AVALANCHE RESCUE REPORT

International Commission for Alpine Rescue

Lawinenkommission • Commission d'avalanche • Avalanche Rescue Commission

IKAR-CISA

3 – 6 October 2012 — Krynica, Poland

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The following report is based on notes and commentary by Atkins. As of early November the official minutes of the Avalanche Rescue Commission — taken and submitted by Atkins at the close of the meeting — have not yet been published. The minutes will eventually posted on the IKAR website.

INTRODUCTION

The Avalanche Rescue Commission of IKAR at the Annual Meeting of the IKAR. In some years a special winter-skills meeting may be held. Within the Avalanche Rescue Commission is a sub-group of rescue dog handlers. These rescuers host typically a summer time meeting.

The Avalanche Rescue Commission is a comprehensive composite of the international avalanche community represented by national mountain rescue associations, avalanche research and forecast institutions, national alpine clubs, and avalanche-rescue equipment manufacturers. The Commission provides a forum for the discussion and exchange of ideas, skills and knowledge. This expertise helps mountain rescuers become more effective and efficient, which also helps those in need. The commission generates guidelines related to avalanche rescue that are typically adopted at national levels. Recommendations can be found on the IKAR website: www.ikar-cisa.org > Avalanche Rescue > Recommendations.

AVALANCHE COMMISSION MEETINGS

This year's congress was held just outside Krynica, the largest spa town in Poland, at the Jaworzyna-Krynicka ski resort. New commission president Mr. Dominique Létang (ANENA, FR) chaired the daily meetings; vice president Atkins assisted, and Mr. Manuel Genswein served as interpreter working breathlessly and seamlessly in German and English, and occasionally in French.

More than 60 rescuers from the following 21 countries participated: Andorra, Austria, Bulgaria, Canada, Croatia, Czech Republic, France, Germany, Iceland, Italy, Liechtenstein, Norway, Poland, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom (Scotland) and

Figure 1. Jaworzyna-Krynicka ski resort

United States of America. The Avalanche Rescue Commission also joined the Terrestrial Commission for a day to share presentations and experiences.

Pre-Conference Workshop
The Terrestrial Commission organized the field day, and without an avalanche rescue component

Minutes
Minutes from the 2011 meeting in Are were read and approved.

Summary of Avalanche Accidents, 2011/12
Accident case reports or season summaries were presented by nine member countries. Lessons learned were highlighted, and the theme of risk management was often heard.

Norway: *Mats Hjelle (NRC)* presented two incidents — *16 February, Middagstind*: Four men were ascending a mountain near the city of Tromsø. At 1130 and near the top they released an avalanche. The two highest survived; both were only partly buried. The two lower men were buried and killed. Equipped with transceivers the two survivors started companion rescue. Because of poor cell phone reception the emergency call was not made until 12:34, and the first rescuers arrived an hour later. Due to some "anomaly" with the transceivers neither companions nor rescuers could locate V_H who also wore an airbag. Rescuers did locate V_R buried 2.5 m and only when they turned off his transceiver were they able to locate V_H at 1440 and about 35–40m downhill of V_H. He had been buried for 3 hrs and 10 minutes. Paramedics pronounced the man dead. Rescuers found V_R buried under 80-180cm of snow in an almost sitting position. His airbag was covered by 50cm of snow. V_R had a distinct air pocket in front of his face partly formed by the airbag. Evidence suggested that V_R was partly buried when the avalanche stopped or slowed down and was then struck by another wave of moving debris. This rescue highlights the issue that no single rescue device — and in this accident even two rescue devices failed to perform as expected — is best.

19 March, Sorbmegaisa. That afternoon a boat-based group of European backcountry skiers triggered a large avalanche that fell nearly 600 vertical meters and buried six. The boat's skipper called in the alarm a few minutes later. A half hour later the first helicopter arrived and found the debris ran almost 2km. On the ground the rescue leader quickly located the first victim who was buried deeply. An external beacon receiver was slung below the helicopter and was used to locate three of the victims. Ground rescuers then quickly pinpointed the three beneath 4–7.8m of snow. On the ground some rescuers continued to search while others dug. A yell was heard from high in the debris. A rescuer was flown to the upper part of the debris and with a transceiver search quickly found the 5th victim dead, buried 1.5m near the top of the debris. Soon after the 6th victim was found alive. His head was out of the snow, but he had no transceiver signal. [It is unknown what happened to his transceiver.] One of the buried victims had deployed his airbag and he and his airbag were one of the deepest buried victims. This was the second case that winter of a victim and airbag being buried. While avalanche airbags do save lives there is no guarantee whose life will be saved. This accident and rescue also highlights that sometimes the standard rescue device — the transceiver — does not always work. The survivor was missed by early rescuers. And this rescue is a good reminder that rescuers should not give up hope as the last person found was the survivor (who was also missed by early rescuers).

Austria: *Klaus Wagenbichler (ÖBRD)* presented a summary of Austrian accidents and deaths. Snowfall was below normal so and so too were the number of accidents and deaths. In 83 reported accidents 9 died (long-term average 26). About half of those involved in accidents were foreigners. Of the 9 killed, 5 were ski tourers, 4 were involved in "other activities". No ice climbers were killed, nor were any skiers on the pistes. Of the 83 rescue

Figure 2. The 12 July avalanche that killed nine climbers on the slopes of Mont Maudit. The avalanche is in the center of the photo. At the toe of the avalanche debris are numerous rescuers and a helicopter. (Photo:Gendarmerie Nationale)

operations 2032 spent a total 5316 rescuer-hours on the operations; 135 dogs were involved which is 5 times the number used the year before.

