

**Minutes of the
Research, Engineering and Development (R,E&D) Advisory Committee
Holiday Inn Rosslyn Westpark Hotel
1900 North Fort Myer Drive, Arlington, VA 22209**

January 29-30, 1998

On January 29 & 30, 1998, the Federal Aviation Administration (FAA) held a meeting of the Research, Engineering and Development (R,E&D) Advisory Committee at the Holiday Inn in Rosslyn, Virginia. Attachments 1 and 2 provide the meeting agenda and meeting attendance respectively.

DAY ONE - JANUARY 29

Welcome and Introductory Remarks

Mr. Ralph Eschenbach, Chairman, and Dr. Jan Brecht-Clark, Designated Federal Official to the Committee, welcomed attendees and introduced two new members: Mr. Paul Drouilhet, recently retired from a distinguished career at MIT Lincoln Laboratory, and currently serving on the ATS Subcommittee; and Mr. Richard Christiansen, Director of NASA's Aerospace Research Division. Two members leaving the Committee, Dr. Najeeb Halaby and Mr. John Zugschwert, were recognized for their valuable contributions to many Committee efforts.

Dr. Brecht-Clark reminded members that nomination forms for the Excellence in Aviation Award were included in their meeting materials.

In opening remarks, Dr. George Donohue, FAA Associate Administrator for Research and Acquisitions, expressed his interest that the Committee be informed about the Administrator's task force on NAS modernization. He stated that Dr. Jack Fearnside, Senior Vice President and General Manager, MITRE/CAASD and chairman of the task force, would present an extensive briefing on the task force recommendations during the afternoon session.

Meeting Objectives

Dr. Clyde Miller, FAA Program Director for Research, reviewed the meeting process and pointing out the following meeting objectives:

- To vote on the Air Traffic Services Subcommittee report.

- To vote on the Runway Incursions Subcommittee report.
- To review the FAA's responses to the NAS ATM R&D Panel recommendations in the areas of management, system capacity, airport capacity, and human factors.
- To review the Committee's role in shaping the Fiscal Year 2000 R,E&D investment portfolio.
- To review FAA's international research coordination efforts.
- To review and assess the implications of the Administrator's task force recommendations on NAS modernization.

Air Traffic Services (ATS) Subcommittee Report

The ATS Subcommittee is one of six standing subcommittees established in January 1997 to provide recommendations to the FAA on its proposed R,E&D investment portfolio and to conduct annual reviews of FAA's research and development program. FAA's ATS program includes air traffic management (ATM) systems; communications, navigation and surveillance systems; and weather systems. Ms. Nancy Price chairs the Subcommittee.

Mr. Paul Drouilhet, reporting for Nancy Price on the November 1997 Subcommittee meeting, explained that the purpose of that meeting was to review and comment on the Flight 2000 initial program plan, the Operation Concept for 2005, and their integration with NAS Architecture Version 3.0 and the overall R,E&D program plan. Mr. Drouilhet presented the Subcommittee's recommendations for the Committee's discussion and approval. After Committee discussion, Mr. Eschenbach asked Mr. Drouilhet to write a separate recommendation addressing safety, and to modify recommendation 2. The report was approved as modified. Findings and recommendations appear in Attachment 3.

Runway Incursion Subcommittee Report

The Runway Incursion Subcommittee was established as an ad hoc subcommittee in September 1997 to develop recommended runway incursion preventive actions that would contribute to developing a runway incursion action plan. Realizing this Subcommittee's potential benefit to the FAA, the Advisory Committee extended the Subcommittee's charter to January 2000. Under this revised charter, the Runway Incursions Subcommittee will serve as a vehicle for industry input; will monitor FAA's response to the Subcommittee's thirteen recommendations; will assist in reviewing and developing the 1998 Runway Incursion Action Plan; will assess whether FAA programs for surface traffic control are adequate and will make recommendations accordingly. Mr. Bruce Landsberg chairs the Subcommittee.

