Appendix B.: Charter and Invite Letter

Scanned Copy of Charter

SUBJ: NEXCOM Aviation Rulemaking Committee

1. PURPOSE. This order constitutes the charter for the NEXCOM Aviation Rulemaking Committee tat is designated and established pursuant to the Administrator's authority under 49 Use 106&)(5).

2. DISTRIBUTION. This order is distributed at the director level in Washington headquarters and throughout the Office of the Associate Administrator for Regulation and Certification (the Associate Administrator).

3. BACKGROUND. FAA will modernize and upgrade its existing communications infrastructure in this decade to meet a variety of ATC and airspace user needs including: VHF spectrum depletion, reduced logistics costs, increased voice channel security and control, and the provision of infrastructure for data communications. Regardless of technology choice, this FAA action will beget an in-kind level of investment for all airspace users, and concerns within the aviation community have been raised over the rulemaking associated with such a decision. The present FAA NEXCOM acquisition program will convert the en-route air/ground communications system from analog to digital radio communications by 2009, and extend to the terminal airspace thereafter, dictated by spectrum needs. A new special committee under the auspices of the RTCA will address the NEXCOM Principles of Use, System Transition Plans and System Demonstration/Validation Plans in parallel with this committee. The RTCA committee will continue the work on planning the VDL-3 solution and is required in order to keep the VDL-3 acquisition on schedule.

4. OBJECTIVES AND SCOPE. The Administrator has determined that a government/industry forum is needed to develop the combined ground and airborne system investment and cast/benefit analyses. These analyses will be needed to support decision making to upgrade the communications system and to support potential rulemaking. The committee will also prepare recommendations on the appropriate regulatory path for any such system.

5. DUTIES. Predicated on present airspace transition plans for NEXCOM, the committee will:

Develop the combined cost/benefits analysis, considering both airspace user equipage and the FAA ground implementation, of two alternative choices for FAA rulemaking:

- (1) VHF Digital Link Mode 3 voice/data communications
- (2) 8.33 kHz analog voice system and VHF Digital Link Mode 2

Recommend appropriate rulemaking activity consistent with the analysis and with the program implementation timeline, to include: system demonstration/validation, key site, en-route and terminal airspace implementation.

6. ORGANIZATION AND ADMINISTRATION.

a. The Associate Administrator is the sponsor of the NEXCOM Aviation Rulemaking Committee. The Associate Administrator shall also be responsible for providing administrative support for the committee.

b. The Associate Administrator shall have the sole discretion to appoint members to the committee and designate the Chair of the committee. The committee shall consist of employees of major airlines, regional airlines, ALPA, AOPA, NBAA, DoD, FAA, AEA, GAMA, PASS, NATCA, MITRE, and such other individuals as the Associate Administrator may deem appropriate.

c. Once designated, the Chair:

(1) Determines, in coordination with the other members of the committee, when a meeting is required and where it will be held.

(2) Arranges notification to all committee members of the time and place for any meeting.

(3) Formulates an agenda for each meeting and conducts the meeting.

(4) Develops clear roles and responsibilities to distinguish differences between this committee and the RTCA committee.

d. The committee is not required to keep minutes, but may elect to do so.

7. COMPENSATION. Non - Government representatives serve without Government compensation and bear all costs related to their participation on the committee.

8. ESTIMATED COST. The committee will be supported by 4 staff years of technical, economic and administrative support funded by the product team.

9. PUBLIC PARTICIPATION. Unless otherwise decided by the Associate Administrator, all meetings of the committee shall be closed. Interested persons wishing to attend a meeting who are not members of the committee must request and receive approval in advance of the meeting from the Associate Administrator.

10. AVAILABILITY OF RECORDS. Subject to the conditions of the Freedom of Information Act, 5 U.S. C. Section 522, records, report, agendas, working papers, and other documents that are made available to or prepared for or by the committee shall be available for public inspection and copying at the FAA Office of Rulemaking, 800 Independence Avenue, SW., Washington, D.C. 20591. Fees shall be charged for information furnished to the public in accordance with the fee schedule published in part 7 of title 49, Code of Federal Regulations.

10. PUBLIC INTEREST. The formation of the NEXCOM Aviation Rulemaking Committee *is* determined to be in the public interest in connection with the performance of duties imposed on FAA by law. 12. EFFECTIVE DATE AND DURATION. This committee is effective on December 6, 2000. The committee shall remain in existence until April 30, 2001, unless sooner terminated or extended by the Administrator.

inun Jane F. Gar Administrator

SUBJ: Extension of NEXCOM Aviation Rulemaking Committee

 PURPOSE. This order extends the NEXCOM Aviation Rulemaking Committee that was designated and established pursuant to the Administrator's authority under 49 USC 106(p)(5).

 DISTRIBUTION. This order is distributed at the director level in Washington headquarters and throughout the Office of the Associate Administrator for Regulation and Certification (the Associate Administrator).

 BACKGROUND. By order dated December 6, 2000, the Administrator created the NEXCOM Aviation Rulemaking Committee to develop the combined cost/benefits analysis, considering both airspace user equipage and the FAA ground implementation, of two alternative choices for FAA rulemaking:

- (1) VHF Digital Link Mode 3 voice/data communications
- (2) 8.33 kHz analog voice system and VHF Digital Link Mode 2

In addition, the NEXCOM Aviation Rulemaking Committee was to recommend appropriate rulemaking activity consistent with the analysis and with the program implementation timeline, to include: system demonstration/validation, key site, en-route and terminal airspace implementation.

After completing its task by April 30, 2001, the NEXCOM Aviation Rulemaking Committee presented the FAA with its recommendations. The recommendations included that FAA should:

- Continue to aggressively manage frequency assignments to prolong the useful life of the 25 kHz channel allocation in support of Air Traffic Services (ATS). Conduct an annual assessment to confirm that there will be an adequate number of 25 kHz communications frequencies to meet future capacity needs. This assessment should have at least a 5 year outlook to provide adequate warning of 25 kHz frequency spectrum depletion.
- Continue to support VDL Mode 2 for data link communications and support its continued evolution to meet the needs of future Air Traffic Service data link requirements as they develop until and unless it can no longer meet those requirements.
- Expedite the demonstration/validation of the VDL Mode 3 system to include both voice and data link. The demonstration/validation must have industry participation, clearly defined success criteria, and must meet all FAA certification criteria for the end-to-end system. VDL Mode 3 should only be pursued if indicated by the results of the efforts of the FAA worldwide efforts to establish an acceptable global data link standard.
- Develop a detailed plan for implementing an 8.33 kHz spacing analog voice system. If the VDL Mode 3 demonstration/validation cannot be successfully accomplished, then the plan should be implemented in time to ensure the 8.33 kHz system is in place prior to 25kHz channel allocation depletion. Specifics on rulemaking recommendations will be included in the formal report. The FAA must determine the date that allows for rulemaking action (which is assumed to be less than two years), aircraft equipage (4 years), and implementation of the ground system

in sufficient time to ensure that voice frequency spectrum is available and does not constrain capacity growth.

Take the positive steps now to lead from within the US in a worldwide effort to establish a
global standard voice and data link communications system.

In accordance with paragraph 12 of the December 6, 2000, Order, the Administrator hereby extends the duration of the NEXCOM Aviation Rulemaking Committee to allow:

- Minor clarification and editorial changes from the NEXCOM Aviation Rulemaking Committee
 on its recommendations; and
- Additional work from the NEXCOM Aviation Rulemaking Committee to organize the supporting data for its recommendations.

4. DUTIES. The Chairman of the NEXCOM Aviation Rulemaking Committee is authorized to reconvene the NEXCOM Aviation Rulemaking Committee to enable clarification and editorial changes on its recommendations and additional work to organize the supporting data for its recommendations.

5. PUBLIC INTEREST. The extension of the NEXCOM Aviation Rulemaking Committee is determined to be in the public interest in connection with the performance of duties imposed on FAA by law.

6. EFFECTIVE DATE AND DURATION. This extension is effective May 1, 2001. The NEXCOM Aviation Rulemaking Committee shall remain in existence until September 30, 2001, unless terminated or extended by the Administrator.

Jane F. Gaute Administrator

Scanned copy of Letter

JUL 2 5 2001

Mr. John Kern Chair, NEXCOM Aviation Rulemaking Committee 1511 N. 22nd Street Arlington, VA 22209

Dear John:

Thank you for transmitting the NEXCOM Aviation Rulemaking Committee's (NARC's) final recommendations to me by letter dated May 22. The FAA accepts the recommendations and has developed implementation actions in accordance with the recommendations.

I appreciate the NARC's careful deliberation of the issues and consensus on the recommendations. Transitioning to the next generation communication infrastructure will help ensure safe and efficient air transportation well into the future.

Sincerely,

Original Signed By

Thomas E. McSweeny Associate Administrator for Regulation and Certification

cc: NARC members

ARM-108:cbnordlie x77627:Docs#15920 ARM-1/100/108;AVR-1

NEXCOM Aviation Rulemaking Committee

September 28, 2001

Ms. Jane Garvey, Administrator through Mr. Thomas E. McSweeny Associate Administrator for Regulation and Certification, AVR-1 Federal Aviation Administration 800 Independence Avenue, SW Washington, DC 20591

Dear Ms. Garvey and Mr. McSweeny:

Attached is a final copy of the NEXCOM Aviation Rulemaking Committee (NARC) report. This report gives additional background information and rationale for the NARC recommendations that I forwarded to FAA on May 22, 2001.

The NARC team invested a great deal of time on this important effort, and I am very proud of their work. Many of the team members have expressed an interest in continuing their involvement in this issue until final resolution. I believe NARC member participation in ongoing efforts would be invaluable since the members are very familiar with the issues.

Thank you for allowing our team to help with this very important decision, and I look forward to NARC members' continued participation on this issue.

