



Unit-level Evidence and Research Strategy: RVSS and RPS Directorates (2006/2007)

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Preface

This strategy provides an overview of the current evidence and research activities that are planned or already underway in the *Road and Vehicle Safety and Standards* and *Roads Performance and Strategy* Directorates of the Department for Transport. We hope it will be informative for DfT civil servants and external stakeholders.

Chapter 1 - Introduction

1. DfT is committed to producing policy that is substantiated by a broad evidence base. Following recommendations made in the White Paper 2000 - 'Excellence and Opportunity: A Science and Innovation Strategy for the 21st Century'¹ - departments have been charged with producing science and innovation strategies. A change for 2006 is a re-structuring of the DfT strategy into a parent Board-level Evidence and Research Strategy (B-ERS)², to address high-level strategic themes in departmental research and evidence activities, and a series of Unit-level documents to cover more specific protocols followed by individual or combined directorates.
2. This report sets out the Unit-level Evidence and Research Strategy (U-ERS) for the Road and Vehicle Safety and Standards (RVSS) and Roads: Performance and Strategy (RPS) Directorates. This joint venture reflects the strong links between, and complementary objectives of, the individual directorates. The organisation chart at Annex A shows a shared contribution to a number of strategic themes.
3. RVSS comprises three divisions: Road User Safety (RUS), Traffic Management (TM) and Transport Technology and Standards (TTS); RPS comprises five divisions: Roads Performance (RP), Roads Strategy (RS), Road Pricing Framework (RPF), Statistics: Roads (SR) and Cleaner Fuels and Vehicles (CFV).
4. The publication of this document should aid collaboration and understanding both internally and externally and set out a clear direction for our future evidence and research strategy, highlighting priorities and gaps in our knowledge which need addressing and indicating areas where the need for new material is less pressing, allowing resources to be scaled appropriately.

¹ <http://www.ost.gov.uk/enterprise/dtiwhite/index.html>

² Draft B-ERS available at <http://www.dft.gov.uk/pgr/scienceresearch/er/ers/>

Chapter 2 - Aims and objectives

2.1 Overview

1. The Government's aim for land transport, as set out in the 2004 White Paper *Future of Transport: a network for 2030*³, is to deliver 'transport that works for everyone'. Transport policy is important both in its own right and also because it impacts on several other high-profile policy areas, such as the environment and the economy. Spending on transport over the next three years is forecast to increase from the current level of Â£10.4 bn to over Â£12.8 bn by 2007, and will continue to grow in real terms. This reflects the vital importance of transport at the heart of several key Government policies and the investment in infrastructure, research and operational activity which will be required in the years ahead.

2.2 DfT business plan

2. The DfT business plan contains a series of strategic themes covering 26 separate objectives which focus on achieving the White Paper priorities, corporate effectiveness and service delivery efficiency. RVSS and RPS lead on the following Departmental objectives:
3.
 - improve urban traffic management
 - improve road safety
 - improve the quality of public space through local transport measures
 - take forward development of Government policy for road pricing, including the EU perspective
 - continue to develop the Public Service Agreement (PSA) congestion targets, including establishing an urban congestion target
 - make improved information available to influence travel behaviour and inform decisions

2.3 Unit-level objectives

3. There is also a business plan approach at the directorate level, to identify and progress a range of activities in support of the higher level objectives summarised above. There are synergies between the activities of each directorate since many policy areas are inherently cross-cutting. For RVSS, current priorities include:
4.
 - a) delivery of the road casualty reduction targets: This is RVSS' biggest undertaking for the next few years. The directorate structure makes a distinction between behavioural (including speed management) and vehicle safety issues, but there are many cross-cutting themes and activities. Current shared priorities (between TTS and RUS Divisions) include the enactment of a Road Safety Bill and the launch of a programme of activity to deliver the 44 actions identified in the Government's Motorcycling Strategy. Other key issues are the publication of a new Child Safety Action Plan, refining the national safety camera programme and implementing secondary legislation on seat belt wearing and child restraints. The next challenge is to look beyond the 2010 targets and develop future targets and policies. There are also cross-cutting issues with TM on the safety of the road environment.
 - b) improving the management of urban and rural traffic: The main focus here is the

- implementation of the Traffic Management Act (TMA) 2004. Measures include further work on Urban Traffic Management and Control, the rolling out of new street works powers and permit schemes, and new regulations and statutory guidance on civil enforcement of parking and other traffic contraventions. Full implementation of the TMA is anticipated to take until the end of 2007/08.
- c) promoting technology solutions to address road transport problems: the recent publication of the Government's Intelligent Transport Systems (ITS) Policy Framework ⁴ has set out a range of measures, including development of policy on co-operative vehicle highway systems, technical work on road pricing and smart cards, and a number of improvements to vehicle and infrastructure technologies. This is discussed further in Chapter 8.
 - d) contributing to the improvement of the streetscape of British villages, towns and cities through the promotion of local environmental improvements and supporting policies aimed at encouraging more sustainable local transport. Measures include promoting local environmental improvements through innovations like Home Zones and Quiet Lanes, developing new design guidance for residential streets, reducing sign clutter and providing advice on the design of cycle facilities.
4. For RPS, current priorities include:
 5.
 - a) leading development of a road pricing strategy: The Government is committed to considering options for the future in the light of the 2004 Road Pricing Feasibility Study. RPS Directorate, together with Regional and Local Transport Delivery Directorate, is responsible for encouraging and managing the Transport Innovation Fund allocations to local authorities for innovative packages including demand management (pricing). Additional RPS objectives include the completion and evaluation of road pricing technology trials under the DIRECTS programme (forecast for the end of 2006), implementation of the EU Directive on interoperability of tolling equipment, and support for further EU interoperability and standardisation work, (results due in Spring 2008).
 - b) putting in place PSA targets for addressing congestion on strategic roads, and roads in the ten largest urban areas. In addition to the top-level targets, Highways Agency (HA) business plan targets are being developed to incentivise and demonstrate performance improvement across the board, and a set of complementary performance indicators for local authorities are being developed to improve local authorities' ability to manage their networks.
 - c) working to meet the Department's environmental PSA targets through measures targeting fuels and vehicles (*eg* fuel consumption, fuel efficiency, energy use, vehicle technology, vehicle choices, etc). Research priorities include improved emissions modelling capability and research into renewable energy sources (*eg* availability, costs, technological feasibility) and driver preferences (including vehicle choice).

2.4 PSA targets

5. In addition to departmental targets set out in section 2.2, DfT has four overarching PSA objectives to fulfil:
6.
 - support the economy through the provision of efficient and reliable inter-regional transport systems
 - deliver improvements to the accessibility, punctuality and reliability of local and regional transport systems
 - balance the need to travel with the need to improve quality of life by improving safety and

- respecting the environment
 - improve cost effectiveness
6. Delivery against these overarching objectives is measured at PSA level through a number of key targets, five of which are of key relevance to this U-ERS, as follows:
 7.
 - a) by 2007-2008, make journeys more reliable on the strategic road network.
 - b) by 2010-2011, the ten largest urban areas will meet the congestion targets set in their Local Transport Plan relating to movement on main roads into city centres.
 - c) reduce the number of people killed or seriously injured in Great Britain in road accidents by 40% and the number of children killed or seriously injured by 50%, by 2010 compared with the average for 1994-1998, tackling the significantly higher incidence in disadvantaged communities.
 - d) improve air quality by meeting the air quality strategy targets for carbon monoxide, lead, nitrogen dioxide, particles, sulphur dioxide, benzene and 1,3 butadiene (responsibility for delivering this target is shared with DEFRA).
 - e) reduce greenhouse gas emissions to 12.5% below 1990 levels in line with our Kyoto commitment and move towards a 20% reduction in carbon dioxide (CO₂) emissions below 1990 levels by 2010, through measures including energy efficiency and renewables (responsibility for delivering this target is shared with DEFRA and DTI).
 7. In addition, PSA targets relating to demand for travel and mode choice, including public transport use and improved rail performance, are relevant to some activities across the two directorates.

