

Front cover

Photo: SP5XVY P2260972

Text: "VP6DX Ducie Island"
RGB = 255, 255, 0
(color chosen opposite blue for contrast)
Font: Quaint Gothic, regular, 48pt

General instructions for all pages:

- Assumed card dimensions: 3½ × 5½ inches (approximately 89 × 140 mm).
- Fonts (unless otherwise marked):
 - General text: Garamond 8 pt. Titles are 16 pt.
 - Quaint Gothic at specified locations. See K3NA for the OpenType file.



Text: names of person
color = white
Font: Garamond, regular, 8pt

Text: "a project of ..."
RGB = 255, 255, 0
Font: Quaint Gothic, regular, 12pt
Special ligatures & kerning for "Radio Expeditions LLC" logo.

Early Major Sponsoring Organizations



Life at sea: Nigel brings in wahoo; Neil & Bro prepare it for lunch. On the way to Ducie, we eat, sleep and plan.



← "And if you hear me say \$@*%/, that means stop!"

Photo: DL8LAS 0168

Photo: DL8LAS 0158

Photo: SP5XVY p2089103

2008 February 8: Arrival



After dropping anchor during mid-morning, the team unloaded the ship by crane into small boats for transfer to shore. An inconvenient low tide required each item to be carried across the coral reef to shore and up a 4m embankment of loose coral. By late afternoon attention could turn to construction of sleeping tents, cooking area, and eating areas.

Photo: SP5XVY p2089056

From ncdxf.org



Northern California DX Foundation



Expeditions like VP6DX would be far more difficult to organize without the early and significant financial support of the Northern California DX Foundation. Most expedition costs occur before the operators leave home. Early grants from the NCDXF make these expeditions possible.

And NCDXF funding would not be possible without its members: people around the world who, like you, want to see good expeditions to rare places.

The NCDXF, in cooperation with the International Amateur Radio Union, also constructed and maintains a world-wide network of 18 HF radio beacons (left).


Please consider contributing to NCDXF. Your contribution is tax deductible for US citizens. A certificate and semi-annual Newsletter will be sent to you and you will join hundreds of DXer's worldwide who support the foundation. Instructions for contributing are at the website www.ncdxf.org.

Photo: SP5XVY P2220240


Photo: SP5XVY p2099171

Photo: SP5XVY P2119340

Photo: SP5XVY P2119339



2008 February 9–11: Construction








Except for 160m, 80m CW, and 6m, all the antennas at VP6DX were home-brew designs using Spiderbeam fiberglass poles.

The 75m 4-square below employed wire elements supported by Spiderbeam 18m telescopic fiberglass poles. The 40m and 30m 4-squares used Spiderbeam's 12m telescopic poles. Each 4-square element included a ground screen of 18 to 40 radials.

Two-element vertical single-band Yagi wire antennas (left) radiated VP6DX's signal on 20m through 10m. Spiderbeam's 12m telescoping poles and a cross arm supported the elements, driven element balun, feedline and coax shield current choke.

These compact, easy to assemble, and lightweight designs were trouble-free, even during the worst rain squalls.

Antenna teams assembled each system at the main camp, then carried the elements to their designated location on the beach. After installing guy anchors in the loose coral rubble and attaching guy ropes, the crew tilted up the poles and made final adjustments to the guy ropes.

Before connecting any 4-square element to the feed system, or connecting a Yagi to a coax, the system was checked against past measured results. This 20m Yagi looks OK!

Photo: SP5XVY P2159651

Photo: SP5XVY P2099178

Photo: SP5XVY P2119387

Logo and equipment photo from www.palstar.com



Palstar DL1500 dummy loads (right) sat at the center of each 4-square vertical array, including the 75m SSB array shown below. Franz DF6QV built Collins hybrid-coupler feed system, including an indication of power dumped into the dummy load. All Palstar DL1500s ran trouble-free throughout the expedition.



DL1500 dummy load



Hooray! Enough radials to meet the design goal! Time to roll out the coax to the radio tent. For the 4-square arrays, CAT5 cable served as control lines.



80m/30m and 160m Titanex verticals completed at the west camp.

Photos: DL6LAU email attachment

Photo: N4IA img_1014

Site Layout

Radio operations centered around two locations in the northeast part of the atoll: "east camp" and "west camp".

Landing occurred at the east camp. This location included not only four operating positions, but also the cooking/eating area, sleeping tents, technical work area, and a fresh water shower. Transmit antennas stood along a 250m stretch of shoreline: separate 4-squares for 75, 40 and 30m, 2-element vertical Yagis for 20 through 10m, and a 5-element Yagi for 6m.

The three west radio operating positions were 810m to the west-northwest. These radios transmitted on a Titanex 160m vertical, a Titanex vertical shared between 80m and 30m, a 40m 4-square, or 2-element vertical Yagis for 20 through 10m.

