#### State-of-the-art Technology Fault Resilient Distributed Solutions



Trantek MST

# **TRANTEK MST** Your partner in solutions

AMT5

**Distributed Control and Management for** 

**Road Infrastructure** 

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### **OBJECTIVES**

- Distributed monitoring and control
- Mitigating the consequences of control system and operator induced failures
- Mitigating the consequences of component failures
- Using technological advances to reduce complexity
- Cost effective robust systems
- Scalability
- Easy, safe, loosely coupled 3<sup>rd</sup> party tool integration

### **Typical Sources of Failure**

#### Hardware

- Accounts for a diminishing percentage of systemic failures
- Communications
  - Redundant Path technologies are making the failures rare
- Software
  - Least reliable components of a control system
- Human Errors
  - Users, operators and maintenance account for most system failures

#### **Legacy Control Systems**

- Point to Point or Master/Slave Networks and Protocols
- Network Structure implies system organisation
- Low bandwidth
- Small memory
- Small persistent storage
- Slow processing power





### AMT5 Architecture – A new approach to integrated control

- Peer to Peer communications there is no designated master
- Hardware is cheaper than software. AMT5 uses multiple hardware platforms performing the same functions in parallel for fault resiliency with less complexity
- Can duplicate functions simultaneously from different geographic locations
- Manages multiple simple network paths to achieve communications redundancy
- ▶ Gateways provide support for 3<sup>rd</sup> party systems and protocols
- Triple modular redundancy provides fault tolerance for 3<sup>rd</sup> party devices that communicate only in master/slave fashion using master/slave protocols such as Modbus and IEC-60870-5-104

### Architecture – A new approach to integrated control

- Introduces the concept of "resources" as the basic element
  - A resource can be an input, an output, a microphone, a speaker or camera
- Complex resources are constructed from simpler resources
- Resources can have complex behaviour
- Introduces the concept of a Controlling node as a consumer of resources
- A control node performs actions by locking resources
- Introduces the concept of a service node that controls access to resources
- A hardware element can have both a controlling node and service node functions
- Access is prioritised, supporting up to 256 priority levels

#### **Example Architecture**



#### **AMT5** Features

- Distributed Monitoring and Control avoids single points of failure
- Fault resilient without complexity
- Easy Integration
- Structured configuration language allows for simply design of complex systems
- Supports redundant communications interfaces
- Supports 3<sup>rd</sup> party integration
- Triple modular redundancy for 3<sup>rd</sup> party master/slave systems

### **Operations Control and Monitoring**

- Integration Platform for Central Control Facilities
- Operations Management Control facilities
- ITS Functions and Integration
- Tunnel Control
- Plant Management and Electrical Distribution and Transmission (SCADA)
- Radio Rebroadcast Interface and Management
- Emergency Public Address using VoIP and native AMT5
- CCTV Video Management System
- Motorist Intercom using VoIP and AMT5 with call queue management
- Gateways for 3<sup>rd</sup> party systems integration with OPC, Modbus
- Custom protocol development

#### **Tunnel Emergency Public Address**

- Networked Public Address System Every Speaker is a network node
- Low cost cabling
- 15 to 20 W RMS class D amplifier per speaker
- Per speaker background noise compensation
- Feedback on message delivery success/failure
- Software Configurable and Dynamic Audio Zone Configuration
- VoIP gateway

### **Radio Rebroadcast and Break-in System**

- Native AMT5 Redundancy
- AM and FM rebroadcast, DAB ready
- Scalable
- Prioritised multiple break-in channels
- Pre recorded announcements



#### **Remote Control Units**

- Programmable to conduct complex functions using AMT5 configuration language
- Small and scalable
- Sized for the application, from single resource (I/O) to many I/O and many types



#### **Remote 3<sup>rd</sup> Party Equipment Gateways**

- Choice of Interface Options
- Custom design and protocol development available
- Small device can be built into 3<sup>rd</sup> party equipment



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Thank you very much for your attention! Obrigado pela sua atenção Gracias por su atención! Merci beaucoup pour votre attention! Vielen Dank für Ihre Aufmerksamkeit! Bedankt voor uw aandacht!

