By John G. Troster, W6ISQ, and Robert S. Fabry, N6EK

Report and update

The NCDXF/IARU International Beacon Project

An earlier two-part *QST* article (Oct 1994, p 31; Nov 1994, p 49) explained the International Beacon Project sponsored jointly by the Northern California DX Foundation and the International Amateur Radio Union. Those articles gave the history of the beacon network, told how we hoped to add more beacons and more bands to the beacon network, and presented a technical description of the new beacons we planned to install.

This is a report on the almost complete beacon network now operating on 14, 18, 21, 24 and 28 MHz. Everyone is invited to join the "Beacon Watcher's Society" and learn to use these new beacons as sunspot Cycle 23 blossoms.

The New Five-Band Network

The original beacon network was started in 1979, operated on 14.100 MHz, and grew to eight beacons. In the past two years we have almost completely upgraded this to a network of 18 beacons, each operating on five bands. As this is being written, 16 beacons have been built, 14 of which are on the air (all 16 may be on the air by the time you read this). The two beacons that have not been built are reserved for China and Russia.

When the planned Russian and Chinese beacons are in place, the network of 18 beacons will transmit in sequence for 10 seconds on each of five bands every three minutes, as shown in Table 1. That's 90 10-second transmissions from locations around the world every three minutes! It is an entirely new ball game for propagation monitoring.

Each transmission consists of the call sign of the beacon sent at 22 WPM followed by four one-second dashes. The call sign and the first dash are sent at 100 W. The other three dashes are sent at 10, 1 and 0.1 W, stepping downward in power with each dash. Note that it is not necessary to be able to copy CW to use the beacons. If you have an accurate clock, you can easily deduce which beacons are being monitored by using the information in Table 1.

A more detailed version of Table 1 is available on the Internet at **http://www.ncdxf.com**. The version on the Internet is updated frequently, and it indicates any deviations from the announced schedule.

How to Use the Beacons

The authors have over 100 years of collective experience in DXing and contesting. We are well aware of the strange and interesting propagation phenomena that exist. However, we have developed an entirely new feeling for the bands during the past two years, as we monitored the new beacons.
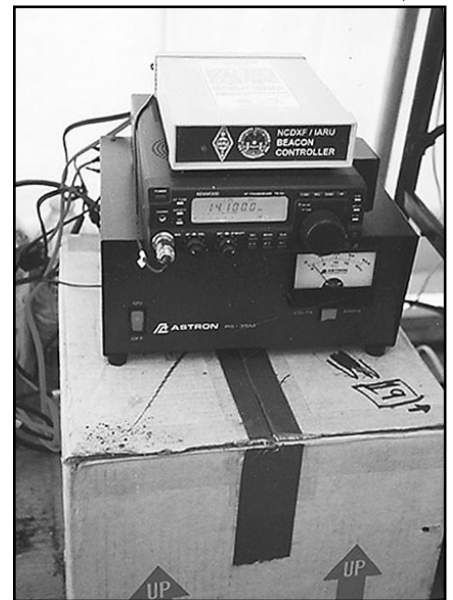
You can monitor a single band for three minutes or, with the beacon frequencies stored in the memory of a modern rig, track a single beacon as it transmits in sequence across the five bands. You can leave the receiver on a given beacon frequency, turn on the speaker, and work around the shack. Over a time period of a few hours, you will hear the various beacons fade in and out—slowly rising out of the noise, peaking, and then fading away as the skip changes.

You will learn to identify which is a bellwether beacon to monitor as an indicator of how band conditions will be for you for the day. For example, in the San Francisco area (at this point in the sunspot cycle), the CS3B beacon performs this function. If that beacon has a good signal early in the morning, the band will be good that day. If you find a beacon that lets you forecast propagation for your area, we hope you will share your observations with your friends.

It is quite instructive to see how the propagation varies from day to day, both as to what is heard and as to what is the lowest power level at which each signal can be heard. Who will be the first listener to log

GLENN JOHNSON, WØGJ

The VKØIR beacon in its final location at operating site OP-3.

AL HERNANDEZ, K3VN

Glenn, WØGJ (l), and Al, K3VN (r), check out the VKØIR beacon just after it became operational on Heard Island.

Plea to Digital Operators

We have one plea: Will all beacon network listeners please join us in asking our digital friends who operate near 14.100 MHz to observe the courtesy of moving up or down a half kilohertz to avoid interfering with the beacon network? We have had a multibeacon network on 14.100 MHz since 1979, before most present digital modes were in general use, and we have eager listeners worldwide who would like to monitor the beacons. Unfortunately, many are unable to copy them because of unintentional interference from digital stations. 14.100 MHz has been listed as a "guarded beacon frequency" by IARU for many years, and we hope digital operators will yield to us just a bit to allow monitoring stations a chance to hear the beacons.

BeaconClock is Freeware for DXers!
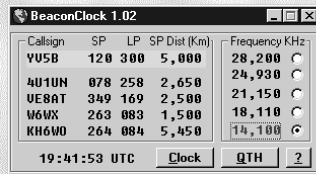
What are Beacons?

One of the most enduring laws of DX states that there are at least two possible explanations for an apparently dead band: 1) propagation is poor, or 2) no one is transmitting. The NCDXF/IARU International Beacon Network addresses the second of these possibilities by insuring that reliable signals are always on the air, around the clock, from fixed locations worldwide.