2.5 Evidence and research strategy

8. The Board-level ERS focuses on five strategic themes:
9.
 - improving reliability by **tackling congestion**
 - **improving accessibility and choice**, including improving public transport
 - **improving safety and security**
 - **reducing environmental impact** and improving sustainability
 - **supporting the UK's economy** in a global competitive environment
9. The rest of this document discusses the RVSS and RPS strategies for addressing Unit-level objectives and PSA targets, mapping evidence gathering (including research) to the five strategic themes used in the B-ERS. It then sets out our strategies for communication, collaboration, development of skills, resource management and use of technology.

³ <http://www.dft.gov.uk/pgr/strategy/whitepapers/fot/thefutureoftransportwhitepap5710>

⁴ <http://www.dft.gov.uk/pgr/roads/network/policy/intelligenttransportsystems3907>

Chapter 3 - Evidence needs

3.1 Introduction

1. Gathering, analysing and using evidence, including evidence collected through research, is fundamental to the development of policy. Part of this process is to take a broad view on the benefits, opportunities and risks that impact on policies and the achievement of targets; factors such as the political climate, shifting social attitudes, pace of technological change, and UK and EU legislation can all have an impact.
2. This chapter will set out the Unit's evidence needs, in the framework of the five strategic policy themes used in the B-ERS and introduced in Chapter 2:

Five key policy themes

3. Whilst much of this chapter deals with short- and medium-term strategies, it is clearly important to keep the long-term view in mind when formulating policy; our strategy for considering Transport Futures is discussed in Chapter 9.

3.2 Sources of evidence

4. Evidence to inform transport policy comes from a number of sources, many of which are inter-related, such as:
5.
 - research (including literature reviews)
 - statistics (including surveys)
 - analysis and modelling
 - data from joint working
5. Formal **research** is one of the key ways in which DfT informs policy. In addition to *ad hoc* research activities, various discrete research programmes exist within the two directorates and are reviewed and updated on an annual basis. **Literature reviews**, sourcing information from published reports, journal articles and search engines, also comprise a relevant source of information and major literature reviews typically form an early part of more detailed research projects.
6. **Statistics** represent another important source of evidence. The Department has long-established data series for traffic levels, vehicle ownership, driver and vehicle licensing, road condition and road safety. Statistics: Roads (SR) Division plays a major role in collecting, collating and analysing these series, working closely with colleagues in other statistics divisions. DfT's statistical working methods are regularly reviewed by the Statistics Commission to ensure that National Statistics principles of quality and impartiality are upheld. Statistical estimates are derived from a variety of sources including the National and Regional Traffic Control Centres, cameras, weather stations, police, Traffic Officers, floating vehicle data and **surveys**, such as the Office of National Statistics Omnibus Survey and the National Travel Survey. **Analysis** and evaluation of information and data is carried out across the Unit as a fundamental part of the policy development process. RPS makes particular use of **modelling** to project and predict the likely range of future outcomes from base case to a number of identified interventions. The Integrated Transport Economics and Appraisal (ITEA) Division lead on traffic modelling, in particular through development of the National Transport Model. Modelling is also key to projecting options on climate change and air quality.
7. **Joint working**, internally within the Department and with other parts of Government, and also with external stakeholders at both a national and international level, is an important way to increase and

communicate our evidence and knowledge. Chapters 4 and 5 discuss this aspect in more detail, setting out the variety of ways in which we communicate and collaborate, and to what effect.

3.3 Unit-level evidence needs

8. Evidence needs around the five strategic policy themes will be addressed in the sections indicated below:
9.
 - improving reliability by **tackling congestion** [3.4]
 - **improving accessibility and choice**, including improving public transport [3.5]
 - **improving safety and security** [3.6]
 - **reducing environmental impact** and improving sustainability [3.7]
 - **supporting the UK's economy** in a global competitive environment [3.8]

3.4 Tackling congestion

9. The evidence needs within this theme focus on understanding the nature of the congestion problem, (*eg* how much traffic is where and when, and how do various factors affect this?) and use of this knowledge both to get the most out of the existing road network, and to inform decisions on where expansion of the road network offers a viable option. This is true both at the strategic and local road network levels, although for the purposes of this U-ERS the strategic road network aspects need to be read in conjunction with the separate ERS prepared by the Highways Agency.
10. Priority areas for evidence gathering to tackle congestion fall under three broad areas:
11.
 - roads performance
 - traffic management
 - road pricing

Roads performance

11. Evidence needs within this area require information on two key aspects:
12.
 - establishing current levels of congestion, and time and location patterns
 - investigating causes of congestion and the impact of interventions

Current levels of congestion and its time and location patterns

12. There is significant progress being made on increasing our evidence base on traffic flows and speeds, and person movements in urban areas. Traffic flow data is collected using automatic traffic counters (operational 24 hrs/day), in addition to 10 000 manual traffic counts per year, with 12 hour counts carried out by contractors in each region of England, plus Wales and Scotland. Information on local authority roads has been improved through the purchasing of data sourced from Global Positioning System (GPS) receivers in lorries and buses, and satellite navigation devices in cars; this contract is being re-tendered this year. Local authorities are also conducting vehicle occupancy surveys in some urban areas.
13. Systems using data from Automatic Number Plate Recognition cameras deliver traffic speed

information for every link of the Highways Agency network for every 15 minute period of every day. We are working to develop the evidence base further, using additional data sources and indicators.

Causes of congestion and the impact of interventions

14. Congestion is the result of a complex mix of factors, including volume of traffic, unplanned incidents (eg accidents), planned events (eg roadworks or sporting events) and poor weather.
15. The Highways Agency is in the lead, through Traffic Operations Regional Intelligence Units, in developing a clearer understanding of the causes of congestion and the effectiveness of different interventions on the strategic road network. Roads Performance Division is promoting activity by local authorities in the ten largest English conurbations to develop a similar understanding for urban routes. Both initiatives flow from development of the congestion PSA targets. Both require the collection, collation and analysis of key traffic data, stored by the HA in the Journey Time Database, and suggest the case for a common national information architecture to be developed under the Roads Information Framework.

Traffic management

16. Evidence needs to tackle congestion also include the following aspects:
17.
 - improving the quality of traffic management by developing further guidance on good practice
 - updating the inventory of traffic signs
 - examining communications technologies

Traffic management guidance

17. We plan to bring existing and new guidance together in a Code of Practice for local highway authorities on maintaining good network operation.
18. Guidance on strategic road operation and management was published in late 2005 ⁵ . Once use of this guidance has become established, we will review its effectiveness and identify where improvements can be made.

Traffic signs

19. The last inventory of traffic signs was carried out in 1992/93. We aim to update this inventory in order to assess the impact of policy developments (e.g. tourist signs, complex parking restrictions, camera enforcement, 20 mph zones) on numbers of traffic signs and the impacts on streetscape issues.

Communications

20. Discussions with local authorities, industry and the Highways Agency have highlighted the need to examine communications technology relevant to traffic control, to be tackled by a working group established under the Engineering Industries Traffic Advisory Committee. The work will explore which existing or emerging communications standards should be considered for adoption by highway authorities for traffic control.

Road pricing

21. The programme to explore road pricing has generated a number of evidence and research requirements. In addition to the need for good traffic data and enhanced modelling capability (at national and local level), specific projects are being developed under four broad headings:
22.
 - researching public attitudes to, and interactions with, road pricing
 - conducting technical research into system design
 - modelling of road pricing
 - keeping up to date with wider road pricing experience

Social research

22. We are continuing to gather evidence on how the public, and segmented sectors of the public (*eg* businesses), feel about road pricing, *ie* whether they consider it to represent a practical and proportionate response to the challenge of traffic growth. Additionally, we are developing our knowledge of how the public will interact with pricing, in terms of how a pricing signal would be received and what that would mean for the design of any system.

