

**52nd AGIFORS Annual  
Proceedings 2012**

**Annual Symposium and Study  
Group Meeting**

**Phoenix, Arizona, USA  
9-13 October 2012**

**Volume 1 of 2**

**ISBN: 978-1-62748-023-9**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2012) by AGIFORS -  
Airline Group of the International Federation of Operational Research Societies  
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact AGIFORS  
at the address below.

AGIFORS c/o Anne Jan Beeks  
AMS/QO Decision Support  
P.O Box 7700  
1117 ZL Schiphol Airport  
Schiphol, Netherlands

Phone: +31206491138  
Fax: +31206488326

[http://www.agifors.org/information\\_home.jsp](http://www.agifors.org/information_home.jsp)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## VOLUME 1

### ANNA VALICEK MEDAL SUBMISSIONS

<b>Multi-Product Price Optimization and Competition Under the Nested Logit Model with Product-Differentiated Price Sensitivities</b> .....	1
<i>Guillermo Gallego, Ruxian Wang</i>	
<b>Scheduling of Runway Operations for Reduced Environmental Impact</b> .....	39
<i>Gustaf Solveling, Senay Solak, John-Paul Clarke, Ellis Johnson</i>	
<b>Modeling Passenger’s Airline Ticket Choice Using Segment Specific Cross Nested Logit Model With Brand Loyalty</b> .....	57
<i>Tomasz Drabas, Cheng-Lung Wu</i>	
<b>Impact Analysis of a Flexible Air Transportation System</b> .....	78
<i>Bilge Atasoy, Matteo Salani, Michel Bierlaire, Claudio Leonardi</i>	
<b>To Fuel or Not to Fuel: That is the Question</b> .....	104
<i>Eduardo Sanchez Ayra, David Rios Insua, Javier Cano</i>	
<b>Investigation of the Flight Product Dynamic Choice Problem – Preliminary Results with Simulated Respondents</b> .....	135
<i>Uzi Freund-Feinstein, Shlomo Bekhor</i>	

### CREW MANAGEMENT STUDY GROUP PRESENTATIONS

<b>The Impact of Mobile Social Computing on Crew Management</b> .....	153
<i>John Corry</i>	
<b>Dealing with Multiple AOC’s</b> .....	169
<i>Jose Revelo</i>	
<b>Fairness of SB/RE Lines for Cabin and Cockpit at Lufthansa</b> .....	178
<i>Helmuth Eggeling</i>	
<b>Forecasting Overtime and Optimizing Crew Costs Through Better Vacation Placement</b> .....	200
<i>Alexandre Feray, Christophe Louat, Antoine Montulé, Anaïk Trihoreau</i>	
<b>Global Optimization of the Resource Plan</b> .....	210
<i>Natalia Gagnacci, Fredrik Altenstedt</i>	
<b>Adding Biomathematical Fatigue Models to Pairing Optimizers and Line Generators</b> .....	232
<i>Robert Gerbracht</i>	
<b>Crew Systems Update</b> .....	244
<i>Darrell Haskin, Ed Gaïtan</i>	
<b>Fatigue Risk Management in Crew Scheduling using Biomathematical Modeling of Fatigue</b> .....	249
<i>Steven Hursh, Robert Gerbracht</i>	
<b>Crew Fatigue Management, Quantitative View</b> .....	268
<i>Xiaodong Luo</i>	
<b>FRMS: From a Crew Management Perspective</b> .....	279
<i>Jim Mangie</i>	
<b>Pilot Pad</b> .....	299
<i>Guy de Nadaillac</i>	
<b>Flight and Duty Time Limitations: A Study on their Effectiveness in Managing Crew Fatigue</b> .....	304
<i>Ake Olbert</i>	
<b>B737 Design to the MAX</b> .....	319
<i>Joel Purificacion</i>	
<b>Crew Reroute System Going Forward</b> .....	336
<i>Claudia Rolan, Merrill Isenman</i>	
<b>Welcome and Keynote Address: AviancaTaca</b> .....	348
<i>Adan Antonio Solares</i>	
<b>The Challenge of Pushing FRM to Its Limits</b> .....	371
<i>Andreas Söhlke</i>	
<b>Challenges and Opportunities in Crew Management Performance Monitoring</b> .....	384
<i>Victoria Teworte</i>	

