

**IBEC Secretariat**



**Proceedings of the International Workshops on ITS Benefits,  
Evaluation and Costs at the 10<sup>th</sup> ITS World Congress, Madrid,  
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**Issue 1**

**by Alan Stevens, Sally Bygrave and Jean Hopkin (IBEC Secretariat,  
TRL Limited)**

## Document information

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## TRL Quality Review

<b>Approvals</b>	
<b>Project Manager</b>	<b>Jean Hopkin</b>
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## Abbreviations

ATIS	Advanced Traveller Information Systems
ATLANTIC	A Thematic Long-term Approach to Networking for the Telematics and ITS Community
AVL	Automatic vehicle location
APTS	Advanced Public Transportation Systems
CALTRANS	California Department of Transportation
CBA	Cost Benefit Analysis
CCTV	Close Circuit Television
CENTRICO	Project on for Central European Region Transport Telematics Implementation Co-ordination
DfT	Department for Transport, UK
DMS	Dynamic Message Signs
DOT	Department of Transport, US, also referred to as USDOT
EC	European Commission
EDL	Electronic Document Library
EEG	Evaluation Expert Group
FHWA	Federal Highway Administration, United States Department of Transportation (USDOT)
GPS	Global Positioning System
HAR	Highway Advisory Radio
IBEC	International Benefits, Evaluation and Costs Working Group
IDAS	ITS Deployment Analysis System tool
IIMS	Integrated Incident Management System
ITS	Intelligent Transport System
ITS America	Intelligent Transport Society of America
IVS	In-Vehicle Signing
MCS	Motorway Control Systems
NPA	National Police Agency, Japan
PEA	Policy, Evaluation and Advocacy
R & D	Research and Development
RWIS	Road Weather Information Systems
STREETWISE	Project for Seamless TRavel Environment for Efficient Transport in the Western ISles of Europe
TEMPO	Trans-European intelligent transport systems PrOjects
TTI	Traffic and Traveller Information
VIKING	Project for Co-ordination of ITS implementation in northern Europe
WIM	Weigh in Motion

## 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 series of four workshops and a training session which were held during the ITS World Congress held in Madrid in November 2003.

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 Turin in 2000, Sydney in 2001, and Chicago in 2002; the Sydney and Chicago workshops had been organised as a joint effort with the EU-sponsored ATLANTIC project. 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. This introduces an element of 'peer review' to ensure that the workshops are of a high quality.

### 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. Brief mention is also made of the training session which was provided for ITS professionals covering ITS performance measures and evaluation techniques.

The workshops were divided into four main sessions:

- How do those Yanks do it? Overview of ITS evaluation in the US
- How do the Europeans do it? Overview of ITS evaluation in Europe
- Show me the Benefits: Examples of ITS evaluation results
- Now I know the Benefits of ITS .... So What? How are ITS Evaluation Results Used?

In addition, there was a training session:

- ITS Evaluation 101: Training Course on ITS Performance Measures and Evaluation Techniques

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 text which follows summarises each of the presentations, and the discussions which were generated. The final section of the report presents some overall conclusions.

The leaflet used to promote the workshops is included in the annex to the report.

### Conclusions

As in previous years the workshops were highly successful. They were attended by a wide range of professionals from around the world, with between 30 and 40 people attending each session. The speakers provided a programme of varied and thought provoking presentations and were of a consistently high standard. By comparison, the standards within the main technical sessions were more variable, which emphasises the importance of designing sessions in advance, and identifying presenters to speak to a brief.

Looking back over the IBEC workshops held in previous years, there seems to have been an evolution in the focus of the ITS evaluation community. Initially, the main questions were technical (“will it work?”); this developed through more financial considerations (“does it provide good value for money?”) and now the major issues seem to revolve around implementation (“how do we convince decision-makers to adopt it?”). As one observer noted, we don’t have to evaluate every traffic light in detail – we already know the benefits. A key issue throughout evaluation was the need for “outreach” and the importance of providing information about ITS and its benefits at different levels of detail for different stakeholders.

The issue of transferability of ITS evaluation results was a recurring theme. The US Costs & Benefits database provides many examples of evaluation but it is only just becoming possible to identify some qualitative trends. It is anticipated that more quantitative inter-site comparisons will become possible as more evidence is collected. Similarly, in Europe there is a realisation that there is a need to adopt a common framework for collecting results and for recording evaluations, and it is a future challenge for researchers to see whether European and US approaches can be brought together. At minimum, databases of evaluation results can provide a key summary of previous activities and a link to specific ITS implementations and their corresponding evaluations. This information can be very valuable to implementers even if they feel the need to undertake their own site-specific evaluations.

Particular note should be made of the last IBEC session involving the views of international decision makers. The presentations from China, USA, Canada, Spain and the UK identified differences and, more importantly, many common elements in the need for good evaluation and demonstration of the benefits of ITS. This last session really put the “I” into IBEC and underlined the success of the four themed sessions.

## 1 Introduction

### 1.1 Background

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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 Turin in 2000, Sydney in 2001, and Chicago in 2002; the Sydney and Chicago workshops had been organised as a joint effort with the EU-sponsored ATLANTIC project. 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. The proceedings of the Sydney and Chicago workshops are available from ATLANTIC ([www.atlan-tic.net](http://www.atlan-tic.net)).

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.

### 1.2 Overview of Content

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- How do those Yanks do it? Overview of ITS evaluation in the US
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- Now I know the Benefits of ITS .... So What? How are ITS Evaluation Results Used?

