AAS NEWSLETTER

Aviation Applications Section of INFORMS

Spring 2015

A Word from the Section Chair

Senay Solak
Associate Professor
University of Massachusetts Amherst
AAS Chair

As I welcome you to this issue of our newsletter, a new and dynamic year is in progress for the Aviation Applications Section (AAS) of INFORMS. You will find a lot of information in this newsletter that reflects this dynamism. These range from an interesting article on the impacts of potential cruise speed changes in the design of next generation aircraft, to news about various initiatives that we are undertaking as a section.

Many AAS members have been actively involved in serving our community by supporting the activities sponsored by our section this year. Philippe Bonnefoy has served as the Guest Editor for this year's newsletter, also authoring the featured article you will find on page 3. David Lovell is chairing the AAS Dissertation Award Committee this year, and the call for submissions for the competition can be found on page 11. Bo Zou is leading the 2015 Best Student Presentation Competition, while Stephen Maher is doing a great job in organizing the AAS Cluster at the 2015 INFORMS Conference in Philadelphia, PA. Guy Desaulniers is organizing the AAS cluster at the 2015 CORS/INFORMS Conference in Montreal, Canada, and has provided some information about it on page 12. Ahmed Abdelghany and Farshid Azadian have taken the lead on organizing the AAS Webinar Series to be inaugurated this year, about which you can find some information on page 12 as well. Finally, Heng Chen has set up an AAS LinkedIn Group for us to exchange thoughts and information on aviation issues. More information on the group and a link are provided also on page 12.

Involvement by you, individual members of AAS, is the key ingredient in AAS activities, and I would like to thank all the section members that participate or contribute in such activities. On the other hand, we owe to several key individuals, some of whom are mentioned above, for their roles in organizing and coordinating AAS activities, and in making sure that AAS remains a vibrant community. Of course, these include our strong leadership team. Our Past-Chair Thomas Vossen has paved the way for many activities we are currently undertaking. Our Vice Chair Vikrant Vaze, Treasurer/Secretary Andrew Churchill, and Webmaster/Social Media Coordinator Heng Chen provide significant contributions to AAS in all dimensions, helping AAS bring value to its members. I am grateful to them for their hard work.

I look forward to seeing you all in Philadelphia in November! In the meantime, please let us know of any comments and suggestions that you might have on making AAS a better section for its members.

With Best Wishes,

Senay Solak

Inside this issue

Featured Article by Philippe A. Bonnefoy, PhD:

System Level Optimization for the Next Generation of Aircraft Designs: Application to Aircraft Design Cruise Speed Reductions

Philippe A. Bonnefoy

Lead Associate

Booz | Allen | Hamilton

Introduction

With the increasingly global and interconnected nature of the air transportation system, there is the need to consider the design and evolution of the system in a holistic manner. Decisions associated with investments, policies and changes to the system increasingly require system level analyses and studies. It is often not enough to design and optimize a sub-component of the air transportation system, but rather design and optimize it as a system-of-systems. This article illustrates this paradigm shift with an illustration of the system level design and optimization for the next generation of fuel efficient and clean aircraft.

Future reductions in fuel burn and greenhouse gas emissions from commercial aviation will be in part achieved through aircraft technology and potentially through the design and use of aircraft with alternative mission specifications/capabilities (e.g., lower design cruise speed, different payload-range characteristics). Aircraft can be designed and optimized for given typical missions - however, the aircraft level solutions are not necessarily optimal at the system level. Considering the operations of the aircraft by airlines and their integration in the air transportation system tends to result in alternative solutions.

Background & Motivation

The increase in the effective cost of fuel -comprising crude oil price, crack spread, and environmental related taxes and fees- is expected to continue to put significant pressure on the air transport industry to improve aircraft fuel efficiency in the long term. Figure 1 shows the significant increase in the price of crude oil and jet fuel over the past two decades and the substantial increases during the past years. Future trends and forecasts in the effective cost of fuel suggest continued pressure on the industry. In addition, the air transport industry faces increasing pressure from environmental regulations and standards, reflected through the importance of environmental performance in the development of aerospace products and operations. This motivates the need to find ways by which fuel efficiency can be further improved (e.g., aircraft technologies/designs, operational improvements, alternative fuels).

