

RM-10806
Submitted by Charles L. Young, AG4YO

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It is recommended that this partition be Adopted and the six other RMs denied.

Introduction – The issue in the seven RMs being reviewed here should not be whether amateurs should be allowed on HF without knowledge of the Morse Code. The issue is how to control licensing so that Amateur Radio can be counted on to maintain the largest possible pool of operators trained in the essentials necessary to conduct effective communications operations in times of emergency. Those essentials include some level of knowledge of the following topics:

1. The technical side of radio so that field repairs can be made if equipment breaks down;
2. Knowledge of the construction and tuning of antennas so wind damage to transmitting antennas during a disaster can be repaired and retuned or the antennas replaced;
3. Ability to improvise interconnecting circuitry between radios, modems, antennas, power supplies, microphone and telegraph keys, loud speakers and headphones to allow radio stations to be set up using the equipment available after a disaster strikes;
4. And, most fundamental of all, how to use the simplest forms of communications devices and modes effectively – effectively enough to allow emergency information to be communicated under the most adverse conditions, and, if necessary, without the use of radios.

The most fundamental mode of radio communications has been and continues to be the Morse Code. Aside from face-to-face voice conversations, Morse is the only mode that does not require the medium of radio for its use. These days, only Boy Scouts and Radio Amateurs can be counted on to provide that capability, and I may be wrong about the Boy Scouts. It has been a number of years since I looked over a Boy Scout Handbook. In any event, the Boy Scouts are limited by the fact that they have not been trained to have knowledge of or experience in using radios.

As frequently pointed out by ARRL President Haynie, the survival of Amateur radio, as we now know it, will depend upon our ability to deal with emergency communications. I have written a detailed, 10-page discussion of this topic. It has been added at the bottom of this response. I urge all to read it before rendering the final decisions about each of the seven RMs in this group.

Morse Code
The Case for Keeping it Active in
the Amateur Radio Service
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I am writing this paper to make the case that the **Morse Code is Fundamental to emergency Communications** and must not be abandoned for any reason. Although I maintain at least a 10-15 wpm proficiency in Morse, I seldom use the code for casual contacts in my normal Amateur Radio operations. My operating preferences center around my interest in the technologies. Because of that, I have never achieved the expert level in the use of Morse that would have allowed its reception and transmission to have become virtually automatic and, hence, fun -- i.e., reduced to habit.

In spite of this, I believe continued proficiency in the code, albeit at an elementary level of 5-10 wpm, is extremely important to the continued survival of the Amateur Radio Service as we have known it. My goal here is to make the case that the ability of amateurs to use Morse, at least at low speeds, is not only important; it is often critical to emergency communications, the service amateurs willingly provide and in which our continuing participation is essential to the survival of Amateur Radio itself.

Morse code is far too important a communications mode to be thrown away. Its overwhelming advantage stems from the fact that humans can learn to send and receive it without the aid of any electronic devices, including computers, modems or even radios. On the other hand, combined with the use of HF (3-30 MHz) radio as the communications medium, amateur radio has the potential to provide effective, mountain-and-ocean-hopping communications in emergencies. For short paths, radios are sometimes not needed at all. This is the thesis I will pursue in the remainder of this paper.

The amazing adaptability of the Amateur Radio community is what allows amateurs to cope with widely varying emergency situations occurring at random times. As ARRL President Haynie has

pointed out, the future of amateur radio most likely will be determined by our ability to continue to provide emergency communications service with ever increasing efficiency. The primary components that make us efficient are our numbers plus our versatility and adaptability. When viewed from above the fray, the Morse Code has been and must continue to be a major tool if we are to maintain our efficiency. As I will explain, it is giving us an ever-increasing edge that we must not lose.

Teaching Morse in scouting contributes to the pool of Morse-qualified personnel available for emergency operations; but, unlike Radio Amateurs, the scouts are not licensed to make use of the medium of radio for communications, thus limiting their potential versatility. Keeping Morse as part of the licensing requirement for amateur radio is the only remaining means for assuring that a significant segment of the populations is trained in this potentially life-saving communications skill when others are abandoning it. Amateurs should encourage the boys and girls in Scouting to learn the code, and those who do to get their Amateur licenses. By so doing, they can become full fledged members of the Amateur Radio emergency communications team that this country sorely needs to have waiting in the wings to support our local, state, and federal governments at minimal or no cost.

