Institute for Transport Studies (ITS)

UNIVERSITY OF LEEDS
Institute for Transport Studies

Introduction Dr Susan Grant-Muller

The past year has been an extremely busy one for the Institute for Transport Studies (ITS), especially in looking toward new future horizons following the excellent outcome of the 2008 Research Assessment Exercise (RAE). A particular highlight of the year was the announcement in November that ITS was to receive a Queen's Anniversary Prize for Higher and Further Education. The Queen's Anniversary Prizes form part of the national honours system and are the UK's most prestigious educational awards. The winners are honoured for their world-class achievement – for ITS the recognition was for '40 years sustained excellence in transport teaching and research'.

The Queen's Anniversary Prize is a fitting tribute to all those who have contributed to ITS since its origins in the 1960s, particularly the alumni of staff and students. A number of the Institute's former Directors were invited to join the delegation to London for the prize giving ceremony, with one of the most well known being Professor Tony May. Professor May retired from ITS in 2009, after more than 30 years dedicated service. To reflect his remarkable contribution to the Institute's success, a scholarship appeal was launched with the alumni body. In what is intended to become a long-standing tradition, the scholarship will give a student from a developing country the chance to study at ITS and subsequently apply the skills and knowledge in a setting where the need is most pressing.

RESEARCH FACILITIES

ITS maintains two major research facilities - the University of Leeds Driving Simulator (UoLDS) and the Instrumented City (IC).
UoLDS is the UK's most sophisticated research facility of its type. It provides a safe and controlled environment facilitating research into driver behaviour and transport safety. Established at a cost of over £1m, its main features are:

- A Jaguar S-type vehicle cab. The complete Jaguar interior provides a natural driving environment with full controls and dashboard instrumentation. The driver feels accurate control loading at the steering wheel and pedals. An integrated sound system provides engine, transmission and environmental noise. A non-intrusive eye-tracker measures the drivers' eye-movements, which can gauge driver fatigue, distraction and workload.
- The Jaguar cab is housed in a 4m diameter dome. The virtual road is projected in 3-D inside the dome, creating a horizontal field of view of 250°, plus a view through the rear mirror. LCD screens in the wing mirrors complete the eight-channel visual system.
- An eight degrees of freedom motion system. This enhances the fidelity by providing realistic inertia forces to the driver during acceleration, steering and braking. Users also experience a life-like heave sensation, thus allowing the simulation of a rough or bumpy road surface. Just five driving simulators currently exist worldwide with equivalent or superior motion characteristics.

UoLDs offers the scope to undertake a wide variety of research, including much that would not be safe, ethical or cost effective to do on real roads. It is supported and operated by an expert team, who can tailor virtual scenarios and experimental data collection to the exact requirements of a particular investigation. UoLDS has been a key research tool for a number of studies in 2009, such as the safety implications of Advanced Driver Assistance Systems and the use of road engineering measures to reduce fatigue related accidents. For more information please visit the UoLDS website (www.its.leeds.ac.uk/facilities/uolds) or contact the Facility Manager, Hamish Jamson, email:A.H.Jamson@its.leeds.ac.uk.

The IC is a suite of research facilities dedicated to transport and environment issues. It includes an extensive range of traffic, vehicle emission, meteorological, noise and air pollution monitoring instrumentation. The complimentary facilities allow researchers to simultaneously study traffic flow and congestion – emission generation – dispersing air flows – atmospheric chemistry - noise and air pollution. The IC supports multidisciplinary research, bringing together researchers from the disciplines of traffic engineering, dispersion modelling, atmospheric chemistry and noise. The facilities include portable equipment and semi-permanent installations, which collect synchronous data on traffic flows, route journey times, prevailing and in-street air-flows that disperse vehicle emissions, noise and air pollution. Long-term links with the Leicester and Nottingham City Council Area Traffic Control (ATC) centres have also enabled the IC to amass a unique historic database of traffic flows, congestion and signal timings. Further details are available via Dr James Tate, email: j.e.tate@its.leeds.ac.uk).

STAFF CHANGES

Professor Malachy Carey joined ITS as Research Professor of Dynamic Traffic Modelling. New visiting appointments included John Wann, Professor of Psychology at Royal Holloway College, University of London; Visiting Professor Erik Verhoef from Free University Amsterdam and Visiting Lecturers Mervyn Hallworth and Jeff Turner. Paul Cockerill was appointed to the technician team.
Staff leaving this year included Professor Tony May who left at the end of July but will complete his WCTRS term of office; Dr Nicolas Ibanez to take up a new post at the European Commission Joint Research Centre Institute for Prospective Technological Studies in Seville; Dr David Carslaw to join the Environmental Research Group at Kings College London and Dr Liliya Chernyavska to take up a post in Seville. Dr Nick Marler retired and Frank Montgomery took semi-retirement. Support staff leaving included Nusrat Walid and Mary Huby.

STAFF NEWS

Professor Peter Bonsall attended the Transport Research Board (TRB) Annual Meeting and made two invited presentations ('Particular problems to be overcome when seeking data on sustainable travel behaviour' and 'Surveys in the context of sustainability and user adaptation'). His membership of the TRB committee on Telecommunication and Travel was reconfirmed. Prof. Bonsall also made an invited presentation to a TRB symposium in Washington D.C., on 2 September, on 'Equity Issues in Transport Finance'. Prof. Bonsall and Dr Greg Marsden were invited to present findings from their recent study on 'Influencing behaviour' to a group of 40 senior staff at DfT. Prof Bonsall attended the IATBR conference in Jaipur in December where he co-chaired a workshop on 'Sustainable Travel Behavior - The Role of Behavioral Research in Facilitating the Reduction of the Carbon Footprint', and presented two papers: 'Factors Affecting People's Engagement with the Assessment of Road Charges in an Experimental Setting' and 'The value of simplicity: an investigation of travellers' response to simplified fare structures'.

Professor Oliver Carsten spoke about the potential of Intelligent Speed Adaptation (ISA) at the Conference 'The changing face of speed management – policy, practice and enforcement' on 19 March. Prof. Carsten also gave an invited lecture at the University of Minnesota on the relevance of European ISA research to the United States (http://mediasite.uvs.umn.edu/Mediasite/Viewer/?peid=ef094199520e4eacbec26ec199395021). Prof. Carsten presented a paper on the 'Preparation of Field Operational Tests' at the Human Factors and Ergonomics Society Europe Chapter meeting in October. Daz Hibberd

(supervisors - Dr Samantha Jamson, Prof. Carsten) presented a 'talking poster' on his PhD experiments at the Human Factors and Ergonomics Society Europe Chapter meeting and at the 22nd ICTCT Workshop in Leeds on the 22-23 October. Prof. Carsten gave an invited address to the 2009 ISA Conference, held in Sydney on 10 November. This conference was an associated event to the annual Australasian Road Safety Research, Policing and Education Conference. The title of Prof. Carsten's talk was 'What are the obstacles to wide-scale and effective deployment of Intelligent Speed Adaptation?'. Subsequently he was interviewed by ABC television about the benefits that ISA can deliver.

Dr Haibo Chen hosted a visit by Dr Kairan Zhang, College of Traffic and Transportation, Southwest Jiaotong University, China. Dr Zhang's research interests cover both transportation safety and environment. He intends to review and analyse the recent advances in both areas for developed and developing countries.

Stephen Clark was promoted to Principal Officer working on special projects and transport initiatives at Leeds City Council. This work will be heavily orientated towards the use of transport models to evaluate the effectiveness of transport strategies in Leeds and the wider region.

Professor Joyce Dargay gave a seminar on 'Long Distance Travel' at the Technical University of Denmark in September and a presentation on 'Longer Distance Coach, Rail, Air and Car Travel in GB' for the Thought Leadership programme, at the London Transport Museum in October.

Professor Gerard de Jong started as Guest Researcher at the Centre for Transport Studies of VTI/KTH in Stockholm and worked as Guest Researcher at the Università degli Studi di Roma Tre. Prof. de Jong continued as Director of the Association for European Transport - and member of the Editorial Advisory Board of Transportation Research 'A' (Policy), the Journal of Choice Modelling, Transportation and Tijdschrift Vervoerswetenschap. In 2009 he was a member of the peer group for EU-DGTREN on regulation of long and heavy vehicles and gave invited lectures at the University of Amsterdam, Delft University of Technology, ETH Zurich, University of Roma Tre and at Post-Academic courses. He did a keynote presentation on developments in choice modelling at the PLATOS conference in Utrecht and a Masterclass presentation on value of time and reliability at Delft University of Technology. Prof. de Jong also acted as member of PhD Committees at Delft and ETH Zurich. He was chairman of two plenary sessions at the European Transport Conference 2009 and also gave two presentations (one on freight transport modelling and one on uncertainty margins in traffic forecasts) at ETC. He also gave presentations at ICMC 2009 in Harrogate and at the BIVEC Research Day in Brussels (both on the impacts of abolishing car purchase taxes on car ownership) and another at BIVEC/Benelux seminar in Brussels (on cross-border mobility).

Dr Tony Fowkes was interviewed for Radio Leeds in July, following National Express' announcement of their default on East Coast Main Line franchise payments. Dr Fowkes made an invited presentation on Adaptive Stated Preference methods at the European Transport Conference (ETC) in the Netherlands in October. Dr Fowkes was invited by the Department of Transport and Regional Economics at the University of Antwerp to contribute a chapter to a book on Applied Transport Economics in celebration of Prof. Gust Blauwens.

Dr Paul Goodman gave a presentation at the London Transport Museum on 6 May, entitled the 'Environmental Assessment of New Vehicle Technologies' as part of the 'Transport in Cities' conference organised under the SUE FUTURES project. The presentation covered results of a 5-year collaboration between ITS and the Energy and Resources Research Institute (ERRI) and the University of Newcastle.

Dr Susan Grant-Muller was invited to participate in the International Road Federation (IRF) policy committee on Intelligent Transport and nominated to lead a sub-committee on research needs and capacity building. The policy committee comprises 19 representatives from 11 countries. The broader agenda for the committee covers policy objectives, financing infrastructure, legal frameworks, strategy development and benchmarking. Dr Grant-Muller also gave a presentation on the issues to IRF committee members and a wider group of interested parties in Stockholm on 23 September. Dr Grant-Muller acted as a member of the steering group for the new EPSRC funded Doctoral Training Centre in energy at the University of Leeds: Technologies for a Low Carbon Future. The DTC brings together a cohort of postgraduate research students and their supervisors to develop innovative technologies for a low carbon future based around key interlinking themes: Low Carbon Enabling Technologies, Transport & Energy, Carbon Storage, Climate Change & Energy Systems Research. The DTC welcomed its first cohort of students in October 2009.

Dr Astrid Gühnemann was a session chair and presented at the 8th Conference on Applied Infrastructure Research on 9-10 October, 2009, Berlin. The paper was entitled Gühnemann, A, Koh, A, Kimble, M, Chernyavs'ka, L, Shepherd, S. (2009) Implications of Interdependencies between Charging Strategies of Local Authorities for the Protection of Sensitive Ares in the Trans-Pennine Corridor. Dr Gühnemann was also appointed by the German Councils of Science and Humanities as member of the group of evaluators for the evaluation of the German Federal Highway Research Institute (BASt).

Dr Stephane Hess organised the inaugural International Choice Modelling Conference (ICMC) in Harrogate, UK, from 30 March to 1 April. This highly successful event confirmed the Institute's role as one of the leading groups in the field of choice modelling. The conference brought together leading researchers and practitioners from across the many different areas in which choice modelling is a key technique for understanding behaviour and evaluating policy. Presentations looked both at state-of-the-art methodology as well as innovative real-world applications of choice models. The highlight of the conference was a presentation by Professor Daniel McFadden from the University of California at Berkeley, Nobel Prize laureate in Economics and chief architect of random utility modelling. Many other leading names in the field participated in the conference, including Professor Moshe Ben-Akiva, Professor David Hensher, and Professor Chandra Bhat. The papers can be downloaded from the conference website: www.icmconference.org.uk. Dr Hess edited a book that contains a selection of the best papers from the conference, published by Emerald. Plans are also underway for a follow-up conference in 2011, with the aim of making this a regular event.