## **OPERATIONS STUDY GROUP PRESENTATIONS**

<b>The Stand Allocation Problem: Solution Methods &amp; Robustness</b> .....	396
<i>Rodrigo Acuna-Agost</i>	
<b>Efficient Solution Procedures for the Stochastic Airport Runway Scheduling Problem</b> .....	412
<i>John-Paul Clarke, Gustaf Solveling</i>	
<b>The Impact of Advances in Modern Human Computer Interaction in Operations Control and Decision Support</b> .....	424
<i>John Corry</i>	
<b>Road to Precise Departure Sequencing</b> .....	455
<i>B. Murphy</i>	
<b>Design of Cognitive Work Support Systems for Airline Operations</b> .....	462
<i>Karen Feigh</i>	
<b>Advanced Optimisation - Optimiert Entscheiden!: Integrated Air to Air Trajectory – A Decision Support Solution Approach</b> .....	520
<i>Miriam Klubertz</i>	
<b>Cost Efficient Operations in a Dynamic Environment</b> .....	541
<i>David Karlberg</i>	
<b>Revenue and Operational Impacts of Depeaking Flights at Hub Airports</b> .....	556
<i>Donald Katz</i>	
<b>Trends in U.S. Airline On-Time Performance</b> .....	573
<i>Joshua Marks, Edmund Otubuah, Ryan Leick</i>	
<b>Solving the Metroplex Optimization Problem</b> .....	585
<i>Evan McClain</i>	
<b>Steering a Better Performing Hub – Development of a Holistic KPI System</b> .....	600
<i>Florian Merget</i>	
<b>Managing Customer Connections During FAA Ground Delay Programs</b> .....	610
<i>Balaji Na garajan</i>	
<b>New United’s Network Operations Control Center</b> .....	622
<i>Julian Pachon</i>	
<b>Airport Customer Service: Atlanta</b> .....	632
<i>Bryan Reiter</i>	
<b>Integrating the Aircraft Routing, Crew Pairing, and Tail Number Assignment Problem</b> .....	637
<i>Natashia Boland, Faram Engineer, Ian Evans, Sebastian Ruther</i>	
<b>Streamlined Boarding Experience</b> .....	660
<i>Alejandro Scalise</i>	
<b>Mitigation of Airspace Congestion Impact on Airline Networks</b> .....	678
<i>Bo Vaaben</i>	

## **REVENUE MANAGEMENT STUDY GROUP PRESENTATIONS**

<b>Demand Seasonality for Revenue Management</b> .....	687
<i>Anubhav Jain</i>	
<b>Measuring and Monitoring Granular Forecast Performance</b> .....	699
<i>Octavian Oancea, Praveen Bala</i>	
<b>Barcelona Air Route Development Committee (BARDC)</b> .....	710
<i>N/A</i>	
<b>Fare Family RM in Competitive Markets</b> .....	716
<i>Peter Belobaba, Vincent Surges</i>	
<b>How Should RM Folks Feel about Frequent Flyer Programs?</b> .....	732
<i>Bill Brunger</i>	
<b>Inferring Market Elasticity From Traffic Data</b> .....	740
<i>Tassio Carvalho</i>	
<b>Maps, Models and Agents – Quantifying the Value of Micro-Level RM</b> .....	747
<i>Catherine Cleophas</i>	
<b>Vueling, a New Model</b> .....	758
<i>Alex Cruz</i>	
<b>The Pitfalls of Decomposing Dependent Demands into its Independent Components</b> .....	788
<i>Guillermo Gallego, Lin Li</i>	

## VOLUME 2

<b>Post-Sale Revenue Management: Reused Seats + Unsold Seats</b> .....	836
<i>Sachin Goel</i>	
<b>Forecasting Passenger Demand at the “Right” Level: Optimal Dimension Definitions and Clusters for Forecasting Demand</b> .....	856
<i>Thomas Gorin</i>	
<b>Bid Price Sharing and Dynamic Valuation</b> .....	868
<i>Himanshu Jain, Peter Belobaba</i>	
<b>Dynamic Pricing for Airline Partners</b> .....	887
<i>Thilo Pfeiffer</i>	
<b>Branded Fares Product Design and Pricing</b> .....	910
<i>Richard Ratliff, Guillermo Gallego</i>	
<b>Enhanced Choice-Based Network Revenue Management</b> .....	925
<i>Arne Strauss</i>	
<b>Network RM–Approx DP and Lagrangian Relaxation</b> .....	940
<i>Kalyan Talluri</i>	
<b>Converting No-Show Passengers Into Additional Revenue and Loyal Customers</b> .....	948
<i>Jose Luis Vilar, Nicola Giannessi</i>	
<b>EM/PD Timeframe Unconstraining in PODS Network T1 with Two Implementation Twists</b> .....	968
<i>Larry Weatherford</i>	
<b>Benchmarks for Revenue Management Methods Under Competition</b> .....	990
<i>Benedikt Zimmermann, Catherine Cleophas, Karl Isler</i>	

