Minneapolis/St. Paul International Airport (MSP)  
Noise Oversight Committee (NOC)  
Meeting Agenda  
November 17, 2010  
1:30 P.M.  
Lindbergh Conference Room  
MAC General Office Building  
6040 28th Avenue South  
Minneapolis, MN 55450  
(Vern Wilcox, Bloomington City Council Member & NOC  
Co-Chair, will be the acting Chairperson for the meeting)  

*Note: 1:00 to 1:30 – Committee Agenda Review Session  
(NOC members only in the Coleman Conference Room)  

1. 1:30 to 1:45 – Public Comment Period  
2. 1:45 to 1:50 – Review and Approval of September 15, 2010 NOC  
Meeting Minutes  
4. 1:55 to 2:05 – Review Status of FAA Center of  
Excellence/PARTNER, TRB and FICAN Initiatives  
5. 2:05 to 2:20 – Review of Aircraft Fleetmix Trends at MSP  
6. 2:20 to 2:30 – MSP 2030 Development Phases 1 & 2  
Environmental Review Process  
7. 2:30 to 2:40 – 2010 NOC Accomplishments and 2011 NOC Work  
Plan  
8. 2:40 to 2:45 – Comments From 4th Quarter 2010 Public Input  
Meeting  
9. 2:45 – Adjourn
MEMORANDUM

TO: MSP Noise Oversight Committee (NOC)
FROM: Chad E. Leqve, Manager – Aviation Noise and Satellite Programs
SUBJECT: REVIEW STATUS OF FAA CENTER OF EXCELLENCE/PARTNER, TRB AND FICAN INITIATIVES
DATE: November 3, 2010

The 2010 Noise Oversight Committee Work Plan includes a review of the various projects being conducted by the Partnership for Air Transportation Noise and Emissions Reduction (PARTNER), the Airport Cooperative Research Program (ACRP), and the Federal Interagency Committee on Aircraft Noise. Below is a brief description of each organization and a table summarizing its respective projects and their status. At the November 17, 2010 NOPC meeting staff will provide a briefing on this topic.

The Partnership for Air Transportation Noise and Emissions Reduction (PARTNER)

PARTNER is a leading aviation cooperative research organization, and an FAA/NASA/Transport Canada-sponsored Center of Excellence. PARTNER research fosters advances in alternative fuels, emissions, noise, operations, aircraft technologies, and science and decision-making for the betterment of mobility, economy, national security, and the environment. The organization’s operational headquarters is at the Massachusetts Institute of Technology.

While there are projects and studies being undertaken by PARTNER to address many environmental facets of transportation, below is a summary of projects specifically related to aircraft noise, aircraft operations, and land use planning:

<table>
<thead>
<tr>
<th>Research Project Number</th>
<th>Research Project Title</th>
<th>Research Project Description Summary</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Project 1</td>
<td>Low Frequency Noise Study</td>
<td>The Low Frequency Noise Study evaluated the perceptual impact of low frequency aircraft noise. It encompassed many factors, including the source level and its spectrum; atmospheric propagation; the impact on homes in the form of noise, vibration and rattle; subjective perception and annoyance; and the ability of metric calculations to predict the physical and perceived impact. Its goal was to enhance metrics currently used in the FAA's Integrated Noise Model, and to identify alternative algorithms that predict the impact of low frequency noise and its perceived annoyance. The report is available at: <a href="http://web.mit.edu/aeroastro/partner/projects/project1.html">http://web.mit.edu/aeroastro/partner/projects/project1.html</a></td>
<td>Project Completed April 2007 [Report No. PARTNER-COE-2007-001]</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Project 1.5</td>
<td>Passive Sound Insulation</td>
<td>The objective of this research is to produce a comprehensive Model Development Plan (MPD) that will guide future development of a model to facilitate integrated quantification of multimodal noise and emissions (e.g., aviation, rail, transit, maritime, and roadways), as well as assist with economic analysis of alternative scenarios. This research will define the process required to create this model, but will not result in the actual development of the model. The model that will result from implementing the MDP should be designed for use by airport operators, planning and regulatory agencies, airlines, and other relevant stakeholders. The report is available at: <a href="http://web.mit.edu/aeroastro/partner/reports/proj1/proj1.5report.pdf">http://web.mit.edu/aeroastro/partner/reports/proj1/proj1.5report.pdf</a></td>
<td>The interim report was published January 2008. [Report No. PARTNER-COE-2008-003] Phase II work is currently underway and the final report was expected in early 2010.</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Project 1.6 [Complete d]</td>
<td>Vibration and Rattle Mitigation</td>
<td>A by-product of low frequency sound incident on a building façade is the excitation of structures within the building into vibrations. Such acoustically-induced structural vibrations may be imperceptible, but they may cause rattle. Analytical models of idealized systems which have the potential to rattle were developed in this investigation. From the analytical models, rattle onset thresholds were determined for simple models of various household components such as: window systems, wall hangings, door latches and bric-a-brac. The analytical rattle onset models provide guidelines for design to mitigate rattle. This report is available at: <a href="http://web.mit.edu/aeroastro/partner/reports/proj1/proj1.6report.pdf">http://web.mit.edu/aeroastro/partner/reports/proj1/proj1.6report.pdf</a></td>
<td>The interim report was published January 2008. [Report No. PARTNER-COE-2008-004]</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
</tr>
</tbody>
</table>
| Project 2 [Active]      | Source Emission and Propagation | The Source Emission and Propagation Project has the goals to provide a better understanding of aviation noise problems and to contribute to the development of improved noise impact prediction tools that lead to developing solutions. Project 2 is primarily concerned with the radiation (emission) of sound from aviation noise sources and how that sound is transmitted (propagated) from noise source to receiver.  

Anticipated outcomes include improved understanding and tools for predicting the noise of aircraft during all phases of operation, from takeoff to landing.

