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| SUBJECT | | HF Beacon Coordinator's Report | |
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| Contact: | Martin Harrison, G3USF | e-mail: | g3usf@yahoo.co.uk |

Region 1 HF Beacon Coordinator's Report

The purpose of this paper is to brief Conference on the current situation and the activity of the Coordinator and to indicate his proposed work programme and proposed lines of development.

In February 2005 the distribution of HF beacons was (approximately) as follows. The brackets show the position at the time of the San Marino conference.

| | Region 1 | Region 2 | Region 3 | Worldwide |
|--------|----------|----------|----------|-----------|
| 1.8MHz | 5(3) | 1(1) | 0(-) | 6(4) |
| 3.5MHz | 5(3) | 0(-) | 4(-) | 9(3) |
| 5MHz | 4(-) | 0(-) | 1(-) | 5(-) |
| 7MHz | 4(1) | 1(-) | 0(-) | 5(1) |
| 10MHz | 7(3) | 4(2) | 0(-) | 11 (5) |
| 14MHz | 8(5) | 8(6) | 7(7) | 23(18) |
| 18MHz | 9(8) | 8(7) | 7(7) | 24(22) |
| 21MHz | 9(6) | 9(8) | 7(7) | 25(21) |
| 24MHz | 8(8) | 6(6) | 8(8) | 22(22) |
| 28MHz | 49(31) | 164(102) | 21(17) | 234(150) |
| TOTAL | 108(65) | 201(131) | 55(46) | 364(242) |

The number of beacons has substantially increased. Below 28MHz the increase is small. These are mostly experimental beacons on 'unprotected' frequencies, often intermittently operating QRSS/QRP. They rarely interfere with normal working. The 5MHz beacons in G, DL and VO are an important development, offering possibilities for exploring near-vertical incidence propagation, including propagation studies, and helping to stake a claim for continuing amateur use of frequencies in this part of the spectrum.

The great majority of HF beacons are on 28MHz. Despite the decline in solar activity they continue to increase in number. However, vast gaps in coverage remain. We have no active HF beacons in SP, HA, LZ, YO, UA or UR although this area has many VHF beacons. There are also no beacons in West Africa, where one would be valuable during solar minimum in highlighting 28MHz openings for both Europe and Region 2. My San Marino report urged national societies, clubs or groups of individual amateurs to give serious consideration to filling these gaps but there has been no response to date.

The second weakness of the present situation is that the system is underpowered. Apart from the 100-watt NCDXF/IBP transmitters, the total nominal power of all the 28MHz beacons in Region 1 is, at most, 1600 watts. Especially during solar minimum years our beacons risk giving an unduly pessimistic impression of propagation conditions. This may adversely affect activity on the higher bands.

The Lillehammer conference agreed that there would be no beacon sub-band on 7MHz until the full 300kHz was restored. However, it also accepted a strongly argued plea from the South African national society for beacons to be allowed on the band in southern Africa. I have not been informed of any additional beacons there.

Many beacons used in Region 1 are located elsewhere. So comments on the wider situation are appropriate although decisions are of course a matter for those regions. The best known and most widely used beacons are in the NCDXF/IBP network. Most continue to give excellent service, although one or two have been silent for very long periods. This is a matter for great regret. Region 3 has fewest beacons. I would welcome beacons in 9V/9M/YB, or in Central BY/AP/northern VU. Most of Region 2 is well covered (sometimes too well). However, more Caribbean beacons would be welcome. A consistent PY1/PY2 beacon would be very useful for the same reasons as in West Africa. The other big gap is KL7, where a beacon could be a useful guide to Es, trans-Arctic and auroral propagation.

Beacon List. I maintain the Region 1 HF beacon list at www.keele.ac.uk/depts/por/28.htm. All societies are free to reprint it. I am grateful to colleagues who tell me about changes or who consult about proposed developments. However, the list is only useful when it is accurate and up-to-date. This depends on all societies. Several important beacons in our region have been off the air for long periods. I do not know why or whether they will return. Consequently, I do not know whether to reassign their frequencies to new projects.

