

# TERRESTRIAL RESCUE REPORT

International Commission for Alpine Rescue



# IKAR-CISA



**Stary Smocovec, Slovakia 6-10 Oct 2010**

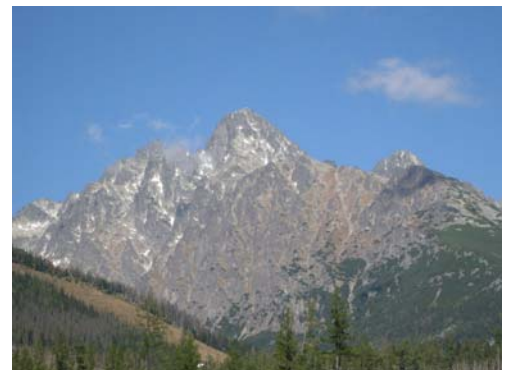
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## INTRODUCTION

The International Committee for Alpine Rescue (IKAR-CISA) met for its annual congress in Stary Smokovec, Slovakia 6-10 Oct 2010.

**Stary Smokevec** is a ski village in southwest Slovakia on the slopes of the Tatras mountain range. The Tatras offer superb compact mountain landscape which varies from open meadows and pine forests to broad glacial valleys with spectacular tarns surrounded by jagged alpine peaks.



The High Tatras provide facilities which are more than comparable with other famous international resorts. Although not as high as the Alps, this beautiful mountain region offers a similar broad range of activities such as hiking, climbing and skiing. The clean air, sunny weather and traditional Slavic hospitality, as well as a wide range of comfortable tourist accommodations and sporting amenities, are a major attraction for people from different countries of the world.

**The Congress:** The theme of this year's IKAR Terrestrial Rescue meeting was "The use of Dyneema rope in mountain rescue." There was also an emphasis on cable care, chair lift, and gondola rescue.

This year's congress drew more than 300 rescuers from 38 national organizations. Representing the MRA in Slovakia were Rocky Henderson (Terrestrial Commission), Dr. Ken Zafren (Alpine Medicine Commission), Ken Phillips (Air Rescue Commission) and Dale Atkins (Avalanche Commission). Rick Lorenz of Olympic Mountain Rescue also attended. He and his son Matt will be producing a video report of the congress. Attendance of the U.S. delegates was made possible by support from **CMC Rescue, Goodrich Corp., and RECCO**, as well as funding by the MRA. The U.S. MRA delegates are grateful to our sponsors for their long term support of this important international exchange.

Many delegates arrived in Stary Smokovec on the afternoon and evening of Tuesday, Oct 5th. A day of field demonstrations and exercises was held on Wednesday, Oct 6th and regular sessions began with a grand opening and welcome on Wednesday evening. The Bellevue Hotel was the location of the congress. It is a very modern and complete convention center with all the amenities needed for over 300 delegates from as far away as Japan. The Hotel's internet system was slightly overwhelmed by the many high tech guests. They finally resorted to limiting access by issuing codes with one hour limits.

**Wednesday Sessions:** At 8:00 am we were all loaded in three tour buses and headed to the largest ski resort in Slovakia, Chopak Nizke Tatry. Upon arrival, we were divided into the German and English speakers in one group and the French and Slavic speakers in the second group. Our group started with a demonstration of three different techniques of chair lift evacuation. All the operations began by lowering a rescuer down the cable from a tower to the first chair. When rescuer reached the chair, he would lower himself down to a position facing the subjects. After securing all the occupants, he would then open the safety bar and put a triangle sit harness on the first person and then lower them to the ground. Variations involved doing two subjects at a time and with different devices. All three demos professed to adhere to the principle of redundancy and two points of contact. There were times when the operation was all linked through one large biner around the cable. It was probably very safe but not redundant.





The next demonstration involved rescuing a stranded paraglider stuck between two large trees. Paragliding is becoming a very popular sport and these types of rescues are increasing. We were told later that, although they practice it, they have not yet actually found some one suspended between two trees. The rescue involves two separate rescuers lead climbing two trees on opposite sides of the subject. They use standard arborist tools to ascend. Protection is accomplished by placing slings around the tree about every 3-5 meters. They each climb to well above the subject trailing a second rescue rope, and then place a good anchor.

