Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 97 of the Commission's Rules	)	WT Docket No. 05-235
To Implement WRC-03 Regulations Applicable to	)	
Requirements for Operator Licensing in the	)	
Amateur Radio Service	)	
	)	

REPLY TO COMMENTS Of Karl W. Bullock of 11 August 2005

Submitted on 14 August 2005 by:

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General

This Reply to Comments is made in refutation to many of the Comments of Karl W. Bullock (*Bullock*), radio amateur callsign WA5TMC, appearing in the Commission's Electronic Comment Filing System (*ECFS)* on 11 August 2005..

Discussion

1. Radiotelegraphy in Emergency Communications

On page 2 of *Bullock* he states, "*Even with all the advances in technology, continuous-wave telegraphy (cw) is the simplest and most reliable method of "getting the message through."* Firstly, the phrase *get the message through* has been a maxim of the United States Army Signal Corps for over 75 years.[1] The phrase is not exclusive to amateur radio and has entered the public use in many ways besides referring to messages

[1] This can be seen in several articles in the archives of past issues of The Army Communicator viewable at www.gordon.army.mil/ocos/rdiv/AC/articles/INDEX.HTM such as a story on the 34th Signal Regiment. It is also on the last page of the Japan Signal Service Battalion's 1962 booklet describing STARCOM radio station ADA and facilities, and archived at: http://kauko.hallikainen.org/history/equipment/stations/AlphabetSoup.pdf

communicated by radio. As to *simplest* - for a radio transmitter below 30 MHz - that is true for vacuum tube architecture transmitters but not necessarily so for receivers needed at the other end of a communications circuit. As to *reliable*, that is in misuse by *Bullock* since it is necessary for both transmitting operator and receiving operator to send and receive **perfect *copy* every time** to justify the word *reliable*. Given known, but not always admitted, human frailties, having human coders and decoders at each circuit end adds its own unreliability to the situation.

On the same page 2, 3rd paragraph, 2nd sentence, *Bullock* states, *No other mode of wireless communications can match the combination of simplicity and accuracy as can CW* [*CW* used as a euphemism for radio-telegraphy by on-off carrier keying using the International Morse Code]. Both *simplicity* and *accuracy* are stated as absolutes and not proven by *Bullock* or any references. As to *simplicity*, the standard field radios of the United States Army prior to 1940 were two-vacuum-tube voice transceivers operating at high-HF and low-VHF bands.[2] *Accuracy* is open for question since that depends on the skill of the radio-telegraphists at each end of the radio circuit.

On the same page and paragraph, 3rd sentence, *Bullock* states, *One of the primary missions of Amateur Radio is its long history, and in future promise, of reliable emergency communications when all other options fail.* The definition of United States amateur radio is given in Part 97.1 with comprehensive clarity and without the flowery prose of exaggeration. There is no *mission* of amateur radio since it is not a recognized branch of the United States government, civil or military. Amateur radio is, de facto, a hobby, a recreational pursuit by individuals for personal enjoyment, not engaged in for personal monetary gain. That it **may** aid in emergency situations is, in actuality, in the **same way** as any good citizen helping out in such as they can. As to *long history*, there is no reference given that *all other options fail*[3] or that, miraculously, amateur radio operators and their radio stations survive some great emergency while all else perishes or is rendered inoperative. Neither is there any reference that amateur radiotelegraphy has played a primary role in emergency communications in any way since the Titanic disaster of 1912 over and above any other communications mode available to amateur radio licensees.

On the same page and paragraph, 4th sentence, *Bullock* states, *Our society has chosen, and with good reasons, digital and satellite communications over traditional analog and shortwave, and indeed, Amateur Radio has not only embraced these modes, but has pioneered many of them.* The *pioneering* description is largely self-aggrandizement since the evolution of radio as a communications means has been carried on by the entire radio world, at first by trial and error[4], then by academics, commercial firms, governments, and the militaries such that the technologies of radio could be documented, that documentation serving as a baseline for further advancement of the state of the radio art by all involved. That the very first experimenters in radio were described as *amateurs* is true only in the sense that there was no profession existing to make pecuniary interst for those first experimenters. The first demonstrations of radio as a communications means in 1896 used on-off

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[2] SCR-194, SCR-195, each using a single tube circuit for super-regenerative receiver, modulated oscillator for transmit, the other tube for audio amplification.