Mr. Bruce Landsberg reviewed runway incursion problems, providing statistics, incident and accident specific data, and a video describing historical runway collisions at various airports where ASDE and AMASS might have saved lives had they been in place. Mr. Landsberg submitted the Subcommittee's recommendations for discussion and approval.

The Advisory Committee approved the recommendations, except Recommendation 8, which was referred back to the Subcommittee for further investigation.

NAS Modernization Task Force

Dr. Jack Fearnside summarized the work of the Administrator's NAS Modernization Task Force. Dr. Fearnside said the primary emphasis shifted away from ADS-B, WAAS, and other CNS programs that the Task Force believes are "risk" programs to focus on users' operating cost issues. Using the Task Force's risk reduction model, Dr. Fearnside named four programs focused on congestion problems citing that most of them are currently available: Conflict Probe; Collaborative Decision Making; Center TRACON Automation System, especially Traffic Management Advisor and Passive Fast; and data link.

Mr. Frank Buck, Program Manager, MITRE/CAASD, said Flight 2000 should be modified to address CNS program risk areas. He said that the NAS Modernization Task Force proposes to delay full-scale development of several CNS programs including elements of GPS; NEXCOM; data link (CPDLC Build 2); and ADS-B until critical risk areas are resolved.

Response to NAS ATM R&D Panel Report

The NAS ATM R&D Panel was an ad hoc subcommittee chartered to review FAA's current research and development program associated with CNS/ATM and weather research. The purpose of the review was to explore opportunities for increasing the program's effectiveness in enhancing the NAS.

Dr. Clyde Miller and Mr. Quentin Taylor, FAA Deputy Associate Administrator for Airports, presented FAA's responses to a number of the Panel recommendations described in the March 1997 report. The FAA agrees with virtually all of the report recommendations. Implementation of some of the recommendations will occur over time as programs are adjusting and evolve. A written report, documenting FAA's response will be forthcoming in the next few months.

International Research Collaboration

Mr. Theodore Davies, FAA Program Director, Office of International Research and Acquisitions, said the agency's mission, in its interfaces with ICAO and various international civil aviation authorities, is to harmonize new technologies and systems in support of a global CNS/ATM system. This cooperation ensures aviation safety, operational efficiency, and economic viability in a continuously evolving global environment. Mr. Davies stressed that international policy decisions are coordinated within the FAA, and with other agencies, including Department of State,

Department of Defense, Federal Communications Commission, Department of Transportation, and NASA, as well as embassies around the world.

Dr. Davies cited the importance of capitalizing on international research efforts and pooling scarce resources to collective advantage. He pointed to detailed collaboration with specific regions around the world where FAA participation and leadership in global aviation continues to expand. He pointed out, in an environment of increasing European activities, the necessity of continuous FAA representation.

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DAY TWO - JANUARY 30

Mr. Eschenbach convened the meeting at 8:30 a.m., and Dr. Jan Brecht-Clark reiterated the terms of the public meeting announcement.

Global Analysis and Information Network (GAIN)

Mr. Charles Fluet, Manager of FAA's GAIN Program Division in the Office of System Safety, explained that GAIN is a concept proposing a worldwide partnership where all members of the aviation community, working together, collect, analyze, and disseminate aviation safety data. A wide range of data patterns and trends will emerge as GAIN records even minor deviations. These small and seemingly innocuous events, when combined with other data, alert analysts to potentially dangerous situations. Referring to the Heinrich Pyramid, Mr. Fluet illustrated how crucial it is to include all relevant and available data in analyses.

Mr. Fluet stressed GAIN's distinctive qualities in relation to other systems, citing voluntary reporting, broad scope, and continuous digital flight data monitoring of routine flight operations. GAIN's home page may be accessed at nasdac.faa.gov.