Picture two guys on adjacent mountain peaks or on opposite sides of a wide, raging river where one of them has a broken leg. If they are both either Scouts or hams who know the Morse Code, and one has a flashlight and the other has nothing but a handkerchief, towel or extra sweater, they can communicate via Morse code. The one with the light can key his light. The guy with the towel or nothing more than a handkerchief can use it as a flag, as is taught in the Boy Scouts, swinging it across his body for a dash, away from his body for a dot, and dropping his arm for a space, once for a letter space, twice for a word. If the guy with the flag is the one with the broken leg, he can still wave the flag or just his arm while lying down. Because of this versatile Code and the presence of a ham or scout on each side who knows the code, the two mountaintops or riverbanks are immediately connected. In this scenario, there is little doubt that steps will be taken, consistent with his injury, to rescue the guy with the injury.

If even *one* of them does not know the Code, the odds of an appropriate and timely rescue are greatly reduced. On the other hand, if the rescuer is a licensed Radio Amateur and is on the

mountain to spend a few days QRPing (working other hams using 5-Watts or less of transmitter output power), he can tell his colleague with the broken leg to standby while he gets on the radio and calls for help, *using the same code*. Yes, *the same code!* It is this component of Morse that illustrates it's amazing versatility and, hence, gives Amateur Radio operators the edge I mentioned above.

Armed with knowledge of the Morse code, amateurs don't need fast computers with sound cards or modems or even microphones coupled to fancy modulators to communicate effectively in many types of emergency. The fact is, there are many situations in which they don't need radios at all. The primary advantage to using radio as a transmission medium is that it greatly extends the range of communications. This is why the Scouts cannot make best use of Morse's versatility. They lack the legal authority to use radio.

In his book, "The Terrible Hours", Peter Maas tells the true story of how the Submarine USS Squalus' high induction valves failed to close as it prepared to submerge. These were 31-inch-diameter valves that were opened to furnish air to its Diesel engines when the submarine cruised on the ocean's surface. Misleadingly, the lamps on the submarine commander's indicator panel turned from red to green, indicating that the valves had closed. When the submarine began to submerge, several of its aft compartments were quickly flooded, sending the vessel diving to the ocean floor, some 243 feet below the surface. Once rescue vessels located the submarine, the rescuers found a telephone circuit from the submarine floating in a marker buoy the submarine had sent to the surface. Sadly, there were rough seas and the telephone line parted shortly after initial contact was made. The line was intended to serve two purposes: it was to provide voice communications from the surface to the submarine and it was to provide divers with a line to follow that would take them directly to the vessel in distress. When it parted, the submarine had to be located once again with a grappling hook. On the submarine, it's main batteries had had to be disconnected because of shorts in the power busses, so all communications systems other than the telephone were disabled.

The rescuers on the surface used an underwater sound system to communicate one way to the submarine. Maas describes this system as, "... the shrill ping of an oscillator....". Although he doesn't clearly identify the code used, it was Morse sent as an audio tone. What he did say to

justify that conclusion is that the radio operators aboard the submarine were the crewmen sending and receiving these signals, and he later stated that one hammer clang on the sub's hull represented a dot and two clangs represented a dash. Since Morse was clearly the code used by the submarine for its aural transmissions to the surface, and the radio operators maintaining the communications link were accustomed to using Morse on their radios, it seems fair to conclude that the incoming "pings" were Morse characters as well. Outgoing signals were used by the submarine to report its plight, the number of survivors, where they were located on the boat, and to coordinate the very first successful rescue using the Momsen Lung and the Momsen Rescue Chamber. For more on this subject, you may refer to Maas' exciting book.

Why did Squalus resort to Morse? It was because all other communications devices and systems had failed. Why didn't they use voice, packet, RTTY, AMTOR, or PACTOR? It was because there was no available medium, such as wire or radio, for their transmissions. The crew had had to disconnect the shorted batteries to avoid being overcome by toxic fumes. Morse was the last resort. It required no special equipment of any kind, and a Morse link could be established by any two people who knew the code. It is important to note that the only qualified people at *both* ends of the link were the radio operators. I have no idea what our Navy folks could or would do in that situation now that the services have been systematically abandoning the Morse code. I'm sure they will still have both hammers and wrenches aboard, but will they have anyone who can both send and receive the Code? And, would they have such talent at *both* ends of the path?

