Advancing Control Systems Integration

Ematics
CONTROL SYSTEMS ENGINEERS

Engineering & Design Solutions

About Us

Ematics

Ematics are market leaders in delivering critical infrastructure projects and advanced technological engineering solutions.

As a trading name of Morson Projects, Ematics are a specialist control systems integrator providing high quality industrial automation and information systems. With a wealth of experience in managing projects covering several industry sectors including Transportation, Process Control, Manufacturing, Power, and Environmental, Ematics delivers innovative solutions to strict quality standards including SIL related safety systems and IEC 61508 / BSEN 50128.

Morson Projects

Morson Projects are a reputable multi-disciplinary engineering consultancy with over 40 years' experience across the UK and overseas. Morson Projects provides cost effective project management, engineering, and design services to clients across a variety of industrial sectors.

This gives our clients added value and the advantages of bringing best practice that has been developed by Morson Projects delivery teams. Services range from complete turn key project management through to detailed design exercises. Clients have the opportunity to outsource complete design packages to Morson Projects. Their services include:

→ Aerospace Systems & Structures
→ HVAC & Piping
→ CNC Programming
→ Mechanical Engineering
→ Power Engineering
→ Tooling Design & Manufacture
→ Stress Analysis
→ Technical Services & Project Management
→ Control Electrical & Instrumentation
→ Manufacturing Engineering

Services

Ematics' highly skilled and committed technical staff are able to deliver complex automation projects across a range of markets for a diverse client base.

Project Management

Ematics ensures that client requirements and expectations are met through regular consultations, progress meetings, formal design reviews, and using in-house project tracking and reporting systems.

Design & Specification

By embracing the challenges posed by ever-changing technology, Ematics provides leading edge solutions, future proofing your investment; systems design specialists formalise requirements into design specifications and detailed system design.

Site Survey

Ranging from initial site surveys and feasibility studies through to detailed audits, Ematics' engineers will visit site to consult on the best approach to meeting particular control systems objectives.

Installation & Commissioning

Ematics solutions cover all aspects of the control system including control panel installation, cabling infrastructure, instrumentation systems, system hardware, software, and ergonomically designed control room facilities.

Maintenance & Support

Through planned visits, emergency call-out and telephone support, Ematics provides the necessary support to keep mission critical systems operational, and advises on system expansion, version upgrades, modifications, future planning, and obsolescence.

Independent Solutions

As an independent integrator, Ematics offers commercial-off-the-shelf solutions using equipment and software from any of the major manufacturers, supplemented with bespoke in-house developed software and modules to meet client specific needs.

Training

Customised systems courses are delivered on-site or at the Morson training facilities to suit client requirements. Ematics also arrange training for manufacturer's particular products as well as other generic training courses including CCNSG & First Aid training.

Our Services

SCADA Control Systems

Ematics work closely with clients and the wider supply chain to deliver custom built and off-the-shelf based SCADA packages.

The essence of a SCADA system is the communication of reliable data and records, vital in keeping the right people informed. Ematics has extensive experience integrating large and complex systems in safety-critical, redundant environments, utilising all the major SCADA software packages including:

→   Schneider Electric Citect
→   Wonderware InTouch
→   Panorama
→   Monitor Pro
→   FactoryLink

Ematics' capabilities include the provision of services from upgrades to existing systems, through to complete new builds. When standard integration solutions encounter limitations the Ematics in-house engineering team can develop bespoke modules to maximise system potential.

PLC Control Systems

Where speed and safety is critical, PLCs sit at the heart of the control system. Ematics upgrades legacy PLC platforms and designs new systems including standalone, hot-standby, and safety-critical PLC systems to SIL 3.

Ematics' equipment experience includes:

→   Schneider Electric
→   Modicon
→   Square D
→   Telemecanique
→   Allen Bradley
→   Mitsubishi
→   Omron
→   Siemens

When planning system upgrades, Ematics consults with suppliers and offers the most cost effective and reliable solutions to suit, including meticulously planning changeover operations to cause minimal disruption, with proven quality assurance and risk mitigation techniques.

