

**ERA**  
TECHNOLOGY

Engineering consultancy services  
for the rail industry



ERA Technology is a specialist engineering consultancy, test and assessment business working at the leading-edge of many advanced technologies and provides high value-added, engineering consultancy services including assurance, design, assessment, testing and expert advice. Our services reduce technical and commercial risk, and improve the performance and resilience of critical systems and infrastructure assets.

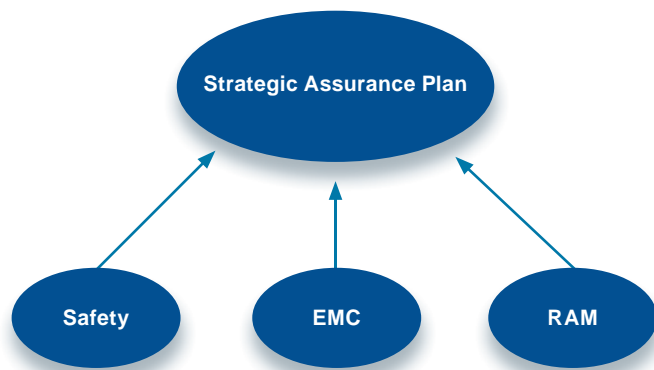
With an impressive engineering pedigree stretching over 90 years, ERA has continually adapted to be customer-facing and remain at the forefront of innovative service development. The company's services are based on best practice engineering principles that stem from its long-standing experience.

A particular strength of the organisation is the ability to bring together project teams with expertise covering a wide range of technologies and sector knowledge to solve problems in a cost-effective manner.



ERA's expertise in the rail industry provides a comprehensive range of engineering disciplines applicable to major railway developments or discrete projects alike:

- Strategic planning for assurance
- Optimal safety management and assessment
- EMC management and control plans
- RAM analysis
- Power systems engineering and analysis
- Forensic engineering.



**Strategic Planning for Assurance**

At ERA we believe that assurance strategies add value when they are agreed at the earliest stage of a project and when they encompass all relevant disciplines combined to plan how assurance will be managed and which tasks will be undertaken throughout the life of the project.

Our multidisciplinary strategic assurance plans are structured to provide optimal assurance management that is sympathetic and realistic to the project's goals and avoids repetition of activities and duplication of information.

**Safety Engineering and Assessment**

Within the rail sector, the main aim of most improvement programmes is to provide a more efficient transport service. Safety is always paramount and therefore, any changes in risk (such as increased line speeds or traffic density) are always carefully assessed to ensure the safety of the rail infrastructure is maintained.

ERA offers a renowned safety consultancy team with over 20 years of safety engineering experience, working with main line and underground infrastructure controllers and railway equipment suppliers. Our extensive

safety engineering experience spans across each phase of the safety lifecycle, from planning through to approval and operation. ERA has provided safety services to a wide range of railway projects, including: Independent Safety Assessment (ISA) for Train Protection and Warning System (TPWS), safety case preparation for the Piccadilly Line Extension, derivation of Safety Integrity Level (SILs) and demonstration of achievement of SIL allocation, and development and management of hazard logs.

In addition, ERA has specific experience of the preparation and submission of Safety Cases for equipment developed to non-UK specific standards but required to be used in a UK railway operational environment.



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## Software Assurance

Railway systems are increasingly dependent on the development of software and this is often the area that causes most delays. Unstable customer requirements, inexperienced development teams, unrealistic timescales and under resourcing are common problems encountered. ERA's software assurance services provide our clients with confidence that their supplier's software will implement the correct functionality and performance requirements, conform to the appropriate quality and safety standards and be delivered on schedule. Areas of risk can be highlighted early to enable appropriate corrective action to be taken.



ERA's experienced software assessors concentrate on areas of quality, scope and progress during a series of audits, reviews and analyses throughout the project lifecycle. This involves reviewing a combination of process, product and schedule issues. All these areas impact on each other and it is therefore more cost effective to review them together as part of a single assessment.

## EMC Assurance

The railway electromagnetic environment is particularly demanding in terms of the close proximity of sources of disturbance to potentially sensitive electronic systems,



some having a safety-critical function.

