IBEC Secretariat

Proceedings of the International Workshops on ITS Benefits, Evaluation and Costs at the 12th ITS World Congress, San Francisco, November 2005

Issue 1

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Acknowledgements

This report presents the results and conclusions of a series of Benefits, Evaluation and Costs (BEC) workshops organised, as part of the 12th World Congress on Intelligent Transport Systems (ITS) in San Francisco, USA, November 2005, by the IBEC (International Benefits, Evaluation and Costs) Management Committee in conjunction with the IBEC Secretariat, UK Department for Transport, ITS America and the US Department of Transportation.

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The editors and organisers of the pre-conference workshop wish to acknowledge the co sponsors of the event and the US DOT and UK DfT for financially supporting the event. In addition they wish to thank ITS America for their organisation of the venue, catering and logistics. They also wish to thank the congress organising committee for placing the registration form on the congress website and providing details of the workshop in the final program.

IBEC would also like to thank the sponsors of the social event Cairo Corporation, Mitretek, ISIS and TRL.

It is hoped that this successful formula will be repeated again at the next (13th) ITS World Congress in London under the auspices of the IBEC Working Group.

Abbreviations

ACAS	Automotive Collision Avoidance System
ADAS	Advanced Driver Assistance System
APTA	American Public Transport Association
ATIS	Advanced Traveller Information Service
CEO	Chief Executive Officer
CVHS	Cooperative Vehicle Highway System
DfT	Department for Transport, UK
DSRC	Dedicated Short Range Communications
EC TEMPO	European Commission programme for Trans European intelligent transport systeMs PrOject
EEG	(European) Expert Evaluation Group
EPS	Electronic Payment Service
GPS	Global Positioning System
GPS/GSM	Global Positioning System/Global System for Mobile Communications
IBEC	International Benefits, Evaluation and Costs Working Group
ISA	Intelligent Speed Adaptation
ITC	Information Technologies and Communication
ITS	Intelligent Transport System
ITScO	Integrated Smart card Organisation
MIDAS	Motorway Incident Detection and Automatic Signalling
MMTIS	Multi Modal Traveller Information System
MTC	Metropolitan Transport Commission
PDA	Personal Data Assistant
PeMS	Performance Measurement System
PIARC	World Road Association
PFI	Private Finance Initiative
PPP	Public Private Partnership
RDS - TMC	Radio Data Service – Traffic Message Channel
RSU	Road Side Unit
RUC	Road User Charging
SASITS	South African Society of ITS
SF	San Francisco
TTI	Traffic and Traveller Information
USDOT	US Department Of Transport
UTFS	Universal Transit Fare Card Standard
VII	Vehicle Infrastructure Integration
VMS	Variable Message Sign
V-V	Vehicle-to-Vehicle
WIM	Weigh In Motion
WMATA	Washington Metropolitan Area Transit Authority

Executive Summary

Background

IBEC is the International Benefits Evaluation and Costs Working Group. The objectives of the group are set out in its Charter. These concern providing support to decision-makers on cost-benefits and cost-effectiveness analysis of ITS, promoting consistent and reliable evaluation methodologies, providing information to a wide range of stakeholders on ITS costs and benefits, and sharing information across the profession on non-technical and institutional issues and lessons learned. The group organised a pre-conference workshop run as a 'virtual tour' and a series of four thematic workshops (special sessions) which were held during the ITS World Congress in San Francisco in November 2005.

The workshops were the latest in a series organised each year at the ITS World Congress. Previous workshops had been organised by members of the IBEC group in Toronto 1999, Turin in 2000, Sydney in 2001, Chicago in 2002, Madrid in 2003 and Nagoya in 2004. The workshops aim to develop links between evaluation communities around the world, and are one of the ways in which the objectives of the IBEC Charter are met.

IBEC organises the workshops by setting out the main themes to be covered, and then inviting specific individuals who are known to be able to present high quality material, to present their ideas and findings.

Overview of Content

This report summarises the proceedings of the technical workshops, in which experts in ITS evaluation and decision-makers from around the world were brought together to present results and share ideas and experiences.

The workshops were divided into a pre conference workshop (full day):

- Traveller Information Services
- Electronic Payment
- Vehicle Infrastructure Integration
- Supporting Decision Makers on ITS Investments

And four Special Sessions:

- Private Sector Decision-Making on ITS Investments: Making the business Case for ITS
- Where Do I Start? Issues facing Economies in Transition and Developing Countries
- Hot Off the Press! The Latest Evaluation Results in Europe and North America
- The Impacts of Road Pricing: Beyond the Technology

For each session, the report presents an outline of the objectives of the session, and provides a table listing the presentations, which includes hyperlinks to enable the reader to view the presentations that were made to the audience. The following text summarises each of the presentations and ensuing discussions.

The annex includes a listing of IBEC Management Committee members, geographical spread of IBEC members as well as background material developed to promote the workshops.

1 Introduction

1.1 Background

IBEC is the International Benefits Evaluation and Costs Working Group. The objectives of the Working Group are set out in its Charter. These concern providing support to decision-makers on cost-benefits and cost-effectiveness analysis of ITS, promoting consistent and reliable evaluation methodologies, providing information to a wide range of stakeholders on ITS costs and benefits, and sharing information across the profession on non-technical and institutional issues and lessons learned[1]. The Working Group organised a full day workshop and a series of four Special Sessions which were held during the ITS World Congress held in San Francisco in November 2005.

The workshops were the latest in a series organised each year at the ITS World Congresses since 1999. Previous workshops organised by members of the IBEC Working Group include:

- 6th: Toronto in 1999,
- 7th: Turin in 2000,
- 8th: Sydney in 2001,
- 9th: Chicago in 2002,
- 10th: Madrid in 2003,
- 11th Nagoya in 2004,
- ITS Europe, Hannover in 2005, and
- EuroRegional pre-Conference Workshop, Dublin in 2005.

The Sydney and Chicago workshops were organised as a joint effort with the EU-sponsored ATLANTIC project.

The workshops aim to foster and develop links between evaluation communities around the world, and are one of the ways in which the objectives of the IBEC charter are met. Several materials from the Toronto workshop are available on the IBEC website (www.ibec-its.org). The proceedings of the Turin workshop are available on the U.S. Department of Transportation Website www.itsdocs.fhwa.dot.gov/jpodocs/repts_te/@@c01!.PDF). The proceedings of the Sydney and Chicago workshops are available from ATLANTIC (www.atlan-tic.net). The proceedings of the Madrid, Nagoya, Hannover and Dublin workshops are available on the IBEC Website (www.ibec-its.org).

The workshops reported here were organised by the IBEC Management Committee (see Annex 1 for a list of current members) with support from the IBEC Secretariat. Planning for the workshops began with a brainstorming session that took place during the 84th Transportation Research Board (TRB) Annual Meeting in Washington, D.C. in January 2005 among a small group of members of the IBEC Management Committee. Using the framework developed at the brainstorming session, members and the IBEC Secretariat performed the hands-on work of identifying, recruiting and confirming speakers and moderators, and organising the final programme for the sessions.

IBEC organises the workshops by agreeing the main themes and then inviting specific individuals who are known to be able to present high quality material, to present their ideas and findings. This introduces an element of 'peer review' to ensure that the workshops are of a high standard.

These proceedings comprise a culminating aspect of this joint effort of all participants, and dissemination is intended to be oriented to the community involved in evaluating the benefits and costs of ITS throughout the world. It is being made available on the IBEC website.

[1] See the IBEC website www.ibec-its.org for more information on IBEC, the Charter, etc.

1.2 Overview of Content

This report summarises the proceedings of the technical workshops in which experts in ITS evaluation and decision-makers from around the world were brought together to present results and share ideas and experiences. The workshops were divided into:

A pre-conference workshop (full day):

- Traveller Information Services
- Electronic Payment
- Vehicle Infrastructure Integration
- Supporting Decision Makers on ITS Investments

Four Special Sessions:

- Private Sector Decision-Making on ITS Investments: Making the business Case for ITS
- Where Do I Start? Issues facing Economies in Transition and Developing Countries
- Hot Off the Press! The Latest Evaluation Results in Europe and North America
- The Impacts of Road Pricing: Beyond the Technology

The structure for this report is as follows:

Chapter 2: **Summary of Sessions and Individual Presentations from the Pre-Conference workshop:** Provides an overview of each session and provides a table listing the presentations which includes hyperlinks to enable the reader to view the presentations that were made to the audience. The report then summarises each of the presentations and provides a review of the main questions and answers.

Chapter 3: **Summary of Sessions and Individual Presentations from the Special Sessions:** Provides an overview of each session, presents an outline of the objectives of the session, and a table listing the presentations which includes hyperlinks to enable the reader to view the presentations that were made to the audience. The report then summarises each of the presentations and provides a review of the main questions and answers.

Annex 1: **List of IBEC Management Committee Members**

Annex 2: **Geographical Spread of IBEC Membership**

Annex 3: **Session Flyer**

2 Summary of Sessions and Individual Presentations for the Pre-Conference Workshop

Approximately 95 people attended this workshop that took place from 09:30-16:00 on Sunday 6th November in San Francisco.

2.1 Welcome

2.1.1 Welcome from Steve Tarry (IBEC Chair)

Steve Tarry began by welcoming everyone in the very full room and provided background to IBEC.

2.1.2 Presentation from Randy Iwasaki

Mr Iwasaki began by making a number of opening remarks:

Good Morning, I would like to thank the International Benefits, Evaluation and Costs Working Group for making this workshop possible. I would also like to thank you for this opportunity.

As a leader of one of the largest Department of Transportation's in the world, we are constantly grappling with the costs and benefits of projects and services. Although our yearly budget is close to $10 billion per year, it isn't enough. I have a philosophy that anyone can manage if you have enough money. You just say yes. However, if you do not have enough money, you have to make decisions on priorities. It seems like the performance measurement program has followed me throughout my career. As a manager in a district, our director told his management team that we would need to develop a business plan with performance measures by Monday. It was Thursday. I said that only gives us one day. He replied that actually we had three days. Has this ever happened to you?

I am pleased to be talking to a group that actually supports and has the vision of the benefits on deploying ITS to aid in the decision making process for selection of projects and services.