In summary, while pursuing our hobby, we have learned the most useful multi-medium communications mode yet invented. Morse Code, the common digital language of both Scouts and hams, can be transmitted and received via many media of which radio is but one. Having a radio at each end of the path is certainly handy but not always required and sometimes not even usable. The Morse code is currently the only widely known mode that enjoys this remarkable versatility. Hence, just as skill in reading is considered by educators to be *fundamental* to education, the Morse code is *fundamental* to emergency communications. Moreover, nothing to replace the Code is being developed, widely taught, or even proposed. **And NOW! we are proposing to throw the Morse Code away??!!**

We must all take a moment to stand above the politics and rancor and ask ourselves, why are we abandoning Morse? Is it merely because it is no longer technically fashionable or because those interested in amateur radio simply want the licensing process to be made easier?... perhaps like CB?

It is well known in military circles that if we ever have to face an enemy who has its rocket and guidance science, technology, and production capabilities developed to about the point we did twenty years ago, that enemy's first target in a strike to cripple the United States will be to knock out all of our communications satellites. If it is successful in this adventure, it will wipe out all of our domestic and overseas telephone circuits, TV networks, radio networks, and military communications circuits that make use of the satellites. This means that most of the phones will be out, and television stations will be capable of transmitting only their locally produced programs. Satellite TV will be out. Cable TV will be out except for locally generated program material. After all, the cable systems also use satellites to distribute their programs from the myriad of generation points to the local cable companies for distribution. Even the overseas links of the Internet using satellites would be lost.

One of my early engineering assignments while employed by RCA was to work on a project under US Air Force contract to assist in the design and construction of a Globe-circling Point-to-Point HF communications system. It was initially called GLOBECOM. Later, it was renamed the AIRCOM System. At the end of our propagation analysis and antenna design process, I was assigned as the supervisory engineer for part of the installation of the HF antennas at the Andrews AFB Transmitter and Receiver sites. Later, I was assigned to carry out the entire job at similar sites near McClellan AFB, Sacramento, California.

I completed the latter assignment in September 1954. In the spring of 1984, my wife and I took one of our daughters on a three-week tour of the US West Coast in celebration of her recent graduation from college. On that trip, I made a point of driving out to look at the transmitter site antenna farm I had helped install for the Air Force three decades earlier. I was shocked and dismayed to discover that every single HF antenna, some 16 Rhombics, numerous HF dipoles, and 3 HF Discones, had been dismantled and taken away. All that stood on the 640-acre transmitter site, south of Davis, California, was what had been the building housing the HF

transmitters and a number of large satellite dishes. It was then that I realized that the Air Force had not only abandoned HF for its point-to-point communications, it had dismantled all of the antennas and equipment that would have made it possible to return to HF in an emergency should their satellite systems fail.

When I retired, it was true that HF was still used in some military Ground/Air communications, but the ability to link together our various bases around the World via HF had been abandoned in favor of what has been considered to be a more reliable (under peacetime conditions) and higher-bandwidth medium. Today that medium is still our much more technically attractive but also much more vulnerable system of satellites. Unfortunately, our enemies have not abandoned HF, and they know full-well of the vulnerability of our satellites.

In one important sense, the philosophy behind the development of the Internet seems to have been lost to many in the field of communications. The basic idea behind ARPANET, the grandfather of today's Internet, was to provide the country with *distributed data storage* that could survive enemy attack, even by nuclear weapons, or at least that was the hope. The idea is simple: **Use Extreme Redundancy**. Add redundant copies of our national databases to many sites all over the world and interconnect those sites by a dense, redundant web of communications links. To incapacitate such a system of data bases and interconnecting links, an enemy's nuclear arsenal would have to annihilate most of the human population of Earth, including themselves, if they were to be certain of success.

