

Press Release

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MANAGING TUNNEL ACCIDENTS PROFESSIONALLY

Cooperation of the AIT Center for Technology Experience with the Zentrum am Berg (ZAB) of the Montantuniversität Leoben: two research projects (MED1stMR and NIKE MED), three emergency organisations and a real exercise in the tunnel on 16 September 2023.

Who does what at the right time? Who manages and coordinates the incident? Accidents in places that are difficult to access - such as in a tunnel - are even more difficult to manage. Austria is a tunnel country, with many road and railway tunnels. The longest road tunnel is the Arlberg tunnel with almost 14 km, followed by the Plabutsch tunnel and the Gleinalm tunnel (both Phyrn motorway). According to Asfinag, there are currently 166 road tunnels in Austria - which puts Austria in second place in Europe behind Italy.

This makes it all the more important to ensure safety in tunnels. In the event of an accident or fire in the tunnel, it is important to react quickly. When people are trapped or injured, every second counts - and the emergency services should be on top of their game. Coordinated deployment of the fire brigade, rescue services and police is the top priority. It is also important to communicate with the operations centre and to have an up-to-date overview of the situation, how many people are seriously injured and in which order (triage) the emergency paramedics have to take care of them.

AIT has years of experience and know-how in the field of Extended Reality (XR), especially in the area of training for different professional groups. "We see XR as a central element in preparing emergency forces for their daily work and complex situations in a targeted and innovative way," emphasises AIT researcher Helmut Schrom-Feiertag from the Center for Technology Experience. This is not only about training in the virtual world, but also about biosignal and stress measurement, a combination of virtual and real world (use of tangible objects such as stethoscope or respirator) as well as a multi-sensory "experience" during training - for example through heat, wind or wetness. In order to develop a virtual training that is as realistic as possible, practical experience and exercises are of great importance.

Researchers and emergency services pull together

It is important to prepare for accidents in the best possible way. But the joint practice of all emergency forces is also crucial. Two research projects are now working together on this - to improve operations in the event of an emergency.

The **MED1stMR** project (funded by the EU Horizon 2020 programme), led by the AIT Center for Technology Experience, is developing a mixed reality solution for emergency paramedics to train complex accidents in a virtual environment as a team. A total of 18 partners from nine countries are involved in MED1stMR, including seven different international medical emergency organisations/training centres from all over Europe. (all partners here: <https://www.med1stmr.eu/consortium>). A major field test is currently underway as part of the project: Emergency organisations from all over Europe are testing the MED1stMR prototype and giving feedback on how to optimise the training. <http://www.med1stmr.eu>

The **NIKE MED** project (funded by the KIRAS programme), led by the ZAB (Zentrum am Berg) of the Montanuniversität Leoben, aims to evaluate emergency capacities together with Med Uni Graz, Mindconsole GmbH, the University of Innsbruck - Institute of Psychology, the Federal Ministry of Defence, IL - Ingenieurbüro Laabmayr & Partner ZT GmbH and DCNA (Disaster Competence Network Austria) and to develop an application for all emergency forces involved in order to ensure that disaster operations underground or in tunnels can be carried out in a coordinated and professional manner. In the tunnel in a coordinated and professional manner. In this way, the emergency medical care of the injured is to be optimised in the future. <https://www.kiras.at/gefoerderte-projekte/detail/nikemed>

The goal now is to benefit from the experiences of both research projects and to improve the technologies even further. To this end, a large-scale emergency exercise will be held on 16 September 2023 to better prepare first responders for real operations. Johanniter Austria, the Inzersdorf volunteer fire brigade and the Gleinalm police will train together in the underground facilities of the Zentrum am Berg in the tunnels of the Styrian Erzberg.

Procedure of the large-scale emergency exercise

During the large-scale exercise at the ZAB, a bus accident with a large number of injured people is simulated in a real tunnel. "We are currently testing exactly this scenario in the MED1stMR project with the emergency paramedics in the virtual environment. A comparison of both training methods will provide information about future potential for improvement," explains MED1stMR project manager Helmut Schrom-Feiertag from the AIT Center for Technology Experience.

The one-day real large-scale emergency exercise in the tunnel represents a major effort: "Around 20 first responders will train together for the emergency. Including extras, organisations and researchers, a total of over 70 people will be involved in the exercise," says Prof. Robert Galler, Head of Department at the ZAB, explaining the dimensions of the exercise. The findings from the exercise will subsequently flow into both research projects and are intended to improve training for major emergencies and the organisation on site of such challenging situations for all emergency forces in the future. "It is great that we are working together on a cross-project basis and with benefits for both research projects," both researchers agree.

Train treatment of specific injuries

In the event of an accident underground or in a tunnel, special, often severe injuries occur, such as poisoning (by toxic gases, fires and smoke development), large-scale burns or large-scale mechanical impact by structural or vehicle parts. In addition, there is often contamination with NBC substances, which also pose a risk to the emergency services.

ZAB as the ideal training environment

Real training days for emergency forces are expensive and organisationally complex - both in terms of preparation and implementation. A concrete example: The closure of the Kaisermühlen Tunnel in Vienna for training purposes is a major event that also causes a lot of organisational effort in terms of traffic. The ZAB offers a great advantage here - nothing has to be closed or specially prepared. The Montanuniversität Leoben operates a research infrastructure at Erzberg that is unique in Europe in terms of the construction and operation of underground facilities. The test and research facility consists of four tunnels, each 400 m long. <https://www.zab.at/ueber-uns/die-anlage>

Statistics

According to Asfinag, there are 166 road tunnels in Austria. In 2021, 125 accidents occurred in Austrian tunnels, according to Statistik Austria, and 186 people were injured. Most accidents and injuries occurred in Upper Austria, followed by Tyrol and Vienna.

<https://www.statistik.at/fileadmin/publications/Strassenverkehrsunfaelle-2021.pdf> (in German)

Service

Media representatives can participate in the real exercise on **16 September** as observers. Interviews with the project leaders and the emergency personnel involved can be organised.

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