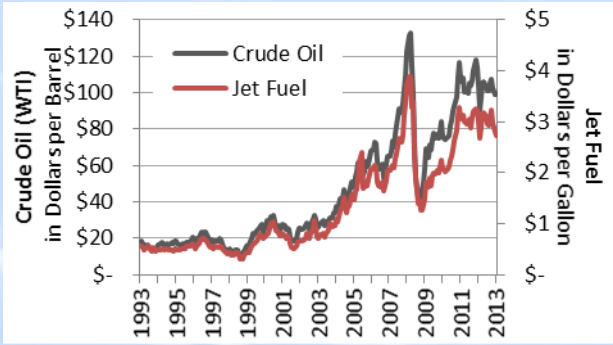

Figure 1. Historical Trends in Crude Oil & Jet Fuel Price [EIA 2013; World Bank 2013]

Future reductions in fuel burn and greenhouse gas emissions from commercial aviation will be in part achieved through aircraft technology improvements (i.e., aerodynamics, propulsive efficiency and structural efficiency). However, another approach that has the potential to yield fuel burn and emissions reductions, is to open up the design space to consider aircraft with alternative mission specifications, such as lower design cruise speeds. Figure 2 shows an illustration of potential next generation aircraft with such design characteristics.

Featured Article: System Level Optimization to the Design Next Generation of Aircraft; Application to Aircraft Design Cruise Speed Reductions

Figure 2. MIT/NASA D8.5 Advanced version of Double Bubble Aircraft Concept [Grietzer 2010; Bonnefoy 2011]

Alternative mission specifications generally result in trades between operating benefits (e.g., fuel savings) and operating costs (e.g., labor, maintenance, and depreciation/rental/lease). This article illustrates the benefits and impacts of reducing design cruise speed, not only at the aircraft level, but more broadly to include the airline and passenger levels. Flight time increases from cruise speed reduction and their associated costs are thus evaluated against fuel burn savings. In addition, the effects of reduced cruise speed on airlines' schedules are mitigated through airline schedule re-optimization. This article also includes an assessment of the cost of cruise speed reduction on passengers, as well as potential ways to mitigate the impacts to airline schedules through changes to aircraft configuration. Overall, operating cost savings can be found to be achievable from design cruise speed reduction, but trade-offs among cost savings, risks of delay, and impact to passengers need to be evaluated in determining acceptable levels of cruise speed reduction for future aircraft designs.

Approach for System Level Design and Optimization of the Next Generation of Aircraft: Application to Aircraft Design Cruise Speed Reductions

In order to assess the system wide benefits and impacts of the next generation of aircraft and to design aircraft that can be integrated in the National Airspace System optimally, a multi-disciplinary framework was developed and used.

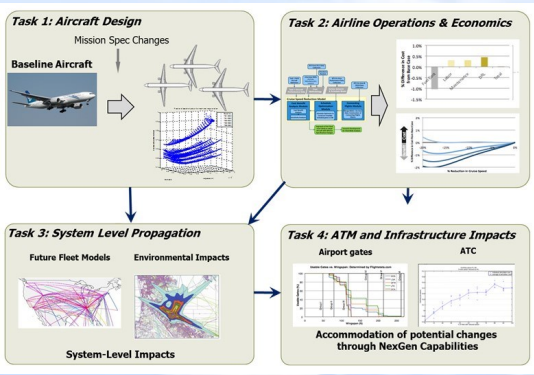

Figure 3. Multidisciplinary/System Level Analysis Framework for Analysis of Alternative Aircraft Mission Specifications

The first step is to develop and use aircraft design tools in order to generate concepts and designs. The next step is to propagate these aircraft concepts through the system by first modeling the airlines operations and economics to assess the implications of mission related changes on airline and manufacturer operations and economics. The aircraft are then propagated through the fleet (step 3). Finally, the impacts on NAS operations and relationship with NextGen Concops and capabilities are then assessed.

A reduction in design cruise speed can result in improved fuel efficiency at the aircraft level. All else being equal, this improvement leads to fuel savings and potentially a net reduction in airlines' operating costs. However, these aircraft mission specification changes may impact airlines operations (e.g., schedules, network, fleet allocation) and raises several questions. Indeed, is the aircraft level optimum identical to airline/operator optimum? If not, what is this optimum? How would this influence airlines' interests in aircraft with alternative mission specifications? The objective of the analyses conducted by Booz Allen was to evaluate the key trades between benefits (fuel burn savings) and airline operations and economics impacts of mission specification changes.

