

# AMATEUR RADIO EMERGENCY SERVICE: ARE COMMUNICATION LINES THE MISSING LINK TO HOMELAND SECURITY?

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## I. INTRODUCTION

On June 20, 2002, President George W. Bush authorized a nationwide grant of federal funds to promote internal security interests under the new Department of Homeland Security mission.<sup>1</sup> Charged with appropriating these Homeland Security funds, the Corporation for National and Community Service (“CNCS”) unveiled a myriad of federal grants to volunteers in Homeland Security efforts with a nationwide objective aimed at public safety, public health, emergency response, and disaster preparedness.<sup>2</sup> On July 18, 2002, the CNCS awarded the Connecticut-based American Radio Relay League, Inc. (“ARRL”) with \$181,900 of the total Homeland Security funds.<sup>3</sup> The CNCS stated that these funds will allow the ARRL to train more volunteers by funding the Amateur Radio Emergency Communication Course and to revise the training curriculum to include new elements of emergency preparedness and homeland security.<sup>4</sup>

The CNCS’s unprecedented issuance of governmental funds to promote amateur radio demonstrates a national interest in the telecommunications industry and recognizes amateur radio as a legitimate and dependable communication method during periods of national disaster. Although primitive, amateur radio does not require intermediary technology to operate.<sup>5</sup> The question that remains, however, is to what extent the government’s interest in amateur radio will continue to prove worthy of federal funding in the future. With the

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1. Exec. Order No. 13,267, 67 Fed. Reg. 42,469 (June 20, 2002).

2. Press Release, Corporation for National and Community Service, White House and Corporation for National and Community Service Announce New Grants to Involve Volunteers in Homeland Security (July 18, 2002), at <http://www.cns.gov/news/pr/071802.html>.

3. Corporation for National and Community Service, Homeland Security: Grant Recipients, at <http://www.cns.gov/about/hs/grantees.html> (last visited Aug. 24, 2004).

4. *Id.*

5. Marshall Brain, How Radio Works, at <http://electronics.howstuffworks.com/radio.htm/printable> (last visited Aug. 24, 2004) (explaining that radio uses continuous sine waves to transmit information sent between a transmitter and receiver antennas).

omnipresent concern over terrorism facing our nation,<sup>6</sup> amateur radio offers a unique defense tool. It provides an effective, independent communication means and promotes friendlier international relations and interpersonal discourse, while protecting security interests through a constant and predictable communication method where other technologies may fail.<sup>7</sup> Direct contact between individuals across the world via amateur radio helps reduce prejudice and thus promotes peaceful, friendlier borders.<sup>8</sup>

Critics may question why the federal government continues to fund amateur radio when amateur radio is already a widely established system and has largely existed as an independent entity. The quick answer might be that the government already set a precedent when it began to require federal licenses to use designated amateur radio airways under the Federal Communications Commission (“FCC”).<sup>9</sup> Now, unlicensed individuals who communicate over amateur radio risk violating explicit FCC regulations.<sup>10</sup> By regulating the use of amateur radio, the federal government has made amateur radio a matter of national concern.

Members of Congress have argued that the friendlier borders and increased preparedness that amateur radio offers in both emergency and non-emergency settings are invaluable resources worthy of federal support.<sup>11</sup> This Note evaluates the necessity of maintaining an amateur radio system as a matter of federal concern. Section II summarizes the history of amateur radio and outlines the technology and licensing requirements involved in communicating over the medium. Section III examines the application of amateur radio in society by analyzing the national and international impact of the various types of emergency

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6. President George W. Bush addressed terrorism in the 2003 State of the Union Address: Now, in this century, the ideology of power and domination has appeared again and seeks to gain the ultimate weapons of terror. Once again, this Nation and all our friends are all that stand between a world at peace and a world of chaos and constant alarm. Once again, we are called to defend the safety of our people and the hopes of all mankind. And we accept this responsibility. President George W. Bush, State of the Union Address (Jan. 28, 2003), in 149 CONG. REC. H212, H214 (daily ed. Jan. 28, 2003).

7. AM. RADIO RELAY LEAGUE, INC., PUB. NO. ARLB037, WHITE HOUSE GREETES AMATEUR RADIO OPERATORS (June 19, 2002), at <http://www.arrl.org/w1aw/2002-arlb037.html> [hereinafter ARRL, WHITE HOUSE].

8. See Marilyn B. Brewer & Norman Miller, *Beyond the Contact Hypothesis: Theoretical Perspectives on Desegregation*, in GROUPS IN CONTACT: THE PSYCHOLOGY OF DESEGREGATION 281, 281–302 (Norman Miller & Marilyn B. Brewer eds., 1984) (describing the contact hypothesis, which postulates that direct contact between antagonistic groups helps reduce prejudice).

9. See 47 C.F.R. §§ 97.5–7 (2003).

10. See *id.*; see also FCC, Amateur Radio Service, at <http://wireless.fcc.gov/services/amateur> (last modified Oct. 22, 2002) [hereinafter, FCC, Amateur Radio Service] (laying out the process, qualifications, and forms required to obtain a license from the FCC to communicate over an amateur radio).

11. See 47 C.F.R. § 97.1(a), (e) (2003) (recognizing that amateur radio service provided a “[c]ontinuation and extension of the amateur’s unique ability to enhance international goodwill,” as well as recognizing the “value of the amateur service to the public as a voluntary noncommercial communication service . . . providing emergency communications”); 47 U.S.C. § 151 (2000) (recognizing the value of the telegraph, telephone, and radiotelegraphs for bolstering national defense and “promoting safety of life and property through the use of wire and radio communication”).

training available under the Homeland Security mission. Section IV identifies a proper purpose for federal Homeland Security funding and evaluates whether continued financial support is necessary for amateur radio.

