

Presentations – Commission for Terrestrial Rescue

- Place: Thessaloniki, Griechenland
- Date: 18. Oktober 2024
- Time: 08.00 Uhr
- Present: Delegates of the Commission for Terrestrial Rescue
- Delegates of the Commission for Avalanche Rescue (from 08.30 to 11.30 and from 15.30 to 16.00 Uhr)
- Delegates of the Commission for Alpine Emergency Medicine (from 11.30 to 12.00)
- Delegates of the Air Rescue Commission (from 10.30 to 11.00)
- Delegates of the Doghandler Subcommission (von 08.30 Uhr bis 11.30 Uhr und 15.30 Uhr bis 16.30 Uhr)
- Chair: Gebhard Barbisch, Stephanie Thomas
- Minutes: Fabienne Jelk

The Integration of Mountain Rescue Services into Cross-Regional Crisis Management Martin Gurdet (ÖBRD), Sebastian Stepfer (MOPS)

In Austria, a new law came into force on January 1, 2024, according to which rescue organizations should be financially supported in order to increase the resilience and performance of rescuers in the event of major events. Such events can be catastrophic avalanches, forest fires, blackouts and events with major damage (train accidents).

For such major events the rescue organizations must be prepared, in terms of organization, training and technology.

The SKKM 2024 (State Crisis and Disaster Management) was the trigger for improving communication and coordination in the event of major events that require a supra-regional response.

Blackout-Save: In the event of blackouts (power outages), communication is ensured with a satellite-based data connection for data communication (Starlink) and a satellite-based telephone system for voice communication. Since August 2023, the Bavarian Mountain Rescue Service has had nine Starlink systems at its disposal.

The Incident Command System (moPS app) helps to prepare for and manage major events. It is used for communication within the mountain rescue service and with external organizations, for coordination during the event and documents the information that has flowed, the measures that have been carried out and the decisions that have been made.

A journal is kept in which it is recorded which information came in and when, what was communicated and what was decided. The Incident Command System provides an overview of all parties involved in an organizational chart. A map provides a graphical common picture of the situation in the area of operation. All types of information are used to support decision-making and seamless communication.

Information is the core of incident management. Information can be input, output or decision information. The Incident Management System allows information to be read and written anytime and anywhere. The sum of all messages forms the journal of the incident.

The organizational chart shows the structure of those involved and enables easy communication between the parties involved.

The event map provides a graphical common picture of the operation in the area of operation. The map can contain symbols, shapes, lines and text elements. Map elements can be linked to messages. All users have access to the map in real time.

Incident Command together with “Blackout Save communication” provides the necessary technical platform for managing major events.

Presentation: 20241018-01-OB RD-MOPS.pdf

Auto-Avalanche Terrain Exposure Scale and its use in Public Communication Mike Koppang (CAA)

The Avalanche Terrain Exposure Scale (ATES) is a system for classifying mountain landscapes according to the degree of avalanche danger. ATS means the automated representation of the avalanche situation on a map, regardless of snowpack conditions.

The Avalanche Terrain Exposure Scale (ATES) classifies terrain into five categories based on slope gradient, forest density, slope shape, terrain traps, avalanche frequency, size and density of the starting area, run-out area characteristics, interaction with avalanche tracks and route options.

The five categories are

- Non-avalanche (Class 0, no danger)
- Simple (Class 1, easy terrain), many options to reduce or eliminate exposure.
- Challenging (Class 2, challenging terrain), there are options to reduce or avoid exposure through careful route planning.
- Complex (Class 3), many avalanches and terrain traps with minimal opportunities to reduce the risk.
- Extreme (Class 4), no opportunities to reduce the risk and even small avalanches can be fatal.

ATES is another tool that can be used by both experienced and less experienced users.

