

ANALYSIS

JHY - FUNDS

PROTECTED SALES GROWTH DYNAMICS



New Consulting Offering

MicroNova expands consulting services in the testing area

SMO Architecture in Practice

Successful proof of concept for RAN use cases

Workload Management with monday.com

Successfully coordinate the workload of teams



The Great Balancing Act



Dear Reader,

In our previous editorial we talked about challenging times – on the one hand, this is unfortunately more true than ever. Just look at the current geopolitical upheavals, inflation, a shortage of skilled workers, chips and supposedly mainstream energy sources, a recession that is imminent or indeed already here, etc.

This is one side of the coin. The other is that many companies still have a record order backlog, unemployment is low, supply chains are being actively rebuilt, the energy transition is making progress... So it proves true once again that challenges usually are or at least open up opportunities – although it is of course important that those who cannot participate in them are included in any sort, too.

All companies, including MicroNova, have to master the balancing act between uncertain times and opportunities. Happily, we managed to do this very well in 2022. And a glance at our portfolio and our know-how makes me confident for 2023 too. Because we can offer you, our customers, tangible and measurable added value in many and an ever increasing number of places.

In the testing environment, for example, we have further expanded our consulting expertise. Further information about this can be found in a detailed article on page 4. Articles about AI, automated test cases and

cooperation with AVL underline that the Testing Solutions division at MicroNova has the right solutions for car manufacturers and suppliers, and increasingly for companies in other sectors.

Added value through automation is also an important topic in the telecommunications sector. Numerous processes and procedures relevant to mobile network operators in terms of the Radio Access Network (RAN), for example, can be made even more efficient and can be optimized for risk – you can find an article about this starting on page 14.

Enterprise software such as that from ManageEngine or monday.com can also be an extremely helpful tool when it comes to successfully managing the balancing act between uncertain times and opportunities. Articles from page 18 onwards explain how companies can advance their internal projects in IT or project management using solutions from these two software firms.

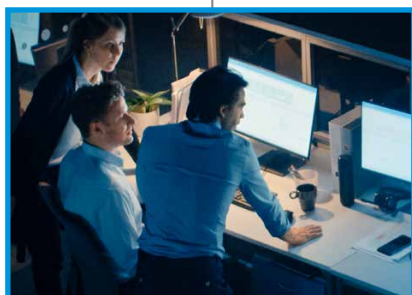
The interest shown by the Munich University of Applied Sciences, our guests at an innovation workshop, is one example that shows that MicroNova is succeeding in this balancing act. And another example: the award given to MicroNova as one of Bavaria's 50 best companies. In all of these matters, I always like to remind people that the consistency and trust of the company's owners are important building blocks for such successes – MicroNova founder Josef W. Karl has some more news for you in this regard on page 31.

Now once again I hope that you enjoy reading the magazine and I wish you health and, of course, a peaceful future.

Your Orazio Ragonesi

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We have the Solution!

MicroNova has greatly enhanced its range of consulting services – from artificial intelligence to virtualization.

TEXT: Dr. Klaus Eder, Stephan Schmidt **PICTURES:** © ImageFlow / Shutterstock.com

Electric cars, autonomous driving, digitalization and the resultant topics ranging from new business models to cybersecurity – the highly dynamic automotive industry requires in-depth testing concepts based on innovative technologies. Manufacturers and suppliers have had to and still have to adapt to the “software-defined car”, restructure themselves for it, and build up expertise. The reliability and safety of control units and the associated software are essential elements of this.

Other relevant examples include the development of proprietary vehicle operating systems and highly automated assistance systems, the networking of vehicles, and continuous software updates, including the provision of new functions over-the-air (OtA). Today’s automotive industry therefore requires efficient and reliable safety mechanisms more than ever before, and these must be underpinned by technology and processes. The necessary depth of testing can only be achieved through a high degree of automation.

Against this background, MicroNova advises its customers on the essential challenges that the new automotive world is primarily facing: test concepts and processes, modeling and virtualization, functional security, cybersecurity, and the use of artificial intelligence (AI).

Customized Consulting for Test Concepts and Processes

This support relates to the entire implementation of test projects – from concept development, evaluation of



state-of-the-art technologies and trends to process consulting and support during integration in project and quality management. Added to this is the support and optimization of complex testing structures. MicroNova acts here as a consulting partner. The focus is on complex issues including the associated preparatory work and documentation.

The aim is to give the specific projects the best possible start so that they can then be handed over to our customers' subcontractors for subsequent execution. MicroNova Consulting provides support for optimizing test projects as well as for setting up test facilities – from design to test report.

The associated portfolio of consulting services ranges from the conceptual design and selection of the ap-

propriate test method the support for tool extensions and the initial setup of the test automation solution to the complete test project. The solutions we develop are always manufacturer-independent and therefore take into account the most suitable mix for the particular customer or project.

Modeling: Creating, Maintaining and Developing Simulation Models

Exact replication of the associated sensors and actuators forms the basis for reliably safeguarding electronic control units on HiL systems. In addition to extensive expertise in sensor and actuator modeling, MicroNova brings many years of experience in scenario and environment modeling to the table. This includes the creation as well as the maintenance and extension of existing models.

Systematic modularization considerably shortens the compilation times for the models. This means that a separate model is created for each control unit and each function, which can be run independently directly on the HiL simulator – without the need for costly re-compiling of the entire model. This applies to all levels of abstraction: from simulating the bus communication of a non-existent ECU to ECU functions that can also be split into modules if they become more complex.

Earlier and Greater In-depth Testing with Virtual ECUs

Electronic control units (ECUs) for modern vehicles are becoming increasingly complex due to the growing

number of assistance systems and more and more autonomous driving functions, which in turn increases the demands placed on reliable validation. New ways of testing ECUs are needed to meet these demands. One of these is virtualization. MicroNova Consulting provides companies with comprehensive support in operating virtual ECUs. Their expertise helps manufacturers and suppliers to perform ASIL-D-relevant tests in accordance with the requirements of the ISO 26262 standard (see below), including virtually.

This type of test solution has been part of MicroNova's core business for more than 30 years. This brings the digital twin of future vehicle series within reach.

Artificial Intelligence: Data Science and Machine Learning

Another consequence of increasing digitalization related to topics such as Connected Car / V2X, Industry 4.0, IoT or Agile Development is that huge amounts of data from different databases and systems need to be properly collected, processed and analyzed. To this end, it is crucial for companies to combine data from different sources in one application in order to be able to use and evaluate them in a centralized manner.

Accordingly, MicroNova's consulting services also cover the associated data management and evaluation based on artificial intelligence. Automotive companies, for example, can validate autonomous driving functions effectively and efficiently, in particular in combination with data science.

Data science plays an important role in the development of suitable AI systems, for example for the intelligent testing of user interfaces or for creating adaptive, learning models for vehicle components or environments. Using preliminary data analysis and workshops, MicroNova's consultants identify the relevant application potential and support OEMs and suppliers in all challenges related to the use of AI.