In addition, there was a training session:

- ITS Evaluation 101: Training Course on ITS Performance Measures and Evaluation Techniques

### 1.3 Structure of Proceedings

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 text which follows summarises each of the presentations, and the discussions which were generated. The final section of the report presents some overall conclusions, and the promotional flyer used to invite people to attend the sessions is included in an annex.

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<sup>1</sup> See [www.ibec-its.org](http://www.ibec-its.org)

## 2 Summary of sessions and individual presentations

### 2.1 Session AE 5: How Do Those Yanks Do It? Overview of ITS Evaluation in the US.

Moderator: Dr. Joseph I. Peters (Manager of ITS Program Assessment Organisation: ITS Joint Program Office, U.S. DOT, USA)

Time: Wednesday November 19<sup>th</sup> 10:00 am – 11:30 am

Description: This session provided an overview of ITS evaluation efforts in the activities in the USA, with an emphasis on ITS evaluations conducted under Federal sponsorship. The three main components of the US ITS Program Assessment and Evaluation Program – outputs (how much is being deployed), outcomes (what are the benefits and costs of ITS deployments) and outreach (communicating those benefits to decision-makers) – were all addressed.

Approximately 26 people attended Session AE5

Presentation title	Speaker	Content	Hyperlink to presentation
Measuring ITS outputs: The ITS Deployment Tracking Effort	Steve Gordon	Description of a methodology to track and gather data on ITS deployment and to develop a set of indicators.	PDF
Measuring ITS outcomes: The Impacts of Advanced Traveller information systems.	Chris Cluett	The impact of static and dynamic traveller and transit information with a concentration on dynamic systems	PDF
Measuring ITS Outcomes: The Impacts of Advanced Traffic Management	Mark Carter	The benefits of the integration of advanced traveller information systems	PDF
Where to Find the Data: The ITS Benefits and Costs Database	Robert Maccubbin	An overview of the content of the benefits and costs database.	PDF
The ITS Benefits and Costs Database	Robert Maccubbin	A tour of the benefits and costs database.	PDF
What To Do With The Data: Outreach Of ITS Evaluation Results	Amy Polk	Description of the Federal Government use of outreach of evaluation data, particularly the ITS benefits special studies programme.	PDF

#### 2.1.1 Measuring ITS Outputs: The ITS Deployment Tracking Effort - Steve Gordon (Member of Research Staff, Oakridge National Transportation Research Center, USA)

This presentation described a methodology to track and gather data on ITS deployment and to develop and show an easily understandable set of indicators. This has involved over 2000 National surveys in Metropolitan and some smaller Cities and State-wide from 1996 to 2002.

The methodology identified 9 major ITS functions/components and identified key indicators of deployment in each. Examples include highways under surveillance, buses with AVL and roll-out of "511", the nationwide traffic information number in the USA. The presentation illustrates the growth in different areas. The summary and integration indicators have also been used to track FHWA programme goals of ITS roll-out towards 2005. The ITS deployment web site is available through [www.its.dot.gov](http://www.its.dot.gov).

### **2.1.2 Measuring ITS Outcomes: The Impacts of Advanced Traveller Information Systems - Chris Cluett (Research Leader, Battelle, USA)**

This work has considered both static and dynamic traveller and transit information with a concentration on dynamic systems. Information sources include: Camera images of the roadway (static and streaming video), Dynamic Message Signs (DMS), on-vehicle route guidance, kiosks, hand-held wireless devices, Radio and TV.

Typical indicators/benefits include: Trip time savings, choices, travel time reliability, departure timing capability, stress reduction, and greater preparedness for driving conditions. These were illustrated through two examples of evaluations:

- Acadia National Park (communications between buses and to travellers, monitoring, parking management)
- Spokane State of Washington (road weather information and cameras)

In Acadia the outcome was less congestion and a better visitor experience with some indications of safety and environmental improvements. In Spokane surveys of truck drivers and private drivers indicated a greater preparedness for severe weather conditions and general approval of the systems. More generally, high awareness of ATIS has been found although there is still scope for greater use. Data from both examples will be included in the US benefits database.

#### **Questions:**

**Q:** What is your definition of safe driving and how do you calculate the monetary value of safety benefits?

**A:** In this case unsafe road conditions are 'icy, snowy or low visibility conditions' and the driver can then re-route or make sure they have all the equipment they need to drive in the unsafe conditions. Monetization is very difficult and was not included in this study, but is something that needs to be worked on in the future.

### **2.1.3 Measuring ITS Outcomes: The Impacts of Advanced Traffic Management - Mark Carter (Transportation Systems Engineer, SAIC, USA)**

Over 100 studies of Arterial management, Incident management and Freeway management are already included in the benefits and costs database. Benefits include safety, congestion and environmental improvements. So, benefits are well known but there are still additional benefits to be realized through integration.

Integration may be between systems and there can be integration across jurisdictional boundaries and examples discussed in the presentation included:

- Cross-jurisdictional signal co-ordination in Pheonix which, following evaluation resulted in additional deployments.
- Co-ordination of incident management and infrastructure repair in New York through video communications and GPS technology.

Such co-ordination is also building up trust between agencies and allowing more centralization of records.

