Research, Engineering & Development (R,E&D) Advisory Committee

Recommendations on Fiscal Year 2000 - 2004 R,E&D Investment Portfolio and Meeting Minutes

April 23-24, 1998

Table of Contents

Meeting Minutes of the Federal Aviation Administration Research, Engineering and Development Advisory Committee April 23 and 24, 1998

On April 23 and 24, 1998, the Federal Aviation Administration (FAA) Research, Engineering and Development (R,E&D) Advisory Committee held a meeting at the Washington Dulles Airport Hilton Hotel in Herndon, Virginia. Attachment 1 and Attachment 2 provide the meeting agenda and meeting attendance, respectively.

Day One -- April 23, 1998

Welcome and Introductory Remarks

Dr. Jan Brecht-Clark, FAA Acting Director for Aviation Research and Designated Federal Official of the Committee, read the public meeting notice. Mr. Ralph Eschenbach, Chairman of the Committee, welcomed members and visitors. In his opening remarks, Mr. Eschenbach asked members to review, for later discussion, the Inspector General's questionnaire on the working relationship between FAA and National Aeronautics and Space Administration (NASA).

Mr. Eschenbach welcomed and introduced Mr. Monte Belger, FAA Acting Deputy Administrator, and Mr. Dennis DeGaetano, FAA Acting Associate Administrator for Research and Acquisitions.

Air Traffic Services (ATS) Subcommittee Report

Ms. Nancy Price, Subcommittee Chair, led a discussion on the ATS Subcommittee's interaction with FAA Administrator Jane Garvey at its meeting on February 25-27, 1998. Ms. Price reviewed the Subcommittee's presentation and the Administrator's responses. The Administrator has since assigned Mr. Dennis DeGaetano to coordinate further responses to Subcommittee recommendations.

Mr. Dennis DeGaetano's Remarks

Mr. Dennis DeGaetano, confirmed that in following up on many of the Subcommittee's recommendations, dialog with the Administrator had been limited due to pressing issues of National Airspace System (NAS) modernization and Free Flight Phase I. He emphasized the Administrator's desire, however, to continue that dialog.

Mr. Monte Belger's Remarks

Mr. Belger expressed appreciation for the opportunity to address the Committee and offered the Administrator's regrets that she was unable to attend. He encouraged the Committee's continued review of FAA's R,E&D work, and its continued focus on R,E&D priorities in implementing Free Flight Phase I. Mr. Belger strongly urged the Committee to use explicit language in making recommendations to the Administrator.

Regarding the ATS Subcommittee's recommendation to establish central NAS modernization management, Mr. Belger said that the recommendation strongly parallels the RTCA Free Flight Steering Committee's recommendation for Free Flight Phase I central management. He said the RTCA proposed management structure carries with it the authority, resources, and responsibility to implement Free Flight Phase 1; however, many details remain to be resolved.

Continuing the theme of NAS management, Mr. Belger urged the Committee to consider how it may choose to address the Secretary's and the Administrator's recent announcement of proposed legislation on a performance-based organization (PBO) within FAA. This proposed organization would include research, acquisition, operation and maintenance functions, and would be funded through user fees. Mr. Belger explained that this is an effort to provide an integrated organization as well as funding flexibility.

Mr. Belger touted the agency for its continuing initiatives, including weather, airport capacity, and cooperative efforts with organizations and industry in tracking Free Flight Phase I and other modernization benefits. Both Mr. Belger and Mr. DeGaetano took questions and comments from the Committee during an extended discussion period. Both expressed appreciation and support for the Committee's continuing role in providing advice and recommendations on FAA's research and development (R&D) efforts.

Status of NAS Modernization

Mr. Steve Bradford, FAA Branch Manager of NAS Concept Development, presented the status of NAS modernization. Referring to NAS modernization's rapid changes, Mr. Bradford stated that the RTCA Free Flight Steering Committee has endorsed the Free Flight Phase I Plan as it now stands. He said that the Administrator will forward funding strategies to Congress on April 30, 1998, as a commitment to implement this Plan. Initially, Free Flight Phase I will include six core capabilities: Passive Final Approach Spacing Tool (pFAST), Controller to Pilot Data Link Communications (CPDLC), User Request Evaluation Tool (URET), Traffic Management Advisor (TMA), Collaborative Decision Making (CDM), and Surface Management Advisor (SMA). Key Communications, Navigation, and Surveillance (CNS) technologies will be phased into the system between 1998 and 2015, enabling the transition to Free Flight.

Mr. Bradford pointed out that Version 3.0 Architecture, when it is baselined in July or August 1998, will embody the tenets of NAS modernization, and fit within a multi-year Office of Management and Budget (OMB) pass-back with a constrained growth curve.

Flight 2000

Mr. Dave Tuttle, FAA Project Director for Flight 2000, contrasted the aims of the new Flight 2000 Demonstration Plan with Free Flight Phase I. Free Flight Phase I is a short-term Air Traffic Management (ATM) implementation program using Facilities and Equipment (F&E) dollars to implement capabilities requested by the airline community and does not require cooperative avionics. Flight 2000 is a longer-term program, funded with R,E&D dollars. Flight 2000 also incorporates and integrates CNS systems and requires cooperative avionics. Mr. Tuttle indicated that The MITRE Corporation was being tasked to categorize future CNS architecture transition risks. Furthermore, Mr. Tuttle cited Flight 2000 as a critical risk mitigation component of NAS modernization.

