

Transport Operations Research Group

by Professor Phil Blythe, Director of TORG

This report describes the activities and portfolio of current research of the Transport Operations Research Group (TORG) during the year from March 2004 to date. Readers interested in acquiring a copy of any of the papers or reports referred to in this report, or in obtaining further information on current research, future symposia, short courses, postgraduate study and PhD research should contact Ms Emma Simblett.

STAFF CHANGES

We are delighted to welcome Dr Dilum Dissanayake to the academic staff of Newcastle as Lecturer in Transport.

We are equally delighted to announce that Dr Jenny Brake and Simon Edwards have been promoted to Senior Research Associate.

Following completion of phase 1 of the Phone and Go project the Travel Dispatch Centre (TDC) was transferred successfully to Nexus (the Tyne and Wear PTE). Graeme Piggott, Judy Phillipson, Glynis Mitchinson and Stephen Hurst (the Travel Reservation Assistants) moved to Nexus. Stephanie Murphy remained with the DRT team to take up the position of Transport Liaison Assistant.

Dr Paul Lewis left the Group on completion of his contract and has taken up a teaching position in the Business School. Oliver Heidrich left the group to continue his PhD studies in Environmental Engineering

Eric Sampson of the Department of Transport, is welcomed as a new Visiting Professor to TORG. Fred Crouch was re-appointed as a Visiting Lecturer.

RESEARCH STUDENTS

Congratulations to Annet Ehlert on the award of her PhD.

Welcome to Rick Fairchild who has a joint studentship with Geomatics following his MSc and to Sabine Poitz who is an ERASMUS student from the Technical University of Dresden.

SHORT COURSES AND TAUGHT POSTGRADUATE DEGREE PROGRAMMES

The three Transport MSc courses offered at Newcastle continue to flourish with a large cohort of students registered on the 2004/05 programme.

The 31st Annual Residential Course on Asphalt Materials and Flexible Pavements was attended by over 110 delegates in September 2004.

Newcastle hosted the Smartcard Networking Forum meeting in October 2004 and a workshop on Future Road User Charging Research Challenges in February 2005.

The short courses on Traffic Management; Vissim-users, Road Safety and Railways were all successfully re-run and have become firmly established annual events for the transport industry.

NEW PROJECTS 2004

The DRT team were awarded a number of new contracts during the year, most importantly the EPSRC DESTINO project which will develop a decision-making methodology to aid the delivery of flexible public transport systems. The Department for Transport commissioned the development of a DRT Good Practice Guide and follow-on funding was received from Northumberland County Council for phase 2 of Phone and Go.

The ITS team has been awarded several contracts in early 2004 in the area of pervasive computing and mobile ad-hoc networks for transport applications including the ASTRA project under the DfT's New Horizons Programme awarded jointly with the School of Computing Science. Several contracts in the road user charging research area have also been awarded.

PROFESSIONAL ACTIVITIES

Professor Phil Blythe continues as Director of TORG and as the Director of Business Development for the School of Civil Engineering and Geoscience (CEGs) and sits on the Executive Board of the School. He also leads the ITS Research Unit which co-ordinates multi-disciplinary research in Intelligent Transport across the Schools of: CEGs; Computing Science; and Electronic Engineering and is a member of the Universities Informatics Institutes' advisory group. His core research activities have focused primarily in the areas of road user charging, delivery of location-based services to mobile devices and applications of mobile ad-hoc networks to transport. A number of new, significant projects and initiatives have been undertaken including membership (with Neil Thorpe) of a consortium short-listed for the trial phase of the national lorry road user charging programme, continued involvement in the DfT's National Trial of Road User Charging trial (DIRECTS project), peer review of the TfL technology trials for future congestion charging options and analysis of future communications and networking technologies and their applicability to road pricing. Phil has recently been appointed an expert advisor to the DTI Future Foresight research programme on intelligent infrastructure and is currently assisting

in the commissioning of scientific reviews in the field. He continues to promote research and development in the area of e-transport and e-Government location based services through a variety of delivery platforms including mobile devices and PDAs and their integration within mobile ad-hoc networks and intelligent agents in the EU funded projects IMAGE and ASK-IT.

He continues to sit on the Steering Committee of the North East Regional Smartcard Consortium (NERSC) and recently joined: the Tyne and Wear Connectivity group which is addressing the regional transport aspects of the Northern Way and the planning team for the 2006 ITS Congress in London.

He has published widely during the year and has presented papers and keynote addresses at conferences across the UK, in several European countries and at the ITS World Congress in Nagoya, Japan as well as chairing several conferences and professional gatherings.

Phil's other professional activities include the steering committee of the DfT's Transport Card Forum, the Executive Board of the IEE's Professional Network in Automotive and Road Transport Systems and as a member of the EPSRC Peer Review College.

Professor John Nelson was promoted to a personal Chair in Public Transport Systems in August 2004 and was subsequently appointed Director of Research in the School of Civil Engineering and Geosciences (January 2005). He relinquished the position of Degree Programme Director for the MPhil / PhD programme in Transport. He has continued to be engaged in many activities relating to his principal research area of Demand Responsive Transport (DRT) and other forms of flexible transport. Following the publication of *Demand Responsive Transport Services: Towards the Flexible Mobility Agency* (ENEA, 2004) a companion volume *Policies and e-Technologies for Sustainable Freight Distribution in Urban Areas* has been completed.

Transport Operations Research Group,
University of Newcastle upon Tyne,
NE1 7RU,
For general enquiries contact
e.j.simblett@ncl.ac.uk
Tel. 0191 222 6547; Fax. 0191 222 6502 or
one of the members of staff as follows: for
research and consultancy enquiries contact:
p.t.blythe@ncl.ac.uk; Tel: 0191 222 7935
for taught post graduate academic enquiries:
r.n.bird@ncl.ac.uk Tel: 0191 222 7681
for PhD and MPhil academic enquiries:
corinne.mulley@ncl.ac.uk Tel: 0191 222 6567

He is co-ordinator of the FP6 CONNECT which began in January 2004 and the SUNRISE (INTERREG III C) project commenced in June 2004. New projects were secured from EPSRC, the Department for Transport (DfT), Northumberland County Council, Mobisoft (UK) Ltd and the Countryside Agency. A major highlight of the year was the completion (with Corinne Mulley and others) of *Network planning for high quality public transport in small and medium sized cities* as part of an INTERREG III B HiTrans project.

External appointments during the year included, Senior Vice-Chairman of the North Eastern Branch of IHT, external examiner to the MSc Transport Engineering and Planning course at Salford University, membership of the EPSRC Peer Review College and the DfT's Clear Zone's Steering Group. Other continuing professional activities include the Editorial Advisory Board of the *Journal of the Ghana Institution of Engineers*, the Editorial Advisory Board, *International Civil Engineering Abstracts* and the Expert Readers' Panel, *Public Transport International*.

Roger Bird has continued his research and teaching activities within the Transport Group and the School of Civil Engineering and Geosciences. He took up the role of degree programme director for the transport MSc's in September 2004. He leads the undergraduate Transport Engineering and Transport Infrastructure modules, and the postgraduate module in Traffic Management Techniques. He also leads the Integrated Design theme for the undergraduate Civil Engineering degrees. He is also the Pavior's part-time lecturer in Highway Engineering at Imperial College, London. He continues as Course Director of the Annual Residential Course in Flexible Pavements and Asphalt Materials, this course, run jointly with the Quarry Products Association, receives around a 100 delegates each year from a wide range of employers across the asphalt industry in the UK. Within TORG he completed his work as Principal Investigator for SENSOR, an EU funded project looking into the potential application of project sensors on the secondary road network. He is also Principal Investigator for a project to develop a methodology for area-wide safety audits for a local authority in the light of long term accident trends. His research interests include the consistency of alignment of rural single carriageway roads, highway design standards, junction capacity calculation methods, the quality of cycling infrastructure and life cycle assessment of road paving materials.

Dr Dilum Dissanayake joined TORG in October 2004 as lecturer in Transport with special interest in transport modelling. Dilum undertook her PhD and post-doctoral research in Nagoya Japan and has extensive experience of working in Asia, in Sri Lanka, Philippines, Thailand and Japan. She now leads the transport modelling team in TORG, currently lectures in travel demand forecasting and also has an active interest in pavement design and infrastructure maintenance.

Dr Corinne Mulley continues to develop her research portfolio broadly within the Passenger Transport and Policy Unit within TORG and is now a Fellow of the Chartered Institute of Transport. She is now the Degree Programme Director for the MPhil / PhD programme in Transport for the School of Civil Engineering and Geosciences. In the past year she has been particularly involved in the DfT New Horizons ASTRA project which is looking at the future pathways for smart dust technology in transport operations. Other activities have included working as part of the TORG team on the CONNECT project. In addition, Corinne leads TORGs work in the benchmarking of bus operations and a new project looking at how methodology, developed in previous projects, can be applied to Demand Responsive Transport is now underway. Corinne has also just completed research on how to develop a framework for assessing the soft benefits of introducing smartcards for the ODPM. Alongside work on current issues, Corinne has continued research in the transport history arena and was invited to present at the prestigious T2M international forum in Detroit and has been elected onto the T2M Conference Committee for 2005, and invited as an external expert on the panel at the final conference of the COST340 Action, Towards a European Intermodal Transport Network: Lessons from History. Other external activities have focussed on giving papers on benchmarking and competitive strategy, participating in the activities of the ILT (both locally and nationally) and she is the Editor of a Companion to Road Passenger Transport History covering the whole of the British Isles. She is co-author of a forthcoming Best Practice Guide entitled *Network planning for high quality public transport in small and medium sized cities*.