Featured Article: System Level Optimization to the Design Next Generation of Aircraft; Application to Aircraft Design Cruise Speed Reductions

Airline Operations & Economics Modeling

The impact of cruise speed reduction (CSR) on airline operations is examined using the Cruise Speed Reduction Model. Booz Allen developed a cost benefit analysis tool to evaluate fuel burn benefits vs. time related costs from CSR, that embeds an airline schedule optimization module (with connecting flight constraints) to derive expected impacts of CSR. The operating cost impacts (i.e. labor, maintenance, depreciation/rental/lease (DRL)) were computed for each aircraft type. Sensitivity analyses of CSR on fuel burn benefits vs. costs were conducted with application to representative aircraft type models i.e., CRJ900, B737, B767, B777 and B747. Specifically, the airline operations and economics model was based on a Schedule Optimizer using a Linear Program (LP) model to evaluate the increased flight time from reduced cruise speed can have disruptive effects to an airline's schedule. In addition to airline level impacts, the Cost Benefit Analysis Module evaluates the cost to passengers for increased travel time from CSR, using the passenger value of time (PVT). These values are derived from the hourly wage data for business travel, and annual household income for personal travel, and are applied to the flight time increases from CSR for each passenger.

Investigation of the Benefits and Impacts of CSR on Existing Airline Networks and Schedules

The Cruise Speed Reduction Model was applied to 5 reference aircraft; CRJ-900, B737-800, B767-300ER, B777-200ER, and B747-400. Net benefits are found to be possible for all reference aircraft types depending on fuel prices, and level of CSR. Figure 3 shows the fuel burn inputs for the B737 type aircraft as the percent of the baseline fuel burn across a set of cruise speed reductions at the R1 range. For each value of design cruise speed i.e. % CSR, a newly optimized aircraft is designed. For this narrow body type of aircraft and stage length, maximum fuel burn savings of approximately 6% occur at 12% CSR.

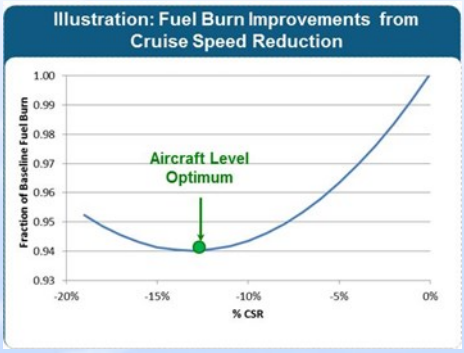

Figure 3: Illustration of Investigation of CSR for Single Aisle Jet (i.e., B737-800)

Propagating these optimized aircraft through the airline operating and economics model, results in the percent change in airline operating costs. As shown in Figure 4, reduction in design cruise speed can yield net benefits (i.e. fuel cost savings can outweigh increases in labor/maintenance/DRL costs). Results are sensitive to aircraft level fuel burn performance and unit fuel price.

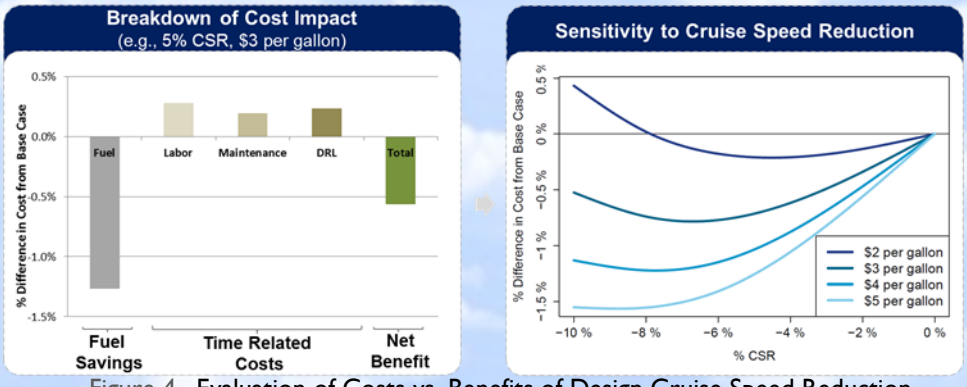

Figure 4. Evaluation of Costs vs. Benefits of Design Cruise Speed Reduction

Evaluation of Benefits and Impacts of Cruise Speed Reductions on Passengers: Illustration for B737-800 Type Aircraft

Increased flight time from CSR represents an opportunity cost to passengers, who could use the additional time to pursue other activities. However, the fuel burn reduction from CSR, which leads to operating cost savings, could be passed on to the passenger through fare reductions and therefore results in a benefits to passengers.