Security Concepts

Appropriate safety concepts are essential, no matter what technology is used or what solution is introduced. The regulations of the United Nations Economic Commission for Europe (UNECE) are intended to enhance the protection of control unit architectures against attacks by hackers, for example. Manufacturers must therefore comply with UN R155 for the Cyber

Security Management System (CSMS) and UN R156 for the Software Update Management System (SUMS) in order to obtain approval for new vehicles.

Consequently, development and production must build up the corresponding expertise, along with processes, methods and tools. MicroNova advises and assists OEMs and suppliers in complying with these EU requirements. In addition, our consult-

Cyber Security as Part of MicroNova's Consulting Services

MicroNova supports OEMs and suppliers in the automotive sector in implementing EU requirements regarding cyber security. The processes MicroNova has introduced at companies in the area of cyber security are based on the specifications of the ISO 21434 standard; continuous assessment of the situation makes sure that these can be adapted in good time. Being able to reuse proven templates saves time and costs, as does our know-how. The internal development of skills carried out with the help of our experts also ensures independence in the long term.

Custom services for cyber security projects

- » **Establishing a Cyber Security Management (CSM) system taking into account cyber security risk management:** By using standardized tools and methods, MicroNova supports companies in the fast and efficient implementation of cyber-secure development projects. The central building block here is to establish a Cyber Security Management System (CSMS). Clients benefit from our experts' years of experience in the validation of electronic components in vehicle development.
- » **Threat assessment:** Analysis and assessment of potential threats in terms of probability of occurrence and severity. A risk analysis helps with the decision whether and which measures need to be taken. The downstream cyber risk management identifies and quantifies the risks, from which it is possible to derive the appropriate measures.
- » **Identification and prioritization of potential vulnerabilities of a system with regard to cyber security**

More information: <https://www.micronova.de/cyber-security>



ing team applies its expertise relating to ISO 26262 in order to support automotive manufacturers and suppliers in implementing the measures required by the standard covering the development of automotive electronics.

The services are directed at functional safety managers, quality managers, and test managers looking for compe-

tent advice on project coordination, requirements creation, and documentation. Our consultants provide advice and support in identifying and implementing improvement potential for processes and tool chains in the area of functional safety. This also applies to related services concerning Automotive SPICE (ASPICE).

Summary

Whether hardware or software: we have the solution. After all, MicroNova's consulting services enable OEMs and suppliers in the automotive industry to take any project to the next level – this is our value proposition. Incidentally, the tried-and-tested concepts and services from the automotive industry can also be used for ECU protection in other sectors; the principle remains the same: optimized test processes and efficient data management speed up reliable development processes and save costs. ■



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Enterprises Need to Put AI to Work!

Everyone's still talking about Artificial Intelligence (AI).
But how can real progress be made on the subject in
everyday business? A commentary.

TEXT: Tobias Weimer PICTURES: © Efman / Shutterstock.com; © MicroNova

Used correctly, Artificial Intelligence and Data Science, for example, can open up a wide range of possibilities for making operational processes significantly more efficient. This is true of numerous industries and segments – but only a few subjects open up as much potential as the validation of autonomous driving functions. For good reason, MicroNova's Consulting & Services division has for some time now been offering a comprehensive range of consulting and development services with a focus on Data Analysis and Machine Learning (ML); companies from the automotive sector receive valuable assistance for the challenges they face relating to the use of AI.

Because one thing is clear: AI must become widespread! But how can companies, in this case MicroNova, really push forward the issue operationally during ongoing everyday business and as such in addition to all orders and deadlines? How can employees be won over for an AI project? How can ideas be collected and implemented in such a way that they can be used in a customer project? And how can all this be done when everyone involved has little spare time available?

The answer is as simple as it is challenging: just do it! AI is not just something that can or should be approached strategically. Rather, there are a number of possible starting points, such as a project of individual people, as weekly meetings, or via dedicated brainstorming sessions. If an exchange of knowledge is desired and at the same time employees' pre-

vious time is to be used optimally to actually arrive at a functioning piece of software, there is another way: the hackathon.

In this event form, talents from different areas work on one specific problem for a limited period of time – and sometimes achieve amazing results. This is also the case at MicroNova, with its many brilliant experts. Since they all work at different sites, the latest hackathon from our AI Competence Team was a cross-border event, with colleagues from Mladá Boleslav in the Czech Republic, and Wolfsburg and Leonberg in Germany.

The topic of the hackathon was to test software including a graphical user interface. Due to time constraints, it was important that the tests were automated – because the software is developed agilely in a SCRUM project



and therefore new releases have to be scrutinized regularly. Furthermore, the tests carried out should also be usable later for qualification of the software according to the ISO 26262 safety standard. The tools available to achieve this very often require adaptations to the software being tested before they can be used at all. In this case, however, not least for safety reasons, the software had to be tested in its original state.

A brainstorming session at the beginning of the hackathon revealed two possible solutions: the use of a) AI libraries to examine individual elements of the user interface or b) a freely available framework already developed for testing UIs. Working groups followed up on both approaches. It soon became clear that the freely available framework would have had to be adapted to the use case at hand,



1 In a cross-site AI hackathon, MicroNova participants tested a software including a graphical user interface.

which would require a lot of effort. The team therefore decided to develop its own EXAM library based on AI libraries. The working groups were divided again between development of the library, and testing and documentation; another group ensured the library's compatibility with the EXAM Test Case Generator.

The developed library can scan the user interface to identify the menus, buttons and text boxes that can be used to operate and test the software. This means the application being tested is operated automatically as if by a real user. In the next step, the library was used to implement the test specifications as automated test cases in EXAM. Using the Test Case Generator also saved time.

Ultimately and despite a tight deadline, the MicroNova team was able to achieve the hackathon's stated goal: The required library for implementation of the automated test cases was available. An extensive test of the library also proved that it was suitable

for use in qualification tests in accordance with ISO 26262.

For us at MicroNova, this proved once again that AI can also be used in areas such as testing graphical user interfaces, and the solution can be quickly available with the right approach. Or to put it another way: If tackled correctly, progress on the subject of AI can be achieved in everyday life! ■

AI Study

According to a BITKOM survey, roughly two-thirds of companies see AI at least predominantly as an opportunity – but only nine percent are actively dealing with it. Only a quarter are planning or discussing its use. Overall, interest and use predominate among large companies. More information (GER): <https://www.bitkom.org/Presse/Presseinformation/Kuenstliche-Intelligenz-2022>

Automated Test Case Creation pays off

Test automation solutions have become an indispensable tool in ECU development. A practical example shows why an investment is worthwhile.

TEXT: Stephan Schmidt, Tobias Schibgilla PICTURE: © Gorodenkoff / Shutterstock.com

Over the course of their careers, test engineers are repeatedly faced with the question of whether the creation of test cases can be automated. And almost as often the answer is yes. This provides a clear indication of the myriad solutions that this affirmative answer to the question has produced over the years in various departments and companies.

Certainly not all of the attempted automation approaches could be maintained in the long term. And some attempts even increased effort instead of reducing it, meaning they had to be laboriously reversed – often a painful process. We at MicroNova are also familiar with these challenges. The lessons learned were an important condition for us to develop the Test Case Generator (TCG), a powerful, future-proof, and long-lasting product for the automation of test cases. How well it works in practice is shown by

the project outlined below, in which MicroNova came to the aid of a test department at an automobile manufacturer.

