Subject	**50 MHz Synchronised Beacons**		
Society	RSGB	**Country:**	United Kingdom
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50 MHz Synchronised Beacons

Introduction

As requested at the 2013 Interim Meeting at Vienna, further information is provided regarding the implementation of the 50 MHz synchronised beacon scheme.

Background

At the 2011 Region 1 Conference in Sun City, the re-plan of the 50 MHz band made a reservation for new synchronised beacons (50,000 – 50,010 MHz in Region 1). This was against the background as illustrated in the appendix of a large number of beacons in the 50,0 – 50,1 MHz segment reducing the available space for CW operation. It also recognised that propagation in 'the magic band' is highly variable.

At the 2013 Interim Meeting at Vienna some technical parameters were agreed including: 1 kHz frequency spacing, 1-minute CW/MGM sequence and a 4-minute repeat period. It was also suggested that the scheme might need to accommodate some frequency reuse if some of the sparser parts of Region 1 were to gain 50 MHz capability.

Proposals / Objective

At Vienna, two papers provided key technical recommendations but it was recognised that further information was needed in order to enable coordination, on-air tests and a demonstration of the benefits, so that the concept could become reality.

The objective should be that we could take all the final recommendations and create such an attractive guide for both users and beacon builders, that this encourages widespread implementation. Depending on the timescale, we should also extend the original Sun City deadline for other beacons to migrate to their new 50,4 – 50,5 MHz allocation.

Below we propose some key topics we believe are needed. We welcome comments in the lead up to the 2014 conference (and offers of participation for the initial tests)

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Pilot Scheme / Demonstration

We believe that a pilot scheme is vital for an early demonstration of the benefits of the system and encourage its wider rollout. In addition to the beacon hardware, a key ingredient for the pilot should also include monitoring software/reports, so that

the propagation benefits can be maximised and good feedback is obtained during this development phase.

A pilot scheme would also enable comparative testing of the various options for MGM, etc. It might also enable testing of features for in-situ upgrades, robustness to for power outage etc., before deploying to remoter locations.

A group of Societies should therefore cooperate and create a small-scale demonstration. This could perhaps be a single frequency (nominally 4-beacon) system. In such a case 50,002 MHz may be appropriate, as it has relatively few beacons and could then be progressively expanded.

User Friendly

Priority should be given to make this easy and attractive for users. Frequency/time slots should be easy to look up. MGM modes must be published and chosen that are well supported.

Advanced Features

As MGM modes and propagation conditions can change over time, it may be appropriate to specify that the hardware design can adapt to the time of year, or can be easily updated for a new MGM mode or frequency/timing-slot without a major effort/interruption. Modern digital beacon sources offer many possibilities to create a more advanced system than the HF IBP. For example a modern synthesised source might also include carrier-phase reversals for measurement of propagation delay. However, we also need to consider the balance between simplicity/reliability vs adaptability.

Advanced Monitoring

Given that the multiplex will incorporate precise frequency/timing and MGM, this will create considerable opportunities for remote/automated monitoring. This might include software that may exploit SDR techniques to monitor a complete multiplex, or even satellite reception experiments that can survey and profile sporadic-E.

Frequency Re-Use:- Extra Slots & Propagation

Region 1 covers a huge area and the band has highly variable propagation. As a guideline, a separation of at least 500 – 1 500 km between multiplex beacons seems to be appropriate depending on local circumstances. Should the system prove popular and the overall number of beacons rises beyond the capacity of a single multiplex (with ~40 slots), then frequencies could be reused in parts of the region (e.g. Europe, Southern Africa, Middle East, etc.) This would take advantage of the beacon hardware design being flexible so that it could be easily reconfigured.

Recommendations

That Region 1 proceeds with the scheme as agreed in the 2011 and 2013 recommendations and uses this paper to help develop the final implementation guide and an initial pilot scheme demonstration

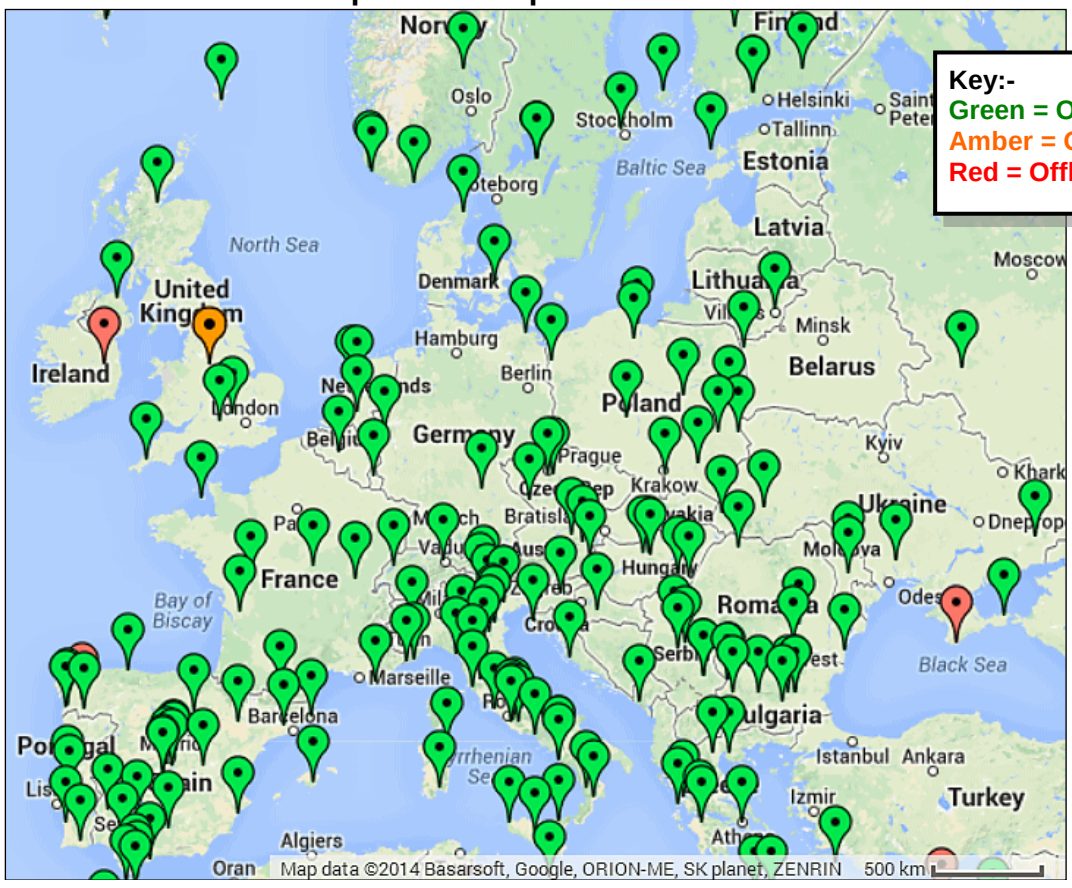
To keep Region 2 and Region 3 informed of progress should they wish to start implementing their own beacon multiplexes.

Appendix 1: 50 MHz Beacons

The following are taken from the www.beaconspot.eu interactive database and maps, which collates real-time reports of beacons from DX Cluster data.

50 MHz active beacons – March-2014

As above – but close-up over Europe



Source: Beaconspot website http://www.beaconspot.eu/beaconm.php?bandmhz=50