## II. BACKGROUND

### A. History of Amateur Radio Communication

Prior to 1895, the only available method to send a message any distance was through telegraph wires.<sup>12</sup> Fascinated by the idea of wireless communication, Guglielmo Marconi experimented with wireless communication in Bologna, Italy.<sup>13</sup> In 1895, Marconi succeeded in sending signals over a few kilometers and patented his invention.<sup>14</sup> In 1901, improving upon his invention, he transmitted a signal across the Atlantic Ocean, and he received the 1909 Nobel Prize in physics for his work.<sup>15</sup> Today, amateur radio operators regularly utilize Marconi's invention to make contact around the world using widely available, inexpensive equipment.<sup>16</sup>

A typical modern ham radio<sup>17</sup> consists of a transmitter and a receiver, which are combined into a single transceiver unit, as well as an antenna, which is attached to the hand-held type of transceiver.<sup>18</sup> The size of ham radios ranges from radios that can fit into a shirt pocket to those that take up an entire room based upon the amount of power the radio outputs.<sup>19</sup> The antennas range in size from a small whip antenna to a stand-alone antenna atop a tower depending on the frequency

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12. MICROSOFT ENCARTA ONLINE ENCYCLOPEDIA (2004), at <http://encarta.msn.com/encnet/refpages/RefArticle.aspx?refid=761556697> (discussing Marconi, Guglielmo, Marchese).

13. *Id.*

14. *Id.*

15. *Id.*

16. Gary Brown, How Ham Radio Works, at <http://electronics.howstuffworks.com/ham-radio.htm/printable> (last visited Aug. 19, 2004); Ben Steelman, *Making Waves*, SUNDAY STAR-NEWS (Wilmington, N.C.), May 21, 2000, at 1D (noting that starter ham radios and parts can be purchased for as little as \$50 and the licensing test currently costs only \$6.65).

17. In colloquial terminology, amateur radios are commonly referred to as "ham radios." Many different theories exist as to the origin of the name. One such theory traces the name to the early days of amateur radio where every station occupied the same wavelength. See Am. Radio Relay League, Inc., Ham, at <http://www.arrl.org/whyham.html> (last modified Mar. 19, 2000). Operators of powerful amateur radios had the ability to effectively jam government, commercial, and public stations. *Id.* In response to the jamming, commercial operators would call the amateur radio operators "hams," meaning a poor operator or plug. *Id.* Amateurs, perhaps unfamiliar with the real meaning of the term, began using the term "ham" to refer to themselves and the name stuck. *Id.* A simpler explanation proposed by another source asserts that "ham" is short for the first syllable of *amateur* radio. Brown, *supra* note 16.

18. Brown, *supra* note 16.

19. *Id.* Power outputs for ham radios range from a few milliwatts to 1500 watts. *Id.* Depending on various environmental factors, including the presence of sun spots, ham radios can communicate around the world with only a few watts of power. *Id.*

desired.<sup>20</sup> To prevent transmissions from interfering with one another, operators often use the VHF (very high frequency) and UHF (ultra high frequency) bands because the ranges of these bands are limited by the radio's line of sight.<sup>21</sup> When transmitting great distances over these short-wave bands, variable frequency tuning allows operators to receive transmissions from different transmitting stations in order to listen for other ham operators in a sought-after county, state, or country.<sup>22</sup>

### B. FCC Licensing Qualifications

In the wake of Marconi's wireless telecommunication invention, the interest in wireless communication spread dramatically across the United States, as well as the entire world.<sup>23</sup> The U.S. government responded in 1912 by requiring licenses for radio telecommunication operators.<sup>24</sup> The federal licensing agency for amateur radios is the FCC,<sup>25</sup> which authorizes licenses for "qualified persons of any age who are interested in radio technique solely with a personal aim and without pecuniary interest."<sup>26</sup> The FCC reserves twenty-seven small frequency bands allocated internationally with 1300 digital, analog, pulse, and spread-spectrum emission transmission types.<sup>27</sup> Amateur radio operators share all frequencies within the allotted range and no one frequency is assigned for the exclusive use of any amateur station.<sup>28</sup> The FCC offers three license classes—technician, general, and amateur extra—with each

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20. *Id.* Lower frequencies have longer wavelengths and therefore require larger antennas. *Id.*

21. *Id.*

22. *Id.*

23. Am. Radio Relay League, Inc., About the ARRL, at <http://www.remote.arrl.org/aarrl.html> (last modified Sept. 5, 2001) [hereinafter ARRL, About]; see also MICROSOFT ENCARTA ONLINE ENCYCLOPEDIA, *supra* note 12 (stating that around the turn of the twentieth century, both the British and Italian navies recognized the significance of Marconi's radio equipment and installed radios in their ships).

24. ARRL, About, *supra* note 23. The stated purposes of the FCC regulations are:

- (a) Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.
- (b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.
- (c) Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communication and technical phases of the art.
- (d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronic experts.
- (e) Continuation and extension of the amateur's unique ability to enhance international goodwill.

47 C.F.R. § 97.1 (2003).

25. FCC, Amateur Radio Service, *supra* note 10.

26. FCC, About Amateur Radio Services, at <http://wireless.fcc.gov/services/amateur/about/index.html> (last modified Feb. 19, 2002) [hereinafter FCC, About Amateur Radio Services]; see also 47 C.F.R. § 97.1(a) (2003) (describing amateur radio service as a "voluntary noncommercial communication service").

27. FCC, About Amateur Radio Services, *supra* note 26.

28. *Id.*

increasing license class giving the operator more responsibilities and opportunities to broadcast.<sup>29</sup>

In its early stages, the United States' communication system was a chaotic mess of conflicting communication interests. In order to rectify this problem, the federal government initiated the Radio Act of 1927 and the subsequent Communications Act of 1934, thereby giving Congress the power to grant and deny broadcasting licenses and eliminate existing stations.<sup>30</sup> Congress intended to authorize the FCC to regulate interstate wire communication at every stage, from its inception to its completion.<sup>31</sup> However, Congress noted that it intended the Communications Act of 1934 to permit private broadcasting "to develop with the widest journalistic freedom consistent with its public obligations," where government interference will occur only when the interest of the public outweighs legitimate journalistic interests of broadcasters.<sup>32</sup> Hence, amateur radio operators have wide discretion with regard to what they broadcast over ham radios.