The 700-950m separation between transmit antennas on each band, together with the excellent characteristics of the Elecraft K3 radios and other technical and operational aspects, allowed two stations to operate simultaneously at 1.5 kW power levels on any band.

Operators followed a path along the lagoon's edge when walking between the two radio camps. A 10-15 minute stroll covered the 1.1 km distance. A jet boat moved heavy materials via the lagoon

For 160m, 80m and 75m, an array of beverage receive antennas radiated from a switching hub located midway between the camps. Each operator could independently select one of 8 receiving directions through a remote-controlled switch. The 015-195° beverage was 200m long. The 045-225° antenna employed two parallel 200m beverages, separated by about 60m and combined in phase. The 305-125° beverage stretched about 250m, and the 090-270° antenna ran almost 500m in length.



Images from Google Earth

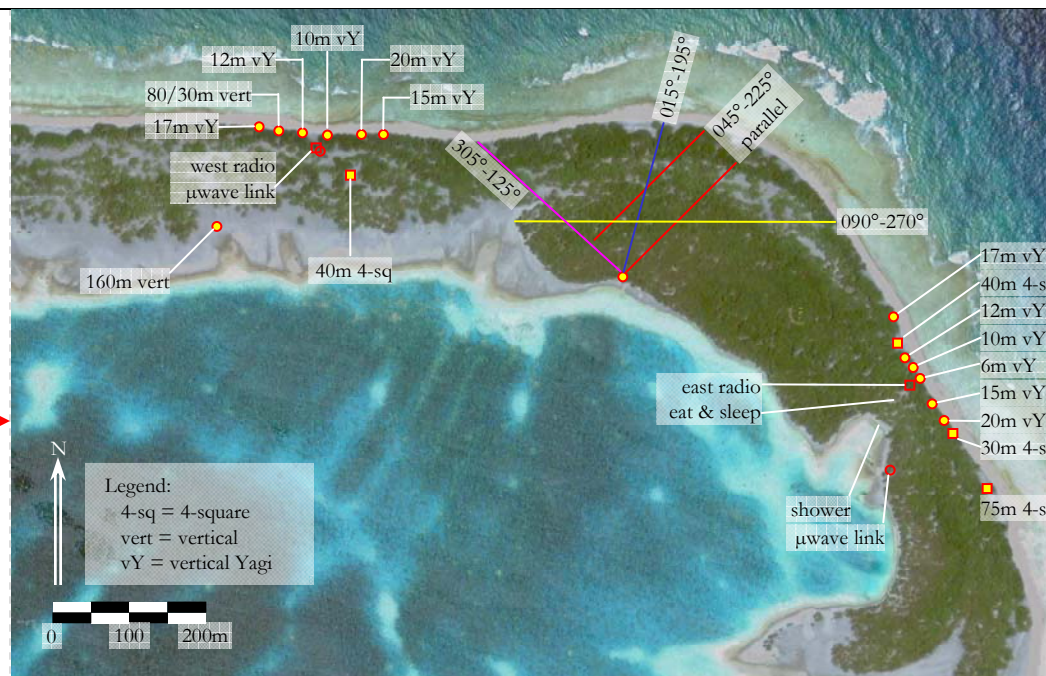


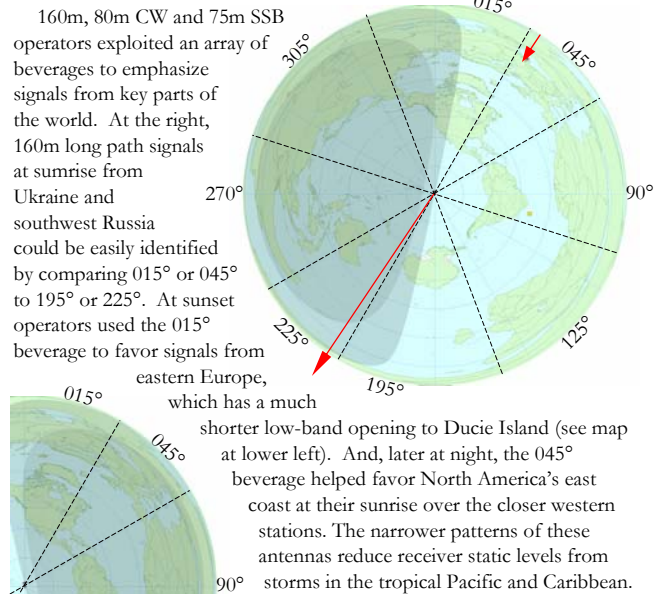
Photo: SP5XVY p2261080

Photo: N5IA 1227

Low Band Receive Antennas



Using a collapsible fiberglass pole, Robin threads another beverage antenna through the brush.