Next, they each place the rescue ropes through pulleys placed at their anchors. A rescuer on the ground connects the two ropes together and this connection point is raised back up to one of the rescuers above.



Each rope is now rigged through a DCD and anchored at the base of each tree respectively. Now the rescuer at the connections point is lowered to a point directly above the subject using both ropes. From here the operation is a standard pick off. In some cases a short raise is required in order to release the subject from his harness accomplished by a raising system on each of the two tensioned lines.

The afternoon started with a demonstration by Kirk Mauthner of Canada demonstrating what was called a "Mirror System" using the new MPD (Multi-Purpose Device) from CMC. He emphasized in his introduction the different risk factors in the different phases of a vertical rescue. In the edge transition and while the attendant is in an unstable position it is preferred to have a single tensioned main line and a hand tight belay line. Once over the edge and when the attendant is in a stable position the load can be shared by each rope equally. The MPD can accomplish this very effectively with its precise tension control mechanism. Another advantage is the ease of transferring the load from one rope to the other for adjustments at the edge. Since the MPD functions as a pulley, rope capture and a DCD, the change from a lower to a raise is just a matter of adding a Prusik and a pulley for a 3:1 MA. With only half the load on each rope, the friction on the edge is less than a standard main and belay system.





The next demo was back to paragliding, only this time it was off of a chair lift cable. You may wonder what the chances of that happening are, but I was told it is actually pretty likely. The explosion of the sport and the proximity to numerous cable cars and chair lifts makes it a reality. The operation was similar to the morning chair evac demo, but with a pick off mid drop. Like the tree rescue in the morning, the pick off required a raise in order to release the subject from his harness. At times it seemed overly complicated, with a dependence on many different devices and multiple ropes.



Surprising many observers, were the three separate incidents of operator error. One required a knife to cut a rope while a subject and rescuer were suspended, another damaged a piece of hardware, and a third resulted in a significant delay in the operation.

It is well to remind ourselves of some key principles that can prevent these. Command and control with clear and precise communication is one. Verbalizing and checking with teammates the anticipation and completion of key tasks is important. Two, letting one rescuer do multiple tasks while others are standing around leads to over tasking and can be unsafe. Three, keeping it simple is not just a matter of using less pieces but requires careful analysis of the task and then choosing the best and sometimes very specialized tool for that task. A final key principle is good rope management by the rescuer. Good habits like gathering a rope rather than dropping it may take a few seconds longer, but could save hours.



**Thursday Sessions:** The Terrestrial Commission began its official meeting for 2010 with President Bruno Jelk presiding. The minutes from the Zermatt meeting were reviewed and approved. Some discussion followed regarding plans for next years pre-conference demonstrations. Tradition is that the Avalanche Commission will be in charge.

Next, Gebhard Barbisch requested that all members please go to the IKAR website and check their contact info and other data. There has been some frustration with out of date info and trouble making contact with the correct officials.

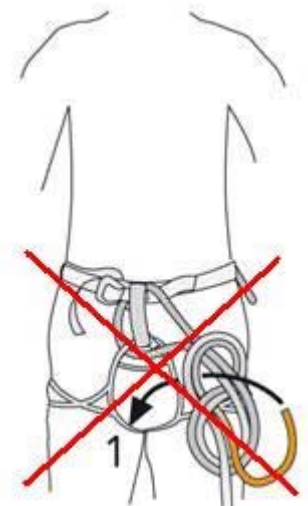
**Terrestrial Rescue Commission Issues:** Following a quick review of the current published recommendations a new recommendation regarding standards and systems was presented. It was tabled for later due to translations not being ready for review.

Bruno then presented a recommendation from the Medical and Air Commissions that was quite detailed and specific regarding patient care. It was decided to not support this recommendation.

As a follow-up to last years discussion on Dyneema ropes the subject was again reviewed. The Austrian delegate asked for a general recommendation and presented a plan to certify systems. The Bavarian delegate explained that they had certified their system and were comfortable with their process. They did express some concern about the life and strength of the rope over time. Slovenia stated that Dyneema should be used only in specific places in a system that has been certified. They also stated some concern about MBS and actual reality in the field. The Tyrolean delegate stated that they have some experience now and felt that by using it they were certifying it.

