



INTERNATIONAL ROAD FEDERATION
FEDERATION ROUTIERE INTERNATIONALE

The IRF Vienna Manifesto on ITS

Smart Transport
Policies for
Sustainable
Mobility

Acknowledgements

The IRF Vienna Manifesto on ITS – Smart Transport Policies for Sustainable Mobility, has been initiated by the Policy Committee on Intelligent Transport Systems (ITS) of the International Road Federation (IRF). The IRF and the Policy Committee wish to express their sincere gratitude to all those who have contributed to this document, either through their participation in Policy Committee meetings, by providing text proposals and examples, and through editorial and other support.

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Publisher:



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Foreword	04
The Manifesto at a Glance	05
In Support of the Manifesto	06
1. Making a Change	10
1.1 About this Manifesto	10
1.2 About the International Road Federation and its Policy Committee	11
1.3 Reader's Guide	11
2. The Key: Access to Mobility	12
2.1 Intelligent Transport Systems (ITS) at the Service of Mobility	12
2.2 Why Policy is Important for ITS Deployment	12
3. How ITS Helps Improving...	15
3.1 Safe Mobility	15
3.2 Transport's Environmental Performance	17
3.3 Traffic Flow and Travel Time Reliability	20
3.4 Innovation, Business Development and Job Creation	23
4. Considerations for the Future	25
4.1 The Importance of Preserving Access to Mobility	25
4.2 Promising Technologies	25
5. Unleashing the Potential of ITS	28
5.1 What Political Leaders Can Do	28
5.2 Policy Recommendations	28
5.3 The Way Forward	32
References	33
Annex	34

Dear Reader,

Global transport and access to mobility faces many challenges. As a key voice in the international road infrastructure and transportation community, IRF takes responsibility for providing solutions to these challenges. IRF is committed to the **UN Decade of Action on Road Safety** and provides continual and proactive avenues for the road sector to address key transport, mobility, road financing, road safety, and environmental concerns.

The IRF – and our members – believe that our children have the right to **access to sustainable mobility** in the widest sense of the word: safe, green and cost-effective. In this spirit, we strongly believe smart technology can help to provide – and safeguard, this basic right.

This Manifesto calls for the **furtherance and more complete integration of Intelligent Transport Systems** into overall transport policies. It provides clear, evidence-based policy recommendations that, if accepted and implemented, will significantly advance the goal of access to sustainable mobility. At IRF, we believe in increasing and optimizing the use of Intelligent Transport Systems as a clear solution to on-going transport and mobility challenges.

In close, we would like to express our sincere thanks to our network of global partners who have contributed to this Manifesto in a variety of ways. We invite all organizations and you to join us in the effort to promote ITS and unleash its full potential.



Mr. Kiran K. Kapila

Chairman
IRF Geneva



Mr. Josef Czako

Chairman
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Mrs. Caroline Visser

Programme Manager
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The Problem

Our roads are congested with traffic, leading to damaging impacts on the environment, and each year the number of vehicles to be accommodated grows. The United Nations (UN) estimates that 1.3 million people are killed on the world's roads each year; some 50 million are injured, with many disabled. Global economic uncertainty makes major investments in road up-keep politically unpalatable and financially impossible.

Yet, **mobility** is the key to social and economic development and integration of local communities, regions and states.

The Solution

Intelligent Transport Systems (ITS) have a **demonstrated ability to improve the efficiency of mobility and quality of life**. ITS contributes significantly to solving today's transport challenges such as congestion, accidents and incidents and the lack of funding for maintaining our roads in a cost-effective manner.

Policies have a major impact on the roll-out and use of intelligent technology, with many policy areas affecting deployment, such as mobility policies, environment policies and transport funding and investment policies.

Political leaders can push for a wider uptake of smart technology by **recognising** the importance of the tools that ITS provide to address the challenges effectively and by creating the right policy framework for their deployment.

Unleash the Potential of ITS - Your Action is Needed

IRF calls upon political leaders to undertake the following policy actions in order to foster the use of smart technologies to their full potential:

- A. Incorporate ITS in Existing Transport Policies** to acknowledge and confirm its role in achieving major transport objectives in safety, sustainability and efficiency.
- B. Enhance ITS Partnerships and Collaboration** between public, private and academic stakeholders to create a conducive environment for viable, user-oriented ITS services and innovation.
- C. Encourage Sustainable Mobility Behaviour** to balance people's growing mobility demand with preserving the environment and quality of life.
- D. Plan for ITS Deployment** to create a clear unambiguous path towards safer, greener and more efficient roads and to embed ITS as an integral part of infrastructure planning.
- E. Foster ITS Harmonisation and Standardisation** to enable cross-border, user-friendly, high quality services for the public and to enable economies of scale.
- F. Stimulate ITS Education** to foster innovation, to enable the general public to intelligently use the transport infrastructure and the services and to continue developing the industry.



Intelligent Transport Systems is the future. It will not only make mobility safer, more efficient and more environmentally friendly while keeping the choice of freedom, but it will also change the whole way how traffic management is conducted, how the transport sector at large is managed. ITS will be the way to commercialize the transport sector. The speed of change - I believe - will be faster than we may expect. In addition its impact will be beyond transportation, it will have a cultural change in many different areas of our society.

Mrs. Eva Molnar, Director, UNECE, Switzerland



The Intelligent Transportation Society of America strongly supports the IRF Vienna Manifesto's core recommendation that calls on political leaders at all levels to "push for a wider uptake of smart technology" by recognizing that "Intelligent Transportation Systems (ITS) has a demonstrated ability to improve mobility and quality of life." The policy actions that IRF proposes—ranging from establishing a policy framework that recognizes the role of ITS, encouraging sustainable mobility behavior, fostering harmonization and standardization, stimulating awareness, enhancing partnerships and collaboration, and planning for deployment—reflect the essential elements ITS America believes essential if we are to accomplish the vision of widespread interoperable deployment of ITS to save lives, time and money, and protect the environment.

Mr. Scott Belcher, President and CEO, ITS America



Sustainable mobility will be realized only by an integrated approach on infrastructure, vehicles and behavior of people with ITS as enabler. Therefore, policy makers' leadership is essential.

Mr. Hajime Amano, Secretary General, ITS Asia-Pacific



The ERTICO Partnership very much welcomes this global support and commitment towards the deployment of Intelligent Transport Systems. Only in cooperation with all stakeholders will we achieve effective deployment which will lead to saving lives, protecting the environment and strengthening mobility of people and goods.

Mr. Hermann Meyer, CEO, ERTICO



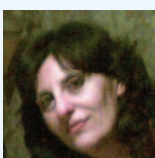
ITS, when used in the appropriate situations and with appropriate planning not only improves transport safety but can support congestion reduction and transport's impact on the environment. This Manifesto is therefore of particular relevance to politicians on national, state and local level and high level decision makers within transport authorities to support improvement for all travellers and those affected by transport.