Safety Performance Analysis System (SPAS)

Ms. Barbara Wright, FAA Program Manager for Safety Performance Analysis System (SPAS), explained that SPAS is a decision support tool that tracks aircraft and air personnel performance; identifies safety risks; and analyzes surveillance results, accident records, mechanical reports, financial statistics, and DOD oversight results. Ms. Wright said SPAS' technical capabilities and graphical interface will allow inspectors to more effectively achieve their missions.

Subcommittee Reviews

Mr. Eschenbach asked each subcommittee chairperson to report briefly on its February/March Target Area Team (TAT) review meeting plans, and to make agenda information available to Lee Olson, AAR-200, as soon as possible.

Airports

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Ms. Angela Gittens, Chairwoman, said the Airports Subcommittee planned a TAT review on February 27, 1998 and that the agenda was not currently complete.

Aircraft Safety

Mr. Bob Doll, Chairman, said the Aircraft Safety Subcommittee planned a TAT review on March 17, 18 and 19, 1998. Mr. Doll said that although the full agenda was not yet complete, three items had been decided upon: (1) a review of information about FAA cooperative international research efforts; (2) an extensive discussion on SPAS; and (3) an extensive discussion on GAIN and related information management systems.

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Security

Mr. James Pierce, Chairman, said the Subcommittee planned a TAT review at the end of February 1998, followed by a general meeting in the near future. He said the Subcommittee plans to review FAA's "Check Point for the Future" in light of the importance of an integrated security system architecture.

Human Factors

Hon. Susan Coughlin, Chairwoman, said the Human Factors Subcommittee planned a TAT review on March 4 & 5, 1998 including: NAS modernization human factors implications in greater detail; maintenance and automation human factors programs; and, a key area, dealing with human factors in modern automation platforms.

Dr. Donohue and Mr. Eschenbach agreed that human factors is the most critical element in modernization and offered support to the Subcommittee.

Environment and Energy

Dr. Wesley Harris, Chairman, said the Subcommittee planned a TAT review on March 6, 1998. Dr. Harris said the Subcommittee will be targeting the effects of increased traffic on the environment and its ultimate effect on modernization efforts. He said the FAA's long-range planning should include these analyses. In that regard, Mike Rioux, offered to make recent environmental analysis findings available to the Subcommittee.

Mr. Eschenbach asked Dr. Harris and Ms. Gittens to coordinate efforts to review airport noise and other common Subcommittee issues.

General Aviation and Vertical Flight

Meeting plans and dates were not immediately available.

NAS Modernization Deployment Briefing

Dr. George Donohue presented a detailed briefing on several modernization issues including: Architecture Version 3.0's three phases, concentrating on Phase I from 1998 to 2002; the vast US oceanic responsibilities, especially in the Pacific; HOST replacement and associated Year 2000 certification issues; and STARS installations and human factors issues.

FY 2000 R,E&D Investment Process

Dr. Clyde Miller reminded the Committee that under terms of Congressional mandate, the FAA will report to Congress in February 1998 on its responses to Advisory Committee recommendations during calendar year 1997.

In evaluating the Fiscal Year 2000 investment portfolio, Dr. Miller urged the Subcommittees to be frank about their opinions of the value of the investments proposed. Lessons learned from last year indicate that TATs should brief specific outcomes, outputs, time frames, costs, partnerships, and accomplishments, while providing detailed backup information in the RPD packages.

Human Factors Subcommittee Report

In September 1994, the Advisory Committee chartered a Human Factors Subcommittee under the Chairmanship of Dr. Earl L. Wiener. The purpose of the Subcommittee was to investigate, assess, and report on the status and organization of the human factors program in the FAA, and make recommendations for improvements.

Dr. Maureen Pettitt, FAA Chief Scientific and Technical Advisor for Human Factors, addressed the following recommendations from the Subcommittee's August 1996 report:

Recommendation: Centralize responsibility for Human Factors in the FAA.