To assess the benefits vs. costs tradeoffs of CSR on passengers, the DOT's recommended low, mid, and high values of Passenger Value of Time (PVT) were applied to the B737-800 case. Average fare is calculated using DB1B data for flights within the airline's itinerary. The passenger costs from flight time, and potential fare savings from reduced operating costs are normalized by the average fare for each flight.

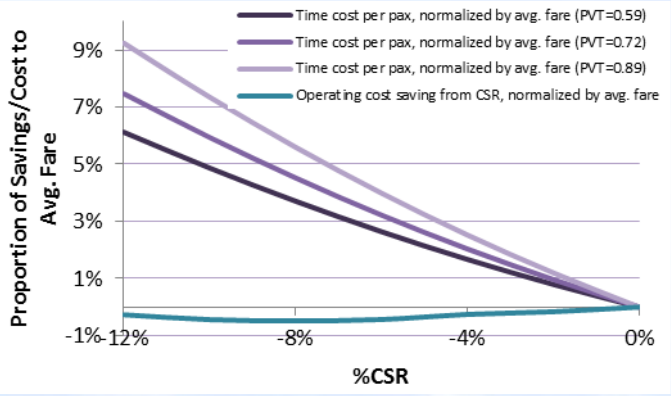

Figure 5. Impacts of CSR on Passengers at $3 per Gallon of Fuel

Figure 5 shows that as cruise speed is reduced, the cost to passengers for longer flight time increases almost linearly, and outweighs the potential reductions in fare from reduced airline operating costs. However, this analysis assumes a constant PVT value for each minute of time increase, regardless of the magnitude of increased flight time from CSR. The passenger cost per minute of flight time may actually be non-linear, (e.g. PVT for a one minute increase in flight time, may be different from that of one hour).

Although the passenger time cost outweighs the potential fare reduction from CSR, customers tend to place more importance on air fare than on schedule related factors (i.e., scheduling convenience and on-time arrival). This is also reflected through the strong competition among airlines to provide flights at the lowest fares, to gain market share. Passengers may thus prefer a flight with slightly greater block time but with lower fare compared to shorter but more expensive flights.

Moreover, design cruise speed reduction tends to only require small increases in flight time for regional and mid-range aircraft. A 5% CSR to gate-to-gate time for flight segments representing the average and 95th percentile for each reference aircraft type. The additional time due to CSR is found to range from 3 minutes for the regional jet to 21 minutes for the wide-body aircraft. Given that the Transportation Security Administration and airlines recommend that passengers arrive at the airport at least 90 minutes before a domestic flight (and potentially 3 hours prior to an international flight, depending on the airport), these flight time increases from CSR may be acceptable to passengers, as they constitute a small portion of the total door to door time.

Analysis of Changes in Cabin Layout on Airline Schedules Impacts from Cruise Speed Reductions

Opening up the design space to consider lower design cruise speeds may also include configuration changes that can help mitigate the impacts of CSR on airline schedule. Alternative configuration can include changes in cabin layout where a greater number of aisles are designed at constant seating capacity. This can allow for faster boarding and deboarding times, thus reducing the

minimum turnaround time required. To evaluate the effect of cabin layout changes, two configurations are considered: (1) single aisle, (2) shorter twin aisle with same seating/payload capacity as the single aisle, as illustrated in Figure 6.

Based on a literature review of optimal boarding and deboarding strategies [Chung, 2012], assuming that the twin aisle configuration reduces the boarding time by almost 9 minutes, when compared to that of the single aisle (e.g. 20.3 minutes to board the single aisle; 11.2 minutes for the twin aisle), new turnaround time assumptions are applied to the Cruise Speed Reduction Model. It was found from this analysis that larger CSRs become feasible by transitioning from a single to a twin aisle. Moreover, the number of flights that need to be adjusted to accommodate CSR is significantly lower for the twin aisle case when compared to the single aisle. The risk of delay or passenger disruption from CSR are also reduced from aircraft configuration changes, potentially allowing airlines to operate at lower cruise speeds.