Neil Thorpe, Lecturer in Transport Studies, has focussed his research activity during the year on road-user charging and road safety. He has remained involved in the Department for Transport's (DfT) DIRECTS trial of interoperable road-user charging systems, and continues to supervise two DfT research studentships which involve developing a system of charging HGVs for pavement damage and investigating the impact of charging on household activity patterns. In road safety, he continues as the independent data analyst for the Northumbria Safety Camera Partnership and is involved in a collaborative research project with Northumbria Healthcare NHS Trust to explore the impacts of safety cameras on healthcare provision in the region. Other research activities at the local level remain focussed on Local Transport Plan issues including public attitude surveys, Best Value, public transport provision in Northumberland and developing Smartdust solutions for transport applications as part of a DfT New Horizons project. During the year he has also co-ordinated the University's input to the EPSRC SOLUTIONS project.

Dr Steve Scott has handed over the job of Degree

Programme Director for the postgraduate courses in Transport to Roger Bird and is now the Director of Undergraduate Studies for the School of Civil Engineering & Geosciences. He remains as chair of the group looking at quality assurance for the School, now also chairs the School Teaching & Learning Committee and has become a member of the Faculty Teaching & Learning Committee. He continues as Chairman of the Editorial Advisory Board for Emerald's *International Civil Engineering Abstracts*.

Recent publications include a paper published in the ASCE *Journal of Construction Engineering and Management*, which continues a longstanding interest in claims analysis and reports on an innovative approach to understanding how construction professionals deal with delay claims. His interest in the use of virtual reality in transport environments will soon generate a research proposal to EPSRC to pursue the use of VR to aid the public's awareness of new road schemes and also to enhance the process of road safety audit. In January 2005, Steve presented some details of the work done to date in this area at a VR-NET seminar on Virtual Reality Visualisation and Modelling of Cities and Terrains at Northumbria University.

SUMMARY OF CURRENT PROJECTS

INTELLIGENT TRANSPORT SYSTEMS AND SERVICES: PROJECTS

Intelligent Mobility Agent for Complex Geographical Environments (IMAGE)

(EU 5th Framework IST programme, Co-ordinating Partner: Hellenic Institute of Transport, from November 2001 to May 2004). Mr Simon Edwards. Contract Holders: Professor P.T.Blythe and Dr S.Scott.

IMAGE was completed in May 2004. Using a web-based agent that can be accessed through mobile phones, PDAs, PCs or info-kiosks, it provided dynamic, regularly updated transport and tourism information and services, including m-payment, aimed specifically at users travelling in complex urban environments. It provided a range of navigation and localisation services and information from multiple sources. User profiling was also available thus enabling services to be "pushed" to individual users if they so wished.

The system was trialled at two test beds: Tampere (Finland) and Turin (Italy). These test beds carried out the majority of the IMAGE evaluation process, which was divided into three types: user acceptance, technical, and legal issues. A range of more generic evaluation measures was carried out in other participating countries (Greece, UK, and Germany). Broadly, it was found that user acceptance of such a system is high, and demand for and willingness to pay for such a system increases in an unfamiliar location.

Reports: Blythe (2003a and b), Edwards, Blythe & Scott (2003 a and b). Blythe (2004a), Edwards

and Blythe (2004) and Edwards, Toffolo and Usseglio (2004)

Demonstration Of Interoperable Road-User End To End Charging And Telematics Systems (DIRECTS)

(Department for Transport, from October 2001 to December 2005) Mr Neil Thorpe. Contract holders: Professor P.T.Blythe and Mr Neil Thorpe

The aim of the DIRECTS project is to demonstrate the interoperability of different road-user charging technologies and to develop a comprehensive and robust road-user charging solution appropriate for the unique conditions of the UK road network. The overall output of the project is a delivery of a National Specification for DSRC-based road-user charging equipment.

TORG's principal role in the DIRECTS project is to develop and assist with the implementation of a volunteer recruitment and management strategy as part of the on-road trials of the end-to-end road-user charging system. As part of this trial, the consortium aims to recruit sufficient numbers of volunteer drivers to create a mixed fleet of commercial and private-vehicles. These vehicles will be equipped with suitable DSRC and/or GPS-based road-user charging technology to generate sample transactions as they pass through the various charging sites on the Leeds network. In addition a supplementary trial of GPS-based charging has also been hosted by the City of Bristol. As part of the trial, drivers will receive specimen transaction reports and enforcement notices to demonstrate the various components of the end-to-end charging system. The detailed strategies for the recruitment, management and retention have been devised and volunteers recruited. Equipment from the charging system suppliers is currently being integrated and installed in Leeds following a year of testing and evaluation at the TRL test track facility.

Reports: Blythe (2003c and d)

Assessment Framework for the Evaluation of the Soft benefits of Smart Card Schemes

(Southampton City Council on behalf of the Office of the Deputy Prime Minister, from December 2003 to April 2004) Mr Simon Edwards, Ms Amy Guo and Dr Paul Lewis. Contract holders: Professor P.T.Blythe and Dr C.Mulley.

The business case for a smart card scheme revolves around the costs and benefits to the supplier of the smart card product, primarily the costs associated with implementing a scheme (card production, roll out, labour, etc.), and what revenues will be accrued (from whom). Such costs and benefits are 'priced' by the market and are, as such, quantifiable. However, there are further costs and benefits associated with smart card schemes which have no market price. These can be called 'soft' costs or benefits and include such attributes as 'efficiency', 'convenience' and 'security'. This project addresses the problem of how to identify and evaluate the 'soft' benefits

which may arise as a result of implementing a Local Authority-led smartcard scheme in a city or region for access to a range of citizen-centric and private sector applications and services. The project team comprises TORG, Nexus and Southampton City Council, and is under the auspices of the ODPM-sponsored National Smart Card Project.

Reports: Edwards, Mulley, Blythe, Guo and Lewis (2004), Edwards and Mulley (2004)

Future Communications and Networking Technologies for Transport

(Department for Transport, from December 2003 to April 2004). Contract holders: Professor P.T.Blythe and Dr A. Tully (School of Computing Science).

The advent of new and emerging communications technologies, such as 4G, WiFi, RFID, and CALM as well as the promise of new networking possibilities through mobile ad-hoc networks and the future nanofication of the technologies into Smartdust suggest that it would be timely to examine the potential for using these new technologies in the transport sector.

The DfT have contracted TORG and the School of Computing Science to undertake review of the emerging state-of-the-art in communications technologies and the mobile Internet. The review identifies most relevant candidate technologies and the likely way in which the technology may evolve to support services in the transport domain.

The ultimate aim of the study are to provide recommendations as to how the new mobile technologies could best be deployed to benefit the transport sector. These recommendations should provide a broad list of application areas, likely timescales to market and a strategic assessment of the impacts the technologies may have on the transport sector. Moreover the impact that these new technologies may have on standards is also to be examined.

Reports: Blythe (2004g)

Ambient Intelligence System of Agents for Knowledge-Based and Integrated Services for Mobility Impaired Users (ASK-IT)

(EU 6th Framework IST programme, Integrated Project Co-ordinating Partner: Siemens, from November 2004 to October 2008). Mr Simon Edwards. Contract Holder: Professor P.T.Blythe

ASK-IT uses ambient intelligence technology to provide functions and services for older and disabled people in various environments, including home, work, leisure and transport. The main features include: Mediation of content and services; seamless environment management (anywhere, anytime); user preference and context-related processes; flexible geo-referenced services; a user confidence based environment.

The first phase of the research involves the

collection of info-mobility content relating to the environments described above. In the leisure and tourism sector, for example, this might include details of accessibility to cinemas, sports venues or restaurants. This content is then integrated with different tools, including enhanced accuracy localisation, accessible inter-modal route guidance modules, and interfaces to e-commerce/e-payment, e-working, e-learning systems and assistive devices. It is envisaged that this framework will be interoperable in terms of mobile devices and local and wide area networks.

The integrated ASK-IT services and system will be tested in a number of interconnected cities/areas across Europe, to prove that accessibility for disabled users can be achieved in a reliable, seamless and viable way, using a range of available technologies and communication networks.

Reports: Edwards and Blythe (2004b)

Transport in e-Europe (TRANEE)

(European Commission Leonardo da Vinci Programme. Co-ordinating Partner: Local Futures Group, from 2003 to 2006). Mr Simon Edwards. Contract Holder: Professor P.T.Blythe

TRANEE aims to support small and medium-sized businesses (SMEs) in the freight and logistics industry. TRANEE supports these businesses in developing a range of competencies and good practice to perform effectively in the enlarged EU. This requires a recognition and understanding of the fundamental shift to a knowledge-based economy, which includes, but is not limited to, the ability of SMEs to adopt and integrate new technologies, and identify and capitalise on new market opportunities. TRANEE provides a strategic framework and a practical 'user guide' for competitiveness in the global economy and the enlarged EU. Using a range of diagnostic tools senior decision makers in companies can identify the most important opportunities for improving the productivity and competitiveness of the business.

