

# VKØEK Heard Island 2016

## Part 4 - INFOTECH: “Good evening...Heard Island!”

Robert Schmieder KK6EK, with Rich Holoch KY6R,  
Adam Brown K2ARB, Mike Coffey KJ4Z, and Pete Bourget W6OP

### It Takes More Than HF

In the Good Ol’ Days, all you did was turn on your radio and log QSOs. Everything went out and came in on HF. DXing had one channel only, and it was flakey. Of course, flakiness was the source of both challenge and delight in the sport of DXing. But then the internet was invented, and websites, streaming video, social media, and real-time interactive multimedia became common. Rather quickly, HF just wasn’t enough—DXers were offered a reliable communications channel that could materially enhance the experience

of short-wave radio. Of course, you still have to use radio waves to be doing amateur radio, but DXers developed an apparently unlimited appetite for additional *information* to help them get that next—or last—crucial QSO. Increasingly, DXers are depending on *Infotech* to keep them happy.

From the very beginning, infotech was a central part of the VKØEK project. Our emphasis was to involve as many kinds of “info” and “tech” as we could. Among others, we implemented:

Offsite	Voyage	Onsite
<a href="#">Expedition and radio websites</a>	<a href="#">GPS trackers</a>	<a href="#">DXA</a>
<a href="#">Newsletter</a>	<a href="#">Reverse Beacon Network</a>	<a href="#">Email</a>
<a href="#">Facebook, Twitter</a>	<a href="#">WSPRnet</a>	<a href="#">Skype</a>
<a href="#">Contact us</a> (Help desk)	<a href="#">Drifter tracking</a>	<a href="#">AudioLog</a>
<a href="#">QSL orders</a> (OQRS)	<a href="#">Diving buoy tracking</a>	
<a href="#">Souvenir orders</a>		

Many of these capabilities were implemented by, or at least stimulated by, co-organizer Rich Holoch KY6R. With professional expertise in both software development and social media, Rich proposed, created, and managed an impressive range of services for the DXer, some of which were done for the first time

(ever). Mike Coffey KJ4Z contributed several technological leaps, including the AudioLog and the first (ever) remote operation on a DXpedition. Adding in the upgrade of DXA by Pete Bourget W6OP, trackers by Adam Brown K2ARB, and others, it was an infotech *tour-de-force*.

### Outreach Offsite

One of our central goals was to reach as many DXers as possible with information that would help them make a valid QSO with VKØEK. Part of that was to enable them to interact with the DXpedition, before, during, and after the event. To that end, the main vehicle for outreach was the two websites, [www.heardisland.org](http://www.heardisland.org), which covered the expedition as a whole, and <https://vk0ek.org/>, which principally covered the radio operations.

The **main website** carried links ABOUT, TEAM, NEWS, NEWSLETTER, AUDIOLOG, DXA, QSLs, SOUVENIRS, RESEARCH, FAQ, DOCUMENTS, SPONSORS, and DONATE! The NEWS page carried stories about developments in personnel, logistics,

operations, and (eventually) scientific results. The AUDIOLOG was a cumulative set of recordings made during the actual expedition. RESEARCH provided descriptions of the field work. DOCUMENTS provided the extensive set of expedition documents: Project Description, Legal, Permits, Policies, PowerPoint presentations, the expedition poster, a library, a complete copy of VKØIR by KK6EK (1997), and the Final Report. On the SPONSORS page we listed every person and organization that provided support.

The **radio website** carried links NEWS, HOW TO WORK US, PROPAGATION, LOG, QSL, PLAN, SPONSORS, SOUVENIRS, CONTACT US, TRACK

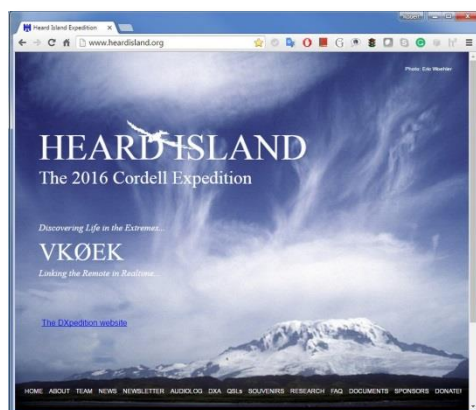
US, LISTEN TO US, DXA, ARGO BUOYS, DRIFTING BUOYS, WSPR BEACON, WEATHER, and PHOTOS. It was where you went to see what was happening, radiowise.

