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Living with a legacy

by Andrew Pickford

In the second part in this series we revisit the development of ITS in South Africa. In this post-apartheid era the initial focus was initially to take stock of national assets then redeploying them more suited to an economy gearing up for international trade and ready to face global competition. Here we look at current ITS activities in the Johannesburg/Pretoria corridor – a region at the hub of a transport infrastructure programme that is the most ambitious in African history



South Africa, 2002. A country at the point where the Atlantic meets the Pacific, a melting pot of ethnic groups, customs and religions. A country of over 42 million people contributing to restructuring an economy that was more suited to autonomy and self-sufficiency in response to international sanctions against apartheid. But, since emerging from the 1994 elections with a new government, the country has been able to focus outwards on assuming a visible and sustainable position in international trade, unshackled from sanctions but nevertheless burdened with the legacy of history.

South Africa is wealthy; one of the world's top 25 trading nations and one of the largest suppliers of minerals, gold and diamonds. At the same time the country suffers from 30 per cent unemployment and lacks basic infrastructure in many townships. In response to this government investment targets have been raised from 17 per cent of its gross domestic product (GDP) to a record 25 per cent helped in part by foreign capital injections. This is the context in which South Africa's ITS programmes have

been instituted – not only to provide an outlet for local technology innovation, but also to create jobs, encourage international competition with transparent procurement policies, make more efficient use of the existing limited transport infrastructure and to support its extensions. At the country's economic heart is Gauteng province - a mere 17,100 sq km in area (just 1.4 per cent of South Africa's total land mass) but, centred around the Johannesburg and Pretoria corridor, generates 40 per cent of South Africa's GDP (or 9 per cent of Africa's GDP). In absolute terms, Gauteng is the most economically powerful zone in Africa, at the hub of South Africa's road building programme and the focus of the country's ITS applications and regulatory innovation. Outside Gauteng, Cape Town and Durban are achieving some

success, mainly in Advanced Traffic Management Systems.

The Gauteng Department of Transport and Public Works' (Gautrans) stated aim is to operate the highway infrastructure on commercial lines. Demonstrating that this is feasible has been a complex exercise in unravelling cross-subsidies and whilst this may keep the economists at work it has also provided opportunities for ITS vendors. ETC, urban traffic control and highway management are being considered as tools to better measure traffic demand and ultimately, to raise revenue from it and manage it.

Making plans

The South African Government's Moving South Africa strategy states that: "By 2020, transport in South Africa will meet the needs of freight and passenger cus-

"Moving South Africa sets out the framework, vision and process that aims to regenerate a transport system that is also consistent with national economic growth targets"



Figure 2 National ITS Initiative: objectives

- Improved transport safety
 - Improved transport security
 - Improved transport efficiency, performance and quality, for the movement of people (by public and personal transport) and goods, by covering all transport modes and their linkages
 - Reduced congestion and travel times, and improved travel demand management
 - Improved effectiveness of use of transport infrastructure
 - Improved transport environmental outcomes
 - Improved contribution to economic development, including regional, rural and remote area development
 - Improved transport accessibility - enhanced transport planning, policy making and delivery
- Source: SASITS Strategic Objectives



"For South Africa, playing catch-up with first world countries will require a blend of standards adoption rather than standards creation"

tomers for accessible, affordable, safe, frequent, high quality, reliable, efficient and seamless transport operations and infrastructure." Moving South Africa sets out the framework, vision and process that aims to regenerate a transport system that is also consistent with national economic growth targets.

Part 1 of 'Living with a Legacy,' published in the *Tolltrans* supplement to *TTI Aug/Sep 2000*, focused on the priorities faced by South Africa and how ITS was being used. The embryonic South African Society of Intelligent Transport Systems (SASITS) had just been launched – a public-private forum that reports to the Minister of Transport and dedicated to improving transport infrastructure and improve safety.

So, 18 months on, have the seeds of ITS taken root and what plans are being made, particularly in Gauteng?

Scene setting

The National ITS initiative sets the scene

and the ambitions (Fig. 2) in six separate areas: 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) and Advanced Vehicle Control Systems (AVCS).

The ITS industry, many of them members of SASITS, includes leading wireless communication system vendors, local companies dedicated to positioning systems (historically a South African strength), mapping and routing firms, electronics manufacturers, traffic control subsystem integrators, vehicle manufacturers, transport consultancies, private financiers and most notably a 'can do' attitude.