Human Machine Interface (HMI)

Providing a reliable interface between the operator and control system is imperative in maximising production and reducing downtime.

Obsolescence is extremely common in the HMI market as technology moves on very quickly - Ematics in-house engineers have decades of experience upgrading legacy HMI's from all the major manufacturers, including:

→   Panelmate
→   Magelis
→   Panelview
→   WinCC

In this field, Ematics' strength lies in conversion techniques - keeping the new system looking as close as possible to the original to minimise operator training, as well as developing modern systems using the latest tools and technologies.

CCTV & Incident Detection

Ematics integrates the latest in analogue and IP surveillance technology. With security and safety a priority, Ematics expertise and in-depth knowledge of industry standards and developments ensures the right solution.

Off-the-shelf product experience is combined with the development of in-house bespoke solutions for control rooms, video walls and intelligent security to deliver:

→   Advanced analytics detecting smoke, fallen objects, stopped vehicles, custom events
→   Perimeter fence detection
→   Access control
→   Rapid deployment self-contained monitoring solutions

Our Services

Device Communications

Whether expanding an existing system, testing and fault finding, or designing a completely new system, Ematics engineers have the necessary experience and skills to get everything running smoothly on a wide range of standard and proprietary inter-device communications protocols including:

→ Ethernet
→ Profibus
→ Modbus+, Modbus, Modbus TCP/IP
→ Unitelway
→ FIP
→ AS-i
→ ControlNet
→ DeviceNet

Public Address & Radio

Ematics designs and installs the latest public address and radio rebroadcasting systems, offering seamless integration to SCADA systems utilising custom interface designs.

Specialist Tunnel & Highway Solutions

Ematics' system solutions cater for the integration of other tunnel sub-systems including: addressable lighting, heat detection systems, water curtain stop systems, video incident detection, CCTV, PA, and Radio.

The tunnel environment is complex and varied, with multiple life-safety systems critical for the day-to-day use and operation by the public and staff. Within these environments, Ematics deliver:

→ CCTV and incident detection
→ Device communications
→ Escape lighting and systems
→ Fire detection and prevention
→ HMI
→ Instrumentation and environmental sensors
→ Lane control signage
→ Lighting and lighting control
→ Networking and data communications
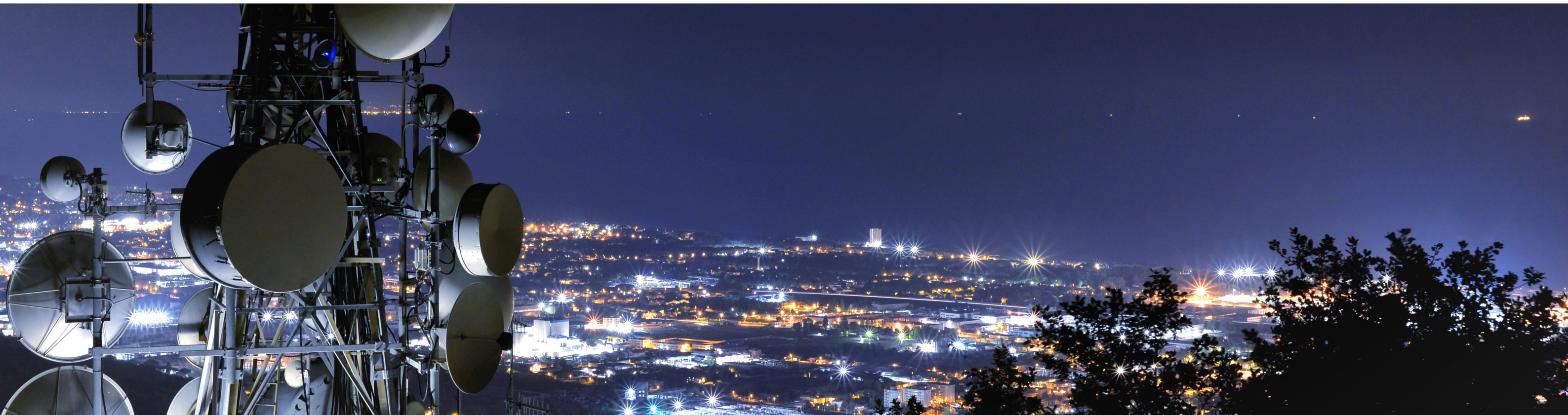→ Public address and radio
→ SCADA and PLC

Networking

"Without a robust and reliable method to transfer data between remote equipment, it doesn't matter how stable the underlying systems are."