The expedition was represented on Facebook and Twitter. Four-page electronic Newsletters were sent to a subscription-only list about once per month for a year; the mailing list was more than 7000 persons.

A significant innovation was the replacement of

the traditional team of pilots with an online Help Desk. Any person could click on the “Contact us” link, which would provide a dialog box (a “ticket”) in which could be entered a question, comment, issue, etc. A team of volunteers organized by Rich (called Diablo DXers) processed the ticket, usually within a few hours, and provided a personal response. About 3000 of these tickets were handled during the project. We believe this is the first time this was done.

Main website



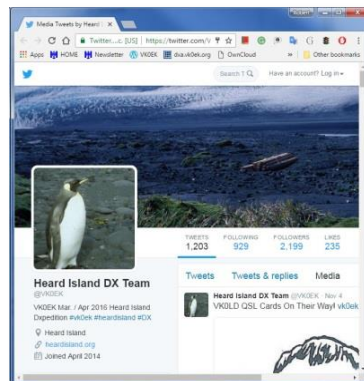
Radio website



Facebook



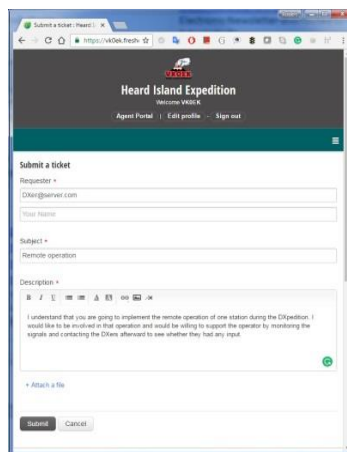
Twitter



The Newsletter



Help Desk (Contact us)



## Outreach Underway

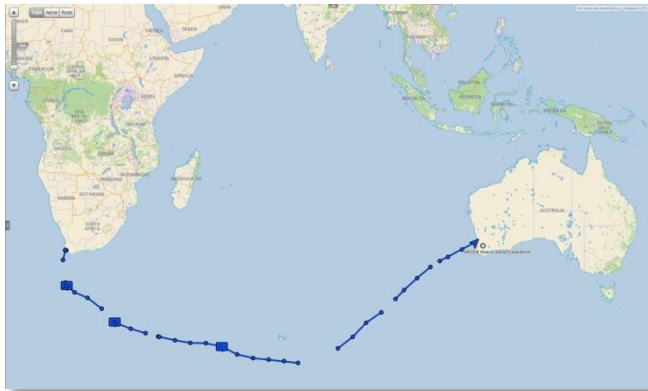
Several means for tracking the progress of the expedition were implemented by Adam Brown K2ARB. Among these was a GPS tracker. Anyone could watch the tracker with an ordinary browser.

The Weak Signal Propagation Reporter Network (WSPRnet) published spots and a map showing the location of the vessel using the callsign ZS9HI, and the location of Heard Island during the time we were operating.

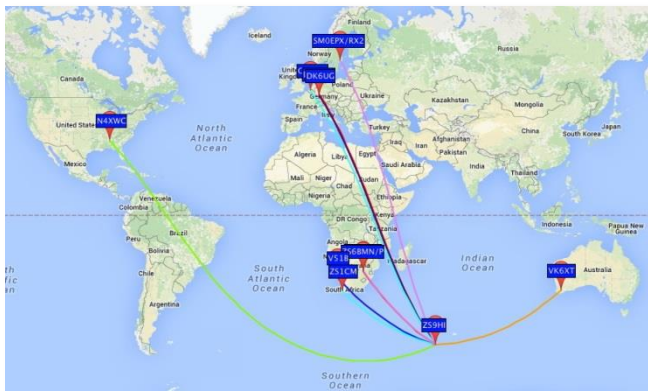
The Reverse Beacon Network (RBN) is a network of stations listening to the bands and reporting what stations are heard, when and how well. The RBN listened for our signals and reported them as spots, including distance, direction, and signal strength. Their data enables us to plot the frequency [MHz] of QSOs as a function of time of day [UTC]. The data clearly shows the diurnal cycle.

