

**Research, Engineering and Development Advisory Committee (REDAC)  
Federal Aviation Administration, Bessie Coleman Room  
800 Independence Avenue, SW, Washington, DC 20591  
June 8, 2004**

**Meeting Minutes**

On June 8, 2004, the Federal Aviation Administration's (FAA) Research, Engineering and Development Advisory Committee (REDAC) met in the Bessie Coleman Room at FAA Headquarters. Attachments 1 and 2 provide the meeting agenda and list of attendees.

**Welcome and Introductory**

REDAC Co-Chair, Dr. John Hansman and REDAC Executive Chair, Joan Bauerlein, welcomed members and visitors. After reading the public meeting announced, Ms. Bauerlein introduced the new members: Michael Bragg, John Douglass, Albert Kaehn, Arthur Lucas, Donald Richardson, Ronald Wickens, Christine Horne and John Wilding.

**Remarks – Hon. Marion Blakey**

Ms. Blakey stated the Committee is changing the way the government is doing business. The many organizations including the military, NASA and industry have been and will continue to be a great help to assure that our goals are met.

Even though we are experiencing difficult financial times, we will be able to get through this and continue to see the outstanding work that comes out of the committee.

**Reorientation of REDAC – Strategic Issues – Dr. John Hansman**

Dr. Hansman commented on the shift of R&D to F&E funds which has prompted the question of research for future considerations. He stated the REDAC should regain its original charter of a strategic nature instead of the current technical role that it has been playing.

Dr. Hansman would like to make the REDAC a more collaborative effort. He suggested that the subcommittees look at budgets further (perhaps out to '09). The meetings will change to have more issues brought to the table with written documents from the subcommittees. It would be good to see additional information as a resource for tasking to bring the community in. There is a strategic slant to this group. Even at a national level, where safety is important urgency is also important.

Ms. Blakey informed the Committee that in August or September, the FAA would be modifying the flight plan. The Agency is going to employ our research to make sure to keep our safety record high.

Mr. Paul Drouilhet agreed that the REDAC has an obligation to look at more strategic issues. A strong support of focusing on special studies and activities will be where the subcommittees could be of great service to the FAA.

Jerry Thompson commented that we need to concentrate on teamwork. Jerry feels that we are not doing enough with the productivity of the controller. This family of concerns will have to be handled by our own group. The increased traffic is a real concern and a human factors issue. What is the system going to look like for the control of traffic? There seems to be no money to transition important actions to the field. Only R&D and Data Link are available and should be used.

NASA representative, Vic Lebacqz reported that there is a Subcommittee on Aeronautics. There are four working groups one of which examines “systems” and is finalizing its data so that a report can be generated by the fall to integrate R&D requirements.

Mr. Steve Brown, FAA responded to Mr. Thompson's concerns about funding and shared that there is a real plan and a challenge that the committee will be considering. In challenging areas such as this, Mr. Brown is determined to become more knowledgeable in the key FAA challenges of the managers and what they are most concerned about.

#### **Discussion- REDAC'S Role and JPDO – Mr. John Kern**

Mr. John Kern, FAA, updated the Committee on the activities of the Joint Planning and Development Office (JPDO). He reviewed the implications for policy and the need to understand and resolve issues associated with alternative operational roles for pilots, controllers and others.

He stated the objective for CY 2004 is to build a framework for government, industry and partner to facilitate actualization for working transformation. In July a new plan will be issued and Congress will get the plan by December 12 of this year.

Dr. Hansman questioned what is the process for privatization? We know that the first year is when the foundation document is developed. Mr. Kern responded that products we produce in the system (about 40%) are exported out of the United States.

#### **Discussion- Strategic Direction for REDAC and '06 Program - Ms. Woodie Woodward, Ms. Sharon Pinkerton and Ms. Peggy Gilligan**

The Committee engaged in a lengthy discussion with FAA's Senior Management on their perspective programs.

Ms. Woodie Woodward stated testing for the larger aircraft such as Airbus vehicles and the design standards for developing aircraft. In 2002, GAO issued a report claiming that \$509M would be needed to update and widen taxiways. The statistical analysis showed that Airbus A380 would be able to utilize the existing taxiways.

1) Pavement Testing facility- Pavement strengthening for the A380 and other heavier planes, has shown a reduction in the thickness of the pavement. This has proved to be a substantial savings to the Agency.