Mr. Tim Gammons, Director, ARUP



A coherent policy framework facilitates seamless mobility. Investments in cooperative systems and services connecting infrastructure and vehicles are needed to unleash the full potential of ITS. Initial allocations of funds should be directed to a responding road infrastructure. I fully support the work of the IRF ITS Policy Committee. The Manifesto at hand strives to meet the mobility expectations of freedom and individuality while at the same time respecting social and environmental responsibilities.

Mr. Georg Kapsch, CEO, Kapsch TrafficCom AG



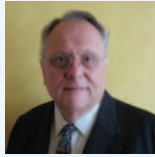
Mobility is a fundamental right. It underpins all aspects of societal development allowing everyone, from individuals up to whole nations, to develop and prosper. ITS has already demonstrated to be an essential tool for improving mobility and quality of life. The challenge now is to start using it to its full potential, to maximise the benefits that ITS can bring to society.

Mrs. Olga Landolfi, Secretary General, TTS Italia



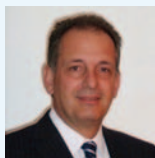
The dual challenge is to improve the through-put of existing transport infrastructure through a variety of ITS-related solutions and to achieve a radical modal shift towards public transport. This will depend to a large degree on the deployment of ITS systems to achieve transport integration. The IRF ITS Policy Committee is working towards such an enabling policy framework.

Dr. Paul Vorster, CEO, ITS South Africa



The ITS Manifesto brings politicians, authorities and the ITS community together. It is only through a concerted joint effort can we improve the safety, efficiency and sustainability of the surface transportation network everywhere in the world.

Mr. Gerald D. Conover, Managing Director, PRC Associates



This Manifesto is a result of an in-depth analysis of the benefits that ITS bring to society. The policies are a second half that will enable seamless and complete use of the technology. In Mexico, society has welcomed ITS incredibly, but there are issues. Through appropriate policies to grant the support and with sufficient legal frameworks to be able to protect the investment and move forward to standardization of technologies, these issues can be tackled.

Mr. Alfonso de la Parra del Valle, Director General, Tecnosistemas y Peaje, Mexico



The European motorway concessionaires have a long tradition with ITS. Starting with local and regional developments in the 1990s, common European standards and harmonised deployment scenarios under real market conditions are recent priorities. ASECAP and its members therefore actively support the implementation of the European ITS Directive as well as further user-oriented and economic feasible ITS initiatives.

Mr. Klaus Schierhackl, President, ASECAP



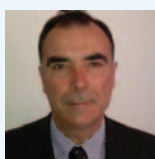
In the Netherlands, ITS is utilised to make the best possible use of the existing road network and link it to the other transportation networks as much as possible. Experience and evidence clearly show that ITS is contributing towards more efficient, safer and cleaner transportation in a cost effective way and is also providing increasingly seamless services for road users.

Mr. Nico Anten, Managing Director, Connekt/ITS Netherlands



I support this manifesto and hope it helps build momentum to improve mobility services. I welcome increased political leadership and guidance that allows the main industry players to be free to get on with the actual technological development. Our ITS services are outcome based and support policy and industry objectives. In Xerox we work on making transport smart and simple for users and operators. This means not overcomplicating services and keeping the functional models simple to encourage user take-up and engender trust

Mr. Cees de Wijs, Group President, International Transportation and Government Group, Xerox



EasyWay, as one of the largest European programs in the field of ITS , is strongly oriented to extend the areas of cooperation with all the organisations and stakeholders that are relevant for the enhancement of ITS services in order to make road transport at EU level more sustainable, safer and of better quality.

Mr. Robert Ferrazza, Chairman, EasyWay



The image shows the cover of a report titled 'The IRF Vienna Manifesto on ITS'. The background is a photograph of a multi-lane highway with a metal guardrail on the right side, leading towards a horizon with yellow fields under a clear blue sky. Overlaid on the top half of the image are several large, overlapping circular and semi-circular graphic elements in shades of green, blue, and yellow. A central black circle contains the title and subtitle in white text.

The IRF Vienna Manifesto on ITS

Smart Transport
Policies for
Sustainable
Mobility

1. Making a change

The smart transport technologies that can allow us to make significant, positive impacts on the safety and environmental performance of our transport networks already exist in abundance. In many cases, they are already deployed and proving their worth. Unfortunately, they are **not being used in anything like the scale and quantities that they need to be** – especially when one considers that such technologies, collectively termed Intelligent Transport Systems or 'ITS', are very cost-effective and cost-conservative by comparison with traditional solutions.

We face some stark choices. If left unaddressed, we might be continuing towards:

- 1.9 million road deaths annually worldwide, by 2020, costing global society an estimated \$100 billion each year.¹
- Close to 9000 Megatons of global CO₂ emissions from transport vehicles by 2030², contributing significantly to climate change and, combined with other emissions, burdening millions of people with health problems through air, water, soil and noise pollution; and
- 30% increase of traffic congestion by 2025³ in some countries, costing society billions in fuel and overall economic penalties through time lost.

Or we can **act now** and acknowledge the role that ITS applications and services can play in addressing and managing our mobility needs and **start using them to their full potential**.

1.1. About this Manifesto

This Manifesto is about the role that ITS can take in improving the efficiency of our transport and, for instance, keeping the traffic on our roads moving, minimising its effects and maintaining and improving our quality of life. It is about **benefits for society**, both qualitative and quantitative, that can be achieved by optimising the integrated use of technology.

The Manifesto is compiled by international transport industry professionals who strongly believe in that potential but who are not convinced that the right **key decision-makers** share the commitment.

This Manifesto is of particular relevance to **political decision makers** on national, state and local levels, high level decision makers within transport authorities and their respective advisers. It addresses road transport in particular, but with a keen eye on the need to support co-modality between the road and other transport modes.

The planning, deployment and operation of ITS has to be **people-focused** and **solution-driven**. This Manifesto is not about technology being the right answer because it is modern. The value of ITS lies in its contribution to:

- Achieving overall transport policy objectives in terms of safety, the environment and mobility; and
- Providing access to improved mobility for all.

1.2. About the International Road Federation and its Policy Committee on ITS

The International Road Federation (IRF) brings together public, private and research sectors in the road industry. IRF promotes roads that are safe, smart and sustainable. Despite a proven track record, ITS still suffers from a lack of recognition and support from politicians, high level policy makers and the general public. IRF has taken up this awareness challenge by creating a **Policy Committee on ITS**, which saw its kick off in 2008.



The mission of the Committee Members is to foster the deployment of ITS. The Committee supports the development of national and regional ITS strategies and encourages governments to integrate ITS as a major tool to achieve their transport policy objectives in safety, sustainability and efficiency.

The IRF Policy Committee on ITS provides an important platform for the exchange of experience of ITS experts from all over the world on the latest progress in the development of policy frameworks and ITS action plans and strategies.

