

TRB AV030

Environmental Impacts of Aviation

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**Transportation Research Board
AV030 Environmental Impacts of Aviation Committee
Mid-Year Meeting Minutes
May 28-30, 2008
Toronto, Ontario, Canada**

Wednesday, May 28, 2008

Attendees participated in a tour of Bombardier's Customer Response Centre and "Q400 Green Machine" Production Facility.

Thursday, May 29, 2008

1. Welcome and Introductions

Mary Ellen Eagan, Chair, welcomed participants (listed on page 6). Thanks were expressed to Steven Davis-Mendelow for organizing and hosting the day's meeting.

2. Joint Meeting of AV030 Sustainability and Climate Sub-committees

John Putnam and Burr Stewart kicked off a joint meeting of the AV030 subcommittees on sustainability and climate change.

A. Emissions Credits, Trading & Impact in Canada

Judith Hull (Environment Canada), chair of the ICAO/CAEP Sub-Committee on market-based measures, gave a presentation on the Canadian government's perspective on climate change actions.

- Canada intends to propose climate change regulations this fall which will achieve about half of required emission reductions to reach their goal of an absolute 20% reduction from 2006 levels in GHG emissions by 2020 (330 megatons). Canada's GHG emissions are currently 25% above 1990 levels although they are committed to Kyoto goals.
- A domestic carbon trading market and offset system to be established. They project \$65/ton for carbon credits by 2018.
- Transportation to be addressed through fuel consumption standards, renewable fuel content requirements, etc. Transport Canada is responsible for these initiatives.
- Judith noted that Canada supports ICAO's work to address GHG emissions.

B. Well-to-wake Analysis of Alternate Jet Fuels

Jim Hileman (MIT) discussed work being conducted at MIT through PARTNER regarding alternative jet fuels. The goal of the work is to determine if there are alternative fuels for commercial aviation that could reduce price and price volatility of jet fuel and environmental impacts.

- Potential fuels under consideration include Fischer-Tropsch; biojet, biokerosene, and biodiesel; and ultra low sulfur jet fuel.
- Work is also being done by the University of Missouri Center for Science and Technology to study aircraft particulate matter measurements.
- Fuel life cycle being examined for emissions from “well-to-wake.” Includes entire process from extraction, refinement, transport, and combustion. Based on initial calculations of life-cycle carbon dioxide emissions, biomass to F-T fuel has lowest fossil CO₂ intensity.
- PARTNER is working with RAND to analyze fuels and feedstocks using comparison metrics: usability in current systems, fuel readiness level, production potential, CO₂ emissions (well-to-wake and tank-to-wake), air quality, and merit of aviation use.

C. **Future Research Needs**

Participants discussed ideas for future research needs:

- Where does feedstock come from (not unique question for aviation)?
- What is the impact of developing large-scale alt fuel industry?
- What emissions result from use of alt fuels?
- What is the impact of alt fuels on air quality and climate change (in particular)?
- How is cost analysis conducted?
- How would reduced cost of oil impact the incentive to investigate alt fuels? It was noted that TRB and similar entities need to continue to drive the research, keeping in mind that the current incentive is not just cost, but also environmental impacts (which will continue to exist).

3. **AV030 Committee Business**

A. **Introductions**

Mary Ellen Eagan welcomed participants who introduced themselves. Steven Davis-Mendelow welcomed participants on behalf of Bombardier who hosted the day’s meeting.

B. **Committee Membership**

Committee member rotations are up at the end of 2008. Christy Gerencher will discuss this process at the meeting in January. There are some open positions on the Committee, but we can wait until next year to fill those positions for full 3-year terms. Those interested in membership should contact Darcy Zarubiak. TRB must ensure varying representation on the Committee. Members were reminded that they received discounted registration for the TRB Annual Meeting.

C. **Review of Minutes from Annual Meeting**

Jessica Steinhilber reminded participants that the minutes from the Annual Meeting were circulated shortly thereafter. Any changes should be sent to Jessica.

D. Mission Statement

Steven Davis-Mendelow led a discussion of the Committee's mission statement, which has not been reviewed recently. Steven will develop a draft revision for consideration at the January 2009 meeting. Christy reminded the Committee that revising the Committee Scope requires going through a formal Committee and TRB review and approval process. Burr will assist Steven. Christy can provide assistance and TRB perspective.

E. Website

The Committee's website is <http://www.trbav030.org/>. All presentations will be posted on the website. To reduce duplicate emails, a consolidated email list will be developed from the subcommittee email lists.