2) Large Airport Research - National Academy of Science took part and is currently is working on a Memorandum of Understanding (MOU). There are already many proposals for research

from airports, which include safety, environmental design, and maintenance issues. \$26M in proposals has been received.

Programs that are developed would serve commercial and General Aviation (GA). The Transportation Research Board (TRB) is working with the FAA. We tried to shift the F&E money into the AIP. Congress has rejected those efforts.

### **REDAC - Role and the Work of the Joint Planning Development Office Subcommittee – Dr. John Hamre**

Dr. Hamre began his discussion stating that his group is actually a subcommittee within REDAC. He noted that Dr. Hansman will be the official for the committee. The Joint Planning Development Office Subcommittee is still in its infancy. The group first met on May 17<sup>th</sup> Bob Bryant, Esther Dyson, Paul Kaminsky, Herb Keleher, Gina Marie Lindsey, Les Lyles, Jim Pierce, Tom Morman, Vern Rayburn, John Hansman, first Amr ElSawy were present.

Immediate agreement was reached that a new system is needed. The following were noted as well:

- 1) Funding is the main concern and with current patterns, the future funding will be challenging.
- 2) A dedicated systems engineering capability is required.
- 3) It is hard to develop priorities since there are so many “hands” involved.
- 4) A master plan is needed but the focus is to build up the JPDO and get institutional buy-in now.

Dr. Hamre stated a memo has been sent to Secretary Mineta, Under Secretary Shane, and Administrator Blakey outlining observations and recommendations from their meeting. Administrator Blakey later in the day shared the memo with members and audience in attendance.

### **Continued - Discussion- Strategic Direction for REDAC and '06 Program – Ms. Woodie Woodward, Ms. Sharon Pinkerton and Ms. Peggy Gilligan**

Ms. Peggy Gilligan, FAA reviewed the Goals: 1) Continue operational safety, 2) Establish New Standards, and 3) Develop New Certification.

The R&D program supports the 1<sup>st</sup> two items above. The FAA uses R&D programs for the process to set the right standard so designers, builders and operators can do their jobs. We strive to get a good level of quality.

FAA has shared the mitigation for risk to be sure that we understood the airplane and ground system to establish the appropriate safety. This committee will help us complete this action. The key role for this committee is the integration of all the effective and efficient ways we can operate.

There is a growing focus on the capacity and efficiency. The AVR organization wants to be sure we are analyzing to make sure safety and efficiency are maintained, therefore we must balance these demands.

Dr. Hans Weber reported that the subcommittee concluded that Aircraft Safety should be taken out of ATO since the sheer size of the demands will be overwhelming to safety aspects. We recommend that they be removed. One option would be that they report to AVR.

Air/ground is part of the Operational Evaluation Plan (OEP) and there is a very structured process for requirements by contractors for services and products. It makes sense for the software in the plane and on the ground to be the same.

Ms. Sharon Pinkerton, FAA, mentioned noise and emissions are getting attention on the Hill. The work we are doing is critical. It is a major goal to increase capacity in an environmentally sound way. In addition, the FAA is aware that 80% of aircraft do not comply with air quality standards. Noise and emissions were looked at but now we have broadened this area. NASA is a key partner as is Transport Canada. We have to work together globally which includes the International Civil Aviation Organization (ICAO).

A new consideration is a carbon dioxide charge to be levied against airlines that do not comply with the emission standards.

The key concern that the FAA hopes to achieve is a reduction in both noise and emissions by 2007. We know that there will be new risks in an acceptable way (accident reduction). We are focused on an accident-free industry. There is a model (aircraft) for 4 persons (there will be 75 a/c built) and introduced into the system. We need to be able to see the signs to be ready for a regulatory framework for this new type of aircraft.

Noise has been a high visibility issue. Local airports are more of an air quality problem. In Europe, there is a proposal for a carbon dioxide environmental charge. The science and cost will have to be examined.

Capacity is going to be another looming issue--it is just a matter of when. Mr. Ray LaFrey mentioned that NEXRAD created a way to introduce changes.

It was noted that LAAS and WAAS have become more involved with each other to exchange information. In addition, shall some of the safety aspects revisited?

Ms. Gilligan replied that it doesn't have to be handled all on the ground and all in-flight. We will seem to do so in an ad-hoc basis.

Dr. Hans Weber indicated that another issue is automation. We are introducing new airframes, which will require that FAA look at the new automated systems. How far can we go to take the operator out of the loop? The era for this is approaching and studies are being done now.