More information about this project can be found at: http://web.mit.edu/aeroastro/partner/projects/project2.html | Not completed at this time. |
<table>
<thead>
<tr>
<th>Research Project Number</th>
<th>Research Project Title</th>
<th>Research Project Description Summary</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project 3 [Active]</td>
<td>Valuation and Trade-offs of Policy Options</td>
<td>The benefits and environmental impacts of air transportation are highly interwoven products of a complex interaction of interdependent technological and operational systems, operating within policy constraints and evolving with market conditions. The overall objective of Project 3 is to enable better communication and decision-making in addressing the interdependent environmental effects of aviation by being able to fully assess the benefits and costs of interdependent policies, technologies, operational procedures, and market conditions. Major aspects of this project include: <strong>REPORT TO CONGRESS: AVIATION AND THE ENVIRONMENT</strong> --In December 2003, as part of HR 2115 Vision 100-Century of Aviation Reauthorization Act. Congress required the Secretary of Transportation, in consultation with NASA, to study reducing aircraft noise and emissions, and increase fuel efficiency. the study was conducted by PARTNER and can be found at: <a href="http://web.mit.edu/aeroastro/partner/reports/congrept">http://web.mit.edu/aeroastro/partner/reports/congrept</a> Aviation_envirn.pdf <strong>AVIATION ENVIRONMENTAL PORTFOLIO MANAGEMENT TOOL</strong>-- There is a need for analytical tools that can effectively assess interdependencies amongst emissions, and between noise and emissions, and that can effectively analyze the benefit-cost of proposed actions. A description of this tool can be found at: <a href="http://web.mit.edu/aeroastro/partner/apm">http://web.mit.edu/aeroastro/partner/apm</a> t/index.html More information about Project 3 is available at: <a href="http://web.mit.edu/aeroastro/partner/projects/project3.html">http://web.mit.edu/aeroastro/partner/projects/project3.html</a></td>
<td>This effort is ongoing.</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------</td>
<td>-------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Project 4 [Completed]</td>
<td>Continuous Descent Arrival</td>
<td>Continuous Descent Arrival is also referred to as the Continuous Descent Approach, and is now called Optimum Descent Profile (OPD). OPD has proven, through both simulation and flight demonstration tests, to be highly advantageous over conventional arrival and approach procedures that require combinations of level flight segments and descents (“dive-and-drive”). These advantages provide ample motivation for research efforts to further develop OPD for implementation in low-density through high-density traffic. OPD's environmental and economic benefits were demonstrated by PARTNER researchers in flight tests at Louisville International Airport in 2002 and 2004, and Atlanta Hartsfield-Jackson Airport in 2007. Successful implementation was also achieved at Los Angeles International Airport in 2007 and Atlanta in 2009. This goal of this research was the development of prototype tools and protocols for OPD arrival sequencing and spacing, leading to quieter and more fuel efficient arrivals. This report is available at: <a href="http://web.mit.edu/aeroastro/partner/reports/cda_rpt.pdf">http://web.mit.edu/aeroastro/partner/reports/cda_rpt.pdf</a></td>
<td>Published January 2006 Report No. PARTNER-COE-2005-02</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Project 5</td>
<td>En Route Traffic Optimization to Reduce Environmental Impact</td>
<td>Air traffic delays due to congestion in the National Airspace System are a source of unnecessary cost to airlines, passengers, and air transportation-dependent businesses. Delays also have a negative environmental impact. The magnitude of air traffic delays indicates that the current air traffic control infrastructure is not capable of handing current traffic levels. In this report, we propose methods to investigate and quantify the economic and environmental benefits of optimization tools that en route air traffic controllers could use. This report is available at: <a href="http://web.mit.edu/aeroastro/partner/reports/proj5/proj5-enrouteoptimiz.pdf">http://web.mit.edu/aeroastro/partner/reports/proj5/proj5-enrouteoptimiz.pdf</a>.</td>
<td>Published July 2008 Report no. PARTNER-COE-2008-005</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------</td>
<td>--------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Project 6 [Completed]</td>
<td>Land Use Management and Airport Controls</td>
<td>The project’s focus was primarily on assessment of how incompatible land use impacts airports, and how this fuels noise concerns and complaints. The research team worked closely with airport administrators, civic leaders, and aviation organizations to identify and collect data concerning the most prominent issues precipitated by the incompatible land uses. Useful data was collected from personal interviews and focus groups, which provided a balanced view of the noise complaint data. Two reports were published and can be found as follows: 1. <em>Land Use Management and Airport Controls: Trends and indicators of incompatible land use</em> (Dec. 2007) <a href="http://web.mit.edu/aeroastro/partner/reports/landmgt-proj6-2008-01.pdf">http://web.mit.edu/aeroastro/partner/reports/landmgt-proj6-2008-01.pdf</a> 2. <em>Land Use Management and Airport Controls: A further study of trends and indicators of incompatible land use</em> (Sep. 2008) <a href="http://web.mit.edu/aeroastro/partner/reports/proj6/proj6-landmgt-aptcontrol.pdf">http://web.mit.edu/aeroastro/partner/reports/proj6/proj6-landmgt-aptcontrol.pdf</a></td>
<td>Land Use Management and Airport Controls: Trends and indicators of incompatible land use Published December 2007 Report No. PARTNER-COE-2008-001 Land Use Management and Airport Controls: A further study of trends and indicators of incompatible land use Published September 2008 Report No. PARTNER-COE-2008-006</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Project 8 [Active]</td>
<td>Sonic Boom Mitigation</td>
<td>Sonic boom noise issues are different from many other aspects of aircraft noise in that the potential annoyance occurs en route, along the flight path rather than just near airports. Maximum utility will require supersonic flight over land, currently prohibited by law. The law was formulated and promulgated at a time before the purposeful shaping of the sonic boom waveform was achievable. The aim of the proposed work is to determine if sufficient new data exists to warrant a reevaluation of the FAA’s regulation prohibiting supersonic flight over land. Anticipated outcome includes improved understanding and metrics of civil supersonic flight, leading to the reevaluation of existing regulations and, possibly, to the development of new regulations to permit operation of newly-designed commercial supersonic aircraft over land and water. More information about this project can be found at: <a href="http://web.mit.edu/aeroastro/partner/projects/project8.html">http://web.mit.edu/aeroastro/partner/projects/project8.html</a></td>
<td>Not completed at this time.</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Project 10</td>
<td>Outreach (NoiseQuest)</td>
<td>The goal of the Outreach team is to provide educational information on aviation noise and to facilitate Outreach efforts by airports and community groups. The Outreach team has developed and released NoiseQuest, a Website to share information about aviation noise and its impact on communities. NoiseQuest provides an outreach forum for airports too small to have an established community program as well as information that supports existing outreach efforts; and it was designed to educate and inform the public, and provide an independent source of information that can help to contribute to improved airport-community relationships. More information about this project can be found at: <a href="http://web.mit.edu/aeroastro/partner/projects/project10.html">http://web.mit.edu/aeroastro/partner/projects/project10.html</a> The NoiseQuest website can be found at: <a href="http://www.noisequest.psu.edu/">http://www.noisequest.psu.edu/</a></td>
<td>The NoiseQuest site debuted in March 2009. The site will be expanded as necessary to include additional outreach information and downloadable handouts.</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------</td>
<td>-------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Project 14 [Active]</td>
<td>Environmental Design Space (EDS)</td>
<td>The U.S. Federal Aviation Administration Office of Environment and Energy, in collaboration with Transport Canada, is developing a comprehensive suite of software tools that will allow for thorough assessment of the environmental effects of aviation. This suite of software tools is called the Aviation Environmental Portfolio Management Tool (APMT). The main goal of the effort is to develop a new, critically needed capability to assess the interdependencies among aviation-related noise, emissions, and associated environmental impact and cost valuations, including cost-benefit analyses. One of the building blocks of APMT is the Environmental Design Space (EDS). Other elements of this suite of tools include Aviation Environmental Portfolio Management Tool for Impacts, Cost Benefit with the Aviation Environmental Portfolio Management tool, Aviation Environmental Portfolio Management tool for Economics, and Aviation Environmental Design Tool. More information about this project can be found as follows: PARTNER Website locations: <a href="http://web.mit.edu/aeroastro/partner/projects/project14.html">http://web.mit.edu/aeroastro/partner/projects/project14.html</a> OR <a href="http://web.mit.edu/aeroastro/partner/apmt/index.html">http://web.mit.edu/aeroastro/partner/apmt/index.html</a> FAA Website: <a href="http://www.faa.gov/about/office_org/headquarters_offices/aep/models/">http://www.faa.gov/about/office_org/headquarters_offices/aep/models/</a> Committee on Aviation Environmental Protection (CAEP) : <a href="http://web.mit.edu/aeroastro/partner/reports/caep7/caep7-ip023-eds.pdf">http://web.mit.edu/aeroastro/partner/reports/caep7/caep7-ip023-eds.pdf</a></td>
<td>The progress of EDS development was presented at the CAEP 7th Meeting, February 2007, Montréal, Canada.</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Project 18 [Completed]</td>
<td>Reduced Vertical Separation Minimums</td>
<td>The term Reduced Vertical Separation Minimum (RVSM) describes a reduction from 2,000 feet to 1,000 feet of the standard vertical separation required between aircraft flying at altitudes between 29,000 feet and 41,000 feet. RVSM reportedly enhances aircraft operating efficiency by making more fuel/time efficient flight levels available, enhancing air traffic control flexibility, and providing the potential for enhanced enroute airspace capacity. Project 18 assessed the accuracy of the fuel burn and emissions modeling and quantified the effects. This report is available at: <a href="http://web.mit.edu/aeroastro/partner/reports/rsvm-caep8.pdf">http://web.mit.edu/aeroastro/partner/reports/rsvm-caep8.pdf</a></td>
<td>Published November 2007 Report No. PARTNER-COE-2007-002</td>
</tr>
<tr>
<td>Project 19 [Completed]</td>
<td>Health Effects of Aircraft Noise</td>
<td>This research involves a review of the health effects of noise literature, particularly that portion related to aircraft noise, and to examine in detail the basis for the findings reported in these recent meta-analysis studies. Research findings reveal whether a different approach to measuring the cost of noise should be adopted in PARTNER Project 3: Valuation and trade-off of policy options, and also identifies gaps in knowledge that need to be explored to help develop more realistic health effects of aircraft noise models. The report is available at: <a href="http://web.mit.edu/aeroastro/partner/projects/project19.html">http://web.mit.edu/aeroastro/partner/projects/project19.html</a></td>
<td>Published July 2010 [Report No. PARTNER-COE-2010-003]</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Project 24               | **Noise Exposure Response: Annoyance**      | The goal of PARTNER Project 24 is to develop a deeper understanding of how noise affects annoyance in communities in proximity to airports. The ultimate aim is to construct models that can be coupled with sound prediction models to predict annoyance that would result from future airport developments or changes in air traffic patterns.  

