SUPPLEMENTAL SUBMISSION

TO THE

PRODUCTIVITY COMMISSION'S INQUIRY Into the RADIO COMMUNICATIONS ACT

Introduction

To conclude my contribution to this Inquiry, this Supplemental Submission places before the Commission: (1) information that was not available earlier; and (2) certain issues raised that deserve a final rejoinder. As before, it is confined to issues that concern the Amateur Radio Service and, particularly, its convergence with the Internet and the use of WinLink.

Promoting change takes vision and courage. While not arguing that Australia should necessarily follow overseas' practice, a vision about the future of amateur radio was eloquently presented by Mr. Dale N. Hatfield (W0IFO), Chief, Office on Engineering and Technology, US Federal Communications Commission (FCC). In the context of this Inquiry his address on the subject of "The Role of Amateur Radio in the New Century" is well worth reading. For the benefit of the Commission it is appended as Attachment A.

The many submissions and expressions of support have, I believe, made a solid case for liberalizing the Australian amateur radio service. Not a single respondent has argued against progress. The testimonials of hundreds of WinLink 2000 Users, as recorded in individual and the Consolidated Submission (No.: 269) show that radio amateurs can provide an extremely valuable community service that cannot be readily met in any other way.

Having proven the value of amateur radio, its unstoppable convergence with the Internet, and the safety and other benefits of WinLink 2000, it is up to PC and, eventually, the Australian Communications Authority (ACA) or the responsible Ministry, to allow Australian hams to join the 21st Century.

Productivity Commission

Australia is fortunate in that it has a system of inquiry, through the Productivity Commission (PC), that is impartial and transparent. The transparency places extra demands on both the PC and Respondents.

In this context, the lack of understanding in Australia about the modus operandi of the WinLink 2000 protocol is a concern. Discussions with top regulators, a radio communications lobbyist, and the Wireless Institute of Australia (WIA) have shown an abysmal gap in understanding. This is understandable as it is difficult to be an authority on a protocol the use of which is outlawed in Australia. It is hoped that the information about WinLink 2000 provided in Submission (No.: 14), is an adequate User Guide.

For the PC this Inquiry should be interesting in that an apparently relatively lesser issue, covered in the Terms of Reference under Community Services, has attracted worldwide attention. It is about the status of amateur radio in Australia and, in particular, the restrictive regulations that prevent radio amateurs from taking part in the advances in Information and Communication Technology (ICT), among which WinLink 2000 operation.

Also, the PC must have had a new experience when, through one of these ICT developments, that is, the Internet, several hundreds of supporting submissions were lodged. Had more time been available there could have been thousands of expressions of support. I trust that the PC views these contributions as a true exercise in participative democracy.[1]

Some 14,000 Australian radio amateurs, many visiting hams, and countless recreational cruisers and others in need of communications when in remote locations look forward to the Commission's recommendations and, of course, the subsequent decisions by the Australian Government.

Australian Communications Authority

The evidence presented shows that the Australian Communications Authority (ACA), like other agencies of government, appears to be faced with shrinking budgets. Under these circumstances it will obviously prioritize, possibly, at the expense of less well represented interests like Amateur radio. Like its US counterpart, the FCC, ACA should be allowed to: (1) concentrate on its highly innovative spectrum management and the enforcement of really critical issues; and (2) divest itself of some of the burdens of administrating non-commercial matters, like amateur radio.

It is hoped that the ACA will be as progressive in reviewing the status of amateur radio in Australia, including allowing them to operate a WinLink 2000 PMBO, as it is in managing commercial aspects of the radio spectrum.

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[1] Many Respondents expressed reservations about the PC's appreciation when: (1) for a period of time Submissions sent by email were blocked by the PC Webshield; (2) regular outages of the PC's Web server were experienced; and (3) when the PC apparently transmitted numerous acknowledgments of receipt to Respondents, thus seriously disrupting radio communications for WinLink 2000-participating recreational cruisers on the high seas. WinLink was eventually forced to stop the PC from accessing its mail system.