Randy then covered the following points in the main body of his speech:

- *Safety is our top priority. We use a measurement system. It is not ITS based, but effective. The problem is that it is a reactive program.*
- *We do a project analysis to ensure the project actually met the purpose and need. If not, we adjust the strategy.*
- *Talk about the data gathering efforts to populate the Pavement Management System. We have moved to a yearly analysis of pavement condition to make more cost effective decisions. We use a vehicle outfitted with lasers and road sensors to get a condition rating.*
- *We moved from a worst first to a pavement preservation focus and also moved from historical allocations to a needs based allocation.*
- *I have a theme for this speech, it is IMAGINE A DAY…*
- *Vehicle Infrastructure Integration (VII) - Imagine a day when vehicles communicate to vehicles. Imagine a day when vehicles communicate with the infrastructure.*
- *Use the use case for occupancy. If you need occupancy data, you should be able to get it automatically through the electronics in a vehicle.*

- *We have a system call PeMS. It is our performance measurement system. You can get reliability curves, predictive travel time, shortest route, speed map information and the ability to test or accurately predict the value of improvements to the highway system.*

- *Imagin a Day when your CEO can log onto a computer and get accurate delay information. Each day in California, there is about 500,000 hours of recurrent delay in the urban areas. In the future, they will be able to look back and more importantly forward to see how the system is and will perform.*

- *Our Governor rolled out GoCalifornia (Figure 1 shows the pyramid). You will be pleased to know that the base is system monitoring and evaluation. This triangle is our system management philosophy. I will use the benefit cost ratio of a freeway service patrol at 20 to 1 versus a capacity increasing project that is in the neighbourhood of 3 to 1. How do we convince the boards, city councils, legislature, parliaments of the benefits of ITS.*

- *So I would challenge all of you to carry the message about "Imagining a Day" when we access to timely accurate information. Imagin a day that funding decisions are made with the needs of the travelling public. When you are putting the word out, please make sure it is in layperson's terms.*

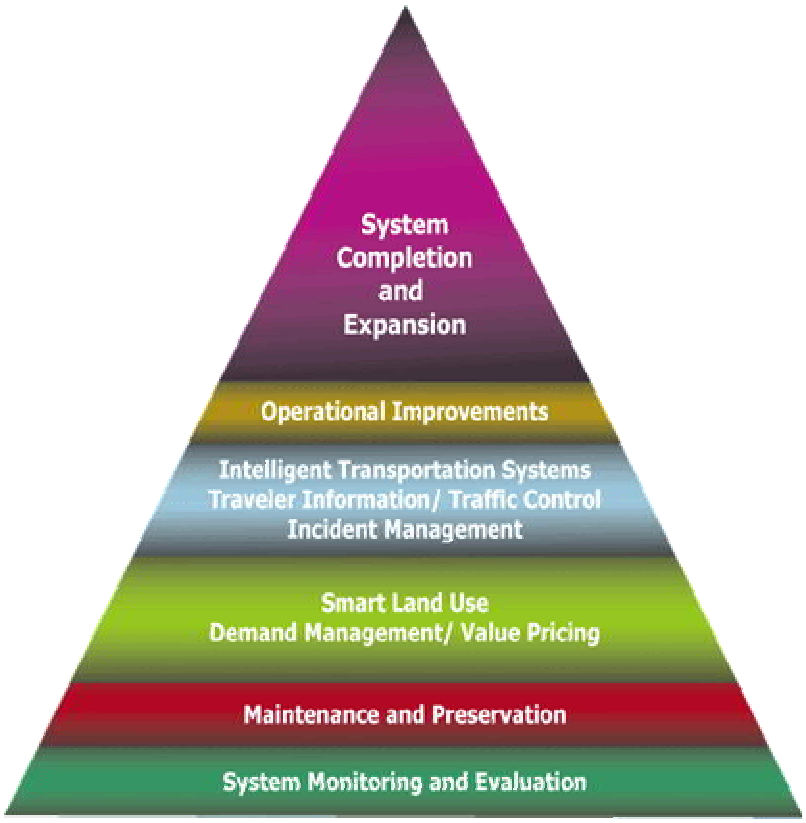

Figure 1: GoCalifornia system management philosophy

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2.2 Traveller Information Services

Moderator: Jane Lappin, Program Manager, USDOT/RITA/Volpe Center, USA

Time: 10:00 – 11:45

Approximately 40 people attended this Session.

Presentation title	Speaker
European Community Traveler Information Services: An Overview of Program Goals and Lessons Learned http://www.ibec-its.org/sanfran/01_Harris.pdf	Richard Harris
The Costs and Benefits of Transport Direct http://www.ibec-its.org/sanfran/02_Illsley.PDF	Nick Illesley
Traffic Information Services: Why bother? http://www.ibec-its.org/sanfran/03_Anderson.PDF	Ian Anderson
The Dutch Experience http://www.ibec-its.org/sanfran/04_Wouters.PDF	Dr. Jacorien A. A. Wouters
The Bay Area's Lessons Learned about Traveler Information Services from TravInfo to 511 – http://www.ibec-its.org/sanfran/05_Kuester.PDF	Carol Kuester

2.2.1 The Bay Area's Lessons Learned about Traveler Information Services from TravInfo to 511 - Carol Kuester, AICP, Manager of Traveler Information Services, Metropolitan Transportation Commission, USA

The presentation focused on the development of the traveler information in the San Francisco (SF) Bay area. The traveler information 511 is a service founded in July 2000 by reserving the number 511 for that purpose. Motivation of establishing the number was the easy remembering and the confusing high number of traveler information phone numbers in the past.

The service in the SF bay area can reach 7 million people in 9 counties with 101 municipalities and capture an infrastructure of about 1,400 miles highways and 19,600 miles of local streets and roads. The SF bay area 511 development was the first in California and addresses the largest metropolitan area in the United States. The service can be used by phone as well as by the internet with www.511.org .

Essential characteristic of the service is its multi-modality to capture the different means of transport and in order to fulfil the different demands of the road user in terms of the traffic and transit information desired. The "identity" of the telephone service tries to be that of retired highway patrol officer who leaves the impression of being experienced, trustworthy, responsible and courteous.

In order to meet the desired high quality level of the system, the information service provider has a high interest in user feedback. Therefore, the customer feedback is part of the ongoing research, by conducted surveys, in the last 3 years. The service is very successful, which can be observed by the actual usage of about 1 million combined Internet and phone sessions. However, observing and discovering usage trends will become complicated by the ongoing service evolution. The key challenge is the linking of 511 use and future transportation improvements.

Questions:

Question: You mentioned that you have one million hits per month, does your service provider have back up for power breakdown?

Answer: Not yet, we are looking at that now and considering "what is an emergency". We are looking at whether to invest further into a more complex system. As emergencies are very infrequent so should we be prepared for them or should we just provide a "standard" service"?

Question: Have you ever had too many calls to handle?

Answer: We have recently increased the capacity so it is not so much of a problem, but it can and does happen.

Question: Who is paying for the service – do users pay?

Answer: No users do not pay, we give them the data free of charge. We are currently re-examining the business case. Establishing a PPP will be difficult because a market for selling the data does not exist presently.

2.2.2 European Community Traveler Information Services: An Overview of Program Goals and Lessons Learned - Richard Harris, Regional Director ITS Services, Faber Maunsell, UK

The underlying message given by the example of the state-of-the-art of ATIS in Europe is especially to work with the data, i.e. processing the pool of collected and existing data.

The European commission initiated the development of ITS in Europe and the financial framework was given. The EC TEMPO Program provides in the so-called MIP (multi-annual indicative program) from 2001 – 2006 a budget of about € 192 million with a focus on road traffic management and pan-European ITS services and products. There are now seven Euro-regional projects funded by the European Commission.

In Europe a wide range of ATIS and delivery models are available to the road user with different forms of partnerships, financing models, coverage levels and delivery channels. The basis of the messages are an efficient and sophisticated data monitoring and processing system with traffic centres for a data exchange as the overall interface.

The main activities in developing traveler information services are in traffic information disseminated by radio, pre- and on-trip travel time information, internet services and traveler on-trip information given by VMS. Pan-European activities in the Mare Nostrum project coordinate VMS between three the Euro-Project Partners. Traveler information services are necessary to manage roads based on investment and ownership. Trust in the systems has to be built for the user. The users like the services but are not willing to pay.

Questions:

Question: There is a strong debate about VMS, what is the UK experience?

Answer: There is a large variety of contents which exist in the case of signing; some are not traffic-related. It is very expensive and sometimes not useful (e.g. Dublin Ring road has loads of information but it is not helpful). The European partners are still experimenting to find appropriate reactions. The bandwidth varies from unhelpful to useful. In each case, personalized information would be better and this is likely to be available in the future – e.g. number plate recognition information.

Question: How do you negotiate differences between borders?

Answer: For cross-border information legal issues have to be taken into account by multi-lateral arrangements. Spain and France have set up a trust system.

2.2.3 The Costs and Benefits of Transport Direct - Nick Illesley, Chief Executive, Transport Direct (London), UK

The presentation focused especially on the development, functionalities and user feedback of the national traveler information service "Transport Direct". The vision for Transport Direct is to provide comprehensive, easy-to-use multi-modal travel information. The challenge of the service is to connect people to places, removing barriers, offering choices, imparting intelligence and enabling citizens.

Based on four main areas of influence, on the large variety of individual modes of transport and on the transformation of complex activity chains of real life, the initial functionality was defined by seven types of information that the service will offer the end-user.

The service is well accepted especially in providing real-time information. With the success, the target was given of about 10 million user sessions by the end of 2006. This target seems to be realistic because of the overall positive and constructive in terms of improvements user feed back. About 25% of the users have requested the service for journey plans and about 15 % claim bad results from public transport options and car journey plans. It is remarkable that the service has changed substantially the traffic behavior in about 20% of users, so from car to public transport and changing the modes in general.

On the way to improve and to stabilize the service a program of data and functionality improvement was established. The most severe problem and challenge in the development and the daily work is seen in the data sustainability by the huge number of planned locations to be integrated from several hundred data sources. The data quality and management will be the key for providing good information and thus important for acceptance of the service.

