR introduces the following innovations to the GNSS PVT calculation:

- Galileo OS-NMA anti-spoofing mechanism
- GNSS + accelerometer remote data fusion processing
- Remote Differential processing (DGPS / RTK)

The following requirements related to GNSS are consequently added to the list:

- The H-GEAR system will be able to detect a spoofing of the Galileo navigation message using the Galileo OS-NMA mechanism.
- The H-GEAR system will jointly use accelerometer and GNSS raw measurements during the alert/theft or accident mode, to verify the movement and position of the motorcycle.
Honda SH for H-Gear
Installation in the SH chassis
H-Gear Mobile Application

4:26
Home

00:00:00
Total time

0.00
Distance, km

0.0
Altitude, m

0.0
Current speed, km/h

0.0
Average speed, km/h

START RIDE
HISTORY

4:27
Find my SH

Rescue chain started

Localisation of your SH detected

Position shared with your local authority

SH rescued by local authority

CANCEL

11:58
Emergency call

If you don't stop the service, the rescue process will start

SOS
CANCEL
SERVICE CENTER

© 2019 Leonardo - Società per azioni
Contacts
Alessandra Settin
Project Coordinator
a.settin@vitrocisetbelgium.com
THANK YOU
FOR YOUR ATTENTION

Vitroiset Belgium.com