

Welcome to the **AEGIS** SPRING NEWSLETTER



The image above hangs on the wall between the bedrooms of my 9-year-old twins. It is a sentiment that has always resonated with me and one that I hope my children will embrace throughout their lives.

In 2019, AEGIS won the RIA Growth in Rail award for SMEs in recognition of our tenfold growth in 7 years. Throughout that growth we had focused on creating a working environment that prioritised work/life balance whilst continuing to deliver the best possible services to our clients. Following the award, we set about defining the targets for what we called "Chapter 2" in the AEGIS story.

Whilst our future plans were to supercharge our growth mindset, they were closely aligned with the clear objective of maintaining the culture we had established which was deeply rooted in our core values of We Care, Respect, Excellence, Passionate and Do the Right Thing. We had just formulated our 3-5 year business plan when we were approached by the IKOS Group. It soon became clear that IKOS shared our growth mindset having grown from a start-up to 1000 employees in 10 countries in just 15 years. The stars aligned further when we discussed their core values which turned out to be Team Spirit, Respect, Excellence and Passion.

On 2nd March this year AEGIS became part of the IKOS Group.

The AEGIS/IKOS partnership offers exciting new career opportunities for our teams; opens up international markets and provides us with strength in depth to deliver more services to our clients. IKOS work throughout the rail industry consulting on signalling & control systems, telecommunications, power and electrification, civil engineering and track as well as rolling stock. In particular IKOS has been providing industry leading ERTMS and ETCS on board and trackside system engineering services across Europe. We will look to leverage this knowledge and expertise to strengthen our current offerings. In fact, in such a short time, our clients are already seeing the benefits of the IKOS resource pool.

So, in this quarter's newsletter we thank our great teams for making AEGIS the great company it is, we welcome our new colleagues from IKOS and we reach out to our clients and ask them to dare to Dream Big with us.

Mark McCool

Projects

AEGIS Certification Services has been appointed by Mors Smitt as Notified Body (NoBo) and Designated Body (DeBo) across a range of project applications.

The Mors Smitt TPWS system consists of a TPWS control unit, AWS receiver and TPWS antenna as its core with configurable options for the in-cab display and sound unit, depending on the rolling stock requirements. The system can also be configured to work in standalone mode or be integrated with an ETCS onboard control system which interfaces via a Specific Transmission Module (STM). Each configuration will comply with the latest TPWS Railway Group and Industry Standards.

We have developed an in depth understanding of the Mors Smitt TPWS system through a range of projects. This expertise has allowed us to interpret system changes effectively and efficiently when appointed as NoBo and DeBo to assess TPWS upgrades.

Our strong relationship with our client and system expertise aids in our information reviews and allows for production of Technical Files for Mors Smitt. We have produced both Type Examination and Quality Management System Approval Certificates which have enabled various evolutions of the TPWS system to be entered into service.

With AEGIS appointed as NoBo/DeBo, Mors Smitt's TPWS system has gained certification across a range of applications such as:

- Mersey Rail, East Anglia & FLIRT Train/Wales and Borders (Stadler Rail Group)
- Heathrow Express & Electrostar (Bombardier Transportation now Alstom).



Design of TPWS V4 Installation, OTDR and Roll Back Protection System and Removal of Automatic Train Protection

Our design team is working with Chiltern Railways to undertake the Installation Design for this range of train safety systems and producing Engineering Change documentation for the Chiltern Class 165, 168, 172 fleets and DVT Units. The Class 168/3 units are not included in the scope of work as these have previously been modified.

AEGIS will provide the installation designs for the upgrade of the Train Protection Warning System (TPWS) on all fleets to TPWS version 4 and to replace the On Train Data Recorder (OTDR) on all fleets with a TPWS v4 compatible device. In addition, we will provide the designs for the installation of rollback protection to the Class 168 and 165 fleets and create a removal procedure to de-commission the Automatic Train Protection (ATP), for use at a later date.

Chiltern's ATP was installed in the early 1990s and is a bespoke system with no commonality to other systems worldwide. In 2011, the manufacturer advised of the impending obsolescence of the equipment. Although there were spares available, this stock is now depleted to critical levels for onboard equipment and continued operation of the current level of ATP protection is becoming unsustainable.

Chiltern is working with Network Rail and industry stakeholders to undertake a controlled switch off of the ATP system along with an upgrade of the existing Train Protection and Warning System (TPWS) to Version 4 to its entire fleet. This is integrated with a separate project by Network Rail to install Enhanced TPWS on the infrastructure. The combined solution results in a net safety benefit across the Chiltern network. As part of the de-commissioning of the ATP and the upgrade of the TPWS, two other engineering changes are required at the same time. The existing OTDRs on each fleet need to be upgraded as the current devices are not compatible with TPWS v4. In addition, the ATP system that is being decommissioned includes rollback protection, so a stand-alone rollback system is to be installed to certain fleets.

