

Initiative VIF 2011 PCP: Detection Natural Hazards

Flexible Detection and Early-Warning-Systems monitoring the Impact of Natural Hazards on Rail-Infrastructure.



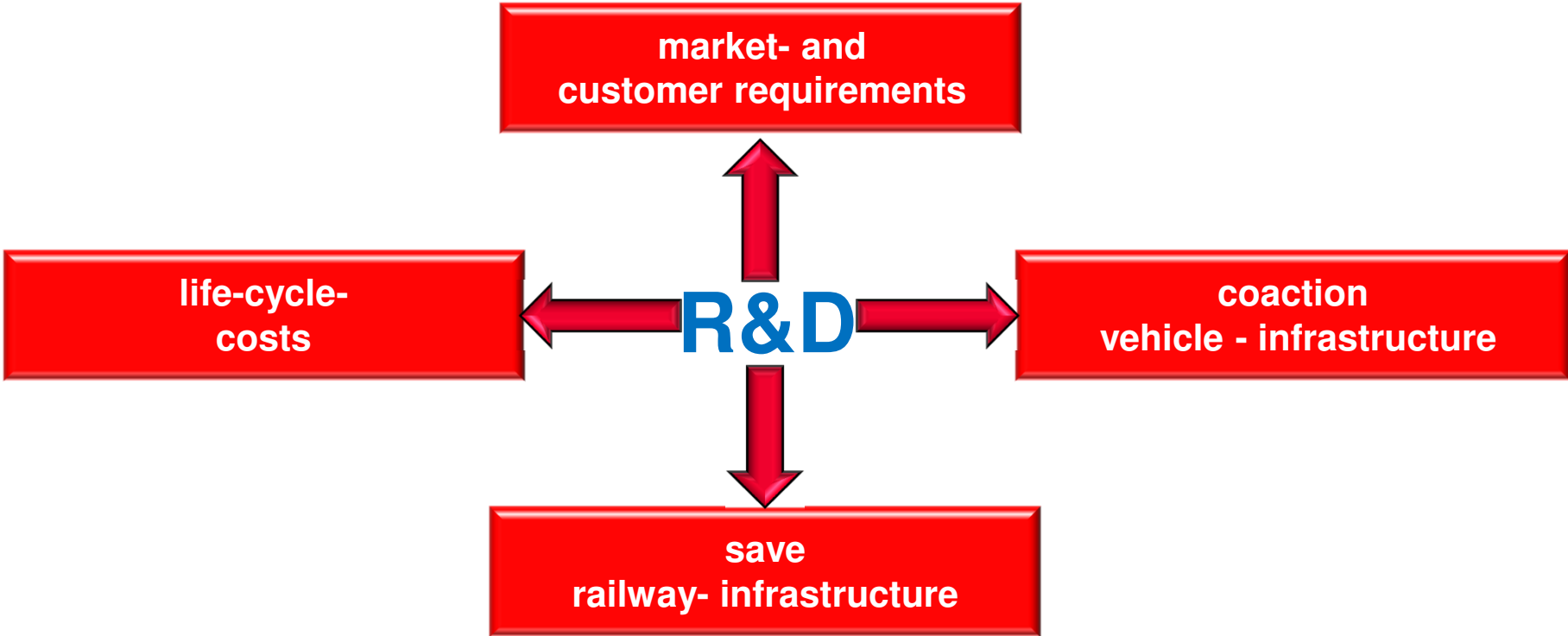
The R&D of the „ÖBB-Infrastruktur AG“ does application-oriented research.

With the help of national and international

- Research institute
- industry
- Operators of Railway infrastructure

ideas are successfully turned into reality.

Main focus of Research & Development of the ÖBB-Infrastruktur AG



Reasons for this PCP project

Due to their short-term profitability for emergency action or temporary measures detection / early warning systems gain increasing attention for protection against natural hazards. But due to the rapid technological development of such systems public tender is hampered by island-solutions and the lack of technical standards.

Therefore based on system prototypes tender specifications should be created:

- Emphasis is set to flexible and stand-alone prototypes.
- They should enable a quick, simple but secure installation wayside remote railroad tracks.
- The focus is put on: debris and high-water flows, rock-fall and other hill-slope processes

PCP Phase 1 – Feasibility Study

Call Opening:

- **1. Mai 2012**

Call closing:

- **31. Oktober 2012**

We had 13 submissions!

