



COMATEC®

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Strong signs of economic upturn prevail

There's good reason for optimism. The cyclic nature of both the Finnish and global economy seems to have diminished or even ended completely. Orders from our customer base have increased clearly and continuously since last autumn. Investments in Finland are no longer limited to building shopping centres and hospitals. The investments by technology industries in Äänekoski, Turku and Uusikaupunki have raised spirits and improved the employment rate. From our perspective, the export of machinery and equipment has taken a major step forward. The same trend can be observed in mechanical forestry and mining. Higher volumes of commercial vehicles, rolling stock and ships are being manufactured. We also reached a record high in the export of power plant engineering. Of production resources, oil has retained a steady and predictable price at a moderate level. The price of money has also remained reasonable for a long period of time.

Our operating environment is currently showing many positive developments. This has resulted in increased demand for engineering in every one of the industries that we serve. Business cycles have clearly lost their power, which has also had some positive impact on our profitability. Increased demand brings with it the need to invest in recruitment in Finland and in our international operations. In the final part of 2016, we acquired some new companies that are currently being integrated into the Comatec Group. We now have a hundred employees in our offices around the Baltic Sea, excluding Finland. As our business volumes grow, we will invest in reorganisation of our business operations. Our administration system will be revamped within the next two years to better meet the needs of future expansion. Development of project operations, advanced technological competencies and the automation business take the lead in our investments. We take pride in being able to produce even

better value to our customers.

This autumn, collective agreement negotiations that will differ from what has been seen in recent years launch the post-Competitiveness Pact era. I regret to note that the Competitiveness Pact negotiations brought practically no new opportunities for local bargaining. Trade union activities have calmed down compared to recent years. Some minor demonstrations have taken place, but they have not been targeted at collective bargaining agreements. Perhaps labour organisations have learned from the past finance crises. The unemployment rate remains very high in Finland. Past crises have led to a labour market challenge that is difficult or even impossible to solve: the vacant positions and available labour are incompatible. In our field of operations, advanced competencies are increasingly important, and demands for new education capacity have been voiced.

In 2018, government actions will bring no major changes to our operating environment. Taxation will remain more or less the same in all respects. I had hoped to see lower tax rates for employees. The impact on purchasing power would have been much stronger than what can be achieved through pay rises. Regarding trade union activities, next year will be quite peaceful and predictable. The economy only shows rather faint signs of growth so far, and disturbing that growth is not good for any labour market party. However, 2019 will be a different matter altogether. It will be the year of several public elections, including the parliamentary election. They have always inspired more activity in many operators within the society.



A handwritten signature in blue ink, appearing to read 'Aulis Asikainen'.

***Aulis Asikainen
President and CEO
Comatec Group***

Publisher

Comatec Group
Kalevantie 7 C
FI-33100 Tampere
tel. +358 29 000 2000
www.comatec.fi

Editing and implementation

Comatec Group
Taina Syrjänen
tel. +358 40 5931 259
taina.syrjanen@comatec.fi

Feedback, subscriptions, cancellations

Taina Syrjänen
tel. +358 40 5931 259
taina.syrjanen@comatec.fi



Merger of Cading Oy with Insinöörtoimisto Comatec Oy

Cading Oy has been merged with the Group's parent company Insinöörtoimisto Comatec Oy as planned on 31 August 2017.

The business operations of Cading Oy will continue after this date as part of the operations of the parent company, and as from this date the parent company will assume all the liabilities and obligations of Cading Oy. Your account managers and other contact personnel remain unchanged.

The format for individual email addresses is firstname.lastname@comatec.fi

More detailed contact information is available on our website at <https://www.comatec.fi/en/contacts/>



Name of Comatec Group's Polish subsidiary changes

The new name of Cading Polska Sp. z o.o, a Comatec Group company operating in the Mobile Machinery and Commercial Vehicles field, was registered in the Polish trade register in May 2017. The new name of the company is Comatec Poland Sp. z o.o.

Comatec's Polish website was published at the same time. It is available at www.comatecgroup.pl or directly at www.comatec.fi/pl. Correspondingly, the new email format of employees of the Polish company is firstname.surname@comatecgroup.pl.

