



Tunnel Solution

PSI 

PSI Incontrol Sdn Bhd

Introduction

PSI tunnel automation solutions provide you with the best single-stop solution for monitoring and control of traffic, air quality management, traffic information, communication networks, tunnel surveillance, telephony, electrical distribution panels, lighting and SCADA solutions.

You want to meet the challenges of smoothest traffic control, the best air quality, state-of-the-art technologies, most efficient security, highest availability in data communications, autonomous emergency procedures, efficient and user-friendly control stations, and at the same time keeping a close eye on your own costs. We are the complete system integration company that designs, engineers, implements, installs and commissions the tunnel automation systems.

Integrated Process Control Technology for Tunnels

Tunnel Monitoring and Control System (TMCS), are generally designed to fulfill the following primary objectives:

- Monitor and display the operational status of all tunnel equipment
- Detect and report tunnel equipment alarm conditions
- Support a range of operators, locally and remotely
- Provide automatic and manual control of tunnel lighting, ventilation, fire and drainage
- Offer pre-determined tunnel operating configurations for emergency situations
- Provide traffic monitoring and control over traffic on the approaches to the tunnel
- Handle Emergency Telephone annunciation and operation from the Tunnel Control Center
- Provide a range of tools and utilities for optimizing and managing tunnel operation.



Monitoring and executing all these systems is by the latest generation of event-based, computer-aided SCADA systems. Our comprehensive, modularly designed SCADA systems meet the requirements for standardization, integration and establishment of compatibility between a variety of products and services available on the market.

Integrated Tunnel Surveillance System

CCTV system in the tunnel provides

- Continuous visual monitoring and general surveillance of designated areas in the tunnel
- Security against theft and vandalism
- Visual confirmation of equipment breakdown, traffic incident, accident and fire in the tunnel.
- Trigger alarm to alert the maintenance and operation personnel of the important visual events
- Visual recording of designated events in the tunnel
- Supplement tunnel security guarding
- Monitor persons entering and leaving the cross passage and ventilation shaft
- Useful visual monitoring for decision-making information.

Integrated Automatic Incident Detection (AID)

The AID detects the following incidents and relay these to TMCS:

- Stopped Vehicle
- Low Speed
- Queuing
- Wrong Direction
- Visibility
- Camera Failure

Based on the incident and status, the operators at the TMCS will be aided visually by CCTV to take the related actions, such as controlling the Traffic Control Signs (TCS)

and Variable Message Signs (VMS) to close a lane or give early warning of queues forming ahead.

Integrated Ventilation Monitoring and Control

The air quality in the tunnel is monitored and controlled by the TMCS. The tunnel ventilation system controls the number of Jet fans in operation in the tunnel to supply fresh air, disperse exhaust fumes and any fire smoke to maintain a safe and acceptable air quality in all parts of the tunnel. Comprehensive air quality monitoring network along the tunnel monitors the Carbon Monoxide (CO), Nitrogen Monoxide (NO) and the visibility level. The measurement levels of these initiates the appropriate ventilation schemes and provides indication and alarms to the operators. The ventilation systems are also designed to deal with the major disaster of a fire inside the tunnel.



