



Networked



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DEAR READERS,

Where would we be without networks? Without fast Internet access, without mobile networks, without our personal networks? Our world is not getting smaller, but it is getting more interconnected – making it all the more important that young people learn not to become entangled in the Net but to make use of it in their working and personal lives. This requires them to keep up with an ever increasing pace of innovation. In 2015, it is only 40 years since Bill Gates and Paul Allen founded their company Microsoft. Some 30 years ago, Lucas-Nülle brought out its computer trainer, winning the Worlddidac Award 1984. And it was just 15 years ago that we presented the first UniTrain system.

Educational institutions have a duty to convey innovations and provide equipment enabling trainees to get to know, understand and apply state-of-the-art technology. As a manufacturer, we are faced with the task of staying one step ahead of technical developments and updating our systems in good time. The time has therefore come for a new UniTrain system which makes multimedia learning the standard at universities and vocational schools. To this end, we have carried out a general update of UniTrain, transforming it into the key for networked learning. On page 6, you can read about the innovative features offered by the best ever version of our classic product. Networking and remote learning are just two of the topics that will gain in importance in the classroom of the future – whether it be at a vocational school, professional association or university.

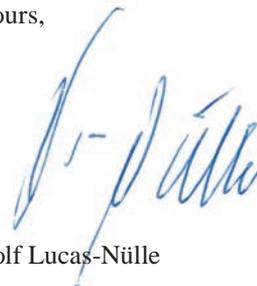
Our training systems are continuously being improved and upgraded in line with the latest technological developments, because we as a company are constantly developing as well. In recent years, we have established ourselves as a full-range supplier in every technical area of the secondary and tertiary education sectors. We are continuing to consolidate this position – including at the international level.



There have also been some changes where our product development is concerned: in addition to new fields such as metal technology, we have further developed the Industry 4.0 topic. The Internet of Things will continue to be an important issue for us in the future. Networking is playing an increasingly important role in all disciplines. For example, we are going to enhance our smart grid system with micro-grid modules – a topic that shows how networking can also boost self-sufficiency and is set to become an important factor for the supply of electricity at a local level. We are connected through a worldwide network, enabling us to identify such technology trends at an early stage and integrate them into teaching and training. Our new subsidiary in the USA and our (from now on) annual Training Manager Day are two building blocks in this development.

Watch this space!

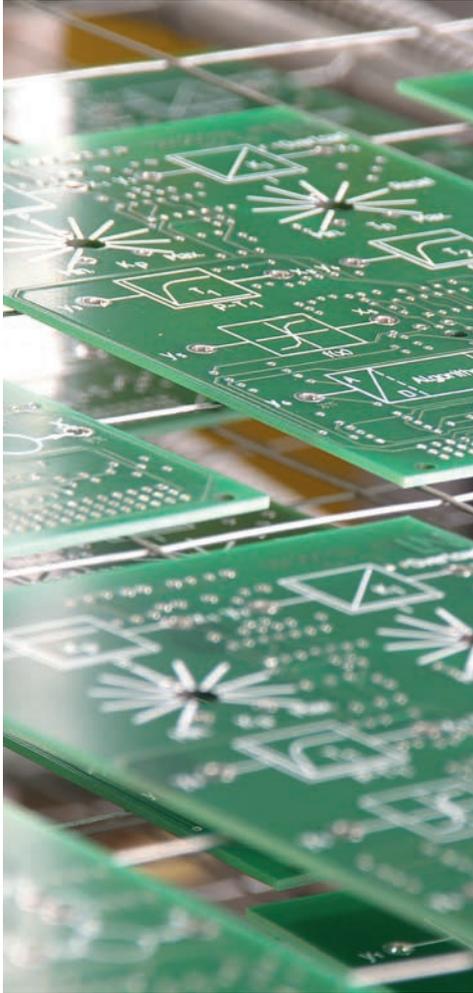
Yours,



Rolf Lucas-Nülle

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The national teams of Lucas-Nülle have a local presence internationally and always speak the customer's language.



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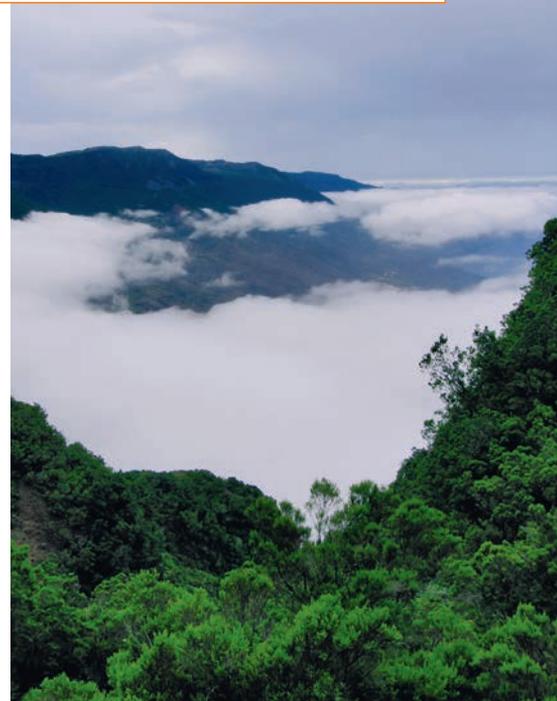
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Island grids make local communities independent of national grids. This is the case on El Hierro in the Canaries.



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In Lucas-Nülle, it found a partner who will help it become a competence centre for the entire region.



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The New UniTrain — The Next Generation of Multimedia Learning

2015 will see the market launch of the new UniTrain, Lucas-Nülle's best-known multimedia training system for technical training. The new version once again sets new standards for multimedia learning and teaching.



The new UniTrain system

Christoph Müssener, Managing Director at Lucas-Nülle, is proud: “The new UniTrain opens up completely new possibilities in the laboratory and in laboratory management. The system offers 6-channel high-tech measuring technology combined with WLAN. Measured data can be shared very easily in the classroom or all around the world. UniTrain thus constitutes a unique experimentation approach for learning management systems.”

Presenting the new UniTrain

The attractive, clear design of the new UniTrain system was developed by the famous designer Uwe Spannagel. The third generation of UniTrain features WLAN, enabling wireless communication with tab-

let PCs; the latest trend in the classroom and another step towards individualized learning and teaching with online elements. An app for Android and iOS systems will also be available soon, which can be used to control the interface.

In addition, the multimedia training system offers new functions and improvements for electronic training, which make day-to-day use of the system easier and open up new possibilities. These include additional measurement inputs, increased input and output bandwidth, elimination of the additional power supply, addition of the WLAN module, improved resistance to short-circuiting and the option of using safety connection cables.

“These new functions, which are becoming increasingly important in blended learning scenarios, make UniTrain an indispensable tool for multimedia-based instruction,” says a confident Jörg Sprengel, product manager for the UniTrain system.

UniTrain is now even more practically relevant and flexible: with the four additional measurement inputs – 2 of them for direct current measurement – it is now possible to use four voltage and two current measurement inputs at the same time. Thus the new interface, featuring new virtual instruments such as the 4-channel oscilloscope, is optimally equipped for everyday laboratory work. Another optimized feature is the increased bandwidth of the oscilloscope inputs.

Tried and tested products endure: UniTrain forms the basis for more than 130 learning programmes in all fields of technology. All existing courses and experiments can also be used with the new equipment.

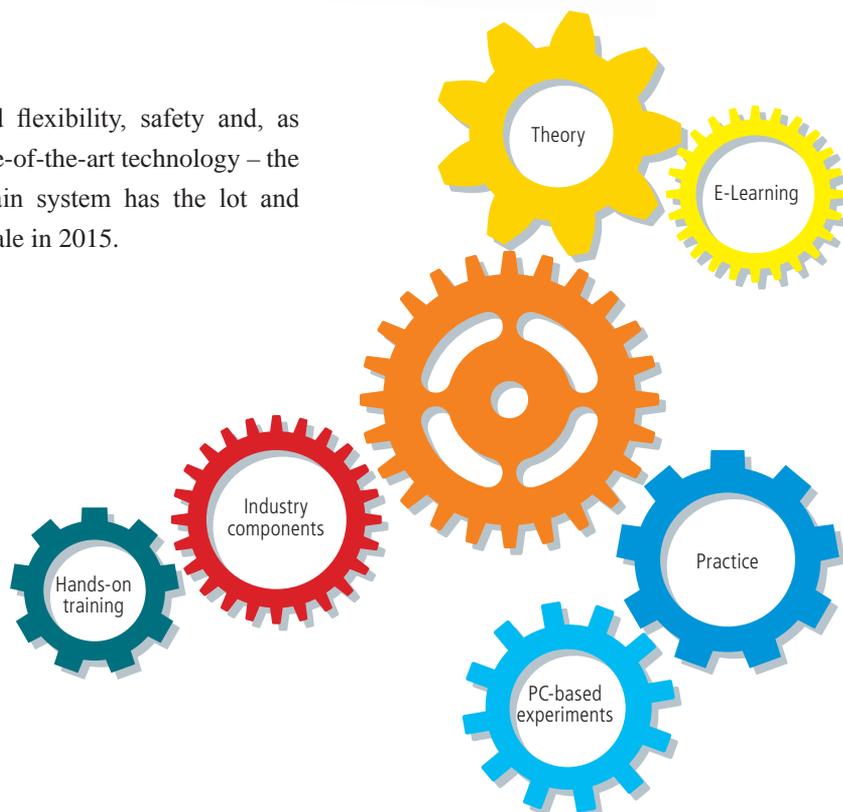


Moreover, it is, of course, possible to use any combination of old and new equipment.

Convenience, versatility and enjoyment of learning are the strengths of UniTrain. Thanks to the elimination of the second power supply and the new high-quality housing, the system can be made ready for use even more quickly. The new housing allows UniTrain to be placed in the table-top frames of the panel system for demonstration purposes in the twinkling of an eye.

“We have thus created a connection between UniTrain and our panel systems, making joint use and the learning step from one system to the other easier for students and teachers,” Müssener explains.

Enhanced flexibility, safety and, as always, state-of-the-art technology – the new UniTrain system has the lot and will go on sale in 2015.



+ NEW +++ NEW +++

The New UniTrain — Combination of Theory and Practice



EVEN QUICKER CONNECTION
NOW WITH JUST
ONE POWER SUPPLY.

EVEN SAFER THAN BEFORE:
THANKS TO IMPROVED RESISTANCE TO
SHORT-CIRCUITING AND THE DEVICE FOR
SAFETY CONNECTION CABLES.



THE MEASURED DATA CAN
BE SHARED - WITH THE CLASS
OR THE WHOLE WORLD.



THE NEW UNITRAIN IS
WLAN ENABLED.

THIS MEANS THAT IT CAN VERY EASILY
ESTABLISH A PRACTICAL, WIRELESS
CONNECTION WITH TABLET PCS.

AND THE BEST FEATURES REMAIN:
130 LEARNING PROGRAMMES FOR ALL
FIELDS ARE AVAILABLE FOR UNITRAIN.



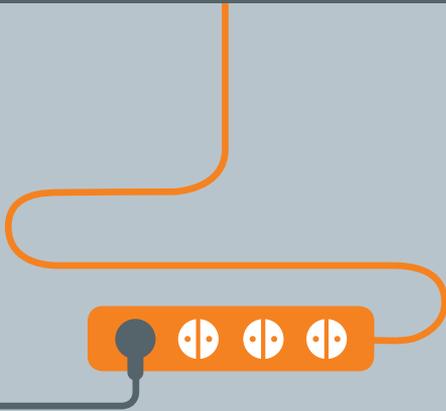
THIS IS IMPORTANT WHEN COMBINING
UNITRAIN WITH A
LEARNING MANAGEMENT SYSTEM.

130 LEARNING
PROGRAMMES



THE NEW UNITRAIN IS MOBILE -
ITS INTERFACE CAN BE REMOTELY
CONTROLLED WITH AN
APP FOR ANDROID AND IOS.

