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

Comments of	)	WT Docket No. 98-143
	)	
Courtney B. Duncan	)	RM-9148
	)	RM-9150
and	)	RM-9196
	)	
Jan A. Tarsala	)	
	)	
In the Matter of	)	
1998 Biennial Regulatory Review --	)	
Amendment of Part 97 of the Commission's	)	
Amateur Service Rules.	)	

Summary

Today's Amateur Radio Service licensing structure -- with its Byzantine, pyramidal form and hodgepodge of rules -- is a failure. A radically simplified licensing structure is called for, consisting of a single license issued by the government with six incentive endorsements administered by the private sector.

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Introduction

In FCC WT Docket 98-143, the Commission seeks comments concerning the number of Amateur Radio Service license classes (Section IV (A), paragraph 13). Herein we respond to the request of the Commission and set forth a radically simplified Amateur Radio Service licensing structure which reduces the processing burdens on the Commission, emphasizes privatization of the process, and reintroduces meaningful incentives towards personal mastery of the radio art and science. In order to provide a foundation for this proposal, we briefly examine current roles and a vision of the future of the Amateur Radio Service. We comment on the current pyramidal licensing system and its modification which has been proposed by the Commission in WT 98-143, and we show that changes are necessary if the vision stated for the Amateur Radio Service is to be fulfilled and enhanced. Our proposed licensing system is planar, consisting solely of a core Amateur Radio Operator and Station License, and six Endorsements which are crafted to expand the skills and knowledge of the licensee. The core license is issued by the government, while the endorsements are issued by the private sector and recorded in the government database. This concept of a license plus an endorsement is already in place and used within the Volunteer Examiner credentialling process. We provide a road map from the current licensing structure to the one we propose, along with information concerning callsign selection and other administrative issues.

Current Roles and a Vision for the Amateur Radio Service

The Amateur Radio Service is a multi-faceted jewel,* a set of many diverse, fascinating and useful avocations unified by their involvement with the art and science of radio. The missions of amateur radio include: service to the public; aid to those in distress; technical self-education; promotion of international goodwill; a testing ground for techniques that do not have or have not yet proven to have commercial value; camaraderie; preservation of the glories of the development of radio; and a place for enthusiasts to experience and to be awed by the magic of wireless. The broad institutional goals within the Amateur Radio Service and the entry requirements captured within the licensing structure must focus on recruiting, developing, and enabling people who are interested in the above mentioned missions as well as those new ones that will emerge as the service evolves in the future.

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* Ralph Wallio, W0RPK, personal communications with Courtney B. Duncan, N5BF, conducted over amateur radio.

The Problem with Today's Incentive Licensing

The current licensing structure and incentive system has been in place for over three decades. Periodically over this time it has been modified, but only marginally. This is true even with the Commission proposals in WT 98-143. It is pyramidal in form, consisting today of seven amateur radio service licenses (from top to bottom): Amateur Extra class, Advanced class, General class, Technician class (granted before 21 March 1987 but no longer, yet capable of being renewed), Technician Plus class, Technician class (granted after 21 March 1987), and Novice class. Mastery of the knowledge for one license class is a winnowing requisite for the next one in the sequence, and each step along the path to the Amateur Extra class license requires the processing and the issuance of a new paper license by the Commission's facility in Gettysburg, Pennsylvania. The resulting hodgepodge of licenses, elements, and exceptions (e.g. Technician licenses granted before 21 March 1987) was characterized quite properly by the wife of one of the authors (JAT) as being "Byzantine."

The incentives inextricably built into the pyramidal Amateur Radio Service licensing structure of today and intended to motivate radio amateurs towards broader mastery of the radio art and science emphasize goals and values that are virtually entirely backward-looking, stressing past needs. Therein lies its most damning, fatal flaw. Licensing statistics for the last decade shown in Figure 1 demonstrate that the upgrade path, leading primarily to greater privileges in the Medium

Frequency (MF) and High Frequency (HF) spectrum, is not appealing. Newcomers apparently are not being offered anything of value to them through increased MF and HF privileges, as they already have with just an entry level license all amateur privileges at Very High Frequencies (VHF) and above. Many explanations have been proposed for this trend (demographics, increasing urbanization, decreasing spare time, and so forth) but the fact remains that United States citizens who are interested in being involved in the broad spectrum of activities that comprise the Amateur Radio Service are not being motivated effectively by the current licensing structure. The one exception obvious in Figure 1 is the number of Amateur Extra class licensees which *has* grown proportionately with the Amateur Radio Service as a whole, thus keeping the percentage of Amateur Extra licensees constant. We believe that the incentives offered by the Amateur Extra class license beyond additional HF operating frequencies (namely pride in the accomplishment, volunteer examiner opportunities, and preferred access to coveted station callsigns through the amateur radio vanity callsign system) do have and will continue to have motivational powers. For this reason, these are the types of incentives around which our novel concept of a core license with endorsements is built.