Changing a Radio License Determination to allow Australian hams to enter the 21st century appears to be well within in the jurisdiction of the ACA without, necessarily, having to change or adopt a new Australian law.[2]

Wireless Institute of Australia

The Wireless Institute of Australia (WIA) is the logical body to represent the interests of the amateur radio service and, under suitable arrangements, to assume some of the regulatory functions now in the hands of the ACA. Yet, with a membership of only 6000 of the total number of 14,000 radio amateurs in Australia it can hardly be said to represent the majority of radio amateurs. It seems clear that WIA, in Australia's national interest, should pursue policies and deliver services that are more in keeping with interests of current members and potential entrants. The WIA Submission presents progressive ideas that, of accepted, auger well for the future of amateur radio in Australia. [3]

Amateur License Fees

During the PC's public hearings one of the Commissioners asked the WIA why amateur radio operators in the US are not charged fees for their amateur radio licenses. In anticipation of this question, I had already answered it in my initial Submission. It is because "the US values highly its Amateur Radio Service." A more authoritative answer is found in the records of the US Congress. The record shows the following:

QUOTE

During the discussions that led up to the passage of the 1989 Omnibus Budget Reconciliation Bill many Congressmen supported the amateur radio service. The main spokesperson, Representative John Dingell (D-MI-16) in presenting the Conference Report, inter-alia, said:

"*It is my view (that) amateur radio operators should not be subjected to (the) fees. Amateurs do not use the spectrum for profit, and they render important services to the public during natural disasters*" **He concluded: "***we have decided to exempt the amateur service (from the payment of fees)***."**

[2] Unfortunately, Australian supporters report that ACA is still "marketing" its outdated Determination rather than taking a proactive position to decide how it can best change the existing Determination to allow the liberalization of the Australian Amateur Radio Service, including the convergence with the Internet.

[3] It could well be a condition for ACA handover of certain regulatory functions to WIA that it membership should be at least 50 percent of licensed radio amateurs. Also, in the event of WIA assuming such responsibilities, its decisions should be subject to appeal, either directly to ACA or through Courts of Law.

Accordingly, the Conference Report reads:

*"Both the House Bill and the Senate Bill include fees on licensees in the amateur radio service. The Conference Report strikes all of the fees for amateur radio licensees. The Conferees recognize that amateur radio licensees do not operate for profit and can play an important public safety role in times of disaster or emergency***".**

Both the US *Senate* and the *House of Representatives* on November 21, 1989, passed the 1989 Omnibus Budget Reconciliation Bill (HR 3299) that exempted radio amateurs from the payment of any fees."[4]

UNQUOTE

The enlightened attitude in the US appears to be in sharp contrast with the low value that appears to be placed on amateur radio in Australia.

In the US, radio amateurs are issued with licenses that have a ten-year validity period[5] and these are issued for free. In Australia, hams pay a relatively hefty fee and face the "%^#*&" requirement of *annual* license renewals or otherwise pay hundreds of dollars for years in advance.

To compound it all, Australian radio amateurs, apart from their "Licence Tax" are actually charged an additional tax, called "General Services Tax" (GST). The GST extracts the "princely" amount of a further $1.90 per year just for having a hobby that, in this case, provides community services.

This "penny pinching" practice hardly seems to be worth the bureaucratic effort. Net revenue from these sources, after meeting the cost of *annual* renewals, at best amounts to no more than about $200,000 a year. It is a slap in the face of the Australian amateur radio fraternity, who unselfishly put their intellect, time and equipment into public service whenever they are called upon to do so during a national emergency or public event.

In Australia's own national interest, Australian radio amateurs deserve official recognition and support. They should be exempted from all fees and taxes.[6]

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[4] Supplied through the courtesy of the **American Radio Relay League** (ARRL) that represents so ably the interests of the amateur radio service in the USA.

[5] The requirement to renew licenses every tenth year makes sense to free up unused callsigns when hams leave the amateur radio service voluntarily or become "Silent Keys".

[6] At the very least, all fees should be waived for any Australian amateur radio operator who joins WICEN or any other emergency service network. It might even entice them to join the WIA!

Comments on Other Submissions

In reviewing the Submissions placed before the Commission, not one argues against liberalizing amateur radio or against allowing WinLink 2000 to operate in Australia. In fact, two respondents who had raised some questions have correctly and courageously withdrawn their Submissions.

Reference has been made to SailMail. SailMail is identical to Winlink in virtually all respects, except that the former is touted as a "commercial" operation whereas WinLink 2000 is clearly a voluntary service by hams. SailMail has but a few operational stations and can therefore not effectively provide a global service. In contrast WinLink 2000 has close to thirty stations. SailMail is not a financially viability operation and, apart from the personal goodwill and financial support by individual station owners, could fail at any moment and it this were to happen would leave its subscribers "high and dry" – something that cruisers very much dislike.[7] SailMail is therefore NOT a possible substitute for WinLink 2000. Yet, SailMail does not regard WinLink 2000 as a commercial threat (see below). Apart from the fact that radio amateurs should be permitted to provide community services, giving the private sector a monopoly in any sector is unhealthy. The joint evolution of WinLink and SailMail is described in Attachment B.

