

- Achievements in the past year
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Aviation Applications Section

Newsletter

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A Year in Retrospective

We moved past the first inaugural issue of the newsletter, which is hopefully a good sign of sustainability. Among other information, in this issue you can find an interview with James Diamond, Managing Director of Operations Research and Decision Support at American Airlines. An updated list of forthcoming meetings is provided and we report on several initiatives from the past year.

As I look back to the first year of the current leadership, we undertook several initiatives. My personal favorite is the superb panel we held at the fall INFORMS meeting. Thanks to all four panelists, James Diamond from American Airlines, Erik Andersson from Carmen Systems, Glenn Roberts from MITRE, and Wilson Felder from the FAA, and all participants in the ensuing discussion, we had an excellent exchange of views, ideas, and issues. Three of the four presentations are available online at <http://aviation-appl.section.informs.org>.

Since the turn of the millennium, our membership is on the decline and efforts are underway to attract new members. With the assistance of INFORMS, we have sent three hundred individual letters to past members and to those individuals that have somehow expressed interest in aviation. Hopefully many of them will join. If you have a colleague, a friend, or a student with interest

in aviation, please refer him or her the Aviation Application Section. You do not have to be an INFORMS member to become a member of the section.

As many of you are aware, the Transportation Science and Logistics Society, which was previously a section, has an aviation special interest group. You can read more on page three on how this might effect our section.

In the past year we have also increased our collaboration with AGIFORS and NEXTOR. Several members gave presentations at the AGIFORS symposium and NEXTOR hosted a nice get together dinner after the business meeting in San Francisco.

I would like to acknowledge all of the section members that contributed to the well being of the section through their engagement. In particular, Stefan Karisch, Amy Cohn, Thomas Vossen, Irina Ioachim, and Laurie Garrow have dedicated a significant amount of their time in leading the section.

Laurie's superb job in organizing the Aviation Applications Cluster at the fall meeting in San Francisco must be put forward. I am confident her successor Gregory Coldren will keep the quality and quantity of the sessions on at least the same level. If you would like to contribute a talk or organize a session, please contact Gregory Coldred by email at



gregorycoldren@yahoo.com.

The members of an organization are at least as important as their leadership and I would like to thank all of you for being part of the section. I hope that being a member of the section is of value to all of you. I am looking forward to another big gathering at the Annual Meeting in Pittsburgh.

On behalf of the board, I thank you for being a part of AAS. If you have any comments or suggestions, please let any of us know.

Chair, Diego Klabjan, University of Illinois at Urbana-Champaign



Promoting OR in Aviation: Read more at

<http://www.orchampions.org/>

“Hardly a month would go by without a new airline O.R. paper being published in an academic journal. Airlines had standing advertisements seeking O.R. consultants.

Featured Interview: James Diamond

James Diamond is Managing Director of Operations Research and Decision Support at American Airlines. He started his career with American Airlines Decision Technologies (AADT) in 1989, and has held various positions in that company and subsequent incarnations of what today is Sabre, Inc, a spin-off of AMR Corporation.

He re-joined American Airlines in 2000 to help establish and lead a new Operations Research group, which today is 40 people strong and provides O.R. expertise to numerous business units throughout the company.

He has over 15 years of experience in applying O.R. and developing decision support tools for the airline industry. He holds a B.S. from Cornell University and a M.S. and Ph.D. from Purdue University.

Stefan Karisch from Carmen Systems and the vice-chair of the Aviation Application Section interviewed James for this issue of the newsletter.

Q. What made you decide to pursue a career in O.R.? In particular, what attracted you to the airline industry?

A. The truth is, I stumbled across O.R. by accident during my third year of undergraduate studies at Cornell. I took a course in environmental systems analysis where we were required to formulate and solve complex management problems as math programs. It was my first introduction to O.R., and I just loved it. I went on to study applications of

O.R. in the public sector in graduate school at Purdue.

After a brief stint in academia, I ended up working in the airline industry because it was a hot spot for O.R. – where O.R. was being applied with great bottom-line success – something I valued a lot. Hardly a month would go by without a new airline O.R. paper being published in an academic journal. Airlines had standing advertisements seeking O.R. consultants. And, when I interviewed for airline jobs, you could sense the energy and enthusiasm in every O.R. group. These were sharp people working on tough problems.

Q. What is the function of the Operations Research and Decision Support group at American Airlines? And, what is your role as managing director of this group?

