

EXPEDITION SUPPORT



Project organization

The 1997 Heard Island Project originated with Ralph Fedor KØIR in 1994, and was implemented in 1996-97 by Robert Schmieder KK6EK and Peter Casier ON6TT acting as both Project Directors and Expedition Leaders. They assumed the following authorities and responsibilities: (1) Publish a scoping document; (2) Establish an Honorary Expedition Leader, an Executive Board, a set of Czars, an Advisory Board, a Technical Support Team, and a set of Pilots; (3) Establish schedules; (4) Prepare logistics; (5) Manage finances; (6) Determine the disposition of scientific materials; and (7) Interface with other groups; (8) Publish a Participant's Handbook. Schmieder was primarily responsible for permits, logistics, safety, schedules, camp operations, scientific programs, and documentation. Casier was primarily responsible for radio operations, electronic gear, communications, pilots stations, public relations, and logs. Both were responsible for team building, fundraising, training, international liaison, and team functioning.

The Executive Board had the power to (1) Approve participants, major logistical and procedural plans, major financial arrangements, and joint participation with other groups; (2) Make "go/no-go" decisions on specified dates; and (3) Cancel the expedition. The Czars were members of the expedition team who assumed responsibility for a major component of the project, and the authority to ensure its completion.

The project was set forth in a Scoping Document, the Czar Plans, and other documents, all of which were posted on the main Web site, written and maintained by KK6EK. The documents explicitly stated policy for intellectual, scientific, expedition, and personal property, and liability, authorities, cancellation, and withdrawal. The web site functioned not only for public information, but also as a crucial means for the team to communicate with itself. For instance, posting the Czar documents provided them to the team with negligible delay. Eventually, essentially the entire Participant's Handbook was posted on the Web.

The overriding consideration in all plans and operations was safety of personnel and property. Plans for emergencies and contingencies were an integral part of this project. The Expedition secured all appropriate permits and operated within their requirements.

Finances for the project were managed by Cordell Expeditions. Donations were held until the Expedition was complete, and were therefore not at risk. The expedition was carried out on schedule and on budget.

Public facilities for electronic communications included:

WWW main site: <http://www.cnet.com/~cordell/Hi>
 WWW news site: <http://www.aurumtel.com/hnews.html>
 e-mail reflector: heard@ve7tcp.ampr.org
 WWW logserver (Eu): <http://heard.eunet.be/>
 WWW logserver (US): <http://www.aurumtel.com/heard-log.html>
 e-mail logserver (US): heard-log@ve7tcp.ampr.org
 EU PBBS logserver (Eu): PBBS mail to: PA3BXR @PI8VAD.#ZH2.NLD.EU
 80 m net: ON4UN at 2300Z

The team used two e-mail reflectors during planning, one for general communications (heard-team@mag-net.com) and one for technical discussions (heard-nerds@mag-net.com).

The Pilot Coordinator

[Contributed by John Devoldere ON4UN]

The pilots are the ears, the eyes and the voice of the DXpedition. Because of the difficulty of Heard-NA contacts, we had 5 pilot stations in North America (N1DG, W4WW, WØEK, KØEU and W2IJ/6), one in Japan (JH1ROJ), and I was the pilot for Europe. I also acted as the pilot coordinator.

Here are some of the statistics about the expedition: There was a total of about 100,000 hits on the WWW sites (which include the main site, the news bulletins, and the log servers).

At one time 1700 DXers were subscribed to the Heard reflector (heard@ve7tcp.ampr.org). My computer logged 5,872 e-mail messages related to the Heard Island expedition, representing 11,962 megabytes of text files. There were 3,851 messages addressed directly to me, or 66% of the total mail. I sent out 1,586 individual reply messages: 34% of all messages received were answered individually. I also posted 115 information messages to the reflector. Of these, 95 were numbered messages comprising 223 pages of printed text. They consisted of 14 general and background info messages, 16 messages with CV's of all team members, and 65 hot-news messages. The members of the Heard Island team exchanged 1,785 messages before the departure for the island (30% of all Heard Island related messages on my system). 85 messages were sent to Heard Island during the expedition (about 4 per day), and 79 messages were received from the island, including 12 pieces of log data totaling 545 Kb (compressed) to be posted on the servers. The log data, which included only callsigns, band and mode, was compressed before sending via pacsat. At the end of the expedition, this file was 1027 Mb, which was compressed to 205 Kb before dispatching.

I received 320 messages via Packet radio to my BBS address. About 10% were individually answered. I received about 100 messages via the DX-Cluster network. All messages that were sent to the Heard Island internet reflector were also sent to the world-wide Packet BBS system and the DX-cluster network in Europe.

During the DXpedition, a typical day for me started at 05:00z. After a quick look on 160, I would down-load all the messages from the internet server. I opened

3 windows on my screen: one to read the messages, one with the draft of my next "numbered" news message for the reflector, and one with the draft of my next message to the island. I would then drag, cut, and paste pieces of info received to those last two screens, as appropriate. At the same time I would acknowledge all pieces of valuable information, often with a short message, e.g. "your info will be forwarded to the island." The outgoing message to the island was sent to ON1AIG, who uploaded it PACSAT. During the next orbit near Heard Island. Arie, PA3DUU would down-load the message. The message for the Heard reflector was posted directly to the internet.

During the first part of the expedition (when they were on Reunion and while sailing to Heard Island), I had a number of pre-packaged messages that we had prepared in order to supply the DX community with information. Most of it came from KK6EK's WWW pages, where all this stuff had been available for some time. But, as not all readers of the Heard Island reflector have WWW facilities, and as there are still a great number of DXers who only have Amateur Packet (PBBS or DX-Cluster), we thought it was good to get all this information out once more.

The numbered messages for the DX-community were distributed both via amateur packet radio as well as via the internet. Via the internet they were sent to the Heard reflector as well as to the pilots individually. Don N1DG posted these messages on his Web Page (the Heard Island Tribune), together with the color pictures he received from ON1AIG also via e-mail. All these digital pictures were sent from the island using pacsat. The other pilots were responsible for uploading these messages on local PBBS or DX-Cluster networks, in order to give it maximum coverage. Sending these messages via e-mail takes only a minute or so. I was also responsible for loading the same messages on the packet radio network and DX-cluster network here in Europe. That was often a painful experience. If I could upload before 7 AM or after 1 AM, I could do it in minutes. Uploading between 5 and 10 PM sometimes took hours and many retries. Here in Europe many hams seem to be sending endlessly long EXE files via packet radio, and the networks are heavily overloaded. At the same time I was sending the messages to the PBBS system, I would download any messages that were waiting for me. The entire procedure easily took 3 to 4 hours. Time to take a shower and have a late breakfast! This entire procedure of reading messages and putting together messages to the island and to the DX community would repeat itself 3 to 4 times per day. On the DX-cluster, messages came through at any time, as I had a separate computer connected to one of the local DX-Clusters, and I could check these messages immediately upon arrival.

Once a day I would also receive the incremental log data which ON1AIG had down loaded from pacsat. I would unzip the file, append it to the previous log file, check for errors, and send the new log files to the people responsible for the log servers: Don N1DG, Lyndon VE7TCP, and Rob PA3BXR.

Initially we had announced the European 80 meter DX info net at 22:00, but this was at the peak propagation time for the low bands, so I decided to change that to 23:00, sunrise time on Heard Island. The first day we had about 15 stations checking in on the net, and nobody seemed to have any real questions. They seemed to know all they wanted to know either via e-mail or packet. They were friends

who just wanted to say hello. This friendly group of supporters was quickly reduced, and after less than one week I decided to discontinue the net, because there were no check-ins. This really meant that we were doing a good job via our other communication means.

Being a pilot station is an unbelievable experience. It is probably as rewarding as being on the island itself. The appreciation you get from both sides gives you a feeling of fulfillment that is hard to equal. I am the proud owner of the Belgian flags from Peter I and from Heard Island, and they are my number one pride trophies in my shack! VKØIR was the Number One DXpedition for this century. I am proud I was part of it. Thank you guys!

The Northeast Pilot and Assistant Webmaster

[Contributed by Don Greenbaum N1DG]

In addition to being a pilot for VKØIR, I was asked to help out with the world wide web site for news and log lookup. I also volunteered to provide laptop computers for logging on the island. KK6EK developed and maintained the main web site. Late in 1996 he set up links to my site, where I would update news and post pictures from Heard Island. I named my site the HEARD ISLAND TRIBUNE.

The real action began in December 1996, as the team prepared to leave and we put the initial news and log sites up on the internet. We quickly discovered my web provider was not capable of running CGI scripts efficiently and I scrambled to find a replacement. This required moving my company's domain. It was close, but before the team left for Reunion all was up and running and we were able to test the servers using a 70,000 QSO database. We had a response time of 3-10 seconds depending on how many links were needed to connect to the server, time of day etc. The news page went through many changes as the team gave valuable advice to format, readability, etc. The perl script for log lookup was up and running with the help of KA1R and we found a second service provider that would host a backup site at EUnet, one of our sponsors.

Just before the operation began, ON4UN starting issuing bulletins about the operators, equipment, operating plans, etc. The page began growing and the excitement was building as the ham community was about to have its first *Virtual Expedition*. The operators began assembling on Reunion and the interest in the web site was growing. By the time the crew had reached Heard there were over 8,000 "hits" to the news site. It was clear that the TRIBUNE was going to be a major part of the operation.

On 14 January, the first day of operating, there were 3,000 visits to the news site. My e-mail began to build as hams in the Eastern US and South America sent questions, requests etc. I had scheduled a very light work load during the operation and it was a good thing. It was now taking up to 6 hours a day formatting John's bulletins in HTML, answering e-mails, converting pictures received by satellite into the right size and different format for our pages, etc. Additionally there was an informal "net" on 3850 that Scotty and I took turns hosting. Not many people showed up on frequency which was another indicator that the posting of the bulletins on the web, news page and packet clusters were doing the job of informing the audience.

We were ready for the first logs to be uploaded. Then disaster struck on the island. The satellite radio failed and since we had done such a great job advertising the availability of the logs, the disappointment was obvious from the e-mails coming in. Arie and Al fixed the rig by the 17th of January. We were fully operational on the web now and the hits to the site were growing rapidly. In the 24-hour period after the logs and the first set of pictures off the island were posted, we had 6500 visits to the two sites! By the time we had 68 bulletins and 31 pictures, the total number of hits topped 28,000.

Things ran pretty smoothly until January 20. The logs had been delayed Sunday coming off the island and when we did get them a day late the file was now over 1 MB. I uploaded the files and tested them at about 2 am in the morning, posted a message to the reflector announcing the new logs, and went to bed. When I woke up on Tuesday and downloaded my e-mail there were over 200 messages all requesting various info about the status of the logs. It appears that immediately after I posted the logs, about 1000 Europeans hit the EUnet web site and brought it to its knees. At that point the controllers denied access, and everyone requesting a lookup got a message saying they were not allowed permission to access the logs. Some took it very personally and wanted to know why I was denying them their data. At the same time, the USA server was getting double the traffic, and many people hitting the sites could not get a response. I suspected it was a problem with the log data, my script or worse! I spent the whole day reloading the CGI script, sending e-mail to EUnet, etc. By 2 pm the US server crashed as well. At that point the web pages, both e-mail servers, and my company site was down. I called my US provider and we looked at what was happening. They rebooted the server and watched the traffic. I then finally got an e-mail from EUnet informing me they had turned us off due to the heavy traffic and I redirected the EUnet site to my US server. For a while we returned to normal but as word got out we were up and running again the traffic exploded. At 7 pm I got a call that the hits to the log lookup and news site were taxing the server's resources and one would have to go. The log server had its plug pulled again. Hundreds of e-mails were flowing by now. At this point I had spent 12 hours at my terminal and had accomplished nothing.