/s/John S. Kern Chairman

Attachment NARC Report

NEXCOM AVIATION RULEMAKING COMMITTEE



Recommendation of the

NEXCOM AVIATION Rulemaking Committee

ТО

FEDERAL AVIATION ADMINISTRATION

September 2001 Amended February 2002

I. Introduction

Background:

Over the last decade the aviation community, particularly in the United States and Europe, has been planning for predicted spectrum depletion particularly in high-density air traffic areas. During this time, RTCA and ICAO/AMCP have served as the aviation community forums to define the voice and data communications alternatives that are best suited to resolve the available spectrum capacity limitation in the VHF aeronautical band. Because the time to take the next step towards implementation of the preferred alternative has arrived, the FAA has redoubled its efforts to reach out to the aviation community to ensure that the NEXCOM program stays in harmony with current and future A/G communication needs of the NAS users. This FAA/industry dialog started in earnest first as part of the NEXCOM program approval process by the JRC in 1998, followed by a NEXCOM Roundtable, involving a wide cross-section of industry representatives, in September 2000. It is widely recognized that these joint efforts have contributed to the common understanding of the needs and are critical to the success of the NEXCOM program. Moreover, recognizing that the lead-time to develop, test and install a new communications system is long, the decisions made must have the consistent support of the aviation community.

Consistent with the FAA strategy to work with the aviation community to ensure the successful completion of the NEXCOM Program, the Federal Aviation Administration (FAA) Administrator, called for the formation of the NEXCOM Aviation Rulemaking Committee (NARC). This committee was requested to make recommendations to the FAA concerning the direction and potential rulemaking for the air/ground communications infrastructure modernization.

This report summarizes the actions of the NARC in arriving at its recommendations to the FAA.

Key Assumptions

- Voice communications will continue to be the real-time means of communications between the air traffic control system and pilots operating aircraft.
- Data Link will be used for more of the routine and strategic information exchanged between the air traffic controllers and the pilots and become a major enabler for supporting emerging concepts of operations as envisioned by the RTCA Select Committee (see RTCA "National Airspace System, Concept of Operations", December 13, 2000).
- Spectrum depletion, data link, and the need to modernize the FAA's A/G communications infrastructure are the major driver for the need to implement a new system.

• Continuing and ongoing delays are the predominant cost factor in the airline industry and are the driving factor for preventing adequate growth in the market demands for improved scheduled services.

Alternatives Considered

Although other potential alternatives have been suggested and considered in the past, the Committee agreed with the Administrator's guidance to only consider the following two realistic alternatives for FAA rulemaking:

- VHF Digital Link Mode 3 for both voice and data communications
- 8.33 kHz analog system for voice and a separate VHF Digital Link Mode 2 for data

These alternatives are based on well-known technologies. They are mature and have undergone the most extensive development coordination nationally and internationally for a system that has been defined specifically to deliver critical ATC voice and data communication services.

The NARC Membership

John Kern, Chair American Airlines (Russ Chew)(Alternate: Brent Blackwell) Southwest Airlines (Brian Gleason) ALPA (John O'Brien) AOPA (Randy Kenagy) (Randy Kenagy replaced Dennis Roberts when he left) NBAA (Bill Stine) (Alternate: Robert Lamond) DoD (Neil Planzer) (Alternate: Patric Theusius replaced John Gonda) AEA (Terry Pearsall) PASS (Mike Fanfalone) NOTE: There was no participation by PASS in meetings or correspondence NATCA (Bill Blackmer) MITRE (Jim Chadwick) Northwest Airlines (Jon Pendleton) GAMA (Ron Swanda) (Alternate: Ed Bolen) United Airlines (Rob Fuschino) Horizon Air (Perry Solmonson) Regional Airline Association (Scott Foose) Air Transport Association (Bill Sears)

Key Drivers

As stated earlier, the principal factors that generate the need for a new system to provide additional aeronautical communications capacity are the impending spectrum depletion,

the need to provide additional data link capabilities, and the need to modernize the FAA aging infrastructure.

From the spectrum perspective, once it becomes impossible to add new frequencies or reassign existing frequencies, the ability of the NAS and Air Traffic Control to support further increases in operations by NAS users is severely constrained. This scenario will also limit the extent to which forthcoming innovations (e.g., free flight, airspace redesign, RVSM) can be realized, because they may rely in part on the availability of additional communications channels for their implementation. While this constraint will first affect the more congested air traffic areas, this problem will spread throughout the NAS as system growth in operations continues.

Once spectrum depletion limits are reached, the NAS would likely experience a combination of exponentially increasing air traffic delays and a cap in growth to accommodate future demand. Commercial aircraft operations would be fewer than they would have been with sufficient communications capacity, as would passenger enplanements. The magnitude of this shortfall depends on numerous factors, including growth trends in the economy and the responses to the capacity inadequacy by commercial air carriers. Airline operators would most likely act to maintain the service quality of their operations by ending the growth in operations. However, competition among carriers would force the industry to attempt to increase capacity beyond the point at which there would be unacceptable delays and system disruptions. The national economic consequences of retarded growth and the system disruptions due to NAS capacity constraints would be devastating. A 1995 national study¹ on the economic impact of civil aviation estimated that civil aviation contributed directly almost \$376 billion or 6% of the U.S. Gross Domestic Product. This estimate did <u>not</u> include the benefits to U.S. businesses from the use of aviation. Obviously the economic impact of constrained air traffic capacity growth should not be taken lightly.

As suggested by the National Airspace System Concept of Operations, it is anticipated that the use of data link will increase dramatically as the services to support new operational concepts are adopted and used throughout the NAS. This will present the potential for a major change for air traffic operations in the FAA, and data communications is expected to become a major enabler for this change. Routine and strategic information exchanged between the air traffic controllers and the pilots currently exchanged using voice communications, will be provided over data links.

Beyond the exchange of routine and strategic information, increased collaboration will require increased information sharing regarding all elements of the NAS, and development of decision support systems and services for both operators and air traffic service providers. These decision support systems will utilize inputs from many sources, including the aircraft, and allow NAS infrastructure assets to be dynamically assigned to best make use of the NAS resources. The underlying data infrastructure that supports the

¹ The Economic Impact of Civil Aviation on the U.S. Economy – Update '93, Wilbur Smith Associates, April 1995

quantity of information, as well as the performance and security needs of these systems is yet to be defined, but is expected to evolve from the data infrastructure elements being considered today.

Approach

From the outset, the committee recognized the enormous challenge and responsibility in offering recommendations that would serve the aviation industry for the next 20-30 years. Forecasting the communications needs for envisioned operational concepts especially during such a long period is to say the least "uncertain". Other than the spectrum depletion trend analysis, there is not a sufficient body of quantitative data to help sharpen the future picture. These obstacles were exacerbated by the diverse views represented by the NARC members. However, in order to meet the expectations of the Administrator, the NARC attempted to address a variety of difficult issues (related to policy, economics, operations, and technology) that may impact both airborne and ground systems. In our deliberations we considered questions such as the following:

- How can the FAA best fulfill its responsibility as the custodian of the NAS resources including spectrum?
- How are the present interests of the air carriers reconciled with the interest and future needs of all classes of users?
- How can we capitalize on this "first in 60 years" opportunity to modernize the current analog system?
- How can we position the industry in the least constraining path towards future technologies needed to support envisioned operational concepts?
- Who pays for ATC data services in the long run? Would there be conflicts of interests between the FAA and the private sector for the adoption of VDL-2 vs. VDL-3?
- What would be the costs and benefits (both quantitative and qualitative) generated from either of the alternatives?
- What are the relative risks (technical and schedule) for the two alternatives.

In the period between December 2000 and July 2001, the committee had seven formal meetings. As part of the fact-finding process, a series of presentations were given to the NARC which allowed the committee to form an opinion on relevant issues including the frequency spectrum depletion timeframe.

In an effort to accomplish this task, the NARC also invited the CNS/ATM Focus Team (C/AFT) to perform a cost benefit analysis of the two alternative infrastructures identified above. However, the analysis was not directly used in framing the recommendations. This analysis is available in a separate report from the C/AFT.

II. Recommendations:

The following recommendations are given a number in order to track the discussion, however they are not meant to have any particular precedence.

- 1. Continue to aggressively manage frequency assignments to prolong the useful life of the 25 kHz channel allocation in support of Air Traffic Services (ATS). Conduct an annual assessment to confirm that there will be an adequate number of 25 kHz communications frequencies to meet future capacity needs. This assessment should have at least a 5 year outlook to provide adequate warning of 25 kHz frequency spacing depletion.
- 2. Continue to support VDL Mode 2 for data link communications and support its continued evolution to meet the needs of future ATS data link requirements as they develop until and unless it can no longer meet those requirements.
- 3. Expedite the demonstration/validation of the VDL Mode 3 system to include both voice and data link. The demonstration/validation must have industry participation, clearly defined success criteria, and must meet all FAA certification criteria for the end-to-end system. VDL Mode 3 should only be pursued if indicated by the results of the efforts described in recommendation five below. There must be no dilution of, or loss of impetus to the aggressive development, evolution and fielding of VDL Mode 2 data link.
- 4. Develop a detailed plan for implementing 8.33 kHz spacing, analog voice system. If the VDL Mode 3 demonstration/validation cannot be successfully accomplished as defined in 3 above, then the plan should be implemented in time to ensure the 8.33 kHz system is in place prior to 25kHz channel allocation depletion. The FAA must determine the date that allows for rulemaking action, aircraft equipage, and implementation of the ground system in sufficient time to ensure that voice frequency spectrum is available and does not constrain capacity growth.
- 5. The FAA should take the lead within the US in a worldwide effort to establish the next generation global standard voice and data link communications system.
- 6. Prior to a final decision, the NARC should be reconvened to evaluate its recommendations based on any newly acquired data resulting from participation in validation efforts such as the VDL Mode 3 demonstration/validation and CPDLC Build 1 and Build 1A.

III. Rationale

Recommendation 1:

Continue to aggressively manage frequency assignments to prolong the useful life of the 25 kHz channel allocation in support of Air Traffic Services (ATS). Conduct an annual assessment to confirm that there will be an adequate number of 25 kHz communications frequencies to meet future capacity needs. This assessment should have at least a 5 year outlook to provide adequate warning of 25 kHz frequency spacing depletion.

Rationale:

It has been established and generally accepted by the aviation community that the VHF aeronautical spectrum for air/ground communications is reaching a point whereby it will be difficult and costly to find new VHF channels to satisfy the anticipated capacity needs. We concur that in addition to this impending spectrum depletion for critical ATC and FIS communications, the Federal Aviation Administration (FAA) is also facing an aging air/ground (A/G) communications infrastructure. In this light, we understand that in response to the spectrum need, the FAA has been working within RTCA and ICAO's AMCP to develop VHF A/G communication system improvements alternatives and is in the process of procuring its Next Generation Air/Ground Communications (NEXCOM) system to ensure that future aviation needs are met.

