Institute for Transport Studies, University of Leeds

By Professor Mark Wardman

INTRODUCTION

The past year has again been a very successful one for ITS across its wide range of research areas. Staff numbers again grew as did the number of research projects and their diversity. Over £1m of EPSRC research funding was secured, including the renewal of the Platform Grant to support LANTERN and the award of the DISTILLATE project after an earlier scoping study. Announced and awarded EU projects amounted to around 1m Euros. Included within this is the PEAT training site awarded under the Marie Curie training and mobility programme. This will fund 8 full time scholarships and provides international recognition of ITS' excellence in research training. Significant additional funding has been obtained which will transform the driving simulator into a world leading facility. A notable development in staffing in 2004 was the movement from a rolling contract system for most research staff to one where all researchers with four or more years service have permanent employment contracts.

RESEARCH FACILITIES

ITS maintains two major facilities, the Advanced Driving Simulator, and the Instrumented City, complemented by the LANTERN (Leeds health Air pollution, Noise, Traffic and Emissions Research Network) infrastructure award.

The Leeds Advanced Driving Simulator (LADS) is currently a fixed-based facility, built around a complete Rover 216GTi with its driver controls and dashboard instrumentation fully operational. A real-time, fully textured and anti-aliased, 3-D graphical scene of the virtual world is generated by an Onyx2 Infinite Reality2 workstation and is projected onto a 2.5m radius cylindrical screen. The projection system consists of five forward channels, the front three at a resolution of 1280 x 1024 pixels. The images are edge-blended to provide a near seamless total image, and along with two peripheral channels (640 x 480 each), the total horizontal field of view is 230°. The vertical field of view is 39°. A rear view (60°) is back projected onto a screen behind the car to provide an image seen through the vehicle's rear view mirror. The frame rate is fixed to a constant 60Hz. The simulation uses naturalistic scenery modelled using MultiGen-Paradigm Creator and operates with in-house code to model realistic vehicle dynamics and intelligent scenario control to script specific traffic events. Although the simulator is fixed-base, torque feedback at the steering wheel is provided via a motor fixed at the end of the steering column and a vacuum motor provides the brake pedal booster assistance. Data are collected at the frame rate.

Unlike many other simulators, especially in the United Kingdom, LADS was and continues to develop using in-house expertise. It became operational in 1994 after receiving the development funds from the University and the former Science and Engineering Research Council. Since then, the simulator has been an essential element in much of the driver behaviour and transport safety research work carried out at the University and has been used in 21 major projects with a combined total value of nearly £3m. Research sponsors have included the Departments for Transport and of Trade and Industry, U.K. Research Councils, the European Union and several vehicle manufacturers.

The simulator is to receive a major enhancement in 2004/5 with investment through HEFCE's Science Research Investment Fund. The outlay will fund:

- a state-of-the-art motion base to represent the inertial cues felt by a driver during braking and cornering;
- a new vehicle cab and dome, including the provision of standard driver controls and fully functioning dashboard instrumentation;
- kinaesthetic feedback to the driver through pedal feel, steering wheel torque and other control loading; industry standard visual modelling and run-time platform;
- a new image projection system including up to eight visual channels;
- realistic binaural acoustics with up to eight audio channels;
- refurbishment of existing campus space to house the new facility and its associated research offices.

The upgrade aims to move the LADS from the head of UK research facilities into a world leader for an affordable investment.

The instrumented City, iC, Facility, is a multi-purpose, transport-related database and equipment facility. Since its inception in 1992, data from the Instrumented City facility has been or is being used in 20 different Universities in over 200 research projects funded by the EPSRC, EU, DTLR, Department of Health, Asthma Campaign, Local Authorities, private companies and student research. Originally funded in 1989, by the UK, Science and Engineering Research Council, to establish a dedicated communications link with the Leicester Traffic Management computer to capture the wealth of real-time traffic data available as a by-product of its operation of SCOOT, the iC has expanded to include data from Nottingham, York, Surrey and London. Following a successful EPSRC: LINK project, in collaboration with Siemens Environmental Systems Ltd, Siemens Traffic Controls Ltd, Leicestershire County Council and Nottinghamshire County Council, a low-cost roadside pollution monitoring unit was developed. In 1997, when the iC research team joined ITS, 10 roadside monitoring systems were installed in each of Nottingham and Leicester cities and one in each of Hinckley, Loughborough and Melton Mowbray and since then, this data has been captured in real-time along with meteorological conditions, accident and other data amounting to 60 gigabytes. The most significant recent development for the iC, has been an investment of a £4m EPSRC: JIF award. This has enabled a novel research programme LANTERN, Leeds health Air Pollution, Noise, Traffic and Emissions Research Network to be launched. A complete refurbishment and enhancement of the research laboratories in ITS, Energy Resources and Mineral and Mining, the Schools of Chemistry and Civil Engineering, and the Molecular Epidemiology Unit in the School of Medicine, has taken place by considerable investment in new technologies. The equipment includes an instrumented vehicle, traffic monitoring systems (CCTV, ANPR, speed and count detectors etc), emissions engine test bed and monitoring systems, portable air quality, particulates, noise and exposure monitoring systems and computers and specialist software including, GIS, pollutant emissions, dispersion and attenuation models. The LANTERN is actively engaged with joint research activity in the projects funded by the EPSRC; DAPPLE (in collaboration with the Universities of Reading, Cambridge, Bristol and Imperial College London) and SUE: FUTURES (Universities of Southampton and West of England and TRL) and RUPERT funded by the Department of Health (York University and BRS). The iC and LANTERN are engaged in research with York, Leicester and Nottingham City Councils, Transport for London and Surrey County Council. International research links include, Colorado State University, University of Hungary and University of Palermo. During 2004/2005 a £1m HEFCE SRIF award is being invested in the instrumentation of a signalised junction in Leeds and a fleet of 10 instrumented cars, 6 with petrol and 4 with diesel engines, of different vintages will be available to further extend the portfolio of research. For further information regarding the use of the iC Facilities contact the Instrumented City Manager, James Tate (email: j.e.tate@its.leeds.ac.uk)

SOFTWARE

Following the retirement from the University of Dirck Van Vliet in August 2001, the continuing development of the SATURN simulation and assignment model is now a 3-way partnership between ITS, Dirck Van Vliet and Atkins Highways and Transportation (who are responsible for marketing). SATURN Version 10.5 was released in December 2004.

A major innovation in 10.5 has been the inclusion of Origin-Based Assignment (OBA) in collaboration with Hillel BarGera of the Ben-

Gurion University, Israel and Professor Dave Boyce of the University of Illinois at Chicago where Professor BarGera was a PhD student in the late 1990's. His work has revolutionised traffic assignment in that his methods solve for Wardrop Equilibrium solutions to accuracy limited only by the numerical accuracy of the computer and within comparable cpu times to existing algorithms such as Frank-Wolfe as traditionally used in SATURN.

OBA is a particularly efficient relative to Frank-Wolfe (the algorithm normally employed within SATURN) in assessing the impact of small 'schemes'. If the assignment is less than perfect then the change in, say, total vehicle-hours due to the scheme may be totally masked by the intrinsic 'noise' in the with-scheme and without-scheme solutions. By making the assignment extremely accurate OBA allows the impact of even very small changes, such as the addition of a single lane or changes to signal timings, to be accurately measured within SATURN. It is planned that version 10.6 will include extended options for demand modelling in the light of VaDMA recommendations yet to be formally released. The contact for SATURN is Dirck Van Vliet (Tel +44 (0)113 343 1789; email: Dirck van vliet@yahoo.co.uk)

Also produced by the Institute and distributed by Atkins Highways and Transportation is the DRACULA microsimulation package. DRACULA shares a common network format with SATURN, allowing easy transfer of data between the two packages. DRACULA represents complete transport trip mechanisms, from a choice of where and when to travel, to the choice of mode and the simulation of the entire journey by motorised means at a microscopic (individual vehicle) level. The contact for DRACULA is Ronghui Liu (Tel: +44 (0)113 343 5338; email: rliu@its.leeds.ac.uk).

STAFF CHANGES

The most significant change was the retirement of Tony May at the end of July. Fortunately for ITS, his retirement is only partial; Tony returned in September as a part-time Research Professor.

Research Officer Joanna Beale left the Institute to take up a post at Cardiff University Business School and Research Fellow Guenter Emberger returned to TU, Vienna. Jo Ferguson moved to take up a post at Durham University.

Dave Watling was appointed to the Chair in Transport Analysis, one of 30 new chairs created to celebrate the University's centenary.

Among those joining the Institute were Dr Anthony Whiteing, returning as Senior Lecturer in Transport Economics, and Dr Andrew Smith, who took up a joint appointment with Leeds University Business School as Lecturer in Transport Economics.

David Carslaw joined as a University Research Fellow in October. He was previously a principal scientist in Kings College London's Environmental Research Group. Karl Ropkins was appointed as Research Fellow as was Bill Lythgoe after completion of his PhD. Other appointments include Richard Bettie as Computer Officer, Nusrat Walid as Survey Officer, Cara Busfield as Receptionist, Jo Moran as Taught Courses Assistant and Carole Murray as Research Secretary. Robin Marsh also joined the team as an Administrative Officer.

Gerard de Jong and Tom Van Vuren were appointed as Visiting Professors and in January John Carr became Visiting Senior Lecturer. After completing his PhD, John Parkin became a Visiting Research Fellow. There were several promotions over the year. Mark Wardman was promoted to Professor of Transport Demand Analysis, Haibo Chen and Simon Shepherd were promoted to Principal Research Fellows, and Agachai Sumalee and Natasha Merat to Senior Research Fellows. Tony Fowkes was promoted to Reader in Transport Econometrics and Anil Namdeo qualified as Chartered Environmentalist. Emma Holden was promoted from Clerical to Academic-related on the research team.

STAFF NEWS

Professor Tony May was awarded an OBE in the Queen's Birthday Honours list. He continued as Chair of the Royal Academy of Engineering Group on Transport Policy. He presented a paper on demand management in Moscow for the third ECMT seminar on sustainable urban transport and gave two papers at the European Transport Conference in Strasbourg. Professor May visited Hanoi to give seminars on integrated transport strategies to TDSI and attended the 10th World Conference on Transport Research, chairing a meeting of the Special Interest Group on Urban Transport Policy. He finished his term as ITS Director in July. Professor Oliver Carsten continued as Chair of the Road User Behaviour Working Party of the Parliamentary Advisory Council for Transport Safety (PACTS). He was a keynote speaker at the 3rd International Conference on Traffic and Transport Psychology (ICTTP) in Nottingham in September. Oliver took over as Director of ITS in August.

Professor Peter Mackie continued as Dean of the Faculty of Environment. He gave a paper at the workshop on Highways: Costs and Regulation in Europe held in Bergamo, and with Dr Greg Marsden gave evidence to the House of Commons Transport Select Committee enquiry 'Should All Roads be Toll Roads?' in January 2005.

Professor Chris Nash was a keynote speaker at the UIC conference on the Role of Rail in National Productivity in Tunis in March. He also gave presentations at conferences in Maribor (Slovenia), Athens, Heidelberg, Stuttgart and Madrid in the course of the year. He is currently acting as Specialist Advisor to the House of Lords Select Committee on the European Union for its investigation into the liberalisation of international rail freight, and to the ECMT Railways Group for its study of rail infrastructure charges.