The Commission should recognize that fundamental, sweeping change is essential if the goals of the Amateur Radio Service are to be achieved today and tomorrow. The situation posed by the licensing structure is analogous to roofing material on a house. As roofs age, new roofs are placed over the old and patches made until the structure of the house can no longer support them. At that point, all the old material must be removed back to the sheathing and a new roof put in place.

This is where we find Amateur Radio Service licensing today. The classifications and incentives with which the old licensing structure was designed are now burdensome. It is time to remove several layers of old thinking and paradigms, design a new licensing structure, and incorporate new incentives with the future in mind.

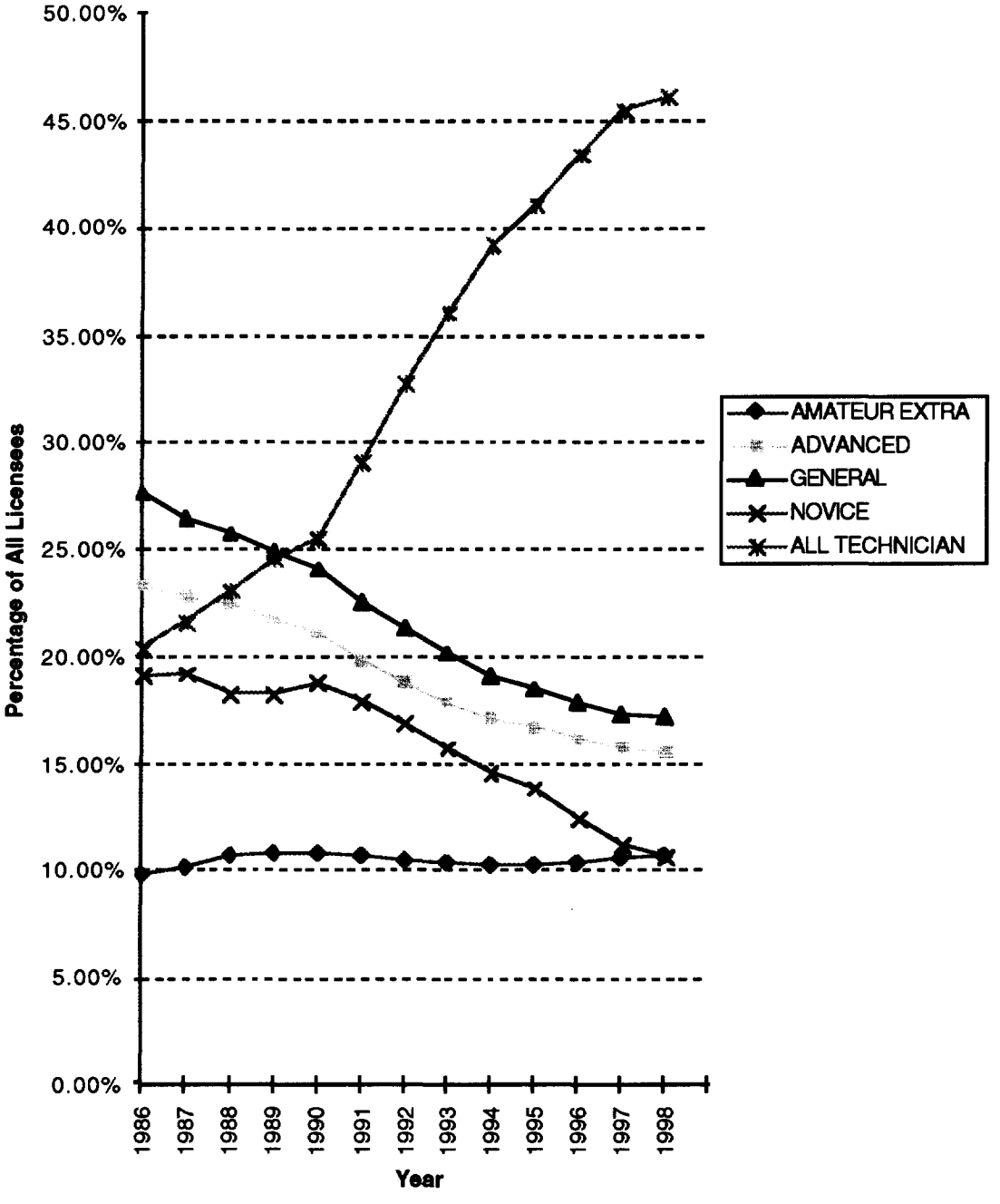


Figure 1: Amateur Radio Licensing Statistics
Showing the Failure of Current Licensing Incentives

A New Amateur Radio Service Licensing Structure

Desirable attributes of a revised licensing structure:

- realistic incentives to promote the expansion of knowledge of the radio art and science;
- flexibility to respond to changing communication technology and operating practices;
- reduction in FCC processing activities;
- simplicity; and
- privatization.

The proposed licensing structure is shown schematically below (Figure 2). It is planar, egalitarian, flexible, logical and simple. It consists of one class of license, the Amateur Operator and Station License, which conveys all amateur privileges except those for which special knowledge or skill is required. These are conveyed through a system of Endorsements. The guidelines used in establishing the licensing structure and examination requirements are:

- safety of personnel and property;
- minimized interference;
- incentives to excel in the radio art; and
- foresight toward the future.