#### **Questions:**

No questions were asked

**2.1.4 Presentation Titles: Where to Find the Data: The ITS Benefits and Costs Database; and The ITS Benefits and Costs Database - Robert Maccubbin (Senior Transportation Engineer, Mitretek Systems, USA)**

The first of these two presentations provided an overview of the content of the benefits and costs database. Basically, the database provides evaluation summaries and costs (unit, system, deployment, operation and maintenance) and there are links and references to full reports. The database is available on-line.

The second presentation provided a brief “tour” of the web site.

The site includes a taxonomy of infrastructure and vehicles. A typical benefits summary content includes Context, Methodology and Results and these are expressed in terms of the Benefits Goal areas of: safety, efficiency, mobility, productivity, energy and environment, customer satisfaction.

There is also an On-line submission form to add new data which will be carefully reviewed before inclusion in the database.

**Questions:**

**Q:** Has there been any consideration to any meta-analysis to identify trends, such as the efficiency of systems?

**A:** Some synthesis is possible but difficult because each deployment is different so this is a future rather than current activity. At the moment the analysis is qualitative, but as time goes on we hope it will be quantitative.

**2.1.5 What To Do With The Data: Outreach Of ITS Evaluation Results - Amy Ellen Polk (Senior Technologist, Cairo Corporation, USA)**

This presentation described Federal Government use of outreach of evaluation data and particularly the ITS benefits special studies programme which was one of first to take a national strategic view concerning how to disseminate ITS information.

As most ITS deployment decisions are made at State or local level different types and levels of publication have been designed for different stakeholders or decision makers. Some are general and some are “Case Studies” or implementation guides. Also videos and CDs have been produced.

The presentation also included an overview of other involvement in outreach activities including through ITS-America, IBEC, and instructional courses. [www.its.dot.gov](http://www.its.dot.gov) is the key website to access all the documents and the electronic documents library.

**Questions:**

No questions were asked

## 2.2 Session AE 6: How the Europeans do it: Overview of ITS Evaluation in Europe

Moderator: Mr Bipin Radia (STREETWISE Project Co-ordinator, Department for Transport, UK)

Time: Wednesday 19<sup>th</sup> November, 12:00 – 13:30

Description: This session provided an overview of ITS evaluation activities being conducted in Europe, with an emphasis on the six Euro-regional projects selected as part of the European TEMPO programme for ITS deployment. Key themes for the session were how to:

- engender cross fertilisation between Euro-regional projects on evaluation issues through the Evaluation Expert Group (EEG);
- use a common framework for evaluating, reporting and exchanging the results within all Euro-regional projects;
- utilise existing and future data for informing project stakeholders.

These themes were also addressed in a discussion session which introduced the TEMPO Programme's evaluation approach as well as addressing the practical issues of evaluation within projects.

Approximately 39 people attended Session AE 6

Presentation title	Speaker	Content	Hyperlink to presentation
EU Vision: the Role of Evaluation in ITS Deployment	Keith Keen	Description of how evaluation is an increasingly important element of ITS deployment within the European Community	PDF
Towards a Single European Approach to Evaluation	Risto Kulmala	Described how the European Evaluation Expert Group (EEG) is facilitating joint working on evaluation across the various Euro-regional projects	PDF
Practical experience of evaluation in Projects: Evaluation of a Motorway Control System. Experience of CENTRICO partner Rheinland-Pfalz.	Guido Schuster	A practical example of a Motorway Control Systems where National guidelines on evaluation are required that concentrate only on accident impact.	PDF
Evaluation of the ITS Systems, applied to Urban, Metropolitan and Railway Transport Networks	Isabel Navarro	Description of the objectives of ITS and its application to APTS mainly in Spain.	PDF
Open discussion: Issues of Transferability, Compatibility and Comparability in European ITS Evaluation	Steve Tarry	Discussion involving speakers and audience	No Presentation

### 2.2.1 EU Vision: the Role of Evaluation in ITS Deployment - Keith Keen (Administrator, European Commission DG TREN E4)

This presentation described how evaluation is an increasingly important element of ITS deployment within the European Community as policy makers need evidence of real benefits to be able to justify further investment in ITS against competing claims on resources.

Six Euro-regional projects were briefly described, involving the deployment of a diverse range of ITS systems and services. The aim is for evaluation within Euro-regional projects to be undertaken cost

effectively, with the achievements of similar ITS initiatives, carried out in different locations and countries, being presented on a consistent basis.

The presentation also overviewed the work of the EEG, as reported in more detail in the next presentation.

**Questions:**

No questions were asked

**2.2.2 Towards a Single European Approach to Evaluation - Risto Kulmala (Research Professor, VTT Building and Transport; VIKING project)**

This presentation described how the European Evaluation Expert Group (EEG) is facilitating joint working on evaluation across the various Euro-regional projects including the outcomes of:

- Common European Guidelines for the evaluation of ITS
- A common approach to reporting evaluation results
- An Evaluation Work Plan
- A library of reports on evaluation results
- Guidance on best practice

This presentation described the principles used in these guidelines and that some harmonization between VIKING and STREETWISE will take place in the details of evaluation measures.

Results will be made available to project partners and decision-makers via a web site ([www.temposec.org](http://www.temposec.org)) and Handbook of Best Practice and a first description of the contents of a forthcoming Handbook of Best Practice were given.

**Questions:**

**Q:** There are currently different national policies with environmental, social and other aspects. Are the objectives set by the Member State or EU to put these in a common framework?

**A:** We are currently aggregating transparently. The objectives and indicators or framework of each national policy including all relevant impacts of a system will be collated. Both the Member State and EU objectives are taken into account, but principally national policy objectives.