LEARNING
MANAGEMENT
SYSTEM



THE NEW UNITRAIN OFFERS MORE POSSIBILITIES:
IT HAS AN ADDITIONAL FOUR MEASUREMENT INPUTS, FOR
EXAMPLE FOR THE 4-CHANNEL OSCILLOSCOPE.



THE NEW UNITRAIN FITS
INTO THE TABLE-TOP FRAMES OF
THE LN PANEL SYSTEMS.



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Kontakt:
Dipl.-Ing. Andreas Eißner
Bereichsleiter bfe-media
Tel.: 0441 34092-166
E-Mail: a.eissner@BFE.de

LUCAS-NÜLLE CONCLUDES COOPERATION AGREEMENT WITH ERFURT CHAMBER OF TRADES

WORKING TOGETHER FOR VOCATIONAL EDUCATION AND TRAINING OPPORTUNITIES WORLDWIDE



Cooperation agreement signed: Christoph Müssener, Managing Director of Lucas-Nülle, and Thomas Malchereck, Chief Executive of HWK Erfurt.

Lucas-Nülle and HWK Erfurt (Chamber of Trades) have signed a declaration of intent with the aim of expanding vocational education and training opportunities worldwide.

Lucas-Nülle and HWK Erfurt are jointly planning to offer worldwide German-standard automotive and electrical engineering training opportunities leading to the journeyman's exam. The initiative also seeks to facilitate exam preparation for groups of trainees, with the option of doing so in Germany. The groups will be accommodated at the boarding school for trainees in Erfurt.

Trade Fairs – Meet Us Locally Worldwide

Each year we have a presence at the most important education and trade fairs worldwide. At these events, interested parties are given an overview of our systems and how they can be used. Our customers are shown our latest innovations and exciting projects. Besides the Didacta trade fair in Germany, as well as GESS and Worlddidac, we also have our own stand at technical trade fairs such as SPS/Drives, where we look forward to welcoming educational experts, teachers and students.

Find out more about current dates:
www.lucas-nuelle.com/2252/News/Dates-Fairs.html



Seminars – Update for Teachers and Lecturers

For new and experienced users of our training systems, we offer practice-oriented seminars throughout the year. These one- to two-day events focus on the use of our systems in the classroom. As well as providing training in terms of technical application, our product managers also convey new didactic approaches that are made possible with our equipment. In addition, we inform you about the latest technological developments in our special fields.

Find out about the seminars currently on offer and register online:
www.lucas-nuelle.de/2000/Seminare/Seminarkalender.html



LABORATORY SYSTEMS

NEW LAB BENCHES WITH SLIDING EXPERIMENT FRAMES

Laboratories designed for technology experiments can soon be enhanced by lab benches with sliding experiment frames from Lucas-Nülle. Now it is possible for trainees to slide the entire experiment frame towards themselves to insert the training panels into the frame without having to strain themselves. Once the experiment is set up, they can push the frame back into position and secure the quick-lock fasteners.

“This way experiments can be set up without any lifting stress on the student’s back,” explains Stefan Linden, Product Manager responsible for laboratory technology at Lucas-Nülle. “The workstation has become more flexible. And when the experiment is performed the trainee now has more space to deploy measurement instruments and to document findings.”

The high-quality bearings and steel rails ensure that the profile frames enjoy a long working life and are able to withstand high loads.



CEREMONIOUS PRESENTATION OF A DONATION

TO THE NON-PROFIT ORGANIZATION

DON BOSCO MONDO LUCAS-NÜLLE FOUNDATION PROMOTES THE EDUCATION AND TRAINING OF DISADVANTAGED YOUNG PEOPLE

The Lucas-Nülle Trust donates 30,000 euros to Don Bosco Mondo. In a ceremony celebrating the donation, Christian Oberhaus, Managing Director of Don Bosco Mondo, and Dr. Susanne Franke accepted the funds. The occasion has a spe-

cial, emotional significance for the Chairman of the fund, Rolf Lucas-Nülle: “With our donation we want children in the poorest regions of the world to have the opportunity to obtain job training that will provide them with a future.”

The Lucas-Nülle Foundation was established in 2011 by Rolf Lucas-Nülle. Its donations support the Don Bosco Mondo’s aim to fight poverty with education and training. Don Bosco Mondo as a non-profit organization promotes projects in Africa, Asia, Latin America and Eastern Europe. Children from the poorest families profit from this, as do homeless children, victims of child labour and child soldiers. The work of Don Bosco Mondo focuses on vocational training that appropriately fits the prevalent conditions.

The donation being ceremoniously handed over. From left to right: Wolfgang Pett (Managing Director of the Trust), Rolf Lucas-Nülle, Dr. Susanne Franke, Christian Oberhaus.



Out of the Ivory Tower — Into the Practice Lab



Successful colleges and universities emphasize practical experience and close partnership with industry

Technological and social changes are reflected in the demands put on and made by universities in relation to training equipment and educational methods. The introduction of bachelor's and master's degrees, the increasing differentiation of courses and the increased level of competition between universities for the best entrants, as well as the calls from industry for a greater emphasis on practical skills and knowledge, are presenting universities with significant challenges, and not just in Germany.

Baden-Wuerttemberg Cooperative State University (Duale Hochschule Baden-Württemberg/DHBW) has already come up with an outstanding solution. With state-of-the-art, practically relevant equipment, close cooperation with companies and a practical emphasis from the start, this institution not only manages to attract the best students each year, but also produces highly sought-after graduates. Not least because their dual courses of study ensure intensive contact with industry from an early stage. For 40 years (it was known as a vocational academy until 2009), the number of its industry partners has risen steadily to more than 10,000 companies while the number of students has increased to 37,000. As a result, DHBW has been the largest university in Baden-Württemberg for some years now. Universities like DHBW often convey course content in a more practically relevant way and with modern teaching techniques. In this way, they

also help students get through periods of low motivation or cope with difficult content. Because the most frequent reasons for dropping out of a course of study are difficulties with the demands of the course and lack of motivation, HIS discovered on behalf of the German Engineering Association (VDMA). With its "Maschinenhaus" ("Machine Room") initiative, the association is actively seeking to boost levels of success in engineering studies.

Setting new standards

This is an urgent requirement because, according to the Federal Statistical Office, 2013 saw the number of entrants to engineering courses fall to a record low. Some nine per cent fewer first-year students felt enthusiastic about studying a subject in this discipline. However, of those who choose engineering, certainly not all of them stick with their subject. According to a study carried out by university infor-

mation service HIS, some 48 per cent discontinue their studies. At the same time, there is a growing need for skilled and qualified employees in industry.

"The universities have identified their problem. However, it is not easy to bring courses into line with the new circumstances," says Robert Redling, Lucas-Nülle specialist for the university sector. He regularly talks to professors and scientific staff. "For many of them, the scope for action is limited".

Universities that offer dual courses of study in cooperation with their industry partners have the fewest problems attracting suitably qualified students. Pre-selection is carried out by the company that enters into a training contract with the students undertaking a dual course of studies.

Best practice for reducing dropout rates

The "Maschinenhaus" Toolbox for successful studies recently published by



VDMA provides support to both students and universities, for as the HIS study showed, there are problems on both sides. With check lists, tips and best practice examples, the Toolbox provides the tools for successful organization of study programmes and motivational teaching. These tools were developed on the basis of the HIS study on reasons for dropping out of courses, which showed that best practice is only possible where theory and practice are closely interlinked.

This approach is being pursued by DHBW with its programme and this idea also forms the basis of Lucas-Nülle's systems. The multimedia systems allow the students to set their own pace and review content when necessary. The animated experiments and practical examples enable each student to acquire knowledge independently.

"In this way, the students not only gain testable knowledge but real practical skills, which is essential, particularly for engineers. This then also increases enthusiasm for the subject," emphasizes Redling, an engineer himself.

The HIS study backs him up. If there is no sustained interest in the subject, it is obviously difficult to develop enough staying power for such a demanding course. At the same time, the universities do not seem to be having enough success stimulating lasting enthusiasm for the subject," the study states.

Driving force: heterogeneity

Many seminars are dominated by dry theory rather than exciting application examples. Often the idea behind overly theoretical sessions is that quality is compromised by too much practice and reduction. In many a place, the high dropout rate is even regarded as a sign of the high quality of education provided. VDMA experts see this attitude as part of the problem though. Industry agrees with them. For today's students are a much more heterogeneous group than their predecessors only

ten year ago. Today, the introductory sessions are attended by industry master tradesmen with general certificates of education, holders of a vocational baccalaureate who have completed technical training and school-leavers with university entry-level qualifications. It is necessary to make use of the different skills and abilities and to ensure that teaching takes them into account. Lifelong learning and varied educational backgrounds also open up new opportunities for a higher quality of teaching.

"Our systems also allow highly complex topics to be conveyed in a clear and vivid way. A good example is Rapid Prototyping with Matlab. Integrated into our courses, students can use it to quickly implement their own projects and produce results that have a very strong motivating effect," reports Redling. "It is particularly important for undergraduate students to have experiences of success."

Practical examples in the first semesters enhance the status of the bachelor's degree. Because industry is serious when it says that it welcomes holders of bachelor's degrees – though this is primarily addressed to graduates of practically oriented courses.

Download: VDMA toolbox

www.vdma.org/article/-/articleview/6175552





First Smart Grid Simulator in Africa

The rising economy has significantly increased the energy demand in Durban and the whole of South Africa. To facilitate further growth, the country needs new energy, including from alternative energy sources, and implementing this requires well-trained professionals. A partnership between ESKOM, the country's largest energy supplier, and the University of KwaZulu-Natal (UKZN), is intended to drive forward teaching and research in this area. A smart grid training centre, which Lucas-Nülle equipped with state-of-the-art systems, is key to this development.

On the occasion of ESKOM's 90th anniversary, Professor Nelson Ijumba, Deputy Minister of Public Enterprises Bulelani Magwanishe, Deputy Mayor of eThekweni Nomvuzo Tshabalala, and CEO of ESKOM Brian Dames, officially launched the groundbreaking new Smart Grid Training Centre. It is the third element of the Science and Technology Innovation Park.

Private Public Partnership for practically relevant research

In order to be able to use the new centre for both research and teaching, ESKOM and UKZN had been looking for a partner who was capable of equipping the Smart Grid Training Centre with realistic systems that can be used on a modular basis. In Lucas-Nülle they found a competitive manufacturer who

was able to supply an extensive, practically relevant smart grid training system and install it in accordance with the centre's requirements.

"Our modular, SCADA-controlled training system, which can simulate a country's entire grid, quickly convinced those in charge at ESKOM and UKZN. Another deciding factor was the multimedia self-learning software. The system is now regularly used to train students as well as to provide further

training for ESKOM employees,” says Dirk Schönian, Lucas-Nülle’s area sales manager for the region.

Optimizing the grid of the future in experiments

The new Smart Grid Centre therefore houses a state-of-the-art Smart Grid Simulator, which controls conventional and renewable energy producers and makes adjustments in line with the constantly changing demands of a wide range of consumers. Various scenarios, such as changing wind conditions, can be controlled and monitored with the SCADA software.

Primarily ESKOM employees and master’s students at UKZN are expected to use the simulator to investigate new development opportunities for smart grids in Durban. Future research will focus on regional energy grids and a more sustainable energy supply via the national grid. At the same time, the simulator provides a learning environment for ESKOM employees who want to undertake further training specifically for smart grid control.

In his opening address, Professor Nelson Ijumba said: “ESKOM’s investment in the university’s research and infrastruc-



The new laboratory at UKZN

ture underlines the company’s strong commitment to corporate social responsibility. It is enabling many individuals to further their academic development and is helping the region achieve sustainable progress.”

Following the official opening, the centre on the Westville Campus went into operation.

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HVDC TRANSMISSION – LONG-DISTANCE POWER

Renewable energies have a long way to go – and this often occurs on a long transmission cable. Accordingly, it is sometimes necessary to transmit energy to consumers that has been produced in offshore wind parks, for example, with a long power line. However, conventional AC lines are not cost-efficient for long-distance power transmission, because too much energy is lost along the way. DC power lines are the solution. A new course prepares skilled workers for this new technology of tomorrow.



