ITS SOUTH AFRICA – TOWARDS DEPLOYMENT

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1. INTRODUCTION

Transportation has been – and will continue to be in the foreseeable future – a driving force behind economic development worldwide. As standards of living increase, there is an even more rapid growth of demand for transportation capital, transportation infrastructure and vehicles. However, the capital required to make a transition to improved standards and living conditions is typically insufficient to adequately address the need. In the face of this limitation, transportation professionals are turning to Intelligent Transportation Systems (ITS) as a means of squeezing more efficiency and/or productivity out of a given transportation investment, whether it is infrastructure or operations.

2. WHAT IS ITS?

Intelligent Transportation Systems (ITS) involves the collection, processing, integration and supply of information through the application of computer, control and communications technologies to enable authorities, transportation professionals, operators and individual customers to make better informed, i.e. more "intelligent" transport decisions.
The overarching function of ITS is to improve the operations of transport systems which in turn will support the general transport objectives of mobility, safety, reliability, effectiveness, efficiency and environmental quality.

In layman's terms: ITS provides intelligent solutions to our every day transport problems by optimising transport infrastructure in order to get there **smarter, smoother, safer**, and **sooner**.

2.1 Development areas of ITS

The areas of ITS which are implemented varies from country to country depending on the specific requirements of a region or country. This is especially evident if one compares the wish lists of Developed and Transitional countries. Due to lack of funding and a non-integrated approach to ITS in most transitional countries the focus is placed on current needs and long term ITS planning is non-existent. This in comparison to the billions of dollars spent on ITS development in developed countries coupled with strategic planning.

In an attempt to standardise ITS initiatives the International Organisation for Standardisation (ISO) has classified ITS into eight (8) main development areas and in each of these areas various user services have been identified. Some of the user services currently in demand in South Africa are listed in table 1 below the relevant ISO development area:

Table 1: ITS user services currently relevant for South Africa

DEVELOPMENT AREAS	USER SERVICES
1. Traffic Management	• Incident Management • Demand Management • Policing/enforcing of traffic regulations
2. Traveller Information	• Pre-trip information • On-trip driver information • Public Transport information
3. Vehicle Systems	Pre-crash restraint deployment
4. Commercial vehicle	• On board safety monitoring • Fleet management
5. Public transport	• Public transport management
6. Emergency Management	• Emergency notification management • Hazardous materials and incident management
7. Electronic Payment	• Electronic financial transactions
8. Safety	

2.2 What can ITS do for me?

We have already indicated that ITS will assist in the optimisation of transport infrastructure. The success thereof can be measured by means of the following parameters: Increase in safety, efficiency, productivity, cost reduction and reduction in environmental impact and combating fraud and crime.

Road safety will not only be increased by reducing accidents, but by also increasing response times to accident victims, thus limiting the number of fatalities after serious accidents. Increased road safety can be achieved by implementing incident and emergency management, driver monitoring, speed enforcement and by implementing Engine Management Systems (EMS) in public transport vehicles.

Efficiency will be increased by a reduction in travel times and in the delays experienced by travellers and commuters, by reducing the number of incidents that could lead to delays and the time it takes to clear these incidents, thus increasing the capacity of existing infrastructure. In this way traffic and incident management systems have proven that it can delay the need for the costly expansion of highways. Travel Demand Management (TDM) strategies can now also be more easily applied e.g.: congestion pricing, enhancing public transport, etc. Also aspects like modal integration become much easier technically to apply with concepts like through ticketing now a reality in many countries.

Increased **productivity** and **cost** savings will be achieved by fleet owners, public transport authorities and toll authorities by a reduction in wasted time and a reduction in delayed arrivals. This can be achieved through driver monitoring, Vehicle Positioning Systems (VPS), Automatic Vehicle Pre-Clearance, automation of border crossing procedures and the implementation of Electronic Toll Collection (ETC).

Environmental benefits can be measured in terms of a reduction in emission levels and fuel consumption. This can be achieved by means of the implementation of ETC, route guidance, re-routing through Variable Message Signs (VMS), freeway and incident management etc. **Fraud and crime** are aspects that the Government recognizes as being of an extremely high priority. This can be achieved by Electronic Licensing Systems (ELS), Vehicle Positioning Systems (VPS), Electronic Toll Collection (ETC) systems, Driver recognition, etc.

On board navigation systems and the whole arena of **telematics** in vehicles will also influence safety, efficiency and productivity positively.

3. A QUICK WORLD OVERVIEW

3.1 Developed countries

Many countries around the world have established ITS programs at the national level and invested in ITS projects at the local level. In the case of developed countries such as America, Europe and Japan, ITS research and development and project deployment have taken place in respect of virtually all of the user service areas identified in section 2.2.

The **United States** Transportation Secretary announced 17 new standards that have been identified as critical to the smooth operation of ITS through-out the country during 1999, from more than a hundred ITS standards previously identified. They aim to have these 17 critical standards implemented by January 2001.

The United States Department of Transportation estimates that the deployment of ITS can save their taxpayers 35% on infrastructure investment and reduce systems life-cycle costs over the next decade by 25% or $30 billion. The United States are investing US$130 billion in ITS over a 3 year period. By 2015, the United States estimates ITS investment will have generated US$ 350 billion in direct economic benefits and 600 000 jobs.