No global view

The department in question had been around for several years at the time of the project. As such, the variance and product diversity had grown over time, making an expansion of the testing infrastructure inevitable. The department made the decision to outsource parts of the testing process to avoid a linear increase in costs. The outsourcing contracts were organized by the procurement department, and various providers underbid each other.

The result was frequent changes of test implementers, which left behind an almost unmanageable proliferation of automation. For example, a multitude of help scripts were written to

somehow get a grip on the continuously growing number of parameters. This went so far that at some point none of those involved actually knew the details of how exactly the automation worked. To rectify this, experts were first identified and hired internally. But even they soon reached their limits.

The beginning of an experiment

At this point, it was clear to everyone involved that things could not continue in this way. The problem had to be tackled for the long term. Therefore, the department decided to bring MicroNova on board. The next steps were quickly decided after the initial discussions: An expert from MicroNova's Consulting team in the Testing Solutions division would be made available exclusively to the company for six months. His mission: To have

test specifications interpreted automatically by the Test Case Generator developed by MicroNova and to create test cases for a new vehicle project.

In parallel, a team of implementers would work on the test cases for the same vehicle project using conventional methods. To ensure that the two parties did not get in each other's way when working with the database, a copy of the relevant test automation data was requested from IT. This allowed MicroNova personnel to work in the copy and the implementer team to work in the original model.

Test specifications as a challenge

Right from the outset of the project, the Testing Solutions consultant had to overcome one of the biggest hurdles: Adapting the data structure to the Test Case Generator. The data had initially been developed for a specific environment and so for a specific data structure. However, the structure of the data is not necessarily exactly the same in every company, let alone in every test department. This meant that – as with almost every major IT project – various adjustments had to be made before the tool could actually be used.

However, for the TCG to be able to interpret the existing data as a sequence of commands as desired, it was first necessary to adapt the specification texts, for example. Up until then they had only been available as continuous text. In order to be able to use them with the TCG, the MicroNova expert compiled specifications from various test attributes and in some cases restructured them. For the most part, this was possible using specially developed scripts. The analysis of the data structure and the subsequent scripting took some time – an invest-

ment at the beginning that nonetheless laid the foundations to reap the reward later on and led to the project's success.

The structure found also offered its own advantages: For example, it was possible to quickly identify keywords that the MicroNova consultant could use to speed up the mapping process. He also revised a large library with special functions for the test infrastructure as well as the ECUs themselves – another milestone before the actual work on test cases could begin.

Interim status after six months

Once the preliminary work for the deployment of the TCG had been successfully completed, it took almost no time at all to reach the next major milestone: A comparison of the work of the two teams, after exactly six months. The MicroNova expert alone had completed all the necessary preliminary work for the use of the TCG and was able to present around 50 test cases that could go into productive use. In contrast, the team of implementers had created around 500 test cases using the conventional method.

Since there were around 2,000 more tests still open, the department decided to continue both approaches for another six months. But just three months later, the remaining test cases could be generated automatically using the TCG, with the exception of roughly ten percent that were deemed too time-consuming for automation. This meant the company was able to reallocate the remaining budget and, with the help of the MicroNova consultant, spend three months automating the next vehicle project. The conventional approach was then used only to maintain existing projects.

Following the successful deployment, MicroNova has since been able to withdraw its consultant from the project and hand his tasks over to internal experts; they now manage both vehicle projects and only call on the MicroNova employee's know-how for complex problems as and when the need arises.

Implementing a test case using the TCG now only takes about ten seconds per test case – a fraction of the previous manual effort. The capacities freed up by this time saving have been used by the company, among other things, to re-evaluate the remaining ten percent of non-automated tests, which were initially put on hold as being too time-consuming. In this process, further cases suitable for automation were identified, then processed and productive use made of the time that had previously been spent on maintaining parameters in conventional test operations.

Conclusion

In summary, this project very clearly shows that investing in the introduction of a new tool – in this case the Test Case Generator – can pay off significantly with the correct approach. This is true even if the initial effort takes a little longer due to the specific starting position requiring extensive preparatory work, as was the case in this project. In any case, the effort has paid off measurably for the user: Test automation has drastically increased efficiency with the TCG, which in turn has freed up resources for new projects. This also pays off financially in the medium and long term – all the hallmarks of a classic investment. ■

MicroNova and AVL: Cooperation for Testing ECUs

HiL Simulation Platform NovaCarts for Use with AVL CRUISE™ M

TEXT: Editorial staff PICTURES: © AVL; © SMART TESTSOLUTIONS Emanuel Zifreund

Fuel Cells

In one of the first projects, AVL successfully modeled a fuel cell system with CRUISE M, which MicroNova subsequently integrated into the associated NovaCarts HiL simulator as a so-called plant model. The simple merging of models via the Functional Mockup Interface (FMI) was equally as impressive as the performance on the real-time simulator.

The simulation platform AVL CRUISE™ M is used for model-based development and optimization of vehicle subsystems up to the generation of real-time models as required in hardware-in-the-loop (HiL) systems. From now on, CRUISE M users can deploy the HiL simulator NovaCarts as a target system ("target") – this is the result of a cooperation agreement between MicroNova and AVL List GmbH. MicroNova uses its years of expertise in the testing of ECUs to offer a comprehensive consulting service for the integration of CRUISE M on its NovaCarts simulation platform; this is complemented by corresponding services for the creation of models.

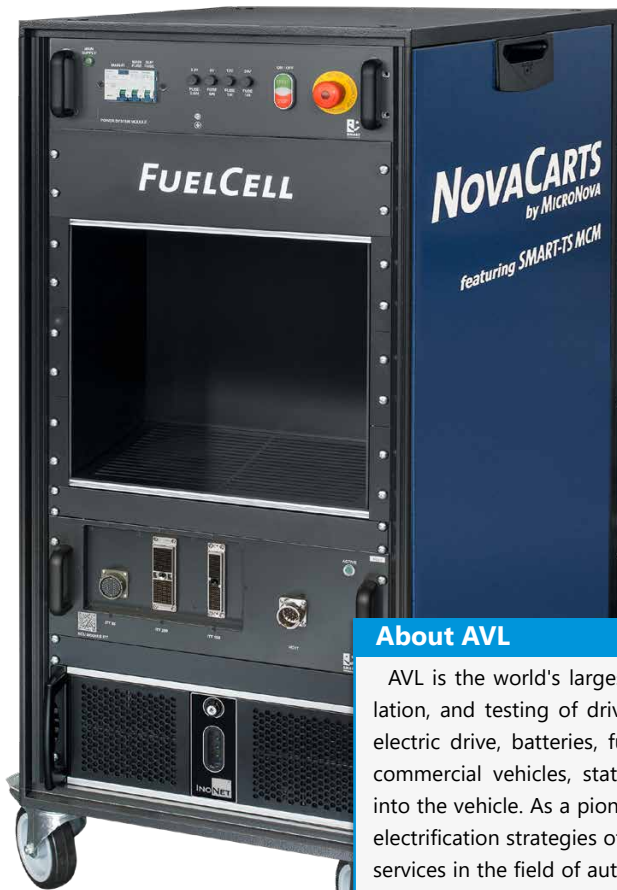
"With NovaCarts, we are adding a very powerful platform to the target hardware for CRUISE M real-time models. This is particularly interesting for our customers from the mobility environment," says Dr. Roland Wanker,

Vice President AVL Advanced Simulation Technologies. "They can achieve even better quality at a lower cost, and in this way gain an additional competitive advantage."