The approach includes a strategic view of technology uptake and use but also looks beyond the technology and evaluates a range of internal and external factors to business innovation in the transport sector. The programme follows a step by step approach through key business areas to outline a strategy and practical steps towards maximising any company's potential.

Reports: None yet available

North East Regional Smartcard Consortium (NERSC)

(NERSC, from January 2001 to December 2005) Contract holder: Professor P.T.Blythe

TORG provides a wide range of support and advice to the North East Regional Smartcard Consortium – which is an association of all North East Councils, transport and service providers who are developing an interoperable citizen smartcard for

4 University of Newcastle-upon-Tyne

the North east region. TORG, as a member of the steering committee has provided advice and research on technology options, security, business case analysis, roadmap to the implementation of the eURI and how a multi-tiered reward and loyalty scheme could be introduced as part of the card roll-out.

Reports: Blythe (2004a and e)

Applications of Smartdust in Transport (ASTRA)

(DfT New Horizons Programme, from July 2004 to June 2005) Contract holders: Dr A. Tully (School of Computing Science) Professor P.T.Blythe, Dr C.Mulley, Professor J.D.Nelson and Mr Neil Thorpe.

The project investigates the use of mobile adhoc networks and more specifically MOTES for transport applications. The project examines the current state-of-the-art of MOTES and the likely market and technological evolution of smartdust over the next decade. A trial of MOTES is being hosted in Newcastle with a pervasive 'intelligent' corridor established by a network of fixed MOTES near Newcastle Central Station. Mobile MOTES are fitted to a fleet of buses. An analysis of how this technology may be used in future road-user charging systems is also undertaken as part of the project.

Reports: None yet available

Transport Direct (DfT Framework Contract as Subcontractor to WSP Systems, from June 2003 to December 2005). Contract holder: Professor P.T.Blythe

TORG is part of a consortium which provides technical support, research and advice to the DfT's Transport Direct real-time transport information programme under a framework contract. Key contributions that TORG makes include location based services, evaluation of user requirements, business case analysis and the delivery of personalised services to mobile devices.

Reports: None yet available

Future Research Challenges in Road User Charging (DfT, from November 2004 to March 2005) Contract holder: Professor P.T.Blythe

To assist with the setting of the DfT's future research agenda in the area of road user charging. Newcastle University has been assisting the DfT with a brainstorming exercise to gather opinions on the key research challenges from the leading UK, European and international experts in the field. The exercise has included a 2 day workshop in Newcastle in February 2005.

Reports: None yet available

Review of London Congestion Charging Technology Trials (Transport for London, from December 2003 to April 2005) Contract holder: Professor P.T.Blythe

TFL is currently undertaking a series of trials with a range of different technologies to explore which could be candidate systems for the future extension of the London Congestion Scheme. A peer review panel of experts has been established to review the performance of the trials and to advise TFL on the next stages of the study. Phase 1 was completed in the Autumn of 2004. In Phase 2 TFL will look in more detail at a number of candidate technologies and undertake medium sized trials of the system in the first half of 2005

Reports: Restricted

Peer Review of National Road User Charging Options (DfT, April to May 2004) Contract holder: Professor P.T.Blythe

Prior to the publication of the National Steering Committees report on National Road User Charging, the DfT commissioned a number of experts to analyse the options for future road user charging and the likely migration path for the technologies who could most likely fulfil the requirements for a National Scheme. A series of technology roadmaps were defined and used as input to the Steering Committees final report.

Reports: Restricted

Foresight Intelligent Infrastructure Research

(Office of Science and Technology Future Foresight Programme, from December 2004 to December 2005) Contract holder: Professor P.T.Blythe

The Foresight project on Intelligent Infrastructure Systems will explore the implications of Science and Technology over the next 50 years for the design and implementation of Intelligent Infrastructure Systems that are efficient, robust, sustainable and safe. The study will focus on transportation of goods and people and the alternatives to mass movement.

The infrastructure includes the physical links (roads, railways etc), but also the support infrastructure (the availability and security of parking at stations; the availability of refreshments and washrooms, etc) and the built environment. Increasingly important is the information infrastructure, for the availability and pricing of all these things and how they can be combined to deliver journeys. It also includes technologies that might directly and indirectly affect the amount of transport needed

Key factors focussed on in this study include sustainability, encompassing economics, society and environmental issues, plus energy, safety, robustness and technology development itself. Currently the State of Science Review papers covering 15 key issues are being commissioned.

Reports: None yet available

Lorry Road User Charging (SERCO, from September 2004 to December 2005) Contract Holders: Professor P.T.Blythe, Professor P.Moore, Dr D. Barber and Mr N.Thorpe

TORG jointly with the Goemetics Group within the School of Civil Engineering and Geoscience are a member of a consortium tendering for the UK Lorry Road User Charging Procurement. Newcastle University are providing several specialist roles as well as a development capability. Trials of prototype solutions are currently under assessment on the TRL test track.

Reports: Restricted

INTELLIGENT TRANSPORT SYSTEMS: RESEARCH STUDENTSHIPS

Future Personalised Transport Information Delivery using Pervasive Mobile Computing Services

Sponsor: School Studentship.

Start Date: December 2003 **Expected End Date:** November 2006. Amy Guo.

Supervisors: Professor P.T.Blythe, Dr S Scott

The opportunities of using future pervasive computing infrastructures in a mobile environment are to be examined from the view of the delivery of real-time, personalised trip planning and on-trip information. How such information may influence travel behaviour and trip choices will be studied

The provision of public transport information is currently based upon the user initiating a request enquiring for information. In order to gain a better understanding of end-user's attitudes towards future intelligent traveller information services, an end-user survey is being currently executed. The end-user survey is conducted in partnership with two communities chosen in Newcastle upon Tyne area and is being carried out via household visits.

Following the end-user survey, interviews with potential service and content providers are to explore their attitudes and intentions of delivering future traveller information services in a pervasive computing environment. Data collected via the surveys will inform the construction of scenarios by taking into account three generations of technologies, i.e. current technologies (2.5G and limited service availability of 3G), next generation technologies (namely 4G) and pervasive computing technologies, to illustrate plausible future traveller information services. The final stage of the research is to test the computer-controlled scenarios through focus groups.

Reports: None yet available

The development and evaluation of a road user charging system for heavy goods vehicles

Sponsor: Department for Transport Research Studentship

Start Date: October 2001

Expected End Date: September 2004. N. A. Dadoo.

Supervisor: Neil Thorpe.

The principal aim of this project is to develop and evaluate an on-board system for charging heavy goods vehicles taking into account costs associated with pavement damage. Following the successful development and initial on-road trials of the prototype on-board charging system involving the use of GPS technology and an on-board axle weighing system, the system has been installed on a 2-axle HGV and demonstrated in on-road field trials. Results from the field trials suggest that the implementation of the prototype system could improve current charging systems in terms of fair and efficient charging for HGVs and also generate benefits for the management and use of road pavements.

Reports: Dadoo (2005), Dadoo and Thorpe (2004a and b).

Autonomous Navigation along Marine Superhighways

Sponsor: EPSRC & UK Hydrographic Office Case Studentship,
Start Date: October 2004
Expected End Date: October 2007
 Richard Fairchild.
Supervisors: Professor PT Blythe and Professor P Moore.

The new European funded global navigation satellite system Galileo will offer several new and improved services over its main competitors; GPS and GLONASS. The most useful of these is the safety of life (SoL) service.

More and more emphasis is being placed safety in all transport sectors. However, the maritime industry maintains a poor safety record. This is especially apparent at night or under poor visibility. The objective of this project is to investigate the impact of SoL service on digital navigation in the maritime field by realisation of an autonomous control system on board the bridge of a vessel. This will be accomplished by the creation of marine navigation simulation software that uses the SoL service combined with digital charts to navigate a vessel autonomously through dangerous or busy routes such as the Dover Straits. A secondary objective is to research the policy issues associated with autonomous navigation and the legal problems of the liability associated with the SoL service.

Reports: None yet available

PUBLIC TRANSPORT AND TRANSPORT POLICY UNIT: RESEARCH PROJECTS

EMIRES – Economic Growth and Sustainable Mobility Supported by IST at Regional Level Including SME's (EC 5th Framework, IST Programme, from May 2002 to January 2005). Dr S.D. Wright and Dr J.F. Brake. Contract Holders: Professor J.D. Nelson and Dr J F Brake. Partners: ETRA (Spain), RCAUEB (Greece), Mobisoft Oy (Finland), CCSS (Czech Republic) and others.

EMIRES in the UK has provided a web-based search facility for users to find job vacancies which not only match their pre-defined user profiles but has the added value in that details are also provided of public transport (including Demand Responsive Transport) which is available between the user's designated home address and the location of the job vacancy. This service has been designed for use in predominantly rural areas where lack of transport is one of the main barriers to people gaining employment. Knowledge of jobs which match users profiles, but which have no public transport available to connect the user to the job will highlight to the Local Authority where there are gaps in the public transport provision (see <http://emiresscotland.org>).