Technical research and system design

23. It is important for the Department to understand the realm of technical and system possibilities within which it is working - 'the solution space'. The DIRECTS project has been a multi-year trial of the Department's draft business model for charging systems, testing interoperability of systems, suppliers and technologies (Dedicated Short Range Communications and GPS). The next priority, following on from DIRECTS, will be to explore how robust and reliable the systems can be made in practice.
24. The road pricing programme has also sought to capture the practical experience developed in the HMRC Lorry Road User Charging project.

Modelling

25. A key challenge is in modelling the public response to a road charging price signal. The Unit is a key client for the upgrade of the National Transport Model (NTM 3). New algorithms have been developed to help speed the process of modelling cordons. We are developing modelling capability at the city/regional level and will move into more detailed cost modelling.

Wider experience

26. Road pricing and road demand management are areas of increasing interest across the world. The programme has developed both a database of world experience (with schemes in place, in development and under consideration) and a real-time web-scan service that picks up pricing stories and helps the team stay in touch with the emerging picture.

3.5 Improving accessibility and choice

27. This strategic theme addresses the need to improve both public transport delivery and the provision of transport information. It responds to the PSA target: 'Deliver improvements to the accessibility, punctuality and reliability of local and regional transport systems'. The delivery of most objectives in this policy area is outside the remit of the Unit's responsibilities, but we do contribute significantly, and hence require evidence, on two major aspects:
- 28.
- providing and presenting transport information
 - implementing smartcard technologies

Transport information

28. Evidence is needed to support decisions on the provision and presentation of information to users of the strategic road network, with a focus on understanding how information provision can influence driver decisions and enable other objectives, such as reducing congestion, to be met. Some evidence concerning the success of variable message signs should be provided from the Highways Agency M42 traffic management trial.

Implementation of smartcards

29. The TTS Smartcard programme is researching issues around multi-modal transport passes to improve understanding of the opportunities which smartcards can provide, both as a transport-specific service and as a part of wider Government initiatives. A national standard was developed by the Integrated Transport Smartcard Organisation (ITSO), under contract from DfT, and was published in 2004. Evidence is now required on the roll-out of the national standard, which is being achieved through various studies, working in conjunction with ITSO. In 2006, for example, existing ticketing schemes in Cheshire, Nottinghamshire and Southampton will migrate to the national standard, funded by DfT grants to LAs. A further example is the TTS 6-month trial on buses in London (completed in March 2006), using ticketing services piggy-backing on the DfES Connections card.
30. The use of complementary applications on a single card has the potential to reduce deployment costs, potentially leading to efficiency improvements through the sharing of back-office facilities. There is, however, a need to carefully examine associated data protection aspects.
31. In the near future (1-5 years), the Smartcard programme has the potential to improve the management of concessionary travel and improve the link between travel demand and the service provided. We will trial multi-modal cards as part of the Yorcard project, and continue research into low-cost smartcards in Cheshire, with potential for temporary, *eg* tourist, use. Future research will look at closer collaboration across Europe, opportunities for using new technologies emerging from the mobile phone and banking sectors, and a study to investigate 'Be-in Be-out' payment systems (where a passenger's presence is automatically detected). We expect, within this timeframe, to work more closely with Transport Direct, since creating an interface with ticketing infrastructure will enable features such as text size and contrast to be customised, thereby maximising inclusion of users with specific needs. The contact-less interface between card and reader further facilitates use by disabled customers, complying with the Disability Discrimination Act.

3.6 Improving safety and security

32. The Unit has substantial involvement in the delivery of objectives within this strategic theme. The road safety programme directly addresses the Departmental objective: 'Keep on track towards the Department's 2010 road safety PSA and develop the Department's strategy for future improvement', where progress is on course to achieve the casualty reduction targets. A second three year review of overall DfT road safety standards and casualty reduction targets will commence during 2006, due for publication in 2007.
33. A large body of evidence to support this policy theme is obtained through the gathering of statistical evidence. This process is cross-cutting, with collaboration between RS, TTS, TM and SR Divisions, as well as input from DfT Agencies. Current major projects in this area include studies of accident causation through the On-The-Spot (OTS) accident investigation project (jointly with the HA), as well as an in-depth study of fatal accidents and a project to investigate the extent of accident under-reporting. Additionally, we obtain evidence from the Co-operative Crash Injury Study, a major collaborative project under DfT management, and the Heavy Vehicles Crash Injury Study, looking at analogous information from trucks, buses and coaches. A further source of accident data is provided through development of the Vehicle & Operator Services Agency accident database, now in Phase III, where evidence is collected from vehicles that have been involved in accidents in which a vehicle defect is alleged to have been a contributory factor.
34. A key input to the process of evidence gathering is the national road safety statistics database, STATS19, which includes detailed information on all road accidents involving injury that are reported to the police. This database provides the foundation for monitoring and analysis, and is supplemented by a wide-ranging research programme. The importance of the STATS19 data is such that there is ongoing research into improving the accuracy of reporting by the police, and the Department is funding the Police Information Technology Organisation to carry out a project to improve the accuracy and timeliness of police reporting by providing software for data capture at scene, including an immediate help facility for reporting officers. There is also research into measuring the level of reporting to the police.
35. Considerable evidence is also generated from collaboration, literature reviews and ongoing policy analysis. However, the greatest source of evidence under this theme is through three complementary research programmes:
36.
 - vehicle safety (including ITS)
 - road user behaviour
 - traffic management

Vehicle safety

36. TTS Division contributes towards the road safety PSA objectives, through the use of technology, including improvements to vehicle design and engineering. Major evidence and research themes are as follows:
37.
 - developing vehicle technology
 - investigating the road safety benefits of intelligent transport systems (ITS)

Vehicle technology

37. Vehicle technology research provides a wealth of evidence to support policy linked to improved safety on the roads. This is achieved through identifying aspects of vehicle design, construction or operation which could be modified to reduce casualty rates and/or severity, and commissioning research to examine this further. We seek to deliver improvements to driver, passenger and pedestrian safety whilst minimising the burden on industry. We also aim to ensure that regulatory standards keep pace with technological development, maintaining awareness of existing technical standards in other member states. The evidence needs within this theme are categorised into programmes on primary & eSafety, secondary safety, heavy vehicles and motorcycles.
38. Within the **primary & eSafety** programme, one major evidence and research theme is improving understanding of the frequency of wheel loss from heavy vehicles. We are soliciting the experiences and views of vehicle operators and drivers regarding after-market devices which claim to offer potential solutions to the wheel loss problem by indicating or preventing wheel nut movement.
39. We will investigate the potential benefits of new advanced vehicle/driver assistance technologies, such as Electronic Stability Control. We have extensive evidence on driver behaviour to show there is benefit, in terms of casualty reduction, to alerting drivers to the local speed limit through in-vehicle technology. We aim to complete a UK in-vehicle Intelligent Speed Adaptation trial by the end of 2006. The programme will continue to work on understanding how the development of increasingly sophisticated driver assistance systems, especially those providing information (such as screen-based navigation systems), affect driver concentration and behaviour.
40. Within **secondary safety**, we will continue to collaborate with other like minded governments in areas such as car-to-car collision protection and side impact protection advances. We will seek to prioritise our research on the basis of road casualty data and with regard to the recommendations of the Department's recent review of secondary safety priorities. The programme will monitor the effectiveness of the recent introduction of pedestrian safety requirements on new car types to establish whether the anticipated casualty savings will be realised. Advances in smart technologies may provide further opportunities for occupant casualty reduction, perhaps working in concert with primary safety systems. The programme will consider these opportunities, particularly in the field of restraint systems and seat technology. These advances offer new challenges in terms of the ongoing availability of the systems to protect the occupant as the vehicle ages. We will consider the opportunities that are offered by on-board diagnostic systems to monitor the integrity of these systems in such a way that the vehicle occupant can be alerted to deficiencies.
41. We are currently in the final stages of the 'New Program for the Assessment of Child Seats' research project to formulate appropriate testing methods for child seats, using the latest from field accident data. A priority now involves carrying out the test procedures (which include dynamic crash testing) to provide independent guidance to consumers on the relative merits (in terms of safety, cost, ease of use, etc) of the most recent car and child seat designs. The Department will also continue its activity in the Euro New Car Assessment Programme which has ongoing evidence needs to support its aim of assessing safety (through crash testing) of popular new cars in Europe so as to provide motorists with independent comparative information on vehicle safety.
42. Within the **heavy vehicles** programme, research is already underway to analyse accident data from the sources discussed in paragraphs 33 and 34. This will help to determine the priorities for future work, which could include an examination of changes in patterns of heavy vehicle rollover incidents (with an analysis of accident causes and identification of possible countermeasures), research to establish whether requirements for pedestrian protection should be introduced for heavy vehicles, and