At the same time Lyndon, VE7TCP, who had provided the lookup for the XRØY/ZDXpeditions the previous year, put his server at our disposal and brought up the code he wrote for XRØY. We were back in business. Thanks Lyndon!

Other than this 48-hour period, it was a lot of work but very rewarding as well. By the time the crew returned to Reunion we had posted 95 bulletins and 83 pictures to the site. I had uploaded 20 MB of data to the site and we had been accessed 95,000 times. A week after the operation was over 1,000 people a day were still looking at the site. Maybe they were catching up on the pictures or just reliving the excitement. In any case e-mails of congratulations were still flowing and my e-mail received total had surpassed 1400 (all got an answer). One final piece of data: the amount of data downloaded from the site (text, pictures, log inquiry replies) during the period from 1 January to 7 February totaled 14,251,325,166 bytes. Over 14 Gigabytes!

The Midwest Pilot

[Contributed by Bob Bruner WØEK]

I was very honored to be asked to fill the position of Midwest Pilot, replacing Glenn Johnson WØGJ who had become a member of the team. Being a pilot was very exciting and rewarding. The internet was one of the best ways to get the information out to the audience. The DX cluster was very valuable to get the news out to the local audience that didn't have internet accesses. I spent about 17 hours per day in the shack. By trying to work the team myself, plus keeping up on all the comments and feedback that I was getting, and relaying information out on the various networks. I was kept very busy. Now I can sit back and laugh about one incident in particular where a gentleman called me on the phone at 2:30 am and asked if they would be on 20 m tomorrow!

In all my years of working DX I have never seen the operators take such great care in trying to make sure that they have you in there log. It's teamwork like this that makes a DXpedition a great success.

The Japan Pilot

[Contributed by Isao Numaguchi JH1ROJ]

On January 12th at 12:00 z, I started the Heard Island daily on-air net with my friend Kaz JH1ORA. The first day of the net ended in about a half hour, with only a small number of participants. That day I could hear the beacon signal from Heard island with a bit of fluttering sound, but it was nice and strong. The second day was almost like the first, with no big news from the team. In the afternoon on the 14th, I received an e-mail that VKØIR was finally on the air. I found VKØIR on 21.024 MHz and made it by barefoot at 06:45z, but it was too strong to believe, solid 559. Later I made another contact on 20 m SSB, and once again I was surprised to hear their strong Q5 signal. At the net, quite a large number were there. From the night of 14th on, we had many stations on the net, which usually lasted 1-2 hours. There were requests after requests, for high bands, for 160m, and for RTTY. In my every e-mail to John, there was a lot of "Pse do this, pse do that, pse—". I have used "please" more times in those e-mails than ever in my life.

Through the experience of being a VKØIR pilot for 2 weeks, I found that not many amateur radio stations are capable of connecting with the internet here in Japan. Connecting to the internet still costs a lot and you will be surprised to see how expensive the phone bill is after a long Web surfing session. It will take some time to spread the internet among the Japanese amateurs. Look at the percentage of Japanese on the Heard Island reflector, only 40-50 Japanese addresses among 1,700 worldwide.

You might notice very few e-mail messages of thanks and appreciation from JA on the reflector. This is not because of less appreciations among JA stations. However, they appreciate the thrills, hope, anticipation, bitterness and joy that VKØIR team brought to the world. Someday there may be another expedition to this bare and icy place. Then I would like to introduce myself and say proudly, "I was a pilot for VKØIR!"

The Heard Satellite Link

[Contributed by Arie Nugteren PA3DUU]

The only reliable data link between the island and the outside world was through a set of radio amateur satellites, KO-23 and KO-25. Inmarsat proved to be unreliable for the data link.

The satellites carry an on-board computer and have 9600 baud radio-links. The computer has a carry-and-forward file system, which means that one amateur can upload a file and another amateur can read that same file from the satellite, sometimes days after it initially has been uploaded. One of the strengths of this system is Public Broadcast. This means that everyone within the footprint of the satellite can grab all data and store it on a hard disk. Every morning on Heard Island, Bob N6EK collected all the logs, checked them, merged them and passed the log-file to me. I prepared a satellite upload file, addressed to ON1AIG.

When the satellite passes over Heard Island, the software connects to the satellite and passes the length of the file to the OBC (On Board Computer). The satellite returns the file number assigned. Then the file is uploaded through a protocol that sits above AX-25. This protocol is called FTLØ (File Transfer Level Ø) and ensures the reliability. Even if the satellite went out of sight during an upload, the software would know how and where to restart the next pass. After the file is uploaded completely, the file number and the description of the file are added to the on-board directory.

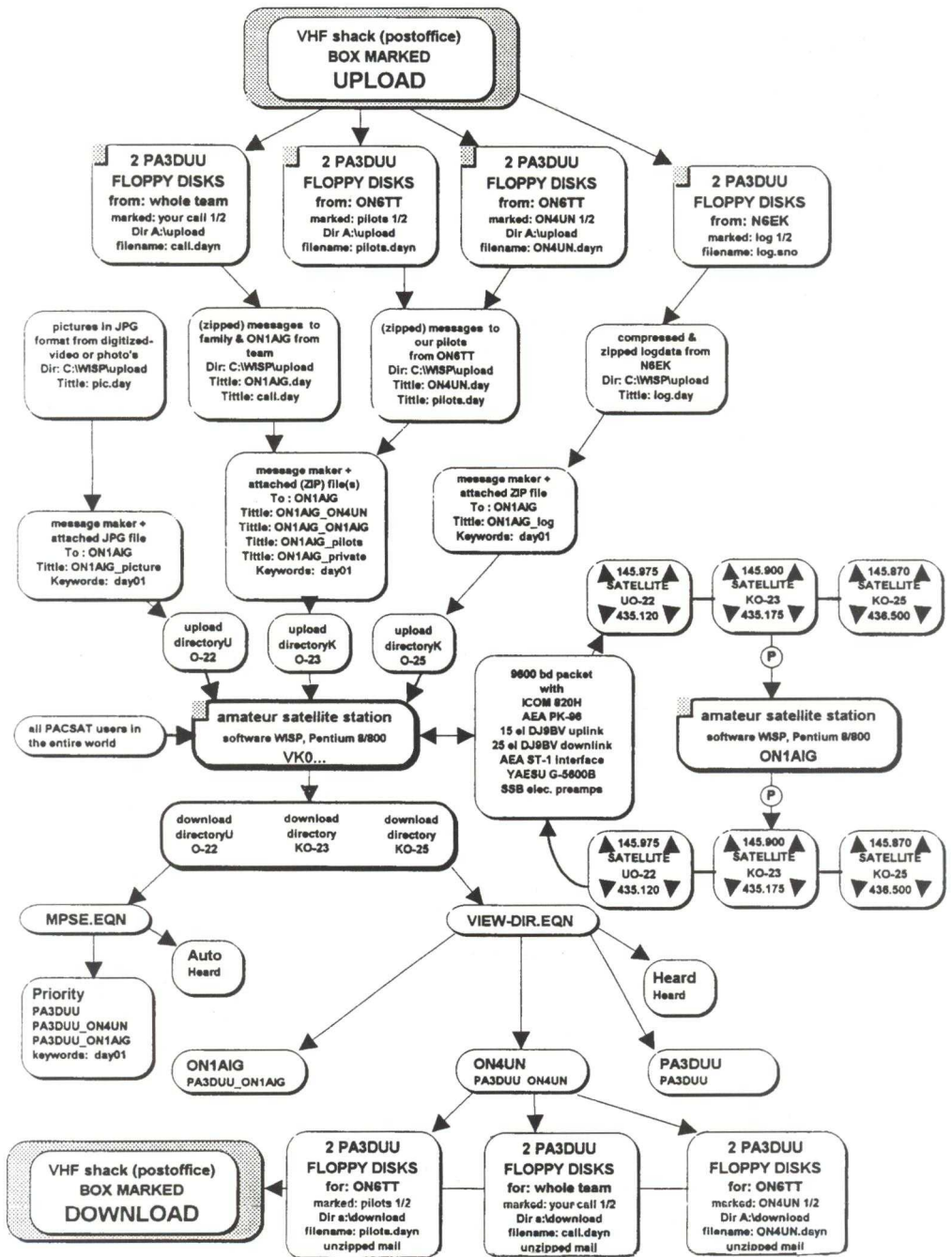
The next thing to happen, is that the satellite needs to pass over ON1AIG's QTH. At some moments of the day, this can take a few hours between passes, but normally the satellite comes around every hour and a half. André's computer then sends a command to the satellite, telling the OBC up to which time his directory (the one on André's disk) is up-to-date. The OBC then starts to dump the directory entries that were added after that time.

After receiving the directory entries, André's computer decides which files to download. This decision is based on a set of rules, that were programmed. For these two weeks, everything coming from VKØIR had top priority! Besides leaving the decision to the computer, André could review the directory entries and decide which files to download.

Then a command is sent to the satellite to broadcast the selected file. Downloading is done in unconnected mode. Each packet sent by the satellite has the file number and the position in it. At the ground station, the file is reconstructed from these packets. Of course, there is a sophisticated algorithm to ask the satellite to fill the "holes" in a file. Even if André loses the satellite, he can continue where he was on the next pass.

Once the file is completely received and the CRC's verified, the file is sent to the WWW-server (photo's) or to ON4UN (logs) via the internet. John then processes the files, checks them, zips (compresses) them, and sends them by e-mail to Don, N1DG (for the WWW servers), to Lyndon, VE7TCP (for the e-mail server), and to Rob PA3BXR (for the Packet BBS server).

The diagram on the following page shows the flow of information for VKØIR. This is only one of five such diagrams we generated and used for the expedition. The participants had these diagrams available to them in the Handbook.



Arie's flow diagram for the satellite communications.

COMMENTS AND STORIES



Every person who interacted with the VKØIR project has his or her individual story. We heard hundreds of these stories, and received many, many letters of congratulations and comments. I wish I could include excerpts from all of these in this book, but there is simply not space. I am reduced to picked a few, almost at random, to give you a flavor of what we heard.

Many people spoke about our goal of broadening the DXpedition experience. One of those, Terry KK6T, expressed it perhaps the most eloquently:

"This has without a doubt been a defining moment. It's not just the unprecedented number of contacts made on the DXpedition, or the fact that Heard Island is so rarely activated, or that a fascinating amount of technology was melded in with the ham radio experience, although these were all part of the magic. What made the difference was seeing the ham community becoming a single entity again. Of course I've heard about the great fellowship and sharing and hospitality from the old-timers, and to a certain extent, I've experienced it first hand. But the VKØIR DXpedition forged something more: For two weeks, we worked, we agonized, we cheered as one collective soul. When someone was successful in getting through the pileup, we all celebrated their success. When someone was having trouble working or even hearing the Heard boys, we all helped. We offered ideas on the best propagation, where to look for the op, how to get through the pileup. We weren't separate geographic areas fighting each other in the pileups, we were one cooperative group, each person taking his turn at standing by and each having his time to do his best. One goal of this DXpedition was to put as many people in the log as humanly possible. One only needs look at the stats to see that this goal was achieved. But the VKØIR crew achieved another, more significant, goal: I've never been more proud to be part of the amateur radio community! Thank you VKØIR!!"

Jim Smith VK9NS and Kirsti VK9NL: "Congratulations to you and the amateur radio group on the recent operation from Heard Island signing VKØIR. Each of us knows the effort and expense involved in such a major undertaking to this remote area of the world. It seems incredible that 14 years have now elapsed since the H.I.DX A. DXpedition led by myself and Kirsti in the name of amateur radio. Perhaps this is a measure of just how difficult Heard Island can be. We are part of a tiny group of people who for whatever reason have been privileged to visit this majestic and remote sub-Antarctic island. You, in particular, are now part of an even smaller number who became a leader of men and provided the motivation, cohesion, and drive needed to make your Expedition to Heard Island such a success story. Warm regards to your team."