Questions:

Question: Do you plan to push information out using a PDA system?

Answer: yes, we haven't got a golden proposition but I don't agree that users should pay. Paying for service would be difficult to achieve especially in the case of mobile services

Question: Data Input is important, how do you equalise data?

Data handling is a permanent challenge because of the different data formats. The interchange language was defined as XML. A clear data architecture and management will be the basis for a seamless data exchange and providing? For modern IT, it doesn't matter if formats differ, there are EU standards.

2.2.4 Traffic Information Services: Why Bother? - Ian Anderson, Senior Engineer, Scottish Executive Development Department, UK

The presentation focused on current European deployment and the findings of market researches to improve traveler information services. Different criteria like the coverage of the European Community by RDS-TMC, travel times, Internet services and density of VMS give a quite good impression of the state-of-the art in Europe.

The coverage is quite good in terms of RDS-TMC and Internet services, whereas some white areas exist for the travel time and VMS density. Especially the new EC countries have a big backlog. A higher accuracy of data would improve the services.

In Scotland, three market research studies were conducted in the last nine years to get a better impression about the user's needs and attitudes. During the last nine year on one hand the user's expectation about accuracy and content have become distinctly higher, on the other hand, the tolerance to delays have increased. Users have expressed the desire for tailored services.

Based on the findings, the monitoring systems were extended to increase the data coverage and quality. New groups of information were integrated and new types of portals are offered to meet the user's desires. The main objective of daily activities is alignment with the policy and public expectations.

Questions:

There were no questions

2.2.5 The Dutch Experience: Evaluating the Impact and Value of Dutch Advanced Traveler Information Services - Dr. Jacorien A. A. Wouters, Program Manager

Traffic Data and Travel Information, AVV Transport Research Center, NETHERLANDS

The presentation described in particular the Dutch policy of traveler information services and the lessons learned based on user surveys and evaluation studies. A high proportion of cyclists and pedestrians of about 40% characterize the Dutch modal split; which is high in contrast to other industrialized countries.

The Dutch policy has defined an acceptable and reliable door-to-door travel time as one of the main important goals with the sub-goals that travel information shall improve the usage of the road network and fulfill of the travelers expectations of the traffic conditions. In the traffic information chain of collecting, processing and distributing, the Ministry set priorities in 1996 for collecting and processing traffic data with the consequence that distribution would be undertaken by the private sector. The focus was shifted by a policy update last year to an improvement of quality, new forms of partnership and to fill data gaps in by buying data.

In the Netherlands, the supply of traffic information involves about 15 service providers and more than 100 dynamic route information panels. Ongoing work was assessing knowledge about the use and effects of pre-trip and on-trip traffic information. The presentation delivered detailed insight about road user habits and behavior. For instance, the greatest effects of pre-trip information are the choice of another route and an alteration of the departure time. This information was based on a survey and was confirmed by a second one. Moreover facts about the traveler psychology and perception could be elaborated so that the user needs were identified; these were to increase significantly the use of travel information like door-to-door-information, reliability, easy access, user-tailored and realistic information. Positive effects on traffic behavior and throughput are to be expected. In the future new types of data sources and working the complete information chain by private providers will be tested.

Many traffic users are already satisfied with the services - they cannot recognize deficits in the services in order to improve their own situation. In terms of a user-specific planning information service, the user-interface is ranked as the most critical part in the system. It was confirmed, too, that identifying the business cases is very difficult because the users are not willing to pay for the services.

2.3 Electronic Payment

Moderator: Leisa Moniz, USDOT/RITA/Volpe Center, USA

Time: 10:00 – 11:45

Approximately 40 people attended this Session.

Presentation title	Speaker	Hyperlink to presentation
Evaluation of Smartcard Schemes Oyster Card Overview http://www.ibec-its.org/sanfran/06a_Blythe.PDF http://www.ibec-its.org/sanfran/06b_Stout.PDF	Phil Blythe and Simon Edwards	PDF PDF
North American Overview of Transit Smart Card Projects http://www.ibec-its.org/sanfran/07_Garback.PDF	Gregory Garback	PDF
TransLink Program Evaluation Findings http://www.ibec-its.org/sanfran/08_Avidon.PDF	Jacob Avidon	PDF

2.3.1 Evaluation of Smartcard Schemes - Phil Blythe, Professor of ITS, University of Newcastle, UK and Simon Edwards, Professor of ITS, University of Newcastle, UK

Professor Phil Blythe presented some of the lessons learned from evaluation of the Oyster card, which is a transit smart card for London. There are 2.9 million Oyster cards currently in use, which transmit payment for 2.2 million journeys per day. The London Oyster card is the largest transit smart card system in Europe. Lessons learned from the project include:

- Customize your communications to the public, especially to combat the media's anti-government attitude.
- Have firm requirements in place between the government and its vendors because vague requirements cause delay.

Phil also talked about the Oyster card program's participation in the Integrated Transport Smart card Organization (ITScO), which aims to develop standards for smart card communications among its members. All other cities in the U.K. that use a transit smart card system use the same system, which is not currently compatible with the Oyster card. ITScO's goal is to make the two systems compatible, and to expand use of the standard across Europe.

Because transit smart cards are rapidly becoming a kind of electronic purse, the issue of security and theft prevention should be considered. Biometrics is one method of theft prevention, and Prof. Blythe discussed various biometric methods, such as retinal scans, face recognition, hand scans and a thumb print reader built into the card.

Phil's presentation ended with a video made by Newcastle-area students discussing the pros and cons of an electronic payment card used in their schools. It was interesting to hear what students thought of the smart cards in their own words.

Questions:

Refer to Section 2.3.3

2.3.2 North American Overview of Transit Smart Card Projects - Gregory Garback, Executive Officer, Washington Metropolitan Area Transit Authority (WMATA), USA

Mr Garback gave a presentation on his agency's SmarTrip system. SmarTrip was launched in 1999 and currently has over 1 million users. Mr. Garback noted that his agency wants to get out the business of actually issuing the cards, which he sees as a more appropriate role for banks, credit card companies, and other financial institutions.

As a lesson learned, Mr. Garback stressed the importance of testing: "You cannot over-test the system." He advocated incremental deployment to avoid catastrophic problems. He cited the following other keys to success: standards, collaboration, experimentation, and outreach. He noted the American Public Transportation Association's (APTA's) Universal Transit Fare Card Standards (UTFS) effort as being especially helpful.

2.3.3 TransLink Program Evaluation Findings - Jacob Avidon, Senior Program Coordinator, Metropolitan Transportation Commission (MTC), USA

A full rollout of TransLink is planned to begin in 2006 and be completed in 2008. At that time, TransLink will be installed on all 20 transit agencies in the region.

The MTC conducted a test pilot of the system in 2002, and results from that pilot are now available. Results from the test pilot included the following:

- Transit riders liked the system.
- The system was easy for riders to figure out.
- Not all frontline staff knew about the test pilot.
- It was difficult to get bus riders to use the system.
- It was difficult for some disabled people to use TransLink. It was especially difficult for visually impaired people to use the fare card machines.
- There was not a huge cost savings.
- Use by daily card holders remained constant throughout the test period

Questions:

Question: (from Mr King of San-Francisco): What about the "un-banked" and under-banked community?

Answer: in the U.S., this population is already very familiar with pre-paid telephone calling cards. The transit smart cards would work in a similar way, so that the under-banked population could easily take advantage of the benefits (convenience, replacement of lost or stolen cards, etc.)

Answer: Focus groups with lower socio-economic groups found value in a smartcard as opposed to a bus pass since it has balance protection: if they lose card, then they call for a new card and they don't lose money.

The un-banked have access via pre-paid cards. There will be a range of options and transit operators will accept all of these.

Comment: An audience member from South Africa noted that in his country, a large population does not have bank accounts but does have cell phones. These cell phone accounts essentially act ask bank accounts for much of the un-banked population in that country. Consequently, South Africa is exploring using cell phone accounts for transit fare payment.

Question: Aren't regional and smaller banks being cut out?

Answer: They don't like to take risk, but they are interested and may also get involved when larger players have started the branding and increased awareness of the possibilities of combined cards.

Question: (From Washington DC): Is there any research to show that electronic transit fare payment increases ridership?

Answer: None of the speakers knew of any research with this finding, but Gary Garback of WMATA said that his agencies suspects that there is a positive correlation. Ridership has gone up but it is not possible to prove it because of smartcards alone. It's not a captive market as it is possible to pay for transit without smartcards.

Question: (from South Africa): We don't use banks as clearing operator – is there a clearing house outside of the banks also?

Answer: Transit operators are not banks. Core competencies should be used and banks are best at providing these financial services such as clearing.

Question: Cell Phones billing – is this used?

Answer: Payment for travel by using cell phones is probably 1-2 years away but will definitely come. As an operator, all payment means are acceptable. Interestingly, some of the "un-banked" have cell phones, so this means of payment may be an additional access route for them.

2.4 Vehicle-Infrastructure Integration

Moderator: Jane Lappin, Program Manager, USDOT/RITA/Volpe Center, USA

Time: 13:00 – 14:15

Approximately 95 people attended this Session.

Presentation title	Speaker
Challenges to Prospective Evaluation of Public Sector Investments in Vehicle-Infrastructure Cooperative Systems http://www.ibec-its.org/sanfran/09_Sloadova.PDF	Steven Shladover
Approaches to Evaluation http://www.ibec-its.org/sanfran/10_McDonald.PDF	Mike McDonald
Wireless Roads or Connected Cars: An Automotive Industry Forecast of Vehicle-Infrastructure Integration Presentation not public	Steve Underwood
VII in Europe: eSafety Implementation Road Map http://www.ibec-its.org/sanfran/11_Kumala.PDF	Friederich-Fritz Bolte

2.4.1 Challenges to Prospective Evaluation of Public Sector Investments in Vehicle-Infrastructure Cooperative Systems - Steven Shladover, Research Engineer, California Partners for Advanced Transit and Highways, USA

Key points of prospectively evaluating VII were identified and discussed during this presentation. As a ground rule, VII is really what ITS was intended to be from its initiation. It was noted that VII benefits will be indirect; that is, they will come from the services that use VII, not from VII itself. Services that can build on VII data as well as new opportunities available in the future as a result of VII data were highlighted. Examples include: real-time infrastructure condition assessment, automotive customer relationship management, and hazard warning beyond line of sight. While VII can be the enabler of new services, evaluations need to be conducted so benefits and costs can be estimated. Estimating benefits is far more challenging than costs; however, estimating operations and maintenance costs requires skill and care in determining allocation across stakeholders.