Integrated Fire Detection System

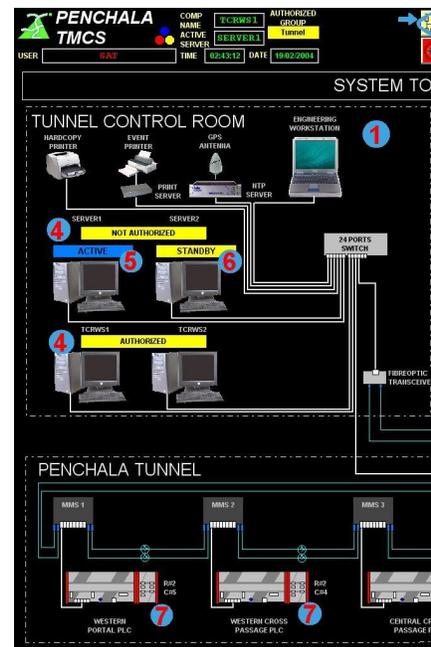
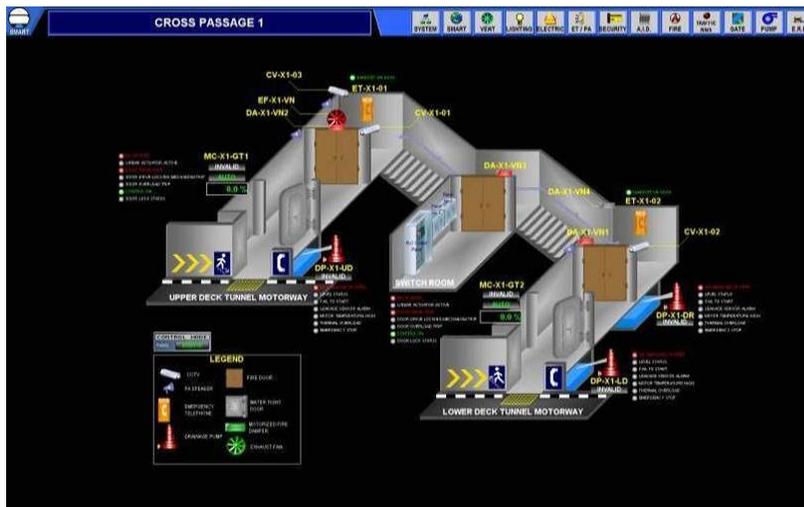
The detection of the fire within the tunnel is via the fiber optic linear heat detection system. The linear heat detection is interfaced with SCADA to allow the operator to see the temperature profile along the tunnel. To enhance the fire detection system in the tunnel, the system also utilizes both CCTV system and AID system to indicate when traffic is going to generally slow or stop downstream of the incident in case of fire. The AID system is also capable of doing pre-detection base on smoke detection. This alerts the operator in the control room who can then observe what is occurring on video cameras and react appropriately. The CO and NO detectors are the primarily for air quality measurements, but they also double as an indicator that there is a fire.

Integrated Access Control System

The monitoring of tunnel related security includes access to certain equipment and buildings. In the breach of security, a result alarm will be raised in the SCADA and a command can be issued to the CCTV system to direct the most relevant camera to start recording.

Integrated Audio Communication Systems

The Emergency phone, PABX and VoIP Public Address system are controlled via a single integrated control system which links all the three facilities together for ease of use and a faster, more effective response. The integrated system also allow more efficient in tracking and logging of emergency call, interface with other system such as SCADA and CCTV.



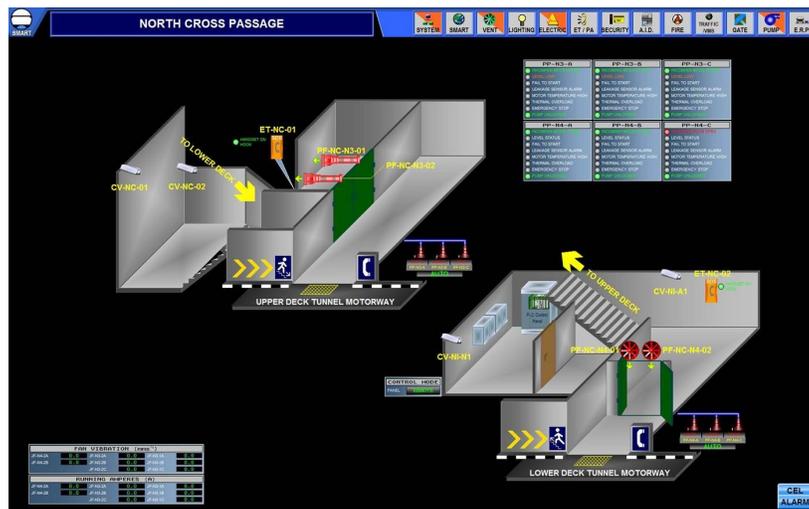
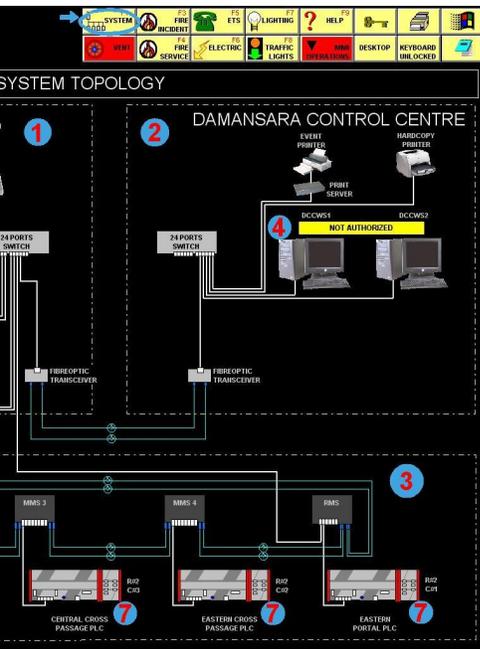
Traffic Monitoring and Control System