[3] Presumably the infrastructure of existing Public Safety agencies, telecommunications service providers, broadcasting services, and military Guard units equipped with environmentally-proven, survivable communications equipment, in addition to millions of Citizens Band mobile transceivers and handheld Family Radio Service transceivers .

[4] Sometimes called *empirical data derivation.*

keying for the simple reason that the radio technology was so primitive that such was the only practical way to communicate anything; the on-off code of the Morse-Vail Telegraph, first demonstrated in 1844, was then mature as a communications means and had spread worldwide.

As to *pioneering many of them*, that is more self-aggrandizement. Telegraphy itself began as a commercial venture. Radiotelegraphy began as both an academic exercise (Aleksander Popov in Russia, 1896) and as a commercial venture (Guglielmo Marconi in Italy, 1896); Marconi going on to establish a communications corporation in England.[5] Voice transmission by radio began as a commercial venture, first public demonstration by Reginald Fessenden on Christmas Eve, 1906. Single sideband voice transmission techniques (SSB) were first done by telephone interests as a way of increasing the number of telephonic voice circuits on a single pair of wires.[6] SSB over radio was first done on LF in 1923, USA to England, a decade later on HF after vacuum tube technology could be improved for higher power.[7] Teleprinting by radio was a slow transition from the first commercial interests seeking to displace landline or wired manual telegraphy and a need to find a suitable modulation for radio, ultimately settled using frequency-shift keying (FSK); amateur radio teleprinting was delayed until the post-WW2 period and availability of surplus machines. Image transmission by facsimile or live video over television was pioneered by commercial interests, the latter by broadcasting. Frequency modulation for voice was pioneered by both broadcasters (E. F. Armstrong) and commercial interests (Link, to use on police vehicles) in the 1930s, then spurred on by wartime needs during the early 1940s. Radio astronomy (receiving only, no transmission, no license required) began as an amateur experiment. PSK31, an innovation of Peter Martinez in the UK in the early 1990s, combined moderate-rate teleprinting data with coding theory for a minimal bandwidth occupancy.

On page 2, last sentence, continuing on to page 3, *Bullock* writes, *While the Commission is not requiring the elimination of CW as a communications mode, the elimination of the testing requirement will eventually lead to a severe lack of CW operators on the amateur bands, which might make a significant difference in the event of necessary communications during an emergency.* Those are exaggerated speculations and based on a false premise that emergency communications are primarily done using radiotelegraphy. Given that **all** present-day public safety agency communications is done by **non-**radiotelegraphic means, there is no basis for his premise. A ship sinking in the open ocean can be considered a real emergency. The maritime world, in several conferences on Safety Of Life At Sea (SOLAS), worked out the details of the Global Marine Distress and Safety System (GMDSS) which uses essentially automatic message generation on ship and relay by communications satellite (Inmarsat) to worldwide stations, no radiotelegraphy skills or radiotelegraph

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[5] Marconi is easily described as an *international entrepreneur* and those endeavors are described on the pages of Thomas H. White at http://earlyradiohistory.us on the Internet.

[6] Used in what is commonly referred to by the older public as *long-distance*, telephone people as *long-lines* using *carrier* equipment. *Carrier* is a jargon term and derives from *communications carrier* as a service, not as the electronics term for a *carrier wave* or *carrier frequency*. *Carrier* equipment was sub-divided by a *Type* number descriptor and *Type C Carrier* denoted four-voice-channel frequency-multiplexed circuits using 12 KHz of audio spectrum. Type C Carrier format became the base for commercial and government Single Sideband radio first operational on HF between the Netherlands and Netherlands East Indies in 1933.