### C. Amateur Radio Organizations

In 1914, Hiram Percy Maxim, a leading Hartford, Connecticut inventor and industrialist, created the ARRL to band together the thousands of licensed amateur radio operators.<sup>33</sup> The ARRL is the largest organization of radio amateurs in the United States today, consisting of approximately 163,000 members, and aimed at: (1) "promot[ing] interest in Amateur Radio communications and experimentation," (2) "represent[ing] US radio amateurs in legislative matters," and (3) "maintain[ing] fraternalism and a high standard of conduct among Amateur Radio operators."<sup>34</sup> The ARRL provides a multi-level public service by educating the young and old about ham radio,<sup>35</sup> maintaining a national database of local ham radio clubs in order to help local operators get technical support,<sup>36</sup> and lobbying for rights vital for amateur radio's continued success.<sup>37</sup>

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29. FCC, About Amateur Operator Class, at <http://wireless.fcc.gov/services/amateur/about/operatorclass.html> (last modified Apr. 29, 2002).

30. Red Lion Broad. Co. v. FCC, 395 U.S. 367, 388 (1969).

31. United States v. AT&T, 57 F. Supp. 451, 454 (S.D.N.Y. 1944).

32. CBS v. Democratic Nat'l Comm., 412 U.S. 94, 110 (1973).

33. ARRL, About, *supra* note 23. Currently, there are "more than 675,000 licensed [amateur radio] operators in the United States and perhaps 2.5 million worldwide." Steelman, *supra* note 16.

34. ARRL, About, *supra* note 23.

35. See, e.g., Am. Radio Relay League, Inc., The ARRL Amateur Radio Education & Technology Program a.k.a. "The Big Project," at <http://www.arrl.org/FandES/tbp/> (last modified Aug. 20, 2003) (describing the ARRL's "Big Project" where teachers are persuaded to introduce amateur radio into the classroom to "help students become employable, informed, conscientious citizens").

36. See, e.g., Am. Radio Relay League, Inc., Affiliated Club Search, at <http://www.arrl.org/FandES/field/club/clubsearch.phtml> (last modified Nov. 11, 2002) (listing 2090 amateur radio clubs in a database organized by state and zip code).

37. See, e.g., AM. RADIO RELAY LEAGUE, INC., THREATS TO OUR AMATEUR BANDS (July 8, 2003), at <http://www.arrl.org/news/bandthreat> (describing compromises between the ARRL and

In an attempt to recognize the support that amateur radio operators have already supplied in the emergency context, the ARRL created the Amateur Radio Emergency Service (“ARES”), the same organization that the federal government provided with its most recent Homeland Security grant.<sup>38</sup> ARES is a group of “licensed amateurs who have voluntarily registered their qualifications and equipment for communications duty in the public service when disaster strikes.”<sup>39</sup> Membership in ARES is open to every licensed amateur, regardless of membership in the ARRL, where there exists a sincere desire by the individual to join.<sup>40</sup> The stated goal of ARES members is to “use their skills to help the [local governmental] agencies provide the information that needs to be passed, while at the same time showing their talents as trained communicators who know how to pass information quickly and efficiently.”<sup>41</sup>

A separate emergency organization, the Radio Amateur Civil Emergency Service (“RACES”), was founded in 1952 as a volunteer reserve communications group within the government that serves the public in times of extraordinary need.<sup>42</sup> The RACES declaration states that “no station may transmit in RACES unless it is an FCC-licensed primary, club, or military recreation station and it is certified by a civil defense organization as registered with that organization, or it is an FCC-licensed RACES station.”<sup>43</sup> The RACES system operates using certified unpaid personnel who already perform communication tasks for their respective government agencies.<sup>44</sup> RACES provides a communication means between critical locations such as hospitals, emergency services, and emergency shelters.<sup>45</sup>

ARES is different from RACES in that the government does not regulate ARES to a large degree. In contrast, the FCC directly regulates RACES.<sup>46</sup> However, at the local level, the government passively regulates certain ARES groups through formal understandings with local law enforcement and civic groups.<sup>47</sup> The ARRL recommends that local groups contain ARES and RACES groups so that both independent and

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federal and private authorities to allow the continued unlicensed device operation of advanced radio frequency identification devices between 425 and 435 MHz).

38. AM. RADIO RELAY LEAGUE, INC., PUBLIC SERVICE COMMUNICATIONS MANUAL 9 (2000), available at <http://www.arrl.org/FandES/field/pscm/pscm.pdf> [hereinafter ARRL, MANUAL].

39. *Id.*

40. *Id.* Currently, ARES consists of approximately 80,000 licensed amateurs with 2500 local and district emergency coordinators. *Id.* at 5.

41. *Id.* at 12–13.

42. 47 C.F.R. § 97.407 (2003); Radio Amateur Civil Emergency Serv., What Is RACES?, at <http://www.races.net/what.html> (last modified Aug. 16, 2004).

43. 47 C.F.R. § 97.407 (2003).

44. Radio Amateur Civil Emergency Serv., *supra* note 42.

45. *Id.*

46. Harold Melton, Getting Started in ARES, RACES, NTS, and Etc., at <http://www.qsl.net/k5eph/ARESintro.htm> (last visited June 21, 2004).

47. *Id.*

formal emergency service systems are in place.<sup>48</sup> In a typical emergency situation, an ARES group will first activate and implement predetermined plans to assist local governments.<sup>49</sup> If or when the emergency situation escalates, the federal RACES group is activated, which often involves the same ARES individuals acting in a different capacity.<sup>50</sup> Allocating funds to ARES shrinks the financial support gap between the two services and increases the incentive to wear both ARES and RACES hats.