Meeting Process and Objectives

Dr. Clyde Miller, FAA Project Director for Research, pointed out two principle meeting objectives: (1) to solicit Committee advice and recommendations on FAA R&D investment portfolio priorities for fiscal year (FY) 2000-2004, and (2) to urge Committee deliberations on, and proposals for, resource allocations among projects. While the funding profile spans 5 years, Dr. Miller reminded the Committee

to focus primarily on FY 2000.

Members were urged to consider the following issues when reviewing investment portfolios:

- Portfolio Content - Does the portfolio address the right outcomes, outputs, and timeframes?

- Research Project Descriptions (RPD) Funding - Which RPDs should receive more funding and which should receive less, and why?

- Target Area Funding - Which areas should receive more funding and which should receive less, and why?

- Partnerships - What specific opportunities exist to better leverage R,E&D investments with contributions from industry, academia, and other government agencies?

- Response - Has FAA responded effectively to the guidance provided by your subcommittee?

- Process - What should FAA do to improve the process for engaging the Committee to offer advice on the investment portfolio?

- Additional Guidance and Recommendations - In what other areas does the Committee feel its advice might better focus R,E&D investments on community needs?

Other special issues:

- Flight 2000 funding was not to be considered in Committee deliberations.

- Subcommittees were asked to comment on R,E&D Management functions, as needed.

Dr. Miller explained how the FY 2000 investment portfolio was initially constructed internally through a series of processes, culminating in RPD funding estimates for essential aviation program capabilities. Through further processing, including Advisory Committee recommendations from this meeting, these estimates will be forwarded for Department of Transportation (DOT), OMB, and finally Congressional Committee actions. Dr. Miller pointed out the importance of the Advisory Committee’s role as a Congressionally-mandated R&D investment advisor to FAA.

There were two breakout sessions. During the first day of the meeting, the Committee broke into five subcommittee breakout groups to review their respective parts of the R&D proposed investments. On day two of the meeting, the Committee broke into two groups to review the entire R&D investment portfolio proposed by FAA.

Program Briefings

The FAA presented its 5-year R&D investment portfolio for FY 2000-2004 to the Committee in six technical program areas as well as management. Each program highlighted its mission, outcomes and outputs, long range views, and detailed funding summaries. The presenters and their respective programs in order of presentation were:

Ms. Joann Kansier & Mr. John Staples, Air Traffic Services

Dr. Maureen Pettitt, Human Factors

Mr. Jim White & Mr. Paul Jones, Airports

Mr. George Marania, Aircraft Safety

Mr. Dave Smith & Mr. Paul Polski, Civil Aviation Security

Mr. Tom Connor, Environment and Energy

Mr. Randy Stevens, R,E&D Management

Subcommittee Breakout Groups

Mr. Eschenbach directed each R,E&D Advisory Committee standing subcommittee to meet in groups to review and discuss FAA's proposed R&D investments. He suggested the groups consider the list of questions presented by Dr. Clyde Miller in his briefing on meeting objectives and process. The subcommittees were directed to develop recommendations to bring back to the plenary session for full Committee discussion. Subcommittee Breakout Group Chairs were:

Ms. Nancy Price, Air Traffic Services

Ms. Angela Gittens, Airport Technology

Mr. Jean McGrew (Acting), Aircraft Safety

Mr. James Pierce, Aviation Security

Capt. Patricia Andrews (Acting), Environment and Energy

The plenary session adjourned for the day, but the subcommittee breakout groups met for the remainder of the afternoon.

DAY TWO -- April 24, 1998

Introductory Remarks

Mr. Ralph Eschenbach convened the meeting at 8:00 a.m., and Dr. Jan Brecht-Clark reiterated the terms of the public meeting announcement.

Subcommittee Reports

Each Subcommittee Chair reported briefly on the previous day's breakout sessions, providing recommendations for the Committee's consideration. The subcommittee recommendations are provided in Attachment 3.

Second Breakout Group

Having previously met in six subcommittee groups, Dr. Clyde Miller now asked the Committee to divide into two groups, chaired respectively by Ms. Nancy Price and Dr. Aaron Gellman. The two groups were comprised of a cross-section of members from all subcommittees. They were asked to consider all six program areas in the proposed investment portfolio, taking into account subcommittee recommendations from the previous day's breakout sessions. Members were again urged to refer to the list of questions in Dr. Clyde Miller's meeting process briefing as guidance in making recommendations. The recommendations from each group are provided in Attachment 4.

Dr. Aaron Gellman, Group 1 Chair

Ms. Nancy Price, Group 2 Chair

Committee Recommendations

Mr. Eschenbach reconvened the final plenary session at 1:00 p.m. and asked Ms. Price and Dr. Gellman to each present her or his group's list of recommendations before taking the Committee's final vote. After presentations and discussions, the Committee reached consensus on the following seven recommendations to send to the Administrator.