Number of participants:

- **5 consortia**



riskCAST

Mobile monitoring/warning kit focusing on hill-slope processes

project consortium:

alpinfra,consulting + engineering GmbH

UBIMET GmbH

Project idea:

Mobile measurement cubicle enabling quick system set-up. Combines state-of-the-art sensors as well as data management facilities.

Result – selected for phase 2:

Good performance of sensors, data analysis, data transmission and storage devices during pre-tests. Good detection results.

DESME

Early warning system focusing on rock-fall and debris flows

Project consortium:

AIT Austrian Institute of Technology GmbH

Energy & Mobility Sommer GmbH

Project idea:

Combination of ground sensors at the source area and detection fence surveillance system nearby the railroad tracks.

Results – not selected for phase 2:

Pre-tests showed inhomogeneous results and too high energy consumption – still at scientific development level.

Natural Hazards Radar

Real-time detection of mass movements

Project consortium:

BOKU, Dep. of Structural Engineering and Alpine Hazards

H&S, Hochfrequenztechnik GmbH

Project idea:

Short-time warning to real-time detection of quick mass or water movements by means of high-frequency radio beam up to 1km.

Result – selected for phase 2:

Good operational performance for snow flows and promising tests for small-scale hill slope processes.

SART

Early Warning System against hazardous Rock-Fall Processes

project partner:

INGLAS GmbH

Project idea:

Combined detection design by real-time surveillance of rock-fall protection fences in combination with source detection by borehole based sensors.

Result – selected for phase 2:

Good performance of fence sensing, data management and alerting matrix. Promising source detection concept.

IDSF

Real-time warning system against hazardous rock-fall processes

Project consortium:

PULSE Engineering GmbH - Worldsensing

BOKU, Dep. of Structural Engineering and Alpine Hazards

Project idea:

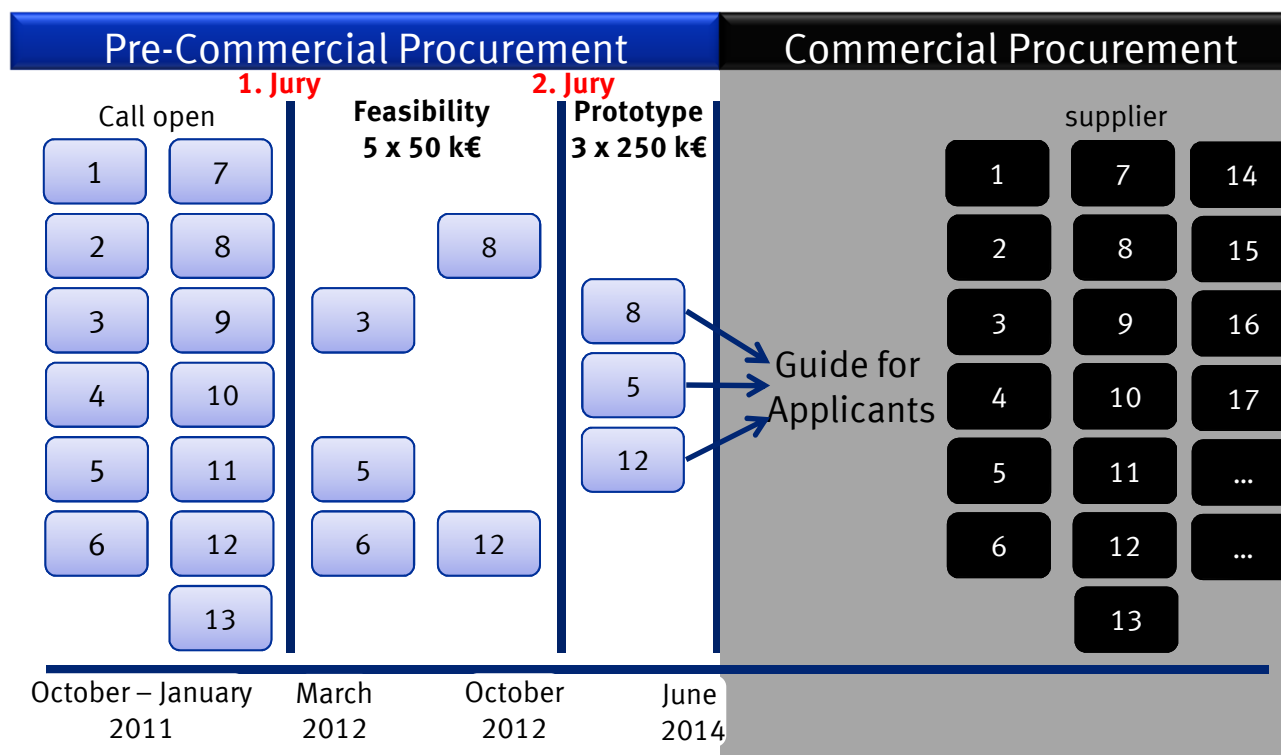
Real-time surveillance of railroad tracks based on punctual or linearly aligned sensors (Geophones, LWL) along the track.