F. TRB Announcements

Mary Ellen will circulate the TRB Aviation Group newsletter with the minutes. Several aviation committees are meeting in DC next week. The committee chairs will meet next week to discuss session allotments at the Annual Conference.

Papers for the TRB Annual Meeting are due Aug 1 if in PDF form; July 27. During the second week of August, Committee members will be solicited to review papers.

148 problem statements were received for ACRP FY09 funding. Committee chairs will be asked to review problem statements. This committee will receive environmental problem statements for input. The ACRP AOC will meet July 20-21 to select projects under the assumption that funding will be provided. Shortly thereafter, new ACRP projects will be announced and solicitation for oversight panels will be put out. ACRP is also seeking input on the program overall, including input on current and emerging issues and feedback on final products. ACRP is looking at how to be strategic in selecting projects.

Francis X. McKelvey award nominations are being accepted until August 1. Nominations through the committee are encouraged.

TRB is setting up webinars. Each can have about three speakers and be about 2 hours, similar to an Annual Meeting session. There is a \$99 log-in fee for each webinar. Over 1000 people participated in a recent webinar on climate change. The committee was encouraged to host a webinar to allow for discussions on topics that cannot get into the Annual Meeting.

G. Critical Issues in Aviation and the Environment

The Committee's Critical Issues paper can provide input to research needs. The paper is currently being updated, although progress is slow. Climate, life-cycle costs, and alternative fuels sections are now being added. The goal is to complete revision in order to get it published for the TRB Annual Meeting in January. Dave Bell is providing overall editing, but all sections have not been sent to him.

All Committee members must review and approve it before it goes to TRB for internal review. Input from Committee friends can also be solicited. Mary Ellen and Dave will circulate a draft once all sections are received. It was suggested that a section on Sustainability should be added for the next revision. Cheryl Koshuta and Burr Stewart volunteered to draft that section.

H. **Annual Meeting**

Nate Brown reported from the TRB Energy and Climate Change Special Task Force which is cataloguing TRB climate change activities and how to integrate those issues into the Annual Meeting. The TF is meeting June 15 meeting to develop a roadmap of activities related to TRB and climate change. Input is sought from all TRB committees on topics and strategic plans for climate change. A draft roadmap document will be circulated for input. A workshop on the science of climate change will be held at the TRB Annual Meeting.

4. **Oil Depletion and the Future of Aviation**

Richard Gilbert, author of “Transport Revolutions: Moving People and Freight Without Oil,” gave a presentation on oil depletion and the future of aviation. He emphasized a future with electrified land transportation. He noted that oil production has peaked in 55 out of 65 oil-producing countries and production is expected to decline over the next couple decades even though consumption will continue to increase. Aviation is likely to be the most affected transport mode because it is the least fuel-efficient mode, there are low or no fuel taxes, and there is no alternative to current fuel. He predicts that future aviation will depend on large, fuel-efficient aircraft. He also predicts that the number of airports with scheduled flights will decrease from 330 to about 30.

5. **Update on the ACCRI Science Initiative**

Mohan Gupta provided an update on the Aviation Climate Change Research Initiative (ACCRI).

- ACCRI aims to facilitate the NextGen goal of limiting or reducing the impact of aviation emissions on global climate. Participating agencies include FAA AEE, NASA Earth Science Division, NOAA, and EPA. ACCRI has an objective of identifying and addressing key scientific gaps and uncertainties on a priority basis while providing timely scientific input to inform optimum mitigation actions and policies.
- White papers have been developed on: UT/LS chemistry and transport; contrail and cirrus clouds: formation, microphysics, and lifecycle; contrail and cirrus clouds: optics and radiation; and climate impacts and metrics.
- A science meeting was held in February to develop a consensus on the white paper findings and integrate those findings into a report with recommendations for the way forward. The report should be publicly available in early August 2008. Findings will also be published in a peer reviewed journal.
- Going forward, ACCRI will be a multi-year priority research-driven program with responsibility for delivery of realistic outcomes scheduled to match decision-making. Steering group being formed. Comprehensive work plan under development. Funding is being worked out.

- It was suggested that this issue be the subject of a webinar or Annual Meeting session.

Friday, May 30, 2008

7. **Trade-offs of Economic and Environmental Costs & Benefits**

Anuja Mahashabde (MIT) discussed tradeoffs and interdependencies of economic and environmental costs and benefits. Through PARTNER, tool suite under development that allows for analysis of cost-benefits of various environmental policy decisions/scenarios. CBA allows for decreased uncertainties.