Questions:

Question: Please can you expand on the sensitivity studies?

Answer: We need to look at slow and rapid system uptake – this will depend on assumptions about OEM or retrofit on vehicles and budgets for infrastructure equipping. Sensitivity studies include factors such as how quickly in-vehicle systems will be adopted – on luxury vehicles, all vehicles, and the number of new and retiring vehicles.

Question: Are there privacy issues?

Answer: Governments and automotive industry regard this as the most important institutional issue. E.g. individual vehicle identity will not be saved so O-D data will not be per vehicle.

Question: Are public safety players involved?

They need to be involved; also regional authorities, telecom companies etc. Public safety agencies are not the only group missing from the stakeholders – telcos are missing, too. The current group of stakeholders consist of the U.S. DOT, 10 state DOTs, and seven automobile manufacturers.

Question: Would it be possible to opt out of privacy for payment for the information?

Answer: Opting for reduced privacy is possible and necessary for some commercial services e.g. insurance.

Question: Is there really a future market for VII or will this be like the CVHS programme?

Answer: Desirability depends on services that are built on VII e.g. downloading movies is likely to be popular. Industry believes that there *will* be attractive services.

Question: Wouldn't infrastructure control at intersection control be rather like "Russian roulette" ?

Answer: VII gives an opportunity to add to existing traffic lights, not replace them. Applications include, for example, informing drivers if another vehicle is violating.

2.4.2 Approaches to Evaluation - Mike McDonald, Director, Transportation Research Group, University of Southampton, UK

This presentation focused on the Department for Transport's study on Cooperative Vehicle Highway System (CVHS) that is now compete, but politically sensitive. Objectives of the study were to deliver useful information to policy makers. The full benefits of CVHS may not be achieved because automotive manufactures are using different algorithms and because of the current low accident rate in the UK. Issues include: evolution of technology; step changes in opportunities – the need for big changes in vehicle and infrastructure to obtain big benefits; and socioeconomic background. The analysis was based on two generic types of CVHS: autonomous and co-operative systems with the latter being a much more integrated system.

Evaluation of various ADAS applications were studied in a series of scenarios, but this excluded road use charging (for political reasons) and junction control. ADAS implementation was assumed to be consumer-led, but it was assumed that the Government may offer incentives or mandate through legislation. Benefits were discussed in terms of safety, journey times, and environmental costs. Cost benefit results were discussed with an industrial advisory panel. Customer acceptance was also assessed based on soft issues as well as economic benefits.

The results showed that the strongest case could be made for Intelligent Speed Adaptation (ISA). Benefits of other systems were relatively small. If government were to pay, the rate of return of hard benefits would be small but the incremental costs would be small if it's built on consumer-led services.

2.4.3 Wireless Roads or Connected Cars: An Automotive Industry Forecast of Vehicle-Infrastructure Integration - Steve Underwood, Research Scientist, Center for Automotive Research, USA

This presentation focused on preliminary results of a Delphi study involving 20 experts from the automotive industry. Each expert was asked to respond to survey questions based on their personnel feelings and not those of their company/employer. The questions were forward looking and were specific in nature. For example, questions included ranking the top communication pipeline (e.g., Dedicated Short Range Communications (DSRC), WiFi, cellular) to vehicles for discrete data communications (e.g., tolling, intersection warnings, and commercial applications), to what services are essential to VII becoming a reality (Essential service being that VII isn't going to happen unless the particular service is a component of VII), as well as indicating which services to be deployed first.

Because the study is on-going, details of the presentation are not highlighted at this time. Only a selection of first-round results was presented. Results did indicate agreement in some areas among experts, controversy over some topics, and positive as well as negative feedback on VII.

Questions:

Question: If drivers ignore a warning, will this impact responsibility and enforcement?

Answer: This is untested and unknown at present and may also be country specific.

Comment: Australia has to follow Detroit but it should be remembered that some communications options are not available in Australia!

Question: Which complementary media are thought necessary other than DSRC?

Answer: This is not really specific at the moment.

Question: How much was really revealed – is there anything else?

Answer: It appears that some V-V services will move ahead without government supported VII, so industry may well develop some services on their own.

Question: Will your presentation be made available?

Answer: No – not the details as this work is ongoing, but I will make something available.

2.4.4 VII in Europe: eSafety Implementation Road Map - Friederich-Fritz Bolte, Bundesanstalt für Strassenwesen (Federal Highway Research Institute), GERMANY

The results and recommendations of the Implementation Road Map Working Group were presented. Objectives of the Working Group include a 50% reduction in fatalities by 2010 and application of ITS and ADAS. The Working Group was to develop suitable and realistic implementation roadmaps. This was based on ongoing European projects and interaction with other eSafety Working Groups. Industry view and road authorities willingness to invest in road infrastructure were considered in the approach. Assumptions of the Working Group are that costs of in-vehicle equipment will decrease and countries with the least infrastructure have the highest accident rates/safety issues. Priority systems were identified in the autonomous area and for the infrastructure. An overview of all recommendations is available on the eSafety website.

Questions:

Question: Did you look at ISA and driver drowsiness detection?

Answer: Intelligent Speed Adaptation (ISA) and sleep monitoring are being looked at by the Working Group. ISA has different implementation possibilities so implementation scenarios need to be studied. Speed maps are a difficult issue as many regional organisations are involved. Institutional issues including responsibility and liability need further consideration for ISA. Various implementations of ISA should be studied: on all roads, which roads, all drivers, which drivers? Speed maps are not yet clearly defined. Certification of speed maps is needed. Take for example, the question, who is responsible if the systems malfunction? Sleep monitoring was not on the priority list (but driver drowsiness may be important in some other countries). However it is noted as a big problem for freight carriers. Lane Departure Warning Systems might help here also.

2.5 Supporting Decision Makers on ITS Investment

Moderator: **Richard Harris**, Regional Director ITS Services, Faber Maunsell, UK

Time: 14:30 – 15:45

Approximately 95 people attended this Session.

Presentation title	Speaker
Decision Making Resources in the USA http://www.ibec-its.org/sanfran/12_Joe.PDF	Joseph I. Peters
Decision Making Resources in the U.K http://www.ibec-its.org/sanfran/13_Tarry.PDF	Steve Tarry
Decision Making Resources in Developing Countries http://www.ibec-its.org/sanfran/14_Paul.PDF	Dr. Paul Vorster

2.5.1 Decision Making Resources in the USA - Joseph I. Peters, Manager of ITS Program Assessment, USDOT, USA

The presentation focused on the latest developments in the ITS Costs Benefits database and supporting material produced by the US DoT to aid decision making in ITS investment (www.benefitcost.its.dot.gov). Most emphasis was placed on the Technology Overview section, which was launched in September 2005. This allows the user to undertake a structured search of the benefits and costs databases, plus lessons learnt and other sections of the site to get information tailored to their individual needs, including where they are in the decision making process.

Focus groups have been used to ensure the structure and nature of the content is truly reflective of users needs. This work also reviewed the UK Toolkit approach to structuring material and presenting it to the end user (as described in the following section). Although there are differences, both the UK and US resources are well received by those who seek to use them. Recognising that such resources require up to date content, a request was made for results to be passed to the ITS Program Assessment team for possible inclusion.

Questions:

Question: Does cost data go broader than the US?

Answer: Everything is international except the costs database, but even there, there are a few entries.

Question: What about the timeliness and removing old data?

Answer: Cost information is standardised to one specific year, so that's not a problem and is updated outside the US.

The databases clearly require operation and maintenance and older information on lessons learned may be dropped or revised.

2.5.2 Decision Making Resources in the U.K - Steve Tarry, Regional Director, Faber Maunsell, UK, IBEC Chair

The UK Toolkit is a resource to enable decision makers to identify possible ITS tools, based on a consideration of national and local policies, local aims and objectives and the specific problems to be addressed. Candidate tools are presented for further consideration, together with information on key cost drivers, the nature of the benefits that might be anticipated and what others have done and learnt from their experience of deploying and operating that tool. Multiple policy objectives can be addressed and the possible integration between individual tools is highlighted throughout. Case studies are presented and all 'results' within the Toolkit, from studies within the UK and around the world are held within a structured Results Database. As for the US resource, results are sought to ensure the Toolkit is up to date and reflects current custom and practice and lessons learnt.

Questions:

Question: How are costs shown in the toolkit?

Answer: Costs within the toolkit are whole life costs and are, as for benefits, are presented in accordance with UK Government guidance on Transport Investment. Conventional measures are also highlighted along with ITS tools within the Decision Making Tree at the heart of the Toolkit.

Question: Is there National architecture for ITS?

Answer: There is no formal national architecture for ITS, although a Policy document on ITS was thought to be imminent. Meanwhile all funding requests, for ITS as for conventional measures come to the Government as part of the Local Transport Planning process.

Question: What work is the European Evaluation Expert Group (EEG) undertaking?

Answer: EEG is seeking to get some common approaches to evaluation and the reporting of results from ITS projects within the European Commission's TEMPO programme

Question: How much of the work you have described is available on the IBEC website?

Answer: The EEG and TEMPO have their own web site and we need to ensure there are links to them. The DfT work will be moving to a web-based approach. The TEMPO website is currently being re-launched as a home for the reports along with any future web-based version of the UK Toolkit

Question: Is ITS evaluated over a long enough period consistent with infrastructure timetables?

Answer: Whole-life costs and benefits are evaluated based on DfT guidelines and this is consistent with infrastructure evaluation.

Question: Are governance and sustainability of ITS issues included in this work

Answer: Not as yet but the UK will be developing a policy framework document for ITS.

