HEARD ISLAND The 2016 Cordell Expedition

Discovering Life and Links in the Extremes

THE TOPOLOGY OF INFORMATION FLOW FOR VKØEK

To a first approximation, it takes four radios, four computers, and four "mirrors" to make a contact with a modern DXpedition. Topologically, these elements are arranges in a circle, with a DNA-like sequence -RMR-CMC-RMR-CMC-. Information flows around the circle, clockwise in the drawing below.

The first -RMR- pair is what distinguishes ham radio from IT—it introduces the imperfectly predictable and unreliable effects of the atmosphere,

especially the ionosphere (the mirror). Historically, this was the only segment in amateur radio-the two-way contact between two stations separated by a significant distance. Then in 1995 a revolutionary change occurred: the XRØY Easter Island DXpedition introduced a whole new loop by including a communications satellite and the internet. By uploading the radio logs through the satellite, they could be posted on an internet

server, enabling a whole new set of services for DXers. The most valuable XRØY invention turned out to be the online log server which has become *de rigour* for all major DXpeditions.

For the last two decades, the habit for almost all DXpeditions has been to use

the satellite connection to upload the logs once or twice each day, updating a database accessible to DXers who want

confirmation of their QSO. This has worked nicely, but it leaves unsolved a major problem: If an error is discovered in the log, it may be too late to correct it the next day; propagation may have dropped off, or

worse, the DXpedition went QRT. Then, in 2005 (20 years after XRØY!) this problem was solved by the introduction of real-time into the second -



RMR- segment (the satellite). The first demonstration of this was on the Kure Atoll DXpedition K7C. The software that enabled this breakthrough was called DXA. It was so popular that the web page graphically displaying the log received 40 *million* hits!

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/KØEK

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Now, after 10 years of improvements, DXA version 3 is ready to provide DXers with an almost perfect traverse

> of the dataflow circle. It might take you hours or days to break through the pileup to get your QSO logged by VKØEK. But what happens next is that within 1 millisecond your QSO is passed across the first CMC link (WiFi), then within 1 minute it passes across the second RMR link (ComSat) to a central server, and within 1 more minute it passes across the second CMC link (internet). Automatically, without you

doing anything, the information is displayed on your browser (assuming you are watching the DXA page!) and you see your QSO confirmed. From logging to confirmation it takes less than 2 minutes, providing the opportunity to correct errors.





HOW THE INFORMATION FLOWS FROM TWO OPERATING SITES

munications and Media Authority (ACMA).

Each site will have multiple computers net-

worked together for logging the QSOs; they

will use the well-known logging program

N1MM+. One computer in the network at

from two widely separated locations: Atlas Cove and Spit Bay, 20 miles apart, with the 9000-ft. volcano Big Ben smack in between. The volcano blocks HF radio signals to some parts of the world and also prevents direct radio communications between Atlas and Spit. Fortunately there is a relatively simple solution to both these problems.

From the beginning of the VKØEK DXpedition, it has been planned to upload the radio log data via a communications satellite to a central server, where appropriate software will provide status updates once per minute. This system, called DXA, has been used on previous DXpeditions (K7C and TX5K), and has been extremely popular (40 million hits each). Now, in a bit of irony, DXA will pro-

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gentoo

king

he radio operation at Heard Island is Atlas Cove and Spit Bay. This ability is very VKØEK, authorized by the Australian Comcomplicated by the plan to operate important, not only for coordination of schedules and activities, but also for emergency response.

The two sites will use the same callsign,





Most of the Atlas Cove computers are named for the penguins of Heard Island. (Left to right) Adelie, Macaronie, Chinstrap, Rockhopper, Gentoo, King



VK0EK Atlas Cove:

CW stations



Client (l





QSL delivery

RADIO STATIONS USE RELIABLE COMMERCIAL EQUIPMENT

The stations on VKØEK will make use of commercially available equipment, all provided by generous sponsors. Our strategy was to make all the stations (essentially) the same, to enable substitution in case of a failure. The stations are built around the Elecraft K3S transceiver. The computers are all Windows 7 machines. The radio logging is done with N1MM+. Other software includes chat, hardware setup and control, browsers, word and image-processing, user manuals, and documentation. With the exception of DXA, all the software is standard. This equipment implements the first – CMC– segment in the information-flow topology (c.f., p. 1). From here the information (=QSO data) is passed to the second –RMR– segment, passing through the satellite to the internet.