Professor Peter Bonsall was invited to give a presentation at the 7th International Conference on Travel Survey Methods. He gave two presentations at the World Conference on Transport Research and one at the European Transport Conference. He was invited to give a presentation to the Department for Transport's Transport Statistics Users' Group and is a member of the panel for the North East Regional 'Question Time' on 'Transport policy – getting the message across'. Professor Bonsall acted as assessor for the International Association of Travel Behaviour Research's 2004 Eric Pas Prize and was a member of the judging panel for the UK Public Transport Industry Awards for Marketing. He continued to advise the Highways Agency on their portfolio of research into understanding travel behaviour and their study of the performance of the M42 Advanced Traffic Management Measures, and also provided advice on the design of the monitoring program for the M1 high occupancy vehicle lane. He advised the Department for Transport on a project to design and evaluate new methods of collecting travel diary data for the National Travel Survey and was appointed Counsellor for the Centre for Transport Studies at the Dalien University of Technology, China. He continued as Editor (with responsibility for Topical Issues) of Transport Policy.

Professor David Watling served on the International Scientific Committee of the Second International Symposium on Network Reliability (INSTR) held in Christchurch, New Zealand in September 2004. He has been invited to join the organising committee of the 4th IMA (Institute of Mathematics and its Applications) International Conference on Mathematics in Transport, to be held in London in September 2005. David has continued to serve on the editorial boards of Transportation Research B and Networks and Spatial Economics and on the peer review college of EPSRC.

Frank Montgomery was appointed Director of Learning and Teaching in April. He also became Chairman of the Yorkshire and Humberside Branch of the Institution of Highways and Transportation in April and was appointed to the Joint Board of Moderators in December.

Professor Margaret Bell took up the post as Chairperson, and Greg Marsden as Secretary, of the UTSG for three years from January 2004. She is the Chairperson of the ITS(UK) Smart Environment Interest Group and engaged in the organisation of the IEE, RTIC and ITS(UK) International Conferences for 2006. She was invited to the University of Palermo to deliver presentations and to join the PhD examination panel of Pietro Zito, an ITS Marie Curie Fellow. Professor Bell gave presentations at the International 13th World Clean Air and Environmental Protection Congress and Exhibition in London and at the Annual Review Meeting on Outdoor and Indoor Air Pollution Research, IEH, Leicester. She was an invited speaker at the Regional Meeting of the ROSPA Advanced Driver.

Professor Mark Wardman became Director of Research in August. Papers were presented at the World Conference on Transport Research, European Transport Conference, ACUSTICA and Inter-Noise. He continues to advise the railway industry on updates to its demand forecasting procedures and to provide training courses for railway managers. He also serves as an Associate Editor of Transportation Research E.

Dr Agachai Sumalee was awarded the Hans-Jürgen-Ewers prize for the outstanding applied research in infrastructure economics. The co-winner of this prize was Dr. Steven Anderson from Harvard University, USA. Dr Sumalee won the Smeed Prize at the 37th UTSG in January and has been invited as a speaker for the CIVITAS/TELLUS workshop on Urban Road Pricing for Sustainable Cities in February 2005.

Dr Greg Marsden was appointed as a member of the Independent Transport Commission and UK ambassador for the Association of European Transport.

Dr Anil Namdeo was appointed Secretary of the Smart Environment Interest Group of the Intelligent Transport Systems, UK.

STUDENT NEWS

Our ex-MSc(Eng) student Himanshu Budhiraja was awarded the ITS-UK/TEC Student Award 2004 for his paper entitled "Impact of Network Knowledge on Response to Driver Route Guidance and Information Systems ", which was based on his dissertation project, using the TRAVSIM route choice travel simulator developed by Dr Paul Firmin. This is the 3rd time that an ITS student has won this prestigious award in the last four years!

VISITORS

Visitors in 2004 were Kwang Seok-Han from Railway Industry Restructuring Headquarters Korea, Dr Jose Aparecido Sorratini from Universidade Federal de Uberlandia, Brazil, Professor Hasib Mohammed Ahsan from University of Bangladesh, Mr Wole Morenikeji from Federal University of Technology, Minna, Nigeria, Dr Ken Uchida from Hokkaido University, Japan and Professor Hiayan Wu from Beijing Institute of Civil Engineering and Architecture, China.

PHD'S AWARDED

Six PhD's were awarded in 2004. *They were:*
Bill Lythgoe 'Enhancing cross-sectional rail passenger demand models'; Eric Moreno-Quintero 'Planner-user interactions in road freight transport. A modelling approach with a case study from Mexico'; John Parkin 'Determination and measurement of factors which influence propensity to cycle to work'; Cesar Rivera Trujillo 'Measuring the productivity and efficiency of railways (an international comparison)'; Agachai Sumalee 'Optimal road pricing scheme design'; Fergus Tate 'JAWS: the safety impact of a Junction Accident Warning System'.

RESEARCH STUDENTS

Other than those awarded degrees in 2004, the research students registered and their research topics were:

Robert Bain, 'A quantative credit scoring framework for highway concessions';
Narasimha Chandrasekha Balijepalli, 'A stochastic process model for dynamic traffic assignment';
Hazel Baslington, 'Education for behavioural change: School travel plans, pupils' health, attitudes and care dependency culture';
Ofelia Betancor, 'Airlines and airports infrastructures; externalities in air transport; safety in air transport, privatisation and regulation';
Arun Bhatti, 'Impacts of hard shoulder running as a motorway management strategy';
Neil Buxton, 'Impact of real-time travel information on journey behaviour';
Pelle Envall, 'Managing car free households accessibility: A GIS tool for integrated transport and land use planning';
George Franklin, 'Developments in long distance commuting';
Anthony Glass, 'Modelling competition in the British passenger rail industry';
Xu Hao, 'Using new technology to improve public transport service quality';
Yaron Hollander, 'The cost of bus travel time variability';
Shamsul Alam Mohammad Hoque, 'The role of improved quality bus services for developing countries: A case study for urban bus studies for Dhaka City';
Kaveh Jahanshahi, 'The role of transit orientated development in reduction of private transport usage (Tehran case study)';
Hamish Jamson, 'Evaluation of driving simulator safety';
Sabariah Jemali, 'Urban passenger transport, sustainable policies and strategies';
Fumio Kurosaki, 'An analysis of the important factors behind railway reform';
Frank Lai, 'Driver attentional demand to dual-task performance';
James Laird, 'Modelling the economic impact of transport projects in sparse networks and peripheral regions';
Hui (Lucy) Lu, 'The effect of stated preference design on bias in responses';
Daniel McGehee, 'The biodynamics of pre-impact bracing';
John Nellthorp, 'Transport investment, pricing and use of resources';
Quoc Hien Nguyen, 'Derivation and use of variable pcu values for traffic network models';
Clifford Opurum, 'Evaluation of the impact of automated fare collection system on rail rapid transit: The case of New York';
Nasir Rana, 'Modelling telework as an instrument of demand management strategy';
Pattarathep Sillaparcharn, 'National transport modelling: General approach and application to Thailand';
Anna Stapleton, 'Reducing rural car use';
James Tate, 'A study of vehicular emissions and ambient air quality at the local-scale';
Fitsum Teklu, 'Optimal choice of new road construction for an urban network in Ethiopia';
Sotirios Thanos, 'Aircraft externalities';
Minh Tran Huu, 'Design of traffic management strategies for public transport priority in developing cities';
Jioa Wang, 'A merging model for motorway traffic';
Wenqun Wang, 'Traffic incident duration analysis';
Helen Watters, 'Tradable carbon permits: their potential to reduce CO2 from the transport sector'.

SAFETY

Stroke Drivers

TRL from January 2002 to January 2005
Grant holders: Professor Oliver Carsten, Dr Lily Read
This study aims to assess to reliability and validity of the Stroke Drivers Screening Assessment (SDSA), a testing tool that aims to differentiate between those drivers who suffered a stroke who are fit and those who are unfit to return to safe driving.

The study consists of a survey and telephone follow-up investigation of current users of this task, which also examines the accuracy of the test administration and interpretation. Test-retest and inter-rater reliability are also examined, as are training effects.

Criterion validity is assessed used standard route and scoring on-road driving task, and a study of concurrent validity in relation to the Useful Field of View is also carried out. A sample of drivers who suffered a stroke and a group of matched controls are included in the validity study.

The survey stage of the study and the inter-rater reliability study have been completed, and data collection on the validity study and on the training effects sub-study are at an advanced stage.

Evaluation of the effectiveness of the National Driver Improvement Scheme (NDIS)

DfT from May 2001 to April 2005
Frank Lai, Grant holder: Professor Oliver Carsten
Collaborating partners: ANDISP; The Police; DVLA
NDIS has been in operation in the UK since 1991. The course consists of a full and a half day lessons covering lectures and on road practice, and is offered to drivers committed motoring offences against Section 3 of the Road Traffic Safety Act 1988, driving without due care and attention, as an alternative to prosecution through the courts. NDIS aims to rectify unsafe driving behaviour and reduce accident involvement rates of the attendees.

This project investigates the magnitude of changes in drivers' attitude and behaviour as a result of the NDIS intervention, and, more importantly, the duration of the changes. This research consists of questionnaire surveys, driving assessments, and re-offence analyses. We are currently completing field driving assessments in West Yorkshire and County Durham. Preliminary analysis results have indicated positive movements in terms of driver attitude and driving behaviour after course attendance, and some of the changes have lasted over 12 months.

Intelligent Speed Adaptation

DfT from January 2001 to December 2006
Dr Sam Jamson, Hamish Jamson, Kathryn Chorlton, Sarah Gawthorpe, Dr Tri Tjahjono, Frank Lai, Grant holder: Professor Oliver Carsten
Collaborating partners: MIRA Ltd, Peter Jesty Consulting
This project is the follow-on to External Vehicle Speed Control, funded by DETR between 1997 and 2001. The main tasks of the project are to investigate user behaviour with ISA by means of set of field trials, to study overtaking behaviour

with ISA in a driving simulator, to prepare an ISA design for motorcycles and large trucks and to build a demonstrator of each, to prepare a system architecture for a mass production configuration of ISA, to have an input into relevant standards activities at an international level, to carry out a process of technology watch throughout the project duration, and to further investigate the costs and benefits of ISA. Each of the four field trials lasts for six months, of which two months are without ISA and four months are with ISA. The first field trial in Leeds with the twenty equipped cars has been completed and the second Leeds trial has started.

The Older Motorcyclist

DfT from May 2001 to April 2004

Kathryn Chorlton, Dr Mark Connor (Psychology), Grant holder: Dr Sam Jamson

The "Older Motorcyclist" project was funded by the Department for Transport in a response to the increasing number of motorcycling accidents involving this specific age group. The work aimed to collect information to provide a broad picture of the older motorcyclists' activities in terms of exposure, experience, vehicle characteristics, riding history and attitudes to risk. The study involved four stages; a literature review, a survey examining ownership characteristics completed by 1009 riders, a survey examining psychological determinants of risky riding behaviours completed by 4929 riders and a simple accident analysis using STATS 19 data.