The United States has developed a National ITS Architecture (see Annexure A) to facilitate the integration of existing and new ITS developments to maximize the benefit to authorities, users and suppliers. The following are among the ITS applications in use in the United States: Traffic Signal Control, Freeway Management, Transit Management, Incident Management, Electronic Payment, Electronic Toll Collection, Multimodal Traveller Information Systems and Commercial Vehicle Operations. Several other applications are in a trail stage.

Europe are investing EU 30 billion over a two year period in ITS. (See Annexure B for architecture.)

The following list provides an indication on how ITS have assisted European cities in managing an increasing demand for road transport:

- **savings in time** for public transport users, through an integrated platform for several independent, but connected ITS services (Turin, Italy; Southampton, UK)
- making public transport **more efficient and secure** (Paris, France)
- making public transport **more flexible to use** (Flanders, Belgium; Florence, Italy)
- **reducing pollution** (Athens, Greece; Bristol, UK)
- **lowering accident risk** from speeding (Umea, Sweden)
- protecting urban city centres from **congestion** (Barcelona, Spain; Rome and Bologna, Italy)
- **keeping travellers informed** and supporting their travel decisions (West Midlands, UK; Stuttgart, Frankfurt, Munich, Germany)
- **making payment systems smarter**, thus lowering costs and increasing availability to public transport (Vaasa, Finland; Paris, France)
- **raising revenue** for the city and **controls traffic demand** (Olso, Norway)
- **managing parking**, thus decreasing "search traffic" for parking spaces (Cologne and

Japan has defined nine fields for ITS development (See Annexure C). In at least three of these fields systems are already in use. They are: Traffic Management, Electronic Toll Collection and In-Car Navigation Systems (2 million units sold). They have also started the Smartway Project in 1998 to integrate the various available ITS applications.

Australia has implemented Traffic Management Systems, Information Systems (for public transport passengers at bus stops and indicating available parking in cities), In-Vehicle Navigation Systems in luxury cars, Electronic Toll Collection, Fleet and Taxi management (e.g. by GPS), Red light and speed cameras, and Weigh-in-motion.

3.2 Transitional countries

Many transitional countries, including those countries undergoing basic changes in their economic systems and those experiencing rapid economic development, have begun to invest in ITS. This should not be surprising, since these countries face the same transportation problems, i.e. decreasing efficiency, safety and environmental quality, that confront the developed countries and which ITS can help to solve.

The two most common ITS applications in **Asia** are area traffic control which is installed to reduce traffic accidents and congestion and non-stop electronic toll collection which increases the efficiency of toll collection dramatically. In **Central and Eastern Europe**, several countries have started to develop reliable traffic information databases which can then be distributed to the travelling public via radio and roadside variable message signs. In **South America**, electronic toll collection is currently the most common ITS application, while a few important cities have already deployed centralised traffic control, video surveillance, video speed enforcement and incident management.

3.3 ITS organisations world-wide

Several countries and regions have established ITS organisations to co-ordinate, integrate and establish partnerships among different transport authorities, and between them and the private sector. Among these count ITS America, ITS Canada and Ertico (ITS Europe), with local ITS organisations in the UK, Italy and other European countries. In the East Vertis (Japan), ITS Taiwan, ITS Korea and ITS Australia promote these goals, also in co-operation with one another.

The United States established a National Architecture for ITS to facilitate integration. Japan completed their National ITS Architecture during 1999 and Korea is working on theirs. So are other countries. The European Union has established an ITS plan, Italy has a Telematics Master Plan, Japan completed their "Comprehensive Plan for ITS in Japan" during 1996 and Canada released their ITS plan on 8 November 1999, to only mention a few.

Annexures A, B and C depict the ITS architecture in USA, Europe and Japan respectively.