*This change has no impact on customer relationships or the personnel. The same contact people will continue to serve our customers in Poland, and **Elżbieta Helminen** will continue as the Managing Director of Comatec Poland.*

New talent in Comatec Group

The following competent professionals have joined the Comatec Group:

Mobile Machinery and Commercial Vehicles

Teemu Merranti has started as a Special Design Engineer, **Jarno Suurjärvi** as a Design Engineer and **Jaakko Sairanen** as a Junior Design Engineer; all three joined the Mechanical Engineering unit. **Jyri Lepistö** has started as Senior Design Engineer in the Electricity and Automation unit. **Päivi Laine** has started as Documentation Specialist in the Rolling Stock unit. **Visa Toppinen** has started as Testing Engineer in the Expert Services unit.

Material Handling Solutions

Timo Viljanen has started as Business Unit Manager in the

Bulk Material Handling unit in Oucons Oy's Pori office.

Industrial Production Systems

Henri Hänninen has started as Senior Design Engineer in the Processing Machinery and Plant Engineering unit. **Antti Häkämies** has started as Junior Design Engineer and **Tuomas Seppänen** as Junior Design Engineer, Testing, in the Electromechanical Systems and Components unit.

Boilers and Power Plants

Jari Silvennoinen has started as Chief Design Engineer, EIC, in the Process Engineering unit.

Comatec Group customer satisfaction survey 2017

Customer satisfaction is the most valuable of Comatec's five values. In early summer 2017, we conducted a customer satisfaction survey in which telephone interviews helped us to identify our customers' experiences of Comatec's operations and services. We would like to thank all of our customers who responded to the survey. You gave us valuable feedback, which we will use to develop our operations further. We have planned individual steps with each respondent to develop our customer relationship and service.

Our customers value the ability of our contact people to identify the needs of every customer company and to assign suitable designers to each assignment. Customers expect our contact people to present more ideas and perspectives of future methods and tools. When it comes to service production, customers appreciate Comatec's focus on solutions and its ability to stick to the schedule and achieve common goals. Customers expect Comatec to utilise virtual solutions and expert designers more in the future.

Every customer we spoke to said they would recommend Comatec to others as a good service producer and design partner. Customers' challenges in most fields are associated with the expertise required to utilise automation and robotics, growth and shorter delivery times, cost pressure, the availability of design resources, digitalisation and an increase in the degree of automation. We will invest even more in these areas in the future.

We want to continue our diverse, open and practical cooperation with our customers also in the future. We wish you all a nice autumn full of work and success!

Comatec Group to open new office in Pori

Comatec Group will expand its operations in western Finland, opening a new office for the subsidiary Oucons Oy in the coastal city of Pori. Other Oucons offices are located in Oulu and Kankaanpää.

The region of Pori and Rauma holds great potential for the Comatec Group and shows positive development. The region also has a long tradition of mechanical engineering industry, and much related competence. The Pori office will open in the Puuvilla Shopping Centre, and its address will be Pohjoisranta 11. The owner of the premises will convert a historic thread spinning mill into modern and functional office facilities to suit our needs. Recruitment will begin in the autumn, once the new office has been opened. **Timo Viljanen** has been appointed the head and Business Unit Manager of the new office starting from 7 August 2017.

Oucons Oy operates within the Material Handling Solutions sector of Comatec Group. The Pori and Kankaanpää offices also serve Comatec Group's other sectors. With the new office, we will be able to offer an increased service range for the technology industries of the Pori and Rauma region not only in the area of material handling systems, but also in automation, mechanical engineering and plant design. Expansion to Pori is part of Comatec Group's strong growth strategy.

Comatec Group is a growing provider of mechanical, electrical and automation engineering as well as consulting and project management services. We have approximately 500 employees in 20 locations in Finland, Estonia, Poland, Sweden and India.



Comatec-uutiset



Comatec Group at Nor-Shipping trade fair

Comatec Group presented its marine electrical and automation engineering expertise at the international Nor-Shipping 2017 trade fair held in Lillestrøm, near Oslo, between 30 May and 2 June. The event has been an established part of the industry for 50 years. Our stand was in Finland Pavilion together with other Finnish companies.