The initial survey found evidence for the shift in the nature of motorcycling, in that it has, for some, become a leisure activity, with the motorcycle being more of an accessory than a means of transport. The data suggested that 85% of the riders engaged in leisure riding, making trips for no other purpose than pleasure. These leisure riders tended to comprise of long-term and returning riders owning the larger capacity motorcycles. The increased income, disposable income and employment position of these riders is likely to account for their opportunity to indulge in leisure riding. A second survey examined the key psychological predictors of riders' intentions to engage in risky riding behaviours. The Theory of Planned Behaviour (Ajzen 1985, 1988,1991) was used as a model to examine riders' intentions to engage in speeding, close following, "going for it", lack of awareness, riding fast into a corner, drink riding and group riding. On average the predictors explained 50% of the variance in intentions to engage in risky riding behaviours. Past behaviour, measures of attitude and measures of control emerged as the most consistent predictors of intentions across scenarios. A number of possible interventions are discussed along with ideas as to the likely recipients and the most appropriate timing of such interventions.

Human Machine Interface and the Safety of Traffic in Europe (HASTE)

EU Fifth Framework programme from January 2002 to January 2005

Hamish Jamson, Dr Sam Jamson, Dr Natasha Merat, Frank Lai, Grant holder: Professor Oliver Carsten

Collaborators: Delft, MIRA, TNO, Transport Canada, Volvo, VTI, VTT, University of Minho

The aim of HASTE is to develop methodologies and guidelines for the assessment of in-vehicle information systems (IVIS), i.e. to formulate pass/fail criteria for IVIS. A major technical and scientific objective of HASTE is the identification and exploration of the relationship between traffic scenario, driver and IVIS. This relationship will be investigated by studying behavioural, vehicle, psycho-physiological, and self-report measures. The partnership consists of eight European partners and one partner from a country with a cooperation agreement and consists of a balance of Northern and Southern European countries. A large number of experimental studies were carried out using surrogate IVIS to determine the likely effects of driver distraction on performance. The most sensitive and robust performance measures were used to test four real navigation systems in simulator and field trials. The project is now in its final stages of suggesting an appropriate 'Test Regime' for the evaluation of real systems/tasks in a design process.

Driver Response to AFS Failure

Jaguar from November 2003 to January 2004

Grant holder: Hamish Jamson

Active Front Steer (AFS) has the ability to apply varying road wheel angles for the same steering wheel angle, depending on the speed of the vehicle. It achieves this by changing the steering gain dynamically and can be a useful driver aid: less steering wheel input is required at low speeds than a more traditional fixed-gain steering system to achieve the same radius of turn. Should an AFS system fail, it is designed to revert back to a fixed-gain system. Concerns have been expressed by designers of AFS systems that this sudden change in steering gain may prove hazardous for drivers and be particularly difficult for them to handle. Using the Leeds Driving Simulator, this study compared driver behaviour using both AFS and fixed-gain steering systems. Failures of each system were also investigated. Fixed-gain system failure was simulated by a loss of steering power-assist. Forty drivers, balanced for age and gender took part in the study.

Fully-functioning AFS had some advantages over fully-functioning fixed-gain steering. Drivers found AFS less demanding, demonstrated by the fact that they showed significantly fewer steering reversals. They also rated AFS as easier to control in curved sections. Whilst making left-hand turns at a series of T-shaped intersections, there was a highly significant worsening of driver performance between steering functioning normally and failed steering. However, drivers found AFS failure no harder to manage than power-assist failure. Indeed, there were statistical trends suggesting that, if anything, AFS failure was easier for drivers to deal with than loss of power-assist.

Adaptive Integrated Driver-vehicle InterfacE (AIDE)

European Commission Sixth Framework Programme, Information Society Technologies from 2004 – 2008

Dr Sam Jamson, Dr Natasha Merat, Frank Lai, Hamish Jamson, Grant holder: Professor Oliver Carsten

Volvo Technology Corporation (coordinator); European Commission Joint Research Centre; Netherlands Organisation for Applied Scientific Research (TNO); Institute of Communications and Computer Systems, Greece (ICCS); and 23 other partners.

The general objective of the AIDE Integrated Project is to generate the knowledge and develop methodologies and human-machine interface technologies required for safe and efficient integration of ADAS, IVIS and nomad devices into the driving environment. Specifically, the IP will design, develop and validate a generic Adaptive Integrated Driver-vehicle InterfacE (AIDE) that employs innovative concepts and technologies in order to:

(1) maximise the efficiency, and hence the safety benefits, of advanced driver assistance systems,

(2) minimise the level of workload and distraction imposed by in-vehicle information systems and nomad devices and

(3) enable the potential benefits of new in-vehicle technologies and nomad devices in terms of mobility and comfort, without compromising safety. The AIDE concept will be implemented, demonstrated and validated in three different test vehicles: a city car, a luxury car and a heavy truck. ITS is involved in two sub-projects of AIDE: SP1, Behavioural Effects and Driver-Vehicle-Environment Modelling; and SP2, Evaluation and Assessment Methodology.

NETWORK MODELLING

Co-ordinating Urban Pricing Integrated Demonstrations (CUPID)

EU Fifth Framework programme from January 2000 to March 2004

Dr Paul Timms, Professor Tony May, Dr Simon Shepherd, Grant holder: Dr Dave Milne

Collaborators: TTR (UK); ISIS (I); TIS (P); TUD (D); SINTEF (NO)

CUPID is a Thematic Network which has provided state of the art research intelligence about urban transport pricing. In particular, it has provided guidance and assistance to eight European cities that have been developing and attempting to trial road pricing schemes, as part of the related PRoGRESS project. Those trials which have proved possible within the timescale of the project have now been carried out and the results were presented at a project conference in London during February 2003. The final report on the work has now been accepted by the European Commission and the consortium is currently pursuing the potential for follow-up work. Further details are available at www.transport-pricing.net

Advancing Transport Network Design through Improved Behavioural Response

EPSRC from April 2003 to December 2005

Dr Agachai Sumalee, John Nellthorp, Dr Richard Connors, Grant holder: Professor David Watling

The objective of this project is to advance the

techniques available for problems of the network-level, bi-level optimisation kind, e.g., determining optimal toll levels/locations subject to an equilibrium response. Research reported in the project in 2004 has further advanced the understanding of the link between optimal toll patterns for equilibrium models with perfect and imperfect information, studied the impact of incorporating multiple user classes into the equilibrium model, and has developed and tested sensitivity-based computational schemes for conducting the network optimisation. Our most recent work has involved incorporating equity objectives and constraints into the problem, and devising efficient algorithms for joint discrete/continuous design problems, such as the simultaneous determination of optimal toll levels and locations.

The Design of Optimal Strategies

EPSRC from July 2002 to June 2004

Dr Guenter Emberger, Dr Simon Shepherd, Dr Agachai Sumalee, Grant holder: Professor Tony May

Collaborating Partners: TRL Ltd.

The overall aim of the project was to use a range of models to enhance our understanding of urban transport and land use systems and, through this, to develop guidance on the design and implementation of integrated land use/ transport strategies. All three of our models used, START/DELTA, MARS, and TPM showed that reduced public transport fares and increased frequencies contribute significantly to optimal strategies. This brings into question the issue of control over Public Transport services and whether subsidies from the use of demand management instruments such as road pricing cordons should be considered. Adding financial and environmental constraints increased road user charges whilst reducing the subsidy required for improved public transport services. Spatial and temporal variations in instruments were able to improve the performance of strategies whereas land use responses to optimal strategies were not significant. The most interesting result was that different strategies resulted from the use of a CBA as opposed to a target based approach. This highlights the possible inconsistency between local targets and values used for impacts on emissions and accidents.

Network Reliability

DfT from January 2003 to March 2004

Dr Agachai Sumalee, Dr Richard Connors, Dr Jeremy Toner, Grant holder: Professor David Watling

This project is funded by the UK Department for Transport under the New Horizons programme. The project consists of two main phases. The first phase is to develop an efficient approach for evaluating travel time reliability with dependent probability of link failure for a large-scale network. A framework of cause-based failure approach is utilised to frame the dependent link failure into an easier format to handle during the evaluation process. A method based on partitioning algorithm and stratified Monte-Carlo simulation has been developed for the evaluation of travel time reliability. The method was tested with a medium-sized SATURN buffer network. The second phase of the project is to look at the travel time reliability from a dynamical perspective. The demand for travel on a single link is treated as an inflow Professorile over a period of time, based on the dynamic whole-link model of Carey et al. The project introduces the concept of day-to-day variation of the inflow Professorile and attempts to analytically estimate the expected travel time for the users from different departure times. The project was completed in March 2004.

A Model to Assess Public Transport Reliability

DfT/EPSRC from September 2003 to September 2005

Kate Woodham, Peter Balmforth, Grant holders: Dr Dirck van Vliet, Dr Ronghui Liu

A research project funded jointly by DfT and EPSRC under the Future Integrated Transport (FIT) programme.

The overall aim of this project is to enhance modelling of bus operations and to develop methods for direct assessment and analysis of public transport reliability. More specifically this project will develop explicit representation of buses in terms of their timetables and scheduling and of bus passengers into an existing micro-simulation model of vehicle traffic, DRACULA, in order to model how, on a day-to-day basis, unreliability occurs and to quantify its scale and causes. The model will produce numerical measures of reliability and assess how measures such as bus lanes or signal priority schemes can improve reliability. Specific studies of Warrington will be carried out in conjunction with Warrington Borough Council and with the cooperation of several bus operators and transport consultants.

Platform Grant: Towards a Unified Theoretical Framework for Transport Network and Choice Modelling

EPSRC January 1st 2004 – December 2007

Professor Andrew Daly, Professor Tony May, Dr Paul Timms, Dr Simon Shepherd, John Nellthorp, Dr Richard Batley, Dr Gerard Whelan, Dr Ronghui Liu, Dr Agachai Sumalee, Dr Richard Connors, Grant holder: Professor David Watling

The objective of this grant is a strategic one, to provide a base-line level of funding in order: to provide security for the group of researchers involved; to coordinate ITS research in the three fields of networks, choice modelling and appraisal; to enable international collaboration with other groups; and to support small scoping studies of speculative research ideas. While there have been many smaller activities supported by this grant, the four primary research themes that have been explored to date have been: the development of a wide-ranging philosophical context for transport modelling; the exploration of alternatives to random utility theory for the explanation of user behaviour, and the connection of these alternative theories to RUM; the exploration of the link between minimal assumptions required for a travel behaviour model and those required for an economic appraisal; and the development of methods for quantifying and optimising network reliability. In addition, a three-day joint workshop was held in Leeds on a range of topics related to network modelling and optimisation, dynamics and choice modelling in February 2004, involving leading academics from several Italian universities.