Similar to RACES, the Military Affiliate Radio System (“MARS”) is sponsored by the U.S. Department of Defense, including the Army, Navy, and Air Force.<sup>51</sup> MARS provides worldwide auxiliary emergency communications during times of need, and consists of over 5000 amateur radio operators who are each interested in military communications on a local, national, and international basis.<sup>52</sup> In practice, MARS primarily patches calls between service people in remote locations and their friends and relatives back home, although operators are also prepared for other government-related communications needs.<sup>53</sup>

#### *D. Current Qualification and Training Requirements for ARES Membership*

ARES consists of four organizational levels—national, section, district, and local—each under the supervision of the national ARRL Field and Services Manager.<sup>54</sup> Members at each level elect an emergency coordinator, who runs that level of the ARES organization.<sup>55</sup> The local level handles the majority of emergencies, as the local level is where both the bulk of emergencies occur and the interaction between ARES volunteers and local agency officials exists.<sup>56</sup> A typical pre-disaster plan and arrangement for disaster communication includes: (1) “identification of clients who will need Amateur Radio communication services”; (2) “discussion with these clients to learn the nature of the information which they will need to communicate, and the people [with whom] they will need to communicate”; and (3) “specification, development and testing of pertinent services.”<sup>57</sup> A formal written description of the

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48. *Id.*

49. *Id.*

50. *Id.*

51. U.S. Army Network Enter. Tech. Command, 9th Army Signal Command, U.S. Army Military Affiliate Radio System, at <http://www.asc.army.mil/mars> (last updated May 8, 2004).

52. *Id.*

53. Steelman, *supra* note 16.

54. ARRL, *MANUAL*, *supra* note 38, at 9.

55. *Id.*

56. *Id.*

57. *Id.* at 11.

communication is required for completeness, conciseness, and easier copy for operators to understand.<sup>58</sup>

A relay of emergency information under ARES must follow standard ARRL formal message format.<sup>59</sup> The text should be as short as possible and followed by a signature from the person sending the message along with his title.<sup>60</sup> ARES operators are encouraged to quickly and efficiently relay pertinent, accurate information.<sup>61</sup> Information must be passed accurately (i.e., verbatim) even if terminology, such as an unfamiliar abbreviation, is not understood by the operator.<sup>62</sup> A Simulated Emergency Test occurs every year in October to: (1) explore the strengths and weaknesses of the ARES volunteers and the system as a whole; (2) provide a public demonstration of ARES's valuable capabilities; and (3) help the ARES operators gain experience in standard communication procedures.<sup>63</sup>

When disasters occupy the resources of local ARES operators, the ARES Mutual Assistance Team requests that all ARES operators: (1) keep all other stations silent unless called upon to increase primary signal strength; (2) monitor designated disaster frequencies; (3) avoid spreading rumors; (4) authenticate all messages; (5) strive for efficiency; (6) select the appropriate mode and band to suit the need, whether CW (continuous wave), voice, or digital mode; (7) use communication channels intelligently by using normal channels of communication where available; and (8) communicate for the public and not to the public.<sup>64</sup> Finally, the ARES procedures state that there is no substitute for actual practice by and proper judgment of individual operators.<sup>65</sup>

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58. *Id.* at 11–12. Formal written traffic is important for “[a] record of what has happened,” which aids in “frequent status review, critique, and evaluation.” *Id.* Written traffic also promotes “[c]ompleteness which minimizes omission of vital information[;] [c]onciseness, which when used correctly actually takes less time than passing informal traffic[; and] [e]asier copy [because] receiving operators know the sequence of the information, resulting in fewer errors and repeats.” *Id.* at 12.

59. *See id.* at 12.

The record should show, wherever possible:

1. A message number for reference purposes.
2. A precedence indicating the importance of the message.
3. A station of origin so any reply or handling inquiries can be referred to that station.
4. A check (count of the number of words in the message text) so receiving stations will know whether any words were missed.
5. A place of origin, so the recipient will know where the message came from (not necessarily the location of the station of origin).
6. Filing time, ordinarily optional but of great importance in an emergency message.
7. Date of origin.

*Id.*

60. *Id.*

61. *Id.* at 12–13.

62. *Id.* at 13.

63. *Id.* at 15.

64. *Id.* at 25–27.

65. *Id.* at 13.

## III. ANALYSIS

A. *Justification for Grant of Federal Funds to ARES*

On January 31, 2002, President Bush went on amateur radio to personally thank local ARES volunteers “who help make sure that [local communities are] prepared for any kind of emergency.”<sup>66</sup> President Bush enunciated this same spirit of approval on June 19, 2002, where he acknowledged the amateur radio operator’s role in emergency communications and in generating international goodwill, as well as in working on behalf of public safety officials.<sup>67</sup> President Bush also commended amateur radio operators for their “interest in communicating with persons in other parts of the world and learning about other cultures and countries,” and commented that such communication “builds understanding and goodwill around the globe.”<sup>68</sup>

Following the grant of federal funding, the ARRL responded that such a decision was an exciting day for amateur radio because the highest levels of government recognized the role of amateur radio in homeland security.<sup>69</sup> The ARRL was pleased with the characterization of amateur radio as “the bedrock of communications when other outlets fail.”<sup>70</sup> In authorizing the payment of \$181,900 to the ARRL, the CNCS described the ARRL as the “national leader in emergency communications by volunteers who operate their own equipment on their time at no cost to any government, organization, or corporation.”<sup>71</sup> The CNCS emphasized that the ARRL volunteers serve their local communities by working side by side with emergency medical teams, as well as police and fire departments.<sup>72</sup> The CNCS believed that such funds were integral in promoting Homeland Security grant interests because the federal funds allow the ARRL to train more volunteers by funding an Amateur Radio Emergency Communication Course, as well as updating the ARES training curriculum “to ensure that new elements of emergency preparedness and Homeland Security are included.”<sup>73</sup>

In authorizing federal funds to amateur radio, the government identified a myriad of policy concerns. Emphasizing the consistency of amateur radio, the Senate Subcommittee on Science and Technology identified various important aspects of amateur radio.<sup>74</sup> For example,

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66. AM. RADIO RELAY LEAGUE, INC., PUB. NO. ARLB009, PRESIDENT BUSH ADDRESSES FLORIDA ARES NET (Jan. 31, 2002), at <http://www.arrl.org/w1aw/2002-arlb009.html>.