Using the training system on high-voltage DC transmission (HVDC), trainees and students can become familiar with the functionality and properties of DC power lines. The course focuses on the converter stations, the so-called substations or terminals installed at both ends of the transmission line and used to re-convert the current again. This is also where power flows can be modified. In a realistic learning environment where the theoretical information units and the practical hands-on experiments are interwoven, the students learn the essential principles needed for substation control and operation. At the same time, they familiarize themselves with how to use the SCADA software embedded in the multimedia course.

This specific kind of energy power transmission is deployed frequently in countries with vast expanses of territory like the USA or China. In Europe, HVDC transmission lines are found primarily between the offshore islands and the mainland. This is because three-phase cable lines are no longer cost-efficient over distances in excess of 70 kilometres (45 miles) since far too much reactive power is generated and this needs to then be compensated for at a high price. The fact that this technology is now being used more and more is also due to the broad dissemination of renewable energies, which frequently have to be transported over long distances from their point of origin to the consumer

The high-voltage DC
transmission training system



AUTOMATIC TRANSFORMER CONTROL MAKES GRID FLEXIBLE

Renewable energy has changed the requirements that electricity grids have to meet. On the one hand, this is because the supply of renewable energy cannot be planned like the supply from conventional sources. On the other hand, it is due to the fact that the flow of energy in the grid can change direction, presenting the local network with new problems.

Private homeowners with their own photovoltaic system are consumers and producers of electricity. They not only draw power from the grid but also supply some to it. This can lead to voltage fluctuations in the local network which have to be evened out. Automatically regulating transformers are important in this connection. Lucas-Nülle has developed a new training system with a new ILA course that looks at the specific features of modern local networks.

Adjustable local network transformers are used to even out the fluctuating voltages in the local network. The new training system from Lucas-Nülle integrates such a transformer into a multimedia learning environment that enables trainees to familiarize themselves with the transformer's functions and control options. Through exciting experiments and fault simulations, the trainees learn how the transformer is required to influence voltages in the local network.

Finally, the Lucas Nülle SCADA software is used to set up an automatic voltage control function as well as analyze and optimize it in the trend graphic.



The new control transformer training system

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READY FOR THE ISLAND LIFE: ENERGY FROM MICROGRIDS

Microgrids are small, self-sufficient networks that are often connected to a larger national grid. They are supposed to form an integral part of the extensive smart grid of the future. Another feature of microgrids is that they are generation structures with consumers and storage facilities located close to the point of generation. These work together so that as little electricity as possible has to be taken or supplied to them from higher grid levels.

Where is such a grid most effective? On an island!

The 10,500 inhabitants of El Hierro, the westernmost and smallest of the Canary Islands, meet all their electricity requirements via a local microgrid, making them self-sufficient and independent of the European grid. This makes El Hierro the first island to manage without the European high-volt-

age grid on an independent and permanent basis. This level of freedom requires the right conditions: El Hierro gets its electricity from renewable energy sources, primarily wind and hydropower. Here the energy from the wind turbines is not only fed directly into the grid but is also used, in the event of an energy surplus, to power the water pumps at a storage power plant.

Microgrids have several advantages: ideally, they can supply electricity to a limited area even when there is a power failure at higher grid levels. In addition, they can be temporarily disconnected if there are problems within their boundaries, thus avoiding extensive blackouts as a result of localized faults. Since an

equilibrium is sought locally between producer and consumer, it should be possible to avoid transport-related energy losses and reduce the need for electric cables.

“The best thing about microgrids is that they make the best use of the resources

“The best thing about microgrids is that they make the best use of the resources that are available locally.”

that are available locally. It is possible to integrate several energy sources,” says Jörg Ludwig, product manager for renewable energy at Lucas-Nülle. A

microgrid needs control and compensation especially if renewable energy sources are used which are subject to strong fluctuations or if the main source is subject to strong fluctuations.

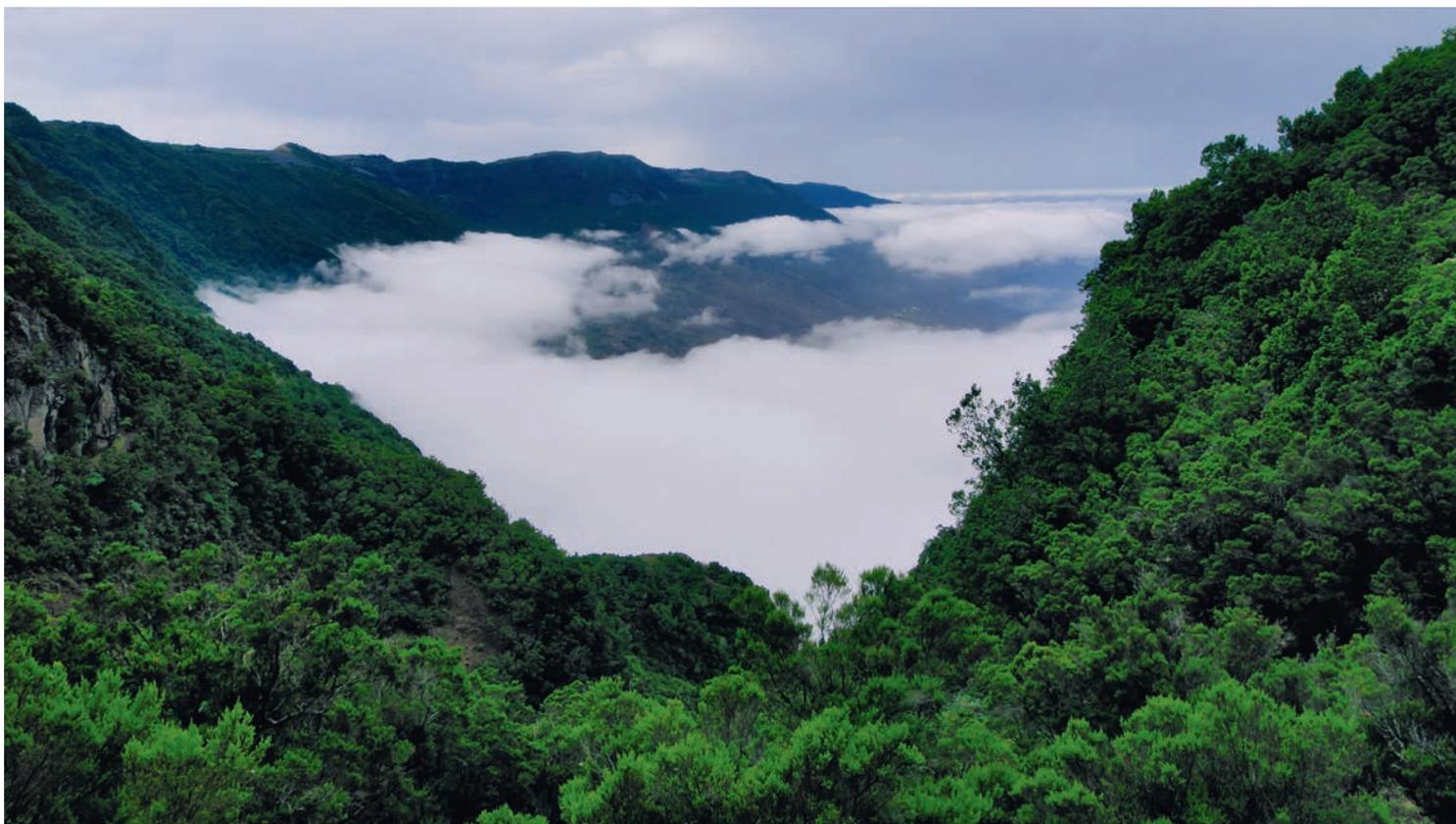
Energy storage facilities, energy sources, consumption forecasts and weather forecasts have to dovetail in order to be able to use the microgrid continuously as a reliable energy source.

Microgrids need fine-tuning

“Such a network offers many advantages, but consumption and production have to match,” says Ludwig. “Creating and monitoring these conditions requires qualified people who have mas-

The microgrids training system





tery of the grid.”

Lucas-Nülle has therefore developed a training system that conveys the features of microgrids in a realistic way. Like real microgrids, it can be used as a stand-alone system for experiments, but it can also be integrated into Lucas-Nülle’s smart grid environment. Real microgrids, too, can operate on their own, but more often than not they also have a connection to the national grid; for safety and security, for low-energy phases or in order to sell surpluses.

Lucas-Nülle offers a training system with practically relevant experiments and original components to enable future skilled and qualified personnel to be introduced to the structure and control of a microgrid. The trainees and students thus get to know different parameters, loads and influencing factors.

Small grids – big impact

These skills will serve them well when more microgrids are installed in the future. And there are environmental benefits as well. Annual CO₂ emissions from electricity production on El Hierro have been reduced by 18,700 tonnes.

What is more, the island can dispense with the 40,000 barrels of oil that were previously consumed to meet energy requirements.

“The example of El Hierro shows that microgrids can offer stable operation as well as economic and environmental benefits,” Ludwig emphasizes.



IMS 4.0: FOR INTERCONNECTED INDUSTRY

In the automotive industry, the future of automated production has already begun. Here machines and products communicate with each other in such a way that manufacturing processes take place in an individualized and completely automated way. Industry 4.0 applies the principles of the “Internet of Things” in industrial production. The radical changes triggered by this are so extensive that people are talking about a fourth industrial revolution – after the steam engine, mass production and the Internet. What do the skilled workers of tomorrow need in order to survive in the working world of Industry 4.0 and even drive it forward?

The extent of the revolution is enormous. Conservative estimates, for example by market analysts Gartner, assume that some 26 billion machines will be connected to each other by 2020. The anticipated volume of business for the same period is expected to be in the region of 600 billion euros.

“Only qualified skilled employees who can understand and control the machines’ communication channels will be able to get ahead in their careers in Industry 4.0,” explains Marijan Naglic, product manager for automation technology.

Experiencing the future today

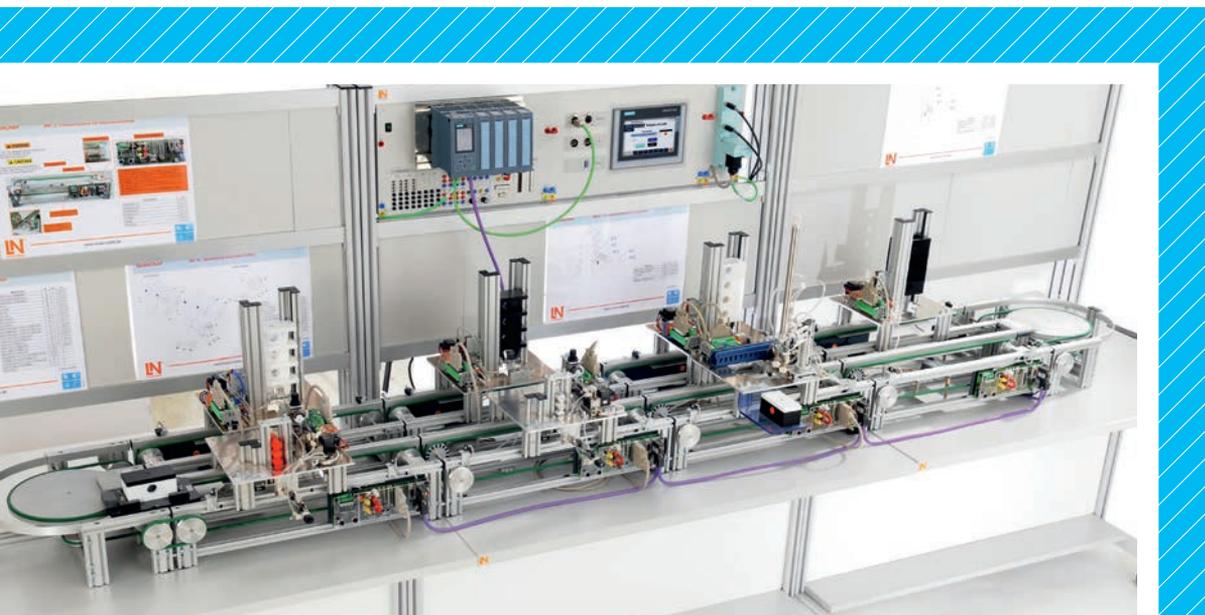
Lucas-Nülle has equipped its IMS® training station in a way that facilitates a realistic representation of the Industry 4.0 conditions. This involves assembling a workpiece within the system from three parts that are fitted with an RFID chip. This chip contains all the relevant information about the production status and the product being manufactured. Prior to the pro-

cessing stations, the version in which the workpiece is to be assembled is read out. A touch panel is used to select the colour/material combination of the workpiece and start the production process.