Response: A human factors group was convened as a result of human factors issues surrounding the STARS system. This process group also agreed that there should be a centralized responsibility for FAA human factors, adequately resourced and that AAR-100 should be designated as the lead in this effort. An implementation plan is under development.

Recommendation: Assign resources and people to this central responsible structure, define the agency's expectation, and hold [those assigned] accountable.

Response: A human factors group was convened as a result of human factors issues surrounding the STARS system. This process group agreed that there should be a centralized responsibility for FAA human factors, adequately resourced, and that AAR-100 should be designated as the lead in this effort. An implementation plan is under development.

Recommendation: Provide an agency lead organization for Human Factors.

Response: A human factors group was convened as a result of human factors issues surrounding the STARS system. This process group agreed that there should be a centralized responsibility for FAA human factors, adequately resourced, and that AAR-100 should be designated as the lead in this effort. An implementation plan is under development.

Update on Flight 2000

Dave Tuttle, FAA Director for Flight 2000, explained that Flight 2000 is an initial implementation of capabilities, including GPS, WAAS and LAAS, and ADS-B, to support Free Flight. It is a risk-reduction effort. The program's scope and its activities will be adjusted to support the recommendations of the NAS Modernization Task Force when those recommendations are finalized.

Closing

The Chairman thanked the Members and the audience for attending and adjourned the meeting.

Research, Engineering & Development (R,E&D) Advisory Committee
Holiday Inn Rosslyn Westpark Hotel
1900 North Fort Myer Drive, Arlington, VA 22209
(703) 807-2000 Fax: (703) 522-7480

January 29-30, 1998

Thursday, January 29

9:00 a.m.	Welcome and Introductory Remarks	Mr. Ralph Eschenbach, Chair Dr. Jan Brecht-Clark, FAA Dr. George Donohue, FAA
9:30 a.m.	Meeting Process and Objectives	Dr. Clyde Miller, FAA
9:40 a.m.	Presentation and Vote on the Report of the Subcommittee on Air Traffic Services	Mr. Paul Drouilhet
10:15 a.m.	BREAK	
10:30 a.m.	Presentation and Vote on the Report of the Subcommittee on Runway Incursion	Mr. Bruce Landsberg
12:00 noon	Lunch	
1:00 p.m.	NAS Modernization	Dr. John Fearnside, MITRE/CAASD
2:00 p.m.	FAA's Follow Up Response to the Report of the NAS ATM R&D Panel	Dr. Clyde Miller, FAA Mr. Quentin Taylor, FAA
2:30 p.m.	BREAK	
2:45 p.m.	FAA's Follow Up Response to the Report of the Subcommittee on Human Factors	Dr. Maureen Pettitt, FAA
3:15 p.m.	International Research and Development	Mr. Ted Davies, FAA
4:15 p.m.	Air Traffic Management Research and Development Action Team (ARDAT) Report	Mr. Tom Proeschel, FAA

5:00 p.m. Adjourn

Friday, January 30

8:30 a.m.	Convene Meeting	Mr. Ralph Eschenbach, Chair Dr. Jan Brecht-Clark, FAA Dr. George Donohue, FAA
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8:35 a.m.	Global Analysis Information Network (GAIN)	Mr. Charles Fluett, FAA
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9:30 a.m.	Safety Performance Analysis System (SPAS)	Ms. Barbara Wright, FAA
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10:25 a.m.	BREAK	
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10:45 a.m.	Subcommittee Update and Future Meeting Plans	Subcommittee Chairs
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10:45-10:50	Subcommittee on Airports	Ms. Angela Gittens
10:50-10:55	Subcommittee on Aircraft Safety	Mr. Robert Doll
10:55-11:00	Subcommittee on Security	Mr. James Pierce
11:00-11:15	Subcommittee on Human Factors	Hon. Susan Coughlin Dr. John Lauber
11:05-11:10	Subcommittee on Envi. & Energy	Dr. Wesley Harris
11:10-11:15	Subcommittee on GA & Vertical Flight	Mr. John Olcott Mr. John Zugschwert