There is a very cordial relationship between owners of SailMail and the WinLink 2000 Development Team. Both systems have their origins in the same early pioneers who now hold major commercial radio interests, including in Australia. Jim Corenman (KE6RK), one of the principals of SailMail, actually was one of the principal speakers in support of WinLink 2000 at the recent gam hosted by the Seven Seas Cruising Association.[8]

One Submission (No.: 58) that should be acknowledged has come from a commercial *Operator* who operates a SailMail digital radio station. Three of the comments in this Submission are worth commenting upon:

(a) **It states that**: "*licensed amateur radio operators (are) a very small minority in the yachting world.*" **It's clear, therefore, that this commercial operator does not, like the principals of SailMail, regard WinLink 2000, used exclusively by radio amateurs, as a competitor;**

[7] SailMail, reportedly has 1100 subscribers, each contributing $200 per year. It claims to have eleven radio stations. Therefore, the gross earnings per station are estimated at about $20,000 per year. Upholding its claim of system reliability would require each station to be manned 24 hours per day, at a total annual cost – just for wages – of, say, $200,000. These figures show that SailMail is a hobby and not a business.

[8] In excess of 100 expressions of support for WinLink 2000 from members of the international **Seven Seas Cruising Associatio**n were placed before the Commission's Inquiry into Radio Communications.

(b) **The Submission further states:** "*No argument should sight (sic) WinLink 2000 or SailMail as providing a safety service for mariners…*" **This statement, by an *Operator*, is in stark contrast with the views of hundreds of *Users* who, as shown in the Consolidated Submission (No.: 269), virtually without exception, praise the safety features of WinLink 2000. This is not to say that this *Operator* is totally incorrect. Every mariner is taught not to rely on just a single method of *navigation*. The same applies to emergency *communications*. The mariner must use those means of navigation or, in this context, communication that are available to him as are appropriate under the particular circumstances. Such options range from the simplest, like shouting or lighting flares to the most advanced, such as, HF digital radio and, under extreme circumstances, the use of an Emergency Position Indicating Radio Beacon (EPIRB); and**

(c) **Finally, the following statement by this *Respondent* goes to the core of the case for allowing WinLink 2000 operation in Australia:** "*The case put forward for WinLink 2000 operations highlights the existence of pre world war British Post Office regulations imposed on the amateur radio fraternity of that day and inherited in current legislation.***" This is related, specifically, to third party traffic. The Submission continues:** *"The term "Third Party Traffic" is now an almost historical statement."* **I strongly agree with the author. In my Submission I discounted the question of Third Party Traffic as: (1) the bulk of international WinLink 2000 traffic is routed via the Internet that has no third party restrictions; and (2) because Third Party Traffic is already legal within Australia.**

WinLink Statistics

It would be of interest to the Commission to view some statistics that pertain to the worldwide usage of WinLink 2000. These are given below. [9]

QUOTE

Currently there are 3374 users, categorized as follows: 85 percent maritime, 10 percent land cruisers and 5 percent other (the missionary family mistakenly shot down in Peru in the small plane were WinLink users.)

Approximately 30 percent of users are in the Bahamas and Florida coasts; 30 percent in the Caribbean and Central and South America; 10 Percent are on US West Coast and Baja California; 15 percent are inside the continental USA; 10 percent are in the South Pacific; and the other 5 percent include

[9] Supplied through the courtesy of the WinLink 2000 Development Team. Visit: www.winlink.org.

Africa, Europe, MED, AK, etc. These percentages change markedly with the hurricane season in the Caribbean and South Pacific.

There have been 1744 registered Position Reports sent to family and friends during the last 30 days. Most people use the Automatic Position Reporting Maps to locate their traveling user. However, they may also receive an automated email historical view when they request it.

There are approximately 32 personal WEB sites that are used to show Pictures and journal reports sent by cruising users who send them with attachments via WinLink 2000.

There are approximately 350 bulletin products available via the shared AirMail/WinLink Catalog. These include about 300 WX (weather) products - worldwide, Help files, and other "How To" files.