Some of the people working on this are KY6R, W6OP, KJ4Z, K2ARB, VK6CQ, AEØEE, and others. Our co-organizer Rich, KY6R, is integrating the various computer and communications systems, and this work is being implemented and tested by the team in monthly work sessions in California. If you wish more information, please <u>Contact Rich</u>.

Master PC WiFi BGAN "Chinstrap Station 1 40-4SQ cw C N1MM mouse "Gentoo 40-4SQ USB key contro K3S filter headset amp PSU P3 р а Station 3 t cw PC N1MM+ RX mouse c h 160/80 selector "Rockhoppe ant splitter USB key contro headset K3S filter amp Station 2 PC N1MM+ cw mouse PSU P3 "Macaroni USB key contro filter headset K3S amp 80-4SQ 80-4SQ PSU P3

Connections for 3 CW stations and 8 antennas at Atlas Cove. The stations are comprised of Elecraft K3s radios, KPA500 or OM2000+ amplifiers, and Dell Latitude E6410 laptop computers. The computers are networked with a local WiFi. One of the computers in the network is a "master," with a connection to the satellite.



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The Spit Bay and backup computers are named for other birds of Heard Island. (Left to right) Albatross, Petrel, Cormorant, Sheathbill, Tern, Skua



THE HEARD ISLAND PROJECT

The Heard Island Project is centered around an expedition to Heard Island, lying at 53°S 73°E in the Southern Ocean. The island is extremely isolated, and very seldom visited.

The project will include an ambitious amateur radio operation using the callsign VKØEK, and a variety of scientific investigations under the title "Discovering Life and Innovative Communications in the Extremes."

The expedition team of 14 will sail on or around March 8, 2016, from Cape Town, South Africa, spend up to 21 days on Heard Island, and end the voyage at Fremantle, Western Australia.



WATCHING THE QSOS ROLLING IN (AND OUT)

M ost DXers and DXpeditioners are familiar with N1MM, for years one of the most popular logging programs. We will use the latest version, N1MM+. The operators see the QSOs as they are logged, and except for infrequent band changes, only have to type in callsigns as they roll in. The following shows typical Windows desktop with N1MM running. The op only watches his own QSOs as they accumulate.



One computer watches ALL the QSOs. It is an equal node on the local network, hence maintains a complete copy of the entire log, including QSOs from all stations. This computer is also connected to the satellite terminal (e.g., BGAN). Once per minute it uploads log updates to the stateside server, using the DXA control panel, shown below. QSOs logged in the last minute scroll up the window, and at the next upload the screen is cleared and a new cycle begins. If there is an interruption in service, the software automatically recovers and updates the database on the server. This self-repair happens in minutes.

UNA-	- Col	Control Center for VRUER							Running
ast OSOs unloaded:	Ne	xt uploa	ad in 5	3 seco	nds	-31 03	24-543	,	Packets Upload
Time	Call	t databa.	Band	102 00 2	Mod	e	(Operator	Station
2015-07-19 14:03:21	KY6R		14		USB		V	KOEK	0
2015-07-29 02:23:452	Z KY6R	KY6R 3.5			LSB			KOEK	0
2015-07-29 02:40:36Z WA2Q		HN	3.5		LSB		V	KDEK	0
2015-07-29 02:41:21	5-07-29 02:41:21Z WA2QE		QHN 14		USB			KOEK	0
2015-07-29 02:42:34	5-07-29 02:42:34Z AB6VA		24		USB			KOEK	0
2015-07-29 03:04:24	Z AG5T		14		USB			KOEK	0
File Upload Queue			Last	100 Uplo	ads				
VK0EK_Atlas_000001	zip								
		Station	Opline			_	_	_	
Total QSOs:	17	ST C	2 53	54 55	56	\$7	58 5	9 510	
Acres 1-020	17	54 5							

BACK ISSUES ARE AVAILABLE FOR DOWNLOAD

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