4. ITS ACTIVITIES IN SOUTH AFRICA

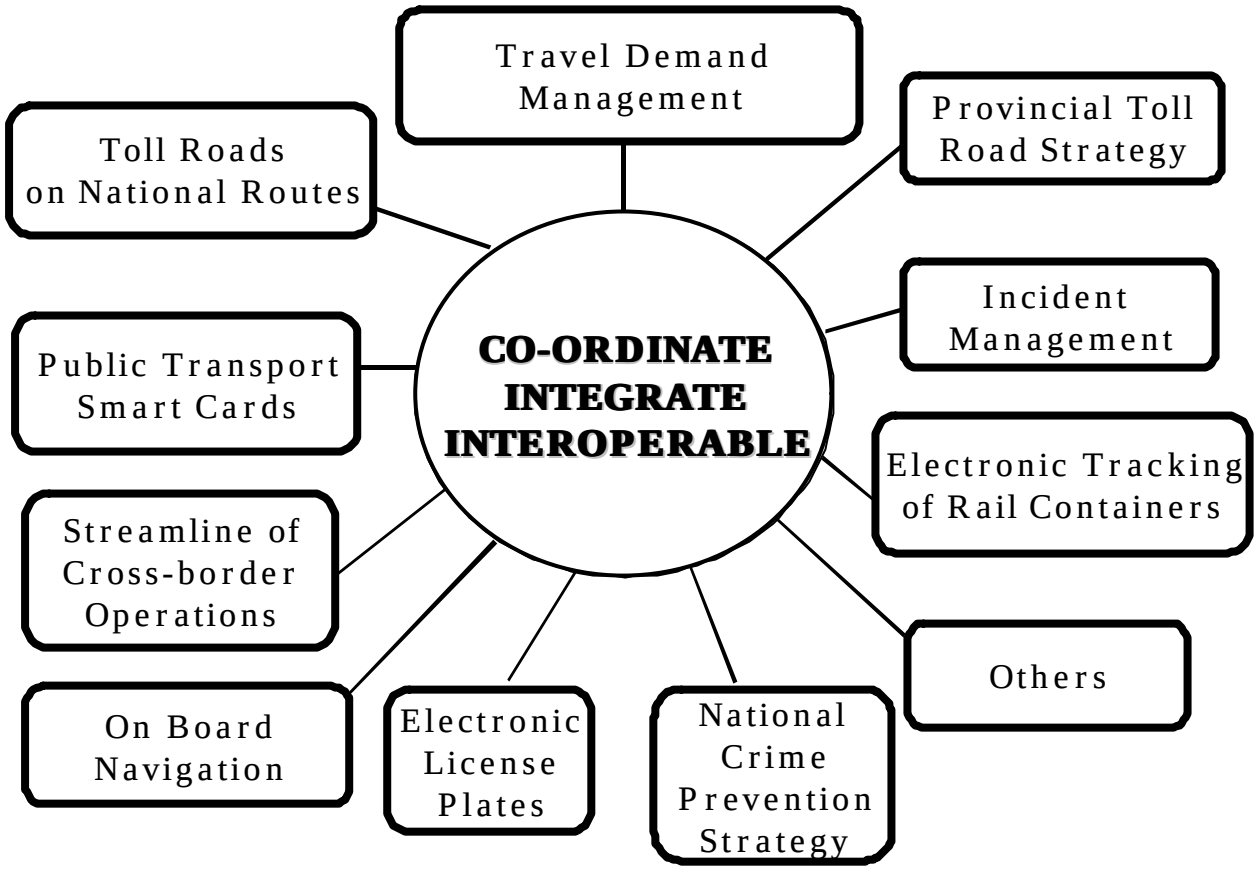
4.1 Background

South Africa is part of the global village and therefore exposed to world technology. More specifically we are exposed to the international ITS market and are experiencing tremendous pressure from vendors/suppliers and organisations wishing to pursue opportunities in their particular fields. The challenge is for South Africa to be able to channel and harness these energies released into an integrated, co-ordinated and efficient system.

4.2 ITS Activities

The activities of electronic technology are everywhere to be seen – banking cards, merchandise cards, new proposed ID cards, cell phones etc. The question one may rightly ask is whether the activities in the transportation field are linked and in what way and how far ITS should be integrated with the whole sphere of electronic wizardry? Various initiatives are currently underway locally, as depicted in **Figure 1**.

Figure 1: ITS Initiatives in South Africa



The initiatives as depicted in Figure 1, are at various stages of implementation. Some current key initiatives are explored in more detail hereafter.

4.2.1 Taxi Recapitalization

This initiative by the Department of Trade and Industry involves the transformation and recapitalization of the South African Taxi fleet. It involves the replacement of existing taxi vehicles over time by a new generation of mini-and midibus. The current tender documentation captures some of the essential operating needs but sets no definitive standards and/or protocols.

- **Fare collection** - by means of smart cards is prescribed, but it is imperative that Government must decide on the standards e.g.: contact or contactless, communication protocol etc. It is important that the concept of Modal Integration and therefore through-ticketing be an integral part of not only the taxi recapitalisation process, but also be part of the current Metrorail tender for a smart card system. It is furthermore important that buses are also included in the setting of standards so that all modes are interoperable, utilizing one tag-, and/or one smart card. The South African Reserve Bank controls e-commerce and links to the MOTU User Groups who have established the MOTU Smartcard Standard that are being forged.
- **Tracking devices** – A vehicle positioning system is called for in the tenders. This system should provide an interface with the Fare Collection System. This system will not only allow for day-to-day tracking of vehicles from some traffic control centre, but also allow for optimization of the public transport system. This information can also be utilized in planning processes that can inter alia assist demand analysis and forecasting.

- **Some other aspects** that could be incorporated include:
  - detection of overloading
  - detection of exceeding the speed limit. It would be possible for instance to link variable message signs enforcing a variable speed limit to the vehicle and driver
  - efforts to recover hijacked/stolen vehicles
  - provide "black box" type of detail after accidents to assist in the courts and Multilateral Motor Vehicle Fund cases
  - route violation reports, driver working time, etc.
  - identification of driver, etc.
- Linked to this initiative are a host of other ancillary functions and issues that will also need to be addressed such as:
  - marketing of the system and its soft/hardware, e.g. where will passengers buy smart cards?
  - Educating/capacitating users/operators
  - Integrating these systems with bus and rail

4.2.2 Electronic Licensing Systems (ELS), Vehicle Crime and ITS

National Crime Prevention Strategy (NCPS), Business Against Crime (BAC), Vehicle Crime Project Office, CSIR are some of the major players interested in the deployment of ITS to combat vehicle crime.

The importance of an integrated effort to fight vehicle crime, is evident in the following statistics:

- Some 107 000 vehicles are stolen annually in South Africa, equating to a ± R7,4 billion cost.
- License fees non-payment results in a loss of more than R100 million per annum.
- Only ± 15% of issued traffic tickets is paid as drivers or vehicles cannot be easily traced.
- It is estimated that more than 30% of unrecovered stolen vehicles are exported.

