Transport Studies Group - Annual Report 2009

INTRODUCTION

2009 saw the start of six new research projects in the areas of aviation and the environment. These included two EPSRC awards from an Energy Programme Sandpit on Airport Operations: the ABC (Airports and Behavioural Change) project focusing on the environmental impacts of surface access trips and a network on low carbon airport operation. A further EPSRC project relating to Future Resilient Transport Networks (FUTURENET), which has a focus on the impacts of transport on climate change is one of a series of projects relating to Adaptation and Resilience to Climate Change (ARCC).

The successful lunch and lecture series continued with 12 guest speakers including independent consultants Lynda Addison and Derek Halden and academics Helena Titheridge and Tom Cherrett presenting their perspectives on Transport Planning and Accessibility; Roles and Perspectives of the Transport Policy Community, What future for Travel Planning? and Filling the Gaps, Travel Planning: Local Authority and Developer Perspectives at four lunch and lecture at Loughborough events. Lunch and lectures form a key part of the MSc modules Travel Behaviour and Travel Planning and Transport Policy and Planning and aim to establish and develop relationships between students, local transport practitioners and the expert speakers. In addition the Transport Studies Group hosted an ACT Travelwise Master class on Advanced Travel Plans in December.

STAFF NEWS


Dr Lucy Budd co-authored the two final OMEGA reports on climate related ATM and the environmental effects of European airspace charges published at the end of January 2009. She also contributed to, and appeared on, the critically acclaimed three part BBC4 television documentary series ‘The Secret Life of the Airport’, which was first transmitted in June 2009. She was invited to take part in a live debate on sustainable air transport on Radio Leicester in mid-December.

Dr Lisa Davison took part in Come Alive with Science to promote STEM subjects to a school audience. Focussing on ‘Propensity to Fly’ research outputs Lisa Davison worked alongside fine artist Steffie Richards with pupils at Long Eaton Secondary School. Pupils at Long Eaton devised creative STEM challenges, games and competitions to spark the imaginations of local primary school pupils and parents during National Science and Engineering Week 2009. Dr Davison was involved in the TRAVEL PLAN PLUS project meetings.

Dr Marcus Enoch was invited to speak as part of a debate on the future of travel plans at the European Conference on Mobility Management in San Sebastian, Spain in May and a COMMERCE project meeting in Bucharest, Romania in December. He became a Chartered Member of the Chartered Institute of Logistics and Transport in August. Finally, as principal investigator of the lead partner, Dr Enoch chaired two project meetings of the euro 1m EC-funded project TRAVEL PLAN PLUS in Bagès, Spain in May and in Stockholm, Sweden in November.

Professor Stephen Ison chaired a Workshop on the Nexus Between Parking Pricing and Congestion Charging, 88th Annual Meeting of the Transportation Research Board, TRB, Washington DC in January. His paper co-authored by G Hughes and R Tuckwell: “Cambridge’s experience of road user charging: lessons learned”, published in the Proceedings of the Institution of Civil Engineers, 161(TR3), 135-141, was the winner of the Rees Jeffreys Award 2009 awarded to the author of the best paper on highway engineering published in “Municipal Engineer” or “Transport” in any one year by the Institution of Civil Engineers. He organised, with Tony May, a WCTRS Special Interest Group (SIG10) Workshop on the Transferability of Urban Transport Policy in Gothenburg on the 18th April. This was held to coincide with the Volvo Research and Educational Foundations (VREF) - Future Urban Transport (FUT), Dr Frost and Professor Ison presented a Prestige Paper ‘Comparisons of Noise Impacts from Urban Transport, Silence of the Trams?’ at the Institution of Civil Engineers, London on the 7th December. Professor Ison was a Visiting Lecturer at the Institute for Sustainable Development, University of Malta, Msida, Malta 14th-17th December.

