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Magalie Roman Salas
Office of the Secretary
Federal Communications Commission
1919 M Street, NW, Room 222
Washington, DC 20554

IN THE MATTER OF

1998 Biennial Regulatory Review - Amendment of Part 97 of the Commission's Amateur Service Rules.	))))	WT Docket 98-143

REPLY COMMENTS OF

DATE: January 7, 1999

Alan J. Wormser, N5LF
4805 Rustown Drive
Austin, TX 78727-6748

I file these reply comments on January 7, 1999, regarding the FCC's proposed Amendment of Part 97 of the Commission's Amateur Service Rules, WT Docket 98-143.

My reply comments are enclosed.

I SUPPORT emphasis on digital modes over voice modes, increased testing on technical knowledge, and preserving CW as a mode uniquely suited to the Amateur Service.

I OPPOSE comments by Fred Maia (on behalf of NC-VEC), CQ Communications, and others who advocate further erosion of licensing standards.

Thank you for the opportunity to share my observations and concerns about the future of the Amateur Service.

Sincerely,

Alan J. Wormser
Austin, Texas

Enclosure: Reply Comments

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REPLY COMMENTS

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REPLY COMMENTS

INTRODUCTION

Personal Data

I am 42 years old and have been a licensed amateur radio operator for 23 years. I have been an active member of the ARRL throughout most of that time. I held the General Class license for 20 of those years, and only achieved the Extra Class in 1996. My father was also a ham, holding the callsign W5GKX from 1936 until his death in 1997. Amateur radio launched him into a rewarding career as an electronics engineer--a fact that underscores the importance of maintaining amateur radio as a technical service.

Member of a Technical Service, not Simply a Hobby

I consider my recreational time on the radio precious, but the Amateur Service is a primarily technical service designed to attract technically-minded people. As stated by Kenwood Corp. in their comments, amateur radio is perhaps the most educational and cost-effective service regulated by the FCC.

As a licensee in a government service, I strive to continually earn my privileges. Listed below are a few of the ways that I volunteer my time, equipment, and skills to the FCC and the community:

Volunteer Examiner

I am a volunteer examiner with both the W5YI/VEC and ARRL/VEC programs. Even before there was such a thing as Volunteer Examiners, I examined applicants for the Novice license under the old mail-in system.

Volunteer Instructor

I have taught Novice and Technician classes for both the written and Morse Code exam elements. I have also worked one-on-one with aspiring hams as young as 10 and as old as 78. I have worked with applicants who were blind and applicants with severe hearing impairments. In every case, I have never met anyone who was motivated and interested who could not pass a 5 wpm or 13 wpm CW exam or the written elements for any class of license. My CW students (I have usually taught 2 or 3 at a time) have had a 100% pass rate on their CW exams.

Emergency Volunteer

As a member of ARES, I am active in emergency work using amateur radio. I assist with emergency communications at the State of Texas EOC (WC5AAH), and have drilled at the Travis County Red Cross (W5KA) and City of Austin EOC (W5TQ). I have also helped plan county-wide emergency drills relying on VHF packet, FM, and repeaters.

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Just this past autumn I volunteered my skills and equipment for over 50 hours at the State EOC, a Red Cross shelter in south Austin (Texas), and from my home and automobile. These events included the Rio Grande floods, the central Texas floods, Hurricane Georges, and assisting the Salvation Army and Hondurans in the aftermath of Hurricane Mitch.

In both emergency and non-emergency traffic handling, I have observed how important CW can be as a supplement to HF voice communications. Weak stations often communicate by CW on voice nets when the need arises.

Also, I cannot overemphasize the importance of digital techniques--on both VHF/UHF and HF--in the modern Amateur Radio Service. Each mode is essential as part of an integrated tool kit for emergency and non-emergency communications. Unfortunately, too many new amateurs focus their resources only on VHF FM communications, and ignore digital, CW, and HF voice modes.

Operating Many Modes

I operate in most of the modes that amateur radio has to offer: I am active on CW, SSB, RTTY, AMTOR, and VHF FM and Packet. I have also experimented with SSTV, DSB, AM, and satellite communications.