The agencies above have realised that an electronic system that has a vehicle's VIN number stored electronically within the vehicle can be utilized to combat vehicle related crime. This then relates to the Electronic Licensing System (ELS) that will combat fraudulent use of vehicles not being licensed. Any law enforcement officer will be able to interrogate a vehicle from a distance, and even in movement by making use of hand-held scanners. The implication is that every vehicle should therefore have such an electronic licensing system. This can be brought about by legislation and the mounting of the electronic device be done nationwide by various means e.g. at Traffic Management Centres, Licensing and Testing offices etc. making use of law enforcement officers and related authorised staff. Vehicles can therefore be interrogated when crossing border posts, entering parking garages, travelling on freeways (tolled or not) etc.

It is possible with the manufacturing of new vehicles to build in smart electronic systems so that for instance a stolen vehicle passing under a toll road gantry (or at a border post etc.) can be identified and an immobilising system activated on the stolen vehicle and/or a signal being sent to law enforcement/SAPS officers in the immediate vicinity. An initial ELS feasibility study by the CSIR shows a benefit cost (B/C) ratio in excess of 1,9 (realistic value +- 3,8).

4.2.3 Commuter Rail

Metrorail have called for tenders for a smart card system. Fare evasion is in some instances higher than 50%. A smart card ticketing type of system, coupled with other measures could effectively combat this. As indicated in the taxi recapitalization section, the operative words are modal integration and through ticketing. It is therefore vital that the smart card will be interoperable i.e. to be used on bus, taxi, rail, freeways and even parking garages. A passenger can be charged via

various scenarios eg. according to distance travelled, whether it is within the peak or off-peak period, whether the person is one with physical disabilities, pensioner etc.

4.2.4 Electronic Toll Collection

The National Roads Agency (NRA) and the Gauteng Department of Transport & Public Works (Gautrans) both have a specific interest in the establishment of Electronic Toll Collection (ETC) systems.

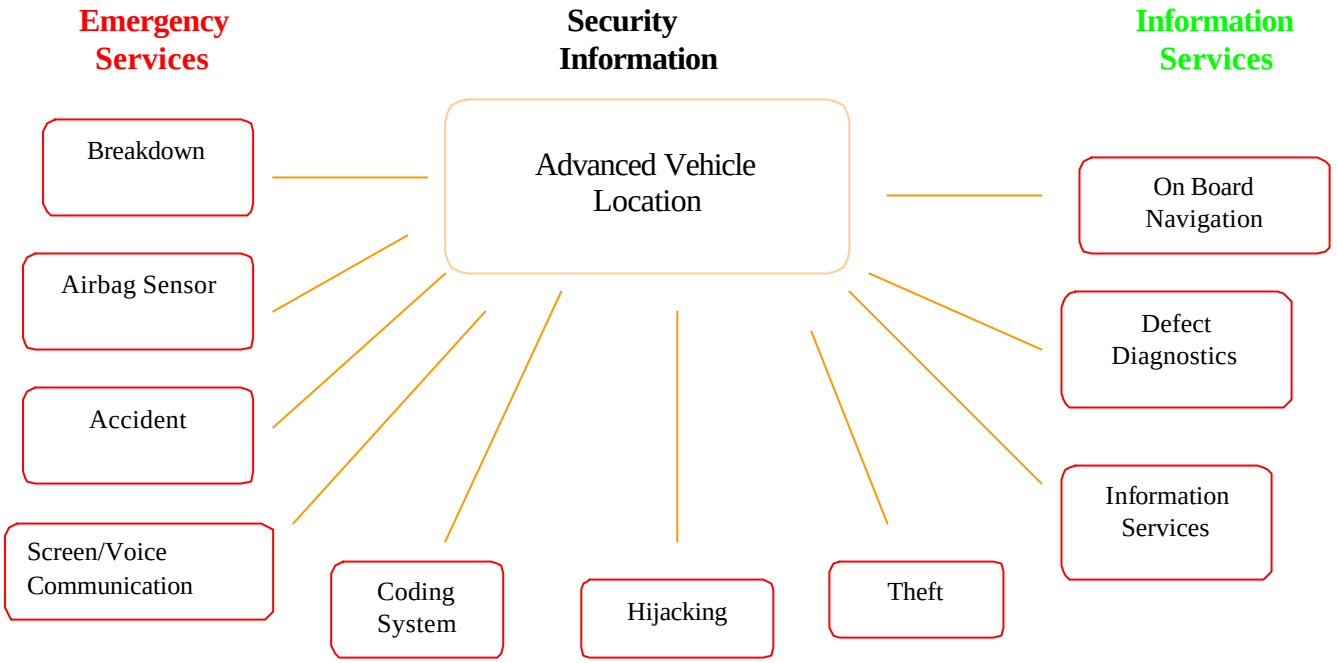
The NRA wants to introduce dedicated ETC lanes at toll plazas under their jurisdiction. These plazas are mostly in semi-urban or rural areas. ETC is more efficient than manual toll collection, with benefits in terms of increased throughput, reduction in travel times, cost reduction and reduction in vehicle emissions. The NRA aims at phased implementation through pilot projects within the near future.

Gautrans has embarked on a toll road strategy for Gauteng whereby freeways within the province will be tolled. Eight priority freeways have been investigated as possible toll roads. It will also be necessary to cross-subsidize new freeways by tolling existing ones. The practical implementation of the Gauteng urban toll strategy will not be feasible and efficient without the introduction of non-stop electronic toll collection. The linking of ETC and electronic licensing by using the same tags and equipment will greatly enhance the functionality, efficiency and market penetration of such a toll system. For interest, if the Ben Schoeman (N1) between Pretoria and Johannesburg were tolled using current conventions (i.e. no ETC) then the Toll Plaza would have to consist of more than 40 lanes.

