

REPORT

U. S. Climate Change Science Program (CCSP) Listening Session at the DOT – Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) 11th Advisory Board Meeting

**Wednesday, October 22, 2008
4:00 p.m. – 6:00 p.m.**

Hyatt Rosemont Hotel,
Rosemont, Illinois, USA

Introduction

On October 22, 2008, the U. S. Federal Aviation Administration, the National Aeronautics and Space Administration, and Transport Canada convened the 11th Advisory Board meeting of the Partnership for AiR Transportation Noise and Emissions Reduction (PARTNER).

PARTNER is an aviation related cooperative research organization, and a FAA/NASA/Transport Canada-sponsored Center of Excellence. It fosters technological, operational, policy, and workforce advances to improve mobility, economy, national security, and the impact of aviation on the environment.

The organization comprises nine universities, and 53 advisory board members. One of PARTNER's greatest strengths is the advisory board's diversity and inclusiveness. Its members include aerospace manufacturers, airlines, airports, national, state and local government, professional and trade associations, non-governmental organizations and community groups. They are united to foster collaboration and consensus to jointly advance environmental performance, efficiency, safety and security.

As an incentive to collaboration, equal matches are required for federal dollars granted to PARTNER. The universities provide some of these matching funds, but most are obtained from the organizations represented on the advisory board. This collaborative process has fueled unique research efforts involving a wide spectrum of participants.

The PARTNER Advisory Board is chartered to advise its Director on all aspects of the organization. In addition to providing general advice, the Advisory Board undertakes a yearly review of the core competencies of PARTNER and makes recommendations for enhancing the capabilities of the research team.

As the attached agenda indicates, the 11th meeting of the Advisory Board held in Chicago on 22 October 2008, reviewed 22 or its 23 active projects. Each project's status was presented over a two-day period. The first day (22 October 2008) focused on projects dealing with operations, fuels, air quality and climate. The second day was focused on interdependencies and noise. The CCSP listening session took place during the first day in the climate session. Also included in that session was a presentation of a project entitled "Assessing impact of aviation on climate," as well as an update on the Aviation Climate Change Research Initiative (ACCRI). Approximately 40 people participated in the listening session. An hour was scheduled for the listening session, but it actually went slightly longer. Dr. Jack Kaye (NASA) gave an introductory

presentation that included potential questions for discussion. The potential discussion questions were also provided to the meeting attendees at registration and are attached to this report. The following few pages encapsulate the comments and questions by the meeting participants, and the responses by Dr. Kaye during the listening session. Also included is a comment submitted by e-mail.

DOT Listening Session Comments, Questions and Responses

Comment – Uncertainties and gaps in our understanding of the current and projected impacts of aviation on climate and the metrics to characterize these impacts, cause decisions in forming US aviation policy to be made based on imperfect science. These decisions are needed in the 2009 to 2010 timeframe in order to affect the design of future aviation systems and operations. *[Ed.: I can't find specifically what these decisions are or what is driving the schedule.] (government agency executive)*

Response – In the near-term we have to evaluate specific scenarios (for instance) such as those identified in the Fourth Assessment Report (AR4) of the IPCC. To address the needs of the aviation community we need to know: what information is needed, the schedule for the decisions, and what are the relative priorities for this information? (long-term, what are the key issues?)

Comment – Two years ago the FAA presented their key research needs and recommendations. The answer (from the relevant CCSP agencies) was “we can help you.” Since then we have completed the ACCRI and organized the Environmental Working Group of the NextGen Joint Planning and Development Office. However, there were no new resources and there is general frustration with making decisions without adequate input. *(government agency executive)*

Response – The CCSP was asked to deliver on the goals set out in the strategic plan. However, since IPCC AR4 many are asking for information on which to make decisions. The need for this information is coming out loud and clear. More specification is required giving the information needed. The next administration may have to refocus priorities to address the issues coming forward.