The report is available at:  
<table>
<thead>
<tr>
<th>Research Project Number</th>
<th>Research Project Title</th>
<th>Research Project Description Summary</th>
<th>Status</th>
</tr>
</thead>
</table>
| Project 25 [Active]     | Noise Exposure Response: Sleep Disturbance | Project 25's goal is to understand the impact of aircraft noise on sleep, and to develop models that predict sleep disruption for a given aircraft noise profile. Chronic sleep disturbance is associated with multiple health issues including cognitive difficulties, exhaustion, high blood pressure, diabetes, and depression. The amount of time spent in different sleep stages is important in terms of physical and psychological well being. What is not fully understood is how much aircraft noise impacts sleep in communities around airports, and how impacts due to aircraft noise compare with those due to other things (other noise sources, weight, age, stress, etc.) that are known to affect sleep.  

*The anticipated outcome of this project is improved tools for assessing, modeling and predicting sleep disturbance in communities that are exposed to transportation noise.*  

More information about this project can be found at:  
http://web.mit.edu/aeroastro/partner/projects/project25.html                                                                                   | Not completed at this time. |
<table>
<thead>
<tr>
<th>Research Project Number</th>
<th>Research Project Title</th>
<th>Research Project Description Summary</th>
<th>Status</th>
</tr>
</thead>
</table>
| Project 26 [Active]     | Sound Transmission Indoors – Integrated Windows           | Project 26 will develop numerical models to evaluate the transmission of low frequency noise (LFN) through elastic panels such as windows, doors, walls and roofs. The models and simulations will be optimized for applicability to residential buildings in airport neighborhoods. The long-term goal is to develop appropriate models and metrics to assess and mitigate the indoor impact of outdoor-generated LFN.  

*The anticipated outcome of this project is improved tools for assessing, modeling and predicting LFN propagation through windows under various mounting conditions, new criteria for acoustic performance classifications, and improved information for consumers who wish to select noise-blocking window materials and mounting hardware.*

More information about this project can be found at: http://web.mit.edu/aeroastro/partner/projects/project26.html | Not completed at this time. |
<table>
<thead>
<tr>
<th>Research Project Number</th>
<th>Research Project Title</th>
<th>Research Project Description Summary</th>
<th>Status</th>
</tr>
</thead>
</table>
| Project 35 [Active]     | Open Rotor Noise Impact on Airport Communities | Recent increases in fuel prices have driven the commercial aviation industry to focus on fuel efficiency. The efficiency of propellers and prop-fans has produced renewed interest in advanced "open rotor" engine designs. To contribute to the design process, noise predictions need to accurately identify the issues associated with these new designs and must forecast the annoyance of the population near airports due to the new noise sources.  

*The anticipated outcome of Project 35 is an assessment of a large set of metrics will be produced for turbofan and open rotor engines. The variation between metrics will be used to quantify the impact of metric selection for each engine architecture.*  

More information about this project can be found at: [http://web.mit.edu/aeroastro/partner/projects/project35.html](http://web.mit.edu/aeroastro/partner/projects/project35.html) | Not completed at this time. |
<table>
<thead>
<tr>
<th>Research Project Number</th>
<th>Research Project Title</th>
<th>Research Project Description Summary</th>
<th>Status</th>
</tr>
</thead>
</table>
| Project 38 [Active]     | Sound Transmission Indoors – Study of Whole Houses | The intent of Project 38 is to provide insight into how typical dwelling envelopes affect indoor sound levels due to non-sonic boom aircraft noise. Many existing aircraft noise guidelines are based primarily on outdoor sound levels. However, human perception is largely based on indoor response. This study will leverage existing technologies in sound transmission to model the combined sound isolation of dwelling envelopes. 

*The anticipated outcome is improved tools for modeling and assessing aircraft noise propagation through typical dwelling envelopes, and development of a database of typical construction types around major U.S. airports. Model results will be verified against outdoor/indoor recordings taken as part of the previous PARTNER Project 1 Low Frequency Noise Study (Project 1-Report No. PARTNER-COE-2007-001)*

More information about this project can be found at: [http://web.mit.edu/aeroastro/partner/projects/project38.html](http://web.mit.edu/aeroastro/partner/projects/project38.html) | Not completed at this time. |

### The Airport Cooperative Research Program (ACRP)

ACRP is sponsored by the Federal Aviation Administration (FAA) and funded through the annual federal appropriations process. ACRP began work in 2006 and is an industry-driven applied research program that develops near-term, practical solutions to problems faced by airport operators. Research topics are selected by an independent governing board appointed by the U.S. Secretary of Transportation that includes individuals from airports, universities, FAA, and the aviation industry.

While there are projects and studies being undertaken by the TRB to address all facets of transportation, below is a summary of projects specifically related to
### Research Project Number | Research Project Title | Research Project Description Summary | Status
---|---|---|---
ACRP 02-05 [Completed] | Guidebook on Community Responses to Aircraft Noise | The objectives of this project are to (1) develop an informative guidebook about local aircraft noise to inform readers with a direct interest, involvement, or investment in airports; (2) develop a toolkit that airport decision makers can use to manage expectations related to aircraft noise within the community; (3) investigate alternative metrics to communicate noise issues to the community; and (4) suggest other improvements that go beyond current practice to ease aircraft-noise issues. Look for this project at the following link: http://www.trb.org/ACRP/ACRPProjects.aspx | The guidebook has been published as ACRP Report 15.
<table>
<thead>
<tr>
<th>Research Project Number</th>
<th>Research Project Title</th>
<th>Research Project Description Summary</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACRP 02-09 [Active]</td>
<td>Comprehensive Model Development Plan (MDP) for Multimodal Noise and Emissions Model</td>
<td>The objective of this research is to produce a comprehensive Model Development Plan (MDP) to guide future development by others of a model that will facilitate integrated quantification of multimodal noise and emissions (e.g., aviation, rail, transit, maritime, and roadways), as well as assist with economic analysis of alternative scenarios. This research will define the process required to create this model, but will not result in the actual development of the model. The tasks included in this research will determine the feasibility of an integrated approach to quantification of multimodal noise and emissions, the form that this model might take, and the process required to create the model. Actual development of the model will be considered in the future, as determined by the outcome of this research. The model that will result from implementing the MDP should be designed for use by airport operators, planning and regulatory agencies, airlines, and other relevant stakeholders.</td>
<td>The interim report has been approved and Phase II work is currently underway. The final report was expected in early 2010.</td>
</tr>
<tr>
<td>ACRP 02-24 [Active]</td>
<td>Guidelines for Airport Sound Insulation Programs</td>
<td>The objective of this research is to develop updated guidelines for sound insulation of residential and other noise sensitive buildings for potential use by airport and non-airport sponsors in order to develop and effectively manage their aircraft noise insulation projects.</td>
<td>Research is underway</td>
</tr>
</tbody>
</table>