Nor-Shipping is full of action, and it attracts major marine operators from 80 countries all around the world – a total of 30,000 exhibitors and visitors. The presence of leading operators of the marine industry makes Nor-Shipping a valued networking venue. This year's event was the most extensive so far, with exhibitors from 48 countries. As a new feature, the fair had a section for start-ups where projects such as the Hyperloop and clean energy production methods were introduced. At the fair, Arctech Helsinki Shipyard Oy published its letter of intent on building an EcoShip cruise ship (60,000 GT, 2,000 passengers and 750 cabins, hand-over in spring 2020) for the Peace Boat organisation.

The matchmaking event that offered the opportunity to meet many potential customers in rapid succession was a particularly valuable part of the fair for Comatec. Discussions on future projects have continued after the fair with several companies.

Overall, the position of the international marine industry is very interesting. Cruise ship builders have enjoyed order books reaching as far as 2024 or even 2026. The cruise ship market has now room for new operators. In many countries, the opportunity is now being taken by shipyards with no previous experience of building cruise ships. On the other hand, the current price level of raw oil has left plenty of oil and gas industry support vessels with nothing to do in countries such as Norway. As a result, Norwegian shipyards have looked for orders in other sectors, including the fishing industry. The construction of cruise ships and other passenger vessels has also increased in Norway.

Comatec at the FTRFORUM event

Major changes in industry and the information surrounding it

Comatec Group participated in the FTRForum event held in Lappeenranta on 16–17 May 2017. The event focused on the latest developments in industries and technologies. Important themes included IoT and industrial Big Data, the circular economy, digitalisation of the forest industry, technology exports, and technologies and megatrends of the future. Speakers at the forum emphasised the fact that industries and information around it is changing at a rapid pace. The atmosphere was good at the Forum, with people getting to know each other and networking.

*“We heard many interesting perspectives into circular economy and maintenance operations of the future. The rapid expansion of IoT and virtual realities in the industry and engineering is particularly worth noting. Virtual reality (VR) offers great opportunities for informative presentation. It is obvious that these two areas, IoT and VR, are the two things that will be heavily invested in”, said Engineering Manager **Harri Haavisto**, describing the proceedings at the Forum.*





Comatec participated in the Advanced Engineering event

The Advanced Engineering event was held at the Messukeskus Helsinki expo and convention centre on 29–30 March 2017. The event gathered together many solutions of the future from advanced materials, design and measurement tools and IoT solutions to robotics and automation, and painted a picture of tomorrow's opportunities across the whole supply chain and many different business sectors.

At the event, Comatec presented the expertise of Microteam Oy, a new member in the Group. Microteam designs and builds embedded systems, machine automation and rolling stock, and masters the entire chain from genuine real-time solutions to broad-scale networked systems.

*Microteam has long-standing experience in bringing smartness to customers' systems, such as the IoT, electric drives for vehicles, and other demanding industrial electronics and automation. In his presentation, Sales Manager **Janne Virta** of Microteam explained the Lucid concept developed by Microteam to give a new direction to vehicle automation.*

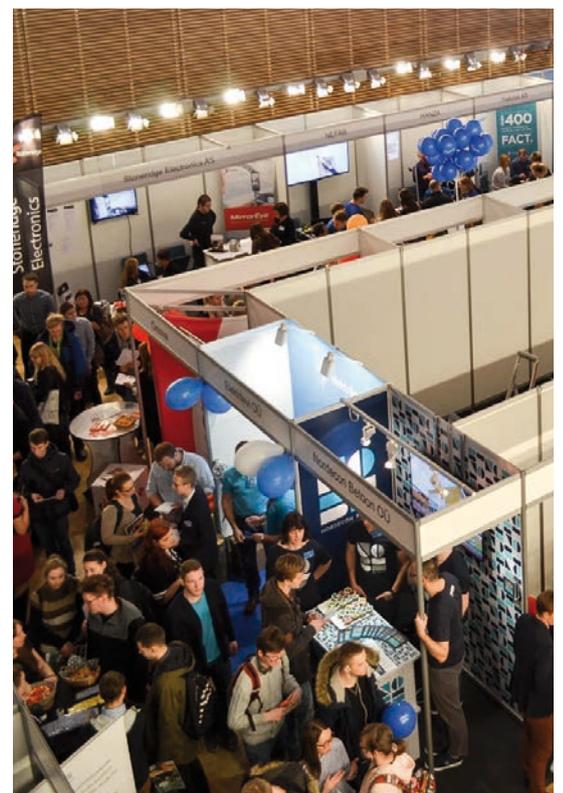
Greetings from the Key to the Future recruitment event in Tallinn