Towards the Development of Efficient, Equitable and Acceptable Urban Transport Systems

Volvo Research Foundation, Future Urban Transport programme

January 2004 - December 2006

Dr Agachai Sumalee, Dr Richard Connors, Grant holder: Professor David Watling

Collaborating Partners: Professor Michael Patriksson (Chalmers University, Gothenburg), Dr Clas Rydergren (University of Linkoping)

The objective of the project is the development of a decision support tool, to explore the impact of future policy measures (e.g. road capacity changes, tolls, public transport subsidies, bus frequencies) on measures of economic efficiency, equity and public acceptability. The technical approach involves the adoption of a multi-modal, multi-class equilibrium model, for which sensitivity analysis is used to compute directional derivatives of changes to network flows caused by the policy variables, which directly accounts for the behavioural response of travellers to the policy measures. Presently, the theory and computational procedures have been completed for the cases of efficiency and equity. The remaining work will involve, among other tasks, the development of a practical procedure for exploiting this information and the trade-offs involved in a realistic policy context.

Sustainability Planning for Asian Cities making use of Research, Know-how, and Lessons from Europe (SPARKLE)

European Commission (Europe-Aid) from November 2004 to August 2006

Professor Tony May; Dr Nick Marler, Dr Agachai Sumalee, Grant holder: Dr Paul Timms

Collaborating Partners: Institute for Transport Planning and Traffic Engineering, Vienna University of Technology (Austria), Faculty of Engineering, Ubon Ratchathani University (Thailand), Faculty of Engineering, Chiang Mai University (Thailand).Faculty of Engineering, Khon Kaen University (Thailand),Transport Development and Strategy Institute (Vietnam), National Transport Committee, Ministry of Communication, Transport, Post and Construction (Laos PDR), Ministry of Public Works & Transport, Department of Planning (Cambodia).

The project objective is to promote and transfer knowledge to the countries of South East Asia on the process of developing sustainable urban land use and transport policies, and to provide technical training to local planners and decision-makers on how to use scientific and logical approaches to formulate a sustainable land use and transport policy. The main activities will involve:

(1) a First Seminar in Bangkok to disseminate results of relevant EU research projects on

principles and approaches towards sustainable land use and transport planning;
(2) a Second Seminar in Hanoi to provide feedback from participants in the training courses about the relevance of the approaches to Asia. There will be ongoing dissemination about the project throughout its lifetime.

STEPS

EU Jan 2004 - July 2006

Professor Tony May, Dr Simon Shepherd, Dr Ann Jopson, Dr Graham Clarke (Geography), Grant holder: Dr Simon Shepherd Collaborating Partners: Buck Consultants International (BCI), The Netherlands (Project Coordinators), AUEB, Greece, JRC IPTS, Spain / EU, KUL - SADL, Belgium, LT, Finland, Novem, Netherlands, Spiekermann und Wegener (S&W), Germany, Stratec, Belgium, TIS, Portugal, TRL, United Kingdom, TRT, Italy, TTR, United Kingdom, UPM, Spain.

STEPS (Scenarios for the Transport System and Energy Supply and their Potential Effects) is funded under the EU Thematic Priority 1.6.2 'Sustainable Surface Transport'. The Overall objectives are (i) to develop scenarios for the transport (ii) translate these scenarios into policy recommendations and to identify needs for future research, (iii) to communicate and discuss the results and findings of the project by holding Sounding Board Forums and Clustering Meetings. The project has reviewed the state of the art and reported on current trends in energy use and the relationship with transport requirements. The next stage of the project will develop scenarios for future fuel and vehicle technologies and apply these within a range of regional/European models.

PERIURBAN

EC from September 2002 to November 2005

Frances Hodgson, Grant holder: Dr Paul Timms

Collaborating partners: The Energy Research Institute (TERI), New Delhi; Anna University, Chennai; IRMA, Gujarat; Stockholm Environment Institute (SEI); Technical University of Vienna (TUW)

The specific scientific and technological objectives of PERIURBAN are:

To identify interlinkages between environmental and socio-economic processes in the peri-urban interface (PUI), particularly in India.

To understand the existing institutional mechanisms within PUI in the Indian region.

To identify and understand energy and transport sector pressures on natural resources in peri-urban areas.

To formulate a set of policy options to promote economically and environmentally sustainable settlements in the rural fringe areas around urban settlements in Indian region.

ITS is responsible for a work package concerning transport issues in peri-urban areas. It has already organised a workshop on these issues in Bangalore in July 2004, and is organising a workshop in Leeds to be held in April 2005. A deliverable will be produced in mid 2005.

TRAFFIC, ENVIRONMENT AND INFORMATICS

LANTERN Platform Grant

EPSRC from January 2001 to January 2005

Dr Paul Goodman, Dr Ronghui Liu, James Tate, Grant holder: Professor Margaret Bell

Collaborators: York City Council, Leicester City Council

The purpose of the LANTERN Platform Grant (PG) is to provide the time needed for key researchers from the internationally leading departments of ITS and the Energy and Resources Research Instituite (ERRI) to carry out fundamental research identified in LANTERN thereby making the best use of the equipment and facilities enhanced by the recent award of up to £4.2 from the EPSRC:JIF. The PG intends to contribute substantially to the success of the research programme LANTERN, by pump-priming entirely new theoretical approaches, to formulate robust statistical analyses and develop novel survey methodologies to create microscopic simulation tools for predicting pollutant concentrations in the urban environment. The proposed research team members present unique complimentary skills that by working together will, make substantial progress in the core research areas of LANTERN to gain a better understanding of the dispersion of pollutants in the street canyon, and identify multi-disciplinary research to generate at least four proposals for cross-Research Council funding each year of the grant. This project is enabling key researchers in ITS in the field of microscopic modelling of traffic and noise to carry out integrated monitoring and modelling with ERRI on dispersion. A key to the success of this project, is in achieving integrated survey campaigns and data analysis using the database, developed by the School of Civil Engineering. The PLATFORM research programme has already delivered: In the dispersion area: a practical scale Lagrangian based model capable of representing the dispersion of traffic based pollutants within a fully 3 dimensional description of urban topographies. The model has demonstrated the impact of building structures on the mean concentrations of pollutants within urban streets for a range of background weather conditions. The combined model will provide a step change in the capability of Local Authorities to understand the influence of traffic on local air pollution hot-spots and has received significant support from several City Councils in the form of traffic and emissions data. In particular, strong links have been formed with York, Leeds and Leicester councils. In the traffic area: The ITS has carried out comprehensive data capture of SCOOT traffic data simultaneously with roadside pollutant concentrations and probe vehicle pollution monitoring. A microscopic simulation model has been integrated with the SCOOT system so that the data from the detectors drives the vehicles in the microscopic model. The model will be used to predict pollutant emissions. The model is being calibrated against measured traffic and noise level measurement. The model will be used to investigate the complex relationships between traffic, emissions and pollutant levels for various meteorological conditions. More information on the Platform Grant is available on the ITS Instrumented City website.

Marie Curie Training Site TMS

European Commission from January 2002 to December 2005

Grant holder: Dr Susan Grant-Muller

The Traffic, Modelling and Safety Marie Curie Training Site is one of two sites for which ITS gained international recognition under the EU FP5 programme. Students registered for PhD study in Europe are able to benefit from the opportunity for supervision and training by leading researchers in this field. To date 7 students have visited the site from Italy, Spain and Poland. Example topics of study include (i) A new approach to estimating the environmental impacts of road transport and (ii) Use of Neural Networks to model roadside pollutant concentrates.

RUPERT (Reducing Urban Pollution & Exposure from Road Traffic)

Department of Health from October 2002 to September 2004

Asif Chaudry, Dr Haibo Chen, Dr Anil Namdeo, Grant holders: Professor Margaret Bell, Dr Haibo Chen

Collaborators: University of Bradford, Building Research Establishment

In collaboration with the University of Bradford and BRE, this project develops an innovative modelling framework for NO2, CO and PM to simulate personal exposures of different population groups across a city, and to assess the impact of roadside concentrations on these exposures. This has been achieved by modeling the frequency distribution of personal exposures (PEFDs) as a function of urban background and roadside concentrations under different traffic conditions. The modelling framework combines new and existing models relating traffic and air pollution data, with particular emphasis of the impact of congestion, and an existing probabilistic model of air pollution exposure. The modelling framework is parameterised and applied using data from Leicester and possibly extended to York. The relationships between predicted PEFDs across the city and outdoor concentrations provide a basis from which to estimate the potential health benefits of measures to reduce concentrations at roadside and urban background locations, based on results of time-series studies. To assess the personal exposures, more than 4000 road links in Leicester have been characterised into four groups using the k-means algorithm. In addition, the use of neural networks as a means of roadside pollution prediction has been investigated using the SCOOT data (i.e. M02, A02) and metrological conditions (e.g. wind speed, wind direction and temperature). A comparison between the two neural networks developed shows that both models are able to explain about 77% and 65% of the CO and NO2 variations respectively. A sensibility analysis has been carried out in order to determine which of the input variables were mostly important to the estimation of the pollutant concentrations. It shows that the weather data plays the most

important role in the formation process of the concentrations. The transferability of the trained neural networks has also been tested with data from another road intersection in Leicester. The results show that the neural networks still perform well. Intensive data analysis reveals that both the RPM and AURN data have significant diurnal, day-of-week and seasonal variation, corresponding to local traffic conditions.

DAPPLE (Dispersion of Air Pollutants and their Penetration into the Local Environment).
EPSRC from April 2002 to March 2006
James Tate, Dr Anil Namdeo, Dr Haibo Chen, Grant holder: Professor Margaret Bell
Collaborators: Universities of Cambridge, Surrey, Bristol and Westminster, Imperial College London, Met Office
This is a collaborative project with LANTERN partners ITS, ERRI (GEA) and the School of Civil Engineering University of Leeds, Universities of Cambridge, Surrey, Bristol and Westminster, Imperial College London, Met Office.

DAPPLE is a four year project involving six universities and funded by the Engineering and Physical Sciences Research Council (EPSRC). DAPPLE's aim is to increase our understanding of vehicle emissions, pollutant dispersion and exposure to pollution in realistic urban environments, to such an extent that makes possible the improvements necessary to enable the better planning and management of urban air quality needed to make our cities healthier and more pleasant places in which to live and work. The research includes wind tunnel modelling, computer simulations, field work and analysis. The research teams are working closely with the users of the project output (e.g. local authorities and government agencies) to ensure that deliverables are of real and practical value. The field work is based in the area around the intersection between Marylebone Road and Gloucester Place in central London. It involves vehicle movement monitoring, wind and pollution measurements, tracer dispersion studies, and personal exposure measurement. The DAPPLE project is a mostly field based campaign aiming to understand the influence of urban traffic and urban junction topographies on the dispersion of pollutants, and is based in London. So far a four-week campaign has been carried out in London (April 2003) with air flow, traffic and pollutant measurements provided by LANTERN consortium members in several locations around the junction. The flow measurements are supporting the evaluation of a tracer release experiment that took place in the middle of the campaign in order to provide understanding of how an accidental release may disperse through London streets. ITS with support from SoC is setting up the database for Marylebone SCOOT Region in London and ITS will implement the WebCOMIS and ETEM algorithms. Traffic surveys have taken place to validate the SCOOT model and pollution monitoring using roadside monitors and the mobile laboratory has taken place. The Emissions from ETEM will be input to ADMS and the roadside measured levels compared with predicted.More information on DAPPLE is available on the ITS Instrumented City website.