Susan Taylor KB6VXX: "Congratulations on a fabulously successful DXpedition. I firmly believe the success of the DXpedition was largely, if not completely, due to organization and foresight. Twenty men had the experience of a lifetime. As the wife of one [N6EK], I thank you from the bottom of my heart."

Ward Silver NØAX: "Your adventures, viewed by thousands the world over, have brought back to the bands a refreshing sense of community and of the bonds of friendship for which Amateur Radio is renowned. A marvel of conception and a jewel in execution, this single operation will be remembered by DXers young and old as a pinnacle of achievement for the whole DX community."

John GW4FRX: "A 'shared co-operative experience' neatly sums up what most of us seemed to feel about the VKØIR DXpedition. It linked many amateurs, even the more casual DXers, in a way which is entirely unique in my experience. VKØIR seemed to bring all of us collectively together. In a very weird kind of way, I would almost call it a healing experience. I know that many of us were reminded why we took the trouble to become licensed in the first place; and for people like me it quite literally opened up an entire new vista on the hobby. It's extremely difficult to imagine that a DXpedition could have been better planned and organized. This has been simply the finest and best-run DXpedition of all time."

Garry VE3XN: "It was the enjoyment of day-to-day coverage of progress, set-back, plans, objectives, photographs, etc. which really made me feel I was in a way an active part of the adventure without leaving the comfort of my shacks! VKØIR has to be the #1 DX operating activity of the century! The number of QSOs, the logistics of making it happen, the difficulties posed by the low point of the solar cycle, the remoteness of the QTH, the amassing of such an expert team of operators, and the teamwork involved in producing 80,000+ QSOs make this an operating event of unsurpassed excellence! Congratulations to all who made it happen!"

Many people wrote to say this was the finest DXpedition they had ever experienced in all their years as a ham. Here are some of their callsigns: K3UL (30 years), WØFLS (33), WA9HMN (34), AA4M (37), NØIJ (40), N1AU (40), VE4SN (40), W3IKO (40), W1UN (45), K3IX (50), W5FYZ (60), W4DOU (62), WØJCB (65). And here are some of their comments:

"Thanks for rekindling the fire..."

"I've never witnessed anything like this in ham radio."

"Organizers—brilliant!"

"Thanks for giving the ham world a couple of fantastic weeks."

"I never witnessed such a class act as this operation."

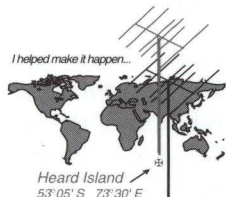
"This will be an operation that future operations will be judged by."

"Things will never be quite the same again!"

While we were slightly embarrassed at the lavishness of the praise, I must admit that the team loved it. We worked hard to involve our audience in the experience, and apparently it worked for many. From our side, the event was just as fun and interesting. One of the team members, Wes Lamboley, wrote a beautiful description of what the experience meant to him. I only have space for his last line, which probably captures what each one of us on the team felt:

"When people ask me about my trip to Heard Island I start out by saying: It was perfect. Absolutely perfect!"

RETROSPECTION



The statistics of the VKØIR project speak for themselves:

No. team members	20 + 7 pilots + 5 others
Total cost	\$400K (including \$100K lost in 1995)
Project time	3 years
Duration	5 weeks, 17 days on HI, 13 days operating
Equipment	30+ tons loaded on HI in 100 helo flights
Shelters	7, total area 1260 sq ft
Generators	7, total 37.5 kW
Antennas	24, including 4-square arrays, plus backups
Radios	8 plus Pacsat, Inmarsat, 2 m
Total QSOs logged	80,673 QSOs with 27,500 different stations
e-mail messages	10,000 total
Web hits	100,000 downloading 15 GB of info

Although some people have said this performance will never be eclipsed, we know better. An expedition logging 100,000 QSOs is just over the horizon. There are many ways this operation could have been done better, and many opportunities for doing the next one better. It seems worthwhile here to summarize the lessons we learned from the VKØIR experience. Who knows, maybe we'll be reading our own words sometime soon!

We did, in fact, learn from the Peter I 3YØPI experience. In the book about that project, I wrote some of the lessons we learned there. Did we make use of them on VKØIR? The following aspects were identified as desirable and were successfully implemented: Optimum team personalities, good team communication before the expedition, better food, accurate positioning of the camp layout, appropriate personal clothing, convenient and effective gear containers, toilet facilities, workable operating schedules, more extensive pilot involvement, computer logging, digital communications, good interstation communications, no on-air personal communications, safety and emergency preparedness, backup plans, sufficient tools, shower, weather instruments. This list includes almost everything we thought of from 3YØPI, an amazing record in itself! About the only aspects we failed to implement were protection for the generators, backup pacsat radio, electronic test gear, and a warehouse. Clearly, we used our 3YØPI lessons on VKØIR!

So what went wrong with the 1995 expedition? Believe me, we asked ourselves that many times. Here is my opinion: The project was simply below critical size. The expense of getting to Heard Island is so high that it simply cannot be done with a team of ten, at least not *safely and reliably*. Ten people alone do not have sufficient resources for fundraising, logistics planning, equipment procure-

ment, arranging permits, coordinating the ham radio community, publicizing the event, and so on. Heard Island is an extraordinarily difficult target. A small, informal team is unlikely to succeed.

The team KØIR assembled for HI 1995 was great for an easier target, but was just too small for HI. The team was scattered around the world without effective communication, leaving Ralph to do most of the thinking and most of the work. We had inadequate financial resources to find a reliable vessel, and became desperate. When the offer came from Australia of a vessel at bargain price, it was all we had, and we grabbed it. The entire sequence of events was made more difficult because of an agreed policy of secrecy: we wanted to have every important part of the expedition in place before going public with our plans. The result was too few people working on the problem, too little resources to solve it. It was a classic case of underestimating the enemy and losing the battle. We were collectively guilty: Ralph for taking on too big a task, and the rest of us for letting him.

When Peter and I assumed the responsibility of reorganizing the project, we had extensive discussions of what we should do to ensure success. We listed the origins of failure: Too little time, too concentrated leadership and effort, too much secrecy, too few people, too much informality. Antidotes were the obvious reverses of these points. I editorialized to Peter: "There is a tendency to plan as if there will be no problems. It is, however, characteristic of inexperience to do so. The experienced expeditioner will have planned for trouble from the beginning." This time, we were not going to underestimate our enemy.

The result was there for all to see: doubled team size, a completely public plan, formal organization of the tasks, total quality management, team training, and the commitment to obtain the resources necessary. The decision was to do *it right, or not do it*.

We know now that this strategy worked perfectly. But not only did the plan work, the team got along well as well. There was no fighting, no fractionation, no animosity, even very little irritation. The gentlemen of this team, from start to finish, treated each other with respect and charity. Furthermore, the team itself was apparently a mirror for the larger community of hams, which, according to KK6T, was "one large cooperative group." How did that happen?

I tend to believe that a good part of the reason lay in the recognition that what people want is to be part of the action. In the early days, the magic of wireless communication itself served to create a community. As radio science progressed, however, the magic wore off. Fax machines and direct dialing made it all seem a bit irrelevant. DXpeditions took a hit, psychologically: some people could afford to go to remote places, but left everyone else home feeling abandoned. Logging a contact with the DXpedition became inadequate: everyone wanted more. In particular, they wanted to *share the experience*.

Sharing the experience was what the Easter Island XRØY Expedition was about. The overwhelmingly enthusiastic response to that project validated the idea that what people wanted was to go along with the team, at least vicariously. It was new technology, specifically the internet, that provided the means for them to do that. With uploaded logs, online pictures, e-mail, electronic QSLs, and a host of other services, the average DXer could become a virtual member of the team.

Although XRØY was technically a success, it was personally challenging for the team, and the leadership. It was not obvious how to create and manage a large team of technically savvy radio amateurs. Near the end of our stay on Easter Island, we got the answer. In a self-analysis led by Wes Lamboley W3WL, we discovered that the highest priority of the team members was *not* the accomplishment of the expedition goals (which were set by the expedition leader), but individual *personal satisfaction*. This was both a surprise and a strategy, and I adopted it as my personal goal for the Heard Island team: I would do everything in my power to provide the team with whatever *they* defined as their personal satisfaction. Not surprising, it turned out to be essentially the same as the expedition goals, but with a different perspective: Instead of embracing some else's goals, the team members felt these were *their* goals. The same message was coming through: people don't want to watch. They want to *participate*.

After it was over, Peter ON6TT made a penetrating analysis of the reasons for the VKØIR success. Here is his list:

- * A great team, and involvement of the team in the preparation
- * The Participant's Handbook
- * Leadership
- * Excellent preparation on the ship
- * Pre-programmed radio operations
- * Great support from the ship and the helicopter crew
- * Good luck with the weather and the animals
- * A great team of pilots, internet gurus, and other support people
- * The internet and packet servers, and related services
- * Generous financial support from the ham community.

Wes made a similar analysis. Here is his list:

- * Team member selection
- * Flowdown of responsibility and authority
- * Early involvement, training
- * Team meetings, online communication
- * Procedures for handling problems

Wes remarked that the team functioned incredibly well. There were few problems which had to be addressed, and those that did occur were handled quickly and effectively, primarily because of the openness which had been developed over the previous year. One team member observed that "It worked like magic." In reality, a lot of hard work went into the planning and effective execution of team functionality; the real magic was the strength of the friendship bonds the team developed, based on extensive planning.

Several specific mechanical aspects worked well: (1) the green Army transit cases for protecting the electronics and later for personal lockers; (2) the large white canvass sacks used for protecting and collecting loose items; (3) the tractor and wagon. A few things didn't work so well: (1) our food was boring; (2) we failed to have regular team meetings in camp; (3) our shelter zippers failed at an alarming rate; (4) we took far too much food, gasoline, and propane; (5) we had insufficient backup radios; (6) propane fittings were not properly engineered.

On the vessel returning from Heard Island, the team held several continuous brainstorming sessions in an attempt to find ways in which the operation could have been improved. The interesting result from these sessions is that the proposed improvements were, by and large, minor. Here is the bare-bones list that resulted:

Antennas: Marked beam orientations. Rotators. Band switch. More monobanders. Better labeling. Dipole for 80m. 4-sq. on 30m.
 Coax: Core winder. Check for integrity.
 Computers: Network them. Develop new logging software.
 Czars: Give them a budget
 Food: Greater variety, with menus planned and meals pre-packed.
 Fuel: Refuel directly from drums. Calculate consumption better.
 Health: Sanitary SSB conditions. Preventative medicine.
 Inventory: Better documentation. Minimize personal gear. Standard size containers. Packing list in crates. No cardboard.
 News: More white boards. Publish daily newspaper. Mailboxes.
 Op site: Prepack entire stations in kits.
 Operations: Wake-up service. CW and SSB captains. Meetings.
 Pilots: More feedback on operations. Team review pilot plan.
 Publicity: Organize earlier.
 Radios: More spares. Smaller, lighter radios. 6 m transceiver.
 Sleeping tents: Heaters. More personal space.
 Team size: Keep 20 man team

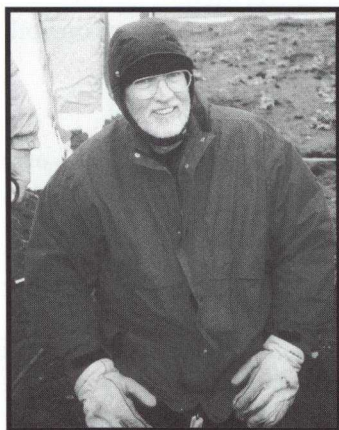
Our experience also showed the potential value of an Onsite Information Manager. This person would collect, comprehend, and distribute information to and from the team, the pilots, and the public, preventing overload, clotting, and missing crucial information. A large expedition should have a central computer facility, to which all radio and personal computers are linked. A queuing system would manage the uploading and downloading of files.