Frances Hodgson presented her work on networks, capitals and walking to the Transport and Society workshop on 'Mobilities: New perspectives on Transport and Society', Lancaster University, on 8 September. Frances Hodgson was also invited to lead a workshop by the University of Leeds Africa College on 'Food, transport and packaging'. The workshop focus was on opportunities for innovation and knowledge transfer in the agriculture value chain through food processing, packaging and transport innovation and the impact of these innovations on the everyday lives of small farmers' (particularly women). This workshop brought together multi-disciplinary perspectives drawing on crop science, food science and processing, social science, transport and packaging across the academic, public and business sectors. Frances presented on 'Everyday lives, community enterprise and access to markets: mapping the knowledge'. An accompanying workshop in Africa is planned for March 2010.

Hamish Jamson attended the Fourth Motion Cueing Workshop, hosted by the Technical University of Delft in the Netherlands. In June, Hamish Jamson and Natasha Merat presented the Fifth International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design, in Montana, USA.

Dr Samantha Jamson was the local organiser for the 22nd ICTCT conference hosted by ITS in October, incorporating a 2-day Young Researcher Course and a 2-day workshop dedicated to the 'Stubborn Issues in Road Safety'. The course was attended by 8 participants and included interactive sessions devoted to pedestrian safety and intelligent transport systems. The workshop, held at the Leeds City Museum, was opened by Professor Andrew Thompson (PVC for Research) and Deirdre O'Reilly (Road User Division, DfT), with 20 speakers and 60 participants. The keynote speakers, Ezra Hauer (University of Toronto) and Torsten Geissler (University of Cologne) debated 'Is Cost Benefit Analysis Worthwhile in Traffic Safety Planning?'.

Andrew Koh was invited by Professor Enders Ozcan to Nottingham University to give a talk on his research in evolutionary optimization and heuristics. After presenting to the Automated Scheduling, Optimisation and Planning research group he was interviewed for a case study for solving large scale optimization problems occurring in transportation systems modelling. The CURACAO research project (see below), for which Andrew was a co-investigator, was mentioned in the European Action Plan on Urban Mobility adopted by the European Commission.

Dr Ronghui Liu was invited to give a seminar at the Institute for Transport, Technical University of Denmark (DTU) and was a PhD external examiner at the DTU Management School. Dr Liu was Associated Editor for IEEE Transaction on ITS and Guest Editor, with Rosaldo Rossetti, of a special issue in Artificial Transportation Systems and Simulation. She was a member of International Publication Committee for the International Conference on Applied Simulation and Modelling and Co-organiser of the Thematic Track on Artificial Intelligence for the EPIA 2009 Portuguese Conference on Artificial Intelligence.

Professor Peter Mackie attended the International Transport Forum conference in Leipzig in May and presented a paper, jointly with Robert Cochrane of Imperial College, London, on the implications of the economic crisis for strategic transport projects. Prof. Mackie was a member of the HS2 Analytical Challenge Group responsible for advising the HS2 company on the economic appraisal of the London- Birmingham High Speed Line. He also took up his position as Director of the Short Term Analysis programme of the UK Transport Research Centre, responsible for securing research contracts and consultancy with the Department for Transport for the academic transport research community.

Professor Mike Maher travelled to Spain in March to give an invited seminar at the School of Transport, University of Castilla-La Mancha. Whilst there, Prof. Maher also sat on the panel (as the foreign academic) for a PhD viva. Also in March, Prof. Maher recorded a podcast on his work in transport modelling for the Institute of Mathematics and its Applications (IMA) 'Travels in a Mathematical World' series: www.travelsinamathematicalworld.co.uk/

Dr Greg Marsden presented the following papers at the Transportation Research Board Conference Washington D.C. 'Congestion Pricing: Do We Need a New Approach to Parking Policy? Lessons from Europe', Marsden, G. (2009), 'The role of information exchange and performance management in cross-sectoral policy making: Lessons from the UK', Marsden, G. (2009), 'Better Informed, Better Behaved? A case study of public attitudes to climate change and transport from England', Marsden G., Harwatt, H., Kimble, M. and Jopson, A. (2009), 'Using Deliberative Methods to Understand Travel Choices in the context of Climate Change', Marsden, G. and King, S. (2009). Dr Marsden has also been invited to join the Panel of Assessors for the new Transport Planning Professional qualification provided by the Institution of Highways and Transportation and the Transport Planning Society. Dr Marsden and Prof. May also collaborated with Professor Betty Deakin and Karen Trapenberg Frick in studying the processes of policy transfer for the Volvo Research and Educational Foundations.

Bryan Matthews, together with Sarah Woodin of the Centre for Disability Studies, were invited to present at the Office for Disability Issues (ODI) 'Evidence Day' in London on 19 November. The ODI is a cross-departmental government unit and the Evidence Day was designed to disseminate disability related research to policy officials from a range of government departments. Bryan and Sarah presented their recent work on choice and control for disabled people and on disabled people's access to transport, housing, the built environment and information and communication technology. Bryan also took up his position on the Universities' Transport Studies Group (UTSG) Executive Committee and the organising committee for the 2010 UTSG annual conference.

Professor Tony May and Dr Greg Marsden spoke at a WCTRS Special Interest Group meeting on policy transfer among cities in Gothenburg in April. Prof. May also presented a paper on financing urban transport policy, and their study on policy transfer, to the Volvo Future Urban Transport conference. He also presented the CityMobil project at the PRT@LHR conference, held to mark the introduction of personal rapid transit to Heathrow airport. Prof. Tony May spoke at the TRL Academy on improving the design of urban transport strategies, and also at the Lyon Truck and Bus Forum about public sector business models for urban transport. Prof. May gave a keynote address at a conference in Beijing on Green Urban Transport, organised by Tsinghua University and the Singapore Land Transport Authority on 2-3 September and in October, Prof. May attended the European Transport Conference at the invitation of AET to lead a review on the future development of the conference. He gave an invited presentation on urban transport policy and climate change at the INTERREG climate change conference in Rotterdam on 8 October and later that month he accepted an invitation from the CIVITAS Forum in Krakow to provide a summary of the 16 parallel sessions on the achievements and future development of the CIVITAS programme. Prof. May gave a keynote paper at the opening of a new Urban Policy Unit for a Low Carbon Society in the University of Kyoto.

Dr Natasha Merat attended the DfT behavioural seminar and presented the results of a recent project funded by the Highways Agency, which used the University of Leeds Driving Simulator to assess the effect of three engineering measures on reducing driver fatigue. Dr Merat chaired a session on Surface Transportation at the 2009 Human Factors and Ergonomics Society Europe Chapter meeting (HFES EC) in Linkoping, where Dr Merat and Dr Yvonne Barnard also presented some preliminary results from the EPSRC-funded EASY project. On 24 November, Dr Merat gave an invited talk to the RoSPA advanced drivers and riders group about the ITS Safety Group, its facilities and current projects.

David Milne wrote an invited article for the Yorkshire Post to suggest measures the next UK government should consider to improve the region's transport, which was published on 6 January.

Helen Muir and other ITS colleagues hosted Michael McDonnell, Director of Road Safety Scotland and Jill Mulholland, the Road Safety Team Leader from the Scottish Government Transport Directorate, on a visit to ITS on 5 August.

Professor Chris Nash spent February as visiting professor at the University of Gran Canaria, where he gave a short course on European Transport Policy and a seminar on British experience of the privatisation of public transport, and two weeks in October visiting the Eurasian National University of Kazakhstan. He gave a short course in welfare economics to doctoral and Masters students, and a seminar on rail policy to senior staff of the state railway and the Ministry of Transport. He served as Specialist Advisor to the European Union Select Committee of the House of Lords for its investigation into the recast of the First Railway Package, which reported in June. He spoke on rail regulation at the Workshop on Transport Economic Regulation on 24 April 2009 at the European University Institute, Florence, on policy instruments for reducing greenhouse gas emissions from transport at Symposium on Energy and CO_2 Emissions Policies, 18-19 August at Sandbjerg (University of Aarhus), and on Strategy and Economics at a Summer School on Railway Transport and Technologies in Genoa on 31 August. Prof. Nash gave a presentation on European Transport Policy to a group of European Members of Parliament plus staff of the Commission and of the rail industry in the European Parliament building in Brussels on 1 October. During November, he spoke on rail scarcity charges at a symposium on transport infrastructure capacity at the University of Venice, on passenger rail franchising at a seminar organised by the University of Barcelona and on high speed rail at the International Transport Forum symposium on transport economics in Madrid.

Matthew Page's comments about UK pedestrian crossing times were quoted on the BBC news website in March. He also contributed to a discussion programme on 'street life' on BBC Radio Scotland and was interviewed on Radio Leeds in October about cycle lanes and the recent evidence suggesting that car drivers give cyclists less room if they are in a cycle lane. Matthew attended the 6th Cycling and Society Research Symposium in Bolton on 7-8 September, giving a paper entitled 'Making Decisions about Cycling – Issues in Appraisal' and chairing one of the sessions. Matthew also wrote a comment piece for

the December edition of 'Transportation Professional' - the magazine of IHT, on whether climate change was being taken seriously enough by transport professionals. For his poster on the DISTILLATE research programme, Matthew won the prize for the most interesting display of thought provoking research at the TRL Academy Symposium.

Dr Andrew Smith and **Phill Wheat** were appointed as Visiting Research Fellows at the Centre for Transport Studies (CTS)/Swedish National Road and Transport Research Institute (VTI). During their visits they will collaborate with CTS/VTI researchers on a number of topics, such as estimation of marginal costs for rail operations and infrastructure, efficiency analysis and franchising policy and impacts. Dr Smith has also been involved in advising the London Underground Office of the PPP Arbiter on efficiency and wider regulatory issues.

Dr James Tate accepted the invitation to become a member of the West Yorkshire Transport Emission Group. Dr Tate presented at the Air Quality Conference 2009 in Istanbul in March 2009. Dr Tate is a Technical Advisor and partner on the Leeds City Region Low Emission Strategy Project - which is tasked with accelerating the uptake of low emission fuels and technologies to mitigate air pollution and carbon dioxide emissions associated with the road transport.

Dr Miles Tight gave the keynote address at the annual UK conference of Malaysia's Terengganu University (UMT) and its UK student department (MSD). Delivered in partnership with ITS and Leeds University Malaysian Society, the event brought together Malaysian students from across the UK. In addition to Dr Tight's talk on transport and climate change, delegates heard a number of research student presentations, from across a range of disciplines. Dr Tight presented a paper on 'the potential for walking and cycling to provide sustainable urban transport systems of the future' at a conference on 'Transforming the Energy Future: Pathways to Change' organised by the University of Exeter in June as part of Falmouth's Energy Week. The following month he gave a presentation at a seminar held at the Centre for Analysis of Risk and Regulation, London School of Economics on 'Are there alternative less risky futures than continued dependence on the car?'. Also in July, Dr Tight provided advice to DfT and Department of Health on active travel at a seminar in London. Dr Tight gave presentations on 'Visions for the role of walking and cycling in 2030' at the Royal Geographical Society Institute of British Geographers conference in Manchester in August, at the Walk21 Conference in New York in October and a related presentation at the International Symposium on Cycling Towards a Sustainable City in Korea in September. Dr Tight has been appointed to the Editorial Panel of the journal Engineering Sustainability and as External examiner for the transport Masters programmes at Loughborough University.

Dr Paul Timms made a keynote presentation at the 1st MRSI International Conference 'Mekong Development in Transition: Challenges and Prospect', in Ubon Ratchathani, Thailand, 28 July 2009. Entitled 'Cities in Mekong Region: Liveability and Sustainability', the paper and wider proceedings are available at: www.ubu.ac.th/~mrsi/documents/mrsi_1st_InternationalConference.pdf

Professor Mark Wardman presented two papers at the IATBR Conference in Jaipur in December, two papers at the annual Transportation Research Board conference in Washington in January and one paper at the inaugural International Choice Modelling Conference in Harrogate in March. He also served as an external reviewer of the Centre for Transport Studies at Stockholm University in December.

Dr Tony Whiteing presented the 'Laurie English lecture' to the CILT(UK) local group on 10 February on the theme of 'Freight, Logistics and the Yorkshire and Humber regional economy'. On 24 July, Dr Whiteing presented a seminar on Green Logistics to staff at DfT, at the invitation of the Chief Scientific Adviser. Dr Whiteing facilitated the Logistics Research Network Doctoral Student Workshop at Cardiff University on 9 September. He also presented a Briefing Note on Sustainable Freight Transport and Logistics to the Transport Working Group of the EU Parliament in Brussels on 2 December.