research on improving bus design to minimise passenger injury during non-collision incidents, *eg* as a result of excessive braking. Consideration is also being given to a study of the suitability of longer and heavier goods vehicles, such as those currently being trialled in the Netherlands. In addition, where appropriate, evidence will be sought regarding the implementation of national vehicle approval schemes in response to new EU legislation, including how best to check compliance of trailers before they are first used.

43. There is also a significant research programme focusing on **motorcycles**, and a requirement to deliver on objectives in the Motorcycle Strategy. We will investigate the benefits of new technology to motorcycle safety, for instance through research on sensor and braking technologies. We will also consider the potential for improved rider survival as a result of safety helmet performance. The outputs of previous research will be used to evaluate the relative safety of the wide range of helmets available in the market by exposing them to advanced performance tests, and a potential rating system will be evaluated. We are hoping to support both the 6th Framework project, which is investigating the integration of primary and secondary safety features of powered two-wheelers, and an Organisation for Economic Co-Operation and Development (OECD) programme looking at motorcycle accident trends across Europe, in terms of factors such as rider age and engine size, etc.

Intelligent Transport Systems (ITS)

44. Intelligent transport systems increasingly offer opportunities to transform the transport system, with benefits both within and outside the context of vehicle safety. The development and use of ITS are discussed in more detail in Chapter 8 - Technology and Innovation.

Road user behaviour safety

45. The Road User Safety research programme is organised into six main themes, each of which has a specific objective:
- 46.
- improving the safety of vulnerable road users
 - understanding and influencing driver and motorcycle rider behaviour and attitudes
 - improving understanding of impairment from alcohol and drugs, and devising measures to reduce accident risk from these causes
 - developing road safety engineering and speed management measures to reduce accidents in urban and rural areas
 - providing scientific evidence to underpin road safety initiatives aimed at people suffering from medical conditions, taking medication or undertaking other medical procedures
 - providing evidence for the understanding and delivery of road safety remedial measures through statistical monitoring and policy evaluation

Vulnerable road users

46. The priority in this theme is to increase understanding of the circumstances and contributory factors in accidents to children, pedestrians and pedal cyclists, and to identify, develop and evaluate practical measures to reduce casualties. We are currently addressing the significantly higher incidence of child road casualties in disadvantaged areas through the use of targeted pilot child pedestrian training schemes. Future work will analyse the results of the pilot and evaluate the Department's Neighbourhood Road Safety Initiative which is working in 15 local authorities in deprived areas

within England.

47. As part of the life-long learning approach to road safety education, the programme aims to improve the delivery of road safety education and will produce and evaluate education and training resources for children and other age groups. We will also conduct research to identify effective methods of communication with adolescents and older road users.

Driver / motorcycle rider behaviour

48. The key objective of research in this theme is to increase understanding of driver and rider behaviour, and of the development of their skills and attitudes, in order to reduce casualties through improvements to training and testing, and by influencing attitudes and behaviour. Novice drivers and riders, most of whom are young, have a poor safety record compared with older, more experienced, drivers and riders. In contributory factors research, driver or rider factors are implicated in over 90% of road traffic accidents. These factors are many and varied but include examples both of skill deficit and of deliberate and motivated bad driving or riding. We will conduct research into how future driver behaviour can be influenced through pre-driver education, and how safety can be improved through driver/rider pre- and post-test training and other interventions, including driver/rider improvement and speed awareness courses. The programme will also obtain more information on the impact of distractions on driver behaviour.
49. It has been estimated that between a quarter and a third of all road traffic incidents involve someone who was driving in connection with their job. Drivers who do a lot of work-related driving have a much higher risk of injury accident, even after allowing for other factors such as annual mileage. We will gather further evidence on how a company's safety culture influences its road safety risk.

Impairment from alcohol and drugs

50. Impairment is a major contributory factor to accident risk. Although deaths in drink-drive accidents have more than halved in the past 20 years, around 500 people die each year in drink-related accidents. Recent data suggest that drink-driving may be on the increase, especially amongst young men. We are looking at those involved in Drink Drive Rehabilitation schemes and making an assessment of alcohol levels in drivers involved in accidents. It is not known how many drug-related accidents there are, but 18% of fatalities have one or more illegal drugs at post mortem test. We are exploring the feasibility of collecting evidence on drug use by some groups of drivers.

Road engineering and speed management

51. The main evidence priority under this theme is for speed management research that will relate understanding of driver behaviour regarding speed choice to enforcement and road environment. We will update evidence on vehicle speeds and injury severity in pedestrian accidents and examine drivers' acceptance of, and attitudes to, speed limits. Rural roads present a particular problem with high accident rates, and we will aim to improve safety through an improved understanding of issues specific to rural roads.

Medical- and health-related impairment

52. The principal objective of this theme is to improve the quality of evidence underlying both medical advice related to road safety and driver licensing decisions to ensure that risks to road safety are minimised while drivers are not unnecessarily restricted. We continue to gather evidence on the impact of specific medical conditions on road safety. We are also exploring the feasibility of obtaining medical data to enhance the OTS database of road accidents. We will continue to hold workshops on specific medical conditions to inform policies on fitness to drive.

Statistical analysis and policy monitoring and evaluation

53. The priority in this theme is to provide an in-depth understanding of road accidents, including through the use of statistical databases (see paragraphs 33-34) and through monitoring local and national trends in road safety performance and activity in order to identify good practice in delivery. Local Highway Authorities (LHAs) are key partners in delivering casualty reduction targets; 90% of casualties occur on LHA roads and there is a wide spread of performance. We will identify and promulgate best practice in LHA performance, particularly in the areas of mainstreaming, partnership working and delivering through others.

Traffic management

54. There are many ways in which traffic management can be used to improve driver/passenger and pedestrian safety. Evidence needs are discussed under the following headings:
55.
 - improving pedestrian safety
 - improving safety of other road users
 - increasing public awareness

Pedestrian safety

55. An increasing number of local authorities are recognising the benefits of Puffin crossings (which are sensitive to traffic conditions), in terms of efficiency and improving mobility for various pedestrian groups. We aim to build on limited research, undertaken in London and Manchester, to help clarify the potential safety benefits of Puffin crossings.
56. Traffic signal controllers utilise a range of operating strategies, or algorithms, to determine when signals should change. These range from simple systems which defer the change from a green signal when vehicles are close to the signals to those with sophisticated control strategies. The Microprocessor Optimised Vehicle Actuated (MOVA) control strategy is an example of the latter. Originally intended for high-speed roads, MOVA automatically optimises signal timings to maximise junction capacity, and then will balance queue lengths when the junction reaches saturation point. A development of MOVA, Compact MOVA, is aimed at lower speed roads and typical urban sites.
57. Studies have shown that Compact MOVA significantly reduces pedestrian delay at signal-controlled pedestrian crossings, with negligible effect on vehicle delay. Risk assessments and a limited safety study indicate that Compact MOVA will be at least as safe as systems it is intended to replace. The Department is therefore keen to promote the use of Compact MOVA but we will first carry out further research, including a full safety evaluation.
58. Traffic signal control is increasingly seen as a way to deliver benefits such as priority for public transport, easier and safer walking and cycling, and improved accessibility and mobility. We will support research leading to software tools which will help to design traffic signal settings that take

better account of pedestrian behaviour.