1. FAA should bring together, in a single organization within FAA, all aspects of the National Airspace System (NAS) --- R,E&D, acquisition, operation and maintenance (but not certification) -- headed by a person reporting directly to the Administrator. A small system team responsible for planning the evolution of the NAS should directly support this person. The system team should be made up of the best and brightest from both the operational and developmental parts of FAA. Other organizations and agencies can support this activity, but the responsibility and leadership must remain within FAA. The Committee emphasizes that strong, credible FAA

leadership is mandatory for success. Such leadership must include the willingness to make decisions when consensus cannot be achieved. There continues to be a need to strengthen the number and competence of FAA's internal staff. Only with a strong internal capability can FAA make good use of outside support contracts.

2. Free Flight Phase 1 should be only the first step in a multi-step process. The rapid movement toward the full implementation of the operational concept and the new architecture is essential for the evolution of the NAS and the continued leadership of the United States in the emerging global transportation system. Continued R&D effort will be required to achieve reduced separation standards in all domains and increased terminal and airport capacity to meet the growth projections of the next decade. The FAA weather program has developed a number of weather products, which can provide significant benefits to aircraft operations. The FAA should move aggressively to effect an operational deployment of these products, with emphasis on making them available to aircraft in flight.

3. FAA needs to address the certification process issue energetically, as it is a pacing item in NAS evolution. Certification must be end-to-end (ground and air) across the NAS.

4. Given the Administration's requested budget level, the Air Traffic Services' (ATS) budget of $50.1 million has the right program balance. However, the following R&D areas are not adequately funded in the $50.1 million ATS program. In fact, the ADS-B project, a cornerstone of the NAS modernization has been zeroed! We feel it is crucial that these projects be restored.

Area	Additional Funding Required
ADS-B	$2.5 million
Aviation Weather	$2.8 million
Flight System Technology	$0.8 million
Enroute Automation	$9.0 million
NAS Management	$3.0 million
Total	$18.1 million

5. For many R&D areas, there is significant R&D work being done in other nations, usually with public support. FAA must systematically identify such R&D efforts and gather the outcomes, as they become available. This will minimize duplication of effort and facilitate subsequent harmonization in appropriate matters.

6. FAA needs to rebuild and strengthen its leadership role in international aviation. A mismatch in ATM approaches regionally around the world will require international aircraft to have multiple systems on board their aircraft. We cannot allow this to happen.

7. FAA needs to pursue R&D partners, who benefit from the R&D that FAA conducts and can partially or fully fund the R&D effort. The FAA should systematically and regularly review each of its present and prospective research project descriptions to determine the major private and public agency beneficiaries of the R&D work either underway or proposed. This will identify likely R&D "partners." The value of the benefits for each such party should be estimated competently, and a proposal for joint funding of each R&D effort should, then, be developed. In the course of estimating the value of the benefits available to a prospective partner (an appropriateness analysis), FAA will find some instances in which such benefits exceed the cost required to achieve the R&D results -- often by a substantial amount. Such cases are candidates for the transfer of perhaps all the costs of such R&D to the other parties, thus enabling FAA to use its own resources to pursue R&D which, otherwise, would not be undertaken.

Inspector General Questionnaire

After lengthy discussion and comments, and Committee consensus, Mr. Eschenbach said the Committee would not respond formally, as a body, but would allow each member to respond individually to the Inspector General's questionnaire according to his or her own expertise.

The Chairman's Closing Comments

Mr. Eschenbach thanked FAA for consistent and well-delivered presentations. He expressed appreciation AAR-200 for their support in assuring a well-run and successful meeting. He called attention to the next meeting to be held September 15 and 16, 1998. He adjourned the meeting at 3:00 p. m., April 24, 1998.

Attachment 1

	Tentative Agenda	
Thursday, April 23 - Ballroom		
8:00 am	Welcome and Introductory Remarks	Mr. Ralph Eschenbach, Chair Dr. Jan Brecht-Clark, FAA Mr. Dennis DeGaetano, FAA
8:15 am	Dialogue with Deputy Administrator on Committee Support for NAS Modernization	Mr. Monte Belger, FAA Ms. Nancy Price

9:00 am	Status of NAS Modernization	Steve Bradford, FAA
9:30 am	Status and Current Plan for Flight 2000	Dave Tuttle, FAA
10:00 am	Meeting Process and Objectives	Dr. Clyde Miller, FAA
10:15 am	FY 2000 R,E&D Investment Portfolio	Dr. Clyde Miller, FAA
10:45 am	BREAK	
	Target Area Team (TAT) Reports	
11:00- 11:40	Air Traffic Services	John Staples, FAA Joann Kansier, FAA
11:40-12:10	Airports	Jim White, FAA
12:10 pm	LUNCH	
	TAT Reports Continued	
1:10-1:50	Aircraft Safety	George Marania, FAA
1:50-2:20	Security	Paul Polski, FAA Dave Smith, FAA
2:20-2:50	Human Factors	Maureen Pettitt, FAA
2:50-3:20	Environment & Energy	Tom Connor, FAA
3:20-3:30	R,E&D Management	Randy Stevens, FAA
3:30 pm	BREAK	
3:45 pm	Breakouts (5) – Subcommittee Meetings	Committee Members
	Air Traffic Services – Ballroom	