VISITORS

Academic visitors during 2009 included Dr Maosheng Li, College of Traffic Engineering and Transport Planning, Changsha, China; Dr Kairan Zhang, Southwest Jiaotong University, China; Dr Jiang Qian Ying, Gifu University, Japan; Ms Katharina Parry, Massey University, New Zealand.

PHDS AWARDED

Three PhDs were awarded in 2009: Anna Clark, 'Optimal Congestion Pricing Schemes including Heterogeneous Users and Departure Time Choice'; Daniel McGehee, 'Perception and Biodynamics in Pre-crash Driver Response: A Design Theoretic Rooted in Nature'; Rico Merkert, 'The Organisation of European Railways: A Transaction Cost Perspective'.

RESEARCH STUDENTS

In addition to those awarded research degrees in 2009, the research students registered and their respective topics were: John Armstrong, 'Incorporating Human Learning Into Route-Choice Models And Investigating The Effects'; Erica Ballantyne, 'How Is Urban Freight Logistics Affected By Transport Demand Management Measures And Policies?'; Zahara Batool, 'Aberrant Driving Behaviour And Attitude Towards Road Safety In Pakistan'; Ofelia Betancor, 'Pricing Externalities In Air Transport Markets: A Case Study Of Madrid Barjas Airport'; Anzir Boodoo, 'Walking As An Integral Part Of Sustainable Transport Policy'; Simon Brown, 'Customer Optimised Integrated Asset Management'; Kaushali Dave, 'Preference Elicitation And Preference Uncertainty: An Application To Noise Valuation'; Jonathan Exon, 'Evaluating The Effectiveness Of The Driver Improvement Scheme In Scotland'; James Fox, 'Temporal Transferability Of Mode-Destination Models'; Faisal Habib, 'Traveller Choice Of Information Sources'; Daryl Hibberd, 'In-Vehicle Systems - Developing A Multiple Warnings Strategy'; Nurul Hidayati, 'Modelling The Effects Of The Physical Facilities 'School Safety Zones' On Passenger Car Equivalent Values On Urban Roads'; Hamish Jamson, 'The Effects Of Varying Characteristics Of Driving Simulator Design On Their Validity As Research Tools'; Sabariah Jemali, 'Decision Making Process For LRT Schemes In Malaysia'; Calvin Jephcote, 'The Health Effects Of Urban Air Pollution Derived Predominantly From Traffic Using GIS'; Andrew Koh, 'Particle Swarm Optimisation For Transport Planning'; Ben Kolosz, 'Measuring Performance, Standardisation and Control for Intelligent Transport Systems'; Georgios Kountouriotis, 'Vision, Attention And Steering'; Anthony Magee, 'Modelling Passenger Demand For Rail Services'; Mojtaba Moharrer, 'Studying Driver Behaviour Across Countries And The Effect On Safety'; Helen Muir, 'The Influence Of Area And Person Deprivation On Pedestrian Casualties'; Said Munir, 'An Investigation Into New Trends In Air Pollutant Concentration (Particularly Ozone And Nitrogen Oxides)'; John Nellthorp, 'Transport Investment, Pricing And Use Of Resources'; Rahman Pilvar, 'Development Of A Modelling Framework For Optimising The Interaction Between Planned Street Works And The Performance Of Transport Networks'; Shafiq-Ur M Rahman, 'Improved Public Bus Transport In Dhaka City'; Martin Rivas Perez, 'The Dynamics Of Access: A Study Of Social Inclusion, Job Opportunities, Travel Mobilities And Developing The Gateshead Metro Centre'; Doh Kyoum Shin, 'Bicyclists, Can We Know More About Them With GPS?'; Janos Szabo, 'Extreme Value Theory And Air Pollution'; Evona Teh, 'Driver Distraction, Vehicle Automation, Human Machine Interface'; Nikolaos Thomopoulos, 'Incorporating Regional Equity Concerns In Appraisal Of Large Transport Infrastructure Projects'; Andrew Tomlinson, 'Inferring Personal Movement Patterns Using Locational Data Captured From Mobile Devices For Transportation Data Collection'; Phillip Wheat, 'Application (And Development Of) Cost Modelling And Efficiency Methods To Transport Problems'; Zhitao Xiong, 'Development Of UoLDS With Intelligent Traffic Environment'; Noor Zaitun Yahaya, 'Temporal And Spatial Variations Of Ultra-Fine Particles In The Urban Environment'.

CONFERENCE ATTENDANCE

The following international and national conferences were attended by ITS staff members in 2009:

1st MRSI International Conference, 'Mekong Development in Transition: Challenges & Prospects': attended by Paul Timms.
4th Kuhmo-Nectar Conference on Transport and Urban Economics: attended by Simon Shepherd.
4th Workshop of Discreet Choice Modelling: attended by Nicolas Ibanez.
5th International Driving Symposium on Human Factors in Driver Assessment, Training & Vehicle Design: attended by Hamish Jamson and Natasha Merat.
6th Cycling & Society Research Symposium: attended by Matthew Page.
8th Conference on Applied Infrastructure Research: attended by Astrid Gühnemann.
11th International Conference Series on Competition and Ownership in Land Passenger Transport (The Thredbo Series): attended by Chris Nash.
ASSET Final Conference: attended by Astrid Gühnemann and Andrew Koh.
Australasian Road Safety Conference: attended by Oliver Carsten.
BIVEC/ Benelux Interuniversitaire Vereniging van Transport Economisten: attended by Gerard de Jong.
Conference on Traffic Modelling, OU Milton Keynes: attended by Haibo Chen and David Watling.
CRC 19th Vehicle Emission Workshop: attended by Karl Ropkins.
DADDY international workshop on Day-to-day dynamics for transportation network analysis: attended by David Watling.
European Transport Conference: attended by Pedro Abrantes, Richard Batley, Phani Kumar Chintakayala, Richard Connors, Gerard de Jong, Tony Fowkes, Dan Johnson, James Laird, Tony May, Rico Merkert, Shujie Shen, Jeremy Shires and David Watling.
Green Urban Transport: attended by Tony May.
Human Factors and Ergonomics Society Europe Chapter Conference: attended by Yvonne Barnard, Oliver Carsten and Natasha Merat.
International Association for Travel Behaviour Research: attended by Peter Bonsall and Mark Wardman.
International Co-operation Theories and Concepts in Traffic Safety: attended by Yvonne Barnard, Oliver Carsten, Kathryn Chorlton, Gerard de Jong, Samantha Jamson and Frank Lai.
International Air Quality Conference: attended by James Tate.
International Choice Modelling: attended by Richard Batley, Peter Bonsall, Phani Kumar Chintakayala, Gerard de Jong, Tony Fowkes, Stephane Hess, Dan Johnson, James Laird, Bill Lythgoe, Jeremy Shires Jeremy Toner and Mark Wardman.
International Conference on Models and Technologies for ITS: attended by Dong Ngoduy.
International Symposium on Cycling Towards a Sustainable City: attended by Miles Tight.
International Symposium on Transportation & Traffic Theory: attended by David Watling.
International Transport Forum: attended by Peter Mackie and Chris Nash.
INTERREG Climate Change Conference: attended by Tony May.
Institute for Public Policy Research: attended by Helen Harwatt.
Intelligent Transport Systems and Services: attended by Yvonne Barnard, Oliver Carsten and Samantha Jamson.
Low Emission Strategies Advisory Seminar: attended by Karl Ropkins.
Malaysia's Terengganu University Annual Conference, Leeds: attended by Miles Tight and Mark Wardman.
PRT @ LHR conference. (Personal Rapid Transport at London Heathrow): attended by Paul Firmin and Tony May.
Planning and Transport, Research and Computation 7th Practitioners Meeting: attended by Greg Marsden.
Royal Geographical Society Institute of British Geographers Conference: attended by Miles Tight.
Scottish Transport Applications and Research Conference: attended by James Laird.
Symposium on Energy and CO2 Emissions Policies: attended by Chris Nash.
Symposium on Transport Infrastructure Capacity: attended by Chris Nash.
Transforming the Energy Future: Pathways to Change: attended by Miles Tight.
Transport Economic Regulation: attended by Chris Nash.
Transportation Research Board, Washington: attended by Chandra Balijepalli, Peter Bonsall, Stephane Hess, Greg Marsden, Dong Ngoduy and Mark Wardman.
UK Chapter System Dynamics Conference: attended by Simon Shepherd.
Universities' Transport Studies Group: attended by Richard Batley, Richard Connors, Mike Maher and Shujie Shen.
Walk 21 Conference: attended by Miles Tight.
World Conference on Transportation Research SIG10 Workshop: attended by Greg Marsden and Tony May.

RESEARCH PROJECTS

SAFETY

EASY
Grant Holder(s): *OMJ Carsten*
Investigator(s): *AH Jamson, A Horrobin, N Merat, F Lai, Y Barnard, R Auckland*
Funded by: *Engineering and Physical Sciences Research Council (EPSRC)*
Dates: *January 2007 - April 2010*
Research Group: *SAFETY*

Abstract
This project is examining how some of the new Advanced Driver Assistance Systems, which are planned by car manufacturers, will affect safety. Currently the most advanced assistance system on the market is Adaptive Cruise Control (ACC) which automates the task of car following. ACC is particularly designed for motorways, but can also be used on rural and even urban roads. It has deliberate limitations, in that it cannot deal with situations requiring severe braking and that the ACC radar cannot detect stationary objects. The car manufacturers plan to extend the capability of ACC so that it can handle most forward situations. They also plan to provide lane keeping systems which will automate lateral control of a vehicle (i.e. steering), once again particularly for motorway driving. The combination of longitudinal and lateral control will provide a situation in which a large part of the driving task is automated. As a consequence, there is a risk that drivers will no longer feel a need to pay attention to the road and traffic environment, and therefore may not be aware of impending risk. They may also lose track of when manual control has been resumed, e.g. on exiting from the motorway, and therefore be slower in responding when required to brake or steer. This project is conducting a systematic evaluation of driver's performance and safety awareness as they experience increasingly greater automation of the driving task. The major tool for this work is the new driving simulator at the University of Leeds, which has a complex motion base to provide gravitational feel to the drivers. The initial set of experiments will be designed to identify any safety related problems that result from driving in a semi-automated vehicle. A wide range of drivers will be used, with the major factors in their selection being age, gender and trust in automation. Having identified the problems, a second set of experiments will focus on solutions to those problems, i.e. on ways in which driver alertness and awareness can be enhanced. The results are intended to provide guidance to those governmental organisations planning to use new driver assistance systems to increase road capacity and safety. They are also intended to lead to better design of new products by the vehicle manufacturers.

Assessing post-court disposal courses
Grant Holder(s): *K Chorlton*
Investigator(s): *E Wincup, M Conner*
Funded by: *UK Department for Transport (DfT)*
Dates: *October 2008 - June 2009*
Research Group: *SAFETY*

Abstract
The Road Safety Act 2006 makes legal provision for four post-court disposal courses for serious traffic offences (speeding, careless and inconsiderate driving, ignoring traffic signs and using a special road contrary to scheme or regulation). The course would be offered to those with 7-11 endorsement points at the time of conviction, and those disqualified from driving for at least one year. This research explored the person characteristics of likely course attendees through qualitative interviews with previous offenders, magistrates and police officers. Results indicated that very few offenders going through the courts would meet the course eligibility criteria and many of the offenders will refuse the offer due to preference for alternative penalties. The small number of magistrates and police officers interviewed suggested widening the criteria and making post-court attendance part of an alternative for all driving offenders who have a set of attitudes which encourage speeding and risky driving.

EuroFOT
Grant Holder(s): *O Carsten*
Investigator(s): *S Jamson, F Lai, K Chorlton*
Funded by: *European Commission (EC)*
Dates: *May 2008 - August 2011*
Research Group: *SAFETY*

Abstract
The EuroFOT project aims to demonstrate the effectiveness and encourage the deployment of Intelligent Vehicle Systems on European roads. Extensive Field Operational Tests (FOTs) can be used to validate the effectiveness of these systems and functions for a safer, cleaner and more efficient transport in a real environment. The aims of the project are to analyse driver behaviour and acceptability, to analyse and assess the impact of these functions using real data and to improve awareness about the potential of intelligent transport systems and create socio economic acceptance. A key concept of EuroFOT is that the systems will be used by drivers in their own vehicles. EuroFOT is testing systems that are already in the market or sufficiently mature to represent a commercial application, such as lane departure warning and forward collision warning. The ITS contribution is particularly on experimental design and the specification of questionnaires.