Comment – There are disagreements in the community about global warming. The US Mayors got together after US didn't sign Kyoto Protocol and

requested the following: 1) consensus within the science community on the causes and consequences of climate change, and 2) a logical approach to assessing funding priorities. *(representative of local community organization)*

Comment – Two-thirds of every drop of petroleum is used by transportation with aviation being a small, but growing fraction of the total. Commercial air transportation is an industry that is estimated to contribute 3% to 8% to the U.S. GDP; it is also an industry that is very sensitive to a variety of economic and policy decisions. Understanding the climate impacts of emissions caused by aviation is insufficient. This lack of understanding is especially critical because of the unique nature of aviation’s impacts on climate due to operational requirements, and constraints like limited energy sources. Additional resources are needed to address this lack of understanding in time for industry-wide design and operations decisions are expected to be made in the next two years. *(government agency science manager)*

Comment – The frustrations being expressed at this listening session relates to the last presented discussion question: “What approaches should be modified/pursued to more effectively link research to decision making and the public interest?” We have people doing excellent science, but they need to communicate with decision makers. The international community needs to participate in the exchange. The last discussion question agrees with the last bullet of slide 6 giving the results of the NRC review of CCSP, i.e., “Progress in communicating CCSP results and engaging stakeholders is inadequate.” However, there is a lack of coordination and support for this activity by the federal government. In agreement with the first bullet of slide 6, the next administration should have a cabinet level position for climate change with broad budget authority. *(Executive officer with an aviation related research company)*

Response – CCSP is working to engage stakeholders with the purpose of informing future CCSP strategic planning activities.

Comment – Regulatory agencies (like FAA), which are more closely involved with the issues than are the science agencies, need to be directly supported for this work. *(government agency executive)*

Comment – In agreeing with previous comment, mentioned that focus of a regulatory agency differs from that of other agencies. Science agencies investigate the nature of the issue, where other agencies ask, “what can we do about it?” This commenter was in agreement with the purpose and mission of the CCSP listening sessions. (*commenter’s affiliation unknown*)

Comment – Climate science research shouldn’t go on “forever and a day,” but should take the attitude of “putting the scientist out of a job” once the problem is solved. This research is about solving a problem and then moving on. (*government agency science manager*)

Comment – The environmental impact studies started with congressional legislation directing decisions on noise abatement in aircraft operations. We need Congress to make a similar decision concerning aviation’s impact on climate change. Will CCSP or a related federal entity have access to the next administration for directed efforts and associated scheduling? (*executive with airport and airspace planning consulting company*)

Comment – Study results on aviation and environmental change are being published and presented by experts from many nations. Decisions need to be coordinated on an international level by the International Civil Aviation Organization (ICAO). (*Executive officer with an aviation related research company*)

Comment – The impacts of aviation on climate change involves quite different areas of research such as chemistry and transport in the upper atmosphere, and contrail formation. One of the challenges is to identify what will replace Kyoto in these vastly differing areas of applied research. How will the industry implement the results this research and on what schedule should it be implemented.

Comment received on-line

Comment - Thanks for the opportunity to comment on the climate change mitigation possibilities related to commercial aviation. Since I do not arrive in Chicago until Wednesday evening, I've attached a newspaper article and my response as a letter-to-the-editor of our local newspaper, the *Centre Daily Times* . I've also attached the text version of the response since the *.pdf scan is a bit difficult to read. [*Ed: Copied below*]

My claim is that investment in intra-city rail service is the near-term key to

reducing both airport congestion and carbon dioxide emissions produced by commercial air traffic. Use the large jet aircraft for transcontinental trips and leave the under-500 mile "spoke" commuter flights to high-speed rail. It certainly works well in Europe as demonstrated in the *.pdf scan of a recent article about the expansion of the European air-to-rail system as reported in *Aviation Week & Space Technology* . (University professor and aerospace consultant)