Result – Not selected for phase 2:

Weak point sensor design. High energy consumption and high maintenance expenditure.

Initiative VIF 2011 PCP: Detection Natural Hazards

innovation needs time vs. problems need quick solutions



PCP Phase 2 – Prototype Development

Start: 1. April 2013, End: 30. May 2014

3 Consortia

will develop and test prototypes of their detection concepts during this project phase.

After the end of the phase these

Pre-commercial Prototypes

will be tested by means of a real-time test application wayside of an operational railroad line.



riskCAST

Mobile monitoring/warning kit focusing on hill-slope processes

project consortium:

alpinfra,consulting + engineering GmbH

UBIMET GmbH

Prototype status:

The prototype is in assembling and pre-testing phase.

Pre-tests & Test site:

Suitable test sites are being discussed at the moment. Final performance and endurance tests are starting May/June 2014.



Natural Hazards Radar

Real-time detection of mass movements

Project consortium:

BOKU, Dep. of Structural Engineering and Alpine Hazards

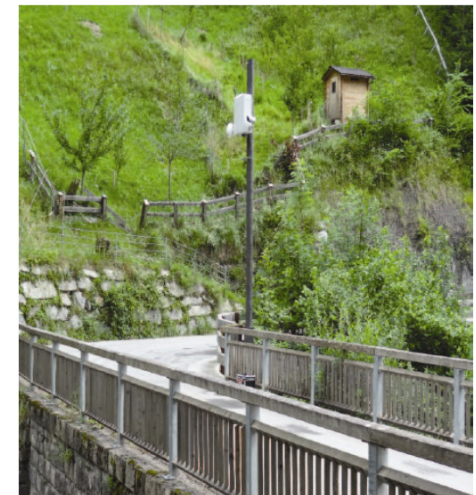
H&S, Hochfrequenztechnik GmbH

Prototype status:

The sensor prototype is assembled and successfully tested and calibrated during field laboratory events. Data acquisition unit is assembled at the moment.

Pre-tests & Test site:

Suitable test sites are being discussed at the moment. Final performance and endurance tests are starting May/June 2014.



SART

Early Warning System against hazardous Rock-Fall Processes

project partner:

INGLAS GmbH

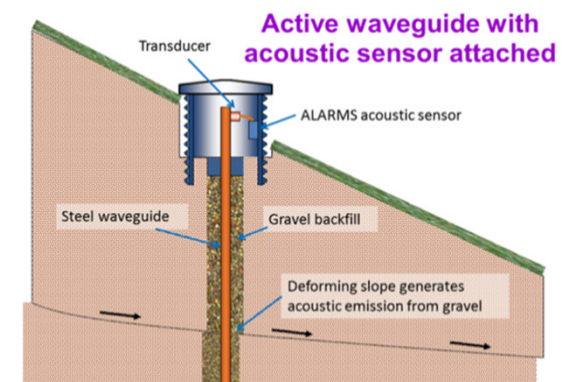
University of Loughborough, Dep. Civ. Engineering

Prototype status:

Prototype hardware (sensors, data-acquisition units) are assembled and have been successfully pre-tested. Software is developed and tested at the moment.

Pre-tests & Test site:

Suitable test site is selected and first hardware installation is carried out at the moment. Final performance and endurance tests are starting February 2014.



© Loughborough University

Initiative VIF 2011 PCP: Detection Natural Hazards

First results:

- Initial feasibility studies require a lot of effort on the client side, which was underestimated.
- Only project ideas close to implementation have a good chance to be realized within project-time. Practically, operational systems which only need limited adjustments to match the project targets had the best scores.
- Many good ideas showed a too high degree of innovation, so that a successful prototype implementation was doubtful and the project therefore had to be eliminated.
- The development of standards is difficult to enforce.

From the past to the future ...



Thank you for your attention



You need more information?

Contact:
Wolfgang Zottl
Head of Research and development

ÖBB-Infrastruktur AG
1020 Vienna, Praterstern 3
Tel. + 43 1 93000 32604
Fax + 43 1 93000 833 32604
Mobile +43 664 617 62 16
wolfgang.zottl@oebb.at
www.oebb.at/infrastruktur