CRUISE M is designed for model-based system development and enables the integration of high-quality, real-time capable subsystem models. Potential applications include electrical machines, battery storage, and fuel cell systems. When it comes to modeling, users have access to an extensive library of components from various domains of vehicle development.

Consistent system layouts

It does not take long to create even extensive system models. The numerical solver, designed for efficient multi-physics simulation, allows these models to be calculated on the NovaCarts real-time simulation system. Model



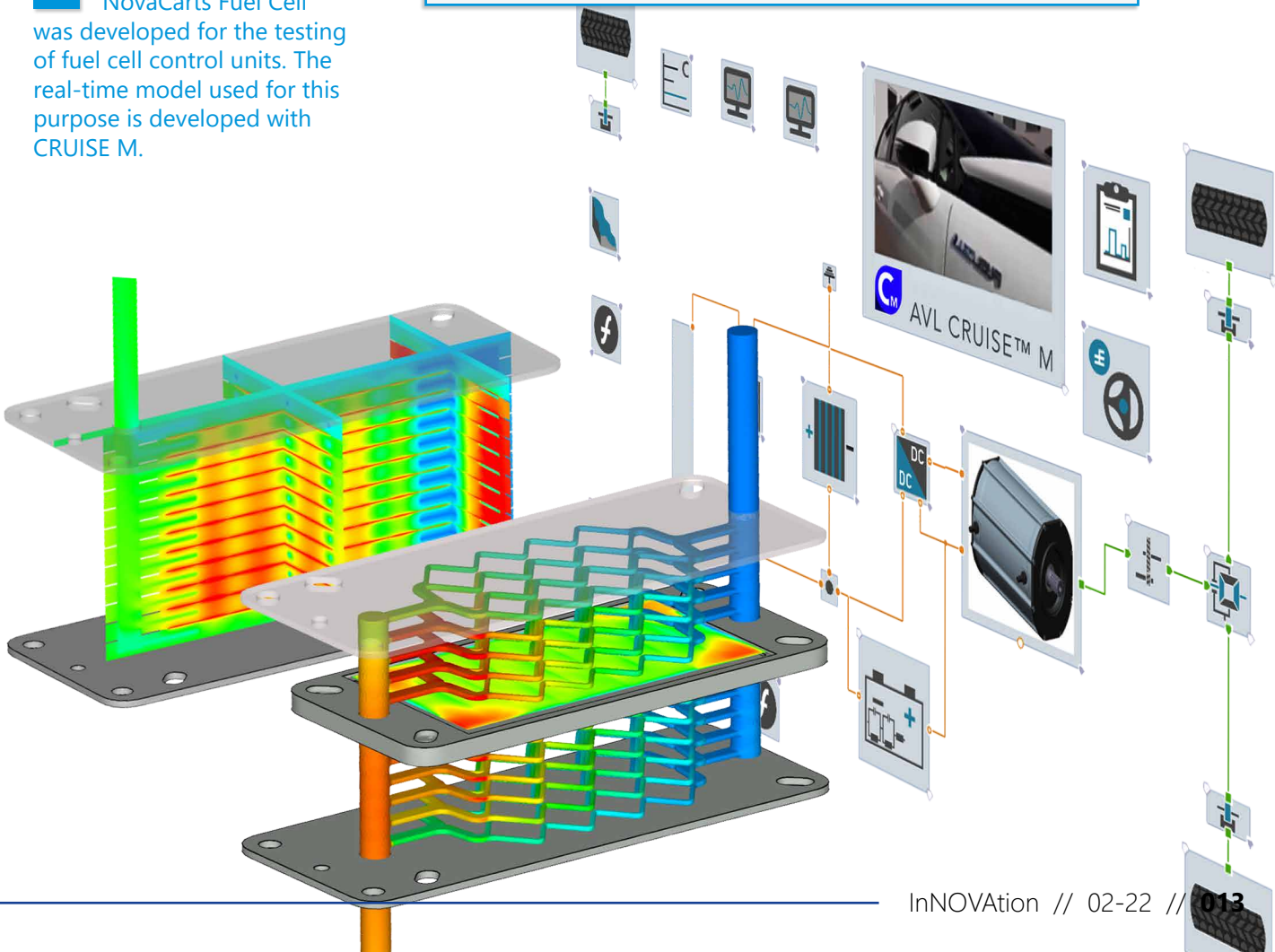
and solver are delivered together in a Functional Mockup Unit (FMU). The consistency from system layout to final test significantly shortens development processes.

"As development cycles become ever shorter, so the demands on HiL systems intensify. For that reason, with CRUISE M we offer users a powerful simulation system to create models more quickly. In addition to a shorter time-to-market, users benefit from the reusability of models once they have been created on the HiL," adds Dr. Klaus Eder, COO of MicroNova AG. ■

About AVL

AVL is the world's largest independent company for the development, simulation, and testing of drive systems (hybrid, combustion engine, transmission, electric drive, batteries, fuel cell, and control technology) for passenger cars, commercial vehicles, stationary engines, large engines, and their integration into the vehicle. As a pioneer in the field of innovative solutions such as diverse electrification strategies of propulsion systems, AVL is increasingly expanding its services in the field of autonomous driving, especially on the basis of subjective human perception (driveability, connectivity, ADAS, etc.). In the competition between technologies – combustion engine, battery-electric drive, and fuel cell – as well as combinations of them, AVL works intensively with equal priorities.

1 The HiL simulator "NovaCarts Fuel Cell" was developed for the testing of fuel cell control units. The real-time model used for this purpose is developed with CRUISE M.



From Network Automation to Orchestration Architecture

High network quality and new use cases: InNOVation 1-22 discussed the basic features of a service management and orchestration (SMO) architecture and network slicing. This article describes how many mobile network operators are driving practical implementation.

TEXT: Ingo Bauer PICTURES: © Kitawit Jitaton / Shutterstock.com; © Kara / Fotolia.com

The starting point of this SMO architecture is the automation solution developed by MicroNova over many years for radio access network configuration and optimization: COM5.Mobile and COM5.SDN. The complete mapping of the radio network design in the form of engineering policies/rules and templates in COM5.Mobile allows the vendor-specific models of Nokia, Ericsson and Huawei to be worked out in a fully automated way. This means that all relevant use cases can be automated to the greatest possible degree in a cost-effective and quality-enhancing manner, enabling the integration of new stations and their configuration, the activation of new features, and the optimization of network parameters.

By connecting the solution directly to the network, all changes made by a network planner or initiated by an orchestrator can be activated immediately and directly in the network after

successful zero-touch validation. An integrated parameter database provides the core component of the automation solution. It contains the entire design of the network, operator-specific policies and rules, as well as default values and templates. The vendor-independent model, which is highly optimized for functional use cases, permits easy connection to higher-level planning systems.