Tallinn's largest recruitment event Key to the Future, now organised for the 27th time, gathered a crowd of career-oriented students at the University of Technology and the student house.

The theme of this year's event was Career. The theme was discussed by numerous speakers, and representatives of both start-ups and nearly 70 established companies told the audience about their recruitment focus and the career opportunities that they offer.

*"This was the third time that Comatec Estonia presented its operations at the event. It was a great opportunity for us to meet potential new employees and to network with other operators in the field. The students who visited our stand were very interested in Comatec's operations and possible internships. Our plans for more extensive international operations also raised interest among the students. We noted that this year's event had attracted plenty of foreign students", says **Esko Aura** of Comatec Estonia.*

*"In Estonia, and I'm sure in Finland as well, graduates usually want to get a job at a well-known company. Every year, the recruitment event gives us new motivation to further develop our recruitment operations and employee image", says **Tõnis Tiedemann**, who was another representative of Comatec at the event.*



Comatec Poland builds operations under Elżbieta Helminen

When Comatec Group acquired the companies of Cadring Group at the beginning of December 2016, the package included Cadring Polska Sp. z o.o, which has operated in Poland since 2009. In May 2017, the company was renamed Comatec Poland Sp. z o.o. It belongs to the Mobile Machinery and Commercial Vehicles business line of Comatec Group.

TEXT: TAINA SYRJÄNEN

Elżbieta Helminen was one of the founding partners of Cadring Polska, and now continues the work as the managing director of Comatec Poland.

“I have held the position of a managing director in Comatec Poland since the company joined Comatec Group. In this role, I develop the company in the desired direction”, Elżbieta says.

The birth of Comatec Poland

“I graduated from the Wrocław University of Science and Technology, the Faculty of Mechanical Engineering. I aimed for a career in vehicle design. I have gained insight into the structure and construction of vehicles as well as production methods and technology by working with engineering, product development and customer applications of a bus manufacturer in Poland and in Finland”, says Elżbieta.

“Working in both countries has taught me the importance of respecting cultural differences and appreciating what’s best in each country.”

“Together with the owners of a Finnish engineering company, we recognised the opportunity of offering in Poland the services that we were already providing in Finland at the time.”

“We established Cadring Poland and for the next eight years, we built a successful engineering agency with nearly 90 employees and a strong market position”, Elżbieta says.

“We knew that failure was not an option. It was not an easy start, but we proved our expertise and value and gained the trust of our first customers. I am proud to say that all the customers involved in the first shared project have continued with us; we have maintained the same good level of services all these years.”



Managing Director Elżbieta Helminen, Comatec Poland Sp. z o.o

“Years of hard work eventually led to a partnership with Comatec Group.”

Customers and employees as guiding values

“We wanted to create a profitable company based on the values we believed in”, Elżbieta says.

“We always place the customer’s needs first. We are open in all our operations and value employees as our biggest asset. This is the foundation on which we build a team of competent and committed engineers who are passionate about their work.”

“We have done our best to create a working environment to match our message and values. We were lucky to find professionals who have met our expectations and wishes right from the start. The same people still play a key role in the development of our operations, and they have maintained their passion and hunger for success unchanged”, Elżbieta says.

“A strong team of experts ensures reliable customer solutions and high added value from the services that we provide. We want to be sure that we are a reliable business partner for our customers. We believe that expertise is key to launching cooperation, but trust is what defines the relationship over the long term.”

Wrocław ja Gdansk

“At the moment, our Polish operations are based in Wrocław and Gdansk”, Elżbieta says.