Dr David Pitfield was awarded the Moss Madden Memorial Medal, 2008 from the British and Irish Section of the Regional Science Association International for the best published paper by a regional scientist in the section Pitfield, D.E. (2008). The Southwest Effect: A time series analysis on passengers carried by selected routes and a market share comparison. Journal of Air Transport Management, 14, 113-122. He served on the Scientific Committee of VIII SITRAER – Air Transportation Symposium of the Brazilian Air Transportation Research Society. São Paulo, Brazil, 3-6 November 2009. The Aircraft Accident Models’ Risk Assessment Analysis Procedure developed as part of an EPSRC supported project was applied to San Francisco and Toronto Airports in 2009. He has been appointed as External Examiner for the MSc Aviation & International Trade at London Metropolitan University.

STAFF CHANGES

David Gillingwater has been a member of the Transport Studies Group since the early 1970’s and after a brief spell at Nottingham Trent University, he was promoted to senior lecturer at the end of the 1980’s. When Professor Norman Ashford retired, David became the leader of the group and editor of the journal Transportation Planning and Technology. In his career at Loughborough his teaching at first focused on strategic planning issues and later on business strategy. His research moved increasingly towards aviation and its economic and environmental effects as well as the use of soft computing methods in supporting strategic decision making. He has supervised a great number of PhD students and he will be fondly remembered by the various cohorts of undergraduate and postgraduate students as well as his colleagues on the staff now that he too has retired. However, he has a continuing involvement with the Group, having been appointed to an Honorary Fellowship. This will enable him to continue his research work and edit the Journal from Loughborough as well as maintain membership of the EPSRC Peer Review College.

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Dr Mohammed Quddus has accepted an invitation to act as an Associate Editor of the Journal of Intelligent Transportation Systems. He was also invited to join the advisory boards of two leading journals in transport: Transportation Research C: Emerging Technologies and Accident Analysis and Prevention. He guest edited two special issues for the Journal of Intelligent Transportation Systems on “Intelligent vehicle navigation (iVN).” In July 2009, Dr Quddus and Professor Ison were invited by the Dhaka City Corporation, Bangladesh to share their expertise on “Transport crisis in Dhaka city: technological or policy measures?”

Dr Tim Ryley and Dr Lisa Davison were invited to present a paper at the 23rd European Conference on Operational Research, Bonn 5th-8th July 2009 within the Revenue Management stream. Dr Ryley also gave a presentation, entitled ‘Consumer choice modelling inputs into airline revenue management applications’, to the East Midlands Operational Research Group (EMORG), Loughborough University, in October 2009. There was a lot of national media interest in the ‘Propensity to Fly’ project research findings in October 2009, stemming from a Guardian newspaper article concerning the reluctance of the British public to fly less in order to reduce their carbon footprint.

Dr Alberto M Zanni presented a paper, co-authored by Prof Abigail Bristow, at the 17th Annual Congress of the European Association of Environmental and Resource Economists in Amsterdam. The paper, titled “Exploring the impact of personal carbon trading and carbon tax schemes on personal transport and domestic energy usage,” was selected, among about one hundred submissions, by a leading climate change economist, Prof Richard Tol, to be presented in a special session of the congress “Optimal Policy Mix”, sponsored by the Ministry of Economic Affairs of the Netherlands.

**RESEARCH PROJECTS**

### AIR TRANSPORT

#### Propensity to Fly

**EPSRC from November 2006 to April 2009**

Grant holder: Dr Tim Ryley

Researcher: Dr Lisa Davison

The Propensity to Fly research focus was on the general public and the choices they make when conducting air travel. The overall goal of the research was to assess the propensity, or likelihood, of individuals to fly. It concerns the development of stated choice models to assess the propensity to fly, and how this propensity varies across different segments of the population. The initial stage of the project included a literature review, media analysis, focus groups (supplemented by aviation tax focus groups for the Sustainable Development Commission), and examination of secondary data (including purchased CAA data for the East Midlands region). Insights include the impacts of life stage (such as having children and retirement) upon air travel, and an overall individual preference for greener aviation solutions through technology improvements rather than restricting air travel behaviour.