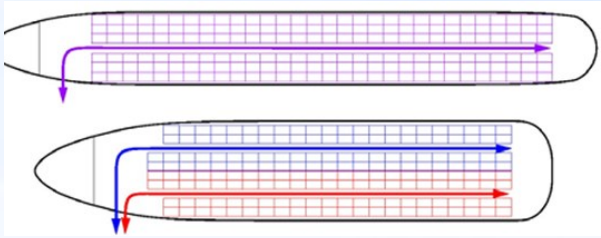

Figure 6. Illustration of Single vs. Twin-Aisle Cabin Configurations for Equivalent Seating Capacity [Greitzer, 2010]

Conclusions

Changes to mission specifications, such as design cruise speed, could be a viable means of improving aircraft fuel efficiency using current technology. At the aircraft/design level, fuel savings with CSR are found to range from 4% to 8% depending on aircraft type. Although these benefits are significant, it is also necessary to evaluate this change in mission specification in the context of airline operations.

This article discussed the implications of design cruise speed reduction on airline operations for five reference aircraft types. A cost-benefit analysis on the flight time increase from reduced cruise speed is accomplished through an assessment of the fuel burn savings from CSR, and the additional non-fuel costs. This analysis shows that benefits ranging from 1% to 8% are possible with CSR, depending on the aircraft type, CSR level, fuel price, and airline network structure. Moreover, the optimal level of CSR at the aircraft level (e.g., fuel burn only) differs significantly from the airline optimal level. Schedule optimization is also conducted on each aircraft type to evaluate the impact of CSR on airline schedules. The results of this part of the analysis serve to provide bounds for CSR levels, by accounting for risk of delay or passenger disruptions.

From a passenger cost/benefit stand point, if the operational savings from CSR are translated into reduced fares, PVT costs from increased flight time are found to significantly outweigh this discount in fares. Nevertheless, non-linearities may exist that are not captured in the calculation, which uses constant PVTs for all flight time increases. Moreover, passengers tend to value lower fares more than other factors when making ticket purchasing decisions. Depending on the distance of a flight, flight time increases from CSR may be marginal, especially when compared to total passenger door-to-door travel time.

Finally, methods to mitigate the schedule impacts of CSR, such as changes to aircraft configuration to allow for shorter boarding/deboarding times, were discussed. This article and type of analysis showed that while aircraft can be designed and optimized for given typical missions - however, the aircraft level solutions are not necessarily optimal at the system level. Considering the operations of the aircraft by airlines and their integration in the air transportation system tend to result in alternative solutions.

References

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The World Bank. Crude Oil (petroleum). GEM Commodities, 2013.

Greitzer, E. "Volume 1: N+3 Aircraft Concept Designs & Trade Studies – Final Report." NASA, 2010.

Bonnefoy, P. and Hansman R.J.H., "Operational Implications of Cruise Speed Reductions for Next Generation Fuel Efficient Subsonic Aircraft", 27th International Congress of The Aeronautical Sciences (ICAS), September 23rd 2010, Nice,

Belenky, P. "The Value of Travel Time Savings: Departmental Guidance for Conducting Economic Evaluations - Revision 2." Department of Transportation, 2011.

Wessels, D. "Consumer Loyalty in the Airline Industry." University of Pennsylvania Wharton, 2006.

Chung, C. "Simulation Design Approach for the Selection of Alternative Commercial Passenger Aircraft Seating Configurations." Journal of Aviation Technology and Engineering,

Acknowledgements

This project was also conducted in collaboration with Stanford University, the Massachusetts Institute of Technology (MIT), Georgia Tech and the U.S. DOT Volpe Center. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the U.S. Federal Aviation Administration (FAA).

2014 INFORMS ANNUAL MEETING
Aviation Applications Section Business Meeting Minutes

Vikrant Vaze
Assistant Professor
Dartmouth College
AAS Vice Chair

Meeting held on November 9, 2014 at 6:15pm in San Francisco, CA. *Approximately 35 were in attendance.*

AAS Chair Thomas Vossen opened up the meeting by introducing all section officers.