DX Engineering RBS-1P reversible beverage hardware (right) turned copper-clad steel ladder line into beverage antennas. Two directions of low-band signals from each beverage passed through RFCC-1 coax shield current chokes on their way to the central hub. RPA-1 preamps (below, left) at this band-splitting and switching hub delivered the signals from each low-band operator's selected antenna through 600m of RG-6 coax. Each pre-amp received its DC power through the same coax. Power was removed while the operator transmitted, and custom filters protected the pre-amps from transmissions on other bands.

DX Engineering receive antenna hardware and coax formed the heart of the best low-band receive antenna system the operators have ever used on an expedition.



DXAtlas image: 2008 02 21 1411z white bkgng

Photo: UA3AB 461

Photo: N5IA 1024

Photo: SP5XVY p2109273

Photo: N5IA 0931

Radio Site Construction



Generators, electrical wiring, antenna coax cables, amplifiers, radios, computers, and the latest software and firmware updates: all unite in the radio tents to create a station. During the evening of Feb 10, a short test session validated the configurations and logged 1034 contacts.



A 30m RTTY pileup with callers from all continents awaits the next nighttime operator.



The Elecraft K3's outstanding receiver and transmitter characteristics allowed us to run two stations simultaneously on any band – even the very narrow 30m band – with absolutely no interference. Good design makes the complex appear simple: the ins and outs of this sophisticated radio were quickly mastered by the operator team, none of whom had seen a K3 before the expedition.

On 6m the CW message features of the radio allowed the VP6DX beacon to run without an attached computer or keyer.

RTTY operators at VP6DX exploited the special dual-frequency filter to isolate individual callers from the large pileups.



Photo: SP5XVY p2109267

Photo: SP5XVY p2109288

Photo: SP5XVY p2129458

Photo: SP5XVY P222050

Photo: SP5XVY P2159485

Photo: SP5XVY
p2159567.jpg

Logo from
microKeyer II
instruction manual

microHAM microKEYER II



Each operating position included a *microHam* microKeyer II between the transceiver and the logging computer. Not only did the microKeyer II provide flawless CW and RTTY FSK keying, it also sequenced the transition between receive and transmit. By correctly managing receive antenna pre-amp DC power, the transmitter power amplifier key line, the transceiver PTT, and CW/FSK keying, the microKeyer II helped protect the pre-amps and kept transmitted signals free of transients. The computers recorded audio archives via the microKeyer's high quality USB audio codecs.

Andy UA3AB runs an early morning European pileup on 15m.



Photo: image from cover of microKeyer II instruction manual (extracted from the PDF available at the microHam website).

Logging Data Network



Milt N5IA points the east microwave antenna (right) toward the west camp.

Computers ran WinTest logging software. A WiFi hub at each radio site tied the logging computers into a network. The east and west hubs bridged the gap between the two sites with a microwave link. To get a line-of-sight connection above the trees, bamboo poles supported the link's antennas and radios. This seamless network allowed the operators to share observations about propagation, coordinate band and mode changes, ask for help (or coffee!), and gossip about the pileups.



Photo: SP5XVY p2189739

Photo: SP5XVY P2119347

Photo: SP5XVY P2250861

Photo: SP5XVY P2199830

Photo: SV1JG 468

Photo: SP5XVY p2199829

Bandpass Filters

A major engineering challenge for any multi-transmitter station is cross-station interference. As part of the solution at VP6DX, we used bandpass filters to reduce the strength of harmonics and other out-of-band signals.

Array Solutions' 200 watt bandpass filters sat between the transceiver and power amplifier at each station. These W3NQN-designed filters introduce less than 1/2 dB loss in-band, while reducing even harmonics by at least 70 dB and odd harmonics by 50 dB or more.

The filters, together with other engineering choices, eliminated cross-station interference.

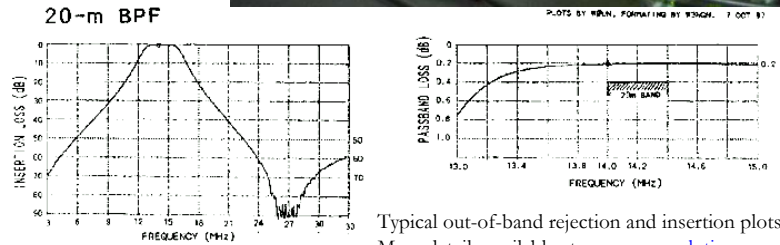
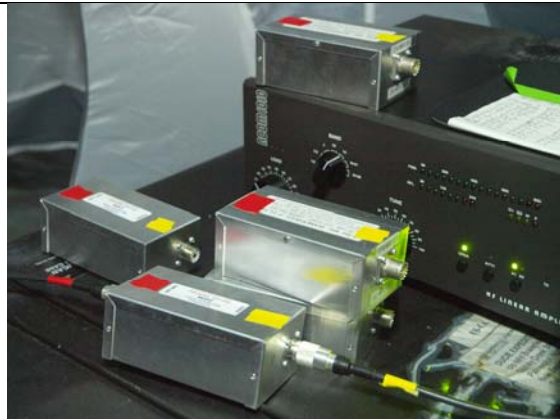


Image from on-line instruction manual for Array Solutions triangle vertical antenna array.