Professor Joe Beebe, NCVECS (US), Visiting Fellowship.
EPSRC from May 2002 to April 2004
Commissioning LANTERN infrastructure associated with measuring transient engine emissions
James Tate, Grant holder: Professor Margaret Bell
Collaborating partners: Energy and Resources Research Institute (ERRI), University of Leeds
This funds four three-weeks duration visits to enable Dr. Joe Beebee from Colorado State University to assist with the commissioning of the engine test bed and associated emissions measurement equipment and the specification and commissioning of the instrumented car. This is high Professorile activity has considerably enhance the research capability and fostered and strengthened the collaboration of ITS with Fuel and Energy.

Future Urban Technologies Undertaking Research to Enhance Sustainability (FUTURES)
EPSRC from April 2004 to March 2009
Dr Paul Goodman, Dr Anil Namdeo, Grant holder: Professor Margaret Bell
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, Bristol, Centre for Human Service Technology, University of Southampton, Intelligence, Agents, Multimedia Group, University of Southampton, Transport Research Laboratory (TRL)
SUE FUTURES: Environment Assessment of New Vehicle Technology with Improved Confidence
FUTURES is one of four transport research consortia within the EPSRC's Towards a Sustainable Urban Environment Programme. The project, following on from an initial scoping study, is a five-year research programme to investigate and promote the role of new technologies in achieving sustainable urban mobility. FUTURES will address the ways in which new transport-related technologies will be able to contribute to a sustainable urban environment. There is no single scenario or vision which describes the extent to which various communications, location, detection, materials; power train, vehicle and computing technologies can contribute to a sustainable urban environment. Travellers can have their urban mobility needs met in effective and efficient ways through a mixture of conventional and novel services, utilising advanced vehicle and related technologies and teleservices. Understanding and quantifying the opportunities involves social, environmental, traffic, mobility, location/communication, vehicle, goods and operational issues, from a range of disciplines. The FUTURES consortium is comprised of six main research groupings in four institutions. The consortium possesses a collective and complementary expertise and track record in the understanding, development, application and opportunities of transport and transport-related technologies. It also harnesses an understanding of people, systems and vehicles which FUTURES believes are the three key 'actors' in the use of new technologies to pursue sustainable urban mobility. The overriding priority of the consortium is to conduct high quality research. More information on SUE FUTURES is available on the ITS Instrumented City.

RETEMM (Real World Traffic Emissions Monitoring and Modelling)
EPSRC from October 2003 to September 2007
Dr Haibo Chen, Dr Anil Namdeo, James Tate, Grant holder: Professor Margaret Bell
Collaborators: Energy & Resources Research Institute (University of Leeds), City Councils of York, Leeds, and Leicester, Ford.
An EPSRC award of £624k has been awarded across ITS, ERRI(GEA) and SoC. The RETEMM project will research real-world regulated and unregulated emissions with low time resolution to be achieved through in-vehicle and dynamometer measurements. RETEMM will study the effect of driver behaviour on exhaust emissions for vehicles driven in a range of urban traffic conditions; busy, quiet, congested, in cities, along different road types and across various junction geometries, to produce data suitable for the development of microscopic traffic emissions models. Building on earlier work, the emissions measurements will include cold starts for winter and summer and will seek to investigate the speciation of the cocktail of exhaust gases and explore how the levels vary across the spectrum of vehicles in the UK fleet. The results will improve the emissions prediction algorithm based on the traffic characteristics data from SCOOT, (Split Cycle offset Optimisation Technique) and demonstrate the transferability of the results in London. This RETEMM project will use state of art equipment made available from the EPSRC: JIF award, and collect data of a volume and nature that will be unique in the world. More information on RETEMM is available on the Instrumented City website.

IMAGINE (Improved Methods for the Assessment of the Generic Impact of Noise in the Environment)
EU Sixth Framework from December 2003 to December 2006
Dr Paul Goodman, Grant holder: Professor Margaret Bell
In response to the need for strategic noise maps as required under the EU Directive 2002/49/EC, improved assessment methods for environmental noise will be required. Noise from any major noise source, be it major roads, railways, airports or industrial activities in agglomerations, needs to be included in the noise mapping. For road and rail, improved methods will be developed in the 5th Framework Harmonoise project. These methods will be adopted to develop methods for aircraft and industrial noise in the IMAGINE. Noise source databases to be developed in IMAGINE for road and rail sources will allow a quick and easy implementation of the methods in all member

states. Measured noise levels can add to the quality of noise maps because they tend to have better credibility than computed levels. Guidelines for monitoring and measuring noise levels will be developed to produce a combined product (measurement and computation) that has high quality and high credibility. Noise action plans will be based on strategic noise maps. The IMAGINE project will develop guidelines for noise mapping that will make it easy and straightforward to assess the efficiency of such action plans. Traffic flow management will be a key element of such action plans, both on a national and a regional level. Noise mapping will be developed into a dynamic process rather than a static presentation of the situation. IMAGINE will provide the link between Harmonoise and the practical process of producing noise maps and action plans. It will establish a platform where experts and end users can exchange their experience and views. This platform should continue after the project and provide a basis for exploitation of the IMAGINE results. More information on IMAGINE is available on the Instrumented City website.

Health Effects and Risks of Transport Systems (HEARTS)

European Union 5th Framework Programme, "Quality of Life" thematic Programme From September 2002 – September 2005.

Dr Paul Goodman, Dr Anil Namdeo, Grant holder: Professor Margaret Bell

Collaborative Partners: WHO Europe (coordinators), Imperial College London (UK), KTL -Kansanterveyslaitos Folkhälsoinstitutet (Finland), ENEA - Ente per le Nuove Tecnologie, l'Energia el'Ambiente (Italy), ISIS - Institute of Studies for the Integration of Systems (Italy), INRETS - Institut National de Recherche sur les Transports et leur Securite (France), PRISM Laboratory, Université de Versailles Saint-Quentin (France), NTUA - National Technical University of Athens (Greece), RIVM - Rijksinstituut voor Volksgezondheid en Milieu (Netherlands), Berry Environmental Ltd. (UK), Institute for Transport Studies, University of Leeds (UK)

The HEARTS project promotes healthier transport policies through the development of tools that support the integration of health impact assessments in the decision-making process. The project focuses on health risks associated with air pollution and noise, and with injuries, especially within vulnerable groups such as children and elderly people. HEARTS tools are based on models of exposure and health effects generated by different transport policies. Scenarios will be developed and linked to provide integrated estimates of health effects. These models will be embedded into a geographical information system (GIS) and tested by three European pilot cities. HEARTS models specifically address traffic and emissions, air pollution, noise, traffic accidents, time activity and exposures, and health effects. As part of the HEARTS project ITS will be involved in the development of noise exposure modelling techniques. Website(s): The main HEARTS page on the World Health Organisation (WHO) site.

ECONOMICS AND BEHAVIOURIALMODELLING

Better targeted marketing of public transport through understanding of non-users misperceptions

EPSRC from December 2000 to April 2004

Jo Beale, Dr Paul Firmin, Grant holder: Professor Peter Bonsall

Collaborating partner: West Yorkshire Passenger Transport Executive

The project sought to investigate the extent to which mode choice decisions are based on travellers' inaccurate assumptions about modal attributes and to establish whether targeted marketing might help to correct some of these inaccurate assumptions and hence increase use of public transport. Following a literature review and focus groups to determine the factors affecting mode choice for local journeys, a questionnaire was designed to ascertain travellers' perceptions of the journey from Horsforth to Leeds by bus and by car and their views as to the importance and quality of key attributes of the alternative modes. The results were analysed and compared with objective data to determine what aspects of the journey were inaccurate and which inaccuracies were most likely to be favouring use of car rather than bus. The most notable findings were that the most pronounced inaccuracies related to the car mode, which was seen in an overly rosy light and that non-bus users were inclined to exaggerate the disadvantages of bus use.

A marketing campaign, designed to correct these biases, was devised and implemented by Metro, with whom we are working on this project. A follow-up survey was conducted to see whether the targeted marketing has had any discernible effect on attitudes or behaviour (the survey included a control group who did not receive the targeted marketing). The results suggested that the marketing had had a positive effect on the attitudes of people who had been regular bus users at the time of the first survey but that it had had a negative effect on the attitudes of non users. We also noted differences in the response according to age and gender. A second marketing campaign, designed to appeal to non bus users, was conducted (again with careful experimental control) and confirmed that different segments of the population respond in very different ways to the same message. Explanations for this result can be found in psychological theory.

Integrating Transport and eCommerce in Logistic Supply Chains (ITeLS)

DfT LINK from May 2001 to August 2004

Dr Tony Fowkes, Dan Johnson, Jeremy Shires, Grant holders: Professor Peter Mackie, Dr Tony Fowkes

Collaborating partners: Cardiff University, University of Ulster.

This project has now reported with the final dissemination conference held in October 2004. The Leeds ITS contribution has included the specification of scenarios for testing purposes, the development of a cost model, and the construction of a strategic freight transport planning model (LEFT2). Documentation of the scenarios, LEFT2 , and results from running the scenarios on LEFT2, are available on the ITeLS website (www.itels.org.uk). Implementing pricing reform in transport – effective use of research on pricing in Europe.

Implementing pricing reform in transport – effective use of research on pricing in Europe (IMPRINT-EUROPE)

EU Fifth Framework Programme from April 2001 to March 2004

Bryan Matthews, Batool Menaz, Grant holder: Professor Chris Nash

Collaborating partners: ISIS (IT); FAV (DE); TNO (NL); BUTE (HU)

The principal purpose of this project was to bring together policy-makers, operators, researchers and other stake-holders in order to promote the implementation of the required changes to transport prices. Papers and conclusions from all seven of the seminars are now on the website, as is the Final Report. The project achieved a good degree of consensus regarding future priorities for policy and research. A consortium involving ITS, being lead by ISIS (IT), is soon to embark on a follow-on project entitled IMPRINT-NET.

Forecasting Handbook

First from May 2003 to August 2004

Dr Gerard Whelan, Jeremy Shires, Grant holder: Professor Peter Mackie

The Institute was commissioned by First to develop a demand forecasting framework and forecasting handbook. The model has an aggregate elasticity structure which allows for competition between time periods, ticket types and other modes. It is implemented in a flexible spreadsheet application. The handbook is similar to the Passenger Demand Forecasting Handbook used in the rail industry and documents evidence and parameters relevant to urban bus demand forecasting. The overall objective of the project is to assist in First's medium to long-term business planning process.

Freight User Benefits

Strategic Rail Authority, from June 2003 to March 2004

Peter Balmforth, Sam Hoque, Grant holder: Dr Tony Fowkes

Collaborating partners: Booz Allen Hamilton.

ITS undertook a Leeds Adaptive Stated preference (LASP) survey of 49 persons connected with freight mode choice decisions, mostly the distribution managers of shippers. Markets covered were coal, metals, auto, express, stone, construction, petrol/chemicals, general merchandise and containers. Attributes valued included modal penalty, scheduled journey time, delay uncertainty, and forced returnings of journeys. The project reported on 31/03/04, but the results are not yet publicly available.