**Q:** Is there a challenge of assessing against ITS objectives with different national objectives initially?

**A:** They must be clear and transparent in terms of evaluation so there is less need to repeat measurements in different geographic areas.

**Q:** Do you have an influence over the selection of methods?

**A:** We hope that we have influence and that is certainly the plan.

**2.2.3 Practical experience of evaluation in Projects: Evaluation of a Motorway Control System. Experience of CENTRICO partner Rheinland-Pfalz - Guido Schuster (Landesbetrieb Strassen und Verkehr; CENTRICO project)**

This presentation took the example of Motorway Control Systems (MCS) where national guidelines on evaluation are required that concentrate only on accident impact. The requirements of the evaluation were described involving both before and after measurement and calculation of an impact factor.

Some practical issues were outlined, including:

- The difficulty of comparison with the 'control' section (because of local differences such as surface texture and gradient)

- The relative insensitivity of accident rates affected by a motorway control system compared with specific measures such as speed limits and overtaking bans
- The importance of considering operational factors as well as initial impacts

#### **2.2.4 Evaluation of the ITS Systems, applied to Urban, Metropolitan and Railway Transport Networks - Isabel Cintas Navarro (Ingenieria Y Sistemas, S.A. Spain)**

This presentation described the objectives of ITS and its application to Advanced Public Transportation Systems (APTS) mainly in Spain. Examples described included:

- Automatic train protection and automatic train control (driverless operation e.g. New Line 9 in Barcelona)
- Intelligent ticketing systems in Gijon

User benefits were described including greater safety and security, reduction in operating costs and shorter travel and waiting times. Another result was increased use of public transport. More general benefits in terms of environmental effects were also described.

Finally, increasing international co-operation in the areas of signalling communications and traffic management were noted and the future challenge of comparing costs and benefits in railway transport networks to other infrastructure investments.

#### **2.2.5 Open discussions with invitations to the floor to contribute their own experience including thoughts on "Issues of Transferability, Compatibility and Comparability in European ITS Evaluation" - Steve Tarry (Faber-Maunsell)**

##### **Discussion:**

**Q:** How have Europeans discussed the need for a common database in Europe? Should we use the US database or develop our own European database?

**A:** The STREETWISE project and the TEMPO Evaluation Expert Group have the task of looking at applicability of US database to Europe.

**Q:** What do we mean when we say that we want to harmonise?

**A:** There is different terminology, but it can be overcome by transparency. We can always use database as a key into the full study. We would encourage people to contact the authority involved to obtain more detail on each study. Within Europe we need to adopt a common framework to collect results and conduct evaluations.

The EC approves of commonality but it is more a question of usability of the data e.g. to avoid repeating work. If we have standardized evaluation guidelines and criteria, then this helps to build confidence on transferability.

**Q:** Is there any quality check on what goes into the database?

**A:** The database is rather varied in terms of how the results are reported. Material on the database is checked but reference has to be made to original work. There is a peer review of reports before they go on the database.

The concern of reliable results is a big one so in America we do not use any commercial material or newspaper articles etc.

In America the database is used for inspiration and ideas. ITS Deployment Analysis System (IDAS) is one approach for looking at other sites and slightly different scenarios. However, local decision makers may need their own investigations rather than relying on the database results. So the database does not reduce the need for people to do research themselves as every scenario is different.

**Q:** Is there self-interest in evaluation?

**A:** The Euro-Regional Evaluation Expert Group is there to support and solve issues. The main issues may be developing European indicators and methods. The Euro-Regional Evaluation Guidelines are being developed but may be revised based on experience.

**A:** Getting transferability of results may be a problem; you need rigorous and “fair” evaluation. Euro-Regional projects are providing results in a standard way and these are peer reviewed. You never get transferability of results based on data from different projects.

**Q:** How to you plan to overcome the language gap and solve the problem?

**A:** There is no magic answer to this; we will have to make the information available in all languages. One approach is to provide a taxonomy or dictionary of evaluation terms in different languages.

**Comment from Audience:** There could be cross peer review between US and Europe.

**Comment from Audience:** It is surely important to be working alongside America and help them build on the database that they already have rather than starting again with a European database.

Steve Morello agreed that the Europeans should use the US database and Bipin Radia agreed that we should build on the US database and not re-invent.

## 2.3 Session AE 7: Show Me The Benefits: Examples of ITS Evaluation Results

Moderator: Dr. Richard Mudge (Vice President, Delcan, Inc., USA; Chair IBEC)

Time: Wednesday November 19<sup>th</sup> 15:00 – 16:30

Description: In this session, speakers from around the world presented case studies of evaluations of ITS projects. Speakers addressed different ITS systems being deployed or tested, the goals of the deployment or test, the goals of the evaluation, the evaluation results, and how the evaluation results were put to use.