What I envision for the future is an approach toward real-time interactive participation in a remote operation by the worldwide amateur radio community. To achieve that, we could imagine hybrid-mode transmissions in which coded data is multiplexed onto voice or inserted into digital-mode exchanges. We can envision real-time onsite video, pseudo-real-time internet confirmation of radio contacts, automatic immediate local printing of customized QSL cards, automatic notification of band openings, onsite optimization of resources, and a hundred other things that technology offers us.

But does the amateur radio community want to move in this direction? I think that VKØIR answers that: Yes! *What amateurs want is to participate.* Technology enables participation. Ergo, technology is what amateurs want. Technology is, of course, a tradition in radio, but one that may have been damped for a couple of decades while professional engineers did things no one else could. Now, with technology centered on the information sciences, *anyone* can participate in advancing it. Anyone with a computer and a user package can write a new expedition logging program, develop a protocol for local site management, combine signals and separate them again, or develop data bases.

DX is alive and well, and ready for a new future. Let's make it happen!

THE VKØIR TEAM



Bob Allphin K4UEE

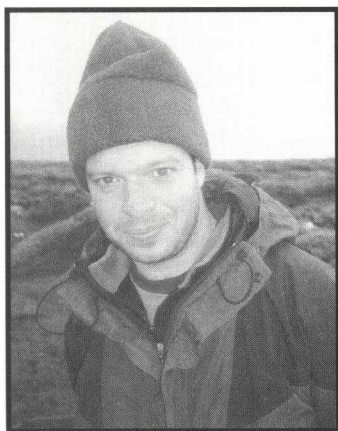
Bob, 51, was licensed in 1958 at the age of 13. Today, he is "Top of the DXCC" and only needs one country to complete DXCC (phone) and DXCC (CW). He is an active contester and has participated in numerous DX contests from his QTH in Aruba (P40R). In addition to many 1st and 2nd place finishes, he has set five Single Band/Single Operator world records. Bob is also a DXpedition organizer and participant, using such calls as XF4DX, AH1A, XRØY, CEØZ, VP2KC, VP5KMX, K9GL/VP2V, J87J, PJ9W, and ZPØY. In all, Bob has visited 47 DXCC countries and operated from 22 countries. He is a low band enthusiast, and prefers CW. Other callsigns he has held are: KR6LY, VP2KAE, ZF2FX, J87UEE, J34UEE, T30EE, K4UEE/VP2V, K4UEE/C6A, 3A/K4UEE, PJ2/K4UEE, ZP5/K4UEE, TA1/K4UEE, HSØ/K4UEE, VR2/K4UEE, KH6/K4UEE, and CE3/K4UEE. Recently, Bob participated in WRTC '96 (World Radio Team Championships), along with his partner N6IG, finishing 5th in the championship. Professionally, Bob is Division Sales Manager and Senior Vice President in Wood Logan Associates, a company that markets mutual funds and annuities. He has been married 29 years, and has 2 children. He has a B. S. degree from Auburn University and an M.B.A. from Golden Gate University.



Igor ("Harry") Booklan RA3AUU

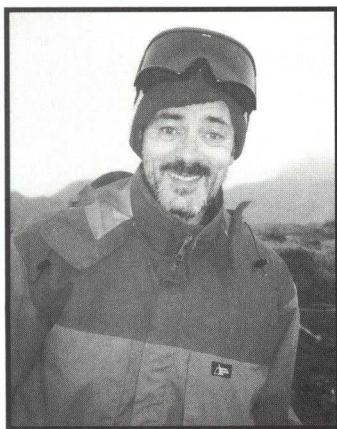
Harry is an electronics engineer, and works for a communication company in Moscow. At age 27, he is the youngest on the team. Licensed since 1982, Harry is a versatile fast CW and phone op, experience DXpeditioner and contester (5BDXCC, 5BWAZ, DXCC Honor Roll, DXCC 160). He was active as RV4F/RA3AUU, 4L4F, RU6L, RK3B,

RU3A, R3HQ, and guest op of OT4T. DXpeditions include: XYØRR, 1SØRR, XV3UU, XE2/RA3AUU, XF4M, and most recently R1MVI, in Sept. 1995. He used to compete in the ex-USSR radio pentathlon competition, and became a champion for Far East USSR. He has also used N1RTW, VK6AUU, ON9CIB, EA8/ON9CIB, K6S (WRTC 96), OT6T twice, and OT7T soon. He is chairman of the contest committee of the Union of Radioamateurs of Russia (Soyuz Radioljubitelej Rossii). He loves his wife, cooking, low bands and huge pile ups on both CW and SSB.



James Brooks 9V1YC

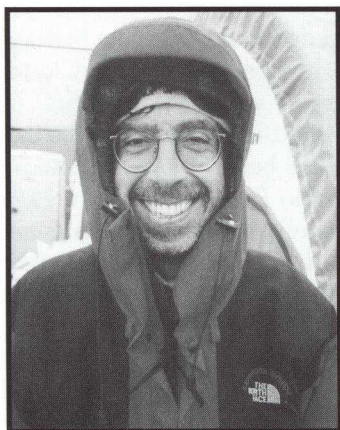
James has lived in Singapore for 7 years, and is a serious CW contester. He set Asian records at VS6WO two years in a row and the low-power Asian record a few years back for WPX CW. He also holds the callsign XUØAA in Cambodia for his expedition during 1990. Previous expeditions: KB1CM/KH8, KB1CM/4X, 5W1FR, ZK1XM, VU2ZAB, VR2/KB1CM. James currently owns a video post production and design company in Singapore that specializes in documentaries (corporate and commercial), TV commercials, Openings, and Graphic packages (animation). He travels to China on occasion for filming, but most of his work is regional SE Asia & Hong Kong. He was previously an antenna design engineer with an Australian/SE Asian manufacturer of broadcast & cellular antennas. Following that he was head of video post production (engineering) for the Singapore Broadcasting Corp until 1995, when he started his current company. He speaks English & Mandarin (Chinese) and other Chinese dialects.



Hans R. Burki HB9BHW

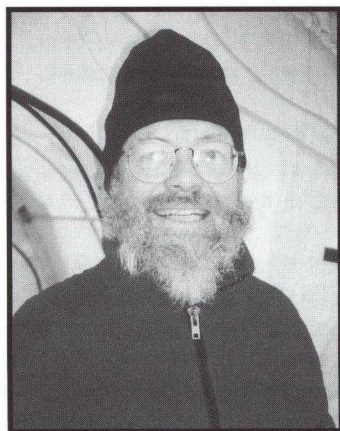
Born in 1939, Hans was apprenticed as a mechanic in the textile industry. He served as radio telegrapher in the Swiss-Army. In 1960 Swissair employed him as an aircraft mechanic for DC-8, CV 990 and Caravelle aircraft. During 1963-65 he lived in Australia. Returning to Swissair, he was stationed in London as a station mechanic. Hans was married 1966, and has 2 children. In 1969 he attended Swiss Aviation School where he completed training for flight engineer on DC-8 (6 years), later

on DC-10 (16 years). During the 23 years of flying, mainly long-range, he was teaching aircraft systems to cockpit personnel. In 1992 he left Swissair and started a new job with Schumperlin Avionics. He does a lot of mechanical repairs and also some electronics on HF and satellite equipment. Hans was recently licensed for amateur radio.



Peter E. O. C. Casier ON6TT

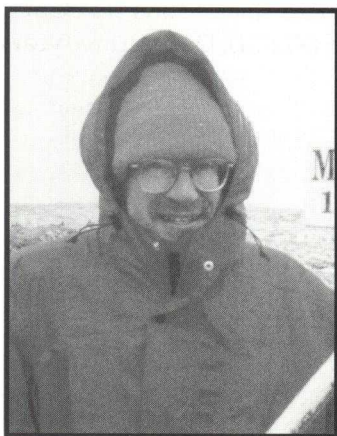
Licensed since 1989, Peter is mainly a phone and RTTY op. He is an active contester and expeditioner. In the VKØIR project, Peter shared the overall project responsibility with KK6EK. Peter coordinated the radio operations. He was also the co-organiser of the 3YØPI effort. Previously, he was also part of the AH1A and FOØCI expeditions and operated as 5X1T, 9U5CW, 5Z4DU, 9Q5TT, 4U9Q, D3T, D2TT, TU4FE, T30AJ, VK6ATT, VP8BZL, VP8CPH, VP8CBE, 4K1F, C30EMA, 4U1ITU 4UØITU, 7Q7XT, 4U/ON6TT, /C3, /LX, /GU, /GJ,.. He contested from OT2T, OT3T, OT4T, OT5T, OT2A, OQ7AR,..., and holds a number of national and continental contest records. He is an officer of the European DX Foundation and a member of the CQWW DX contest committee. Peter was trained as a printing engineer, always worked in the computer world before switching over to become a telecommunications consultant for the UN and the Red Cross. Currently he is the regional telecommunications manager for the United Nations World Food Programme, based in Uganda.



Bob Fabry N6EK

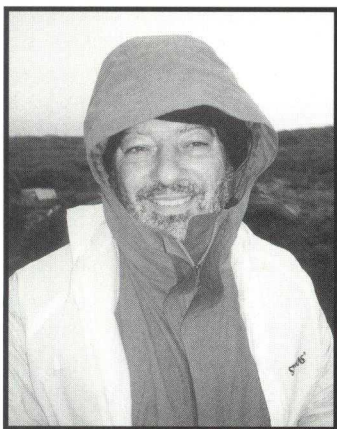
Bob is retired from the faculty of the University of California, Berkeley. Among other accomplishments at the University, he founded, and for many years led, the project which created Berkeley UNIX. Licensed since 1957, Bob is a phone and CW contest op. He has been active as VP5Y, N6EK/C6A, XE2GBD, N6EK/VE7, N6EK/1 (NA-148), HD8D, N6EK/HC8, XE2GBD/XF3 (NA-90), J76EK, XE2/N6EK/XF1 (NA-189), 3D2EK (OC-121/OC-156) and AL7EL/KH9. He is active in many contests and has won California in the single-operator all-band category in the SSB World-Wide DX Contest. Bob is an advisor to the Northern California DX Foundation, for whom he de-

signed and fabricated their new beacon system. He is a member of the Northern California Contest Club and the Northern California DX Club. Bob lives in Berkeley with his wife Susan. They like to backpack in the Sierra, travel and spend time with their five grown children and three grandchildren.