Rail Research UK

EPSRC from April 2003 to July 2006

Professor Mark Wardman, Dr Tony Fowkes, Dan Johnson, Batool Menaz, Jeremy Shires, Dr Gerard Whelan, Grant holder: Professor Chris Nash

ITS are members of the new Universities' Rail

Research Centre, Rail Research UK, which is a consortium of 7 Universities, led by Birmingham and Southampton. ITS is leading a project on the role of rail in integrated transport policy, and participating in a further project on rail user needs, in both cases jointly with the University of Southampton. The work in the first year of the projects has concentrated on identifying alternative roles for rail seen by stakeholders and pressure groups, alternative future scenarios and what is currently known about user needs for passenger and freight transport. We are now preparing our modelling strategy, which includes further development of existing ITS models of passenger and freight transport in order to test a variety of external scenarios and rail strategies, including road pricing, major improvements to rail services and rationalisation strategies.

Generalised Journey Time

Passenger Demand Forecasting Council (ATOC) from May 2003 to March 2004

Dr Gerard Whelan, Grant holder: Professor Mark Wardman

The aim of this study was to evaluate how the railway industry forecasts changes in timetable related service quality and to enhance the current procedure to include access to and egress from the rail network. A large amount of ticket sales data, forming over 50,000 station-to-station demand observations, was analysed and a wide range of different formulations were compared. These included: the traditional railway industry approach of generalised journey time, a composite term covering time, frequency and interchange; the more conventional generalised cost approach; and the estimation of separate elasticities to each aspect of service quality. There was no strong support for changing the weights used to create generalised journey time. However, there was evidence to suggest revised generalised journey time elasticities would be appropriate and fresh recommendations, based on these results and review evidence, were provided. Analysis revealed that the value of time weights used within generalised cost which provided the best fit to the data and which implied sensible elasticities to generalised journey time and to cost often bore little resemblance to the behavioural values typically used in scheme appraisal. Estimating separate elasticities to generalised journey time and cost was found to be statistically superior to the generalised cost specification widely used in transport planning. As far as access time is concerned, it was found that the decay effect is not best represented by a constant elasticity but rather an initial slight drop off in rail trips with distance but then a sharp reduction before a levelling out. It was found preferable to specify separate elasticities to access and egress times rather than include them within an extended generalised journey time term.

Prediction of the Effects of the E-economy on Transport (POET)

EC Fifth Framework from November 2002 to March 2005

Dr Paul Firmin, Grant holder: Professor Peter Bonsall

Collaborating partners: Rand Europe, Transek, ARPA, HUJI, PROODOS, Kessel, and Partners, TRAIL and Solving International

This project seeks to develop a basis for predicting the effects of developments in the e-economy on passenger travel and freight traffic. It involves literature reviews, formulation of an analytical framework, development of scenarios, collection of case study data, calibration of models and prediction of effects for a number of European city regions.

The Leeds input to the project has included a review of technological developments affecting passenger travel, contributions to the development of an analytical framework (a "system diagram" and associated "choice Professoriles") for passenger travel decisions, and the development of a questionnaire seeking firms' expectations of the effect of developments in communications technologies on the amount of teleworking and business travel likely to be done by their employees under different future scenarios. The questionnaire was made available in 5 different languages and administered via the Web. The results were analysed using regression models and, along with equivalent models for other sectors, provide the basis for adjusting the traffic forecasts from urban and regional models constructed by our consortium partners. Further details of the project can be found at www.poet-eu.org.

Road User Charging – Pricing Structures

Department for Transport from May 2004 – September 2004

Jeremy Shires, John Maule (LUBS), Bryan Matthews, Jo Beale, Grant holder: Professor Peter Bonsall

This project was part of DfT's programme of research into the feasibility of a national road charging scheme whereby drivers would be charged according to the distance travelled on congested roads. It addresses a problem inherent in any congestion charging scheme; namely that the theoretically optimum, first-best, pricing structure might be so complicated and dynamically variable that it would be unreasonable to expect road users to predict, let alone respond to, the prices on any given road at any given time – and hence that a better overall result might be achieved with a simpler pricing structure. The project brief required us to consider the extent to which the public could cope with, and respond to, pricing structures such as distance-based charges varying by degree of congestion, time of day and type of road. The evidence from published sources, grey literature and interviews with industry experts was evaluated in the light of theories about human decision making and information-processing abilities. Existing studies of road pricing schemes and tolls were reviewed along with evidence from other transport modes and other industries (notably telecommunications and utilities). Conclusions were drawn on people's willingness and ability to deal with complex/uncertain prices, the coping strategies they adopt (e.g. the use of heuristics), and on the implications this has for the design and implementation of road charging schemes. We concluded that, although people have a strong preference for simplicity, they are able to respond to quite complex tariffs provided that they have a clear and logical structure. However, people's difficulties in estimating distance will severely limit the accuracy of their estimates of distance-based charges and their response to complex pricing signals will be influenced by their attitude to the fairness of the charge.

Evaluating policy fares regulation options

Strategic Rail Authority from June 2004 – December 2004

Dr Jeremy Toner, Jeremy Shires, Dr Richard Batley, Professor Mark Wardman, Professor Chris Nash, Dan Johnson, Grant holder: Dr Gerard Whelan

The research provides a quantitative and qualitative analysis of the impact of changes to fares and ticketing restrictions in two passenger rail markets in Britain. To these ends the research draws on economic theory, current regulatory and pricing practice in three industry sectors, a series of in-depth interviews with operators and a large scale survey of passenger preferences culminating in the development and application of econometric models of passenger behaviour. The behavioural models are then applied to two case study settings to determine a structure for optimal fares regulation.

Enhancing the Road Travel Experience

Rees Jeffreys from April 2002 to March 2004

Jo Beale, Grant holder: Professor Peter Bonsall

Collaborating partner: TRL Ltd.

This project sought to establish the expectations and aspirations of road users (car drivers and passengers; pedestrians; cyclists; motorcyclists; taxi, bus and coach passengers; PSV and freight drivers) and to examine the extent to which current policies and actions by providers of roads, and the services using them, are likely to meet these expectations and aspirations. Where a gap was apparent, the reasons for this were examined and, where appropriate, recommendations made for remedial actions or further research.

The research involved a substantial literature review covering past investigations of road user opinions, focus groups and interviews with drivers and fleet operators, and an investigation of what a road-user might "reasonably" expect in terms of level of service. A major survey of road users and providers revealed significant differences in the priorities between those who use the roads and the authorities and Professoressionals who provide them. We also noted differences between the problems that users regard as important for "other people" and those that they experience themselves; the tendency being for most issues to be seen as more of a problem for other people. Interesting differences also emerged in the perception of problems by people with different socio-economic characteristics.

Cycle facilities on the university of Leeds campus
University of Leeds Estates Service from October 2003 to March 2004
Pelle Envall, Grant holder: Professor Peter Bonsall
ITS were commissioned by the University to conduct a review of facilities for cyclists on the campus and to propose alternative strategies for improving the provision of such facilities. The work was conducted in the context of the University's Transport Plan which seeks to reduce the proportion of staff and students driving to the campus and to promote the use of more sustainable modes. A phased programme of enhancements to the currently available facilities was recommended – with regular monitoring of the uptake of such facilities.

REVENUE
EC from September 2003 – November 2005
James Laird, John Nellthorp, Dr Simon Shepherd, Professor Tony May, Grant holder: Professor Chris Nash
Collaborating Partners: ISIS, TIS, IWW, TOI, NEA, LETS, WUT, ECOPLAN, AdPC, KUL, DIW, TTR, STRAFICA, INFRAS, ENPC
In recent years, transport pricing research has provided major contributions to the shaping and formulation of EU policies. Following the 1995 Green Paper and the subsequent White Paper (1998), pricing principles have been established and cost valuation methodologies have been tested, leading to basic policy recommendations. These are reflected in the revision of the Common Transport Policy (2001) and in several EU Directives and proposals thereof (e.g. on rail – 2001, on HGVs – 2003). As part of the process, it has clearly emerged that the impact of pricing policies will heavily depend (in terms of effectiveness, efficiency, equity, acceptability) on the use that will be made of the revenues generated by transport pricing schemes. The REVENUE project has been designed to address this specific issue, thus providing further input to the formulation and development of EU policies in the area of infrastructure charging.

Reforming transport infrastructure pricing on the basis of marginal social costs may have significant effects on the levels of revenue earned, with surpluses on some modes and in some areas, and deficits in other modes and areas. Institutional arrangements would need to allow for this in an efficient, equitable and acceptable manner. Given that these arrangements might well involve multiple layers of government, private infrastructure managers and public private partnerships, the institutional arrangements for the collection and use of revenues would be quite complex.

The REVENUE project therefore has three objectives: To assess current practice for transport revenue use;To develop guidelines for good use of the revenues from social marginal cost pricing; and To examine both current practice and the use of the guidelines on a set of case studies.

Greater Anglia Rail Franchise
Competition Commission from June 2004 to September 2004
Dr Gerard Whelan, Dr Richard Batley, Grant holder: Professor Mark Wardman
This study was undertaken to provide advice to the Competition Commission in its investigation into the award of the Greater Anglia franchise to National Express. A review study was conducted which identified rail elasticities for time, fare and headway relevant to the franchise as well as deducing cross elasticities between rail and coach. Fresh empirical work, based around both revealed and stated preference data, was undertaken to examine competition between rail and coach in East Anglia and between the train services on the two routes between Southend and London.

Passenger Demand Forecasting Handbook Update
Grant holder: Professor Mark Wardman
The Passenger Demand Forecasting Handbook contains a demand forecasting framework and recommended parameters that are widely used in the railway industry in Britain. This update started by identifying areas of weakness in the Handbook. This influenced the search for new empirical evidence as well as providing recommendations for further research. A review of relevant material was then conducted and its potential contribution to the Handbook assessed. Amendments have been made in three key areas. The recommendations relating to external factors, and primarily the GDP elasticities, have been extensively revised based on new evidence and 'road testing' of demand forecasts against actual demand changes. The fare elasticities have also been amended, with the inclusion of journey purpose based elasticities alongside ticket based elasticities and an enhanced procedure for obtaining own and cross elasticities specific to ticket types. The generalised journey time elasticities have been changed in the light of new evidence.

POLICY AND APPRAISAL

Measuring Pedestrian Accessibility EPSRC from July 2001 to March 2004
Charlotte Kelly, Grant holders: Frances Hodgson, Matthew Page, Dr Miles Tight
Collaborating partners: The Pedestrians Association, City of York Council
The overall aim of this project was to increase understanding of the factors which influence levels of walking and the choices pedestrians make in terms of routes. The research developed in three main strands. The first strand consisted of a number of surveys of pedestrian attitudes to aspects of their environment. Key findings showed that a number of attributes were considered important by pedestrians to create a good environment, including: pavement cleanliness (in particular absence of dog mess), safe (and designated) crossing places, good street lighting, exclusion of cyclists from pavements and good connectivity (i.e. the pedestrian network takes you places you want to be). A key positive aspect of walking was felt to be that it encouraged a 'slower pace of life' and offered the opportunity for people to appreciate the urban environment. The second strand of the work explored various ways of providing valuations for different aspects of the pedestrian environment. This work examined the applicability of three types of technique – stated preference, a pseudo-priority evaluator and contingent valuation. Results showed that stated preference was the most useful technique to provide the kinds of valuations required. The final strand of work involved assessing the feasibility for and undertaking the development of a computer based pedestrian evaluation tool, building on the outcomes of the first two strands. The tool provides an overall score for the quality of the pedestrian environment on individual links and for a route as a whole.