FOT-NET
Grant Holder(s): *O Carsten*
Investigator(s): *Y Barnard, S Jamson, F Lai, K Chorlton*
Funded by: *EC via ERTICO*
Dates: *June 2008 - August 2010*
Research Group: *SAFETY*

Abstract
The FOT-Net project aims to gather European and international stakeholders in a strategic networking platform to present results of Field Operational Tests (FOTs), identify and discuss common working items and promote a common approach for FOTs in the form of the FESTA methodology. FOT-Net is a Specific Support Action funded by the European Commission DG Information Society and Media under the Seventh Framework Programme. The ITS role is particularly oriented at conducting seminars on FOT evaluation issues.

ITERATE – IT for Error Remediation And Trapping Emergencies
Grant Holder(s): *F Lai*
Funded by: *EC*
Dates: *2008 - 2011*
Research Group: *SAFETY*

Abstract
The objective of ITERATE is to develop and validate a unified model of driver behaviour and driver interaction with innovative technologies in emergency situations. This model will be applicable to and validated for all the surface transport modes including cars, trains, and ships. Drivers' age, gender, experience, and personality traits are factors that will be considered together with influences from the environment and the vehicle. Culture differences across borders will also be investigated. The ITERATE model can be used to improve design and safety assessment of innovative technologies and make it possible to adapt these technologies to the abilities, needs, driving style and capacity of the individual driver. This provides a useful tool for system manufacturers as well as authorities to assess Intelligent Transport Systems.

Lancashire ISA
Grant Holder(s): *F Lai*
Funded by: *DfT*
Dates: *2009 - 2011*
Research Group: *SAFETY*

Abstract
This project deploys innovative but low-cost in-vehicle speed management systems for Lancashire drivers in the UK. The equipment involves an enhancement to standard satellite navigation systems to provide warnings, visually and aurally, when drivers are speeding and when they are approaching historical accident spots. The system is turned on upon ignition and cannot be overridden by the driver. Data are logged at 1 Hz and transmitted back to the data server through the GSM network. The system has been installed in 550 vehicles for a 9-month field trial. A wide range of drivers participate in this FOT, including newly qualified drivers, generic private motorists, taxi drivers, bus drivers, and fleet drivers.

BRIDGE
Grant Holder(s): *Y Barnard*
Funded by: *EPSRC*
Dates: *May 2009 - December 2010*
Research Group: *SAFETY*

Abstract
BRIDGE - Building Relationships with the 'Invisible' in the Digital (Global) Economy – is an EPSRC funded project, originating from a Research Council 'sandpit' within the Digital Economy programme. The project is a collaboration between the Business School from the University of Edinburgh, the Product Design & Engineering Department of Middlesex University and ITS. BRIDGE addresses the problem of how to meet the needs of consumers who are new to the digital economy and thus invisible to companies and designers. It aims to better understand the needs of digitally excluded people as well as to search for common requirements across the globe to define new segments large enough to be economically feasible, reducing both social and economic barriers to inclusion. The project aims to develop a bridge between two points of view: that of the invisible non-user and that of the supplier and developer of digital products and services. BRIDGE explores the needs and mental models of potential users, using these to develop design guidelines relating user needs to behavioural characteristics observed through modelling demand within global markets. In BRIDGE an approach is developed to bring together qualitative methods to get a deep understanding of the needs of potential users, and quantitative methods to identify partially excluded groups within consumer records of large suppliers active within the global digital economy. One of the areas in which ITS performs research is the acceptance of advanced driver support systems by elderly users.

NETWORK MODELLING

Cycle Towns Study
Grant Holder(s): *M Maher*
Funded by: *DfT*
Dates: *March 2009 - September 2009*
Research Group: *NETWORK MODELLING*

Abstract
The project aimed to develop and deliver an evaluation of cycling investment within the 12 new Cycling Cities and Towns (CCTs) in England which have been selected to receive significantly increased funding for cycle measures. The CCTs have adopted 'hard' measures (e.g. route, parking and signage improvements) and 'soft' measures (e.g. training, marketing, information and personalised travel planning).
The objective is to provide robust evidence about the 'whole town' programme wide impacts of all CCTs in terms of cycling and travel behaviour change, physical activity and wider impacts and, in addition, to identify if there has been a change in cycling and other behaviour and how far any change might be attributed to the investment made. This project was to conduct a baseline survey to provide a robust measure of current physical activity, cycling and travel behaviour in each CCT. Future, repeat surveys following interventions in each town will identify any changes in behaviour and how far these can be attributed to the programme.

MARS – DISTILLATE Future developments
Grant Holder(s): *S Shepherd*
Investigator(s): *C Balijepalli, A Koh*
Funded by: *DfT*
Dates: *March 2009 - November 2009*
Research Group: *NETWORK MODELLING*
Collaborating Partners: *Austrian Energy Agency*
URL: www.its.leeds.ac.uk/projects/mars_distillate

Abstract
The Department for Transport in the UK conducted a review of its appraisal process (NATA) during 2007/8 and concluded that there was a need to reduce the effort required in modelling and appraisal of strategies in the early stage of policy design. They suggested that one approach may be to conduct a staged appraisal with an initial filtering of options based on easily available qualitative and quantitative information. This could be in the form of an MCA and that the indicators should be in line with their parallel guidelines on Delivering a Sustainable Transportation System (DaSTS). This research project was funded to address these issues by enhancing the strategic model MARS which is a fast running LUTI model capable of simulating policy over an urban region in less than one minute. Three enhancements were made (i) an automated link has been developed between the

traffic assignment model SATURN and MARS which means the MARS speed-flow relationships are now compatible with existing network models and that growth factors from a MARS policy run in a future year may be passed back to the more detailed model; (ii) an MCA in line with the DaSTS challenges or goals has been implemented within the software platform (iii) the interface has been upgraded to include spatial policy variables allowing corridor based policies to be analysed.

Transeuropean Transport Network Planning Methodology
Grant Holder(s): *R Liu*
Investigator(s): *A. Koh, J. Laird, A. Pearman*
Funded by: *EC (DG TREN)*
Dates: *August 2009 - March 2010*
Research Group: *NETWORK MODELLING*

Abstract
In February 2009 the European Commission, Directorate General for Energy and Transport (DG TREN), adopted the Green Paper 'TEN-T: A policy review – towards a better integrated trans-European transport network at the service of the common transport policy'. The Green Paper creates the political framework for this invitation to tender. The policy document concerns a review process of the trans-European transport network policy (TEN-T). Since the first drafting of the TEN-T guidelines in 1996 Europe is now faced with new political, economical and environmental challenges. Against this background the purpose of the TEN-T policy review is to set out new objectives for the future development of the TEN-T policy. In support of the review process a definition of the methodological approach of the TEN-T Guidelines is required. The objective of this project is to provide the Commission services with technical and institutional support for the interim period in 2009 on the basis of the Commission's Green Paper on the TEN-T policy review. More specifically, the project is to provide the definition of a methodological approach of the TEN-T planning network, in particular the 'core network' as defined in the Green Paper. Within the overall framework, ITS participated in a consortium led by Transport Mobility Leuven and provided the guidance on methodologies for the evaluation of individual projects with Cost Benefit Analysis.

Longevity of SAFED Training
Grant Holder(s): *M Maher*
Funded by: *DfT*
Dates: *September 2009 - December 2010*
Research Group: *NETWORK MODELLING*

Abstract
The SAFED programme for HGV drivers training programme was launched in 2003 by the Department for Transport to improve safe and fuel efficient driving techniques among HGV drivers, with a view to increasing safer driving and reducing fuel usage and carbon emissions. The programme was extended to vans in January 2006. Previous studies have shown have shown, on the day of training, an average fuel saving of around 10 per cent with 36 per cent fewer gear changes for HGVs, and a 14 per cent fuel saving and a 34 per cent fewer gear changes for vans.
The primary objective of this current study is to investigate the longevity of these impacts, and thereby produce a statistically robust estimate for the average changes in fuel efficiency and safety that can be expected over time following a driver receiving SAFED training. In the study, 240 drivers of HGVs and vans of various sizes, and from a variety of companies, have been recruited to undergo the SAFED training programme, and to have their fuel consumption data recorded before training and for 12 months after training. Analysis of the data will aim to estimate not only the immediate impact on fuel consumption of the training, but whether this diminishes over time, and whether there are differences between types of vehicle and the management culture within the company.

Noisy Optimization in Transport
Grant Holder(s): *M Maher*
Investigator(s): *R Liu, D Ngoduy*
Funded by: *Leverhulme Trust*
Dates: *October 2009 - March 2011*
Research Group: *NETWORK MODELLING*

Abstract
In transport, as with other areas, many complex, real-world systems are represented by simulation models. Such models offer the means to try out alternative policies or strategies and study and compare their effects prior to implementation in practice. Models have been developed and applied to a wide variety of problems, ranging from logistics, scheduling and timetabling to traffic flows through networks. Such models are frequently very large and complex, involving many decision variables. The search for the values of these decision variables that optimize some measure of system performance is therefore often a challenging task. The number of possible solutions is frequently huge and such a search will typically involve many thousands of evaluations of trial solutions. Given that each evaluation requires a (possibly lengthy) run of the simulation model, it is vital that the search is conducted in an efficient and systematic way so that the final solution is reliable and as close to the global optimum as possible. A variety of approaches have been adopted to tackle such complex combinatorial optimization problems. These include evolutionary algorithms, particle swarm optimization, simulated annealing, and many others. One recent addition is an approach known as the cross entropy method. Previous work at ITS has demonstrated the successful application of the method to the problem of the optimization of traffic signal settings in a network, using a detailed, but deterministic, traffic simulation model. The current research is investigating the application of the method to noisy problems – that is, where the simulation model used to evaluate the trial solutions is Monte Carlo in nature and consequently the outputs are subject to random error, or noise.

GHG-TransPoRD
Reducing greenhouse-gas emissions of transport beyond 2020: linking R&D, transport policies and reduction targets.
Grant holder: *S Shepherd*.
Investigator(s): *P Timms, A Gühnemann, M Tight, A Jopson*
Funded by: *EC*
Dates: *October 2009 – October 2011*
Research Group: *NETWORK MODELLING*
Collaborative Partners: *Fraunhofer-ISI (Co-ordinator), TRT, JRC, TML*

Abstract
The main objective of GhG-TransPoRD project is to support the EU in defining a feasible research and policy strategy for GHG reductions of transport that fits and contributes to the overall GHG reduction targets of the EU. Such a policy strategy would propose GHG reduction targets for transport as a whole as well as for each transport mode. In doing so, the GhG-TransPoRD project aims to contribute to the development of a research strategy for the EU to reduce the GHG emissions of the different transport modes (road, rail, air and shipping) linking this research strategy with the available policy measures. The project begins with an analysis of patents and assessment of R&D efforts in the transport sector along-side a review of potential GHG reductions to be had from technology and policy interventions until 2020 and 2050.

TURBLOG WW
Grant Holder(s): *P Timms*
Investigator(s): *P Timms, T Whiteing*
Funded by: *EC*
Dates: *October 2009 –September 2011*
Research Group: *NETWORK MODELLING*
Coordinating Partner: *TIS.PT (Portugal)*
Collaborating partners: *NEA (Netherlands), INOVA+ (Portugal), BHTRANS (Brazil), PTL-UNI (Peru), TIS.BR (Brazil)*

Abstract
The main goals of this study are to: (1) provide an international network of experts and a platform for the exchange of ideas, information and policies concerning the field of urban logistics; (2) to promote cooperation among relevant international networks on urban logistics; (3) to select nine case studies for an analysis of potential transferability (two in Europe, three in Latin America, and one each for four further countries/regions: China, Japan, India and Africa); (4) to compare different business concepts and models based on the selected case studies; (5) to organise four thematic workshops coupled with site visits (two in the EU and two in Latin America); and (6) to develop a guide with recommendations on issues to be considered when transferring the selected case-studies to national contexts.