With experience in proven Ethernet technology and ultra-fast fibre-optic communications, Ematics can develop an integrated communications network using the right technology for the right purpose, at the right price.
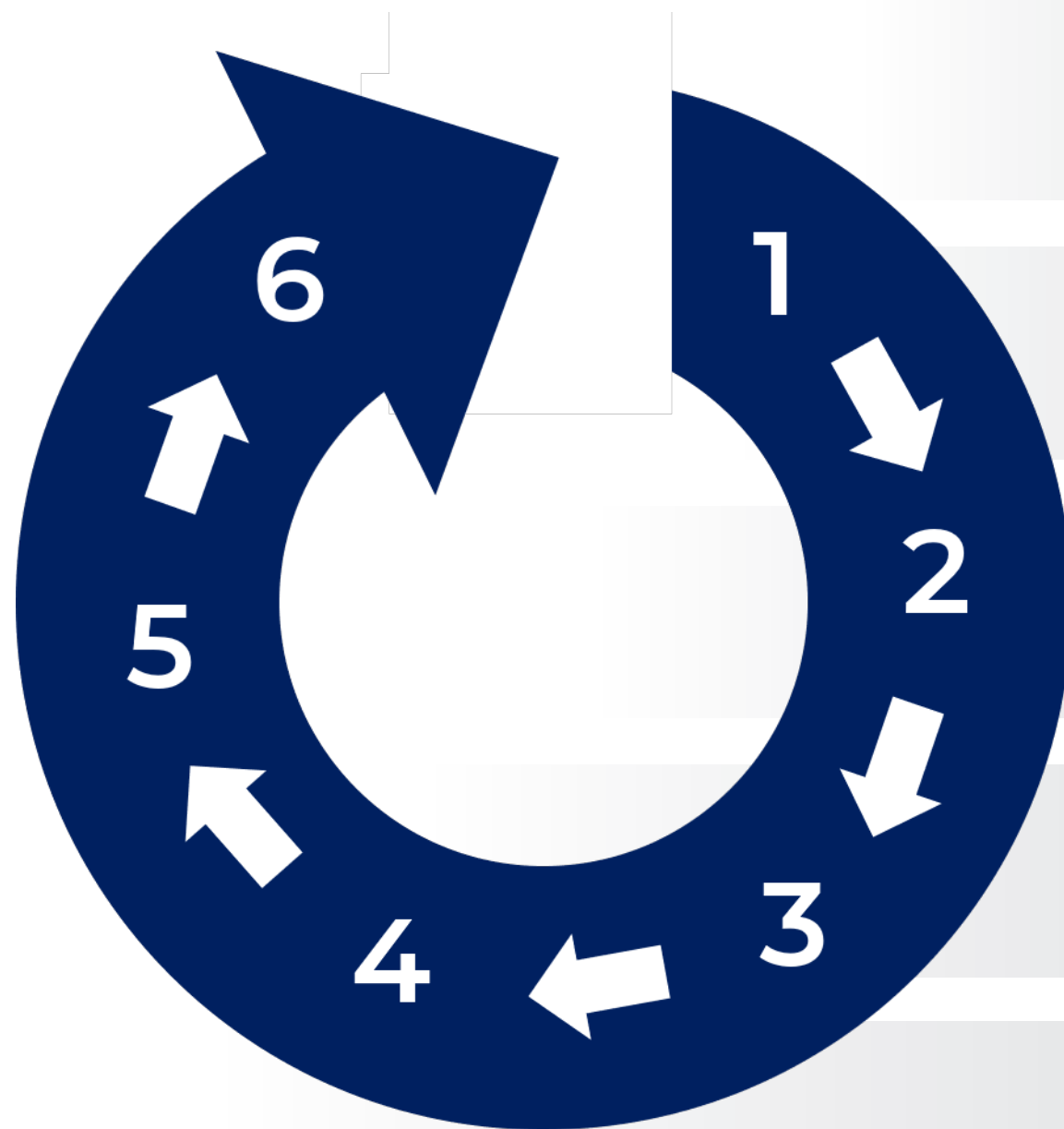
With specialists in upgrading outdated systems that run legacy protocols, Ematics can make recommendations for steps to overhaul the communications system - including link bundling, upgrading link speeds, and quality of service optimisations, as well as more complex communication hardware upgrades. Ematics deliver:

→ Ethernet and IP Technology
→ Multimode & Single Mode Fibre-Optics
→ Telecoms
→ Wireless including WiFi & WiMAX, 3G & HSDPA+
→ RS485
→ Network Redundancy
→ NMCS2
→ Custom and Proprietary Protocols

Project Lifecycle

Ematics delivers over every stage of the project lifecycle, providing a full Design-to-Renew service through continuous improvement and long term support.

1 Design

Consult with clients to fully understand and document the user requirements before embarking upon the development phase, starting at the site survey and progressing into design specifications, panel design, C&I drawings, hardware, and network topologies. Completing anything from small panel upgrades to full turnkey projects with project management of third party contractors.

2 Develop

Adhere to strict quality regimes for development of the control software, working to the agreed Functional & Software Design Specifications. Create rigorous testing mechanisms and environments to ensure compliance of the system to user requirements, including adherence to SIL Level 3 Requirements, where specified.

3 Integrate & Test

Carry out on-site installation, integration and testing to Quality Assurance processes. Engineering teams ensure all aspects of the project are carried out safely, to any relevant standards & legislation, to the customer's satisfaction.

4 Operate & Maintain

Work closely with the customer to create training programmes and environments to ensure a seamless handover of the new system. Offer planned maintenance schedules to ensure optimal performance of the system and full functionality in the long-term.

5 Continuous Improvement

With changes in processes, technology, and production criteria, assist the customer in maximising the potential of the control systems. Utilise market leading technologies or bespoke solutions to keep ahead of the competition.

6 Renew

When obsolescence becomes an issue, or where technology has advanced to an extent that a new system is the most cost-effective solution, consult with and guide the customer through this process - ensure the best value and technology is utilised in getting the client back on track.

Projects

Ematics works for a wide variety of clients in multiple industries. With a broad depth of experience, the best is taken from each project and integrated into the next generation, providing a natural continuous improvement.

← **Drax Power Limited**

Ematics have provided a high availability system for the monitoring and control of 11kV and 415v Switchgear for the new Biomass Facility at Drax Power Station, comprising Schneider Quantum PLCs, Advantys Remote I/O, Citect SCADA, and a Magelis HMI.

Further works by Ematics has included the provision of a Diversion Safety System to switch between conventional fossil fuels and biomass combustibles supplying the main unit boilers; a dual redundant Safety PLC System was deployed to meet SIL1 requirements as it was responsible for the safe switching of the combustible products.

New Tyne Tunnel - TT2

The New Tyne Crossing project involved the design and build of a second vehicle tunnel under the River Tyne, and the refurbishment of the existing vehicle tunnel.

Ematics has designed and installed a Citect based SCADA system with full data redundancy, controlling CCTV, telecoms, radio rebroadcast, VAID, and traffic control from a control room near the new tunnel portal. The accompanying data comms system utilises a 3Gb bonded fibre backbone and proven CISCO architecture.

Formula 1 - Circuit of the Americas

This project involved the provision of a race management control system (RCMS) and fault indication system utilising redundant PLC, SCADA and Remote I/O technology. The fault indication system provided the monitoring of essential supplies and UPS equipment as well as key meteorological data for presentation to the race control officials.

The RCMS provides programmable control of the start lights and horns. Inductive loop based systems were installed to provide audio/visual pit lane warnings to drivers.