	Airports – Hilton West Room	
	Aircraft Safety – Hilton East Room	
	Security – Fairfax Room	
	Envi. & Energy – Boardroom #2	
5:00 pm	Adjourn	
Friday, April 24 -Ballroom		
8:00 am	Plenary Session Reconvenes	Mr. Ralph Eschenbach, Chair Dr. Jan Brecht-Clark, FAA
8:05 am	Subcommittee Reports (Plenary Session)	Subcommittee Chairs
	(10 minutes per Subcommittee)	
9:00 am	Guidance to Breakout Groups	Dr. Clyde Miller, FAA
9:15 am	Breakouts (3) – Investment Portfolio	Committee Members
	Group I – Hilton West Room	
	Group II – Hilton East Room	
	Group III – Fairfax Room	
12:30 pm	Lunch	
1:30 pm	Breakout Group Reports (Plenary Session)	Group Leaders
3:00 pm	Break	
3:30 pm	Committee Recommendations	
5:00 pm	Adjourn	Mr. Ralph Eschenbach, Chair

Attachment 2

Research, Engineering & Development (R,E&D) Advisory Committee **April 23-24, 1998** **Attendance**		
Mr. Ralph Eschenbach	Capt. Patricia Andrews	Mr. Richard Bustelo
Mr. Viggo Butler	Mr. Paul Drouilhet	Mr. Robert Doll
Dr. Aaron Gellman	Ms. Angela Gittens	Mr. Paul Fiduccia
Dr. Dennis McLaughlin	Mr. Jack Olcott	Mr. Jean McGrew
Ms. Nancy Price	Mr. Edward Stimpson	Mr. James Pierce
Mike Hawthorne, FAA	Randy Stevens, FAA	Nick Stoer, Stoer & Assoc.
Robert Luddy, NASA	Nancy Lane, FAA	Paul Dykeman, FAA
Ray Godman, TRW	Fidel Cornell, DOT/IG	Lauren Grace, FAA
Charles Huettner, NASA	H. Schlickenmaier, NASA	Jim Eck, FAA
John Bednarz, Galium	Fenton Carey, DOT	Randy Kenagy, AOPA
Tish Colvin, SRI	Trudy Gray, FAA	James Banks, ATCA
Ken Klasinski, FAA	Chris Seher, FAA	Bill Petruzel, FAA
Gary Church, AMA	David Tammaro, Volpe	Les Vipond, FAA
Bill Wood, Volpe	Lee Tucker, Booze Allen	Robert Wright, FAA
Nan Shellabarger, FAA	C.J. Ruehle, AAM	Jean Watson, FAA

Bob Stanzione, FAA	John Staples, FAA	Jim White, FAA
Joseph Pino, FAA	Dennis Kershner, JPL	Richard Page, FAA
Barry Scott, FAA	Tom Proeschel, FAA	Al Smith, FAA
Mary Lynn Tischer, Volpe	Paul Jones, FAA	Sieg Poritzky
Steve Bradford, FAA	Jim Poage, Volpe	Calvin Mitchell, FAA
Walter Hett, WHA	Julie Beckham, FAA	Guy Gardner, FAA
Ed Harris, FAA	Carlos Karregil	Dave Balderson, FAA
Tom Connor, FAA	Todd Blakely, FAA	Dick John, Volpe
Warren Fellner, FAA	Barry Romney, FAA	Kendall Ball, FAA
TD Toler	James McMahon, FAA	Rudy Ruana, Jeppesen
David Smith, FAA	Dave Tuttle, FAA	Herm Rediess, FAA
Paul Polski, FAA	Chuck Hedges, FAA	Warren Standley, TRW
David Stroop, CIE	Robert Woolfob, SRI	Lee Olson, FAA
Rosanne Marion, FAA	Mike Gallivan, FAA	Jim Wichmann, MIT/LL
Ray LaFrey, MIT/LL	Tim Swope, Crown	Paul Jankowski, FAA
Herb Bachner, FAA	Paul Murphy, FAA	Joann Kansier, FAA
Ada Downing, FAA	Mary Barboza, FAA	Keith Murray, TRW
Richard Young, FAA	Jan Brecht-Clark, FAA	John Fielding, Raytheon
Mitch Grossberg, FAA	Bruce Carmichael, NCAR	John Begin, Northwest
Victor Ilenda, JHU	Lonnie Bellamy, FAA	Dennis DeGaetano, FAA
Clyde Miller, FAA	Conrad Gonzales, DOD	Carl Dean, Booz Allen

Ed Hazelwood, ATC Market Report	Lee Coons, Pratt & Whitney	Neil MacDonald, Federal Technology Week
Edward Gervais, Boeing	Maureen Pettitt, FAA	Fred Snyder, FAA
Conrad Gonzales, DOD	June Lidder, TRW	Paul Jones, FAA
Joseph McCormick	Bill Edmunds, ALPA	Donald Jones, FAA
Jean Watson, FAA	John Curley, TRW	Carole Schmidt, Crown
Terry Kraus, FAA	Marcie Romagnoli, TRW	Ken Hacker, FAA
Lorraine Iritano, SRM	Gloria Dunderman, Crown	

Attachment 3

Breakout Group Reports
From The Subcommittee Meetings
April 23, 1998

Includes Reports from the Following Subcommittee Groups:

Air Traffic Services
Airports
Aircraft Safety
Security
Environment & Energy

Report from the Subcommittee on Air Traffic Services

Chair: Ms. Nancy Price

Members:	**Participating Subcommittee Members:**
Mr. Richard Bustelo	Mr. John Fielding
Mr. Paul Fiduccia	Dr. Charles Gonzales
Mr. Paul Drouilhet	Mr. Raymond LaFrey
Mr. Jack Olcott	Mr. Joe McCormick
	Mr. Sieg Poritsky

1. Appoint a person reporting directly to the Administrator who is responsible for all aspects of the NAS. This person should be supported by a small system team responsible for planning the evolution of the NAS. The system team should be made up of the best and brightest from both the operational and development parts of the FAA. Other organizations and agencies can support this activity, but the responsibility and leadership must remain within the FAA.