Continuous Technical Advancement

Lately, I have been developing my knowledge of RF circuit design, packet networking schemes, and have been introducing myself to spread spectrum and coherent systems. I tap my own network of fellow amateurs for knowledge and advice.

All of this self-training and peer training is accomplished at almost no cost to the government. Yet it supplies a great opportunity for young and old alike to meet and share their love for radio and electronics. There is no generation gap on the air, and international boundaries disappear. There is no other technical communications service like it.

Through experience, I have developed an appreciation of the ways in which all modes complement each other, and which modes are advantageous for which situations.

Self-Taught through Amateur Radio

I am a social scientist by profession. Yet, daily, I am able to apply the skills I have acquired in the Amateur Service. As an archeologist, I am in a field that is becoming more and more dependent on satellite geolocation, complex electronic equipment, knowledge of solar cycles, and interpreting the effect of various geomagnetic indices on our sensitive geophysical devices.

Like the radio amateurs and their continued use of CW and SSB, modern archeologists have not thrown away their shovels and brushes only to rely on high-dollar cesium magnetometers. On the contrary, the modern techniques work in tandem with traditional techniques to get the job done. The right tool is selected for the right job.

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The same is true of the amateur service: Complementary techniques and modes allow the skilled operator to choose from a broad array of modes to get the job done. We will succeed in the 21st century by maintaining our traditional skills while continually adding new ones--always enlarging our collection of tools and techniques.

RESTRUCTURING: WORMSER, ADSIT, DINELLI, BILLINGSLEY AND OTHERS

Review of Our Plan

In the plan proposed by Wormser, Adsit, Dinelli, Billingsley, and others, there would be 4 classes. But unlike the plan proposed by ARRL, grandfathering would require taking the missing exam elements before renewal.

Under the plan, the Codeless Technician and Extra Classes remain unchanged, except that the Technician is restricted to 50 watts output. The General Class is grandfathered to Advanced Class.

The primary difference between the Wormser-Adsit-Dinelli-Billingsley Plan and the ARRL plan occurs in treatment of Pre-1987 Technician, Technician Plus, and Novice. Rather than grandfather them to General Class, as the ARRL proposed, Wormser, Adsit, Dinelli, and Billingsley recommend creating an Intermediate Class.

Intermediate Class: Emphasis on Digital Modes

The Intermediate Class would require 5 wpm CW and the current General Class written exam. Thus, pre-1987 Technicians would automatically become Intermediate Class. Novices and Post-1987 Technician Plus would be grandfathered to Intermediate.

Privileges for Intermediate Class would encourage digital modes over voice modes by granting all digital and CW HF privileges of the Advanced Class, but restricting HF voice to the existing 10 meter Novice voice allocation and the upper 150 kHz of 75 meters to encourage developing skills in traffic handling.

We must encourage digital HF/VHF and wide band VHF/UHF modes in order to stay current with modern technology.

Enhance Technical Questions on the Exams

We recommend adding questions on commonly encountered circuits, use of common test equipment, and digital modes. I also recommend including such things as TCP/IP and various other encoding and handshaking schemes, data layers, and frames. I further suggest that these be introduced earlier in the test series: at the Technician and General exams.

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Maintain the Current 3 Levels of CW Exam

The current three levels of exam continue to serve us well. The 5 wpm CW exam is an excellent introductory level exam, as most individuals can master 5 wpm in a matter of a few days or weeks of practice. However, only at 12 or 13 wpm is the operator able to copy accurately enough under adverse conditions, sufficient to relay critical information to the proper authorities.

The 20 wpm CW exam is a significant achievement for many yet is not a barrier to those who seek the highest class of license. This is proven by the fact that while the number of new Advanced and General Class licensees has levelled out over the past 5 years, the Extra Class continues to grow in numbers despite its 20 wpm CW exam requirement.