**Figure 8 Knot Danger, Martin Henny, Switzerland, Mammut Co,**

Mr. Henny presented a problem regarding a mistake with a Figure 8 knot. It seems there have been several cases of climbers using a figure 8 to tie two ropes together for a rappel. We know that the Figure 8 can roll off the ends so a lock or stop is required. Some climbers have gotten in the habit of locking a Figure 8 with a follow-back when doing a Figure 8 follow-through like the illustration at the right. The problem is when using that same technique on a two rope join for a rappel. If you do the follow back from the wrong side like this the knot will fall apart and collapse.



He then presented some data on the strength of the knot when tied properly but his conclusion was a recommendation to no longer use the follow-back lock for the Figure 8 knot but to use a double overhand stopper for a Figure 8 like this.

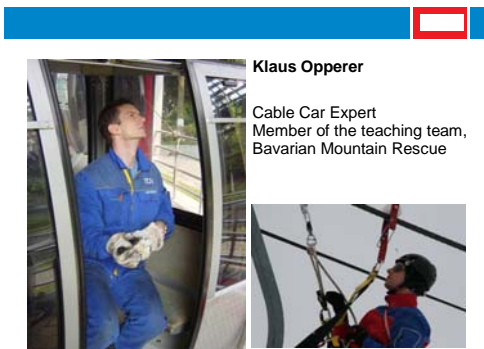


It was voted to approve this recommendation. I believe that research actually shows that no lock or stopper is needed for a Figure 8 knot as long as there is an adequate tail.

Gebhard then made a request for all members to report all near misses and mistakes so that we can all learn and be safer.



## Cable Car Rescue and Training: Klaus Opperer, Bavarian Mountain Rescue

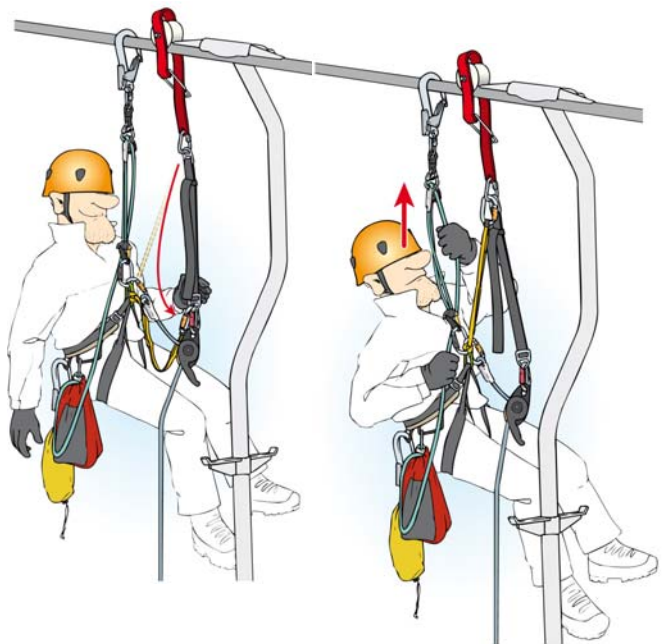
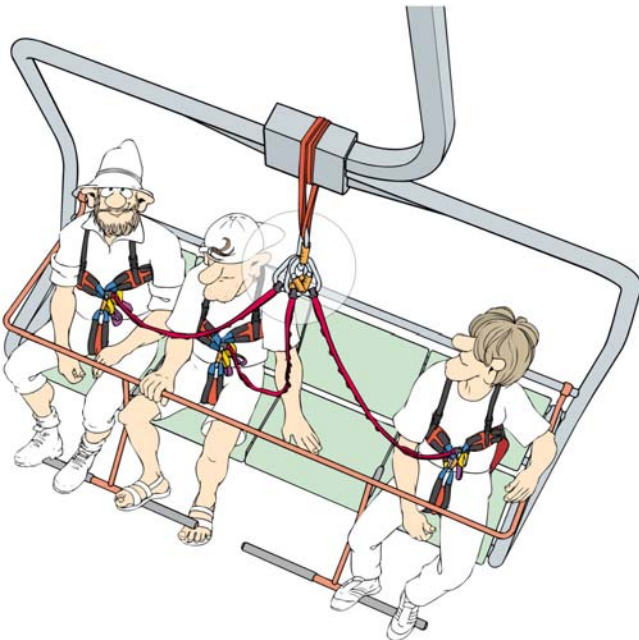