1.3. Reader's Guide

In the following chapter, the Manifesto will highlight what lies at the base of our understanding of mobility, policy and ITS (chapter 2). Chapter 3 will provide a comprehensive overview of the role ITS plays in addressing key challenges such as improving road safety, reducing the negative environmental impact of transport, fighting congestion and travel delays and fostering innovation and job creation. In chapter 4, a number of promising technological trends and developments are reviewed. Chapter 5 closes the Manifesto with six concrete policy recommendations that, in their coherence, provide the optimum framework to unleash the full potential of ITS.

2. The Key: Access to Mobility

The ability to earn a living and so care for a family and loved ones is arguably the most basic of rights. Individuals, trade unions, other professional bodies and politicians all campaign for this on behalf of their constituencies.

There can be **no economic activity without transport**, which facilitates the collection of resources, the delivery of end-products and all processes in between. This equates to a clear need for balanced transport networks which allow both individuals and enterprises to select the most appropriate mode, or combination of modes, to meet their needs.

Access to a sustainable level of mobility can therefore be regarded as a **fundamental human right**. It underpins all aspects of societal development allowing everyone, from individuals up to whole nations, to develop and prosper.

Indeed, lack of mobility is one of the more significant contributors to perpetuating poverty. According to the United Nations, road infrastructure density is correlated with social performance indicators.⁴ Governments, as custodians of the public good and protectors of basic rights, have an obligation to establish an enabling environment which allows all to exercise that right.

2.1 Intelligent Transport Systems (ITS) at the Service of Mobility

The options to extend infrastructure networks are often limited, due to insufficient funding, physical barriers (topography), lack of support from the general public or more complex issues around balancing multiple objectives such as the need to have liveable communities and safety. New approaches and concepts for the optimization of the transport system and for dealing with traffic demand will have to be found.

Over the last three decades a whole suite of technological solutions, together with the enabling legislative and institutional frameworks, have been developed to address the challenge of maintaining and improving mobility. ITS already has a **demonstrated ability to improve mobility and quality of life** by cost-effectively:

- Making traffic flow better and improving travel times
- Making the use of transport networks more people-friendly
- Making those networks safer; and, at the same time
- Significantly reducing their environmental impacts.

2.2 Why Policy is Important for ITS Deployment

Policy is often defined as a “Statement of Intent” or a “Commitment” together with a framework for courses of action, regulatory measures, and funding priorities concerning a given topic. A policy is typically described as a set of principles or rules to guide decisions and achieve desired objectives. Policies are generally adopted by the senior governance body within an organisation or by Parliament in the case of a state, whereas procedures or protocols would be developed and adopted by senior executive officials.

The ITS Policy Committee of the IRF understands policy as:

A set of principles and associated guidelines that provide a political, managerial, financial, and administrative framework to direct and bound actions in pursuit of explicit and prioritized goals.

Transport and mobility issues and challenges typically manifest themselves locally, but their combined impact is global. Since transport challenges are, complex and multidimensional, their solutions are cross-cutting, inter-sectoral and require a higher-order framework to find a holistic and integrating solution. Cooperation at local, regional, national and sometimes even at an international level, is required. This brings ITS into the **policy arena**.

To achieve the required cooperation towards solving mobility challenges, ITS deployment involves:

- Standards setting and facilitating interoperability;
- Coordination to make better use of available funding;
- Simplification of legislation and initiating new legislation if deemed necessary;
- Exchange of knowledge and sharing of best practices;
- Quantification of benefits so that the value proposition of ITS systems is better received;
- Guidance and raising awareness;

What are Intelligent Transport Systems?

The definition used by the ITS Policy Committee of the IRF: *Intelligent Transport Systems (ITS) apply Information and Communication Technologies (ICT) that support and optimise all modes of transport by cost-effectively improving how they work, both individually and in cooperation with each other.*

This concept of ITS is made up of broad fields of application with numerous stakeholders involved:

- **Infrastructure related ITS:** applications that focus on availability and quality of transport infrastructure and that can be used to intervene in traffic capacity, to enable paying for road use, to detect incidents or hazardous weather conditions, among others.
- **Vehicle related ITS:** applications that are put in the car to support in the driver task and/or to assist in management of a fleet of vehicles.
- **User related ITS:** applications that focus on convenience and efficiency for travellers, reducing barriers to switch transport modes and provide real-time and forecast information
- **Industry related ITS:** applications aimed at reducing costs and/or maximizing profits in the operation of transport.
- **Vehicle-to-infrastructure/vehicle-to-vehicle related ITS:** so called cooperative systems foresee the real-time interaction among vehicles and between vehicles and the road infrastructure, in order to enhance primarily traffic safety.
- **ITS back-office systems:** applications aimed at processing collected data, storing data for historic analysis, cross-application processing and system integration, providing the base for tailored, real time information flows to road managers and users.

Policies have a major impact on the use of intelligent technology, as it defines the carrots and sticks guiding human behaviour.⁵ Or, as phrased by POLIS, the network of European cities and regions working together to develop innovative technologies and policies for local transport, in its 2011 paper on ITS research needs: ITS is **policy-driven**.⁶ The most relevant policy areas to ITS deployment are:

- **Mobility policies:** acknowledging the role and importance of transport and mobility for social and economic integration and development of regions, states and nations.
- **Environmental policies:** aiming to protect the environment (air, noise, water, soil, natural habitat), to mitigate environmental impacts of transport and to adapt transport infrastructure to changing conditions due to climate change.
- **Transport funding and investment policies:** determining the funding sources, revenues and priorities for transport infrastructure investment, maintenance and operation.
- **Spatial planning policies:** determining the physical grid and spacing of different functions such as living, studying, working, relaxing hence impacting on mobility needs and patterns.
- **Social policies:** shaping the social context in which people use transport such as accessibility, affordability, connectivity among transport modes and timing.

The following chapter relates to how ITS contributes to achieving various policy objectives. It describes the various policy challenges that governments are faced with, and highlights – based on concrete examples – how ITS can cost-effectively and efficiently contribute to achieve the policy aims.

3. How ITS Helps Improving...

3.1 Safe Mobility



The challenge

In its recently launched **Decade of Action for Road Safety** campaign, the United Nations (UN) estimates that 1.3 million people are killed on the world's roads each year; some 20 to 50 million are injured, with many remaining disabled. The World Health Organisation (WHO) has described road casualty figures as being of 'epidemic' proportions. Road-related trauma is the biggest single killer of those aged between 10 and 24.⁷

The UN estimates that road accidents have an economic cost of \$100 billion per year and, if unchecked, global annual road-related deaths are forecast to reach 1.9 million by 2020.⁸ The **challenge** is to curb this worrying trend.

The role of Intelligent Transport Systems

Road safety is commonly addressed comprehensively with the **three Es of Education, Engineering and Enforcement**. ITS can play a role in all of them, contributing to safer road infrastructure through clearer, more accurate warnings of danger and responses to incidents. ITS can educate by helping people to plan journeys to avoid dangerous weather conditions, by travelling at less busy times or warn of driver tiredness. Technology provides ITS based information services to road users, making them feel more at ease on the road. And increasingly innovative ways of monitoring and making sure people comply with road safety regulations, through the use of ITS, positively influences driver behaviour in traffic.