Release the Novice Subbands to Digital/CW

We recommend reserving the Novice bands for digital and CW modes. Expanding the SSB bands would do nothing to enhance technical skills in the Amateur Service. Advancements for the next few decades appear to be in digital technology.

Do NOT Allow Testing Twice at the Same VE Session

A candidate for an exam should only be allowed to fail one written element and one CW element per testing session.

Change Waivers to Include FCC Review and Certification

We recommend eliminating the current waiver system and requiring the FCC field office to review any requests for waivers. If accepted, the FCC would issue a waiver certificate that would be presented by the candidate at the testing session.

TWENTY YEARS OF LOWERING OUR STANDARDS

Please Do Not Lower our Licensing Standards Yet Again

It has never been easier to obtain an Amateur Radio license. Yet, even with easier exams, more testing opportunities, and removal of the Morse Code requirement, there are those who want instant gratification with no real effort.

Over the past 20 years, several changes have been made that lowered the skills required for the exams--especially in the Technician Class requirements. Examples include publishing the exact test questions, answers, and distracters (about 1980); creating an easier Technician written exam from the General exam (1987); not requiring Technician Pluses to take the General written despite being given HF privileges (1987); adoption of fill-in-the-blank and multiple choice CW exams (early 1980s); and finally, dropping the CW requirement for Technicians (1991).

In fact, today's examinee can expect to be able to take the exams in any order they choose. If they fail, they are even allowed to retake another version of the exam immediately by paying a second fee to the VEC.

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This was not always the case: Until the early 1980s, a candidate had to take the written General exam before attempting the Advanced exam, for example. Also a candidate who failed an exam had to wait 30 days to retest.

If a candidate's knowledge is marginal, it would serve us better if they studied a little more and tried again another day.

OBSERVATIONS ABOUT SOME OF THE COMMENTORS

Many of the comments received regarding WT Docket 98-143, especially those filed electronically, appear to have been authored by individuals with Technician or Technician Plus licenses who want HF privileges without having to pass a CW exam. Some comments of this nature were sent in by individuals who are not licensed at all, and by a few who were licensed (and residents of) foreign countries. I have noted some of the respondents with questionable motivations below:

Non-Resident Foreign Commentors Who are not Licensed by the FCC

In my opinion, commentors who are neither licensed by the FCC, nor even reside in the United States, have very little standing to comment on a docket that involves domestic restructuring, much less whether or not the FCC should maintain a CW requirement. I have no idea why anyone would be so interested, unless it is to press for their agenda to eliminate CW requirements in their home country or worldwide. These individuals may see the FCC's acceptance of this agenda as a means to "lead by example" for their own domestic licensing authority.

Non-Licensed Individual Commentors

As for unlicensed commentors, certainly it is tempting for some to ask that standards be reduced, especially when they are unwilling to meet even the minimal standards that are necessary to achieve a Novice or Technician license.

Those Who Want Something for Nothing

A large number of the respondents sent brief messages decrying the difficulty of learning CW, even at the "Chinese water torture" rate of 5 wpm. These individuals are grossly exaggerating, as anyone who has ever passed 5 wpm and continued to use it on the air can attest. I have seen too many people, especially in the last 10 years, who have an "attitude" about learning anything beyond what is absolutely required for the modes they think they will operate in the near future.

We must not "give away the store" to those that want to just take the easy way out and satisfy their desire for instant gratification . It has been a mistake to only test licensees on modes they anticipate using. We need a technically-minded service made up of well-rounded amateurs.

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Profit Margins and the Myth of "Too Few" US Amateurs

It is important to mention the fact that several of the major commentors represent profit-driven interests and may not have the best interests of the Amateur Service in mind. What bothers me about this group of commentors is that they hide behind a mask of being mainstream, but actually represent the "fringe element" of the amateur radio community.

Maia, CQ Communications, and others cite statistics indicating that the amateur population is in decline for the past 5 years. However, using the same figures that Maia uses, since 1970, the number of licensees has grown at roughly 2 to 5 times the annual growth of rate of the general US population. The age and population numbers are very hard to analyze because of the change from 5- to 10-year terms, because codeless Technicians have never renewed, and deceased amateurs are underreported – thereby inflating estimates of the age of the average licensee.