The success of the demonstration and evaluation phase (May-November 2004 in the East Sutherland area of the Scottish Highlands) has led to continuation of the service past the end of the project. A follow-on project, responding to the EMIRES identified gaps in the transport provision by establishing a shared taxi scheme for job seekers, is likely.

Reports: Wright et al (2004). All publicly available Consortium documents are at: <http://www.emires.net>

Phone and Go Phase 1 (Northumberland County Council, from April 2001 to August 2004). Dr J.F. Brake, Dr S.D. Wright and Mrs S.M. Murphy. Contract holder: Professor J.D. Nelson. Partners: Tynedale and Getabout Rural Transport Partnerships, Northumberland Care Trust, Berwick Borough Council.

The objective of Northumberland County Council's Rural Bus Challenge project was to demonstrate and evaluate Demand Responsive Transport (DRT) services in two diverse rural locations. The trial sites (which continue after the conclusion of the project) incorporate a variety of DRT route concepts and trip-booking scenarios. An additional five services are now part of the Phone and Go project. A Travel Dispatch Centre (TDC) was been established at TORG where routes are planned, scheduled and dispatched to the DRT vehicles using MobiRouter software. TORG was responsible for managing the TDC, implementing service design and is the Evaluation Manager for the Phone and Go project. A separate contract for project management services has required the preparation of an overall technical and financial project plan and on-going project management support.

Reports: Mageean, Nelson and Wright (2003a, 2004a, b and c), Brake, Nelson and Wright (2004a and b)

Phone and Go II (Northumberland County Council, from September 2004 to September 2005). Dr J.F. Brake, Dr S.D. Wright and Mrs S.M. Murphy. Contract holder: Professor J.D. Nelson.

'Phone and Go' was Northumberland County Council's Rural Bus Challenge project to demonstrate and evaluate Demand Responsive Transport (DRT) services in two diverse rural locations. Within this TORG managed the Travel Dispatch Centre, implemented service design and managed the evaluation of the scheme.

Following the success of Phone and Go, DRT services offered in Northumberland have grown necessitating the transfer of dispatching activities to the Nexus call centre. TORG have been retained by NCC to facilitate the transfer, provide liaison between themselves and Nexus and monitor the DRT provision under a new operational environment. Additional roles include designing and establishing new services to support Rural Transport partnerships and to negotiate and plan with Health, Education and Social Service sector transport co-ordinators with the aim of better integrating overall transport demands in rural areas.

Reports: Mageean, Nelson and Wright (2003a, 2004a, b and c). Brake, Nelson and Wright (2004a, b and c).

Click and Go (Northumberland Health Authority, from April 2001 to September 2005). Dr M.A. Smith. Contract holders: Professor J.D. Nelson and Dr J.F. Brake. Partners: Northumberland County Council and Berwick Borough Council)

This project investigates possible savings to the health services through transferring patient transport trips on to public transport. The long-term aim is to facilitate health trip planning through the County Council's journey planner, utilising the Nexus dispatch centre. A pilot evaluation into bookable health trips has been carried out as part of the monitoring of a semi-fixed route taxi service, introduced to give access to GP's surgeries from the village of Shilbottle. Another scheme of bookable taxis for health-related trips in Berwick is currently being evaluated. A web-based tool for the screening of eligibility for patient transport services to interface with the journey planner is under construction.

Reports: None publicly available

Flexible Agency for Collective Demand Responsive Mobility Services (FAMS) (CEC 5th Framework, IST Programme, from April 2002 to February 2004). Dr J.F. Brake. Contract holders: Prof J.D. Nelson and Dr J.F. Brake. Partners: ATAF SpA (Italy), Softeco Sismat SpA (Italy), European Transport and Telematics Systems Ltd. (Rep. of Ireland), SITA SpA (Italy), Angus Transport Forum, MobiSoft Oy (Finland).

FAMS developed Demand Responsive Transport (DRT) services in Angus (a greenfield site) and Florence (pre-existing site) as part of this Take Up Action. Existing DRT management tools were adapted and made interoperable as part of the implementation and trial of the Flexible Agency

concept. The Agency operates in a collaborative environment amongst diverse transport service suppliers thereby providing a new value added service chain to customers. TORG provided technical support to Angus Transport Forum by advising on: the establishment of the Angus Travel Dispatch Centre; the conduct of the User Requirements Analysis; and the evaluation and monitoring studies (including the Evaluation Plan design for both FAMS demonstration sites). In addition, liaison activities were conducted with other DRT scheduling systems in the UK.

Reports: FAMS (2004), Mageean and Nelson (2004). All publicly available Consortium documents are at: <http://www.famsweb.com/>

CONNECT (Co-ordination of Concepts for New Collective Transport) (CEC DG RESEARCH, from January 2004 to December 2005). Dr M.A. Smith and Dr J F Brake. Contract holders: Professor J.D. Nelson, Dr C. Mulley and Dr J F Brake.

CONNECT is a Co-ordination Action funded under the EC FP6 programme taking the subject of Flexible Transport Services (FTS), such as DRT and other related types of public transport. 23 partners are involved in 11 European countries, being co-ordinated by the University of Newcastle. The principal outputs of the project will be a Knowledge Portal, which is now available in its partially populated form on the project website - www.flexibletransport.com - and a series of thematic workshops covering different aspects of FTS. The first of these has been held in parallel with the ETC conference in Strasbourg during October 2004, and others are planned for Cremona, Italy during May 2005 and one other to be announced.

Reports: All publicly available Consortium documents are at: <http://www.flexibletransportation.com>

SUNRISE (Social cohesion in Urban / ruRal areas based on Innovative and Sustainable collective mobility services) (INTERREG III C, from June 2004 to November 2005). Dr J.F. Brake. Contract holders: Professor J.D. Nelson, Dr J.F. Brake and Dr C Mulley. Partners: ATAF SpA (Firenze Transit Company) (Italy), Aristotle University of Thessaloniki, (Greece), Bratislava Transit Company (Slovak Republic), Ring a Link, Kilkenny (Ireland), City of Terrassa, (Spain), CAT Spa (Italy).

SUNRISE addresses the key factor of improved mobility for all categories of citizens within the context of sustainable, competitive development and social cohesion in European areas and Regions. Co-operation is being encouraged between providers of six Demand Responsive Transport (DRT) schemes in urban and rural areas by promoting the exchange of experience and transfer of good organisational/operational practice between transport operators. Together with feasibility studies and the implementation of

DRT services, training courses on the design and operation of DRT services are being given. DRT technology and tools, already developed in R&D programmes, will be transferred to the sites. Important output will be a Best Practice handbook for analysing and operating DRT services alongside conventional more general transport schemes. TORG is developing the common evaluation methodology for the five diverse demonstration sites across Europe.

Reports: All publicly available Consortium documents are at: <http://www.interreg3csunrise.com/>

Monitoring and evaluation of Demand Responsive Transport services for PTEG (Passenger Transport Executive Group) (PTEG, from May 2002 to May 2005). Dr J.F. Brake. Contract holders: Professor J.D. Nelson and Dr J.F. Brake. Partners: Nexus, West Yorkshire PTE, Greater Manchester PTE, South Yorkshire PTE, Strathclyde Passenger Transport, Centro, Merseytravel.

Following their success in securing substantial funding from the (then) DTLR Urban and Rural Bus Challenge programmes, the seven PTEG members have developed and implemented Demand Responsive Transport (DRT) services at diverse sites. These services are operating with varying levels of ITS and different strategies for service design in urban and rural areas. TORG has developed and is implementing a generic evaluation methodology, as it is a particular requirement that the methodology adopted is transferable to other DRT schemes so as to ensure a valid cross-site evaluation. Data collection in the field is using multi-application survey forms (face-to-face/postal/telephone) which have been designed for seven identified types of user groups.

Reports: Mageean, Nelson and Wright, (2003)

Monitoring and evaluation of the Cango Demand Responsive Transport service (Hampshire County Council, from July 2002 to May 2005). Dr J.F. Brake. Contract holders: Professor J.D. Nelson and Dr J.F. Brake.

Hampshire County Council (HCC) has introduced several Demand Responsive Transport (DRT) services – under the brand name of Cango – in rural areas of the northern Test Valley from 1st July 2002 as a result of receiving funding from the (then) DTLR Rural Bus Challenge Fund. TORG is developing a programme of monitoring and evaluation for these Cango services. It is of particular interest that the methodology adopted should be based on that developed by TORG for the monitoring and evaluation of DRT services across the PTEs and for the Northumberland Phone and Go project, so as to facilitate comparison of findings. Additionally, a number of strategic level indicators to establish the overall impact of the new services from the local authority viewpoint are required as part of this study.

Reports: None yet available

Demand Responsive Transport Good Practice Guide (Department for Transport, from November 2004 to April 2005) Dr J.F. Brake. Contract holders: Professor J.D. Nelson, Dr C.A. Mulley and Dr J.F. Brake. Partner: Cumbria County Council.