59. Previous work by the Department and a range of external organisations has investigated informal pedestrian crossing places such as refuges, dropped kerbs or flat-topped road humps. This led to production of a prototype for a tool to help those faced with decisions about their design and location. We will carry out a feasibility/scoping study to examine how this can be taken forward, and how it would be used by planners and designers.

Safety of other road users

60. Motorcycle user groups and advocates are interested in allowing motorcycle riders to use facilities such as cycle Advanced Stop Lines and bus lanes as safety and priority measures. However these suggestions are resisted by user groups representing other vulnerable road users, notably cyclists and pedestrians, although there appears to be no hard evidence in support of their concerns. These issues are identified as areas for action in the Department's National Motorcycling Strategy. We will conduct research to build the evidence base in respect of the use by motorcyclists of these facilities, and to develop guidance for authorities.
61. Amendments to the Road Safety Bill for changes in the way level crossings operate and for improved safety of crossings have raised the importance of work in this area. Research will be undertaken to investigate how traffic delays at level crossings can be reduced without compromising safety. The project will review the recommendations made in earlier work and develop them, in close consultation with the Rail Safety and Standards Board (RSSB), leading to a RSSB trial project with local authorities, in close association with DfT.

Public awareness

62. We will research how road users understand and react to new traffic management schemes, which will lead to the development of guidance on the design and use of new schemes.

3.7 Reducing environmental impact

63. Work to tackle this strategic theme is carried out by the Cleaner Fuels and Vehicles and Traffic Management Divisions. (Note that, additionally, much of the ITS work carried out by TTS will indirectly contribute to the Departmental environmental objectives since improvements in transport efficiency are often coupled to a concomitant reduction in environmental damage.)
64. Most evidence needs within this theme are determined by the policy requirements to achieve the environmental PSA and other priority targets, and to deliver the commitments in wider Government transport and environment strategies. There is an additional need to inform policy in relation to vehicle and fuel environmental standards under development in the EU. The PSA environmental targets are shared with DEFRA and DTI and concern greenhouse gas and air pollutant emissions, as well as a strategy for reducing ambient noise levels. Policy priorities are, further, set out in a number of Government strategies and programmes, including the UK Climate Change Programme, the Powering Future Vehicles Strategy ⁶, the Energy White Paper ⁷ and the Air Quality Strategy for England, Wales, Scotland and Northern Ireland ⁸. There are ongoing reviews of the climate change and air quality strategies, and of energy supply.
65. As part of the research programme, evidence is gathered from international sources, including other Member States and industry, OECD reports, EU Framework programmes, literature reviews and other Government Departments' programmes and activities. An important source of evidence is the

National Atmospheric Emission Inventory (NAEI), which includes detailed information on pollution levels in the UK and the significance of various emissions sources. This inventory allows projections to be made of future emissions levels and air pollutant concentrations. Projections of future air quality are made based on currently adopted legislation and also of any proposed future legislation, enabling an assessment to be made of the effectiveness of possible policy measures for improving air quality.

66. The programme for evidence-gathering and research is organised into three main themes:
67.

- vehicle environmental standards
- reducing carbon emissions from road transport
- traffic management

Vehicle environmental standards

67. Priorities under this theme include:
68.

- improving understanding of the nature and control of particle emissions
- ensuring that data and methodologies used in emissions modelling are up-to-date and representative
- ensuring that vehicle testing cycles properly reflect the performance of vehicles in use
- evaluating the potential for, and the costs and benefits of, noise reduction measures

Nature and control of particle emissions

68. To improve control over fine particle emissions from motor vehicle exhausts, we are seeking to develop a system for counting particle numbers, rather than simply measuring the gross mass/weight of particles. In addition, we are currently conducting research into how the production of particles and their composition is affected by components such as fuels and lubricants under certain operating conditions.

Data and methodologies used in emissions modelling

69. We will maintain and develop our programme of vehicle 'emission factor' testing for both regulated pollutants and those which are currently unregulated. This will include, for example, obtaining test data on new technologies and fuels, as well as taking account of the effects of factors such as user behaviour (*eg* engine retuning) on emissions. This information is necessary to ensure that data input used in emissions modelling is based on the most representative data available, ensuring that testing methods accurately reflect typical vehicle use, condition and load, and also that appropriate data is collected to allow it to be used for local, as well as national, air quality modelling.
70. In addition to data quality, we are working to ensure that the methodologies used by the NAEI for estimating road transport emissions are robust, accurate and consider recent developments in emissions modelling.

Vehicle testing

71. We will obtain more information on the degree to which the fuel consumption and CO₂ tests for new vehicles properly reflect vehicle operating conditions, in the light of factors such as user behaviour and typical vehicle use (condition and accessory load). The relative efficiency of new energy-using

systems such as air conditioners will also be studied.

Potential for, and costs and benefits of, noise reduction

72. We will examine the scope for developing a robust and cost-effective in-service test that could be used to measure noise at the annual MOT test. The programme will also seek more evidence on the benefits and social costs of vehicle noise reduction in relation to particular groups, such as those on low incomes, and on road noise exposure levels experienced by drivers, pedestrians and businesses.

Achieving reductions in carbon emissions from road transport

73. Evidence needs under this theme are as follows:

74.

- improving understanding of future vehicle and fuel technologies
- identifying the scope for improving fuel efficiency
- improving modelling of the impact of policy

Future vehicle and fuel technologies

74. The Government recently announced the establishment of a renewable transport fuels obligation for oil suppliers. As a result, bio-fuels are likely to play an increasing role in transport fuels and we have commissioned research to investigate the use of different blends in bus fleets.

Scope for improving fuel efficiency

75. We are investigating policies in other member states on issues such as environmental taxation and incentive schemes.

Impact of policy

76. We will continue to improve and update our capacity for modelling the effects of policy on the vehicle fleet, for example how changes in motoring taxes impact on its efficiency and make-up. In addition to the technical task of ensuring our models are all working correctly, this work requires quantifying consumer sensitivity to fuel efficiency and other cost factors when purchasing vehicles.

Traffic management

77. Traffic management initiatives to reduce congestion often have a knock-on effect in reducing environmental impact. Additionally, traffic management measures can significantly enhance the local environment. The main evidence needs within this theme are set out below:

78.

- evaluating Home Zones
- encouraging public involvement
- researching road design

Home Zones

78. The Government recognises that the quality of the local environment affects and reflects the well-being of the people living there. Home Zones improve the quality of life in residential roads by making them attractive places in which to live, and the Home Zones Challenge was established to encourage their development. We will work with the Home Zones authorities to review data they have collected since the schemes have been completed, aiming to provide evidence of the impact of Home Zones on communities, and to demonstrate the benefits that can be delivered in support of wider Government objectives.

Public involvement

79. Generally there is limited public involvement in the development of new traffic management schemes. The Home Zones projects have demonstrated how public involvement, rather than public consultation on options, can lead to schemes that are more acceptable to the local community. We will develop this approach for other traffic management areas (such as traffic calming schemes), building on work already commissioned by the County Surveyor Society. Through a series of Traffic Advisory Leaflets, we will provide guidance for local authorities and practitioners to use in engaging with local communities affected by new and changing environments.