In 1990, citing amateur population figures, these same parties promoted a codeless Technician license. Now, after an increase from roughly 500,000 to 718,000 licensees, they continue to "cry wolf." It is easy to see why: It is because they can only increase their sales by lowering standards to attract ever more people to amateur radio. However, it was unwise to expect the Amateur Service to continue its phenomenal 10-year growth rate indefinitely. They do the Amateur Service a great disservice to meet short-term goals and line their own pockets.

Mr. Maia, (i.e., NC-VEC comments page 29 and *ex parte* Section 5), CQ Communications, Kenwood Corporation, and others express their belief that the Technician Class, in particular, exists to provide customers for the domestic radio equipment market. This has never been the case, nor should it ever be the case: We must not yield to this opinion, or the Amateur Service will continue its downward slide from a technical service to a non-technical personal radio service. The Amateur Service, by ITU treaty, is non-commercial and should remain free of such heavy-handed commercial influence as that proposed by Maia, CQ Communications et al.

Commentors who File Multiple Times as Different Individuals

I noticed among the comments what might be inflated, perhaps even fraudulent, E-mails. For example, at least 7 E-mailed comments were from people with the surnames Motak and Monopolus (various spellings). Yet, *there is only one Motak* with an amateur license, and no Monopolus. All the messages share similar or the same wording, including misspellings of "moris code" and "sattelite." While the licensee is in Florida, some of the filings are listed under New York. All these E-mails may be from the same individual using relatives or several names.

Commentors who File Multiple Times as Different Organizations

A much more sophisticated example is Mr. Fred Maia, owner of the W5YI Group, Inc. publishers. For years, he has been a loud champion of the fringe element, expressing an anti-CW and anti-technical-skills agenda.

He reappears among the commentors over and over using various fronts including NC-VEC, NCI, CQ Communications, and form letters E-mailed to the FCC. What is interesting is that Maia did not file any comments as "Fred Maia" himself, but preferred to act behind the scenes:

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He authored the comments on behalf of the NC-VEC, but they read the same as Maia's many editorials in his W5YI Newsletter and CQ Magazine. *They **do not** look like the comments of a committee,* and if they indeed represent the views of the NC-VEC (excepting the ARRL who refused to sign it), I question who is in charge of the many VEC programs. The NC-VEC comments do not indicate what, if any, dissent there was among the participating VECs.

Maia's comments show up again in the comments by No Code International (NCI). Even though Mr. Maia's name appears nowhere in NCI's comments to WT Docket 98-143, Maia is a board member and one of its founders. Maia is even the owner of the its web page domain, "nocode.org," and his essays from the web page appear almost word-for-word in portions of the NC-VEC comments.

NCI exists *only as a web page.* Its self-appointed "board of directors" gathers "members" by signing up web surfers who happen upon the site and adding them to an E-mail distribution list. They also ask for a donation. However, *it is not a bona fide amateur radio group*, but rather just another vehicle for Maia to promote his anti-CW and anti-technical message.

CQ Communications also imbedded Maia's comments in theirs. He is a contributing editor of their flagship publication, CQ Magazine. His columns in CQ have consistently argued for reduced technical skills and elimination of CW testing, as have the editorials by the editors of CQ magazine and CQ-VHF. It is no surprise, then, that CQ Communications presents comments that are parallel to Maia's. Insofar as CQ Communications differed from Maia, it demonstrates only that Maia was not the sole author of CQ's comments.

Maia also used his "bully pulpit" in CQ Magazine and on the Internet newsgroups to solicit form letters for electronic submission to the FCC, thereby inflating the count with numerous short messages, many with a series of paragraphs starting with the phrase, "I believe..." At least two forms of E-mail form letter have appeared on the newsgroups over the past few months, and Maia's name and E-mail address was attached to at least one of them. Both originated from Maia's "virtual" organization, NCI.

