



The Avalanche Gazette

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The CSAC Avalanche Network and Individual Contributors

Editorial Board:

Dr. Steven A. Reinfurt - European Editor

Jim Frankenfield - Managing Editor

editors@csac.org

Editors Page

Welcome to the first issue of “The Avalanche Gazette”.

In this issue ...

Bernard Giraudon of Nic-Impex (which includes ARVA brand avalanche beacons) reviews the history of the development of avalanche beacon technology. This article was originally written in 1998 and therefore it ends with the introduction of digital technology. We hope that others from the transceiver industry will contribute beacon-related articles for future issues. Since the introduction of digital technology there have been steady improvements and parameters such as pulse rates have become more important than in the past. We hope a future article will discuss these recent developments of the past two or three years.

Bill Glude shares with us the efforts to build an avalanche center for southeast Alaska in the non-profit sector. While most attention in the United States is on government-run centers there are many good efforts underway in the non-profit sector as well. These are inherently built from the ground-up to reflect the needs and resources of the areas they serve. Southeastern Alaska has some unique needs and challenges and the local non-profit center is working to address these as well as the universal need for recreational education and awareness. We plan to focus on other such projects in the upcoming issues.

Steven Reinfurt has contributed two articles for this premier issue. His first article is a reminder of things to consider as we recreate this winter, either as leaders or group members. The second addresses the roles of attitude vs knowledge in avalanche safety. It has some orientation towards guiding and appeared the “Mountain Bulletin” of the American Mountain Guides Association. However, the same attitudes can be spotted among recreational groups and leaders by the astute observer of human behavior.

We hope over time to have incident and snowpack updates from as many countries as possible. For this first issue Frank Tschirky of the Swiss Federal Institute for Snow and Avalanche Research in Davos has sent in a summary and Jim Frankenfield of the CSAC has prepared a summary for the US. These summaries are intended to be updates of what has happened between newsletter issues. When more details on incidents are available they will continue to be posted on the CSAC website in the Incidents section.

This first issue has required a great deal of work to get the “infrastructure” arranged, including the webpages for distribution, the layout, and other logistical work. We hope that we have laid the groundwork for the following issues and that we will be able to attract contributions of public interest from around the world. Dr. Steven Reinfurt, as the first to join our editorial board, has already been at work locating some topics of interest in Europe. His efforts are appreciated, and we hope that the editorial board will now expand and include people from around the world.

Jim Frankenfield
Managing Editor

APPAREILS DE RECHERCHE DE VICTIMES D'AVALANCHES

40 % DES SURVIVANTS SONT LOCALISES GRACE AUX EMETTEURS-RECEPTEURS

(This is the original version in French, which is printed without change here.)

Depuis longtemps, les chercheurs ont essayé de retrouver les victimes d'avalanches sous la neige par différents systèmes émetteurs actifs à émission magnétique, radio et maintenant à la fois émetteur-récepteur. C'est en 1940 que le Suisse BÄCHLER, se basant sans doute sur les recherches Gonio des «radios-pirates», travaille sur la mise au point d'un émetteur 150 kHz, retrouvé à 10 m. par un récepteur séparé. Vers 1964, d'autres chercheurs suisses s'orientent vers des systèmes magnétiques à fixer sur les chaussures (systèmes VARIAN et FÖRSTER) à rechercher avec des sondes magnétiques mais la portée ne dépasse pas 2 m à 2,5 m. A cette même époque, un anglais crée un émetteur 9 kHz, le SKILOK, mais la portée reste faible à 7 m.



La société américaine LAWTRONICS fait une avancée remarquable en présentant le premier appareil émetteur-récepteur à batterie rechargeable portant à 20 m, partant d'un quartz radio existant sur le marché en 2.275 kHz, le SKADI.

C'est en 1969 qu'en Suisse, l'Institut Fédéral pour l'Etude de la Neige et des Avalanches à Davos (IFENA) réalise les premiers tests comparatifs sur les systèmes existants (BÄCHLER, SKILOK SKADI et FÖRSTER). Pendant ce temps-là, diverses sociétés

APPARATUSES OF SEARCH FOR VICTIMS OF AVALANCHES

40 % OF SURVIVORS ARE LO- CATED THANKS TO BEACONS ("ARVAs")

(This English version was translated by the CSAC as described in the note at the end. The CSAC is responsible for any resulting errors or problems.)

For a long time researchers tried to locate victims of avalanches under snow by various active transmitting systems using magnetic, or radio, emissions and then transceivers (at the same time a transmitter and receiver). It was in 1940 that the Swiss BÄCHLER, basing itself on the Gonio search of the «radio-pirates», worked on the development of a transmitter on 150 kHz, found up to 10 meters by a separate receiver. About 1964 other Swiss researchers directed themselves towards magnetic devices to attach to shoes (the VARIAN and FÖRSTER systems) to seek with magnetic probes, but the range did not exceed 2.5 m. At the same time an Englishman created a transmitter on 9 kHz, the SKILOK, but the range remained weak at 7 m.



The American company LAWTRONICS made a remarkable advancement by presenting the first transmitter-receiver apparatus with a rechargeable battery. Based on existing radio quartz of 2.275 kHz its range extended to 20 m (the SKADI).

It was in 1969 that the Federal Institute for the Study of Snow and the Avalanches in Davos, Switzerland (IFENA) carried out the first comparative tests on the existing systems (BÄCHLER, SKILOK SKADI and FÖRSTER). At the time of

s'intéressent à ce problème et on voit apparaître d'autres émetteurs-récepteurs aux USA (le RAMER avec les ECHO I et II), en Allemagne (le RUF et le REDAR) toujours basés sur la fréquence 2.275 kHz mais avec batteries jetables.

L'armée Suisse lance alors un appel d'offres pour réaliser un émetteur-récepteur hyper performant en acceptant de financer l'étude et de passer commande au vainqueur ; c'est la société AUTOPHON qui en utilisant la fréquence spécifique 457 kHz obtient une portée de 40 m. avec le BARRYVOX VS, portée qui sera doublée par la suite avec le fameux VS68 longtemps considéré comme la Rolls-Royce des Appareils de Recherche des Victimes d'Avalanches.

Mais compte tenu que la fréquence 457 kHz est réservée aux USA pour la NAVY, les fabricants choisissent de laisser cette fréquence aux armées et continuent de produire des émetteurs-récepteurs en 2.275 kHz.