Ralph Fedor KØIR

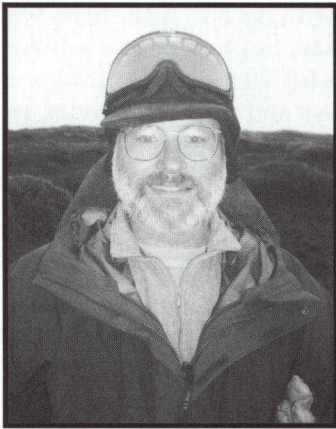
Ralph is a medical doctor specializing in diagnostic radiology and has practiced in St. Cloud, Minnesota for the last 20 years. He was first licensed in 1961 as WAØABU; he has held the call KØIR since 1976. He has been involved in many aspects of amateur radio from 1.8 MHz to 1296 MHz but has always gravitated back to DXing and contesting, especially on CW. He holds most of the popular awards relating to DXing. Ralph was a member of the 1992 VP8SSI DX'pedition team. He organized and led the 1994 3YØPI DXpedition to Peter I with additional operating from the Falkland Islands and the South Shetlands. In 1995 he participated in the XRØY DXpedition to Easter Island. He has worked on the Heard Island DXpedition since 1994. Ralph holds the additional call signs: VP8CBA, 3YØPI, 7J1ATJ, VK6DIR, F/KØIR, FR/KØIR, and VKØIR. He is a member of the Explorers Club, St. Cloud Amateur Radio Club, Brainerd Area Amateur Radio Club, Northern Minnesota DX Association, the International DX Association, Northern California DX Foundation, and an honorary member of the Twin Cities DX Association. Ralph and his wife, Saundy, have four grown children. They enjoy their country home where Saundy cultivates flowers and Ralph grows antennas.



Al Hernandez K3VN (WA3YVN)

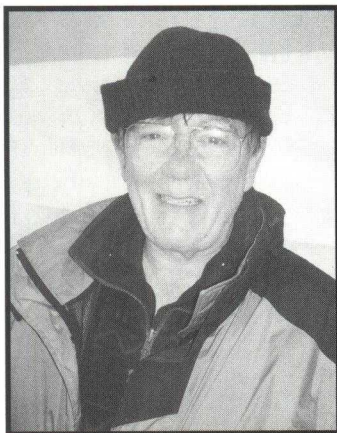
Al is an electronics engineer with more than 30 technical publications and two patents in electronic interference research and radio communications. He has published several expedition articles and contributed a chapter to the book *Antarctica: A New Look*. As a member of the U.S. Antarctic Research Program, Al participated in over 15 research expeditions and has the distinction of having crossed the "terrible" Drake Passage, off Cape Horn 18 times as a crew member aboard the

National Science Foundation Research Vessel HERO. He is a licensed Radio Officer in the U.S. Merchant Marine and is a Master Scuba diver and photographer. He is an active expeditioner and since 1992 has organized, co-organized, and/or participated in several major DXpeditions including South Georgia Island (VP8SGP), South Sandwich Island (VP8SSI), Falkland Islands (VP8CBC), and Kermadec Islands (ZL8RI). During three years of active exploration in Antarctica he activated Deception Island LU1ZC in the South Shetlands and operated from Palmer station KC4USP, South Orkney Islands LU1/KC4AAB, King George Island 4K1/KC4AAB and the R/V HERO KC4AAB/MM. He is a Fellow in the Explorers Club and is a member of the American Polar Society, Florida Academy of Sciences, Sigma XI -The Scientific Research Society, Radio Society of Great Britain, and the American Radio Relay League. Additional licenses and/or operations: CE8/WA3YVN, LU1AKO, C6AHI, XX9TWA, VR2/WA3YVN, ZD8/WA3YVN, ZL3AH, and BT1DX from China.



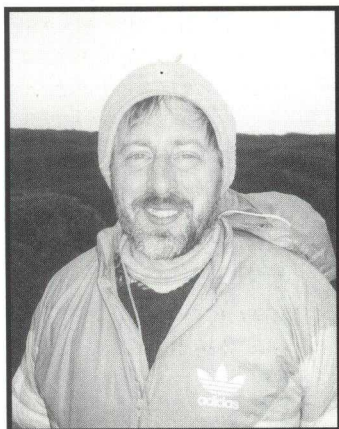
Glenn Johnson WØGJ (WAØPUJ)

Glenn has been DXing and contesting since the age of 15 in 1965. He is currently licensed as C6/WØGJ, VO2GJ, VP2EZ, and ZF2RT. He has recently operated on the CQWW multiop teams of VO2WL and V59T and on the ARRL multiop teams of VP5H and ZF2RX. His wife Vivien is KL7YL (also ZF2RU). He and Vivien home-school their 4 children. Melissa, age 12, (NØYPC & ZF2WL), was first licensed at age 8. Mark, age 10, (KBØNLC), was first licensed at age 7. Paul, age 9, and Carrie, age 7, have both learned the code and are studying for their licenses. By the time this book is in print, every member of the family should be licensed. The family contests as The Johnson Joules with their "club" call, N1JJ. They live on the continental (Laurentian) divide in the north woods of Minnesota. Glenn operates a PacketCluster node in the Northern Minnesota DX Association. In real life, Glenn is an orthopedic surgeon specializing in total joint replacement and fracture care. He also flies a floatplane in the summer when the bands are dead or he's not putting up towers and antennas.



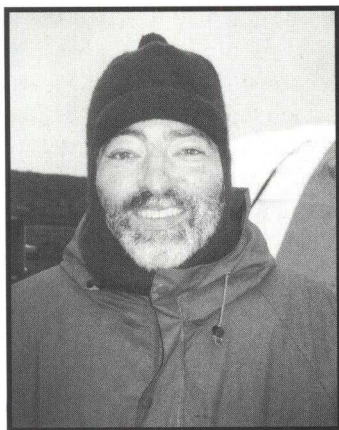
Wes Lamboley W3WL (W8FMG)

Wes is a Manager with Rockwell International and is responsible for the Engineering Computing, Simulation, CAD tools and Laboratories at the Duluth, Georgia site. He has been an active ham since 1954 and has operated from VK4, J28, KX6 and XRØ. He provided a cover story to QST in April, 1972, and was the Great Lakes Division Convention Chairman in 1975. He and his wife Bev have two children (Lisa and Joe) and live near Atlanta. They enjoy camping, bicycling, hiking, square-dancing, and doting on their grandchildren (Mariah and Sarah)!!



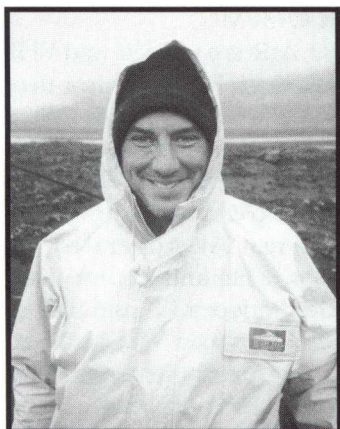
Arno Metzler OE9AMJ

Arno is 40. He has been active for 20 years as a ham, in CW and SSB. He has logged more than 300 countries. He enjoys amateur radio direction finding, for which he was several times the Austrian champion. He is the organizer of the annual all-OE 40/80m contest, which he won first place two times and was two times the third place. He is QRV 23 cm + 13 cm with his 5 ft. dish. Arno was trained as an electrician, but he's been a self-employed businessman for 20 years. He trades in bubble gum, small toys and costume jewelry. He and his wife Helga have 3 children.



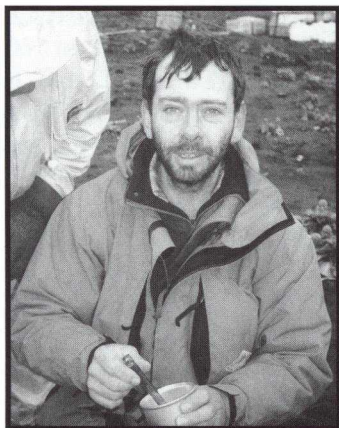
Mike McGirr K9AJ

Mike was first licensed in 1963 at the age of 16. He grew up in New Jersey, and lived on the East Coast until residency training at the University of Chicago brought him to the Midwest. He is Board Certified in Emergency Medicine & an examiner for the oral exams given by the American Board of Emergency Medicine. He is an avid DXer and prefers CW—especially on the low bands and WARC bands. He is on the top of the mixed and CW DXCC honor rolls and was the first Midwest station to work 5 band WAZ. Past operations include: 4S7AJG, 8Q7AJ, 8Q7BQ, HC8X, XF4DX, T32BJ, K9AJ/KH5K, AH1A, T30AJ and J3J. Mike's XYL (Sue) is KA9RHK who helps run the K9AJ PacketCluster node. They have 4 children ranging in age from 12 to 19.



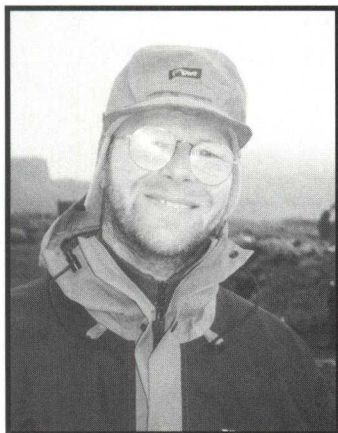
Michael A. Mraz N6MZ

Michael was first licensed in 1966 at age 11, and has held N6MZ since 1977. He is an avid CW DXer and contester, but also enjoys SSB and the digital modes. Michael is a builder and experimenter, has restored many tube-type "boatanchors," and enjoys modifying commercial transceivers. He published a QST article as a result of one of his modifications to the ICOM IC-765. He also enjoys experimenting with antennas, and has field-tested several new antennas for Telex/Hy-Gain. He is a life member of the ARRL, a DXCC member, and a member of the Western Washington DX Club. He received his BS degree in electrical engineering from Ohio State, where he was very fortunate to work with and study under Dr. John Kraus, W8JK. When not chasing new ones, he loves sailing, scuba diving, bicycling, cross-country skiing, and opera.



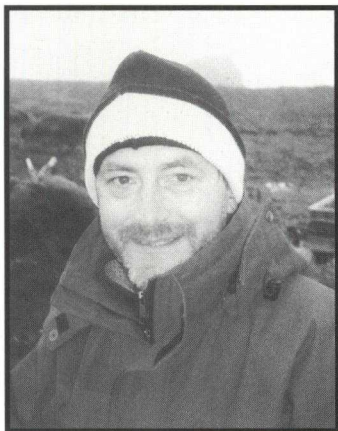
David Muller VK2JDM (VK2TQM)

David has been involved in radio and electronics since the age of 12. Interests include VHF, UHF voice, Packet, SSTV and HF operation. He is involved with the Parrammatta Amateur Radio Club, where he constructed, installed and maintains the Cub's 2m repeater. He served 6 years in the Department of Defence Army Reserve, where he was directly involved in the establishment, maintenance and running of many communications systems. He is actively involved in the State Emergency Service (a volunteer rescue organization). As Local Controller, his responsibilities include command and control of operational resources, plus the development of Standard Operating Procedures, including disaster plans, command and control of resources in response to a disaster, disaster planning and preparation, and training and education of both members of the service, plus the public. David has the following certifications: First Aid, Flood Boat Operator, Instructional Techniques Certified, Basic Rescue, Advanced Rescue, and Communications. He is currently employed by GEC Electronics as Operations and Quality Assurance Manager. He is married to Katherine, with two children, Alexis 5 years old and Renee 2 years old.



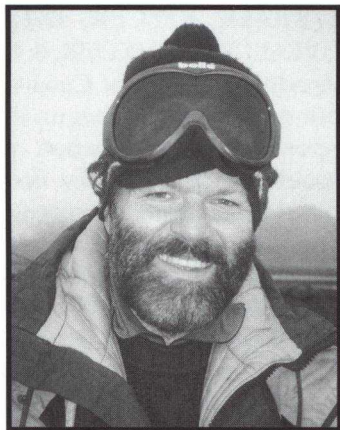
Arie Nugteren PA3DUU

Licensed since 1983, Arie is a satellite and VHF freak who recently picked up RTTY. He is a very precise and systematic op who will never miss a SAT opening while on expedition. He ran SAT/6 m on the FOØCI (1992) and AH1A (1993) expeditions. He was active as T3ØDUU, and ran SAT and RTTY as 7Q7AN this year. Arie operated the Morokulien HAM-station (a fictitious country situated right on the border between LA and SM) as SJ9WL/LG5LG 3 times, mainly on VHF and 6 m. Arie is an economist, and currently works as a production manager in a fruit and nuts plant.