AAS Secretary/Treasurer Vikrant Vaze provided an overview on finances and membership:

- There has been a decrease in overall membership by approximately 22%. The new membership level is approximately the same as that two years ago.
- Most of the decrease is in student membership which is what was expected after the student dues being increased from $0 to $5 last year. Current membership levels are expected to be stable going forward.
- Current number of members is 506, with 243 student, 255 regular, 5 retired and 3 other category members.
- Despite the decrease in membership, the dues revenue is projected to go slightly up to approximately $1900. This is mainly due to increase in regular membership and increase in student membership dues.
- Food and beverage expenses for the year 2014 were much higher than usual as the San Francisco rates are significantly higher than those at the past meeting locations. The food and beverage expenses are expected to return to the levels of the previous years starting next year.
- The labor/admin charges by INFORMS are expected to be flat.
- There is an expected net loss of approximately $400 this year.
- Membership dues for 2015 are the same at $20/$5/$20/$20 for regular, student, retired and non-INFORMS members.

AAS Vice Chair Senay Solak provided an overview of the revenue sharing agreement between AAS and TSL:

- The AAS/TSL revenue sharing agreement, starting in 2008, included a dual membership structure. Anyone signing up for the TSL Air-SIG automatically became a member of AAS, and vice versa.
- A number of challenges were encountered recently including administrative complications to INFORMS and revenue dilution to both AAS and TSL.
- As a result, the revenue sharing agreement has now ended and the dual membership no longer applies to TSL Air-SIG and AAS.
- As part of the deal, TSL will pay $300 to AAS in 2014 and another $300 in 2015.
- Starting from 2015 membership, the members can register separately for both TSL Air-SIG and AAS. Default registration option for the current dual members will be both TSL Air-SIG and AAS.
- Make sure to register for AAS separately when members renew their memberships.

Aviation Applications Section Business Meeting Minutes (cont.)

Farshid Azadian, AAS Cluster Chair for the 2014 INFORMS Annual Meeting, provided an overview of the organized sessions. The number of sessions and talks organized by AAS remains strong. Almost all the sessions this year had four talks each.

On behalf of the AAS Dissertation Committee, *Committee Chair Milind Sohoni* announced Stephen Maher of the University of New South Wales to be the winner of the 2014 dissertation award, while Clayton Tino of Georgia Tech was presented with the Honorable Mention. The committee also included Alper Murat of Wayne State University, Vinayak Deshpande of UNC and Lavanya Marla of UIUC.

AAS Secretary/Treasurer Vikrant Vaze provided an overview of the AAS Best Student Presentation Competition:

The competition was introduced in 2013 meeting and had a successful kickoff year with 10 entries from 7 universities across 3 countries. Alexandre Jacquillat from MIT was the 2013 competition winner while Yi Liu from UC Berkeley received an Honorable Mention in 2013 competition.

The 2014 competition again has 10 entries from 8 universities across 4 countries. The 2014 competition judging committee chair is Megan Ryerson from University of Pennsylvania and the committee also includes John-Paul Clarke from Georgia Tech, Amy Kim from University of Alberta and Anil Yelundur from MITRE. The winner will be announced after the conclusion of the 2014 INFORMS Annual Meeting.

AAS Chair Thomas Vossen discussed the elections for officers, which will be announced by email notification after the conference. Senay Solak will become the Chair, Vikrant Vaze is running for Vice Chair/Chair Elect position and Andy Churchill is running for Secretary/Treasurer position. Other open positions include Cluster Chair, Dissertation Prize Chair, and Guest Editor for the AAS Newsletter.

AAS Chair Thomas Vossen made an announcement that the keynote talk by Dr. Parimal Kopardekar of NASA will take place on Monday at 4:30pm.

AAS Chair Thomas Vossen asked the members for any other business issues. One member mentioned that AAS can organize monthly webinars on relevant topics, and it was agreed that this could be an issue to follow up.

Location and directions for the Dutch treat dinner, which will take place at Cupola Pizzeria, were announced.

The meeting was adjourned.

2014 Dissertation Award

Vikrant Vaze
Assistant Professor
Dartmouth College
AAS Vice Chair

A committee consisting of Milind Sohoni (Chair) from Indian School of Business, Alper Murat from Wayne State University, Vinayak Deshpande from The University of North Carolina at Chapel Hill, and Lavanya Marla from University of Illinois at Urbana-Champaign awarded the 2014 AAS Dissertation Award to Stephen Maher from University of New South Wales for his dissertation titled "The Application of Recoverable Robustness to Airline Planning Problems". Maher was advised by Gary Froyland.