Wider deployment of ITS services and applications will result in **substantial safety improvements**. These technologies can increase the safety of all road users by:

- Enabling network management techniques which smooth traffic flows, reducing stop-start conditions hence reducing the variations in speed which can lead to crashes;
- Improving speed compliance and incident management such that the effects of traffic incidents, when they do occur, are minimised;
- Detecting incidents early on and shortening reaction times for appropriate rescue measures;
- In-vehicle driver support and safety applications, like for example e-Call, currently in development in the European context, where in case of an accident an automatic message is sent from the vehicle to an e-Call-centre to inform emergency services;

- Addressing the specific needs of vulnerable road users, such as cyclists, pedestrians and those with and disabilities;
- Allowing communication and interaction among vehicles and between vehicles and their surroundings which will support even greater safety.

Average speed control on a road section ⁹

What Measurement of a vehicle's average speed over a whole section of road rather than by traditional speed cameras at a single point

Where Austria, Vienna, Kaisermühlen Tunnel

Who ASFINAG, Austria's national road operator

Why To reduce speeding accidents, to avoid accidents in the tunnel, to harmonize traffic flow, to reduce emissions caused by "Stop and Go" traffic, to educate road user behaviour

- Benefits**
- After one year of operation, a reduction in average speed by more than 10 km/h was recorded.
 - After two years of operation injury crashes reduced by 33.3%, fatal and serious injuries by 48.8%.
 - Taking into account both effects on road safety and road traffic emissions, this example of a average speed control system shows a computed cost-benefit ratio of 1 to 5.3.



Tutor for average speed monitoring ¹⁰

What The tutor is a recently introduced system made available to the traffic police to record the average speed of a vehicle on the basis of the time spent to cover a given distance.

Where The tutor system has been installed in Italy, on those stretches of motorway with a higher than average fatality rate. At present the tutor is used on 2.093 km of road, equivalent to 31% of the Autostrade per l'Italia Group's network.

Who	Autostrade per l'Italia, Italian motorway operator
Why	To reduce average speed and mortality rates on motorways
Benefits	<ul style="list-style-type: none"> • Measured reduction of average speed of 15% and of maximum speeds of 25% since implementation. • Drastic reduction in accident rates and consequences to human lives: <ul style="list-style-type: none"> - 51% reduction in mortality rate - 27% reduction in rate of accidents involving injuries - 19% reduction in accident rate

3.2 Transport's Environmental Performance



The challenge

Climate change is among the major issues facing the transport sector today. According to the OECD, transport-sector CO₂ emissions represent 22.5% of global man-made CO₂ emissions in 2008 and account for approximately 15% of overall man-made greenhouse gas emissions. Projections state that, "under business as usual, including many planned efficiency improvements, global CO₂ emissions from transport are expected to continue to grow by approximately 40% from 2007 to 2030."¹¹ The **road sector dominates** total transport

CO₂ emission production and, in a comprehensive analysis, is only surpassed by emissions from the energy production sector.¹²

The **challenge** is how to effectively manage mobility while at the same time preserving the environment and quality of life.

The role of Intelligent Transport Systems

Without doubt, demand for mobility will increase and will do so at a rate which far outstrips traditional means of increasing network capacity, such as road-building. If it goes unchecked there will be significant, negative effects on carbon and other emissions related to transport.

Restricting mobility contradicts the economic benefits of free movement of people and goods and is not a sustainable solution. As alluded in Chapter 1, a certain level of mobility, or – put differently – volume of travel is essential and considered a fundamental right.

We can use ITS technologies, with their combination of information and communication technologies, to assess and potentially reduce the number of journeys which are necessary, and then reduce as far as possible the environmental footprint of those remaining. **Modifying road users' and vehicles' behaviour** in ways which make

them less carbon-intensive is a much more realistic proposition than attempting to reduce demand. ITS can do this through a combination of encouragement and enforcement measures:

- **Encouragement:** ITS can be used to enable electronic payment schemes for access to certain routes, zones or facilities where the cost of access varies according to type of vehicle or time of day. This supports the ‘polluter pays’ concept, whereby those road users and vehicles with the greatest environmental impact pay the greatest share of the financial costs of putting things right. Other means of encouragement include awareness raising and sensitising (e.g. via calculation of the individual footprint) as well as measures of rewarding ecological behaviour in the form of mobility points or vouchers. Rewarding desirable mobility behaviour tends to better serve and support the general transportation policy goals than for instance granting the highest commuter tax allowances to the most frequent users of roads.
- **Enforcement:** ITS can be used for monitoring and surveillance to incur penalties and therefore mitigate excessive and aggressive driving such as speeding. It has been estimated that reductions in the speed limit with effective enforcement across the United Kingdom, would save around 1.4 Megatons in carbon emissions in the period 2009-2020.¹³ The cost of enforcement – which is envisaged would be through the monitoring of average speeds via ITS technologies – would be a factor in practical implementation.

As eco-driving relies predominantly on voluntary action – albeit substantially influenced by “carrots” and “sticks” – other measures such as fiscal incentives and education programmes may need to be introduced concurrently.

The application of ITS can benefit the environment by:

- Providing users with advanced and real-time information which allows better pre- and on-trip planning, facilitating greener choices;
- Facilitating remote financial and data transactions which improve network performance;
- Monitoring and comparing the impact on emissions from traffic management interventions;
- Realising pre-trip and en route tolling to manage demand and mitigate the effects of congestion;
- Reducing individual vehicles’ inefficient behaviour and so smooth traffic flows;
- Supporting adaptation of networks during climatic extremes by diversion and route management.

Optimising Traffic Light Timing ¹⁴

What A process that optimises the coordinated way traffic lights work on a junction. This can involve the timing of red/yellow/green, the order and traffic light control.

Where Various locations in the United States

Who Local agencies responsible for road operation

Why To minimise stop & go traffic, hence reducing fuel consumption and emissions, to reduce delay times for road users, to prevent diversion of traffic to the underlying road network, to reduce accidents, to accommodate differences in traffic volume (e.g. peak hours versus off-peak)



Benefits ¹⁵

- The Traffic Light Synchronization Program in Texas reduced fuel consumption by 9.1%.
- In Montgomery County, MD traffic signal retiming reduced fuel consumption by 2%.
- Traffic signal retiming at 11 intersections on U.S. Route 1 in St. Augustine, Florida resulted in annual fuel savings of 26,000 gallons.
- A retiming project for eight intersections on State Route 26 in Gainesville, Florida resulted in annual fuel savings of 3,300 gallons.
- In Burlington, Canada, signal retiming at 62 intersections lowered fuel consumption by 6%.
- The Fuel Efficient Traffic Signal Management (FETSIM) Program in California demonstrated a reduction in fuel consumption of 8.6 %.