From Web Interface directly to SMO

COM5.Mobile's complete functionality is mapped using an open web interface. This enables easy integration into a higher-level workflow, SON, or even orchestration system. This creates the basis for completely automating the processes that are relevant for network operators.

The parameter database, which has been developed and continuously im-

proved over the years, offers highly flexible adaptability to customer-specific requirements. What is more, vendor-specific legacy models can be mapped or integrated in a structured manner with little effort. Furthermore, mobile network operators (MNOs) can easily implement new approaches such as O-RAN. MicroNova had already implemented zero-touch provisioning in COM5.Mobile for all central RAN use cases, creating the basis for automatically setting up network slices and service management.

Added Value for MNOs in Operation

A major advantage of COM5.Mobile for MNOs is the reusability of existing models and policies, network equipment, etc., right through to the integration and automation of existing

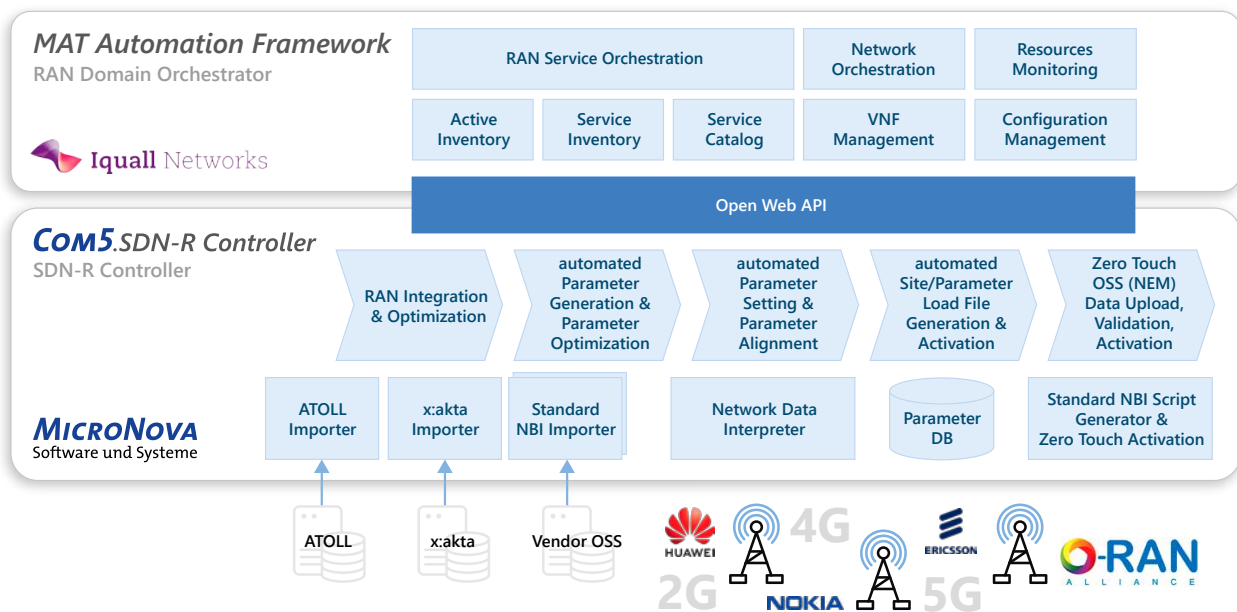
processes and use cases. This establishes a basis for subsequent integration of the existing network into an SMO-based architecture. The chosen path is technically low-risk and, moreover, cost-effective; at the same time, it can be followed in an iterative and agile manner.

Together with partner company Iquall (see box), MicroNova successfully implemented two exemplary use cases from the area of RAN configuration and optimization in the form of a fully functional proof of concept (PoC) within a very short period. One use case each from the area of integration (integration of a base station) and from the area of service-relevant parameter changes was selected, specified (cell parameter change) and implemented.



Iquall Networks

Iquall Networks specializes in providing software solutions to leading suppliers in the telecommunications market. The company has come a long way since releasing a global messaging and management solution in 2008 – all the way to today's fully agnostic network automation solutions. The Iquall team develops next-generation agile networks and guides its customers as they move into the era of automation and artificial intelligence.



1 System Overview

Key Focus for MNOs

The degree of automation mentioned above depends on the particular process group. Technologies such as ML and AI will continue to drive depth in the near future, as these are becoming increasingly important, especially with the increasing complexity and flexibility of the network

and a variety of new methods to provide scalability at an economical cost structure. The COM5.SDN-R Controller, drawing on all of MicroNova's experience, can become the hub for the entire network and an essential part of an SMO architecture for MNOs.

MicroNova has now been involved in telecommunications for almost two decades, automating processes and workflows with a focus on the radio access network (RAN). COM5.Mobile has always been a pioneering system in terms of functionality. With the COM5.SDN-R Controller, MicroNova has successfully transferred its cutting-edge power into a cloud-based solution, opening the door to future viability. The open web interface provides seamless integration into the new SMO-based architecture.

MAT from Iquall

MAT is an open automation framework that cloud service providers (CSPs) use to create customized use cases. The basis for this is built on well-known standard programming languages and techniques such as Python or Ansible. The framework provides a deeper level of intelligence and insight into the intended state at every step of the network lifecycle – from planning and design to service assurance. MAT is highly customizable, which benefits communications service providers in particular when introducing and applying automation solutions, for example:

- » **Intent Based Networking (IBN)** – for automating existing manual processes for network configuration, as well as for automated detection and resolution of network problems. It uses mechanisms such as machine learning and artificial intelligence.
- » **Model Driven Networks (MDN)** – a common modeling language for translating between service-specific configuration (service/slicing) and vendor-specific device configuration. Modeling with YANG (Yet Another Next Generation) as in O-RAN can eliminate the need for proprietary network adapters.
- » **Closed Loop Automation** – continuous assessment of network conditions, traffic, resource availability in real/near real time for optimal service quality and resource utilization according to operator guidelines. It provides continuous communication between network infrastructure and management systems for self-optimizing functions.

MAT offers excellent monitoring and traceability of all processes and tasks involved in the creation or other operation of the corresponding use case. There are many benefits to using MAT in automation processes:

- » Fast learning curve
- » No additional costs for NE scalability
- » Multiple domains
- » Independent of hardware vendors
- » Highly available architecture
- » Version control

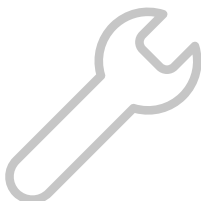
Summary

Together with its partner company Iquall, which provides a powerful orchestrator in the form of MAT (see box), MicroNova has been able to implement a fully functional PoC for a radio access network in a very short time. In doing so, the project team has shown that traditional vendors' legacy equipment can efficiently integrate into an orchestrated, fully automated environment – and that MNOs can maintain their existing design in a cost-effective, quality-enhancing manner. The COM5.SDN-R Controller is well prepared for integrating O-RAN thanks to its modular structure and model-based approach.



Process and Use Case Groups

Essentially, network operators distinguish between three groups of processes and use cases for network management – i.e., expanding and operating the mobile network: integration, optimization and service / slice management.