“Wrocław was the obvious choice for a location when we founded the company. It is the capital of Lower Silesia province. The region is known as one of Poland’s foremost industrial areas that is a major target of interest for international investors. Lower Silesia has plenty of advanced electro-mechanical industry with familiar international operators such as Autoliv, Bosch, Faurecia, Toyota, Volvo, Wabco, Bombardier Transportation, Whirlpool and many others. Wrocław also has the University of Science and Technology, one of the best in Poland. The university produces competent engineers for many specialised industries.”

“When looking into a location for a second office, we chose Gdansk for its logistic advantages and high potential. The factors that spoke for Gdansk were its coastal location, the dynamic development of the region’s industry, good availability of qualified engineers and the strategically favourable location with respect to Wrocław and Finland.”

Our customers and services

“Our customers mostly include major manufacturers who have their own large or small engineering departments. Our customers’ industries may be facing various challenges, they may not have enough competent resources or the workload could have suddenly increased, requiring additional resources. Comatec Poland offers its customers various solutions that can be flexibly adjusted to their needs”, Elżbieta explains.

“Our experienced specialist teams from different industries can help in projects from concept development and 3D and 2D documentation to product development and after-

sales support. The customer will be able to define tasks, hand over the responsibility and focus on other projects. If the customer does not wish to outsource the project, we can provide an expert to join the customer’s team and offer the exact support that they need the most. This kind of solution is very flexible, allows easy communications and is directly connected to the customer’s production operations.”

“Our strategy has included the creation of cross-industry teams. This ensures that our customers can rely on receiving a full range of engineering services. Our teams operate in mechanical, electrical and automation engineering, and in plant and process engineering.”

Commercial vehicles

“Comatec Poland focuses on commercial vehicles, which currently bring in more than half of our turnover. More than half of our team also works with commercial vehicles in one way or another. We have proven our expertise in chassis and frame design in countless projects. We have been involved in all technical tasks from preliminary surveys to the after-sales market, the development of new products, cost management and reducing the vehicle’s weight in both mechanical and electrical parts and systems”, Elżbieta says.

“Environmental considerations are a strong driver behind the further development of electric vehicles. Global manufacturers aim to respond to market demands by developing new products. Our experience and expertise in the design of electrical systems for vehicles seems to be particularly valuable because the field is relatively new and expertise rare.”

“Since our expertise is primarily targeted at commercial vehicles, we strongly invest in building professional competencies in this area. We aim to offer our designers challenging projects and to make sure that they remain up to date

in the development, innovations, technological development, legal requirements and design trends of vehicle manufacture.”

Production technology and heavy industry

“Another one of our areas of expertise is industrial engineering and the heavy industry. They account for nearly as large a proportion as vehicles.”

“Production technology and heavy industry are a strongly growing section for us, because the need for tools keeps growing. Improving production efficiency and profitability is of key importance. Our projects include minor manual tools for simple systems, but also specialised welding equipment for various industries. We provide comprehensive and specialised service of high quality. Our engineers build our customers customised solutions that meet their needs. The production technology department also provides expertise for special fields such as paper machines, conveyors and food industry machinery,” Elżbieta says.

Offshore and marine industries

“We launched the development of offshore and marine strategies after we made the decision on opening an office in Gdansk. This is our third major area of operations. In recent years, the company has been strongly involved in projects related to the design, stability, strength calculations and modelling. Even though we have no short-term plans for building entire units, current projects and future prospects hold enough promise to justify the further development of our offshore and marine business.”

Commercial vehicles

– innovation and best practices

The development projects in the commercial vehicles sector are becoming more versatile, and an increasing number of them are carried out with an experienced partner. Comatec Group holds top expertise in the technical design of commercial vehicles. Innovation is also required in the commercial vehicle sector. Our design work is characterised by the will to seek new solutions. We have taken part in many demanding commercial vehicle projects, giving us a full understanding of product development and design processes in this field.

TEXT: TAINA SYRJÄNEN

In addition to technical expertise, project management and risk assessment, Comatec Group focuses on communication and trust. Trust helps us to maintain open communications and to enjoy what we do.

We allocate sufficient resources to engineering, testing and piloting in order to minimise the risks associated with the commercial success, design, usability and safety of the products. We believe it is important to take into account the entire lifecycle of the product or service throughout the project.