The main data collection phase was a series of questionnaire-based East Midlands Air Travel Surveys (EMATS), of over 1,400 households. EMATS1 included innovative stated choice experiments for flight and airport decision-making; EMATS2 involved a survey panel to examine repeat choice decisions and the examination of the decision whether to fly or not; EMATS3 had a specific focus on the environmental aspects of air travel choices (including a flight energy rating) and associated attitudes (linking with the Theory of Planned Behaviour). The project delivered a stated choice modelling capability, highlighting the willingness of individuals to make both airline and airport trade-offs. In addition to air fare, the importance of departure time and airport parking cost when making air travel decisions has been highlighted. Segmentation, using cluster analysis, identified 8 distinct population segments (e.g. “less mobile, low earners”; “retiring frequent flyers”). Only a small proportion of respondents were trying to fly less for environmental reasons. It would take a £50 increase in total air fare for most individuals to reduce their air travel. A range of stakeholders were engaged throughout the project including airports (e.g. East Midlands airport), airlines (e.g. bmi baby), Government (e.g. Department for Transport) and other bodies (e.g. Sustainable Development Commission, East Midlands Tourism). This was achieved through seminars, stakeholder visits and a project newsletter. Further outreach is planned for 2009/2010 including a final newsletter, Press Release and the EURO-OR, IATBR & TRB conferences.

### MOBILITY MANAGEMENT

**TRAVEL PLAN PLUS**

European Commission from November 2008 to June 2011
Grant holders: Dr Marcus Enoch and Professor Stephen Ison
Researcher: Dr Lisa Davison
Collaborators: Loughborough University (Lead Partner) (UK); Cambridgeshire County Council (UK); Mobycon (NL), Consell Comarcal Del Bages (ES), Municipality of Györ (HU), Swedish Road Administration (SWE).

TRAVEL PLAN PLUS stands for “Travel Reduction Attainment Via Energy-efficient Localities PLANning”. It is a project comprising six partners with expertise in mobility management, united by a vision that travel plans can be more efficient and effective if implemented jointly by local groups or networks of organisations (i.e. Local Travel Plan Networks (LTPNs)) rather than on an individual basis so as to promote energy saving. The objective of the project is to promote energy efficiency through the use of LTPNs across the EU. This will be achieved by developing a framework in order to aid and promote the implementation and dissemination of LTPNs in a systematic way, to implement four LTPNs in representative locations across the EU, to monitor and evaluate these LTPNs, to provide recommendations for developing an effective policy framework and to encourage and support the widespread adoption of LTPNs across the EU. The work undertaken will provide important guidelines on the implementation process of use to policy makers and implementers.

So far results from the state-of-the-art review and the implementation work packages are available at the project website at www.travelplanplus.eu.

ENVIRONMENT AND SUSTAINABILITY

The ‘ABC’ project. Airports and Behavioural Change: towards environmental surface access travel
EPSRC from October 2009 to September 2012
Grant holder: Dr Tim Ryley Co-investigators: Dr Keith Mason (Cranfield University), Prof. Jaafar Elmirangi (University of Leeds)
Researcher: Tom Budd

The purpose of this research is to find proactive solutions to the challenge of encouraging better environmental behaviour of individuals travelling to and from airports, in a bid to reduce the carbon intensive nature of the whole system. It will examine the generated travel of both an international and a regional airport and explore how technology and innovative systems can influence individual and segment travel behaviour. Initially, a state-of-the-art review will examine airport surface access issues, formed of: a literature review, user group profiling; determining the carbon footprint of airports and generated traffic; and key stakeholder engagement, including a Delphi study to initiate scenario development. Secondly a technology evaluation will consider the application and potential of innovations to reduce airport access route travel demand. Thirdly, the receptiveness for individuals to select existing and future options for energy efficient travel will be explored using revealed and stated preference data; advanced discrete choice models will determine individual and segment willingness to pay for realistic technology advances. Finally, the carbon reduction potential of interventions will be assessed, to provide a basis for effective investment, and propose policy recommendations for a more efficient airport system.

Low Carbon Airport Operations Network
EPSCP from July 2009 to June 2012
Grant holder: Prof Paul Stewart (University of Lincoln) Co-investigator: Dr Tim Ryley.