Integration

Integration comprises all network-related enhancements, such as the installation of new sites/base stations, the expansion of existing sites with new equipment, the modification of sites, etc. As a rule, this requires modifications to the hardware configuration, including on-site intervention by a technician. Upstream of this is a planning process. Maintaining consistency between "new v. existing configuration" is the biggest challenge throughout the entire process lifecycle.

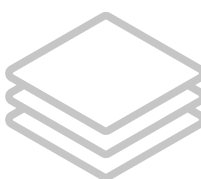
COM5.SDN-R Controller supports this process from the moment the planning data is imported, including the necessary consistency. Some parts of the process require manual intervention by a technician, while others can be automated by COM5.Mobile in a cost-effective and quality-enhancing manner. The functionality of the COM5.Integrator was incorporated into the open web interface and consequently into the COM5.SDN-R Controller. It is possible to integrate it into the orchestration layers above it without any restrictions.



Optimization

It is very important not to conflate the optimization use cases with the service and network slice activation and optimization. While the processes may be similar, they differ fundamentally in terms of performance, runtime, network focus, and automation requirements. Optimization in this case is meant network-wide and cross-network. This includes, for example, handover management, frequency and PCI optimization, importing network-wide engineering and design specifications, (area-wide) consistency matching in the configuration, etc.

Only a configuration of the network that is optimally adapted to the operators' guidelines enables the subsequent setup and activation of services with correspondingly high quality. COM5.SDN-R Controller also offers the possibility to connect directly to external systems – ActixOne or SON systems, for example – to automate the transfer of parameters, to compare them with the operator-specific design and network, and finally to activate them automatically in the network via zero touch. As with the COM5.Mobile Integrator, the COM5.Mobile Optimizer functions have been fully incorporated into the COM5.SDN-R Controller.



Service / Slice Management

The transformation to a service-oriented architecture involves this group of use cases. The scenarios outlined above may appear similar at first sight, but it is easy to underestimate their complexity. However, they are clearly differentiated by very exacting requirements, particularly in terms of performance and runtime. The classes of service defined in the 5G standard (eMBB - enhanced Mobile BroadBand, URLLC – Ultra Reliable Low Latency, mMTC – massive Machine To Machine communication) permit a variety of new services (see article Network Slicing, p. 020, InNOVation 1-21).

In the future, network operators must be able to define these services in a flexible and "straightforward" manner and make them available to selected customers in both the commercial and residential sectors on an ad hoc basis. This is only possible if provisioning is fully automated, while at the same time ensuring quality of service over the entire lifetime of the relevant services; technologies such as machine learning (ML) and artificial intelligence (AI) are a valuable aid here in the context of the RAN Intelligent Controller (RIC). The essential functions for this are implemented in the COM5.SDN-R controller and optimized with regard to the stipulated benchmarks – for leading-edge, automated RAN service management with a particular focus on quality and operating costs. ■

SIEM: One Step Ahead of Cyber Criminals

Cyber attacks on companies are now commonplace. In a new e-book, ManageEngine shows how Security Information and Event Management (SIEM) can be used to best protect corporate networks from cyber criminals.

TEXT: Editorial staff PICTURES: © vectorfusionart, Pack / Shutterstock.com; © ManageEngine

Log360

ManageEngine Log360 is a comprehensive SIEM solution that helps companies defend against attacks, monitor security-related events, and comply with statutory requirements. The solution consists of various modules, including integrated log management, an incident management module, and an integrated threat intelligence platform.

More information and a free 30-day trial are available at: www.manageengine.de/log360

Companies are becoming more and more interconnected and increasingly have access to business partners' data. Excellent news for cyber criminals. They only need one single successful attack to hit not only one company, but also all its business partners. What's more, the numerous successful cyber attacks of recent years have clearly shown how vulnerable corporate networks are. Against this background, it is not only necessary to secure networks, it is vital.

SIEM is key to overcoming these challenges and helps to secure corporate networks as well as possible through

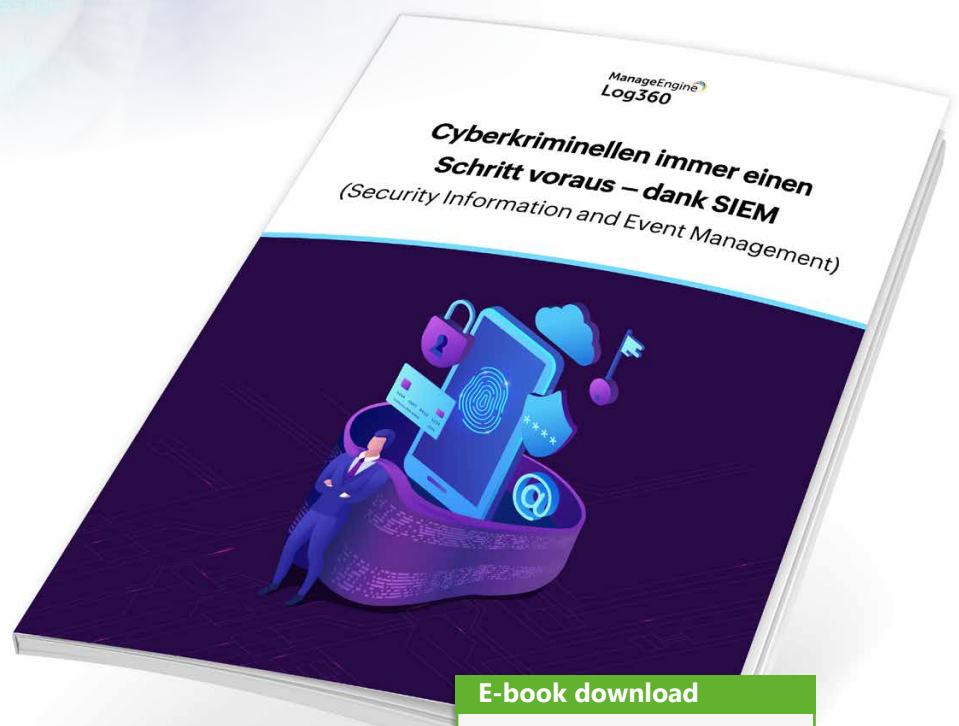
strong measures for damage limitation and incident response.

MicroNova partner ManageEngine has put together a free e-book of various ways in which companies can stay one step ahead of cyber criminals with SIEM. The e-book shows IT departments how they can use a SIEM solution to seamlessly monitor their networks, spot anomalies through artificial intelligence and automation, and reliably detect and defend against threats. It also describes how the log management and active directory auditing solution Log360 can help ensure the security of the corporate network.