2.5.3 Decision Making Resources in Developing Countries - Dr. Paul Vorster, CEO, South African Society for Intelligent Transportation Systems, SOUTH AFRICA

The underlying message is that South Africa is not unusual from what might best be described as emerging nations, rather than developing countries, where there are stark contrasts between high tech and low, or indeed no tech, between those who have cars and those who probably do not have access to public transport. Decision making therefore needs to take account of a different set of policy considerations and assess the merits of investing in ITS using a different set of objectives and indicators for success. Due to time constraints it was not possible to develop this theme further during the session. However, this is a topic which is also addressed within IBEC Special Session 2.

3 Summary of Sessions and Individual Presentations within the Special sessions

3.1 IBEC 1: Private Sector Decision-Making on ITS Investments: Making the Business Case for ITS

Moderator: Richard Mudge, Vice President, Delcan-NET, USA

Time: Monday 7th, 15:30 – 17:00

Description: When determining whether or not (and how much) to invest in ITS, the decision-making process is different in the private sector than the public sector. What kind of data does the private sector collect? How do companies analyze data in order to support their decision-making process? In this session, speakers from private sector organizations, large and small, from around the world will shed light on this aspect of ITS investment decision-making, which is not well documented in the public arena.

Approximately 55 people attended this Session.

Presentation title	Speaker
Travel Time Prediction: The Low Cost Solution http://www.ibec-its.org/sanfran/15_Manor.PDF	Dan Manor
Making the Business Case for ITS http://www.ibec-its.org/sanfran/16_Burr.PDF	Jonathan Burr
Investment in ITS: The Private Sector Perspective http://www.ibec-its.org/sanfran/17_Stout.PDF	John Stout

This session presented three case studies related to ITS investment decision-making by private sector consortia and companies. The first presentation compares the advantages and disadvantages of predicting travel time on corridors using the floating car technique and the point detection technique. The business case is made for point detection techniques that use low-cost traffic measurement technologies and, based on this argument, for investment in a new class of low-cast and reliable detector technology. The second presentation focuses on estimating link travel times from floating (probe) vehicles by monitoring signals from cell phones in the vehicles. The business case is based on the completeness of the travel time picture provided for corridors across a region at a reasonable total cost. The presentation discusses the factors for success in providing the service. It has been implemented in the UK and in Baltimore, MD. The third presentation highlights the financial and other risk factors considered by a consortium when it undertook a long-term contract to manage and maintain the collection of transport fares using a smart-card system (Oyster) in London UK. These examples serve to illustrate the many factors considered in making a business case for investing in ITS products and services from a private investor's perspective.

3.1.1 Travel Time Prediction: The Low Cost Solution - Dan Manor, President, EIS Electronic Integrated Systems, CANADA

The presentation began with an introduction to the concept of travel time information as having value when it predicts a future state of the transport network, i.e. at the moment when a traveller actually reaches a given point in their trip. This prediction of future travel times cannot be based on historical records or even current travel times in the network. A method is needed to estimate traffic conditions near a point – in the future – at the time when the driver will get there.

Two conceptual solutions were discussed – vehicle probes and point detection. Vehicle probes can be based on monitoring electronic toll tags, license plates, GPS/cellular or cell phones The advantage is that they can measure segment travel time directly and accurately and specific to a vehicle. The disadvantages, among others, are that they measure effect and not cause, and have relatively high infrastructure and communications costs. Point detection systems, on the other hand, have the advantage of also measuring traffic volumes, not just small samples of the vehicle flow, and thereby permitting estimation of volume/capacity ratios across the network from which speed can be estimated and, incidentally, probability of accidents.

Travel time prediction services are suitable for public-private partnerships. However, a viable business model requires very low operating costs and high availability. The microwave traffic detector developed by the author's company has the low life-cycle costs and high reliability required to enable service providers to establish viable travel time prediction services in several cities including Sacramento, CA, Moscow, Russia and Beijing, China. Based on this outcome, there was a viable business case to invest in the development and marketing of this device.

Questions:

Question: Are there different motivations and requirements? Between different agencies in different countries?

Answer: In China the police think travel time information is a "soft" form of control and think it should be provided

Question: Is there a business case for directly selling data to private motorists?

Answer: Some are willing to pay but expect highly accurate data

3.1.2 Making the Case for ITS – Jonathan Burr, CEO IT IS Holdings plc

IT IS operates the worlds largest network of floating vehicle data. The business was built from truck data by buying data from companies who are already tracking and tracing vehicles. IT IS are now looking at mobile phone data also.

Data is merged with journalistic data and this is published to:

- Mobile phone industry (premium service)
- Motorists (via RDS-TMC)
- Governments (for monitoring the network)

The business is viable because of *multiple* customers/markets. Also, it only works because road networks have problems.

Mr Burr described the tensions and differences between private-sector and public-sector approaches to traffic information. E.g. Goverment does not accept responsibility for journey times.

Questions:

Question: How did you start – did you ask government?

Answer: Business started without Governments on the dot.com boom as a consumer based "gadget" model. Subsequently we demonstrated to Government and there was a very long procurement process.

Question: Information gives relative advantage, but is there an issue if there are too many vehicles receiving the data?

Answer: Our model does not rely on the same people receiving as generating the information. There is an argument for the Government to subsidise information to ensure everyone has it.

Question: How do you go about creating a new market?

Answer: Any selling to a new market needs someone with vision and authority to buy it. So it depends on finding the risk-taking trend setters. The first RDS-TMC customer was Toyota.

3.1.3 Investment in ITS: The Private Sector Perspective - John Stout, CEO, Transys, UK

The presentation outlined the story of the PRESTIGE project from the perspective of the private investment consortium that implemented and operates the Oyster smartcard for ticketing on London Transport. The Transys Consortium, formed with EDS and Cubic as the primary shareholders and sub-contractors, has the contract for management and maintenance of all existing London Transport automated fare collection assets and services. It is responsible for provision of the ticketing equipment and operating the service over a 17-year contract period. The revenue stream depends on system and service availability and transaction volumes with a base of £192m. The majority of the risks and obligations are flowed down to the sub-contractors.

The rationale considered by the Consortium for making this investment included financial return, opportunities for growth and improving the experience of the traveling public. The financial considerations were the return on investment, cash flow, risk and reward, the need to raise capital, the consortium approach and the length of the concession. To make a success of the project, there were several contractual considerations that needed close attention including having clear requirements, clear outputs, confidence the solution would work, mechanisms to transfer risk and appropriate contract arrangements. Other non-contractual considerations included understanding the client's business needs, management of the interfaces with the client, managing expectations and having clear milestones and goals.

In conclusion, the main consideration for the private sector investors is financial but the other factors are also important to the overall success of the project. In particular, the risk to reputations should not be underestimated. Successful contracts and projects will take all these factors into account.

(Note that Mr Stout was unable to attend the IBEC 1 Session at the 12th ITS World Congress due to a last minute change of plans and William Johnson, Session Co-organizer, read his presentation.)

Questions:

Question: What is PFI?

Answer: Private Finance Initiative – a previous government initiative to encourage private investment in public infrastructure projects.

Question: Are there additional problems because ITS is more complex and involves systems?

Answer: We are very focussed on business close to our core competencies

3.2 IBEC 2: Where Do I Start? Issues facing Economies in Transition and Developing Countries

Moderator: Jane Lappin, Program Manager, USDOT/RITA/Volpe Center, USA

Time: Tuesday 8th, 10:30 – 12:00

Description: Economies in transition and developing countries face different and unexpected issues when deploying ITS projects. The World Road Association (PIARC) committee on Management of Network Operations (C1.4) is studying what evaluation is needed. Where evaluation is not part of the ITS implementation process, speakers from the committee will discuss why and how ITS implementation decisions are made.

An interactive session with the participants will explore the question: "What are (your) decision-makers looking for when they are deciding whether to back an ITS project?" The answers to that question will help in guiding the committee's work over the next 18-24 months.

Approximately 37 people attended this Session.

Presentation title	Speaker
Decision Makers and ITS http://www.ibec-its.org/sanfran/18_Bennett.PDF	Christopher R. Bennett
ITS Decision making in Developing Countries http://www.ibec-its.org/sanfran/19_Darryl.PDF	Darryll Thomas
Where do I start? http://www.ibec-its.org/sanfran/20_Miles.PDF	John Miles
Mobility for Today and Tomorrow http://www.ibec-its.org/sanfran/21_Bajpai.PDF	Amitabh Bajpai

3.2.1 Decision Makers and ITS - Christopher R. Bennett, Senior Transportation Specialist, East Asia and Pacific Region Transport Unit, World Bank

Mr Bennett is actively involved in operations, primarily in China, but also in several countries in South-East Asia. He is currently involved in various ITS implementations as part of his expressway projects in China, and is involved as an advisor and reviewer on other projects throughout the World Bank, especially in the application of IT for road management. He is also a member of the regions 'Information Technologies and Communications' (ITC) task force, looking at new ITC areas where the World Bank can be involved. In this capacity he is a proponent of increased ITS components on World Bank projects

Developing countries are still building their infrastructure and therefore ITS is easier to incorporate than it is in the developed world, which has to contend with legacy systems. There has been a rapid take off of ITS in some countries which are technologically aware. In the South-East Asia region there are some technically advanced countries such as China and others that are 'low tech' such as the Philippines, where infrastructure is extremely basic. Legal frameworks in developing countries often complicate the introduction of ITS, eg the introduction of cameras. Data models often do not exist.

The World Bank has to be sensible about funding ITS projects. A major challenge for the Bank is to reduce expectations of over-ambitious politicians in developing countries. Countries often want the

state of the art in ITS but this is usually not realistic. The Bank's preference is to introduce a fairly basic level of ITS initially. If this is successful, it can be expanded later.

World Bank clients tend to think of the benefits of ITS but not the costs. They do not need convincing of the benefits of established technologies, as these are apparent from experiences in the developed world. Often, they do not understand the idea of sustainability and maintenance costs for ITS.

World Bank projects seldom include formal evaluations of ITS projects. However, a major issue for the Bank is how the public sector agency is going to finance ITS when World Bank funding ends. Accurate information is required for the whole life of a project, including implementation, operating and adoption costs.