[7] Chapter 1 of *Single Sideband Principles and Circuits* by E.W. Pappenfus, Warren B. Bruene, E.O.Shoenike, McGraw-Hill Book Company, 1964. That book and subsequent editions are sometimes colloquially referred to as *The Collins Sideband Book* since its authors were employed by Collins Radio Company, a designer and manufacturer of post-WW2 single-channel, single-sideband radio equipment for both government and civil users of radio.

equipment (on 500 KHz) being necessary.[8] With Global Positioning System (GPS) receiver additions, a ship's position may be sent automatically by the GMDSS transmitter. No radiotelegraphy specialists are needed for safety or disaster notification during a very crucial time at sea. In aircraft there is the Emergency Position-Indicating Radio Beacon (EPIRB) which can automatically send signals indicating a crash situation, even if no aircrew are able to call for help over their air traffic control beacon identification system or by voice radio. On land, there are many possible emergency situations but, to reiterate, present-day public safety agencies do not include radiotelegraphy mode on radio to rescue anyone or anything in real emergencies. All that could possibly be considered is a worst-case *doomsday scenario* where **all other radio services fail but amateur radio miraculously survives.**[9] Given the present-day radio world, that is an absurd fantasy pipe dream.[10]

2. Historical Preservation

In the second paragraph, page 4, *Bullock* writes, *For this reason alone* [continuing as a single paragraph from preceding text on *Historical Preservation* citing one particular episode on the NBC-TV *Tonight Show* of an alleged contest between a cellular telephone text user against an experienced telegrapher pair] *the Morse testing requirement should not be entirely eliminated from the Commission's rules for amateur radio licensees.* Given that the Commission is **not** altering any **operation allocations** for any United States radio amateur, any class, it would be prudent to include questions on radiotelegraphy knowledge in the **written** test elements. This is presently done in the Question Pools generated by the Volunteer Examiner Coordinator (VEC) Question Pool Committee (QPC) with the Commission's approval.

In terms of **historical preservation** on the psycho-motor skill of receiving and sending International Morse Code manually, *Bullock's* statements have no logical basis. Firstly, the Commission does **not** require the use of radiotelegraphy over and above any other allocated mode, any frequency other than two small band segments on VHF allocated exclusively to radiotelegraphy. Choice of mode is optional. In the common acronym of the amateur radio service or ARS, the letter R does **not** denote *radiotelegraphy.* Secondly, the psycho-motor skill of telegraphy had been learned, practiced, and tested in the practical world of telegraphic communications for the 68 years between the first use of the Morse-Vail Telegraph System in 1844 and the establishment of the first United States radio regulating agency in 1912. There was **no** governmental necessity of license testing

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[8] The Commission licenses for GMDSS operators, that described in Part 13, Title 47 C.F.R. Testing for GMDSS operator licenses are privatized to Commercial Operator License Examination Managers (COLEMs).

[9] In general, there is **no** amateur radio equipment as robust, nor as immune to extreme environmental conditions as military radio equipment. Civilian infrastructure radio antennas are designed and installed to withstand extremes of atmospheric disturbances whereas few amateur radio antennas, particularly wire types, are capable of withstanding such natural environmental onslaughts. Today there is a virtual mass of communications equipment in the military and civilian infrastructure that **can and has survived** in several disaster situations over the last two decades in the United States. The military of the United States and its National Guard units has a **quarter million** operational SINCGARS VHF transceivers in the field, working, the largest production quantity of environmental and work-tested radios ever produced for the United States Department of Defense. Those alone would be invaluable in local emergency situations and need be activated by a simple command from the President.

[10] The very fictional science-fiction/fantasy film of 1996, *Independence Day,* postulated that space-faring alien beings invaded the Earth and disabled the normal civilian population infrastructure although leaving the military radio systems still operable. They were defeated by a fictional computer expert who *hacked* the aliens' computer center and some *still-trained in telegraphy* morse code operators who, through radiotelegraphy, coordinated an international counter-attack on the aliens' flying saucers. While entertaining to the mass audience and profitable to the film makers, such can, in no way, be taken as either a documentary nor an accurate picture of the radio-communications world of 1996 or the future. At least one other Commenter has used it as a *reference.*

by federal agencies in that time. If the skill of telegraphy could grow and mature over a span of time greater than the life expectancy of a single human being then, the skill of radiotelegraphy can easily survive a cessation of federal testing for an amateur radio license in the near future.