Ghis Penny ON5NT

Ghis was born Dec. 10, 1947. He is married, with two daughters. He was licensed in 1966, and started DXing in 1973. He is on the Honor Roll #1 in CW, Phone, and Mixed. Operates CW and SSB on all 9 HF bands, and is a great fan of the low bands. He holds 5BDXCC, 5BWAS, and 5BWAZ. He needs only 1 more to complete WAZ on 160. Ghis went to Benin as TYA11 in 1981, and to Burundi as 9U5JB in 1985. He has operated from AP, CE, CX, LU, VU, YU, 4U11TU, 4U1VIC, and 7X. Other calls he has operated with are: XX9TNT, ON5NT/BV, /CT, /HBØ, /IT84, /LX, /VR2, /5NØ, /6W1 and EA/ON5NT, F /GM/, LA/, OE/, OZ/. Back home he has used the following calls: ON5Ø/5NT, OO5NT, OR5NT, OS5NT, OT5NT, and ON9CDX. Ghis also works the IOTA program, with 825+ confirmed. He activated EU-038 as ON5NT/PA, EU-146 twice as PA/ON5N, and EU-096 as OH1/ON5NT. He was a member of the first DXpedition to "Les Sept Isles" EU-107 as FV8NDX and operated as FV9NDX (single op) from EU-074, EU-105, and again EU-107. He is QSL manager for 9Q5TT, D2TT, D3T, 4U9Q, 7Q7XT, 5X1T, all calls for ON6TT, and for 9X/ON4WW, 9X1A, and 9X4WW (all recent operations). He also took care of N4HX's QSLs for N4HX/TT8, TYA11, and 9U5JB between 1979 and 1986. Ghis has a technical background in electronics, and is sales manager in consumer telecommunications equipment. He enjoys building equipment for his station, and loves to play around with his beverage antennas.



Willy Ruesch HB9AHL

Licensed since the age of 17, Willy is a CW and phone op, DXer (Top of Honor Roll, 5BWAZ, 5BWAS/5BDXCC,..) and an experienced DXpeditioner. He was previously active as SV1DB/A (Athos 1973), TI9FAG (1975), FOØXC (Clipperton 1978), 3Y5X (Bouvet 1989-90), NØAFW/KH5 and N9NS/KH5K (1993), 3YØPI (1994), and operated as VP8BZL (Falklands 1994). Willy is a doctor of science technology and works as a forest engineer for the Swiss government.

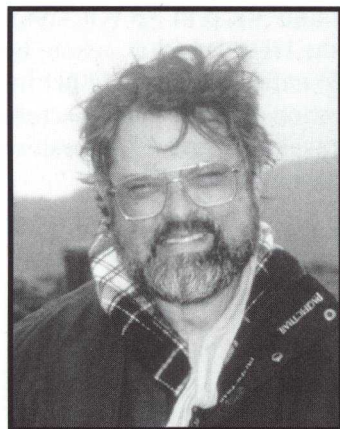
Michel Sabatino EA8AFJ

Michel is 36 years old. He was first licensed in 1988 as EB8BTK, and worked digital and voice satellite. After upgrading to EA8AFJ, he spent most of his radio time DXing and contesting, still leaving a little time to digital modes (RTTY, packet, pactor,...). He was born in Belgium where he studied until the end of high school, and then moved in 1978 to the Canary Islands (Tenerife), where he became an importer, wholesaler and retailer of Chinese handicraft products. Since August of this year he has been in Florence (Italy). He is still studying what kind of business to do: probably some internet related business. Michel has been married since 1989 with Cinzia. They have 2 children: Matias (6) and Alicia (3).

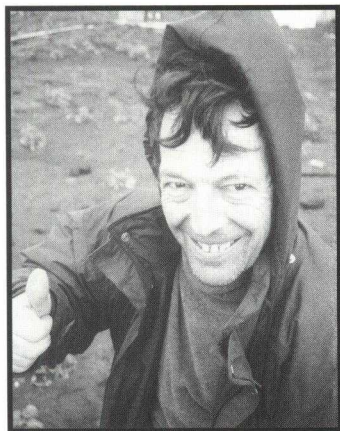


Robert Schmieder KK6EK

Bob is a physicist He is the author of more than 80 technical publications, 2 patents, and numerous popular articles. Bob was originally licensed in 1962. He is active in Islands on the Air (IOTA), having activated five New Ones: Farallons, NA-178; Guadalupe, NA-179; Roqueta, NA-183; Northern California Group, NA-184; and Central California Group, NA-187. Bob was a participant in the 1994 expedition to Peter I Island, Antarctica, 3YØPI, where in addition to radio operations, he carried out a program of sampling and chemical analysis of the environment. He was the co-Expedition Leader (with NP4IW) of the 1995 expedition to Easter Island/Salas y Gómez, XRØY/Z. He was co-Expedition leader (with ON6TT) of the 1997 VKØIR Heard Island Expedition. Other radio calls



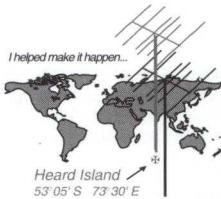
he has held are XF1/KK6EK, VP8CPK, 4K1/KK6EK, CEØ/KK6EK, VK6EKK, and VKØEK. Bob is the Founder and Expedition Leader of Cordell Expeditions, a nonprofit research group begun in 1977. The group is responsible for the creation of the Cordell Bank National Marine Sanctuary. Bob is the author of six books derived from his expeditions: *Ecology of an Underwater Island*, *Edward Cordell and the Discovery of Cordell Bank*, *3YØPI Peter I Island 1994 DXpedition*, *Rocas Alijos*, *DX-Aku: Messages from the 1995 Easter Island Expedition*, and the current *VKØIR: The 1997 Heard Island Expedition*. He is a Fellow of the Explorers Club and current Chairman of its Northern California Chapter. He is honored by *Schmieder Bank* (a rocky bank in the eastern Pacific), *Codium schmiederi* (an alga), *Erylus schmiederi* (a sponge), *Pharia pyramidata schmiederi* (a starfish), and *Megalomphalus schmiederi*, (a gastropod). He has been listed in almost every Who's Who in the world. He is the owner and operator of a research vessel, the Cordell Explorer.



Kurt Wetter HB9AFI

Kurt, age 56, has been a ham since 1964. He is married to Luciana, but has no children. He enjoys CW and SSB DXing and contesting. He has reached DXCC-Honor Roll, IOTA Honor Roll, USA-CA all-counties trophy. He has been active as 3AØHM, HBØ, C3ØEUA, S79FI, 4U1ITU, VK3FBL/7 (OC-195) and VK3FBL/p (OC-196). Kurt is a member of the HB9MM Club, where he won several times H26 national contest. Other interests are radio direction finding, hiking, cross country skiing and traveling. Kurt is professionally an interior-decorator and carpet-layer.

ACKNOWLEDGMENTS



We are proud to list the people and organizations that made this project happen. We apologize for brevity here; to include even the briefest description of what each individual did would have pre-empted the entire book!

The Expedition Team

9V1YC James Brooks • EA8AFJ Michel Sabatino • HB9AFI Kurt Wetter • HB9AHL Willy Rusch • HB9BHW Hans Burki • K3VN (WA3YVN) Al Hernandez • K4UEE Bob Allphin • K9AJ Mike McGirr • KK6EK Bob Schmieder • KØIR Ralph Fedor • N6EK Bob Fabry • N6MZ Michael Mraz • OE9AMJ Arno Metzler • ON5NT Ghis Penny • ON6TT Peter Casier • PA3DUU Arie Nugteren • RA3AUU Igor ("Harry") Booklan • VK2JDM (VK2TQM) David Muller • W3WL (W8FMG) Wes Lamboley • WØGJ (WAØPUJ) Glenn Johnson

Pilots

JH1ROJ Isao Numahuchi (Japan). • KØEU Randy Martin (USA Midwest) • N1DG Don Greenbaum (USA Northeast) • ON4UN John Devoldere. Pilot coordinator • W2IJ (WA2FIJ/6) Jay Kobelin (USA Westcoast) • W4WW (N4PYD) Scotty Neustadter (USA Southeast) • WØEK (WDØAEK) Bob Bruner (USA North)

Support

K7BV Dennis Motschenbacher (souvenir manager) • N1DG Don Greenbaum (pilot, assistant webmaster) • NP4IW Carlos Nascimento (planning and equipment) • ON1AIG Andre Marchandise (pacsat anchor station) • PA3BXR Rob DeWit (PBBS log server) • VE7TCP Lyndon Nerenberg (internet services) • W4FRU John Parrot (QSL manager) • W6OSP Bruce Butler (financial services) • WW5L Tom Anderson (T-shirt manager)

Additional Support

Alfsen Exports/Mario Alfsen (warehouse facilities) • Amcom • DJ4AX (predictions) • DK9SQ (fiberglass rods) • DL6RAI (PP propagation software) • Fredy Furrer • Ham Radio Outlet (loan of FT1000MP) • HB9AEE (propane fittings) • IPS (Radio and amp) • KI6WF (cable fabrication) • N1DG (laptop computers) • N6TR (logging software) • NI6T (PK232 TU) • NX1P (Yaesu serial interfaces) • ON4UN (low band vertical) • ON7UN (Inmarsat) • Space Service (ASAPS HF Propagation Prediction software) • WZ6Z (printing services)

Foundations, Corporations, and Saints (>\$20,000)



Northern California DX Foundation

The Foundation was our largest, and one of the earliest, donors. As such, it was crucial in setting the stage for a successful fundraising campaign. We are most grateful to the members of the Foundation for their faith in this project. [We also thank the Foundation for the contribution of \$15,000 to the 1994 Peter I DXpedition 3YØPI!]



Funkamateur and Knut Theurich DGØZB

The German Hamradio Magazine »Funkamateur« made a significant financial donation, printed this book, and provided considerable savings on the cost of printing the QSL cards. We are very grateful for this support.

Patrons (>\$10,000)

W6OTC Glenn Vinson
 JH1AJT Yasuo Miyazawa ("Zorro")
 The JA Amateur Radio Community

Benefactors (>\$5000)

NP4IW Carlos Nascimento
 Frederick Leonhardt Foundation (NY1I)



American Radio Relay League (ARRL): The Colvin Award

The ARRL administers the Colvin Award, given for significant achievement in the field of DXing. We are proud to be the second recipient of this award, and grateful to the Lloyd and Iris Colvin Foundation for it.



International DX Association (INDEXA)

We would like to acknowledge the support of John W4FRU as the QSL manager, through INDEXA.

Commercial Sponsors

We are especially indebted to Yaesu (Europe), Cushcraft, and ALPHA/POWER for providing the major constituents of the stations. In Europe, Pittoors and Spector provided major amounts of support in video and photographic services.

The following list is necessarily incomplete, but serves to demonstrate the commitment of the commercial sector to DXpeditions and to record our appreciation of that support.

ALPHA/POWER, Inc. (USA) (Alpha amplifiers)

Formerly Ehrhorn Technological Operations (ETO). Dick Ehrhorn generously lent Alphas for many of the major DXpeditions.

Armamast NV (Belgium) (funds)

A manufacturer of light armatures, towers and street lamp posts. They donated US\$830, which we used to buy gasoline.

Aurum Telemedia Company (USA) (Compaq portable computers)

One of the best computer sales businesses in the USA.

Belgian Polar Exploration Society (funds)**Cami NV (Belgium) (funds)**

Wholesaler in picture framing material (frames, machines to frame, glass, packing material). They donated US\$300 which we used to buy food.