67. ARRL, WHITE HOUSE, *supra* note 7.

68. *Id.*

69. AM. RADIO RELAY LEAGUE, INC., ARRL RECEIVES HOMELAND SECURITY TRAINING GRANT (June 18, 2002), at <http://www.arrl.org/news/stories/2002/07/18/102/>.

70. *Id.*

71. Corp. for Nat’l and Cmty. Serv., *supra* note 3.

72. *Id.*

73. *Id.*

74. AM. RADIO RELAY LEAGUE, INC., TESTIMONY OF THE AMERICAN RADIO RELAY LEAGUE:

“[w]henver natural catastrophes or acts of terrorism occur in our country, Amateur Radio is available as a tested and organized nationwide network of trained radio experts.”<sup>75</sup> The subcommittee further held that amateur radio is a tested and organized nationwide network of trained radio experts that “often step forward to help when telephone services, data networks, radio and television broadcasters, police, fire and ambulance two-way radios, or other vital components of local, state or national telecommunications systems are disrupted.”<sup>76</sup> With respect to emergencies, Congress stated that “[w]hen normal communication systems are overloaded, damaged or disrupted because a disaster has occurred, or is likely to occur, in an area where the amateur service is regulated by the FCC, an amateur station may make transmission necessary to meet essential communication needs and facilitate relief actions.”<sup>77</sup>

When disasters occur, the public often loses several means of communicating at once.<sup>78</sup> Although technicians can often rectify a phone outage in a short period of time, such lag time interferes with effective emergency response. As opposed to conventional methods of communication like telephones, where a centralized intermediary is required to keep a system running, amateur radio requires only two independent transceivers to communicate.<sup>79</sup> Taking advantage of natural effects, an amateur radio employs a radio signal bounced from one end of the globe to another using the Earth’s atmosphere.<sup>80</sup>

Although critics may question the need for spending funds on an already developed amateur radio system that has performed well without governmental support, the fact remains that the ability to communicate better in certain disasters is an invaluable tool. Communication means are vital to shrinking great distances and making individuals feel a closeness between one another and accountability for their actions. The

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SUBMITTED TO THE SUBCOMMITTEE ON SCIENCE AND TECHNOLOGY OF THE SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (Dec. 5, 2001), available at <http://www.arrl.org/govrelations/arhomeland.html> (prepared for hearings on Senator Wyden’s NetGuard proposal).

75. *Id.*

76. *Id.*

77. 47 C.F.R. § 97.401 (2003).

78. See, e.g., Thomas Frank et al., *The Day the Phones Died: Cable Cut Causes Outage*, NEWSDAY, May 22, 1999, at A4 (describing how phone service in Long Island, New York, was disrupted for 285,000 customers merely by the severing of a fiber-optic cable the diameter of a quarter buried four feet below ground); see also Courtenay Thompson, *Y2K Ahead: Amateur Radio Operators Will Be Standing By Just in Case*, PORTLAND OREGONIAN, Dec. 8, 1999, at D4 (describing an instance in Bend, Oregon, where a child needed parental consent for an emergency medical procedure but the parents’ phone line was cut, so a ham operator in Bend radioed a fellow operator in Prineville, Oregon, who then drove to the parents’ house).

79. Brown, *supra* note 16.

80. Steelman, *supra* note 16. The atmosphere can contain a “solar max,” which occurs when an eleven-year high point in storms on the surface of the sun hurls large quantities of electrically charged particles through space that collide with Earth’s atmosphere, resulting in better radio signals as they bounce farther through the air. *Id.*

great unpredictability of disasters creates an even greater need to maintain this constant, dependable method of communication. If all communication methods fail, the ability to communicate over amateur radio will remain.

### *B. Amateur Radio Emergency Communications Course*

In response to the CNCS's grant of federal funding, the ARRL created a hybrid Amateur Radio Emergency Communication Course.<sup>81</sup> The purpose of the hybrid system was to fuse "the resources of the printed word, on-air operating and the Internet to create a unique learning experience for students."<sup>82</sup> Each instructor has the latitude of defining the syllabus according to his or her "particular strengths, access to materials and local interests."<sup>83</sup> Although a student must pay the \$45 registration fee up front, the CNCS grant reimburses that registration fee upon completion of the course.<sup>84</sup> ARRL officials believe a financial stake in completing the course will spark an increased graduation rate.<sup>85</sup>

Since implementation of the hybrid emergency communication course, a few positive effects have already surfaced. First, the course has made both federal and local branches of government aware of amateur radio and its value as a vital national resource.<sup>86</sup> Second, an increase in the number of qualified emergency communicators has created an influx in new ARES and RACES groups.<sup>87</sup> Third, existing emergency communication groups are "building stronger ties and developing memoranda of understanding with local emergency operations centers."<sup>88</sup> Finally, the hybrid course with the new features has created an influx of new ham operators to local emergency communication teams.<sup>89</sup>

Additionally, the ARRL has revised the training curriculum to ensure that new elements of emergency preparedness and homeland security are included by developing an interactive training course tailored to what local emergency communication instructors feel the emergency concerns of the local community require.<sup>90</sup> It could be argued that although the training system is imperfect because of its inability to create a 100% completion rate for the emergency communication course, the fact that increased numbers of individuals are interested in

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81. AM. RADIO RELAY LEAGUE, INC., "HYBRID" AMATEUR RADIO EMERGENCY COMMUNICATIONS CLASSES BRING BETTER VALUE TO STUDENTS (Jan. 28, 2003), at <http://www.arrl.org/news/stories/2003/01/28/1/?nc=1>.

82. *Id.*

83. *Id.*

84. *Id.*

85. *Id.* (stating that the current completion rate of the Amateur Radio Emergency Communication Course is 68%).

86. *Id.*

87. *Id.*

88. *Id.*

89. *Id.*

90. *Id.*

emergency communications ensures that organizations like ARES will survive into the future. With the increase in individual emergency ham radio operators comes an increased assurance that when emergencies occur, a qualified ham operator will be within the area.