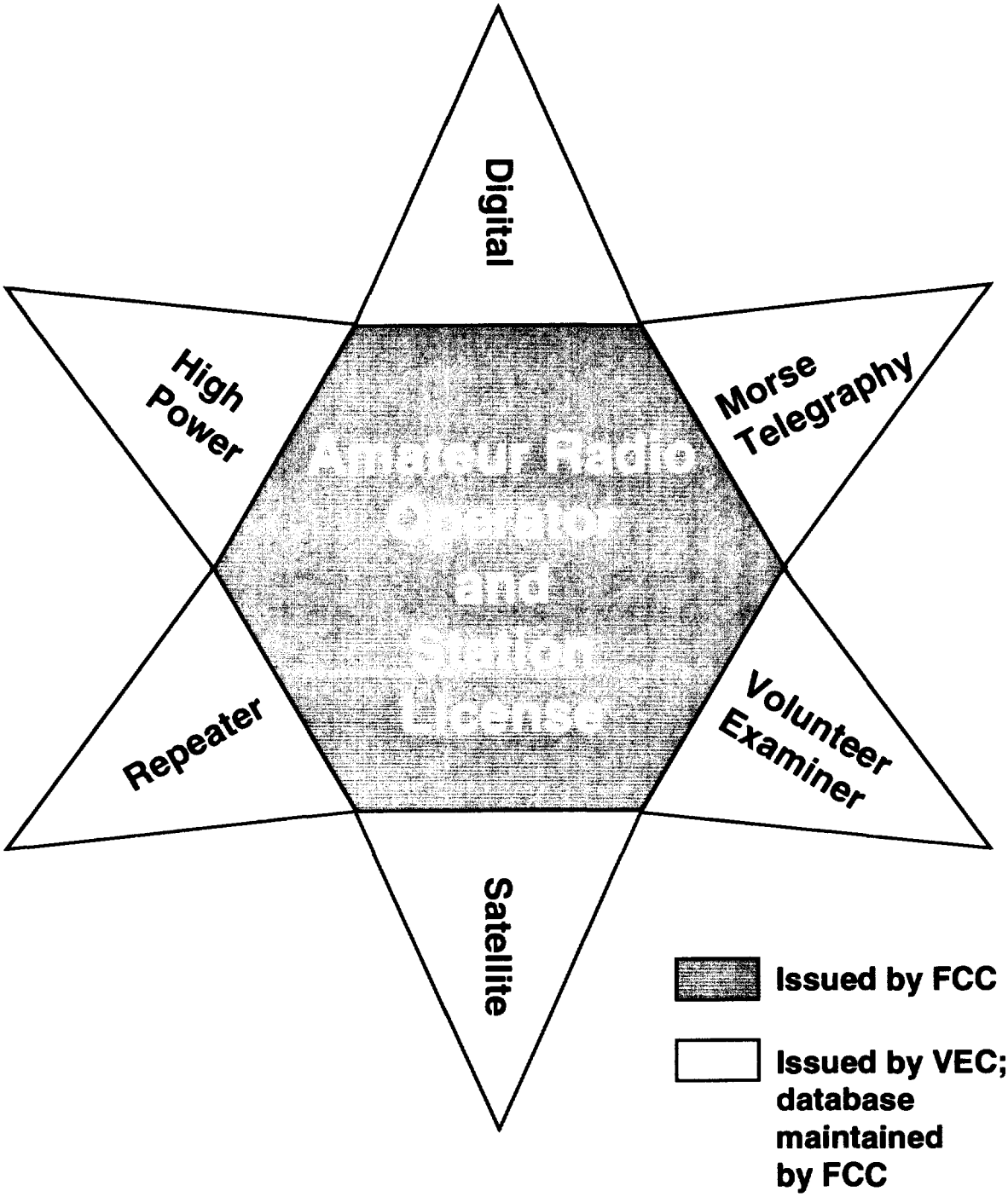


Figure 2: Proposed Single License with Endorsements

The Amateur Radio Operator and Station License

The Amateur Radio Operator and Station License conveys the privileges of all amateur frequencies, emissions and power levels, and authority, except those conveyed by an Endorsement, as detailed below. This is analogous to commercial operator licenses and their endorsements. This license is issued by the government (based on an examination administered through the Volunteer Examiner system) and results in a paper license being generated by the processing facility in Gettysburg and mailed to the licensee.

The Amateur Radio Operator and Station License Endorsements

The art and science of radio is particularly diverse and it would be unreasonable to expect a new applicant to have mastered all of its many facets. To deal with this situation we introduce the concept of a license Endorsement which requires demonstrated, specialized knowledge and conveys corresponding privileges. The guidelines given above are applied once again to the requirements for Endorsements. Endorsements are specifically structured so as to be introduced and deleted as the state of communications technology evolves.

International Morse Code Telegraphy Endorsement

Conveys authority to conduct communications using the International Morse Code. (This privilege is *not* conveyed by the Amateur Radio Operator and Station License.)

Requires demonstration of the ability to correctly send by hand and receive by ear the International Morse Code at a minimum speed of eight (8) words per minute. Students

who have achieved this speed are able to copy characters, not just character elements, are capable of effective communication, and are well poised to progress with the skill.

Volunteer Examiner Endorsement

Conveys authority to conduct examinations for Amateur Radio Operator and Station License and all Endorsements.

Requires demonstrated knowledge of examination administration and processing procedures and accreditation with an authorized Volunteer Examiner Coordinator.

(An examiner administering the Morse Telegraphy Endorsement examination must possess that Endorsement.)