An important practical limitation to the take up of ITS is the availability of suitably qualified staff in the public sector, as they are often tempted to the private sector by higher salaries. In terms of approval for funding, the World Bank has to ask a series of questions, eg 'how will this improve transport?' 'do you have the technical people to support the systems?'

An ITS Toolkit was developed by World Bank 3 years ago and is available on a website – www.developingits.org.

3.2.2 ITS Decision making in Developing Countries - Darryll Thomas, eThekwini Urban Traffic Control, Africa Branch, (Durban) Transport Authority, SOUTH AFRICA

As a result of some unique problems, such as the effects of apartheid, there are huge problems with decision making on ITS projects in South Africa. The problems include:

- A huge disparity in lifestyles. For example in Durban – 23% of the population suffer extreme poverty.
- Car ownership is growing rapidly.
- Road safety is an issue: accident rates are very high.
- Vandalism and theft.
- Very poor public transport provision.
- Traffic lawlessness and poor road safety.
- Overloading of heavy vehicles.

Vandalism and theft makes ITS implementation difficult and expensive. For example the power cable for Durban city's only VMS sign was stolen 3 times and eventually had to be put inside a steel casing; aluminium doors have been stolen from 600 traffic control boxes, aluminium backing to traffic signals is also stolen.

All cities have developed an integrated development plan, with a defined vision. Public transport accounts for 60% of trips and is generally of a poor standard. However, a survey showed that the public do not regard improving transport as a priority. In this context, ITS is seen as a luxury item and too 'high tech' a solution to the country's problems.

Government policy is to use public finances to promote social upliftment. The tender process is complicated by the social requirements such as black empowerment. A points system operates. In a city where 20% of the population cannot afford a bus ticket, how can expenditure on ITS be justified? The challenge is to adopt suitable technology but adapt it to the particular circumstances in South Africa.

There is no national champion for ITS. The South Africa DoT supports ITS but is not involved in administration. Metropolitan cities are the main ITS implementing authorities.

The South Africa Society of ITS (SASITS) was set up in 2001. SASITS advises the Ministry of Transport on ITS and some pilot projects have now been set up eg a VMS sign, which was promoted to politicians on driver safety issues. A website, showing live CCTV pictures, has also been set up.

This was very difficult to justify to the politicians, who felt it would only benefit the richer members of society with internet access. The website is www.sasits.com.

Other developments in the ITS sector include:

- A move towards electronic vehicle licensing, as driving unlicensed cars is a major problem (50% of cars are unlicensed)
- Electronic tolling. One electronic toll system with 15,000 e-tags is now in existence
- Taxi replacement scheme – old taxis are being replaced with new ones with electronic management systems and authorized drivers

With regard to ITS evaluation, cost-benefit is a difficult concept as politicians are looking for obvious 'up front' benefits. Pilot projects have the advantage that they are low budget and the costs can be absorbed within other, larger-scale projects, and can be used to demonstrate the benefits. The 2010 Soccer World Cup is expected to act as a catalyst for ITS projects.

3.2.3 Mobility for Today & Tomorrow - Amitabh Bajpai, President, Association for Intelligent Transport Systems, India

This presentation was not originally planned to take place but Mr Bajpai kindly prepared a presentation. India has recognised that it is socially, environmentally and politically right to adopt ITS. ITS is now in the take-off stage. Some problems include (see '***comment**' in Section 3.2.4):

- lack of co-operation between ministries
- costs
- no long-term approach
- lack of co-ordination between agencies and systems
- language problems for VMS

3.2.4 Where do I start? - John Miles, Managing Consultant, Ankerbold International, UK, PIARC C1.4 Committee Member

The World Road Association (PIARC) committee on network operations is studying what evaluation work is needed for developing countries and those with economies in transition. To help the committee with its work the moderator put four of the common issues to the audience. The issues concerned:

- ITS evaluation results in decision making
- Contribution of ITS to the socio-economic agenda
- Encouraging inter-agency co-operation
- Evaluating 'alien ITS cultures'
- System architecture
- Agency communication
- Costing organisational and professional capabilities

The following responses were offered by members of the audience.

Question: What kind of evaluation results would persuade decision makers that ITS has 'upfront' value? Why not wait? Why go for ITS now? Doesn't ITS make sense only AFTER exhausting other traditional methods?

Answer 1: Communications and satellite technology is there in developing countries. If they do not look at ITS in a proactive way, they will end up with an unsustainable transport system

Answer 2: ITS is not an 'either/or' choice. ITS adds value to infrastructure, it does not replace it

Answer 3: Traffic engineers like to see numbers and politicians like to see 'in your face' obvious results from ITS

Answer 4: Main points for decision makers are a) that ITS will not displace labour b) that quality of life will be improved for all levels of society, not just the more well-off

Answer 5: Developing countries are not looking for off the shelf technologies – solutions have to be tailored to particular circumstances

Question: How can ITS contribute positively to the socio-economic agenda? What evaluation methodology is appropriate?

Answer: In South Africa the Department of Transport is not involved in ITS to any great extent and needed something simple and user-friendly. It has not gone down to the 'nitty-gritty' detail of ITS architecture; nor is cost-benefit methodology applied.

Question: How do we encourage inter-agency co-operation? Conservative organisations are often unwilling to engage in ITS. What benefit measures can be deployed as a counter-argument?

Answer: This is a difficult issue, as agencies may be rivals for the same funding. Need to consider what are the benefits for the agency who may not be the champion? Using an example of highway construction, World Bank wanted to install weigh in motion (WIM), and they used the argument that WIM would help road maintenance.

Question: (John Miles) ITS challenges organisational capacity and professional capability. How do you evaluate the cost of integrating those "alien ITS cultures" into the organisation?

Answer: (Darryll Thomas) Better to buy in ITS experience as often staff trained in ITS leave the public sector for the private sector

Comment: Darryll Thomas: Traffic engineers like to see the numbers but politicians want to see and experience ITS.

Comment: Chris Bennett: Academic institutions have a role but it is important not to aim too high and to use realisable systems.

Comment: John Miles: noted importance of pilots e.g. traffic control in Beijing. Beijing is building highways and are including ITS in this.

***Comment:** Indian Government: Now there is a consensus that ITS will be there but the issues are – does ITS increase unemployment or equity? Does it assist Quality of Life issues? Technology has to be appropriate. The focus has to be on the solution to problems, not on technology per-se.

Response: Amitabh Bajpai – ITS is now just taking off in India. It helps economy and employment. It is easier to identify what decision makers are NOT looking for. He described some of the problems including lack of robust and real time data. Institutional issues make it unclear who is the owner of ITS developments as there are many ministries. Also, there is no multi-modal or integrated or long-term planning and not enough financing. What to do? – Standards and ITS organisations should be supported. Awareness programmes and outreach are needed. The Indian association of motor manufacturers are not yet thinking about ITS. This needs a global approach.

Question: John Miles: Issue of indifference and lack of awareness – is a system architecture appropriate (e.g. South African one) ?

Answer: Darryll Thomas – In US National DOT is fully involved. South Africa did not have Authorities but came from SASITS and is relatively "high level".

Answer: Conservative organisations – One issue is control. Programme sponsored by 1 agency but a 2nd agency may be considered a rival for the same funding. There has to be benefits to the 2nd agency. Mexico experience – by doing an architecture you can identify missing links e.g. needs a vehicle database before ITS can be deployed.

John Miles summarised the discussion as follows: Effective ITS will be appropriate, flexible, basic and simple, and with moderate cost (whole life cost). The World Bank toolkit is useful.

3.3 IBEC 3: Hot Off the Press! The Latest Evaluation Results in Europe and North America

Moderator: Taso Zografos, Senior Systems Integration Manager, SAIC, USA.

Time: Tuesday 8th, 13:30 – 15:00

Description: Come to this session to hear the latest findings from evaluations in Europe and North America. What are recently completed field operational tests, model deployments, and Euro-Regional projects telling us about the impacts of ITS? Don't wait for the report to be published. Be the first to hear the results.

Approximately 42 people attended this Session.

Presentation title	Speaker
Reducing Accidents and Saving Lives on the French Road Network http://www.ibec-its.org/sanfran/22_Chevreuil.PDF	Martial Chevreuil and colleagues
M25: Variable Speed Limits on U.K. Highways http://www.ibec-its.org/sanfran/23_Tarry.PDF	Steve Tarry
Managing and forecasting travel times using anonymous cellular data http://www.ibec-its.org/sanfran/24_Gates.PDF	Gary Gates
Measuring and Forecasting Travel Time Using Anonymous Samples of Cell/Mobile Phone Location in Antwerp, Belgium and Baltimore, Maryland http://www.ibec-its.org/sanfran/25_Mudge.PDF	Richard Mudge
News Flash No presentation	Read by Barbara Staples

3.3.1 Reducing Accidents and Saving Lives on the French Road Network - Martial Chevreuil, Deputy Director General for Strategic Policy and Development, ISIS, FRANCE and Sylvain Lassare and Isabelle Ragot, National Institute for Transport and Road Safety Research, FRANCE

Mr. Chevreuil presented an overview of the French automated enforcement system. Mr. Sylvain and Ms. Ragot presented information on the evaluation of the automated system. The automated speed enforcement system is a co-operative arrangement between all concerned ministries and related departments.

The need for the system is based on a high percentage of speeding and high number of road fatalities nationally. The system was developed to promote active safety measures for mass enforcement using automated technology. Such an application provides for increased and improved enforcement freeing authorities to enforce other laws, and allows fair and equitable enforcement across all road users. The legal framework was adapted to handle automated enforcement penalties. The system operates under centralized processing and high levels of automation.

In March 2005, 733 French car drivers were surveyed by telephone regarding acceptance of fixed radar stations. Evaluators applied factorial analysis to gain insight into user acceptance of fixed radar stations. Approximately 42% fully accepted the radar stations, 26% moderately accepted them, 13% opposed, 12% objected to radars, and 6.5% objected to speed control. The elderly were closely aligned with fully accepting the radars while high mileage drivers were closely aligned with strongly

disagreeing with the implementation of radar stations. Compared with other European countries, the French system receives strong acceptance. The level of speeding is decreasing across all road networks. The trend reflects a continued decrease with increase in fixed and mobile radar stations. A key goal of the system is reinforcement of a change in attitude and change in behavior.