There are 28 Participating stations operating 24 hours a day, 7 days per week, all available worldwide. Currently, 25 of these 28 stations are active, leaving 3 temporarily unavailable (including one station in Australia that was closed down for fear of prosecution by the ACA).

There is one participating station using two separate Transmit/Receive Facilities. The busiest participating station communicates with approximately 160 users daily. The least used stations have only a few contacts daily. The "average" PMBO connects to approximately 38 stations daily. On average about 2,600 messages are processed per day.

The "PMBO" participating stations are located in the following places:

F6CDD: Portet Sur Garonne, France
K4CJX: Nashville, TN
K6IXA: Atwater, CA
KA6IQA: Rancho Santa Fe, CA
KB6YNO: South Portland, ME
KF6NPC: Riverside, CA
KN6KB: Melbourne, FL
K7AAE: Woodinville, WA
HS0AC: Bangkok, Thailand
N8PGR: Cleveland, OH
N0ZO: Lady Lake, Florida (TEMPORARILY INACTIVE)
ON4QR: Bruges, Belgium (TEMPORARILY INACTIVE)
SM6USU: Glose, Sweden
VE1YZ: Halifax,, Nova Scotia, Canada
VK7PU: Burnie, Tasmania (CLOSED DOWN)
W6IM: San Diego Yacht Club
W7BO: Woodland, WA

W9GSS: Peoria, IL
W9MR: Keensburg, IL
WA6OYC: Oakland, CA
WB5KSD: Farmersville, TX
WB0TAX: Elm Grove, LA
WD8DHF: Harker Heights, Texas
WG3G: Trinidad
ZF1GC: Bodden Town, Grand Cayman Island
ZL1MA: Auckland, New Zealand
ZL2UT: Gisbourne, New Zealand
ZS5S: Howick, South Africa

According to Ocean Navigator, WinLink 2000 is the most sophisticated and most used email outlet available to the maritime private cruiser. It dwarfs any other available service. Finally, WinLink is continually being enhanced to benefit the mobile user.

UNQUOTE

Conclusion

While reliable communications, for travelers and others when in remote locations, has always been of extreme importance, it seems clear that the recent terrorist attacks, the recurrence of piracy[10], and increased political risk in some volatile areas of the world have skyrocketed the interest in the safety of travelers on land and at sea -- not only here in Australia but around the world – hence the worldwide expressions of support that have been sent to the Productivity Commission on this subject.

Those who share these concerns and have hopes for a better future look upon those responsible within the Australian Government to liberalize the Australian amateur radio service, so that we can all confidently believe in "Advance Australia Fair".

Respectfully submitted.

Anthony Van Vugt
31 December, 2001

Please visit the Internet at: **www.aussiewinlink.org** to monitor developments.

[10] The press reported the death of Sir Peter Blake of New Zealand, a world-renowned yachtsman, at the hands of pirates on the Amazon in Brazil. There are piracy reports also from other parts of the world.

Attachment A

The Role of Amateur Radio in the New Century

In a speech delivered by

Dale N. Hatfield (W0IFO)

Chief, Office on Engineering and Technology
Federal Communications Commission

at

AMRAD's 25th Anniversary Dinner, Falls Church, VA, USA

June 17, 2000

The Role of Amateur Radio in the New Century

Mr. Dale N. Hatfield

I am very pleased to be able to speak to you this evening on the topic of the role of amateur radio in the new century. I am very pleased to be here for a number of reasons.

***First,** I am very pleased because it is both your 25th anniversary and your first anniversary dinner held in the new century. That seems like a particularly good time to reflect on the future of the amateur radio service and I am flattered that you have asked me to do so.*

***Second,** I am very pleased because I have especially fond thoughts about the service because of the pivotal role that amateur radio – and individual amateur operators -- hams -- played in my own career. As I will explain in more detail in a moment, I would not be in my current position if it had not been for the help of some hams back when I was a teenager about 50 years ago.*

***Third,** I regard it as a particular honor to be asked to address an amateur radio group that emphasizes experimentation and the more technical aspects of amateur radio. Again, as I will indicate in more detail in a few minutes, I believe that experimentation and contributions to the state of the art in the radio field are a major part of the justification for maintaining spectrum allocations for the service in the face of increased demands by commercial and other interests.*

I would like to divide the remainder of my remarks into five parts.