4.2.5 Telematics

There is major effort in the automobile industry taking place regarding telematics. On board navigation systems are commonplace in Japan and some of the other developed countries. In South Africa the NAAMSA body is playing a very active role in bringing telematics on board. For production control within some of the motor car factories, microchips are used in monitoring and control. The following diagram depicts some of the electronic systems:

Figure 2: Telematics Applications



5. THE CHALLENGE FOR ITS DEPLOYMENT IN SOUTH AFRICA

5.1 Key issues for South Africa

Given all the current ITS initiatives the challenge is to "South Africanize" worldwide ITS solutions and approaches to ensure the sustainable deployment of ITS in South Africa. In order to meet this challenge, a number of issues and questions need to be addressed as a point of departure:

- which ITS applications are particularly helpful to our specific situation?
- how much of the ITS experience worldwide from industrially mature countries is transferable to our local environment?
- how can existing technologies be applied or adapted to the special requirements in South Africa?
- how can we design "sustainable ITS" at both the national and local levels within our local constraints?
- how can we make sure that what we do today fits within what we want to do tomorrow?
- how do we take all these powerful technologies and harness them so that they work in harmony and provide results we expect and desire?
- how do we determine our future direction and then set about getting there in small manageable steps?
- how do we identify and define the organization and administration required to support the technical solutions we are planning to implement?
- how do we answer and solve the myriad of other questions and issues.

5.2 Lessons learned by others worldwide

Within this context and realising that the South African transport budget is limited, it is essential that we try to learn from others in order to implement ITS as efficiently as possible. The following depicts some of the important lessons learnt world-wide during ITS deployment and operation:

- **Standardisation** benefits the user, the implementer and the supplier in the following ways:
  - by making it unnecessary to have a number of tags and accounts for Electronic Toll Collection, parking, etc., or different cards for the train, the taxi and the bus, or even for different busses, trains and taxis;
  - by reducing costs due to economies of scale and enhanced competition; and
  - by making bulk buys of cards and tags possible to further reduce the cost.
- **Co-ordination and integration** of ITS deployments is essential in order to maximise the benefits from ITS deployments. Through proper co-ordination, it is possible to:
  - not only maximize the benefits to the user, but also to the implementer.
  - achieve interoperability to ensure that it is, for example, possible to use the same electronic toll tag and the same account to travel seamlessly throughout the country. France is currently achieving this on their ITS project. ITS will also enable the public transport user to use one smart card to travel by taxi, bus or rail. Malaysia has achieved this.
  - make additional benefits possible at very little additional cost, due to the sharing of infrastructure and communication networks. European cities have discovered that they are generating extra benefits by linking networks, systems and organisations to share information, resources, equipment and infrastructure. Lille, in France, for example, has linked the regional highway operator to the city traffic department to allow each agency to know immediately of incidents on the other's network in order to be prepared for the impact on their own network.
  - maximize user acceptance of the new systems/technologies
  - jointly determine future direction and plan for implementation of small manageable steps on which can be built in the future as funds become available.
  - ensure that what we do today are some of the blocks on which we want to build tomorrow, so that our ITS deployment can grow without having to tear anything down.
  - establish public-private partnerships to overcome the lack of funding. The public sector and the national provincial and metropolitan Departments of Transport and future Transport Authorities should create the framework and priorities and convince the private sector of the commercial benefits which ITS can hold for them. An example of one type of public-private sector co-operation can be found in Paris, Cologne and Toronto where the traffic authorities gain new revenue from private operators who use data collected for urban traffic control to provide a commercial traffic information service to subscribers.

- An "**ITS planning forum**" of key players, including authorities, operators, banks, retailers, broadcasters, telecommunication operators, and the commercial service providers and the private sector is required to attain this co-operation, funding and development. By sharing in ITS planning each organisation can increase its own benefits while ensuring that a well co-ordinated range of services is available to customers.

- In ITS deployments, one "**ITS champion**" is required to take the initiative to drive the consultation, planning and realisation of the plan in concrete actions and projects.

- A **national structure** is required in order to:

  - secure finance, from public and private sources;
  - co-ordinate and achieve co-operation between institutions;
  - create political awareness and support;
  - raise public awareness;
  - address regulation and legislation;
  - build a supporting infrastructure;
  - educate and train ITS expertise; and
  - set the framework for public-private partnerships, where public sector determines the framework and priorities and creates the opportunities for the private sector to get involved and co-fund projects and technology development due to the commercial benefits it holds for them. The benefits of these partnerships have been proven worldwide and are advocated throughout the international ITS and transport industries.

- **Do not start too late** and start attacking institutional issues early. It takes time.

- **Involve all stakeholders**.

- Choose an **open architecture** on which all ITS applications can build.

- **Do it right the first time**. Users become averse to systems that change too often and require them to obtain different cards, tags, etc. too frequently. A well integrated, user friendly system contributes to user acceptance.

5.3 Planning for ITS Deployment

Proper planning is of extreme importance in planning for ITS deployment - one need to be able to look ahead as the initial steps are taken. Foresight in the early steps can bring major dividends later on. It is imperative to plan both at the conceptual (strategic) level, and at the implementation (project) level. Moreover, the plan for deployment must take into account both the technical and institutional frameworks. The technical framework will consider the requirements with respect to the systems architecture as well as the communications infrastructure and standards. The institutional framework will involve the organization and roles of the various traffic and highway agencies, road transport operators, telecommunications providers, and other key stakeholders.