Plot from Array Solutions website W3NQN 200W filter page.



Matt barbeques fish and chicken.



Robin, Theresa, Les and Milt at lunch.



Carsten checks the shift schedule for his next assignment.



Tonno, Ben and Harry leave east camp for their next shift at the west camp.



The path skirts the limestone edge of the lagoon, now at low tide.



At west camp, hungry operators are happy to see their replacements arrive.

Photo: SP5XVY P2261003

Photo: SP5XVY P2159549

Photo: SP5XVY P2159564

Photo: DL8LAS 0232

Photo: SP5XVY P2261110

Photo: N5IA 1012

Photo: SP5XVY p2240660

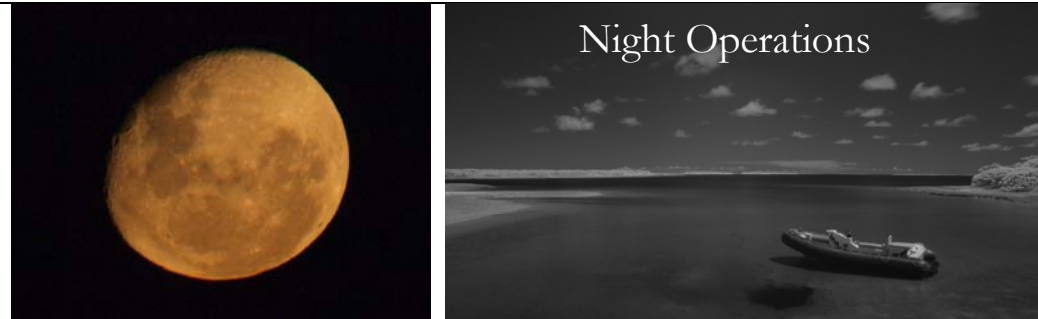
Photo: SP5XVY p2220516

Camp Life While On the Air



Theresa and Matt lug the day's re-supply of food, water, fuel and clean laundry from the lagoon landing into camp (top, left). Off-duty operators enjoy a salt-water soak in the lagoon, followed by a fresh-water shower on the shoreline. After brushing teeth at the wash station, it's time to get a few hours' sleep. Eye covers, ear plugs, a breeze and some shade combine to make feasible that essential nap in the hot afternoon. "Essential", because the next on-air shift starts at sunset.

Night Operations



On Feb 21, the moon rose just a few minutes before sunset. As the sky darkened the moon climbed into the sky in the midst of a total eclipse. Full-moon nights cast such bright light that operators could cross between camps without a flashlight. At 3AM a quick cup of Nescafé from the camp kitchen could postpone temptation for tired operators until after sunrise, when the low bands had closed and the next shift's operators arrived for the morning European runs.