From 10-14 November 2008, a Research Councils’ Energy Programme Sandpit to generate and develop innovative approaches to airport operations was held, resulting in a number of funded projects. This Network is also an output of the event, reflecting the unanimous view that a Network was indispensable to take advantage of the Sandpit energy and cross-disciplinary synergies. The raison d’etre of the network is to develop a research community and its links with the key industrial and commercial players. The proposed network is unique in this way, and will undertake a vital role in bringing its members high risk, high adventure research to general acknowledgement and acceptance.

Future Resilient Transport Networks (FUTURENET)
EPSCP from July 2009 to April 2013
Grant holder: Prof Chris Baker (University of Birmingham) Loughborough University Co-investigators: Prof Neil Dixon, Dr Tim Ryley, Dr Matt Frost and Dr Paul Fleming. Other Co-Investigators from University of Birmingham, University of Nottingham, British Geological Survey, HR Wallingford Ltd & Transport Research Laboratory Ltd.

Researcher: Dr Lisa Davison and Dr Alberto Zanni

Much current discussion about transport and climate change focuses on the impact of transport on climate change. Indeed, many mitigation measures are focussed upon the transport sector. However, FUTURENET recognizes that climate change also has an impact on transport. This impact has two dimensions: an engineering dimension derived from the interaction between climate design, weather events and the physical network, and a socio-economic dimension derived from the interaction between weather and climate and the patterns of transport demand. FUTURENET integrates both in assessing the future resilience of the UK transport system. This interdisciplinary approach will assist stakeholders in adapting the transport network and increasing resilience of critical transport infrastructure. Specifically FUTURENET seeks to develop a number of scenarios for how the transport system in the UK might look in 2050, and will investigate the resilience of each of these scenarios to the effects of climate change. The investigation will be carried out through the five work packages:

a) WP1 - The development of possible UK transport scenarios for 2050, through detailed literature surveys and the results of a number of expert workshops.

b) WP2 - Identification of route corridor for study and development of an inventory of infrastructure that covers the complete range of infrastructure for the chosen route.

c) WP3 - Models of the failure modes of transport systems, which will identify existing models and thresholds for the effects of climate on transport systems, and will develop new models where there are gaps in knowledge.

d) WP4 - Model development and application, which will develop an overarching model framework that will combine the models identified in WP3 with climate change scenarios and the transport scenarios outlined in WP1, to enable the resilience of different types of transport network to be evaluated.

e) WP5 - Generic Tools and Dissemination, through which the results of the project will be made available in an accessible format to a wide variety of stakeholders, and the model of WP4 made available for application to other route corridors.

FUTURENET brings together a wide variety of academic expertise spanning the engineering, environmental and social sciences, together with a diverse group of stakeholders in the transport industry. It has the potential both to develop a deeper understanding of the underlying science on the effects of climate change on transport systems and to provide information and useful tools on how such systems can be made more resilient.

Strategic Advice on Transport and Climate Change Commission for Integrated Transport: from October 2009 to January 2010
Grant holder: Professor Abigail Bristow

Professor Bristow was commissioned to provide advice on climate change and transport. The think piece covered developments since 2007 with a particular emphasis on identifying more cost effective instruments for achieving carbon savings in transport.

Great Britain: An alternative travel destination?
ESPRC Geographical Research Grants from May 2009 to May 2010
Grant holder: Dr Lisa Davison

The research will examine individual and group leisure travel behaviour, in the wider context of household consumer behaviour. More specifically it considers the question, do population segments who holiday in Great Britain have the same propensity to fly as those who do not? It will identify a key segment, with respect to reducing the energy intensive nature of leisure travel. The project will utilise an East Midlands household survey, collecting revealed and stated preference data to provide broad understanding and a basis for population segmentation and discrete choice analysis. This will pinpoint holiday groups to be interviewed, using a semi-structured format. Interviews will ascertain the determinants and motivators determining consumer travel decisions. The use of holiday group interviews reflects the added dimension of collective choices when making leisure time and travel mode decisions. Research outcomes will be of interest to policy
makers, regional development agencies and tourist boards, as well as travel operators.

**Tyndall Transition**
NERC, April 2009 to March 2010.
Grant holder: Professor Abigail Bristow
Researcher: Dr Alberto Zanni

This support allowed further work on the scope for long run reductions in freight transport emissions in London to take place as part of the Cities theme. The cities theme final publication was published in 2009.