Mr. Ron Swanda noted that this does pose some issues that can be confronted now. It is part of commercial aviation; it may be projected in a template for an ADE standard that might alter airport noise and other environmental issues.

The integrated cockpit is a safety concern. An FAA/NASA meeting held last month would result in a new roadmap. The NASA SAS program has great potential but will end in '06. Therefore, it is advisable to continue this program. The NASA vehicles systems program is key so the FAA continues its affiliation with it.

The model is to be an on-demand charter, there will be a current regulatory structure, and will monitor its usefulness. There will be some exemptions or changes needed.

A strategic question for our community is “how do we do things with a lower unit cost?” This is a new concept and FAA is aware that there are parts of government in financial trouble already.

### **Subcommittee Presentation of Written Reports**

In February and March 2004, the standing subcommittees reviewed FAA’s R&D investment areas, including air traffic services, airport technology, aircraft safety, human factors and environment and energy. After reviewing the respective investment portfolio proposed by FAA, each subcommittee generated recommendations and each of the subcommittee chairs presented recommendations to the Committee for FY 06. Attachment 3 provides the subcommittee reports.

|  |   |
|--|---|
| Subcommittee on Air Traffic Services   | Mr. Jerry Thompson                      |
| Subcommittee on Environment and Energy | Mr. Howard Aylesworth (for Dr. Clarke)  |
| Subcommittee on Aircraft Safety        | Dr. Hans Weber                          |
| Subcommittee on Airports               | Ms. Margie Tower-Smith (for Mr. Marchi) |
| Subcommittee on Human Factors          | Dr. Colin Drury                         |

ACTION- The 2005-2009 funding was reduced by \$5M. These issues must be added to the budget. Please get a copy of the report Clay

### **Additional Comments – Hon. Marion Blakey**

Ms. Blakey commented that the current fiscal environment is not likely to change very soon. JPDO does not have enough funding resources. The FAA finds that to be a fundamental issue and FAA estimates that \$3-4B more is required than is in the plan. In industry, we are mindful of these issues, but this is also something that resulted in the JPDO. This whole issue of resources and timing of how to present these to Capitol Hill continue to be a focal point in the committee. The operating budget is being reduced by labor agreement modification, staffing and funding issues.

### **Presentation on Unmanned Aircraft Vehicle (UAVs) – Mr. Phil Potter**

Mr. Phil Potter, FAA updated the Committee on the UAV program. He stated trying to introduce these into the National Airspace System (NAS) is to try to get an equivalent to the manned vehicle. Human performance and the sensor performance are also important. Another parameter would be operational response. There might be other traffic expectations.

Mr. Potter commented that the voice for data link is in use and is working well. There are system limitations and there can be a limited contact with the person on the UAV.

In flight control we need to decipher how the UAV would react in an emergency? None of the larger UAV’s have de-icing capabilities, and cannot do many things that manned vehicles can do. Apparently, the Department of Defense has developed a model that the FAA can study. The information is available here in the U.S. and abroad; therefore, the U.S. is not lacking information.

## **Approval of Oceanic and Sparse Area Communication Report - Mr. Paul Drouilhet and Mr. Jerry Thompson**

Mr. Paul Drouilhet, Workgroup Chairman, stated the report concentrates on the Oceanic and the most pressing problems there. The research that was done is included in the handouts given at the meeting. The detail is very extensive and too indepth to review here.

Mr. Drouilhet stated oceanic air traffic is growing both in the Atlantic and Pacific and the concerns of the area have introduced new automation systems. To get the benefit of these, good communication is needed between the ground and the aircraft where Automatic Dependent Surveillance (ADS) is used. The Reduced Vertical Separation Minimum (RVSM) has helped more traffic to operate on these preferred routes. This has delayed the impact on capacity.

He also mentioned Voice High Frequency (HF) radio is the means of communication between the aircraft and the control facility. Over the last few years, satellite communication has been introduced to provide more reliable means of contact. It works well, but it is expensive to equip and to operate.

The report was unanimously approved by the members.

### **Closing**

Dr. Hansman announced the next meeting will take place on September 14-15 in the Bessie Coleman Room at FAA Headquarters. He thanked the members and the meeting was adjourned at 4:00 pm. The members will receive the draft letter to the Administrator for comment. Final letter provided in attachment 4. Attachment 5 provides the letter transmitted to NASA Administrator, Sean O'Keefe and DOT Secretary, Norman Mineta.

### **ACTION ITEMS**

**ACTION** - REDAC will become more strategic and less technical. Additionally, the Committee should be more collaborative.