The possibility that VHF spectrum depletion would impede industry growth and preclude the provision of additional services, represents a dominant driving factor for the need to implement new ways to increase the channel capacity of the system. The transition to a new system, from the spectrum management viewpoint, is in itself challenging and would require a long time to accomplish. In addition, it requires a sensible use of the remaining scarce resource and a constant search for opportunities to increase spectrum use efficiency.

The information presented by spectrum experts has convinced this Committee that, although the VHF spectrum depletion is looming in the horizon, there is adequate time (approximately 10 years given estimated supply and demand projections), within which the alternatives under consideration can be implemented with sufficient notice for appropriate aircraft equipage. In this regard, the initiatives by the Spectrum and Air Traffic offices to extend the life of the current VHF system are welcome and need to be continued.

Notwithstanding the above, it is imperative that the FAA and the aviation community remain vigilant as to the spectrum demand and supply changes and trends occurring from year to year. This is of particular relevance when emerging operational capabilities are introduced into the NAS. We believe that the measures contained in the recommendation, provides the mechanisms and transparency to alleviate the industry concerns about the spectrum depletion and its impact on the industry growth.

Recommendation 2:

Continue to support VDL Mode 2 for data link communications and support its continued evolution to meet the needs of future ATS data link requirements as they develop until and unless it can no longer meet those requirements.

Rationale:

The NARC examined current and emerging concepts for aeronautical communications, and concluded that, at least until significant experience with the use of data link communications is gained, voice communications will continue to be the preferred means of real time communications between the air traffic control system and pilots operating aircraft.

This committee also concluded that, due of the anticipated emergence of aeronautical data links (beginning with CPDLC over VDL-2) air traffic control operations within the NAS will undergo a paradigm shift, as routine information exchanged between air traffic controllers and pilots is delivered using aeronautical data links instead of through voice communications.

Attempts were made to quantify ATC benefits arising from the use of data link, extrapolating results from previous data link studies (i.e. an evaluation in the Atlanta Center en route environment; and an evaluation in the Newark terminal environment). However, the determination of whether the benefits derived from this extrapolation can be achieved was found to depend on the characteristics of the underlying data link technologies employed. It was also concluded that the present value of the benefit depends greatly on how early the capability could be fully integrated into the NAS. Neither the requirements of the underlying data link technology, nor the determination of the timing of capabilities into the NAS could be confidently evaluated by this committee at this time.

Given that VDL Mode 2 is currently being developed to support the needs of AOC data link, it is the recommendation of this Committee, that VDL Mode 2 also be used to the greatest extent possible, to support ATS data link. Moreover, the experience gained through the operational use of data link communications for ATC should be used to evaluate the characteristics required of the underlying data link communications, and to allow evaluations on when these applications and capabilities could be fully integrated into the NAS with a high degree of confidence. Experience in the use of VDL Mode 2 system will undoubtedly evolve and may or may not meet the full operational data link requirements.

Recommendation 3:

Expedite the demonstration/validation of the VDL Mode 3 system to include both voice and data link. The demonstration/validation must have industry participation, clearly defined success criteria, and must meet all FAA certification criteria for the end-to-end system. VDL Mode 3 should only be pursued if indicated by the results of the efforts described in recommendation five below. There must be no dilution of, or loss of impetus to the aggressive development, evolution and fielding of VDL Mode 2 data link.

Rationale:

The committee recognized and considered the identified uncertainties associated with the implementation of a NAS wide VDL-3 voice and data network:

- Can affordable certified avionics be developed, in a timely manner?
- How will the VDL-3 voice features be integrated and utilized in the NAS?
- Will VDL-3 data link be required to support ATC requirements beyond the capabilities assumed by VDL-2?
- Can the ground system for VDL-3 (voice and data) be developed and deployed in a timely manner?
- Will there be continued international support for the VDL-3 communications standard?

The NARC considered the FAA's plans to conduct operational VDL 3 system demonstrations to mitigate these uncertainties, and adopted the approach. The NARC considers these demonstrations critical to the validation of the VDL-3 concepts in an operational environment, and to the advancement of rulemaking for the VDL-3 standard.

The NARC believes that in the time frame in which VDL-3 system demonstrations are conducted, the aviation industry will have had additional experience with aeronautical data link (with VDL-2 as well as FANS systems) and will have a deeper understanding on what attributes need to be provided for an ATC data link. These will provide a baseline upon which to measure VDL-3 data link performance, and further international interest. The industry will also have a much better conception of the cost to develop and certify avionics for VDL-3. FAA will also have a firmer basis for ground system cost and schedule estimates.

Recommendation 4:

Develop a detailed plan for implementing an 8.33 kHz spacing, analog voice system. If the VDL Mode 3 demonstration/validation cannot be successfully accomplished as defined in 3 above, then the plan should be implemented in time to ensure the 8.33 kHz system is in place prior to 25kHz channel allocation depletion. The FAA must determine the date that allows for rulemaking action, aircraft equipage, and implementation of the ground system in sufficient time to ensure that voice frequency spectrum is available and does not constrain capacity growth.

Rationale:

The NARC recognizes the importance of air/ground voice communications in the NAS, and also recognizes the need to allow sufficient time for airspace users to prepare and provision its aircraft for any new communications equipment if and when it is determined to be required. The lead-time to develop, test and install a new communications system is long, and decisions must have the full support of the entire aviation community. The committee considers that aviation users, along with the FAA must continue its collaboration, to ensure that we all stay in harmony with current and future A/G communication needs of both the FAA and the NAS users.

In order to mitigate the risk of constraining the growth of air traffic and resultant loss of airline business opportunities, due to unanticipated spectrum shortages, or unforeseen difficulties implementing VDL-3 in the operational environment, this committee recommends that the FAA develop a plan for implementing 8.33 kHz channel spacing in the NAS. We also recommend that industry work with the FAA in supporting development of a reasonable rulemaking timeline which recognizes and supports both government and industry business realities.

In this business environment, it is essential that all parties move forward together with such a major undertaking. Although the FAA has an approved acquisition strategy, the agency cannot proceed with a new communications system without the commitment of the aviation community to equip aircraft with compatible avionics in a timely manner. Similarly, the aviation community will not proceed to equip aircraft with new avionics without the government's commitment to prevent unnecessary operational restrictions due to shortages in communications capabilities.

This plan should address the Summary of Concerns contained in a report produced by the 7th Meeting of the Aeronautical Mobile Communications Panel (AMCP) which had been raised in relation with 8.33 kHz.

Recommendation 5:

The FAA should take the lead within the US in a worldwide effort to establish the next generation global standard voice and data link communications system.

Rationale:

The NARC recognizes the FAA leadership and supports its previous industry efforts with the ICAO Aeronautical Mobile Communications Panel and RTCA, to explore, develop, and establish worldwide standards for air traffic control communications systems.

A desire of the members of this Committee, is to avoid the proliferation of incompatible communications standards emerging in the US and Europe, to solve similar ATC problems. Mobile communications technology is advancing worldwide, bringing promise of higher speeds, more capability, seamless operation anywhere in the world, and with lower costs. An ideal resolution, would be a communications system that fully addresses all future communication needs, including the needs of Air Traffic Services, airline, business, and private pilot operations, passenger communications, and other aviation related information needs, that will operate anywhere in the world.

However, realizing that there are real near term issues for the aviation industry to solve, this Committee recommends that the FAA ensure worldwide interoperability, which will allow aircrews to communicate with air traffic services throughout the world without requiring aircraft to carry multiple types of equipment.

Recommendation 6:

Prior to a final decision, the NARC should be reconvened to evaluate its recommendations based on any newly acquired data resulting from participation in validation efforts such as the VDL Mode 3 demonstration/validation and CPDLC Build 1 and Build 1A.

Rationale:

This committee thanks the FAA Administrator, Ms. Garvey, for being given the opportunity to explore the difficult and challenging technology issues faced by the aviation industry, as it moves into the 21st century. We would also like to express appreciation to the C/AFT, and its members and participants for working so diligently to sort through the issues and help identify and clarify the technical and cost drivers for the NARC.

We hope that we have been able to adequately address the questions put forth, and offer our continued support to re-evaluate our recommendations in light of any new information when it becomes available, and is thought to be appropriate.

Appendix A: Participating Individuals

Name		Org/Pos	
A 1	0 1		
Anderson	Sandra	FAA	
Bailey	Geofrey	EuroControl	
Ballard	David	GRA	
Bell	Carol	FAA	
Blackwell	Brent	AA	
Bolen	Ed	GAMA	
Bondareff	Joan	FAA	
Broom	Andrew	GAMA	
Brown	Steve	FAA	
Chadwick	Jim	MITRE	
Chew	Russ	AA	
Cole	Martin	NATCA/AOZ	
Crook	Jim	ATCA	
Cuadrado	Angel	FAA	
del Cid	Lisandro	MITRE/CAASD	
Eberlin	Harry	ATP-410	
Eck	Jim	FAA	
Eckstein	Bruce	FAA	
Fasio	Tony	FAA	
Foose	Scott	RAA	
Fuschino	Robert	United	
Gleason	Brian	SW	
Glickman	Steve	Boeing	
Gonda	John	DOD/USAF	
Griffith	Jeff	FAA	
Harper	Pat	Boeing	
Harras	Edgar	FAA	
Hayes	Hezekiah	IG DOT	
Hawthorne	Mike	FAA	
Нерре	Steve	ADSI	
Ingargiola	Brandy	FAA	
Jones	Clarence	FAA	
Jehlen	Richard	FAA	
Jones	Dave	United	
Jones	Susan	TRIOS	
Kaulia	Sabra	FAA	
Kern	John	Chairman	
Kenagy	Randy	AOPA	
Lamiano	Dean	MITRE/CAASD	
Lamond	Bob	NBAA Alt	
MacWilliams	Kara	MITRE/CAASD	
Martin	Ruth	NATCA	
McCluskev	Scott	FAA	
	20000		

NARC Attendees

McCullough	Carl	FAA
Morser	Fred	MITRE/CAASD
Muckle	Archie	FAA
Nair	Prasad	ADSI
Nordlie	Cindy	FAA
O'Brien	John	ALPA
Overby	Alan, Col.	DOD/ARS-F
Payne	Richard	DOT/IG
Pearsall	Terry	AEA
Pendleton	Jon	NWA
Perie	Michael	ATCA
Petruzel	Bill	FAA
Pirotte	Kathleen	Boeing
Planzer	Neil	DoD-PBFA
Politano	Arturo	FAA
Roberts	Dennis	AOPA
Rodgers	John	FAA
Rogers	Wayne	FAA ARN-2
Sakai	George	FAA
Salvano	Dan	FAA
Sears	Bill	ATA
Siebenthal	Bruce	FAA
Sinnott	Joseph	MITRE/CAASD
Smith	Tom	FAA
Solmonson	Perry	Horizon Air
Stine	Bill	NBAA
Streeter	Don	FAA
Swanda	Ron	GAMA
Thornton	Gail	FAA
Turner	Vaughn	FAA
Wade	Matt	AVR/AIR
Walton	Madison	ALPA
Wargo	Chris	CNS
White	Ben	Secretary
Williams	Jim	FAA
Willis	Don	FAA
Wong	Alice	FAA ARS

Appendix B.: Charter and Invite Letter

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SUBJ: NEXCOM Aviation Rulemaking Committee

1. PURPOSE. This order constitutes the charter for the NEXCOM Aviation Rulemaking Committee tat is designated and established pursuant to the Administrator's authority under 49 Usc 106&)(5).