En 1971, la société autrichienne MOTRONIC présente son PIEPS à la communauté scientifique à GRINENWALD. Il est testé par l'IFENA en même temps que l'AUTOPHON VS68 ainsi qu'un ZELLWEGER suisse qui tente de concurrencer le VS68 pour les marchés de l'armée ; n'ayant pas intéressé l'armée suisse, il meurt avant d'avoir vécu.

En 1973, apparaît un émetteur allemand en 108 kHz, le LAWINENSPECHT qui ne rencontre pas beaucoup de succès. En 1975, au congrès de SOLDA (financé par la fondation Vanny Eigenmann), un point a été fait sur les systèmes de recherches, et AUTOPHON présente son nouveau BARRYVOX, le VS75 plus particulièrement destiné à l'armée.

De son côté, l'armée italienne est équipée par un appareil identique au BARRYVOX en 457 kHz, le SNOW-BIP de la société FITRE.

Des sociétés ont alors l'idée de réaliser des appareils bi-fréquence (457 kHz et 2.275 kHz) afin d'être compatibles avec tous les appareils existants. Il s'agit du Dr Hartwig STRÖBL avec son PIEPS DF autrichien, le Dr Gerald KAMPL avec son

these tests various companies were interested in this problem and there appeared different transmitter-receivers in the USA (Ramer with their ECHO I and II) and in Germany (the RUF and the REDAR), all based on the frequency 2.275 kHz but with disposable batteries.

The Swiss army then launched an "invitation to tender" to produce a powerful transmitter-receiver while agreeing to finance the study and to place an order with the winner. It was the company AUTOPHON which, by using the specific frequency 457 kHz, obtained a range of 40 m with the BARRYVOX VS. This range would be doubled thereafter with the famous VS68, for a long time considered the Rolls-Royce of the Apparatuses of Search for the Victims of Avalanches (ARVAs).

But given that the frequency 457 kHz was reserved in the USA for the Navy the manufacturers chose to leave it to the military and to continue producing transmitter-receivers on 2.275 kHz.

In 1971 the Austrian company MOTRONIC submitted its PIEPS to the scientific community at GRINENWALD. It was tested by the IFENA at the same time as the AUTOPHON VS68 as well as a Swiss ZELLWEGER who tried to compete with the VS68 for the military markets.

In 1973 a German transmitter on 108 kHz appeared, the LAWINENSPECHT, which did not have much success. In 1975 at a conference of SOLDA (financed by the foundation Vanny Eigenmann) a session was held on the systems of search. AUTOPHON presented its new BARRYVOX, the VS75, intended particularly for the army. The Italian army was equipped by an apparatus identical to the BARRYVOX on 457 kHz, the SNOW-BIP by the company FITRE.

Companies then had the idea to produce dual-frequency apparatuses (on both 457 kHz and 2.275 kHz) in order to be compatible with all the existing apparatuses. It was a goal of Dr. Hartwig STRÖBL with his Austrian PIEPS DF, Dr. Gerald KAMPL

ORTOVOX F2 allemand ainsi que le nouveau RUF.

En 1984, en France, un groupe de travail de l'ANENA (Association Nationale de l'Etude de la Neige et des Avalanches) met au point un cahier des charges et la société OPTION sort son premier appareil bi-fréquence en déposant le nom ARVA pour l'appeler l'ARVA 4000.

Fort heureusement, l'U.S. NAVY pousse sa fréquence à 5 kHz et, lors d'un congrès, la CISA/IKAR (COMITE INTERNATIONAL DE SECOURS ALPIN) conseille fermement de s'orienter vers une standardisation internationale en adoptant la fréquence 457 kHz et en prévoyant dans un premier temps de réformer les mono-fréquence 2.275 kHz. Malgré quelques résistances des fabricants américains qui s'obstinent à considérer la 457 kHz comme une fréquence uniquement européenne, ORTOVOX, PIEPS puis l'ARVA 4000 les remplacent peu à peu. Par contre, en Autriche, Monsieur MAILINGER continue à vendre son MIPI (émetteur/récepteur séparables) 2.275 kHz, et MOTRONICS ses PIEPS III. Ce n'est qu'en 1990 que l'armée autrichienne va passer au bi-fréquence avec le PIEPS DF.

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Lors de sa réunion d'Innsbruck, le Comité de Normalisation Européen a envisagé de demander aux fabricants l'arrêt de la production des bi-fréquences entre 1992 et 1993, pour arriver à des mono-fréquence 457 kHz beaucoup plus performants. L'ARVA devient un nom commun. Actuellement, la totalité des appareils sont mono-fréquence 457 kHz \pm 100 Hertz. Les quelques bi-fréquences restants : PIEPS DF, ORTOVOX DF et ARVA 4000 devraient être réformés.

Les recherches s'orientent alors sur l'amélioration de la facilité de recherche et ORTOVOX présente son VISOVOX, galvanomètre indiquant la puissance du signal maximum et donc la direction à suivre. Parallèlement, il invente des «souris» pour retrouver les skis sur une autre fréquence, mais aux dépens des performances de l'arva.

with his German ORTOVOX F2, as well as the new RUF.

In 1984 in France a working group of the ANENA (National Association of the Study of Snow and Avalanches) developed a schedule of conditions and the company OPTION released its first dual-frequency apparatus by taking the term ARVA to call it the ARVA 4000.

Fortunately, the U.S. NAVY moved its frequency by 5 kHz and, at the time of a meeting, the CISA/IKAR (INTERNATIONAL COMMITTEE OF ALPINE RESCUE) firmly advised moving towards international standardization by adoption the frequency 457 kHz and ultimately phasing out the mono-frequency 2.275 kHz. In spite of some resistance by American manufacturers who insisted on regarding the 457 kHz as a European-only frequency ORTOVOX, PIEPS, and then the ARVA 4000 replace them little by little. On the other hand, in Austria Mr. MAILINGER continued to sell his MIPI2.275 kHz (separate transmitter and receiver), and MOTRONICS his PIEPS III. It was only in 1990 that the Austrian army would move to dual-frequencies with PIEPS DF.

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At its meeting in Innsbruck, the European Committee of Standardization planned to request that the manufacturers stop production of the dual-frequencies between 1992 and 1993 and standardize on the much more powerful mono-frequency 457 kHz. ARVA (« beacon » in English) became a common word. All of the apparatuses would now be single-frequency 457 kHz \pm 100 Hertz. The few dual-frequencies remaining (PIEPS DF, ORTOVOX DF and ARVA 4000) should be phased out.