Real-time driver assistance and personalised coaching service ¹⁶

What Driver-centric service, combining real-time feedback with on-going personalised coaching for drivers. The in-vehicle system analyses acceleration and location data to monitor the driver's performance and to deliver real-time recommendations to the driver. ¹⁷

Where Service provided locally in the United States, United Kingdom, Israel

Who Service provided by a private company

Why To reduce crashes, to reduce fuel consumption; to improve driving culture

- Benefits**
- 50% reported reduction of crashes
 - Reduction of 50-70% crash related costs and a reduction of 10% in maintenance costs for over 70.000 drivers worldwide
 - Savings of up to 15% in fuel consumption and a reduction of harmful emission of 6 to 15%



Low Emission Zone (LEZ)¹⁸

What Access restrictions to urban areas for heavily polluting vehicles (trucks and private cars), according to a preset vehicle classification. Technology is being used to match the entry of a vehicle into the zone with payment obligations, to monitor bus lanes and to monitor and penalise illegal parking.

Where The city of Bologna, Italy

Who Bologna Municipality

Why To calm car traffic in the down town city; to reduce air pollution and emissions

- Benefits**
- 23 to 31 % of reduction of absolute traffic count¹⁹
 - Decrease in parking pressure by providing 1.100 additional Park & Ride facilities to facilitate entering the zone by public transport²⁰
 - A 55% reported decrease of illegal on-street parking on bus lanes
 - Less congestion, shorter travel times within the zone
 - 47% reduction of particle matter emissions

3.3. Traffic Flow and Travel Time Reliability

The challenge

The costs of traffic congestion are enormous and affect the economy, environment, public health, comfort and convenience of travellers and those living near congested networks. Figures by the OECD suggest that in 2007, Europe's road congestion costs accumulated to 1% of its GDP, some €127 billion (equivalent to US\$ 167 billion).²¹



The costs of urban congestion, notably in terms of travel time delays and fuel consumption, have risen sharply over the past three decades. According to the Texas Transport Institute's 2011 Urban Mobility Report, people in the United States of America wasted an amount of 1.9 billion gallons of fuel in urban congestion, while an average commuter lost 34 hours in traffic jams in 2010. The total cost to people in 439 urban areas in the US added to US\$ 115 billion.²²

The 2006 Eddington Transport Study in the United Kingdom estimated that "eliminating existing congestion on the [UK's] road network would be worth some £7-8bn (some US\$ 11-12.7billion) of GDP per annum".²³ It concluded that, if left unchecked, congestion would waste an extra £22 billion (US\$ 35 billion) of time in England alone by 2025.

The **challenge** for society is to balance supply of road infrastructure with a traffic demand that is continuing to increase and remains extremely variable.

The role of Intelligent Transport Systems

ITS technologies capitalise on the capabilities of computerisation, mass data storage and improved communications systems. The main functions that ITS fulfil as regards to the improvement of traffic flow and travel time reliability are:

- Enabling road operators to **know what is happening on their road networks**, through the collection of information about traffic speeds, volumes, incidents and accidents, to mention just a few key service level indicators. This information plays a key role in deciding about intervening measures to smoothen and/or re-direct traffic and inform travellers.
- Reducing recurrent and non-recurrent congestion by **managing traffic demand and the available road capacity**. Technology provides the possibility to make road users adapt their speed to the situation on the road, to (temporarily) extend the capacity of the existing road infrastructure e.g. through means the use of the hard shoulder as an extra lane, and to ration access to the motorway so as to keep traffic flowing. Many of these applications contribute to a safer driving environment as well.
- Opening the gate to a **different paradigm for funding roads**. Through ITS technologies, such as the electronic collection of tolls, the **behaviour of road users can be incentivised**, by making them pay on the base of their use of the road network. If it is more expensive to enter a certain road segment during the busiest hours, people might reconsider their travel plans.
- Providing road users with **tailored real-time traffic information**, before and during their trip, based on which they can adjust their travel. Journey time planners are an example of
- **Enforcing traffic regulations remotely**, without impact on traffic flow; an important aspect largely and increasingly supported by ITS technologies. ITS applications enable monitoring and handling compliance to, for example, speed limits and weight regulations without even having to hold or stop the vehicles involved.

Commuter Pain Index

The 2011 Commuter Pain Index, composed by IBM, reveals the impacts of congestion in 20 internationally important cities on people's daily commute in terms of stress, anger levels and their performance at work or in school. The index shows the ranking of the researched cities, with Mexico City having the most painful commute and Montreal the least painful. The survey also revealed that, despite perceived lower levels of traffic in many cities, the negative effects of congestion in terms of personal well-being were felt to be heavier.²⁴



One of the key developments has been the introduction of **traffic or mobility centres**. Mobility suggests reliable travel – and not per se the fastest travel –since its theoretical and practical application is geared towards optimising networks' traffic flow rates. Free-flowing traffic conditions provide reliability and generally fulfil transport policy objectives by contributing to economic performance, traffic efficiency and air quality.

But can mobility centres deliver free-flowing conditions without using demand-management strategies? There may be circumstances, such as in urban areas where network capacity is severely restricted, where **accompanying policies**, aimed at reductions in mobility, are necessary. These strategies might, as alluded before, include the introduction of road pricing in one form or another – or, at least, stimulate reductions in the use of private transport and encouragement of the greater use of public/mass transport. A pricing strategy can set **incentives to users** to choose different routes, different departure times or different transport modes. A staged approach is possible and most likely in many of our cities, but there are clear benefits from individual components and systems.

Parameters for pricing strategies can be time of travel, the location, the type of vehicle used, the type of user, traffic demand or emissions, to mention just a few. Road pricing gives operators, strategists and by definition political stakeholders the **flexibility** to change pricing mechanisms according to the (political) needs of the moment. The more parameters used and the more data collected on them, the more refined the pricing strategy can be. The "steering" mechanism applied can be more adapted to the actual situation on the roads and enable road users, through real time information provision, to adapt their driving behavior. The ITS solutions for this are ready and available.

Single subscription for multiple tolls²⁵

What EasyGo, a Scandinavian partnership, enables users to pay for toll bridges, ferries and roads through one single subscription. One on-board-unit (OBU) is used for all toll domains. More than 2 million users are served by more than 50 toll-charging EasyGo partners.

Where Norway, Sweden, Denmark, Germany

Who EasyGo partnership, initiated by the Norwegian Public Roads Administration, the Swedish Road Administration, the Øresund Bridge Consortium and AS Storebælt.

Why To ease payment for infrastructure usage by the user; to ease the connection between different modes of transport and countries; to ensure interoperability of systems

- Benefits**
- EasyGo is a single contract system in Europe offering users a cross-border payment service for toll collection
 - Seamless services and less congestion at toll stations
 - User charges for roads, ferries etc. are listed on one invoice (transparent documentation)
 - Queries managed by a single service provider
 - Toll Chargers occasionally grant discounts for electronic payments
 - Possible system extensions; for instance, the Austrian national tolling system for heavy vehicles will be included in the EasyGo service from the beginning of 2013 (EasyGo+ project)²⁶



3.4 Innovation, Business Development and Job Creation



The challenge

The Global Financial Crisis has brought economic slowdown and recession to many countries, with many jobs lost and a decline in public purchasing power as well as in tax incomes for governments on all levels. In response, many governments have adopted severe austerity measures, cutting costs and postponing transport investment.