2. DISTRIBUTION. This order is distributed at the director level in Washington headquarters and throughout the Office of the Associate Administrator for Regulation and Certification (the Associate Administrator).

3. BACKGROUND. FAA will modernize and upgrade its existing communications infrastructure in this decade to meet a variety of ATC and airspace user needs including: VHF spectrum depletion, reduced logistics costs, increased voice channel security and control, and the provision of infrastructure for data communications. Regardless of technology choice, this FAA action will beget an in-kind level of investment for all airspace users, and concerns within the aviation community have been raised over the rulemaking associated with such a decision. The present FAA NEXCOM acquisition program will convert the en-route air/ground communications system from analog to digital radio communications by 2009, and extend to the terminal airspace thereafter, dictated by spectrum needs. A new special committee under the auspices of the RTCA will address the NEXCOM Principles of Use, System Transition Plans and System Demonstration/Validation Plans in parallel with this committee. The RTCA committee will continue the work on planning the VDL-3 solution and is required in order to keep the VDL-3 acquisition on schedule.

4. OBJECTIVES AND SCOPE. The Administrator has determined that a government/industry forum is needed to develop the combined ground and airborne system investment and cast/benefit analyses. 'These analyses will be needed to support decision making to upgrade the communications system and to support potential rulemaking. The committee will also prepare recommendations on the appropriate regulatory path for any such system.

5. DUTIES. Predicated on present airspace transition plans for NEXCOM, the committee will:

Develop the combined cost/benefits analysis, considering both airspace user equipage and the FAA ground implementation, of two alternative choices for FAA rulemaking:

- (1) VHF Digital Link Mode 3 voice/data communications
- (2) 8.33 kHz analog voice system and VHF Digital Link Mode 2

Recommend appropriate rulemaking activity consistent with the analysis and with the program implementation timeline, to include: system demonstration/validation, key site, en-route and terminal airspace implementation.

6. ORGANIZATION AND ADMINISTRATION.

a. The Associate Administrator is the sponsor of the NEXCOM Aviation Rulemaking Committee. The Associate Administrator shall also be responsible for providing administrative support for the committee.

b. The Associate Administrator shall have the sole discretion to appoint members to the committee and designate the Chair of the committee. The committee shall consist of employees of major airlines, regional airlines, ALPA, AOPA, NBAA, DoD, FAA, AEA, GAMA, PASS, NATCA, MITRE, and such other individuals as the Associate

Administrator may deem appropriate.

c. Once designated, the Chair:

(1) Determines, in coordination with the other members of the committee, when a meeting is required and where it will be held.

(2) Arranges notification to all committee members of the time and place for any meeting.

(3) Formulates an agenda for each meeting and conducts the meeting.

(4) Develops clear roles and responsibilities to distinguish differences between this committee and the RTCA committee.

d. The committee is not required to keep *minutes, but may elect to do so.*

7. COMPENSATION. Non - Government representatives serve without Government compensation and bear all costs related to their participation on the committee.

8. ESTIMATED COST. The committee will be supported by 4 staff years of technical, economic and administrative support funded by the product team.

9. PUBLIC PARTICIPATION. Unless otherwise decided by the Associate Administrator, all meetings of the committee shall be closed. Interested persons wishing to attend a meeting who are not members of the committee must request and receive approval in advance of the meeting from the Associate Administrator.

10. AVAILABILITY OF RECORDS. Subject to the conditions of the Freedom of Information Act, 5 U.S. C. Section 522, records, report, agendas, working papers, and other documents that are made available to or prepared for or by the committee shall be available for public inspection and copying at the FAA Office of Rulemaking, 800 Independence Avenue, SW., Washington, D.C. 20591. Fees shall be charged for information furnished to the public in accordance with the fee schedule published in part 7 of title 49, Code of Federal Regulations.

10. PUBLIC INTEREST. The formation of the NEXCOM Aviation Rulemaking Committee *is* determined to be in the public interest in connection with the performance of duties imposed on FAA by law. 12. EFFECTIVE DATE AND DURATION. This committee is effective on December 6, 2000. The committee shall remain in existence until April 30, 2001, unless sooner terminated or extended by the Administrator.

run Jane F. Garvey Administrator

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U.S. Department of Transportation Federal Aviation Administration 800 Independence Ave., S.W Washington, D.C. 20591

DEC 2 0 2000

Mr. John Kern Chair, NEXCOM Aviation Rulemaking Committee 1511 N. 22nd Street Arlington, VA 22209

Dear Mr. Kern,

Thank you for your willingness to serve as Chair of the NEXCOM Aviation Rulemaking Committee. Your appointment is effective immediately. I am attaching for your use the tasking statement outlining the work expected of the Committee, a list of Committee members, and a copy of the Committee's charter that was signed by Administrator Garvey on December 6.

Presiding over this Committee presents an enormous challenge. Transitioning to the next generation communication infrastructure will need the cooperation and input of all ATC and airspace users. We have carefully selected Committee members to reflect the broad interests of the aviation community. Your ability to forge a consensus within the Committee will help ensure safe and efficient air transportation well into the future. Only an individual with your extensive experience can recognize the importance of the work assigned and its significance to the aviation system.

We see the NEXCOM Aviation Rulemaking Committee as an innovative approach to rulemaking. One that affords the regulated community an opportunity to provide advice and recommendations on regulations that affect the aviation industry. The FAA looks forward to aiding you in any way necessary to help carry out this objective.

Sincerely,

Thomas E. McSweeny

Thomas E. McSweeny Associate Administrator for Regulation and Certification

Background

FAA will modernize and upgrade its existing communications infrastructure to meet a variety of Air Traffic Control and airspace user needs. This modernization effort will consider VHF spectrum depletion, logistics costs, increased voice channel security and control and data communication infrastructure. The present FAA NEXCOM acquisition program will convert the enroute air/ground communications system from analog to digital radio by 2009 and extend to the terminal airspace as spectrum needs require.

A new special committee under the auspices of the RTCA will address the N7EXCOM principles of use, system transition plans and system demonstration/validation plans in parallel with NEXCOM Aviation Rulemaking Committee. In parallel, the RTCA committee will continue its work on planning for VDL-3 to ensure acquisition schedules for VDL-3.

The NEXCOM Aviation Rulemaking Committee is chartered pursuant to the Administrator's authority under 49 USC 106(p)(5), and there is no conflict with any other established committee, including RTCA.

Tasking Statement

The committee will prepare a report outlining the cost and benefits for the next generation communications infrastructure. The report should specifically address the following elements:

1. Review previous work on costs, benefits and transition assumptions for FAA and industry voice and data link investment decisions (i.e. NEXCOM JRC, Aeronautical Data Link JRC, VDL-2 business case).

2. Develop aggregate cost estimates for alternative solutions to voice and data link service provision. At a minimum, this will include:

a) 8.33 kHz analog communication for voice and VDL-2 for data link b) VDL-3 for voice and data link

Cost estimates are to be provided for all classes of airborne users, as well as the ground system implementation and continued operational maintenance for each system.

3. Develop aggregate benefits for each alternative identified above to each class of users

4. Identify timeline issues associated with costs, benefits and ROI's for each

alternative and user.

5. Recommend appropriate action consistent with the above analysis and with the program implementation timeline for enroute and terminal airspace.

Should the committee be unable to reach consensus, it will document the

respective majority and minority opinions along with supporting rationale.

Schedule: The report will be submitted to the FAA by April 30. 2001.

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JUL 2 5 2001

Mr. John Kern Chair, NEXCOM Aviation Rulemaking Committee 1511 N. 22nd Street Arlington, VA 22209

Dear John:

Thank you for transmitting the NEXCOM Aviation Rulemaking Committee's (NARC's) final recommendations to me by letter dated May 22. The FAA accepts the recommendations and has developed implementation actions in accordance with the recommendations.

I appreciate the NARC's careful deliberation of the issues and consensus on the recommendations. Transitioning to the next generation communication infrastructure will help ensure safe and efficient air transportation well into the future.

Sincerely,

Original Signed By

Thomas E. McSweeny Associate Administrator for Regulation and Certification

cc: NARC members

ARM-108:cbnordlie x77627:Docs#15920 ARM-1/100/108;AVR-1 SUBJ: Extension of NEXCOM Aviation Rulemaking Committee

1. **PURPOSE.** This order extends the NEXCOM Aviation Rulemaking Committee that was designated and established pursuant to the Administrator's authority under 49 USC 106(p)(5).

2. DISTRIBUTION. This order is distributed at the director level in Washington headquarters and throughout the Office of the Associate Administrator for Regulation and Certification (the Associate Administrator).

3. BACKGROUND. By order dated December 6, 2000, the Administrator created the NEXCOM Aviation Rulemaking Committee to develop the combined cost/benefits analysis, considering both airspace user equipage and the FAA ground implementation, of two alternative choices for FAA rulemaking:

(1) VHF Digital Link Mode 3 voice/data communications

(2) 8.33 kHz analog voice system and VHF Digital Link Mode 2

In addition, the NEXCOM Aviation Rulemaking Committee was to recommend appropriate rulemaking activity consistent with the analysis and with the program implementation timeline, to include: system demonstration/validation, key site, en-route and terminal airspace implementation.