2. NASA is a significant partner with the FAA in ATM R&D; the Committee recognizes the importance of coordinating the research between the two agencies. The ATS Subcommittee will include in its review all R&D activities (FAA, including CAASD and F&E Activity 1, and NASA) related to NAS, and will provide advice and guidance related to improving their coordination.

3. Strong, credible leadership is mandatory for success. Such leadership must include the willingness to make decisions when consensus can not be achieved.

4. It has been repeatedly stated by the R&D Advisory Committee that there is a need to strengthen the number and competence of the FAA's internal staff. Only with a strong internal capability can the FAA make good use of outside support.

5. Each year the Subcommittee and the FAA should jointly identify three or four areas for the Subcommittee to focus on. The selections should be made in the early fall to allow subpanels to be formed and meet with the FAA and the appropriate agencies involved (e.g., NASA, and CAASD) as well as others (industry, etc.) to develop findings and recommendations for these areas. Then the Feb./ March formal RPT review could have a broad overview of the RPT areas followed by presentations from each sub-panel discussion. This would enable a more thorough review effort in the selected areas.

6. We endorse the Task Force and RTCA recommendations for the early implementation of capabilities embodied in Free Flight Phase 1. However, Free Flight Phase 1 is the first step in a multistep process. The rapid movement toward the full implementation of the OPS Concept and the new architecture is essential for the evolution of the NAS system and the continued leadership of the US in the emerging global transportation system. It is critical that R&D programs continue in order to provide a basis for NAS modernization and continued system evolution. In particular, continued R&D effort will be required to achieve reduced separation standards in all domains and increased terminal and airport capacity to meet the growth projections of the next decade. The Subcommittee will assist in identifying the R&D needed to support decisions on the key technology choices facing the agency. This will assure stable decisions that are broadly supported by industry (e.g., GPS/WAAS backup, Loran C versus

skeleton VOR).

7. We are concerned that adequate attention has not been given to the pacing issue of weather. The FAA weather program has developed a number of weather products which can provide significant benefits to aircraft operations. The FAA should move aggressively to effect an operational deployment of these products, with emphasis on making them available to aircraft in flight.

8. The Subcommittee will work with the agency to develop a system engineering approach to define future stages of NAS Modernization research and development needs. This approach should be sufficiently broad in order to include technology elements, operating procedures, operator behavior, etc., and be used to identify key research issues and functional requirements which will support system-level decisions and manage development risk.

9. The industry and the FAA need better means for establishing the benefits of NAS modernization. The Subcommittee proposes more sophisticated ATC system performance measures to pinpoint concentrated areas for further R&D and system improvements. The Subcommittee recognizes the FAA's efforts in work begun with industry to improve performance measures and metrics. The Subcommittee firmly supports this work and urges that it be adequately funded. To further this work, the Subcommittee stands ready to help and advise. In addition, the Subcommittee proposes to work with the agency to develop NAS performance metrics.

10. A great deal of R&D money is being spent in Europe especially by EC and its project "partners." A mismatch in ATM approaches regionally will require aircraft operating globally to have multiple systems on board their aircraft. It is recommended that the FAA rebuild and strengthen its leadership role in international aviation.

11. If the FAA loses the initiative in developing new ATM approaches:

- a. The FAA will suffer further with respect to its reputation for technical and operational expertise and leadership.
- b. The nation will suffer as U.S. suppliers of nav/comm. equipment and software, both air- and ground-based, lose share overseas markets.

Subcommittee on ATS Considerations on FY 00 Portfolio

1. What is missing from the portfolio?

a. ADS-B can be zero funded if it is already funded in Flight 2000; otherwise funding should be allocated to Flight 2000 for ADS-B.

Funding needs to be allocated to en route automation, as this addresses the integration of the Free Flight Phase 1 capabilities. Postponement of this activity could seriously jeopardize NAS

modernization.

b. Which RPDs are not needed?

None.

2. Are the investment levels assigned to RPDs correct?

We think all of ATM R&D is underfunded. The scarce contract dollars were allocated as well as could be expected.

3. What specific opportunities exist to forge stronger partnerships?

Clear and concise decisions by FAA in terms of future deployed technology would foster increased industry participation in terms of privately funded R&D.

The FAA should use limited implementation programs where a partnership between FAA and industry is established with cost sharing to try out new technology, (e.g., the TCAS program in 1980s with several airlines and avionics manufacturers).

4. a. Has TAT responded effectively?

They listened and are responding; but they are limited by lack of funding.

b. What points were missed?

The RPDs should quantify the benefits of the research. TAT briefings should state what has been accomplished only during the last 12 months.