Adding to it the negative relation between economic growth and sustainability, the road sector is put under high pressure to come up with urgently needed innovation that cuts this irrevocable tie and that provides value-for-money investment options that improve the performance of road networks.²⁷

The **challenge** for political leaders is to maximise the efficiency of existing infrastructure, provide frameworks for value-for-money technology solutions, as well as create a conducive environment for transport innovation towards safe and sustainable mobility in the near future.

The role of technology

Technology plays an important role and is a very **cost-effective tool** in the hands of road infrastructure managers to optimise the use of existing infrastructure. Indeed, some applications have benefit-cost ratios as high as 62 to 1²⁸. In times of austerity, ITS solutions can bring temporary relief to the most urgent traffic problems against relative low costs.

Additionally, investments in ITS have a so-called **networking effect leading to job creation**. To give an example, according to a study prepared by ITS America in 2011, the ITS end use market in the US is worth \$48 billion. The report estimated that in 2009 the ITS value chain contained 445'000 private sector jobs in the US. Outlooks are bright, as job volume in the ITS value chain in the US are projected to increase to over 500'000 in 2015.²⁹

Furthermore, the use of ITS allows many of the traditional methods of managing traffic to be altogether better supported. At the same time, it allows many of these to be replaced with something more advanced. The result is a **higher level of innovation** overall; one which affects all of those in the transport management marketplace.

Enhanced information exchange between the various market stakeholders enables:

- **Greater cooperation** within the market, enabling changes and improvements to logistical processes as well as the creation of innovative services and business models; and
- **The creation of new products and services** based on information exchange (these can include integrated transport information services, added-value and/or premium services, and advanced solutions combining several different technologies).

ITS therefore has both immediate economic advantages, in the form of the performance improvements it brings to a transport network, as well as those which may be less obvious or more longer-term in nature. For example, as data sources become more numerous and the information sets they produce become richer, so will the number of business opportunities for information service providers increase. The business models involved are very profitable and readily exportable around the world, allowing the cost of ITS deployment to be further offset.

4. Considerations for the Future

4.1 The Importance of Preserving Access to Mobility

According to the United Nations, the current world population of just over 7 billion people is projected to reach 9.3 billion by 2050 and over 10 billion by 2100. Most of this increase will occur in 39 developing countries in Asia, Africa and Latin America. Urbanization prospects, also from the United Nations, suggest that the number of people living in cities and large agglomerations will increase to almost 6 out of 10 in **2030**, concerning close to **five billion people** by that time.³⁰ Rapid urbanization puts strains on urban infrastructure networks and the environment. A huge rise in the numbers of people living in cities (and mega-cities) and urban areas will lead to growing social problems – worsening traffic congestion, increasing air pollution and a growth in the numbers of road incidents.

According to the OECD, the **need for mobility** will triple in 2050, compared to 2000 levels.³¹ And, as most of this increase will occur outside the developed countries, we will see a significant shift in the demand for mobility capacity. These changes pose huge challenges – but also offer great opportunities in terms of social, economic and environmental sustainability.

The shifts in transport will need new mobility concepts. Travellers will change their preferred methods of getting around, technological changes will make travel more user-friendly while at the same time making networks more resilient, and there may even be new modes of transport.

Change is inevitable and we need to start thinking about it now.

ITS will be the **integration tool**. It will enable local, regional and national governments in developed countries to improve already established infrastructures. It will also allow those in developing nations to leap-frog over the previous-generation networks already in place elsewhere by providing solutions which are smarter and more eco-friendly than building new road infrastructure. For densely populated urban areas it provides a tool to enhance multiple objectives, such as quality of life, public health and urban environment, preservation of historic centres next to management of road traffic and public transport.

4.2 Promising technologies

Social networking

There are already many examples of **social media applications**, like Facebook and Twitter, being used as the travel information source of choice during times of heavy disruption. Examples include heavy rains in Mumbai, volcanic ash clouds over Europe and more localised problems with road and rail conditions caused by snow and rain. In many such cases, traditional information sources were unable to provide travellers with the information they needed and in a timely manner.

Consumer electronics

The **use of 'probe data'** gained from tracking of both vehicles and mobile phones through the use of satellite navigation is in fact already common. Such data are made anonymous to protect citizens' privacy and are sourced by road operators from traffic information suppliers. The data are used to supplement many types of traffic condition monitoring, both for real-time operations and historical analysis.

Such solutions can be very **cost-effective for developing countries** where very little investment has been made in conventional traffic monitoring equipment and for monitoring traffic movements in complex urban networks. They also underline how many of the developments in ITS technology are paralleling those in the **mass-market consumer electronics sector**.

Many of the traffic management, tracking, e-commerce and information applications discussed in this document can be readily supported by modern smart phones, tablets and PCs. In some cases, this means that the development of ITS solutions can be achieved **at much lower costs** than would have been the case only a few years ago. And, as many travellers and consumers already have their own smart portable devices, dissemination of the necessary technology and applications is already taken care of.

Connected vehicles

On-board systems in the car that are currently being developed will enable vehicles to communicate with each other and their surroundings. This interaction will bring significant benefits to our road operation.

Traffic flow can be improved. Recent tests on the A270 Motorway in the Netherlands showed that with a fleet of vehicles equipped with so-called 'cooperative infrastructure' technologies, a 12 to 25% improvement in traffic flow could be realised by reducing so called "shockwaves".³²

Other studies have shown that even a 10% market penetration of such technologies would start to have significant positive effects;

- Reductions in collisions, which adversely affect congestion, even if there is no injury;
- Improved responses to incidents and associated traffic management, with less delay as a result of better communications;
- Better navigation and routing, leading to significant time and fuel savings; and
- The introduction of congestion charging schemes based on precise knowledge of vehicles' locations and prevailing traffic conditions.



Intelligent Infrastructure

The **paradigm** regarding transport infrastructure development and operation changes over time. In the era after World War II the main objective for governments was to reconstruct and extend their infrastructure networks, to enable economic development. The future might see a combination of economic and sustainability aspects as dominating factors in the transport infrastructure paradigm. Nowadays we might find ourselves in a transition phase between these two.³³

The paradigm shift is being fed by **changes and trends in travel behaviour and customer values**. The Intelligent Infrastructure Studies, Foresight, UK showed for example that people start valuing predictability of travel times higher than travel time savings. Another example is the evolution from the belief that only the rich segment of society can be mobile, to mobility as a universal right, towards an attitude of “conscious” mobility.³⁴

These changes influence the **expectations from transport infrastructure networks** in their capacity to accommodate mobility and their “intelligence” to adapt to changing circumstances.