Research is now directed towards improving of the ease of searching and ORTOVOX presented its VISOVOX, a galvanometer indicating the power of the maximum signal and thus the direction to be followed. At the same time, ORTOVOX developed “mice” to find the skis and other equipment using

C'est en 1989 qu'OPTION utilise pour la première fois une LED lumineuse (système D.D.I. dont la fréquence du clignotement donne des Indications sur la Direction et la Distance). Il est très rapidement remplacé en 1994 par l'ARVA 8000 remarqué pour sa portée maximum à 127 m. PIEPS suit le mouvement avec l'OPTIFINDER et ORTOVOX améliore largement la facilité d'utilisation avec le FOCUS. D'autres appareils comme le BERDIN tchécoslovaque et l'AB15 japonais ne résistent pas aux tests de 1994 de la CISA/IKAR.

Maintenant que la fréquence 457 kHz est devenue unique et internationale, que les problèmes de portée ont été discutés et analysés, tous s'intéressent avant tout à la facilité d'utilisation. En effet, une portée de plus de 100 m. a été jugée inutile et il est souhaitable que la portée maximum soit de l'ordre de 60 à 80 m. et la portée minimum de 30 à 35 m.

En 1998, le Dr STRÖBL améliore le PIEPS avec son système OPTI 4-Modul qui est une flèche lumineuse d'approche en option, adaptable sur les OPTIFINDER précédents. Par contre, le Dr KAMPL présente un appareil semi-automatique l'ORTOVOX M1 qui dirige les manoeuvres du sauveteur en lui indiquant sur un écran digital la marche à suivre.

Mais, une nouvelle génération d'appareils entièrement automatiques apparaît sur le marché : un microprocesseur analyse les signaux et assure automatiquement tous les réglages...il suffit de suivre la direction indiquée et d'aller directement sur la victime sélectionnée. Il s'agit du TRACKER américain mis au point par la société RESCUE TECHNOLOGY et de l'ARVA 9000 français fruit de la collaboration entre les sociétés OPTION et NIC-IMPEX.

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Il existe également des émetteurs simples en 457 kHz qui ont UNIQUEMENT la possibilité d'émettre, donc

another frequency, but at the expense of some of the performances of the arva.

It was in 1989 that OPTION used, for the first time, a luminous LED (system D.D.I. whose blink rate gives Indications at Management and the Distance). It was very quickly replaced in 1994 by the ARVA 8000, noteworthy for its maximum range of 127 m. PIEPS followed with the OPTIFINDER and ORTOVOX largely improved the ease of use with the FOCUS. Other apparatuses like the Czechoslovakian BERDIN and the Japanese AB15 did poorly in the CISA/IKAR tests of 1994.

Now that the frequency 457 kHz had become an international standard, and that the problems of range had been discussed and analyzed, everyone was most interested in the ease of use. Indeed, a range of more than 100 m was considered to be useless and it was deemed desirable that the maximum range would be about 60 to 80 m and that the minimum range 30 to 35 m.

In 1998 Dr. STRÖBL improved the PIEPS with his system OPTI 4-Module which is an optional panel of LED lights, field adaptable to upgrade existing OPTIFINDER. Dr. KAMPL presented a semi-automatic apparatus, the ORTOVOX M1, which directed the operations of the rescuer by indicating the procedure to him on a digital screen.

But now a new generation of entirely automatic apparatuses exists on the market: a microprocessor analyzes the signals and automatically ensures all the adjustments... it is enough to follow the direction indicated and to go directly to the selected victim. These are the American TRACKER developed by the company RESCUE TECHNOLOGY and the ARVA 9000, a result of collaboration between the French companies OPTION and NIC-IMPEX.

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There have also been simple transmitters on 457 kHz which have ONLY the possibility of emitting, and therefore can be found by one of the approximately

d'être retrouvé par l'un des quelques 300 000 porteurs environ d'un bi-fréquence ou d'un mono-fréquence 457 kHz : le SNOW-JOKER allemand, le POWDER-PEEP autrichien, le LIFE-BIP français et le BARRYVOX S2 suisse. Seuls restent sur le marché le LIFE-BIP et le BARRYVOX S2 et il est important de souligner que **ce ne sont pas des ARVAS** et qu'ils sont destinés au hors-piste (dans le domaine skiable), ou à la limite pour équiper dans un groupe une ou deux personnes qui aurait des difficultés à se servir d'un arva.

En 1982, un autre système également émetteur-récepteur, le ELP de la société ELPHORA, utilisait une longueur d'ondes différente. Les victimes équipées d'un simple émetteur suspendu autour du cou étaient retrouvées jusqu'à 300 ou 400 mètres. Cependant, , malgré l'émetteur actif , le récepteur était trop encombrant.

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Enfin, il faut tout de même parler du réflecteur RECCO qui est uniquement PASSIF, ce qui veut dire qu'on peut retrouver celui-ci qu'avec une unité de recherche spécifique, émettant en hyperfréquence 917 Mhz et recevant en 1834 Mhz, le réflecteur ayant renvoyé le signal en doublant la fréquence. Ces réflecteurs doivent impérativement être fixés sur les chaussures qui sont les seuls accessoires que la victime est presque certaine de ne pas perdre pendant l'avalanche. Cette technique est intéressante à cause de sa précision de recherche, mais seulement dans un ensemble délimité compte tenu du temps important de mise en place de l'unité de recherche, non compatible avec les systèmes arvas.

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Le RECCO pour du ski hors-piste ? Oui mais UNIQUEMENT sur une zone précise équipée d'unités de recherche RECCO et couverte si possible par un hélicoptère.

Une balise émettrice ? Oui mais SEULEMENT pour du ski hors-piste et TRES EXCEPTIONNELLEMENT pour un ou deux

300,000 carriers of dual-frequency or 457 kHz frequency units. These transmit-only units included the German SNOW-JOKER, the Austrian POWDER-PEEP, the French LIFE-BIP and the Swiss BARRYVOX S2. The only ones remaining on the market today are the LIFE-BIP and the BARRYVOX S2 It is significant to stress that they are not ARVAS (beacons) and that they are intended for use off-trail in or near the ski-field, or in extreme cases to equip one or two people in a group who would have difficulty making themselves useful with a beacon for searching.

In 1982 there was also another transmitter-receiver system, the ELP of company ELPHORA, which used a different wavelength. The victims equipped with a simple transmitter suspended around the neck were found up to 300 or 400 meters. However, in spite of the active transmitter, the receiver was too cumbersome.

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Finally, it is necessary to speak about the RECCO reflectors which are only PASSIVE, which is to say that one can be located using a specific searching unit which emits the ultra high frequency 917 MHz and receives on 1834 MHz, the reflectors having doubling the frequency. These reflectors are best fixed on the shoes which are the only accessories that the victim is almost certain not to lose during the avalanche. This technique is interesting because of its precision of search, but is limited by the significant time of installation of the search unit. The system is incompatible with the systems arvas (beacons).