Radio Amateur Satellite Service Endorsement

Conveys authority to operate stations in the Radio Amateur Satellite Service.

Requires demonstrated knowledge in space communications techniques and regulations.

Repeater Endorsement

Conveys authority to act as a control operator or trustee of a station in repeater, auxiliary, or beacon operation.

Requires knowledge of radio communication relay systems and regulations.

High Power Endorsement

Conveys authority to operate stations above the power levels which require routine radio frequency environmental evaluation prescribed in 47 CFR § 97.13 up to the maximum power allowed for amateur operation.

Requires knowledge of radio frequency and electrical safety and of amplification techniques.

Digital Communication Endorsement

Conveys authority to operate stations conveying data except those using the International Morse Code.

- Requires knowledge of digital communications codes, protocols and techniques.

Examination Administration and Processing

The examination for the Amateur Radio Operator and Station License is processed in the same way that current licenses are administered, in that, at the end of the processing cycle, a paper license is generated by the Federal Communications Commission Processing Facility in Gettysburg and mailed to the licensee.

Endorsements, however, do not result in the generation of a new paper license. Rather, the record of the Endorsement is recorded electronically in the FCC database by secure FTP from the Volunteer Examiner Coordinator. Endorsements are handled in the private sector with the

database held by the government (this results in a significant reduction in government paperwork involvement).

With the exception of the Amateur Radio Operator and Station License examination and the examination for the Morse Telegraphy Endorsement, all examinations are candidates for self-paced study in the model of a correspondence course. Such a correspondence course is already the practice of the American Radio Relay League Volunteer Examiner Coordinator for credentialling its Volunteer Examiners. We believe this offers great potential to revolutionize the way amateur radio operators are educated and trained.