Certainly, it is an important element of a democracy that one person can have influence by working hard to build a base of support for an issue. I do not object to Maia's heartfelt stances, or attempts to build support. I do, however, strongly object to tactics that involve using front groups, some of which only exist as a web page or an Internet E-mail "list server."

CONTENT OF TECHNICIAN EXAMS

Keep the Technical Questions on the Technician Exam

When the No Code Technician Class was created, the FCC emphasized that the Amateur Service should attract technically-minded individuals. This is a very wise policy to keep American leadership in electronics and advanced communications as we move into the next century.

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I OPPOSE Fred Maia/NC-VEC

It is therefore alarming that Mr. Maia (speaking for the NC-VEC, page 29) suggests removing the technical and electronics questions from the Technician exam. He bases this on his exaggerated claim that nowadays, Technician Class licensees are non-technical, equipment operators.

However, Maia is wrong. There are a number of astute Technician Class licensees who are busy experimenting and acquiring new skills. I know this because I work with them as a VE and meet them every day on the air.

Maia is wrong when he characterizes the Amateur Service as simply a recreational hobby. It is a technical service which allows private individuals to develop and volunteer skilled services to the US and many other countries. The fact that amateurs can ragchew on the air is merely a side benefit.

Admittedly, there are also individuals whose goal is to just meet the minimum requirements necessary to get access to VHF FM in order to avoid the chaos of the Citizens Band. The trend away from attracting technically-minded individuals was amplified in 1991, by introducing a codeless license without increasing the technical requirements on the written exam.

As a result, many Technicians and Technician Plus operators overutilize FM voice to the exclusion of all other modes. However, some, who were not at first technically-minded, became so *only because they were exposed to technical questions* on the written exams.

CW requirements, if reduced, must be balanced by increasing the technical exam requirements. To the extent that Technicians are being licensed today who lack basic electronic skills, it points to a failure of lowering the Technicians' written exam requirements. Lack of technical skill among today's Technicians must be addressed by having more technical questions on the Technician exam, not less.

I OPPOSE CQ Communications, Inc.

CQ Communications (for which Mr. Maia is a contributing editor) offers a similar lowering of technical standards in their comments. Although they couch it in terms that sound "educational," in reality their Basic License merely focuses on operating equipment rather than emphasizing technical skill.

In addition, their testing and upgrade proposal is flawed because it also emphasizes operating equipment and involvement in clubs, rather than technical knowledge and technical skills. The current written exams are the appropriate medium to test candidates' technical knowledge. CQ Communications' recommendation fails to ensure a well-rounded, technically-minded licensee. The CQ Communications proposal is a murky standard that would be difficult to test or to regulate.

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Opportunities Already Exist for the Non-Technical

Today, there are many outlets for people who do not wish to meet technical licensing requirements: Examples include shortwave listening, Citizens Band, Family Radio Service, and the Internet. None of them requires a license. Add to this the readily available cellular phones and worldwide paging networks, and the average citizen has access to communications technology that was hardly dreamed of just ten years ago. With so many other non-technical communications outlets available already, it is more important than ever for the FCC to maintain at least one technical service like amateur radio.

NUMBER OF QUESTIONS ON EXAMS

I Recommend at Least 50 Questions on Written Exams

I agree with those commentors who recommended increasing the number of questions on each written exam. The number of questions should be increased to 50 per exam. I further believe that the exams should include more questions of a technical nature, as suggested in comments by Wormser, Adsit, Dinelli, Billingsley, and others.

In addition to my August 17 comments, I would recommend that the Extra Class exam (Element 4B) should include more questions related to circuit design. I also reiterate that technical topics should be introduced earlier in the series--at the Technician (Element 3A) and General Class (Element 3B) levels.

NUMBER OF CW EXAMS

Maintain Three Exams: 5, 13 (or 12), and 20 wpm

At 12 or 13 wpm an individual can operate CW in a manner that ensures that they can relay a message to authorities through the noise and fading of the HF bands. Because it is difficult to achieve 13 wpm proficiency without on-the-air practice, the 5 wpm exam was introduced with the Novice license. This two-tier system has served us well in developing CW skills.