Rescuers and Avalanche Forecasters: Where is the Intersection? (multi-national Presentation)

Thomas Mair:

There are 35 rescue stations in South Tyrol. 1714 rescue operations are carried out each year, 23 of which are avalanche incidents. 3 people (avalanche experts) work full-time to ensure the South Tyrol avalanche warning service during the

winter. They issue an avalanche report for the Tyrol (Austria), Trentino and South Tyrol regions for around 150 days. All European avalanche reports are integrated into their homepage. Avalanche forecasters also help assess the avalanche situation during rescue operations. The mountain rescue services, in turn, help the avalanche experts to investigate avalanche accidents and conduct rescue courses for them. A journal is kept in the Knowledge Box 2.0 in which the accidents are recorded. In the future, the avalanche warning service will be integrated into the training of mountain rescuers.

The cooperation between the avalanche service and mountain guide training is to be strengthened in the future.

Interrelation between rescuers and weather forecasters (France):

Various partners work together: CRS (mountain rescuers), Coucas 0.5 (helicopter) and the weather services. A mission on 12/13 August is shown, during which several alpinists were blocked in various places (les Bans, Meije). One problem was the bad weather. The weather service was asked for support. The weather experts were able to predict good weather windows with less wind for certain areas. With the support of the weather service, the evacuations could be carried out. The weather services also issue weather reports for the mountain huts. In return, the mountain rescuers pass on information about special events to the weather services.

The exchange of information between rescuers and the weather service works, e.g. by sending pictures after a mission.

Matthias Gerber, SLF

The SLF issues an avalanche report. The SLF works with the ARS and KWRO to do this. A national avalanche bulletin is issued. This is issued twice a day and is aimed at everyone who is exposed to a potential avalanche danger in the mountains during the winter, whether professionally or in their free time, as well as those who are responsible for the safety of others. Avalanche rescue in Switzerland is carried out by the ARS (SAC), KWRO and REGA. The alarm is raised via Rega (1414) or KWRO (144).

In Switzerland, avalanche experts have been integrated into mountain guide

training since a long time. Avalanche experts are not involved in rescues.

Mike Koppang, Canada

In Canada, there are various avalanche warning services (Avalanche Canada - non-profit, Parks Canada - government, Kananaskis Region - government, Avalanche Quebec - non-profit). There are also various rescue organizations (RCMP police, volunteer rescuers in the provinces, professional rescuers in three regions (Parks Canada, Kananaskis Region). Information is exchanged in the Infoex. The volunteer rescuers will base their decisions more on the avalanche report.

Per-Olov Wikberg, Marie Nordgren, Avalanche Forecasting in Sweden and how it is used by the public and rescuers

The avalanche warning service with regional avalanche reports has been provided since 2016. In 2024, about 305 of the mountain areas were covered. The service is provided by about 30 snow and avalanche observers and 6-8 forecasters from mid-December to mid-May. The main target group is the public with skiers and snowmobilers, but also mountain guides and mountain rescuers. The avalanche report is not intended for roads and railways.

Presentations:

20241018-03-Avalanche Forecasters and Rescuers Relationships.pdf

20241018-04-Avalanche forecasting in Sweden.pdf

20241018-05-SLF-AvalancheForecast.pdf

20241018-06-GSM-ICAR rescuers-forecasters.pdf

20241018-07-AVS-Interaction LWD_BRD.pdf

Presentation of a particularly difficult rescue at Tete Blanche, Pierre Metrailler (KWRO)

The rescue operation took place on the Tête Blanche. 6 people left Zermatt on the morning of March 9, 2024 to ski from Zermatt to Arolla. They were blocked at an altitude of 3500 m from 4 p.m. The route is part of the Patrouille des Glaciers. The 6 people were on training for this ski touring race. The alarm was received at 4:03 p.m. A relative raised the alarm. At 5:19 p.m. one person of the blocked group was able to contact the emergency call center by cell phone. The 6 backcountry skiers were blocked because one member was ill. The group were able to be located by the police at an altitude of 3500 m. At 6:20 p.m. a rescue column set off from Zermatt. They had to abort the operation at 9 p.m. at an altitude of around 3000 m due to wind, cold, fog and the risk of avalanches. During the night, the rescue operation was interrupted due to the prevailing conditions (wind up to 120 km/h, heavy snowfall, 30 cm on Tête Blanche, temperature with wind chill -30 degrees).

The avalanche danger level was 3.