France: *Frédéric Jarry (ANENA)* told the winter 2011/12 was one of the better winters in terms of few accidents and fatalities. Unfortunately, a mid-summer accident tarnished the final numbers. The winter season started very snowy, one of the snowiest in 50 years, in the northern Alps, and then turned dry in February. The result was a generally stable snow cover that resulted in few accidents. The southern Alps received very little snow, so few accidents occurred. The Pyrenees had some snow, but hard, icy conditions were greater problems than avalanche. As a good reminder to rescuers that some victims are very lucky, in the Chartreuse mountains just outside Grenoble a solo backcountry skier survived a burial of 6 hrs and 15 minutes. At the end of May the avalanche season ended as one of the best for few accidents and few deaths: 13 fatal accidents and 13 fatalities. Both numbers are well below average. However, the good fortune ended on 12 July when nine alpinists died in an avalanche on the slopes of Mont Maudit. Rescuers were reminded that some buried victims are lucky when organized rescue found a man alive after a 6 hour and 15 minute burial. In the Chartreuse Range near Grenoble a couple of snowshoers came across an avalanche and called rescuers who found the buried victim. These summertime avalanches are a great concern to rescuers as the climbers never carry avalanche rescue gear. In these large avalanches rescuers face great risk when they must spend days searching for victims that are not equipped with a transceiver or Recco reflector.

Italy: *Stefano Pivot (AINEVA)* reported that except for snow right along the borders of France, Switzerland, and Austria, the winter was very dry with little snowfall until April. Because snowfall was so light, avalanche accidents were few. An exception for snowfall was in the Emilia Romagna area (280m) where in early February 300cm of snow fell in 10 days. The snow did not cause avalanche problems but caused plenty of problems to the local towns and villages. Units of the Civil Protection authorities and army responded to help residents dig out.

There were 13 fatal accidents (one-third involved foreigners) that killed 9 (average = 18). All died along the borders of France and Austria. Of the 6 backcountry skiers killed, 2 were ascending and 4 descending; 2 were heli-skiers, and 1 was a mountaineer. Of the backcountry skiers, one victim's transceiver was damaged in a fall when the victim hit rocks. In another case the transceiver was not working, but may not have been turned on. Two avalanche accidents involved heli-skiers with airbags. One victim in a small (30x80m area) avalanche was buried and killed with a deployed airbag. He and his bag were buried 40–50cm; he died from trauma. In the second accident two skiers with airbags were caught. One successfully deployed the airbag and was not buried or injured. The second skier (from his helmet camera) made no attempt to deploy his airbag. (He also wore ski pole straps.) Two points: first, avalanche airbags did not save the lives of all caught. Second, as in France, rescuers were reminded that some victims survive long burials. A solo backcountry skier was buried by blocky hard slab debris. He was well dressed and survived under the snow for 4 hours and 5 minutes.

Figures 3. A typical Gleitschneelawinen or glide snow avalanche. (Photo: SLF)

Switzerland: *Lukas Dürr (SLF)* reported avalanche deaths (19) were also below average (25). Of the 19 killed, 13 were touring, 7 off-piste, 1 on-piste, and 2 were engaged in other activities. Most were killed in the early season. *Dürr described two accidents in* detail — one involved a small avalanche in extreme terrain and the other involved unusual full-depth "*Gleitschneelawinen*" event. These avalanches were unusual as they ran in February rather than in springtime. These avalanches were difficult to forecast, released natural and numerous hit ski pistes and roads. One unfortunate skier, hit by a natural release deployed their airbag, but bag and victim were completely buried and killed from traumatic injuries.

Sweden: *Rickard Svedjesten (CIFRO)* reported that Sweden suffered it's first avalanche fatality in several years at Tänndalen. Tragically the avalanche buried and killed one of Sweden's most knowledgeable and skilled avalanche workers who did not carry rescue equipment. Svedjesten commented, "The big problem with avalanches in Sweden is that we don't have big avalanche problems." It was mentioned that IKAR may want to consider a connection with the Fédération Internationale des Patrouilles de *Ski* (FIPS).

Figure 4. Worker and excavator completely buried, Stanserhorn, CH. The worker was clearing snow from an avalanche from the day before when a second *Gleitschneelawinen* released. Despite two spotters he could not flee to safety. The worker was found by dog and probes buried 2.5m. (Photo: Kapo Nidwalden)

Canada: *John Buffery (CAA)* described avalanche fatalities in the context with the average avalanche character of the winter, as in that some winters are inherently unstable while other winters are stable. Light early season snows created a weak base and the 1st fatality occurred in mid November. December was dry until storms arrived around Christmas. Three fatal accidents occurred between December 29 and January 6. The storm track continued to bring snows in January that stabilized the snow cover, but by the end of the month clear weather caused the first surface hoar layer to form. February experienced a warming trend with periods of storms and clear weather that grew surface hoar. The 5th fatality occurred early in the month. In March storms continued to bury weak surface hoar. Warnings were issued every weekend. Four fatal accidents occurred resulting in 5 deaths. Of the 10 deaths, 3 involved backcountry skiers, 3 snowmobilers and 4 mechanized guiding (snowcat and helicopter).