### C. Alternatives to Amateur Radio Communication

A potential alternative to ham radio that offers many of the same characteristics of ham radio is the citizen band ("CB"). A CB is a radio service in which a private two-way voice communication occurs between two transceivers.<sup>91</sup> One advantage of the CB is that unlike a ham radio, it does not require a license to operate the machine, but only requires an unmodified FCC-certified CB unit.<sup>92</sup> However, a CB unit is deficient in that it can only communicate over a range of one to five miles<sup>93</sup> and can only operate at a few frequencies.<sup>94</sup> When compared to ham radio's ubiquitous capability of communicating around the world, the CB only offers a sufficient means of communication for localized concerns. Thus, in the emergency context, a ham radio offers an overall superior method of communication.

Critics argue that ham radio will become obsolete with the emergence of the Internet and wireless cell phone communication.<sup>95</sup> Despite these critics, one source suggests the Internet has actually reinforced the amateur radio hobby.<sup>96</sup> For example, slow-scan television, known as SSTV, now interfaces with ham radios and computers by using a computer to convert images and transmit them over airwaves with low 30- to 100-watt power requirements.<sup>97</sup> Moreover, there is currently a minimalist movement attempting to send messages worldwide using less and less power by using a tool-shed conglomeration of electronic parts to transmit the signal.<sup>98</sup> Additionally, third-world countries currently use ham radios as a form of inexpensive communication.<sup>99</sup> Amateur radio licenses all over the world bring an ingenuity and fervor that has kept ham radio popular over the last century without regard to changing

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91. FCC, Citizens Band (CB), at <http://wireless.fcc.gov/services/personal/cb> (last modified June 5, 2003).

92. *Id.*

93. *Id.*

94. Joshua B. Good, *Ham Radio to Help Ring In 2000*, ATLANTA J. & CONST., Dec. 19, 1999, at J1.

95. Jeremy Boot, *The Future of Amateur Radio*, at <http://www.innotts.co.uk/asperges/internet.html> (last modified Aug. 13, 2002) (arguing that the Internet has created a gap between older "folk" and young university students); Karen Blair, *On the Radio*, ROCK HILL (S.C.) HERALD, Dec. 14, 2000, at 2D (finding that only one person in five hundred holds a ham radio license, the average operator is in his mid-thirties to eighties, and "[m]ost of the young people involved have parents who were ham operators").

96. Steelman, *supra* note 16.

97. *Id.*

98. *Id.*

99. *Id.*

technology. Ultimately, the operators' focus remains on amateur radio's grassroots dependability.

#### *D. Role of ARES During Y2K Technology Transition*

Local governments saw ham radio under ARES as a legitimate and necessary means of communication during the end of the last millennium when concern over the Year 2000 ("Y2K") bug was high. In locations ranging from Georgia to Oregon to Nebraska, ARES ham radio operators were on hand, ready for any emergency.<sup>100</sup> In Atlanta, Georgia, fire stations, wastewater treatment plants, city halls, airports, and hospitals placed ham operators in their facilities because ham radios do not contain clocks, which were the root of the Y2K problem.<sup>101</sup> The ARES volunteer ham operators were ready for "emergency communications if the computers crash[ed], the telephones [went] out [or] the county's own radio system [went] on the blink."<sup>102</sup> Because the 911 system becomes useless if the phones are out, ham radio operators were positioned to replace the 911 system by waiting at the station to dispatch police, fire, or ambulance officers to the appropriate scene.<sup>103</sup>

At the same time in Portland, Oregon, a network of twelve amateur radio operators along the West Coast set up "Operation Rollover" to track the millennium as it worked its way west through the time zones.<sup>104</sup> Radio operators involved in Operation Rollover had powerful radio sets that could talk to radio operators in New Zealand, Fiji, and other countries that would experience the new millennium well before the United States.<sup>105</sup> Amateur radio operators anticipated relaying information to federal emergency management officials regarding power outages, television and radio news, telephone or computer disruptions, or other potential problems related to the Y2K computer glitch.<sup>106</sup> As Craig Marquette, information manager for the Portland Bureau of Environmental Services, stated, "the beauty of ham radio is we are prepared to operate off a battery, like a car battery. We're prepared to put up a piece of wire, MacGyver-like, and we are on the air."<sup>107</sup> It is this grassroots dependability that has inspired so much federal support during emergencies.

In Omaha, Nebraska, 911 operators in local hospitals, nursing homes, and other critical-care facilities enlisted amateur ham and CB

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100. Good, *supra* note 94; Thompson, *supra* note 78; Toni Heinzl, *Ham Radio, CB Operators on Y2K Alert*, OMAHA WORLD-HERALD, Oct. 12, 1999, at 13.

101. Good, *supra* note 94.

102. *Id.*

103. *Id.*

104. Thompson, *supra* note 78.

105. *Id.*

106. *Id.*

107. *Id.*

operators to aid in emergency communication.<sup>108</sup> Calls by and to the ham operators were restricted to medical, law enforcement, and fire requests involving emergency or life-threatening situations, although private citizens could achieve the same attention by going to their nearest fire or police satellite stations.<sup>109</sup> The local facilities wanted to ensure that the most critical cases received the most immediate attention, therefore only those particular locations involving the greatest need for assistance enlisted ham radio operators.

The anticipated Y2K problems are perfect examples of the importance of the amateur radio system. ARES volunteers were called in from all over the country to assist local authorities in performing their emergency duties. The ARES ham operators provided an effective intermediary communication link that no other telecommunication system could provide. With the assistance of ham operators, the United States' defense was increased as it prepared for a potentially serious and imminent threat. Although the Y2K bug proved benign in the end, had it been dangerous and caused the communication lines to unravel, the entire nation would have required amateur radios to communicate internationally to respond to Y2K events.