BeaconClock is an on-screen, real-time, schedule of the transmitting times, frequencies, short-path and long-path beam headings for each beacon in the NCDXF/IARU International Beacon Network from your location. Versions of *BeaconClock* are now available for both *Windows* 3.x and *Windows 95* systems. To download a copy of *BeaconClock*, go to **http://www.mutadv.com/ kawin/pages/bcnclk.htm** on the World Wide Web.

NCDXF/IARU International Beacon Network

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The Foundation, in cooperation with the IARU, maintains a series of beacon stations which operate sequentially. The 10 dB power steps are precise and are useful for "S" meter calibration and for judging band conditions. The entire system was designed and built by Foundation volunteers at no cost except for the actual price of hardware components.
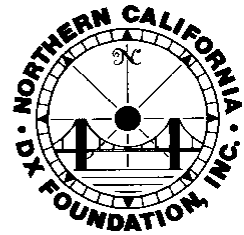
NCDXF/IARU Beacon Transmission Schedule

For more information on the NCDXF/IARU International Beacon Network, check out **http://www.ncdxf.org/** on the World Wide Web.

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all the beacons on a single pass? What places in the world can be open to your location on all five bands at the same time? What is the furthest beacon you can hear at 1 W today? Have fun!

Interesting Observations

Learning to anticipate normal band conditions and openings is a valuable use of the beacon network, but the beacons can also alert us to unexpected conditions. For example, a five-band beacon was loaned to XRØY, the Easter Island DXpedition in September 1995, near the bottom of the sunspot cycle. The five-band vertical antenna was erected almost at ground level, at a motel away from the operating site—not a great location. Nevertheless, one afternoon the beacon was copied on 28 MHz at S9 near San Francisco. No other signals could be found anywhere on the 28 MHz band. Lesson: the band was open but there was nobody there because everybody "knew" the band was dead.

In the late fall of 1996, one of the authors was working in his shack near San Francisco while monitoring 14.100 MHz in the background. Within 10 minutes the 5Z4B beacon came out of nowhere, went up to S7 and then faded away rapidly. No other beacons were heard except W6WX (30 miles away, and line of sight). This opening sounded like a quick 80 or 160 meter gray line opening! The only other stations copied on 14 MHz at the time were some weak W9s who were ragchewing.

Heard Island

A five-band beacon was loaned to VKØIR, the Heard Island DXpedition, in January 1997 (for the complete Heard Island story, see page 28). The beacon was put on the air within hours of the landing and ran continuously for two days before the DXpedition came on the air. Stations hearing the beacon were asked to send reception reports to John Devoldere, ON4UN, who

Table 1—Beacon Schedule.

This table gives the minute and second within each hour of the start of the first transmission on each frequency for each beacon. Each transmission is then repeated every three minutes. The actual starting times are approximately 20 ms after the nominal times shown, because of keying delays in the transmitters. A more detailed current version of this table is available on the Internet at **http://www.ncdxf.org**.

			Frequency (MHz)				
Slot	Country	Call Sign	14.100	18.110	21.150	24.930	28.200
1	United Nations	4U1UN	00:00	00:10	00:20	00:30	00:40
2	Canada	VE8AT	00:10	00:20	00:30	00:40	00:50
3	USA	W6WX	00:20	00:30	00:40	00:50	01:00
4	Hawaii	KH6WO	00:30	00:40	00:50	01:00	01:10
5	New Zealand	ZL6B	00:40	00:50	01:00	01:10	01:20
6	Australia	VK6RBP	00:50	01:00	01:10	01:20	01:30
7	Japan	JA2IGY	01:00	01:10	01:20	01:30	01:40
8	Russia	open	01:10	01:20	01:30	01:40	01:50
9	China	open	01:20	01:30	01:40	01:50	02:00
10	Sri Lanka	4S7B	01:30	01:40	01:50	02:00	02:10
11	South Africa	ZS6DN	01:40	01:50	02:00	02:10	02:20
12	Kenya	5Z4B	01:50	02:00	02:10	02:20	02:30
13	Israel	4X6TU	02:00	02:10	02:20	02:30	02:40
14	Finland	OH2B	02:10	02:20	02:30	02:40	02:50
15	Madeira	CS3B	02:20	02:30	02:40	02:50	00:00
16	Argentina	LU4AA	02:30	02:40	02:50	00:00	00:10
17	Peru	OA4B	02:40	02:50	00:00	00:10	00:20
18	Venezuela	YV5B	02:50	00:00	00:10	00:20	00:30

forwarded the reports to Heard Island. Once there, the reports were used to refine the propagation predictions made in advance by computer. That refinement was very helpful in fine-tuning the operating strategy—computer predictions are not perfect!

Unfortunately, the only weatherproof places for the beacon were at the operating sites and the beacon transmissions interfered with the operation at any site where it was placed. Thus, the beacon was turned off when operation started in earnest. We believe 500 feet of separation would have been enough to eliminate this interference and hope to provide a weatherproof container so this much separation will be an option next time a beacon is loaned to a DXpedition.

There are now several free programs

available over the World Wide Web that will help beacon listeners figure out which beacon is transmitting on which frequency at any given time. You can find information about these programs in the beacon section at **www.ncdxf.org**.

Conclusion

In the time you spent reading this article and looking at the beacon schedule, you could have listened to a complete pass around the world of the entire beacon network on your favorite band. Try listening! You might find short band openings that you would otherwise miss. And if listening doesn't fit into your busy schedule, why not have your PC and radio do it for you? Watch for the article by Helmut Zürneck, DL4FBI, in next month's *QST*!