Klaus explained that industry standards required that a plan be in place to accomplish a full evacuation in 3-1/2 hours or less. If the operators of the lift can not accomplish this then a cooperative plan must be implemented. He noted how his team has worked together with top executives from various authorities and agencies to formulate plans to meet the standards. Once the plans were agreed upon full training of all participants was then implemented beginning in Oct of 2009.

In January of 2010 there was an acute mechanical failure of a gondola in their response area. The planning and training really paid off as they were able to do the full evacuation in less than 45 minutes. There were 5 helicopters used in the operation. There was a lot of media attention which worked out well as they were able to show that their training and preparation had served the community well.

## Cable Car Rescue Standardization of Training: Klaus Opperer, Bavarian Mountain Rescue

In this presentation Klaus focused on various standards in their training programs. It was an explanation also of some of the techniques that were demonstrated the day before in the field demos. It was quite helpful to us in the audience to see clear graphics of what we needed binoculars to see in the field the day before.



## Cable Car and Chair Rescue, Tyrol:

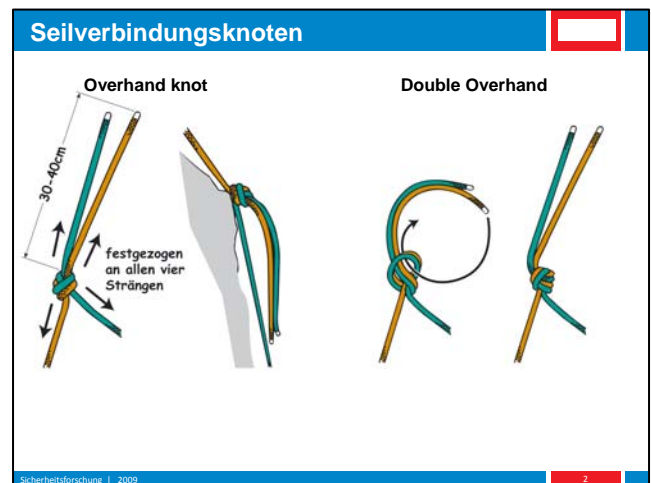
Peter Veider, Training Director Tyrolean Mountain Rescue.

This presentation outlined the similarities and the differences between the Bavarian region and Tyrol region of Germany. Peter confirmed the industry standards and a similar training program. He emphasized the need for robust and active training program for all of the team and a full cooperation with the operating companies. He also outlined some of the conditions that they experience that drive the need for a timely evacuation. High winds, cold temperatures are common when chairs break down.

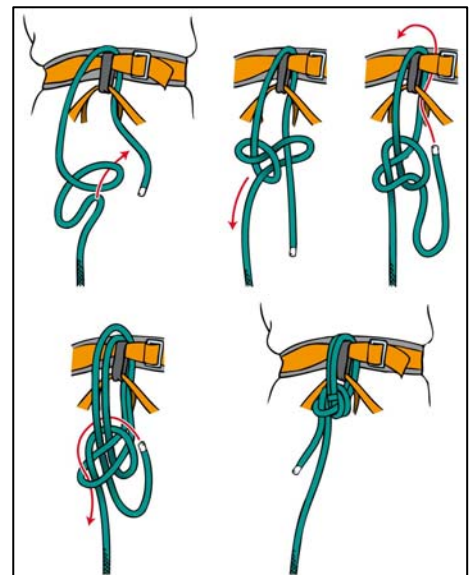
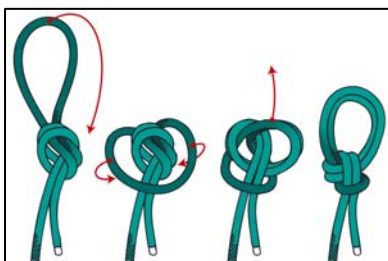


## Safety Technology: Bavarian Mountain Rescue

This was a short presentation regarding some knot research. This was a slightly different look at several knots used in climbing. The first one was what we Americans some times call the European death knot although it has never caused a death. The joining knot commonly used for rappelling is an overhand with long tails shown at the right. Then what was offered as an alternate was what was called a double overhand. Their research led them to recommend this and they also stated that shorter tails were allowed.