3.3.2 M25: Variable Speed Limits on U.K. Highways - Steve Tarry, Regional Director, Faber Maunsell, UK, IBEC Chair

The presentation focused on the key impacts of a mandatory speed control system implemented along the M25 near London. The system which was phased in over several years consists of variable speed limit displays mounted above the motorway between Junction 10 and Junction 16. Variable speed limits of 50 mph and 60 mph are posted in response to prevailing traffic conditions based on an advanced version of MIDAS (Motorway Incident Detection and Automatic Signalling) system. Additional traveller information is posted on dynamic message signs. Speed limits are enforced via the use of automatic camera technology.

The Business Case for the system focused on evaluation of the impact on journey time, safety benefits, and impacts on vehicle operating costs. A Cost Benefit Analysis was undertaken as were surveys of user reactions. Initial reports indicate positive results of safer, less stressful, and more predictable travel times, with minor increases in some travel times. The Benefit to Cost ratio for an example site was estimated to be 3.9 over a 30 year period.

3.3.3 Managing and forecasting travel times using anonymous cellular data - Gary Gates, PhD, Vice President International Development, iTIS Holdings, PLC, UK

Measurement and forecasting of travel time data is typically performed using traditional detection equipment; however, there is a growing trend toward use of non-traditional methods. This presentation focused on how measuring and forecasting travel time information using anonymous cellular data works.

Key issues include personal privacy, and data quality and reliability. Personal privacy is assured because identify information is filtered and not transmitted from cellular carriers. Cellular signals/position data from different cellular towers is combined with GIS maps; statistical techniques are then performed on the data. Although individual data points may be inaccurate, the statistical accuracy of the large data mass is high.

Performance data from the Baltimore (Maryland) Multi-modal Traveler Information System (MMTIS) were presented. Data collected along I-695 were shown demonstrating congestion and route travel times by time of day. Similar systems are operational in Belgium, Israel, and the United Kingdom.

3.3.4 Public Sector Applications of Cell Phones as Traffic Probes - Richard Mudge, Vice President, Delcan-NET, USA

Dr Mudge followed the preceding presentation with a slant towards potential applications of cellular data beyond what is traditionally thought of as ITS. Cellular probe technology can be applied to planning, management, land use/location, and emergency management. Cellular probe data provide value added when integrated with other systems. As an example data from the Baltimore Multi Modal Travel Information System (MMTIS) will be integrated with other transportation agencies including transit and emergency services. A number of key applications identified include: reliability measures for the traveling public, performance measures for transportation operators, planning for special events and work zones, and analyzing access to ports of entry and intermodal movement. The use of data for evaluation of network performance under different circumstances was also highlighted.

3.3.5 News Flashes

News flashes announcing recently completed or "soon to be" completed evaluations were interjected throughout the session. Projects highlighted included:

- Ediport Vehicle Access Management System, Halifax, Nova Scotia, Canada
- 100-Car Naturalistic Driving Study Data Collection Program, United States
- Automotive Collision Avoidance System (ACAS) Field Operational Test, United States
- Crash Avoidance Metrics Partnership Driver Workload Metrics, United States
- Effects Of Weather-Controlled VSLs On Injury Accidents, Finland

3.4 IBEC 4: The Impacts of Road Pricing: Beyond the Technology

Moderator: Eric C. Peterson, Deputy Administrator, Research and Innovative Technologies (RITA), USDOT, USA

Time: Tuesday 8th, 15:30 – 17:00

Description: While much has been written about evaluating technology options for road pricing, less information has traditionally been available about the actual impacts of these schemes on travelers' daily lives. Come to hear experiences presented by implementers and evaluators from national and city pricing schemes which have been implemented around the world.

Approximately 70 people attended this Session.

Presentation title	Speaker
The Essential Framework of Electronic Road Pricing http://www.ibec-its.org/sanfran/26_Opiola.PDF	Jack Opiola
The German Truck Tolling System: A Long Road to Success http://www.ibec-its.org/sanfran/27_Stappert.PDF	Karl-Heinz Stappert
Interoperability & Mobile Payment Services: The OmniAir DSRC/WAVE Model http://www.ibec-its.org/sanfran/28_McGuckin.PDF	Timothy McGuckin
Why Price Road Usage? http://www.ibec-its.org/sanfran/29_Davis.PDF	Glen Davis

3.4.1 The Essential Framework of Electronic Road Pricing - Jack Opiola, International Director ITS, Hyder, UK

This presentation provided an introduction into the current framework for Electronic Road Pricing as a means of setting the stage for the three subsequent speakers by highlighting the fact that congestion is an ever growing problem in cities, regions and countries around the world. The issue about using fuel prices to manipulate or counteract traffic growth is no longer viable given that this would require a 6.6% per annum in the pump price of fuel. This situation is further exacerbated by the project on that excise tax revenue from fuel is decreasing (estimate of 16 to 24% by 2016) as a function of the ever increasing fuel efficiency of all categories of motorised vehicles including more and more vehicles that are not using fossil fuels.

The main treatise espoused is that we are faced with a range of transport policy choices whereby the degree or extent of congestion is ultimately dependent on the transport actions which lead to implementing road pricing schemes to offset the reduction in excise tax revenue from fuel in order to

maintain and undertake the requisite expansion of our road and public transport networks. A range of lessons learned from past and ongoing experience includes the following:

- Establish Policy and Legislative framework FIRST. THEN select a technology solution to fit Policy objectives;
- Understand and test your objectives, BE OPEN and COMMUNICATE clearly;
- Establish choices in payment streams – ensure simplicity and efficiency;
- Minimise exemptions;
- Establish enforcement / legal appeals process; and,
- Clearly define what will be done with the revenues.

A key example was provided regarding Congestion Charging in the City of Edinburgh which was rejected in a referendum. The authorities should have gone to referendum first and then made the technology fit the policy objectives and not the inverse as was the case in Edinburgh.

Questions:

Question: Is there evidence on public opinion before and after introduction worldwide?

Answer: No global answer; it depends on local issues. E.g. Trondheim ring road only has 33% approval but 67% after. 100% approval is not possible. More approval if charges and public infrastructure are introduced in parallel.

Question: What ratio of autos:transit capacity is required before pricing can be successfully introduced?

Answer: No set ratio – need suppression rate within the model to identify where capacity has to be added.

3.4.2 The German Truck Tolling System: A Long Road to Success - Karl-Heinz Stappert, Project Manager, TÜV InterTraffic GmbH, GERMANY

On the 1st January 2005 the Truck Tolling System on German motorways started operation. After a long and winding road of preparation, the system – based on a new technological concept – is working. This presentation described the political objectives, the characteristics of the tolling system and the system itself before elaborating on positive and negative impacts that either have been detected after 9 months of operation or are expected to arise in the future.

The political objectives included:

- Generate a stable income for infrastructure investment,
- Strengthen the “user pays“ principle with regard to road infrastructure costs,
- Earmark the toll revenue for improvement of transport infrastructure,
- Enable a fairer competition between goods transport modes,
- Support the protection of the environment, and
- Encourage the use of innovative technologies for tolling.

The main characteristics of the system comprise:

- Multi-lane open road tolling system
- Dual system using GPS/GSM-based on-board units and manual booking at terminals and via internet
- No obligation to have/use on-board unit
- Distance-related tolls

- Differentiation into 2 axle classes + 3 emission classes
- Tariffs range from €0.09 to €0.14 /km.

The main preliminary impacts based on user surveys and other analyses are:

- Effects of tolling are obstructed by effects of rising fuel prices,
- Less empty runs, but lower truck load rate,
- More vehicles with lower emissions, which implies lower revenue,
- Increased investment in smaller vehicles < 12 tonnes GLW,
- Diversion of truck traffic to secondary and other trunk roads in certain locations,
- Diversion of truck loads to other transport modes with an increased use of combined road-rail transport,
- Transfer of toll costs to the industry placing the order when customer relationship is well established, and
- There is no detectable impact on inflation rate.

Questions:

Question: Are revenue figures net?

Answer: These are overall costs but operating costs are not public.

Question: Were all the policy goals reached?

Answer: A stable revenue has been achieved. The additional objectives have been or are likely to be achieved.

Question: What was the sampling approach?

Answer: This was a results summary from Federal sources; the results were based on user surveys. The results are available on the internet in German only.

3.4.3 5.9GHz DSRC/WAVE An ITS technology enabling a new electronic payment model - Timothy McGuckin, Executive Director, OmniAir Consortium Inc., USA

The USDOT-sponsored mobile wireless standard – DSRC/WAVE – is approaching. The objective of this presentation was to present the main components of this technology as well as an overview on issues related to the certification process and challenges ahead.

The main point raised is that by the end of this decade we could see this interoperable technology integrated into vehicles during assembly and shipped nationwide. A key ‘day-one’ application intended for this platform is Electronic Payment Services (EPS). With 7.5 billion transactions per year today, primarily from the toll sector, DSRC/WAVE will cultivate and grow that market by providing a universal payment platform for parking, infotainment, and other e-commerce applications. But issues remain, namely, a common service definition and transaction model for EPS. The OmniAir consortium has been established to bring together the myriad actors involved in tolling in the USA ranging from government agencies, automobile manufacturers, toll infrastructure operators, engineering firms, systems integrators and suppliers.

The OmniAir Transaction Specification would stipulate basic standards for EPS which are required for true interoperability in this emerging EPS sector.

The main issues and technology, certification and challenges were summarised as follows:

- DSRC/WAVE is a capable, rapidly emerging, high performance communication technology enabling new ITS and private applications not possible today.
- Standardised technology & product availability for large scale deployment in 2010 decade will benefit Operators, Private Sector, and Your Customers
- U.S. DOT and Automotive OEMs will make decision – anticipated in 2008
- Service providers needed positive assurance of performance and interoperability of products from the various suppliers already present, and expected to enter, the market.
- Certification is driven by the user community which is more likely to lead to adoption of it.
- OmniAir to provide Certification of Standards-Compliance & for limited use cases and interface devices, do so for interoperability
- The Application must also be interoperable. OmniAir begins with EPS.
- Funding Challenges – Building the national network of Road Side Units (RSUs)?
- Security and Liability – Meeting the tests.

