intelligence on wheels

Train Collision Avoidance

Although rail transport is extremely safe, collisions of railway vehicles happen occasionally. Our innovative safety overlay system adopts a concept very successfull in aircrafts for avoiding the collision of trains. It combines three core technologies: a direct train-to-train communication system, an accurate localization system and a cooperative situation analysis and decision support system. As opposed to “traditional” technical train safety systems, our system does not require any technology in the infrastructure, i.e. along the railway track, but entirely relies onboard technology.

Portable Train Unit

A portable version of our on-board collision avoidance system is available which can be used to temporarily equip vehicles such as locomotives or even single wagons. A typical use case for the portable version is to equip any rolling stock which is about to enter a certain area (e.g. maintenance area) where the existing signaling and control system has to be switched off during the work in progress. For example, a set of portable units can be pooled by an infrastructure operator to temporarily equip trains which would be otherwise not allowed to drive into specific areas. As the portable version runs on battery power for several hours, it might even be temporarily attached to stabled load to make these wagons “visible” to other trains even if there is no locomotive attached to the stabled load.

The portable all-in-one unit is based on a ruggedized embedded PC in a particular robust housing with a large color touch-screen for optimal viewing in all lighting conditions, all specifically designed for the use in vehicles. The direct train-to-train communication (i.e. no base stations required) is based on the internal TETRA radio which operates on a frequency band between 350-473 MHz with 1W. Simply when in range, units exchange information about the vehicle's position on the track, speed, driving direction etc. using the communication module. Optional multi-bearer connectivity may be used for service access and maintenance.
The localization module consitst of a high precision GPS which can optionally be extended with a 6 degree-of-freedom inertial measurement unit (IMU) for demanding cross-track accuracy and localization availablility.

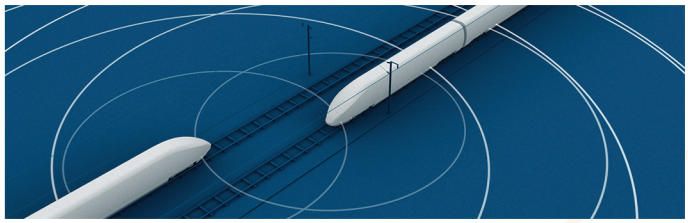
The internal battery ensures hours of operation typical for portable operation scenarios, such as temporary use of construction vehicles.

Capabilities of the processing module

- Intel Core solo 1.06GHz low power draing for long life battery and low heat dissipation
- 1 GB RAM, 1MB level 2 cache
- 32 GB Solid State Drive
- USB 2.0 host
- Built in speaker
- Dimension 220 x 190 x 55 mm, weight 2.2 kg
- Protection compliant to MIL-STD-810F (shock & vibration) and IP54

Capabilities of the communication module

- TETRA radio on a frequency band 350-473 MHz with 1W transmit
- power for direct train-to-train communication in DMO mode
- Optional 4G/3G/GPRS/GSM/HSDPA wide area radio for service access
- Optional Intel Centrino 802.11 a/b/g Wireless Local Area Network (WiFi) radio for on-site maintenance
- Integrated TETRA/GPS/3G Antenna



Display

- 8.4“ SVGA Transflective color screen
- 650cd creating 1000cd using ambient light
- finger, gloved finger or stylus operation

Capabilities of the localization module

- high precision GPS
- Optional 6 degree-of-freedom MEMS IMU

Power Supply

- Internal Lithium-Ion removable/rechargeable battery, 4 hour typical usage
- 12V/24V with range of 10V to 30V

Docking option

- Secured mounting of unit
- Charging controller
- External Antenna mount

About Intelligence on Wheels

Intelligence on Wheels, founded in 2012, is a spin-off of the German Aerospace Center (DLR) committed to the commercialization of an innovative train collision avoidance system. It is our vision that every train will be equipped with our technology as additional means of technical train protection. In doing so, the safety level will be lifted from whatever safety technology is installed along the track or in the train to a higher level.

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