Approximately 30 people attended Session AE 7

Presentation title	Speaker	Content	Hyperlink to presentation
Evaluation of Automated Traffic Law Enforcement in Gauteng, South Africa	Andre Kilian	A brief introduction to South Africa, specific problems in Gauteng Province, two examples explained with results	PDF
The Benefits of a Pilot Implementation of Public Transport Signal Priorities and Real-Time Passenger Information	Mikko Lehtonen	Description of the Benefits of a Pilot Implementation of Public Transport Signal Priorities and Real-Time Passenger Information in Helsinki, Finland	PDF
Evaluation of Traffic Safety Facilities in Japan	Mitsuo Matsumoto	Description of the National Police Agency of Japan and trends of accidents and how the NPA with other Agencies has undertaken nationwide research	PDF
Transit ITS in the New Millennium	Carol Schweiger	Overview of the different public transport ITS that have been deployed in the US over recent years, sample measures and examples of recent ITS implementations.	PDF
Improving urban mobility with free flow tolling roads in Santiago Chile	Salahdin Yacoubi	An overview of Santiago's four toll ways	PDF

### 2.3.1 Evaluation of Automated Traffic Law Enforcement in Gauteng, South Africa - Andre Kilian (Acting Chief Director for Strategic Planning, Gauteng Department of Public Transport, South Africa)

After a brief introduction to South Africa some specific problems in Gauteng Province were outlined including the poor image of public transport, road deaths, road congestion, unroadworthy and overloaded vehicles and non-payment of traffic fines. The presentation then identified where ITS applications were potentially useful as part of wider projects aimed at changing the behaviour of drivers.

Two examples were then described along with the results obtained and lessons learned: Firstly, the Heidelberg traffic control centre which includes weigh-in-motion screening. This reduced overloading and also identified companies that were habitually overloading. Secondly, the Traffic Systems and Operational Support project where WIM was expanded with a range of additional camera and other monitoring. Even though there had not been formal benefit/cost evaluation, it was considered highly beneficial and essentially self-funding.

#### Questions:

**Q:** If the project results are very successful (i.e. few fines being given to overweight lorries), then would funds to the Government be reduced?

**A:** No, the extent of problem is so large and people know what they are doing is dangerous, but they still do it in the hope that they will not be caught.

### **2.3.2 Benefits of a pilot implementation of Public Transport Signal Priorities and Real Time Passenger Information - Mikko Lehtonen (Research Scientist, Technical Research Center of Finland, VTT)**

This research project aimed to reduce delays and increase information for users of bus and tram services in Helsinki by introducing AVL using satellite beacons within vehicles and information at bus stops. Evaluation used the Finnish guidelines for evaluation of ITS projects and included passenger usage, punctuality, and also environmental improvement calculations through modelling. Interviews and survey results showed good acceptance amongst passengers.

A quantitative Socio-Economic evaluation was presented and the benefit/cost ratio was calculated at between 3.3 and 2.6. Private economy methods were also investigated using the DuPont model and the pilot was shown to be profitable. As a result, Helsinki is now extending the system.

#### **Questions:**

**Q:** In the UK the business case has included personal safety but benefits are diffuse and depend on geography and social issues. How are "soft" benefits evaluated?

**A:** The value of information is difficult to quantify. Multi-Criteria Analysis could be used.

**Q:** What is the value of time that you used in your presentation?

**A:** The value of time was the same for passengers and car drivers.

**Q:** How you evaluate passenger 'value of information'?

**A:** It is very difficult to evaluate, we asked passengers if they would like different information. We did not calculate the monetary value of passenger information, so maybe the benefit/cost ratio is not reliable.

### **2.3.3 Evaluation of Traffic Safety Facilities in Japan - Mitsuo Matsumoto (Assistant Senior Engineer, Sumitomo Electrical Industries Ltd, Japan)**

Activities of the National Police Agency of Japan and trends in accidents were briefly discussed. The presentation then described how the NPA with other Agencies has undertaken nationwide research on the change in accidents and other indicators after ITS installations.

This is done by the NPA requesting each Prefecture to investigate before and after accident data and then reporting back. The data was collated and analysed resulting in an annual report.

Examples were then described of the results which had been collated and analysed including:

- Travel time before and after Area Traffic Control
- Reduction in accidents after speed-actuated control of intersection
- Value of on-board traffic information (difficult to measure)

Additional derived measures were calculated in some instances, including environmental issues for Area Traffic Control.

#### **Questions:**

No questions were asked

### **2.3.4 Transit ITS in the New Millennium - Carol Schweiger (Managing Consultant, TranSystems Corp., USA)**

This presentation began with an overview of the different public transport ITS that have been deployed over recent years, particularly traveller information and communication systems. In terms of challenges in evaluation, issues discussed included:

- Transferability of measures from a highway/traffic related domain to public transport
- Length of implementation time frame
- Fewer standards that can be used for evaluation
- Constant changes in transit services, technologies, fares etc.

Sample measures in the areas of safety, efficiency, productivity and energy & environment were presented. Examples were then given of recent ITS implementations and the timeframes illustrated and selected quantitative and qualitative evaluation results presented.

In the future evaluation of public transport ITS will need to tackle the effects of greater integration and there are also challenges in institutional issues to be considered.

#### **Questions:**

No questions were asked

### **2.3.5 Improving urban mobility with free flow tolling roads in Santiago Chile - Dr. Salahdin Yacoubi (Director of Systems Division, Autopista Central Concession, Chile)**

It was explained that this was an ongoing project and that evaluation results can be discussed in future years.

An overview of Santiago's four toll ways were provided involving US\$1.5Bn construction cost. The new tolled area will be built beneath the free lanes.

The fee structure was presented including incentives to regulate the traffic pressure. It was expected that there would be 800,000 users generating an income of \$175m.

The tolling system was described involving on-board microwave tags, gantries, enforcement systems and back-office systems to provide clearing between the four operators.