The contract with AEGIS is broken down into two work packages. The first is for the Installation Design of TPWS V4, OTDR and Roll Back Protection System. The second will follow on from this at the end of the project and provide a Removal Procedure for ATP.

There will be extensive vehicle surveys on all fleets and design reviews at each stage of the project to ensure both Chiltern and AEGIS are happy with the design progress. As there will be changes to the cab desk layout, there will be involvement from the human factors team and Chiltern's driver representatives to ensure we provide the most efficient design for all stakeholders. Various disciplines within AEGIS will be utilised to ensure the design meets the client's requirements as well as the mandated industry standards.

AEGIS' highly experienced rolling stock design team will deliver this project. The team has extensive expertise in the mechanical and electrical installations of equipment onto rail vehicles through their experience gained from working for and with TOCs, ROSCOs and train manufacturers on new build and retrofit projects.

This project is expected to be completed in early 2022.



Class 230 D-Train Safety Approvals

Vivarail is the designer and manufacturer of the Class 230 trains. Its fleets are built with new modular power systems using the most modern, green technology. Vivarail has led the development of battery power in the UK and, with the help of AEGIS, now has the only battery and battery hybrid trains fully approved for passenger service.



The Class 230 has many variants including a DEMU, a Diesel-Battery Hybrid and a Battery Hybrid (that utilises lineside charging stations). Vivarail selected AEGIS to support the safety approvals of the Class 230 designs and their operation by Vivarail, all managed by following the requirements set out in the Common Safety Method.

Safety and Approvals Strategy

AEGIS prepared the Safety and Approvals Strategy document at the outset of the project, setting out the process for gaining approval of the Class 230 designs and presented it to all stakeholders (including DfT, ORR, Network Rail and the identified Train Operating Company) for endorsement. The strategy detailed the DEMU base unit and set out the progressive development and integration of the battery module and charging unit. The intent of the strategy was to provide a flexible approach to the approvals such that the design and testing is as efficient as possible.

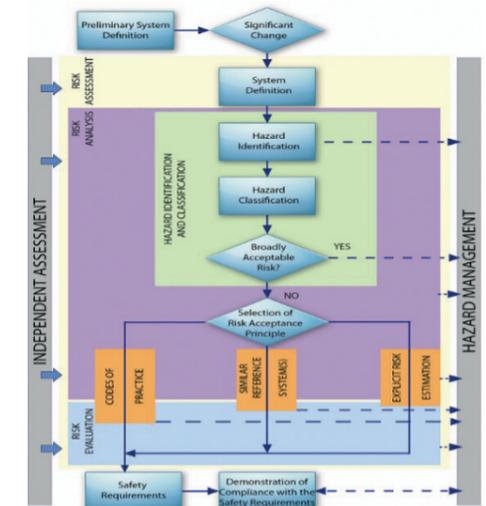
COMMON SAFETY METHOD – CSM-RA

A key requirement of CSM-RA is to produce and maintain a clear System Definition. AEGIS guided Vivarail through the process and assisted in defining the scope of the system, which due to the different design variants, had to be split according to design and operation as they may require different "actors" under CSM-RA.

Hazard Identification & Management

We managed a Hazard Identification workshop to permit all hazards associated with the design, installation, operation and maintenance of the Class 230 to be identified. Both generic and specific hazards were identified to cover all Class 230 design variants. We prepared a complete Hazard Record, including an initial estimation of the risk classification (frequency, severity) in accordance with an established CSM-RA approved risk classification matrix. We then summarised this process and its outcomes in a Preliminary Hazard Analysis (PHA) Report that advised the Project and its suppliers of the objective evidence required to close out the identified hazards.

Risk mitigation leading to hazard closure followed, applying the key Risk Acceptance Principles within CSM-RA.



EMC & EMF

AEGIS defined and managed all required activities for the Class 230 development, including:

- Producing all necessary EMC and EMF documentation Strategy
- Battery traction system design
- Creation of the EMC & EMF Requirements document
- Test specification and management
- Longitudinal voltage assessment

AEGIS also managed bespoke EMC testing to provide functional EMC assurance to Vivarail for its Diesel-Genset (DGS) apparatus, which helped mitigate a major risk to project progression. This was arranged at an Open Area Test Site (OATS) as the apparatus was too large for an anechoic chamber.

Forming Lasting Partnerships

The initial work with Vivarail has led to AEGIS supporting several further projects including:

- Route compatibility (EMC, EE&CS and non-EE&CS) of Class 230 Diesel-Battery Hybrid units for Wales & Borders transit and operational routes.
- EMC and safety approvals of Class 484 750VDC 3rd rail variant for the Isle of Wight, including the specification and management of all EMC testing.
- EMC and safety approvals of a 25kV EMU variant.