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The RECCO for skiing off-trail? Yes, but ONLY in a precise zone equipped with RECCO search units and covered if possible by a helicopter.

A transmitting-only beacon? Yes, but ONLY for skiing off-trail in or near an established ski field and VERY EXCEPTIONALLY for one or two

membres d'un groupe (6 à 8)
randonneurs.

Un ARVA ? Pour tous ceux qui, dans
tous les cas, ne pensent pas seulement à
leur propre sécurité mais aussi à celles
des autres.

A part le RECCO, tous les appareils sont
compatibles entre eux.

En conclusion, le meilleur système est
celui qui permet de retrouver LE PLUS
RAPIDEMENT POSSIBLE la victime,
car les secondes sont longues et même
souvent mortelles.

Il n'existe pas de système «ANTI-AVA-
LANCHE» mais seulement des
appareils permettant aux sauveteurs de
localiser l'emplacement des victimes, de
confirmer avec LA SONDE et de les
dégager avec l'indispensable PELLE A
NEIGE.

Annecy, le 4 septembre 1998
Bernard GIRAUDON

members of a group (6 to 8) tourers.

A ARVA (Beacon)? For all those who, in every case, think not
only of their own safety but also of that of the others.
Aside from the RECCO, all the apparatuses are compatible
with each other.

In conclusion, the best system is that which makes it possible to
find the victim as soon as possible, because the seconds are
long and often fatal.

There is no " ANTI-AVALANCHE " (prevention) system but
only apparatuses making it possible for the rescuers to locate
the victims, to then confirm with a PROBE, and to recover them
with an essential SHOVEL A SNOWS.

Annecy, September 4, 1998
Bernard Giraudon

A note on the Translation ...

This was first translated very roughly online using AltaVista. It
was then smoothed over a bit by the managing editor. A
student at Oregon State University who has lived in Belgium
and studies French helped with some sections which remained
unclear. The managing editor then wrote the final version
which appears here. Anything which did not come out quite
right is the result of this process and should not reflect in any
way on the original author.

NO MATTER WHERE WE GO, THERE WE ARE

By Steven A. Reinfurt, Ed.D

"It was an incredibly beautiful day where nothing could possibly go wrong!" I am not sure how many
avalanche accident reports, stories or interviews I have read or done over the years in Europe of United
States where a survivor has said this. Although its true most avalanches occur during or directly after a
storm, most avalanche accidents statistically happen on gorgeous days.

One of the most basic of human failings is that many people believe the whole world is exactly like where
we are having a great time. Sunshine gives warmth, relaxation and hope. Storms bring on the cold, rage and
gloom. It's hard to imagine one while the other is going on. To a snow pack that is still suffering the unstable
effects of the last storm, the sunny skies and great skiing have not changed its mood of new pending burden
only ours.

Each person that enters their given winter wonderland needs to fully learn, practice, and maintain the established snow safety standards. This avalanche awareness knowledge is necessary for professional ski and climbing guides right down to the preteen with their new snowboard. Everyone must make sure that they are skiing, climbing, snowshoeing, snowmobiling, etc. with all the necessary information regarding their sport and setting. Each needs to remain responsible and not forget that they are mutually and continually faced with evaluating their route and mode of travel. They can do this more safely by knowing, reading and instructing others about nature's three constant warning signs triangle, which are the *weather*, *snow pack*, and *terrain*. To date, these three basic items are still the main ingredients for any avalanche. And, of all these salient factors the one in the very center (us) is the most critical.

For avalanches are avalanches and people are human. Often the only way to know an avalanche is to first know thyself and not forget the following; *No matter where we go or what snow sport we do...there we are.*

RATIONAL:

This winter season lets make it a point to review with ourselves or those in our charge the bigger picture of the following and we will be working to assist a worldwide effort to improve a needed educational awareness. Why? Simply because the fatal statistics caused by avalanches are still rising each year around the globe and our appropriate actions will aid in reducing those unnecessary numbers.

EXAMPLE OF CONCEPTS TO CONSIDER:

- * Where and how to acquire daily avalanche hazard forecasts
- * Review the operational functions of avalanche receivers
- * What to do if someone else or ourselves are caught in an avalanche?
- * Rescue procedures, time factors, tools, and immediate first aid

ALSO:

- * Terrain, snow, and weather factors
- * Route selection and precautions
- * General observations based on experience
- * Avalanche hazards and key warning signs, etc.

CONCLUSION:

So let us continue on in the new millennium together in a team effort no matter where we reside, so as to help assist in bringing down the present negative avalanche statistical records. How? Simply by using sound educational strategies mixed respectfully with a "110% commitment to excellence & snow safety" while experiencing the enjoyment of our many remarkable climatic environments of white.

Southeast Alaska Avalanche Center

The Nonprofit Model in Alaska

by Bill Glude, SAAC director, December 2000

How We Got Started, Local History:

Interactions between avalanches and humans in Alaska have a varied history. The Native people were generally smart and observant enough to learn where the hazardous areas were and avoid them, although some Natives still got caught. In contrast, the early miners and settlers displayed a startling ignorance; often traveling through or camping in obvious avalanche zones during heavy winter storms, or cluelessly rebuilding in the exact same locations when mine buildings were destroyed by slides.

This frontier attitude continued into the fifties and sixties, when large avalanche cycles affecting highways and urban areas finally brought about enough awareness to lead the highway department to fund Alaska's first avalanche program. It was a very impressive research and mitigation effort involving ridgetop instrumentation, research huts at starting zone elevations, careful recording of weather and avalanche activity, explosive avalanche reduction work, helicopter support, and construction of protective earthworks.

But after a few low-snow winters the funding for the program was discontinued. In the following years, a handful of avalanche specialists worked for ski areas, the Alaska Railroad, the Forest Service, and the Department of Transportation. Public education was left to the occasional ski patrol or mountaineering club course. There was no coordinated research, forecasting, or public education.

Recreational use of the Alaskan winter backcountry boomed in the seventies, bringing a sharp increase in avalanche incidents. In the statistical tallies, Alaska moved to number one, with the highest per capita avalanche death rate in the United States. In 1977, some South-central pro patrollers and guides brought Rod Newcombe and Ed LaChapelle up to teach an American Avalanche Institute course at Summit Lake, on the Kenai Peninsula. Among the group attending was Doug Fesler, a State Parks ranger with a strong interest in avalanches. Doug understood that many more courses were needed, enough to reach out to the general public, and that they would need to be taught by an Alaskan avalanche school; he also realized that the prospective instructors for future courses were among those attending the AAI workshop.