#### **Questions:**

No questions were asked

## 2.4 Session AE 8: Now I Know the Benefits of ITS... So What? How Are ITS Evaluation Results Used?

Moderator: Steve Morello (ISIS, France)

Time: Wednesday November 19<sup>th</sup>, 17:00 – 18:30

Description: The ultimate customer of the ITS practitioner is the travelling public. The ultimate customer of the ITS evaluator is the decision-maker who uses ITS evaluation results to chart the course of future ITS deployments and investments. In this session, transportation decision-makers at the Federal, state, provincial and local levels from around the world shared their insights as to how they use ITS evaluation results, and what the ITS evaluation community can do to serve decision-makers better.

Approximately 30 people attended Session AE8

Presentation title	Speaker	Content	Hyperlink to presentation
The view of a decision-maker in China	Xiaojing Wang	Two projects were described: Beijing urban traffic management and Beijing to Shangyang Expressway toll collection system	PDF
The view of a decision-maker in California	Susan Shaheen	Description of how CALTRANS has been heavily involved in ITS including simulation, field tests including the Guided snowplough etc	Notes not presentation PDF
The view of a decision-maker in Canada	Susan D Spencer	Description of funding for ITS in Canada and potential requirements to evaluate this funding programme	Not received yet
How are the evaluation results used – The Spanish view	Federico Fernandez Alonso	Overview of ITS deployment on Spanish roads and their benefits. Discussion of the low level of evaluation of ITS in Spain	PDF
Prioritising ITS solutions at the strategic level - Assisting the decision makers	Steve Tarry	Description of a UK project funded by the UK DfT to provide tools for decision makers.	PDF

### 2.4.1 The view of a decision-maker in China - Xiaojing Wang (Director of National ITS Center, Organisation: Ministry of Communications, China)

Two specific projects were highlighted in this presentation:

Beijing urban traffic management

Beijing to Shangyang Expressway toll collection system

To look ahead to future ITS, experts, project managers and police were involved to forecast technologies and products and provide input into the Government's "National developing plan". The plan was then described including the areas of policy and software research, technology R&D, integration of existing systems demonstrations and standardization. One special project for the Olympic Games in Beijing was also mentioned.

**Comment:** US Salt-Lake City games evaluation has just become available

**Q:** Why was incident management rated to be a low priority?

**A:** Incident management is in the second stage of the project, so it is now being considered.

#### **2.4.2 The view of a decision-maker in California – Susan Shaheen (Program Leader, PATH, USA)**

This presentation described how CALTRANS has been heavily involved in ITS, including simulation, field tests including the Guided Snowplough etc. However, there is now a new focus on deployment in partnership with the private sector, and recognition of the importance of institutional issues.

Current challenges discussed included:

- Timescale for political approval and rapid changes in technology.
- Lack of incorporation of ITS solutions in design manuals
- Understanding and articulating the benefits of ITS

CALTRANS has partnered with ITS America and the US Government for the 12<sup>th</sup> World Congress on Intelligent Transport Systems to be held in 2005 in San Francisco, California where the “Innovative Corridors” initiative will showcase projects in partnership with many stakeholders. ([www.itsa.org](http://www.itsa.org)). The impacts of these will all be evaluated. The aim is to generate sustainable business models.

##### **Questions:**

There were no questions

#### **2.4.3 The view of a decision-maker in Canada - Susan D Spencer (Director of Intelligent Transportation, Transport Canada, Canada)**

This presentation covered funding for ITS in Canada and potential requirements to evaluate this funding programme. It was explained how the Federal government was able to secure initial funding without hard data within the plan called “En Route to Intelligent Mobility”. However, the challenge is now to demonstrate auditable benefits, particularly in the area of environmental benefits. To secure funding beyond the current programme Transport Canada want to address all the initial claims made.

Other issues discussed were the appropriate scale of evaluation relative to the size of the actual deployment and the transferability of other national results to Canada.

##### **Questions:**

There were no questions

#### **2.4.4 How are the evaluation results used: the Spanish view - Federico Fernandez Alonso (Head of Traffic Information, Direccion General de Trafico, Ministry of Interior, Spain)**

This presentation began with an overview of ITS deployment on Spanish roads where there is a focus on the high capacity road network. This typically involves traffic sensors, cameras, signs and weather stations. It was explained that benefits expected from ITS are expected to include comfort & safety, efficiency, quality & accuracy of information and an improvement in the operational tools available to traffic managers. Differences were noted between novel and well-proven ITS systems.

Reasons for the low level of evaluation of ITS in Spain were discussed. Evaluation is largely seen as a technical issue although a more comprehensive view is slowly developing which would include benefits from the point of view of the users.

##### **Questions**

**Q:** Do you always do Cost Benefit Analysis before purchasing?

**A:** No, reports and issues are explored but not formal CBA.

#### **2.4.5 Prioritising ITS solutions at the strategic level - Assisting the decision makers - Steve Tarry (Consultant, Faber Maunsell, speaking on behalf of the UK Department for Transport)**

This presentation concerned a UK project funded by the UK government (DfT) to provide tools for decision makers. ITS is seen as a vital tool to achieve a range of policy objectives as the technology matures. Recent deployment has provided results of individual system deployment but has also illustrated the importance of integration and the difficulty of transferring results between sites.

Since initial projections in 1996, environmental factors and social inclusion have become increasingly important and deployment has not happened as initially envisaged. The project will develop a previous methodology as well as including case studies and a database of results. Outputs were described as involving various levels and forms of dissemination.

##### **Questions:**

**Q:** Is it possible to say whether over the last 10 years there has been more or less implementation than we expected, and are the implementations different to what was expected?