As a point of departure, an ITS concept plan need to be developed. This will provide the blueprint or framework for ITS development in a given region, thus providing the "big picture" for all involved. It will provide a comprehensive statement of the priorities and what is to be achieved. Typical output of such a concept plan will include the following:

- a mission definition statement summarizing the key objectives and priorities for investment in ITS
- a popular vision statement to explain to lay people and politicians what will be achieved if investment in ITS proceeds
- a more substantial prospectus putting forth an implementation strategy for ITS, outlining the role to be played by all major stakeholders
- an ITS architecture reference document or theory of operations

The next step of an ITS implementation plan will then be to translate the various concepts into reality. Any potential application of ITS must be checked for its feasibility and desirability in the local context, both from a technical and non-technical perspective. Five major aspects are identified and need to be addressed in this implementation plan:

- develop an ITS regional architecture – this need to be developed taking cognisance of national and local circumstances, ensuring that national interoperability of some systems are attained. It will show how independent systems can be tied together in an integrated framework;
- secure an organizational framework to serve the needs of the primary stakeholders – one of the keys to success is to identify the complete range of major stakeholders in the transportation systems that are subject to ITS planning. Since both the public and private sectors have a role to play, the institutional arrangements must include requirements from both sectors;
- develop effective coordination mechanisms – major stakeholders need to develop voluntary agreements and memos of understanding between them. The achievement of consensus among all of them can be a lengthy process. It is important to have a clearly defined "champion" both in terms of the lead organization as well as having a lead business unit or individual to drive the process. This lead organization need to have sufficient authority and must ensure effective co-ordination and liaison structures to ensure the success of ITS deployment;
- secure interagency operational agreements – the operational roles and responsibilities of the different organizations need to be agreed upon. It need to be spelt out what the basis are of ITS integration – what are the strategic links, what data exchange should take place etc.;
- program planning – it need to be established how to reach the program objectives. The timing of projects will clearly be dictated by budgetary constraints. One will probably give priority to those investments that will deliver the highest benefits at the lowest risks or that will deliver benefits to a number of stakeholders.

5.4 The South African Approach

The initial impetus for setting up a South African ITS forum was provided by National and Provincial Road Authorities. Their immediate need is standardisation of Electronic Toll Collection (ETC) in order to achieve the benefit of interoperability and a first ITS conference (primarily focusing on ETC) took place in May 1999. This event culminated in the establishment of an initial ITS Steering Committee and already involves role players from both the public and private sectors.

A key event in this process, was the staging of the recent ITS Awareness Symposium and Exhibition aimed at all stakeholders (politicians, officials, as well as the wider industry). The symposium was successful in creating awareness of ITS in South Africa. It was an opportunity to build capacity of role players by sharing state-of-the-art technology and worldwide experience were

experts shared their views and managed to communicate the importance of the ITS industry for the Southern African region. Any new stakeholders were also given the opportunity to be incorporated into the national ITS structures, thereby ensuring an integrated approach to ITS solutions and deployment within the region.

Further development of an ITS concept plan and ITS implementation plan will be accommodated within the structures of ITS South Africa. Technical development teams have been activated corresponding to the areas where initiatives have been identified. These areas include:

- Advanced Public Transport Systems (APTS)
- Electronic Toll Collection (ETC)
- Electronic Licensing Systems (ELS) & Automatic Vehicle Location (AVL)
- Commercial Vehicle Operations (CVO)
- Advanced Traffic Management Systems (ATMS)
- Advanced Vehicle Control Systems (AVCS)

Various challenges and activities were identified at the Symposium in the mentioned development areas. The initial emphasis in the workgroups is on stakeholder identification and involvement as well as development of user requirement specifications for each development area. Aspects pertaining to each workgroup identified at the Symposium will also be taken forward by the various technical teams. Some overarching issues were also identified and need to be carefully managed in the ITS deployment process. Some of these issues include:

- the establishment of traffic control management centres simultaneously with the deployment of ETC along some of the urban corridors
- the need to clarify the clearing house concept and the establishment thereof for the transportation industry (mush attention was given at the Symposium to the Malaysian transportation sector that managed to instigate their own clearing house).

Activities within the above context will be coordinated to ensure that one will move towards ITS deployment in an efficient and sustainable way.

5. CONCLUSION AND INVITATION TO PARTICIPATE

Intelligent Transportation Systems is a growing industry in the world, which renders significant benefits. Several ITS application have already been implemented in South Africa. More is currently planned or being deployed.

Co-operation, integration and interoperability are required urgently to maximize the benefits from these implementations. All stakeholders e.g. implementing authorities (in the public and private sectors), technical experts, suppliers and users should get together in order to achieve these aims to benefit of all involved in transport in South Africa, especially the users.