This means that the trainees can track the production of a specified product and control it themselves by programming it. In order to make the conditions as realistic as possible, the system is equipped with the kind of industrial components that the trainees will encounter in their future working lives.

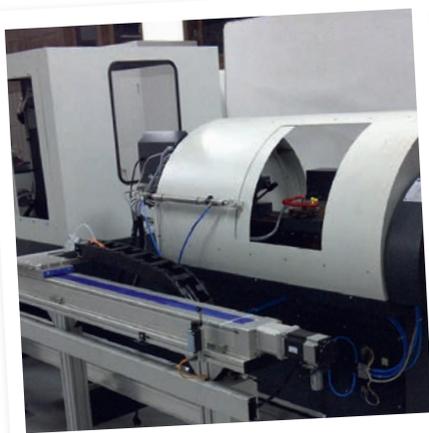
The accompanying multimedia course was developed in close cooperation with Prof. Becker from Bonn-Rhein-Sieg University of Applied Sciences, thus guaranteeing a focus on practical applicability in training and a high technical and educational level.

“Our cooperation with the university ensures quality and functionality in any training situation. The new system allows students to learn how processes can be optimized. After all, that is the main goal of Industry 4.0,” says Naglic.



IMS® training system
with Industry 4.0 module

Indonesia: Industrial Production Is Catching Up



Banda Aceh – the city at the extreme tip of the Indonesian island of Sumatra is particularly well-known in connection with the tragic events of the 2004 tsunami. Ten years after the disaster, the city has recovered economically and is one of the country's industrial centres. There is strong demand for qualified technical staff, which the educational institutions are trying to meet. Syiah Kuala University in Banda Aceh has reorganized its metalworking technology laboratory with the help of Lucas-Nülle.



Lucas-Nülle's CIM unit simulates extensive automated production processes in a didactically optimized way. The school was quickly convinced of the effectiveness of the system and opted for the CIM unit with a linear axis for the robot.

"We have thus created an elegant combination of all the stations involved in the production process and are offering additional learning content," explains Marijan Naglic, product manager for automation technology at Lucas-Nülle.

The trainees learn to program the entire automation process between the production line, the lathe and milling machine, the robot and the PLC. And now this also includes the linear axis, which is programmed as the robot's seventh axis.

"Our idea is to convey mechanized, automated processes to the trainees in a realistic way. With our system, they learn how the different parts and phases are connected," Naglic explains.

The highlight here is that all the systems are connected with each other via a bus system and are controlled via a PLC.

One of Principal Samsul Rizal main priorities was to have modern equipment with a long-term perspective. This is being used to give trainees the perfect preparation for life in industry.

The centrepiece of the new laboratory is the Computer-Integrated Manufacturing (or CIM for short) production facility. What is new here is that the robot for equipping the lathe and milling machine moves along a linear axis.



Students working with the new CIM production facility

NEW COURSE: INDUSTRIAL BUS SYSTEMS

The term BUS is actually the abbreviation for Binary Unit System, so it has nothing to do with buses. Nevertheless, the idea of a bus route can be helpful in getting a mental picture of the application of bus systems: just like a bus on the road, the bus system also travels a certain route collecting data like passengers, which it transports to and fro. These connections are becoming increasingly important in industry. The new course from Lucas-Nülle allows trainees to acquire knowledge of several modern bus systems which are particularly widely used in industry.

To test the bus functions, a conveyor belt is connected to a PLC. Using practical experiments, the multimedia course guides the trainees through the basics of the AS-I bus and PROFI NET. The first step involves learning how to control the conveyor belt directly via the digital in-

puts and outputs of the PLC. In the second step, the trainees plan all the bus systems that are shown, which involves having to implement the correct configurations in the TIA portal.

“The new equipment is compact, yet it covers a lot of content. All the important fundamentals regarding bus systems can thus be conveyed and investigated in a

minimum of space,” explains Marijan Naglic, product manager for automation technology at Lucas-Nülle.

For each bus system, the trainees have to work on smaller sub-projects, ensuring that they acquire the necessary expertise for larger projects in small steps.

“This knowledge is important for all students and trainees who want to study automation technology more closely,” Naglic emphasizes.

Screenshot: course on bus systems

The screenshot displays a software interface for a course on industrial bus systems. On the left, there is a navigation menu with a list of topics including:

- SFS und Bautechnik
- Antennentechnik
- Sensoren
- Elektropneumatik
- Elektrohydraulik
- Mechatronik 1.2: Transportsystem DC
- Transportsystem AC
- Mechatronik 3: Subsystem Verzahn
- Mechatronik 4: Subsystem Montage
- Mechatronik 5: Subsystem Bearbeiten
- Mechatronik 6: Subsystem Prüfen
- Mechatronik 7: Subsystem Handhaben
- Mechatronik 8: Subsystem Lagern
- Mechatronik 9: Subsystem Rangieren
- Mechatronik 10: Subsystem Puffern
- Mechatronik 11: Subsystem Demontieren
- Mechatronik 23: Produktionsanlage mit mehreren Stationen
- Grundlagen Robotik
- CVI 1: Scheibentechnik mit Sicherheitskreis
- CVI 2: Scheibentechnik - zis-Safety at work
- RMS 11: Station Demontieren mit einem Roboter
- RMS 12: Transportsystem DC
- RMS 23: Produktionsanlage mit 3 Stationen
- RMS 24: Produktionsanlage mit 4 Stationen
- RMS 25: Produktionsanlage mit 5 Stationen
- RMS 26: Produktionsanlage mit 6 Stationen
- RMS 28: Produktionsanlage mit 8 Stationen
- RMS 3: Station Verzahn
- zurückbeschreibung
- technische Daten
- Schaltstellenbelegung
- Aufgaben
- Grundständiges zur Versuchsdurchführung
- Versuchsbeschreibungen
- Vereinbarung
- Grundständiges zur Ablaufsteuerung
- Ablaufsteuerung
- Copyright
- Druckversion RMS3
- RMS 4: Station Montage
- RMS 5: Station Bearbeiten
- RMS 6: Station Prüfen
- RMS 7: Station Handhaben
- RMS 8: Station Lagern
- RMS 9: Station Rangieren
- Industrielle Prozessautomatisierung
- Industrielle Prozessautomatisierung 2
- Industrielle Prozessautomatisierung 3
- Industrielle Prozessautomatisierung 4

The main content area features a diagram illustrating the connection of various industrial bus systems. The diagram shows three main sections connected by a central horizontal line. A legend below the diagram identifies the connection types:

- Profinet IO (black double-headed arrow)
- Ethernet (green line)
- Profibus (purple line)
- Profinet CBA (blue line)

Textual information in the main area includes:

PROFINET ist ein auf Ethernet basierendes Bussystem mit Echtzeit Funktionen. Ein Vorteil bietet das Einbinden von existierenden Feldbussen. So lassen sich Feldbussysteme wie z.B. PROFIBUS oder AS-I einbinden ohne die Feldgeräte ändern zu müssen. Da Ethernet TCP/IP unterstützt ist die Nutzung von Webtechnologien, wie z.B. der Zugriff auf integrierte Webserver von Feldgeräten möglich. Bei Profinet unterscheidet man zwischen zwei Sichtweisen, Profinet-IO und Profinet CBA (Component Based Automation).

Profinet CBA ist die komponentenbasierte Maschine-Maschine Kommunikation und ermöglicht die Modularisierung von Anlagen. Die grafische Konfiguration der Kommunikation kann mit Hilfe von iMap durchgeführt werden. Dabei bildet z.B. ein Profinet IO System eine Profinet-Komponente, die mit anderen Profinet-Komponenten kommunizieren können.

Profinet IO beschreibt eine IO Datensicht auf dezentrale Peripherien.

At the bottom, it states: Profinet im ISO/OSI-Referenzmodell: (laut "Automatisieren mit PROFINET" Seite 19)

THE STAGE IS SET FOR LEDs –

NEW MODULE FOR DMX MICROCONTROLLER TRAINING SYSTEM

LEDs can be used to create fantastic lighting effects which ensure enthusiastic audiences at large and small venues alike. The more complex the lighting production, the more complicated the technology behind it is. Thanks to the LED matrix that is now available, there is now a completely new and realistic project for our microcontroller training system which did not exist in this form before in the field of training and education. The exciting nature of the topic ensures a high level of motivation when it comes to programming the microcontrollers. The EloTrain course is guaranteed to quickly generate a sustained sense of achievement in the students.

The trainees perform programming of the images, light and colour sequences for one or more RGB-LED matrix modules. They work with a DMX interface, which is standard in studio and stage technology today, and this enables them to control the LEDs, create colour mixtures and generate animated graphics.

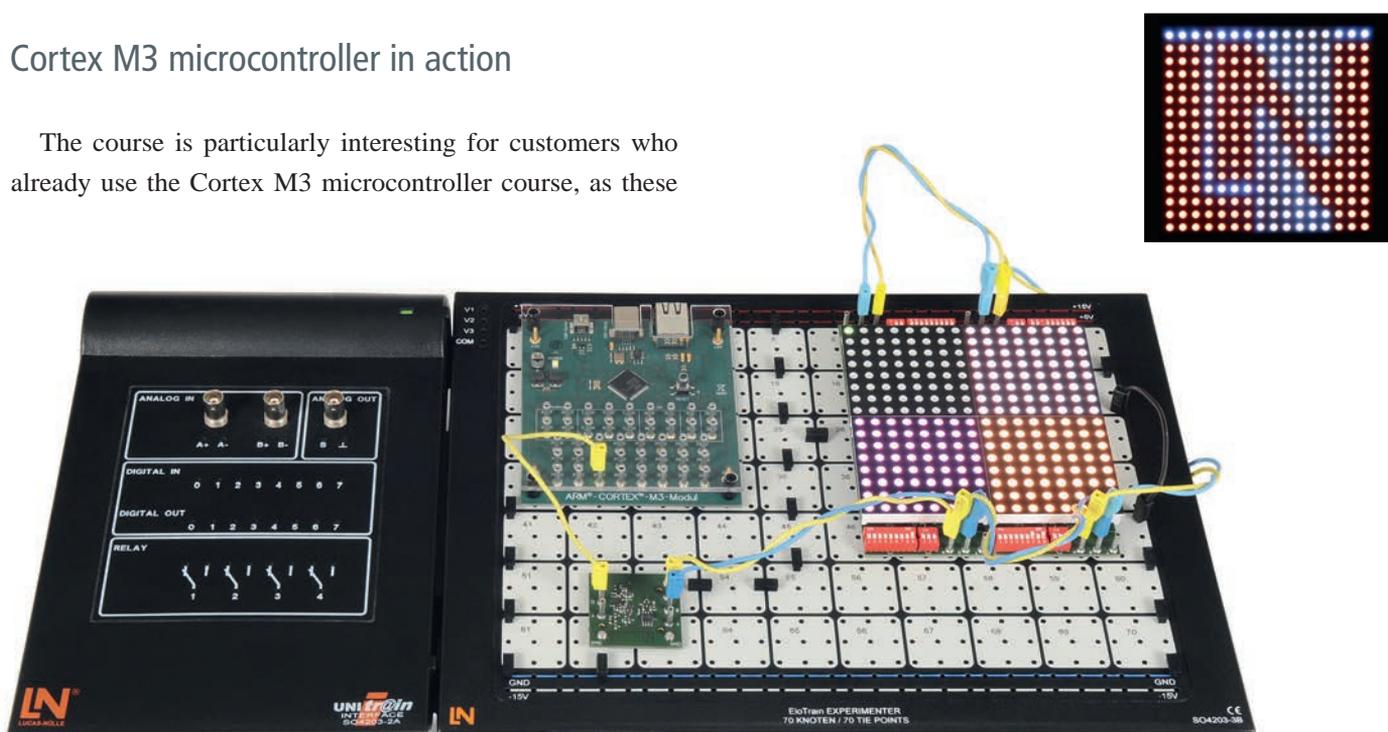
The EloTrain course presents the usual blend of necessary basic knowledge, exciting experiments as well as exercises and questions for self-testing. “This course provides a vivid depiction of the topic,” explains Igor Pavlin, product manager for communication technology at Lucas-Nülle. “It only takes a few programming steps to create wonderful lighting scenes, thus ensuring that the trainees are quickly motivated through learning successes.”