Historical preservation of the skill of telegraphy and radiotelegraphy is simply not necessary now. There is quite enough of it in museums, on recordings, in books, on personal computer programs for self-learning, and kept alive by many different private organizations besides the Commission's mode allocations for operation. The Commission is not chartered by law of Congress of the United States to be a historical archivist of psycho-motor skills. Neither is the Commission chartered to be an educational institution which grades licensees on their test-taking ability. Where a license class examination requires a manual telegraphy skill test, that singular skill test must be passed to achieve that class license grant; passing the written test with a required or even perfect score of correct answers is not enough. In essence, a slight majority of all United States radio amateur licensees have passed a manual telegraphy cognition test, thus justifying the ARS acronym for Amateur **Radiotelegraphy** Service.

3. Operator Proficiency

On page 4, 3rd paragraph, 1st sentence, *Bullock* writes, *While related to previous reasons, the elimination of the Morse requirement will result in decreased communications proficiency on the amateur bands.* That is imaginative speculation as well as being impossible to predict. The interpretation is that *Bullock's* use of *the Morse requirement* refers to the manual test of cognition of International Morse Code. First, radiotelegraphy skill has no causal relationship to either data or voice mode operation, nor the reverse. Second, we have no specifics on what *Bullock* says *the amateur bands.*[11] The overwhelming majority of amateur radio transmissions on amateur VHF bands and higher is already voice.

In the same paragraph, 4th sentence, *Bullock* states, *Indeed, the development of VHF and microwave bands is pioneered with communications using Morse rather than voice for obvious reasons.* That is patently false since commercial and government radio services did the pioneering of VHF and higher in the pre-WW2 and immediate post-WW2 period, using voice and video imagery. VHF, UHF, and low-microwave range ready-built radio equipment has been on amateur radio equipment store shelves for three decades, already *pioneered* in use and for use. As to pioneering by commercial radio services, this writer was an NCO superintendent on 1.8 GHz 24-voice-channel microwave radio relay equipment in his military service, that equipment designed and built by General Electric Company in the early 1950s, 51 years ago.[12] That the editors of the American Radio Relay League's periodicals choose to call **all** amateur radio bands at VHF and above for a separate *world* that is their prejudiced choice. Those of us who have worked at VHF and higher for a half century will simply accept that this *World Above 30 MHz* has **already been pioneered** as well as allocated internationally by the International Telecommunications Union - Radio on up to 300 GHz.

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[11] The Commission presently allocates United States amateur radio frequencies, primarily in *bands*, from just higher than the AM broadcast band (MF) to the limit of international radio allocations of 300 GHz. Only by colloquial use is the phrase *the bands* referring to amateur radio bands in the HF portion of the EM spectrum. The Commission specifically uses the term *channels* in reference to the recently allocated spaces referred to as *60 meters.*

[12] See http://kauko.hallikainen.org/history/equipment/stations/RadioRelay.pdf or an overview of Army station ADA at http://kauko.hallikainen.org/history/equipment/stations/My3Years.pdf.

4. Operator Incentive

On page 5, 1st paragraph, first three sentences, *Bullock* writes, *The incentive mentioned here is an incentive to value one's license, rather than an incentive to obtain a certain license. That which requires work to obtain is more valued than that which does not. Again, it has seemingly become popular in our society to make such things easier without taking into consideration that such thinking cheapens rather than adds value.* That is almost sophistry but is really only a collection of moral-ethical maxims, themselves a rationale for retention of personally-achieved privileges that - in older standards and practice terms - define *good* versus *bad.* There is a prejudicial implication that, without the radiotelegraphy test, a personally strived-for and tested amateur radio license is of little value. That is unproven and a bit of radio operating bigotry, done up in self-patriotic telegraphic bunting.[13]

In the same paragraph, 4th and 5th sentences, *Bullock* writes, *I obtained my license when the requirement was to take in the exam in front of an FCC examiner. As such I place high value on my license, and work to ensure my on-air activities conform to FCC regulations and to good amateur practice.* The implication seems to be that *Bullock* places little value on licenses first obtained under privatization with examination under a VEC. For a personal anecdote, I traveled 90 miles by rail in 1956 to take the examination for a First Class Radiotelephone (Commercial) Radio Operator License in the Chicago, IL, Commission Field Office. My personal pride existed in passing it the first time after near-memorizing the entirety of the Commission's regulations.[14] Such successful examination and grant of a radio operator license grant did **not** instill any special value over and above the personal value I placed on the law of the United States. It would have been no different if I had passed only a Second Class Commercial license class or third...except for the imposition of having to travel another 90-mile round trip to take subsequent *upgrade* test elements.[15] Having completed four years of active Army duty, **that** service imbued a greater value of adherence to the law and regulations than any fancy certificate. While that is my personal viewpoint, and recognizing that military service in the United States is entirely voluntary, all branches, is not some sort of moral or ethical standard that all should follow. What **is** pertinent is the implication by many in addition to *Bullock* who have passed manual telegraphy are the *only ones who have worked* for an amateur radio license test. Such is a false moral-ethical view.