Beacon Monitoring A group of UK operators systematically monitors the 28MHz beacons. The results are published in the RSGB Propagation Studies Committee's Six and Ten Report, now available at www.6and10.org.uk. HF managers: please ensure your beacon keepers know about this source of feedback?

The hfbeacons mailing list hfbeacons-subscribe@explore.plus.com reaches listeners and operators worldwide with information about changes, reception results and discussion of technical aspects of beacon construction and operation. It serves as a useful news source and informal channel of coordination. HF managers: please let this be more widely known.

Future programme:

To work with societies and individuals to encourage the filling of the gaps in coverage.

To work with individuals and societies to optimise use of beacon frequencies.

To encourage high technical standards and innovation.

To promote the use of beacons for propagation study projects.

To continue making information about beacons as widely available as possible.

Future Development

We owe a great debt to colleagues who construct and maintain beacons, often for many years and at considerable cost. This is in the best traditions of the amateur service. Long may that continue.

Simple beacons running about 10 watts into a vertical antenna often offer excellent service. They will remain the prevailing model. Good quality ex-commercial equipment can often be adapted at small cost in time and components.

However, we must also innovate and think strategically. A few technically advanced beacons, such as the new 5MHz beacons, have come into service, but such initiatives are too rare. Since beacons are designed and used for a variety of purposes there can be no required model. However, I intend to encourage development along these lines:

1. **Locations**. We have many beacons but very limited frequencies. So we should always ask what purpose any new beacon would serve. Desirably, there will be a strategic purpose - whether to fill one of the gaps mentioned earlier or to test particular transmission paths (e.g. trans-equatorial or trans-auroral.). Unless there is some clear purpose it is not helpful to increase the congestion on our frequencies.
2. **Technical standards**. Wherever possible newly constructed beacons should aim for frequency stability of at least 10^7 . (10^8 would be desirable for automated monitoring projects.) The ZL/VK precision beacons and designs by G3LDO and G4JNT are examples of best practice. Frequency-locking/synching, whether relating to GPS, MSF or Frankfurt are desirable.
3. **Messages**
 - 5-10 seconds of plain carrier to facilitate measurement of signal strength.
 - Call sign in a1a morse at least twice per minute + optional psk identifier. Avoid fsk.
 - Grid locator NOT essential but may be included.
 - Sending speed: remember many operators now have very limited morse capability.
 - Minimal pause between messages.
 - Digital voice identification should NOT be transmitted in narrow-mode parts of the band.
 - This specification may be varied to meet the requirements of particular projects.
4. **Power**: 10 watts to be the norm. However, it would be good to have a few running around 100 watts. Power stepping is valuable for some projects but is not generally required.
5. **Antennas**: Most beacons will radiate omnidirectionally with vertical polarization. However, directional antennas and horizontal polarization should be considered if the intention is to target a particular path or propagation mode.
6. **Frequency sharing**: Strongly encouraged. It uses spectrum more efficiently and signals openings more effectively. Frequencies assigned for this purpose are underused.
7. **Duration**: Beacons are sometimes established for short-term projects. Providing this is known it causes no problems. However, most beacons should aim to be reasonably long-term projects, so that other operators can rely on them as propagation aids. Maintaining beacons can be demanding and expensive, and radio clubs and national societies should be encouraged to give assistance and support.

8. **Stimulating activity**: During solar minimum, 24 and 28MHz risk being deserted. There are signs this is currently happening. Yet openings do occur; beacons can highlight them, encourage activity and relieve pressure on other bands. We cannot afford to have spectrum seriously under-occupied for half the solar cycle. 28MHz probably has enough beacons, apart from areas mentioned earlier, but during the next few years additional beacons on 24MHz could be very useful. They would, of course, be 'unprotected'. There is no proposal to widen the protected beacon segments.

These proposals would form the basis for a network of technically proficient beacons that would be more useful to operators, could command respect among professionals and would be suitable for automatic monitoring in propagation research projects.

Martin Harrison G3USF
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