

## ARCHE - General information

ARCHE stands for Advanced Robotic Capabilities for Hazardous Environments and is organized by the science and technology center of the Federal DDPS, armasuisse Science and Technology, in cooperation with the rescue and ordnance disposal units (LVb G/Rttg/ABC) of the swiss military, ETH Zurich and NCCR Robotics, Switzerland.

### Purpose of the event

While scientists and engineers are motivated to understand the challenges imposed by real world applications, governmental entities are interested to evaluate the readiness and usefulness of robotic devices for future applications, especially in hazardous environments. Thus, the event ARCHE is initiated that allows demonstrating capabilities of research demonstrators and new technologies in a simulated disaster environment. The demonstrations are based on scenarios of Search and Rescue and ordnance disposal units (LVb G/Rttg/ABC) and may include applications such as mapping, firefighting, obstacle removal, localization of hazardous materials or recovery of casualties and more. To this end ARCHE provides a platform which allows science and governments as well as industry to interface, showcase and learn about state-of-the-art technologies.

### Organization

In order to facilitate an interface and appropriate platform for an active exchange of knowledge and technologies between industrial, governmental and research partners, the ARCHE event is split into two main events.

Every odd year (2019, 2021, ...) a "training event" takes place, where researchers have the opportunity to test their systems in a realistic search and rescue environment, participate in workshops and experience how professional search and rescue and ordnance disposal personnel work.

Every even year (2018, 2020, ...) a "test event" will take place. Therein, the researchers have the training environment at their disposal and will be given the chance to demonstrate their systems for private and governmental search and rescue organizations towards the end of the event.

### Training event

The goal of the "training event" is to facilitate an exchange between search and rescue and ordnance disposal specialists and the research community. This event takes place every odd year (2019, 2021, ...).

Throughout the event, researchers have a realistic training environment available to test their systems in. Complementary, the training event includes workshops, open for all participating researchers where selected topics are treated. To get more detailed insights on how professional search and rescue and/or ordnance disposal units (LVb G/Rttg/ABC) perform their tasks, talks and demonstrations by the latter are performed throughout the week.

This offers the researchers the great opportunity to not only test their systems in a realistic environment, but also to get insights on how professionals handle search and rescue scenarios. Also, it facilitates an active exchange platform between these professionals and the research community.

## Test event

The goal of the “test event” is to allow researchers to evaluate their systems in a realistic environment and to demonstrate their results to public partners. This event takes place every even year (2018, 2020, ...).

Throughout the event, researchers have the realistic training environment at their disposal. Apart from testing their technologies and platforms, the teams are required to perform a demonstration on a public demonstration day - usually Thursday of the test event week. Apart from these demonstrations, there are talks about selected topics and industrial partners are given the chance to exhibit products and technologies related to search and rescue and/or ordnance disposal tasks such as new sensors, robots and more.

This event offers researchers the great opportunity to display state-of-the-art technologies in a realistic test environment and portray their systems for potential stakeholders.

Furthermore, selected industrial partners showcase their products which may assist the researchers in solving their tasks.



Figure 1: Different ruins in the training village on the military training site Wangen an der Aare.



Figure 2: The large-scale outdoor fire fighting scenario (left) and a building where fires based on solid matter can be started in various rooms (right).

## Venue

### Location

The ARCHE event takes place on the training site of the Swiss Military Rescue troops in Wangen an der Aare ([google maps](https://www.google.com/maps)). The facility offers a rich training environment with various test sites. These sites, include:

- ruins of different scales (see Fig. 1);
- fire buildings with both gas- and solid matter-based fires (see Fig. 2, right);
- a large-scale outdoor fire site, including tank waggons and gas tanks (see Fig 2. left);
- an area that can be flooded including a building with cellar (see Fig. 3 right);
- a system of hallways and a large-scale multi-story hall that can be filled with smoke (see Fig. 3, left).

### Infrastructure

Throughout the training site there are power stations with two standard swiss (Type J) power plugs each providing electricity. Internet is available using the cellular 3G/4G-network. Note, that there is no pre-installed wireless network.



Figure 3: A multi-story hall than can be filled with smoke (left) and the flood area including a submersible cellar (right).

## ARCHE 2019

### Individual training days

Preceding the main ARCHE event there is the opportunity to participate in individual training days. Throughout these days - upon application (<mailto:kaiho@ethz.ch>) - each team has the possibility to access the training village in Wangen a.A. and use the facilities.

Note, that if a team wishes to make use of operated facilities (i.e., use a fire building in action), this needs to be organized in advance (at least three weeks) and the operability cannot be guaranteed in advance.

The 2019 training day dates are:

- Friday, 25. January 2019
- Monday, 18. February 2019
- Monday, 04. March 2019
- Monday, 15. April 2019
- Friday, 31. May 2019

The training days will start at 8am in the “Übungsdorf” in Wangen aA.

### Main event

The next ARCHE main event will take place in 2019. The tentative date is June 29th until July 5th 2019 in Wangen a.A. and it will be a “training event”.