Road design

80. Some local authorities have been considering new and innovative approaches to the way streets are designed and used. These approaches follow new methods which were first implemented in Holland, and involve removing much of the traditional separation between motor vehicles and other road users. We will work with authorities considering pilot schemes in order to monitor and evaluate the interactions between motorised and non-motorised road users. This will provide evidence to inform DfT policy and develop guidance for designers of schemes using shared space principles.
81. Work to develop comprehensive guidance on the design of residential streets, the Manual for Streets, is in progress. Additional research is planned to help ensure that the conclusions are sufficiently robust to form the basis of a new approach to the way residential streets are designed.

3.8 Supporting the economy

82. Good transport links and efficiency are of vital importance to the economy by facilitating the movement of people and goods and ensuring the U.K. is well-placed to compete at an international level. This Unit carries out a number of evidence and research activities which have direct links to this policy theme. Priority actions are set out below, under the following headings:
- 83.
- continuing to develop roads/vehicle policy
 - promoting deployment of ITS

Roads/vehicle policy

83. An example of a measure which impacts on the economy is the EU CARS 21 initiative, to remove regulatory burdens on the automotive industry. TTS are also developing a route map to the implementation of Co-operative Vehicle Highways Systems to improve the safety and efficiency of road use.

Deployment of ITS

84. The use of ITS has the potential to bring widespread future benefits to transport, and to facilitate the achievement of key Government targets. This area of research is expanded in Chapter 8 - Technology and Innovation.

⁵ http://www.ukroadsliaisongroup.org/pdfs/051116_051111_trl_procedure_guidance_issue%206_1.pdf

⁶ <http://www.dft.gov.uk/pgr/roads/environment/poweringfuturevehicles/>

⁷ <http://www.dti.gov.uk/files/file10719.pdf>

⁸ <http://www.defra.gov.uk/environment/airquality/index.htm#aqstrategy>

Chapter 4 - Communicating research and evidence

4.1 Introduction

1. Communication is essential as a means to advertise our evidence needs and obtain internal and external expertise and feedback on evidence gathering and research activities within DfT. It is also important as a way to disseminate the results of research and analysis into the wider public arena, keeping stakeholders and the public up-to-date with progress.
2. This chapter deals with the public-facing aspects of communication. Communication with stakeholders and networking fora is discussed in Chapter 5 on collaboration.

4.2 Methods of communication

3. These include:
4.
 - holding and/or attending meetings, seminars and conferences, both in the UK and internationally, to discuss areas of DfT interest (*eg* the annual seminar on behavioural psychology research to inform the work of the road safety research team)
 - running workshops on key policy areas, (*eg* on road pricing technologies)
 - setting up Steering Groups for major projects, (*eg* Foresight), or where there are stakeholder or inter-departmental sensitivities
 - holding regular liaison meetings with Advisory Groups, other Government departments, agencies and key stakeholders (see Chapter 5)
 - commissioning external experts, including leading academics, to provide peer reviews of completed research and contribute detailed comments on draft reports
 - reporting research activities widely (*eg* via the DfT website, targeted technical advice notes, journal articles, best practice guidance documents, divisional research compendia and the Research Management Database)
 - anticipating and responding to media interest in research and evidence issues
 - dealing appropriately with Freedom of Information requests and other related correspondence
4. Further avenues for dissemination of evidence and research activities include consultancy websites (for work which has been contracted out) and external project websites, *eg* road safety data is

publicised on the Think! and Hedgehog Campaign web pages. The Statistics Divisions disseminate statistical information across Government and to central and local transport partnerships. However, as the amount and variety of data increases through technological advancement, so the public demand for data tends to increase, which can lead to a strain on resources. Traffic Management also communicate through the web portal initiative and traffic advisory leaflets.

Chapter 5 - Collaboration

5.1 Introduction

1. Working with stakeholders is important both within DfT and externally, to maximise the spread of knowledge and avoid duplication of effort. It helps to ensure that our evidence base is high quality and up-to-date, provides an opportunity to review our practices and can also provide economic benefits, for example when jointly-funded programmes lead to favourable economies of scale.
2. Collaboration tends to take one of three forms:
3.
 - external input (peer review, etc) of DfT activity
 - external activity with some DfT sight or involvement
 - specific joint initiatives or programmes
3. Our strategy here is to:
4.
 - identify areas and initiatives where there may be a commonality of interest
 - consider and decide the appropriate nature of DfT involvement, be it directly or through other departments
 - ensure partner organisations and stakeholders see the value to them of participation
 - be clear about the terms of our engagement (*eg* concerning the publication and dissemination of research findings)
4. This chapter will be structured in terms of the Unit's interactions with the following stakeholder groups:
5.
 - Government departments and agencies
 - commercial organisations
 - other external stakeholders
 - international stakeholders

5.2 Collaboration within Government

5. Internal collaboration occurs formally through much of the research management process, and informally through day-to-day working and meetings. The cross-cutting nature of the Unit's responsibilities leads to significant collaboration between DfT colleagues.
6. Other key partners are the DfT agencies. The Highways Agency is heavily involved with much of the roads policy produced in DfT (C) and, with its co-workers, provides real-time information on road network conditions. The on-the-spot accident study is an example of a current project jointly funded by RUS, TTS and HA. We also collaborate with the Driver and Vehicle Operating Group on technology involved in surveillance and enforcement, and with the Driving Standards Agency on

driver testing and training and current revision of the Highway Code (due for publication by the end of 2007).

7. The Unit collaborates with departments across government, as well as the devolved administrations and regional Government Offices. For example, CFV Division collaborates with DEFRA and DTI on meeting the environmental PSA targets and TTS participates in the DTI ITS Centre of Excellence, InnovITS. The Unit also collaborates with public sector statisticians, lawyers, economists, communications specialists and Government Social Research.
8. Local authorities are important partners to many divisions, including RUS for the provision of evidence through accident data collection and collaborative demonstration projects. Traffic Management Division actively seeks input from local authorities, the major stakeholder for traffic management research, through the Traffic Management Board (TMB). Proposals are formulated in collaboration with the Board, which also includes Transport for London, the Welsh Assembly Government, Scottish Executive and Department for Regional Development, Northern Ireland.
9. A dedicated stakeholder manager (Nikki Yorke) acts on behalf of the Unit to build relationships with external stakeholders from both the public and private sectors.

5.3 Collaboration with external organisations

10. Our strategy for working with external stakeholders, including those from commercial organisations and overseas, is based on the following elements:
11.
 - keeping abreast of published material and attending conferences and seminars that span the public/private boundary
 - arranging events and forming, or assisting in the formation of, cross-boundary groups (*eg* convening the 2005 Environmentally Friendly Vehicles conference, chairing the Transport Card Forum, and joint sponsorship, with DTI, of the Low Carbon Vehicle Partnership)
 - commissioning research in a way best designed to engage the creative input of the private sector, such as through challenge funding (*eg* the Transport Energy research fund, which calls for innovative ideas) and by using relatively open specifications (an approach we are developing on road pricing to engage potential suppliers of system components)
 - being clear about the nature of the Government's policy interests *eg* in encouraging the development of road pricing, road safety and vehicle motive power systems and technologies

Commercial organisations

11. There is clearly benefit to be gained from working with commercial stakeholders, recognising the significant sums being invested globally by sectors such as the automotive and IT industries. We need to avoid duplication, and to be realistic about the scale of our own projects (generally small) and influence (potentially far greater). We also need to be alert to commercial sensitivities, implications for competition and ownership of Intellectual Property Rights.
12. An example of collaboration within this category is CFV Division's participation in the Vehicle Particle Emissions Club, which brings together representatives from laboratories, testing centres, vehicle manufacturers and oil producers to exchange knowledge and best practice on vehicle particle emissions measurement.