A. We are an internal research, development, and consulting group that provides analytical studies and tools to business units across the airline. Our goal is to reduce costs, increase revenues, and otherwise generally improve the performance of the business. All members of our team have advanced degrees in O.R., IE, or other applied quantitative field. We bring a unique set of tools to the table that most departments don't have.

My job, and that of my colleague Armando Silva, is to set the overall direction of the group and determine where we should direct our limited resources. We have more

projects than we have capacity, so we try to ensure we are always working on the most important things. This requires that we stay close to the business and with our senior management.

Q. You participated on the airline Operations Research panel organized by the Aviation Applications Section at the last INFORMS Annual Meeting and began your presentation by claiming that O.R. cannot save the U.S. Airline Industry. Why is that?

A. As everyone knows, the U.S. airline industry has been struggling to turn a profit for several years now. The problem is fairly simple to state – costs exceed revenues - but hard to solve. Unless airlines, especially (but not exclusively) network carriers, can cut costs and raise fares to the point where they can consistently turn a profit, we will continue to read about airlines going into bankruptcy or even out of business.

My claim that O.R. alone cannot save the industry is based on the fact that costs and revenues are so far out of line that a fundamental re-structuring of the way we do business seems inevitable. I'm talking about technology, work rules, corporate culture, government policies and regulation. Some industry analysts think mergers and consolidations in the industry may be necessary. These are things that can move costs and revenues in a big way. Of course, bankruptcy (continue on page 6)

Experts' Opinions



During the INFORMS fall meeting, a panel on aviation was organized by the AAS. The common thread was aviation and operations research.

Erik Andersson from Carmen Systems pointed out that even though the airline industry is cyclic, the airline software market is not. Erik noted that it takes approximately twenty years to deploy a new optimization application to the whole airline market. Among other factors, scalability, which is directly tied to the domain of operations research academicians and practitioners, is often a challenge. Due to this long lead-time, it is more profitable for software vendors to release incremental improvements of the existing software rather than venturing into brand new applications.

James Diamond from American Airlines stressed that operations research is not going to save the

industry, but it can help. He presented several initiatives at American Airlines geared towards cost cutting and customer related improvements. In this new world, operations research is demanded to provide more robust solutions, model flexibility, and simplicity.

Glenn Robertson from MITRE focused on air traffic systems. He pleaded for the important role of visualization. On the other hand, models, simulation, and data processing are vital as well.

Wilson Felder from the FAA talked about the role of his administration in the aviation and the need for systems engineering and its relationship with operations research.

The presentations by the panelists were followed by an open discussion. The academicians were wondering how to collaborate and how to financially sustain their research efforts. Another important topic was the relevance of the conducted research to the real-world problems and applications.

Contributor: Diego Klabjan, University of Illinois at Urbana-Champaign

AAS and TSL

In early 2006 the Transportation Science and Logistics (TSL) section became a society. The newly organized society has an Aviation Special Interest Group (SIG). The special interest groups within TSL are supposed to function much like separate sections within the single society umbrella.

There is clearly an overlap between the Aviation SIG of TSL and the AAS. The current chairs and vice-chairs of this SIG coincide with the chair and vice-chair of the AAS, which for the time being allows single leadership.

The leadership of AAS has been approached by TSL to consider a possible folding of the AAS into the Aviation SIG of TSL. We are currently studying whether and how the two groups should be associated and assess cons and pros of a more formal relationship.

We will prepare our conclusions and plan to have a thorough discussion on this topic at our next business meeting in November.

Contributor: Diego Klabjan, University of Illinois at Urbana-Champaign

In view of the Transportation Science and Logistics section becoming a society, how should the Aviation Application Section be positioned?

Dissertation Award

The recipient of the annual dissertation award for the outstanding Ph.D. dissertation related to aviation in 2005 is Gregory Coldren. In his dissertation titled "Modeling The Competitive Dynamic Among Air-Travel Itineraries With Generalized Extreme Value Models", advisor Professor Frank Koppelman, Department of Civil and Environmental Engineering, University

of Northwestern, Gregory establishes a discrete choice analysis framework for itinerary-level demand allocation.

He has also won the Anna Valicek award given by AGIFORS. We congratulate Gregory for both awards.

We are thankful to the chair of the selection committee Professor Michael Ball and all the committee members for their superb job in selecting the best nomination among several candidates.

The solicitation for the 2006 dissertation award is forthcoming. The chair of this year's committee is Professor Mark Hansen from the University of California, Berkeley.

Special acknowledgments go to all involved members and participants that bring this award into fruition.