KonSULT (Knowledgebase on Sustainable Land use and Transport)
Rees Jeffreys, DfT, EPSRC from January 2001 to December 2005
Bryan Matthews, Dr Ann Jopson, Dr Nick Marler, Jeremy Shires, James Groves (School of the Environment), Grant holders: Professor Tony May, Professor Sally Macgill (School of the Environment)
KonSULT is a web-based information source for policy makers and Professoressionals on the performance of the full range of possible urban land use and transport policy instruments. It provides an introduction to transport policy formulation, and establishes a logical structure in which each policy instrument is assessed from first principles in terms of its impacts on demand, supply and costs, and hence of its contribution to achieving a set of policy objectives and overcoming a given list of problems. Subsequent sections provide case studies drawn from international experience, consider the contexts in which each instrument is best applied, and assess the opportunities for enhancing the instrument by combining it with others in an integrated strategy. KonSULT is hosted on Elsevier's Transport Connect website:http://www.elseviersocialsciences.com/transport/konsult/index.html. At present KonSULT contains details on some 40 policy instruments, with the remainder being covered in less detail. Further development is taking place in connection with a series of related research projects.

Integrated Approaches to Influencing Car Use
EPSRC from October 2000 to March 2004
Dr Ann Jopson, Sarah Gawthorpe, Dr Jo Guiver, Grant holders: Professor Tony May, Dr Miles Tight
Collaborating partners: Metro, City of York Council, Leeds City Council (UK)
This research aimed to discover whether there were complementary benefits to be gained from using attitudinal and behavioural measures (awareness campaigns and company travel plans) in combination with engineering and physical restrictions to influence levels of demand for car based transport in urban areas. The novelty of this work was in the use of each type of measure to enhance the design of the other and through the detailed experimental design enabling the assessment of the performance of the two types of measures on their own and when combined.

Two rounds of surveys were completed with panels in York and Leeds. These considered a

range of 'hard' and 'soft' measures implemented in each city. In practice there were fewer opportunities to test 'hard' measures than originally anticipated. As a consequence a planned final round of surveys relating to real measures was replaced with an innovative use of micro simulation to present subjects with hypothetical changes to the transport system.

Marie Curie Training Site EPA

European Commission from January 2002 to December 2005

Grant holder: Dr Susan Grant-Muller

The Economic, Policy and Appraisal Marie Curie Training Site is one of two sites for which ITS gained international recognition under the EU FP5 programme. The site provides an opportunity for PhD students in Europe to benefit from supervision and training by leading researchers in this field. To date 11 students have visited the site from Belgium, Italy, Spain, Poland, Czechoslovakia and Germany. Example topics of study have included (i) CGE models for evaluating climate change due to Transport and (ii) Tradeable mobility rights: feasibility and socio-economic issues, (iii) Rail ownership models in Europe.

M42 ATM

Highways Agency through Mott Macdonald from September 2002 to August 2007

Professor Margaret Bell, Professor Peter Bonsall, Professor Oliver Carsten, Dr Haibo Chen, Sarah Gawthorpe, Hamish Jamson, Dr Ronghui Liu, James Tate, Dr Tri Tjahjono, Grant holder: Dr Susan Grant-Muller

The Active Traffic Management project for Junctions 3A-7 of the M42 will be one of the Highways Agency's largest and most significant implementation of ATM to date. ITS is advising on the assessment approach for establishing whether individual (and groups of) operational regimes have had a significant impact. Primary indicators will include impacts on safety and the environment as well as the performance of the traffic systems overall. Work to date has involved the specification of a comprehensive assessment methodology and preliminary analysis of the 'before' data.

Aircraft noise perception, representation, measurement, modelling and valuation: further work

(2003-2005) EUROCONTROL

Professor Mark Wardman, Dr Richard Batley, Grant holder: Dr Abigail Bristow

This project aims to fully exploit the social survey and stated preference data set obtained in the original study in order to obtain further insights into the perception and valuation of noise and annoyance from airports. The first phase of this study has added modelled aircraft noise data to the existing data sets which has enabled the use of the level of noise experienced by respondents as a variable in the stated preference models. We have explored the influence of a range of socio-economic and other variables on noise values. We have also obtained a value per unit change in Leq from the substitution of aircraft movements in a stated preference model with modelled changes in Leq. The last phase of the work is underway and involves: the modelling of the relationship between noise and annoyance; further development of the stated preference analysis with special emphasis on values by time period and the appropriate noise index; and comparisons with values obtained elsewhere.

The Hydrogen Energy Economy: its long term role in greenhouse gas reduction (2001-2003)

Tyndall Centre for Climate Change Research from April 2001 to March 2004

Alison Pridmore, Matthew Page, Charlotte Kelly, Grant holder: Dr Abigail Bristow

Collaborating partners: CLRC, Rutherford Appleton laboratory, SPRU, University of Sussex

A major research project awarded by the Tyndall Centre for Climate Change Research which is itself funded by three major research councils (EPSRC, ESRC and NERC). The project was led by CLRC, Rutherford Appleton Laboratory and commenced in late 2001. In the first phase work at ITS included a review of the current state of the art of hydrogen in transport. In the second phase a spreadsheet model to investigate pathways to 2050 was developed at ITS for all modes of transport for the UK and used to explore different future scenarios (Page et al., 2004). This was then integrated into the overall THESIS model of energy supply and consumption across sectors by the team at RAL. The project is now complete (Dutton, 2005).

Study of Policies regarding Economic instruments Complementing Transport Regulation and the Undertaking of physical Measures (SPECTRUM)

European Commission from September 2002 to August 2005

Dr Paul Timms, Professor Tony May, Professor Chris Nash, Dr Dave Milne, Charlotte Kelly, Dan Johnson, Sarah Gawthorpe, Grant holder: Dr Susan Grant-Muller

Collaborators: University of Antwerp (BE), University of Oxford (UK), VTT (Fi), Technical University of Vienna (AT), University of Las Palmas (ES), Budapest University of Technology and Economics (Hu), Catholic University of Leuven (BE), ISIS (It), TOI (No), University of Gdansk (Pl)

The overall project aim is to develop a theoretically sound framework for defining combinations of economic instruments, regulatory and physical measures in reaching the broad aims set by transport and other relevant policies. Research will assess the extent to which economic transport measures can be substituted for (or work in synergy with) physical and regulatory measures. The framework will cover both urban and interurban contexts, passengers, freight and a wide range of transport instruments. Work has already been completed in specifying the broad structure of the framework and approach to assessment. Research has taken place to determine theoretically optimum packages in terms of the high level objective function. The measurement and treatment on impacts has been addressed. During the second year of research a series of urban and interurban case studies have taken place to investigate the research questions and populate the framework. A conference and workshop are planned for April 2005 in Gdansk to disseminate results to date. See www.its.leeds.ac.uk/projects/spectrum.

National Policy Frameworks for Urban Transport

EEC from December 2002 to October 2005

Frances Hodgson, Grant holder: Professor Tony May

Collaborating partners:ISIS (France), Dorsch Consult (Germany)

Information is being collected on the performance of urban transport policies at a national level in each of the 15 member states. The assessment is both objective and subjective, involving the collection of a standard set of performance indicators and the conduct of a Europe-wide telephone survey of public perceptions of urban transport policy. Policy implications are being drawn.

Clarifying Qualitative Sub-objectives in Appraisal

DfT from January 2003 to March 2004

John Nellthorp, Frances Hodgson, Grant holder: Dr Ann Jopson

The introduction of the New Approach to Appraisal (NATA) in 1998 represented a major improvement in transport project appraisal. The inclusion of qualitative objectives was a significant development in the appraisal process. Nevertheless, the definition and assessment of the qualitative objectives is not underpinned by decades of applied research in the appraisal context as the economic appraisal is. Thus, the qualitative sub-objectives are less well understood and defined, resulting in somewhat subjective assessment. As Guidance on the Methodology for Multi-modal Studies (GOMMMS) – the multi-modal application of NATA – includes additional qualitative objectives and is used to appraise more multimodal strategies and proposals, the objectivity and coverage of the process could be challenged over its comparatively subjective appraisal of qualitative sub-objectives. Coverage may be challenged if perceived aspects of a sub-objective are omitted from the appraisal. The research sought to clarify the definition and appraisal of qualitative sub-objectives within GOMMMS using social-psychology research methods and models. These were used to study the perceptions of selected qualitative sub-objectives amongst transport users to ascertain a common understanding. The findings of this work allowed the researchers to draw conclusions regarding the incorporation of qualitative sub-objectives within the economic appraisal. The work was designed to build on and add value to the existing GOMMMS framework.

Commission on Urban Transport and the Environment (CUTE)

Japanese Institute for Transport Policy Studies from July 2001 to January 2004

Grant holder: Professor Tony May

Collaborating partners: JITPS, Universities of Nagoya, Karlsruhe, UC Davis, Southern California,

ENTPE

The Commission on Urban Transport and the Environment, sponsored by the Nihon Foundation, was established by Professor Nakamura, the Director of JITPS. It has conducted a review of trends in urban transport, their impacts on the local and global environment, the technological and transport policy approaches to addressing these problems, and the approaches appropriate for governments in developed and developing countries and for the international community. It illustrated its conclusion with a set of over twenty case studies of cities in the developed and developing world. The book of its findings was published in July 2004.

DISTILLATE Scoping Study

EPSRC from January 2003 to March 2004

Frances Hodgson, Matthew Page, Grant holder: ProfessorTony May

Collaborating partners: TRL, University of West of England, University of Westminster, University of York

This study, funded as part of the EPSRC's Sustainable Urban Environment programme, was commissioned to formulate a major programme of research on Design and Implementation Support Tools for Integrated Local Land use, Transport and the Environment (DISTILLATE) which was funded from April 2004.

The aim of the consortium, working with 16 local authorities, was to identify barriers to the development and delivery of sustainable integrated urban transport and land use strategies and to develop a research programme to tackle them. A series of reviews of the key application areas has been published.

Exploitation of Transport Research Results via the Web (EXTR@Web)

EU Fifth Framework Programme from September 2002 to October 2006

Dr Paul Firmin, Dr Ann Jopson, Dr Nick Marler, Bryan Matthews, Batool Menaz, Grant holder: Professor Tony May Collaborating partners: GCI (Belgium, project coordinator); IABG (Germany); ISIS (France); DITS (Italy); Systema (Greece); Neptune (Belgium); GIE (Romania)

The EXTR@Web project aims to collect, structure, analyse and disseminate transport research results. It covers not only EU supported research but also nationally financed research in the European Research Area (ERA), as well as selected global transport RTD programmes and projects. This is to be done by providing, promoting and maintaining an electronic hub – a website-based transport research knowledge centre - where policymakers, researchers and other stakeholders will have well-structured and user-friendly access to transport research across Europe. The project and the website will provide Professoriles of completed and ongoing projects and in many cases give access to project final reports. It will also provide reviews of the research projects, carried out over thirty thematic areas, thus providing access also to the broad implications of the results of the research. The knowledgebase will have a search facility allowing structured searches to be carried out to the user's requirements. EXTR@Web will also provide a valuable permanent archive of transport research results, including research outputs from FP4 which are currently archived in the EXTRA web site which is to be integrated into the new information system. To date, information has been collected about several hundred transport European and national research projects and work is continuing to obtain summary Professoriles of these projects and carry out the related thematic reviews. A working website has also been established to which the incoming information is continually added.