Sequential Station Callsign Issuance

Amateur Radio operators identify strongly with their callsigns such that they become "second names" with them. Access to special callsigns appears to be one of the effective incentives for upgrades to Amateur Extra class in the current system. Several of the available callsign group pools are now effectively depleted. Callsigns no longer generally convey useful information about class or location.

In this single-license-class system, every new Amateur Radio Operator and Station License will be issued with a sequential callsign from the Group D callsign pool. Operators wishing a different callsign will be permitted to use the Vanity Callsign system after obtaining all currently available Endorsements.

Transition Process

A map of the present Amateur Radio Service license classes into the proposed structure is given below (Table I). We will not debate herein the competency of current license holders to be granted the endorsements shown except to say that their current licenses already grant them the indicated privileges.

Table I: Mapping of Present Amateur Radio Service License Classes into the Proposed Structure of a Single License Plus Endorsements

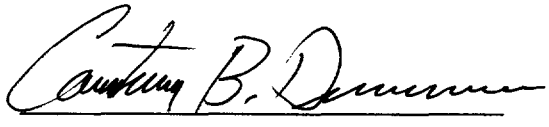
	Amateur Extra Class	Advanced Class	General Class	Technician Class (granted before 21 March 1987)	Technician Plus Class	Technician Class	Novice Class
Amateur Radio Operator and Station License	*	*	*	*	*	*	*
Morse Telegraphy Endorsement	*	*	*	*	*		*
Volunteer Examiner Endorsement	†	†					
Amateur Satellite Service Endorsement	*	*	*	*	*	*	
Repeater Endorsement	*	*	*	*	*	*	
High Power Endorsement	*	*	*	*	*	*	
Digital Communications Endorsement	*	*	*	*	*	*	

At the time of renewal, current license holders will be converted into the new system. The dagger qualifier mark (†) shown in Table I denotes a special case requiring that lists of currently accredited volunteer examiners will have to be periodically provided to the Commission by the Volunteer Examiner Coordinators so that the Volunteer Examiner Endorsement can be properly assigned.

Conclusion

Herein we have responded to the request of the Commission and have set forth a radically simplified Amateur Radio Service licensing structure which reduces the processing burdens on the Commission, emphasizes privatization of the process, and reintroduces meaningful incentives towards personal mastery of the radio art and science. Our proposed licensing system is planar, consisting solely of a core Amateur Radio Operator and Station License, and six Endorsements which are crafted to expand the skills and knowledge of the licensee. The core license is to be issued by the government, while the endorsements are to be issued by the private sector and recorded in the government database. We urge its adoption at the earliest possible date.

RESPECTFULLY SUBMITTED THIS THIRTIETH DAY OF NOVEMBER, 1998 BY:



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Appendix A: Examination Syllabi

Amateur Radio Operator and Station License

A 100 question examination consisting of 5-10 questions in each subject area:

Radio frequency electromagnetic radiation safety

Frequency assignments and band plans

Radio waves and propagation

Antennas and transmission lines

Generation of radio frequency signals

Reception of radio frequency signals

Emission types and required bandwidth

Measurement techniques

Test equipment

Circuit design and analysis

Tools and construction practices

Components, component identification, parameters and tolerances

Electrostatic discharge avoidance

Soldering

Personnel and equipment safety
- Grounding
- Electrical insulation
- Interlocks

Bleeders
Interference, susceptibility and emission

Authority
International Treaties
Federal Regulations
International Telecommunications Union
National Telecommunications and Information Agency
Federal Communications Commission

47 CFR Part 97
Licensing structure
Permissible content
Third party traffic
Restricted countries
Operational protocol
Enforcement

Accessing technical resources

International Morse Code Telegraphy Endorsement

The applicant must demonstrate the ability accurately to send by hand and to receive by ear messages using the International Morse Code at not less than eight (8) words per minute; plus a written examination on:

Telegraphy operating conventions;

Telegraphy abbreviations; and

Q signals.

Volunteer Examiner Endorsement

Examination administration;

Record keeping; and

Examination processing.