Report from the Subcommittee on Airports

Chair: Ms. Angela Gittens

Members: Mr. Edward Gervais (Participating Subcommittee Member)

1. It must be recognized that the return on tremendous investments in the country's Airfield pavements must be protected.
2. The relative small amount of R&D budget suggested for Airports, even at Tier One level, will support the commitments already installed at the test center pavement facility.

3. In the Year 2000 and again in 2002, the pavement test facility will have refurbishment costs of $1.6M, which is part of the sustained overhead required to run the test facility. This should not be a penalty against the balance of scarce fund made available for Airports R&D in the Year 2000.
4. If the Airports technology budget must absorb this bi-annual cost, then in Year 2000, the Subcommittee recommends eliminating RPDs 143, 136, and 589. This will delay needed results, but it is the trade-off against limping along with minimum funds to achieve limited results.
5. If other Airport R&D functions are dropped to response levels only, then wildlife, fire and rescue, and planning and design should all be dropped, if that would be the only way to achieve success on pavement tests.
6. NCARC, the Administrator, and industry, all purport to make capacity improvement a priority item; and four out of six Program Area Descriptions mention capacity or international agreements. Pavement life improvements leverage is evident and directly supports capacity; therefore, it should be strongly supported.
7. The movement to establish a performance-based organization for the ATC and research and acquisition portions of the FAA should stabilize funding sources. The Subcommittee supports this initiative.

Report from the Subcommittee on Aircraft Safety

Chairman: Mr. Jean McGrew (Acting)

Members: Mr. Paul Fiduccia, Dr. Aaron Gellman, Mr. Edward Stimpson

Particpating Subcommittee Members: Mr. Bill Bozin, Mr. William Edmunds

SPAS/ATOS

A major problem for the Subcommittee on Aircraft Safety (SAS) surfaced during the meeting on March 18 when we attempted to get information on the Safety Performance Analysis System (SPAS) design concepts to make more constructive comments on the RPDs. We were surprised that no SPAS demo was authorized for the SAS, and no details were forthcoming on SPAS performance indicators as currently implemented. This position was maintained even though the SAS made it clear that it did not require real data for the demonstration.

Further, the SAS was briefed on the new FAA Air Transport Oversight System (ATOS) program which encompasses SPAS. We tried to advise FAA that ATOS had all the potential for disaster since it is an attempt to significantly change how the FAA does business with industry without the benefit of constructive input from industry. The current plan was to inform the senior air carrier executive of our

position on ATOS on May 1, [1998] just before the first implementation phase.

After these discussions, the SAS concluded that it would recommend no funding to any Flight Standards Service (AFS)-sponsored information technical area work (SPAS-ATOS, etc.) until the SAS was briefed, and understood the program, then it would comment further. This recommendation would specifically impact RPDs 460 and 554. AFS committed to try to get official permission to demonstrate SPAS on April 22, in the afternoon before the full REDAC meeting at the Dulles Airport Hotel location. The SAS requested that all AFS sponsors (i.e., Program Managers, including Barbara Wright) participate in the discussions of SPAS/ATOS at the next meeting.

On April 23, 1998, the Aircraft Safety Subcommittee received a demonstration and briefing on the current SPAS version. While questions on SPAS development program remain, the Committee has agreed that the present version has merit and should receive continued funding. The SAS still has concerns about the FAA/Industry integration of SPAS (and ATOS). These will be reviewed in subsequent committee discussions.

Other RPDs

RPD 501 Aircraft Crashworthiness: AFS should find out what Northwest Mountain Region (ANM) and industry have done in the last nine years since the National Transportation Safety Board's (NTSB) letter on crash-resistant fuel systems, and have a sponsor briefing in August.

RPD 557 Aircraft Icing: Program Manager Charles Masters is to send Dr. Gellman his data related to the 20 years on accidents due to icing.

RPD 559 Electromagnetic T&A: The SAS needs to have a better understanding of DoD work on High Intensity Radiated Fields (HIRF), critical digital systems, and Commercial-off-the-Shelf (COTS). It may be that these issues need more money. The SAS requests a sponsor briefing in August.

NASA/FAA Interaction

The National Aeronautics and Space Administration (NASA) safety goal is an 80% reduction in fatal commercial and general aviation (GA) accident rates. How will progress against this goal be measured, assuming such a goal is reasonable at all?

The SAS supports joint FAA and NASA safety research, but would like to have clear integration and directions where NASA hands the research off to the FAA for implementation and certification. It should be recognized that NASA's strength is more (and is supposed to be) in research and the FAA's strength more in development.

The SAS feels NASA could and should invest more money in long-term research.

Action Items

Add an update of international events related to each RPD briefing package rather than as a bundle at the end.

Human Factors Division, AAR-100 to draft a Human Factors definition for the next Subcommittee meeting.

Airport and Aircraft Safety R&D Division, AAR-400 is to send the SAS the Volpe cost-benefit report and model as soon as it is done (by March 30).

Airport and Aircraft Safety R&D Division, AAR-400 is to send the SAS the Regulation and Certification (AVR) safety goal when it is established.

Other Comments

Global Analysis and Information Network (GAIN) is better understood by the SAS, and shows conceptual promise. Industry is interested in developing GAIN concepts.

Human Factors Division, AAR-100 will brief first at the SAS August meeting in Oklahoma City, and will follow Clyde Miller's briefing format per RPD breakout tasks and dollars per task in each RPD.