Research into the **5th Generation Road (R5G)**, led by the French transport laboratory IFSTTAR, elaborates a system approach to demonstrate a new generation of roads, integrating promising technologies and innovation in energy, materials, information and vehicles. Four conceptual elements are being explored: the adaptable road (to lower emissions), the automated road (through the use of ICT), the resilient road (to climate change) and the acceptable road (to the public).³⁵ Benefits are likely to kick in on service level aspects such as reliability, availability, maintainability and safety of roads.

Similar notions have been developed in the framework of the **Foresight Intelligent Infrastructure Studies** in the United Kingdom:

- “[A] system that can provide intelligence, with sensors and data mining providing information to support the decisions of individuals and service providers
- Infrastructure that is intelligent, processing the mass of information we collect and adapting in real time to provide the most effective services [...]”.³⁶

ITS technologies ranging from satellite based positioning to road weather information systems to real time traveller information services undoubtedly play a vital role in this trend. Taken together with the developments in vehicle-to-vehicle and vehicle-to-infrastructure interaction, we can only imagine the depth and volume of services, innovation and information that will be released and that will benefit road users to travel safe, comfortably and without delay.

5. Unleashing the Full Potential of ITS

The previous chapters have demonstrated what value ITS can contribute in pursuing safer, greener and more efficient road travel. Promising technological trends and developments have been highlighted.

The technology is there; now is the time to commit.

5.1 What Political Leaders Can Do

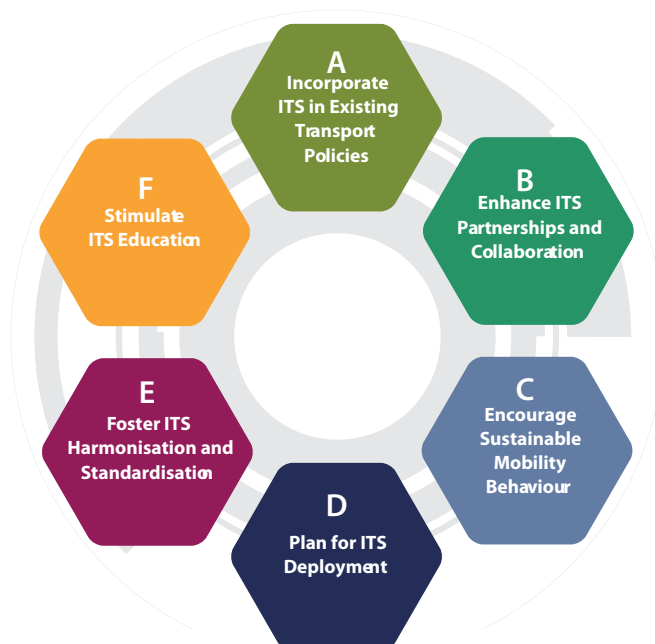
Political leaders can push for wider uptake of ITS, starting out by **recognising the importance** and value of the tools that ITS, at high benefit-cost ratios, provide to address the challenges effectively and by creating the **proper policy frameworks** for its deployment.

The **challenges** are clear:

- The number of road deaths and injured needs to be reduced;
- Mobility, being a fundamental right, should be accommodated while at the same time preserving the environment and quality of life;
- Fixed supply of road infrastructure should be balanced with traffic demand, continuing to increase and remaining extremely variable;
- Current uncertain economic conditions call for job creation and measures to foster innovation;
- Transport networks should retain their robustness and sustainability in the face of future challenges.

5.2 Policy Recommendations

The IRF Policy Committee on ITS recommends the following policy actions to support political leaders to unleash the full potential of ITS and hence societal benefits:



A Incorporate ITS in Existing Transport Policies

The individual traveller cares little about an ‘intelligent transport system’; he or she cares only that the services on offer are **affordable, reliable and safe**. Many of the higher-level aspirations, such as reducing the environmental effects of transport, are of little concern to the end-user on a day-to-day basis.

This drives the need for policy-makers to put in place at the earliest possible opportunity a **comprehensive framework**, which sets out how transport might be improved. That framework, or road map, should look at the ‘how’, taking into account both political aims, such as safety, the environment and congestion reduction, and individual travellers’ needs for transport solutions that are realistic and even desirable.

From there, the necessary solutions can develop in a harmonised environment which prevents technologies and services from becoming fragmented, isolated and proprietary, and so encourages greater take-up by individuals. The end aim has to be an **integrated grid of solutions** that have a common ‘feel’ and recognisable levels of services.

Policy frameworks should address:

- The **role of mobility** in national and regional economic and social development;
- The **role of technology in keeping mobility sustainable**; reducing road fatalities, improving the environmental footprint of transport, reducing travel time delays due to congestion, creating jobs and innovation, and its role in funding and long term up-keeping of infrastructure;
- **Accompanying policies** that should come along with the introduction of smart technology, such as investments in public transport or tax incentives that encourage green mobility choices;
- **Educating the general public** about the intelligent use of road networks and the services available to make their journey safe and comfortable, contributing on a macro level to more sustainable travel patterns.

B Enhance ITS Partnerships and Collaboration

As technology evolves, so do the roles of the public and private sectors and also of the research and user communities. In many cases, traditional boundaries will become blurred, especially as two-way information exchange between the public and private sectors and between road operators and road users becomes more common.

There are both challenges and opportunities.

Partnership models might be looked at to bring applications from the research to the implementation phase. There are already examples of how different parts of the transport industry have come together to trial and test applications which are now mainstream and which would not have been developed by one of the partners in isolation. It is important to note that a business case might exist on a higher level rather than that of an individual stakeholder. It implies that **societal Key Performance Indicators (KPIs) need to be matching with business KPIs**, and mutual understanding of both sides of the equation should be fostered.

At a daily, operational level, the road network as a whole is shared between **different authorities**, often with a division between urban roads operated by city authorities and inter-urban trunk connections run by a private toll-road company or public sector highways agency. Action to address events out on the network often involves more than one jurisdiction. This division of responsibilities means that road operators must work together in concert if the full potential of traffic management is to be realised.

C Encourage Sustainable Mobility Behaviour

Policies directed to reducing the mobility demand of people will be less successful than policies looking to modify people's behaviour, combined with measures to use existing infrastructure networks to their maximum potential.

ITS technologies provide the tools to **translate the “user pays” principle into pragmatic pricing strategies** that make people aware of their mobility patterns and the external (including environmental) costs of their travel, hence providing a grip for them to identify, and ultimately, change their mobility behaviour into a more sustainable one. The technology is there to charge people remotely and in a unified way across jurisdictions. It will also allow road transport to be compared to other transport modes.

Additionally, applying the “user pays” principle is crucial to providing new means to generate revenues that can be used to **finance transport investments**. In many countries, the fuel tax base is slowly but surely eroding, and with vehicles becoming more fuel-efficient, this is a trend that will not turn around. Many governments are therefore in search of sustainable funding mechanisms and ITS technology provides means to implement new revenue sources.