#### *E. Specific Examples of ARES Applications in Local Emergencies*

The work that ARES ham radio operators perform comes with ample praise. One source wrote that “[a]mong the arsenal of gear emergency workers rely on, the radio is arguably the most important and most taken for granted.”<sup>110</sup> Another source stated that, in the circumstance where cell towers are overloaded and phone lines do not work, emergency crews rely on radio.<sup>111</sup> The Emergency Operations Center (“EOC”) director out of York County, South Carolina, commented that it was necessary for the ARES ham operators to be out in force informing emergency stations where resources were needed, and thus acting as the “eyes and ears” of the emergency effort.<sup>112</sup>

With regard to actual application, local officials called in ARES ham operators for emergency communications support during Pennsylvania's big chill that occurred in the first days of March 2003.<sup>113</sup> After a natural gas outage in southern York County, Pennsylvania, somewhere between 5000 and 10,000 citizens were left without natural gas to heat their

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108. Heinzl, *supra* note 100.

109. *Id.*

110. Carlos Acevedo, *Amateur Radio Operators Help Keep the Lines Open*, THE SPOKESMAN-REVIEW (Spokane, WA), Oct. 13, 2001, at V13.

111. Meghan Meyer, *35,000 Ham Radio Operators Tune In for Annual Event*, PALM BEACH POST, June 23, 2001, at 1B.

112. Blair, *supra* note 95.

113. See AM. RADIO RELAY LEAGUE, INC., PUB. NO. ARLX002, AMATEURS RESPOND TO PENNSYLVANIA'S BIG CHILL (Mar. 5, 2003), at <http://www.arrl.org/w1aw/2003-arlx002.html>.

households.<sup>114</sup> A major evacuation of the county occurred as temperatures fell to the teens and twenties.<sup>115</sup> In response, ARES activated two dozen ham operators to assist the American Red Cross (“Red Cross”), local emergency operations, as well as any other necessary agency requiring communication.<sup>116</sup>

In a different context, in the aftermath of the loss of the space shuttle Columbia on February 1, 2003,<sup>117</sup> local emergency management officials called in ARES operators to assist the National Aeronautics and Space Administration (“NASA”) in the recovery of shuttle debris across Texas.<sup>118</sup> NASA asked that ARES aid the agency in both locating and cataloging debris from Columbia found in neighboring areas.<sup>119</sup> Specifically, local ARES operators accompanied NASA and Environmental Protection Agency officials to expedite the search, as well as clean up area schools.<sup>120</sup> Federal officials believed that debris from the shuttle could pose a health hazard to local communities; accordingly, many Texas schools were closed following the shuttle explosion.<sup>121</sup> ARES operators sent NASA specific locations of debris and followed up on NASA-provided telemetry and radar information indicating likely locations of debris.<sup>122</sup> In the location of the crash—the combined Texas counties of Nacogdoches and San Augustine—up to 346 ARES operators were logged in at one time, with 80% of those coming from outside the two counties.<sup>123</sup> Additionally, NASA called on ARES operators from New Mexico to help locate Columbia debris by providing communication and incidental base support for the over 150 searchers outside the Sandia Mountains east of Albuquerque.<sup>124</sup>

On December 23, 2002, in Broken Arrow, Oklahoma, 75,000 citizens across the city experienced a telephone outage that prevented local calls from being routed outside city limits.<sup>125</sup> Local EOC officials immediately requested that ham operators assist the emergency efforts for three area hospitals.<sup>126</sup> Local ham operators responded by staffing emergency communication positions at the Broken Arrow EOC, as well

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114. *Id.*

115. *See id.*

116. *Id.*

117. Press Release, National Aeronautics and Space Administration, Statement by NASA Administrator Sean O’Keefe (Feb. 1, 2003), at <ftp://ftp.hq.nasa.gov/pub/pao/pressrel/2003/03-032.txt>.

118. AM. RADIO RELAY LEAGUE, INC., PUB. NO. ARLB012, TEXAS AMATEURS AID IN SHUTTLE DEBRIS RECOVERY, CATALOGING (Feb. 3, 2003), at <http://www.arrrl.org/w1aw/2003-arlb012.html>.

119. *Id.*

120. *Id.*

121. *Id.*

122. *Id.*

123. AM. RADIO RELAY LEAGUE, INC., PUB. NO. ARLS007, COLUMBIA RECOVERY EFFORT OVER FOR TEXAS HAMS (Feb. 14, 2003), at <http://www.arrrl.org/w1aw/2003-arls007.html>.

124. AM. RADIO RELAY LEAGUE, INC., PUB. NO. ARLS008, NEW MEXICO HAMS HELP WITH COLUMBIA DEBRIS SEARCH (Feb. 26, 2003), at <http://www.arrrl.org/w1aw/2003-arls008.html>.

125. AM. RADIO RELAY LEAGUE, INC., PUB. NO. ARLB003, HAMS HELP OUT DURING OK TELEPHONE EMERGENCY (Jan. 3, 2003), at <http://www.arrrl.org/w1aw/2003-arlb003.html>.

126. *See id.*

as the three hospital emergency rooms.<sup>127</sup> The emergency lasted for five hours without any ham radio communication problems. In fact, ham radio communications with the Oklahoma State Department of Civil Emergency Management in Oklahoma City were successful in promptly invoking all levels of emergency support.<sup>128</sup>

Early on December 5, 2002, a severe winter storm swept through North Carolina, leaving the worst power outage in that area since Hurricane Hugo in 1989.<sup>129</sup> North Carolina declared a state of emergency as one-half inch of ice coated all of central North Carolina.<sup>130</sup> The EOC called in ham operators to help the 1.5 million people without power by routing traffic from the state EOC in Raleigh to local county EOCs and the state's twenty-five open shelters.<sup>131</sup>

On February 12, 2002, ham operators assisted the Red Cross and other local agencies in responding to the larger of two West Coast wildfires.<sup>132</sup> The fire, exacerbated by winds in excess of fifty miles per hour, began on February 10 and subsequently destroyed dozens of houses, injured about a dozen people, and burned over three thousand acres.<sup>133</sup> The Red Cross called in ham operators to provide damage assessments, help at shelters, and assist the Red Cross with emergency communications.<sup>134</sup> Local fire departments, sheriff's departments, hospitals, and evacuation centers for both people and animals placed ham operators in their facilities to offer emergency communication.<sup>135</sup>