Congratulations to Gregory Coldren

Upcoming Meetings

- **INFORMS conference on OR/MS practice, April 30-May 2, 2006, Miami, FL.** <http://www.informs.org/Conf/Practice06/>
- **AGIFORS meetings.** <http://www.agifors.org>
 - **Schedule and Strategic Planning Study Group, May 11-12, 2006, Bedfordshire, United Kingdom.**
 - **Airline Operations Study Group, May 7-10, 2006, Dubai, United Arab Emirates.**
 - **Crew Management Study Group, April 9-13, 2006, Honolulu, Hawaii.**
 - **Reservation and Yield Management Study Group, June 15-17, 2006, Miramar, FL.**
 - **Cargo, June 14-17, Miramar, FL.**
 - **Symposium, September or October, 2006, Rome, Italy.**
- **INFORMS International, June 25-28, 2006, Hong Kong, China.** <http://www.informs.org/Conf/Hongkong06/>
- **INFORMS annual meeting, Pittsburgh, November 5-8, 2006.** <http://www.informs.org/Conf/Pittsburgh06/>

AGIFORS Anna Valicek Award Solicitation

AGIFORS is accepting submissions for the Anna Valicek Medal.

The Anna Valicek Medal is for original and innovative research by graduate students in the area of airline operations research. The Anna Valicek Medal provides a US\$2,500 award as well as the opportunity to present your research at the upcoming AGIFORS Symposium. Students who are interested need to submit a paper describing their research work by 30 April 2006.

http://www.agifors.org/award_home.jsp

Announcements



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 five hundred dollars. Finalists will receive an honorable mention and a certificate. Doctoral dissertations meeting the following criteria are eligible for consideration:

(1) The dissertation must be completed and submitted after June 1 of the previous year and before May 31 of the current year ;

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

Solicitation for Fall INFORMS Presentations

The Aviation Applications Section is soliciting session organizers (chairs) and/or presentations for the upcoming INFORMS Annual Meeting in Pittsburgh, PA (USA). The meeting will be held on November 5 – November 8, 2006. If you are interested in presenting and/or organizing a session, please email Gregory Coldren at gregorycoldren@yahoo.com the following information by April 1.

- **Session Chairs:** Select a theme that reflects your particular interests and provide a session title and a list of 3-4 potential speakers (include their email addresses).
- **Individual Presenters:** Send Gregory Coldren the (tentative) title of your presentation.

Please note that an individual can organize multiple sessions. However, only one contributed paper will be accepted from the same presenting author. Paper abstracts are due on May 15, 2006 and should be submitted online at www.informs.org/Conf/Pittsburgh06/.

Contact person:

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Dissertation Prize

Submit the following documents in portable document format (PDF) via email to the committee chair Mark Hansen (mhansen@euler.berkeley.edu) before midnight on July 15, 2005:

- 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 (if such a paper is available).

Contact person:

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“Although we have worked successfully in many areas, I would contend that some of our biggest (O.R.) contributions have come in the areas of Maintenance and Engineering, Operations Control, and Customer Services.”

Stefan Karisch from Carment Systems and the vice-chair of the section contributed this story.

Featured Interview: James Diamond (continuation from Page 2)

can do that, too. But, bankruptcy takes a toll on other things, like employee morale, too.

By all means, however, O.R. can make a difference to the financial health of an airline. Airlines are complex, the business changes rapidly, there is lots of uncertainty, tons of information, and plenty of decisions to be made. Even in the best of times it is a business of margins – where the difference between profit and loss can be less than a penny per seat mile. This is where O.R. excels!

Revenue management is the classic airline O.R. success story. But RM has become a given – a minimum requirement – just to be competitive in the industry today. The trick is to find another RM-like success story, in some underserved or untapped part of the airline, which will provide the next competitive edge, through reduced costs, increased revenues, or improved service.

Q. However, during your presentation you pointed out that O.R. made a difference in the turnaround at American Airlines. Which would you consider the most important areas where O.R. made a difference?

A. I certainly don't want to claim that O.R. has made a big difference in any turnaround. It has been a huge effort by every department and work group just to stay out of bankruptcy. We still have a long way to go to get back to profitability, and every person in the airline is looking at ways to

do that. But I do think that O.R. has made a contribution to the cause, and we certainly intend to continue to do our part. Although we have worked successfully in many areas, I would contend that some of our biggest contributions have come in the areas of Maintenance and Engineering, Operations Control, and Customer Services.

Q. What are some of the applications that your group is currently working on? Could you also talk about some of the challenges you face in trying to solve these problems in an airline environment?