After completing its task by April 30, 2001, the NEXCOM Aviation Rulemaking Committee presented the FAA with its recommendations. The recommendations included that FAA should:

- Continue to aggressively manage frequency assignments to prolong the useful life of the 25 kHz channel allocation in support of Air Traffic Services (ATS). Conduct an annual assessment to confirm that there will be an adequate number of 25 kHz communications frequencies to meet future capacity needs. This assessment should have at least a 5 year outlook to provide adequate warning of 25 kHz frequency spectrum depletion.
- Continue to support VDL Mode 2 for data link communications and support its continued evolution to meet the needs of future Air Traffic Service data link requirements as they develop until and unless it can no longer meet those requirements.
- Expedite the demonstration/validation of the VDL Mode 3 system to include both voice and data link. The demonstration/validation must have industry participation, clearly defined success criteria, and must meet all FAA certification criteria for the end-to-end system. VDL Mode 3 should only be pursued if indicated by the results of the efforts of the FAA worldwide efforts to establish an acceptable global data link standard.
- Develop a detailed plan for implementing an 8.33 kHz spacing analog voice system. If the VDL Mode 3 demonstration/validation cannot be successfully accomplished, then the plan should be implemented in time to ensure the 8.33 kHz system is in place prior to 25kHz channel allocation depletion. Specifics on rulemaking recommendations will be included in the formal report. The FAA must determine the date that allows for rulemaking action (which is assumed to be less than two years), aircraft equipage (4 years), and implementation of the ground system

in sufficient time to ensure that voice frequency spectrum is available and does not constrain capacity growth.

• Take the positive steps now to lead from within the US in a worldwide effort to establish a global standard voice and data link communications system.

In accordance with paragraph 12 of the December 6, 2000, Order, the Administrator hereby extends the duration of the NEXCOM Aviation Rulemaking Committee to allow:

- Minor clarification and editorial changes from the NEXCOM Aviation Rulemaking Committee
 on its recommendations; and
- Additional work from the NEXCOM Aviation Rulemaking Committee to organize the supporting data for its recommendations.

4. DUTIES. The Chairman of the NEXCOM Aviation Rulemaking Committee is authorized to reconvene the NEXCOM Aviation Rulemaking Committee to enable clarification and editorial changes on its recommendations and additional work to organize the supporting data for its recommendations.

5. PUBLIC INTEREST. The extension of the NEXCOM Aviation Rulemaking Committee is determined to be in the public interest in connection with the performance of duties imposed on FAA by law.

6. EFFECTIVE DATE AND DURATION. This extension is effective May 1, 2001. The NEXCOM Aviation Rulemaking Committee shall remain in existence until September 30, 2001, unless terminated or extended by the Administrator.

Jane F. Garvey Administrator

Memo For Record: As of March 5, 2003. Contains the administrative/editorial changes received from various FAA offices when submitted for preliminary concurrence in Jan 03. Preliminary concurrence from AND-1, ATA-1, ATP-1, AGC-1, APO-1, AIR-1, ARM-1 and AFS was received (see ARM files) in Feb 03; however, Rulemaking suspended on 2/26/03 until further notice per direction by ARA-1 and other senior officials. Intent is for this version to be the starting point when agency rulemaking activity resumes. Barbara Cassidy, AND-360. [4910-13] DEPARTMENT OF TRANSPORTATION Federal Aviation Administration 14 CFR Parts 91, 99, 121, 125, 129, and 135

[Docket No. FAA-XXXX-XXXX, Notice No. XX-XX]

[RIN 2120-]

Implementation of the Next Generation Air/Ground Communications (NEXCOM)
Program

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed policy decision and request for comments.

SUMMARY: The FAA proposes to implement a VHF digital air/ground communication system for use by pilots and air traffic controllers in aviation operations. Due to the inherent limits of the current analog air/ground communication system, the FAA predicts that the current VHF system will be capable of serving growth in aviation demands only to the year 2010. The new

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VHF digital system would ensure necessary spectrum capacity for air traffic control, while enhancing air/ground communications through new data link capability and new safety features. Implementation of the new digital system would require users to implement a compatible digital voice communication system in the cockpit.

DATES: Send yourcomments on or before [INSERT DATE 120 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Address your comments to the Docket Management System, U.S. Department of Transportation, Room Plaza 401, 400 Seventh Street, SW., Washington, DC 20590-0001. You must identify the docket number FAA-200Y-XXXXX at the beginning of your comments, and you should submit two copies of your comments. If you wish to receive confirmation that the FAA received your comments, include a self-addressed, stamped postcard. You may also submit comments through the Internet to http://dms.dot.gov/.

You may review the public docket containing comments to these proposed regulations in person in the Dockets Office between 9:00 a.m. and 5:00 p.m., Monday through Friday, except Federal holidays. The Dockets Office is on the plaza level of the Nassif Building at the Department of Transportation at the above address. Also, you may review public dockets on the Internet at http://dms.dot.gov.

FOR FURTHER INFORMATION CONTACT: William Adams, Flight Technology and Procedures Division, Flight Standards Service (AFS-430), Federal Aviation Administration,800 Independence Avenue, SW., Washington, DC 20591, telephone (202) 385-4609, email: <u>William.Adams@faa.gov</u>. (Note from Barbara Cassidy: change to an office box vice person, i.e. <u>NEXCOM.NPRM@faa.gov</u> after coordination with Help Desk to establish account, when

NEXCOM

nearing NPRM publication approval)

SUPPLEMENTARY INFORMATION:

Comments Invited

The FAA invites interested persons to participate in this rulemaking by submitting written comments, data, or views. We also invite comments relating to the economic, environmental, energy, or federalism impacts that might result from adopting the proposals in this document. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. We ask that you send us two copies of written comments.

We will file in the docket all comments we receive, as well as a report summarizing each substantive public contact with FAA personnel concerning this proposed rulemaking. The docket is available for public inspection before and after the comment closing date. If you wish to review the docket in person, go to the address in the **ADDRESSES** section of this preamble between 9:00 a.m. and 5:00 p.m., Monday through Friday, except Federal holidays. You may also review the docket using the Internet at the web address in the **ADDRESSES** section.

Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act statement in the <u>Federal Register</u> (65 FR 19477, April 11, 2000) or online at http://dms.dot.gov.

Before acting on this proposal, we will consider all comments we receive on or before the closing date for comments. We will consider comments filed late if it is possible to do so

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without incurring expense or delay. We may change this proposal in light of comments we receive.

If you want the FAA to acknowledge receipt of your comments on this proposal, include with your comments a pre-addressed, stamped postcard on which the docket number appears. We will stamp a date on the postcard and mail it to you.

Availability of Rulemaking Documents

You can get an electronic copy using the Internet through any of the following:

(1) Searching the Department of Transportation's electronic Docket Management

System (DMS) web page (http://dms.dot.gov/search).

(2) Visiting the Office of Rulemaking's web page at

http://www.faa.gov/avr/arm/index.cfm.

(3) Accessing the <u>Federal Register's</u> web page at

http://www.access.gpo.gov/su_docs/aces/aces140.html.

You can also get a copy by submitting a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue SW., Washington, DC 20591, or by calling (202) 267-9680. Make sure to identify the amendment number or docket number of this rulemaking.

Public Meeting

The FAA plans to hold a public meeting on this issue during the comment period for the NPRM. The FAA will publish a separate notice in the Federal Register with specifics about the meeting.

ACARS	Aircraft Communications Addressing and Reporting System		
AOC	Airline Operation Control		
ATC	Air Traffic Control		
ATN	Aeronautical Telecommunications Network		
ATS	Air Traffic Services		
CPDLC	Controller-Pilot Data Link Communications		
DoD	Department of Defense		
FL	Flight Level		
ICAO	International Civil Aviation Organization		
kHz	KiloHertz		
MDR	Multimode Digital Radio		
MHz	MegaHertz		
NARC	NEXCOM Aviation Rulemaking Committee		
NAS	U.S. National Airspace System		
NEXCOM	Next Generation Air/Ground Communications		
RF	Radio Frequency		
SARPs	Standards and Recommended Practices		
TDMA	Time Division Multiple Access		
UHF	Ultra High Frequency		

VDL	VHF Digital Link	
VHF	Very High Frequency	

Overview of Notice of Proposed Policy Decision

This proposal would not change current regulatory language pertaining to radio communication requirements in 14 CFR §§ 91.126, 91.127, 91.129, 91.130, 91.131, 91.135, 91.183, 91.205, 91.711, 99.9, 121.345-121.351, 125.203, 129.17, 135.161, and 135.165. The current language in the above-cited regulations requires that aircraft be equipped with two-way radios capable of communicating with air traffic control (ATC). However, these regulations do not provide specifics with respect to the type of radios required for communicating with ATC. Historically, the types of radios needed for communicating with ATC have been addressed in agency policy decisions and announced in the Federal Register. For example, see the Federal Register entry of February 9, 1972 "Air Traffic Control Radio Frequency Assignment: Proposed Integration of 25 kHz Spaced VHF Communications Channels Into National Airspace System; Notice of Invitation for Comments" (37 FR 2900, February 9, 1972)and final "Notice of Policy Decision: Air Traffic Control Radio Frequency Assignment; Proposed Integration of 25 kHz Spaced VHF Communication Channels into the National Airspace System" (38 FR 14784, June 5, 1973).

While a change in a policy decision may not directly affect the regulatory language, it does affect the nature of compliance with the existing language. The policy decision proposed herein would require a change in the type of radios needed to communicate with ATC from analog voice capability radios to digital voice capability radios. Because the effect of this

proposed policy decision is changing the method of complying with the above-identified regulations, the FAA is following the notice and comment rulemaking procedures required in the Administrative Procedure Act for Federal agency rulemaking. In addition, the FAA has prepared an initial Regulatory Evaluation that discusses the costs and benefits of the proposed policy decision.