Adam Brown also arranged for the expedition to deploy five drifting buoys for the National Oceanic and Atmospheric Administration (NOAA) and five diving buoys for the Woods Hole Oceanographic Institute (WHOI). All ten buoys were deployed on the outbound voyage Cape Town→Heard Island. Upon entering the water these buoys begin transmissions of multi-parameter data, including location, and start to drift in the wind and current. The data can be accessed online, and the buoys are still transmitting as of November, 2016. The plot at the bottom of this page shows the positions of the five drifter (NOAA) buoys, with color-coded water temperature.

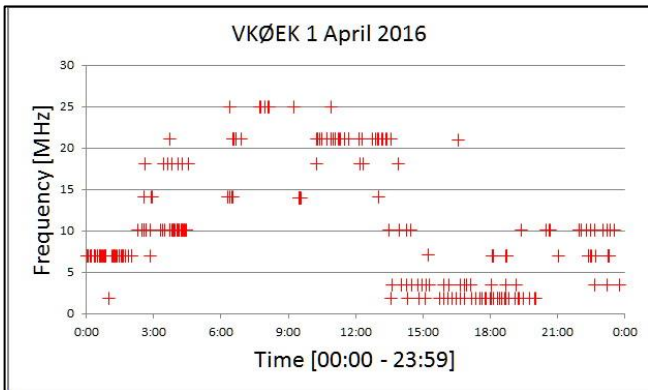
Although the buoys drifted generally northeast, most of them encountered stalls where they went around in circles. One buoy encountered Kerguelen Island (at 70°E) straight-on, and scudded around on its south side, rather than running up on the beach. We expect the same would happen for Heard Island.



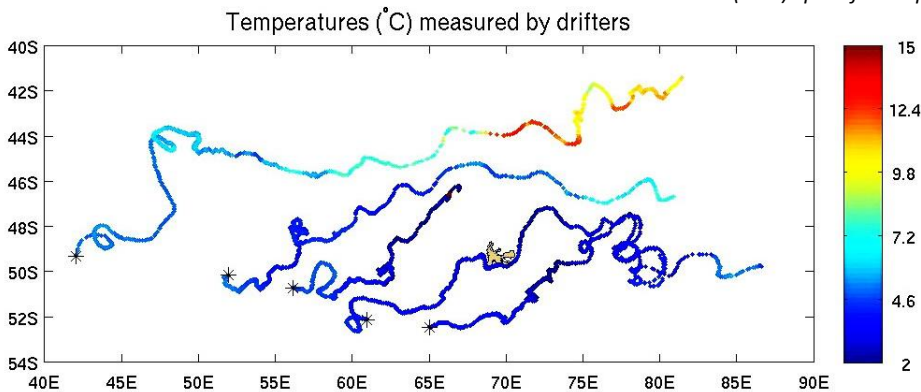
### GPS track of Braveheart Cape Town to Fremantle



### Weak Signal Propagation Net (WSPRNet)



*Reverse Beacon Net (RBN) spots for 1 April 2016*





## Outreach Onsite

Through the efforts of team member Ken Karr NG2H, we were able to secure four Inmarsat BGAN terminals and unlimited airtime. With these, we could be assured of direct and fast internet connection, and with that a variety of services and information for the public.

Probably the most valuable service to DXers was the use of DXA, the real-time online radio log server. DXA was originally written by the author for the 2005 Kure Atoll DXpedition K7C, and was rewritten by Peter Bourget W6OP for the 2013 Clipperton DXpedition TX5K. It is fully documented in the book *DXA: The Realtime Online Radio Log Server* (available from KK6EK). The satellite-based application collects logged QSOs into packets, which it uploads to a server once per minute. The server parses the packets and updates a database containing the accumulating radio log. The HTML DXA front page shows a variety of information about the QSOs logged in the previous minute, arranged around a central map showing the logged callsigns on an equidistant azimuthal map of the world. The page is automatically updated each minute. The application enables DXers to obtain confirmation of a successful QSO in almost real time, eliminating the risk of delaying until the DXpedition is no longer workable. It also provides obvious notice of error (e.g., broken calls), and totally eliminates the risk of working a pirate.