### SCHEDULING STUDY GROUP PRESENTATIONS

<b>Scheduling and Strategic Planning for Fleet of Aircraft with Alternative Mission Specifications</b> .....	1004
<i>Philippe A. Bonnefoy</i>	
<b>Trajectory Management in MT Planning &amp; DDR ( Demand Data Repository)</b> .....	1019
<i>Frederique Senechal</i>	
<b>FLOWBBE – Flow Based Blocktime Engine At Southwest Airlines</b> .....	1028
<i>Alexandre Clerc</i>	
<b>A Tale of Two Airlines; or What Happened to the Block Forecast?</b> .....	1040
<i>Mei Wang, Pat Oldfield, Debra Hoitomt</i>	
<b>Clean Sheet Scheduling</b> .....	1047
<i>Tore Jenner</i>	
<b>&gt;&gt;IT that makes your life easier</b> .....	1052
<i>Olaf Jeschke</i>	
<b>Network Optimization at Southwest Airlines: An Update</b> .....	1060
<i>David Michael</i>	
<b>Network Planning and Business Model Transformation: The Flexibility Challenge</b> .....	1069
<i>Jim Paton</i>	
<b>SJU P7.6.4 - User Driven Prioritisation Process</b> .....	1080
<i>Frederique Senechal</i>	
<b>Airline Tail Assignment Process Optimization: The Impact of Aircraft Heterogeneity</b> .....	1085
<i>Patricia Ribeiro, Susana Relvas, Nuno Leal</i>	
<b>Using Visualization and Reporting for the Customer Choice Model</b> .....	1099
<i>Anja Simon</i>	

### 52ND ANNUAL SYMPOSIUM PRESENTATIONS

<b>Building Reliable Air-Travel Infrastructure Using Empirical Data and Stochastic Models of Airline Networks</b> .....	1107
<i>Mazhar Arkan, Vinayak Deshpande, Milind Sohoni</i>	
<b>2012 Anna Valicek Award</b> .....	1143
<i>Laurie Garrow</i>	
<b>The Recoverable Robust Tail Assignment Problem</b> .....	1146
<i>Stephen Maher</i>	
<b>Different Solution Approach for Airport Gate Assignment Problem</b> .....	1170
<i>Sefika Boz</i>	

<b>Why is Greedy So Greedy?</b> .....	1190
<i>Olivier Ratier, Baptiste Chatrain</i>	
<b>Robust Gate Assignment to Reduce Tarmac Waiting Time</b> .....	1209
<i>Amy Cohn, Ryan Chen</i>	
<b>The Big Data Paradox: Evolving the Airline Industry to Leverage the Opportunity</b> .....	1221
<i>Alex Cosmas</i>	
<b>Integrating Operations Research into Airline Marketing</b> .....	1232
<i>Kaaren Cramer</i>	
<b>Crew Planning Forecasting Methodology</b> .....	1260
<i>Cathi Dege, Markus Wegner</i>	
<b>Do Bags Fly Free?: An Empirical Analysis of the Operational Implications of Airline Baggage Fees</b> .....	1267
<i>Mariana Nicolae, Mazhar Arkan, Vinayak Deshpande, Mark Ferguson</i>	
<b>Modeling Passenger’s Airline Ticket Choice Using Segment Specific Cross Nested Logit Model with Brand Loyalty</b> .....	1307
<i>Tomasz Drabas</i>	
<b>Robust Airline Scheduling with Controllable Cruise Times and Chance Constraints</b> .....	1326
<i>A.S. Duran, S. Gurel, M. Selim Akturk</i>	
<b>The Effect of Advance Purchase Deadlines on Airline Customer Behavior</b> .....	1383
<i>Susan Hotle, Laurie Garrow, Matthew Higgins</i>	
<b>Middle Seat, Anyone?: Factors Influencing Premier Coach Seat Purchases</b> .....	1408
<i>Laurie Garrow</i>	
<b>FLOWBBE – Flow Based Blocktime Engine At Southwest Airlines</b> .....	1424
<i>Alex Heinold</i>	
<b>Importance of Strategic Relationships Between Airlines and Airports</b> .....	1436
<i>Ehtisham Iqbal</i>	
<b>Keeping It Real: Complex Integration Problems and Real World Solutions</b> .....	1441
<i>Brad Jensen</i>	
<b>A Comprehensive Investigation of Flight Time Limitations and their Ability to Control Crew Fatigue</b> .....	1456
<i>Stefan Karisch</i>	
<b>Organization Learning Framework for Managing Massive Airline Flight Disruptions</b> .....	1473
<i>Tulinda Larsen</i>	
<b>Understanding Airline Performance through the Airline Benchmark Rating</b> .....	1491
<i>Ryan Leick</i>	
<b>Assessing Airport Gate Usage: Utilization, Turn Times and Delays</b> .....	1502
<i>Joshua Marks</i>	
<b>The Impact of Oil Prices on the Air Transportation Industry</b> .....	1512
<i>Dominic McCormachie, Christoph Wollersheim, R. John Hansman</i>	
<b>Strategic Business Intelligence Initiative Crew Resources, US Airways</b> .....	1550
<i>Rakesh Mopidevi, Jagadish Ramamurthy, Owen Perrine</i>	
<b>Crew Strategic Planning: An Application of Operation Research in Crew Supply Chain Management</b> .....	1561
<i>Hadi Purnomo, Rakesh Mopidevi, Maxim Spivakovsky, Tim Jacobs</i>	
<b>Flight Search Analytics</b> .....	1568
<i>Charles Robelin</i>	
<b>Flight Scheduling on a Route and Maximisation of Passenger Satisfaction</b> .....	1583
<i>Daniel Sallier</i>	
<b>Revenue and Other Business Metrics in Revenue Management</b> .....	1601
<i>Darius Walczak</i>	
<b>Author Index</b>	