On March 10, several rescue teams were deployed from 5 a.m. What could be expected: The chance of survival depended on whether the group members could build a snowcave and protect themselves. Preparations were made to treat hypothermic victims with cardiac arrest, which means immediate CPR, rapid transport, protection from the cold, and drug treatment with adrenaline. CPR is not started when the body is frozen.

15 mountain rescuers were deployed. A window of better weather was expected at 5 p.m. The weather should then improve from 10 p.m. The avalanche bulletin continued on warning level 3.

After 24 hours, the area was reached with 2 helicopter rotations up to a height of 3200 m. At 5.15 p.m. a team of 4 people was able to ascend to the blocked group. The team consisted of two rescue specialists, a doctor and a mountain rescue specialist from the police.

The victims were found at 9.18 p.m. in the snow and in a small hole that offered no protection. They showed no signs of life. One man was flown to Sion Hospital under CPR. The core body temperature was 7 degrees, the patient died shortly

after arriving at the hospital. 3 people were declared dead on site, one person at an intermediate landing site. The 6th person could not be found. The victims were rescued by helicopter (Air Zermatt, Air Glaciers, Rega).

The rescue teams searched for the 6th victim on March 11th with dogs, Recco, helicopter avalanche transceivers and probing. The search area was expanded. The victim was not found until August.

The operation was psychologically difficult. One victim could not be found, which left the feeling that the operation had not been completed. Some rescuers had relatives among the victims. The event lasted several days and was very media-intensive, which made it difficult to separate work and private life. The team members who were most affected were replaced and protected during the operation. A psychologist was called in for the follow-up. Communication took place via the police and the public prosecutor's office.

Take-home message:

- Never give up hope. Use all available means to help.
- In such operations, the safety of the rescuers is of the utmost importance.
- 3 x safety check: yourself, colleagues, team leader.
- Logistics and organization are crucial.
- Enough resources must be ensured for each scenario and to maintain routine operations.
- Hypothermia patients: search for signs of life for 1 minute, search for electrical activity with the defibrillator. Decide whether to perform CPR or not (no CPR if the body is frozen, no airway)

Questions:

Peter Paal: How long was the patient under CPR? Timeline?

The rescue team set off at 5 p.m. After four hours they were on the accident site. At 10 p.m. two helicopters were on site. The patient was taken to the hospital under CPR. Due to weather conditions the intermediate landing site could not be reached. Therefore they went straight to the hospital, which was a 10-minute flight away. Shortly after arriving at the hospital the patient was declared dead.

Presentation: *20241018-08-Tete-Blanche-Metrailler.mp4*

Multi-Victim Avalanche in Les Contamines, Managing a crisis requires both resilience and expertise. Core skills promote resilience, specific skills develop expertise GSM - French Group

The avalanche occurred on the Armancette Glacier in April 2023.

A crisis begins with a shock. The avalanche was 2200 meters long (from 3400 m above sea level to 1600 m above sea level). 15 skiers were involved. 7 people were caught in the avalanche. 6 people died, one person was injured. Two helicopters, 3 doctors, 3 dog handler teams, special means for localization and 25 rescuers were deployed.

Phase 2 of a crisis: Reaction. The alarms were received, the rescue teams were called in.

Phase 3: Confusion. You have to accept that and deal with it. Confusion cannot be prevented.

Phase 4: Recovery. Build resilience. Develop skills.

The team's skills must be developed, first the core skills, then specific skills.

In the confusion phase, the core skills are used for agility and versatility. In the recovery phase, the specific skills lead to greater efficiency.

To overcome crises, you need both: resilience and Expertise. Core competencies promote resilience, specific skills develop expertise.

The doctors need the help of the rescuers during rescue operations, including in medical matters. A rescue team usually consists of a pilot, a flight assistant, 2 mountain rescuers and a doctor.

Until 2013, the rescuers were trained in medical matters at one table. There was no legal basis for this. In 2013, a new law came into force. The aim was to have standardized skills, procedures and guidelines for training in order to improve the quality of medical care during rescue operations. Since then, there has been a national training program. The training of rescuers in medical matters is standardized.