D Plan for ITS Deployment

Putting in place a roadmap for ITS deployment, as well as the process to get to such a roadmap, will prove to be highly valuable. Sound analysis of the actual deployment situation in a country, state or municipality, in preparation of setting up an ITS strategy, can provide a clear image of the existing fragmentation of systems and services and can help bring about greater coherence among deployments.

Setting up a strategy should be a joint effort among public, private and academic sectors in order to achieve a common understanding of interests. It should address the **institutional setting** in which the plan has to be implemented, aligning the various public administrations and including an analysis of which international partners need to be informed or be involved.

Realistic timetables should be provided, by which technology and services should be delivered and deployed. The planning cycle for road investments typically stretches 10 to 15 years. Policy makers wanting to benefit from the full potential of technology should **anticipate now** and embed ITS as an integral part in the planning, including long run costs for installation, maintenance and operation.³⁷ **Evaluation of ITS deployment** is vital to sound decision making and should be included as a dedicated activity in the Plan.

Most importantly, a deployment plan should include a **financial paragraph**, stating the estimated costs and benefits and – also – who will be sharing in those costs and benefits.

E Foster ITS Harmonisation and Standardisation

Harmonisation has **advantages for all those involved in transportation**. Strategic roads often span geographic boundaries and so common standards for data exchange and dissemination will greatly enhance cross-border (that is, trans-national) network management. Such considerations might mean little to the individual traveller, but from the network management and, ultimately, the level-of-service perspectives, there are profound implications.

For technology manufacturers, including the car-making industry, harmonisation and standardisation offers both a better understanding of what the market requires as well as economies of scale. As example: a car manufacturer can make **significant savings** if he can serve a global market with a single product, compared to having to tailor the product – with important modifications – to different regional markets. The same holds true for other, if not all, technology and system manufacturers.

Standardisation is equally important for the growing deployment of ITS applications in **cities and metropolitan areas** throughout the world. The UNECE has long-standing reputation and tradition for instance in developing standardized terminology for traffic signals; this could be transferred into new domains, such as standards and instruments associated to access restriction schemes.

Innovation and Research & Development (R&D) are essential. For some decades now the European Commission has strongly contributed to the common understanding and development of ITS across European Union Member States. In recent years, significant efforts have been made to increase levels of cooperation and harmonisation among Europe, the US and the Far East. In the future, new regions such as Latin America, Africa and other parts of Asia will achieve greater prominence and the emphasis must be on **establishing cooperation from the outset**.

F Stimulate ITS Education

According to the UNECE there is a lack of ITS training and very limited collaboration between science, governments and industry.³⁸ There is only a very few number of academic institutions around the world that offer integrated courses on ITS at graduate or post-graduate level. In many cases skills and competences relevant to a profession in ITS can only be obtained through combining various relevant professional domains, such as transport planning, ICT, civil engineering, public administration and policy, business administration, civil engineering, sales & marketing, to mention a few. An **integrated curriculum for ITS** at an academic level, preferably internationally tuned, would help in safeguarding the innovation that the ITS sector has brought forward. **Collaboration between research institutes and universities, authorities and the industry** is of key importance and should be stimulated.

Another important aspect is education and communication about ITS services to the **general public**, in order to enable intelligent use of the road networks and the information that is provided through various services.

5.3 The Way Forward

This Manifesto calls for the **further and more complete integration of Intelligent Transport Systems** into overall transport policies. It provides clear, evidence-based policy recommendations that, if accepted and implemented, will significantly advance the goal of access to sustainable mobility.

At IRF, we believe in increasing and optimizing the use of ITS as a clear solution to on-going transport and mobility challenges. IRF is committed to the **UN Decade of Action on Road Safety** and provides continual and proactive avenues for the road sector to address key transport, mobility, road financing, road safety, and environmental concerns.

IRF will therefore continue its own commitment to fostering ITS deployment and creating conducive policy environments for the use of smart technology. The Federation will do so by:

- Setting the agenda and addressing the issue at international forums,
- Providing a global and neutral platform for exchange on the topic of ITS Policy;
- Joining forces and collaborating with international and national stakeholders;
- Supporting national initiatives to address ITS policy.

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Organisations that have participated in meetings of the IRF Policy Committee on ITS (2008-2011)

Organisation	Country
ACEA	Belgium
AGES International	Germany
Aldis Group	United States of America
Ankerbold	United Kingdom
ARUP	United Kingdom
ASECAP	Belgium
ASFiNAG	Austria
Austriatech	Austria
Belgian Road Federation	Belgium
Connekt/ITS Netherlands	Netherlands
D'Artagnan Consulting	United States of America
Ericsson AB	Sweden
ERTICO	Belgium
European Commission, DG MOVE	Belgium
European Union Road Federation	Belgium
GMV	Spain
Grupo Lena	Portugal
Harrod-Booth Consulting	United Kingdom
IBM Netherlands BV	Netherlands
IDEAL SA de CV	Mexico
Imperial College London	United Kingdom
Instituto Mexicano del Transporte (IMT)	Mexico
Intellectual Systems	Russian Federation
International Congress of Industrials & Entrepreneurs	Russian Federation
Invex Expositores	Mexico
IRF ITS India Sub-committee	India
IRF Washington	United States of America
ITS America	United States of America
ITS Arab	Saudi Arabia
ITS Australia	Australia
ITS Belgium	Belgium
ITS Canada	Canada
ITS Denmark	Denmark
ITS Finland	Finland
ITS Ireland	Republic of Ireland
ITS Norway	Norway
ITS Portugal	Portugal
ITS Russia	Russian Federation
ITS South Africa	South Africa
ITS Sweden	Sweden
ITS UK	United Kingdom
Kapsch TrafficCom	Austria
KPN (Royal Dutch Telecom)	Netherlands
Logica	Netherlands
Ministry of Transport and Communications	Norway
Nederland Innovatief Onderweg	Netherlands
Network of ITS Nationals	Belgium

Organisation	Country
NXP	Netherlands
Operación y Conservación de Autopistas Concesionadas	Mexico
POLIS Network	Belgium
Rijksdienst Wegverkeer	Netherlands
Rijkswaterstaat	Netherlands
Roads Australia	Australia
Royal Automobile Club of Victoria (RACV)	Australia
Secretaría de Comunicaciones y Transportes	Mexico
SHCP-Banobras Mexico DF	Mexico
Siemens	Germany
SWARCO Holding AG	Austria
Swedish Transport Administration	Sweden
Tecnosistemas y Peaje SA de CV	Mexico
Tekia Ingenieros de México	Mexico
Trivasa	Mexico
Transport Canada	Canada
TTS Italia	Italy
United Nations Economic Commission for Europe	Switzerland
University of Leeds, Institute of Transport Studies	United Kingdom
University of Newcastle	United Kingdom
Vialis	Netherlands
Whaleco SA de CV	Mexico
World Bank	United States of America
WSP Group	United Kingdom
Xerox	United Kingdom

The IRF Vienna Manifesto on ITS has been made possible with the financial support of:



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