7th Workshop on Algorithmic Approaches for Transportation Modeling, Optimization, and Systems

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Edited by

Christian Liebchen
Ravindra K. Ahuja
Juan A. Mesa

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Editors

Christian Liebchen
Institute of Mathematics
TU Berlin
Straße des 17. Juni 136
10623 Berlin, Germany
liebchen@math.tu-berlin.de

Ravindra K. Ahuja
SCALE Center
University of Florida
Gainesville, FL 32611
United States
ahuja@ufl.edu

Juan A. Mesa
Higher Technical School of Engineers
Department of Applied Mathematics II
University of Sevilla
41092 Sevilla, Spain
jmesa@us.es

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ATMOS 2007 Preface:
Algorithmic Approaches for Transportation Modeling, Optimization, and Systems

Ravindra K. Ahuja[1], Christian Liebchen[2], and Juan A. Mesa[3]

[1] Supply-Chain and Logistics Engineering Center (SCALE),
University of Florida, Gainesville, USA
ahuja@ufl.edu
[2] Institute of Mathematics, Technical University Berlin, Germany
liebchen@math.tu-berlin.de
[3] Higher Technical School of Engineers, University of Sevilla, Spain
jmesa@us.es

We are very pleased to present the proceedings of the ATMOS 2007 workshop which represents the very best of research in the field of scheduled transportation. ATMOS 2007 is being held on November 15 and November 16, 2007 in Sevilla, Spain. ATMOS 2007 is novel in two aspects. First, whereas previous ATMOS workshops were satellite workshops to major European conferences in computer science (ICALP 2001 & 2002, ESA 2003–2006), ATMOS 2007 is preceded by a fall school on "Robust Network Design and Delay Management". This school is sponsored by the European research project ARRIVAL, which stands for "Algorithms for Robust and online Railway optimization: Improving the Validity and reliAbility of Large scale systems", funded by the European Commission.

The second aspect in which ATMOS 2007 is novel, is a broadened scope. Until 2006, ATMOS was an acronym for "Algorithmic Methods and Models for Optimization of Railways." This year, for the first time, we have opened up the scope of ATMOS by enlargening its focus to encompass all modes of scheduled transportation: rail, road, air, and shiplines. Now the ATMOS acronym stands for "Algorithmic Approaches for Transportation Modeling, Optimization, and Systems." Though we invited papers from researchers in all modes of transportation, most of the submitted papers still focused on railroad applications. Thus, like previous years, ATMOS 2007 is going to be mostly a railroad workshop. In that perspective, ATMOS 2007 collects the very best and latest of research in the field of railroad: modeling, algorithms, and applications.

Transportation networks all around the world are experiencing unprecedented growth. Policy makers and corporate leaders are very concerned about the ability of the nations' infrastructure to handle this growth. Congestion is becoming a major economic barrier to the free flow of both, passengers and goods, in our cities and across continents, with railroads, highways, airports, and maritime ports all laboring under record levels of volume, steadily increasing energy costs, employee shortages, reduced funding, and additional challenges of security and severe weather. It is thus incumbent upon us as a society to work together to discover new and innovative techniques whereby all scheduled transportation

providers can improve the utilization, productivity, and reliability of the existing infrastructure.

Researchers working in scheduled transportation networks all around the world are developing new models and algorithms that would improve the productivity of resources and improve network capacity. Mathematical models and tools are gaining greater acceptance in the transportation industry. Senior executives are realizing that they need to develop decision support systems to improve efficiency, productivity, and network capacity. Transportation companies cannot rely forever on the insight and gut feelings of experienced practioners, but need to infuse the manual decision-making with the modeling and algorithmic intelligence. The transportation community is looking up to the academicians and entrepreneurs to develop software solutions which they can use to improve their operations. The optimization is in the air and it is up to us to create success stories and make such systems an integral part of decision making processes. ATMOS workshops are playing an important role in this task by promoting exchange of ideas between researchers and dissemination of ideas from researchers to practitioners.

In response of our invitation for papers, we received 30 submissions by authors of 12 countries, therein four outside Europe. All submissions were reviewed by at least two members of the ATMOS 2007 Program Committee, comprising of the two co-chairs plus the following experts:

- Matteo Fischetti, University of Padova, Italy
- Dennis Huisman, Erasmus University Rotterdam and Dutch Railways, The Netherlands
- Gilbert Laporte, HEC Montréal and GERAD, Canada
- Janny Leung, Chinese University of Hong Kong, China
- Juan A. Mesa, University of Sevilla, Spain
- Matthias Müller-Hannemann, Technical University Darmstadt, Germany
- Klaus Nökel, PTV AG, Germany
- Leena Suhl, University of Paderborn, Germany
- Christos Zaroliagis, University of Patras, Greece

We would like to take this opportunity to thank them for their timely help and professional service. We also thank all external referees who helped in the paper selection.

As the result of this rigorous refereeing and selection process, we accepted only 14 papers[4] – still constituting a new maximum in the series of ATMOS workshops. Indeed, we had to decline some very good papers from presentation. On the brighter side, the selected papers are of excellent quality and we hope the best research conducted in the field. The papers to be presented feature high diversity: there are papers on large-scale integer programming as well as online optimization, in railroad as well as bus services, passenger railroad as well as freight railroad, traditional topics such as timetabling and recent developments

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[4] Luigi Moccia et al. refrained from publishing their accepted paper in this proceedings volume.

such as intermodal services, and emerging mathematical technologies such as robust optimization.

In addition to these contributed papers, this proceedings volume also features invited papers by the ATMOS 2007 invited speakers, and by lecturers of the ARRIVAL fall school 2007:

- Ricardo García, Ángel Marín, Juan A. Mesa, Federico Perea, and Doroteo Verastegui. *A new concept of robustness*. Pages 1–14
- Jens Clausen. *Applied Railway Optimization in Production Planning at DSB S-tog – Tasks, Tools and Challenges*. Pages 15–29
- Jens Clausen. *Disruption Management in Passenger Transportation – from Air to Tracks*. Pages 30–47
- Artyom Nahapetyan, Ravindra Ahuja, F. Zeynep Sargut, Andy John, and Kamalesh Somani. *A Simulation/Optimization Framework for Locomotive Planning*. Pages 259–276

Finally, we would like to thank the editors of the Dagstuhl Seminar Proceedings for the opportunity to publish these proceedings within DROPS. In this ATMOS workshop, we are looking forward to many insightful lectures and constructive discussions.

A collection of selected papers will be published by John Wiley & Sons, Ltd. in a special issue of Networks, to be guest edited by Christian Liebchen and Ravindra K. Ahuja. This special issue of Networks, entitled

Optimization in Scheduled Transportation Networks

will also include other contributed papers. We request authors of ATMOS 2007 Proceedings to revise their papers and contribute to the special issue. We will also invite other authors to contribute papers to this special issue. The deadline for receiving the full papers is December 31, 2007.

Sevilla, November 2007
Ravindra K. Ahuja, Christian Liebchen, and Juan A. Mesa
PC Co-chairs of ATMOS 2007 and Organizer of the ARRIVAL Fall School 2007