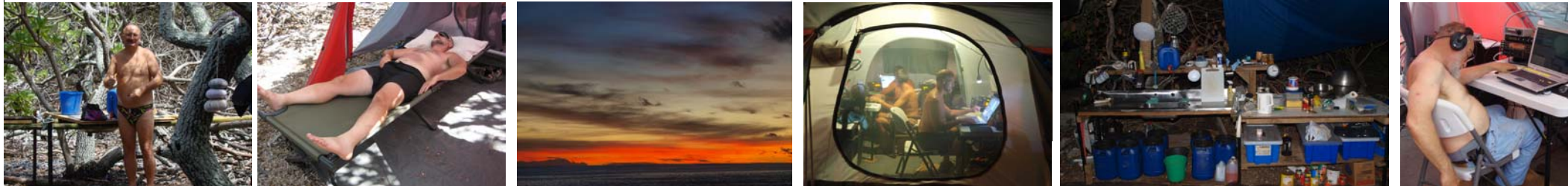


Photo: SV1JG 593

Photo: N5IA 1207

Photo: SP5XVY P2240705

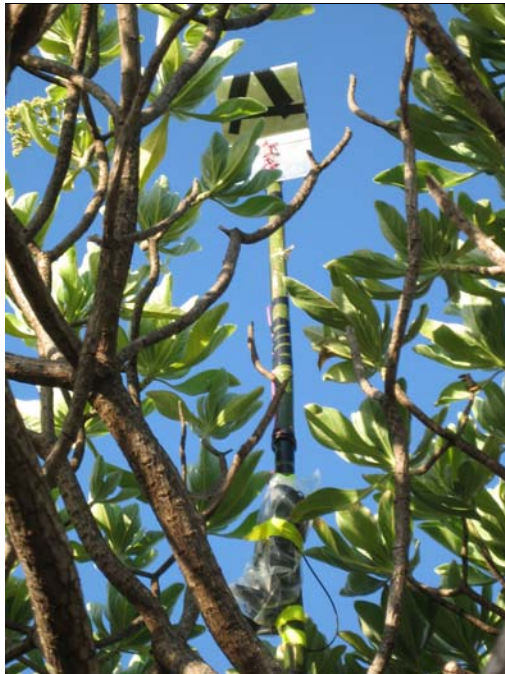
Photo: SP5XVY P2250770

Photo: SP5XVY P2260941

Photo: SV1JG 471

N51A 0968

Logo from Iridium website



Above the trees, a bamboo pole supported an Iridium handheld 9505A phone and its external antenna. Data and DC power cables ran down the pole and into the adjacent radio tent to the supervisor laptop. Iridium low earth orbiting satellites provided reliable low speed, dial-up Internet access for transmission of essential email, photos for the website, and on-line log source data.




Iridium website
Products
Hand-held

Photo: N51A 09790

History

Polynesians visited, but never settled on Ducie. The first European visitor, Pedro Fernandez de Quiros of Portugal, landed on 1606 January 26, 1606 and named it La Encarnación. Captain Edward Edwards of the British navy re-discovered the island while searching for the *HMS Bounty* mutineers. Ducie Island is named after Baron Francis Ducie, a captain in the Royal Navy. Although claimed in 1867 by the United States under the Guano Islands Act, the UK formally annexed Ducie in 1902 into the Pitcairn group.

At 7:30pm on the night of 1881 June 5, shortly after dark and in moderate weather, the wooden sailing ship *Arcadia*, carrying 1788 tons of wheat and a crew of 21, ran aground on the north shore of Ducie Island (near the end of our 305° beverage). Despite several hours work attempting to free the ship, around midnight she began to leak badly. The crew abandoned the ship the following evening, taking two lifeboats to Pitcairn Island. The remains of this wreck lie in about 10m of water (right), and a monument to the accident stands at the nearby shoreline. Today the northern part of Ducie, where we operated, bears the name "Arcadia Island".



Photo: N51A 0919

Photo: SP5XVY P2240647

Photo: SP5XVY p2199805

Photo: Gecko: SP5XVY p2159498 Spider: SP5XVY p2179688 Hermit crab: N5IA 882

Nature

Ducie Island, a small and rarely visited atoll, has no permanent inhabitants. The atoll sits 540 km east of Pitcairn at 24°40'S 124°47'W. A slender arc of slightly uplifted, cracked limestone shelf stretches 1.6 km in width but has a land area of only 0.7 km². Coral fragments heaped up by storm tides and surge rise overlay the shelf. With a height of just 4 m and no fresh water source, Ducie Island provides no safety during stormy seas. 70% of land is forested with *Tournefortia argentea*, a common tree around the tropical Pacific Ocean



which grows to a height of 5m (above).

Birds such as white (fairy) terns (left), nest throughout the island. At this season many fledglings are learning to fly and, between attempts, often watched us humans with a curiosity equal to ours.



A masked booby glides along the shoreline.



The lagoon hosted giant clams and angelfish (left), as well as sharks and other fish. On shore creeping hermit crabs (center right) were numerous. Land crabs (bottom) skittered along the shoreline. A tiny gecko and this spider were among the less common land creatures.



Photo: SP5XVY P2240460

Photo: SP5XVY P2159632

Photo: SP5XVY 2189725

Photo: N5IA 1179

(This column is reserved for more information about volunteers.)

Volunteers

Every expedition relies on volunteers who provide the thousands of hours required to:

- Research, design, build/buy, and test antennas and other equipment;
- Create and update websites, distribute news releases, implement and maintain on-line payment systems, implement and update on-line log search tools, and answer hundreds of questions from the DX community;
- Apply for grants, raise money, collect and disburse cash, and maintain financial records;
- Research questions, track paperwork and shipments, find lost luggage, recommend hotels/restaurants, and handle other local logistical matters;
- Process tens of thousands of QSL requests;
- Review or write agreements with suppliers and others;
- Provide information about past experiences at the expedition's target destination;
- Stand-by on-call in case of medical emergency.

The men and women pictured at the right represent only a sample of those who worked behind the scenes on this project.

Antenna Engineering



Franz Kramer
DF6QV



Uli Weiss
DJ2YA



Staffan Borjeson
SM6DOI

Website



Chris Janssen
DL1MGB

Electrical



Bob Beebe
GU4YOX

Project Advisors:

Legal



Kip Edwards
W6SZN

Medical



Glen Johnson
W0GJ



Kan Mizoguchi
JA1BK



Martti Laine
OH2BH

Tahiti



Michel Huin
FO5QB

Pitcairn



Meralda Warren
VP6MW

Results

The solar cycle minimum did not prevent the operators from breaking most DXpedition records. From the start of on-air operations, the group tried to balance sub-totals for each mode, for each band, and for each of three major DXer regions. E_s coupled to conventional propagation delivered unexpected contacts with Europe on the 10m bands. Unfortunately, no stations were heard on the 6m band.



