June 4, 2007

As I am sure you are aware, the Air Force and Department of Defense (DoD) have raised concerns about interference on the 420-450 MHz band to the Pave Paws Radar (PPR) installations, located at Beale AFB near Sacramento, CA and Otis AFB at Cape Cod in Massachusetts. Let me begin by saying thanks for your patience in this process. While rumors and stories have been circulated over the past several months, hopefully this letter will serve to give you a true understanding of the situation, bring you up to speed what the DoD is requesting in terms of mitigation, and lay out a plan of action that the DoD has agreed to try in resolving the issue.

At the request of the DoD, on March 21, 2007 representatives of the ARRL met with Air Force Spectrum Management officials to discuss their claims of an escalating problem of interference to the PPR sites. According to the DoD, the in-band interference from Amateur Radio fixed FM voice repeaters had increased to an unacceptable level. Pave Paws radars are used for national security functions, including early detection of water-launched missiles. They are critical to our national defense and are in use 24 hours per day, seven days per week.

It is important to note that the Amateur Radio Service is a secondary user in the 420-450 MHz band, both by the Table of Frequency Allocations and the FCC Part 97 regulations. As such, Amateur Radio licensees, jointly and individually, bear the responsibility of mitigating or eliminating *any* harmful interference to the primary user, which in this case is the Government Radiolocation Service that includes the DoD Pave Paws systems.

Our goal has been to develop and implement a plan that would mitigate the interference, and at the same time to permit the repeaters to continue operation and to operate on as liberal a basis as possible. To do so, we have offered to work closely with the two involved repeater coordinating groups as well as the individual repeater owners . Our plan is to share information and to deal with this issue on a coordinated basis with all stakeholders.

Since the meeting of March, 2007, ARRL staff members have been working with DoD officials to come up with a mutually acceptable plan to address the mitigation needs of the Air Force, which would also allow as many of the subject repeaters to remain operational as possible. While there are many unanswered questions due to the classified nature of the Pave Paws system , the ARRL has openly tried to share information.

In our communications with the DoD, we have asked for as much information as possible, especially the criteria by which particular repeaters were included on the list of interference contributors, and what level of signal strength would be acceptable to avoid interference to the radar. The DoD has not yet indicated what its agents relied on in identification of the repeaters nor the methodology used. It cannot (for security reasons) provide any of the technical parameters of the radars, except to tell us that it is not a matter of individual frequencies. Rather, they claim the noise levels in the entire band are an issue. In order to determine what actions to propose, the ARRL Laboratory has spent a significant amount of time trying to determine what technical parameters might be acceptable to the DoD for each individual repeater. This has included doing Longley-Rice calculations for each identified repeater (Longley-Rice calculations are based on electromagnetic theory and on statistical analyses of both terrain features and radio measurements. The studies predict the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space.) The two repeater coordinating groups (NESMC and NARCC) cooperated by sending information from their records on each coordinated repeater.

In mid-April the ARRL asked affected repeater owners to voluntarily reduce transmitter power output for each repeater to 5 Watts. Many repeater owners responded accordingly, though some did not or chose to reduce power but not to the 5 Watt transmitter output level. This reduction was a temporary recommendation pending the outcome of the Longley-Rice calculations and further mitigation strategies. We conveyed this proposal to the DoD on April 23, 2007. We received back their response on June 1, 2007. These exchanges lay out the mitigation plan detailed below.

The DoD requested that a single point of contact be identified through which all of the repeater owners would direct questions/inquiries. The ARRL has agreed to serve as that single point of contact and designated my office as that point of contact. Please direct all questions to me by email at n1nd@arrl.org or by telephone at 860-594-0236. Depending on the nature of your query, I will bring in other resources (such as lab expertise) as necessary.

We have also been in contact with representatives of the FCC, who have the ultimate responsibility for enforcing any mitigation plan, up to and including ordering specific repeaters to shut down operations. The FCC is aware of the complex nature of this problem and the mitigation strategy being proposed in this letter.

The DoD has indicated a willingness to try a mitigation proposal, but have also indicated their need is for these issues to be resolved sooner rather than later. With that expediency in mind, the proposed mitigation strategy is as follows:

1) All repeaters on the DoD list in the affected areas will immediately reduce power to 5 Watts transmitter power output. Each repeater licensee/trustee should contact my office to confirm this once this has been done for their system. We need confirmation of this being done from each repeater owner by June 15, 2007.

2) The ARRL will provide the Longley-Rice calculations for each repeater to the DoD by June 15, 2007. The DoD will provide engineering data to the ARRL and FCC by June 15, 2007. These studies will be reviewed by the DoD, the ARRL Lab and the FCC to determine the amount of mitigation necessary for each repeater. Based on this review by the DoD, additional mitigation proposals for individual repeaters (including further power reductions, lowering of antenna heights, use of more directive antennas and other possible mitigation techniques) will be provided by the ARRL as needed to individual repeater owners. If there is a disagreement on the conclusions, a conference call will be held to resolve any outstanding issues.

3) All interference must be resolved no later than August 1, 2007.

4) Beginning in August, 2007 (and continuing on a periodic basis), the DoD will have a follow-up engineers study at each PPR site to ensure corrective actions have been taken and the interference and to ensure that successful mitigation continues.

As secondary users on the band, we have few options; and all options involve cooperation with the DoD. Hopefully the Longley-Rice calculations from the ARRL and the DoD's engineering studies will provide enough data to allow as many of the repeaters in the affected areas as possible to remain on the air at reasonable power levels. It is entirely probable that even with extreme mitigation techniques, some repeaters in close proximity to the PPR sites may have to be shut down permanently. If that happens, official notice would come from the FCC. It is also possible that some repeaters might be required to operate permanently at a lower power level than the maximum 50 watts permitted by the FCC rules in the areas near these Air Force bases. In those cases, we will be in contact with the individual repeater owners with that information, and the FCC will be notified.

It is important to note that once an acceptable field strength for a given repeater is determined and implemented, the repeater owner will need to be diligent to make sure that the non-interfering RF level is not exceeded in the future by any combination of antenna gain, directivity and transmitter power. We understand that the mitigation strategies are going to mean some repeaters will have a smaller coverage area than they currently have. Unfortunately the option of reduced power or antenna gain or height may be the necessary alternative to shutting down permanently. The cooperation and good faith of the amateur community is important in this arena, as the long-term goal is to continue to allow amateur radio activity on these bands in the affected areas.

We ask that you, and all repeater owners affected by this issue, immediately implement the 5 Watts TPO for your repeater/s. We again ask that you please contact me by June 15 indicating if you have implemented the power reduction. This will allow us to have on hand levels of voluntary compliance that can be used to show the cooperation of the amateur community. It is to each repeater's long-term advantage to implement the power reduction as soon as possible. The DoD has indicated they will be collecting engineering data during June. This presents the opportunity to assess a repeater's actual

impact at the lower power level and a more honest determination of its continued potential for harmful interference to the PPR sites. If any repeaters are running at higher power levels, then the determinations can only be based on assumptions rather than on actual data.

Thanks for your understanding in this complex matter and your cooperation in helping implement this plan of action immediately in order to meet the June 15 initial deadline requested by the DoD. If you have any questions you may contact me at 860-594-0236 or by email at n1nd@arrl.org Please do not hesitate to contact me with any questions or queries.

Sincerely,

Dan Henderson, N1ND
ARRL Regulatory Information Specialist