LIAA
Latvijas Investīciju un attīstības aģentūra
Investment and Development Agency of Latvia
NATIONAL DEVELOPMENT PLAN 2020
EUROPEAN UNION
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INVESTING IN YOUR FUTURE

AUTOMATED RAILWAY LEVEL CROSSING CONTROLNSYSTEM

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Today, the main infrastructures for land transportation are road and rail. They both are located in the same geographical area and therefore inevitably intersect.

Thanks to the development of the world's economy, the volume of freight transportation and the volume of the passenger transportation is increasing, allowing the intensity of infrastructures usage and movement of speed to significantly grow.

Moreover, due to infrastructure expansion, more intersections are formed, which contributes to flourishing social wellbeing, yet, unfortunately, to more accidents and lost lives as well. It's a never-ending loop.

Historically, level crossings have been designed and constructed in accordance with the following operating principle:

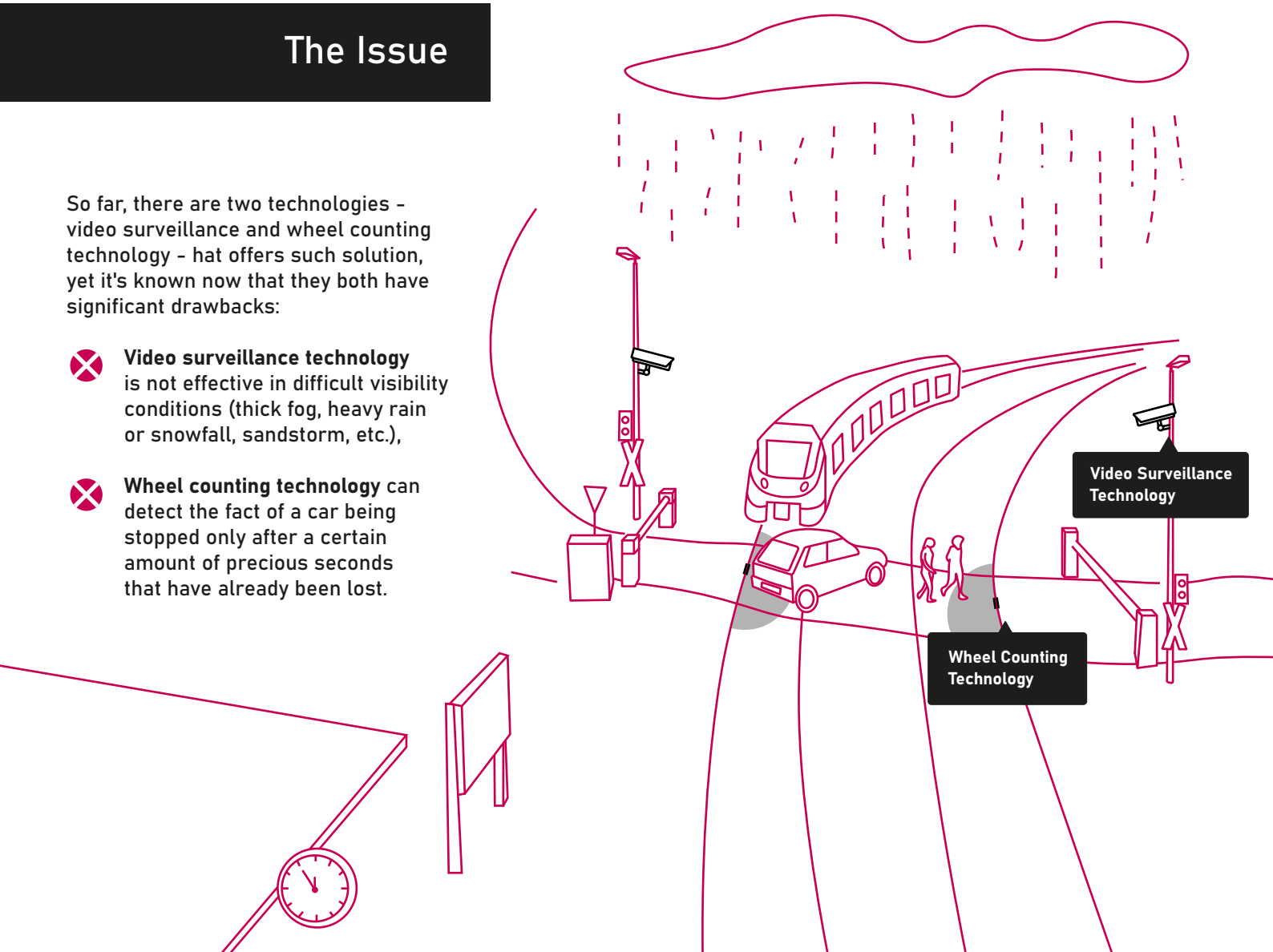
- when the train approaches the level crossing, the barrier is lowered and the flow of cars is stopped;
- the cars leave the level crossing area and the train crosses the level crossing without hindrance.

However, if the car stops on the level crossing due to some technical reason, a safety system is a must in order to prevent a horrendous accident. For example, a solution that immediately detects such a situation and triggers the train to start a stop process.