Cortex M3 microcontroller in action

The course is particularly interesting for customers who already use the Cortex M3 microcontroller course, as these

LED modules can also be programmed with the controller from this course. This means that the students can very quickly familiarize themselves with the new topic and experience the already familiar microcontroller in a vivid application. “As with all our courses, human and equipment safety was a top priority for us with this one, as well,” emphasizes Pavlin. “All the modules used are protected against short circuits, overloads and reverse polarity. As each step of the experiments is explained very precisely, the trainees have no problems coping with the system.”

Most trainees should already be familiar with the virtual measuring instruments from the UniTrain environment, further helping them to make progress with the course.



The RGB-LED training system with DMX control

Lucas-Nülle Opens Subsidiary in the USA

North American business is growing

Lucas-Nülle has been active on the American continent for over two decades. With its new subsidiary, the company is now focusing its foreign business more strongly on the USA. The demand for technical training systems has increased, particularly from the colleges and universities. For this target group, Lucas-Nuelle Inc. now offers even more service.

“The decision to open a subsidiary in the USA is a reaction to the strong interest and a clear decision on our part to achieve rapid growth in this market by our own efforts,” says Andreas Hart, Managing Director of Lucas-Nülle. With Stephen Westbury, David Crowell and

Maren Johnson, the team is in place for customers in the USA and Canada. Another two members of staff are due to strengthen the sales department in the course of the year. Thanks to the central headquarters in Williamsburg, Virginia, on-site appointments and tours can be arranged at short notice. The service



The registered office
of Lucas-Nuelle Inc.

PRACTICE WORKSHOP – FOR MATLAB USERS IN APRIL 2015

Lucas-Nülle has written a success story with the Toolbox for Matlab. Interest stemming from colleges and universities has been greater than expected. To provide professors, lecturers and laboratory staff with even more application potential, Lucas-Nülle is holding its very first user workshop from April 15-16 in 2015.



The Toolbox for Matlab

“Thanks to the high demand for the LN Matlab toolbox and the abundance of very positive feedback from clients, we have expanded our program offering and are going to demonstrate the vast potential versatility of the toolbox in a user workshop,” explains Ralf Linnertz, Product Manager for the area of drive technology at Lucas-Nülle.

The seminar is meant to address in particular lecturers and laboratory staff at colleges and universities which use the new Toolbox or wish to expand their user know-how and abilities. Instructors from Lucas-Nülle present the Toolbox’s application range in a step-by-step fashion. The participants commence with the practical handling of the various sys-

tems and create model-based drive controllers. In small groups they develop control structures for drives, and test and optimize them using the appropriate hardware. It is the objective to build confidence in handling the training system so that it can be deployed any time in the laboratory.

“Automatic control technology is a classic Matlab topic found in college and university level instruction. Complex control algorithms can be simulated within the software so that the student can develop completely new approaches and test them. In our workshop you will be surprised just how much enthusiasm can trigger in the participants,” in Linnertz’s own words.

Advertisement

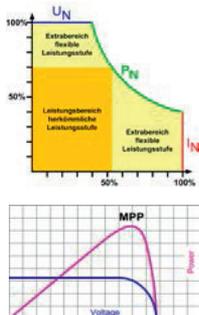


Elektro-Automatik Das neue Power Programm 2014



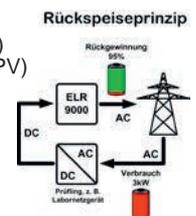
Programmierbare Labor- und Hochleistungsnetzgeräte (AC/DC)

- Leistungen 160 W bis 15 kW (Systeme bis 300 kW)
- Spannungen 0...16 V bis 0...12000 V
- Ströme 0...4 A bis 0...510 A (Systeme bis 6000 A)
- State-of-the-art μ -Prozessor Steuerung (FPGA)
- Modulare hochisolierte Architektur
- Flexible Ausgangsstufen (Autoranging Output)
- PV (Solar) Array Simulation
- Batterie- und Brennstoffzellen Simulation
- Alarm Management, Nutzerprofile
- Funktionsgenerator Sinus, Rechteck, Trapez, Rampe, Arbiträr
- Für Auf Tisch, 19" Integration und Wandmontage
- Analog, Ethernet, USB, CAN, Profibus, GPIB u.v.m.
- Bediener Software Easypower „lite“ und „pro“



Programmierbare Elektronische Lasten (DC) konventionell und mit Netzzurückspeisung

- Leistungen 400 W bis 10,5 kW (Systeme bis 300 kW)
- Spannungen 0...80 V bis 0...1500 V
- Ströme 0...25 A bis 0...510 A (Systeme bis 6000 A)
- State-of-the-art μ -Prozessor Steuerung (FPGA)
- Modulare hochisolierte Architektur
- Mit Netzzurückspeisung (Eff. >90%) und ENS (optional)
- Betriebsmodi CV, CC, CP, CR, Batterietest, MPPT (PV)
- Für Photovoltaik (PV) Array, Ultracap, Brennstoffzellen, EV-Motoren
- Funktionsgenerator Sinus, Rechteck, Trapez, Rampe, Arbiträr
- Für Auf Tisch, 19" Integration und Wandmontage
- Analog, Ethernet, USB, CAN, Profibus, GPIB u.v.m.
- Bediener Software Easyload „lite“ und „pro“





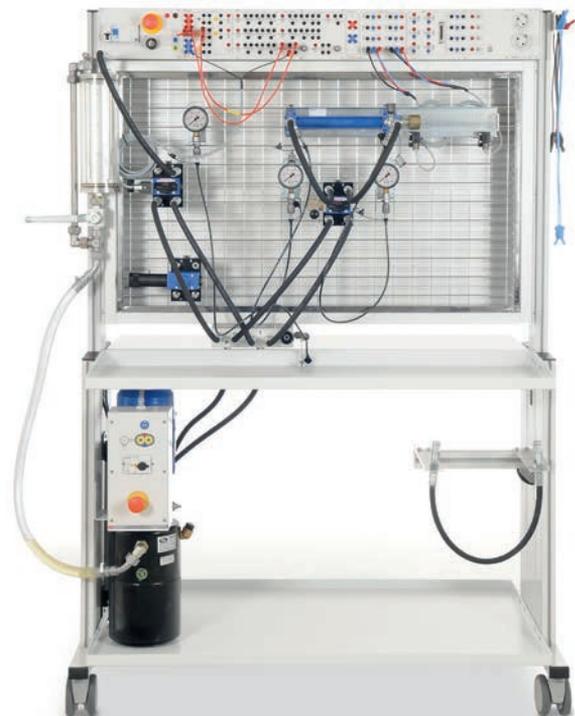
NEW PROGRAMME FOR PNEUMATICS AND HYDRAULICS

Pneumatic and hydraulic systems remain important elements of industrial, automated production processes. Apart from sound basic knowledge, trainees and students therefore need practical experience which they can bring to bear directly in their companies. In cooperation with Bosch Rexroth, Lucas-Nülle has developed new training equipment and courses which use original components to convey pneumatic and hydraulic knowledge and hands-on skills in a particularly realistic way.

“Our cooperation with Bosch Rexroth, the market leader in hydraulic components, guarantees the practical relevance of the systems,” explains Wolfgang Struth, product manager for metal technology at Lucas-Nülle. This means that trainees are always using the latest industry-standard equipment and systems.

The training system’s practical exercises allow pressure measurements to be taken and displayed in distance-time diagrams. The trainees can use interactive circuit diagrams to keep track of which sensors, switches and coils are activated. Animations in the accompanying multimedia course demonstrate the functions and stages of hydraulic and electro-hydraulic processes.

As a supplementary element, the UniTrain experiment board can be combined perfectly with this system and integrated into any classroom.



The LN training system for pneumatics and hydraulics



Lënster Lycée

Focus on Practice



Visitors from other colleges are also keen to see the state-of-the-art equipment.

There is not much happening yet at Lënster Lycée. A mere 209 students have been attending the secondary school since September 2014. But that is set to change. For behind the stylish façade with its endless glazed surfaces and colourful accents is one of the largest and most modern training institutions for school-age students in Luxembourg.

The technical lyceum is a new school which takes demographic developments into account. “We have the best conditions here,” head teacher Romain Kieffer says of the choice of location. “There is great development potential in the area. We could teach 1,500 students here.” With its emphasis on electrical engineering, wood and metal technology, information technology and business administration, Lënster Lycée is geared towards the demand for qualified people in three major growth sectors in Luxembourg.

Technology that inspires

From Year 7, the students, most of whom are 13 years old, switch to Lënster Lycée. At the beginning, they either attend vocational classes or target the university-level school-leaving qualification. After three years, they have to decide on the subsequent path they want to take at the school.

From Year 10, students with an affinity for technology choose from four options for completing their school careers: firstly, they can target the technical school-leaving qualification (DFEST) or technician diploma (DT). With these qualifications, they can go to a university or college or tackle the examination to become a master craftsman. Alternatively, they

“There is great development potential in the area. We could teach 1,500 students here.”



can choose the vocational training route and train to become a journeyman (DAP) and gain direct entry into the trade (CCP). Those who prefer direct entry commence dual training from Year 10, which takes place partly in the workplace and partly at the school. Other students, who have chosen to target the university-level school-leaving qualification, choose their main subjects at this point, for example classical languages such as Latin.

Shaping the future in a practical way

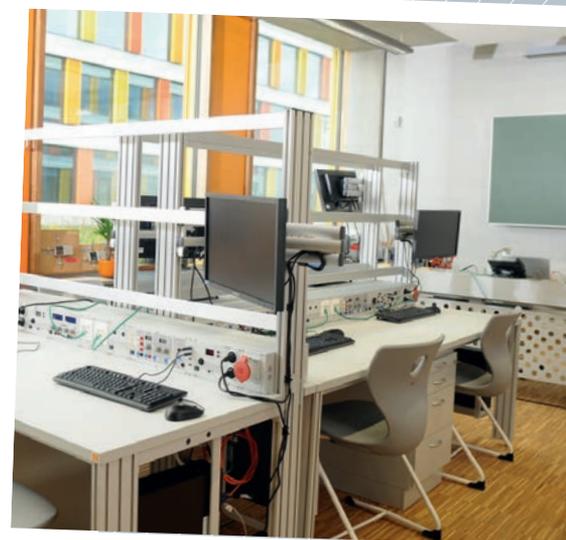
The school has numerous workshops and laboratories for the practical training of students. For electrical and IT training alone, there are six workshops and eight laboratories on the ground floor. On the upper floors, there are six IT rooms and five workshops. Every floor therefore offers a practice-oriented learning environment, in close proximity to the seminar rooms, for budding electrical engineers, communications engineers and metalworking technicians.