The proposal by Wormser, Adsit, Dinelli, and Billingsley maintains this successful two-tiered CW requirement while increasing proficiency of licensees across-the-board. In contrast, the *ARRL plan fails to advance digital modes*. Only the Wormser-Adsit-Dinelli-Billingsley plan extends CW privileges while *emphasizing digital modes* and saves the highly sought-after *voice privileges as an incentive to upgrade.*

The 20 wpm CW exam shows a level of achievement of which an individual can be proud, and fits well with the levels of knowledge required in other areas by the Extra Class license. Within the amateur radio population the number of Extra Class examinees has been increasing, even as many see fewer amateurs in the General and Advanced Classes. Obviously, then, the 20 CW requirement has NOT been a hindrance.

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GRANDFATHERING OF EXISTING LICENSE CLASSES

Require Those Grandfathered to Take Missing Exam Elements

Any licensee grandfathered to a higher class should be required to take the missing elements before renewal, or be reclassified to the next lower class.

I oppose the ARRL's proposal to grandfather Novices and Technician Plus to General Class without further testing. In an ideal world, no one would lose privileges. But it is impossible to restructure 6 classes into 4 without either losing or gaining privileges.

Technician Pluses licensed after March 1987 were never tested on the HF topics. In 1987, the Technician written (Element 3A) was created specifically to avoid HF questions. So, if post-1987 Technician Pluses are simply grandfathered to General Class, they will not have met the prerequisite knowledge of HF, electronic theory, or circuits.

I Support the Wormser-Adsit-Dinelli-Billingsley Compromise

A better approach is to compromise: Under the plan submitted by Wormser, Adsit, Dinelli, Billingsley and others, grandfathered licensees would get to enjoy their new privileges, but would have to take the missing exam elements before renewal to retain those privileges.

TECHNICIAN ACCESS TO CW SUBBANDS

I AGREE with the ARRL Regarding Technician Plus and Novice

Technician Plus and Novices should be given access to all General CW subbands. But not the Codeless Technicians.

I OPPOSE the ARRL Regarding "codeless" Technicians

The ARRL uses convoluted reading of ITU Rule S25.5(3) to rationalize permitting untested licensees on HF: Licensees would meet a *prerequisite* proficiency only *after* receiving the license. In fact, Technicians could send CW on a keyboard without proving proficiency.

CW STILL USED IN EMERGENCIES: REAL EXAMPLE

Detractors of the CW requirement frequently state that CW is not used in emergencies. It is apparent from these commentors that their experience is very limited. I have observed stations checking into HF SSB traffic and emergencies nets using CW. I have also observed formal traffic being sent on SSB nets using CW when conditions would not support voice. CW complements SSB on HF, but sometimes it can also be the only means to get the message out.

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I have not collected data on emergency traffic on the amateur bands. Nevertheless, I am aware of one recent incident in which CW played a central role. I am sure there are many more examples, were anyone to track such situations in detail.

An Example from September 1998: Hurricane Georges

During Hurricane Georges, an amateur operator in Leander, Texas (WA0REE) was using CW on the Novice portion of 40 meters, when he received a request for assistance from a Cuban amateur. The Cuban was operating just a few watts and was very difficult to understand through the static and broadcast interference.

Because both stations were skilled in CW, the Texas amateur was able to notify the Cuban Red Cross, and needed medicine was delivered in time.

CW'S MODERN ROLE IN THE AMATEUR SERVICE

Maia's Flawed and Revisionistic "History"

Fred Maia's NC-VEC comments present an elaborate, if highly selective and revisionist, history of the CW testing requirement. His comments even use the word "hazing," which is a slap in the face to many who served this country throughout this century in the military and commercial sectors.