The Issue

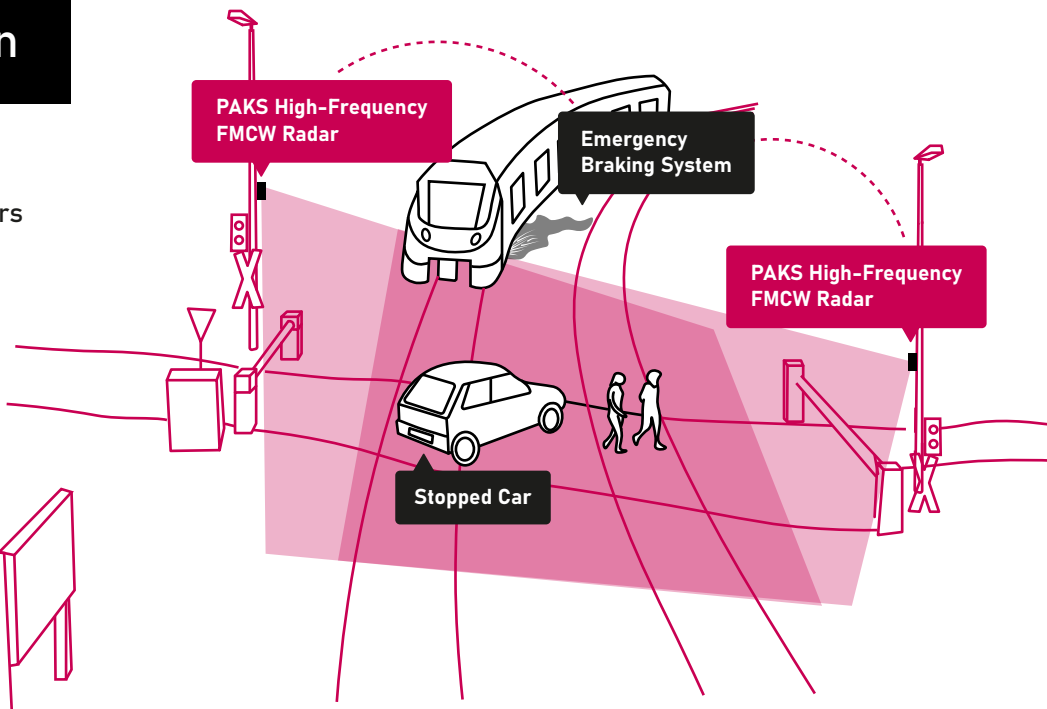
So far, there are two technologies - video surveillance and wheel counting technology - hat offers such solution, yet it's known now that they both have significant drawbacks:

- **Video surveillance technology** is not effective in difficult visibility conditions (thick fog, heavy rain or snowfall, sandstorm, etc.),
- **Wheel counting technology** can detect the fact of a car being stopped only after a certain amount of precious seconds that have already been lost.



The Solution

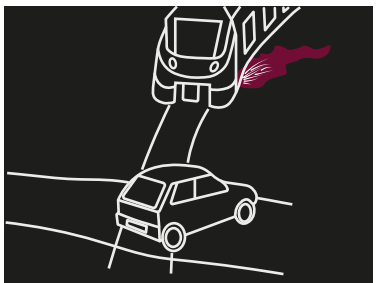
All these reasons lead us to create PAKS - a high-frequency FMCW radars that are used to control the level crossing. Our solution is more resistant to adverse visibility conditions.



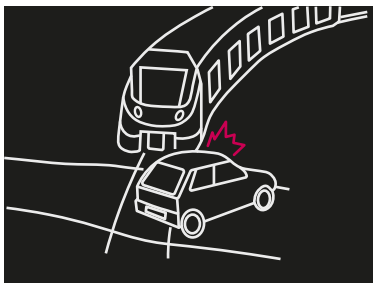
How does the system work

During the arrival of the train, high-frequency FMCV radars scan the level crossing and analyze the objects in it - their speeds and directions. If any of the objects stop or, after a movement analysis, is unable to exit the level crossing until the scheduled arrival of the train, the **train's emergency braking system is activated** to prevent an accident or at least to reduce possible fatalities.

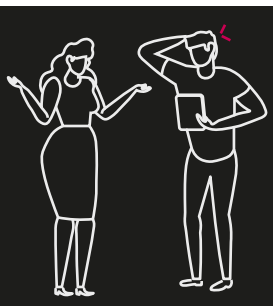
Core Benefits



The number of **collisions** is **reduced** - accidents that other systems are unable to prevent are prevented



The amount of **damage** is **reduced** - the speed of the train is reduced and the collision is easier



The human factor is **excluded**

Why Us?

We have 61 of research experience and is specializing in the development of Smart Embedded Cooperative systems covering the following research areas:

Extremely precise event timing,
Remote sensing and space data processing,
Robotics and machine perception,
Signal processing and embedded intelligence,
Smart sensors and IoT.

In 2014 was carried out the International evaluation of scientific institutions activities in Latvia. Experts rated our performance as excellent or good, and wr are the only state scientific institution in the field of engineering win this assessment evaluated as a high-level, strong and internationally important institution.

About EDI

Institute of Electronics and Computer Science (EDI) is a public research institute founded in 1960 in Riga, Latvia.

EDI has ~100 researchers working on innovative technologies in electronics and computer science, conducting fundemental and applied research in:

Smart Health
Smart Production
Smart Mobility
Smart Digital Life
Smart Space

EDI is among the highest rated scientific institutions in Latvia, focusing on research and development in Smart Embedded Cooperative Systems (SECS) based on original and/or complex signal processing approaches.

Our mission is to perceive the world and design a better future by creating new knowledge, developing innovative technologies and demonstrating their practical significance in real life applications.

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