Carol Cable Company (USA) (coax)**Cushcraft (USA) (antennas)**

Nearly all the beam antennas were from Cushcraft. Some of these had been provided for the 1995 XRØY Easter Island DXpedition.

Eclips (Belgium) (inmarsat)

A reseller of total solutions for the professional HF, VHF, TV and satellite market. Eclips gave us an Inmarsat A satellite telephone on loan.

Electrabel (Belgium) (funds)

The main electricity providers in Belgium. They donated funds which we used for the generators.

Exploration Products (USA, Canada) (Weatherhaven shelters)

Provides a range of specialty gear for expeditions. Customized our shelters for this expedition.

European Satellite DX Fund (Europe) (satellite equipment)**EUnet Belgium (Belgium) (internet services)**

One of the main internet service providers in Europe. They let us use an Email account and a dedicated telephone line for free and assisted us in bringing the Inmarsat datalink from Belgium.

Fritzel (Germany) (dipole antenna)

The Fritzel is a German-made multiband dipole of exceptional quality.

Heil Sound (USA) (headsets)**Inmarsat Station 12 (Holland) (inmarsat)**

One of the best Inmarsat 'LES' or a 'Land Earth Station', for satellite telephone users. They gave us significant price reductions.

Maiers Transport and Warehousing (USA) (storage)**Philips (Belgium) (Fax)**

One of the big manufacturers of household and office equipment.

Pittoors Video Team (Belgium) (video camera, editing, video copies)

If not the biggest, then certainly the most advanced video editing and production houses in the Benelux.

R. E. Smith Serial Communications (USA) (electronics)**R. Myers (USA) (Antennas)**

Communications (Single Band Gladiator Verticals). Heard Island used 4-square vertical arrays on 80 and 160 m built from these antennas.

Roland Digital (Australia) (signs)**ROPE Inc. (USA) (nylon and dacron guy rope)****Schurr (USA) (microphones)****Spector (Belgium) (photographic film and processing)**

A large photo processing plant and distributor.

Sphere Communications (Australia) (WX station)**Synthetic Textiles, Inc. (USA) (guy rope)****Wyvern Technology Inc. (USA) (WF1B RTTY logging software)****Yaesu (Europe) (radios and funding for QSLs)**

A prominent manufacturer of radio equipment. They lent us 7 Yaesu radios (4 FT1000MP and 3 FT900 including power supplies and filters).

Transportation and Logistics

Crew of the Marion Dufresne, our expedition vessel, especially P. Regnier (captain), Claude Chaufrasse (TAAF interface), Christian Palacin (Tonton, the helicopter pilot), and Georges Marjak (Chief Officer).

IFRTP (Institut Francais pour la Recherche et la Technologie Polaires) and TAAF (Territoire des terres Australes et Antarctiques Francaises). Special thanks to Mr. Hermoso, Mr. Goutorbe, and Mr. Balut.

Technical and Logistical Assistance

Europe: ON1CIK • ON6WU • ON5NT • ZS6EZ • ON5FP • ON5SQ
 • ON7UN • DL5EBE • IØJBL • HB9CNM • ON4ASB
 Australia: VK6NE • VK6UE • VK6BFI • VK4JKL • VK2BEX
 Reunion Island: FR5DN • FR5FC • FR5GQ • FR1HZ

Financial Support

The amateur radio community was very generous in supporting this project. All donors at any level are listed below, down to the Penguin partners (\$1 or more). Unfortunately the complete list of donors was not available before press time.

Big Ben-ders (>\$1000)

Brook Byers K4TKM • Clipperton DX Club • Craig Boyer AH9B • Danish DX Group • Don Doughty W6EEN • European DX Foundation (EUDXF) • Flanders DX Club • Glenn Bartoo WØNG • Ken Byers K4TEA • Larry Gandy KS6DV • Lynx DX Group • Mecklenburg Amateur Radio Society • Moscow State University Radio Club • North Alabama DX Club • Northern California DX Club • RSGB/Chiltern DX Foundation • Scotty Neustadter W4WW (ex N4PYD) • Southeastern DX Club • Ted Algren KA6W • The Quigley Family • Twin Cities DX Association • Union of Belgian Amateurs (UBA) • Vincent Denecker GØLMX

Elephant Seal Society (>\$500)

German DX Foundation • Herb Asmussen GØWAZ (G/OZ7SM) • LADX Group • Lake Wettern DX Group • Lone Star DX Association • North Jersey DX Association • Northern Minnesota DX Association • Northern Ohio DX Association • The Second Foundation (Richard Factor WA2IKL) • UA3AB • Union of Spanish Radio Amateurs (URE/DX)

Heard Island Cormorant Club (>\$100)

AA4NG • AA7MH • AC5IB • AI1N • Alamo DX Amigos • Bill McConnell N9US • Charles Harris • Conway Reef DXpedition (NI6T et al.) • Danish DX Group • David and Rosita Issel • DF6JC • DK8OK • DL1IAQ • DL8JDX • Eastern Iowa DX Association • Eastern Washington DX Club • Flanders DX Club • Garth Hitchens KG7GA • GM DX Group • GM DX Group • Greater Milwaukee DX Association • HB9AFH • HB9ANR • HB9KAN • Healesville (Australia) Amateur Radio Group • JA3DLE/1 • K1MEM • K1MZ • K3DI • K5JZ • KE6HD • KH6ALF • KL7IKF • Mile HI DX Association • Mississippi Valley DX/Contest Club • N1MD/N1TLN • N3BB • N5CQ • N6TV • NJ8R • No. Illinois DX Asso-

ciation • NO8D • NØDX (ex AAØGG) • NØJK • North American Satellite DX Fund • Northeastern Wisconsin DX Assoc. • Northern Illinois DX Association • NT5C • NW6P • OH DX-ers • OH2WI • Platinum Coast Amateur Radio Society • Redcliffe and Districts Radio Club • RN6BY • Ron Stordahl KØUXQ • Russian Speaking Radio Club Int'l (NY) • San Diego DX Club • South German DX Group • South New England DX Association • SouthWest Ohio DX Association • St. Cloud Amateur Radio Club • Stewart and Barbara Lewis • UA3AB • UA6AF • Venezuelian DX Club • VK5WO • W1TYQ • W1WFZ/K1FTA • W2JGR • W3NB • W4DR • W4XS • W4ZV • W5QIX • W6PT • W6TEX • W7EYE • W7HUY • W8CXO • W8EB • W8NUV • W9QQ • W9ZR • WB8ZRL • WBØMEJ • West Net Group/South Dublin Radio Club • Western Washington DX Club • Wireless Institute of Australia • WØBV • WØCD • WØJRN • WØYDB • WØZV • WT8S • WZ6Z • XE1CI

Penguin Partners (>\$25)

AA4A • AA6TT • AA6TY • AA7AV • AA7PM • AAØBS • AB6NQ • AE1Q • Alan Day • Arthur Lewis • Bruce Robeson • Burch Cameron • DC8TS • Dean Showalter • Devlynn Tanner • DF5SR • DJ5EY • DJ5JI • DJ5NN • DL2MEN • DL6ET • E. D. Brown • EA3ELM • F6BEE • F6BKI • F8NJ • Fred Moore • Fred Telewski • G3AEZ • G3KWK • G3PMR • Gaeton Messina • Gerald Bay • Guy Black • Harwood Shepard • HB9FBG • I121171 • IK4GME • IKØFVC • J. W. Del Conte • JA2JW • JA2QPY • JA4DWZ • Jerry King • John Larson • John Witt • K1DC • K2BG • K2IBW • K2JF • K2NV • K2RW • K2TQC • K2YG • K3DH • K3KO • K3SME • K3UL • K4CIA • K4CVD • K4EOU • K4FJ • K4IQJ • K4JBY • K4JLD • K4RS • K5EWS • K5KR • K5RT • K5UIC • K6DQ • K6FG • K6IPV • K6JAJ • K6NS • K6OZL • K6SHJ • K6TEH • K6UO • K6YMH • K6ZUR • K7DZ • K7TCL • K7TED • K7WP • K7WTG • K8JLF • K8KFJ • K8PR • K9APW • K9LCR • K9VAL • K9WK • KA2PHQ • KA3UNQ • KA4S • KA5PZM • KA6A • KA6ING • KB9JM • KBØVQ • KBØWY • KC5AK • KD5ZD • KD6XY • KE2WY • KE4SCY • KE5PO • KE9XN • KF2LW • KG2EH • KI6PG • KJ7ES • KN6TN • KØCX • KØIJL • KØJUH • KØWPK • KS4LY • KT4KE • Mabry Electronics • Marina Amateur Radio Association (AA6EG) • Midland Amateur Radio Club • N2FS • N3BB • N3JB • N3SCR • N4AN • N4JJ • N4QQ • N4RU • N4XDQ • N5ORT • N5UMC • N6GM • N6TG • N7DG • N7MCA • NM7M • NN2C • NØAX • NØBB • NØRN • Northern Portugal DX Group • OE3SGA • OH2BCK • OH2JJN/K3FK • OH2LU • ON4CU • ON4IZ • ON5DO • ON5NT • ON5TW • ON7NQ • PA3FQA • Patriot DX Association • Portugese DX Group • R. L. Congdon • Redwood Empire DX Club • Riverland (Australia) Amateur Radio Club • Robert Pazanin • Robert Spindle • Rochester DX Association • Roger Monroe • SM7AYV • Stephen Jones • VA3JAK • VE3IRF • VE3XN • VE7TCP • Virginia DX Centry Club • W1FZ • W1LW • W1NH • W1OHA • W1TO • W1UC • W1WAI • W2BE • W2LO • W2TQC • W3ANX • W3GH • W3UM • W4FX • W4JS • W4MBD • W4NL • W4NXE/DU • W4OGG • W4OWJ • W4PJV • W4PK • W4PV • W4TE • W4UW • W4WM • W4WNB • W4ZYT • W5BXX • W5FKX • W5ILR • W5KN • W5OXR • W5USM • W5ZPA • W6AQ • W6AYQ • W6JTI • W6JZH • W6PRI • W6RQQ • W6SYL • W6WKE • W6WVK • W6YA • W7BJB • W7HR • W7KCN • W7LR • W7RXD • W7VV • W8AH • W8FJ • W8LTQ • W8QID • W8QNF • W8RV • W8WEJ • W9FF • W9JVF • W9NT • W9PD • W9UTC • W9YSX • WA1QXR • WA2VYA • WA3ULH • WA4MME • WA5EIO • WA6KAH • WA7BAY • WA7UTM • WA9VGY • WAØWOF • Wayne Austero • WB2P • WB2V • WB4DBB • WB4DRB • WB6WCW • WB8GXB • WB8ZRV • WB9EEE • WC1M • WC9T • WDØGOS • Western Connecticut DX Association • Western Washington DX Group [WB2YQH] • WF5T • WJ2O • WK6E • Wm. Rowlett • WØFLS • WØNFM • WØRLX • WØRXL • WW1V • WW5L, WY5H • WY2V • WZ1Q

The Tardigrade Trust (<\$25)

Literally thousands of persons enclosed small donations, either with their QSL cards or separately. Here is a list of those we had before press time.