Unlike Mr. Maia's myopic view of the history of the CW requirement, the FCC has had very good reasons for requiring specific CW testing standards in the past. The 20 wpm Extra Class requirement, for example, was selected because of the 20 wpm requirement for the FCC's Third Class Commercial Telegraph License. Thus amateur radio was seen as a bridge to commercial licensing. Anyone taking the commercial exams offered by the FCC would be struck by the similarity of the technical questions to those found on the Amateur exams.

Emphasize Digital Modes: Neither HF CW nor SSB are "State of the Art"

I OPPOSE those commentors who stated that CW is obsolete on the HF bands, because their argument is a "red herring." They don't want to modernize by emphasizing digital and wideband modes, they just want to ragchew on HF SSB. I urge the FCC not to give in to these individuals.

If the goal is to modernize the amateur service, then the focus must be on VHF/UHF/SHF wideband and HF/VHF/UHF digital modes. As stated in an earlier section, only the comments of Wormser, Adsit, Dinelli, and Billingsley emphasize this aspect.

The state-of-the-art in communications today is happening on VHF and UHF frequencies and higher, where wideband and digital modes are prevalent. All Technician and Technician Plus amateurs already have access to these bands and modes -- they simply do not take advantage of the opportunities presented using modern, state-of-the-art modes. This is caused by the decade-long trend to lower licensing standards for those classes, and can only be reversed by raising those standards.

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There is nothing high-tech about HF SSB. It has been used on commercial circuits since 1927, and has been common on the amateur bands for over 45 years. Yet almost all of the commentors who described CW as "antiquated" are seeking equally antiquated HF SSB privileges.

Obviously, many of the commentors have little or no experience with conditions on the HF bands. On the HF bands, and especially supplementing SSB operations, CW remains an extremely viable mode and that explains its continued use by amateur operators.

We Must Look Instead to CW as it is Used Today

Whatever CW was used for in 1934 is not relevant today. Whether it is an older technique than, say, spread spectrum, is irrelevant. We must look at how CW is used today to determine if it should remain a relevant exam element in the Amateur Service.

Many of the commentors describe CW as "old fashioned," and it would be if its purpose was only to supply operators to the commercial martketplace. But that obvoiously is not the case.

Instead, CW has assumed new modern roles within the Amateur Radio Service--roles that complement other modes in all aspects of technical skill and electronics, international good will, communications, and providing skilled operators and experimenters. A few of these are listed below:

Essential backup for voice. On the amateur bands, wherever single sideband is used, knowledge of CW is a benefit. In emergency situations, and in day to day message handling, it is a valuable and important skill. It is common to hear a station check into an HF voice net using CW, or to complete passing a message using CW.

The CW traffic nets that meet nightly pass the same volume of traffic in 10 minutes as the voice nets do in 30 minutes or an hour. Even everyday ragchew sessions on the air that start in SSB are completed in CW. Those who say that CW is not used on HF voice frequencies are simply misinformed, or have no experience with HF, or are exaggerating to make their point.

For purposes of emergency communications on HF, CW remains an important skill when paired with voice.

Building Circuits, RF Design, Technical Skill. Contrary to comments by Mr. Maia and others, CW has not held back technical skills. On the contrary, today's CW operators form the single largest group of experienced RF designers and equipment builders in the Amateur Service.

Traffic Handling. The backbone of the National Traffic System, a system created and modernized for over 50 years, still relies partly on HF CW nets. As long as SSB nets remain active, there will be a place for CW nets as well.

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Emergencies. Since CW is used in the most desperate of emergency situation, CW knowledge is of high importance. If just one life is saved annually because of CW, then it is worth it to maintain that skill in the Amateur Service.

Weak Signal Experimentation. Many Technician licensees overutilize FM to the exclusion of other modes. That is why many of the commentors do not seem to realize that most VHF, as well as HF, weak-signal experimentation relies heavily on CW.

Low Power and Alternative Energy Operation. In addition, low power operators ("QRP") typically use CW, and often with home-built transmitters, because it affords reliable long distance HF communications with as little as 5 watts. In emergency situations, to conserve batteries, such low power operation is often essential. Many low power operators also experiment with wind, solar and other alternative energy sources, some of which is very state-of-the-art.