Look for this project at the following link: [http://www.trb.org/ACRP/ACRPProjects.aspx](http://www.trb.org/ACRP/ACRPProjects.aspx)
<table>
<thead>
<tr>
<th>Research Project Number</th>
<th>Research Project Title</th>
<th>Research Project Description Summary</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACRP 02-26 [Pending]</td>
<td>Assessing Aircraft Noise Conditions Affecting Student Learning</td>
<td>The objectives of this study will be to identify and evaluate conditions under which aircraft noise affects student learning, and to identify and evaluate one or more alternative noise metrics that best define those conditions.</td>
<td>Proposals have been received in response to the RFP. The panel will meet in April 2010 to select a contractor.</td>
</tr>
<tr>
<td>ACRP 02-27 [Pending]</td>
<td>Aircraft Taxi Noise Database for Airport Noise Modeling</td>
<td>The objective of this research will be to develop a noise-power-distance (NPD) and spectral class database for nominal taxi, break-away, and idle thrust levels for use in FAA’s Integrated Noise Model (INM) as it transitions into the Aviation Environmental Design Tool (AEDT). The database will be presented in a spreadsheet format and will encompass the fixed-wing fleet mix provided in INM/AEDT.</td>
<td>Proposals have been received in response to the RFP. The panel was scheduled to meet in April 2010 to select a contractor.</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| ACRP 02-31 [Anticipated] | Assessing Acoustical Materials Used in Airport Residential Sound Insulation Programs | The objective of this research is to survey and test a wide range of acoustical products, including those installed in the 1980s, and compare these products to those emerging as the result of recent and possible future technological improvements. This research would help determine if product performance has deteriorated over time to the point where the noise reduction standards mandated by the FAA are being compromised. A secondary objective is, through a process of interviews, surveys and testing, to determine what types of products perform more effectively over time. This information can help guide on-going and future sound insulation program efforts to choose products that ensure greater longevity to NR effectiveness.  

Look for this project at the following link: http://www.trb.org/ACRP/ACRPProjects.aspx | This project has been tentatively selected and a project statement (request for proposals) is expected in November 2010. |
| ACRP 02-35 [Anticipated] | Understanding Public Perceptions of Aircraft Noise and Noise-induced Sleep Disturbance | The objective of this research is to provide the starting point for the initiation of a large-scale social survey to acquire data in the United States, which further develops noise exposure-response relationships describing the effects of aircraft noise on annoyance and sleep across the United States today.

Look for this project at the following link: http://www.trb.org/ACRP/ACRPProjects.aspx | This project has been tentatively selected and a project statement (request for proposals) is expected in November 2010. |
<table>
<thead>
<tr>
<th>Research Project Number</th>
<th>Research Project Title</th>
<th>Research Project Description Summary</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACRP 02-37 [Anticipated]</td>
<td>Evaluating the Accuracy of the Integrated Noise Model for General Aviation Jet Aircraft</td>
<td>Since the 1970s, the FAA has developed and continuously improved its Integrated Noise Model (INM). One component of the INM is the database of aircraft sound levels used to compute sound exposure around airports. This database is used worldwide as the fundamental aircraft noise data for computing airport noise contours. Historically, the emphasis on improving the sound level database has been on large commercial jets, the most common source of noise at major airports, while the database for general aviation (GA) jets has been less developed. The objective of this research is to collect a statistically relevant sample of noise data for representative GA jet aircraft and use the data to both assess the predictive accuracy of existing INM input and to develop new and improved GA noise INM input. Look for this project at the following link: <a href="http://www.trb.org/ACRP/ACRPPProjects.aspx">http://www.trb.org/ACRP/ACRPPProjects.aspx</a></td>
<td>This project has been tentatively selected and a project statement (request for proposals) is expected in November 2010.</td>
</tr>
</tbody>
</table>
### Research Project Summary

<table>
<thead>
<tr>
<th>Research Project Number</th>
<th>Research Project Title</th>
<th>Research Project Description Summary</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACRP 03-03 [Completed]</td>
<td>Enhancing Airport Land Use Compatibility</td>
<td>The objective of this research was to develop guidance to protect airports from incompatible land uses that impair current and future airport and aircraft operations and safety and constrain airport development. This research project does not address land uses within airport boundaries. For the purposes of this research, incompatible land uses are defined by criteria pertaining to aircraft noise exposure and to safety concerns including aircraft accidents; FAR Part 77 and TERPS height restrictions; FAA engine-out regulations; FAA airport design standards; wildlife attractants; and distractions such as smoke, lighting, glare, and electronic interference. Look for this project at the following link: <a href="http://www.trb.org/ACRP/ACRPProjects.aspx">http://www.trb.org/ACRP/ACRPProjects.aspx</a></td>
<td>This report has been published as ACRP Report 27 Volume I and Volume 2.</td>
</tr>
<tr>
<td>ACRP 03-13 [Active]</td>
<td>Understanding Airspace, Objects, and Their Effects on Airports</td>
<td>The objective of this research is to develop a guidebook that defines and explains the various criteria used to identify objects that affect the airspace needed by an airport for its current and future operations, as well as the interrelationships between these criteria. The guidebook is intended to be used by airport operators, consultants, and surrounding communities in understanding the airport’s current and future airspace needs and how objects individually and collectively can affect the safety, utility, and efficiency of their airport. Look for this project at the following link: <a href="http://www.trb.org/ACRP/ACRPProjects.aspx">http://www.trb.org/ACRP/ACRPProjects.aspx</a></td>
<td>The guidebook is in the editing phase. Publication is expected in September 2010.</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------</td>
<td>--------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>ACRP 03-27 [Anticipated]</td>
<td>Tools and Techniques for Counting Aircraft Operations at Airports</td>
<td>Aircraft operations counts are used in aviation systems planning, airport master plans, environmental studies, aviation forecasts, and to determine funding and design criteria for the nation’s airports. At airports with control towers, aircraft operations are tracked and recorded by air traffic control. However, of the more than 5,300 Public Use airports in the United States, only 546 have towers, and most of the towered airports are not open 24/7. The objective of this research is to identify, test, and evaluate the various data gathering and sampling plans and technologies to provide guidance for airports in selecting the most cost-effective and accurate aircraft operations counting tools and techniques. The research will test traditional methods as well as newer technologies and consider how to supplement counts at airports with towers whose operational hours are limited (e.g., towers closed at night). Look for this project at the following link: <a href="http://www.trb.org/ACRP/ACRPPProjects.aspx">http://www.trb.org/ACRP/ACRPPProjects.aspx</a></td>
<td>This project has been tentatively selected and a project statement (request for proposals) is expected in November 2010.</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>ACRP 11-01/Topic 01-05 [Final]</td>
<td>Responsibilities for Implementation and Enforcement of Airport Land-Use Zoning Restrictions</td>
<td>This project synthesizes all available federal, state, regional, and local laws and regulations pertaining to aviation land-use and zoning; and identifies the primary responsibilities of each relevant legal body and how this responsibility is communicated and enforced. The project includes an assessment of compatibility and non-compatibility between the laws and regulations and illustrate how conflicts have been resolved historically. This comprehensive Legal Research Digest Report includes relevant precedent and guidance concentrated in one source. Look for this project at the following link: <a href="http://www.trb.org/ACRP/ACRPProjects.aspx">http://www.trb.org/ACRP/ACRPProjects.aspx</a></td>
<td>The report is published as LRD 5.</td>
</tr>
<tr>
<td>ACRP 11-01/Topic 02-02 [Active]</td>
<td>Use and Success of Avigation Easements and Other Tools for Airport Compatible Land Use and Development of Model Language</td>
<td>The object of this research is to review the use of existing avigation easements or other legally enforceable instruments, terms, or other tools for the above-described purposes in order to determine those that are most effective considering the wide variety of development challenges at airports. The research should identify or develop models for general use by airport owners to carry out FAA assisted airport programs. Special attention should be given to any state and local variations applicable to real estate use restrictions that may impact enforcement of the particular use restrictions. Look for this project at the following link: <a href="http://www.trb.org/ACRP/ACRPProjects.aspx">http://www.trb.org/ACRP/ACRPProjects.aspx</a></td>
<td>Research is in progress. The final report was expected in January 2010.</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------</td>
<td>--------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>ACRP 11-01/Topic 02-03 [Completed]</td>
<td>Case Studies on Community Challenges to Airport Development</td>
<td>This research project addresses both federal and state cases brought in opposition to airport expansion or the development or operations at airports. The summary of these judicial decisions explains the basis of the challenge, the defense to that challenge, and the outcome of the case. Look for this project at the following link: <a href="http://www.trb.org/ACRP/ACRPProjects.aspx">http://www.trb.org/ACRP/ACRPProjects.aspx</a></td>
<td>Completed-publication pending.</td>
</tr>
<tr>
<td>ACRP 11-01/Topic 03-01 [Active]</td>
<td>Fair Disclosure of Airport Impacts in Real Estate Transfers</td>
<td>The intent of this ACRP Legal Topic is to survey existing fair disclosure laws among the states, determine if and how existing fair disclosure laws are meeting the need for a disclosure to prospective purchasers of airport-related conditions and operations, and to develop an annotated model fair disclosure law. Look for this project at the following link: <a href="http://www.trb.org/ACRP/ACRPProjects.aspx">http://www.trb.org/ACRP/ACRPProjects.aspx</a></td>
<td>Research is in progress.</td>
</tr>
<tr>
<td>Research Project Number</td>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------</td>
<td>--------------------------------------</td>
<td>--------</td>
</tr>
</tbody>
</table>