A South African Society for Intelligent Transport Systems has been established to pursue these goals. If you are interested in participating please contact:

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7. REFERENCES

- PIARC ITS Handbook 2000
- ITS City Pioneers Consortium, “ITS Planning Handbook: Intelligent City Transport”
- “U.S. Transportation Secretary announces 17 critical standards for ITS”, ITE Journal, September 1999 Edition

ANNEXURE A:

ITS AMERICA - USER SERVICES

1. Travel & Transportation Management

a) En-Route Driver Information

b) Route Guidance

c) Traveler Services Information

d) Traffic Control

e) Incident Management

f) Emissions Testing & Mitigation

2. Travel Demand Management

a) Pre-Trip Travel Information

b) Ride Matching & Reservation

c) Demand Management & Operations

3. Emergency Management

a) Emergency Notification and Personal Security

b) Emergency Vehicle Management

4. Public Transportation Operations

a) Public Transportation Management

b) En-Route Transit Information

c) Personalized Public Transit

d) Public Travel Security

5. Commercial Vehicle Operations

a) Commercial Vehicle Electronic Clearance

b) Automated Roadside Safety Inspection

c) On-Board Safety Monitoring

d) Commercial Vehicle Administrative Processes

e) Hazardous Materials Incident Response

f) Commercial Fleet Management

6. Electronic Payment

a) Electronic Payment Services

7. Advanced Vehicle Control & Safety Systems

a) Longitudinal Collision Avoidance

b) Lateral Collision Avoidance

c) Intersection Collision Avoidance

d) Vision Enhancement for Crash Avoidance

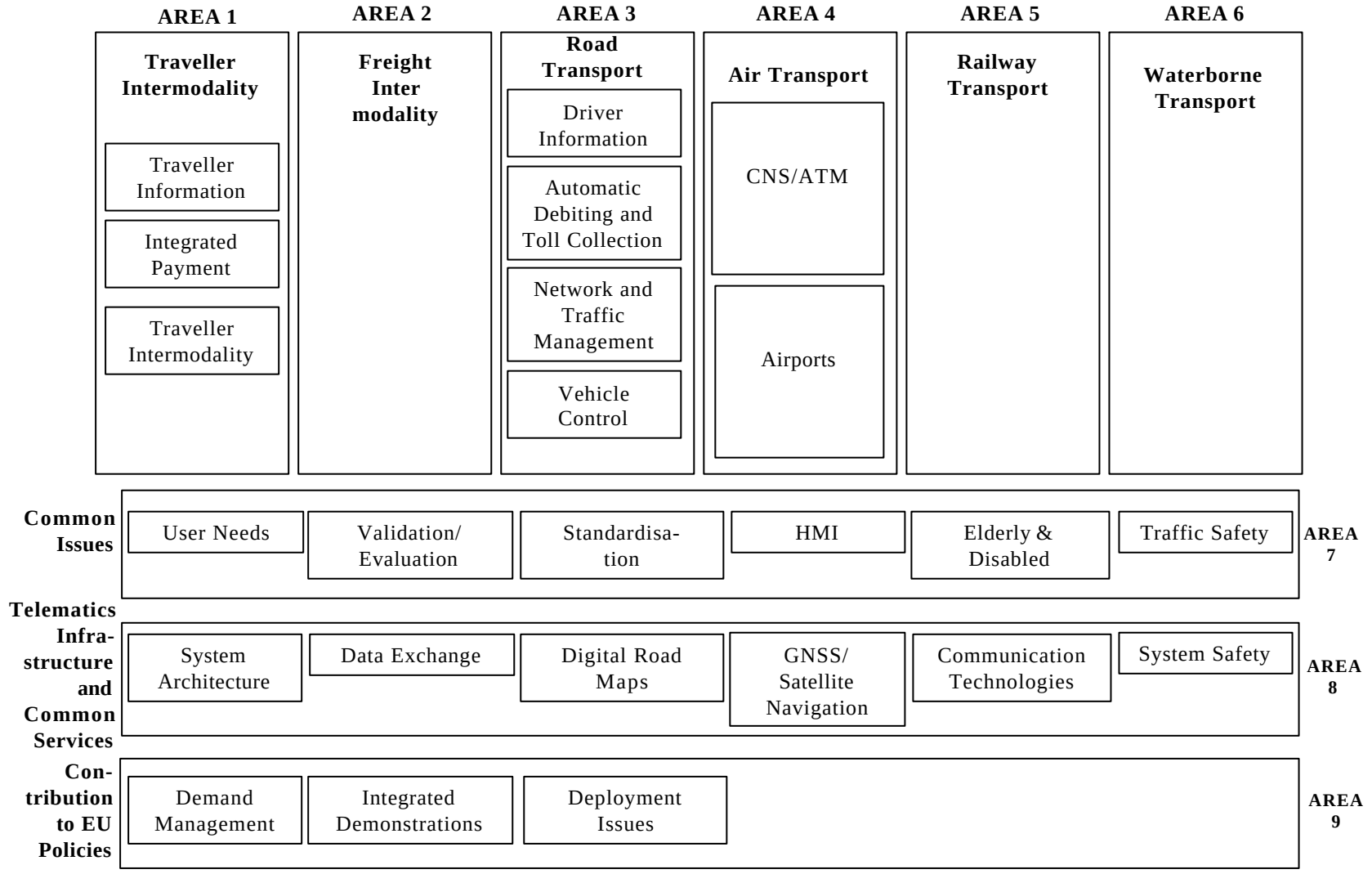
e) Safety Readiness

f) Pre-Crash Restraint Deployment

g) Automated Highway Systems

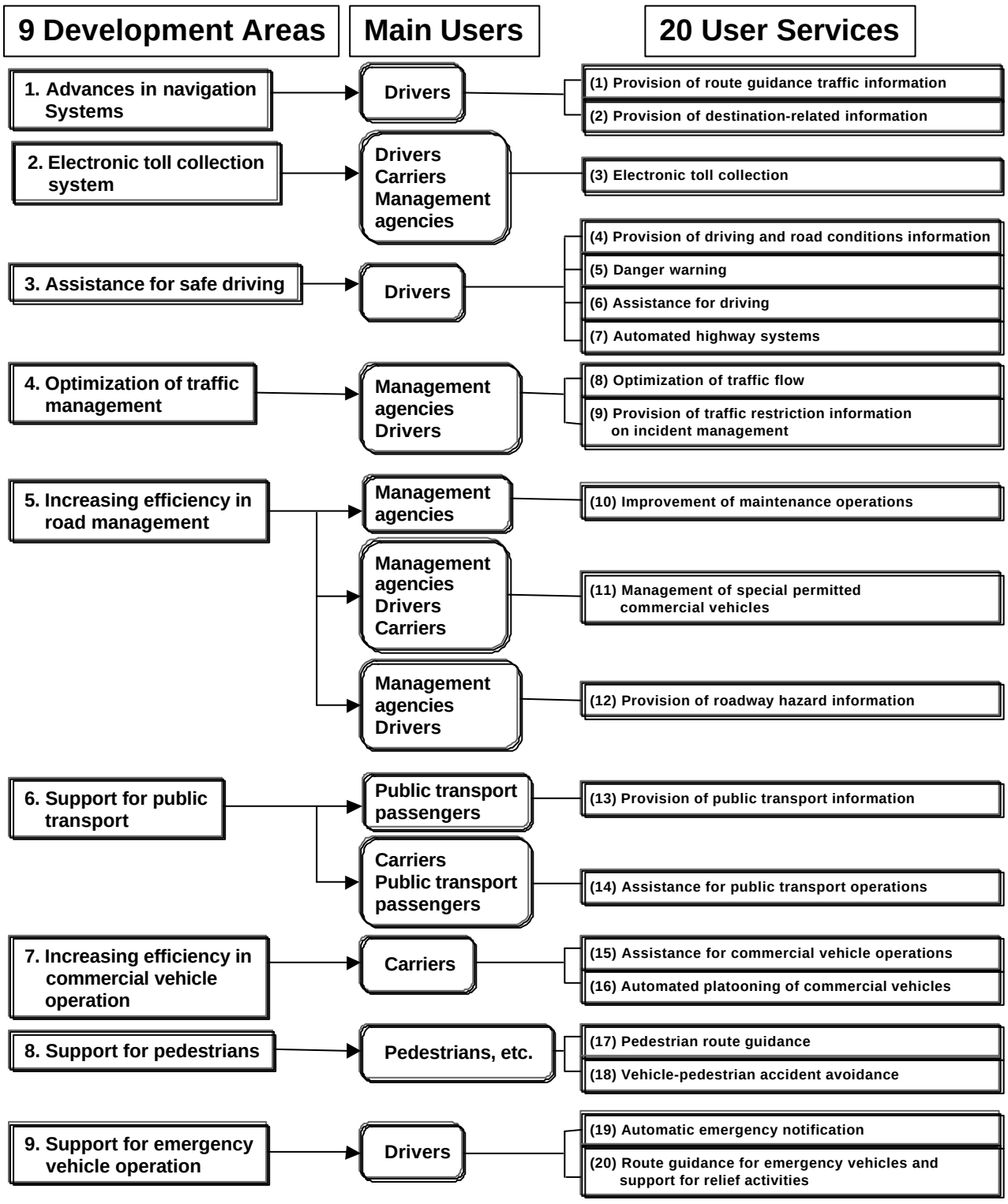
ANNEXURE B:

ITS EUROPE - TELEMATIC APPLICATIONS & SERVICES



ANNEXURE C:

ITS JAPAN - USER SERVICES



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Years experience	10
Designation in company	Director