The e-book contains tips and information on the following topics:

- » Designing optimum monitoring for the network environment
- » Setting up a reliable threat defense system
- » Avoiding human error through AI and automation
- » Using an Incident Response Plan to respond to incidents ■



E-book download

„SIEM: Cyberkriminellen einen Schritt voraus“ – The complete e-book can be downloaded (in German) here free of charge: www.manageengine.de/ebook-siem-gegen-cyberkriminelle

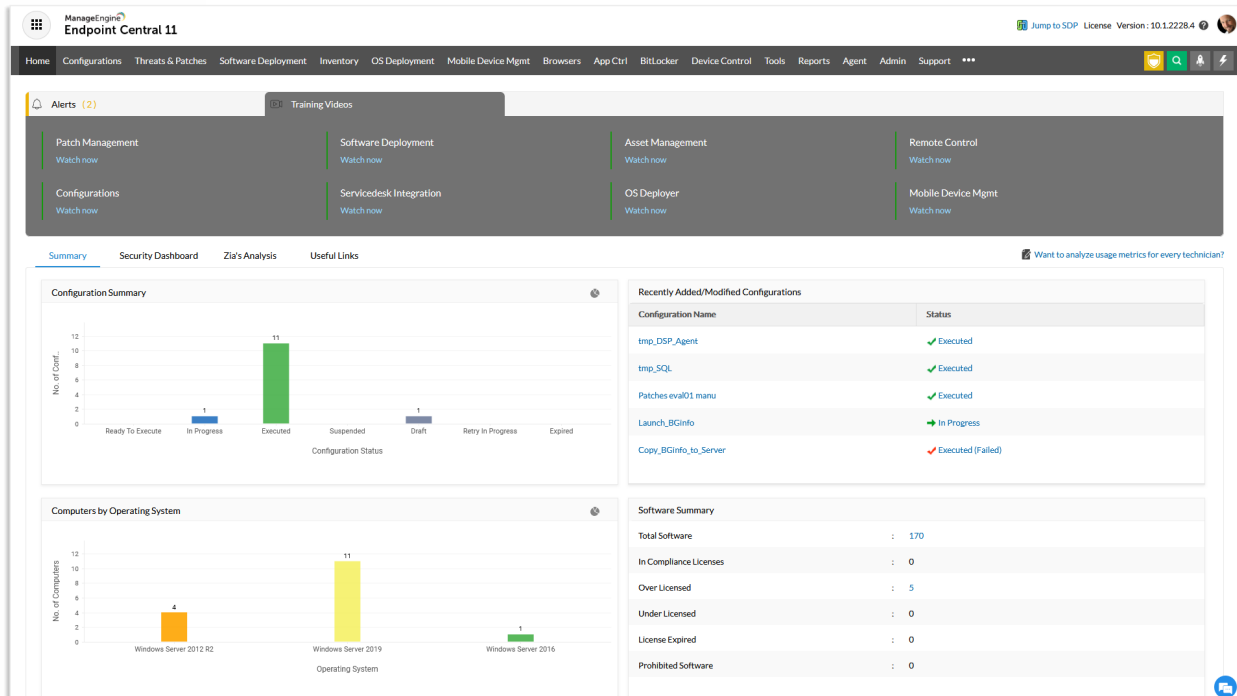
Awarded Endpoint Management

Unified Endpoint Management has become much more important over the past two years. MicroNova partner ManageEngine supports IT departments in this area – with a unified solution for endpoint management and security: Endpoint Central (formerly Desktop Central).

TEXT: Editorial staff **PICTURES:** © GaudiLab / Shutterstock.com; © ManageEngine

Unified Endpoint Management solutions experienced a significant boom when the COVID-19 pandemic broke out: IT teams were suddenly faced with the acute challenge of enabling employees to work remotely. At the same time, these users' endpoints needed to be managed remotely, errors fixed, and the security of corporate resources ensured. This led to an increasing need for a unified solution for endpoint management and security that would simplify device management and provide the IT department with security restrictions and corresponding policies.

Long before the pandemic, MicroNova partner ManageEngine already had a solution in its portfolio that covered precisely these tasks: Desktop Central. However, as the name no longer adequately reflected the functional scope of the product, which was launched in 2005 and had been under continuous development since, the publisher opted for a rebranding in May 2022.



1 The Endpoint Central dashboard shows IT administrators important information at a glance, such as configurations used, operating systems, or software license details of the endpoints present in the network.

The decision to rename the product after many successful years was not an easy one for ManageEngine. But the company explains that it was time to update the identity of the Unified Endpoint Management solution: The new name "Endpoint Central" is intended to be a synonym for the functional scope, which no longer just covers desktop PCs, but also endpoint management and endpoint security tasks. Moreover, the new name leaves plenty of room for any future enhancements.

Multiple awards from analysts

The awards from various analyst firms in recent months are testament to the fact that the solution, originally

launched as a client management tool, still meets IT departments' current requirements, even with a new name. In August, for example, the publisher ManageEngine was recognized in the "2022 Gartner Magic Quadrant for Unified Endpoint Management" together with five other providers.

A few weeks earlier, ManageEngine had already been rated as "Leader" in three IDC vendor evaluations for the Unified Endpoint Management (UEM) market. Another award came back in October 2021, this time from Forrester: The analyst firm had classified ManageEngine as a "Strong Performer" in its "Forrester Wave on Unified Endpoint Management". ■

Analyst Reports

Excerpts of the analyst reports are available in German to download free of charge at the following link:

www.manageengine.de/uem-marktuebersicht

Free trial version

More information about Endpoint Central and a free 30-day trial are available at:

www.manageengine.de/endpointcentral



Organizing IT Service Desks with ServiceDesk Plus

Continuous expansion of IT service management at PFISTERER

PFISTERER Holding AG:

- » Industry: Electrical industry
- » Employees: approx. 2,100
- » Sales: 350 million euros (2020)
- » Headquarters: Winterbach

TEXT: Editorial staff PICTURES: © PFISTERER Holding AG

The PFISTERER Group, which also includes LAPP Insulators, is a leading specialist supplier and system provider in the energy infrastructure sector. Around 2,100 employees develop, produce, and sell components and full solutions for the particularly sensitive interfaces in modern energy grids. PFISTERER is represented in all sectors in which large amounts of electrical power have to be transmitted safely and with low losses for decades: energy generators, grid operators and energy utilities, railway companies, and industry. The group's headquarters are in Winterbach near Stuttgart.

Initial situation: No overview of helpdesk requests

From forgotten passwords to application errors and fault reports – the IT team at PFISTERER handles a large number of tasks. In order to bring structure to the numerous and varied requests, Bernd Hormann decided to introduce a ticketing tool back in 2009. The current Head of Global IT Business Applications was looking for a solution

that supported ITIL processes, was scriptable, and as self-explanatory as possible.

During his search, Bernd Hormann became aware of ServiceDesk Plus from ManageEngine. The publisher's continuous development of the solution was an important criterion for him at that time – and it still gets him excited about ServiceDesk Plus after more than twelve years. A short trial phase was quickly followed by PFISTERER's decision in favor of the solution. "The attractive price and the annual rental model made the acquisition costs manageable and made our decision easier," explains the IT expert.

ManageEngine ServiceDesk Plus

Initially, the company started with a license for ten technicians. The IT department took a very pragmatic approach and learned the ropes gradually by using the tool during day-to-day business. "What can I say? We downloaded the software, install-

ed it, set up the users, and followed the ITIL standards that came with it," says Bernd Hormann. "Thanks to the intuitive interface, the launch went very quickly: after just one week, the system was up and running and ready for use."