**Federal Interagency Committee on Aircraft Noise**
The Federal Interagency Committee on Aviation Noise (FICAN) was established in 1993 to assist with providing adequate forums for discussion of public and private sector proposals regarding aircraft and airport noise analyses, and to encourage the conduct of research and development pertaining to the effects of aircraft noise.
FICAN members include several federal agencies with known areas of expertise through conducting significant research on aviation noise; and other agencies that are not currently conducting research, but have broad policy roles with respect to aviation noise issues (such as HUD and EPA). The members are as follows: U.S. Department of Defense, U.S. Department of Interior, U.S. Department of Transportation, U.S. Environmental Protection Agency, National Aeronautics and Space Administration, U.S. Department of House and Urban Development.

The Findings and Reports published by FICAN are summarized in the table below.

<table>
<thead>
<tr>
<th>Research Project Title</th>
<th>Research Project Description Summary</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findings of the FICAN Pilot Study on the Relationship between Aircraft Noise Reduction and Changes in Standardized Test Scores</td>
<td>In February 2000, the Federal Interagency Committee on Aviation Noise (FICAN) held a public forum to address the issue of the effects of aircraft noise on children. As a result of that forum, FICAN decided to sponsor this current study, which is based upon existing publicly available data. In brief, this study is designed to investigate the relationship between (1) reduction in indoor classroom noise levels through airport closure or school sound insulation and (2) student academic performance, as measured by scores on state-standardized tests. The report is available at: (<a href="http://www.fican.org/pdf/FICAN_Findings_on_school_study.pdf">http://www.fican.org/pdf/FICAN_Findings_on_school_study.pdf</a>)</td>
<td>Published July 2007</td>
</tr>
<tr>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>FICAN on the Findings of the MSP Low-Frequency Noise (LFN) Expert Panel</td>
<td>In December 1998, City of Richfield, MN (Richfield) and the MAC agreed to undertake detailed studies of existing and potential impacts of low-frequency aircraft noise in communities around MSP. This agreement also established an Expert Panel along with a Policy Committee to oversee the work of the Expert Panel. The Federal Aviation Administration (FAA), the Metropolitan Council, the Minnesota Pollution Control Administration, and the Metropolitan Airport Sound Abatement Council served as advisory members of the Policy Committee. On June 27, 2001, FICAN met with the 2 of the 3 members of the MSP LFN Expert panel to discuss the findings of their study of the subject on behalf of the Metropolitan Airports Commission (MAC) and Richfield. The Expert Panel identified four areas of agreement as being important to the discussions with FICAN members. These include (1) effects of low-frequency noise, (2) a descriptor for low-frequency noise, (3) the relationship between low-frequency noise and annoyance, and (4) acceptability criteria for low-frequency noise. The report is available at: (<a href="http://www.fican.org/pdf/lfn_expertpanel.pdf">http://www.fican.org/pdf/lfn_expertpanel.pdf</a>)</td>
<td>Published April 2002</td>
</tr>
<tr>
<td>Value of Supplemental Noise Metrics in Aircraft Noise Analysis</td>
<td>Three different perspectives regarding supplemental noise metrics were prepared and presented during the 2001 International Airport Noise Mitigation Symposium: The topics and titles are as follows: 1. Expanding Ways to Describe and Assess Aircraft Noise 2. Noise Metric Recommendations from the Hanscom Field Work Group 3. Use of sound Exposure Level Contours and Time Above in Airport Noise Analyses The information for all three perspectives can be found at: <a href="http://www.fican.org/pages/finding_noisemetric.html">http://www.fican.org/pages/finding_noisemetric.html</a></td>
<td>Presented at the International Airport Noise Symposium on February 28, 2000 San Diego, California</td>
</tr>
<tr>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>FICAN Position on Research into Effects of Aircraft Noise on Classroom Learning</td>
<td>Research on the effects of aircraft noise on children’s learning suggests that aircraft noise can interfere with learning in the following areas: reading, motivation, language and speech acquisition, and memory. The strongest findings to date are in the area of reading, where more than 20 studies have shown that children in noise impact zones are negatively affected by aircraft. Recent research confirms conclusions from studies in the 1970s showing a decrement of reading when outdoor noise levels are at a Leq of 65 dB or higher. It is also possible that, for a given level of Leq, the effects of aircraft noise on classroom learning may be greater than the effects of road and railroad traffic. Members of FICAN are in agreement on the following: 1) Further work should be done to establish whether school day Leq is the appropriate measure for determining the effect of aircraft noise on classroom learning. (2) In the absence of appropriations for specific research, FICAN encourages &quot;before&quot; and &quot;after&quot; evaluations of the effectiveness of noise mitigation in schools. (3) FICAN will undertake a pilot study to evaluate the effectiveness of school sound insulation programs. (4) FICAN supports the work of the American National Standards Institute in its efforts to develop a standard for classroom noise. The report is available at: <a href="http://www.fican.org/pdf/Effects_aircraft.pdf">http://www.fican.org/pdf/Effects_aircraft.pdf</a></td>
<td>Published September 2000</td>
</tr>
<tr>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>FICAN Position on Research on Natural Quiet</td>
<td>The Federal Interagency Committee on Aviation Noise (FICAN) cosponsored a symposium on the Preservation of Natural Quiet with the Acoustical Society of America in Columbus, Ohio in November 1999. Presentations were given by a number of researchers on a variety of topics dealing with this issue. The members of FICAN find that considerable progress is being made in developing unique approaches and research strategies for the preservation of natural soundscapes. This progress is characterized by four trends: (1) Development of a science of acoustic ecology, (2) Development of appropriate tools for computer modeling, (3) Improved procedures for inventories of the natural soundscape, and (4) Improved procedures for measuring the effects of noise on park users. The report is available at: <a href="http://www.fican.org/pdf/natural_quiet2000.pdf">http://www.fican.org/pdf/natural_quiet2000.pdf</a>.</td>
<td>Published September 2000</td>
</tr>
<tr>
<td>Effects of Aviation Noise on Awakenings from Sleep</td>