**ACTION** - Write a letter to NASA Administrator Sean O'Keefe and DOT Secretary Norm Mineta recognizing the excellent relationship that has been established over the recent past and hoping to encourage further interaction.

**ACTION** - The 2005-2009 funding has been reduced by \$5M. These issues must be added to the budget. Get a copy of the report Clay.

**ACTION** - Elevate the operating budget issue (inadequate funds) to Congress. The complications are labor agreement modifications, staffing just to name a few.

## Attachment 1

Research, Engineering and Development Advisory Committee  
Federal Aviation Administration  
Bessie Coleman Room, 800 Independence Avenue, SW Washington, DC  
June 8, 2004

### Agenda

|            |   |  |
|------------|---|--|
| 8:30 a.m.  | Welcome and Introductory Remarks<br>New Chairs – Dr. Hamre and Dr. Hansman<br>New Members                             | Mr. Steve Brown, FAA<br>Ms. Joan Bauerlein, FAA                                  |
| 8:45 a.m.  | Comments – Role of R&D in the ATO and<br>Relationship between REDAC and ATO   | Mr. Steve Brown, FAA   |
| 9:00 a.m.  | Comments  | Hon. Marion Blakey   |
| 10:00 a.m. | Comments – Reorientation of REDAC –Strategic<br>Issues  | Dr. John Hansman   |
| 10:30 a.m. | BREAK   |  |
| 10:45 a.m. | Discussion - REDAC's Role and the Joint Planning<br>and Development Office (JPDO)                                     | Mr. John Kern, FAA   |
| 11:15 a.m. | Discussion – Strategic Direction for REDAC and '06<br>Program   | Ms. Woodie Woodward, FAA<br>Ms. Sharon Pinkerton, FAA<br>Ms. Peggy Gilligan, FAA |
| 12:15 p.m. | Comments – Role and Work of Joint Planning and<br>Development Office (JPDO) Subcommittee                              | Dr. John Hamre   |
| 12:30 noon | Lunch   |  |
|            | Subcommittee Reports – Presentation of Written<br>Reports – Highlighting Strategic Issues for Future<br>work by REDAC |  |
| 1:30 p.m.  | Subcommittee on Aircraft Safety   | Dr. Hans Weber   |
| 1:45 p.m.  | Subcommittee on Environment and Energy  | Mr. Howard Aylesworth<br>(for Dr. John-Paul Clarke)                              |
| 2:00 p.m.  | Subcommittee on Air Traffic Services  | Mr. Jerry Thompson   |
| 2:15 p.m.  | Subcommittee on Airports  | Ms. Margie Tower-Smith<br>(for Richard Marchi)                                   |
| 2:30 p.m.  | Subcommittee on Human Factors   | Dr. Colin Drury  |
| 2:45 p.m.  | Break   |  |
| 3:00 p.m.  | Presentation on UAVs  | Mr. Glenn Rizner, FAA  |
| 3:30 p.m.  | Approval of Oceanic and Sparse Area   | Mr. Paul Drouilhet   |

Communications Report

Mr. Jerry Thompson

4:00 p.m.

Adjourn

Attendance List

Members

John Hamre (Chair)  
David Ashley  
John Douglas  
Ray LaFrey  
Donald Richardson  
Jerry Thompson  
Jim Wilding

John Hansman (Co-Chair)  
Michael Bragg  
Colin Drury  
Vic Lebacqz  
Margie Smith  
Dave Watrous  
Ron Wickens

Howard Aylesworth  
Sarah Dalton  
Albert Kaehn  
Art Lucas  
Ron Swanda  
Hans Weber

Joan Bauerlein, Exec. Director  
John Rekstad, FAA  
Susan Walsh, P&W  
Rick Zelenka, Boeing  
Randy Stevens, FAA  
Peggy Gilligan, FAA  
Sara Massey, ACI-NA  
Mark DePlasco, ATCA  
Karl Grundman, JPDO/NASA  
Terrence Hertz, NASA  
Lourdes Maurice, FAA  
Satish Agrawal, FAA  
Denise Daniels, DOT/OST  
Phillip Potter, FAA  
Gloria Dunderman, FAA  
Anne Cook, HSF  
Sharon Pinkerton, FAA