“The concept of our school is based on an integrated approach,” deputy head Tom Nober says of the school sys-

tem. “We want to give our students the chance to put themselves to the test. Our young students have the opportunity to get to know areas that are not normally taught in schools. This means that they can specialize as they progress and even continue studying their optional subjects in the final year.” The school has provided additional workshops for this purpose, where younger students can get a taste of technical vocations. “Young people can only find out through practical experience if a career as an electrician, carpenter or cook is for them.” Lënster Lycée thus shows its students further prospects that are open to them after finishing school.

Tomorrow’s technology for today’s young people

During planning and fitting-out, the school’s main priority was to create a learning environment that combines practice and theory. The technical equipment in particular was supposed to reflect the real world of work and enable students to receive training in line with the latest industry standards. “It was important to us that the school’s equipment should facilitate practically



The workstations of the LN training systems



Modern, multimedia laboratory equipment



Students working on the training systems

relevant, modern training,” explains Kieffer. “We want our students to be able to work and learn independently.” The school needed a partner who could meet the high standards of integrated training.

This is a welcome challenge for Manfred Masson, Sales Director at Lucas-Nülle, and Lionel Hemme, Sales Manager at Lucas-Nülle. After all, this project was an opportunity for Lucas-Nülle to prove itself as a single-source supplier and installer of equipment and systems for electrical engineering and metalworking technology. “We were given the task of equipping every room in such a way that the modules and systems could be adjusted to suit the different levels and tasks associated with particular classes and subject areas,” Masson says of the project. “We

therefore went for smart laboratories and modular systems which allow a flexible lesson structure as they can be individually combined. Our systems facilitate didactically and technologically state-of-the-art teaching.”

Lucas-Nülle equipped a total of eight laboratories, two halls and eight workshops for electrical engineering training: from specialist laboratories for telecommunications technology practice to microtechnology to electrical engineering workshops that are equipped with,

“Our systems facilitate didactically and technologically state-of-the-art teaching.”

for example, systems and modules for DC technology, switchgears and tools. In addition, the carpentry and metal workshop was equipped

with sturdy workbenches, variable experimentation power supplies and tool kits. Experiences to date show that the Lucas-Nülle equipment is equally popular with students and teachers. “The



Students experimenting

students are motivated and enjoy working with the systems,” reports Gerard Bethke, who teaches electrical engineering. “What I particularly like about the modules is that they are compact and quick to set up. You can get started straight away. This saves a huge amount of time.”

An integrated concept

The fact that Lënster Lycée makes good use of time is also illustrated by the all-day school programme. The students are looked after from 7.30am to 6.30pm. This appeals to working parents in particular. “We try to make the children’s everyday life attractive. Lessons take place until 4pm. After that they can choose from an extensive range of options,” says Kieffer, explaining the offering. Everything is covered, from extra tuition to technical, sporting or cultural activities. There is also a library with a cyber café, a school garden,

a restaurant, a swimming pool and a sports hall which the students can use in their spare time.

On Fridays, the school day differs somewhat. “Lessons finish at 12.00 noon on Fridays as the afternoon is reserved for our teachers,” says Nober. While the students are looked after, the teachers get together in teams, discuss the school and its pupils, share out tasks among themselves and exchange experiences. “This helps build team spirit and is extremely efficient.”

Efficiency and sustainability are the values that define Lënster Lycée. They enable the school to provide future-oriented education and training that benefits all its students. “We are looking forward to seeing how the school will develop,” Kieffer and Nober say in conclusion. “After all, the school will be getting over 1,000 additional students in future.”





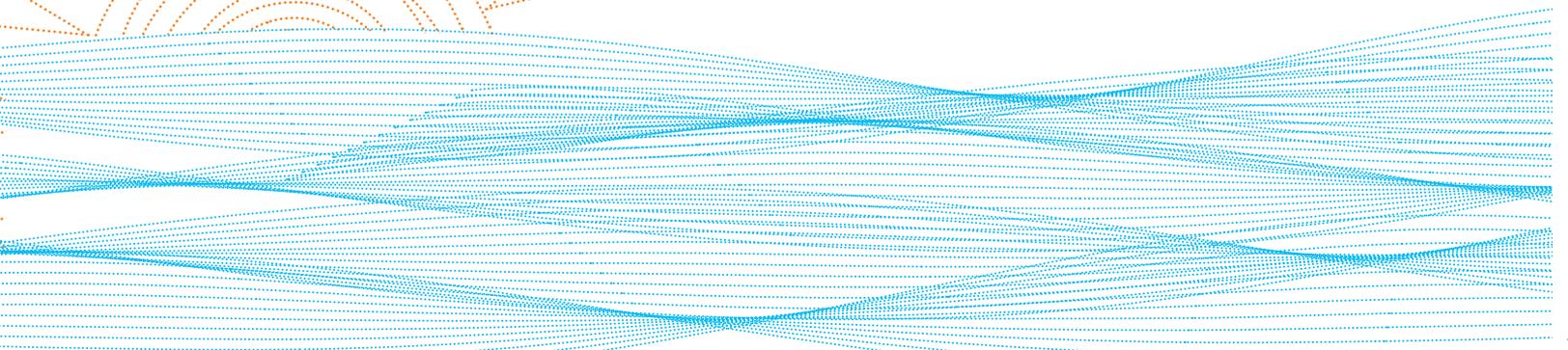
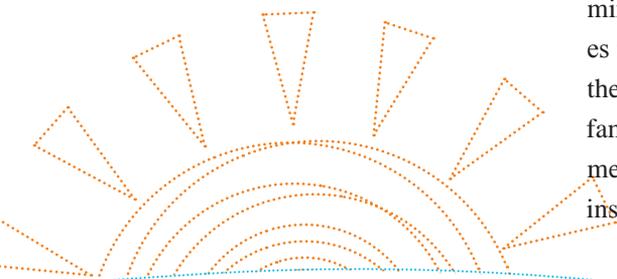
The training system made a strong impression: handshake between Juan Castaneda (centre left) and Gerald Schex (centre right). Also pictured: Jörg Ludwig of Lucas-Nülle (left) and Stephen Westbury of Lucas-Nuelle Inc. (right).

California is Calling

When California's callin', you should get there right away, sang the Beach Boys. Lucas-Nülle is also riding the wave and trying to move mountains to meet the extremely short-term order to equip an entire training centre for one of the biggest power utilities in the United States, Southern California Edison (SCE). Following an enquiry by Juan Castaneda, SCE manager for Advanced Technologies, initial talks started within a matter of two days. Only a few months later, the order for the training systems had arrived. The reason for this success; Lucas-Nülle had founded its own US affiliate shortly before.

Starting in mid-2014, the LN subsidiary headed by Stephen Westbury and his team of three had been busy drumming up business and providing services for the USA and Canada. "Thanks to their local presence, we are much more familiar with the needs and requirements of the local teaching and training institutions and can deal with orders

with a very fast turnaround. Also, when it comes to service, we are in a position to respond quickly. Consequently, we are capable of offering the kind of services in both the USA and Canada which rival local regional suppliers," according to Gerald Schex, Sales Director responsible for the region at Lucas-Nülle.



Smart Grid – designed for industry with a view to practical experience

Southern California Edison proved to be just as enthusiastic about the service offered as they were about the training systems' flexibility. After all, SCE had been on the lookout for a supplier that had in its program realistic training systems for smart grids and which would also be capable of customizing the system to the needs of the customer. Since Southern California Edison is intending to establish its own training unit, the demands and requirements are extremely high and specifically tailored to the needs of this company.

“For the client it is all about training their employees for their grid and its peculiarities. With our Smart Grid system, a lot of different energy sources can be integrated and typical effects and external factors simulated,” explains Schex.

In addition to solar energy, Southern California Edison also utilizes wind energy and conventional power sources, which the company aggregates into an integrated grid. Furthermore there are private individual solar power systems, with the utility company offering household installation assistance. This generated energy is also fed into the grid. The many different energy sources and their specific attributes make balancing the grid more demanding and set greater challenges for the engineers whose job it is to make sure that supply and demand are kept in balance.



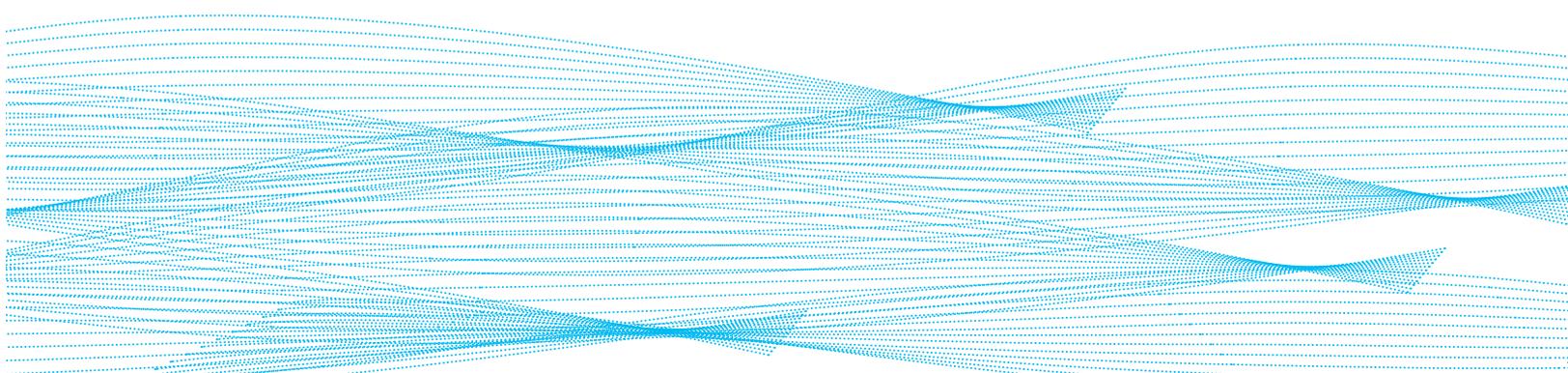
Many years of US expertise

“The fact that we could be on location right away was a huge advantage in being able to discuss needs and requirements. Thanks to our staff based in the USA, we also had the necessary background information on the company and the regional power supply grid,” remembers Schex. In comparison, systems localization has been a cakewalk. Thanks to the many years spent teaming up with a local retailer on the North American market, we were already familiar with many of the peculiarities, safety regulations, technical standards and tests and had even implemented some of them into the system already. Consequently, only minor changes had to be undertaken for Southern California Edison.

“The fact that we could be on location right away was a huge advantage in being able to discuss requirements.”

“We are very well acquainted with the educational terrain and the requirements pertaining to technical training systems so that we can also provide in-depth consultation,” in the words of Schex. “Ultimately, we offer more than just training systems. For us, it is important that the systems are integrated into an overall educational concept that provides the client with long-term support in reaching the targets set for the training and education of the relevant technicians and skilled labour.”

Thanks to the versatile Smart Grid system which permits work on a module-by-module basis, the staff of Southern California Edison can now be trained quickly and systematically on individual topics.



In the Fast Lane with the Audi Q5 Hybrid Automotive training equipment sets new standards in Honduras

At the INFOP (National Vocational Training Institute in Honduras) training centre in San Pedro Sula, the trainees are introduced to the latest automotive technology using state-of-the-art training equipment from Lucas-Nülle. INFOP's aim is to boost the supply of qualified employees for the regional automotive sector.



The new exercise vehicle being unloaded

The brand new Audi Q5 Hybrid attracts everyone's attention. The trainees still keep a respectful distance. Such a car is seldom seen in the garages of Honduras. But now they can not only touch the Q5, but even take it apart. The exercise vehicle from Lucas-Nülle, with an integrated fault simulation circuit, is the centrepiece of INFOP's new automotive training labora-

tory. Hybrid vehicles are the future. Now the automotive mechatronics trainees learn how to service and repair them with Lucas-Nülle training systems and are trained to German standards. INFOP hopes that this will boost the supply of qualified employees for the regional automotive sector, which has suffered from a lack of well-trained skilled personnel for years.