Referenced news article

The “Magic Bullet” for the Flight-Delay Problem

There is a “magic bullet” for the flight delay problem – “bullet trains”! Modern high-speed intercity rail service would also help mitigate several related problems cited in Prof. Smith’s editorial as well as making a significant reduction in greenhouse gas emissions. Since the 1950’s, this country made an enormous investment in the interstate highway system and since the 1970’s in aviation technology and airport infrastructure. What has languished during the past half-century is high-speed rail. America’s passenger trains are slow and are on time even less frequently than airplanes, due in part to sharing right-of way with freight. High-speed intercity passenger trains are common in Europe – the technology is well established and risk-free. A new rail system that could provide fast, all-weather intercity access and would also relieve the takeoff and landing congestion caused by the large numbers of smaller “commuter” aircraft. The co-location of airport and train terminals, so common in Europe, could provide the “spokes” in the current hub-and-spoke air-only system, leaving the transcontinental routes to larger aircraft with better passenger-mile fuel economy. When I was a child living in Los Angeles, a consortium of car companies and tire manufacturers bought the light rail system and tore up the tracks. What was good for GM (then) is no longer good for America (or the world). The political influence of the US automobile industry is waning; now is the time to invest in modern rail transportation.

DOT Listening Session - Discussion Questions

- ◆ **What are the biggest research gaps in understanding impacts of aviation on climate?**
 - Areas of greatest scientific uncertainty related to the physical and chemical consequences of aircraft emissions on climate change?
 - Aviation/Climate research areas most poised for rapid progress? Areas that will require long-term efforts?
 - Research approaches that should be pursued more aggressively?
 - Types of research to better inform decisions related to mitigating the climate effects of aviation?
- ◆ **What are the greatest observational/measurement needs?**
 - What specific types of observations would you require to better address your issues?
 - To what observational management/process/logistics issues should the federal climate program give more attention?
- ◆ **What are the greatest unmet modeling opportunities?**
 - What scientific approaches should be used to address those opportunities?
 - What infrastructural/process issues need to be readdressed?
- ◆ **What climate change information is needed to assess the extent to which you may change design, operations and/or procedures?**
 - How can climate information be best provided?
- ◆ **What approaches should be modified/pursued to more effectively link research to decision making and the public interest?**
 - International, national, and regional assessments
 - Routine provision of useful information (via a National Climate Service)
 - Decision-support research



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DRAFT AGENDA

WEDNESDAY OCTOBER 22, 2008

- 7:30 AM – 8:00 AM – *Registration / Light Refreshments –*
- 8:00 AM – 8:30 AM **Welcome / Overview of PARTNER (and other) Activities (Waitz)**
- Operations**
- 8:30 AM – 8:45 AM **Short Project Review: 10-minute presentation + 5-minute Q&A**
Project 22: Objective Measures to Support Airspace Management (Clarke)
- 8:45 AM – 9:45 AM **In-depth Project Reviews: 20-minute presentations + 10-minute Q&A each**
Project 4: Continuous Descent Arrival (Clarke)
Project 21: Airport Surface Movement Optimization (Balakrishnan)
- 9:45 AM – 10:30 AM **Operations Panel Discussion (brief intro of other projects, followed by discussion)**
Project 5: En Route Traffic Optimization (Clarke)
Project 23: Network Restructuring Scenarios for ATO Forecasts (DeLaurentis)
Project 4: Continuous Descent Arrival (Clarke)
Project 21: Airport Surface Movement Optimization (Balakrishnan)
Project 22: Objective Measures to Support Airspace Management (Clarke)
- 10:30 AM – 10:45 AM – *Mid-Morning Break / Light Refreshments –*
- Fuels**
- 10:45 AM – 11:15 AM **Short Project Reviews: 10-minute presentations + 5-minute Q&A each**
Project 27: Ultra Low Sulfur Jet Fuel Environmental Cost-Benefit Analysis (Waitz)
Project 28: Alternative Jet Fuels Environmental Cost-Benefit Analysis (Hileman)
- 11:15 AM – 11:45 AM **In-depth Project Review: 20-minute presentation + 10-minute Q&A**
Project 20: Emissions Characteristics of Alternative Fuels (Whitefield)
- 11:45 AM – 12:30 PM **Fuels Panel Discussion (brief intro of other projects, followed by discussion)**
Project 17: Alternative Fuels (Hileman)
Project 20: Emissions Characteristics of Alternative Fuels (Whitefield)
Project 27: Ultra Low Sulfur Jet Fuel Environmental Cost-Benefit Analysis (Waitz)
Project 28: Alternative Jet Fuels Environmental Cost-Benefit Analysis (Hileman)
- 12:30 PM – 1:30 PM – *Lunch Break –*
- Air Quality**
- 1:30 PM – 2:00 PM **In-depth Project Review: 20-minute presentation + 10-minute Q&A**
Project 16: Air Quality (Arunachalam)
- 2:00 PM – 2:45 PM **Emissions Panel Discussion (brief intro of other projects, followed by discussion)**
Project 9: Measurements of Emissions (Whitefield)
Project 11: Health Effects of Emissions (Levy)
Project 16: Air Quality (Arunachalam)
- 2:45 PM – 3:00 PM **Comments from Sponsors**
Transport Canada (Sattar)
NASA (Strazisar)
FAA (Maurice)
- 3:00 PM – 3:15 PM **Open time for discussion (All)**
- 3:15 PM – 3:30 PM – *Mid-Afternoon Break / Light Refreshments –*