ECONOMICS AND BEHAVIOURAL MODELLING

CATRIN (Cost Allocation of Transport Infrastructure)
Grant Holder(s): *C Nash*
Investigator(s): *P Wheat, A Smith, J Toner, P Abrantes*
Funded by: *EC*
Dates: *May 2007- April 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*
URL: www.catrin-eu.org/index.php

Abstract
This is a follow up project to the GRACE project, again involving a collaboration of European partners. The focus of the research was to develop further the methodologies for estimating marginal infrastructure costs across modes, and to generate new results. The work was ultimately aimed at informing transport pricing, and has drawn on the most recent theoretical microeconomic literature in respect of pricing rules (e.g. game theoretic approaches). A particular focus in CATRIN has been improved knowledge regarding differential pricing for different vehicle / locomotive types. The work involved both economic and engineering input.

Green Logistics
Grant Holder(s): *A Whiteing*
Investigator(s): *AS Fowkes, S Shen, DH Johnson, D Stantchev*
Funded by: *EPSRC*
Dates: *June 2006 - June 2010*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*
URL: www.greenlogistics.org

Abstract
This four year research project into the sustainability of logistics systems and supply chains is being undertaken by a consortium of six UK universities supported and steered by a range of project partners including the Department for Transport, Transport for London and CILT(UK). The main focus is on the use of freight transport within the supply chain, and how this can be made more environmentally sustainable. The project consists of a set of twelve interlinked work modules, investigating (inter alia) opportunities for modal shift, problems associated with logistics operations in urban areas, the environmental sustainability of reverse logistics, the sustainability of home delivery operations and opportunities for improved scheduling of road freight. A major aim of the project is to develop enhanced methodologies for research into sustainable logistics, to assist in future policy formulation in this important field.

Rail Research UK
Grant Holder(s): *C Nash, M Wardman*
Investigator(s): *D Johnson, A Smith, P Wheat*
Funded by: *EPSRC*
Dates: *April 2003 - July 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
Rail Research UK (RRUK) is the British universities rail research group; it is led by the Universities of Birmingham and Southampton and also working with Imperial College London and Loughborough University. ITS is currently involved in two RRUK projects. The first is on systems costs modelling, undertaking econometric modelling of train operating costs, and testing a range of hypothesis about the way in which policy on franchising, including franchise length, geographical coverage and the willingness to renegotiate influence costs. As part of this first project ITS will also be looking at the structure of the industry and its impacts on incentives to develop new technology, and have been working with Birmingham and Imperial College to develop a methodology for testing the impact of new technology on rail system costs. The second project concerns the value of reliability, building on previous work for the Department for Transport and new survey work.

Concessionary Fares Lot 5 DfT Framework JT
Grant Holder(s): *J Toner*
Investigator(s): *J Shires, J Nellthorp, B Manez, P Wheat, J Dargay, P Mackie, A Smith*
Funded by: *DfT*
Dates: *October 2008 – December 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
Reimbursement of bus operators for concessionary travel has become increasingly important with the introduction of free local travel for older and disabled people in April 2006, and the extension to free national travel on all local bus services in England from April 2008. The aim of this research project is to provide the Department for Transport with reliable, robust, evidence-based estimates of the assessment of the feasibility of, and the key elements of reimbursement, together with an evidence necessary to support, a more deterministic approach to reimbursement. The research has covered a number of areas, including the shape of demand curves, fare- and service-level elasticities, passholder trip rates and additional marginal and capacity costs. Full results are expected to be public by the end of the year.

Advances in modelling human choice behaviour
Grant Holder(s): *S Hess*
Funded by: *Leverhulme Trust*
Dates: *October 2008 - December 2010*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
Almost without exception, human activity can be decomposed into individual choices. The mathematical representation/modelling of such choices had been one of the most active topics of theoretical research in the field of economics over recent years. The contribution of choice modelling to wider science was recognised in the award of the Nobel prize in Economics to Daniel McFadden in 2000 and to Daniel Kahneman in 2002. Choice models are used across many different disciplines, from small scale studies looking at students' choices of course modules, to industrial studies looking at the potential interest in new mobile phone handsets and to large scale cost benefit analyses looking at the economic, environmental and societal sustainability of new infrastructure developments. While there have been impressive advancements in modelling methodology, there are still major gaps between how individual people make decisions and how these decisions are represented in a mathematical model. At the same time, there is a prevailing and growing gap between theory and practice, with many real-world applications relying on inferior methodology that can lead to biased results. Both the theoretical shortcomings and the slow uptake of advanced methodology are worrying. Indeed, with the increasing reliance on choice models to guide important decisions, it is crucial to guarantee the reliability of the modelling work as any bias can have significant financial, environmental and societal effects. The aim of this fellowship is therefore two-fold. On the theoretical side, the research supported by this grant has led to developments that have reconciled modelled choice behaviour with actual human behaviour, while on the applied side, numerous applications have been conducted to bridge the gap between theory and practice by making advanced methodology accessible for large scale real world studies.

UK TRAM (formerly Meta Analysis)
Grant Holder(s): *D Johnson*
Investigator(s): *M Wardman, P Abrantes*
Funded by: *DfT*
Dates: *September 2008 - January 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
The overall purpose of this study was to identify the important quality attributes which comprise a measure of quality of journey experience which make trams distinct from other modes. We class quality attributes as those which are not captured in time or cost related estimated parameters estimated from Stated Preference (SP) or Revealed Preference (RP) exercises. This study had three main aims: to identify the extent of modal preference for tram over other modes captured in the mode specific constant; to identify, where possible, the importance of the various components of the modal preference; to outline gaps in knowledge and suggest possible avenues for future research. The findings are aimed at promoters, funders and operators of rapid transit schemes in the UK and include: a critical review of the available literature on public transport quality attributes; analysis of the tram modal constants available from a range of relevant studies, segmented where appropriate; a ranking of quality attributes and a discussion of those significant quality attributes identified; comparisons of valuations with those from studies into Bus Rapid Transit (BRT) type schemes; consideration of whether appropriate modelling exercises have been

undertaken; a summary identifying gaps in the evidence base and recommendations for future work.

Long Distance Travel Study
Grant Holder(s): *J Dargay*
Investigator(s): *S Clark, D Johnson, M Wardman, J Toner*
Funded by: *Independent Transport Commission (ITC)*
Dates: *2008 - 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
This study develops a model to forecast longer distance domestic travel by coach, air, rail and car in Great Britain. The model considers future developments in transport supply as well as changes in economic, demographic and social factors, and a range of policy measures. The forecasting model is a dynamic, elasticity driven system of equations for the four modes, based own- and cross-elasticities encompassing journey cost and journey time, as well as the socio-economic and demographic characteristics of the population. Demand is defined as annual passenger miles by mode, and consideration is given to five journey purposes: visiting friends and relatives, holidays, leisure day trips, business trips and commuting. Trips below and above 150 miles are considered separately, since air will only be a reasonable option for trips farther than this distance. The base values are determined using data from the National Travel Survey (NTS). The elasticities to drive the model are based on a combination of existing evidence and new empirical estimates. The new estimates are based on econometric analysis of aggregate data for rail, air, car and coach travel, NTS data for the years 1995-2006 and data obtained from a new survey of long distance travellers at coach stations, airports, onboard trains and at motorway service areas. The survey contains a stated preference element to provide information on diversion factors which are used to calculate cross-elasticities for journey costs and journey time. In addition, responses to 'transfer cost' and 'transfer time' questions are analysed to provide information to derive estimates of own-cost and own-time elasticities. The empirical evidence obtained from the different analyses is used in conjunction with economic theory on the relationship between elasticities to determine the values used in the forecasting model. A Base Case is defined in order to produce projections of annual long distance to 2030. This is determined by projections of the socio-demographic characteristics of the population and national economic trends obtained from government bodies and assumptions on future transport costs based on oil price assumptions and calculations provided by the DfT. The model is used to examine the impacts of a number of policy and supply-side scenarios, which are incorporated in the model in terms of changes in travel costs and travel time. The scenarios considered are road user charging and various assumptions regarding car fuel efficiency, motoring costs and rail and air fares. The impact on long distance travel of the current economic downturn is examined and sensitivity analyses are carried out to explore the impacts of different assumptions regarding income and population growth and income elasticities.

European Transport Policy – Progress and Prospects
Grant Holder(s): *C Nash*
Investigator(s): *B Matthews*
Funded by: *Community of European Railways (CER)*
Dates: *October 2008 – May 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
The aim of this study was to outline progress in the implementation of European transport policy since the 2001 White Paper (CEC, 2001) and to put forward a vision of what further developments are needed over the next 5-10 years to attain the objective of the creation of a competitive European railway area. Hence, the focus was on issues affecting the rail industry, both directly, in terms of initiatives and legislation targeted on the rail industry, and indirectly, in terms of initiatives and legislation having a bearing on rail as it seeks to compete with the other transport modes. Given that we are coming to the end of the period covered by the previous White Paper, it is clearly timely to consider to what extent policy for the next decade should differ from what has gone before. A thorough assessment of progress and prospects was undertaken, divided into 3 key areas: intra modal competition; inter-modal competition; and infrastructure investment. The final report is available via www.cer.be

Estimation of Travel Demand Models
Grant Holder(s): *S Hess*
Funded by: *EPSRC*
Dates: *February 2009 - July 2010*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
Random utility models (RUM) are increasingly estimated on datasets in which multiple choices are observed for each respondent, a situation that arises most prominently in the case of stated choice (SC) data. The fact that the standard modelling methodology was developed for a cross-sectional context poses an important issue at a time when many applications rely on panel data. This research project aims to develop new methods for adequately representing the repeated choice nature of panel data in random utility modelling.

Advice on Surveys to Examine the Effectiveness and Acceptability of Measures to Encourage Cycling within Greater London
Grant Holder(s): *M Wardman*
Investigator(s): *M Page*
Funded by: *Transport for London (TfL)*
Dates: *March 2009 - April 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
This was desk top research that involved reviewing both previously applied and potential methodologies and previous research evidence in order to arrive at advice on how best research into the effectiveness and acceptability of measures to encouraging cycling in the context of Greater London might be progressed. A set of recommendations were provided for possible research work in a wide range of areas including: mode and route choice, based on a wide range of data sources; cycling by children; cycle access to and from railways; cycle hire schemes; and monitoring of improvement schemes.

TfL Projections of Future Travel
Grant Holder(s): *M Wardman*
Investigator(s): *A Daly, G De Jong, J Dargay*
Funded by: *TfL*
Dates: *April 2009 - September 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
The objectives of this study were: to review current methodologies, focussing on their ability to characterise travel and forecast trends in the context of Transport for London's (TfL) need for strategic level demand projections and forecasts and to stimulate thinking on the development of new forecasting approaches given the identified limitations of existing methods and sources of data and with particular emphasis on the needs of TfL managers. This was a desk-top review allied to assembling the views and requirements of TfL managers regarding strategic demand forecasting whilst also learning from the experiences gained from comparable forecasting methods in major metropolitan areas in mainland Europe. A large number of key TfL managers were interviewed to establish current TfL methods and requirements whilst interviews were undertaken with managers in the Randstad and Paris to learn from experience and practice in major European conurbations. These interviews, along with a critical review of the state of the practice and available/possible data, provides the basis for a series of recommendations on how TfL can improve their strategic forecasting capabilities.

Guest Researcher Programme
Grant Holder(s): *A Smith*
Investigator(s): *P Wheat*
Funded by: *VTI Swedish National Road and Transportation Institute*
Dates: *April 2009 - December 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
Andrew Smith and Phill Wheat are visiting researchers Centre for Transport Studies, Royal Institute of Technology (KTH) and Swedish National Road and Transport Research Institute (VTI), Sweden (2009). This has involved visits to

present work and develop collaborative research proposals and papers.