Questions:

Question: Have USDOT and Automakers agreed date for implementation?

Answer: 2008 is the target decision date for moving forward on VII.

3.4.4 Why Price Road Usage? - Glen Davis, General Manager Melbourne City Link, VicRoads, AUSTRALIA

The concluding presentation of this session focused on the theme of "The policy objectives for which RUC is adopted and how those objectives influence the project management and price algorithm."

This road user charging presentation began with "A Brief History of Tolling" by pointing out that tolls have been used for 2400 years with the first uses being on trade routes across northern India. By the 11th Century, tolls were common in Europe: a toll on London Bridge commenced in 1286 and lasted 500 years. Beginning the middle of the 19th century and into the 20th century, with growing sophistication of taxation and excise, tolls became less common until the later part of the 20th century.

Over the past 25 years, the resurgence of road tolls has arisen from several different policy objectives:

- PPPs may be used to bring forward the creation of important new infrastructure by using an alternative source of finance
- Pay for the creation of new infrastructure from "Public Capital Budgets".
- Moderate congestion
- Influence city centre business district usage
- Time shifting
- Mode shifting
- User pays principle

The main reason espoused, however, relates to the fact that fuel excise revenue is shrinking with the concomitant need for Governments to find a replacement for the revenue stream. There is now an opportunity to change the current algorithm from fuel consumed to road/vehicle/time/congestion. Therefore, the context actually relates to a policy subtlety encompassing former and actual toll roads.

In general, toll roads are suboptimal in the context of the total network which does not mean they should not be built or operated. Rather, their likely successors, RUC, are now confidently predictable and the migration can and should be planned.

The proposed argument is that road pricing, by choice of price algorithm, offers a policy subtlety that is not available by any other means. It allows the price to signal what roads, what times of day, what fuels and what vehicle characteristics are favoured. It is this opportunity for policy subtlety which is a common by-product of RUC initiatives worldwide.

In conclusion, if traffic must continue to flow smoothly and efficiently on our road infrastructure, then the challenge for Road User Charging is to find the policies and the price algorithms to achieve that.

Questions:

No specific questions

Question: Any documentation of costs and benefits of ETC available?

Answer: TfL benefits are available on their website. Other studies are available via libraries.

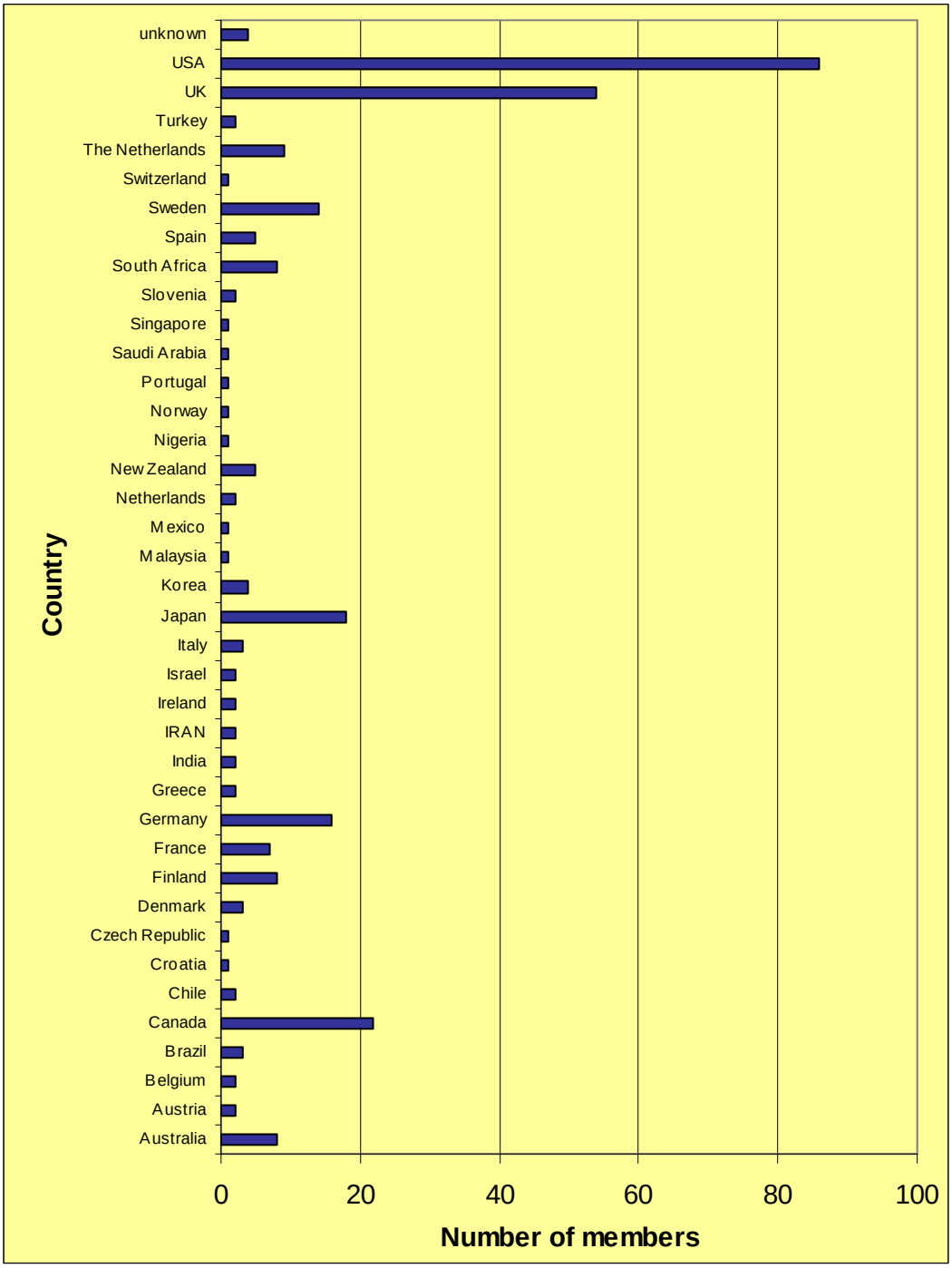
Annex 1: IBEC Management Committee and Membership

IBEC Management Committee, January 2006

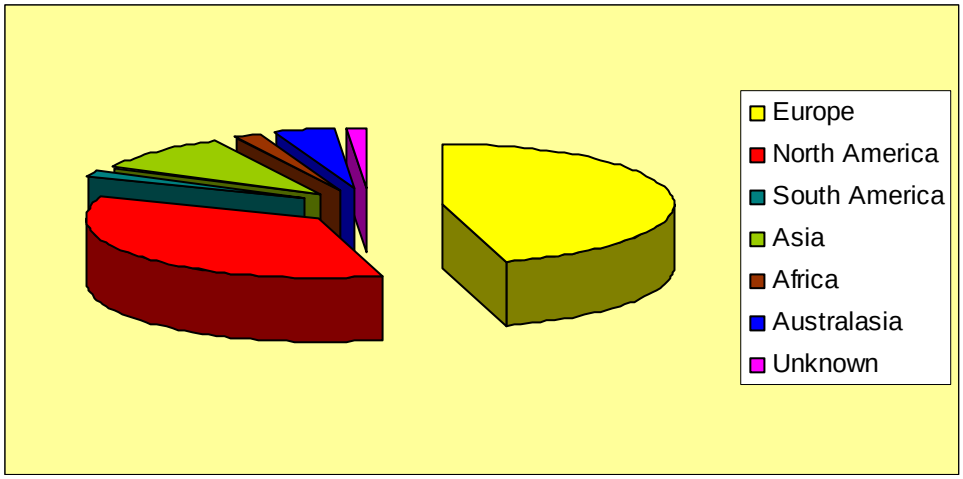
Contact name	Organisation, Country	Role
Jane Lappin	Volpe, USA	IBEC Chair
Steve Morello	Group Egis, France	IBEC Vice Chair
Sally Cotter	TRL, UK	IBEC Secretariat
Jean Hopkin	TRL, UK	IBEC Secretariat
Joe Peters	Department of Transportation, USA	Management Committee
Amy Polk	Cairo Corporation, USA	Management Committee
Mark Carter	SAIC, USA	Management Committee
William Johnson	TRENDS, Canada	Management Committee
Steve Tarry	Faber Maunsell, UK	Management Committee, Past Chair, 2004-2005
Eric Sampson	Department for Transport, UK	Management Committee
Richard Harris	Faber Maunsell, UK	Management Committee
Barbara Staples	Mitretek Systems, USA	Management Committee
Dick Mudge	Delcan, USA	Management Committee, Past Chair, 2002-2004
Guido Schuster	Landesbetrieb Straßen und Verkehr, Rheinland-Pfalz, Germany	Management Committee
Keith Keen	European Commission, Belgium	Management Committee
Patty Del Pozo	ITS America, USA	Management Committee
Risto Kulmala	VTT Building and Transport, Finland	Management Committee
Henk Taale	AVV Transport Research Centre, The Netherlands	Management Committee
Luca Studer	Polimi, Italy	Management Committee
Reinhard Pfliegl	Leiter Telematik, Austria	Management Committee
David Williams	DfT, UK	Management Committee
The Management Committee is assisted by the following individuals:		
Chris Bennett	World Bank	
John Miles	Ankerbold International	Management Committee member 2003 – 2005

Annex 2: IBEC Membership – Geographical spread

As of December 2005, IBEC has 309 members from 38 countries; the spread of members can be seen from the charts below:



Countries represented by IBEC members



Regional representation of IBEC members[2]

[2] Four members have not provided sufficient contact details to identify the country where they work

Annex 3: Session Flyer

The session flyer for distribution by key IBEC participants prior to and during the workshops provided a means of presenting the final programme for the workshops and information on the related activities.

The following hyperlink provides access to this file in PDF format:

http://www.ibec-its.org/sanfran/30_IBEC_SF flyer.PDF