The State of Alaska was flush with Prudhoe Bay oil money then, and State Parks programs were expanding. Doug was able to secure funding for the Alaska Avalanche School, which began offering a full program of avalanche workshops throughout the state. Shortly thereafter, a state avalanche forecast center was started in Anchorage. The oil money allowed us to bring a guest instructor from out of state for each course. They brought up the best people they could get and learned from them in the field and in the classroom. The courses improved steadily and earned a reputation for excellence.

But the oil boom ended, revenues fell, and a Republican legislature zeroed out the funding for all public avalanche programs in 1987. The forecast center ceased operations, and the nonprofit Alaska Mountain Safety Center (AMSC) was formed to take over the Alaska Avalanche School. South-central Alaska still had a full series of workshops every season, and the workshops maintained their high quality; but funds were no longer adequate for travel to outlying areas.

As the amount of avalanche work in South-central Alaska dropped off, longtime Alaska Avalanche School instructor, ski guide, and avalanche specialist Bill Glude moved down to Juneau in 1988. There he ran the avalanche program for a mining operation and did highway studies for the State, teaching only occasionally. There were periodic requests for avalanche courses in Southeast Alaska, but the AMSC was no longer able to afford to travel to Southeast for courses, and Bill was too busy to teach much.

In 1995 one of Bill's friends was killed in an avalanche in the hills above Juneau. After assisting with the search and the body recovery, Bill vowed to start teaching courses the next season. As the one avalanche specialist in the 900 kilometer-long Alaskan panhandle he was the only logical person to teach the courses that would save lives.

He checked with various government agencies to see if any might host an avalanche center, but declining revenue and continuing budget cuts meant that no single agency could do it. Only a private nonprofit could combine money from enough small funding sources to do the job. He discussed forming a Southeast branch of the Alaska Mountain Safety Center, but together they decided that coordinating with a headquarters 1000 kilometers away in Anchorage would be difficult.

Bill assembled an advisory board to start the Southeast Alaska Avalanche Center in the fall of 1995. For the first few years, we remained a simple, community-based organization. Our long-term educational goal included public avalanche forecasts, but the initial focus was on workshops and trainings where minimal funding could have maximum effect. Part-time consulting work on highway studies allowed Bill to donate enough time to keep the courses going; but they were jeopardized when the highway studies were discontinued abruptly in 1998.

In the fall of 1999, SEADOGS, the local dog search and rescue group, convened a meeting of about 20 representatives from rescue groups and state, federal, and local agencies to discuss the status of avalanche readiness and education in the region. The group decided that the Southeast Alaska Avalanche Center should serve as the vehicle to provide avalanche education for the region. They agreed to help us incorporate, obtain IRS educational nonprofit status, and secure stable funding. SEADOGS provided seed money to begin the process, and several state trail and snowmobile safety grants have kept us going and enabled the programs to expand.

What We Do Now:

The Southeast Alaska Avalanche Center now provides snow avalanche safety education and information for a region broadly defined as extending from Yakutat some 900 kilometers to Ketchikan, and overlapping from Atlin to Kluane in adjacent Canada. The Alaska Mountain Safety Center still handles avalanche education in South-central and Interior Alaska. We coordinate our programs closely with them and with several Canadian avalanche specialists who cover the Yukon Territory and northern British Columbia.

For those unfamiliar with Alaskan geography, the easiest way to visualize Southeast Alaska is to hold your right hand out in front of you. Make a fist, then extend your index finger and thumb, with both spread apart. Your finger is the Alaska Peninsula and the Aleutian Islands; your hand is the large landmass of South-central, Interior, and Arctic Alaska; and your thumb is Southeast Alaska.

Southeast is mostly mountains, islands, and fjords. It is a temperate rainforest climate where rain and snow commonly alternate at sea level, the winter weather swings from cold and clear to warm and rainy, and snowfall in the mountains is tremendous. Above the mean snow level the snowpack is deep and complex, and the higher mountains are thickly covered with glaciers and icefields.

No roads connect our communities. Travel is slow and expensive. We must travel by ferry to teach workshops in other towns, because air service is weather-dependent and frequently delayed.

Our programs differ in some respects from those of most avalanche centers. In addition to the usual services aimed at backcountry recreationists, we have a major program focus on our urban avalanche problem. Juneau has some 58 buildings, including one hotel, in avalanche zones; plus an expressway used by most of the daily commuters, and one of the boat harbors. The problem area has been described as the biggest potential avalanche disaster in North America.

Like many avalanche centers in areas with exposed highways, we work on highway avalanche safety issues and train road maintenance crews.

While many avalanche centers still serve mostly the backcountry skiers, our courses have been unusually successful in serving the needs of snowboarders, younger people, alpine out-of-bounds skiers, and Alaskan-style heliskiers and heliguides. Our typical backcountry course makeup is over 50% snowboarders under 18; with the remainder split between a wide range of ages and snowriding tool choices.

We have a major program focus on snowmobile avalanche safety. We have a good mountain snowmachine on loan to us this year from a Center supporter, and are trying to get one of our own for regular educational visits to popular riding areas, for teaching courses, for field snow studies, and for rescue work. Using a state grant from snowmobile registration fees, we are putting on a series of low-cost snowmachine workshops this season, and adding snowmobile field groups to our backcountry courses wherever terrain and land use patterns allow us to do so.

The courses we teach include Level I and II workshops; awareness presentations; snowmobile courses; and training for police and fire departments, rescue groups, ski patrol, and heliguides. The Level I is our standard 30-hour backcountry recreational course (modified to a shorter format in outlying communities to accommodate ferry schedules and community needs), and our Level II is a 33-hour advanced recreational or introductory-level professional course. We began teaching a 2 credit, 9 week in-depth Level I course in collaboration with the University of Alaska in Juneau this fall; and hope to continue and expand our university-level courses.

We devote a considerable amount of our time to providing a broader range of educational services. We answer many media inquiries and do numerous interviews every season; and we function as a source of avalanche expertise for the general public, for specific projects, and for whatever services are needed during avalanche emergencies. For example, our director traveled to South-central Alaska last winter during the big avalanche cycle, where he helped various agencies and operations with explosive avalanche reduction, safeguarding work crews, forecasting, and assessing dangers to houses and communities.

We do our best to serve our entire region. We have done trainings so far in Haines, Petersburg, Wrangell, Ketchikan, and Sitka, as well as in Juneau.