INTERCONNECT
Grant Holder(s): *P Bonsall*
Investigator(s): *B Matthews, P Abrantes, J Shires, B Menaz, B Lythgoe, M Page*
Funded by: *EC*
Dates: *June 2009 - May 2011*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
This project addresses the potential for greater efficiency and reduced environmental impact of passenger transport by judicious encouragement of integration, co-operation and, where appropriate, competition in the provision of local connections to long distance travel. The particular focus of INTERCONNECT are those journeys which might benefit from more effective interconnection between different modes and services, and on those situations where effective interconnection is currently hampered by institutional barriers, lack of investment, or failure to innovate. By identifying examples of good practice from Europe and elsewhere, the project will show how these situations could benefit from a more enlightened approach. The work to date has concentrated on the collation of relevant literature and of published data on the nature of long distance travel in European counties. ITS has also been leading a stream of work which will result in the production of a 'toolkit' of techniques which show particular promise. This has involved consideration of the criteria for success and the various categories of solutions which might be identified (e.g. institutional or regulatory reform, new build, integrated ticketing, and joint marketing). ITS has also contributed to the selection of case studies which can demonstrate best practice or which can be used as test-beds to demonstrate the transferability, or otherwise, of selected solutions. Outputs from the project are posted on the project website as they emerge: www.interconnect-project.eu/

DfT Cost Econometrics
Grant Holder(s): *A Smith*
Funded by: *DfT*
Dates: *June 2009 - January 2010*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
In this project ITS is conducting econometric cost modelling work using a new dataset of franchised passenger train operating company (TOC) costs. The aim is to inform DfT's future forecasts of TOC costs, based on understanding the drivers of costs, and also relative efficiency. The work is being done in partnership with consultants Steer Davies Gleave.

NETSTATE
Grant Holder(s): *C Nash*
Investigator(s): *B Matthews, R Merkert*
Funded by: *DG TREN*
Dates: *July 2009 – December 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*
Collaborative Partners: *PWC, NEA and TML*

Abstract
This study undertook analysis of the existing level of implementation of provisions regarding rail Network Statements, and developed best practice guidance for drafting Network Statements. This encompassed a thorough investigation of the existing rail NS of the Member States and of other relevant European countries, as well as the identification of tools (such as GIS) that can improve efficiency, harmonisation and access of the rail infrastructure information.

Econometric analysis of TOC size
Grant Holder(s): *P Wheat*
Funded by: *Office of Rail Regulation (ORR)*
Dates: *August 2009 - September 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
This project utilised econometric techniques to examine the cost impact of merging and more generally remapping the franchise structure of Britain's Train Operating Companies. Overall it found that simply making franchises larger would not necessarily reduce unit costs, however reducing the overlap of franchises would exploit economies of density in train service provision and so reduce unit costs.

Rail Freight Value of Time Study
Grant Holder(s): *A Fowkes*
Investigator(s): *A Whiteing, D Johnson, D Stantchev*
Funded by: *ORR*
Dates: *August 2009 - January 2010*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
The Office of Rail Regulation (ORR) commissioned this study by AECOM and ITS of the values of journey time savings/increases and of changes to lateness. The main objective of the study was to identify monetary freight user values, both for travel time savings and improvements in travel time reliability. Separate values were identified for a range of commodities including coal, other bulks, domestic and intermodal traffic. The interview questionnaire was based on the Reported Cost approach developed by Booz Allen Hamilton in a study with ITS for the Strategic Rail Authority in 2003/4. The project has reported to ORR, with published results to follow.

Smart and Integrated Ticketing
Grant Holder(s): *P Bonsall*
Investigator(s): *M Wardman*
Funded by: *DfT via Ipsos MORI*
Dates: *September 2009 - January 2010*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
This project, conducted in partnership with Ipsos MORI, explored the degree of public interest in various forms of 'Smart' or integrated ticketing (e.g. stored value cards, smart cards, phone apps, transferable tickets, multimodal tickets) and the effect that their introduction might have on the number of trips made on public transport. The research was concentrated in three cities (Bristol, Birmingham and Manchester) and comprised qualitative interviews and a quantitative questionnaire which included a stated preference (SP) exercise. The qualitative interviews revealed considerable interest in new ticketing concepts but a reluctance to pay a significant premium for 'smart' variants. Results from the SP exercise indicated that, although much of the demand for integrated tickets would be at the expense of pre-existing ticket types, introduction of such tickets would cause a net increase in public transport trips. Elasticities and cross elasticities were estimated from the data and showed particularly strong competition between day tickets valid on all buses and those valid for only one operator. The results of this research will be published by DfT in due course.

ORR Econometric Support Call off
Grant Holder(s): *A Smith*
Funded by: *ORR*
Dates: *September 2009 - December 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
ITS has been carrying out econometric cost modelling and efficiency benchmarking analysis for ORR since 2007 and this contract was renewed for a further two years in the summer of 2009. The work is based on two datasets: a dataset of European infrastructure managers, provided by the UIC, and a second dataset, collected by ORR and ITS, which utilises both national data and regional data within countries. The latter has formed into a new benchmarking club, and its aim is to understand both relative inefficiency across countries, but also within countries. This work has been used to inform the 2008 price determination process and is intended to inform the next price review.

ORR International Review
Grant Holder(s): *A Smith*
Funded by: *ORR*
Dates: *September 2009 - November 2009*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
With consultants Arup, and other academic partners, ITS carried out a review of international experience of approaches to rail delivery around the world to inform ORR's thinking regarding approaches to franchising and also the relationship between the British infrastructure provider, and train operators.

SNCF
Grant Holder(s): *D Johnson*
Funded by: *Societe Nationale des Chemins de fer Francais (SNCF)*
Dates: *September 2009 – July 2010*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
This is a project to assess the impact of open access competition on French rail passenger services. Stage1 includes a qualitative assessment of the impact of open access competition on French rail passenger services based on a review of past experience of modelling with PRAISE and actual experience of open access competition and competition between neighbouring franchises. At the second stage ITS will also undertake some new modelling work using PRAISE (a disaggregate Passenger Rail demand forecasting model), working with a set of Origin-Destination (OD) stations to form the 'route' or 'network' under consideration.

TfL Freight Modelling Support
Grant Holder(s): *A Fowkes*
Funded by: *TfL*
Dates: *December 2009 - December 2010*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
For this work, ITS is to provide detailed technical modelling support for the Freight Unit at TfL, including: advising on the structure of the model and the particular impact of external zones and non-road modes onto the base year freight matrices, to reduce the potential of a monopoly situation arising in the development of the Base Year Forecast Matrix (BYFM); attending technical board meetings and workshops as appropriate; and being able to include partner organisations/universities as necessary for the successful completion of the BYFM project.
It is intended that should the providers of the BYFM have difficulties in particular areas then a joint working with the provider could be required to overcome the particular issue.

SHANTI (Harmonised travel surveys using new technology)
Grant Holder(s): *P Bonsall*
Investigator(s): *J Dargay*
Funded by: *ESF COST*
Dates: *April 2009 - April 2012*
Research Group: *ECONOMICS AND BEHAVIOURAL MODELLING*

Abstract
This is a networking project which aims to facilitate the production of state of the art reviews and recommendations for action in respect of the use of new technologies to collect data on passenger and freight movements in Europe. Previous work (e.g. FP6 project KITE, the COST 355 project and the 2008 ISCTSC conference) has shown that existing mobility data from National Travel Surveys in different European countries is generally not harmonised or comparable. SHANTI will address the pre-requisites for harmonisation of data and will focus on the role of new technologies in the collection or capture of travel information. GPS-based technologies, including hand held devices and those fitted to vehicles, will be studied in particular depth as will the use of new technologies as an aid to travel diaries and the scope for construction of databases from multiple and disparate sources. ITS co-represents the UK within SHANTI's management group and provides the chair for a working group on vehicle-based surveys.

TRANSPORT AND ENVIRONMENT

Mobile Environmental Sensing System Across a Grid Environment (MESSAGE)
Grant Holder(s): *H Chen*
Investigator(s): *Consortium of five universities led by J Polak (Imperial College London), M Bell (Newcastle), P Blythe (Newcastle),H Chen (Leeds), P Landshoff (Cambridge), M McDonald (Southampton).*
Funded by: *EPSRC, DfT*
Dates: *October 2006 - September 2009*
Research Group: *TRANSPORT AND ENVIRONMENT*

Abstract
The project was concerned with developing new techniques for collecting, managing, interpreting and modelling data on environmental quality and its relationship to transport. It brought about a step-change improvement in the data and analysis methods available for the measurement and management of traffic pollution. More specifically, it addressed key scientific challenges in the field of transport and environmental monitoring, using data derived from transportable sensors which can measure local environmental factors such as pollutants from vehicles, and developed a flexible and reusable sensor and communications infrastructure to support a wide range of scientific, policy-related and commercial uses and applications for the resultant data (e.g. pollution at the level of the individual) and it also demonstrated the operation and utility of this infrastructure in a range of case study applications (e.g. mounted on a fleet of buses and individuals as they move about). The Leeds team took part in the deployment and validation of a new class of low cost wireless sensors in and around the road environment in Gateshead, Headingley (Leeds) and Leicester used the data from the sensors to improve the calibration and validation of existing emissions and dispersion models.

Future Urban Technologies Undertaking Research to Enhance Sustainability (FUTURES)
Grant Holder(s): *M Bell*
Investigator(s): *P Goodman, P Skelton*
Funded by: *EPSRC*
Dates: *September 2004 - June 2009*
Research Group: *TRANSPORT AND ENVIRONMENT*
Collaborating Partners: *Energy and Resources Research Institute (ERRI), University of Leeds, Transport Research Group, University of Southampton, Institute of Sound and Vibration Research, University of Southampton, Unit for Transport & Society, University of the West of England*
URL: www.sue-futures.org

Abstract
ITS, in collaboration with the Energy and Resources Research Institute (ERRI), engaged in a core element of the FUTURES project, namely: Environment Assessment of New Vehicle Technology with Improved Confidence. Two environmental impacts were examined in detail: noise levels arising from electric vehicles, and sensitivity issues governing the concentration of Nitrogen Dioxide (NO_2) levels in urban street canyons. The overall FUTURES project was one of four transport research consortia within the EPSRC's 'Towards a Sustainable Urban Environment Programme'. The project followed on from an initial scoping study, and was a five-year research programme to investigate and promote the role of new technologies in achieving sustainable urban mobility. FUTURES sought to address the ways in which new transport-related technologies may be able to contribute to a sustainable urban environment.

4M - SUE II
Grant Holder(s): *P Goodman*
Investigator(s): *K Ropkins*
Funded by: *EPSRC*
Dates: *April 2008 - March 2012*
Research Group: *TRANSPORT AND ENVIRONMENT*
Collaborating Partners: *University of Loughborough, De Montfort University Leicester, The University of Sheffield, Newcastle University*
URL: www.4mfootprint.org

Abstract
Recently published findings make the case for reductions in anthropogenic greenhouse gas concentrations both conclusive and urgent. UK Government policies are attempting to encourage the uptake of low or zero-carbon technologies. However, technological advances and penetration are unlikely to account for reductions in carbon emissions of the order being proposed – behavioural and land-use changes affecting the use of buildings and transport networks will also be required, alongside biological sequestration and better waste management. Unfortunately current tools available to authorities and planners to track and manage such processes are somewhat inadequate. The 4M project seeks to address this issue by building a complete carbon footprint for the City of Leicester UK, using a bottom-up process, alongside appropriate tool development, so that the relative magnitudes and trade offs between competing carbon management strategies may be studied and their effects on the lifestyles of the cities' inhabitants explored.

Identifying and Informing High-emitting Vehicles: Calderdale MBC
Grant Holder(s): *J Tate*

Funded by: *Calderdale Metropolitan Borough Council*
Dates: *September 2009 - December 2009*
Research Group: *TRANSPORT AND ENVIRONMENT*

Abstract
ITS was commissioned by Calderdale MBC to measure on-road tailpipe emissions of vehicles as they drove-through suitable monitoring locations in Halifax (Salterhebble) and Hebden Bridge. The remote vehicle emission sensing instrument works by scanning the exhaust plume trailing a vehicle. The technology is commonly used in the U.S. and Canada in large-scale emission testing programs. The ESP RSD-4600 instrument when installed at a good test-site, is able to measure ratios of NO, CO, HC and a coarse particle index to CO_2 i.e. fuel-based emission factors. Vehicle speed, acceleration and a digital image of the rear of the vehicle, and hence registration mark, are also recorded. The measurements in October 2009 allowed the on-road vehicle fleet emissions to be characterised e.g. categorised by vehicle type, age and emission standard (e.g. Euro 0 – 5). When these emission measurements are coupled with vehicle specific information such as fuel type, engine size, weight etc from DVLA records, much greater understanding of on-road vehicle emissions can be gleaned. Analysis of measurements in October 2009, supported by Calderdale MBC, has shown that whilst emission ratios for petrol cars are falling broadly in-line with Euro classifications and Emission standards, NO emissions from the diesel cars show little sign of decline. It is suggested that improvements in vehicle technology are being offset by an increasing share of diesel engine vehicles, which emit more NOX and coarse particles than comparable petrol engine vehicles. This is important as the UK is not on-track to meet EU limit values or UK objectives for Nitrogen Dioxide by the 2010 deadline. The small proportion of vehicles classified as having elevated emissions, are responsible for a significant (~40%) proportion of HC and CO emissions. The contribution to the total coarse particle measure and NO/CO_2 ratio is less pronounced, indicating a policy of identifying and removing vehicles with elevated emissions from the vehicle fleet would have a significant impact on HC and CO concentrations, but there would only be modest gains for NO and particle emissions.