Planning and Urban Mobility in Europe (PLUME)

EU Fifth Framework programme from November 2002 to July 2005

Dr Guenter Emberger, Dr Simon Shepherd, Dr Paul Timms, Bryan Matthews, Dr Ann Jopson, Grant holder: Professor Tony May

Collaborating partners: TTR, ISIS and POLIS.

PLUME (Planning and Urban Mobility in Europe) is a Thematic Network within the Land- Use and Transportation Research cluster of the City of Tomorrow key action funded by the European Commission DG Research.

The objective of PLUME is to facilitate the transfer of innovation in the field of planning and urban mobility from the research community to end-users in the cities of Europe in order to improve urban quality of life. 23 Synthesis Reports summarise research on key subject areas. Annual State-of-the- Art Reviews (SoARs) provide a synthesis of research findings and case studies, with recommendations as to which policies, measures and tools are best able to meet the need for sustainable development, taking account of user needs and barriers to implementation.

Beside the SoARs PLUME facilitates meetings between researchers and end users at a series of workshops, where the usefulness and relevance of the themes addressed is verified through discussions with stakeholders, politicians and city authorities.

Sources for the SoARs are the existing 12 LUTR cluster projects (ARTISTS, ASI, CITYFREIGHT, ECOCITY, ISHTAR, PROMPT, PROPOLIS, PROSPECTS, SCATTER, SUTRA, TRANSPLUS, VELO-INFO) and ongoing national and international research activities.

Detailed information (deliverables, SoARS, Synthesis reports, contacts, etc.) can be found under the project website www.lutr.net.

Distributional Analysis in Appraisal

SRA from December 2003 –March 2004

Grant holder: Professor Peter Mackie

This project examined how distributional analysis could be undertaken in rail appraisal, in line with the Treasury Green Book recommendations. The task can be considered in two steps – understanding the pattern of incidence of the costs and benefits of rail projects and policies by socio-economic and income classes, and deriving a set of social weights by which to aggregate together one unit of benefit received by each of these classes. This poses challenges in terms of data collection, economic assumptions concerning the incidence of benefits and costs, and the applicability of the method.

The report reviewed the relevant literature on distributive weights in public sector appraisal together with key recent literature on the valuation of travel time. We proposed a weighting procedure for different socioeconomic groupings. We implemented this approach illustratively in three case studies using data from the PLANET Strategic and PLANET South models and ticket sales data to examine a national change in fares policy. These case studies used a range of weights, based on different values for the elasticity of marginal utility as found in the literature, including -1, as suggested in the Green Book.

We concluded that a full distributive analysis for all rail appraisals would be wasteful of appraisal resources and proposed a checklist of criteria for judging whether distributive analysis is warranted.

Sustainability Of Land Use and Transport In Outer NeighbourhoodS (SOLUTIONS)

EPSRC from April 2003 – 2008

Dr Anil Namdeo, Sarah Gawthorpe, Grant holder: Dr Gordon Mitchell

Collaborating Partners: Dr Tony Hargreaves, Professor Marcial Echenique, The Martin Centre, University of Cambridge: Professor Hugh Barton (UWE), Dr Stephen Marshall (ICS), TORG, University of Newcastle

The overarching research questions that SOLUTIONS intends to answer are how far, and by what means, can towns and cities be planned so they are socially inclusive, economically efficient and environmentally sustainable. The method for answering these questions consists in a series of in-depth, integrated case studies in cities that represent different urban scales and characteristics, undertaken in partnership with the local planning authorities.

The research examines the interaction between strategic (whole city) and local (neighbourhood) levels with close attention to transport and urban design issues. The method will apply and test theoretical options to ascertain if there are findings that are transferable between different localities in each case study and between case studies, and how size and characteristics of the city influence the results.

The alternative designs of land use dispositions and transport configurations will be combined to form distinct archetypes of development at strategic and local scales. Each of the alternatives will be analysed in case studies through a combination of quantitative and qualitative procedures to estimate, through time, the likely outcome in terms of people's opportunities and behaviour. The resulting forecast will be assessed in terms of sustainability criteria that encompass the impacts in the economic efficiency of the area studied, its social equity implications, and environmental sustainability. The outcomes of the assessment would be discussed with local and national stakeholders to ascertain the feasibility of implementation of the alternatives as well as their

acceptability. The final products of the research will be individual case study reports and the production of a generic, innovative, practical guide for the development of outer cities to achieve sustainable urban environments. To develop a practical framework for the analysis and evaluation of sustainable urban design that encompasses the strategic and local scales and various forms of transport (walk, cycle, car, public transport, etc), and recognises the different dimensions of sustainable development (economic, social and environmental).

To establish and explain the degree to which outer city areas are, (or are not), environmentally, socially and economically sustainable, and to explore in what ways and to what degree social/economic/environmental goals are likely to be compromised should current trends continue.

To devise alternative transport and land use design and implementation strategies, (e.g. regulation, fiscal, investment, etc.), at neighbourhood and city levels which could satisfy aspirations better, and to evaluate the short-term feasibility and long-term effectiveness and robustness of the alternative strategies using a combination of quantitative and qualitative approaches.

To identify both the key barriers to, and the potential drivers of positive change, and reach conclusions in relation to both local and national policy.

To produce generic, normative guidelines for the development of outer city areas for land use and transport planners & designers, public, private & voluntary sector investors and community groups.

DISTILLATE

EPSRC from April 2004 to March 2008

Matthew Page, Dr Simon Shepherd, Dr Greg Marsden, Dr Ann Jopson, Charlotte Kelly, Jeremy Shires, Grant holder: Professor Tony May

Collaborating Partners: TRL; Universities of Westminster, West of England, York

DISTILLATE (Design and Implementation Support Tools for Integrated Local Land use, Transport and the Environment) is one of 14 research programmes funded under EPSRC's Sustainable Urban Environment programme. Its principal objective is to develop ways of overcoming the barriers to effective development and delivery of sustainable urban transport and land use strategies. It is based on the Scoping Study, which highlighted nine priority research needs, of which seven were funded in the main programme. The seven are understanding the barriers to delivery; generating strategy and scheme options; establishing a set of core indicators and targets; supporting effective collaboration; overcoming financial and other implementation barriers; enhancing predictive models; and improving appraisal methods. These are being pursued, in conjunction with 16 local authority partners, through a combination of research and case study trials.

Appraisal of Sustainability

Rees Jeffreys Road Fund from September 2004 – January 2006

Charlotte Kelly, John Nellthorp, Grant holder: Dr Greg Marsden

The aim of this project is to develop a tool for analysing the sustainability of transport policies and projects. It therefore seeks to directly address one of the needs identified in the 2004 Transport White Paper. The project will first bring together the substantial body of research that exists on defining sustainability and sustainable travel. It will develop a common understanding of the relative importance different stakeholders attach to the various aspects of sustainability. It will then translate this understanding into a practical framework that can be applied to the appraisal of transport projects, programmes and policies. The framework will be subject to intensive interview and questionnaire feedback from a broad range of governmental and non-governmental stakeholders as to the advantages and disadvantages of the approach proposed.

Contribution of parking and traffic management to congestion targets

DfT from March 2004 to April 2005

Dr Ann Jopson, Dr Ronghui Liu, Dr Nick Marler, Bryan Matthews, Dr Dave Milne, Jeremy Shires, Grant holder: Professor Tony May

Collaborating Partners: MVA Ltd (principal contractor Jaqui Dunning)

The aim of this project is to assess the contribution of a range of traffic management measures to the relief of congestion, and to assess the effectiveness of different modelling techniques in carrying out such assessments. In discussion with the clients, a total of 20 traffic management measures were selected, and assessed using the formal structure offered by the KonSULT knowledgebase. A range of modelling approaches have been reviewed, and discussed with model users. This is being complemented by a series of case studies of cities which have been innovative in their use of models. The resulting output will be guidance on appropriate techniques for modelling and assessing traffic management measures.

Policy, Economics and Appraisal in Transport (PEAT)

European Commission from September 2004 – August 2008

Grant holder: Dr Susan Grant-Muller

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. It provides 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. A total of 8 full time scholarships have been funded, each for a 3 year period of study towards PhD at ITS.

HEATCO

EC from February 2004 – July 2006

Charlotte Kelly, James Laird, John Nellthorp, Grant holder: Professor Peter Mackie

Collaborating Partners: IER, COWI, TNO, E-CO, NTUA, Sudop, VTI, ISIS, BUTE, Herry, EIT, Ecoplan, UBath

High quality facilities for transportation are of vital importance to the economy and the environment. However, there are still no clear guidelines for evaluating the costs and benefits of transport investments and policies agreed among EU Member States. While national evaluation frameworks exist, these methods are inadequate to address specific EU challenges such as cross-border effects or competitiveness. There is a clear need for an unambiguous and harmonised framework for socio-economic evaluation of transport policies. Although first steps were taken in the EUNET and IASON projects, further integration between existing methods and practices is necessary and will be addressed in HEATCO.

HEATCO's primary objective is the development of harmonised guidelines for project assessment on EU level. This includes the provision of a consistent framework for monetary valuation based on the principles of welfare economics, contributing in the long run to consistency with transport costing. Based on work undertaken e.g. in the EUNET project, current project assessment practice in the EU15 member states and the new member states will be reviewed and analysed. Existing practice in the assessment of the value of time and congestion, accident risk reduction, health impacts and nuisances from pollutant and noise emissions, and infrastructure costs will be compared to the theoretical and empirical evidence from the literature. As a key feature of HEATCO, harmonisation of guidelines will be organised in a cycle process, involving representatives from member countries from the beginning of guideline development, with discussions and revision of different guideline versions.

A number of stated-preference surveys will be carried out to help fill the most significant gaps in monetary values and add knowledge on the issue of transferability and comparability of values between countries. The harmonised guidelines will be applied to 3 TEN transport infrastructure projects to illustrate differences to existing CBA evaluations.

TIPP

EC from November 2003 to December 2004

Professor Chris Nash, Bryan Matthews, Dr Andrew Smith, Dr Greg Marsden, Grant holder: Professor Tony May

Collaborating Partners: Strafica (coordinator); AdePC; Free University of Amsterdam; Technical University of Berlin; Technical University of Dresden; BUTE; AUEB

TIPP (Transport Institutions in the Policy Process) has assessed the effects of institutional structures and processes on the effectiveness of transport policy interventions across all modes, and at all scales from local to international. It has adopted a normative approach, based on a set of 19 case studies. The Institute's contribution has been in developing the overarching structure of the research programme, conducting two case studies on local transport policy and rail transport in the

UK, and coordinating the review of conclusions and recommendations. The resulting recommendations focus on identified elements of both decision-making structure and decision-making process, and are aimed at both European and national government.

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