Systematizing training

"Automotive engineering has experienced rapid developments," says Stefan Welp, Lucas-Nülle's sales director for the region. "Electronic components and the way they are interconnected are much

more complicated now than they were just ten years ago. Newer cars therefore pose problems for garage employees."

Several years ago, INFOP therefore took initial steps towards modernizing the automotive training centre in San Pedro Sula. However, there were difficulties with financing. Successful implementation of the project was only made possible through co-

operation with EMCO and Lucas-Nülle. Together they supplied and installed state-of-the-art training equipment for "conventional and numerically controlled machine tools" and "automotive mechatronics". They even managed to arrange financing via the Austrian bank ÖKB.

"We were all delighted to be able to implement this project in the end," says Welp. The official opening of the modernized training centre was even attended by the president of Honduras, Juan Orlando Hernández, who said: "With the new training centre, INFOP is setting new standards for technical vocational training in the region."

INFOP's goal is nothing less than systematically reorganizing technical vocational training and establishing

"Electronic components and the way they are interconnected are much more complicated now than they were just ten years ago."



The exercise vehicle in INFOP's automotive training lab



modern didactic standards, including distance learning (for example INFOP Virtual). INFOP therefore found the flexible Lucas-Nülle systems ideal for equipping the training centre. Besides the training of young people, the centre will in future also offer seminars for mechatronics technicians who are already in employment.

Creating professional competence

The new automotive laboratory has 40 to 60 workstations depending on the topic. At these workstations, the trainees explore the fundamentals of electrical engineering and mechatronics. As with a real car, they work under the bonnet of the exercise car. Through the combination with Lucas-Nülle training systems, they learn, for example, how to find and rectify faults in the on-board electronics or mechatronic systems. Advanced trainees work on trickier training systems, solving engine problems in the Q5 or adjusting the toe alignment.

“It is more and more a matter of developing practical fault detection strategies,” emphasizes Welp. “The trainees

should gradually gain an understanding of the car as a complete system. Swotting up is not enough. The regional garages' qualified personnel have to independently analyze faults that are displayed in the OBD2 scanner and rectify each fault and its cause.”

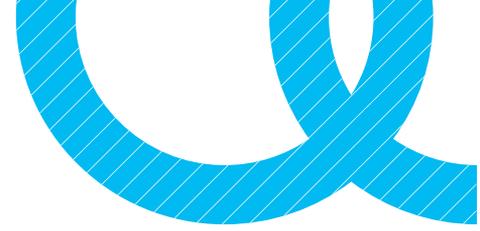
That is why the didactically structured automotive laboratory made an immediate impression. Especially the Q5. Besides the teachers and students, the local Audi dealer and the Audi ser-

vice manager for Latin America, Jose Luis Cabré, are also impressed: “Trainees who have trained on these systems will be able to hit the ground running when they join the workforce. We could do with training of this quality in all the countries of Latin America.”

The region's garages are already waiting for the first trainees to complete their training at the new centre, who are likely to find themselves in the fast lane to a successful career before long.



The Audi Q5 exercise vehicle



Mexico: Audi is in the Starting Blocks

Lucas-Nülle equips training centre for new plant

In October 2014, Audi's training centre at the Universidad Tecnológica in San José Chiapa, Mexico, opened its doors. The training centre is essential for the new Audi plant, one of the company's largest projects at the present time. It will be an important pillar on the American continent for the company's business in South America and the USA. The fact that this major project also has great significance for education in the region was evident at the opening ceremony. Alongside Audi Board members Hubert Wlatl and Thomas Sigi, the event was also attended by high-ranking politicians and education experts.

The guests included the Governor of the state of Puebla, Dr. Rafael Moreno Valle, the President of the Universidad Tecnológica de Puebla, Dr. Jorge Guillén, the Deputy Director of Regional Development at the National Science and Technology Council (CONACYT), Dr. Elías Micha Zaga, and German Minister of State at the Federal Foreign Office, Prof. Maria Böhmer.

The new training centre: Board is fully behind it

"Everyone was just as enthusiastic about the new training centre as our Board of Directors, especially when it came to the systems," Siegmund Singer, Audi education planner, recalls.

The completion of the modern training premises and workshops is an important milestone for the new plant. After a three-year planning and construction phase, there will be an Audi facility here,



The new automotive training centre

DDS-CAD

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boasting state-of-the-art technical standards. The training centre therefore had to meet equally high standards. That is why Audi brought Lucas-Nülle on board at the beginning of the planning phase to optimally coordinate the fitting-out, installation and use of the laboratories.

“We cooperated closely with Audi from the start, helping to plan the premises and advising on how the systems can dovetail within a modular curriculum,” says Siegfried Schulz, automotive product manager at Lucas-Nülle. The completed training centre, which occupies an area of some 20,000 square metres, will provide technically and didactically state-of-the-art training. The training systems, with UniTrain courses relating to all relevant automotive topics, cover the complete basic training for future specialist employees. CarTrain systems on topics

“Everyone was just as enthusiastic about the new training centre as our Board of Directors, especially when it came to the systems.”

such as engine management, diagnostics technology or a topical subject like electromobility offer the appropriate learning environment for specialist employees who wish to undertake further training. The self-learning units enable them to acquire new skills in a targeted way and at their own pace.

They are supported in this by experienced trainers and scientific staff from the Universidad Tecnológica de Puebla (UTP), who run the centre and train specialists there. These skilled workers are needed at the nearby Audi plant, where, initially, the successor to the Q5 is supposed to roll off the production line starting 2016, following completion of the plant.

The programme therefore focuses on qualifications for these key automotive areas. The new centre also offers IT and language training. Further focal points include topics relating to quality assurance and sustainability, such as process quality and resource conservation.



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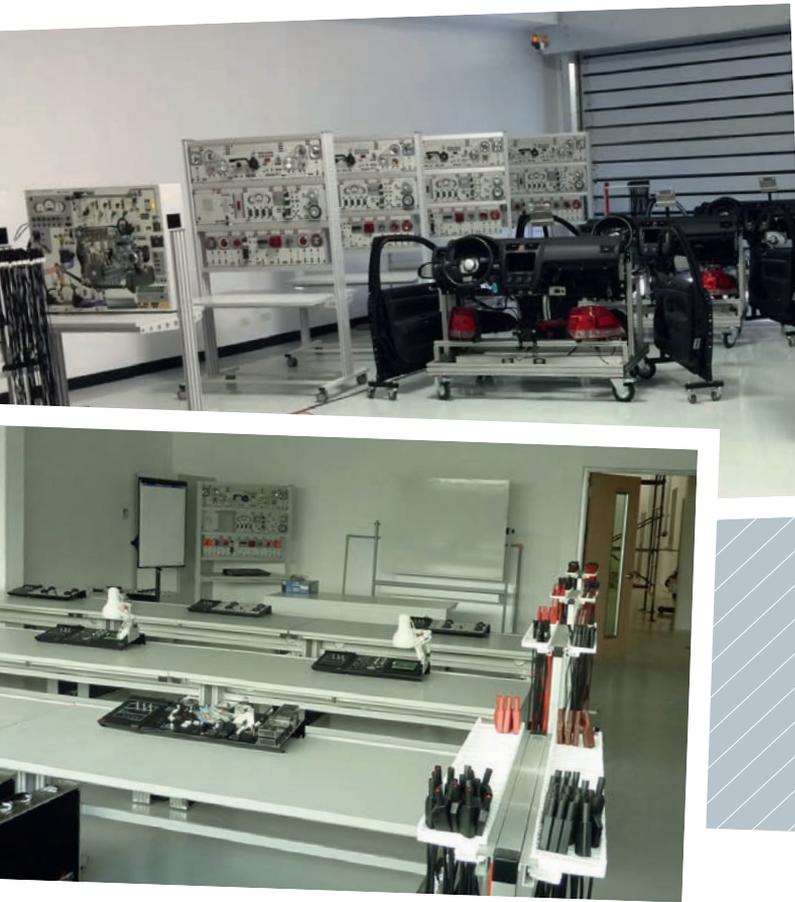
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The new automotive training centre



1,500 seminars per year

The President of the UTP, Dr. Jorge Guillén, explained: “The training centre offers great possibilities for the federal state of Puebla. We will have the opportunity here to refine and pass on our scientific and technological expertise.”

The 1,500 or so seminars that are supposed to take place here every year are targeted at the 1,000 em-

“The training centre offers great possibilities for the federal state of Puebla.”

ployees Audi currently has in Mexico as well as at approximately 80 trainee mechatronics technicians, automotive mechatronics technicians, toolmaking mechanics, bodywork mechanics and production mechanics. The young trainees complete dual training at Audi based on the German model.

The Lucas-Nülle training systems on which the trainees learn their future trade provide them with a direct introduction to the practical application of their knowledge. The great advantage of the dual system, the integration of practice and theory, is reflected in the training systems.

Effective for use in practice

“For a training centre that trains people so directly for a company and is supposed to provide employees with further training in new topics, practical relevance is essential. Our automotive training systems allow both basic and special topics to be covered and conveyed effectively to trainees as well as experienced specialist employees,” says Schulz.

It is essential that the new training centre is effective: Audi is going to take on some 3,800 new employees in Mexico by 2016, who will have to be trained in new topics within a very short space of time.



Signing of the cooperation agreement between the Jakob-Preh-Schule and Lucas-Nülle

A Strong Team: Jakob-Preh-Schule and Lucas-Nülle

The Jakob-Preh-Schule in Bad Neustadt is a school specializing in dual training courses in technical occupations. Besides vocational school classes and vocationally oriented advanced courses, the school also offers dual higher education courses in cooperation with regional companies. This makes it a regional centre of excellence for the technical training of young people. Cooperating with Lucas-Nülle was a natural step and led to the creation of a perfect team.

When the vocational school wanted to add electrical engineering and vehicle technology – in particular electromobility – to its programme, principal Kurt Haßfurter turned to Lucas-Nülle.

The school already had several years' experience with Lucas-Nülle training systems and was convinced that the renowned manufacturer was the ideal partner to equip its laboratories in a practically relevant way and to provide state-of-the-art training on a sustainable basis.

The new equipment that was procured as part of the establishment of the “Electrical Engineering” and “Vehicle Technology and Electromobility” sections included the subject areas of Drive Technology, Smart Grid and Electromobility. “The wide range of new equipment and the school’s high level of didactic competence also made it an attractive partner for us in terms of evaluating our systems,” says Wolfgang Pietsch, member of the sales team for the DACH region at Lucas-Nülle.

The two partners therefore concluded a cooperation agreement aimed at facilitating mutual technical and organizational support. The competence centre for electromobility and ener-

gy-efficient drives is a particular focal point of the joint projects. “We cooperate in delivering the school’s regional and national training courses for specialist subject teachers and instructors. Our contribution consists in providing consultants and technical equipment,” Pietsch explains. “In return, the teachers provide Lucas-Nülle with support in developing and perfecting our training systems by sharing their experiences and giving concrete feedback from the classroom.”

Teachers at the Jakob-Preh-Schule will also selectively test the Lucas-Nülle training software and make suggestions regarding its further development.

When school principal Kurt Haßfurter, Wolfgang Hüppe, sales manager for the DACH region at Lucas-Nülle, and Winfried Miller, treasurer of the Rhön-Grabfeld administrative district, signed the cooperation agreement, the first joint projects, such as the Unterfrankenschau exhibition and an initial teacher training course, were already in the pipeline. Both events were successful, so both partners are already looking forward to the next training events.



Careers in the Fast Lane

Australia's Kangan Institute Automotive Centre of Excellence steps on the gas – with new equipment from Lucas-Nülle

“Real education. Real skills. Real jobs.” That is the motto of the Kangan Institute Automotive Centre of Excellence (ACE) in Victoria, Australia, and one which is taken seriously by its instructors. Not only do they want to comply with state-of-the-art standards, they strive to be a step ahead of them. The newly equipped automotive laboratories with training systems from Lucas-Nülle are the highlight of the innovative educational institution.