Patrick Lewis, FAA  
Andrew Lacher, MITRE  
Robert Jacobsen, NASA  
Dres Zellweger, JPDO  
Dennis Filler, FAA  
John Wiley, FAA  
Ian Redhead, ACI-NA  
Paul Drouilhet, MIT/LL  
George Marania, FAA  
David Hinton, JPDO  
Jenny Kishiyama, NASA  
Mark Rodgers, FAA  
G.Hardy Acree, SAC Intl. Airport  
James Sizemote, FAA  
Nelson Miller, FAA  
Marcello Mirabelli, FAA  
Woodie Woodward, FAA

Debi Bacon, FAA  
Charles Ruehle, FAA  
James White, FAA  
Chris Seher, Galaxy  
Steve Brown, FAA  
Walter Hett, WHA  
Gloria Kulesa, FAA  
Terry Kraus, FAA  
George Greene, FAA  
Pat Reese, FAA  
Mike Beanin, AIAA  
Frank Mangine, FAA  
Joyce Cole, HIS  
Steve Swartz, FAA  
Bill Bradford, FAA  
Steve George, FAA

## Subcommittee Recommendations for FY 06

### Subcommittee on Air Traffic Services

**The ATS Subcommittee is currently working on identifying the core technologies needed to support the next generation air transportation system. As this concept is fleshed out the committee would like to support these technologies for research and development.**

ATS Specific Recommendations concerning the FAA's FY06 budget

**1. National Plan for Transformation for Air Transportation:** The FAA must play a vital role as a system integrator to validate the foundation developed in the JPDO's National Plan. The transformed air transportation system must be scalable to accommodate and encourage growth in domestic and international transportation; accommodate a wide range of aircraft and types of operations; maintain safety and security; and minimize environmental impact and dependency on foreign energy sources. As the system integrator the FAA must ensure that the transformed system will meet national inter-modal and economic needs. The FAA must:

develop and validate joint requirements for all agencies, and develop viable transition strategies, including early implementation options;  
 integrate, evaluate, and validate potential "total-system" solution alternatives in a total system context that addresses all the National Goals simultaneously;  
 develop a system-wide transformation plan, including transition roadmaps; and,  
 develop a virtual laboratory across agencies to assess technologies and concepts for early implementation.

**Recommendation:** We believe the FAA budget for FY06 of \$3.5M, is insufficient for JPDO and FAA needs. This level of funding will have to be increased to support the development of the JPDO's National Plan and to fund its role of system integrator.

**2. Wake Turbulence Research** holds significant promise for great payoff in safety and capacity benefits. A joint FAA/NASA program is on-going whose content and research strategy agree with the recommendations of the independent joint study by Lincoln Laboratory and Mitre/Center for Advanced Aviation System Development. This research, if successful, will provide near term increases in runway throughput through procedural changes, mid-term benefits using weather dependent procedures, and long term benefits by incorporating automation enabled decision support tools. Potentially this research will yield a low-cost, high payoff method for increasing airport capacity.

**Recommendation:** We believe that the current funding of \$2M is insufficient to complete the research required for the current effort and will delay implementation of some capabilities. Also additional funding will be required to support new concerns brought about by domestic Reduced Vertical Separation Minimum (RVSM), Required Navigation Performance/Radar Navigation (RNP/RNAV) routes, and the introduction of the new Airbus 380.

**3. Weather-Efficiency:** The Aviation weather program has produced effective, and needed products and has more of them under development. The continued reduction in funding will either halt or slow work in many productive research areas.

**Recommendation:** We support and believe it is critical to have more accurate short-term weather predications and believe we need mid and long term predictions in convective weather. The FAA has really outreached with NASA to make sure both agencies are in sync. We believe the FAA should do the same with DOD, which may provide additional required funding.

**4. Human Factors:** The committee was briefed on the human factors program. We would like to see the Human Factors program look into the future NAS and assess the role of the controller, the pilot, the maintenance technicians and any new human roles identified. We would also like to assess the number of facilities, their size and the number of people required at each facility for the future NAS.

**5. SWIM:** The committee was briefed on the GCNSS program. The committee believes the network centric system is part of the future NAS and would like to know more and understand what and how the various projects fit together to achieve the SWIM functionality.

**6. Research Product Implementation:** The FAA has and continues to lack the funding or personnel resources to convert research products of its own R&D or that of NASA, Mitre, and DOD, into field implementable products. We believe the FAA needs to find a way to achieve this important activity if any research programs are to be successful.