We do not issue avalanche forecasts at present, though we want to as soon as funding allows for a second forecaster/instructor position to do it. As an interim measure, Center members are put on a subscription list for weekly e-mail snowpack updates and avalanche news. Members also receive a newsletter and a course discount.

For a small, shoestring operation in a thinly populated region with difficult travel conditions, we have reached a large audience. As of the end of the 1999-2000 season, we have taught over 2,200 students; in 20 Level I workshops, 3 Level II workshops, 1 Level III course, 19 awareness talks, 13 custom trainings, and 3 snowmobile courses since our start in 1995. We taught as many people in 1999-2000 as in all the previous four years; and have an even fuller schedule for 2000-2001.

Our Plans for the Future:

We are about to unveil our first website. Initially, it will be a simple site with information on our courses, but will include the full set of most-current outlines, information sheets, and links that we use as our course handouts. We hope that other teachers in the field will be inspired to similarly share their best materials, thus improving all our courses; and that many people unable to attend a course will use the resources on the site as a new source of avalanche education in itself.

In time, we plan to add website sections on the avalanche history of Southeast Alaska, climatology, current forecasts, avalanche news, case histories, and an interactive section that would allow people throughout the region to post and share their field observations. We believe the web opens up a whole new educational form with which we can reach far more people than conventional courses and forecasts ever could.

We are moving our course materials from the old slide and overhead projector talks, and boxes with thousands of 35mm slides, to scanned-in computer presentation formats with easy editability and web capability. We are moving our slide files to CDs, and adapting our curriculum and materials so we can train new instructors while maintaining and even improving the quality of our courses. We anticipate that electronic teaching formats will be the new standard which students will expect within the next five years, and that those new formats will vastly improve our ability to deliver the most-current, clear, and concisely targeted information to them.

We plan to expand our cooperative program with the University of Alaska Southeast. As our staffing allows, we would like to add advanced courses, independent study, research projects, and internships at the Center to the University offerings. A major purpose for the Center is to train more avalanche specialists, so we are not dependent on one person covering the whole region. Bill Glude hopes to have a new generation of forecaster/educators running the Center under his supervision in ten years, and to be able to turn it over to them in another ten; so he can “retire” to focus on training teachers, teaching University classes, and doing snow research.

We are working on a long-term solution to Juneau’s urban avalanche problem, as well as short-term mitigation. That work is ongoing, but we may see the first concrete results within two years.

We are just now securing the funding for more staff, including a part-time field person and a part-time administrative assistant; both badly needed. They will initially be helping for only a few hours a week, but we envision a staff of one year-round fulltime director, one fulltime seasonal assistant, and a year-round part-time administrative assistant when we reach our funding targets.

We will continue our full schedule of courses throughout the region, and add more as staffing allows.

Our Budget Goal:

Our current target budget is \$80,000 a year for being able to sustain our courses, and roughly double that once we add forecasting. Our funding model is a four-legged stool: one leg at 25% each for state, federal, and local government sources; and one leg for what we can raise as a nonprofit.

Learning From Our Experience with the Nonprofit Model:

If you are considering starting a nonprofit avalanche center in your area, we can offer some tips to help you avoid the pitfalls we have encountered. The nonprofit model is a good one for these lean times, when government is unable to provide services like avalanche education. A nonprofit can pool small sources of funding from different levels of government, and from private money, memberships, grants, and fundraisers. All these sources combined can provide a program no single source could support by itself.

There are considerable difficulties, though, with starting a nonprofit center. It is far more work than most people imagine. Funding is very hard to come by. Bad board dynamics can hamstring and demoralize staff, destroying in weeks what has taken years to build.

Avalanche education is hard work. The quality of your teaching and forecasts can make the difference between life and death for the people you serve. Courses and forecasts must be the absolute best quality you can make them, without compromise. Avalanches are extremely complex, and it takes a tremendous amount of training, experience, preparation, and field time to be able to present courses and forecasts clearly, concisely, and accurately; and to make the information come alive. That is why avalanche education has to be a nonprofit endeavor - there is no way to charge enough to cover the true cost.

Many people carry a bias toward thinking of avalanche courses and forecasting as just some ski bum excuse to go powder skiing. Nothing could be further from the truth. Beneath the casual manner most avalanche specialists display on the surface is always the awareness that our work means life and death. This is the first point every board member absolutely must understand.

A good avalanche specialist is worth his or her weight in gold. They know exactly what needs to be done and how to do it. Do not try to second-guess their professional judgment. Ask them what they need; provide support; raise money; contribute ideas; and stay out of their way!

Begin your organization by choosing board members with the utmost caution. Interview and cross-examine them thoroughly. Board members must be absolutely willing to put their money where their mouth is; to come through reliably in the clutch. They must not hesitate to take some risk of personal liability, or to commit to the responsibility to pay staff well. They must trust the professional judgment of their staff, and

... SE Alaska continued ...

commit up front to letting them do their job free from second-guessing, micromanagement, or power struggles.

The IRS 501(c)(3) educational nonprofit status that a center needs to allow supporters to deduct their contributions is difficult to obtain. Many nonprofits accomplish nothing beyond jumping through the organizational hoops for their first few years. Good legal counsel can stack the odds in your favor.

There are at least three jobs in running a center: avalanche, administration, and fundraising. If you can only have a staff of one, you must recognize that he or she cannot possibly do all three jobs. Any decent avalanche specialist will put heart and soul into their teaching and forecasting, and will have a clear vision of the center's direction and a good plan for how to get there, but most simply are not administrators or fundraisers. Don't try to make them into what they aren't.

Set fundraising as the primary board responsibility in the beginning, and let your lead staff hire the administrative and field assistants they will need to do their job. Budget to give your startup staff some huge bonuses once your funding is secure, to compensate for the inevitable unpaid overtime during the lean startup.

The amount of time spent hustling up funding from numerous sources is perhaps the biggest disadvantage of the nonprofit model. The board needs to commit to putting in many hours of hard fundraising work, until they raise enough to pay administrative staff to do it. Dependable national-level funding for the nonprofit centers would allow all of us to focus on our real job of avalanche education, instead of spending far too much of our time chasing sources of money. It would be the single biggest boost we could all get.

European and U.S. Skiers: What do they know about avalanche formation?

By Steven A. Reinfurt, Ed.D

Due to overcrowded skiing conditions in Europe, a skyrocketing amount of skiers in the last ten years can be observed entering the pristine backcountry as ski mountaineers both with and without guides. The observed is somewhat true for the U.S. except for one principle difference in that the European classic routes are catered tours with well-established alpine hut systems. Also, their extensive use of lift systems (railways, gondolas, funiculars, trams, chair lifts, etc.) in every mountain range usually afford a quicker entry for them. The following two items have a direct impact on this subject.