- ***First**, I will briefly -- very briefly -- talk about my personal involvement in amateur radio.*

- ***Second**, I will briefly describe the role of the Office on Engineering and Technology at the Federal Communications Commission so that you will have a better idea of the basis for my remarks.*

- ***Third,** speaking from that perspective, I will talk about the growing scarcity -- and hence economic value -- of the radio*

spectrum and how that growing scarcity will inevitably put pressure on amateur allocations.

- ***Fourth**, I will talk about the important role that the amateur radio service has played in the past and -- going to the basic topic I have been asked to address -- what the amateur service can do to in the future to justify its spectrum allocations on both a national and international basis.*

- ***Fifth, and finally,** I will talk about a proceeding we recently launched at the Commission – a proceeding dealing with Software Defined Radios.*

Before I continue, I need to add the standard disclaimer that my remarks here this evening represent my own views and they may not necessarily reflect the views of the Commission, any individual Commissioner, or any other staff member.

Background in Amateur Radio

My own involvement in amateur radio began in my early teens, when my father bought me a used Hallicrafters S-38B shortwave receiver. He and his brother -- my uncle -- had tinkered with crystal sets when they were kids and he somehow sensed that I might find radio interesting as well. I connected that receiver to piece of antenna wire hung out of my bedroom window and soon I heard a ham radio operator in Morocco calling CQ in the 20 meter amateur band. From that moment I was hooked on radio communications.

Two local hams who lived near me -- this was in Dayton, Ohio in the early 1950s -- helped me get my first license (WN8NGG) and helped me build my first transmitter. These two hams were electrical engineers that were employed at Wright-Patterson Airforce Base near Dayton. It was their interest that led me into electrical engineering as a vocation and ultimately to a job at the government's old Central Radio Propagation Laboratory in Boulder, Colorado. I won't bore you with the details, but that first, entry-level job eventually led me to the position I hold today. Accordingly, I will forever be in the debt of those two hams who so unselfishly supported my passion for radio.

Role of the Office of Engineering and Technology

As most of you may know, the FCC is organized into Bureaus and Offices. Generally speaking, the bureaus -- the Common Carrier Bureau, the Wireless Telecommunications Bureau, the Mass Media Bureau, the Cable Services Bureau, and the International Bureau -- have the "line" or operating responsibility in terms of the Commission's regulation of particular segments of the telecommunications industry. For example, the Wireless Telecommunications Bureau -- under the excellent leadership of my colleague, Tom Sugrue -- has the responsibility for the Amateur Radio Service. The offices -- such as the Office of the General Counsel and the Office of Plans and Policy -- provide support and advice to the operating bureaus and to the five-member Commission itself.

Reflecting that rough division, the office that I now head, the Office of Engineering and Technology, provides technical advice to other bureaus and offices and to the Chairman and other Commissioners. In addition, however, our office has the responsibility for administering specific parts of the Commission's rules, namely, Parts 2, 5, 15, and 18. Part 2 of the rules contains the Table of Frequency Allocations. That is, while the individual bureaus have primary responsibility for developing and recommending specific service rules, we, in OET, have the responsibility for general allocation matters.

We also issue experimental licenses under Part 5 of the Commission's rules. In addition, we administer Part 15 of the Commission's rules dealing with unlicensed devices as well as Part 18, which deals with certain industrial, scientific and medical equipment. Finally, we are responsible for the Commission's equipment authorization program. Much of that work is done at our laboratory facilities in Laurel, Maryland.

Growing Demand for Spectrum

The management of the radio spectrum resource is an extremely important part of telecommunications policy and regulation. As you all know so well, radio spectrum is an increasingly scarce natural resource. We simply do not have enough spectrum to give everyone all they want. This increasing demand is being propelled by a host of developments:

- *the growing shift of our economy towards the service sector,*
- *the increasing mobility of our workforce,*
- *the convenience and increased efficiency produced by mobile/portable communications,*
- *the increasing performance and falling cost of wireless devices*
- *the increasing requirements for public safety and for national defense systems, and*
- *the dramatically growing interest in accessing the Internet on a wireless basis.*

Hence, the allocation of spectrum for particular uses and the development of specific technical and service rules governing those allocations is a crucial determinant of telecommunications industry structure and performance. Even more importantly, it is critical to the performance of our public institutions that are devoted to certain scientific pursuits, such as radio astronomy, to the safety of life and property, and to the national defense.