### **Subcommittee on Airports**

The subcommittee met on March 9 & 10, 2004 in Atlantic City to review progress and provide guidance on development of the F/Y '06 funding request. Among the issues raised by the subcommittee were the following:

Strong support of the effort to develop bird detection radar under the wildlife hazards abatement program led to a recommendation to increase funding by \$200,000. The subcommittee recommends that the program use the additional funds to address human factors issues associated with real-time display of bird hazards in control towers and the transmittal of that information to air crews for avoidance purposes. The subcommittee recommended that funding be transferred from the proposed vertical flight lighting new start to accomplish this.

The subcommittee also recommended that increased emphasis be given to several airfield lighting issues, including:

Review of the efficacy of FAA adopting ICAO taxiway centerline light spacing standards in order to reduce costs.

Investigation of problems reported at several airports of significant variation in brightness by different types of taxiway centerline lights, even though all lights were set to the same intensity step.

Further effort to integrate energy-efficient Light Emitting Diode lighting fixtures into existing airfield lighting.

The subcommittee pointed out the need to coordinate research on deicing issues in the Airport Technology Research program with related work underway in the Aircraft Safety division at the Technical Center. The airports research program is struggling to find environmentally acceptable solutions to the huge quantities of deicing fluids being used while the aircraft safety program is investigating basic mechanisms of ice formation and the possible use of on-wing detectors to guide (and possibly reduce the quantities of) the application of deicers.

The subcommittee asked for research on airfield paints. Oil based paints are environmentally unacceptable, highway style thermoplastic paints pose a FOD risk if they peel off the pavement, epoxy paints cannot be applied over commonly used pavement seal coats and latex paints have unacceptable durability characteristics (in high traffic locations needing replacement every few weeks). Polyurea paints look promising but additional research on their suitability in airfield applications is needed.

The subcommittee recommended that research was not needed on the strengthening needed for airport taxiway bridges and culverts to accommodate the A380 aircraft, since standard civil engineering design practices were adequate.

Finally, in view of the resurgence of delays as the traffic recovers, the subcommittee urged FAA to consider adding an airfield capacity component to the Airport Technology Research program.

### **Subcommittee on Aircraft Safety**

The committee believes that Aircraft Safety-related areas of Chapters 6 and 8 and select portions of the F&E - activity 1 should be separate from ATO; placement under AVR is one option. The SAS has reviewed the Advanced Technology and Prototyping budget line items and believes the following should be part of the separation: GA/Vertical Flight Technology, Safer Skies, Airport Research, NAS, Safety Assessment, Cabin Air Quality Research, Separation Standards, and Lithium Technologies

UAV is an urgent issue that needs research support. The committee supports the UAV above-target initiative, but does not include UAV weather. With regard to flight in weather conditions, the committee believes FAA aircraft standards are adequate for design and production of UAVs. UAV weather capability should be part of the designing and operating certification of UAVs. Weather forecasting and information research should focus on improving forecast resolution and make it available to the aviation community as a whole and not compartmentalized into specialty areas. Finally, other government organizations should contribute to FAA UAV research.

Industry has reported on numerous occasions (e.g. RTCA TF4) that software certification is rapidly becoming the largest roadblock to introducing new technologies in all types of aircraft. The FAA's R, E&D priorities do not reflect this situation. The committee believes that FAA should increase efforts to develop new software assessment and validation tools that would decrease the cost and time involved in certifying software in new and existing digital products. The FAA's lack of support for software digital systems would indicate that it hasn't been presented properly. In order for FAA to better understand industry's problems with certifying software, and then develop solutions, FAA should ensure it has adequate interaction with industry, perhaps by increasing the number or expertise of its National Resource Specialists or

Chief Scientists in this area. The committee recommends that the software digital systems research requirements be reconsidered.

The committee noticed that there seems to be a proliferation of centers of excellence (COEs) proposals, e.g. composites, cabin air quality, and UAVs COEs. The committee is very concerned that this situation will diminish the value of COEs and may result in duplicative activities. The committee recommends that the FAA adopt a deliberative process that will determine if a COE is an appropriate vehicle for sponsoring research and assess the costs/benefits of creating the COE.

In setting safety-research priorities FAA should give high priority to research recommendations made by the CAST and the GA-JSC.

### **Subcommittee on Human Factors**

The Human Factors Subcommittee of REDAC met on 2/3 March at the FAA Technical Center to review the current portfolio of research projects, to consider responses to previous recommendations, and to receive briefings on one major area: Air Traffic Control and Airways Facilities Human Factors. We were also briefed on new information integration initiatives by Human Factors staff.