Catching up

Legislative programmes in South Africa are attempting to catch up with the rapid pace of economic and technology devel-

opment. For ITS this means improving the allocation of radio spectrum for emerging technologies, formalising product type approvals, standardising vehicle classifications, introducing accessible public procurement processes and stimulating international investment through planned road building schemes that are the largest that the African continent has ever faced.

The new highways that link South Africa with two of its neighbours, notably Mozambique and Botswana, are expected to create over 30,000 jobs and stimulate private sector investment in traffic control and surveillance systems, electronic toll collection, highway management technology and operations.

Commercialisation of highways is a stated government objective and private Build Operate and Transfer (BOT) mechanisms are currently being used to fund the creation of the Platinum Highway and the N4 Maputo Corridor serving Mozambique's main port. Both highways on the doorstep of Johannesburg and both expected to employ standardised electronic toll collection (ETC) systems. By the time this edition goes to press, the ETC technology for the Platinum Corridor, South Africa's first electronically tolled road, will have been selected and the vendor announced. Notably, this will

be based on a standardised, interoperable solution so represents the basis for wide scale deployment – consistent with SASITS's vision of one tag for ITS and not just for ETC.

Toll collection is therefore back on the agenda for Gauteng and eight provincial routes have been targeted for a R6.8 billion (US\$600m) investment over 30 years. There are two choices; do nothing or invest. If investment in the corridors were frozen, then average traffic speeds on the corridors would slow to 50km/h. In one case, through modelling it was established that if no new improvements were made at all by 2015 the average speed on the network would approach less than 10km/h. However, new highways combined with public transport initiatives, will keep this average close to present day speeds as well as improve some of the more congested highways like the Ben Schoeman Highway between Johannesburg and Pretoria. The government's focus is to firstly promote the use and further development of public transport (such as the planned R7 billion high speed rail link). The R10.3 billion (US\$900m) Taxi Recapitalization Project is one such endeavour to rationalize and stabilize the volatile taxi industry.

The necessary enabling legislation (often a trigger for ITS technology

deployment) has its opponents, though. The recapitalization project ('Recap-project') seeks to replace a 126,000-strong taxi minibus fleet with 85,000 larger vehicles. A recent attempt to secure buy-in for draft legislation to improve safety and implement a vehicle registration system was stalled due to vociferous resistance and disagreement between operators. The inertia in the present system, whether or not AVL could help, is one example of institutional barriers that potentially limit the adoption of ITS technologies. The potential role of ITS in private taxis cannot be ignored as private

Figure 3: Advanced Traffic Management Systems (ATMS) operating or planned for Gauteng

- Variable Message Signs (VMS) (Johannesburg)
- Red-light enforcement (Pretoria)
- Traffic Monitoring and Incident Detection (Pretoria)
- CCTV traffic monitoring (Johannesburg)
- WIM and overload detection (Pretoria)
- Traffic Information reporting (National Arrive Alive Information Centre, Midrand)

taxis are responsible for 40 per cent of passenger kilometres travelled in Gauteng alone.

Gautrans has in the recent past promoted the 'user pay' principle by way of BOT toll roads to provide for additional funding for infrastructure expansion. This issue has now moved from a government-driven initiative to the private sector where the eight routes are the focus of an unsolicited bid by a private consortium. Gautrans' focus is to provide a rapid rail link between Pretoria and Johannesburg and Johannesburg International Airport and Sandton. This is in co-operation with the unsolicited bid Consortium on the toll roads. Smart cards will be deployed for fare collection. Congestion pricing will also receive further consideration. A national demonstration project run in Midrand on TDM (Travel demand management) was recently completed culminating with HOV intersections on a major arterial. So, although Gauteng desires development the question of how to deal with traffic growth is crucial.

The Transport Economics group at Rand Afrikaans University argues that more roads are not the solution to reduce congestion. Instead, the focus should be to encourage road users to use mass transport system – a laudable aim but



currently Gauteng is notably weak in its public transport infrastructure. Gauteng does have about 33 per cent of the country's taxis (totalling some 40 000 vehicles) but is generally providing a service to a captive market – also the case with the commuter rail.

However, there is general agreement that revenue from tolls is sorely needed to compensate for the critical underfunding of the Gauteng transport infra-

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structure, approximately R3.3bn (US\$290m) every year. The debate between local economists, transport agencies and user groups is sure to continue. So, what can Gauteng do provide viable alternatives and catch up with other global economic leaders?