First, the one element each continent has in common with this surge in skiing popularity is the need to maintain quality continuing avalanche education and information for its "ski total" enthusiasts across various disciplines (*ex: alpine, randonnee, telemark, snowboard, etc). Why? Simply because this growing popularity does not give strong evidence of required avalanche proficiency skills needed. It is not yet successful as indicated by the steady increase of fatal or "close call" accident reports on both sides of the globe for unsuspecting holiday-makers. In Europe, most mishaps have occurred on tour and more than half of the persons injured or killed were placed in the statistical category as a ski mountaineer and/or an off piste skier. An alarming international insight is that almost all incidents, which occurred, were clearly preventable and fairly predictable. Skiers just ignored reading nature's billboards by not following the basic rules of avalanche safety.

Statistical example #1: During the first two months of 2000 twenty seven avalanche fatalities occurred in Europe alone directly in or close to a ski area because skiers were unable to interpret the seriously unstable new snow conditions. In these cases, they knowingly skied beyond the resort's highly visible warning markers and

some never returned to tell their tales of first tracks. Others ended up walking away unhurt only after taking innocent life because their actions sent avalanches roaring down onto unsuspecting “on-piste skiers”.

Secondly, each continent shares the following: When an accident does take place off piste or in the backcountry, media (radio, newspapers, television etc.) usually attaches the incident to the closest ski resort so as to give a location reference for the general public being informed. Unfortunately this is negative publicity for any given area or region, however, there are ongoing strategies to help control this impact. In Europe recent situations and reevaluation have caused many vacation spots, departments of tourism, and various legal & governmental systems to start combining efforts for taking actions (serious fines, revoking of lift passes, and or jail sentences) against poaching skiers who cross their closed boundary lines. This is a uniquely similar situation on both continents as ski resorts change their paradigm of past risk management practices in efforts to save lives, set an industry example, gain attention to this solemn issue, and hopefully deter the harmful avalanche publicity which is extremely detrimental to their winter economy.

To date, Europe and the U.S. have come a long way within a relatively short time towards addressing this growing problem separately and via international cooperation. The valuable work and input of many dedicated professional individuals, progressive ski resorts, alpine/ski clubs, avalanche institutes, guide services, rescue organizations & ski patrols, various companies, legal and jurisdictional support is bringing about change. Their main unified goal is focused towards increasing public safety through quality avalanche information easily available in a consistent format across neighboring borders. While each country may not have arrived at the best possible avalanche rating system for all time, it is at its highest for now and will hopefully serve both the forecasters and the public constructively in their decision making on variable avalanche risk terrain.

Over the years a multitude of ski safety/snow awareness courses have been offered (for free or tuition) by qualified professionals and organizations across the globe. Some individuals have taken a traditional research approach for gathering data by creating questionnaires that have been distributed and then collected for analysis, in efforts to find exact statistical data pertinent for improving specific avalanche educational offerings aimed at skiers and mountaineers at every level of ability, including guides.

In 1990, Snow Scientist Peter Höller (presently the *AAAP European Section Representative*) conducted an excellent research example of one such original inquiry for the *Institute for Avalanche Awareness* in Innsbruck, Austria. He gave out 500 questionnaires containing 50 carefully selected questions, which were distributed by two regional Austrian alpine clubs interested in addressing the issue. Three examples of the special aspects of this study’s findings are given in the following summary:

1. In regards to avalanche education only 19% of the ski mountaineers had ever completed an adequate avalanche instruction.
2. Avalanche beacon training or refreshing was regularly done by only about 60% of the ski mountaineers.
3. That the very high avalanche danger on north facing slopes was not realized yet by most ski mountaineers.

Overall, the conclusion of this investigation was that the avalanche education of many European ski mountaineers and skiers was in fact poor even though their skiing ability rated 1st Class. The report’s two immediate recommendations for addressing and reducing this problem of future avalanche accidents were: 1.) To offer more precise details via hazard management and public warning through TV and radio weather forecasts

relating to avalanches, and 2.) To strongly encourage off piste skiers, mountaineers and guides via appropriate public relations options and suggestions, to improve and refresh their knowledge about the science of snow study and the reality of avalanche dangers & safety.

Ten years have since passed and the world's ski community has entered the 21st Century of outdoor winter pursuits with a noticeable increase of backcountry, off piste, and skiing the extreme. However, Höller's initial research statistics still hold proving there remains a major problem with the steady growth and relationship between present day European ski mountaineers and avalanche accidents.

Statistical example #2: The ferocity of the Europe's 1998/99 winter can clearly be seen in the jump to 95 from approximately 28 avalanche deaths from the previous 1997/98 season. Figures for fatalities were unusually high due to the terrible twin village tragedies in Galtuer and Valzar, which together caused 38 deaths of civilians. The remaining 57 deaths were directly related to mountaineering, snowboarding, and skiing misfortunes in on & off piste, out of bounds, and backcountry terrain.

To address these ongoing international snow risk issues numerous companies have developed a new generation of products for the world's recreational marketplace. Packs with avalanche air bag releases, user-friendly avalanche beacons, avalanche breathable vests, technical clothing, and multifunction ski poles to name just a few. (Each one buys the skier valuable time, but not a superman's cape.) And, several organizations sponsor ongoing courses (beginning to advance) to assist in the educational process while promoting their product line. Even though these outcomes are unique and outstanding additions it still remains the responsibility of each person to utilize wisely the foundational information gained in their initial learning process. Skiers need to remember not be lulled into a false sense of security. Their high tech equipment which should never take the place of sound judgement, based on experience and the most fundamental outdoor asset, common sense.

Yes...real accidents always have the potential of happening to anyone; but some incident reports, after being reviewed, are nothing more than fate or the old adage of evaluating the obvious. Europe and the U.S. still realizes it needs more than just statistical number crunching about inquiries and new products. They must continue their initial goal and total commitment to challenge its many types of skiers to be educated via a life long process of commitment to personal responsibility, learning, and refreshing.

Where does the European guiding community fit into this equation? No differently than in the U.S.. In the author's 16 years of living abroad and 27 years total working in the ski/mountaineering industry he has witnessed first hand that there are basically three types of professional guides: 1.) The underling guide learning from an exceptional older mentor, 2.) The experienced guide who maintains a genuine alertness about themselves, the ever-changing environment, and their clients needs & safety. These are the associates who constantly impress him with their skill and judgement as well as ability to make guiding a lifetime profession. And 3.), the experienced and capable guide who has let their macho attitude slowly turn into arrogance, usually very dangerous when taking people's lives into their hands every day.