The various medical skills required during a rescue operation are divided into four colours: blue (what the rescuers should be able to do, e.g. preparing material for intubation), green (no risk), orange (moderate risk) and red (high risk, rescuers are not allowed to do this). There are training guidelines. 10 years later, more than 700 rescuers have been trained. No incidents have been reported. The guidelines are now 10 years old and need updating. The Nurse Federation should have been involved. The doctors need the help of the rescuers during rescue operations, including in medical matters. A rescue team usually consists of a pilot, a flight assistant, 2 mountain rescuers and a doctor.

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700 rescuers have been trained. No incidents have been reported. The guidelines are now 10 years old and need updating. The Nurse Federation should have been involved. Presentation: 20241018-09-PGHM-Multi-Victim-Avalanche.pdf

Common Training of med Rescuers, Dr. Marc Blancher (GSM)

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Presentation: 20241018-10-Dr-Marc-Blancher-Traing.mp4

Artificial Intelligence Model to Predict Lost People's Location, Roy Hayes Jr., Ph.D. (SEISECURE)

Dr. Hayes leads a multidisciplinary team working on developing an AI model to predict the location of a missing person. This should help to find the missing person faster, increasing their chance of survival and reducing the cost of search operations.

The work is carried out using an agent-based model. The behavior of missing people is recorded based on data collected by Wilderness Search and Rescue. This is how the most likely location of the missing person or accident victim is determined.

An agent-based model is computer simulations that are used to study the interactions between people, things, places and time. The behavior of missing people is simulated in this way. A specific algorithm is used to determine the most likely locations.

The model assumes that the missing person is reluctant to change his strategy and that, if he is on a road or route, he is reluctant to leave it. Agents are given different maximum walking speeds to account for different potential fitness levels. An optimization algorithm is used to calibrate the agents' probabilities of action so that the agent-based model's output best matches the locations in the incident dataset.

The missing people are divided into different categories that take into account the terrain (flat or mountain), population density (urban or wilderness), eco-region (arid, polar, urban), and characteristics of the person (baby, hiker, biker, prison inmate who escaped). For example, women and men behave differently.

The models are integrated into terrestrial SAR so that SAR personnel can use them as a basis for search operations. SAR personnel select and execute the model that is best suited to the specific incident.

The next step is to find SAR partners to conduct field tests, gain solutions, and gather feedback. The regulations still need to be complied with to ensure free

access for the SAR teams.

The system has its limitations. It doesn't work for people who don't want to be found.

Presentation: *20241018-11-AiM-Roy-Hayes-Jr-.mp4*

The Search Intelligence Process Using Artificial Intelligence, Chris Young (Intelligent Search Management)

The Artificial Intelligence for Search and Rescue project aims to use artificial intelligence and related computational methods and tools to support search and rescue (SAR) operations.

At the beginning of every search operation, information must be collected and processed. Certain types of information/data are obtained or requested by those responsible for a missing person case. Traditionally, the collection, processing, evaluation and analysis of data was done by hand on paper. This often made the collection and processing of data very difficult. The project aims to have this work done by computers and artificial intelligence. This will improve the productivity, information flow and results of the search.

The search data is collected in real time in a first step and next-generation AI technologies are applied to an ongoing search operation to predict where to search, thus improving the time and probability of finding the missing person. In a second step, this data is supplemented with external data sources such as ISRID (International Search & Rescue Incident Database) or Google Maps. In a third step, AI is applied to the enriched data to improve search results.

The system can be used on mobile phones, tablets, laptops and other devices.

Conclusions:

The Core IntelliSAR platform is ready. Field testing will begin in November.

The AI feasibility analysis is largely complete. The project is ready for a partnership,

making it a commercial venture.

For questions: Christopher S. Young, (415)760-3117. csy1492@comcast.net

Presentation:

20241018-12-Chris-Young-The Search Intelligence Process Using AI.mp4

Launching / lifting procedure with remote access, Vangelis Symvoulidis, Giorgos Lakias (HRT)

Present a system for helping a climber who is hanging in an overhang after a fall when it is not possible to anchor directly above the injured person.