As the office at the Commission that has primary responsibility for spectrum allocation matters, we, in OET, are in a particularly good spot to judge -- first hand -- the increasing demand for spectrum. Our office is generally the first place people stop when they are seeking new spectrum. Hardly a week goes by without someone stopping in my office or filing a petition asking that spectrum be allocated for some new service or that additional spectrum be allocated to an existing service. While increased efficiency in the use of spectrum -- through the use of digital compression techniques, more efficient

modulation and greater frequency reuse, for example -- can offset some of this increased demand, increased scarcity is a very real concern. This scarcity is exemplified by increasingly contentious debates over spectrum sharing arrangements and by the amounts bid in auctions for radio licenses. The $35 billion bid in the recent Third Generation Cellular auctions in the United Kingdom provides very clear evidence of the increasing value of spectrum.

Our Chairman has recently called attention to the potential for a "spectrum drought", especially in the valuable range below about 3 GHz. Under the leadership of the Chairman, and with solid support of Commissioner Susan Ness -- who has always been intensely interested in spectrum issues, we have put forth a number of proposals and undertaken a number of initiatives that would allow more uses and users of this national and international resource. One of these initiatives relates to Software Defined Radios -- a topic which I will return to briefly near the end of my remarks. The point that I want to emphasize here, however, is that, in thinking about the role of Amateur Radio in the new century, we must think about it in the context of increasing pressure on the underlying spectrum resource.

Future of the Amateur Service

Turning now to the future, it seems to me that – given the increased pressure on the underlying resource from commercial and other non-commercial uses -- the key issue for the amateur service is maintaining access to an adequate amount of spectrum. Let me make it absolutely clear that, in raising the spectrum issue, I am not suggesting that there is any immediate threat to existing amateur allocations. I am simply pointing out the reality of the situation. The rapidly growing demand for spectrum coupled with the increased visibility of its economic value due to auctions makes it almost inevitable that amateurs will be under a certain amount of pressure to justify their "free" use of this precious resource.

In the past, the amateur service has justified its spectrum allocations by, among other ways, (1) engaging in experimentation that has advanced the radio state-of-the-art, (2) providing emergency communications in times of natural or man-made disasters, (3) providing trained radio operators in times of national emergencies, (4) encouraging international cooperation and goodwill by allowing direct

communications between and among people on an international basis and (5) as in my case, providing an important educational outlet for people interested in the more technical aspects of radio communications. While the relative importance of some of these ways has obviously changed because of marketplace, technological and other developments, they remain valid today. The important thing is that they actually be carried out. Or, to use a bit of slang, it seems to me that it will be even more important for all segments of the amateur community to "walk the walk" not just "talk the talk."

Another potentially important area deals with how efficiently one uses the spectrum. We could probably discuss at some length the proper measure of spectrum efficiency but for our purposes here this evening it might be simply the number of simultaneous conversations that can be accommodated in a given amount of spectrum in a particular geographic area. In the commercial sectors, where organizations pay for their use of the spectrum, there is a significant economic incentive to use the resource efficiently – to spread costs over as many users as possible while maintaining good quality service. That is, there is a strong incentive to develop and adopt more spectrally efficient technology. For example, by adopting various digital techniques, commercial mobile radio service providers (e.g., cellular and PCS) have been able to dramatically increase their capacity compared to the original analog technology. Similarly, when the broadcast industry has completed its transition to digital television, we will be able to reclaim a substantial amount of spectrum for other uses.

I recognize that, in the past, hams have also adopted more spectrally efficient technologies – for example, by migrating from double-sideband amplitude modulation to single-sideband modulation and, more recently, by shifting to more efficient modulation for text – TTY – modes. I would urge you to continue shifting towards more spectrally efficient communications techniques – especially digital techniques. Such a shift has a number of benefits:

- ***First of all,** it demonstrates to policymakers and regulators that you are good stewards of the public's airwaves even without direct economic incentives.*

- ***Second,*** *by using what you have efficiently, it strengthens your case when you need to ask for additional spectrum.*

- ***Third,*** *by allowing more users to access the available allocations simultaneously, it improves the amateur experience and ultimately increases the attractiveness of the service to new and old users alike.*

- ***Fourth,*** *it provides the opportunity or "headroom" for increases in data rates to more closely match those available on wireline networks and, in the future, on commercial wireless networks as well.*

- ***Fifth,*** *as the rest of the telecommunications world makes the transition to digital techniques – and there are very few exceptions to that trend – the amateur service will look antiquated if it is not making progress in that direction as well.*

So looking to the future of the amateur radio service in the new century, I would urge you to continue your traditional role in public service by being prepared for and providing communications in times of emergencies, conducting experiments, providing training in radio communications, and encouraging international comity. But I would also urge you to focus particular attention -- for the reasons I just mentioned -- on experimentation with digital techniques that are capable of squeezing more "bits per second per Hertz of bandwidth" out of the increasingly valuable radio spectrum resource.