Channel Tunnel Rail Link - High Speed 1

Ematics completed specialist software engineering and systems assurance for implementation of the ventilation control in the three Channel Tunnel Rail Link tunnels.

The system was deemed to be safety critical, thus development had to follow strict software assurance guidelines and was subject to regular audits to ensure that the system met the required operational safety criteria. All PLC and SCADA software was developed in accordance with the systematic requirements of BSEN51028 SIL3.
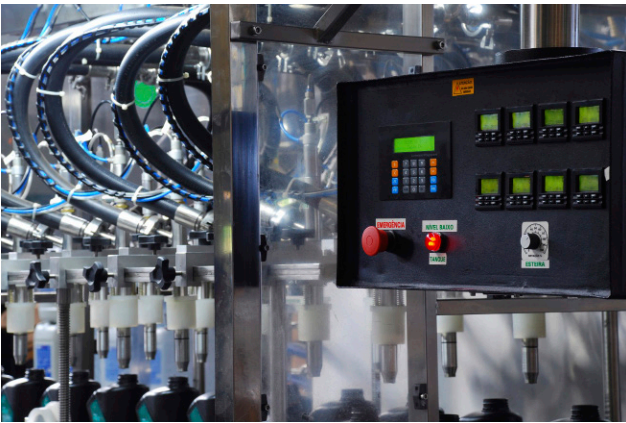
Medway Tunnel

Along with a replacement SCADA control solution, Ematics designed and installed new tunnel sub-systems to replace legacy life-expired equipment that was no longer supported.

The new platform provides monitoring and control of existing equipment with interfaces to new sub-systems including the new CCTV system, radio system, emergency telephone interface, barrier status monitoring, SCADA remote login clients and the interfaces to allow full operations from the master control centre.

Procter & Gamble

Ematics completed the contract to upgrade the filling and manufacturing lines for the shaving foam, gel and deodorant products to a category 3 safety system.

The project involved the upgrade of an existing Wonderware InTouch SCADA system, installation of six new Human-Machine Interfaces (HMIs) and integration with existing and new Omron PLCs. The inter-PLC communications via Sysmac Link and Ethernet were updated to integrate the new and existing equipment.

Dublin Port Tunnel

Ematics conducted a survey of the network to investigate the design concept, current performance and reliability of the whole infrastructure to identify any design and configuration changes that would bring about a more stable network.

After close consultations, Ematics were commissioned to implement a number of the recommendations from the report with a meticulously planned installation to ensure zero disruption, with the tunnel in operation at all times.

Unilever European IT Data Centres →

Mission critical building management systems have been provided by Ematics for two geographically dispersed data centres. Works included full system design, installation, testing and commissioning of hot standby PLC systems, with SCADA and redundant remote I/O for the monitoring and control of cooling plant, standby generators, switchboards, and UPS equipment.

An Integrated SCADA application has also been developed which provides supervisory control and monitoring for all BMS equipment across both data centres.

Thank you for your efforts over the past year with us; we've found your staff to be knowledgeable, helpful, and most of all capable of delivery both on the design and implementation level. Your staff have been instrumental in getting our project delivered on time with zero defects.

I look forward to working with your team on future projects and congratulate Ematics for the open and honest way in which you conduct your business.

I'd have no hesitation in recommending your services.

- Head of Signalling, Control & Communications,
Major Infrastructure Company

MAJOR CLIENTS

Amey	Jacobs Engineering	Ringway Jacobs
BGN Events Limited	Johnson Controls	Schneider Electric
Capita Symonds	KCRC – Hong Kong	Shepherd (SES)
Cardiff County Council	Kellogg's	Siemens Technology
Costain	Kent County Council	SPIE WHS
Drax Power Limited	London Underground	The Rosebery Group
Enterprise	Medway Council	Traffic Wales
Enterprise Mouchel	MTR – Hong Kong	Transport for London
ERH Communications	Network Rail	Tyco International
FM Conway	NG Bailey	Tyne Tunnels
Highways Agency	Procter & Gamble	Unilever

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