To complement the conventional rural bus network, Rural Wheels has been developed as an important element of transport provision in rural areas of Cumbria. It currently provides Demand Responsive Transport (DRT) services in 2 rural areas of the county. It uses a network of existing transport providers in both the commercial and voluntary sectors to provide subsidised travel. Rural Wheels uses smart card technology with stored travel payment, both for ease of use by travel providers and users and for improved management of the service. The Good Practice Guide will demonstrate how DRT services can contribute to the overall strategy and commitment of statutory authorities to provide citizen mobility within budgetary constraints. Using Rural Wheels as a case study along with other European examples, this practical guide will highlight key issues under 5 themes: economic framework, technologies, service design, setting up a Travel Dispatch Centre and marketing and promotion.

Reports: None yet available

Investigation of an Area-wide Bus Network for Rural Northumberland (Countryside Agency/Tynedale Rural Transport Partnership, from January 2005 to March 2005) Dr J.F. Brake and Mrs S.M. Murphy. Contract holders: Dr J.F. Brake and Professor J.D. Nelson

This project aims to provide a better understanding of rural transport planning issues by highlighting the barriers to improvement of public transport networks in rural areas, using the north Tyne and Redesdale as a case study. The existing public transport network within the study area will be described and proposals made for its revision. This will be enabled by consulting operators and local people within the area through face-to-face and telephone interviews and focus groups which will assess local accessibility needs and the acceptability of network improvement proposals. The issues raised will be applicable to other rural areas of the country and will inform the resulting debate. It is further hoped that the study can inform the debate regarding any changes that may be needed within the structures, financing and regulation of public transport provision.

Reports: None yet available

Specification of Future Requirements for Demand Responsive Transport Software (Mobisoft UK, from October 2004 to June 2005) Dr J.F. Brake, Dr S.D. Wright and Mrs S.M. Murphy. Contract holders: Dr J.F. Brake, Professor J.D. Nelson and Dr. S.D. Wright.

The aim of this project is to devise a strategy for

future development work for the Mobisoft suite of Demand Responsive Transport (DRT) software applications. It is taking account of the experience gained by the DRT community following the widespread deployment of telematics based services largely as a result of the success of local authorities in gaining funds from the Rural and Urban Bus Challenge competitions. This rapid growth in development of DRT services, coupled with the pressure on service providers to move towards larger scale and/or multi-service or Agency-type operations, make it timely to investigate the research requirements for the future development of telematics based products. A high-level DRT Strategy Workshop was held in January 2005, bringing together 30 invited key decision makers from the DRT community, including the DfT. The output will help to develop a common vision for the future development of DRT operations and associated systems.

Reports: None yet available

Review of Ring and Ride and Minibus Management Centre. (Napier University / Fife Council, March to June 2004). Dr M. A. Smith. Contract holders: Professor J.D. Nelson and Dr J. F. Brake.

This study was carried out jointly with Napier University Transport Research Institute for Transportation Services, Fife Council. Fixed route services have a key role to play in the provision of bus-based public passenger transport and an extensive network is provided in Fife. To supplement this mainstream provision Fife Council's Transportation Services operates a fleet of 22 accessible vehicles which are all operated under Section 19 of the 1985 Transport Act. The project sought to achieve the following objectives: to evaluate Fife's pilot DRT and MMC schemes against their objectives; to benchmark the schemes against others in Britain and Europe; to evaluate options for expansion/improvement of the schemes and to make recommendations for the future of the schemes.

Report: Napier University (2004)

Public transport networks and methods and tools for assessing public transport schemes (Civitas, from October 2003 to December 2004). Contract holders: Dr C. Mulley and Professor J.D. Nelson.

The focus of this project is principles and methods for network planning for public transport in towns and regions within restricted budgets, regulations and fiscal context. The idea is to develop and implement customer-oriented and financially solid public transport networks, and identify any possible needs for new public transport infrastructure.

The three main objectives can be stated as: (a) to examine and define optimal characteristics of co-ordinated public transport networks; (b) to identify suitable methods and tools for the assessment of solutions for optimal public

transport, with specific focus on the "border area" between bus and rail solutions; and (c) to identify institutional barriers to optimal network development, i.e. how organisational, legal and financial frameworks can restrict or stimulate the development of more optimal solutions. The findings of the study will be presented in a "Good practice Guide for network planning and assessment methods". This will give concise advice about public transport network planning under the considerations of different institutional settings.

Reports: None yet available but the Best Practice Guide entitled Network planning for high quality public transport in small and medium sized cities, based on this work is forthcoming.

Bus Benchmarking Group Continuation Study (A number of bus companies, from December 2003 to June 2004). Dr P.R. Lewis. Contract holders: Dr C. Mulley and Professor J.D. Nelson

The first benchmarking project was concerned with the measurement of the participating companies in a number of key areas. The companies involved collected the data as specified by the handbook devised by TORG. This project continued the work of benchmarking data collection and also focussed on two more specific areas of the companies, namely driver productivity and engineering. Further performance indicators were developed to collect more detailed data in these two areas. Reports were issued, which identified the strengths and weaknesses within the various companies, in comparison to the other companies. In addition, a final project report reports on the main data collected and is suitable for comparison with the equivalent report for the previous year. Comparisons on competitive strategy have been undertaken as part of this work.

Reports: Mulley, (2004b, c, d and e), Mulley, Nelson and Lewis(2004)

Benchmarking DRT (November 2005 to June 2005). Dr J.F.Brake. Contract holders: Dr C. Mulley and Professor J.D. Nelson

This is a benchmarking project in which the experience of previous bus benchmarking projects is to be piloted with DRT operators. Building on the success of these earlier projects, the indicators used in the pilot will be based on the set of indicators devised for the Bus Benchmarking Group, amended where necessary, in collaboration with the users, to reflect the different nature of DRT operation.

Reports: None available yet

PUBLIC TRANSPORT AND TRANSPORT POLICY UNIT: RESEARCH STUDENTSHIPS

Regional Integration & International Travel Demand

Sponsor: Office of Foreign and Commonwealth

Start Date: April 2002.

Expected End Date: June 2007

Ho-kwon Cho

Supervisor: Professor J D Nelson

The principal purpose of the research is to examine the relationship between international travel demand and the level of regional integration by examining travellers' individual perceptions on the regional integration and analyzing their travel behaviour and preferences. Unlike previous studies, the research is based on an anthropocentric approach which assumes that people have general perceptions and attitudes on the progress of regional integration and cross-border travel, and those perceptions and attitudes have a role to play in explaining the change of international travel demand. So far, descriptive analysis has been completed to assess the overall effect of regional integration on international travel demand, and 5 cases of aggregate data have been analyzed to examine the statistical significance of regional integration on international travel demand using data collected from published sources. Finally, as a pilot study, semi-structured interviews and brief questionnaires were carried out with organisations in Tyne and Wear to prepare the main survey.

Reports: None yet available

Land value impacts of transport infrastructure and land value capture

Sponsors: Studentship from the University, the School and support from the Rees Jeffreys Road Fund, RICS Education Trust and The Henry Lester Trust Ltd

Start Date: October 2002 Expected End Date: September 2005.

Hongbo. Du.

Supervisor: Dr C Mulley.

In recent years, land value capture has attracted increasing attention as a result of its potential for funding transport infrastructure. Meanwhile, it is crucial to examine evidence the impact of transport infrastructure on land value before approaching the question of land value capture. There has been substantial research into this issue recently in the US. But, in the UK, only a few studies have considered the subject and these studies concentrate on London. Since the capital is different in many aspects from other places in the UK. Other conurbations like Tyne and Wear might be more representative for British cities.

This study looks at the relationship between transport infrastructure and land value using the Tyne and Wear Metro as a case study to examine the impact of Metro on the value of residential properties by the means of GIS. Traditional techniques to understand changes in property value, such as hedonic models, which use multiple regression modelling normally assume that the observations used in the regression are independent of one another. The spatial autocorrelation often present within geographical data means this is unlikely to be the case. In this study, with the accessibility information derived from the Tyne and Wear Accessibility Model and

other social economic data derived from census 2001, the methodology employs a Geographically Weighted Regression (GWR) model, a new approach to spatial data analysis modifying multiple regression modelling to be suited to geographical enquiry. The paper presented to the UTSG for the Smeed Prize was one of three papers which were highly commended by the judging panel.

Reports: Du (2003, 2004, 2005), Du and Mulley (2004)

The role of neighbourhood design in transferring travel from private car to public transport, walking and cycling

Sponsor: self financed

Start Date: January 2004

Expected End Date: December 2006

P. T. Aditjandra.

Supervisors: Professor J D Nelson, Dr Corinne Mulley

The aim of this research is to gain insight into options for encouraging the use of public transport, walking and cycling in urban settings and to make some recommendations for changes to the way in which housing development takes place. This research proposes an examination of demographic variables associated with high public transport use, walking and cycling levels in West European cities/towns. Multivariate statistics will be applied to identify public transport, walking and cycling 'hotspots' in West European cities/towns and to compare the extent to which they share similar demographic, geographic and urban neighbourhood design characteristics. The research is then expected to involve a multi-country examination of communities of the 'hotspots' found previously. It will include document analysis, interviews and possibly questionnaires to exhibit events leading up to the conditions being met for a public transport/cycling/walking friendly built environment. The applied part of the research will however involve an effort to document the types of conditions which if replicated could lead to similar transportation conditions in areas where private car dependence is greater.