The SAS strongly recommends that the FAA support, and that there be immediate and direct AAR involvement with CAASD, for the Air Traffic Airspace's (ATA) safety priority initiative.

The SAS outlined their wishes for the Regulation and Certification (AVR)-National Resource Specialist (NRS) discussions in Oklahoma City. Questions for the August meeting with the NRS participants (about 6 participants) include: (1) Where do the individual NRSs stand on inputs to and coordination with R&D? How do the NRS relate to safety outputs-outcomes? (2) What new initiatives are under consideration in their areas of expertise? (3) In their estimation, what four new aircraft safety projects would make the FAA a better agency? (4) Are the NRSs facilitating the flow of technological information from aircraft, engine, and component manufacturers that will enhance the safety and economical performance of the products in the areas of their expertise?

Subcommittee on Aircraft Safety Portfolio Content

The SAS prefers the detailed breakdown of R&D programs into numerous RPD's as a method of

providing more detailed information to the SAS.

The SAS finds the content to be generally well developed in the safety area. SAS notes, along with the full Committee, that continued fiscal growth of all present RPD's is not fully rationalized and more careful scrutiny of the portfolio in in order. The SAS applauds the FAA's presentation of the "questions" as a timely reminder to the full Committee to fulfill its responsibilities. SAS concurs with a suggestion to move Human Factors work related to small aircraft training programs from the Human Factors TAT to the Safety TAT. SAS suggests that the Aircraft Icing RPD (557) be limited to propeller aircraft in the absence of definitive data on the need for such large transport aircraft, such data has been requested.

The SAS questions the level of funding increase for crashworthiness (RPD 501). The SAS suggests that more attention to reducing accident causes (which is consistent with the present national goals) would result in larger benefits that trying to make aircraft crash-proof.

AGATE Training

Any Advanced General Aviation Transport Experiment (AGATE) program research into new pilot curricula and employing new training technologies, should be funded under the Safety TAT Human Factors program (rather than the ATS TAT). Any such research may or may not be supported in this way, based on a review and report of the AGATE work being conducted at Embry-Riddle Aeronautical University. This review will be conducted by the Human Factors office, which will, in turn, report to the Safety TAT. This review will assess the value of AGATE work against the value of other Human Factors programs, such as Aeronautical Decision Making.

Partnerships

Regarding "partnerships," the FAA should systematically review each safety RPD (as well as many others) to determine major private and public agency beneficiaries of current or proposed R&D work. This will identify the most likely R&D "partners." A thorough analysis of estimated benefits to each party should made, and a funding proposal for joint R&D efforts developed.

In the course of estimating the value of benefits available to prospective partners (probability analysis), the FAA will find cases where such benefits exceed, often by a substantial amount, the actual R&D costs. Such cases allow possible transfer all R&D costs to the other parties involved, thus enabling the FAA to use its resources to pursue R&D which will not be done otherwise.

Report from the Subcommittee on Security

Chairman: Mr. James Pierce

Members: Mr. Viggo Butler, Dr. Dennis McLaughlin

Outcomes and Outputs

- Projects are appropriate to FAA Mission
- Goals are clear, quantified and appropriate

Project Mix

- No projects eliminated
- More emphasis on
  - Systems Analysis
  - Broader Architectural View
  - Systems Integration
  - Hardening of Narrow Body Aircraft

Partnership Opportunities

- Significant partnerships exist
  - Government Agencies
  - Academic Institutions
  - International
- Increase Involvement with Industry

FAA Response to Committee Guidance

- Response was appropriate
- No Additional Guidance

The RPD process

- RPD's should be TWO pages
- Emphasis on Performance Goals
- Align RPD's with Goals

- Identification of Technical Risks
- Cost benefit difficult for security

Report from the Subcommittee on Environment and Energy

Chair: Capt. Pat Andrews (Acting)

Members: Mr. John Begin (Participating Subcommittee Member)

1. The Subcommittee sees a significant threat to the health and growth of the aviation industry if awareness is not elevated with regard to the environmental impacts of aviation and the environmental benefits of NAS Modernization initiatives.

2. The cost-benefit analysis of CNS/ATM Free Flight initiatives should include a separate line item that specifies savings in terms of reduced nitrogen oxides (NOX) production and reduced fuel burn as well as lowered noise levels.

3. To provide the needed inputs, funding should be restored to the Free Flight environmental impact modeling. This funding of approximately $1.5 million should be incremental and not transferred from the noise budget items.

4. The FAA's Environment and Energy resources should continue their cooperative efforts with NASA, and Environmental Protection Agency (EPA) and also reach out for support from the American Petroleum Industry (API).

5. Regardless of what funding is recommended in the letter to the Administrator, it is essential that she be made aware that the environmental considerations of modernization must be anticipated, measured, and communicated early in the program to avoid derailing those efforts at a later and more critical phase.