11:15 a.m.	Plans for FY 2000 R,E&D Investment Process	Dr. Clyde Miller, FAA
	• Subcommittee meetings in the February/March timeframe (brief content) • Committee meeting in April 23-24	

12:00 noon	Lunch	
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1:00 p.m.	Flight 2000 Update	Mr. Dave Tuttle, FAA
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3:00 p.m.	Adjourn	Mr. Ralph Eschenbach, Chair
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Research, Engineering & Development (R,E&D) Advisory Committee

January 29-30, 1998

Attendance

Mr. Ralph Eschenbach	Ms. Patricia Andrews	Dr. Satya Atluri
Mr. Richard Bustelo	Mr. Viggo Butler	Mr. Richard Christiansen
Mr. Frank Colson	Hon. Susan Coughlin	Mr. Robert Doll
Mr. Paul Drouilhet	Mr. Paul Fiduccia	Dr. Aaron Gellman
Ms. Angela Gittens	Hon. Najeeb Halaby	Dr. Wesley Harris
Mr. Bruce Landsberg	Mr. Jean McGrew	Dr. Dennis McLaughlin
Mr. James Pierce	Mr. Michael Rioux	Mr. Edward Stimpson
Mr. John Zugschwert	Dr. George Donohue	Dr. Jan Brecht-Clark
Monte Belger, FAA	Carson Eoyang, FAA	Quentin Taylor, FAA
Guy Gardner, FAA	Paul Dykeman, FAA	James White, FAA
Warren Fellner, FAA	Willie Card, FAA	Bruce Carmichael, NCAR
Charles Fluet, FAA	Calvin Mitchell, FAA	Brent Phillips, FAA
Ken Leonard, FAA	Dave Tuttle, FAA	Jerry Wright, ALPA
Ray LaFrey, MIT	Frank Buck, MITRE	Joann Kansier, FAA
Clyde Miller, FAA	Robert Wright, FAA	Lee Tucker, Booz Allen
Nick Stoer, Stoer & Assoc.	Richard Wentworth, NTSB	L. Coons, Pratt & Whitney
Nan Shellabarger, FAA	Paul Polski, FAA	S. Schreckengast, MITRE
Lee Olson, FAA	George Marania, FAA	David Kelly, MITRE
Keith Murray, FAA/SETA	Chris Seher, FAA	Bob Schwab, Boeing
Rick Page, FAA	J. McCormick, Consultant	Shelly Myers, MITRE
K. Corcoran, FAA/SETA	Rudy Ruana, Jeppesen	Warren Standley, TRW
Richard Young, FAA	Fred Snyder, FAA	Herman Rediess, FAA
Tom Proeschel, FAA	Maureen Pettitt, FAA	Randy Stevens, FAA
Rosanne Marion, FAA	Dennis McGee, NATCA	Bennie Sanford, FAA
A. Zellweger, Embry Riddle	Karen Stewart, FAA	Roger Richardson, MITRE

Mitch Grossberg, FAA	Don Briggs, FAA	Virgenia Embrey, FAA
John Fielding, Raytheon	Michelle Johnson, FAA	Bill Edmunds, APA
Julie Beckham, FAA	Richard Danz, JIL	Charlie Huettnner, NASA
Victor Lebacqz, NASA	Teresa Hudson, FAA	Chuck Ruehle, FAA
Jim Hardy, Raytheon	Victor Ilenda, JHU	Dennis Kershner, JHU
Thomas O'Brien, FAA	B. Glimie, Honeywell	Art Pyster, FAA
Frank Tung, Volpe	Bob Stanzione, FAA	Dick Marchi, ACI
Jack Ryan, ATA	Ted Davies, FAA	Jack Fearnside, MITRE
John Landers, NASA	John Lapointe, FAA	Don Briggs, FAA
P.K. Bhagat, FAA	Joan Fisher, I&M Tech.	John Staples, FAA
Dennis Niemeier, FAA	Barbara Wright, FAA	Ed Spitzer, Volpe
Pauline Lowell, FAA	Jack Wojciech, FAA	Cynthia Nelson, SRM
Bob Toenniessen, FAA	Mary Barboza, FAA	Gary Hicks, NASA
Dave Tuttle, FAA	Fenton Carey, DOT	Bill Petruzell, FAA
Marcie Romagnoli, TRW	Lorraine Iritano, SRM	Carole Schmidt, Crown
Gloria Dunderman, Crown	June Lidder, TRW	Will Nelson, FAA