TRANSPORT POLICY

MIME (Market Based Impact Mitigation for the Environment)
Grant Holder(s): *M Tight*
Investigator(s): *A Gühnemann, C Kelly, H Harwatt, R Connors, L Chernyavs'ka, J Nellthorp*
Funded by: *EC*
Dates: *August 2007 - December 2010*
Research Group: *TRANSPORT POLICY*
Collaborative Partners: *SINTEF, Norway; QINETIQ, UK; Eurocontrol Experimental Centre; ENV-ISA, France; Technical University of Munich, Germany*

Abstract
Airlines and airports will likely face an increasing number of noise impact constraints in the future. There are already at least 128 airports worldwide with some type of noise surcharges, and the situation that the air transport industry faces regarding noise-related environmental constraints on future growth is very grave. As has been shown in other industries, there are conditions under which a market-based mechanism using transferable permits can be used to provide improved control over environmental impacts, and at the same time, allow efficient business operations. MIME is aimed at discovering whether, and how, such mechanisms can be used to improve environmental noise control in air transport.

Assessing Sensitiveness to Transport (ASSET)
Grant Holder(s): *A Gühnemann*
Investigator(s): *M Kimble, M Tight, A. Koh. L. Chernyavs'ka*
Funded by: *EC*
Dates: *April 2007 - October 2009*
Research Group: *TRANSPORT POLICY*
URL: www.asset-eu.org

Abstract
The aim of the project has been to develop the scientific and methodological capabilities to implement European policies aiming at balancing the protection of environmentally Sensitive Areas (SA) with the provision of an efficient transport system. Although the concept of sensitive areas has been repeatedly evoked in the context of EU transport policies, there is to date no scientific and no political agreement on a definition, nor is there an agreed approach to address the specific concerns associated to transport related SA (TSA). Therefore, the first part of the project has provided a set of sensitiveness criteria to identify TSA and apply these in a mapping of TSAs across the EU, allowing for the identification and prioritisation of critical sustainability issues geared to the development of the Trans-European Transport Networks (TEN-T). The second part of the project was led by ITS and concentrated on analysing policy instruments with regard to their applicability to different categories of TSA and the identification of adequate policy packages with a focus on market-based instruments. The proposed methodology and the policy instruments were then assessed in detail in 10 case studies covering (i) mountainous areas, (ii) urban/metropolitan areas, (iii) natural/protected areas, and (iv) coastal areas, as well as different modes, types of traffic and geographical situations. ITS carried out a case study in the Trans-Pennine region dealing with a situation where the protection of a natural protected area conflicts with the protection of the population. Finally, policy and operational guidelines for TSA have be developed, notably building on the cross site evaluation of the case studies. The final conference was held in November 2009. The project involved a consortium of 11 partners in 9 countries, thus covering all relevant disciplines (natural scientists, economists, transport policy, social policy experts) and a wide geographical scope in Europe.

TRKC
Grant Holder(s): *N Merat*
Investigator(s): *B Menaz, D Stantchev, A Whiteing, P Timms,*
Funded by: *EC*
Dates: *April 2007 - March 2010*
Research Group: *TRANSPORT POLICY*

Abstract
The Transport Research Knowledge Centre (TRKC) is a European project funded under the 6th RTD Framework Programme and is a follow-up of EXTRA (1999-2001) and EXTR@Web (2002-2006). The aim of the project is to promote and disseminate the results of transport research activities from the European Research Area to policy-makers, academics, industry and other relevant stakeholders. A web-based information portal available at www.transport-research.info/web/index.cfm has been established to provide comprehensive information about on-going and completed transport research programmes and projects, transport events as well as thematic analyses of transport research results and their policy implications.

COST 358: Pedestrians' Quality Needs
Grant Holder(s): *M Tight*
Funded by: *EC*
Dates: *November 2006 - November 2010*
Research Group: *TRANSPORT POLICY*

Abstract
The main objective of this project is networking and the development of high quality collaborative research proposals in the area of pedestrians quality needs. The study will focus of three perspectives: functionality of the pedestrian environment, perception of that environment by the users, and durability. The project aims to provide an essential contribution to systems knowledge of pedestrians' quality needs, thus stimulating structural and functional interventions, policy making and regulation to support an improved pedestrian environment across the EU and other involved countries. The project involves experts in this field from 26 countries in Europe and elsewhere.

CityMobil
Grant Holder(s): *A May*
Investigator(s): *H Muir, C Kelly, S Shepherd, G Marsden, A Gühnemann, R Liu, S Jamson, N Merat, D Stantchev*
Funded by: *EC*
Dates: *May 2006 - April 2011*
Research Group: *TRANSPORT POLICY*
URL: www.citymobil-project.eu/

Abstract
CityMobil involves examining the impacts that new transport technologies (mainly PRT, cybercars and high-tech buses) can have on improving the sustainability of European cities, and how these modes can be integrated into existing transport

systems. ITS is involved in four of the five sub-projects, including managing a sub-project to investigate how new technologies would fit into a range of future scenarios. Further work being undertaken by ITS includes: constructing strategic (MARS) and microsimulation (DRACULA) models to assess the future impacts of new technologies in four European cities; developing and applying a framework for evaluating new modes; aiding the co-ordination of links between CityMobil and the PRT system construction at Heathrow Airport; and using the UoLDS to assess the human factors issues associated with transfer of control between manual driving and full automation.

CURACAO (Coordination of Urban Road User Charging Organisational Issues)
Grant Holder(s): *AD May*
Investigator(s): *D Milne, A Koh*
Funded by: *EC*
Dates: *April 2006 – March 2009*
Research Group: *TRANSPORT POLICY*
URL: www.curacao-project.eu

Abstract
CURACAO was a three year project funded by the European Commission to provide support to cities interested in introducing road pricing schemes. Its overall objective was to promote and support fair and more efficient pricing of road usage in urban areas. CURACAO did not undertake research itself, but reviewed the results of research and practice and collated these to provide advice to cities related to the questions which they raised. ITS led the Scientific Committee, which produced an annual state-of-the-art report. This report reviewed evidence on each of the main issues of concern to cities: policy objectives; design methods, technology and business systems; prediction and appraisal; impacts on traffic, the environment, the economy and equity; acceptability, transferability and implementation and evaluation. The final state-of-the-art report covered findings to the end of 2008. It was accompanied by a report on sixteen case studies, a guiding presentation, a series of fact sheets and a set of policy recommendations.

Policy, Economics and Appraisal in Transport (PEAT)
Grant Holder(s): *S Grant-Muller*
Funded by: *EC*
Dates: *September 2004 – February 2009*
Research Group: *TRANSPORT POLICY*

Abstract
The PEAT training site is one of a small number of highly prestigious training sites funded under the EU FP6 Marie Curie training and mobility programme. The goals were to provide a comprehensive research training environment covering the theoretical, methodological and contextual research issues within the field of Policy, Economics and Appraisal for the transport network of today and tomorrow. Eight full time scholarships were awarded, each for a 3 year period of study towards PhD at ITS. All Fellows have now formally finished their period of research and training and the PEAT site has reached its conclusion. Four fellows have already been awarded their PhD whilst others are finalising submission. To date Fellows are pursuing career tracks in academia, local government or industry, either in Europe or the UK. In addition to the main work of research, to date, over 50 conference and journal papers have been produced by Fellows and disseminated at a range of international conferences.

Road User Safety and Cycling
Grant Holder(s): *M Tight*
Funded by: *DfT*
Dates: *September 2008 – August 2010*
Research Group: *TRANSPORT POLICY*

Abstract
This project aims to assess a wide range of road user safety issues in relation to cycling in the UK, in particular analysis of cycling activity and collision data, qualitative research with cyclists and other road users, a review of infrastructure provision and a review and analysis of cycle helmet wearing.

Visions Of The Role Of Walking And Cycling In 2030
Grant Holder(s): *M Tight, D Watling, A Gühnemann*
Investigator(s): *P Timms, D Ngoduy, M Kimble*
Funded by: *EPSRC*
Dates: *October 2008 – September 2011*
Research Group: *TRANSPORT POLICY*

Abstract
This research seeks to examine ways in which more people might be encouraged to walk and cycle in the future, what steps are needed to support this potential increase in walking and cycling and how to improve the experience for those who already use these modes. Walking and cycling can make a considerable contribution to sustainable transport goals, building healthier and more sociable communities and contributing to traffic reduction and lower carbon emissions. The amount of walking and cycling in Britain has declined over the long term and research suggests that there are major obstacles to prevent people from using these modes. There have been many national and local initiatives to promote walking and cycling but without a long term vision and consistent strategy it is difficult to see how a significant change may be achieved. The time is now right to examine the means by which such a fundamental change both in the quantity of walking and cycling, and in the quality of the experience can be achieved, which goes well beyond continuation of existing trends. The work will involve a series of expert workshops to develop visions of alternative futures and also draw in various ways on the experiences of different user groups of the public to ensure that the visions developed are grounded in real experiences. The workshops and other participation events will be used to establish trend breaking views of the future and the key attributes of future conditions which will generate these visions. We will undertake impact assessments to consider the likely costs and benefits of these visions and the potential effects on lifestyle. The work will develop and use innovative methodologies using visualisation software to help users understand how futures might appear, using modelling techniques which examine narrative and storylines to understand how different futures might be attained, and using a range of social research methods to explore how different futures might affect individual lifestyles and society. We will offer people a range of tools that enable them to construct their own versions of the future, and to weave their own stories in and out of expert visions, thus opening up the possibility of a richer and expanded public engagement with the visioning process. This permits a shift from the narrow focus of people's current day decision-making and behavioural and lifestyle choices to a greater focus on the process through which people make decisions and the contextual factors which inform how people choose to live their everyday lives. The value of this project, and the innovative methodologies it adopts, such as the new approach to modelling, is that in this way it opens up the possibilities of a greater understanding of how walking and cycling could change in the future.

Understanding Walking and Cycling
Grant Holder(s): *M Tight*
Investigator(s): *A Jopson, H Harwatt, F Hodgson, S Clark, H Muir*
Funded by: *EPSRC*
Dates: *October 2008 – September 2011*
Research Group: *TRANSPORT POLICY*

Abstract
It is widely recognised that an increase in walking and cycling for short journeys in urban areas could significantly reduce traffic congestion, improve the quality of the urban environment, promote improved personal health, and contribute to a reduction in carbon emissions. This is demonstrated by a wide range of policy initiatives by national and local governments, by health authorities and a variety of non-governmental organizations. Recent reviews of research on travel behaviour have emphasised that the ways in which travel decisions are made remains poorly understood, especially in the context of complex and contingent household travel arrangements. This research seeks to fill this research gap through an in-depth analysis of household decision making with respect to short journeys in urban areas and has two key aims: to develop better understanding of the complex ways in which households and individuals make everyday travel decisions about short trips in urban areas; and to develop a 'toolkit' that helps planners, policy makers and others concerned with promoting more sustainable travel practices in urban areas to target policies and interventions more effectively. The research will adopt a mixed methodology, but with the main emphasis on in-depth qualitative research, and will examine individual, family and household decision making in four different neighbourhoods. Throughout the research the project will engage with a range of stakeholders and potential users, and in the final part of the

project will engage potential users with the development of outputs.

Rural Transport
Grant Holder(s): *J Laird*
Investigator(s): *P Mackie*
Funded by: *Scottish Government*
Dates: *November 2008 – April 2009*
Research Group: *TRANSPORT POLICY*

Abstract
This project reviews the latest research and best practice in rural transport economic appraisal. It has a particular focus on wider economic impacts, option values and suppressed demand. The report has been published by the Scottish Government.