Another knot that was looked at was the double bowline. One use recommended was a climber's tie in as shown here on the right and then it was also offered as an appropriate knot at an anchor using the tail of a runner to the second bolt as the back up clipped with a clove hitch.



## Dyneema during Mountain and Air Rescue Operations:



Enrico Ragoni of Airwork & Heliseilerei GmbH ([www.air-work.com](http://www.air-work.com))

Enrico's company provides soft goods to the helicopter industry. They manufacture slings and hoist accessories primarily for the logging industry. His presentation was about research his company has been doing regarding the life and use of Dyneema ropes. After explaining just what Dyneema is and what it is not he voiced some real concerns about heat exposure and the dangers involved. Because of its low melting point it has some limits in its use. What many are unaware of is that there is a change in yield point as low as 50 degrees C. Any exposure above that point can be critical. Just leaving in a hot car seat or on a black tarmac may damage it. Heat pressure from a winch can be critical. In conclusion he stated that Dyneema is a very efficient material when used correctly and a very dangerous material when used incorrectly. I believe the lesson for users and potential users, is that we still have some unknowns regarding this fiber that should make us cautious and conservative in its use. The MBS is just one data point. We are still unsure of what causes apparent loss of strength over time.

 IKAR 2010 Slovakia 

### 3. Comparison

Material Trade names	HMPE Dyneema	HMPA Aramid	PES Trevira	PA Nylon	Titanium --	
E-modulus	105	130	10-15	0.25-3.5	105	kN/mm <sup>2</sup>
Melting point	140	500	225	215-260	1668	°C
Heat resistance	70 !	350	170	130	--	°C
Elong. at break	3.8	3.4	10-17	18-24	--	%
UV resistance	++++	+	+++	++	n/a	
Breaking load of self weigh	400	235	--	85	25	km

## Super Jeeps in SAR: Icelandic Association for Search and Rescue ([www.icesar.com](http://www.icesar.com))



Given the terrain and large expanses of open space, the teams in Iceland use these vehicles extensively. Many of the citizens use similar vehicles on the streets and for recreation. They define a "Super Jeep" as a highly modified and properly drivable 4x4 vehicle on big tires (38" or more) capable of driving on deflated tires to float on snow. When traveling on soft snow the tires are deflated to as low as 1-2 psi. As SAR vehicles they are outfitted with extra lights and of course radios, GPS, computers and loads of rescue and survival gear.



**Friday sessions:** Avalanche and Terrestrial Commissions met together for most all the presentations on Friday. I am including in this report only those that are specific to the Terrestrial Commission.

**Cable Car Simulation Facility:** Klaus Opperer, Bavarian Mountain Rescue

In this presentation Klaus showcased a new training facility for all types of chair lift, cable car and gondola evacuation. Regulations and the need to train over 3000 professionals and volunteers annually drove this project.

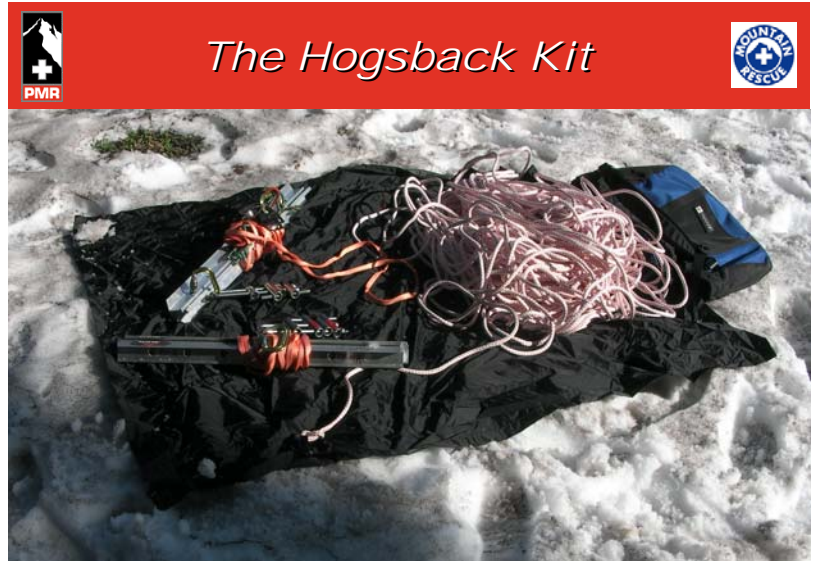
It was cooperative effort between all the stake holders, industry, government and volunteers.