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DRAFT AGENDA

WEDNESDAY OCTOBER 22, 2008 (continued)

- Climate**
- 3:30 PM – 4:10 PM In-depth Project Review: 20-min presentation + 10-min Q&A // Update: 10-min presentation
Project 12: Assessing Impact of Aviation on Climate (M. Jacobson)
Update: Aviation Climate Change Research Initiative (ACCRI) (M. Gupta)
- 4:10 PM – 5:10 PM U.S. Climate Change Science Program Stakeholder Listening Session: 60 minutes
Climate Change Listening Session (Jack Kaye)
- 6:00 PM – 7:30 PM **Networking Reception (Lindbergh Rooms C-D) -- Light Refreshments --**

THURSDAY OCTOBER 23, 2008

- 7:30 AM – 8:00 AM *-- Registration (for new arrivals) / Light Refreshments --*
- Interdependencies**
- 8:00 AM – 8:30 AM In-Depth Project Review: 20-minute presentation + 10-minute Q&A
Project 14: Environmental Design Space (Kirby)
- 8:30 AM – 9:00 AM Interdependencies Panel Discussion (brief intro of other projects, followed by discussion)
Project 3: Aviation Environmental Portfolio Management Tool (Waitz)
Project 14: Environmental Design Space (Kirby)
- Noise**
- 9:00 AM – 9:45 AM Short Project Reviews: 10-minute presentations + 5-minute Q&A each
Project 24: Noise Exposure Response: Annoyance (Davies/Sparrow)
Project 25: Noise Exposure Response: Sleep (Davies)
Project 26: Sound Structural Transmission (Li)
- 9:45 AM – 10:00 AM Open time for discussion (All)
- 10:00 AM – 10:15 AM *-- Break/Light Refreshments --*
- 10:15 AM – 10:45 AM In-depth Project Review: 20-minute presentation + 10-minute Q&A
Project 2: Thrust Reverser Noise (Atchley)
- 10:45 AM – 11:30 AM Noise Panel Discussion (brief intro of other projects, followed by discussion)
Noise Plan Update (Girvin)
Project 8: Sonic Boom Metrics (Davies)
Project 10: Noise Outreach (Hodgdon)
Project 19: Health Effects of Aircraft Noise (Davies)
Project 2: Sound/Emission Propagation (Sparrow/Atchley)
Project 24: Noise Exposure Response: Annoyance (Davies/Sparrow)
Project 25: Noise Exposure Response: Sleep (Davies)
Project 26: Sound Structural Transmission (Li)
- 11:30 AM – 2:30 PM Lunch and Parallel Closed Sessions
- Closed Advisory Board Session (McGrann agenda)
- PARTNER Investigators Session (folding walls dividing Coleman Rooms A-B)
- 2:30 PM – 4:00 PM **Advisory Board Report-out and Feedback, Meeting Wrap-up and Adjournment**