**A:** Some implementations are as envisaged and for others there has been a diversion. So it is really mixed some implementations have been as expected and some haven't. Also there is now a different view of the importance of some applications.

**Comment:** America is about on-track with deployment as envisaged about 10 years ago.

## 2.5 Session AE 9: ITS Evaluation 101: Training Course on ITS Performance Measures and Evaluation Techniques

Moderator: Mark Carter (Science Applications International Corp., USA)  
Steve Morello (ISIS, France)

Time: Thursday November 20<sup>th</sup>, 10:00 – 11:30 & 12:00 – 13:30

Description: This course taught a variety of methods for evaluating ITS projects and measuring the performance of ITS systems. Course material is derived from ITS evaluation methodologies performed in both the U.S. and Europe. The course included case studies from those regions, as well as other locations around the world. The course was designed to provide participants with two important skills: how to conduct an evaluation of an ITS project and how practitioners can benefit from the feedback that evaluation provides. The course examined the differences and similarities between ITS evaluation methodologies used in the US and Europe, concluding that the methodologies share the same many of the same evaluation steps.

Approximately 20 people attended Session AE9

This is a course which was developed by European and American experts to describe ITS performance measures and evaluation techniques. Each attendee has received the course information. The course will continue to be developed and is likely to be held at future IBEC events. A description of the course will be placed on the IBEC website ([www.ibec-its.org](http://www.ibec-its.org)).

The aims of the training session were to:

- Demonstrate the importance of evaluation
- Identify the major elements of an evaluation exercise
- Provide information to allow course participants to select appropriate performance measures for evaluation
- Provide information to allow course participants to select appropriate evaluation techniques and tools

The speakers' presentations covered the following topics, which together provided an excellent insight into ITS evaluation from a group of experienced US and European professionals:

- Mark Carter: introduction and objectives
- Joe Peters: background on the US perspective of ITS evaluation
- Steve Tarry: background to the European perspective
- Mark Carter: description of the Evaluation process, highlighting the differences between the European and U.S. evaluation processes
- Steve Morello: description of a wide range of different evaluation techniques and performance measures
- Steve Tarry: 'Real Evaluations' – interactive session working through a sample scenario with the course participants, demonstrating the differences in the US and European perspective
- Steve Morello: wrap-up and conclusions.

### 3 Summary and Conclusions

As in previous years the IBEC workshops were highly successful. They were attended by a wide range of professionals from around the world, with between 30 and 40 people attending each session.

The sessions contained varied and thought provoking presentations within the overall topic of ITS evaluation, and were of a consistently high standard. This observation, in comparison with the rather variable standards within the technical sessions at Madrid more generally, underlined the importance of designing sessions in advance, and identifying presenters to speak to a (loose) brief.

Overall, there seems to have been an evolution in the focus of the ITS evaluation community. Initially, the main questions were technical (“will it work?”); this developed through more financial considerations (“does it provide good value for money?”) and now the major issues seem to revolve around implementation (“how do we convince decision-makers to adopt it?”). As one observer noted, we don’t have to evaluate every traffic light in detail – we already know the benefits. A key issue throughout evaluation was the need for “outreach” and the importance of providing information about ITS and its benefits at different levels of detail for different stakeholders.

The issue of transferability of ITS evaluation results was a recurring theme. The US Costs & Benefits database provides many examples of evaluation but it is only just becoming possible to identify some qualitative trends. It is anticipated that more quantitative inter-site comparisons will become possible as more evidence is collected. Similarly, in Europe there is a realisation that there is a need to adopt a common framework for collecting results and for recording evaluations, and it is a future challenge for researchers to see whether European and US approaches can be brought together. At minimum, databases of evaluation results can provide a key summary of previous activities and a link to specific ITS implementations and their corresponding evaluations. This information can be very valuable to implementers even if they feel the need to undertake their own site-specific evaluations.

Particular note should be made of the last IBEC session involving the views of international decision makers. The presentations from China, USA, Canada, Spain and the UK identified differences and, more importantly, many common elements in the need for good evaluation and demonstration of the benefits of ITS. This last session really put the “I” into IBEC and underlined the success of the four themed sessions.

## 4 Annex 1: Session Flyer



### Session AE 5: How Do Those Yanks Do It? Overview of ITS Evaluation in the U.S. (Wed 19th, 10:00 – 11:30)

This session will present an overview of ITS evaluation efforts in the activities in the USA, with an emphasis on ITS evaluations conducted under Federal sponsorship. The three main components of the US ITS Program Assessment and Evaluation Program – outputs (how much is being deployed), outcomes (what are the benefits and costs of ITS deployments) and outreach (communicating those benefits to decision-makers) – will be addressed.