Attachment 3

ATS Subcommittee Meeting November 1997 Revised Findings and Recommendations

The ATS Subcommittee on Air Traffic Services (ATS) is one of six standing subcommittees established in January 1997 to provide annual recommendations to the FAA on its proposed investment portfolios and to conduct annual reviews of FAA's research and development program. FAA's ATS program includes Air Traffic Management (ATM) systems, communications, navigation and surveillance systems, and weather systems. Ms. Nancy Price Chairs the Subcommittee.

Finding 1: The principal challenge of ATM modernization is to accommodate the demand for an increasing number of operations (i.e., to increase system capacity) while reducing delay. (A useful working definition of delay is the additional time required for a flight operation, from the time the flight is ready to depart to the time it arrives at the destination gate, over the time which would have been required if it were the only aircraft in the sky.) In meeting this goal, the currently very high ATM system safety standards must be maintained or, where possible, improved.

Recommendation: In its program for ATM modernization, the FAA should give highest priority to increasing capacity and improving safety. Allocation of resources should be in accord with this high priority.

Finding 2: The Subcommittee strongly endorses the use of field testing for the evaluation and

refinement of new systems and operational procedures, as exemplified in Flight 2000. However, it does not believe that Flight 2000 as presently constituted addresses the most critical issues of NAS modernization, namely capacity and delay in capacity-constrained airspace (as discussed above). Flight 2000 addresses important safety-related issues, especially in Alaska; however, it does not address the most critical issue for achieving an integrated ATM System, which will enhance capacity and operating efficiency.

Recommendation: The FAA should focus Flight 2000 on the highest priority issues: safety, capacity, and delay in capacity-constrained airspace, with emphasis on total system integration.

Finding 3: Weather and controlled flight into terrain (CFIT) are identified as principle causes of accidents, with the capability existing to substantially mitigate these accidents. Flight 2000 addresses these technologies, but the current architecture does not reflect early implementation of them.

Recommendation: The FAA must move more quickly to field weather and CFIT accident mitigating operational capabilities.

Finding 4: The FAA has made significant progress in developing and documenting plans for ATM modernization; including the Architecture Version 3.0, the Concept of Operation for 2005, and the Joint FAA/NASA ATM R&D plan. Each represents a substantial undertaking. However, the relationships and interdependencies between these plans are not clear, and none presents a roadmap for an evolving operational capability with quantitatively-defined user benefits.

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Recommendation: The FAA should develop an ATM modernization plan expressed as quantitatively-defined goals for evolving operational capabilities and user benefits. The concept of operations and the architecture should be tied to this ATM modernization plan, and the R&D plans should, in turn, be tied to the concept of operations and the architecture (i.e., what R&D must be done, and when, to support these plans?)

Finding 5: The Subcommittee was pleased to see the Administrator's emphasis on ATM modernization, as evidenced by the creation of the NAS Modernization Task Force. There was concern, however, that this task force might insulate the Administrator from the work and recommendations of already-existing advisory groups such as the Research, Engineering, and Development Advisory Committee.

Recommendation: The Administrator should make sure she is aware of the recommendations of the Research, Engineering, and Development Advisory Committee and other existing advisory

committees, possibly by direct representation of these committees on the NAS Modernization Task Force.