Outcome of the 2012 World Radiocommunication Conference:

Oceanographic HF Radars Officially Recognized by ITU

The International Telecommunication Union (ITU) is the United Nations special agency for information and communication technologies responsible for the worldwide management of the radio-frequency spectrum and "development of technical standards that ensure networks and technologies seamlessly interconnect". The ITU convenes every 4 to 5 years in a World Radiocommunication Conference (WRC) to make decisions resulting in treaties regulating global standards.

Of importance to our user community throughout the world is Resolution 612: Use of the radiolocation service between 3 and 50 Mhz to support (high-frequency) oceanographic radar operations.

Resolution 612 Outcome
The outcome of this resolution is that for the first time "oceanographic radars" are officially recognized by ITU, with their own primary, provisional primary, and secondary bands.

Benefits to HF Users
Once in effect, this resolution will benefit the oceanographic HF community, as it is expected that:
• the licensing process (approvals for radio transmission) by government agencies will proceed smoother and will be concluded faster;
• users will be able to plan with certainty at which frequency their network can operate.

Complete ITU 2012 WRC Agenda and References document can be viewed at:
http://www.itu.int/dms_pub/itu-r/oth/0C/04/R0C040000070001PDFE.pdf

Bottom Line

CODAR will produce, sell, and support SeaSondes that operate in all of the ITU allocated bands and conform to any local regulations.

What Existing HF Users Need to Do Now
No immediate action is necessary by any HF radar operator until the service rules and licensing regulations are developed and promulgated.

Developing Service Rules & Licensing Regulations
While the ITU sets global standards, each Region and country within will set specific service rules and licensing regulations, so there will be some variations among countries. In the United States (which is part of Region 2), development is the responsibility of NTIA and FCC. We expect this to be a lengthy process, spanning months, with some aspects taking even two years to complete. Similar timelines might apply to rules and licensing regulation development for other regions and countries.

What Will Happen to Existing Experimental Licenses (that presently operate under WRC Section 4.4)
Already approved operations as "experimental" licenses in other bands (outside of the new WRC-allocated bands listed below) will not automatically go away. Individual country authorities will need to determine how and when this might happen, if it happens at all. Presumably once the implementation of the WRC decision is complete, at least some oceanographic radars will need to begin transitioning to the new allocated bands, operating under the new service rules, when their experimental licenses reach expiry date and require new or renewal licensing. Use of the new bands should not begin until the service rules are in place and a new license has been issued to an oceanographic radar operator. In most cases, transitioning SeaSondes to the nearest allocated band should not require major hardware modification.

The Details

Primary Allocations

The WRC provided primary and secondary allocations for oceanographic radar worldwide. However, there is a footnote in the documents that essentially means that oceanographic radars can be shut down if interfering with another existing or future system that requires a primary license at that frequency.

The WRC-Allocated Bands and Total Spectral Widths Are:

4.438 - 4.488 MHz 50 kHz (approved as secondary band in Regions 1 & 3, and provisional primary in Region 2)
5.250 - 5.275 MHz 25 kHz (approved as secondary band in Regions 1 & 3, and provisional primary in Region 2)
9.305 - 9.355 MHz 50 kHz (approved as secondary in Regions 1 & 3, not approved for Region 2)
13.450 - 13.550 MHz 100 kHz (approved as a secondary band for all regions)
16.100 - 16.200 MHz 100 kHz (approved as secondary band in Regions 1 & 3, and provisional primary in Region 2)
24.450 - 24.600 MHz 150 kHz (approved as provisional primary in Region 2)
24.450 - 24.650 MHz 200 kHz (approved as secondary for Regions 1 & 3)
26.200 - 26.350 MHz 150 kHz (approved as secondary for Regions 1 & 3)
26.200 - 26.420 MHz 220 kHz (approved as provisional primary for Region 2)
39.0 - 39.5 MHz 500 kHz (approved as secondary for Region 1)
39.5 - 40.0 MHz 500 kHz (approved as primary for Region 3)
41.015 - 41.665 MHz 650 kHz (approved as provisional primary for U.S. and Rep. of Korea)
43.350 - 44.000 MHz 650 kHz (approved as provisional primary for U.S. and Rep. of Korea)

Converting Your Existing SeaSonde Network to a Primary Band

If you are requested by local radio authority to change frequency of operation to one of the WRC-allocated primary bands, then CODAR and its regional technical partners will work with you to convert your SeaSonde network. In some cases the change can be done simply with a software setting adjustment, while in other cases a hardware adjustment at the site and a re-tuning of antennas and filters may be required. No reconfiguration of SeaSonde antenna layout will be needed.

Interpreting "Total Spectral Width" Listed in Table

Some of these slots will likely be broken into sub-bands when licenses are issued, however this detail will be decided by individual countries' approval authorities. It is prudent for for all radar operators below 10 MHz to expect and plan on use of only 25 kHz bandwidth or less. For example, the 50-kHz slot between 4.438 - 4.488 will likely become two 25-kHz channels side by side. For those 100 kHz slots 13.450 - 13.550 & 16.100 - 16.200 we expect that these will each be divided into two 50-kHz channels side by side.

Bandwidth - Range Resolution Relation before Range Software Windowing*

25 kHz bandwidth => a ~6-km range cell
50 kHz bandwidth => a ~3-km range cell
150 kHz bandwidth => a ~1-km range cell
*SeaSonde software processing window extends range cell by 17%; windows required by others extend cell to 100%

It is speculated that the countries inside any Region will attempt to have uniformity on this band/sub-band issue, since a country that grants sweeping across a 50 kHz bandwidth and a neighboring country authorizing use of a 25 kHz bandwidth will interfere with each other, making effective operation for both impossible.

Transmit Identifier or Call Sign

Each radar will have to transmit a call sign, in Morse code, at least once every 20 minutes. The exact method for doing this will be decided at WRC Working Party meetings over the course of the next year or two. Once specific requirements are set, then CODAR engineers will begin developing a technique that can be implemented locally on each SeaSonde, with either software or firmware change that someone local can do with our help, to minimize costs.

Minimizing Mutual Inter-Radar Interference Potential

Each radar will have to minimize interference potential. Exact wording is "should, where applicable, use techniques that allow multiples of such radars to operate on the same frequency, reducing to a minimum the spectral occupancy of a regional or global deployment of radars." Radars within the same and adjacent countries/regions will clearly need to operate simultaneously on the same frequency while avoiding mutual interference. Lower-frequency CODAR SeaSondes are already delivered with the SHARE technology (GPS-enabled modulation multiplexing) that provides this capability, and is an easy add-on for any SeaSondes not already possessing SHARE feature.

No other changes to hardware or existing systems are anticipated. Contact CODAR if you have further questions or concerns.