AA1HB • AA1ON • AA2DY • AA2FJ • AA2HF • AA2VG • AA5F • AA5QT • AA5WE • AA6RK • AA7AV • AA7KF • AA8EY • AAØBS • AAØPQ • AB2N • AB6QM • AC5BG • AC5CM • AC9RCJ • AD1C • AH6HH • Alan Braun • Alan Cunningham • Allen Robbins • Anne Erickson • Anthony McClenny • Audie Kaufman • C. H. Brudtkuhl • Carl Volker • Charles Bilharz • Charles Prindle • Charles Thiesen • Clayton Conard • Craif Mellinger • Craig Severson • CT1BH • David Raines • DF6JC • DJ9ZB • DK3VN • DK8UH • DL9TJ • Donald Olson • EA5KB • Earle Grandison • EI6S • Elwood Blose • F-16332 • F3SG • F5VU • F6AJA • F6BFH • F6FGZ • Foundation for Amateur Intl Radio Service • G3LZK • G3VMW • George Bombria • GM3BQA • GM4UZY • Gordon Carlson • HAØDU/HAØUZ • HB9ATA • HB9BGV • HB9DDM • HB9MD • Howard Sherer • I4EAT • IK4CNO • IK6CGO • J. F. Hisserich • JA3BKP • JA8BVJ • JA8OW • James Brackett • Jayne Calvert • John Douglas • John Durand • John Evans • John Holterman • John Owens • John Smetona • John Smith • John Stager • Jonathan Poulton • Joseph Butler • K1BLT • K1BV • K1GQC (WA4NQG) • K1HDO • K1HJC • K1IYA • K1NTR • K1PL • K1VMI • K1ZDI • K2AJX • K2FL • K2FU • K2GKM • K2SHZ • K2SZ • K3ATO • K3FMQ • K3IX • K3KY • K3TC • K4AVC • K4BSF • K4CSB • K4ESE • K4FOM • K4JMN • K4LAP • K4ULA • K4XF • K5EYT • K5LF • K5MW • K5OVCKA4JNB • K5VR • K5XC • K6ASB • K6BIR • K6DQ • K6EID • K6ERI • K6HNZ • K6IO • K6NL • K6OWN • K7CMZ • K7EG • K7ET • K7UU • K7XE • K8AJR • K8DE • K8MBH • K8UE • K8ZLP • K9AB • K9CC • K9HUY • K9KU • K9RJ • K9XJ • KA1CLX • KA1UMB • KA2HUY • KA2NBB • KA8MUJ • KAØKEL • Kay Hargis • KB5OCV • KB7YX • KC3Q • KC5HWR • KC6QBD • KCØOSO • KDØIP • KE4DH • KE4IXE • KE6HJ • KE6WL • KE8RO • KE9DWN • KF2XF • KF5PE • KF6CNE • KF8VW • KG6AM • KG7DK • KH6CF • KI6T • KJ6NZ • KJØG • KK5UY • KL7AH • KN6OV • KO4RR • KO8O • KØCVD • KØDEQ • KØEPE • KØGAS • KØII • KØRS • KØUSJ • KØVZR • KØWUI • KP3R • KQ2K • KS4Q • KT4AC • KZ7V • L. A. Jannone • LA5CBA • LA9GY • Larry Wassman • Lee Blaske • Leo Keelan • Linda Wlodarski • Lloyd Smith • Louis Greub • M. R. Lipsey • M. W. Crichton • Marilyn Olson • Marion Wilson • Martin Bayes • Martin Hankins • Marvin Bloomquist • Mary Royle • N1EOA • N2OPO • N2SU • N3AQQ • N3CDF • N3CW • N3IUI • N3NNV • N3RB • N4AIG • N4AN • N4CT • N4DB • N4GAK • N4HO • N4NM • N4QQ • N4WV • N4XR • N4XXK • N5FJ • N5GGO • N5II • N5LZ • N5UL • N6GM • N6JM • N6QI • N7JKF • N8LGP • N9HUB • NB7N • NC1E • ND2A • ND3A • ND5S • NG6N • NO7F • NØAT • NØAX • NØFA • NØZA • NR6S • NX1Q • NY1L • NZ2L • OH2BBF • OH2DW • OH5TQ • ON4AMM • ON4AWK • ON4AWZ • ON4IR • ONL5770 • Paul Baumgarte • Paul Elliott • Peter Farige • Phillip Gendreau • PY2KP • R. W. Birbeck • Richard Brown • Richard Eddy • Rodney Klug • Ronald McLean • Roy Maull • Roy Stiegler • Rudy Mooney • Sat Khalso • Sat Kirpal Khalsa • Sheila Frank • Shepard Faber • SMØSMK • SMØDJO • Steven Larson • Tom Mannix • VE1ACU • VE1MF • VE2UI • VE3XO • VE6LB • VE7EW • VE9AA • VE9RJ • Vincent O'Keefe • VK8NSB • VR2KF • W. A. Rice • W1CYB • W1EK • W1JEL • W1MK • W1ZC • W1ZK • W2APU • W2CVW • W2FG • W2OKM • W2OMV • W2UP • W2YT • W3EPR • W3HQU • W3KVS • W3NC • W3NQA • W3NV • W3SAI • W3YD • W4CZ • W4DRF • W4DUP • W4EEU • W4HM • W4IU • W4QW • W4USM • W4VDA • W4WN • W4YCY • W5BWA • W5CJZ • W5ISF • W5NZR • W5SVZ • W5VHN • W5VW • W5ZTG • W6AJJ • W6ESJ • W6FRZ • W6HAL • W6JHQ • W6JOX • W6PGK • W6QON • W6TVP • W6TWN • W6TWO • W6WBY/7 • W6YWH • W6ZPV • W7FKF • W7IUV • W7NL • W7NN • W7QN • W7SX • W7WT • W8CT • W8INR • W8INR • W8LWU • W8PT • W8WFN • W8WVM • W9BF • W9EDA • W9HAO • W9IV • W9KP • W9LJR • W9MAK • W9MCJ • W9RB • W9TGN • W9WHM • W9ZJ • WA1FCN • WA1PTZ • WA1ZIC • WA2BDP • WA2FVL • WA2IZL • WA2UDT • WA3GNW • WA4MCZ • WA4NQG • WA5TUD • WA5VGI • WA5YOM • WA6KAA • WA7KNK • WA8GKW • WA8JBG • WA9MJT • Walace Teto • WAØDEU • WAØGFS • WB4GTM • WB4MRH • WB6KJE • WB7EYD • WB7SWM • WD6EYD • WD8LTM • WD8RJR • WE6V • WE8Q • WI5A • William Haselmire • William Leggat • William Way • WL7VO • WM6R • WØBPA • WØCM • WØGKE • WØJS • WØMHK • WØMHK • WØPGI • WØRI • WP4U • WT4U • WV3B • WV6T • WW1V • WW5WW • YB3OSE • YB9BON • YV3BAP • ZJ1ABD/WA6URY • ZL2TT • ...

We extend our appreciation to these and to all others who were there but are missed in this list. Thank you for helping make VKØIR happen!

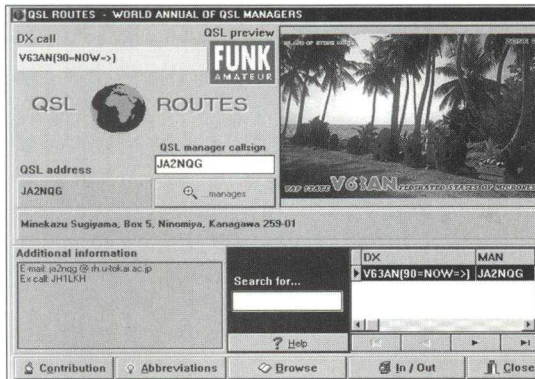
CREDITS



The rights to these photographs and drawings remains with their sources as listed below. International copyright law prohibits the copying of any material in this book without express permission of the copyright owner. Drawings not specifically attributed are either referenced in the text or were produced by the author.

Cover	KØIR	92(upper)	WØGJ
Rear insert (ul)	WØGJ	92(middle,lower)	K3VN
Rear insert (ur)	HB9AHL	96(upper)	KK6EK
Rear insert (ll)	ON5NT	96(lower left)	N6MZ
Rear insert (lr)	WØGJ	96(lower right)	WØGJ
Frontespiece	OE9AMJ	100(upper left)	N6MZ
1,2	KK6EK	100(upper right)	K3VN
21(upper)	TAAF	100(lower left,right)	WØGJ
21(lower),25,28-29,32,40,41	KK6EK	101(upper,middle)	WØGJ
42,44,45	KØIR	101(lower)	OE9AMJ
48(left)	WØGJ	104(upper)	KK6EK
48(right)	KK6EK	104(middle)	OE9AMJ
49	WØGJ	104(lower)	KØIR
52	KØIR	105(upper)	K3VN
53	WØGJ	105(middle)	KØIR
56(upper)	HB9AHL	105(lower)	OE9AMJ
56(lower),58	WØGJ	108(upper)	WØGJ
61(upper)	K3VN	108(middle)	ON5NT
61(middle)	WØGJ	108(lower),112-113	WØGJ
61(lower)	OE9AMJ	116(upper)	OE9AMJ
64(upper)	KK6EK	116(lower)	KØIR
64(middle)	K3VN	117(upper)	OE9AMJ
64(lower)	OE9AMJ	117(lower),120(all)	KK6EK
65(upper)	WØGJ	124(upper)	WØGJ
65(middle,lower)	KK6EK	124(lower)	ON5NT
68(all),69(upper)	KK6EK	128	WØGJ,KØIR, OE9AMJ,K3VN
69(lower)	WØGJ	129	WØGJ,KØIR, ON5NT,OE9AMJ
72(upper)	K3VN		
72(lower)	WØGJ		
73	KK6EK	132(upper,lower)	WØGJ
75	WØGJ	136(all)	KK6EK
75(dwg),76-77(all),80-81	KK6EK	140(upper)	WØGJ
84(upper left)	N6MZ	140(middle)	K3VN
84(all others)	WØGJ	140(lower)	HB9AHL
88(upper left)	ON5NT	145	KØIR
88(upper right)	WØGJ	192	PA3DUU
88(lower)	OE9AMJ	199-208	WØGJ
90	KK6EK		

QSL-ROUTES ON CD-ROM

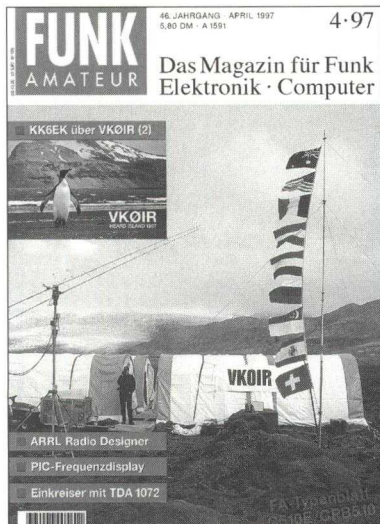
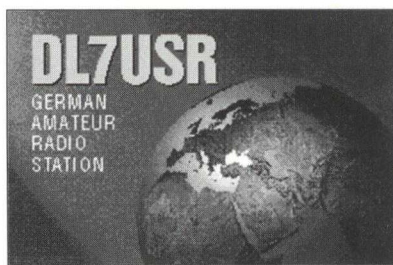


*The first CD-ROM edition
of our manager list is out now:*

- 87000 managers
- 5000 qsl images
- thousands of addresses
- additional information
- ex-calls of dxers
- »lost« managers
- e-mail addresses
- data export function
- browse mode
- slide show and so on...

QSL CARDS

*QSL cards printed by
DGØZB...
I offer value for money.
World wide printing
service for high quality
QSL cards.
World wide delivery!
DXpedition support!*



GERMAN AMATEUR RADIO MAGAZINE

PLEASE WRITE FOR PRICE LIST OR SAMPLES
ALL PUBLISHED AND PRINTED BY

DGØZB, KNUT THEURICH
THEUBERGER VERLAG GMBH
P. O. BOX 73
D-10122 BERLIN
GERMANY

TEL +49-30-44 66 94 60

FAX +49-30-44 66 94 69

E-MAIL FUNKAMATEUR@COMPUSERVE.COM

[HTTP://WWW.FUNKAMATEUR.DE](http://WWW.FUNKAMATEUR.DE)