Reports: Aditjandra (2005)

A multi-criteria decision support method for transport investment proposals

Sponsor: EPSRC

Start Date: March 1999

Expected End Date: March 2005).

Tessa Sayers

Supervisor: Dr Corinne Mulley

The aim of this research is to develop a decision support method which addresses the problems faced by decision takers in the transport sector today. Their task is to evaluate and rank a number of transport investment options, taking into account many diverse evaluation criteria. An interactive multiple criteria decision support tool, based on the linear additive model, has been developed and trialled. The emphasis is on

robustness, transparency, and practicality.

The linear additive model requires a weight to be associated with each of the evaluation criteria. This can present difficulties, especially in the case of criteria such as landscape, for which there is no recognised monetary equivalent and whose measurement is on a qualitative scale. In addition, there may be different interest groups taking part in the decision making process, whose views about the relative importance of the criteria may differ substantially. This method approaches the task of finding suitable weights by eliciting acceptable value trade-offs between pairs of criteria. These need not be precise, but may take the form of an unbounded inequality (e.g. 1 unit of x has less value than 2 units of y) or a pair of inequalities, effectively defining a range of acceptable trade-off equivalences. These trade-off preferences are translated into constraints on the values that may be taken by the criterion weights. At each step in the incremental process of defining trade-offs, the weight set under which the option scores are most evenly distributed (i.e. vary as little as possible) is chosen from the set of feasible weight vectors. This avoids introducing unintentional bias between the options and reveals the point at which the scores begin to diverge. The final option ranking may or may not be determined by the trade-offs that have been gathered. If not, then a further stage ensues in which the rank orders that could result from the feasible weights are investigated and sensitivity analysis is carried out to inform the decision takers of the crucial factors affecting the final outcome.

Reports: Sayers (2002), Sayers et al. (2002a, 2002b), Sayers et al (2003), Sayers (2004)

Best practices for procuring sustainable, efficient, bus services in urban areas.

Sponsor: Self-financed

Start Date: September 2000

Expected End Date: August 2005

Brendan Finn.

Supervisor: Professor J. D. Nelson

This new work examines the processes involved in the provision of urban bus services in a range of regulatory frameworks and competitive environments. A functional model has been developed which describes the tasks involved in each of the key stages of planning, procuring and monitoring bus services in urban area, with specific emphasis on services which are operated under licence, tender or franchise. One or more organisational models have been layered on the functional model to describe how the processes work in a range of regulatory environments. The actual processes in European, Asian and American cities are being examined both to develop the model and to identify best practice.

Reports: Finn and Nelson (2003)

The Communication Strategy: its Realisation and Effectiveness for a Demand Responsive Transport

Service

Sponsor: Self-financed studentship / ERASMUS Programme

Start Date: January 2005

Expected End Date: June 2005

S. Poitz.

Supervisors: Dr J.F. Brake and Professor J.D, Nelson

In recent years Demand Responsive Transport (DRT) services have come into focus in the UK as they were expected to help meet the transport needs of inhabitants of rural areas with particular reference to reducing social exclusion. Considerable research has been conducted on the technical side of DRT, but the customers and their need for information have not been investigated. This research pursues the hypothesis that people do not get the right information about DRT so they are not motivated to try it out. The case study of the Phone and Go services in Northumberland will be used to analyse the communication strategy and which aspects of this strategy successfully informed the potential customers about the service in a way that they were encouraged to use it. Methodologically, the research will begin with semi-structured interviews with people who are in charge of - or who have an opinion about - the communication. Afterwards a questionnaire will be conducted to find out if the information has reached the target group or whether the communication could be improved.

Reports: None yet available

CONSTRUCTION MANAGEMENT: RESEARCH STUDENTSHIPS

An investigation of the use of key performance indicators in the UK construction industry

Sponsor: Sudan University of Science and Technology

Start Date: November 2000

Expected End Date: July 2004

Salma Mahmoud

Supervisor: Dr S Scott

Key Performance Indicators (KPIs) have only recently been developed for the construction industry, following the publication of the Egan report. They are intended to be used to assess the current state of the UK construction industry, as generation of this information should allow comparison, not only between a company's contracts, but between construction companies and also between the construction industry and other industries. Salma has made good progress. She has completed an interview survey of local contractors, consultants and clients to determine what use the industry is making of performance indicators and how useful they find the information generated and has written up the majority of the findings.

Reports: Mahmoud and Scott (2002)

The influence of supply chain management practice on construction site performance

Sponsor: TPSDP Project, ADB Loan,

Start Date: October 2003

Expected End Date: October 2006
 Jati Utomo Dwi Hatmoko
Supervisor: Dr. S Scott

Many construction processes are beset with problems, e.g. poor controllability, delays, budget overruns, poor quality, etc. Analysis of these problems has shown that a major part of them are supply chain problems, which are originating at the interfaces of different parties or functions. The supply chain network in the construction sector can be very complex and may involve many subcontractors and suppliers for just one project. There is therefore an opportunity to make significant improvements in construction supply chain performance, which will inevitably improve construction site performance. Current research on supply chain management (SCM) in construction is mainly focusing on issues such as relationships between contractor-subcontractor-supplier, JIT, organisational perspectives on construction processes, SCM mapping and IT. There is however, to date, little hard evidence on SCM practice and its impact on construction site performance. This research will investigate this important area, aiming to increase understanding of the problem and to identify avenues for improvement. Jati has begun case study work on construction contracts in the Newcastle area and is currently preparing for an MPhil/PhD transfer viva.

Reports: None yet available

TRAVEL BEHAVIOUR: PROJECTS

Road Casualty Reduction (Northumbria Road Safety Camera Partnership, from April 2003 to March 2005). Mr. N. Thorpe. Contract-holder: Mr. N. Thorpe

TORG has been recruited for an initial two year period to act as an independent data analyst for the Northumbria Safety Camera Partnership (NSCP). This role will involve co-ordinating the collection of a wide range of data relating to the impact of safety camera activity on road casualty reduction in Northumbria. It is expected that an additional element of this work will involve a joint project with local Health Trusts to investigate the wider impacts of casualty reductions on health-care provision in the region.

Reports: None yet available

SOLUTIONS (Sustainability of Land Use and Transport in Outer Neighbourhoods)

(EPSRC/University of Cambridge, from April 2004 to December 2007). Dr M.A. Smith and Mr Sergio Grosso. Contract holders: Professor J.D. Nelson, Mr. N. Thorpe and Dr. C Mulley

SOLUTIONS is part of the EPSRC Sustainable Urban Environments cluster and has as its objective the investigation of socially inclusive, environmentally sustainable and economically efficient patterns of urban settlement. The principal approach will be based on spatial

analysis, using a variety of quantitative and qualitative analytical tools to look at a number of UK case studies at both regional and local scales. It is centred on four in-depth, multi-disciplinary case studies, to be carried out in Cambridge, London, Tyne and Wear and Bristol, in partnership with the appropriate local authorities. Spatial economic models will be used to investigate sustainability issues at a strategic level, whilst tools such as sustainability threshold analysis will be utilised at a more local level to evaluate options. Expected results include strategic recommendations for national policy makers and agencies, guidelines for local authorities and urban area stakeholders and area specific recommendations for the participating case study cities. TORG is currently at the stage of liaison with local stakeholders to define the parameters of the Tyne and Wear case study.

Reports: None yet available

Options for and Attitudes to Biometric Templates on Transport Smart Cards

(IBF and ISIS International, from June 2002 to August 2004) Contract holder: Professor P.T.Blythe

TORG has undertaken a series of studies to examine the use of a biometric template on transport smartcards for anti-fraud and security purposes. Studies have identified the options for making a biometric template and their suitability for operation in various transport environments. Furthermore, a study of public attitudes to biometrics on smartcards has been undertaken which includes questions on preferred and least-preferred biometric methods, where such a template should be stored and what services end-users would be happy accessing with their template. A follow-up study aimed specifically at assessing views and attitudes regarding a biometric template on a passport is currently underway.

Reports: Blythe (2004c and f)

TRAVEL BEHAVIOUR: RESEARCH STUDENTSHIPS

The Potential Effects of Alternative Transport Policies on Commuters Mode Choice in Metropolitan Kuwait

Sponsor: College of Technological Studies (Kuwait)

Start Date: September 2001
 Expected End Date: December 2004
 H. AISaeid.

Supervisor: Professor J.D. Nelson.

Kuwait is a car dominant country. Car represents 97% of commuter's mode choice. In order to achieve a mode choice balance between the only two available modes for commuters' the car and the bus, a package of policy measures has been developed. To establish the most technically feasible policy measures, focus groups have been utilised. Then to find a combination of these policies that were considered acceptable and

effective in terms of the public and the politicians' point of view, a preliminary survey was conducted. The final outcomes of this survey were four policies: road-user charging, physical restrictions on cars, bus priorities and reduced bus fare. To explore to what extent (i.e. how well) these measures are likely to be effective in reducing car-use levels several discrete mode choice models (Logit) were developed based on Stated Preference experiment and Revealed Preference data and estimated using ALOGIT software.

Reports: None available.

Developing the Singly Constrained Gravity Model for Application in Developing Countries.