**As a result of this meeting, and subsequent discussions among the whole subcommittee, we have a number of issues, positive and negative, that need to be raised.**

**With the reorganization into an ATO structure, the subcommittee sees a potential for research to have too close a time focus.** Sponsors with requirements may not have the long vision needed to begin research whose payoff may be years away, but without which the effectiveness of future systems may be compromised.

**The HF organization in FAA needs to be able to pursue a long-term research plan as well as to respond to the plans of other groups, e.g., acquisitions.** The FAA also needs to recognize that even the best plans need to respond to rapid global and technological changes. Two specific needs seen by the sub-committee are:

**2A. Human Factors issues surrounding the introduction of UAV's into civil operations.** This is presently being responded to as an over-target item, but requires a fuller study. Such a study should begin by identifying all potential human interfaces to civil UAV operations so that responses to specific items can begin in a timely manner.

**2B. Human Factors implications of outsourcing, particularly to offshore locations.** The R&D program in HF has addressed parts of this in the maintenance domain but the advent of instant internet communications has raised the possibility of other functions being outsourced. These could include dispatch, planning and real-time maintenance advice by operators, as well as such FAA functions as Flight Service. The FAA/HF organization needs to study the potential HF issues for any services that are likely candidates for outsourcing and provide recommendations for maintaining low levels of error.

**3. Access for researchers to flight operations and other facilities has become more difficult in the current economic and security climate.** The FAA needs to develop a process to ensure

access to the operational environment by researchers. Human factors research needs to be grounded in actual operations to ensure validity and acceptance of results. In our report to the September 2003 REDAC, the HF Subcommittee recommended that the FAA act to review the Research Management Plan (RMP) process as it was severely hindering the HF research mission. (“Alternatives to the RMP should be identified for providing coordination for access to facilities for FAA funded research activities. ”) No action has been taken. The subcommittee recommends elimination of the RMP process.

**The FAA is establishing an ATC Safety Management and Oversight process. FAA’s HF expertise needs to be a core part of this process to ensure that human roles in achieving safety are considered in depth.**

Air traffic is expected to increase by a factor of two or even three over the next few decades. **Research is needed on human ATC limits on future growth and complexity expanding concurrent small-scale trials.** Separation responsibilities is seen as a divide-and-conquer approach until about 2015, but what will human roles be in systems that have to deal with volumes of traffic that preclude traditional approaches? These are difficult questions, and research may need to begin now if timely answers are to be found.

**The subcommittee was impressed with the work under way in Air Traffic and Airways Facilities.** The project on human factors at the OCC’s was commended for its comprehensive approach to finding HF issues, and for its active involvement with upper management to help insure implementation of interventions. This project would benefit from studying best practices in other countries and other industries. From these a better case can be made for investment based on life-cycle systems costs.

**Three projects helping integrate HF information showed considerable initiative, and are good examples of interagency cooperation.**

- 7A. The projects and requirements database.
- 7B. The government interagency HF database.
- 7C. The HF knowledge portal.

All three fulfill real needs within the FAA and are well designed. They also have considerable value to other agencies, and there is evidence that these agencies are using these tools. Such initiatives should receive publicity within the FAA and the HF profession as examples of good designs for functionality and usability.

### **Subcommittee on Environment & Energy**

**Observation:** The intergovernmental Joint Planning and Development Office (JPDO) is a Department of Transportation priority. Aviation noise and emissions could limit future aviation growth, and it is critical that FAA maintain a robust environmental R,E&D effort. Increased system capacity and reduction in operational delays are an important means to reduce aviation emissions. FAA R,E&D programs must be well coordinated among separate functional units to ensure program integrity and timely delivery.

**Recommendation:** AEE needs to be fully engaged in the JPDO process.

**Recommendation:** FAA must maintain a research effort that is operationally enabling.

Observation: AEE has identified the right priorities for the individual elements of its R,E&D threshold program based on the September 2003 constrained FY 2005-09 funding scenario. OMB has reduced funding for AEE R,E&D threshold program below this amount. In particular, the Aviation Portfolio Management Tool (AMPT) may be insufficient to meet projected needs. The AMPT, supported by the Aviation Environmental Design Tool, is intended to provide the cost-benefit analysis capability necessary for data-driven decision making.

**Recommendation: Increase AMPT funding to \$14.35 M over the next five years.<sup>1</sup>**

Observation: The environmental and economic impacts of aviation need to be considered within the context of those from other sources. Lack of measurement techniques and consistent methods to quantify emissions prohibits inter-modal comparison. Current modeling capability does not provide decision makers the tools to analyze inter-modal transportation issues.