During the 2002 Super Bowl in New Orleans, a concern developed that thousands of football fans were being intermixed with thousands of Mardi Gras celebrants.<sup>136</sup> The Red Cross called in ARES officials to help handle a variety of possible communication tasks and emergencies.<sup>137</sup> Approximately twenty ARES members were on hand to provide communication support, and to provide Red Cross officials with instant information on, and contact with, emergency relief resources.<sup>138</sup> Although the Red Cross relied primarily on cellular phones, ham radios acted as a backup in case the cellular system became overloaded with calls.<sup>139</sup>

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127. *Id.*

128. *Id.*

129. AM. RADIO RELAY LEAGUE, INC., PUB. NO. ARLX008, HAMS RESPOND TO NORTH CAROLINA STORM CRISIS (Dec. 9, 2002), at <http://www.arrl.org/w1aw/2002-arlx008.html>.

130. *Id.*

131. *Id.*

132. AM. RADIO RELAY LEAGUE, INC., PUB. NO. ARLB012, ARES/RACES RESPONDS IN CALIFORNIA WILDFIRE EMERGENCY (Feb. 12, 2002), at <http://www.arrl.org/w1aw/2002-arlb012.html>.

133. *Id.*

134. *See id.*

135. *Id.*

136. AM. RADIO RELAY LEAGUE, INC., PUB. NO. ARLB010, HAM OPERATORS TO PROVIDE SUPER BOWL SUPPORT (Feb. 1, 2002), at <http://www.arrl.org/w1aw/2002-arlb010.html>.

137. *Id.*

138. *See id.*

139. *See id.*

The above examples all prove the value of amateur radio in emergencies. Local emergency agencies are aware of the inherent unpredictability of communication lines, especially as compared to the reliability of ham radios. When emergency strikes, the ability to unite and control emergency operations requires the fluid communication lines that ham radio offers. Whether the emergency is predictable or not, ARES operators offer a source of organization during catastrophe. Because all levels of government depend on ham radio support, especially during local emergencies, government support and funding of ARES to enhance ham operators' expertise and efficiency are a logical, proactive necessity.

#### IV. RESOLUTION

Amateur radio has consistently received federal attention since its technological inception. Whether the government was regulating the allotted airwaves, requiring federal licenses, or only giving amateur radio financial support, the fact remains that the federal government has remained an active component in the progress of ham radio. Although some may argue that the government should keep its hands free of the matter, it is certain that federal intervention has fostered amateur radio's consistent niche in society. The recent grant of federal funds under Homeland Security should be the start of an increased trend toward active support of amateur radio. There are numerous examples of local government agencies relying on amateur radio as a dependable communication means during local and national emergencies.<sup>140</sup> As a reward for amateur radio's efficiency and dependability, the federal government should initiate further financial support.

To maintain the integrity and growth of ARES, it is imperative that the federal government continue with its active financial support. The greatest result of the recent funding of the ARRL's Emergency Communications Course is a dramatic increase in the total number of certified ARES operators. Although the current ARES operators offer support and efficiency when local emergencies present themselves, the reality is that increased funding is integral to promote the continued growth in the number of ARES volunteers. The government needs trained amateur radio operators in every corner of the world to make communication possible during global emergencies. It is this international dependency by local government agencies that justifies continued federal funding of amateur radio emergency communication.

The federal government should continue its proactive front-end relationship with ARES operators. Unlike RACES, where the federal government regulates the entire process, ARES functions best as an independent entity, largely separate from federal interference. It is

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140. See *supra* Section III.E.

undisputed that ARES operators want to volunteer, but at the same time the government should not take advantage of them by taking their services for granted. By offering proactive financial support before an emergency occurs, the federal government shows the public, and ARES members especially, the necessity of maintaining emergency communication as a preventive measure. This up-front federal support will induce ARES operators to respond to emergencies not as a choice, but as a recognized duty to the federal government.

It is imperative that the federal government refrain from using its spending powers as a means to force federal intentions onto ARES. The latest grant of federal funds was crafted in a broad enough sense that ARES was not forced to change its protocol. Rather, the funds were disbursed with enough flexibility to allow ARES officials to use their own discretion on how to improve the nation's preparedness in the emergency communication context. Volunteers, specifically ARES operators, are a special and unique sector of the American culture, willing and able to devote their time and resources. As an unfortunate consequence of emergencies, it is quite often the case that ARES operators respond to emergencies that affect their own local communities. Because of their willingness to help others, ARES operators are a unique faction of our community, worthy of federal support.

As the recent round of federal funds continues to diminish, ARES is likely to return to its prior state of relying almost exclusively on volunteers' personal financial stake. It is important that the federal government refrain from treating ARES operators as a temporary trend, worthy of federal support only when homeland security is the nation's primary concern. The above analysis has shown ARES's success in all contexts of emergencies, whether natural or man-made, national or international, catastrophic or smaller scale. The government has a duty to expand and foster ARES's growth. ARES is a respected and reliable resource for national and local security that constitutes a legitimate interest for government agencies. The government's increased dependence on emergency communication provided by ARES mandates that the federal government continue its support of ARES in order to maintain high standards of communication efficiency.

## V. CONCLUSION

ARES is a unique organization of volunteers with a unique role in society. As amateur radio operators, they have the power to maintain communication lines around the globe using the natural environment to bounce signals between independent transceivers. By understanding the importance of emergency communication, the ARRL created ARES as a means to formally band together ham operators nationwide that could work with local government agencies to maintain communication lines

during emergencies. ARES has proven itself as a reliable and efficient resource that all levels of government have relied upon in the context of various emergencies. Spawned by the interest in homeland security, the federal government authorized federal funds to improve an already successful organization of ARES volunteers. It is imperative now, as those federal funds diminish, that the government refrain from treating Homeland Security concerns as a fleeting trend that no longer deserves attention. Rather, the federal government should recognize the importance of ARES operators and continue to provide active financial support.