Stephen Maher
2014 AAS Dissertation Award Winner

Clayton Tino
2014 AAS Dissertation Award Honorable Mention

In addition, the committee also decided to award an Honorable Mention to Clayton Tino from Georgia Institute of Technology for his dissertation on "Wind Models and Stochastic Programming Algorithms for En Route Trajectory Prediction and Control". Tino's advisor was John-Paul Clarke. AAS extends its congratulations to Dr. Maher, Dr. Tino, and all the participants, who submitted exceptional research across the board.

2014 Student Presentation Award

AAS held its Best Student Presentation Competition at the 2014 INFORMS Annual Meeting. The presentations considered for the award had to be presented by an undergraduate or graduate student, and required the submission of an extended abstract. A committee consisting of Megan S. Ryerson (Chair) from University of Pennsylvania, Amy Kim from University of Alberta, John-Paul Clarke from Georgia Institute of Technology, and Anil Yelundur from MITRE evaluated ten student presentations and abstracts.

Heng Chen
2014 AAS Best Student Presentation Winner

James Jones
2014 AAS Best Student Presentation
Honorable Mention

The winner of the 2014 AAS Best Student resentation Award was Heng Chen from University of Massachusetts Amherst for his presentation titled "Optimal Metering Point Locations for Optimized Profile Descent Operations at Airports". The committee also decided to award an Honorable Mention to James Jones from The University of Maryland, College Park. Jones's presentation was on "Managing Terminal Airspace Demand Uncertainty with En-Route Speed Control".

Aviation Dissertation Prize

David Lovell
Associate Professor
University of Maryland
2015 AAS Dissertation Award Committee Chair

The Aviation Applications Section of INFORMS awards a prize for the best dissertation in any area related to aviation OR (air traffic management OR and airline OR). The winner will receive a plaque and an honorarium of $500. Other finalists will receive an honorable mention and a certificate. Doctoral dissertations meeting the following criteria are eligible for consideration:

Dissertation must have been completed and filed at the university between June 1, 2014 and May 31, 2015.

The dissertation must be in an area relevant to aviation research or practice.

Application Process
Submit the following documents in portable document format (PDF) via email to David Lovell (lovell@umd.edu), the committee chair, before midnight Monday, July 6, 2015:

- The completed dissertation
- An extended abstract (4 to 5 pages) describing the work and its relevance
- A letter of nomination from the dissertation supervisor supporting the submission and highlighting the importance of the research
- A short paper (20 to 25 pages, double spaced) that is based on the dissertation (optional, but welcome)

Prize Committee

Dr. David Lovell, Chair
Associate Professor
University of Maryland

Dr. Megan Ryerson
Assistant Professor
University of Pennsylvania

Dr. Thea Graham
Manager, Economic Analysis, Office of Performance Analysis
Federal Aviation Administration

Dr. Jim Diamond
Managing Director of Operations Research and Advanced Analytics
American Airlines

Dr. Kenneth Kuhn
Associate Operations Researcher; Professor, Pardee RAND Graduate School
RAND Corporation

AAS LinkedIn Group

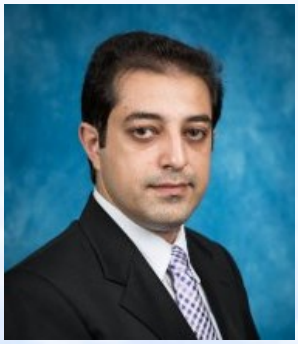
Heng Chen
Ph.D. Candidate
University of Massachusetts Amherst
AAS Webmaster/Social Media Coordinator

The AAS has created a LinkedIn Group to foster network connection and resource sharing on aviation applications. We invite everyone to join and actively participate by posting any relevant items at the following link:

https://www.linkedin.com/groups/INFORMS-Aviation-Applications-Section-AAS-8257712

Please email the AAS Webmaster and Social Media Coordinator Heng Chen if you have any suggestions or comments.

AAS Webinar Series



Farshid Azadian
Assistant Professor
Embry-Riddle Aeronautical University
AAS Webinar Series Co-host

We are happy to announce that this year AAS will start to host technical and educational webinars for the AAS members. The Webinar series will be hosted jointly by Dr. Ahmed Abdelghany (abdel776@erau.edu) and me. Our goal is to provide an opportunity to facilitate the efficient sharing of knowledge and expertise across our AAS community. Our vision is to have one-hour webinars and discussion sessions on various subjects of interest for our community ranging from new research topics to latest aviation industry developments by inviting high ranking speakers. The schedule of our webinar series will be announced through AAS community website soon.