Frequently heard and seen is the remark *I studied and passed the code test...it was easy and anyone can do it.*[16] Human beings do not all have the same **aptitude** for monotonic arrhythmic patterns of radiotelegraphy. If learning (not *studying*) the morse code was *easy* then there would not be so much value placed on that accomplishment.and therefore would not be some superior moral-ethical attribute. Some human beings find it easy, some hard, and most probably somewhere in the middle. An over-riding fact is that the Commission does **not** consider the telegraphy test to be indicative of any applicants' ability to be licensed by the Commission and the Commission does **not** require any specific use of radiotelegraphy over and above any other mode. There is no point in demanding any specific moral-ethical imperative particular to one group of

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[13] One is tempted to remark on tailoring as in the folk tale of *The Emperor's New Clothes*, however the quality could not be seen in this example.

[14] So-called *Question and Answer* books on the market were either unavailable in my home town on my release from active duty in the United States Army or not up to date. A chief engineer at a local AM broadcast station lent me the entire regulation set, then published in loose-leaf 8 ½ by 11 inch format. The entire regulation set was much smaller in 1956 than the five-volume published paper set of Title 47 C.F.R. it had become by 1995.

[15] Privatized testing under VECs or COLEMs was far in the future in 1956, perhaps idly considered by some.

[16] In words to the same effect, speakers and writers may vary it a bit to suit themselves.

hobbyists to apply to all.

Another frequently heard and seen remark is *five words per minute is* [so slow it is] *no code at all*. It that is really true, then it is not logical to have such a slow rate of radiotelegraphy for the *most prestigious license* as *Bullock* writes in his second paragraph on page 6. The *most prestigious license of all* is an artificiality in ranking to many. At the beginning of amateur radio regulation prior to the onset of World War One, there were no *classes* of license. As time passed, a few lobbying groups managed to convince the Commission that it should have classes with *appropriate* rank, status, and privileges. Those classes grew until their number was six after the creation of the no-code-test Technician class in 1991. No other administration has had so many classes of amateur radio license. Six classes and three radiotelegraphy test rates up until the recent Restructuring Order 99-412 took place in mid-2000, new licensing classes down to three and a single radiotelegraphy word rate.[17]

Good operating practice is a positive attribute to all operating in a federally-regulated radio service. That is not exclusive to those who favor radiotelegraphy as an activity, nor is it necessarily absent from those who do not so favor it. It is a state of mind, not of some federal test scored in the past. Such a state cannot be created by any specific test for anything; it exists or not depending on many other factors making up an individual.

Summary

I do not find Karl Bullock's Comment to be compelling for any manual radiotelegraphy test for any class amateur radio license. That is on the basis of having begun operations on HF some 52 years ago in the military, having since operated (legally) transmitters from LF to microwaves, from land, air, and water, always maintaining *good operating practice* as befits any member of the Institute of Electrical and Electronic Engineers professional association following their professional code of ethics. Never **once** in all those years have I encountered any need, any necessity, any requirement to know or use any radiotelegraphy mode...except as a requirement to obtain an amateur radio license having operating privileges under 30 MHz. Ridiculous.

As an ending thought, the government exists for ***all*** the people, to serve them, to recognize their needs and act upon those needs for all. It should not exist solely to serve an elite few.

Thank you for your consideration in allowing Comments from private citizens on matters of regulations that affect the entire citizenry of the United States.

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General Radiotelephone (Commercial) Radio Operator license from a First Class Radiotelephone Radio Operator License first obtained in March, 1956, and kept renewed.
Former contributor to and then Associate Editor of *Ham Radio* magazine prior to 1990.

[17] The word rate for an Amateur Extra telegraphy test before 2000 Restructuring was 20 words per minute, not the 18 given by Bullock on his page 6.