Operations with Distorted Signals. Distortion introduced by auroral storms and meteor scatter propagation can make all other modes unusable. In northern regions, CW is still used to supplement voice during solar blackouts.

The current state-of-the-art in meteor scatter uses very high speed (200 to 1000 wpm) CW because severe multipath makes any FSK modes difficult. Voice is usually impossible. In addition, this propagation occurs in bursts, making handshaking impossible for most digital modes. Thus, very high speed CW is the mode of choice.

Knowledge of CW allows Amateur licensees to explore all kinds of interesting and exotic propagation modes and methods.

International Communications. On the HF bands, not everyone speaks English fluently. Although many Americans speak a second language, few are fluent in that language. In the Amateur Service, CW, with its English-based and French-based abbreviations, as well as the standard Q-signals, hams from across the globe can converse. In addition, citizens of other countries may have home-built or surplussed equipment capable of CW only. Or they may prefer the reliability of equipment they can repair themselves. Thus knowledge of CW meets one of the essential functions of the Amateur Service: furthering international goodwill and forming very personal and real bonds of friendship across national borders.

Access for the Handicapped. CW is used day-in and day-out in the Amateur Service as an essential mode for many individuals with hearing, speech, or motor problems. I personally know of three amateurs who have hearing impairments restricting them to certain tone ranges. For them, voice communications are difficult even over VHF FM. Their primary choices are digital and CW modes, which they utilize daily.

I have also communicated with several amateurs who have limited use of their arms and legs, but who sent excellent Morse code using a puff pipe or their lips. For others, who cannot speak or

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who have severe respiratory problems, CW is a lifeline to the outside world. This kind of one-on-one contact depends on a core of fellow amateurs who can understand what is being sent.

If there existed an ideal community where everyone—deaf and hearing, mute and talkative, bedridden and mobile—had a common way to communicate, the handicapped would be so much better integrated into the community than they are. *Such a community does exist* in the Amateur Service, where almost everyone does know Morse code. Handicapped individuals are tightly integrated into the amateur radio community, as they are nowhere else.

Even outside the Amateur Service, Morse Code is being used for the handicapped. For example, at the University of Wisconsin, the Morse 2000 Outreach program promotes research in using Morse Code for rehabilitation and education. Collaborators include scholars from UW-Eau Claire, Johns Hopkins, and the Trace Research and Development Center at UW-Madison.

Access for those of Modest Means. Because the Amateur Service uses personal equipment, it can tax personal resources. This is especially true of low-to-moderate income individuals who wish to pursue this admirable communications service. The advantage of CW is that the equipment is simple, reliable, and of very modest cost. Using CW, many young Amateurs have been able to get on the air when their families could not afford it otherwise.

Simplicity and Reliability. Another reason that CW use continues, side-by-side with digital modes, is that it is simple and therefore reliable. In an emergency situation, the operator may not have a choice of modes. If a transmitter is working at all, then an on-off carrier can still be produced. Using CW, the message will get out even if the microphone or audio stages, PC, TNC, or keyboard have failed.

Satellite Experimentation and Propagation Beacons. Many of the anti-CW commentors failed to note that satellite telemetry is often passed on CW, as are propagation beacons and many of the two-way communications handled over the various amateur satellites. Using CW, an amateur with modest power and modest antennas can gain hands-on experience with satellite technology.

SUPPORT FOR WORMSER, ADSIT, DINELLI, AND BILLINGSLEY

I urge the FCC to consider elements of the plan (and variations on it) presented by myself, Fred Adsit, Michael Dinelli, Tim Billingsley, and others in our original comments to WT Docket 98-143. Of special significance are the following points:

- Merge Technician Plus and Novice into an Intermediate Class with digital emphasis
- Enhance technical questions on the exams
- Maintain the current 3 levels of CW examination
- Release the Novice subbands to Digital/CW
- Require anyone grandfathered to take the missing exam elements before renewal
- No longer allow examinees to test twice in the same VE session
- Change waivers to include FCC review and certification