Software Defined Radios

I am rapidly running out of time but before I close I would like to talk about one additional topic that, as it turns out, may help enable some of the experimentation with digital techniques that I just advocated. The topic, as I mentioned at the outset of my remarks, is Software Defined Radios. Software defined radios -- or software radios or software programmable radios as they are sometimes called -- can be described as radios that are implemented in digital signal processors with functions defined in software. In other words the signals are generated in -- or converted to -- the digital format and the necessary processing -- for example, modulation and demodulation -- is done in software on a common platform.

From what I have been told, such radios could have a host of advantages:

- ***One,*** *they would allow a common radio to accommodate a host of different standards and thereby help alleviate some of the problems that we have had with the creation of different standards in the wireless field.*

- ***Two,*** *they would facilitate interoperability among different types of radio systems, when for example, a large number of different emergency groups arrive at the scene of a major disaster.*

- ***Three,*** *they would allow a manufacturer to develop different radios but on a common hardware platform. In other words, rather than manufacture and carry in inventory several different radios, the manufacturer could achieve economies of scale in the production of a common hardware platform, but wait until the product is about to be shipped before loading the software to create a specific type of device.*

- ***Four,*** *they would allow the end user to update his or her radio simply by getting a software update -- just like an end user gets updated software for a Personal Computer today. In fact, one could even envision a situation where one could get software updates right off of the Internet or over-the-air.*

- ***Five,*** *it is possible that a manufacturer could sell a bare-bones hardware platform to which third party providers or end users – including hams -- could supply software to create custom radio systems. Certainly we have seen similar developments in the computer field and in other sectors of the telecommunications industry.*

- ***Six,*** *it is even possible to imagine a radio that could adapt its characteristics to fit the interference environment and user needs on a more-or-less real time basis. For example, the radio could maximize its use of bandwidth in areas where the spectrum is not congested while conserving bandwidth or going to more robust modulation in areas where interference is heavy and/or propagation conditions are particularly difficult.*

Indeed, <u>if</u> we can solve some of the difficult regulatory issues involved, it is even possible to envision Software Defined Radios as a means of facilitating a new era of amateur experimentation. One intriguing possibility is that it could enable hams without skills and/or interest in hardware construction to build and experiment with new systems by writing new code. It might also allow the rapid sharing of new modulation techniques and receiver designs through electronic publication of the implementing software. This could stimulate a whole new generation of amateur innovation that not only includes the more spectrally efficient systems I mentioned earlier, but also radios that could adapt to their environment as well.

In many ways, Software Defined Radios represent a final merger of the radio communications and computer fields. Viewed from that perspective, this technological development even has the potential of attracting back to the hobby some of the people who have shifted their interest to computer technology. Because of this potential to advance the service in fundamental ways, I would urge amateur groups to participate actively in our proceeding.

<u>Concluding Thoughts</u>

Let me conclude by saying that I believe that the future of the amateur service is a bright one. It is one where technological advances such as Software Defined Radios can enable the ham community to continue its proud tradition of innovation while demonstrating its commitment to the efficient use of the spectrum resource. Certainly your organization – AMRAD – is in a particular good position to encourage the experimentation that will lead to such innovations and I strongly commend you for your leadership efforts in that direction in the past.

Thank you very much.

By Dale N. Hatfield

Note: Underlining added for emphases.

Attachment B

NEW YORK TIMES
November 22, 2001

RADIO E-MAIL CONNECTS SHIPS TO SHORE

WHEN Jim Corenman wants to get in touch with family and friends while out in the middle of nowhere aboard his 50-foot sailboat, Heart of Gold, he doesn't reach for any newfangled satellite or cellular equipment. Instead he fires up his oldfangled shortwave radio, hooks it up to his laptop computer and starts sending e-mail.

Mr. Corenman and his wife, Sue, have been sailing the globe for 11 years on Heart of Gold. They are among thousands of active cruising sailors who use nonprofit radio e-mail networks to communicate with one another and those on shore. Shortwave radios, more commonly known today as high-frequency (HF) radios, have long been popular with wandering sailors. And digital protocols for sending Teletype text messages via HF radio date from World War II. But it wasn't until the Internet revolution of the 1990's that text messaging via radio became practical for cruisers.