USA: *Dale Atkins (MRA)* told avalanche deaths (34) were above average (30) and the locations and activities of these accidents (western US) was consistent with past years. In these terms little has changed about how accidents happen and what people were doing. However, when considering why people were venturing into such areas, much has changed. In the past — "old school" — people used information and bulletins to avoid avalanche dangers and carried rescue equipment if mistakes were made. Getting caught was considered "bad form". Since most fatal avalanches were human caused, therefore most

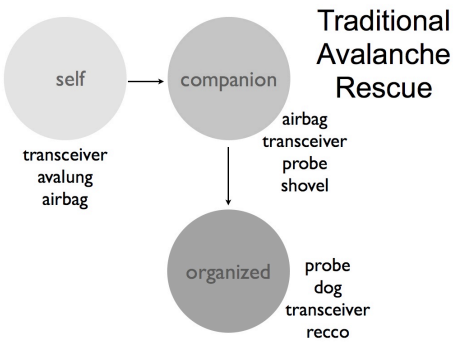


Figure 5a. Tradition avalanche rescue is sequential and tools based. Atkins.

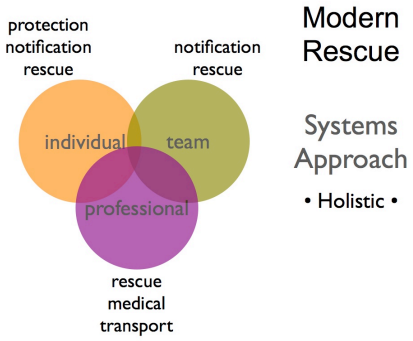


Figure 5b. Vision Zero or modern approach to avalanche rescue is holistic and systems based. Atkins

accidents could be prevented. Today — "new school" — victims use information and rescue equipment to push the limits. Some people report getting caught "is part of the game." In 2011/12 40% of victims were knowledgeable of avalanches and new of the danger and chose to venture into high hazard terrain during periods of unstable snow. Most carried rescue equipment, but some did not. (One case an airbag was ripped apart when the victim was swept at high speed into tight trees. His avalung was also ripped apart.) Since victims chose purposely to go into such locales these accidents cannot be prevented, and sense the attitudes of victims and the types of accidents has changed, therefore, it may be time for the commission to change our approach to rescue.

The traditional and sequential approach to rescue (figure 5a) — self, companion and organized — involves discussion of tools — transceiver, probe, shovel, airbag, reflectors, etc. This approach is outdated and a modern, integrated systems approach (figures 5b and 6) was presented. The three classes — individual, team and professional rely on systems — protection, notification, rescue, medical and transport. The only system shared between all three classes is rescue. The rationale is that because every accident and its outcome cannot be predicted, so the best tools to be used cannot be known. Therefore the best outcome will result from applying systems rather than individual tools. The commission was asked to think about it being time to change the approach to rescue. Because of limited time the discussion was asked to be deferred to breaks and other informal periods.

Figure 6. A systems approach to avalanche rescue. Atkins.

Special Avalanche Activities during 2011/12

Transceivers: *Bob Sawyer (CSGI)* reported on a comparison study of novice and professional transceiver users that was follow study to one performed in 2009. They found that professionals were much more skilled at finding two buried units. For both groups they found that the brand of transceiver did not really matter. The differences from the fastest to slowest average times were: professionals, 23 seconds; novices, 78 seconds. Their data showed that training and practice does matter; professionals were much faster than the novices.

Results From 2012 Workgroups

Avalanche Dog Study

Under the leadership of *Albert Lunde*, the work group developed a questionnaire so the success factors of operations with avalanche dogs can be measured. The questionnaire has been reviewed and its structure and quality is sufficient for use. The work group will turn over the questionnaire to the avalanche dog handlers group for their dissemination and collection of data. *Létang* thanked *Lunde* (who unfortunately could not attend) for his leadership and work in this important project.

Probing Efficiency

Markus Hölzi (AVS) has had to step aside from the project due to other commitments; however the work group will be lead by *Genswein* and *Atkins*. Recent actions include discussions with a programmer who has developed a computer simulation to quantify probe line spacing. This coming winter new simulations will be run, followed by field testing. The goal is to propose a standard for coarse and fine probing in fall 2013.

Avalanche Dog Handlers

Before ending the general meeting of the Avalanche Rescue Commission *Létang* acknowledged and gave special thanks to *Heini Malue* for his valued and important leadership of the Avalanche Dog Handlers sub-commission. *Malue* is stepping aside after guiding the group since its inception. A separate meeting of this group was held during the congress, see item 9 below.

Avalanche Accident Statistics, 201-12

Traditionally, data has been collected by pen and paper and now is time to move to electronic collection. *Gebhard Barbisch* has prepared the database but users need to submit contact information so he may create a personal profile and give permission to access the database. Fields needed are: organization, first_name, last_name, email address, avalanche accidents, all accidents. To collect this info, members entered this information directly on to *Létang's* computer. [UPDATE 29 Nov: Unfortunately, the data has still not been collected. As soon as data is collect this report will be amended.]

Prevention Work Group

Per-Olov Wikberg (CIFRO) leads the group, which meet twice during the congress. Separate minutes are maintained by this workgroup. Active interest and broad participation show strong interest in the group's activities. The work group will meet next between ISSW 2013 and IKAR 2013.

Avalanche Dog Handlers Sub-Commission For details of this meeting please see the minutes of this sub-commission. The group did announce their new elected leader is *Marcel Meir (ARS).*

Other / Miscellaneous

None stated.