Proportionality of Appraisal
Grant Holder(s): *M Page*
Investigator(s): *P Mackie*
Funded by: *DfT*
Dates: *October 2008 - December 2009*
Research Group: *TRANSPORT POLICY*

Abstract
Proportionate Appraisal came from a Department for Transport concern that their appraisal procedures for major (>£5M) schemes were too onerous and inappropriate for schemes at the lower end of the cost threshold. The project involved reviewing current procedures, producing recommendations for a more proportionate process and testing and drafting formal guidance on the proposed approach. This involved extensive consultation with stakeholders and the Department to try and ensure a revised approach remained robust and consistent while being less costly to carry out for scheme proposers. Atkins led the project which was also carried out in conjunction with John Bates Services.

SITPRO Plus
Grant Holder(s): *A Pearman*
Investigator(s): *B Matthews, M Lawler, B Menaz, K Chorlton, C Kelly*
Funded by: *EC (DG Research)*
Dates: *October 2008 – September 2010*
Research Group: *TRANSPORT POLICY*
Collaborative Partners: *ICCR, NESTIER and TIS*

Abstract
The SITPRO Plus Project assesses the impacts of transport projects funded by the European Commission within the 5th and 6th Framework Programmes for Research and Technological Development. Its final aim is to use these findings to define new transport research policy objectives and to provide the European Commission with a methodology for impact assessment in the ongoing and future Framework Programmes. The project is funded by the European Commission through the 7th Framework Programme. Along with four other research projects it forms part of a broader initiative in the EU Transport Research Programme for developing specific impact assessment methodologies for European Commission funded projects.

Northern Way – Technical Advice
Grant Holder(s): *G Marsden*
Funded by: *Northern Way*
Dates: *January 2009 - June 2009*
Research Group: *TRANSPORT POLICY*

Abstract
ITS is supporting Steer Davies Gleave consultants in providing advice on strategic transport matters to the Northern Way. In 2009 this has included research on expanding the consideration of wider economic benefits in transport appraisal, the extent to which transport and economic development in the Northern Way area differs from other parts of the country and low carbon policy and the implications of the Climate Change Bill and new low carbon strategy.

The new Anfield
Grant Holder(s): *F Hodgson*
Funded by: *Arup*
Dates: *January 2009 - February 2009*
Research Group: *TRANSPORT POLICY*

Abstract
The aim of this small project was to explore the travel decisions and practices of Liverpool Football Club supporters attending games at Anfield and their preferred transport options as part of the proposal to improve the Anfield stadium. A series of four focus groups were held with Liverpool Football Club supporters in and around Liverpool. The work found that the travel practices used a variety of competencies, were very routinised, involved highly complex decision making understanding the nature of the transport provision, opportunities to socialise as part of the journey and judgements and predictions of the behaviour and practices of other travellers. In particular it was found that travelling away from the ground is extremely influential in determining the characteristics of the travel to the ground and that the best designs are those it is easier to get away from.

Productivity in Transport Evaluation Study (Department for Transport, 2008-2010) (PITES)
Grant Holder(s): *J Laird*
Funded by: *DfT*
Dates: *February 2009 – December 2009*
Research Group: *TRANSPORT POLICY*

Abstract
This study is examining ex-post economic data for evidence of increases in total factor productivity as a result of a transport infrastructure investment. The study is being undertaken for the Department for Transport and is led by the London School of Economics.

Assessing The Future of Air Transport White Paper as a strategic framework for sustainable airport development
Grant Holder(s): *S Grant-Muller*
Funded by: *DfT via Ipsos-MORI*
Dates: *April 2009 - December 2009*
Research Group: *TRANSPORT POLICY*
URL:
www.dft.gov.uk/pgr/aviation/airports/development/

Abstract
The Future of Air Transport White Paper (ATWP) stated that the government would monitor and evaluate the effectiveness and impact of the policies set out in the ATWP. This specific research study aimed to: (i) assess the perceived effectiveness of the overall strategic framework provided by the ATWP. For example, it investigates stakeholders' views on the timeframe and coverage of the ATWP; and (ii) investigate the influence of airport master plan policy on local airport development processes. For example, it explores stakeholders' views on DfT guidance on master plans and the impact of master plans on community engagement. ITS conducted a content review of 10 master plan documents, selected by ITS based on a range of criteria such as airport size, location and ownership. Ipsos MORI carried out 62 interviews with a range of stakeholders at these airports, as well as members of DfT's Aviation External Advisory Group (which includes representatives from the aviation industry, environmental organisations and other key interest groups). Interviewees were selected to reflect the wide range of views on aviation.

Wider Economic Impact- Northern Way
Grant Holder(s): *J Laird*
Funded by: *Northern Way*
Dates: *July 2009 – September 2009*
Research Group: *TRANSPORT POLICY*

Abstract
This scoping study for the Northern Way examined whether there is a theoretical and practical case for extending current appraisal practice to include regeneration wider impacts. These wider impacts are associated with increasing labour supply in areas of involuntary unemployment. The report has been published by the Northern Way.

Economic KPIs – Fully Allocated Costs & Marginal Costs
Grant Holder(s): *S Grant-Muller*
Investigator(s): *J Shires, P Wheat, S Shen, A Smith, C Nash, P Mackie*
Funded by: *Rail Safety and standards Board (RSSB)*
Dates: *July 2009 - June 2010*
Research Group: *TRANSPORT POLICY*

Abstract
ITS, in association with Paul Watkiss & Associates, and AEA Technology, was appointed by the Rail Safety and Standards Board in July 2009 to undertake calculations of economic KPIs for both road and rail on both a fully allocated costs basis and a marginal cost basis. The main objective of the first stage was to provide updated and improved estimates of the fully allocated costs of transport, following the approach of those provided in the DETR 'Surface Transport Costs and Charges' (STCC) 2001 report (Sansom et al., 2001). The study forms a work package within a group of six pieces of work intended to form a toolkit of industry-wide sustainability metrics for rail, allowing comparisons with other modes.

Influencing Behaviour
Grant Holder(s): *P Bonsall*
Investigator(s): *G Marsden, M Conner, A Jopson (with input from A Darnton)*
Funded by: *DfT*
Dates: *August 2009 - November 2009*
Research Group: *TRANSPORT POLICY*

Abstract
This short project involved the production of 'think pieces' on how to influence traveller behaviour. It was conducted on behalf of the Social Research and Evaluation Division of the Department of Transport and required consideration of theory and evidence on the factors affecting the success of attempts to influence the behaviour of individuals and companies. Three reports were produced (1,2,3) covering, respectively, influencing the behaviour of individuals, influencing the behaviour of companies, and using local agents (e.g. local authorities) as agents in behavioural change initiatives. The relevant psychological and sociological theories were summarised and evidence was presented from a range of fields including transport (including car sharing and personal travel planning), health (including diet, exercise and safe-sex) and environmental behaviours (including recycling and the purchase and use of low energy products). Particular emphasis was placed on the achievement of voluntary changes in behaviour through education and marketing and by capitalising on social norms and trends rather than through compulsion.

UK Transport Research Centre (UKTRC) Capacity Building
Grant Holder(s): *G Marsden*
Funded by: *DfT*
Dates: *September 2009 - August 2014*
Research Group: *TRANSPORT POLICY*

Abstract
UKTRC was established in 2009 as a £7.25m research centre by the Economic and Social Research Council (ESRC), the Department for Transport and Government Scotland. The aim of the Centre is to support top flight social science research and to bring new insights and evidence to bear on the UK's transport policy issues. UKTRC is jointly operated by the University of Leeds, Imperial College London and University College London. A key element of the UKTRC mission is to develop a strong and sustainable inter-disciplinary research base. This involves both attracting new people and perspectives into the field but also providing opportunities to re-skill current researchers and practitioners in state-of-art techniques and, to provide opportunities for the broader social science community to learn from leading techniques within the field of transport research. This element of UKTRC is being led by Dr Marsden and includes a research studentship programme, an annual summer school for research students and early career researchers, a research student network, training events and a visiting scholars programme. 2009 saw the launch of the first of two research studentships competitions.

Sustainability Performance Measures for State Departments of Transportation and Other Transportation Agencies
Grant Holder(s): *G Marsden*
Funded by: *National Cooperative Highways Research Program (NCHRP)*
Dates: *September 2009 - September 2010*
Research Group: *TRANSPORT POLICY*

Abstract
This project is funded by the US National Cooperative Highways Research Program. The aim is to develop guidance for state departments of transportation (DOTs) and other transportation agencies to understand and apply concepts of sustainability through performance measurement to enhance their planning, operations, and decision-making. Specific goals include: conducting a comprehensive survey of available literature, current state of the practice, and detailed case studies to gain a deeper understanding of how sustainability should be addressed; defining a set of guiding principles of sustainability and sustainability goals relevant to transportation agencies' functions; developing a framework to address performance measures and outcomes at different levels, thereby creating an organized system for measuring the performance of transportation with respect to sustainability criteria; compiling the research findings in the form of a guidebook that would help transportation agencies incorporate performance measurement for sustainability. The project is being coordinated by the Texas Transportation Institute and ITS is providing advice on performance measurement framework development and contributing to the case study exercise with UK examples of how sustainability has been put into practice.

Value for Money of Small Schemes
Grant Holder(s): *C Kelly*
Investigator(s): *J Nellthorp, B Matthews*
Funded by: *DfT*
Dates: *September 2009 – December 2010*
Research Group: *TRANSPORT POLICY*
URL: www.its.leeds.ac.uk/aoss

Abstract
This research was funded by the Department for Transport, as part of work to improve the evidence base on the Value for Money (VfM) of small transport improvement schemes (costing less than £5 million). It focused on the methodology and feasibility of determining a robust Benefit Cost Ratio (BCR) calculation for these schemes. Two headline scheme categories of road safety and accessibility were selected to focus on. In the UK schemes that target road safety and have the common goal of reducing accidents, tend to have a good data set available and robust methodology for monetising the key benefits based on the value of prevention of an accident. In contrast the assessment of the VfM of schemes that have the key goal of increasing accessibility has been patchy and an innovative methodology focusing on calculating user benefits has been developed to realise the accessibility benefits. The developed methodology was then applied to real local authority case studies and is now available to local authorities through a web based database that was developed at ITS. Phase 2 of the work has since been funded, which expands on the number of scheme types.

CFIT Public Expenditure
Grant Holder(s): *G Marsden*
Funded by: *Commission for Integrated Transport (CfIT)*
Dates: *October 2009 - November 2009*
Research Group: *TRANSPORT POLICY*

Abstract
This project is seeking to examine the prospects for increasing transport taxes and charges as a contribution to meeting the target set by all political parties of greatly improving the public finance position going forward. The project looks at the principles behind efficient taxes and charges, the options available in the short, medium and long-term and the evidence for their effectiveness. The research is complete and will be published in spring 2010.

Supply of UK Local Bus Services
Grant Holder(s): *H Muir*
Funded by: *Office of Fair Trading (OfT)*
Dates: *2009*
Research Group: *TRANSPORT POLICY*

Abstract
The project involves using GIS to assess the coverage of local bus operator networks and the extent of competition. The areas of network coverage for the main bus operators in the UK were calculated. These were used to assess whether fares are set according to network monopolies and presence of competition.

Promoting Active Life-Long Mental Well-Being (PALM)
Grant Holder(s): *G Marsden*
Funded by: *Medical Research Council (MRC)*
Dates: *December 2009 - March 2010*
Research Group: *TRANSPORT POLICY*

Abstract
This research is part of a multi-disciplinary consortium which is reviewing the evidence base surrounding interventions which can promote life-long well-being through more active and connected lifestyles into older age. ITS is co-ordinating the environmental factors research area covering issues including transport networks, social networks, place and space and recreation.

Maternal Mortality and Emergency Transport
Grant holder(s): *F Hodgson*
Funded by: *UK Department for International Development (DfID)*
Dates: *October 2009 - April 2010*
Research Group: *TRANSPORT POLICY*
Collaborative Partners: *Aga Khan Health Services Kenya and International Forum for Rural Transport and Development.*

Abstract
This project aims to understand the role of transport in maternal mortality in Africa and thus contribute to the international development aspirations expressed in the Millennium Development Goals (MDGs). The project will produce a systematic review of the research on the role of transport in maternal mortality and has to date designed the review and identified the appropriate sources and has to date established that inadequate transport is currently estimated to contribute directly to 34% of all maternal deaths and to contribute indirectly to 70% of all maternal deaths. It also held a workshop in Nairobi, Kenya (November 2009) on this topic and the third goal of developing an network of practitioners and academics across the sectors of transport and health one outcome of which has been to generate a proposal for the EU.

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