**Moderator: Dr. Joseph I. Peters** (Manager of ITS Program Assessment Organisation: ITS Joint Program Office, U.S. DOT, USA)

**Measuring ITS Outputs: The ITS Deployment Tracking Effort**, by **Mr Steve Gordon** (Member of Research Staff, National Transportation Research Center, USA)

**Measuring ITS Outcomes: The Impacts of Advanced Traveler Information Systems**, by **Chris Cluett** (Research Leader, Battelle, USA)

**Measuring ITS Outcomes: The Impacts of Advanced Traffic Management Systems**, by **Mr Mark Carter** (Function: Transportation Systems Engineer, SAIC, USA)

**Where To Find The Data: The ITS Benefits and Unit Costs Database**, by **Robert Maccubbin** (Senior Transportation Engineer, Mitretek Systems, USA)

**What To Do With The Data: Outreach Of ITS Evaluation Results**, by **Amy Ellen Polk** (Senior Technologist, Cairo Corporation, USA)

### Session AE 6: How the Europeans do it: Overview of ITS Evaluation in Europe (Wed 19<sup>th</sup>, 12:00 – 13:30)

This session will present an overview of ITS evaluation activities being conducted in Europe, with an emphasis on the six Euro-regional projects selected as part of the European TEMPO programme for ITS deployment. Key themes for the session will be how we:

- engender cross fertilisation between Euro-regional projects on evaluation issues through the Evaluation Expert Group (EEG);
- use a common framework for evaluating, reporting and exchanging the results within all Euro-regional projects;
- utilise existing and future data for informing project stakeholders.

These themes will be addressed in a Workshop session which will introduce TEMPO's evaluation approach as well as address the practical issues of evaluation within projects.

**Moderator: Mr Bipin Radia** (STREETWISE, Project Co-ordinator, Department for Transport, UK)

**EU Vision: the Role of Evaluation in ITS Deployment**, by **Keith Keen** (Administrator, European Commission, Galileo and Intelligent Transport Unit)

**Towards a Single European Approach to Evaluation**, by **Professor Risto Kulmala** (Research Professor, VTT Building and Transport, Finland)

**Case Studies of "Putting the Theory into Practice"**, by **Guido Schuster** (Rheinland-Pfalz, Telematik, Germany) and **"Evaluation of the ITS Systems, applied to Urban, Metropolitan and Railway Transport Nets"**, by **Isabel Navarro** (Telecom Engineer, SENER, Spain).

**Open discussion with invitations to the floor to contribute their own experiences including thoughts on "Issues of Transferability, Compatibility and Comparability in European ITS Evaluation"**

## Session AE 7: Show Me The Benefits: Examples of ITS Evaluation Results (Wed 19<sup>th</sup>, 15:00 – 16:30)

In this session, speakers from around the world will present case studies of evaluations of ITS projects. Speakers will address what ITS system was deployed or tested, what were the goals of the deployment or test, what were the goals of the evaluation, what were the evaluation results, and how were those evaluation results put to use.

**Moderator: Dr. Richard Mudge** (Vice President, Delcan, Inc., USA)

**Evaluation of Automated Traffic Law Enforcement in Gauteng, South Africa, by Andre Kilian** (Acting Chief Director for Strategic Planning, Gauteng Department of Public Transport, South Africa)

**Evaluation of ITS Public Transport System in Helsinki, Finland, by Mr Mikko Lehtonen** (Research Scientist, Technical Research Center of Finland (VTT), Finland)

**Evaluation of Traffic Safety Facilities in Japan, by Mitsuo Matsumoto** (Assistant Senior Engineer, Sumitomo Electrical Industries Ltd, Japan)

**Transit ITS in the New Millennium, by Carol Schweiger** (Managing Consultant, TranSystems Corp., USA)

**Evaluation of Electronic Toll Collection in Chile, by Dr. Salahdin Yacoubi** (Director of Systems Division, Autopista Central Concession, Chile)

## Session AE 8: Now I Know The Benefits of ITS... So What? How Are ITS Evaluation Results Used? (Wed 19<sup>th</sup>, 17:00 – 18:30)

The ultimate customer of the ITS practitioner is the traveling public. The ultimate customer of the ITS evaluator is the decision-maker who uses ITS evaluation results to chart the course of future ITS deployments and investments. In this session, transportation decision-makers at the Federal, state, provincial and local levels from around the world will share their insights as to how they use ITS evaluation results, and what the ITS evaluation community can do to serve decision-makers better.

**Moderator: Dr John Miles** (Managing Consultant, Ankerbold International Ltd, UK)

**The view of a decision-maker in China, by Mr. Xiaojing Wang** (Director of National ITS Center, Organisation: Ministry of Communications, China)

**The view of a decision-maker in California, by Jeff Morales** (Director, California Department of Transportation (CALTRANS), USA)

**The view of a decision-maker in Canada, Susan D Spencer** (Director of Intelligent Transportation, Transport Canada, Canada)

**The view of a decision-maker in Spain, by Federico Fernandez** (Head of Traffic Information, Direccion General de Trafico, Ministry of Interior, Spain)

**Prioritising ITS solutions at the strategic level - assisting the decision makers, by Mr Steve Tarry** (Consultant, Faber Maunsell, speaking on behalf of the UK Department for Transport)

**IBEC Reception (18:30-19:30) outside room 118**  
 A chance to network with IBEC members, Sponsored by ISIS (France) and FaberMaunsell (UK)

## Session AE 9: ITS Evaluation 101: Training Course on ITS Performance Measures and Evaluation Techniques (Thurs 20<sup>th</sup>, 10:00 – 11:30 & 12:00 – 13:30)

This course will teach a variety of methods for evaluating ITS projects and measuring the performance of ITS systems. Course material is derived from ITS evaluation methodologies performed in both the U.S. and Europe. The course will include case studies from those regions, as well as other locations around the world. Upon completion of this course, participants will gain two important skills: how to conduct an evaluation of an ITS

project and how practitioners can benefit from the feedback that evaluation provides.

**Moderators: Mr Mark Carter** (Transport Systems Engineer, Science Applications International Corp. (SAIC), USA) **and Mr Steve Morello** (International Director, ISIS, France)