Doppelmayer was a major contributor of space and equipment. After much planning, the build-out was completed in 5 days. One of the big advantages is the ability of the instructors to be in very close proximity to the student. The scaffolding and catwalks make direct communications easy and efficient. Being able to simulate helo extractions is a huge money savings and is paying dividends to all the stake holders.



## Hogsback Kit using Dyneema rope, Rocky Henderson, MRA

In the spirit of looking carefully at the proper use of Dyneema rope, I offered to do a short presentation on how my team had selected and how we use a Dyneema rope on Mt Hood. I showed our typical rescue and our need for lightweight gear. The advancement of fast and light alpine climbing had driven us to explore ways to shave off every gram possible. After extensive research we have selected a marine product made by Mamutec called Marlin. We have very tight restrictions on the use of this rope as its MBS is less than 20 kN. It is for moderate angle, less than 30 degrees, lowers on long snow slopes. We use the rope to control the descent with litter attendants acting as the belay. 600ft of the rope weighs less than 7 kg and is easily packaged in a standard sport climbing rope bag. No one seemed to have any real concerns or objections to our solutions although I do have some new concerns regarding any exposure to heat.



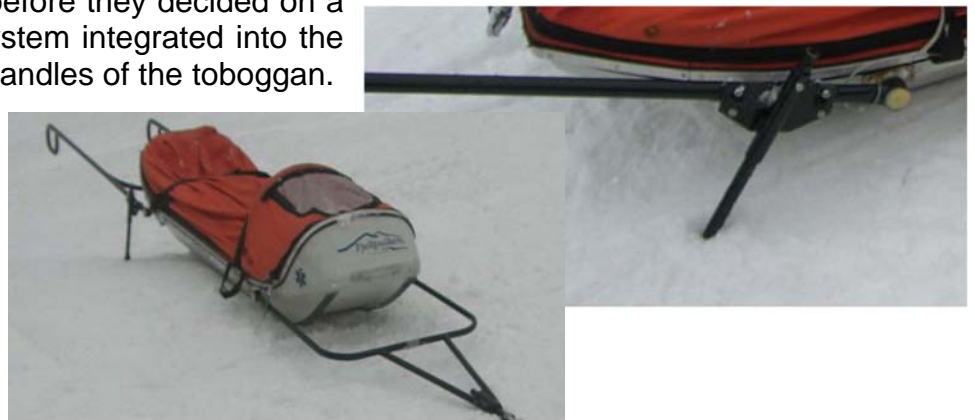
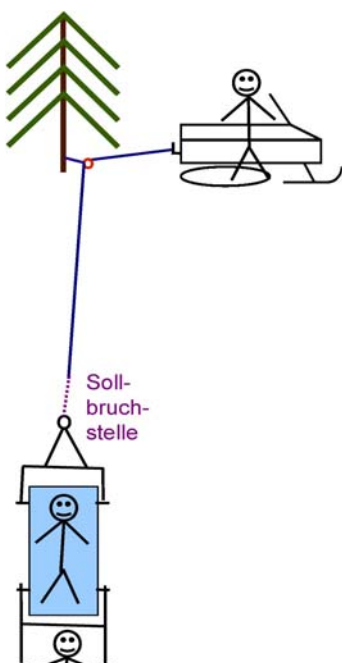
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## Snowmobile – Toboggan Extraction: Bavarian Mountain Rescue

The challenge being addressed here was a task facing ski patrollers in developed ski areas. They need to be able to safely raise an injured skier up to a road or track through heavily wooded terrain with a 2 man team. They wished to use a standard snowmobile for power but do it safely. They started by testing the pulling power of their snow mobiles in typical snow conditions. With a dynamometer they determined under slow pull conditions they had about 2.8 -3.4 kN of force. With a quick start and slightly slack line they hit 4.0 kN. Next they tested various force limiters and decided on a 4mm short cord that broke at about 1.6 kN. They experimented with several systems for the

“belay” before they decided on a brake system integrated into the control handles of the toboggan.



