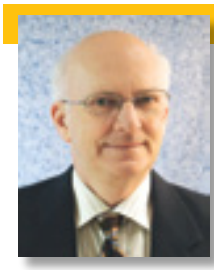

David Sumner, K1ZZ – dsumner@arrl.org
ARRL Chief Executive Officer

Going Digital

"Welcome to cyberspace, I'm lost in the fog — everything's digital, I'm still analog."

Last year's hit song "Analog Man" by rock musician and ARRL Life Member Joe Walsh, WB6ACU, captured the angst of many in his generation. "When something goes wrong," Joe laments, "some 10-year-old" has to show him what to do. Yet there is no denying the positive impact of digital technology, particularly in the field of communications.

Those of us who grew up using vacuum tubes weathered the transition to solid state, but that change — revolutionary as it was — did not have much effect on how the amateur bands sounded. The shift from AM to single sideband (SSB) was much more dramatic in that regard, even though the basic emission is the same: SSB is simply an analog AM signal stripped of its nonessential elements.

Radio amateurs have been using digital modes since the dawn of the radio art. Morse code itself is digital, being made up of a string of equal blocks of time in which a signal is either present or absent. Amateurs have used radioteletype for more than 60 years and packet radio for more than 30. In each of these three cases, as well as in the case of analog telephony, the equipment you buy or build today permits you to communicate with amateurs who are using gear from yesteryear.

Interoperability is essential to the functioning of any communications network. We radio amateurs want to be able to communicate with one another to the greatest extent possible. Not only is this consistent with the principle that Amateur Radio is a single global community, it is also one of our great strengths as public service and emergency communicators.

It logically follows that we want to avoid creating barriers to interoperability. At the same time we want to be able to use and experiment with the widest possible range of radio communications technologies. These two objectives are somewhat in conflict.

One way to encourage or ensure interoperability is by regulation, although this would be a poor choice for Amateur Radio. Regulations of this kind tend to freeze technology, hamper innovation and impose unnecessary costs. Regulations are difficult to change; for example, in the late 1970s it took years for the FCC to amend its rules to permit amateurs to use the American National Standard Code for Information Interchange (ASCII).

Another is through the adoption of voluntary standards. An example of this approach is the AX.25 packet radio protocol. This adaptation of the pre-existing X.25 international standard protocol was developed by a team of volunteer experts and approved by the ARRL Board of Directors in October 1984, and is still in use today. While standards also tend to freeze technology, they can be of great benefit as long as there is a mechanism for reviewing and updating them that is accessible to stakeholders. Even the venerable Morse code can benefit from updating from time to time. In 2004, at the urging of the International Amateur Radio Union, the International Telecommunication Union (ITU) added the "@" symbol, universally used in e-mail addresses, to the international definition of the International Morse code contained in Recommendation ITU-R M.1677. The same ITU process currently is being followed to add the amateur-created Varicode, used for PSK-31 and other purposes, as a new ITU-R Recommendation.

A third approach is to leave it to the marketplace — what amateurs choose to buy or to adopt. If we value interoperability, as we should, then we will make our choices accordingly. Varicode might be regarded as an example of the marketplace approach since it was in use for more than a decade before being proposed for ITU recognition.

Amateurs who are active using HF RTTY and data modes know there is a mind-boggling array of digital communications options, with new ones being introduced all the time. The main limitation on HF data modes has been the FCC rules, which specify a symbol rate of not more than 300 bauds below 28 MHz. So far, interoperability is not a major concern. Most HF digital stations consist of an SSB transceiver, interface, sound card, and computer. The major variable is software, which can be updated or supplemented readily. Even if you have one favorite digital mode it's likely that you're also equipped to use a number of others.

The situation with regard to digital voice is a bit different. Thus far, while there has been some pioneering work done at HF, most of the adoption of digital voice modes has occurred at VHF and UHF and has involved commercial products using protocols such as APCO-25, D-STAR, and Motorola's MOTOTRBO. Amateurs using a digital voice mode on VHF/UHF generally retain analog FM capability but are unlikely to be equipped for any other digital voice mode. At this stage an amateur who is interested in digital voice is at risk of having no one to talk to unless he or she finds out what is in use locally before acquiring a rig, and would still face the same risk when traveling.

The opportunity for amateur digital voice to progress more along the lines of digital data is offered by the Codec2 Project, an unincorporated international Open Source project to produce a low-bandwidth digital voice codec. In awarding the 2012 ARRL Technical Innovation Award to David Rowe, VK5DGR, one of the principal developers engaged in the Codec2 Project, the ARRL Board of Directors observed that "the open-source nature of this work is a major step forward in the development of digital voice communications."

Further advancements in Amateur Radio digital communications are as welcome as they are inevitable. They are deserving of our continued support. But, let's make sure we will still be able to talk to one another.