<td>The effect of aviation noise on sleep is a long-recognized concern of those interested in addressing the impacts of noise on people. In 1992, the Federal Interagency Committee on Noise (FICON) recommended an interim dose-response curve to predict the percent of the exposed population expected to be awakened as a function of the exposure to single event noise levels expressed in terms of SEL. Since the adoption of FICON's interim curve in 1992, substantial field research in the area of sleep disturbance has been completed. The data from these studies show a consistent pattern, with considerably less percent of the exposed population expected to be behaviorally awakened than had been shown with laboratory studies. FICAN recommends the adoption of a new dose-response curve for predicting awakening, based on the field data described in this paper and supporting references. The Committee takes the conservative position that, because the adopted curve represents the upper limit of the data presented, it should be interpreted as predicting the &quot;maximum percent of the exposed population expected to be behaviorally awakened&quot;, or the &quot;maximum % awakened&quot;. The report is available at: <a href="http://www.fican.org/pdf/Effects_AviationNoise_Sleep.pdf">http://www.fican.org/pdf/Effects_AviationNoise_Sleep.pdf</a></td>
<td>Published June 1997</td>
</tr>
<tr>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Assessment of Tools for Modeling Aircraft Noise in the National Parks</td>
<td>In September 2003, the Federal Aviation Administration (FAA) and National Park Service (NPS) jointly requested that FICAN “provide advice on some matters related to the measurement and assessment of the effects of aircraft noise due to overflights of units of the National Park System.” The Statement of Work (SOW) called for the conduct of a comprehensive review of available computer models to be used for assessing aircraft noise in Grand Canyon National Park (GCNP), as well as in other National Parks. FICAN agreed to assist the FAA and NPS and enlisted the assistance of the U.S. Department of Transportation’s Volpe Center (Volpe) and Wyle Laboratories (Wyle). Volpe is responsible for the development of the core acoustics module within the FAA’s Integrated Noise Model (INM), and Wyle is responsible for the development of the Department of Defense’s (DoD) NoiseMap Simulation model (NMSim). The report is available at: <a href="http://www.fican.org/pdf/Assessment_ToolsModeling_NPS.pdf">http://www.fican.org/pdf/Assessment_ToolsModeling_NPS.pdf</a></td>
<td>Published March 2005</td>
</tr>
<tr>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Human Response to Low-Intensity Sonic Booms Heard Indoors and Outdoors [NASA/TM-2010-216685]</td>
<td>Recent advances in aircraft design and computer simulation have stimulated interest in the possibility of supersonic flight overland. These advances are expected to enable the construction of supersonic aircraft that generate booms with shaped waveforms, rather than the traditional N-wave shape, and lower peak overpressures than are possible with current aircraft. Supersonic flight over land is at present banned by international agreement, and the question of what steps would be required to change this ruling has been raised. One step would be a greater understanding of people's response to sonic boom, which could lead to the definition of an acceptable boom level. The present study is focused on the investigation of indoor and outdoor annoyance to low amplitude sonic booms. The range of amplitudes encompasses those that might be achievable with a new class of supersonic vehicles. Particular objectives include an assessment of the relative importance of indoor and outdoor listening conditions and the examination of noise metrics' ability to predict annoyance in both environments. Rattle was present in the indoor sounds, but was not controlled in this test. This report is available at: <a href="http://www.fican.org/pdf/Sullivan_TM_EAFB_Boom.pdf">http://www.fican.org/pdf/Sullivan_TM_EAFB_Boom.pdf</a></td>
<td>Published by NASA April 2010.</td>
</tr>
<tr>
<td>Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety</td>
<td>Congress included among the requirements of the Noise Control Act of 1972 a directive that the Administrator of the Environmental Protection Agency &quot;...develop and publish criteria with respect to noise...&quot; and then &quot;publish information on the levels of environmental noise the attainment and maintenance of which in defined areas under various conditions are requisite to protect the public health and welfare with an adequate margin of safety.&quot; This document identifies noise levels consistent with the protection of public health and welfare against hearing loss, annoyance, and activity interference. The report is available at: <a href="http://www.fican.org/pdf/EPA_Noise_Levels_Safety_1974.pdf">http://www.fican.org/pdf/EPA_Noise_Levels_Safety_1974.pdf</a></td>
<td>Published March 1974</td>
</tr>
<tr>
<td>Research Project Title</td>
<td>Research Project Description Summary</td>
<td>Status</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Federal Agency Review of Selected Airport Noise Issues [Completed]</td>
<td>In 1992, the Federal Interagency Committee on Noise (FICON) published its findings in a report entitled <em>Federal Agency Review of Selected Airport Noise Analysis Issues</em>. FICON recommended that &quot;a standing federal interagency committee should be established to assist agencies in providing adequate forums for discussion of public and private sector proposals, identifying needed research, and in encouraging the conduct of research and development in these areas&quot;. The Federal Interagency Committee on Aviation Noise (FICAN) was formed in 1993 to fulfill this recommendation. This report and its recommendation constitutes the final action of FICON and terminated the Committee. This report is available at: <a href="http://www.fican.org/pdf/nai-8-92.pdf">http://www.fican.org/pdf/nai-8-92.pdf</a></td>
<td>Published August 1992</td>
</tr>
</tbody>
</table>
TO: MSP Noise Oversight Committee (NOC)

FROM: Chad E. Leqve, Manager – Aviation Noise and Satellite Programs

SUBJECT: REVIEW OF AIRCRAFT FLEETMIX TRENDS AT MSP

DATE: November 3, 2010

The first Annual Minneapolis/St. Paul International Airport (MSP) Aircraft Fleetmix Summary Report is attached for your review. By way of background, this annual report was added to the 2010 Noise Oversight Committee (NOC) Work Plan as a means of assessing the fleetmix evolution at MSP following Delta Air Lines’ acquisition of Northwest Airlines.

At the November 17, 2010 NOC meeting staff will provide a briefing on this topic.
Aircraft Fleetmix Trends

MINNEAPOLIS/ST. PAUL INTERNATIONAL AIRPORT

November 2010
### Regional Jets

<table>
<thead>
<tr>
<th>Type</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRJ</td>
<td>28.16%</td>
<td>31.61%</td>
</tr>
<tr>
<td>E135</td>
<td>0.88%</td>
<td>0.36%</td>
</tr>
<tr>
<td>E145</td>
<td>2.55%</td>
<td>3.33%</td>
</tr>
<tr>
<td>E170</td>
<td>10.06%</td>
<td>12.22%</td>
</tr>
<tr>
<td>E190</td>
<td>0.34%</td>
<td>0.24%</td>
</tr>
<tr>
<td></td>
<td>41.98%</td>
<td>47.76%</td>
</tr>
</tbody>
</table>

### Hush Kit

<table>
<thead>
<tr>
<th>Type</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>B72Q</td>
<td>0.30%</td>
<td>0.08%</td>
</tr>
<tr>
<td>B73Q</td>
<td>0.01%</td>
<td>0.01%</td>
</tr>
<tr>
<td>DC8Q</td>
<td>0.05%</td>
<td>0.21%</td>
</tr>
<tr>
<td>DC9Q</td>
<td>8.84%</td>
<td>7.01%</td>
</tr>
<tr>
<td></td>
<td>9.20%</td>
<td>7.31%</td>
</tr>
</tbody>
</table>