Background

The Current Air/Ground Communications System

The FAA uses two-way analog VHF radios in the 117.975 – 137.0 MHz band to provide air/ground voice communications for pilots and air traffic controllers to safely coordinate all flight operations in the National Airspace System (NAS). These types of communications include coordinating ground movements of aircraft at airports, aircraft take-off and landing clearances, and separation distances between aircraft cruising at high altitudes. Each air traffic controller is responsible for monitoring and directing traffic in a particular volume of airspace called a sector (in the enroute environment) or a position (in the terminal environment). Each sector or position requires a separate channel assignment for controllers to communicate with aircraft in that airspace volume.

Within the 117.975-137.0 MHz band, the FAA has 524 channels available for air traffic services. These 524 channels can be used multiple times throughout the country as long as the separate circuits using the channel have enough geographic separation to prevent harmful frequency interference. Channel reuse results in about 12,000 channel assignments throughout the nation. Channels are defined in 25 kHz increments. Because the FAA's current

communication system does not provide the capability for data link communications, the FAA utilizes ARINC's Aircraft Communications Addressing and Reporting System (ACARS) to provide data link communications that are not time critical, such as pre-departure clearances to pilots. (Data link is discussed further in the Discussion of Proposed Policy Decision section below.)

FAA regulations governing air/ground communication equipment requirements are found in 14 CFR parts 91, 99, 121, 125, 129, and 135. For most operations where a communications requirement is specified, the FAA requires that each aircraft must be equipped with a two-way radio capable of communicating with the appropriate ATC facility on a frequency assigned by ATC. The regulatory language is general and does not require specifically identified equipment. For example, § 91.135(b), Operations in Class A airspace, simply states: "Unless otherwise authorized by ATC, each aircraft operating in Class A airspace must be equipped with a two-way radio capable of communicating with ATC on a frequency assigned by ATC. Each pilot must maintain two-way radio communications with ATC while operating in Class A airspace." Sections 91.126-91.131 contain similar language for other classes of airspace. (Also see §§ 91.183, 91.205, 91.711, 99.9, 121.345-121.351, 125.203, 129.17, 135.161, and 135.165.)

NAS Analog VHF System Limitations and Solutions

There are three general limitations of the existing NAS analog VHF system: (1) lack of sufficient spectrum for future radio communication channel needs (referred to as spectrum depletion), (2) blocking of air traffic control communications, and (3) lack of sufficient and suitable data link capability for all air traffic needs.

<u>Spectrum Depletion</u>. Spectrum depletion means there will not be enough frequencies available in the 117.975-137.0 MHz band to meet air traffic control needs. The FAA projects that the current VHF spectrum will meet overall NAS needs until 2010 (see <u>Radio Spectrum Plan</u> 2001-2010 (2002 Revision), http://www1.faa.gov/ats/aaf/asr/library/docs/RSP-2002.pdf).

The NAS has been operating at near-capacity levels for several years. There are a number of programs in place, such as those outlined in the FAA's <u>Operational Evolution Plan</u> (http://www1.faa.gov/programs/oep/), that are designed to address different aspects of the very complex problem of ensuring sufficient NAS capacity for future needs. Growth in air traffic will require the addition of ATC sectors, with associated frequency requirements. The FAA's most recent study on the need for more channel assignments for voice communications, FAA's <u>Radio</u> <u>Spectrum Plan for 2001-2010 (2002 Revision)</u>, found that the need for channel assignments has grown, on average, by over 300 new circuits a year since 1974.

This growth generally mirrors the increase in domestic air travel during the same time. Despite the recent decrease in the growth rate of air travel caused by the terrorist attacks on September 11, 2001, and the economic recession, the FAA expects that growth rate will return to more normal levels by 2004 (FAA Aerospace Forecasts Fiscal Years 2002-2013 (March 2002), http://api.hq.faa.gov/clientfiles/INTRODUCTION.htm). If the FAA does not take steps to expand capacity, delays and re-routings will increase and could affect air transport's ability to meet demand. The need for additional ATC sectors, and the corresponding need for frequencies for these sectors, must be addressed along with other capacity-enhancing efforts.

The consequences of spectrum depletion are both an increase in aviation delays, and eventually, a limiting factor to the growth of flight operations. An air traffic controller can only manage a limited number of aircraft safely and effectively at one time. For the NAS to handle significantly more aircraft would require, among other initiatives, the establishment of additional sectors. Until additional frequency assignment capacity to support new sectors is available, the congestion caused by delayed aircraft will have a domino effect throughout the NAS. Any attempts to increase operations under such circumstances would result in unacceptable delays and system disruption. Such delays could eventually result in air carriers curtailing growth of their operations in order to maintain service quality. Also general aviation would face more limited airspace access. The nation's air transport system would become less flexible and more expensive, and low cost travel could be expected to become less available in many locations.

The FAA believes spectrum depletion would cost airlines potential revenue that would have accompanied the increase in demand for flights. Thus, spectrum depletion without mitigation would seriously limit air transportation growth, which in turn would have serious economic repercussions throughout the country.

Due to the many competing demands by various economic sectors for scarce speetrum resources, the FAA believes solutions to spectrum depletion should focus on making better use of the existing air traffic allocation, rather than attempting to acquire additional spectrum allocation for air traffic communications. One possibility is the subdivision of current 25 kHz channel spacing, which would be consistent with previous FAA solutions to spectrum depletion. Originally, frequencies used for ATC communication were spaced 100 kHz apart. This was subsequently divided to 50 kHz separation and then, in the 1970s, divided again to reach the current separation of 25 kHz. Further subdivision to 8.33 kHz channel spacing theoretically would allow up to three times the number of voice channels in the same spectrum allocation.

In 1999, Europe subdivided its 25 kHz channel separation to 8.33 kHz as an immediate solution to its pressing spectrum depletion problems. Subdivision to 8.33 kHz channelization would create additional voice channel capacity in the allocated spectrum. However, the smaller bandwidth would result in extremely low data rates that are insufficient for all air traffic data link needs.

Another possible solution to spectrum depletion is a digital solution that allows multiple, non-interfering user groups on the same frequency. In the current analog system, each frequency equates to one channel of information flow. A digital system allows a single frequency to be divided into several non-interfering communications channels. The VHF Digital Mode 3 (VDL-3) system the FAA proposes to implement maintains the present 25 kHz channel separation, but divides a single frequency into four non-interfering channels. This can yield up to a fourfold increase in channel capacity in the allocated spectrum that would be suitable for voice and/or data needs.

<u>Blocking Of Air Traffic Control Communications</u>. A common occurrence in the air traffic environment is for communications between pilots, or between air traffic controllers and pilots, to be disrupted or prevented due to blocking. Typically there are two types of blocking. One type is referred to as a "stepped-on" transmission and takes place when a pilot is prevented from completing a transmission because a second pilot starts a transmission, usually because the second pilot is not aware of the transmission already in progress. Another type of blocking occurs when a pilot transmission in progress actually prevents an air traffic controller from transmitting critical information, either to that pilot or to another pilot. The current analog system technology does not give the air traffic controller priority for transmitting on the control

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frequency. Only good communications discipline by all users (limiting frequency use to only the most necessary and concise transmissions) currently permits the controller any degree of assured access. Blocked communications are at a minimum an inconvenience and often result in repeated transmissions and requests from pilots or controllers to "say again." At worst, blocked communications can be a contributing factor in accidents or incidents.

There are solutions to both types of blocking problems described above. Anti-blocking technology in the airborne radio can mitigate the problem of stepped-on transmissions by preventing a second pilot from transmitting while another transmission is in progress. Controller override capability is the solution to the air traffic controllers' need for priority transmission access in safety-related situations to provide critical separation information or other emergency instructions. Providing controllers with priority access to communications through the ability to override transmissions for safety/separation situations would be a highly desirable safety enhancement that would benefit all NAS users. A controller override capability would also serve to resolve the common problem of an aircraft stuck microphone ("stuck mike"). A "stuck mike" occurs when a pilot blocks the channel for all other users through an inadvertent keying of the microphone for an indeterminate period. VDL-3 digital technology includes both anti-blocking and controller override capabilities. Anti-blocking technology is available for current analog avionics but would require a retrofit system-wide. Controller override is not an analog capability.

Lack of sufficient and suitable data link capability for all air traffic control needs. The FAA's current analog VHF system provides voice-only capability. The FAA is committed to the continued and broadened use of data link in the NAS as a key enabler of improved system

efficiency and system capacity expansion. In 1995, the International Civil Aviation Organization (ICAO) recognized the increased role of data link in relieving VHF congestion in its <u>Report of the Special Communications/Operations Divisional Meeting</u> (available for purchase at http://216.46.2.37/documentItemView.ch2?ID=7853). The increased role of data link in the mid and long term evolution of the NAS is recognized both in the RTCA November 2002 publication <u>National Airspace System Concept of Operations</u>(available for purchase at http://www.rtca.org/onlinecart/product.cfm?id=267) and in the FAA's <u>Operational Evolution</u> <u>Plan (available at http://www2.faa.gov/programs/oep/).</u>

Current data link services are obtained through a private-sector service provider. As already noted, the FAA utilizes ARINC's Aircraft Communications Addressing and Reporting System (ACARS) to provide basic data link communications that are not time critical, such as pre-departure clearances to pilots. The FAA is also planning to initially provide its Controller-Pilot Data Link Communications (CPDLC) Build 1/1A application, which provides text messages between pilots and controllers to supplement or replace voice messages, over a VHF Digital Link Mode 2 (VDL-2) subnetwork owned and operated by a service provider. The ability to transmit control instructions via data link will improve the controller's efficiency in handling traffic. VDL-2, which provides data only capability (i.e., no voice capability), is suitable for non-time-critical air traffic control message traffic. VDL-2 is a data-only system that requires a separate radio from that used for voice transmissions. Beginning in 2004, the FAA bears all messaging costs for air traffic control messages transmitted via VDL-2.

The VDL-3 Time Division Multiple Access (TDMA) technology that FAA is proposing as the basis of its next generation air/ground communications would ultimately result in a wholly

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FAA-owned and operated system that would 1) allow increased use of available spectrum allocation through the ability to use multiple non-interfering communications channels in a single frequency, 2) provide a predictable data link cost projection for budgeting of tax dollars without the need for user fees, and 3) provide the high degree of system integrity, availability throughout the NAS, and degree of message transmission prioritization necessary for all types of air traffic control messages, including time-critical messages. VDL-2 would remain an essential element of the NAS by fulfilling the core need for which it was developed, the transmission of aeronautical operational control and other user operational/business management message traffic.

