97.1 (b)

Section 97.1 of the FCC's rules and regulations sets forth the basis and purpose of the Amateur Radio Service in the United States. The second item, after public service and emergency communications, is:

(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

Ever since the first commercially-built receivers came onto the market in the 1930s, many hams have been worried that we have collectively been losing our edge in the technical arena. The hand-wringing has increased in recent years, as transistors replaced tubes, integrated circuits replaced discrete components, and surface-mount technology made everything too small to handle without magnifying glasses and special tools. When it comes to building state-of-the-art equipment, the worriers say, the average ham is out of his league.

In fact, the technical talents of hams today are so often downplayed that the ARRL felt it necessary to focus on them not only in this year's "We do that" public relations campaign (see <http://www.wedothat-radio.org/wedothat/>, but by making technology a "fifth pillar" of the organization's primary purposes, something that should be obvious to all, but often, apparently, is not.

Technical Evolution

Regardless of popular perceptions, something curious is happening as we take the next steps along the path of technological evolution we've been on since the days of spark. That next phase of evolution, of course, is digital technology. More and more, our rigs rely on microprocessors and software routines to perform functions traditionally handled by analog circuits and components. The ultimate transition from analog to digital is the software-defined radio, or SDR. We're reviewing one of them—the FlexRadio Flex-5000A—in this issue. But as noted above, something curious is happening here. Rather than driving another nail into the presumed coffin of amateur radio technical expertise and innovation, the Flex-5000A and the mindset of its designers are opening new doors and creating new opportunities for "continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art."

Before I explain exactly what I mean, though, I want to back up 25 years or so, to the early days of the computer revolution. The common lament in the mid-1980s was that computers were drawing away potential hams and that onerous code test requirements were creating an unreasonable obstacle for otherwise interested computer types who had little interest in traditional HF hamming where code knowledge was most important. This theory led to Novice Enhancement in 1987, the code-free Technician license in 1991, and ultimately, the removal of all code test requirements last year.

There was only one problem with this theory: Even though we made lots of changes to the *rules* to encourage computer and software folks to join our ranks, little was done to change the *technology* of ham radio to really entice them to become active hams. To be sure,

there have been tremendous strides in making the computer an integral part of most ham shacks and in developing software to enhance our operating. Logging software, contesting software, digital mode software (including many new digital modes), and station control software all come to mind. But software-savvy hams have been all but shut out of developing and enhancing the software that increasingly determines the features of our radios themselves. This has now changed.

A Technical Revolution

Traditionally, amateur radio manufacturers have felt that they were the experts on determining (with customer input), designing, and implementing various features on their models. For many years, they were correct. We're not all engineers, after all. Recently, though, three companies in particular have made special efforts to seek out customer input and suggestions. Elecraft, Ten-Tec, and Flex Systems have established very active online user communities, in which company engineers and executives often play active roles along with their customers. Among other things, group members make suggestions that often end up being included in the next software release for a particular radio.

The folks at Flex Systems have now gone a step further, writing the software for the Flex-5000 with open-source computer code. Software-savvy users are invited and encouraged not only to suggest new features but to actually write software routines to make those features work. Their code is then shared with other users who play with it, tweak it, try to break it, and generally make it even better than originally envisioned. Once it reaches a point of general acceptance, it often ends up in the next official software release for all Flex-5000 users. So far, though, most of those users appear to be programmers, downloading constantly-updated developers' versions and happy to finally have found a place in ham radio where they can apply their considerable skills to "advancing the radio art." They are also gaining invaluable experience in blending the digital world of software and computers with the analog world of RF transmission, reception, and propagation —skills that are in high demand and short supply.

In a sidebar to our Flex-5000 review, Lee Crocker, W9OY, says he feels that SDR represents such a paradigm shift in amateur radio technology that all traditional radios are now obsolete. We are not ready to go along with that point of view just yet. There are many, many hams for whom clicking a mouse will never replace pushing buttons and turning dials. However, what we *do* feel represents a paradigm shift is opening up the development of radio operating software to the amateur community and making it a collaborative process.

It has taken 25 years, but the "software guys" (and gals) we've been courting for so long finally have a home in ham radio where they can fully contribute to advancing the radio art. We welcome this change and encourage other manufacturers to consider following Flex's lead into the world of open-source ham radio operating software.

73, W2VU

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