Attachment 4

Breakout Group Reports
From The

Investment Portfolio
Discussion Groups
April 24
Includes Groups 1 & 2
4/24/98

Group 1

Chairman: Dr. Aaron Gellman

Members: Mr. Richard Bustelo, Mr. Viggo Butler, Mr. Robert Doll, Dr. Dennis McLaughlin, Mr. Jack Olcott

Participating Subcommittee Members: Mr. Edward Gervais, Mr. Bill Edmunds, Mr. Randy Kenagy (representing Mr. Bruce Landsberg), Mr. Lee Coons (representing Mr. Ed Crow)

- It is essential that the comparative advantages of FAA and NASA regarding R&D be identified objectives, with specificity, to assure there is no unwarranted duplication of effort between the agencies where Safety and ATM R&D endeavors are concerned. It will also provide greater assurance that the two agencies' R&D efforts will be coordinated and carried out in an efficient manner.

- Criteria must be developed for the discontinuance of R&D projects. Such projects should never be permitted to become entitlements for FAA personnel, contractors, or grantees.

- Budgetary placeholding must not be at the project or program level. Such an approach encourages continuation of projects and programs and they become entitlements. Budgetary placeholding must be a higher level, and should not require premature identification of continuing projects and programs for out-years.

- Managing certain R&D efforts is in a class of management efforts referred to as the "management of technology." This is especially the case where there is an emphasis on development. Particular examples can now be found in R&D related to ATS and Security. The FAA should reconsider the managerial philosophy and techniques traditionally employed, in order to assure that the best practices are being used in managing such projects.

- The National Resource Specialists (NRS) should advise on establishing R&D agendas relevant to their responsibilities.

- Tokenism must be avoided in arriving at R&D programs and budgets. Underfunded R&D is wasteful at best, and misleading to FAA consultants. While FAA requires expertise in support of its rule-making responsibilities, rarely is this end served by underfunding R&D projects. As an example, in many cases an NRS can serve this purpose.

Group 2

Chair: Ms. Nancy Price

Members: Dr. Satya Atluri, Mr. Paul Drouilhet, Mr. Paul Fiduccia, Ms. Angela Gittens, Mr. Jean McGrew

Participating Subcommittee Members: Mr. John Begin, Dr. Charles Gonzales, Mr. Joe McCormick

ATS

- In a single organization within the FAA, bring together all aspects of the NAS -- R,E&D, acquisition, operation and maintenance (but not certification) -- headed by a person reporting directly to the Administrator. This person should be directly supported by a small system team responsible for planning the evolution of the NAS. The system team should be made up of the best and brightest from both the operational and development parts of the FAA. Other organizations and agencies can support this activity, but the responsibility and leadership must remain within the FAA.

- Strong, credible FAA leadership is mandatory for success. Such leadership must include the willingness to make decisions when consensus cannot be achieved. There continues to be a need to strengthen the number and competence of the FAA's internal staff. Only with a strong internal capability can the FAA make good use of outside support contractors.

- Free Flight Phase I should only be the first step in a multi-step process. The rapid movement toward the full implementation of the Operational Concept and the new architecture is essential for the evolution of the NAS system and the continued leadership of the US in the emerging global transportation system. Continued R&D effort will be required to achieve reduced separation standards in all domains and increased terminal and airport capacity to meet the growth projections of the next decade. The FAA weather program has developed a number of weather products that can provide significant benefits to aircraft operations. The FAA should move aggressively to effect an operational deployment of these products, with emphasis on making them available to aircraft in flight.

- The industry and the FAA need better means for establishing the benefits of NAS modernization, through more sophisticated ATC system performance measures to pinpoint concentrated areas for further R&D and system improvements. The Subcommittee recognizes the FAA's efforts in work begun with industry to improve performance measures and metrics, and recommends this include the additional benefits of mitigating environmental impacts.

- FAA needs to address the certification process issues energetically, as it is a pacing item in NAS evolution. Certification must be end-to-end (ground and air) across the NAS system.

- It is recommended that the FAA rebuild and strengthen its leadership role in international aviation. A mismatch in air traffic management (ATM) approaches regionally around the world will require international aircraft to have multiple systems onboard their aircraft.

- Given the administration's requested budget level, the ATS budget of $50.0M has the right program balance. However, the following crucial R&D areas are not adequately funded.

AREA	Additional Funding Requested
ADS-B	$2.5M
Aviation Weather	$2.8M
Flight System Technology	$0.8M
Enroute Automation	$9.0M
NAS Management	$3.0M
TOTAL	$18.1M

Airports

- The Committee supports the Administrator's move to establish a performance-based organization for the air traffic control (ATC) and research and acquisition portion of the FAA because it would, among other thing, stabilize (make more predictable) funding.

- Research on pavement technology has a tremendous system return on investment; as well, the system has a tremendous infrastructure investment that should be protected.

- In the Year 2000, and again in 2002 the pavement test facility will have cost of $1.6M for refurbishment which is part of the sustained overhead that it takes to run the test facility. This should not be a penalty again the balance of the scarce funds made available for airports R&D in the Year 2000. (Requires bi-annual increases of $900,000.) If the airport technology budget must

absorb this bi-annual cost, then in the Year 2000, we recommend eliminating RPD's 143, 136, and 589. This delays needed results, but will be traded off against limping along with minimum funds for limited results.

Aviation Security

- Emphasize system integration and urge closer cooperation with airlines and airports by bringing them closer to the R&D process.

Environment and Energy

- To provide the needed inputs, funding should be restored to the Free Flight environmental impact modeling. This funding of approximately $1.5 million should be incremental and not transferred from the noise budget items.