**Recommendation: AEE must address measurement techniques and quantification of emissions in relation to those from other sources. Any R,E&D program augmentation will require new funding.**

**Recommendation: FAA work with the Department of Transportation to undertake development of consistent modeling capabilities to facilitate integrated cost-benefit analysis of aviation, rail, marine and road transport environmental issues.**

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<sup>1</sup> FY'05 = \$2.5M; FY '06 = 2.41M; FY '07 \$2.63M; FY '08 = \$3.37M; FY '09 = \$3.44M

PROFESSOR OF  
AERONAUTICS AND ASTRONAUTICS  
DIRECTOR  
INTERNATIONAL CENTER FOR AIR TRANSPORTATION

ROOM 33-303  
77 MASSACHUSETTS AVENUE  
CAMBRIDGE, MASSACHUSETTS 02139  
(617) 253-2271 FAX (617) 253-4196  
E-MAIL: rjhans@mit.edu

June 28, 2004

The Honorable Marion C. Blakey  
Administrator  
Federal Aviation Administration  
800 Independence Avenue, SW  
Washington, DC 20591

Dear Administrator Blakey:

On behalf of the Research, Engineering and Development Advisory Committee (REDAC), I wanted to thank you and the senior staff (Steve Brown, Woodie Woodward, Sharon Pinkerton and Peggy Gilligan) for engaging with the committee at the June 8 meeting.

I hope that this will be the beginning of a stronger and more strategic relationship between the FAA and the REDAC. I reiterate the strong interest of the committee to be a resource to you as issues emerge in the future.

I have attached the specific recommendations of the REDAC subcommittees (Aircraft Safety; Environment and Energy; Air Traffic Services, Airports; and Human Factors), which have been endorsed by the full REDAC.

In addition, a number of issues emerged in the discussions of the full REDAC, which you are aware of but whose importance we would like to highlight. These include:

- Need for a strategic national research vision as represented by the fledgling efforts of the JPDO.
- Emergent issues regarding the certification and operation of Unmanned Air Vehicles (UAVs) in the national airspace system.
- Persistent concerns regarding the level of understanding of issues regarding the development, certification and maintenance of high criticality software.
- Uncertainty regarding the impact of the Air Traffic Organization on the goals and structure of the FAA Research Program.
- Persistent concerns regarding the national level of investment in aeronautics research in general and the RE&D budget in particular.

Thank you again for your interest and participation. I, and the other members of the REDAC, are available if you would like to discuss these, or other, issues in more detail.

Sincerely,

R. John Hansman  
Co-Chair  
FAA Research, Engineering and Development Advisory Committee

## Attachment 5

PROFESSOR OF  
AERONAUTICS AND ASTRONAUTICS  
DIRECTOR  
INTERNATIONAL CENTER FOR AIR TRANSPORTATION

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(617) 253-2271 FAX (617) 253-4196  
E-MAIL: rjhans@mit.edu

June 28, 2004

Norman Mineta  
Secretary  
Department of Transportation  
400 7<sup>th</sup> Street, SW  
Washington, DC 20590

Sean O'Keefe  
Administrator  
NASA Headquarters  
300 E Street, SW  
Washington, DC 20024-3210

Dear Secretary Mineta and Administrator O'Keefe,

At the June meeting of the FAA Research and Development Advisory Committee (REDAC), the exceptional collaboration between the FAA and NASA in the initial development of the Joint Planning and Development Office (JPDO) received very strong approval from the committee.

The committee asked me to communicate to you our appreciation for the vision and leadership of Administrator Blakey and of Dr. Victor Lebacqz in actively supporting and encouraging this inter-agency collaboration.

As you both are keenly aware, a healthy aviation and air transportation system is crucial to the future well being of the nation. The vitality of our aviation system is in question. The collaborative efforts of the JPDO are a welcome move. The committee believes strongly that it will require a continued commitment to aeronautics of the agencies under your direction in order for the U.S. to retain or regain its leadership position in aeronautics.

Sincerely

R. John Hansman  
Co-Chair  
FAA Research, Engineering and Development Advisory Committee

cc: Dr. Victor Lebacqz, Associate Administrator for the Office of Aeronautics,  
NASA Headquarters  
The Honorable Marion C. Blakey, Administrator,  
Federal Aviation Administration  
REDAC