JOINT SESSIONS — AVALANCHE AND TERRESTRIAL COMMISSIONS

NOTE: Several avalanche presentations were presented to the joint session of the Avalanche and Terrestrial Commissions. These include:

Merec Biskupič (SLP) reported on a small field test of avalanche airbags, "Three Different Shapes of Avalanche Balloons – A Pilot Study." Three forms of airbags were tested in this very limited trial: Dual-bag, mono-bag, and collar type (Mammut Lifebag Guide 30, BCA Float 18, ABS Vario 25). These were put on human-weight dummies and an avalanche was triggered artificially. The small but reasonable-sized avalanche: volume, 280 m3, fracture height 1.5 m, length 130 m, width 30 m. The maximal pressure was 125 kPa. All three dummies remained visible. The dummy with the ABS was only partially buried; the face was partially covered. The Mammut equipped dummy was partially buried but the face was free.

The BCA equipped dummy was not buried but likely the legs would have been broken. The relative locations of the dummies changed while being swept down as they were swept different distances. The flow and velocity of the avalanche was not consistent; some areas moved faster or slower than other areas. No dummy was critically buried. All airbags were visible. Interestingly, the dummy that traveled the farthest was buried the most. This study is very limited since it only applies to this specific test. Manuel Genswein added that a recent paper presented at the ISSW of a study that involved 100 trials. Their qualitative finding was that most dummies with airbags quickly moved to the edge and stop in roughly 2/3 of the avalanche chute.

Theo Maurer (ARS) reported on the "Problems in Training and During Missions with Avalanche Transceivers, Checking that Devices are Switched Over to Transmit Mode Upon Completion of Search." A natural avalanche released within the ski area in Hasliberg (CH) on 26 January 2012. The avalanche hit a groomed run and a woman was caught and carried 20 meters. Her husband was able to get her back on the slope. Rescuers were called to search the debris for other skiers. By the time the rescue team arrived on location there were already about 20 people (ski patrol and skiers) on the debris. Witness statements were contradictory, some said there had been other skiers on the slope; others said there had been none. The search continued with avalanche dogs, Recco, probe teams and transceivers. Because of very warm temperatures there was a significant risk of secondary avalanches. In order to reduce this risk a spotter was posted who would warn the rescuers. In addition, good escape routes were made by a snocat groomer. When the transceiver search ended all rescuers should have switched their devices back to transmit, and this order should have been given but it was not. The search was suspended after an hour as the danger of another avalanche was too great. One rescuer [not sure why] was still on the avalanche debris when a secondary avalanche came down. The rescuer, luckily, was caught but with no serious consequence. After this incident the search was ended completely.

This example is to show that an operations leader has to make many decisions in a short amount of time. Therefore, the technical devices being used should be as simple as possible so that one's head is free for other things. There are many different types of avalanche transceivers on the market today. There is no standardized testing for these devices. This variety poses problems. One also has to have the ability to turn off devices that are being found which one is not familiar with. The fact that every year new devices are being marketed unsettles the rescuers as well. An amateur rescuer will need about 3 years of practice to use the device correctly in stress situations. That's why the devices should be as simple and uniform as possible.

Summary:

1. Standardized testing would make a comparison between the devices easier.
2. Simpler devices would make use easier and would benefit the victims.
3. After a search is over, the device needs to be switched back to send

Frédéric Jarry (ANENA) and Manuel Genswein (CH) reported to the joint meeting of the Avalanche Terrestrial Commissions of their research on "Transceiver Performance When Searching for Multiple Burials." The goal of the testing was to examine the effectiveness of avalanche transceiver use in cases of multiple buried persons. Three user groups were tested: novice, some experience with avalanche beacons, and professional rescuers. A multiple-burial scenario was chosen because it is common and new devices can manage multiple signals. There were 2 tests: one in Davos (CH) and one on Col du Lautarat (FR).

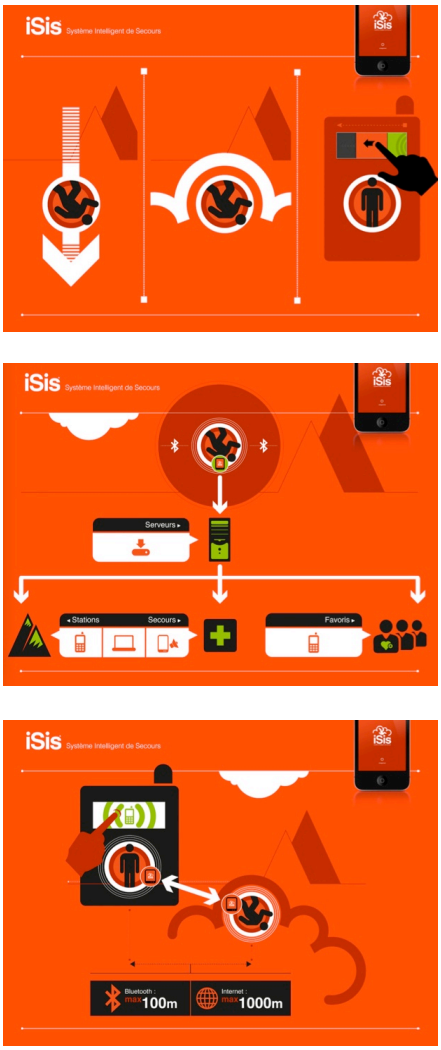
In Davos the test persons were novices. The following devices were tested: ARVA Axis, Mammut Element, Barryvox, Ortovox 3+, Pieps DSP Tour and Tracker 2. The manufacturers trained the users for 2 hours. The search area was 40-50 meters, and burial depths (targets) were 1 meter.

In France the test persons were experienced users. They were instructors and other rescue professionals. The following devices were tested: ARVA Link, Mammut Pulse, Barryvox,

Ortovox S1+ and Pieps DSP. The search area was 100 meters, and burial depths (targets) were 1 meter.