In official European investigations, guide #3 has surfaced within the industry by factual accounts of ego impaired decision-making skills. This is not meant to be judgmental, but to convey as accurately as possible what is formally known. It can be supported by the following: Presently, there are several pending legal cases in Europe which have and are still prosecuting several experienced certified ski mountaineering guides who used what the courts call reckless judgement and culpable negligence.

European courts understand that ski mountaineering entails risk and that some accidents are inevitable. It is also well known that the nascent adventures in these activities should be aware of and accept the risks and be responsible for their direct actions and involvement. Unfortunately, after investigating specific fatal cases the court chose to place all responsibility for safety onto the guides because their specific actions had taken the lives of clients less able to evaluate the hazardous conditions. The facts show that other safer alternatives could have been used and the disasters could clearly have been prevented. Their lawful outcome is as follows: The guides had their licenses revoked and the weight of solemn legal action still hangs heavy over several while their days of guiding are finished.

As backcountry and off piste skiing continues to become a popular endeavor guides need to remain continually aware of their ever-changing surroundings, liability, and obligation for a client's safe being. As professionals, they must commit 100% to being a mainstream part of the educational process to help educate the client about their own personal responsibility to understand the dangers and prevention. The learning process to better themselves by a direct life long commitment to nature's classroom will ensure safest service possible that their customers rightfully deserve. Hopefully they will challenge their clients as mentors' worthy of respect by setting a quality model so that none of them or their leader will become a needless statistic outside the normal risk equation. No matter which continent they reside on at the moment of that important final decision to accept the ski challenge before them.

Incident Updates for 2000-2001

Switzerland, Compiled by Frank Tsirchy; SLF, Davos

2 people (as of December 26, 2000) - 1 out-of-bounds skier, 1 helicopter skier

Cantons: UR = Uri, VS = Valais

Date	Location	Canton	Activity	Description	Fatalities
11/11/00	ski resort of Gemsstock, Andermatt	UR	4 people out-of-bounds (skiers and snowboarders)	3 people caught 2 people partly buried 1 person injured 1 person completely buried and dead (burial depth: 250 cm)	1
11/12/00	Pte des Grands, Trient	VS	3 helicopter skiers	1 person caught and completely buried; ski visible on the avalanche debris (burial time: just 7 minutes!)	1

As you see we have not had many fatalities in the Swiss Alps so far. In the northern parts of the Alps we have very little snow (far below the average). In contrast, in the southern parts and along the highest range between Zermatt and Bernina there is plenty of snow (much more than the average) and a quite solid snow cover. For most of the season so far we have had unusually high temperatures. All storms since October have come from the South, which is very unusual. These are probably reasons for the low avalanche activity in Switzerland in the month of December. At the moment some weak layers are forming on the surface of the snow cover. So we are concerned about a potentially critical situation after the next bigger snow fall.

Frank Tsirchy, Davos - December 26, 2000

US Incidents, Compiled by Jim Frankenfield

8 people (as of December 26, 2000) - 1 hunter, 1 snowboarder, 2 skiers, 3 snowmobilers

Fatalities	Date	State	Vicinity	Activity	Description
1	Dec 25	Wyoming	Teton County	Skiing	3rd of 3 skiers to cross the path
2	Dec 17	Montana	Marias Pass	Snowmobile	snowmachine stuck, terrain trap
1	Dec 14	Utah	Willard Peak	Snowmobile	stuck in drift on a road, in path(s)
1	Dec 09	Alaska	Cantwell	Snowmobile	highmarking, stuck machine just freed
1	Dec 09	Wyoming	Teton Pass	Skiing	terrain trap, skiing alone
1	Dec 01	Wyoming	Teton Pass	Snowboard	popular bowl, buried 1 hr 5-6 ft deep
1	Nov 27	Wyoming	Near Cody	Hunting	terrain trap (cliffs)

This season has gotten off to a slow start for most of North America in terms of snowfall. As a result the thin layer of early season snowfall sat on the ground exposed to a dramatic temperature gradient and cold night time surface temperatures. Professionals throughout many regions are calling this the weakest snowpack in a long time. These fundamental weaknesses are likely to remain a potential problem throughout the winter. Even as they appear to stabilize there will be the possibility of triggering one of these lower level weaknesses at a weak spot and watching it propagate a long distance, producing a large slide. It is a good year to just resign yourself to being conservative in your choice of terrain. In addition to the 8 fatalities (at least) before the new calendar year many others have been reported with more fortunate outcomes.

About the Authors, Contributors and Editors ...

Bernard Giraudon is with Nic-Impex in France, producers of the ARVA 9000 avalanche rescue beacon and other winter safety and recreation products. Their website is <http://www.nic-impex.com/>

Dr. Steven A. Reinfurt is a Professional Member of the American Mountain Guides Association (*AMGA*) (guiding internationally 28 years in mountaineering and skiing), *American Association of Avalanche Professionals (AAAP, now AAA)*, ski industry consultant in U.S. and Europe, Certified Senior *NSPS* professional Alpine and Nordic patroller and advanced avalanche/mountaineering instructor trainer currently working in Europe. He works extensively throughout the Alps in avalanche control & education, ski area risk management, search and rescue, and was co-responsible for creating the *AAAP European Section* jointly with the *Innsbruck Institute for Avalanche Research* in Austria.

Bill Glude is the director of the Southeast Alaska Avalanche Center in Juneau, Alaska. Bill is a professional avalanche consultant, instructor, heliguide, and forecaster with over 30 years experience. He is still the only consulting avalanche specialist in Southeast Alaska, but hopes to train enough others through the Center so he can quit working so hard and go ride powder again! When he does get out of the office, he is equally adept on telemark skis, cross country skis, alpine skis, and snowmobile; but his favorite tool these days is his snowboard.

Frank Tschirky is an Avalanche Forecaster and Mountain Guide who works in the Avalanche Warning and Risk Management section of the Swiss Federal Institute for Snow and Avalanche Research in Davos. The website for the Institute is <http://www.slf.ch/>

Jim Frankenfield is the Executive Director and founder of the CSAC and is responsible for assembly and distribution of the newsletter. In addition to running www.csac.org he guides and teaches recreational avalanche courses, specializing in custom arrangements and small group/class sizes. His avalanche-related background is posted on his professional services website, <http://www.mountain-guiding.com/avalanche/>