Other external stakeholders

13. Stakeholder representative organisations are active in proposing, promoting and disseminating evidence and research material. Both RVSS and RPS actively engage with stakeholder organisations more generally. Key activity in this area for 2006-07 will be on road pricing, when the Commission for Integrated Transport, Motorists' Forum, Institute of Public Policy Research, Social Market Foundation, Transport 2000 and the Confederation of British Industry all have research activity planned or being commissioned. As far as possible, we are seeking to ensure this work is complementary to main departmental programmes.
14. The Unit collaborates closely with the police and there is a Police Liaison Officer (Jeremy Moore) within Road User Safety Division to facilitate work with the Association of Chief Police Officers and individual forces.
15. RVSS and RPS have involvement with numerous national research programmes, with expertise from universities and industry, for example DfT is represented on the external Advisory Panel for the DTI Foresight Vehicle programme. Additionally, the head of TTS division, a university visiting professor, helps to maintain contacts with the academic community.
16. Some further examples of external organisations with which we work are listed in Table 1.

Policy area	Organisation
Traffic Management	Institute of Highways Transportation, County Surveyor's Society, Urban Traffic Management and Control Development Group
Environment	UK Petroleum Industry Association committee, Low Carbon Vehicle Partnership
Smartcards	Integrated Transport Smartcard Organisation, Transport For London, Association of Train Operating Companies, Newcastle and Leeds Universities
Statistics: Roads	Office of National Statistics, Statistics Commission, Transport Statistics Users Group

Chapter 6 - Professional and technical skills

6.1 Enabling professional development

1. DfT has a corporate business objective to develop its own staff and capabilities. Many staff within the Unit hold formal professional and technical qualifications and are working in specialist posts (such as social researchers, engineers, statisticians and finance). The Chief Medical Officer, Chief Engineer (Environment) and Chief Engineer (Safety) are all part of the Unit (and there is easy and regular access to other Heads of Profession within DfT). However, professionalism in administrative and policy development posts is equally important and the Unit takes pride in having a strong, experienced and capable staff complement who are encouraged to maintain and enhance their skills and expertise in line with the formal competence framework within the Department. A broad range of tools and methods are used beyond formal training courses, including attendance at seminars, workshops and conferences for job-specific expertise, and ongoing personal development covering *inter alia* people and project management and IT skills.
2. Flexible deployment (FD) is a current management initiative which aims to ensure projects are

staffed in the most efficient way, through deploying staff to work outside their immediate teams where there is a need for extra resource; it is especially important in the face of the significant departmental headcount reduction. FD will potentially give staff the opportunity to apply their existing skills more widely, thereby adding value to other teams, as well as to encourage professional development.

3. We recognise the value that can be added through liaising with partners in the public and private sectors. Employees from local government and executive agencies are encouraged to come to DfT on secondment to share their experience, and likewise, DfT staff are seconded out to other organisations. We currently employ secondees from the Vehicle & Operator Services Agency in the area of vehicle safety regulations, and from the Essex Safety Camera Partnership in the Road User Safety Division. There are also consultants working on specific policy areas, bringing expertise to expand DfT's own knowledge base. Staff within the Unit possess the necessary professional skills to enable them to act as intelligent customers in their interactions with external consultants and contractors.

Chapter 7 - Evidence and research management

7.1 Existing protocols for project management

1. Much of the evidence gathered by the Unit is connected to specific research projects or statistics. Where evidence is collected through other initiatives, such as a Regulatory Impact Assessment to support legislative change, the management of the process is in line with relevant Cabinet Office and central DfT guidance, including on policy development.
2. The Unit follows the principles of the DfT's Central Research Guidance in how it procures (using Procurement and Estates Division as the formal agent), manages, evaluates and disseminates its research programme activity. There are some local differences between individual research programmes, the main one being whether research project officers below the research programme manager are dedicated staff who liaise with policy colleagues, or instead are integrated within the policy teams and thus share the roles of project and policy officers. Whilst there are clear attractions in developing research management expertise in dedicated units, practicalities (and changing priorities) mean that the latter is by far the more common model, other than for RUS and in the Department's dedicated social and operational research units.
3. Evidence needs and priorities are discussed with policy staff, external advisers, other divisions, agencies, departments and Ministers in building the research programmes. Ideas are also generated from participation in international conferences. New areas of research are often started with literature reviews to ensure that the current state of knowledge is identified, so as not to duplicate existing research.
4. Most research contracts are let by competitive tender, either following advertisements for expressions of interest or by direct contacting of capable parties. Sometimes shorter term contracts, or those forming part of a larger project on which expertise may have been developed, are let by a single tender. The aim is to encourage a wide range of contractors in order to widen the contractor base and maintain high standards. It is noted, however, that in cases where the research is of a specialised technical nature, for example in CFV Division, it is often only possible to invite tenders from a limited range of suppliers.
5. Tenders are assessed by a panel and evaluated against set criteria. The panel composition is dependent on the division, for example, in TTS, tenders are usually assessed by the Project Officer, plus two internal colleagues; in RUS, an external expert is often involved. Where appropriate,

breakpoints are inserted into contracts, particularly where work is in phases and progress in early phases will influence future work.

6. Once let, projects are closely managed with regular meetings with contractors. For larger projects, or those where there are stakeholder interests to take into account, Steering Groups are set up. Detailed risk assessments are conducted and regular reports are submitted to the Head of Division. Programme governance is often integrated into wider governance structures (as is the case for road pricing and road congestion). For the more established programmes (road safety, vehicle safety and environmental standards), groups of External Research Advisors take stock of current programme activity and input to the portfolio development process.
7. On project milestone completion, draft reports are reviewed by research and policy staff, and are frequently peer-reviewed by external experts. The completed projects are evaluated using the Departmental evaluation schedule, and annual programme meetings are held to discuss recent evaluations in order to ensure that lessons are brought forward where necessary.

Chapter 8 - Technology and innovation

8.1 Overview

1. Many of the research and evidence needs within RVSS/RPS are of a technological nature. RVSS is a DfT Centre of Excellence in the promotion of technology solutions to road transport problems.
2. Our strategy for dealing with technology and innovation includes:
 3.
 - maintaining close links with industry, particularly the motor, energy and IT sectors but also the insurance and motoring service sectors, seeking to identify opportunities to apply technologies in a wider context, (*eg* global positioning products could link to road pricing and/or road safety applications)
 - maintaining close links with universities (*eg* the International Road User Charging Research Workshop hosted jointly by DfT and Newcastle University in 2004)
 - participating in technological steering, advisory and working groups, (*eg* the Cabinet Committee for Science and Innovation, the Freight Logistics Research Group, the Low Carbon Vehicle Partnership, and chairing the International ITS Standards Steering Group)
 - incorporating a strong technology element in many of our research programmes (see section 8.2)
 - disseminating knowledge of emerging technologies throughout DfT (*eg* through the Chief Scientific Adviser's Technology Forum)
 - encouraging staff working in jobs of a technological nature to interact with technology leaders in industry and academia in order to expand their knowledge and to ensure that they can act as more intelligent customers
 - engaging in EU and cross-Whitehall technology fora (*eg* Foresight programmes - See Chapter 9)
 - playing an active role on the international stage, (*eg* as hosts of the 2006 ITS World Congress)
 3. Technology plays a fundamental role in research across the Unit, particularly in the teams dealing with transport technology, vehicle standards and emissions, traffic data and control, and road pricing. Specific Unit-level activities of a technological nature, and issues surrounding such work, are discussed in the sections that follow.