Dr Johann Andersen is a traffic engineer and urban transport planner and currently service line manager for transportation and traffic engineering studies with Africon. Most recently, he was involved as the project leader in transportation aspects of the Mabopane Centurion Development Corridor. He was intimately involved in setting up a transport-planning model for the larger Gauteng area for Gautrans, and more recently in developing a traffic model for the city of Gaborone. He was also responsible for a range of traffic impact studies, including developments such as shopping centres, service stations and office developments. Aspects considered include access, the provision of parking and the capacity analysis of adjacent street networks. Dr Andersen is also involved in issues regarding regional transport planning and has extensive experience in the analysis of cross-border freight distribution, both within the South African region and North America. He has successfully applied prioritising techniques (utilising the AHP) within the latter context to determine the role of various performances - based criteria in choosing a mode of transport for regional freight distribution. He is fully conversant in the use of relevant computer software, such as SIDRA, EMME/2, TRANSYT and statistical packages such as SAS, SST and STATGRAPHICS.

STEPHEN LESLIE BURNETT

- Born in Pretoria
- Went to Pretoria Boys' High School
- Graduated at Pretoria University (Tukkies) in 1975 as a civil engineer
- Worked with consultants 1½ years
- Joined TPA Roads Department in 1977
- Has over 20 years strategic planning experience (road based)
- Currently Director: Planning at Gautrans
- Major tasks involved with:
    - Toll Road Strategy
    - Chairperson of the Gauteng Rail Planning Steering (GRP).
    - Logistical support to Transport Coordination Committee (TCC) in Gauteng
    - Chairman of WG1 and WG2 of TCC
    - Coordinating the TPR2/CPTR process
    - Involved in legislation pertaining to land transport
    - Involved with Metropolitan Authorities ITP's
    - Tribunal member of Gauteng DFA tribunal
    - Chairman of LTCC (National Land Transport Coordination Committee).
    - Responsible for the strategic road network
    - Chairman of the Gauteng Rail Planning Committee
- Married with two boys aged 9 and 11
- He is often mistaken for a stranger when arriving home