The AEGIS Difference

The AEGIS Safety and EMC teams offer an unparalleled combination of expertise in all areas of safety (for EMC, EE&CS and non-EE&CS) with the added ability to provide a full suite of EMC test services. This gives Vivarail the assurance that it is partnering with a company that has the knowhow and capability to take ownership of delivering its Safety, Approvals and EMC activities, from start to finish, with continuity and the same high quality of work throughout.

2nd March - The day **AEGIS** moved into the next chapter by joining the **IKOS Group**



IKOS Headquarters in Paris, France

Who are IKOS?

IKOS was founded in 2005, inspired by the vision of two engineers with a passion for the railways and their desire to create a new type of consultancy company. A pioneering company, in fifteen years IKOS has become a leader in the railway sector and a recognised player in the energy sector.

Today, IKOS is a specialised, innovative and international group, capable of supporting its clients in several countries on large-scale projects thanks to its 1,100 engineers across 20 offices in France, Spain, Belgium, Germany, Switzerland, the UK, Italy, Sweden, the USA and Canada.

1100 ENGINEERS
Working on the most technical and innovative railway projects

10 COUNTRIES
We have 20 offices around the world : France, Belgium, Spain, UK, USA, Germany, Switzerland, Sweden, Italy and Canada.

IKOS LAB, INNOVATION CENTER
Innovation is at the heart of our growth. IKOS Lab is responsible for R&D projects, Business intelligence, Knowledge Management and more...

ENERGY EXPERTISE
Because of its railway know-how, IKOS has been developing a complementary offer in the energy sector.

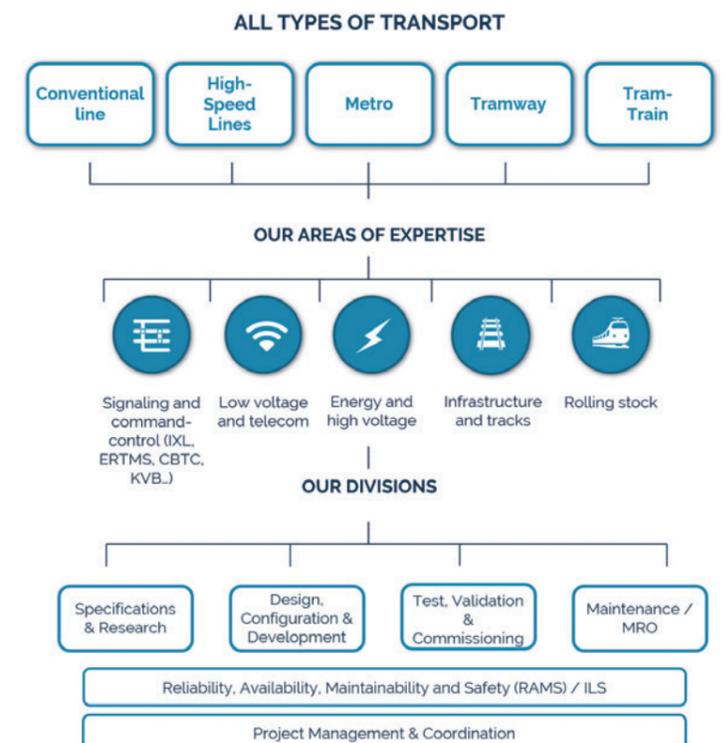
15 YEARS EXPERIENCE
IKOS was founded in 2005 to bring some technical expertise and support to major railway and energy projects worldwide. IKOS' leaders have a 20 years experience in railway.

SPECIALIZED IN RAILWAYS
We are able to operate in all fields of this industry. We have a twofold vision: to accelerate the performance and innovation of our client and the careers of our consultants.

Adding AEGIS to the Group is part of IKOS's desire to accelerate its growth, develop its international expansion and improve its offerings, while contributing to the major challenges of sustainable development in the world of transport. With a team of 100 engineers in the UK, IKOS is now a market leader in the UK.

Until now, the growth of IKOS has been entirely organic, enabling it to add the expertise of 1,000 engineers in 15 years, an unprecedented performance in the technology consulting sector, based on an organisation with solid foundations and flexible operations.

A real driver of performance and innovation for its clients, IKOS offers them innovative, unique and customised solutions, improves their competitiveness by intervening at the heart of their strategic projects, supports them throughout the entire life cycle of their projects and positions itself as a specialised and local player, thus offering a quality alternative in a market that is essentially composed of conventional businesses.



Katarzyna Stepniewska

Katarzyna Stepniewska has joined us as a Project Manager having previously worked as a Product Development Manager at Bombardier Transportation for 12 months. She has a strong engineering background with experience in the aerospace industry as a stress engineer at GE Aviation. Kasia joins us to strengthen our project management capability.



Martin Elliott

Martin Elliott who joined AEGIS in 2020 as Principal Engineer has been appointed AEGIS Certification Services' Chief Operating Officer following an internal restructure.

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