Mr. Corenman, a retired computer engineer, gave radio e-mail a big shot in the arm in 1997 when he published AirMail, an advanced e-mail terminal program he distributes free. Since then, although a desire to get away from it all is a big part of what motivates sailors like the Corenmans, the convenience of being able to send and receive e-mail at little or no cost from anywhere in the world - even the middle of an ocean - has proved irresistible. Modems capable of sending data over radio connections and laptops loaded with AirMail are now considered essential equipment by many long-distance cruisers.

"Radio e-mail has freed us from worrying about the folks back home, and they about us," said Mrs. Corenman in an e-mail message sent from a remote anchorage in southeastern Alaska. "We no longer have to rush to find a phone when we make landfall to let everyone know we made it. It works well, too, for vital spare parts we need along the way. When our refrigerator compressor went out on us in Indonesia, we ordered a new one via e-mail from New Hampshire, and it was waiting for us when we reached Bali."

Several enterprising companies have tried to exploit this market, but so far efforts to commercialize service for recreational mariners have been unsuccessful. One reason is that ham radio operators and cruising sailors belong to tightly knit

communities and like to help one another. They share their technical knowledge freely and have had no trouble creating and maintaining their own radio e-mail networks. The largest such network, Winlink, offers service at no charge and consists of 31 volunteer ham mailbox stations scattered over the globe. According to Steve Waterman, who operates two stations from his home in Nashville and is also the Winlink network administrator, the system currently handles more than 80,000 messages a month and has 3,300 users, about 80 percent of whom are sailors.

Of course amateur ham radio by law is strictly noncommercial. But sailors can also send HF radio e-mail through what are known as marine single-sideband (SSB) frequencies. SSB radio can be operated for profit and can carry business-oriented traffic. Still, the most popular SSB e-mail network for recreational mariners is a nonprofit cooperative called SailMail, which charges a flat $200 annual subscription fee to cover costs. SailMail was formed in 1997 by Mr. Corenman and Stan Honey, an ocean-racing sailor who navigates high-profile vessels like Roy Disney's Pyewacket and Steve Fossett's PlayStation, which recently set a trans-Atlantic speed record. SailMail currently has 11 automated mailbox stations and more than 1,100 users.

One commercial common carrier, Globe Wireless, has had success providing SSB e-mail service to large commercial vessels but prefers not to enroll recreational mariners as subscribers. "They are naïve, service-intensive users generating low levels of traffic, and Globe would just as soon have nothing to do with them," said Vic Poor, a Globe consultant and investor. Mr. Poor, a former cruising sailor, developed the first Winlink system before becoming involved with Globe. Through him, Globe has helped the recreational market service itself by providing technical and logistical assistance to the nonprofit networks.

"It's all a question of support," Mr. Waterman said. "If you're trying to make money doing this, you want your support people talking to Exxon's tanker fleet, not some guy sailing around in a little yacht somewhere."

But another common carrier, PinOak Digital, has pursued the recreational market and has tried to hinder the growth of nonprofit SSB e-mail. Through threats of legal action, PinOak succeeded in 1999 in thwarting the startup of an SSB e-mail cooperative planned by Mr. Waterman and the Seven Seas Cruising Association, a nonprofit organization with a membership of some 11,000 cruising sailors. PinOak failed, however, in its efforts to block SailMail's application to the Federal Communications Commission for additional station licenses to expand its network.

Since then, SailMail's membership has grown steadily. PinOak, meanwhile, has stagnated. Recently reorganized under new ownership as SeaWave, the Company is currently believed to have only about 300 users. Don Black, the new

chief executive, declined comment on this, but said SeaWave would be focusing more on commercial vessels.

Satellite phone companies are another natural competitor for the radio e-mail networks. But they have failed thus far to fulfill their promise of affordable global wireless communications.

"Our assumption when we started SailMail was it would take the satellite companies two years to make bandwidth a cheap commodity," Mr. Corenman said. "I am no longer convinced satellite bandwidth will get cheap anytime soon. The capital cost is too high and the market too small. Satellites may be a viable option for business and government users, but HF radio will continue to be the best option for the low-end market."

And the nonprofit organizations seem to be the best bet for operating the e-mail systems. "Cruising sailors are by nature a very cooperative group of people," Mr. Honey said. "It's perfectly appropriate for us to fill this need on a cooperative basis."

By CHARLES J. DOANE