ITS elsewhere

Reasons quoted to support the introduction of an Electronic License System (ELS) include high annual levels of theft

(107,000 vehicles - R7.4billion), damage caused by overloading (R650m per annum) and evasion of road license fees (R70m-100m per annum). The introduction of ELS would require all vehicles that use corridor routes to be equipped with a remotely readable Automatic Vehicle Identification tag – just one initiative being studied by government, Transportek (a division of the statutory research council CSIR) and COTO

(Committee of Transport Officials) in one of its working groups. In contrast, the government is considering legislation to enable state monitoring of citizens. Although this legislation is initially targeted at telecommunication systems there are fears that a mandatory tagging system could also be a violation of freedom. Again a balanced strategy that uses mass-market ITS technologies sensitively to improve enforcement rates whilst complementing CVO, ETC and traffic man-



agement projects whilst preserving freedom is another institutional tightrope to be walked.

ATMS projects opportunities being promoted by SASITS and applicable for Gauteng include highway management, ramp metering, installation of Variable Message Signs (VMS), incident detection and management, public transport prioritisation and urban traffic control. The plans extend further – to include ATMS in Gauteng (Fig 3).

South Africa is no exception to attaching a high value to personal safety. The National Minister of Transport Dr Dullah Omar declared the opening of the National Arrive Alive Information Centre in Midrand on 7 December last year. This Centre will collect and disseminate information on road conditions to members of the public and commercial organisations and guide long-range planning and policy development.

Other ITS technologies are acknowledged as not requiring regulatory drivers but instead their introduction would be market-led; vehicle navigation systems, collision avoidance, private emergency service delivery and commercial fleet management. Vehicle location technologies based on GPS and triangulation from terrestrial transmitters represent one of South Africa's competence areas.

Over 50 system integrators and application developers are already able to provide asset management, geofencing, vehicle security and rapid response vehicle breakdown services.

“South Africa has joined the ITS community but sees it as the means to an end rather than the end itself”

Overall, the integration of location with accurate mapping (another legacy of sanctions-era defence initiatives) is helping reduce the cost of asset management and improving vehicle and driver security in Southern Africa with commercial exports worldwide currently aided by the weak Rand.

Jo'burg in the limelight

From 26 August to 4 September 2002 Johannesburg will be playing to a world audience. Eighty thousand delegates are expected to attend the UN World Summit on Sustainable Development making it the largest conference ever held on the African continent.

The World Summit will focus on poverty, environment and development, financing mechanisms, technology trans-



fer, the environment, health and land use. It is ironic that all of these are also high on the agenda in South Africa, but the conference provides a real opportunity for the country, through the organis-

ing committee JOWSCO, to promote its domestic policies in all areas and show the level of success achieved of an aspiring first world country. ITS is, not surprisingly, also on the agenda for the organisers.

The impact on Johannesburg has already been felt. School terms have already been rescheduled, parking capacity has been reallocated and 200 Volvo buses have been purchased by Johannesburg Metrobus to include smart-card ticketing systems, GPS location and on-board passenger information systems.

Consideration is also being given to a call centre for the World Summit that can be linked to the current Gauteng-wide call centre initiative that is seeking to not only focus on transport and in particular public transport, but also have

tourism linked into it. This call centre would then also have links to whatever traffic control centres are developed. This is an integrated approach typical of good ITS structure and incorporating ITS into both the call centre and the traffic control centre that would then, for example, permit real-time information systems to be accessed directly from the internet.

Next steps

For South Africa, playing catch up with first world countries will require a blend of standards adoption rather than standards creation, technology transfer rather than technology creation, dealing with institutional barriers and encouraging inward foreign investment to kick-start self-generation.

The creation of the National White Paper for ITS, currently being punted by SASITS, is seen as the first practically realisable vision and process that defines ITS deployment plans in South Africa. It is also intended that this will show traceability with the National Transport Policy and the Moving South Africa project.

In short, South Africa has joined the ITS community but, importantly sees ITS as the 'means to an end' rather than the end itself. Technology vendors are not the primary focus though – the appropriate institutional framework is required and a determination to select and apply standardised interfaces and technology to enable mass market deployment with Gauteng helping set the precedent and ensure the sustainability of ITS in South Africa. ■

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Finally, thanks to Stephen Burnett, from Gabites Porter (ex RSA National ITS Chairman) for his contribution to this article.

All photographs by Andrew Pickford and Jane Hughes, unless otherwise stated.