Sponsor: Technical and Professional Skills Development Sector Project / Asian Developing Bank (ADB), Institut Teknologi sepuluh Nopember (ITS), Surabaya, Indonesia
 Start Date: May 2004 Expected End Date: May 2005

W.Herijanto.

Supervisor: Mr. Neil Thorpe.

This research aims to enhance the accuracy of the singly constrained gravity model by incorporating principles from fluid analogy theory. The method is based on an iterative process to generate and allocate trips in an origin-destination matrix and involves estimating the number of trips produced by and attracted to individual zones. The deterrence function and the attraction factor embedded within the model plays an important role in the relative attractiveness of each zone, while the fluid analogy method is used to allocate trips between zones. The method is applied to replicate the distribution of trip-lengths to work in the case-study city of Surabaya, Indonesia for a base year (1993) and for a horizon year (2003). The Kolmogorov-Smirnov and chi-square tests indicate that the performance of the combined fluid-analogy and singly constrained gravity model output is better than the conventional singly constrained gravity model in this context.

Reports: Herijanto (2005)

Assessing the Casualty Cost of Motorcyclist in Surabaya Indonesia

Sponsor: Technical and Professional Skills Development Sector Project / Asian Developing Bank (ADB), Institut Teknologi sepuluh Nopember (ITS), Surabaya, Indonesia,
 Start Date: September 2002
 Expected End Date: August 2005

H. Widyastuti

Supervisors: Dr. Corinne Mulley, Dr Dilum Dissanayake

There are various ways of assessing the cost and impact of road traffic casualties. Willingness to pay and Gross output are the two methods which are usually used to estimate the value of safety. The purpose of this study is to propose a method to estimate the best figure for valuing the motorcyclist casualty cost. To find the best figure, this study looks at evaluation of gross output and willingness to pay methods for costing

motorcyclist casualty cost in Surabaya, Indonesia, where the number of motorcycles has grown by an average of 6.25% yearly and correspond with growth of the casualties. In order to obtain a real value that reflects the economic burden of the casualty, a questionnaire survey has been undertaken. The results of both methods have been analyzed and compared.

Reports: Widyastuti and Bird (2004); Widyastuti, et al (2004); Widyastuti, H (2005).

Sustainable Travel Demand Management

Sponsor: Self-financing

Start Date: April 2002

Expected End Date: March 2005

Ms S.M. Darroch.

Supervisor: Mr Neil Thorpe

The principal objective of this study is to investigate the consequences that Travel Demand Management (TDM) measures, and packages of measures, may have on business location. Newcastle upon Tyne is used as a case study.

Stated preference techniques survey data has been collected using the mail-out format, from a sample of businesses located in central Newcastle. The business respondents have been presented with hypothetical scenarios involving certain TDM measures, for example road user charging. They have been asked to state their attitudes towards these TDM measures, with respect to the location of their businesses. Statistical analyses are to be undertaken on the collected data.

Reports: None yet available

INFRASTRUCTURE DESIGN AND PAVEMENTS: RESEARCH STUDENTSHIPS

The relationship between geometric design consistency and safety in rural single carriageways.

Sponsor: Egyptian government Research Studentship

Start Date: September 2002

Expected End Date: August 2005

I. H. Hashim

Supervisor: Mr. R. N. Bird

The concept of highway design consistency has emerged in the ten years in North America and some European Countries. However, no research has been done to date in the UK. It is believed that there is a strong relationship between consistency measures and safety. Inconsistent roads may produce a sudden change in the characteristic of the roadway that can lead to motorists' errors. These errors may cause an unfavourable level of accident risk. Previous studies in various countries have shown that this phenomenon is recognized in rural single carriageways. The aim of this research is to develop two types of models. The first model is to reflect the relationship between the consistency measures and roadway characteristics. The second model is to establish a correlation between these measures and safety. Based on the second

model it is anticipated that it could be possible to identify and treat any inconsistency on a highway and this may improve its safety performance.

Reports: None yet available

The use of recycled materials in road paving materials.

Sponsor: Self-financed

Start Date: September 2004

Expected End Date: August 2007

Y. Huang.

Supervisor: Mr R. N. Bird

Much interest is focussed on sustainability in the construction industry. This project seeks to analyse and quantify the benefits and disbenefits of using selected recycled materials in asphalt. The project looks at the practicality of preparing the material, the quality and properties of the resulting mix, and the life assessment of each option.

Reports: None yet available

TRAFFIC MANAGEMENT PROJECTS

Secondary Road Network Traffic Management Strategies (SENSOR)

(EU 5th Framework IST Programme, Project Coordinator ETRA, from January 2001 to September 2004). Dr Anett Ehlert, Sergio Grosso. Contract holders: Mr R.N. Bird, Professor P.T. Blythe and Professor J.D. Nelson

No efficient road traffic and information management systems can exist without appropriate details on the current status of the network. SENSOR has aiming at optimising the number, type and location of data collection points (sensors) focusing in particular on the secondary road network.

A Decision Support System (DSS) tool was developed to help planners in their choice of detectors and the strategic positioning. Among the software modules which comprise the DSS, there are two developed at TORG: a detector optimization tool for detector positions (OptTool), and a program called Path Flow Estimator (PFE), which is used as a network observer with tasks of data completion, and the identification of faulty detectors. Both activities are carried in collaboration with Prof. Mike Bell (Imperial College, London). Tests have been carried out on the Stuttgart network and for the Gateshead UK pilot site.

Reports: None yet available

PUBLICATIONS

ADITJANDRA, P.T. (2005) Sustainable Transport System within a Designed Neighbourhood. Paper presented at Universities' Transport Study Group (UTSG) 37th Annual Conference, 5-7 January 2005, Bristol - United Kingdom.

AMBROSINO, G, NELSON, J D AND ROMANAZZO, M (Eds) (2004) Demand Responsive Transport Services: Towards the Flexible Mobility Agency. Rome: ENEA.

BLYTHE, P.T. (2003a) Marketing e-Services ...or 'to e or not to e'? *Proc. 3rd Moving On Conference*, Nottingham, UK, June

BLYTHE, P.T. (2003b) Delivering Intelligent Location Based Public Transport Information to Mobile Phones and PDA's. *Proc. IQ's Third Annual Conference on Real Time Passenger Information Services for Transport*, London, September.

BLYTHE, P.T. (2004a) Congestion Charging: Challenges to Meet Policy Objectives. Review of Network Economics, Vol 3 (4), pp 356-370, November

BLYTHE, P.T. (2004b) Making the case for Biometric IDs on Transport Smartcards. *Proc. Smartcard Networking Forum, Annual Conference*, Newcastle, October

BLYTHE, P. T. (2004c) A Multi-Year Study of Public Attitudes to the use of Biometrics in Transport Smartcard Schemes. *Proc. ITS-UK Summer Conference*, Winchester, July.

BLYTHE, P.T. (2004d) Road User Charging in the UK. Where will we be 10 Years from Now? *Proc. IEE 12th International Conference on Road Transport Information and Control*, London, April.

BLYTHE, P.T. (2004e) Delivering a framework for interoperable smartcards in the UK Public Transport Industry. Special edition of the ICE Journal, The Municipal Engineer. Issue 157, pp 47-54, March

BLYTHE, P.T. (2004f) An investigation of the use of Biometrics on Smartcards for Transport Security Applications. *Proc. ITS-UK Security Interest Group*, DfT, London, March.

BLYTHE, P.T. (2004g) The potential for WiFi Services in Transport. Chairmans Address, *Proc. IQ Conference on Practical Solutions to WiFi in Transport*, London, January.

BLYTHE, P.T and CURTIS, A (2004) Advanced Driver Assistance Systems: Gimmick or Reality *Proc. 11th World Congress on Intelligent Transport Systems and Services, Nagoya, Japan, October. Proc. 11th World Congress on Intelligent Transport Systems and Services, Nagoya, Japan, October.*

BLYTHE, P.T. and PICKFORD, A. (2004) Road user Charging Technology: Where will we be in 2014? *Proc. IEE International Seminar on Road User Charging Technologies*, London, June

BLYTHE, P.T., WALKER, J, KNIGHT, P and TULLY, A (2004) Road User Charging in the UK. How will the technology evolve over the next 10 years