Actions to Address Future Air/Ground Communications Needs

For many years, the FAA has worked with ICAO and with the U.S. aviation community to address air/ground communication issues. The international effort to study VHF air-ground system improvements, recognizing the future capacity limitations of the air/ground communications system, was agreed upon at the 1990 ICAO Communications, Meteorology, and Operations (COM/MET/OPS) Divisional Meeting.

Many issues of NAS stakeholder concern are addressed through the activities of RTCA, Inc. RTCA, Inc., is a private, not-for-profit corporation that develops consensus-based recommendations regarding communications, navigation, surveillance, and air traffic management system issues. RTCA functions as a Federal advisory committee. Its recommendations are used by the FAA as the basis for policy, program, and regulatory decisions and by the private sector as the basis for development, investment, and other business decisions. In 1991, RTCA established Special Committee 172 (SC-172) on "VHF Air-Ground Communications" to 1) provide recommendations for future Air-Ground Communications for the VHF Aeronautical Band (118-137.0 MHz), and 2) conduct a U.S. government and industry study on alternatives in parallel with the ICAO activity.

In November 1994, SC-172 published RTCA DO-225 <u>VHF Air-Ground Communications</u> <u>System Improvements Alternatives Study and Selection of Proposals for Future Action</u> (available for purchase at http://www.rtca.org/onlinecart/product.cfm?id=58) in which seven candidate future system alternatives were evaluated against future system requirements and desirable features. A fully digital system, preferably with multiple circuits provided on the same Radio Frequency (RF) channel, emerged as the optimum choice for meeting future VHF air-ground system requirements. The TDMA architecture was considered to be consistent with the objectives that surfaced during the studies.

In March-April 1995, a special meeting of the ICAO Communications Operations Division (COM/OPS/DIV) adopted TDMA technology as its model for the future air/ground VHF voice and data communications system. At that time, ICAO also approved standards allowing reduction of spacing between channels from 25 kHz to 8.33 kHz as a near-term analog solution for countries experiencing severe frequency congestion. Eurocontrol, the European Organization for the Safety of Air Navigation responsible for developing, coordinating, and planning the European air traffic management system, implemented this solution in 1999. As a result of this change, aircraft that fly to Europe from other parts of the world must be equipped with a radio that can operate on analog 8.33 kHz channels.

In July 1995, the FAA approved Mission Needs Statement 137 for Next Generation

<u>Air/Ground Communications (NEXCOM)</u> (http://www1.faa.gov/asd/ia-or/pdf/nexcomiar.pdf) and in 1998 made the investment decision to develop and field the system. As part of this investment decision, the FAA Joint Resources Council approved a TDMA-based technology for NEXCOM to provide VHF digital voice and data capability.

The mission needs addressed by NEXCOM include the following:

 Provide additional spectrum capacity within the assigned VHF band (117.975-137.0 MHz).

2. Provide new data link capability for all classes of users.

3. Replace current aging air/ground communications equipment.

4. Reduce frequency interference and provide security mechanisms to identify unauthorized users.

In December 2000, the FAA Administrator chartered the NEXCOM Aviation Rulemaking Committee (NARC). The committee was established to address the technical and operational merits of VDL-3 and its cost effectiveness, particularly in light of the 1999 European implementation of 8.33 kHz analog channel spacing. The NARC included representatives from various aviation industry organizations and the Department of Defense. The Administrator tasked the NARC to review the agency's previous analysis of cost, benefits, and transition assumptions, and to recommend appropriate actions. The Administrator also requested that the NARC review alternative solutions for voice and data link service provision, to include as a minimum a combination of 8.33 kHz analog capability for voice communication with VDL-2 for data link, or a VDL-3 system for both voice and data link.

The NARC issued its report in September 2001. The following summarizes the

recommendations and the FAA's response:

1. Continue to aggressively manage frequency assignments to prolong the useful life of the 25 kHz channel allocation in support of Air Traffic Services. Conduct an annual assessment to confirm that there will be an adequate number of 25 kHz communications frequencies to meet future capacity needs. This assessment should have at least a five year outlook to provide adequate warning of 25 kHz frequency spacing depletion.

<u>FAA Response</u>: The FAA's Office of Spectrum Policy and Management conducts an annual assessment and issues a report each September as part of its Radio Spectrum Plan.

2. Continue to support VDL Mode 2 for data link communications and support its continued evolution to meet the needs of future ATS data link requirements as they develop until and unless it can no longer meet those requirements.

<u>FAA Response</u>: The FAA is initially fielding CPDLC Build 1/1A over a service provider's VDL Mode 2 subnetwork. See further discussion of the role of VDL-2 in the NAS in this preamble's sections titled <u>NAS Analog VHF System Limitations and Solutions</u> and <u>Alternatives To VDL-3</u> Technology Considered.

3. Expedite the demonstration/validation of the VDL Mode 3 system to include both voice and data link. The demonstration/validation must have industry participation, clearly defined success criteria, and must meet all FAA certification criteria for the end-to-end system. VDL Mode 3 should only be pursued if indicated by the results of the efforts described in recommendation five below. There must be no dilution of, or loss of impetus to the aggressive development, evolution and fielding of VDL Mode 2 data link.

FAA Response: The FAA developed the NEXCOM System Demonstration Program as a key

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element of its acquisition strategy in response to this recommendation. A series of three demonstrations (2002, 2003, and an operational system demonstration in 2004) was planned to provide stakeholder insight into the progress of VDL-3 technology and component development. The 2002 and 2003 System Demonstrations show the technical viability of VDL-3 technology as well as providing an opportunity for vendors to demonstrate the VDL-3 avionics they have developed. The 2004 demonstration will take place at an operational air traffic facility to show commercial avionics in an operational environment.

Develop a detailed plan for implementing 8.33 kHz spacing, analog voice system. 4. If the VDL Mode 3 demonstration/validation cannot he successfully accomplished as defined in 3 above, then the plan should be implemented in time to ensure the 8.33 kHz system is in place prior to 25 kHz channel allocation depletion. The FAA must determine the date that allows for rulemaking action, aircraft equipage, and implementation of the ground system in sufficient time to ensure that voice frequency spectrum is available and does not constrain capacity growth. FAA Response: The FAA began deployment of NEXCOM ground-based Multimode Digital Radios (MDRs) in 2003. Available modes in the MDR are 25 kHz analog, 8.33 kHz analog, and VDL-3 digital. See NEXCOM Ground and Airborne Components, later in this preamble, for additional information on the MDR. The FAA has developed a backup 8.33 kHz Transition Plan that addresses acquisition strategy, cost, schedule, performance, avionics equipage, contracting strategy, and logistical support elements, should VDL-3 prove not deployable in time to meet future communications needs. The availability of FAA-approved avionics several years in advance of mandatory equipage dates, and the ability to develop and install the Ground System Segment components at an acceptable cost and on a effective schedule, would be the main

criteria for determining if the timeliness of NEXCOM VDL-3 deployment in the NAS has become unacceptable. Users should note that this 8.33 Transition Plan alternative would not provide a data link capability for the NAS. Such capability would have to be obtained through alternate means.

5. The FAA should take the lead within the U.S. in a worldwide effort to establish the next generation global standard voice and data link communications system. <u>FAA Response</u>: The FAA believes that NEXCOM VDL-3 technology provides the requisite capacity through 2030. The FAA works with ICAO to jointly study VHF architecture and critically review alternate band solutions as they are proposed. The FAA works through a variety of multilateral and bilateral forums to maintain the ICAO COM/OPS/DIV 1995 vision of a compatible global air/ground communications architecture.

6. Prior to a final decision, the NARC should be reconvened to evaluate its recommendations based on any newly acquired data resulting from participation in validation efforts such as the VDL Mode 3 demonstration/validation and CPDLC Build 1 and Build 1A. <u>FAA Response</u>: The FAA did not adopt the recommendation to reconvene the NARC; instead it is pursuing wider public dialog through this Notice of Proposed Policy Decision process.

Discussion of Proposed Policy Decision

The FAA proposes to implement a VHF digital air/ground communication system based on VDL-3 technology to be used by pilots and air traffic controllers in air transportation operations. Implementation of the new VHF digital system would ensure necessary spectrum/channel capacity for air traffic control, and would provide enhanced air/ground

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Implementation of a new digital system is necessary because of the inherent limits of the current analog air/ground communication system. This section of the preamble explains why the FAA is proposing this policy decision and how the proposed policy would be implemented.

The Need To Transition From Analog To Digital Communications

While analog technologies have provided valuable capabilities in a variety of applications in the past, there is a worldwide trend toward implementing digital technology in place of analog technology in many areas. For example, digital technologies are widespread in the wireless telecommunications industry. Digital technology has long since supplanted analog technology in the recording industry, and the television industry is moving to a mandated digital capability. Digital technology is generally preferred to analog technology due to its provisions for increased capacity and new or improved services.

Alternatives To VDL-3 Technology Considered

As noted earlier in this preamble, a variety of alternative technologies were considered by both ICAO and RTCA, with a TDMA-based architecture (i.e., VDL-3) selected as most suitable. Various stakeholders have suggested a two-element solution as an acceptable alternative to the integrated voice and data VDL-3 capability that NEXCOM would provide for the NAS air/ground communications infrastructure. The FAA Administrator chartered the NARC to address this alternative solution as well as the VDL-3 solution. 1. The first element would address the voice communication demands of the NAS by subdividing the current spectrum into analog channels spaced 8.33 kHz apart.

2. The second element would address the data link communications needs by replacing the Aircraft Addressing and Reporting System (ACARS) with the VDL-2 capability now being implemented by ARINC.

The FAA views the 8.33 kHz analog channelization solution for voice needs and use of VDL-2 for data link needs as insufficient to address future NAS requirements for the following reasons:

1. The subdivision to 8.33 kHz spacing as the solution to spectrum depletion would be consistent with previous solutions implemented by the FAA, as discussed earlier in this preamble. Europe subdivided its 25 kHz channel separation to 8.33 kHz in 1999 as an immediate solution to its pressing spectrum depletion problems. U.S. air carriers and some DoD aircraft needing to operate in European airspace therefore installed 8.33 kHz analog channel-capable radios in their aircraft.