The final solution looked something like the diagram to the left. The speed of the snow machine was still a problem but they seemed satisfied with their results.

**Saturday Sessions:** Traditionally the Saturday sessions are joint session with all commissions together. The presentations are of mutual interest to all attendees. Subjects ranged from survival probabilities in avalanche burial to a proposal for a training workshop in Cyprus. None of the presentations were exclusive to the Terrestrial Commission. The afternoon began with reports from the presidents of all the commission. There was one item of business that the Terrestrial Commission needed to address and that was the matter of the proposed recommendation for “Systems in Mountain Rescue”. It was discussed quite a bit with debate about the meaning of “testing agency”

After some clarification the vote was taken to adopt the recommendation below.

### **Systems in Mountain Rescue**

*Systems are assemblies from individual components that have been developed for clearly defined purposes.*

*These systems provide functional solutions for practical use in mountain rescue.*

*If a system contains components that are relevant to safety, but are not covered by technical standards nor legal guidelines, or if those standards and rules are not followed, then an analysis of the entire system must be done.*

*The system documentation (system data, rules and regulations, user manual, interface definitions, risk analysis, test setups etc.) are to be examined by an independent testing agency. The examination may also comprise practical tests.*

*The testing agency should preferably be contracted by the manufacturer or by the entity bringing the product to the market. If so, the product liability remains with the manufacturer, and he is responsible for the integration of the test results.*

*Later modifications to the system require a re-examination by the testing agency.*

*The rescue organizations, being the users of the system, are responsible for correct implementation of the instructions and for correct use of the system.*

### **Vendors:**

One of the benefits to the delegates of the conference is access to the exhibitors. It is a great opportunity to see some of the latest technology and products on the market. I thought I would highlight a few that grabbed my attention. There were no doubt ones I missed but here are a few I thought were worth mentioning.

Peips iProbe. <http://www.pieps.com/en/avalanche-probes/pieps-iprobe>

It has its antenna, sensor in the tip of a carbon fiber probe. The feed back is at the top with both audio and visual. The advantage is you don't need to feel a strike; you can hear and see it. It may be a little pricey for the average user but it seems to be a very worthwhile training tool.



Peips 30 Plus. <http://www.pieps.com/en/safety-equipment/pieps-30d-plus>

This is not just another App for your iPhone; it's an inclinometer and thermometer. The beauty of this is you can read it face on and it has a nice thermometer too. For any one skiing and riding the back country this is a useful tool.





Vakuform vacuum mattresses. <http://www.vakuform.cz>

This company makes all types and sizes of patient stabilization devices. One thing really unique is their dual chamber mattresses and splints. The outer compartment is a vacuum chamber and the inner compartment is a compression chamber. It gives the patient stability and full flotation comfort.



RedVac <http://www.redvac.com> is an Austrian vacuum mattress vendor that bears consideration. The contour form and superior fit is impressive. The material they use is extremely durable and yet pliable and not too heavy. The handles are molded in and tested to 300 lbs each. Parks Canada uses these mattresses exclusively.



SatMap. <http://www.satmap.com/about.php>

This is an UK company making a GPS hand held device with most of the features you expect on a smart phone without the phone and with a very rugged case. This company is anxious to break into the US market and I am in contact with their marketing department regarding some test units for MRA teams to evaluate. Stand by for more info. One of their new features is the interface with Goggle maps and the ability to draw search areas in Goggle Maps then download that to your GPS unit. These units are the choice of most of the mountain rescue teams in UK.

The 2011 IKAR Congress will be held in Are, Sweden. The Swedish delegation has promised that the field demonstration will focus on hands on experiences for the participants. The theme of the Congress will be left to the individual commissions and will be announced.

Respectfully Submitted,

Rocky Henderson, Portland Mountain Rescue  
U.S. IKAR Terrestrial Commission Alternate Delegate