A. In the three areas I just mentioned, for example, we have developed and continue to work on applications for inventory management and shop scheduling in M&E. We have developed tools to help manage resources like crew, aircraft, and slots, during irregular operations. And, we have developed the capability to automatically re-accommodate passengers whose flight has been cancelled or delayed, for example.

There are many challenges, but I'd say the most consistent challenge we face is to deliver with speed – to provide business value quickly. The industry is so dynamic and the airline changes so rapidly that if you take too long to conduct a study or build a tool, there is a good chance that the requirements have changed or the problem has been solved through some other means.

We constantly have to ask ourselves if we can live with something less than optimal if that will solve a business problem today. That's tough for us O.R. types. We like optimality.

Q. What do you find most rewarding about your career in O.R.?

A. The diversity of challenging problems - no day or problem is the same. The detective work involved in figuring out what the real problem is. Learning new aspects of the business so you can develop appropriate solutions. Working with really smart and interesting people. Seeing your team's work product make a difference. That's just the short list.

Q. What advice do you have for those just starting out in a career in O.R. in general, and in the airline industry in particular?

A. The airline industry is full of opportunities for O.R. people. Think of yourself as a consultant. Develop and hone your non-O.R. skills and talents. Communication skills are critical. You must be able to communicate your ideas and results in a credible and persuasive way to a non-technical audience. Learn everything you can about the business. Walk-a-mile in the shoes of your client. Get to know the problems as well as they do (without being a nuisance!). Last but not least, focus on results. Don't go after the optimal solution if 80% is good enough!



Promoting OR in Aviation: Read more at <http://www.orchampions.org/>

Minutes from the November Business Meeting

The Aviation Applications Section held its annual business meeting on Sunday, November 13, 2005 (during the 2005 INFORMS Annual Meeting). The meeting took place in room Union Square 12 at the Hilton Hotel in San Francisco, California. The meeting commenced at 6:15 PM and ended at 7:15 PM.

The following is a summary of the meeting.

In honor of the steamy city of New Orleans, this year's business meeting was sweltering as well. Maybe it was just the tremendous turn-out (literally overflowing out the door) that made the room so hot, but that just made the wine taste that much better and kept the officers from speaking too long!

Diego Klabjan, AAS president, called the meeting to order and presented a summary of the year's accomplishments. These include:

- The newly-revamped newsletter;
- Our recent efforts to increase AAS membership, including a direct mail campaign to former members;
- Our inaugural research clinic, including interesting and thought-provoking remarks by James Diamond from American Airlines, Erik Andersson from Carmen Systems,

Glenn Roberts from MITRE, and Wilson Felder from the FAA.

Diego was followed by Stefan Karisch, AAS vice-president. Stefan described the AGIFORS organization, gave an overview of its activities and membership, and spoke upon ongoing efforts to strengthen the AGIFORS/INFORMS relationship and take advantage of potential synergies.

Diego then gave an update of the AAS website. In particular, the hard work of web-master Thomas Vossen was acknowledged and thanked. Some potential enhancements were discussed as well.

A discussion then followed concerning membership fees. In particular, it was agreed that students should be allowed free membership in AAS, in hopes of both encouraging their participation and also increasing the likelihood of their (paid) membership upon graduation.

Another important topic of discussion was the ongoing efforts at establishing industry internships. We hope to have more information to provide about this in the future.

Laurie Garrow, last year's dissertation prize winner and the INFORMS 2005 cluster chair, then reviewed the tremendous success this year in forming sessions for the INFORMS conference and graciously relinquished her role.

This was conveniently followed by the awarding of the dissertation prize by Mike Ball to Gregory Coldren, who was then promptly dubbed cluster chair for INFORMS 2006 [let this be a warning to all considering submitting their dissertations!].

The meeting adjourned to more wine, cheese, good cheer, and -- for many -- a lovely dinner organized by Scott Simcox and NEXTOR, where the conversation and collegiality continued.

Contributor: Amy Cohn, University of Michigan



Aviation Applications Section

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Institute for Operations Research and the
Management Sciences
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Exchange ideas in aviation.

This section is a venue to promote the exchange of ideas, research, and accomplishments in aviation organization.

We invite interaction among industry professionals, educators, and students in areas including, but not limited to:

- the planning and operation of airports and airline companies
- air traffic control
- aviation financial, economic and policy analysis
- human factors
- the future of aviation.

Contact Diego Klabjan, Chair, for more information at klabjan@uiuc.edu.



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