Fireworks from the *Braveheart* crew after passing another DXpedition milestone.

Unique Calls

all	38 647
NA	?
Eu	?
As	
SA	
Oc	
Af	?

Radio Operators

DL3DXX Dietmar	RA3AAU Harry
DL6FBL Bernd	SP3DOI Les
DL6LAU Carsten	SP5XVY Robert
DL8LAS André	SV1JG Cliff
ES5TV Tönno	UA3AB Andy
K3NA Eric	WA6CDR Robin
N5IA Milt	

(Reserved for QSL Shop)

Contacts

	all	CW	phone	RTTY	Eu	NA	Asia
160m	6 671	5 097	1 574	–	13%	71%	14%
80m	18 348	9 756	8 592	–	35	47	12
40m	29 423	14 487	14 935	–	46	38	11
30m	14 275	10 576	–	3 699	40	43	14
20m	33 536	12 852	17 205	3 479	29	53	14
17m	31 489	11 813	16 603	3 073	29	55	13
15m	27 892	12 366	15 526	–	19	61	15
12m	13 261	6 047	7 215	–	5	70	19
10m	8 791	4 302	4 490	–	3	67	20
all	183 686	87 296	86 140	10 252	28	53	14

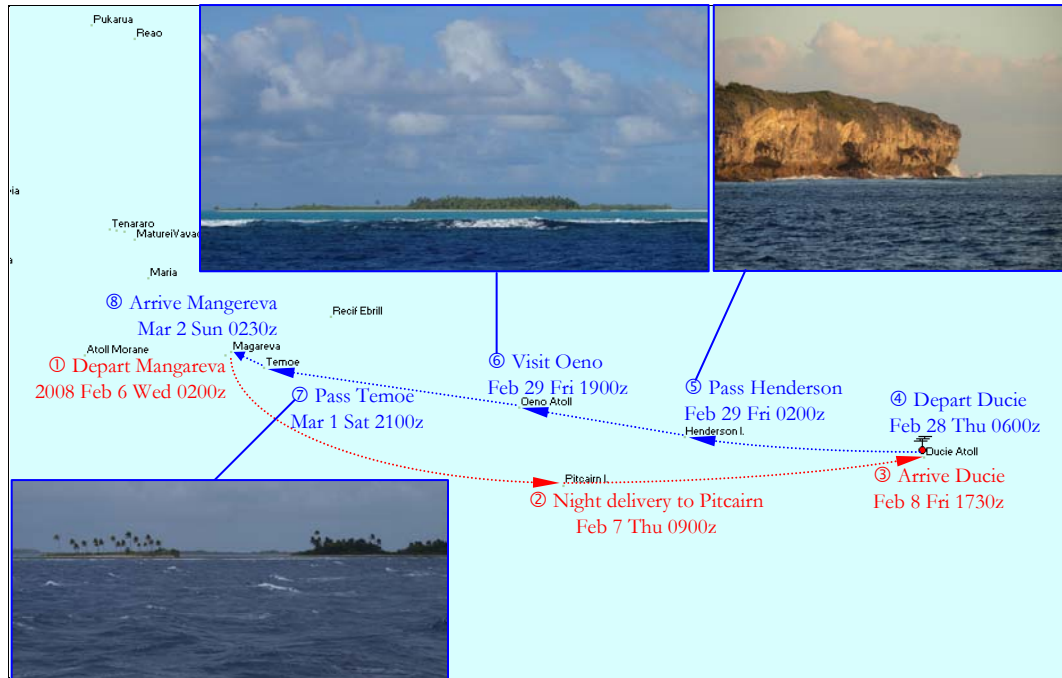
Photo: SP5XVY p2199838

Photo: SP5XVY P2291579

Photo: SP5XVY P3011977

Logos from the companies' websites

Photo: SP5XVY P2291606



Other corporate sponsors



High power bandpass filters



Back-up vertical antennas



WinTest logging software