**Noise Futures Network**
EPSRC from June 2006 to November 2009
Grant holder: Professor Abigail Bristow, Collaborator: Professor Jian Kang University of Sheffield.

This network brings together academics from a wide range of different disciplines, experts from industry and policy makers to explore these questions. Recent activities include those at the euronoise conference in Edinburgh in 2009. A soundwalk in Edinburgh led by John Levack Drever, head of the Unit for Sound Practice Research, Goldsmiths, University of London, and chair of the UK and Ireland Soundscapes Community. "From noise to perception mapping" involved Salford University and the National Physical Laboratory collaborating in a joint activity, demonstrating two different state-of-the art ways to assess the acoustical climate in Festival Square. Finally, a concert of soundscapes compositions, sonic art that explores the perception of sound in relation to space and place through field recording, with works by Robert Dow, John Levack Drever, Pipa Murphy, and the Future Soundscapes commissions of Chris Watson and Yannick Dauby, initiated by the Positive Soundscapes Project, that question: What sounds will we be hearing around us in 20 years time? How different will the urban soundscape be from the one that we hear now?

The network website provides details of activities and membership: [http://noisefutures.org/](http://noisefutures.org/)

**Sustainable transport for the urban poor**
British Council from February 2008 to January 2010
Grant holder: Dr Mohammed A Quddus
Collaborator: Professor J obar Bin Alam (BUET, Bangladesh)

This is a research link programme between Loughborough and BUET. Under this programme, researchers from both institutions shared their expertise in the area of sustainable transport for the garment workers in Dhaka city. With the aim of providing better transport services to this group of workers, the project identified a number of issues that need to be addressed. These include: providing a better walking environment, gender dimension in Dhaka public transport and the role of the bicycle in travelling to work. Researchers at BUET also proposed to make available low-cost walk-able friendly ‘shoes’ and ‘hats’ to the workers.

**TRANSPORT TECHNOLOGY AND SAFETY**

**Real-time intelligent map-matching algorithms for advanced transport telematics systems (RIMATTS)**
EPSRC from June 2008 to June 2011
Grant holder: Dr Mohammed A Quddus
Researcher: Dr Yuheng Zheng

The overall objective of this research is to develop an intelligent map matching (IMM) technique capable of supporting the positioning and navigation modules of most Advanced Transport Telematics (ATT) systems in all operational environments in real-time. Such ATT systems have the potential to support a wide variety of services including navigation and route guidance, distance-based congestion charging, bus priority at junctions, bus arrival information at bus stops, accident and emergency responses, and location based services (LBS). Helios Technology Ltd., a leading SME (Small and Medium-sized Enterprise) in positioning and navigation solutions, is to provide support in the development of potential applications, system design, prototyping and testing.

Substantial progress has been made over the last one and a half years. This includes: an in-depth literature review on required positioning performance (RNP) for the case of location-based intelligent transport systems, the instrumentation of a vehicle for the purpose of collecting positioning and traffic characteristics data and the development of an intelligent positioning algorithm comprised of GPS, dead-reckoning (DR) sensors and digital elevation model (DEM). The next stage is to develop an integrity measure for mission (i.e. safety and liability) critical intelligent transport systems.

The role of the bus in school travel - a GIS Approach
EPSRC (CNA) and JMP Consultants from July 2008 to June 2011
Grant holder: Dr Mohammed A Quddus
Researcher: Jessica van Ristel

The aim of the project is to investigate the role of the bus in travelling to school. This will be done using GIS as an analytical tool. Data from different sources were integrated in a GIS framework. A range of factors affecting bus use and school travel through examining both adult and child travel behaviour have been identified. The project is currently investigating current travel practice of children travelling to school and the use of the buses to transport children to school using spatial models. The next stage is to analyze the attitudes and perspectives of school children and their parents of bus usage and the journey to school.

**PUBLICATIONS 2009**


**BUDD L., GILLINGWATER D., CAVES R. and**


QUDDUS M.A., WANG C. and ISON S.G. (2009) Impact of Road Traffic Congestion on Crash...