### Manufactured Stage 3

<table>
<thead>
<tr>
<th>Type</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>A300</td>
<td>0.10%</td>
<td>0.01%</td>
</tr>
<tr>
<td>A310</td>
<td>0.05%</td>
<td>0.00%</td>
</tr>
<tr>
<td>A318</td>
<td>0.21%</td>
<td>0.21%</td>
</tr>
<tr>
<td>A319</td>
<td>11.21%</td>
<td>10.02%</td>
</tr>
<tr>
<td>A320</td>
<td>13.25%</td>
<td>10.45%</td>
</tr>
<tr>
<td>A321</td>
<td>0.44%</td>
<td>0.28%</td>
</tr>
<tr>
<td>A330</td>
<td>0.88%</td>
<td>0.59%</td>
</tr>
<tr>
<td>B717</td>
<td>0.82%</td>
<td>0.98%</td>
</tr>
<tr>
<td>B733</td>
<td>1.94%</td>
<td>1.28%</td>
</tr>
<tr>
<td>B734</td>
<td>0.07%</td>
<td>0.05%</td>
</tr>
<tr>
<td>B735</td>
<td>0.66%</td>
<td>0.20%</td>
</tr>
<tr>
<td>B737</td>
<td>2.01%</td>
<td>2.42%</td>
</tr>
<tr>
<td>B738</td>
<td>3.51%</td>
<td>4.28%</td>
</tr>
<tr>
<td>B742</td>
<td>0.12%</td>
<td>0%</td>
</tr>
<tr>
<td>B744</td>
<td>0.21%</td>
<td>0.17%</td>
</tr>
<tr>
<td>B747</td>
<td>8.73%</td>
<td>7.56%</td>
</tr>
<tr>
<td>B767</td>
<td>0.13%</td>
<td>0.36%</td>
</tr>
<tr>
<td>B777</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>DC10</td>
<td>0.38%</td>
<td>0.38%</td>
</tr>
<tr>
<td>J328</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>MD11</td>
<td>0.41%</td>
<td>0.38%</td>
</tr>
<tr>
<td>MD80</td>
<td>3.57%</td>
<td>2.63%</td>
</tr>
<tr>
<td>MD90</td>
<td>0.11%</td>
<td>2.68%</td>
</tr>
<tr>
<td></td>
<td>48.82%</td>
<td>44.94%</td>
</tr>
</tbody>
</table>
Regional Jet Counts by Type, 2009 - 2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>CRJ</th>
<th>E135</th>
<th>E145</th>
<th>E170</th>
<th>E190</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>1</td>
<td>8709</td>
<td>195</td>
<td>730</td>
<td>3233</td>
<td>9</td>
<td>12876</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>8061</td>
<td>183</td>
<td>705</td>
<td>2937</td>
<td>4</td>
<td>11890</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>9194</td>
<td>195</td>
<td>789</td>
<td>3315</td>
<td>8</td>
<td>13501</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>8551</td>
<td>224</td>
<td>674</td>
<td>3332</td>
<td>6</td>
<td>12787</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>8296</td>
<td>298</td>
<td>600</td>
<td>3338</td>
<td>92</td>
<td>12624</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>9379</td>
<td>312</td>
<td>602</td>
<td>3013</td>
<td>120</td>
<td>13426</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>9524</td>
<td>310</td>
<td>706</td>
<td>2721</td>
<td>119</td>
<td>13380</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>8891</td>
<td>299</td>
<td>787</td>
<td>2867</td>
<td>124</td>
<td>12968</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>7901</td>
<td>284</td>
<td>974</td>
<td>2812</td>
<td>168</td>
<td>12139</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>7941</td>
<td>299</td>
<td>992</td>
<td>2775</td>
<td>183</td>
<td>12190</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>8235</td>
<td>305</td>
<td>843</td>
<td>3057</td>
<td>176</td>
<td>12616</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>8093</td>
<td>301</td>
<td>899</td>
<td>3317</td>
<td>232</td>
<td>12842</td>
</tr>
<tr>
<td>2009 Total</td>
<td></td>
<td><strong>102775</strong></td>
<td><strong>3205</strong></td>
<td><strong>9301</strong></td>
<td><strong>36717</strong></td>
<td><strong>1241</strong></td>
<td><strong>153239</strong></td>
</tr>
<tr>
<td>2010</td>
<td>1</td>
<td>7451</td>
<td>305</td>
<td>1092</td>
<td>3666</td>
<td>145</td>
<td>12659</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>7525</td>
<td>281</td>
<td>969</td>
<td>3269</td>
<td>107</td>
<td>12151</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>8897</td>
<td>319</td>
<td>1106</td>
<td>3764</td>
<td>135</td>
<td>14221</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>9905</td>
<td>60</td>
<td>982</td>
<td>3764</td>
<td>71</td>
<td>14782</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>10237</td>
<td>6</td>
<td>1113</td>
<td>3851</td>
<td>12</td>
<td>15219</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>10749</td>
<td>8</td>
<td>1074</td>
<td>4143</td>
<td>48</td>
<td>16022</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>11542</td>
<td>12</td>
<td>1096</td>
<td>3946</td>
<td>93</td>
<td>16689</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>11423</td>
<td>16</td>
<td>1016</td>
<td>4227</td>
<td>52</td>
<td>16734</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>10949</td>
<td>5</td>
<td>884</td>
<td>3651</td>
<td>6</td>
<td>15495</td>
</tr>
<tr>
<td>2010 Total</td>
<td></td>
<td><strong>88678</strong></td>
<td><strong>1012</strong></td>
<td><strong>9332</strong></td>
<td><strong>34281</strong></td>
<td><strong>669</strong></td>
<td><strong>133972</strong></td>
</tr>
</tbody>
</table>

Delta Takeover
12/31/2009
### Hush Kit Jet Counts by Type, 2009 - 2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>B72Q</th>
<th>B73Q</th>
<th>DC8Q</th>
<th>DC9Q</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>1</td>
<td>68</td>
<td>3</td>
<td>44</td>
<td>2079</td>
<td>2194</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>78</td>
<td>0</td>
<td>37</td>
<td>2103</td>
<td>2218</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>76</td>
<td>12</td>
<td>35</td>
<td>2696</td>
<td>2819</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>88</td>
<td>0</td>
<td>34</td>
<td>2688</td>
<td>2810</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>85</td>
<td>4</td>
<td>14</td>
<td>2829</td>
<td>2932</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>92</td>
<td>0</td>
<td>0</td>
<td>3023</td>
<td>3115</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>96</td>
<td>8</td>
<td>2</td>
<td>3546</td>
<td>3652</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>94</td>
<td>0</td>
<td>0</td>
<td>3206</td>
<td>3300</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>86</td>
<td>0</td>
<td>2</td>
<td>2396</td>
<td>2484</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>92</td>
<td>0</td>
<td>2</td>
<td>2544</td>
<td>2638</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>147</td>
<td>4</td>
<td>2</td>
<td>2570</td>
<td>2723</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>108</td>
<td>0</td>
<td>12</td>
<td>2574</td>
<td>2694</td>
</tr>
<tr>
<td></td>
<td>2009 Total</td>
<td>1110</td>
<td>31</td>
<td>184</td>
<td>32254</td>
<td>33579</td>
</tr>
<tr>
<td>2010</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>58</td>
<td>2837</td>
<td>2901</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>10</td>
<td>4</td>
<td>63</td>
<td>2426</td>
<td>2503</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>16</td>
<td>6</td>
<td>73</td>
<td>2721</td>
<td>2816</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>33</td>
<td>0</td>
<td>69</td>
<td>2391</td>
<td>2493</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>11</td>
<td>2</td>
<td>62</td>
<td>2151</td>
<td>2226</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>15</td>
<td>2</td>
<td>65</td>
<td>2225</td>
<td>2307</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>67</td>
<td>1975</td>
<td>2051</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>64</td>
<td>8</td>
<td>66</td>
<td>1803</td>
<td>1941</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>65</td>
<td>0</td>
<td>66</td>
<td>1129</td>
<td>1260</td>
</tr>
<tr>
<td></td>
<td>2010 Total</td>
<td>226</td>
<td>25</td>
<td>589</td>
<td>19658</td>
<td>20498</td>
</tr>
</tbody>
</table>