Results from Davos: single targets were always found within 2 minutes. Finding the second device showed different results. With ARVA Axis 18 people did not find the third target. With Pieps DSP 23 people did not find the third device. In France the time differences were smaller, and the third and fourth targets were mostly found.

In many cases in Davos the third target was not found. That was primarily because neither the devices nor the minimally trained rescuers could recognize the situation. One of the problems is signal separation. In order to differentiate between signals, different tones can be used. Differences in time axis, frequency, and signal strength as well as phase shift can be used as criteria. There are cases where signal differentiation does not reliably work. The experienced participants in France could recognize these situations and successfully applied the necessary backup search-tactics (micro strips, 3-circle). In France very few targets were missed. Searchers in Davos had large failure rates. Practice, practice and practice are critical to fast transceiver searches; however, users must learn to recognize situations where signal overlap (multiple transmitting devices) will cause the marking or flagging functions to fail.



Figures 7a, b & c. iSis App screen shots reveal a hint of the future when it comes to companion / small party rescue.

Lukas Dürr (SLF) presented information on “New Avalanche Forecasting Products in Switzerland.” With four languages required of Swiss avalanche products and with all products needing to be adapted to new media the venerable SLF redesigned all their avalanche forecasting products. The old approach was to describe the danger in regions with text, i.e. the Bernese Oberland [this approach is generally also used by American avalanche forecast programs]; however, foreigners have difficulties identifying regions. The solution is to use graphics. Information is presented in a pyramid form: basic information, then information about the core zone, snow pack, weather, and finally access to raw data. The new products can be found at www.slf.ch on the internet or through the App “White Risk.” The new product focuses on the end user knowing which text refers to which area. This was not always easy up to now. Everything is published in 4 languages with special attention so there are no contradictions between each product. The App also contains knowledge content regarding snow and avalanche dangers. The SLF publishes their bulletins twice a day in 4 languages. An integrated translation system performs the translation in a building block system. There is a set of 100 blocks which can be combined. A problem, however, with this approach is that bulletins cannot be communicated by phone or teletext since it is a graphic product. There no longer will be a text product.

Gebhard Barbish (ÖBRD) presented basic, public, details of an avalanche involving a member of the Dutch royal family, “Avalanche Accident in the Arlberg Region.” Described the challenges when a very high profile person becomes an avalanche victim. On 17 February 2012 a member of a royal family from caught and buried. Almost as fast as rescuers

responded so too did the prosecuting attorney's office get involved. Later the case was forwarded to the attorney general in Innsbruck and they in turn forwarded the case to the Justice Department in Vienna. [On 21 October the prosecutors dropped their investigation.] Prince F. was skiing with a personal friend F.M. No ski instructors or mountain guides were involved. Both men carried avalanche rescue gear, and F.M. also carried an airbag. The avalanche was rated 4 [high] and had been for days. The men ventured on to an often skied slope that reaches up to 42 degrees in steepness. Explosives had been applied to the immediate area but no avalanches were triggered. Prince Frisco was swept away by the avalanche and completely buried about 30 centimeters deep. His friend F.M. was able to deploy his airbag and got hung up in bushes a little above and to the side of the avalanche cone. The distance between the two was considerable.

F.M. as well as third parties notified the ski patrol in Lech. The ski patrol was already on high alert due to the critical avalanche situation. Without delay they initiated an avalanche rescue operation through the mountain rescue headquarters. The calls to ski patrol and mountain rescue came in at 12:15 p.m. Heliport Zürs is approximately 6.7 kilometers from the site of operation and rescuers arrived on scene at 12:28 p.m. The emergency physician and the operations leader were dropped off. The helicopter then returned to collect more rescuers. At the same time mountain rescuers who were out and about starting arriving on scene. At this point F.M. was still walking in the snow down to the site. No one knew who it was they were searching for. At 12:28 p.m. there was a first transceiver contact; first probe contact was at 12:30 p.m. By 12:35 p.m. the head had been freed. At 1 p.m. the victim was transported by Skidoo to the helicopter, which took off at 1:20 p.m. to Innsbruck (Feldkirch was not able to admit the patient). Only when the patient was readied for transport did they find out who the victim was. An AutoPulse device was applied to Prince F. This device uses a rechargeable battery, and a replacement battery is always on board and documented. The device was used while transporting the patient to the helicopter. During this segment of the rescue, the first battery depleted. Manual CPR was performed while the battery was changed. There was never an interruption in CPR, either mechanical or manual. On the helicopter the device was turned off because the patient did not need it anymore. As soon as it was common knowledge who the patient was, mountain rescue was notified that PR would be handled by the security directorate and only in agreement with the royal family. The authorities established a press office, which included mountain rescue, royal family, police, community Lech leaders and tourism. PR work took over a week. The newspaper "Bild" then incorrectly published that the patient was only doing so badly because there had been a mishap on the helicopter involving the AutoPulse's drained battery. This report was untrue. A lawsuit has been filed (not by mountain rescue) against Bild, but no word on its status. [As of 19 November the BBC reports Prince Frisco is still in a coma with minimal signs of consciousness.]