With some 40,000 enrolled students, who are either studying at the campuses in Victoria or via online courses, ACE is one of the continent's largest vocational education and training establishments and the most important education and training provider for the automotive sector. The institute offers a varied programme ranging from short courses to diploma courses lasting several years. ACE attaches particular importance to practical relevance and effective teaching of skills. This also benefits those students who want to prepare for the real world of work during their courses, thereby ensuring a smooth start to their careers. A qualification from ACE is often a career booster in the automotive sector.

One of the institute's strengths is that it has always had good contacts with industry, working closely with companies in the various sectors. It is living up to this reputation once again with the systems from Lucas-Nülle. A new laboratory covering an area of about 200 m² has been installed, which covers all automotive systems.

“The practically oriented approach of our training systems corresponds exactly to that of the institute. It is therefore a very satisfactory partnership for both parties,” says Lez Twine, sales director for the region. “Here at ACE, the instructors make full use of the many possibilities offered by our multimedia training systems.”

Training systems: Partners for all levels of learning

Besides UniTrain systems, the CarTrain systems and the didactically optimized Volkswagen Tiguan are particularly popular platforms for technically demanding training units. This is also appreciated by the students, who were soon giving enthusiastic feedback.

Georgia Henderson explained: “These systems are great, they make it so much easier to understand the technical interconnections.”

Apart from the orientation towards industrial standards and company requirements, the sphere of online courses is also very important for ACE. Distance learning students should, where possible, have access to the same content and experiments as participants attending on-site courses. “The fact that our courses can be easily integrated into a learning management system was a strong point in favour of our products,” Twine emphasizes. This allows students to prepare themselves via online training, working on many sections of a

“The practically oriented approach of our training systems corresponds exactly to that of the institute. It is therefore a very satisfactory partnership for both parties.”

topic independently. When they subsequently attend on-site teaching units at the institute, they can carry on training in a learning environment that is already familiar to them, thus facilitating a smooth integration into the course.

Spatial planning, systems and didactic course from a single source

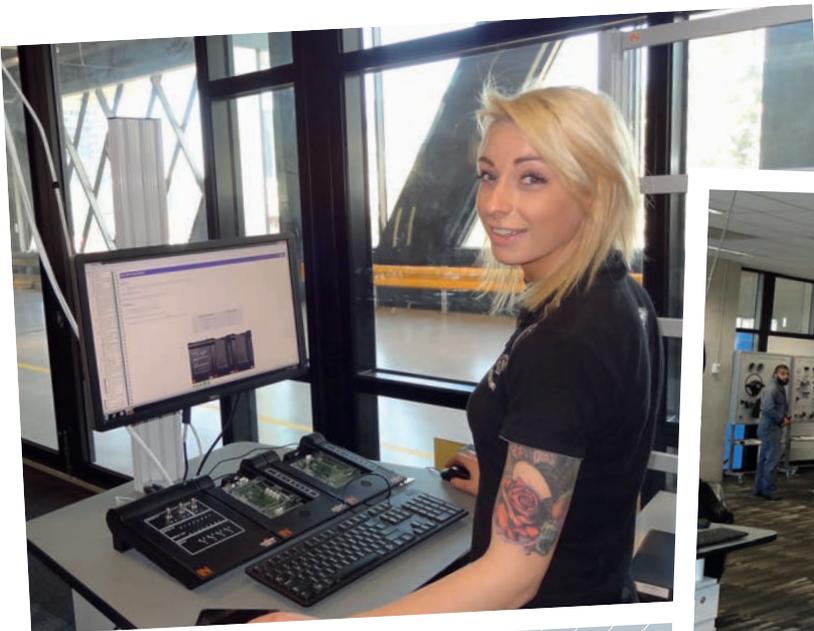
Independent learning is part of the ACE concept, and the premises have also been adapted to take account of this. Training Systems Australia, an exclusive partner of Lucas-Nülle, provided the educational institution with support in planning the laboratories.

With their help, it was possible to make optimal use of the available space and arrange the systems in such a way that they dovetail. Trainees at different levels of learning can be taught simultaneously in one laboratory.

“This laboratory facilitates the kind of learning that ties in with our idea of networked learning. It

is based on modern, trainee-focused teaching methods, enabling young people to prepare themselves optimally for a career in the automotive industry,” Twine explains.

New training systems in use:
Georgia Henderson is impressed.



Bill Triantafyllou and David Birnbaum from TSA, Les Twine from Lucas-Nülle and Adrian Lauder and Phill Murphy from the Kangan Institute Automotive (left to right)



Engine for Automotive Training

Innovam, the automotive guild of the Netherlands designs and organizes technical education and training for the automotive industry. In the Netherlands, many training courses, including technical ones, are school-oriented. The education planners from Innovam therefore attach great importance to facilitating practical experience for trainees and integrating new technical topics into the training. At the MAC (MBO Automotive Center) Helmond, they developed a unique practice lab for the Auto-Campus in collaboration with experts from Lucas-Nülle.

The practice lab is open to companies and automotive schools, enabling them to explore technical topics with their trainees.

“Many schools, in particular the smaller ones, are simply not in a position to constantly upgrade to the latest state-of-the-art technology. The MAC Helmond fills this gap in the training on offer and bundles resources, benefiting institutions across the entire region,” explains Manfred Masson, sales director for the Dutch- and French-speaking regions. The MAC Helmond offers the appropriate training environment for all topics and levels of learning. Besides UniTrain courses for basic training, there are also CarTrain systems which the trainees can use to explore new technologies such as electromobility or engine management.

Whether it be a short seminar on special topics or initial training in an automotive skilled trade, the centre offers state-of-the-art automotive know-how. This makes the training cen-

tre at the MAC Helmond equally attractive for qualified employees and trainees.

The interactive learning tools from Lucas-Nülle are a key factor here. They link practice and theory in such a way that trainees of every level can work through and learn the material independently and then apply it. The planners hope that the interactive training systems will improve the quality of training and provide an additional boost for regional companies. To this end, the MAC will work with four re-

gional training centres, a college and several motor vehicle companies. Trainees at the four affiliated schools (ROC Ter AA, Guild Ausbildung, ROC Leijgraaf and Summa College) will use the centre on a regular basis in order to familiarize themselves with new technologies.

Theo Schippers, director of the MAC, is pleased with the new equipment: “I have already encountered the Lucas-Nülle systems at many educational institutions throughout Europe. It was always obvious that this state-of-the-art equipment is ideal for a multitude of learning situations. In particular the blended learning approach suits our needs.” He adds: “The new materials are ultra-modern and can be integrated into lessons without any problems. They therefore really do enrich the learning experience for our students and teachers.”

Equipping the lab is an important first milestone in training the skilled workers for the surrounding businesses.

The training centre at the MAC Helmond attracts skilled employees from the whole region.

“Many schools, in particular the smaller ones, are simply not in a position to constantly upgrade to the latest state-of-the-art technology”





Educational experts gave reports from the field of practice and research.

Training Manager Day A Complete Success!

The dual training system is subject to constant changes. New generations of students, new curricula, the changing world of work, technological progress – it is hugely important for decision-makers and training managers to be able to identify and evaluate current trends. A good network with like-minded people and experts is an important source of inspiration and impetus.

Lucas-Nülle has therefore initiated the Training Manager Day. The two-day event, which took place for the first time in October 2014 at the VCC Vogel Convention Centre in Würzburg, provided a networking opportunity for training practitioners, scientists and experts in technical vocational training. On the eve of the conference, the participants had the opportunity to exchange ideas and experiences over dinner. On the day of the event, the wide range of presentations and papers given by the experts ensured that there was plenty to talk about.

In his keynote speech, Prof. Michael Heister from the Federal Institute for Vocational Education and Training (BiBB) examined the future of vocational education and training at the national and international level. In his talk, Ulrich Iv-

ens from the Jülich Research Centre explained how important it is for instructors to get further training and qualifications. Christoph Müssener, Managing Director of Lucas-Nülle, gave an insight into the technological developments and challenges for training systems of the future. Werner Degen from Vogel Business Media GmbH looked at the prospects for e-learning while Sabine Bleumortier brought home to the participants that the new generation of trainees has a different mentality, and what this means for companies and instructors.

The response to the invitation was good, the positive feedback after the event even better. “A worthwhile event

with the right mix of networking, exchange and information,” said one grateful participant.

In view of the enthusiastic feedback, it has been decided to hold the event again in 2015.

Lucas-Nülle invites you to the next one from 29-30 September.

You can register now at www.lucas-nuelle.de/seminare.



TRAINING SYSTEMS FOR METAL-RELATED OCCUPATIONS

WOLFGANG STRUTH IS CONTINUING TO EXPAND THE SEGMENT

Today, training is provided in eight metal-related occupations in industry and the trades. Lucas-Nülle has offered attractive courses for the occupation of motor vehicle mechatronics technician for a long time. The company has now added new courses for all industrial metal-related occupations that share the ending "mechanic". The content covered by these occupations is becoming more complex and demanding all the time. One more reason for Lucas-Nülle to further expand this segment. A new training expert has been brought on board for this purpose.

Wolfgang Struth has worked in industrial metal technology for over 30 years – he spent a large part of this time as an instructor in companies, as an examiner on an examining board and as an instructor at vocational training establishments.

"I have always enjoyed introducing young people to new topics and passing on my enthusiasm for metal technology," says Struth. "Nevertheless, I found it easy to make the transition from instructor to training system developer. The exciting challenge consists in building the bridge between electrical engineering systems and metal technology systems."

His many years of training experience will be very useful to him when implementing the training content and didactically preparing the learning content.

As with the electrical occupations, there are no longer any specializations following the reorganization of 2004:

- Plant mechanic
- Production mechanic
- Industrial mechanic
- Construction mechanic
- Punching tool and forming die operator
- Toolmaker
- Cutting machine operator

"For the metal-related occupations too, it is a question of developing skills that go beyond purely content-based aspects. For example, team competence, because large-scale projects can only be managed together," Struth explains.

In each case, he therefore wants to configure the new systems in a way that will foster teamwork from the start. Comprehensive project work for small groups is essential, for example setting up and starting up an installation. The metal technology training systems thus tie in with the mechatronics and electrical engineering systems from Lucas-Nülle.

"This means that electrical engineering trainees can also see that the fundamentals of metal technology will help them in their day-to-day work," Struth emphasizes.

Wolfgang Struth, new product manager for metal technology at Lucas-Nülle



WORKSHOP INSTRUCTION – THE RIGHT TOOLS MAKE ALL THE DIFFERENCE

Well-assorted tool kits are an essential part of any fully equipped laboratory or complete training workshop. Until now, teachers had to put these together themselves depending on the training involved. Lucas-Nülle now offers curriculum-specific kits with high-quality tools, and has also optimized organized storage.

Trainees need a wide range of tools for the fields of installation technology, automotive technology, electronics and refrigeration/air conditioning technology which they will later also have to use in everyday working life as a matter of course.

Lucas-Nülle has therefore put together tool kits for the different training courses: curriculum-based and drawing on experiences with projects in different educational institutions.

Stefan Linden, product manager for laboratory technology at Lucas-Nülle, summarizes the most important advantages: “Based on the training curriculum, we have put together practical kits using tools from a leading German manufacturer. This means that the tools are immediately to hand during lessons. Moreover, the tools and their storage are perfectly suited to the laboratory and workshop equipment.”

In the foam inserts, which have been adjusted to drawer dimensions, each tool has its own labelled place. The inserts also have a two-colour design so that the student can see straight away where the tool that has been removed is supposed to be stored.

“Our tool kits represent a further expansion of our laboratory and workshop equipment range,” says Linden. “Lucas-Nülle can now equip complete laboratories and workshops as a single-source system supplier. For educational institutions, this has the ad-

vantage that all the components are perfectly suited to each other while at the same time meeting the usual high quality standards of Lucas-Nülle.”

The first educational institutions to have opted for Lucas-Nülle as a full-service supplier are the Holzkirchen and Papenburg vocational schools and Lënster Lycée in Junglinster.

You can read more about the major Lënster Lycée project:
On page 28.

Perfect fit: the new tool kits



