

1.3 TECHNOLOGICAL INNOVATION

SANRAL has deployed intelligent transport systems in the metropolitan areas of Johannesburg, Tshwane and Ekurhuleni in Gauteng; eThekweni and Pietermaritzburg in KwaZulu-Natal; and Cape Town in the Western Cape.

An ITS allows for the collection of real-time traffic information, which is conveyed to a transport management centre. The centre processes the information and uses the data to manage traffic flow, and to disseminate important information to road users. The ITS reduces congestion and removes some of the uncertainty associated with travel conditions. An ITS also helps incident management systems to cope with accidents or other unexpected events, leading to faster response times, improved safety and more rapid clearance of impediments to traffic flow.

Notable ITS achievements during the reporting period included the following:

The **Gauteng** FMS spans 230km and includes 183km of fibre optic cables, 49 variable message signs (VMSes), and 245 cameras, including 20 wireless cameras on the R21. Road construction works severely disrupted the service during the reporting period. In response to these challenges, SANRAL took other steps to obtain real-time traffic information. For example, SANRAL used "temperature maps", which use probe data to show the average travel speeds on sections of the network. This data, along with inputs from traffic safety officers employed by GFIP contractors, was used to provide real-time inputs and traffic information to the traffic management centre.

The **Cape Town** FMS, operational for the full reporting period, facilitated the coordinated response to more than 4 400 incidents on Cape Town's freeways during 2010/11. These incidents ranged from vehicle accidents and lane closures, to poor visibility conditions for motorists due to heavy rains and veld fires. The Cape Town FMS has 197 closed-circuit television cameras and 48 VMSes covering about 154km of the busiest freeways in the metropolitan area.

In 2010/11, the **KwaZulu-Natal** FMS was in the final phase of installing the ITS field devices (cameras and VMSes) – the communications backbone of the transport management centre at the SANRAL offices in Pietermaritzburg. The system also monitors the King Shaka Toll Plaza, which opened in May 2010. The transport management centre is staffed for 16 hours a day and logs an average of 79 traffic-related incidents each month. The ITS network coverage will continue to expand, with a further 40km of freeway on the N3 to be added shortly.

In all ITS projects, SANRAL works closely with local transport, traffic and emergency services officials, the South African Police and the Road Traffic Inspectorate to ensure that the benefits of such deployments are realised across a wider spectrum.

SANRAL intends to procure the services of a national ITS operator, based on a performance-based contract, to manage and run the three regional operations.

Freeway management

Incident management systems

SANRAL's incident management system, supported by central coordination centres, embraces interaction between emergency services and law enforcement agencies on all declared national routes.

SANRAL and the Transport Education Training Authority jointly developed a training module for incident management response that was recently approved by the South African Qualifications Authority. SANRAL has been working in close collaboration with emergency services to enhance communication and accident response times according to specific regional requirements. SANRAL also participates in the incident management technical subcommittee of the RTMC. This will support enhanced incident management not only on national roads, but also on provincial and local authority roads.

SANRAL will continue to assist with the development of incident management training for emergency services, the South African Police Service and others role players.

Intelligent transportation systems

To obtain optimal use of existing road space, SANRAL has increased the use of technology on the road network. These innovative solutions are known as intelligent transportation systems (ITS). SANRAL launched its first ITS project in Gauteng in September 2006. This project is now fully operational.

The aim of ITS is to reduce recurrent congestion, with its accompanying impact on the environment; to improve road safety; to keep motorists informed of travel conditions; and to respond rapidly to road incidents. The ITS project has now been extended to a further 190 km of the freeway network in Gauteng and has been implemented along sections of the N1, N3, N4, N12 and N17. During the currency of this declaration, ITS will be rolled out in KwaZulu-Natal and the Western Cape.

ITS employs closed-circuit television (CCTV) cameras, enhanced communications, traffic detection and traffic information devices. The system is monitored continuously at a network management centre.

To communicate with the travelling public, variable message signs have been placed at strategic positions on the network to influence travel patterns and inform road users of real-time and projected traffic conditions due to accidents, scheduled road works, weather advisories and special events. In addition, electronic "tactical warning signs" have been strategically positioned to warn drivers of potential traffic hazards, improving safety and reducing the risk of incidents.

Electronic toll collection

SANRAL aims to extend the use of electronic toll collection on all national toll roads. This system uses an electronic transponder, or tag, to identify customers. It allows for increased throughput at toll plazas (when operating under "boom down" mode) without provision of additional toll lanes.

A central clearing and account management system is being developed to facilitate the interoperable use of a single tag on all toll roads that implement electronic collection.

The Gauteng Freeway Improvement Project will also use the electronic toll collection methodology, but with an ORT configuration. ORT employs specialised gantries over the road and roadside equipment, enabling toll collection at designated points at freeway speeds.

Traffic monitoring

Traffic monitoring is essential on the national road network, allowing SANRAL to:

- Predict the future performance and deterioration of road pavements
- Ensure that budgets for road maintenance, repair, rehabilitation and improvement reflect the best use of funds
- Determine the engineering interventions required to overcome congestion, road safety and environmental problems
- Perform toll-project feasibility studies and calculate loan service repayment schedules to determine the ability of a toll route to meet its commitments
- Supply law enforcement and road safety campaigns with planning and operational data.

The network of traffic data collection stations has been substantially increased. SANRAL currently has a network of 835 traffic monitoring stations, of which 440 are monitored in rotation every one to three years depending on local conditions, and 395 stations monitored continuously. Over the next three years, a significant number of new traffic data collection stations will have to be installed to serve the growing national road network.

SANRAL's traffic monitoring requirements, which will be developed over the next three years to take into account the advances in technology, place stringent obligations on service providers to be diligent in maintaining accuracy, and to provide quality data on which decisions are made involving billions of Rands.