However, subdividing the current analog system to 8.33 kHz is a voice-only solution that would still require NAS users who have not been impacted by European mandate to equip their aircraft with new radios that can tune to that degree of channelization. Data link, essential to future system-wide capacity expansion, would require a separate solution and separate equipment. Furthermore, the 8.33 kHz solution would not solve the problems caused by communication blocking. The anti-blocking capability inherent in VDL-3 technology is not possible in current analog radios without system-wide retrofit, and controller override is not possible in an analog system. The FAA considers these to be significant drawbacks.

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2. Various stakeholders have suggested using VDL-2 to address the need for data link in the NAS. VDL-2 is not an earlier generation of the Time-Division Multiple Access (TDMA) VDL-3 technology, but a separate, Carrier-Sense Multiple Access (CSMA) technology, developed by a private service provider for airline operational and business management data link communications, to replace the Aircraft Communications and Reporting System (ACARS). As the only VHF air/ground data link available at present that operates in accordance with the ICAO Annex 10 - Aeronautical Telecommunications - Volume III, Standards and Recommended Practices (SARPs) for the Aeronautical Telecommunications Network (ATN) (available for purchase at http://216.46.2.37/search results.ch2?Category=document&DocGroupID=67), VDL-2 carries the initial message set for the FAA's first ATC data link application (Controller-Pilot Data Link Communications (CPDLC)) on a radio and frequency separate from ATC voice communications. However, as the volume of data link traffic for both ATC and Airline Operational Control (AOC) applications grows, and as reliability, performance, and security requirements for ATC applications become even more stringent, FAA would need access to affordable data link transport services that satisfy all ATC quality of service requirements, including availability, transit time, message prioritization, message preemption, and security, in order to be able to support all types of air traffic control messages, in particular those that are time-critical. Once implemented, a VDL Mode-3 network would be able to support all the quality of service requirements for both ATC voice and data using the same radio equipment and facilities. All aeronautical users will have access to both ATC voice and data in a single radio, without needing separate radio equipment for ATC voice and key ATC data services. This would be of particular interest to general aviation users with very limited space in

the cockpit.

NEXCOM will eventually provide CPDLC, some types of weather information, and other services to users at no charge. The FAA expects to provide CPDLC over VDL-3 beginning in 2012; however, this time frame could be accelerated or delayed based on user demands. The FAA envisions an initial transition period, duration to be determined, during which CPDLC messages would be available on both VDL-2 and VDL-3. After this transition period, the FAA could continue to make some CPDLC messages available to VDL-2 service providers, but would not continue to pay any charges associated with their transmission over the VDL-2 network. Users who invested in VDL-2 would not lose their investment, as VDL-2 will remain an essential element of the NAS, fulfilling its main function of communicating aeronautical operational control and other user business management message traffic.

NEXCOM Ground and Airborne Components

The Multimode Digital Radio (MDR) is the ground-based radio component of NEXCOM. The FAA began operational deployment of the NEXCOM MDRs in 2003. Available MDR modes are 25 kHz analog, 8.33 kHz analog, and VDL-3 digital. The radio can operate in any mode, but only one mode at any given point in time. Initial use of these radios will be in the 25 kHz analog mode, to replace aging NAS infrastructure. This implementation will be transparent to NAS users.

The MDR's 8.33 kHz analog mode has been incorporated as a back-up capability, in line with the NARC Report recommendation that the FAA have the capability to implement an 8.33 kHz analog channelization should VDL-3 prove incapable of implementation in a timely manner.

Implementation of an 8.33 kHz channelization would still require user equipage with new radios to accommodate the new channelization.

A second ground-based component of NEXCOM is the NEXCOM Ground System Segment. The Ground System Segment will provide the Radio Interface Units and Ground Network Interfaces at FAA facilities that are necessary to enable the MDR to operate as a VDL-3 voice and data system. The FAA plans to begin deployment of the Ground System Segment in NAS air traffic control facilities in early 2008. Purchase and fielding of Ground System Segment equipment in all NAS facilities (enroute, terminal, flight service, etc) will take place over several years.

The airborne component of NEXCOM is the VDL-3 capable radio with which users would equip their aircraft, as explained in the next section. The FAA has signed Government-Industry Agreements with vendors of commercial and general aviation avionics to facilitate the development and FAA approval of avionics, with the goal of FAA-approved avionics available for user purchase beginning in 2005.

Airspace user equipage necessary to transition to VDL-3 in the NAS

As a result of the proposed policy decision, users would have to install VDL-3 voice communication equipment to maintain compliance with 14 CFR requirements that aircraft be equipped with two-way radios capable of communicating with ATC. The equipment must be FAA-approved to operate in system configurations 4V, 3V1D, 2V2D, 1V3D, 3V, 3S, 2S1X, 2V1D and 1V2D, as defined in RTCA DO-224A (September 13, 2000) including Change 1 (October 12, 2001) and Change 2 (August 27, 2002), <u>Signal-in-Space Minimum Aviation</u> System Performance Standards (MASPS) for Advanced VHF Digital Communications Including Compatibility (available for purchase at http://www.rtca.org/onlinecart/product.cfm?id=311).

Users should note that VDL-3 system operation in the optional 3T configuration is not planned for mandatory equipage in the NAS. Users who will fly in other nations' airspaces should be aware that this configuration may be encountered outside the NAS, and consider the advisability of implementing this optional configuration in their equipage.

The FAA's proposed policy decision would mandate only an operational capability for VDL-3 voice. This proposed policy decision would not mandate installation of data link services or applications. Nonetheless, the FAA expects VDL-3 radios to support data link subnetwork functionality, as noted above in the requirement for radios to be FAA approved to operate in configurations specified in RTCA DO-224A. An aircraft's existing equipment configuration may require an additional interface to access the data link services of VDL-3. In this case, it is the user's decision whether to make the added investment to access VDL-3 data link services. Users should note the role of data link in increasing air traffic system capacity that has been identified by ICAO, NAS stakeholders via RTCA, and the FAA in its Operational Evolution Plan in making their decision to implement the data link capability of VDL-3.

Proposed transition schedule to digital air/ground communications for airborne users of the NAS

The FAA is proposing transition of the NAS to digital capability in three phases. Those users whose airspace access needs would require compatible digital communications capability in the first phase of the transition must be aware of the need to maintain an analog VHF voice capability as well for several years until Phase 2 is complete, in order to operate in the terminal environment prior to transition to digital communications in that domain. The FAA expects that most radios will be designed with multimode capability, but users should decide if their particular equipage should be a multimode radio capable of a minimum of both VDL-3 voice and VHF 25 kHz channel analog communications, or separate digital and analog radios. The proposed schedule listed below specifies the dates by which aircraft would be required to have VDL-3 voice capability to maintain compliance with FAA regulations requiring two-way radio communications with ATC.

1. By January 1, 2010, all aircraft operating in Class A airspace overlying the contiguous United States and excluding Alaska, Hawaii, Puerto Rico and Guam, at FL 240 and above must be capable of VDL-3 voice communications on frequencies assigned by ATC to remain in compliance with 14 CFR § 91.135(b).

By January 1, 2015, all aircraft operating within the U.S. designated airspace,
 excluding Alaska, Hawaii, Puerto Rico and Guam, must be capable of VDL-3 voice
 communications on frequencies assigned by ATC to remain in compliance with all 14 CFR voice
 communications provisions (14 CFR §§ 91.135(b) (for FL 180 to FL 240), 91.131(c)(2),
 91.130(c), 91.129(c), 91.127(c), and 91.126(d)).

3. From 2015-2023the FAA would implement digital VHF communications in the remainder of the NAS:

a. All airspace in Alaska, Hawaii, Puerto Rico and Guam, in which two-way communications with air traffic control is required.

 b. Facilities not associated with airspace equipage requirements (Flight Service Stations, Automated Flight Service Stations).

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The specific timing of the transition to VDL-3 voice capability in this third phase would be determined by the interrelationship of several factors, including but not necessarily limited to:

 a. The amount of spectrum capacity expected to be recovered as a result of the transition, in relation to the need for that spectrum.

b. Traffic volume receiving instrument flight rules (IFR) or visual flight rules (VFR) services and the potential for improved service in those areas as a result of the availability of VDL-3 controller override and anti-blocking capabilities.

c. The volume of new user equipage with VDL-3 voice capability required.

The FAA will provide users affected by the third phase (2015-2023) of the transition to digital communications with five years notice of specific compliance dates through notices published in the Federal Register, FAA Advisory Circulars, and Notices to Airmen (NOTAMs). The notification period would provide users the opportunity to plan and equip their aircraft with the necessary radios by the compliance date. The compliance dates would be established through a notice and comment process, which would permit interested persons the opportunity to comment on proposed dates. The FAA would consider the comments before issuing a final notice of compliance dates.

Impact on military aviation of this policy decision

Department of Defense (DoD) aircraft with UHF capability to communicate with ATC are not affected by this policy decision, as this proposed policy only affects VHF radios used for communication with FAA facilities. The FAA maintains a UHF capability in accordance with its obligation to support national security requirements and would continue to do so. NEXCOM

Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507 (d)) requires that the FAA consider the impact of paperwork and other information collection burdens imposed on the public. We have determined that there are no new information collection requirements associated with this proposed policy decision. An agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a currently valid Office of Management and Budget (OMB) control number.

International Compatibility

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to comply with International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA has reviewed the corresponding ICAO Standards and Recommended Practices and has identified no difference with the proposed regulation.

Executive Order 12866 and DOT Regulatory Policies and Procedures

To be completed by APO.

Executive Order 13132, Federalism

The FAA has analyzed this proposed policy decision under the principles and criteria of Executive Order 13132, Federalism. We determined that this action would not have a substantial direct effect on the States, or the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government, and therefore would not have federalism implications.

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Environmental Analysis

FAA Order 1050.1D defines FAA actions that may be categorically excluded from preparation of a National Environmental Policy Act (NEPA) environmental impact statement. In accordance with FAA Order 1050.1D, appendix 4, paragraph 4(j), this proposed policy decision qualifies for a categorical exclusion.

Energy Impact

The energy impact of this action has been assessed in accordance with the Energy Policy and Conservation Act (EPCA) Public Law 94-163, as amended (42 U.S.C. 6362) and FAA Order 1053.1. It has been determined that this proposed policy decision is not a major regulatory action under the provisions of the EPCA.

Director signature