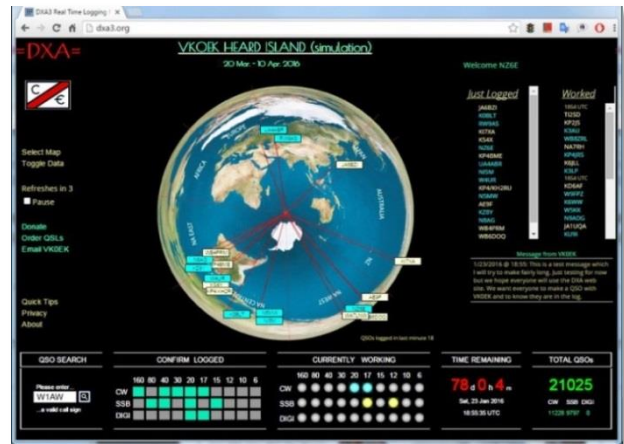
**AudioLog 08:12 AM 3 April 2016.** Right now we are sitting at 51,189 QSOs. Unfortunately we are experiencing a major solar storm, so there is almost no propagation. We cannot hear any stations and apparently no stations can hear us.

We had several handheld satphones, including Inmarsat and Iridium. These were present mainly for emergency, but they were also used regularly for the AudioLog, an innovative feature implemented by offsite team member Mike Coffey KJ4Z. We could dial a number direct, and an automatic voice would ask for a header, then for any message. These were automatically digitally recorded, and they were posted on a web page immediately after the end of the recording. Altogether 60 messages were recorded, and these are still available at our expedition website [www.heardisland.org/AUDIOLOG/](http://www.heardisland.org/AUDIOLOG/).

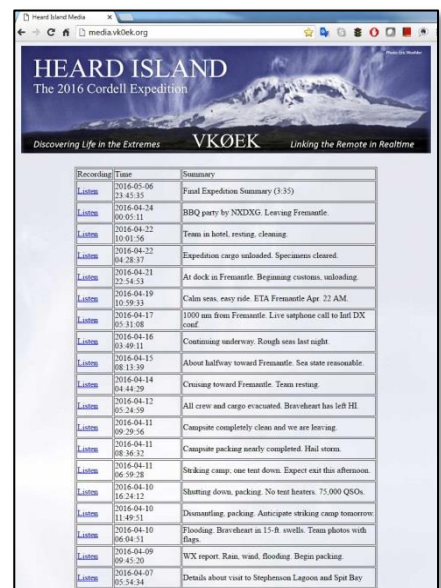
A breakthrough of note was implemented by Mike Coffey KJ4Z, who collaborated with Elecraft to implement the remote operation of one of the Heard Island stations. With this he logged 43 contacts, the first demonstration of such operation on a DXpedition. The diagram shows the flow of signals: A normal HF call is made from the DXer (W1AW in the diagram) to the Elecraft K3S on Heard Island. The signal is passed through the BGAN terminal to the satellite, then to the server (ISP), and from there to Mike, operating as VKØLD in Palo Alto, California. Mike's return transmission moves back through the server, the satellite, the BGAN terminal, and the K3S, which transmits it, to be copied by the DXer. The latency of this path was found to be small, but



AEØEE monitors the internet communications



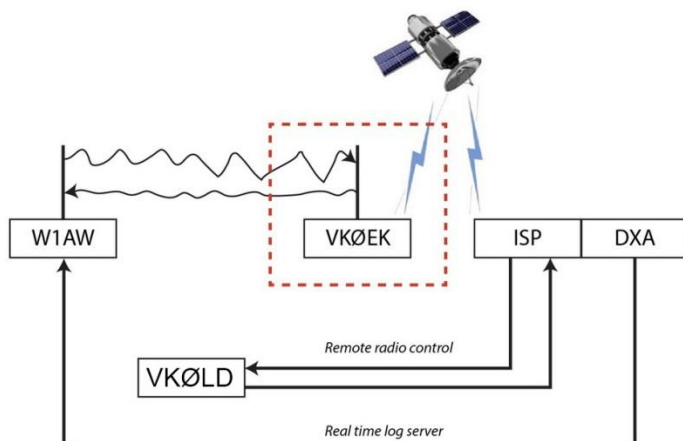
Typical (simulation) update of the DXA web page