Radio Amateur Satellite Service Endorsement

Orbital mechanics;

Link analysis;

Satellite implementation
Spacecraft bus limitations
Transponders, store-and-forward and regenerative;

Stabilization;

Ranging;

Band planning;

International notification;

Radio Amateur Satellite Service structure; and

Special operational rules.

Repeater Endorsement

Band planning;

Frequency coordination;

Coverage-overlap interference resolution and mitigation;

On-site interference resolution and mitigation;

Signaling;

Tone- and digitally-coded squelch systems;

Automatic control operation;

Linking and trunking;

Voting;

Simulcasting; and

Diplexing.

High Power Endorsement

Radio frequency electromagnetic radiation safety;

Personnel safety;

Amplification techniques, tuned circuits, and filters;

Classes of amplifiers and their properties; and

Radio frequency power measurement.

Digital Communication Endorsement

Codes;

Modulation;

Protocols;

Networking and routing;;

Band plans; and

Spread-spectrum transmission.

Appendix B: Curriculum Vitae

Courtney B. Duncan currently holds the Amateur Extra class license N5BF, having been first licensed in March 1972 as WN5GRZ at the age of sixteen. Mr. Duncan is the licensee-of-record for the operational amateur radio microsat *AO-16* sponsored by the Radio Amateur Satellite Corporation (AMSAT-NA); was formerly the Vice President for Operations of AMSAT-NA; and has served as Secretary of the Jet Propulsion Laboratory Amateur Radio Club. He also holds a General Radiotelephone Operator's License (formerly the Radiotelephone First Class Operator's License) and has worked in the broadcast industry as Station Operator at KEFC (FM) and Transmitter Operator at KXTX (TV). He is the recipient of an American Radio Relay League (ARRL) Public Service Award for "meritorious work in connection with a tornado in the Burnet-Hubbard, Texas area on March 10, 1973, as related in June 1973 *QST*, page 75." Broadly experienced in all areas of amateur radio, Mr. Duncan holds an ARRL Code Proficiency Certificate in the International Morse Code at 35 words per minute and is an accredited amateur radio service volunteer examiner through the ARRL Volunteer Examiner Coordinator (ARRL-VEC). Mr. Duncan earned a Bachelor of Music, Piano Performance degree from Baylor University; a Bachelor of Science in Electrical Engineering with Honors from the University of Houston; and a Master of Science in Electrical Engineering with an emphasis in Communication Systems from the University of Southern California (USC). Mr. Duncan is employed as a Member of the Technical Staff in the GPS Systems Group at the National Aeronautics and Space

Administration Jet Propulsion Laboratory (NASA JPL). Mr. Duncan is a member of the Institute of Electrical and Electronics Engineers (IEEE), a Life Member of AMSAT-NA, and a Life Member of the ARRL.

Jan A. Tarsala currently holds the Amateur Extra class license WB6VRN, having been first licensed in March 1967 as WN6VRN at the age of eleven, and is an accredited volunteer examiner through the ARRL-VEC. Mr. Tarsala also holds a General Radiotelephone Operator's License with Radar Endorsement and has worked in the broadcast industry as Chief Engineer for KCPR (FM) and Transmitter Engineer for KROQ-FM. Mr. Tarsala is the outgoing Trustee for the amateur radio club station W6VIO at NASA JPL, and continues to serve as trustee for the Wistaria Wireless Society club station K6TY. Mr. Tarsala received a Bachelor of Science in Electronic Engineering with Highest Honors from California Polytechnic State University at San Luis Obispo, and a Master of Science in Electrical Engineering with an emphasis in lasers and electro-optical systems from USC. Mr. Tarsala is employed as a Senior RF, Microwave, and Antenna Engineer in the Spacecraft Transponder and Signal Processing Group at NASA JPL. Mr. Tarsala is a member of IEEE, a member of AMSAT-NA, and a Life Member of the national engineering honor society Tau Beta Pi.

Appendix C: Acknowledgements

In preparing these Comments, we have benefited from helpful discussions with many active radio amateurs including: Robert J. Dengler, NO6B; Alfred T. Lorona III, W6LX; Mark M. Schaefer, WB6CIA; Michael C. Tope, W4EF; Ralph Wallio, W0RPK; and John Zitzelberger, W6GL.

One of us (JAT) would especially like to thank his wife, Cheryl B. Tarsala, KB0QJJ, for her considerable effort in preparing and submitting this document, as well as for her candid critique of its contents.