Our military communications planners appear to have ignored the advantage of redundancy of communications media in time of disaster. If and when a suitably redundant web of fiber-optic cables has replaced our critical networks across the United States, we will still lack links to our overseas bases if we lose our satellites.

Of course, preserving the tie between Morse Code and Amateur Radio won't have the potential impact of the Internet. However, it will give the Scouts and Amateurs an increasingly important edge in emergencies simply because increasingly fewer others will have Morse available to them. As a result, it's the type of edge we amateurs must keep or face losing our charter as a service. It is precisely its simplicity that makes Morse so attractive.

As amateurs, we have little to no collective financial clout. Our status is fragile and vulnerable to frivolous lawsuits. We must rely on the common sense of The Congress and the FCC to protect us and to look after our needs. To retain the respect of these political bodies, we must continue to demonstrate our ability to communicate when the more sophisticated modes fail. We can't do that if the very organizations we are trying to support in emergencies legislate against us and take away our most versatile and proven tools. The fact that many other countries around the World are discontinuing the requirement for Morse Code in their Amateur licensing examinations does not require that we play follow-the-leader. Perhaps they have worked out their own plans for dealing with the strategic and tactical disadvantages of the abandonment of Morse, or perhaps not. That is not our concern. Our job is to realize that except for Amateur Radio, both the Morse mode and the HF medium of communications have been abandoned. We must then plan accordingly to secure our own future.

Let's also recognize that we humans are very fickle when it comes to assigning values. When we are content and face no dangers, we seek very different data and make use of very different communications links than we seek when we are in distress. The value we place on Baseball and Football games or "Law and Order" or our favorite game shows or soaps on TV during normal times drops to zero when we find ourselves in a hurricane, tornado, flood or forest fire. We suddenly place no value at all on entertainment but great value on survival and the communications related to it. Important here is the fact that under such emergencies, the operational and communications requirements are completely different from those required by the game shows, etc. Then, as the tornado or hurricane or other threat moves into another area and the former area recovers, those folks who suffered the earlier onset of panic return to wanting their ball games back. Then it is the new guy, located in the new area occupied by the moving hurricane or forest fire or other disaster, that suddenly becomes highly interested in emergency communications.

It is the job of Government at all levels to have suitable plans for dealing with these sudden changes in operational emphasis. In turn, we as amateurs and communicators must also understand how to prepare for that sudden shift from normal to emergency. For the typical amateur, it becomes a simple shift from play to work, from pursuit of a hobby to rallying to the cause that defines our existence. Between now and when new 9-11s may occur, and I'm

convinced they will occur, we have a duty, as Amateurs who understand the many problems of emergency communications, to persist in urging the Office of Homeland Security, the FCC, The Congress and others to carefully consider the consequences of their actions. Often, well-meaning government decisions can permanently damage or subvert the Amateurs' abilities to effectively assist with emergency communications. Eliminating the Morse Code as a licensing requirement in the tests required for Amateur Radio licenses would be such an action.

Now, let me attempt to drive home the importance of the Morse Code once again but using a few specific examples derived from personal experience or knowledge. Morse is still the champion of technical simplicity. Any device that will oscillate or click on an audio or radio frequency, emit light, or can be waved or blown or banged on or scratched or scraped or just felt can be used for Morse communications. In the realm of MF radio (where our 160-meter Amateur band lies), every single-conversion, superheterodyne, AM, broadcast receiver has a built-in oscillator that operates 455 kHz above the frequency shown on the radio's dial. This oscillator if keyed and connected to an antenna can be used to send Morse code on the 160-meter band. You can simply tune the radio dial to 1355 kHz, connect its oscillator to an antenna, provide a means for keying it on and off, and an energy source to power it up and you will be able to transmit on 1810 kHz (1355 + 455 kHz), Amateur Radio's national, 160m QRP (low power) calling frequency. What an advantage this would be for someone trapped with only a simple AM radio. No, you wouldn't do that every day. But, if your life or the lives of your family members or neighbors or townsmen were in jeopardy, would you be happy to have it available? You bet you would. Would you care if you couldn't receive? Certainly, but even if you can't, there's a good chance that some ham will hear your message and take steps to provide you aid, provided you are persistent in calling and send the necessary information. Such one-way communications beacons are used routinely by aircraft and watercraft, and they are used successfully. Could you do it if you don't know the code but know a little about electronics? The answer is yes if the person in the emergency situation has a Boy Scout Handbook, the ARRL Radio Amateur's Handbook, or even an encyclopedia or a good dictionary or where he can get his hands on it. They all contain copies of the Morse Code.