Competitive advantage from differentiation

We are experts in commercial vehicles. They have very high requirements concerning safety and comfort. When it comes to vehicles such as buses, trains and trams, the comfort of passengers and a clean environment are of primary importance.

The external parts and design of a vehicle make every product unique and also shape the manufacturer's business image. Good air quality essentially improves the comfort of users and passengers. The HVAC systems that we have designed for commercial vehicles, such as the Volvo air conditioning system, clearly belong to the most advanced in any buses.

The increased wishes of end users are conveyed to the desks of our designers. This can especially be seen in interior design where identifying design and usability trends now plays a significant part. We take both comfort and ergonomics into account in all our design work.

The design of commercial vehicles, just as all engineering, is subject to

requirements set out in laws and regulations. For example the body of the vehicle must be designed to meet the requirements of various regulations.

Electrical design

The level of electrical design in commercial vehicles has increased steadily, and data bus technology and wireless data transfers have made the design process more demanding.

We provide consulting services, for example, for the application development of entire electrical systems and the management of product structures. Our services also extend to carrying out customer-specific product modifications, integrating products and designing after-sales services.

We prepare production documentation and, if required, take care of testing and official approvals. At the product deployment stage, our services include production guidance and monitoring.

In the electrical engineering of vehicles and mobile machinery, particular attention must be paid to manufacturability and the modular construction of the product and the production process. Environmental conditions and the electrical operating environment of the vehicle set many restrictions. Function-based approach to engineering also allows the development of modular software

Examples of our services related to commercial vehicles:

- **Interior design (body)**
 - Internal parts
 - External parts
- **Body in white (BIW)**
 - Roof structures
 - Body wall, front and rear structures
 - Profiles, steel and aluminium products
 - Joining the chassis and the body
- **Vehicle seats**
- **Electrical design**
- **Modularity and manufacturability**
- **Software design**
- **Heating, ventilation and air conditioning (HVAC) systems**
- **Management of legal requirements**
- **Electronics design**
- **Software design**
 - Device drivers
 - Bootloader
- **Graphical user interface (GUI) design**

function components and the management of software within the company's PDM and ERP systems.

Software development tools can be used to produce hardware-independent software components that do not need to be coded again when the ECU is replaced.

Electronics design

Reliability is key to the design of vehicle electronics. The equipment is often used in locations where safety is of critical importance. Design is guided by increasingly strict regulations and the high quality requirements of vehicle manufacturers. We design the electronics for motor controllers, power sources and control modules to meet the customer's needs.

Our key expertise areas in embedded systems include specifications, circuit and layout design, software and EMC testing. The factors to be considered in the design of systems and equipment include the electrical operating environment, official regulations, vibration, large temperature differences and variation, humidity and air quality.

Electric vehicles

Electric vehicles – EV, HEV and PHEV – are expected to have a major breakthrough in the next few years. Buses purchased for urban traffic are already predominantly hybrid vehicles, and fully electric buses are being tried out in many cities. Electrical drives are also being introduced in mobile machinery.

In addition to traditional low voltage systems, the high voltage systems to be adopted will create a new area of expertise. This means knowledge of generally used vehicle constructions, experience of electric vehicles and the knowledge of standards, regulations and test methods with regard to electric vehicles and electric mobile machinery. Electrical safety and EMC requirements related to high-voltage circuits, such as battery systems and chargers, the drive circuit and motor controller, must be known.

We have taken part in many demanding commercial vehicle projects, giving us a full understanding of product development and design processes in this field.



Electrical architecture of buses

We designed the electrical architecture for a new bus model, including chassis and infotainment systems. Design of a recording camera surveillance system for public transportation vehicles comprised an important part of the project.

Bus door automation

Design and construction of bus door automation in accordance with the latest version of the R107 standard. The system was built to be configured for pneumatic and electric doors, among others, in accordance with the customer's product strategy. Automation was configured following Nordic and Central and Southern European recommendations.

Vehicle HVAC design

Design of an automated heating and cooling system for the passenger area and driver cabin of a bus. The system included control circuits for radiator and ceiling heating, hot air blowers for doors, air conditioning for the passenger area and the driver's place, windshield defrosting and the heating and cooling of the driver's area.