- to meet the future challenges of Nationwide charging schemes. *Proc. 11th World Congress on Intelligent Transport Systems and Services*, Nagoya, Japan, October.
- BRAKE, J.F., NELSON, J.D. and WRIGHT, S.D. (2004a)** On-demand brokerage of public transport services: From theory to reality. *Proc. ITS Europe Conference*, Budapest, May. [On CD]
- BRAKE, J.F., NELSON, J.D. and WRIGHT, S.D. (2004b)** Demand Responsive Transport: towards the emergence of a new market segment. *Journal of Transport Geography*, 12(4), 323-327.
- DODOO, N.A., and THORPE, N (2004a)** Towards Fair and Efficient Charging for Heavy Goods Vehicles. *Proc. IEE 12th International Conference on Road Transport Information and Control*, London, April.
- DODOO, N. A., THORPE, N. (2004b)**, 'A Pavement Damage-Based System for Charging HGVs for their Use of the Road Infrastructure', in *Highways: cost and regulation in Europe*, Bergamo, Italy.
- DODOO, N. A. (2005)**, 'Results from On-Road Trials of a Road User Charging System for Heavy Goods Vehicles', in 37th Annual Conference of the Universities Transport Study Group, Bristol, pp. 4A2.1-4A2.10 (unpublished).
- DU, H.(2003)** Land Value and Urban Rail Transit Paper presented at 3rd China France Economic Forum 27-29 October 2003, Lyon
- DU, H (2004)**. Land Value Impacts of Urban Rail Transit and Developer Contribution. Paper presented at 36th UTSG Conference 5th -7th January 2004
- DU, H (2005)** The impact of transport infrastructure on land value using Tyne and Wear Metro as case study. Paper presented at 37th UTSG Conference 5 -7 January 2005, Bristol.
- DU, H. AND MULLEY, C. (2004)** Land value impacts of urban rail transit: quantitative evidence from Sunderland, UK. Paper presented at Citytrans China 2004 Conference, 17-18 November, Shanghai.
- EDWARDS, S. MULLEY, C, P BLYTHE, P LEWIS, ET AL, (2004)** Assessment Framework for the Evaluation of Soft Benefits of Smart Card Schemes, National Smart Card Project. Transport Operations Research Group, Newcastle upon Tyne, March.
- EDWARDS, S and BLYTHE, P.T. (2004a)** Demand for and Willingness to Pay for Geo-Referenced Info-Mobility Services. *Proc. 11th World Congress on Intelligent Transport Systems and Services*, Nagoya, Japan, October.
- EDWARDS, S and BLYTHE, P.T. (2004b)** Providing Knowledge-Based and Integrated Services for Mobility Impaired Users: the Ask-It Project. *Proc. 11th World Congress on Intelligent Transport Systems and Services*, Nagoya, Japan, October.
- EDWARDS S, TOFFOLO S, USSEGLIO Min R. (2004)** User Acceptance and Willingness to Pay for Geo-Referenced Infomobility Services: the Image Project. *Proc. ITS Europe*, Budapest May 2004
- EDWARDS, S AND MULLEY, C.,(2004)** How can Soft Benefits Increase the Viability of Multi-Application Smart Card Schemes? *Proc. 11th World Congress on Intelligent Transport Systems and Services*, Nagoya, Japan, October.
- EDWARDS, S.J, BLYTHE, P.T. and SCOTT, S. (2003a)** A study of the willingness to pay for location based services delivered to mobile devices. *Proc. INFORM Annual Conference*, Cardiff, October.
- EDWARDS, S., BLYTHE, P.T. and SCOTT, S (2003b)** Delivering Dynamic, Personalised Travel and Tourist Information through Mobile Phones and PDAs: the IMAGE Project. *Proc. 10th World Congress on Intelligent Transport Systems and Services*, Madrid, November.
- FAMS Consortium (2004)** The FAMS Final Report. IST Programme Project No IST-2001-34347. Commission of the European Communities, Bruxelles, April. (contributor).
- FINN, B and NELSON, J (2003)** A Functional Model for an Urban Passenger Transport Authority. Paper presented at 8th International Conference on Competition and Ownership in Land Transport, Rio de Janeiro, September.
- HERIJANTO W. (2005)** Developing the singly constrained gravity model for application in developing countries. Proceeding of Universities Transport Study Group (UTSG)37th Annual Conference (3) page 7B1.1-11. Centre for Transport & Society, UWE. Bristol.
- MAGEEAN, J.F., NELSON, J.D. and WRIGHT, S.D. (2003a)** Demand Responsive Transport: towards the emergence of a new market segment. Paper presented at the RGS-IBG Conference, London, September.
- MAGEEAN, J.F., NELSON, J.D. and WRIGHT, S.D. (2003b)** Demand Responsive Transport: Responding to the Urban Bus Challenge. Paper presented at the AET Conference, Strasbourg, September. [On CD]
- MAGEEAN, J.F., NELSON, J.D. and WRIGHT, S.D. (2004a)** Telematics-based Demand Responsive Transport: The Phone and Go experience. *Traffic Engng Control*. 45(2), February.
- MAGEEAN, J.F., NELSON, J.D. and WRIGHT, S.D. (2004b)** Using Intelligent Transport Systems to Broker Integrated Demand Responsive Transport Services. *Planning in London*, No. 48, January, 22-25.
- MAGEEAN, J.F., NELSON, J.D. and WRIGHT, S.D. (2004c)** The application of Telematics-based Technologies to Supply Public Transport in Areas of Low Demand. *Public Transport International*, 53(3), May, 22-25.
- MAGEEAN, J.F. AND NELSON, J D (2004)** Recent developments in telematics-based Demand Responsive Transport Services. *Proc. WCTR*, Istanbul, July. [On CD]
- MAHMOUD, S.Y. and SCOTT, S., (2002)**, 'The development and use of key performance indicators by the UK construction industry', *Proceedings of the the 18th Annual ARCOM Conference*, September 2-4, Newcastle upon Tyne, Vol.2, pp587-594
- MULLEY, C (2004 a)** A postgraduate perspective. Paper at Transport Studies - an Audit of Change. Cardiff, Wales: Institute of Logistics and Transport, February.
- MULLEY, C (2004b)** The experiences of Bus Benchmarking in the UK. at Association of Local Authority Managers. Blackpool, May.
- MULLEY, C (2004c)** Improving efficiency as a means to improving transport quality, Municipal Engineer, *Journal of the Institute of Civil Engineers*. Issue157, March pp 17-24
- MULLEY, C (2004d)** Benchmarking internal efficiency: How useful is the process for local transport operators? at 2nd International Conference on Business, Economics, Management and Marketing. Athens, Greece, June.
- MULLEY, C (2004e)** The benchmarking of the internal efficiency of local public transport, *Trasporti Europei* XXIII.
- MULLEY, C (2004f)** Motorised bus transport: 20th century public policy in the UK and its affect on mobility. at T2M International Conference. Dearborn, USA, Nov.
- MULLEY, C, J.D. NELSON, N THORPE ET AL (2004)** Final Report for the Bus Delay Study.. Commissioned by Nexus on behalf of the Tyne and Wear LTP Partners. Transport Operations Research Group, University of Newcastle upon Tyne, January.
- MULLEY, C, J.D. NELSON, AND P LEWIS (2004)** Benchmarking Reports for the ALBUM bus companies, final reports utilising individual and database information. Bus Benchmarking Group. Contract Report, Transport Operations Research Group, University of Newcastle upon Tyne.
- MULLEY, C (2004f)** Motorised bus transport: 20th century public policy in the UK and its affect on mobility. at T2M International

Conference. Dearborn, USA, Nov.

NAPIER UNIVERSITY (2004) Fife Council. Review of Ring and Ride and Minibus Management Centre. Contract Report, Transport Research Institute, Napier University, June. (contributor).

SAYERS, T.M. (2002) "Taking Multi-criteria Transport Investment Appraisal a Step Further", Proceedings of 34th UTSG conference, Edinburgh, January.

SAYERS, T.M. (2004) "The Potential and the Pitfalls of Multi-criteria Appraisal of Transport Options", Proceedings of 36th UTSG conference, Newcastle upon Tyne, January (unpublished)

SAYERS, T.M., HILLS, P.J. AND JESSOP, A. (2002a) "A Pragmatic Approach To Uncertainty In Transport Investment Appraisal Using Multiple Criteria", Proceedings of 13th Mini-EURO conference, Bari, Italy, June.

SAYERS, T.M., HILLS, P.J. AND JESSOP, A. (2002b) "A pragmatic approach to unbiased weight assignment in multi-criteria evaluation", Proceedings of 3rd conference on Decision Making in Urban and Civil Engineering, London, November.

SAYERS, T.M., HILLS, P.J. AND A.T. JESSOP (2003), "Multi-criteria evaluation of transport options – flexible, transparent and user-friendly?", *Transport Policy*, 10, pp95-105

SCOTT, S, HARRIS, RA & GREENWOOD, D, (2004), 'Assessing the new United Kingdom Protocol for Dealing with Delay and Disruption', *Journal of Professional Issues in Engineering Education and Practice*, Vol. 130, No 1, January 2004 pp 50 - 59

SCOTT, S. & HARRIS R. A.,(2004), 'United Kingdom Construction Claims: Views of Professionals', *Journal of Construction Engineering and Management*, Vol 130, Number 5, September/October 2004 pp 734 - 741

TRANSECON CONSORTIUM (2004) Final Report. Growth Programme Project No. GMA1-2000-27409 Contract Report 7. Commission of the European Communities, Bruxelles, March. (contributor).

WRIGHT, S.D., MAGEEAN, J.F. and NELSON, J.D. (2004). A means of providing public transport information to passengers who may not know where they are going! *Proc. 12th International Conference on Road Transport Information and Control*, London, April 2004. IEE, London, 26-33.

WIDYASTUTI, H. AND BIRD, R (2004). Assessing the social cost of motorcycle casualties in developing countries. Paper presented at 36th Annual Conference, Universities Transport Study Group, University of Newcastle Upon Tyne, Newcastle, 5th-7th January 2004. Conference Papers, Vol. 1, pp 2C3.1-2C3.10 (unpublished).