HF and VHF amplifiers

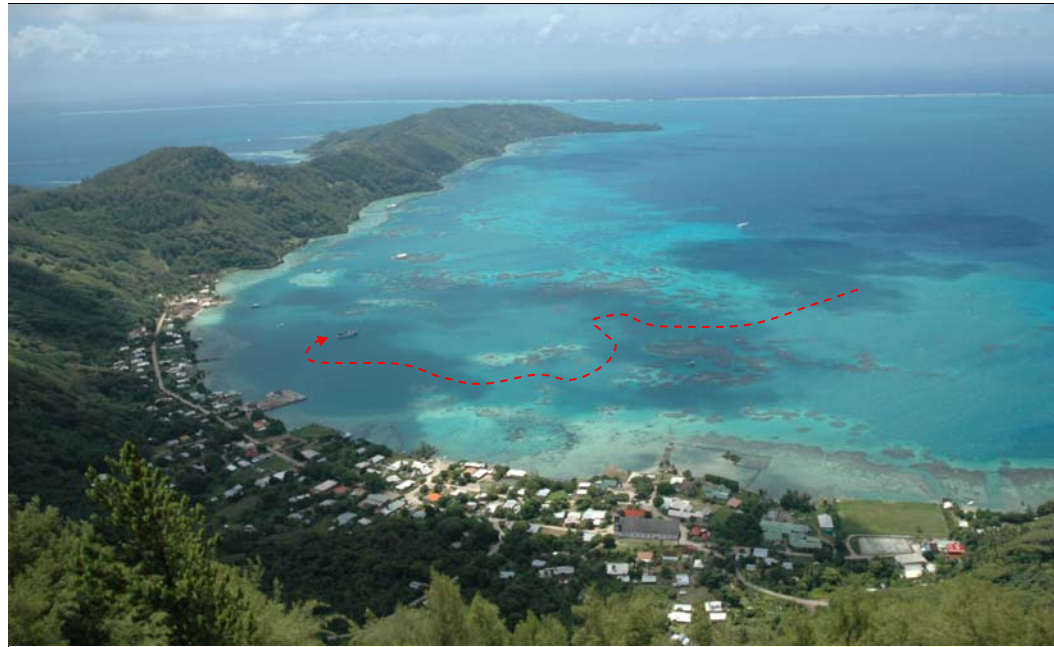
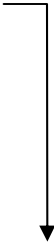
Map background from DX Atlas, but any suitable map of this region could be used. One could even plot the island locations on a plain background just as easily.

Photos were given borders to tie into the dingbat numbers for each atoll we visited.

Red arrows and annotations for the outbound voyage; blue arrows/annotations for the return voyage.

Photo: SP5XVY P3011957

Photo: DL8LAS DSC_0713



Early Major Individual Sponsors – page 1

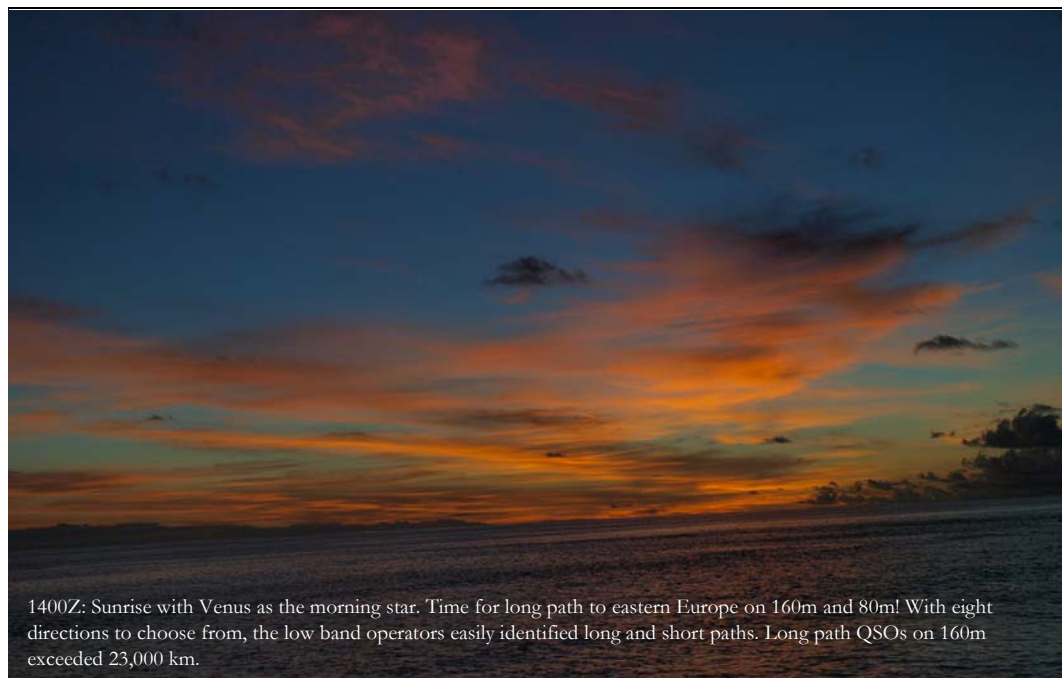
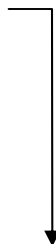
- \$1000+
 - Alfred Leuthi HB9JW
 - Robert Lusnia SP5XVY
 - David Topp W5BXX
- \$500+
 - Martti Laine OH2BH
 - Al Baker W5IZ
 - Wayne Gingerich W6EUF
 - Kip Edwards W6SZN
- \$250+
 - Mitchell Wolfson DJ0QN
 - Jan Harders DJ8NK
 - Fernando Fernández Martin EA8AK
 - Justin Snow G4TSH
 - Clay Brown K7HC
 - Peter Bruno NC8B
 - Hakan Eriksson SM5AQD
 - Krister Julinder SM5HTL
 - Michael Zak W1MU
 - Bruce Butler W6OSP

