<u>Research in the Grisons</u>

Rescue from the rack wall

Improving alpine rescue with creative research

The Academia Raetica, the association for the promotion of science, research and education in the canton of Graubünden and its surroundings, is organizing the eighth conference "Graubünden forscht" (www.gr-forscht.ch) in Davos on September 21 and 22, 2022. The conference brings together young scientists from a wide range of research fields that are of social importance for Graubünden and the Alpine region. "Graubünden forscht 2022" wants to give everyone an opportunity to get an insight into the diverse research in Graubünden. Until September, we will give you a monthly preview of an exciting project.
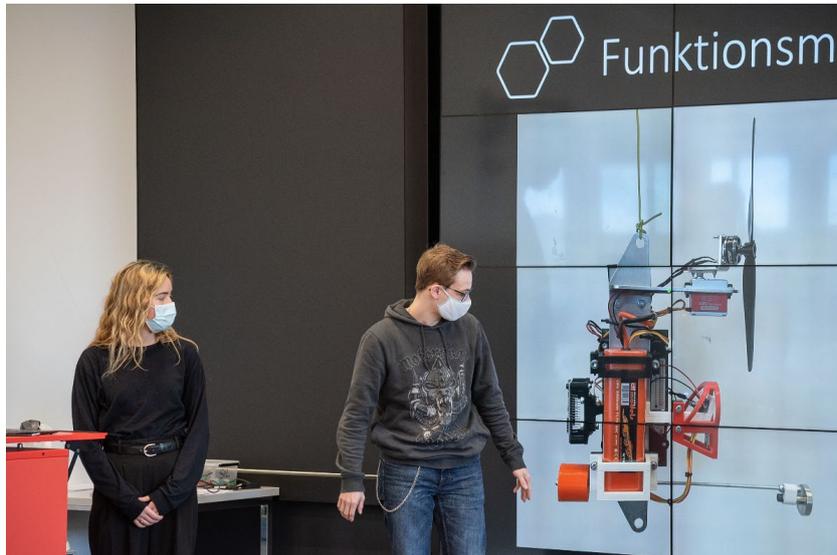
Photonics students from University of Applied Sciences of the Grisons presented their prototypes to an audience for the first time in January 2022. Photo credit: UAS Grisons

Since last year, Bachelor students of Photonics and Mobile Robotics at the University of Applied Sciences of the Grisons have been tinkering with a rescue assistance system for alpine rescue with the support of project leader Andreas Bitzer and other lecturers. "The idea for this practical and innovative project came about while climbing in Pontresina," reveals Bitzer. When hikers, mountain bikers, paragliders or skiers have an accident in the mountains, they can often only be rescued via the helicopter's winch in particularly dicey situations. These missions pose a challenge for those involved, explains Bitzer: "In a so-called longline rescue, the rescuer hangs 100 to 200 meters on a rope below the helicopter, for example, to rescue someone from a rock face that is difficult to access. The rotor wind can trigger rockfall or startle game, which in turn triggers rockfall."

For the research project, in which Swiss Alpine Rescue is also involved in an advisory capacity, students have developed a prototype. The goal is to expand the state of the art in alpine rescue. The use of technologies from the field of robotics should simplify rescue operations and increase the rescue spectrum. For the preliminary development, the students received a construction kit with

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propeller, battery, motor and electronics board for testing control algorithms, which will later be used in a real system. The finished assistance system will later consist of a drone on the helicopter's winch hook and will have lateral turbine drives. In addition, the drone is to have image transmission, audio communication, headlights, various sensors and control technology. With the use of such an assistance system, the rescuer, who is on the rope below the helicopter, could be steered sideways and maneuvered to an emergency site by an operator under remote control.

The students reached a first milestone this January. They used three different miniaturized prototypes to demonstrate the rescue of Playmobil figures from a rack wall. This preliminary work provides important insights for the next steps, Bitzer said. He hopes to be able to continue the project with new funding and, in the next step, to test a real system with turbine drive together with his students.

Andreas Bitzer and Daniela Heinen

Andreas Bitzer

The University of Applied Sciences of the Grisons trains future engineers in the bachelor's degree program in photonics: (https://www.fhgr.ch/studium/bachelorangebot/medien-technik-und-it/photonics/).
In the Mobile Robotics field of study, they learn to design robots and their actuators, to provide them with an electronic control system and to program the appropriate software: (https://www.fhgr.ch/studium/bachelorangebot/medien-technik-und-it/mobile-robotics/).

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