Malik Karaoui, (FR) presented his novel iPhone-to-iPhone app (still in development) that can be used in lieu of traditional transceivers, "iSis – Intelligent System for Mountaineering Rescue." Karaoui presented a smart phone "solution" that someday could replace traditional avalanche transceivers (figures 7a, b & c). He has been working on the App for 2 years and has been testing it diligently for 6 months. The system works on iPhone 4S and 5, and uses three alarms: falling, accelerating, or manual. In case of a fall or acceleration, the alarm is sent automatically after analysis of various data. After the alarm a Bluetooth Cloud is initialized. People who are found in an avalanche can be marked, and the search function is very exact. The search can be switched from GPS to Bluetooth in which the search can be done more precisely. iSis has an unlimited range. A slope can be visualized out to 50 kilometers! However, an internet network is necessary. If there is no network, Bluetooth has to be used, which limits the range to 100 meters. Multiple alarms can be managed at the same time. iSis costs less than an avalanche beacon. Use is easy, no training is necessary. Advantage: Fast notification, transmission of lots of information, low cost. Disadvantages: high power/battery consumption, cold weather performance is limited. This application is free for rescue organizations. Does this technology represent the future? It works, so maybe but maybe not. While *Karaoui* has a functioning app, there is still much to be tested. Also, mobile phones are notorious for failing in cold conditions, but this is a pretty cool App.

For additional information on the presentations above please see the 2012 minutes of the Terrestrial Commission.

JOINT SESSIONS — ALL COMMISSIONS

NOTE: Several avalanche presentations were presented to all Commissions. The avalanche oriented presentations include:

Results of the "Pig Study" – Implications for Avalanche Burial

Peter Paal, Hermann Brugger *(IT, EURAC and Bergrettung Süd Tirol):* Paal presented research from this ground breaking study led by Brugger. The study was initiated several years ago but was stopped prematurely after four days because of public outcry. The team analyzed cooling rate, circulation, and metabolic parameters of pigs, which are a close analog to humans (BME as in body mass equivalent). Despite the early end to the project, 8 pigs (of 25) were analyzed. There were three groups of pigs, all completely buried; one group had no air space; second group had a 1 liter airspace, and third group had 2 liter airspace. Results: A) up to 12C/hr cooling rate in open air. B) Upon suffocation temp cools but then plateaus. C) Even with 1L and 2L airspaces these pigs died within 30 minutes. D) K+ accumulates quickly in 1L and 2L pigs. Results are to be published soon in a yet to me named medical journal.

Accidental Hypothermia

Doug Brown *(CA, UBC), Brugger (IT), Boyd (CA) (MEDCOM) and Paal (IT):* [Paper was recently published in The New England Journal of Medicine: NEnglJMed2012;367:1930-8] Brown and team reviewed the medical literature and concluded that two aspects of the European approach to hypothermia rescue — rewarming and transport — should be adopted and applied worldwide. The paper provides simplified clinical staging based on vital signs and condition. Core temperature is nice measure in the field but is not essential for mountain rescue. This paper should be reviewed and discussed with your team's medical advisor.

A Study of Behavioral Patterns of Young Freeriders: New ways to communicate in the future.

Mathilde Gletty, (FR, ANENA) presented some preliminary results of her doctoral dissertation. Very little is know about young adults between the ages of 20 and 30 who call themselves freeriders. Gletty reports they are cognizant of the avalanche risk; however, they engage in increased risk and accept the negative consequences of an avalanche. Additionally, they are also looking for the adrenaline rush and therefore assume greater risks. Many believe that an avalanche is simply bad luck and that they can not do anything about that. Therefore they do not take precautions to avoid an accident. Dialog needs to be opened up between freeriders and mountain rescuers as there are many prejudices on both sides. There will be an extensive study regarding this topic in the next 3 years. First results should be available at ISSW in Chamonix in 2013.

PGHM Chamonix: Avalanche on Mont Blanc

Jean-Baptiste Estacky, (FR, PGHM) presented the accident, crisis and operational management plan from the Mont Maudit accident of 12 July 2012. At 0525 hours 23 alpinist were caught; 7 injured and 9 killed. First rescuers arrived at 0620. Formal crisis management plan was initiated at 0700 when situation was identified as a mass casualty incident and that the rescue operation would be high profile too. Forty rescuers were involved at the accident site, and 3 helicopters made about 30 total trips to carry in rescuers and equipment, and to evacuate victims. The last victim was about about 1200, and searching was concluded at 1450. Last rescuers arrived at 1730 and final accounting of all people was concluded by 1900 hours.

The following approach was taken:

1. Emergency measures: Send rescuers to the location immediately, establish a list of potential victims, call in reinforcements, inform authorities.
2. Implement a command and control structure, legal tasks (identifying victims, groups), PR, appointing an on-site rescue leader.

3. Issuing orders. Rescuers were also sent to the Mont Blanc summit to keep climbers from going down the route of the accident. Posts were also established at the Aiguille de Midi.

Various factor had to be considered: The “big chiefs“ want to be informed about happenings before they happen; the media wanted to fly overhead; the forensic technicians did not want the bodies to be moved; friends started calling in after seeing the accident on TV. The operation had to handle all of these factors as well as protect and operate efficient SAR activities.

Some lessons learned include:

- The accident site needs to be cordoned off well, so access and egress can be controlled.
- Another problem was officials who appeared on site quickly. Consider establishing a second operations center only for officials and to transmit the rescue actions to them via TV monitors.
- PR could have been handled better.
- The helicopter deployment could have been better coordinated.

Two more points Estacky stressed:

1. The operation took place in the high mountains. It was not easy to get the rescuers on site. The short term weather conditions were uncertain. It was still very windy and it was uncertain if the helicopters could keep flying after the first flight. It took about 2 hours to return all rescuers off the mountain down to the valley.
2. A crisis always takes longer and carries consequences of official inquiries and public outcry.