**Delta Takeover 12/31/2009**

![Graph showing jet counts by type for 2009 and 2010]
TO: MSP Noise Oversight Committee (NOC)
FROM: Chad E. Leqve, Manager – Aviation Noise and Satellite Programs
SUBJECT: MSP 2030 DEVELOPMENT PHASES 1 & 2 ENVIRONMENTAL REVIEW PROCESS
DATE: November 3, 2010

The 2011 to 2017 Metropolitan Airports Commission (MAC) Capital Improvement Program (CIP) includes projects for Minneapolis-St. Paul International Airport (MSP) that represent Phases 1 and 2 of the MSP 2030 Long-Term Comprehensive Plan that are intended to address 2020 facility demands by accomplishing the following:

- Accommodate the 2020 passenger forecast from Delta Air Lines/Sky Team Airlines at Terminal 1 - Lindbergh and from all other airlines at Terminal 2 - Humphrey
- Accommodate the 2020 parking demand at Terminal 1 - Lindbergh and Terminal 2 - Humphrey
- Relieve curbside traffic at Terminal 1 - Lindbergh
- Improve passenger screening and baggage claim areas at Terminal 1 - Lindbergh and Terminal 2 - Humphrey
- Accommodate the 2020 rental car demand for Terminal 1 - Lindbergh and Terminal 2 - Humphrey
- Accommodate the 2020 Ground Transportation Center commercial vehicles demand at Terminal 1 – Lindbergh
- Enhance traffic movements into and out of the airport terminal areas
- Improve international arrivals facilities at Terminal 1 - Lindbergh

The projects planned to address the above 2020 accommodations flow from the MAC’s recently completed MSP 2030 Long-Term Comprehensive Plan Update that was submitted in July 2010 to the Metropolitan Council for review and approval.

In September 2010 the MAC also initiated the Environmental Assessment (EA) process for Phases 1 and 2 of the MSP 2030 Long-Term Comprehensive Plan. This will be a comprehensive and detailed environmental analysis of the direct and cumulative environmental effects related to the projects in both phases. The MSP NOC will be an important review group for the noise related evaluations.

At the November 17, 2010 NOC meeting Mr. Roy Fuhrmann – MAC Director of Environment will address the Committee on the project purpose and need, environmental review requirements, and the EA process. Additionally, the EA schedule will be reviewed and community comments will be welcomed.
MEMORANDUM

TO: MSP Noise Oversight Committee (NOC)

FROM: Chad E. Leqve, Manager – Aviation Noise and Satellite Programs

SUBJECT: 2010 NOC ACCOMPLISHMENTS AND 2011 NOC WORK PLAN

DATE: November 3, 2010

At the September 15, 2010 Noise Oversight Committee (NOC) meeting the Committee initiated discussion regarding the 2011 NOC Work Plan. Committee members were instructed to forward to MAC staff any work plan elements that they would like to include on the 2011 Work Plan. To date, MAC staff has received no requests for items to be placed on the 2011 NOC Work Plan.

The attached Draft 2011 NOC Work Plan details items provided by staff for the Committee’s consideration. NOC members are encouraged to come to the November 17th Committee meeting prepared to offer additional 2011 Work Plan items for consideration in the 2011 NOC Work Plan finalization process.

For purposes of review, the Committee had an extremely productive year accomplishing the following in 2010 (representing substantial completion of the 2010 NOC Work Plan):

- Nighttime Runway Use - completed the dialogue with the FAA on nighttime parallel runway usage.
- Developed and distributed the Minneapolis/St. Paul international Airport (MSP) Pilot Guide.
- Reviewed the MSP Long-Term Comprehensive Plan (LTCP) Update.
- Reviewed annual MSP Noise Contour Report (assessing the 2009 actual noise contour) published per the requirements of the MSP noise litigation Consent Decree.
- Conducted Annual Scheduled Nighttime Operations Assessment.
- Monitored the successful installation of the Multilateration Flight Tracking System.
- Deployed real-time FlightTrack on the macnoise.com website.
- Developed Runway 35 optimized Profile Descent (OPD) procedure for incorporation into MSP airspace-wide Performance Based Navigation (PBN) procedure development and implementation.
- Actively participated in RNAV procedure development at MSP resulting in the FAA embarking on an airspace-wide RNAV procedure development and implementation project at MSP that will include the Runway 12L and 12R RNAV departure procedures and the Runway 35 OPD procedure.
- Reviewed status of the 64 to 60 DNL noise mitigation program implementation process at MSP.
- Continued to review input received from the quarterly public input meetings.
- Revisited the possibility of a Runway 35 River Visual Approach Procedure.
• Received a briefing from Delta Air Lines Technical Pilots on Delta's Performance Based Navigation (PBN) efforts.

At the November 17, 2010 NOC meeting additional items will be discussed and addressed by the Committee which will be add to the above list of 2010 NOC accomplishments.

Considering the above, the attached 2011 NOC Work Plan is provided for Committee concurrence/approval to be presented by the NOC Co-Chairs at the December 8, 2010 MAC Finance, Development and Environment Committee meeting.

**COMMITTEE ACTION**
FINALIZE THE 2011 NOC WORK PLAN AND RECOMMEND MAC APPROVAL.
Minneapolis/St. Paul International Airport (MSP)
Noise Oversight Committee (NOC)

2011 MSP NOC WORK PLAN

1. RESIDENTIAL NOISE MITIGATION PROGRAM
   a. Review Residential Noise Mitigation Program Implementation Status

2. MSP NOISE PROGRAM SPECIFIC EFFORTS
   a. 2010 Actual Noise Contour Report
   b. Annual Scheduled Nighttime Operations Assessment
   c. Implementation of Runway 35 Optimized Profile Descent (OPD) Procedure
   d. Runways 17, 12R and 12L RNAV Departure Procedure Use Analysis
   e. Noise Analysis – Minneapolis-St. Paul International Airport (MSP) 2020 Environmental Assessment (EA)
   f. Review of Aircraft Fleet-mix Trends at MSP
   h. Nighttime Runway Use Analysis
   i. Review Status of FAA Center of Excellence/PARTNER, TRB and FICAN Initiatives
   j. Macnoise.com Website Redesign and Enhancement

3. CONTINUE REVIEW OF PUBLIC INPUT
   a. Continue to Review Input Received from the Public Input Meetings as Possible Agenda Items
MEMORANDUM

TO: MSP Noise Oversight Committee (NOC)

FROM: Chad E. Leqve, Manager – Aviation Noise and Satellite Programs

SUBJECT: COMMENTS FROM 4TH QUARTER 2010 PUBLIC INPUT MEETING

DATE: November 3, 2010

One of the elements of the Metropolitan Airports Commission’s (MAC) approved framework for the MSP Airport Noise Oversight Committee (NOC) requires MAC staff to conduct quarterly public input meetings. The intent is to ensure residents’ concerns are considered as part of the ongoing effort by the MAC and the NOC to address noise issues around MSP. This memorandum provides a summary of the comments received at the most recent public input meeting. The NOC may also review these topics as possible future action items if the members so desire.

On October 26, 2010 MAC Aviation Noise and Satellite Program staff conducted the fourth quarter 2010 public input meeting; four people attended the meeting and three individuals made comments. MAC staff responded to questions at the meeting and is also providing a written response to the questions. The comments and associated responses can be found on the MAC Noise Program’s website accessible on the Internet at www.macnoise.com when they are completed.

In summary, questions related to runway use variables, departure track locations and operations volumes over South Minneapolis, home mitigation eligibility, departure tracks off Runway 12R over Mendota Heights, the Crossing–in–the–Corridor Procedure, and accessing data on the macnoise.com website.

The next quarterly public input meeting is planned for January 25, 2011.