The traffic around and within the tunnels is both monitored and controlled by the Traffic Monitoring and Control System, with the traffic information presented on a graphic screen. The TMCS monitors the current traffic sign through the outstation PLC and the CCTV system. These include the VMS at tunnel portal, and lane control signs located above each traffic lane. Based on the incident and status from the AIDS, the TCS & VMS can be directly controlled by the operator or SCADA system to close a lane or give early warning of queues forming ahead. The Traffic control system also provides a series of pre-defined traffic plans which selectable by operators during emergency situation such as fire alarm or accident in the tunnel.

How you benefit

Real-time traffic, air quality, equipment monitoring information
 Efficient normal operation
 Failure management
 Decisions based on operational data

- ▶ Cost-effectiveness
- ▶ Competitiveness
- ▶ Reliability
- ▶ Safety



Successful Projects

Penchala Link Tunnel

We have completed the design, engineering, testing and commissioning of the Penchala Link Tunnel. Having a length of 800m, the 3-lane dual carriageway route has three cross passageways that does not only connects both traffic tunnels to each other, but also stores the monitoring equipments. The Tunnel Monitoring and Control System (TMCS) controls and monitors the ventilation, lighting, electrical distribution, emergency telephone, fire and traffic signals.



SMART Tunnel

Our world-renowned Kuala Lumpur Stormwater Management and Road Tunnel (SMART) tunnel is a unique solution to the Malaysian capital's long-term traffic and stormwater management problems and, is the first dual-purpose tunnel of its kind in the world. The tunnel is diverting floodwaters away from the confluence of the two major rivers running through the city centre while its central section will double up as a two-deck motorway to relieve traffic congestion at the main southern gateway into the city centre.



We had undertaken the complex integration and execution of twenty three different systems for monitoring, control and automation. The PLC based system has over 10,000 data points from which to collect data to compile a detailed picture of Storm Water Management, traffic flow and events. This will enable the Tunnel Control System to effectively manage traffic flow, incidents, ventilation, security, fire detection and emergency response. The Tunnel Control System boasts one of the most advanced systems in the world. The Storm Water Management SCADA System and the Traffic/Tunnel Control Services SCADA System that makes up the Tunnel Control System, together with the integrated subsystems will perform the Control and Monitoring Functions for the entire facility. This innovation was successfully launched in May 2007 and has been the biggest ever tunnel automation project undertaken by PSI Incontrol. It has been the de-facto standard in Tunnel Automation for other companies since then. The success of the SMART drew world-wide acclaim having been documented by Discovery channel as one of the technical wonders of the 21st century, and won numerous local and international awards in tunnel and automation technology. The success of SMART tunnel propelled PSI Incontrol as a leader in Tunnel Automation.

Building Partnerships Through Empowered People



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