Avalanche Accident on Siachen Glacier in Pakistan

Bruno Jelk (MRZ, CH, Beat Dietrich (CH, OCVS), Dan Halvorsen and Mats Hjelle, (NO, NRC):
On 7 April 2012 at about 0200 a massive ice and snow avalanche struck a Pakistani military field base at Gayari on the Siachen Glacier burying 140 soldiers and civilian contractors. The debris covered about 1.2 square kilometer under 20 meters of snow, ice and rock. In many places debris was 50 to 70 meters deep!

Figure 8. Avalanche debris. A person in orange stands next to a very small excavator. (Photo: Bruno Jelk)

Several days after the avalanche Swiss rescuers were notified by DEZA (Swiss Agency for Development and Cooperation SDC) in Bern, and the next day a team of one rescuer, one dog handler, and one official from the Swiss Government flew to Pakistan.

The drive to the site was done under close guard; soldiers with machine guns accompanied the rescuers.

At the site, it was felt that only soldiers who had been in a hardened bunker during the avalanche would have had a chance of survival. But it was unknown if bunkers existed or even where they were.

Traditional search tools were totally ineffective. Probe poles would only penetrate the top 20cm. The Swiss team told Pakistani military officials that heavy equipment was needed to move snow. At the site the team learned previous search efforts were random so it was difficult to know where had been and how was it searched. Dietrich’s dog alerted a few times some backpacks were found. There were also Recco signals, but rescuers were unable to move the massive rocks that were also tumbled down in the avalanche. Two transmitting avalanche transceivers was found in backpacks buried at 26 and 33 meters. [Yes, meters and not feet.] But no people were found.

The avalanche dammed the river and caused a good sized lake to form. The lake posed a danger to the rescue operation and access route down valley. A spillway was dug to drain away water. The Norwegians arrived days later, after the Swiss had already left. [Incidentally, the US military sent 8 advisors to assist in the search effort, but inclement weather prevented their trip to the accident site. From 10–12 April, I was involved in multiple conversations with the USAF Interagency Action Group, Plans and Stability Operations Division, Central and South Asia Branch. I advised as to search strategies, tactics, and tools. I also said there would be nothing new or different the American SAR community could add to the efforts of the Swiss and Norwegians. I suggested we not go. The Austrians also decided not to go. The most effective search tools would be heavy equipment excavators. No further action followed.]

By the time the Norwegian rescuers arrived, weather conditions had improved dramatically. Their first actions were to map the avalanche using Google Earth in order to position the structures pre avalanche. Then the positions were marked on the cone using GPS. The area was searched with a ground penetrating radar. A steam probe was tried but that was practically useless to melt through the mix of ice and rock. The deepest they got was 2 meters. The Pakistani military had lots of dogs with them; however, they were not used for searching but for guarding the area.

It is should be noted that Pakistan has trained civilian rescuers. But because of politics the local rescue teams were not called.

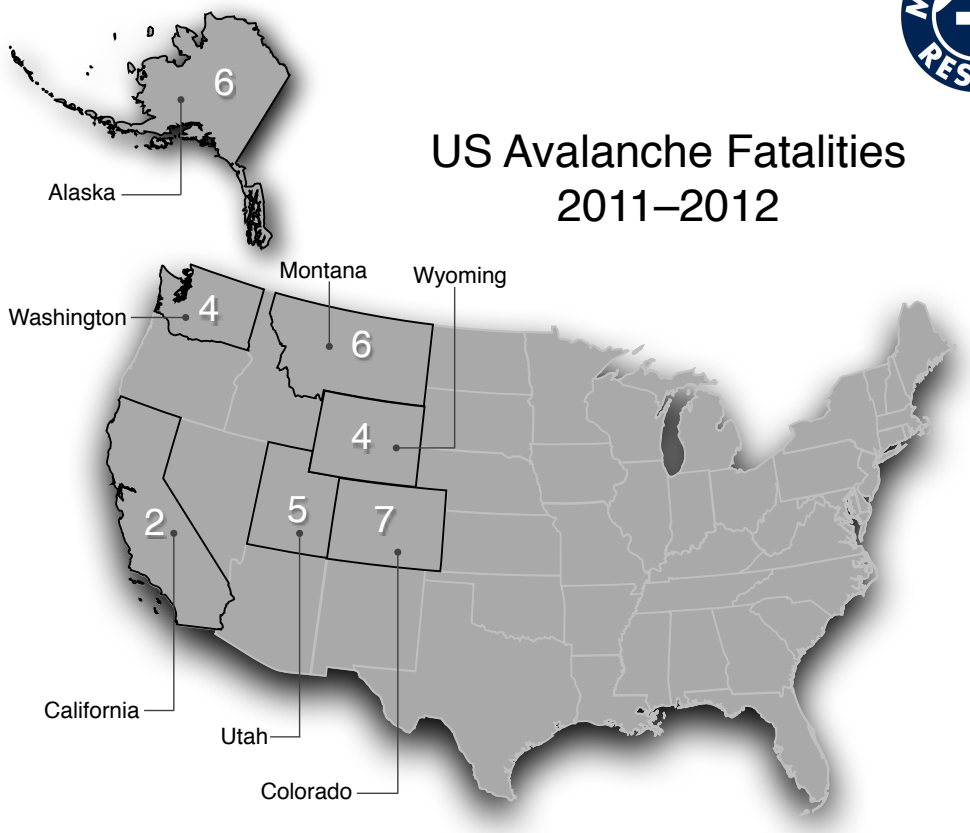
2012 MEETING – Poland
The 65th IKAR Congress will be held 15–20 October in Bol, Brač, Croatia. The theme will be "Mountain Rescue — Helicopter Interface." Basic information can be found at: www.youtube.com/watch?v=wd-PZA-WD9w.