A vertical rescue line was developed next to the overhang (vertical axis) and a horizontal rescue line (horizontal axis) and this was combined into a controllable pendulum rescue procedure.

The system is shown in a picture:

- yellow: main and safety rope (shared tension rope system)
- blue: Via Cordata
- white: double pulleys (SPIN L2)
- green: anchors with Petzl rigs
- red: horizontal runner (long loop) to prevent swinging
- brown: Dynaloop to change the angle and reduce the load

A video shows how the system works.

Presentation:

20241018-13-Controllable Pendulum Rescue - HRT - ICAR 2024.mp4

VHF - Use in Rescue Operations, Dimitris Stoupis (HRT)

(VHR - Very High Frequency)

A perfect working radio communication is essential in rescue operations.

Radio: communication takes place via radio waves over long or short distances. Transmitters and receivers are in operation. In 2021, an emergency call made on the frequency 146,500 MHz could not reach the emergency call center directly due to the Olympus mountain range.

The HRT radio network (HRT: handheld radios) covers large areas. How does it work in the mountains? Repeaters are used. By using repeaters, the range of the radios can be increased. They save battery power and ensure a reliable communication connection. Repeaters work in both directions.

The HRT radio network consists of many repeaters installed throughout the Greek territory. The HRT radio network is compatible for every civilian with a radio, for the fire brigade, for SAR operations and for VHF/UHF radios.

Properties of electromagnetic waves: Challenging communication via line-of-sight, reflection and diffraction outside the LOS (line-of-sight, UHF radio waves reflect more than VHF, VHF diffract more than UHF. Reflection and diffraction are phenomena that can be used to the advantage of rescuers during a SAR operation in a mountainous environment and enable communication that would otherwise not have been possible via LOS (radio transmission with direct line of sight).

HRT repeaters run on 146,500 MHz (channel 1). An emergency call can be made on this frequency across the country. This means that emergency calls can be received from across the country. The network works for civilians who have a radio, fire departments, air force, SAR helicopters. Whoever makes the emergency call is always on 146,500 MHz.

Presentation: 20241018-14-VHF-Greece-Dimitris-Stoupis.pdf

The training of mountain rescuers of the Civil Guard of Spain, Alberto Rodriguez Martinez, Pedro Garijo Ananos (GC-GREIM)

The CAEM Mountain Rescue School is located in a small village called Candanchú in the north of the Pyrenees. CAEM is the only school for mountain rescue and police operations in the mountains in all of Spain. Since 1967, the mountain specialist of the Guardia Civil has been trained there. In nine months, the candidates learn how to move in the mountains, self-rescue, rescue others and investigate accidents.

Every year, around 60 people apply for the course, 12 or 14 are accepted. The candidates must pass a selection process that lasts a week.

The following is learned: how to move, self-rescue, rescue others. Training is provided in mountain sports and training, first aid, air rescue, police investigation procedures.

The entire training lasts 1640 hours: 1446 hours of instruction and training in the mountains (669 hours of technical training, 145 hours of self-rescue, 632 hours of rescue operations), 56 hours of first aid, 50 hours of air rescue, 88 hours of police technology.

Presentation: 20241018-15-GC-GREIM-Training-Education.mp4

Closing Remarks and Future Discussion, Gebhard Barbisch, Kirk Mauthner, Stefan Blochum (ICAR)

Stefan Blochum:

There was a lot of discussion in the anchor systems working group. Criteria for anchor systems were discussed. The final version of the recommendation is not yet available; that will be next year in Jackson Hole.

Kirk Mauthner:

Rope systems: There was a lot of input from different countries. The recommendation needs to be revised. If anyone wants to help with this, they can get in touch. Send an Email to Gebhard Barbisch. A draft of the recommendation will be sent in July so that everyone can read the draft before the next congress.

Gebhard Barbisch:

On the meetings yesterday and today (working groups, presentations), feedback:

It is better to have the working groups at the beginning. It was unfortunate that the working groups were in the morning and the presentation of the results in the afternoon. That was stressful for the heads of the working groups.

End of our meeting: 17:00