Interior design for a new underground train

Design project comprising the entire interior of the train: ceilings and lighting, entrance area ceiling, railings and handles, wall panels with advertisement and route map sections, seat mountings, and end doors and walls.

The project required the management of multiple design areas, and included cost and schedule pressures; the stringent fire and safety requirements for subway trains also created challenges. Requirements were set by the interior manufacturer, industrial designers and the English train manufacturer. The project included several thousand documentation items: quality documents, installation instructions and user manuals, spare part information and drawings.



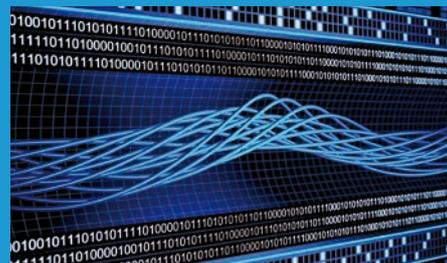
Modernisation of a series of railway carriages

Design of new, modern interior for railway carriages built in the 1970s. The work included the design of ceilings, lighting and the overhead storage racks. Challenges included integration in the legacy structures, the four different carriage types and the new fire standards and other standards and requirements. Comatec's representative acted as the main designer and managed contacts to the end customer. Comatec also prepared drawings, the installation instructions and the user manuals. The project was completed in one year.



Electric vehicle

The purpose of the project was to engineer a high-quality product. Comatec was involved in structural and accessory design for the vehicle body. We managed the design of the electrical system and producing the related specifications, and acted as technical support during production launch.



Software development and lifecycle management

Development of a software concept based on functional components. The concept allows hardware-independent management of software lifecycle from product development to the disposal of the vehicle. The concept uses a component-based approach that allows multiple products to be configured at once, with software management carried out in the company's PDM/PLM system. The concept also allows field management of campaigns targeted at specific operations.

Comatec Group:

FINLAND:

TAMPERE

Tel. +358 29 000 2000, Comatec Oy
Tel. +358 20 766 0700, Microteam Oy
Tel. +358 29 000 2090, Rantotek Oy

VANTAA

Tel. +358 29 000 2000

HYVINKÄÄ

Tel. +358 40 5563 299

IMATRA

Tel. +358 29 000 2070

JOENSUU

Tel. +358 29 000 2000

JYVÄSKYLÄ

Tel. +358 50 555 6688

JÄRVENPÄÄ

Tel. +358 44 775 4192

KANKAANPÄÄ

Tel. +358 2 5722 411

KOUVOLA

Tel. +358 20 765 9425

KUOPIO

Tel. +358 44 7414 440

LAHTI

Tel. +358 29 000 2000

LAPPEENRANTA

Tel. +358 29 000 2070

OULU

Tel. +358 400 542 547

PORI

Tel. +358 40 485 9140

TURKU

Tel. +358 29 000 2000

Tel. +358 20 762 2640

VARKAUS

Tel. +358 29 000 2090

OTHER COUNTRIES:

POLAND, WROCŁAW, GDANSK

Comatec Poland Sp. z o.o.
Tel. +48 71 342 16 07

SWEDEN, STOCKHOLM

Comatec Sweden AB
Tel. +358 50 52 63 731

ESTONIA, TALLINN

Comatec Estonia OÜ
Tel. +372 5685 0845

Detailed information:

www.comatec.fi/en/contacts/

Brain power for engineering

Comatec is at its best in mechanical, automation, and electrical engineering, as well as project management expertise.

- Mobile machinery
- Commercial vehicles
- Rolling stock
- Production technology
- Material handling
- Cranes and load handling
- Electromechanical systems and components
- Marine industry
- Process industry
- Processing Machinery and Plant Engineering
- Energy



2017
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SUBCONTRACTING FAIR - FINLAND



TEKNOLOGIA 17
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We participate
Alihankinta 2017
Subcontracting Trade Fair
26-28th September 2017

Welcome to visit
our stand E120!

We participate
Elkom Trade Fair
10-12th October 2017

Welcome to visit
our stand 7k128!

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