Indeed, the success of this initiative depends on the support of our members. If you would like to suggest a topic for a webinar session, volunteer as speaker or nominate a speaker, please do not hesitate to contact me at azadianf@erau.edu

Aviation Applications Cluster at CORS/INFORMS International Conference, Montreal 2015

Guy Desaulniers
Professor
Polytechnique Montreal
2015 CORS/INFORMS AAS Cluster Chair

In 2015, the INFORMS International Conference (joint conference with the Canadian Operations Research Society) will be held at the Sheraton Hotel in Montreal, Canada, on June 14-17, 2015. This year, the cluster sponsored by the Aviation Applications Section includes a total of 24 talks distributed in six sessions. These sessions will cover various topics such as crew scheduling, air traffic control, flight delay prediction, ground delay planning, gate allocation, and flight plan optimization.

We would like to thank all session organizers and all speakers for their participation. We hope to see you in great numbers at the conference.

Recent Publications

The AAS is compiling a list of recent publications to support aviation researchers. Following is a list of sample recent papers that have appeared in INFORMS journals. You are invited to submit your published or working papers to be listed on the AAS website. Please send your papers to the AAS webmaster Heng Chen.

Operations Research

Bagchi, Aniruddha, and Jomon Aliyas Paul. "Optimal Allocation of Resources in Airport Security: Profiling vs. Screening." *Operations Research* 62.2 (2014): 219-233. [URL]

Barnhart, Cynthia, Douglas Fearing, and Vikrant Vaze. "Modeling Passenger Travel and Delays in the National Air Transportation System." *Operations Research* 62.3 (2014): 580-601. [URL]

Aktürk, M. Selim, Alper Atamtürk, and Sinan Gürel. "Aircraft Rescheduling with Cruise Speed Control." *Operations Research* 62.4 (2014): 829-845. [URL]

Gallego, Guillermo, Richard Ratliff, and Sergey Shebalov. "A General Attraction Model and Sales-based Linear Program for Network Revenue Management under Customer Choice." *Operations Research* (2014). [URL]

Management Science

Li, Jun, Nelson Granados, and Serguei Netessine. "Are Consumers Strategic? Structural Estimation from the Air-travel Industry." *Management Science* 60.9 (2014): 2114-2137. [URL]

Prince, Jeffrey T., and Daniel H. Simon. "Do Incumbents Improve Service Quality in Response to Entry? Evidence from Airlines' On-Time Performance." *Management Science* (2014). [URL]

Transportation Science

Alonso-Ayuso, Antonio, Laureano F. Escudero, and F. Javier Martín-Campo. "Exact and Approximate Solving of the Aircraft Collision Resolution Problem via Turn Changes." *Transportation Science* (2014). [URL]

Bilotkach, Volodymyr, and Vivek Pai. "Hubs versus Airport Dominance." *Transportation Science* (2014). [URL]

Froyland, Gary, Stephen J. Maher, and Cheng-Lung Wu. "The Recoverable Robust Tail Assignment Problem." *Transportation Science* 48.3 (2013): 351-372. [URL]

Koster, Paul, Eric Pels, and Erik Verhoef. "The User Costs of Air Travel Delay Variability." *Transportation Science* (2014). [URL]

Evans, Antony, Vikrant Vaze, and Cynthia Barnhart. "Airline-Driven Performance-Based Air Traffic Management: Game Theoretic Models and Multicriteria Evaluation." *Transportation Science* (2014). [URL]

Pyrgiotis, Nikolas, and Amedeo Odoni. "On the Impact of Scheduling Limits: A Case Study at Newark Liberty International Airport." *Transportation Science* (2015). [URL]

Maher, Stephen. "Solving the Integrated Airline Recovery Problem Using Column-and-Row Generation." *Transportation Science* (2015). [URL]

Manufacturing & Service Operations Management

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Upcoming Meetings

CORS/INFORMS 2015 Joint International Meeting
Montreal, QC, Canada
June 14-17, 2015

AGIFORS: 55th Annual Symposium
Washington, DC, USA
August 23-27, 2015

INFORMS: Annual Conference
Philadelphia, PA, USA
November 01-04, 2015

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