8. **2009 TRB Annual Meeting Planning**

TRB is considering the pros/cons of moving the Annual Meeting to other locations within DC, but the cons appear to outweigh the benefits.

Participants discussed possible sessions and workshops for the Annual Meeting and identified topics Mary Ellen will propose at the Annual Meeting planning session:

- **Understanding EPA's Proposed Effluent Limitation Guidelines for Airport Deicing Runoff:** This session will provide a report on proposed Effluent Limitation Guidelines (ELG) regulation, currently scheduled for publication in November 2008. The expert panel will focus on (1) explaining EPA's conceptual approach to regulating the industry; (2) the operational, engineering and economic impacts of the proposed rule; (3) research needed to support development of a sound final rule; and (4) research that may be needed to support cost-effective compliance. This topic is best suited for a session as it consists primarily of information delivery as opposed to roundtable discussion.
- **Developing Greenhouse Gas Inventories for the Aviation and Maritime Sector:** This session will include a discussion of the ACRP methodology for conducting an airport GHG inventory and how similar inventories can be conducted in the maritime sector.
- **Impact of Climate Change on Aviation Infrastructure Adaptation (proposed for joint session with AV070):** This session will discuss potential impacts of climate change on aviation infrastructure and related environmental impacts, with a focus on planning for adaptation.
- **Science of Aviation Climate Change:** This session will cover the five pillars of aviation climate change, including discussion of alternative aviation fuels.
- **Proposed Workshop - Reducing Your Aviation Carbon Footprint:** This session will provide practical and innovative ways for reducing aviation's carbon footprint. The workshop will present a number of case studies from airports, airlines, and manufacturers, and will allow sufficient time for a facilitated discussion among participants.

Other topics proposed included:

- Joint session with noise committee on ACRP and PARTNER noise project results.
- Status of research regarding the formation and impacts of contrails and cirrus clouds.
- Choice of metrics to assess climate impacts of aviation.

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- Emissions characteristics of aviation synfuels and biofuels.
- Other alt fuels issues.
- Joint consideration of maritime and aviation climate issues, especially institutional similarities.
- Getting out of the “blame game” – arguing about who is the dirtiest among modes – dialogue among modes on impacts and possible controls.
- Carbon offsets and neutrality – what is being done, what impact is it having, what can we learn, how do we evaluate standards?
- Tradeoffs between various environmental impacts.
- A workshop will be held on the science of climate change organized by the special task force on energy and climate change.
- Webinar on aviation climate change science.
- Airport Compatibility Committee AV070 organizing session on consideration of climate change and air quality issues in infrastructure planning. We can jointly sponsor.
- Multi-modal session on contributions to climate change. Suggested for special task force to consider.

9. **Research Needs and ACRP**

- Research needs to be done on what aviation’s contribution to climate change is and the sources/reliability of commonly cited data.

10. **Adjourn**

The meeting adjourned and Randy McGill led participants on a tour of Toronto Pearson International Airport.

Participants

In Person:

Nate Brown (FAA)
Jim Hileman (MIT)
Christy Gerencher (TRB)
Lourdes Maurice (FAA)
Mohan Gupta (FAA)
Andrew MacTaggart (Pratt & Whitney)
John Putnam (Kaplan Kirsch & Rockwell)
Judith Patterson (Concordia University)
Joel Zhengyi Shon (Taiwan Univ. of Tech.)
Randy McGill (GTAA)
John Pehrson (CDM)
Darcy Zarubiak (Jacobs Consultancy)
Anuja Mahashabde (MIT)
Tim Pohle (ATA)
Jessica Steinhilber (ACI-NA)
Mary Ellen Eagan (HMMH)
Steven Davis-Mendelow (Bombardier)

Via Phone:

Mary Vigilante (Synergy Consultants)
Geoff Gosling ()
Burr Stewart (Port of Seattle)
Tom Klin (CH2M HILL)
Judith Hull (Environment Canada)
Anne Kohut (Airport Noise Report)
Cheryl Koshuta (Weston Solutions)
Jennifer Salerno (Booz Allen Hamilton)
Doug Smith (ENSR/AE Com)
Mike Kenney (KB Environmental)
Richard Davis (Beveridge & Diamond)
Chowen Wey (NASA)
Roger Johnson (LAWA)