To ensure safe and reliable operation of the railway, knowledge, assessment and mitigation of these risks is essential.

Under the EMC Directive 2004/108/EEC, and UK Statutory Instrument 3418, it is the responsibility of the "manufacturer" of an installation to demonstrate compliance with its requirements through performance and documentation of the necessary assessments. Manufacture has both a design and construction element and it is essential that good practices be documented to successfully present a defence of due diligence for both these phases.

London Underground and Network Rail also have mandatory EMC standards to help protect operation and resilience of their systems which must also be met for equipment, systems and installations.

ERA has extensive experience of EMC in the rail environment and provides a range of services to assess and manage the EMC aspects of infrastructure developments and the introduction of new technologies and systems in the rail industry.

ERA is a UK Government BIS appointed Notified Body for EMC.

## Power System Engineering

It is essential for the operation of modern industry that electrical power can be generated, distributed and utilised safely, reliably and efficiently. In the railway sector, the problems of distribution are particularly acute because the load distribution is continually changing and the loads imposed by traction equipment are non-linear. Additionally, the travelling public must be protected against the potential dangers resulting from the traction current distribution system.

The power distribution system for a railway needs to be extremely flexible. Whilst safety is paramount at all times, it must be possible to control the isolation and connection of sections of track to respond to changing conditions and emergencies.

ERA's power system engineering services specialise in the following areas:

- Analysis of power system performance using advanced modelling software
- Earthing system design and analysis
- Power quality
- High integrity power supply design and performance
- Circuit protection
- Performance monitoring
- Lightning protection consultancy.

## Services

Safety Management Systems	Provides confidence that clients and their suppliers have adequate safety management processes in place, that staff are appropriately trained in these processes and that they are being effectively followed
Independent Safety Assessment	Provides an unbiased and pragmatic assessment of the project's safety plan, safety assurance activities and robustness of the safety argument. Provides key evidence to support an argument that a product or system is safe for its intended use
Safety Engineering	Ensures that a system is safe, reliable and compatible within its environment by developing an appropriate safety plan, applying techniques for hazard and risk identification, Safety Integrity Level (SIL) assessments and management of risks to ALARP, and finally produces an efficient Safety Case as evidence
Software Assurance	Provides assurance that our client's supplier's software will implement the correct functionality and performance requirements, will conform to appropriate quality and safety standards, and will be delivered on time
RAM Planning and Analysis	Sets appropriate RAM plans and targets for a project to help ensure efficient RAM activities are undertaken. Provides analysis of the RAM constituent elements including Reliability Block Diagrams (RBD), Fault Tree Analysis (FTA), Failure Mode Effect Analysis (FMEA), and provides reliability growth techniques
Electromagnetic Impact Assessments	Supports the Planning Approval stage for new installations to determine impact of the development on existing infrastructure
EMC Management Plans	Sets an efficient, practical strategy and agrees responsibilities for all stakeholders
EMC Control Plans	Provides design analysis and guidance on EMC good practice, early recommendations to avoid issues later on in the process, performs required risk assessment studies (including touch potential, psophometric noise etc.), identifies risk to both existing and new systems, procurement requirements and vendor assessments, determines cost-effective mitigation as required
EMC Measurement Surveys	Measurements of the existing environment to determine ambient threat. Measurements post-construction to prove the environment hasn't been increased due to the works
EMC Modelling	Modelling of electrical infrastructure to identify early solutions to predicted risk areas
EMC Assurance Evidence Files	Technical documentation to present evidence of EMC compliance for the development
Radiation Hazards	Measurements and assessments to identify risk of human exposure to EMFs (electromagnetic fields)
Peer Reviews and Notified Body Support	Provides confidence in 3rd party proposed designs, solutions and reports. Notified Body assessments of technical documents
Radiocommunications	Coverage and radio-interference assessments

## ERA Technology Ltd

Since its foundation in 1920, ERA has evolved from its roots as a research association to become a centre of excellence in engineering technology with a strong brand and reputation, sitting at the forefront of specialist asset integrity service provision.

ERA is committed to delivering professional services to our customers across all business sectors, assisting them in reducing technical and commercial risk, improving the operational performance of their assets and developing and enhancing the competitiveness of their products and systems.

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