

Editorial: Driving, cycling and flying: trends in planning and operational transportation research in Europe

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In this special issue we present three papers selected from the 18th meeting of the EURO Working Group on Transportation (EWGT) which was held in July 2015 in Delft, the Netherlands, organized by Delft University of Technology. The selected contributions reflect the diversity of topics that were addressed in this conference, which is dedicated to mathematical modeling of transportation problems. We are happy to have a small but representative sample in which three different modes of transportation are in focus: the bicycle, the car and the airplane. The editors are very grateful for all the work that authors and referees have put in creating interesting research papers in this broad field of transportation research. This editorial first explains what the EWGT is and how the EWGT conference was organized. The three contributions are then presented and put into the perspective of the Dutch edition of the EWGT conference.

1. The Euro Working Group on Transportation

The EURO Working Group on Transportation (EWGT) is one of 32 Groups of EURO - The Association of European Operational Research Societies. Its main interest lies in the application of operations research methods in the field of transportation. EWGT focuses on the development of mathematical models, algorithms and decision support tools to solve complex transportation problems. EWGT has met on a regular basis since 1991, when it was founded in Cetraro, Italy. At that time, this was called the EURO Working Group on Urban Traffic and Transportation. Since a first meeting held in Landshut, Germany, in 1992, consecutive EWGT conferences were hosted by different European countries such as: France, Spain, United Kingdom, Sweden, Finland, Italy and Poland. Over this period of two and half decades EWGT has become a reputed conference, not only in Europe, but also abroad, attracting participants from all over the world to its annual meeting. All through the years the topics covered in this conference have been broadening. While the Operations Research perspective is still strongly represented, as it had been since the beginning of the conference series, in present meetings, it is now natural to find colleagues from fields as diverse as the social sciences, geography, urban planning and other fields, which connect to transportation and require quantitative methods of analysis.

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2. The 18th meeting of the EWGT in Delft

For its 18th edition, the Euro Working Group in Transportation (EWGT) was held in the Netherlands. From the 14th to the 16th of July 2015, EWGT was organized and managed by the Delft University of Technology through the Transport Institute of this university. For this, the Institute coordinated the efforts of three departments: Transport & Planning of the Faculty of Civil Engineering and Geosciences, Air Transport & Operations of the Faculty of Aerospace Engineering, and Engineering Systems & Services of the Faculty of Technology, Policy and Management.

EWGT 2015 has received considerable attention from around the world. The total number of abstracts received was almost 400, of which 75% was accepted for presentation at the conference. The conference featured keynote speeches by three leading authorities in transport modelling and provided an exciting technical programme covering a wide range of topics in transport research.

While the conference did not have an overall theme, there were special streams of the programme organized by experts in their fields. From these sessions relevant trends in society and science can be identified. For example, there was much interest in shared mobility and automated vehicles, reflecting the trend that society is moving from owning and driving vehicles to renting and enjoying a ride in a self-driving car. Traditional research fields such as urban traffic and railway traffic modelling also received much attention, indicating that these fields are still developing in accurately describing their systems and tackle capacity and safety problems. From a methodological perspective, multi-criteria analysis stood out as one of the most robust and flexible methods of arriving at better decisions in transport investment. Air transport in this edition was also given extra attention with many contributions in which operations research methods were employed to achieve a more secure, efficient, and delay-free system of travelling between countries and continents. Last, but definitely not the least, the organizers are proud that cycling mobility was very well represented in the programme. Since the Netherlands is so famously known for high bicycle usage, for all kinds of trips, it made complete sense to create a forum to discuss how to support and foster the usage of this sustainable mode of transport around the world.

3. Selected contributions

In this special issue we wanted to present a selection of high-quality papers that represented the latest trends in research being done in the field of mathematical analysis and modeling of transportation problems across different modes of transportation. From the papers presented at the conference, almost half were invited to submit a full paper for the selected proceedings, which were peer reviewed by an international review panel. Based on those reviews and the diversity in topics being addressed, 5 papers were selected. The authors of these papers were invited to submit an extended version for this special issue in EJTIR. Based on the results of a second review, three of these five papers have been accepted for publication.

In the conference we have done a particular effort in giving more visibility to air transport including air traffic management and airline operations. From these contributions we have selected one paper which aims to assess the effectiveness of a peak-load pricing policy in reducing network congestion. We also wanted to reflect in this special issue the great emphasis on innovative modes and technologies that the conference has put forward. From contributions in this domain we selected a paper which is aimed at estimating the demand for public charging of electric vehicles in an urban environment. Finally, as mentioned above, given that this edition of EWGT took place in the Netherlands, we wanted to have contributions on research being done in the field of cycling research. Hence, the last paper represents a contribution from this theme

and is focused on providing knowledge to support the transition of a cycling network from an incipient small network to a full encompassing network. In the following we explain each contribution in more detail.

The first paper by Bolić, Castelli and Rigonat (Bolić et al., 2017) investigates the effectiveness of applying a centralized peak-load pricing policy in the European Air Traffic Management (ATM) system. In these times that the implementation of a Single European Sky is still an open debate, this research suggests an innovative and unconventional policy for analysis. The authors explore the existing EU regulation to propose time-dependent en-route charges imposed by a central planner. The goal is to reduce network congestion in the European sky, resolving the capacity-demand imbalances and mitigating flight delays caused by ATM. The authors formulate this problem as a bi-level model, where the pricing decisions of the central planner and the routing decisions of the air space users are modeled together. The optimal peak and off-peak en-route charges are defined according to the Stackelberg equilibrium concept. Maybe the idea of having a central ATM planner in Europe is (still) very unconventional for implementation. Nevertheless, this research contributes for the discussion of the balance between a centralized airspace control of the European space and the current decentralized control at the national level. Results from a preliminary study presented in this paper suggest that a centralized approach can be promising.

Moving down from the clouds to the land, we reach the cities and their challenges in improving mobility conditions for all in a sustainable way. Urban mobility in the last decade is changing quite rapidly from a system based in traditional technologies and modes of transport such as buses, trams and metros to a much more diverse reality with new shared models, such as carsharing and electric vehicle technologies. Against this background, Schüßler, Niels and Bogenberger (Schüßler et al., 2017) present a methodology for calculating the charging demand for electric vehicles in different regions as a function of the range of Battery Electric Vehicles (BEV) and the characteristics of the drivers (for example, the possibility or not to charge the vehicle at home). They use an agent-based simulation model to spatially distribute the BEV users and through scenarios analysis they are able to identify the most important determinants for the number of arrivals at charging stations thus allowing for a better planning and operation of these charging networks.

Finally, we move towards the soft modes and, more precisely, the bicycle, which is one of the most important urban modes of transportation in the Netherlands. This, in contrast to other countries where there is typically a entirely different situation with respect to the available cycling infrastructure. In many cases urban cycling networks which support more than just leisure trips are still non-existent or incomplete. Often, this is due to the low priority given to cycling in most countries. Against this background, Moura, Magalhães da Silva and Santos (Moura et al., 2017) propose a method to expand the incipient cycling network of the city of Lisbon, Portugal, through the screening of the road network for finding compatible characteristics which will support bicycle traffic flows. The paper is especially interesting in that it addressed a case study of a city that is particularly known to have an old and organic historic city center with very high slopes, which is in total contrast with the Netherlands.

References

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