8.2 Unit-level technological activities

4. TTS Division focuses on technology in several ways:
5.
 - supporting the development of international technical standards for vehicle design as part of the overall regulatory framework
 - supporting the development of international and national standards for Intelligent Transport Systems (ITS)
 - exploring and communicating the benefits and opportunities to policy delivery arising from ITS technologies
 - providing a co-ordinating role and a technology watch function for DfT and Agency policy colleagues on ITS and vehicle design issues
 - delivering the national multi-functional smart card technology environment for seamless travel
5. The Department's new ITS Policy Framework for the roads sector⁴ explains how ITS can support transport systems and travelling experience against seven key themes:
6.
 - improving road network management
 - improving road safety
 - better travel and traveller information
 - better public transport on the roads
 - supporting the efficiency of the road freight industry
 - reducing negative environmental impacts
 - supporting security, crime reduction and emergency planning measures
6. The Framework also sets out the main issues that need addressing and describes actions that DfT is taking to support and facilitate the economic, legal and administrative climate for widespread ITS deployment. It emphasises the fundamental need for greater co-ordination and a partnership approach.
7. Examples of actions we have identified include a review of the recommendations from the Co-operative Vehicle Highway Systems feasibility study, the trialling of Intelligent Speed Adaptation and, in conjunction with the Road User Safety Division, an evaluation of how in-vehicle technology affects driver attentiveness and safety. TTS are also supporting SRE Division in an assessment of public acceptance to 'intrusive' security measures and communication of safety information.
8. TTS continues to play an international role, *eg* the division works with European partners on ITS deployment through the TEMPO projects STREETWISE (with TM Division) and CENTRICO.
9. The work of CFV Division has a strong technology context and the division leads on the following areas:
10.
 - developing international vehicle and fuel environmental standards
 - supporting international development of new emissions measurement procedures
 - reviewing and providing technical input to national road transport emissions modelling
 - reviewing and investigating the feasibility of improvements to national vehicle emissions enforcement measures
10. Communications technologies are of widespread interest, including in a road pricing context. Smartdust technology is currently being trialled in the Astra project in Newcastle and a future aim is to pump prime emerging technologies, such as Bluetooth, WiMax, WiFi and Wideband, which could

potentially be applied to Road User Charging. RPF Division has now taken over responsibility for work on trialling road pricing technologies under the DIRECTS programme.

11. TM Division deals with a number of technology issues in the context of urban traffic management, *eg* the Urban Traffic Management Control initiative, which is increasingly being adopted by local authorities as the urban traffic management standard
12. RP (and TTS) Divisions liaise closely with the Highways Agency on its Active Traffic Management trial on the M42 and, more generally, in ensuring a joined-up approach to activities including research.

8.3 Issues and management

13. We face many challenges in the use of technology in transport. The first is the sheer difficulty of dealing with a complex and fast-developing picture. Twenty years ago, central locking and driver airbags were still relatively novel; today, side-curtain airbags and line-fitted GPS are becoming common. Keeping the policy teams abreast of technological developments is a key role, as is the consideration of legal, institutional, administrative, security, resilience and public acceptability issues.
14. Second, there is the challenge of how best to focus on policy outcomes without getting tied to specific technologies, thereby closing off potentially better options. Striking the right balance between what we do - particularly the research we fund directly, as opposed to industry-led development (where the budgets are higher by several multiples) - requires careful thought. This is evident in fields such as powering future vehicles and road pricing, but also arises in thinking about any sophisticated traffic control or in-vehicle systems.
15. It is essential to keep the bigger picture in mind when considering technologies and their application to transport. For instance, a range of recent technologies (*eg* Advanced Driver Assistance Systems, Intelligent Speed Adaptation, GPS, etc.) could, individually, improve safety on the roads. However, we must also be mindful of the potentially negative implications of driver-overload and the danger of driver distraction.
16. There is also a need to keep wider international considerations in mind when developing our technology-related policies. Ensuring the interoperability and compatibility between systems is a complex issue. A key role for DfT is to be sufficiently well-informed that we can affect global perspectives (in the EU and at UNECE) to influence the setting of new standards and directives in the most efficient and cost-effective way.

Chapter 9 - Transport futures

9.1 Considering long-term strategies

1. 'Transport Futures' involves predicting what the future of transport will look like on a timescale of 10-50 years, and making progress in the intervening period towards the best possible outcome. Predictions are based on a combination of methodologies, including the use of trends, statistical projections, modelling and forecasting and horizon scanning.
2. Managing risk is of key importance when considering long-term strategies in order to have a realistic understanding of Futures proposals and to minimise time spent 'fire-fighting'. Risk management is an integral part of the development stage of a new project.
3. The ITS Policy Framework and major policy initiatives on road pricing and road safety beyond the

- 2010 PSA targets all contribute to DfT's longer term transport aims. The Department is working on co-operative vehicle highway systems, considering further integration of vehicles, drivers and the road.
4. The Unit utilises the New Horizons programme, managed centrally within DfT, and acts as both validator of relevant proposals and user of the eventual outputs, which are factored into wider policy development. The third call for proposals (2006) is looking to support research projects to investigate the options for moving towards adopting a hydrogen transport infrastructure in around 2030.
 5. The Unit works closely with others in a Futures context. The U.K. Foresight programme ⁹ is a national process to identify emerging issues and prioritise research for addressing long-term issues. The programme is managed by the Office of Science and Technology and is now in its third round.
 6. Both directorates have involvement through the Foresight Vehicle programme, which aims to develop, demonstrate and promote technology for vehicles that will be available to the mass market by 2020. Foresight Vehicle has produced, and is maintaining, a road map of vehicle technology, to which DfT has contributed. CFV Division is currently using the programme to conduct research into new technologies to deliver pollutant and CO₂ emissions savings.
 7. At the broader level, TTS is participating in the major Intelligent Infrastructure Systems Foresight project, looking at the challenges and opportunities of bringing 'intelligence' to infrastructure, and chaired by DfT Ministers. The project explores different ways of applying science and technology to the design and implementation of intelligent infrastructure for robust, sustainable and safe transport over the next 50 years. In addition to the preparation of a number of very specific technology capability and development reviews, four scenarios have been prepared, which will be used to investigate how different combinations of events, discoveries and social changes could influence transport in the future. Where the scenarios suggest complex or less-acceptable outcomes for transport, "back-casting" exercises will be used to indicate opportunities for policy interventions at an earlier stage. Future policies will be tested for robustness using the scenarios to help effectively manage long-term risks and take advantage of opportunities.
 8. To assist with projects and technologies that have longer-term aims, we will extend this internal Futures thinking more widely than at Unit- or even DfT-level in order to look at issues across government and internationally. A cross-departmental discussion of the Intelligent Infrastructure Systems 'Next Steps' document is being set up, and the Foresight approach and outline conclusions will be addressed internationally at the World Congress on Intelligent Transport Systems in London later this year.
 9. The Unit (through TTS) is also collaborating closely with DTI's Technology Programme and the resulting Innovation Platform covering the ITS sector. The purpose of the platform is to apply a systemic approach to tackling well-defined societal challenges, where Government departments/ agencies, business and the science base can work together to identify and apply a diverse range of technologies, together with other policy levers, (such as standards and regulation), in order to develop innovative products and services, for which there are clearly identifiable customers in a potentially large global market.
 10. On a European level, the Unit has been involved with the European Commission's eSafety road map to look at technical and economic issues surrounding the introduction of eSafety systems (vehicle and infrastructure) and an indication of the timeframe on which such solutions could be deployed. Safety measures under consideration included electronic stability, blind spot monitoring, adaptive head lights, obstacle and collision warning, lane departure warning, eCall and dynamic traffic management. Future actions involve implementing the recommendations from the study, including by promoting the safety benefits of such systems and by setting in place the necessary negotiations with the automotive and insurance industries and other stakeholders.
 11. Additionally, on a shorter timescale, the Unit participates in the European Commission 7th research framework programme, for research, technological development and demonstration activities from

2007-2013. Objectives include to develop integrated, greener and smarter pan-European transport systems for the benefit of the citizen and society, respecting the environment and natural resources and securing, and further developing, the leading role attained by the European industries in the global market. Activities to improve surface transport include achieving a reduction in environmental and noise pollution, using alternative fuels and developing innovative, intermodal and interoperable regional and national transport networks, infrastructures and systems in Europe. Further activity includes supporting the European global satellite navigation system (Galileo).

⁹ <http://www.foresight.gov.uk/>