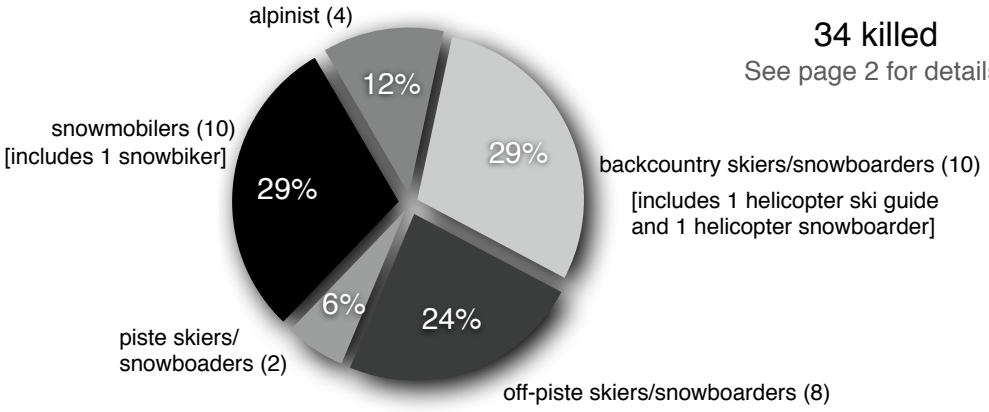
RECOMMENDATION REGARDING THE MRA INVOLVEMENT IN FUTURE IKAR MEETINGS
It is this writer's opinion the MRA remain involved in IKAR. The exchange of ideas, knowledge, and skills, is of huge benefit to the MRA membership. The analysis, consideration or application of this information, skills, and equipment can benefit all MRA teams from training to SAR operations. IKAR can help MRA teams become better, safer, and more efficient rescuers. The challenge to the MRA is better bring and share this knowledge to the MRA community. This report is one way to transfer information

The Mountain Rescue Association (MRA) benefits from participation in IKAR in many ways. Perhaps the most import benefit is the opportunity to gain knowledge and skills from the leaders of mountain rescue from around the world, especially in Europe. The knowledge and skills learned can help MRA teams and members do their jobs faster and safer. In recent years the reach of IKAR has been expanding beyond Europe and North America. Japanese representation has been present for several years.

DISCLOSURE
I, Dale Atkins, am a volunteer MRA member (Alpine Rescue Team, Evergreen CO), and I am also employed by RECCO AB who paid for my participation at the 2012 IKAR congress, reducing the costs of the MRA's participation. I am very aware of the potential for conflict of interests and have in the past withdrawn myself from specific voting actions. During the 2012 meeting no voting took place involving the RECCO system.

US Avalanche Fatalities
2011–2012





34 killed

See page 2 for details.

date	location	state	description	rescue method	rescue technique
Nov. 13	Snowbird	Utah	1 backcountry snowboarder killed‡	organized	not buried
Dec. 31	Cooke City	Montana	1 snowmobiler killed‡	companion	foot out
Dec. 31	Cooke City	Montana	1 backcountry skier killed §	organized	transceiver
Jan. 1	Phillipsburg	Montana	1 snowmobiler killed	companion	foot out
Jan. 18	Snowmass (Aspen)	Colorado	1 off-piste skier killed	companion	transceiver
Jan. 21	Park Range	Colorado	1 snowmobiler killed	companion	transceiver
Jan. 22	Winter Park/Mary Jane	Colorado	1 piste skier killed‡	organized	spot probe
Jan. 22	Vail	Colorado	1 piste skier killed‡	organized	spot probe
Jan. 28	Big Cottonwood Canyon	Utah	1 backcountry snowboarder killed	companion	transceiver
Feb. 01	Big Fork	Montana	1 backcountry skier killed §	organized	transceiver
Feb. 05	Richfield	Utah	1 snowmobiler killed	organized	transceiver
Feb. 12	Telluride	Colorado	1 backcountry snowboarder killed*	others	transceiver
Feb. 16	Wolf Creek Pass	Colorado	1 backcountry skier killed	companion	transceiver
Feb. 19	Alpental	Washington	1 off-piste snowboarder killed	organized	not buried
Feb. 19	Stevens Pass	Washington	3 off-piste skiers killed	others	transceiver
Feb. 20	Kalispell	Montana	1 snowmobiler killed §	organized	transceiver
Feb. 21	Cooke City	Montana	1 snowmobiler killed	companion	transceiver
Feb. 23	The Canyons	Utah	1 off-piste snowboarder killed‡	others	object out
Feb. 25	Marias Pass	Montana	1 snowbike rider killed	companion	foot out
Feb. 27	Togwotee Pass	Wyoming	1 snowmobiler killed	companion	transceiver
Mar. 1	Alpine Meadows	California	1 backcountry skier killed	companion	transceiver
Mar. 2	Carson Pass	California	1 snowmobiler killed	companion	transceiver
Mar. 3	Moab / La Sal Mtns	Utah	1 snowmobiler killed ‡	organized	probe
Mar. 7	Grand Teton NP	Wyoming	2 backcountry skiers killed †	organized	transceiver
Mar. 13	Haines	Alaska	1 helicopter guide* and 1 client killed	organized	transceiver
Mar 30	Silverton	Colorado	1 backcountry skier killed	organized	transceiver
Jun. 14	Denali NP / Mt. McKinley‡	Alaska	4 climbers killed ‡†	organized	object out (rope)

§ Companion could not use a transceiver † No companion rescue ‡ No transceiver * Equipped with airbag
(Recco System located a buried snow-immersion-suffocation victim at Stevens Pass, WA)