Yes, Morse is a multi-medium communications mode. Train whistles, car horns, referee whistles, fog horns, flashlights, mirrors reflecting sunlight, coins or wrenches tapped or scraped

on pipes, squeezing of the human hand, blinking eyes, patting the human leg, flags, and tone generators attached to loudspeakers can all be used as well as radio to send and receive Morse signals.

In hospitals, paralyzed patients with tracheotomies have used blinking eyelids to send Morse signals. I know of at least one case of touch being used to “talk” to persons who have lost their voices or, as in the following example, don’t want to use them:

Legend has it that Thomas Edison used the old Continental Morse code to propose to his second wife. As he sat with her in the family living room of his winter home in Fort Myers, Florida, he squeezed her hand to send the dots and dashes because he didn’t want his children, by his first wife, to know who their new mother might be until he had asked her to marry him and she had said, “Yes!”

I have heard “HI”, “CQ”, and “73” deliberately sent in Morse code on a Hammond Organ by a professional organist who was also a ham and close friend. He had recognized my wife and me as we came into the restaurant where he was entertaining. Locomotives whistle a stretched out Morse “Q” at every railroad grade crossing to warn motorists of their presence. Their engineers could send other important messages in emergencies if they knew the rest of the code. I have sent and received many greetings to fellow hams met along the highway using our automobile horn. In one case, we used our horns to agree to meet on 146.52 MHz simplex, one of our frequencies in the Amateur 2-meter band. POWs from our various wars have written or told about coin tapping or scraping on pipes to communicate with their fellow prisoners.

The critical point here is that *at both ends* of every one of these transmission paths, there had to be someone capable of receiving and sending Morse signals if any information were to be transferred. Edison’s second wife had been a Morse operator on the railroad just as had Edison himself. That’s how he met her, so she was well qualified to understand and answer his proposal. The Squalus’ rescue occurred at a time when the services still made wide use of the Code for their ship-to-shore and ship-to-ship communications so they had Morse operators both on the rescue ships and on the submarine.

Ask yourself how you would feel if you had a stroke and although paralyzed, retained all or most of your mental faculties except certain motor skills including the ability to speak. My wife's grandfather had just such an affliction. It was obvious to all of us that he understood all that was going on around him but he had no way to communicate anything about himself, including his pains, his needs or his desires. He lived in that condition for six years before he passed away. During that time, his frustration seemed endless. I am pleased to be able to say that this particular affliction won't happen to my wife or me. We are both code-proficient hams, so if one of us suffers from a similar fate and has pain or an ache from being in one position too long or just a nose that itches, the one affected will be able to ask the other for help. We both derive solace from that.

What must be recognized is that maintaining a cadre of Morse proficient communicators is analogous to maintaining a fire department when there is no fire or buying long-term health-care insurance when you are too young to be likely to need it. In the case of fire insurance, you do such a thing because when a fire does occur, there is too little time to teach a bunch of family volunteers how to be firemen or, in this case, Morse operators. We have no idea when another "Squalus" incident will happen or when one of two guys on adjacent mountaintops will break his leg. Nor, do we know when the next major earthquake will devastate the region around the San Andreas Fault or fires will once again devastate the forests of the west or, God forbid, another terrorist attack or catastrophic power-grid failure will cripple a large section of the country. We simply know that collectively and over time these things are as likely to happen as accidental house fires.

Amateur radio has been recognized as an important backup communications service that has always been ready to jump into the fray when emergencies arise. What's important is that it is cost free to our governments at all levels. Let's not legislate it into obscurity by taking away a major component of the primary advantages it has over the commercial carriers: namely, a code that doesn't require a radio or any other specialized equipment to use, a feature that makes it a fundamental skill required for emergency communications. Five words a minute at test time for what amounts to a lifetime license is a small price for us amateurs to pay to protect and maintain this increasingly important edge. Morse is the KISS approach to emergency communications, and only we Amateurs still have it.