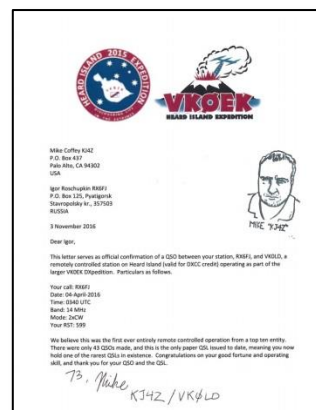
Recording	Time	Summary
Links	2016-01-06 23:43:35	Final Expedition Summary (3:35)
Links	2016-04-24 00:05:11	BDQ party by NZDXG. Leaving Fremantle.
Links	2016-04-22 10:01:56	Team in hotel, voting, cleaning.
Links	2016-04-22 04:28:37	Expedition cargo unloaded. Specimens cleared.
Links	2016-04-21 22:24:52	At dock in Fremantle. Beginning customs, unloading.
Links	2016-04-19 10:29:32	Calm seas, easy ride. ETA Fremantle Apr 22 AM.
Links	2016-04-17 05:31:08	1000 km from Fremantle. Live satellite call to Jut DX conf.
Links	2016-04-16 03:49:11	Continuing underway. Rough seas last night.
Links	2016-04-15 08:13:39	Above halfway toward Fremantle. Sea state reasonable.
Links	2016-04-14 04:44:29	Cruising toward Fremantle. Team resting.
Links	2016-04-12 05:24:59	All crew and cargo evacuated. Broadband has left HI.
Links	2016-04-11 09:29:56	Campsite completely clear and we are leaving.
Links	2016-04-11 08:36:23	Campsite packing nearly completed. Hail storm.
Links	2016-04-11 06:29:28	Staking camp, one tent down. Expect end this afternoon.
Links	2016-04-10 16:24:12	Shutting down, packing. No test heaters. 75,000 QSOs.
Links	2016-04-10 11:49:51	Disassembling, packing. Anticipate striking camp tomorrow.
Links	2016-04-10 06:44:11	Flooding. Broadband in 15-ft. waves. Team photos with flags.
Links	2016-04-09 09:43:20	WX report: Rain, wind, flooding. Begin packing.
Links	2016-04-07 05:34:04	Details about visit to Stephenson Lagoon and Spit Bay.

The index to the AudioLog

Mike slowed his CW speed to avoid calling collisions. It worked so well that the DXers were unaware that Mike was physically located in California, not on Heard Island. Don't worry—this scheme is approved by the DXCC program. Mike sends a QSL to the logged stations as a personal letter (if you request it!).



Connections for the remote operation



QSL for the remote operation by KJ4Z

With open and unlimited internet connection, we were able to send and receive email and browse the web. We were required to make daily reports to the AAD, and there was a steady flow of messages received by the support team at home relaying emails, many of them requiring immediate processing. We were also able to make Skype calls. We used this for several real-time interviews, conferences with our support team, calls to certain individuals, and conferences with a few classes. For instance, Jim Colletto N6TQ held three one-hour Skype conferences with elementary school classes in California. Vadym Ivliev UT6UD conducted a conference with a class in Ukraine. It was thrilling to see a picture of the class with Vadym live on their screen.



Skype conference with classroom in Ukraine

## Retrospective

The team was somewhat startled to have such extensive communications capability in the tent. One result was that the team was slightly lavish in its use of the capabilities. Because operating time was not manpower limited (it was propagation-limited), we had time to carry on email conversations and surf the web. As Expedition Leader, I was swamped with filing reports and answering emails. Ironically, I was somewhat regretful that we had such extensive and convenient communications; otherwise we might have made more of an effort to get outside and experience the island. Mostly I am speaking for myself—I regretted that I had so much overhead, because I really wanted to be wandering around the wilderness!

It's fairly clear that this DXpedition implemented significantly more outreach communications and services to the DXing community than any previous DXpedition (that we know about). Some of it was straightforward (e.g., websites, QSL services, souvenirs, etc.), but some (the Help Desk, open email, web browsing) was innovative for a DXpedition, and some (remote operation, Skype conferences) was frankly experimental (and successful). VKØEK wasn't your usual DXpedition, I admit, but I claim it is what DXers want in the long run. Wouldn't you like to be able to dial a phone number and hear "Good evening...Heard Island!" And maybe you'll see live video of you making your next QSO!