- \$100+
 - Cy Kitching
 - Yoshio Sato 7N2KRX
 - Craig Young AC6NN
 - Larry Pyle AD6ST
 - Heye Harms DJ9RR
 - Franz Langner DJ9ZB
 - Thomas Rudolph DK3DUA
 - Thomas Herrmann DL1AMQ
 - Wolfgang Ziegler DL1AWI
 - Wolfgang Bleher DL2MWB
 - Michael Lüdemann DL2OE
 - Willy Fassl DL3BUM
 - Günter Fassl DL8CMM
 - Johann Bruinier DL9KR
 - Michel Brunelle FM5CD
 - John Dunnington G3LZQ
 - George Eddowes G3NOH
 - Frederick Handscombe G4BWP
 - Brendan McCartney G4DYO
 - Steve Bogyo HA0DU
 - Istvan Szecsi HA9PP

- Daniele Christen HB9CIP
- Marco Luporini IK5BAF
- Tsutomu Kitahara JA0DBQ
- Shigeru Kondo JA0HXV
- Isao Numaguchi JH1ROJ
- Carolyn Gyger K0AN
- William Morgan K0DEQ
- Bob Novak K0OK
- Whit Carter K1EO
- Ed Parish K1EP
- Robert Foxworth K2EUF
- Edward Ciochetto K3ED
- Sidney Shusterman K3SX
- Robert Garrett K3UL
- Kenneth Byers K4TEA
- Peter Naumburg K5HAB
- Charles Aubrey Hair K5TKY
- William H Avery jr. K6GNX
- Elliott M Pisor K6ILM
- Don Lisle K6IPV
- Dana Roode K6NR
- Kevin Rowett K6TD

Entering Rikitea harbor at Mangareva requires careful navigation around the plentiful coral shoals..

Photo: SP5XVY P2240720



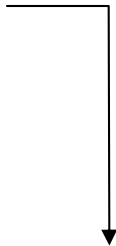
1400Z: Sunrise with Venus as the morning star. Time for long path to eastern Europe on 160m and 80m! With eight directions to choose from, the low band operators easily identified long and short paths. Long path QSOs on 160m exceeded 23,000 km.

Early Major Individual Sponsors – page 2

- | | | |
|----------------------------|-----------------------------|-----------------------------|
| \$100+ | Dan Brown NA7DB | Joseph H Reisert W1JR |
| Elliott Klein K7ER | Garry Shapiro NI6T | Brian Haughey W2RI |
| Nancy Klein K6NAN | Dennis Dreier NN6L | David Strout W2YC |
| Mark Ratajack K7MTR | Jari Jussila OH2BU | Richard Haendel W3ACO |
| Dick Flanagan K7VC | Frantisek Pohl OK2SK | Robert King W3GH |
| Dwaine P Modock K8ME | Michiel Minderhoud PG4M | Francis Donovan W3LPL |
| Craig Thompson K9CT | Eugene Pletnev RU3DX | John R Eshleman W4DR |
| Kenneth Archbold KA6C | Goran Ostman SM4DHF | Bill Tippett W4ZV |
| Dennis J Davis KC9JH | Anders Larsson SM6CNN | Ray Motley W5CWQ |
| Harry Hart KH6CW | Hans Olof Hjelmström SM6CVX | Paul Elliott W5DM |
| Gabriel Fuentes III KP4BJD | Mirosław Paczocha SP5ENA | Richard Henry W5QP |
| Paul Fletcher M1PAF | Tomasz Barbachowski SP5UAF | Dave Bell W6AQ |
| Bob Barden MD0CCE | Bogdan Zdaniak SP5WA | Howard Critchell W6IHP |
| Ron Dohmen N0AT | Wojciech Klosok SP9PT | Joel Clark W7EPA |
| Bob Hervatine N2NS | Vlad Lesnichy UA6LV | Richard R Pooley W7HUY |
| Mark Kempisty N3GNW | Vladimir Juranek VA6IK | Robert Leo W7LR |
| Maurice Schietecatte N4LZ | Andrew Borynsk VK2AR | John Graf WA6L |
| Arthur Burke N4PJ | Austin Condon VK5WO | Richard Breckinridge WA9BXB |
| Dan Severance N6ERD | Robert Keith Bainbridge | James Seibel WB3CQM |
| Bob Grimmick N6OX | VK6XH/VK6DXR | Buddy Brown WD5DBB |
| William E. Moyes N7IE | Glenn Johnson W0GJ | Philip Southwart ZL2RVW |
| Clark Wierda N8CBW | Robert Milbert W0ZT | |

Rear Cover

Text: "VP6DX Ducie Island"
black
Font: Quaint Gothic, regular, 49pt



VP6DX Ducie Island
IOTA OC-182 grid square CG75oh ITU zone 63 CQ zone 32