PFISTERER later connected its in-house monitoring system to ServiceDesk Plus. Since then, every fault report for any of the more than 70 applications managed immediately and automatically triggers a ticket, which is assigned to the relevant support staff member. The ticket systems used by various service providers, such as the tool used by the company's SAP service provider, were also easy to connect to ServiceDesk Plus via the built-in REST API. This means that the IT team at PFISTERER can, for example, simply create new incidents in their own system, which are then automatically forwarded to the SAP experts' tool. The responses, including important parameters such as ticket number, classification, and priority, are sent back to PFISTERER and correctly as-

signed to the original ticket. This makes it much easier for the IT team to communicate with service providers and to keep track of open requests.

"Over time, we have expanded the number of technicians and further refined our operations. We have created categories, defined templates and rules, and renamed the order of phases," adds the Head of Global IT Business Applications. "It's great that all this could be done so easily."

Now PFISTERER is also using the service catalog to offer help to users and to make the use of the self-service portal more appealing. Through this portal, a lot of the information needed by IT to process an incident is provided directly by the originator. Moreover, some tickets can now even be avoided completely thanks to the solutions database.

ServiceDesk Plus now also plays an important role in documentation for financial audits at PFISTERER: the IT department uses the workflow process contained in the change management module, from request through to approval and release. Members of the "Change Advisory Board" are involved in the entire process.

Lighter workloads thanks to automation, overview, and documentation

After more than twelve years in use, ServiceDesk Plus has more than prov-

en itself at PFISTERER: Many IT tasks have been automated or at the very least simplified, saving the IT team a lot of time. The solution also proved beneficial during the integration of an acquired company: Thanks to synchronization with the Multidomain Controller, it was possible to integrate the new domains extremely quickly. As a result, the new employees quickly received access to the ticket system.

Even after all these years, Bernd Hormann particularly likes the publisher's approachability: "I very much enjoy taking part in the customer days, which give us the chance to speak to the publisher directly and outline our requirements. I find it very positive when we are listened to as a customer and can actively introduce improvements." One example of this is a survey that has now been implemented, which can be triggered per ticket depending on the classification.

Continuous expansion for optimum overview

Every month, the 15 IT experts at PFISTERER get through around 1,000 tickets with ServiceDesk Plus. In order for Bernd Hormann's team to maintain an overview of all open tasks in future despite the large number of requests, he closely follows the continuous development of the software: "Recently, the KANBAN view was added. This allows us to display the ticket queue graphically and therefore to keep an even better overview of things."



"I very much enjoy taking part in the customer days, which give us the chance to speak to the publisher directly and outline our requirements. I find it very positive when we are listened to as a customer and can actively introduce improvements."

– Bernd Hormann,
Head of Global IT Business
Applications, PFISTERER
Kontaktsysteme GmbH

Customer benefit:

- » Secure documentation
- » Less time spent on routine tasks
- » Continuous development of the software
- » Intuitive and user-friendly
- » German-speaking support





Workload Management with monday.com

Managing just your own workload can be a challenge, but coordinating the workload of an entire team is an even bigger one. However, help is at hand.

TEXT: Felix Bauer PICTURES: © Andrey Popov / Shutterstock.com; © monday.com

Numerous studies, i. a. conducted by several health insurance providers, generally arrive at the same conclusion: stress levels in the workplace have increased, and employees often feel under pressure. Of course, the Coronavirus pandemic also plays a role here; and even the triumph of working from home, spurred on by Covid, and the resulting reduction in commuting has not provided any relief.

One reason for high workloads is often due to the way they are unevenly distributed within teams. This also explains why, despite generally high levels of stress, what is known as the bore-out is also a challenge for businesses. A fair, effective and efficient allocation of tasks can remedy this situation.

Fortunately, there are strategies, tools, and frameworks that can help project managers in particular to better balance their team's workload. In fact, they are quite easy to implement.

When deployed correctly, teams are not only less stressed and more satisfied, but also more productive. What is more, both adherence to deadlines and quality benefit.

Workload Management

As a certified monday.com partner, we have used our experience gained from a number of successful customer projects to put together the following tips for implementing and using intelligent workload management. The focus is on using the "Work OS"



monday.com, but the same principles apply across all tools. And the goal is always the same: to successfully manage the workload for teams.

First, however, we need to explain these basic principles. Workload management is more than just about arranging workloads. Everyone does that to some degree, such as by prioritizing daily tasks and organizing themselves accordingly. In contrast, formal workload management is a rational management approach to controlling and distributing workload among

April	Sales	Intro call	Intro	Presentation	Presentation	Negotiation	Negotiation	Closed Date	Plan
Amazon	Done	Apr 7	Working on it	Apr 18	Won	Apr 19	Apr 24	Pro	
Facebook	Done	Apr 1	Done	Apr 2	Won	Apr 1	Apr 26	Basic	
Zoom	Done	Mar 4	Done	Mar 4	Won	Mar 11	Apr 30	Standard	
Slack	Done	Mar ...	Done	Mar 12	Won	Mar 17	Apr 24	Pro	
Sony	Done	Mar ...	Done	Mar 17	Won	Mar 24	Apr 26	Enterprise	
Apple	Done	Mar ...	Done	Mar 23	Won	Mar 18	Apr 30	Basic	
Nestle	Done	Mar ...	Done	Mar 18	Won	Mar 18	Apr 17	Pro	
Twitter	Done	Mar ...	Done	Mar 23	Won	Apr 20	Apr 26	Standard	

1 Listing leads in monday.com, broken down by month

project team members on a task-by-task basis.

Workload management therefore involves the following:

- » Understand the entirety of the tasks to be completed
- » Knowing the capabilities as well as actual available capacities of teams
- » Allocating outstanding tasks as efficiently and effectively as possible using a workload management system

Recognizing Overload

Project managers have a responsible duty in several respects. For example, they account to customers and line managers for meeting deadlines. It is also important for them to achieve their technical and commercial objectives. Above all, they have a duty to the members of their team. Managing people goes beyond operational activities, which is precisely why recognizing overload is such an important task.

The following indicators help to identify excessive effort by individual team members or the team as a whole:

- » Employees are visibly stressed, pessimistic, or frequently tired.

» The number of sick days is high or rising.

» Conflicts arise between team members, especially with regard to the allocation of tasks.

» The churn rate among team members is higher than usual; reference values can be industry averages or comparisons with other departments, as well as comparisons with previous years.

» Projects overrun deadlines and/or budget.

» Voluntary overtime is high/increasing.

Four Steps to Successful Workload Management

One preliminary finding could therefore be that workload management aims at effective resource allocation in order to ensure a balanced workload within teams. Four simple steps can help achieve this goal.

1. List tasks, understand scope better

A team's workload can only be organized if the type, number, and scope of tasks are known. So the first step in organizing workload is to detail all the work needed to complete a project. The key is to

not only capture the action items of the project itself, but also to account for time spent on handling e-mails and general administrative tasks.

What is challenging, but particularly important, is the next sub-step: estimating the time required for each task. Once the overview of tasks and time has been established, a formal system such as monday.com is used to organize them; its administrative functions make it easy to set priorities and assign responsibilities. In addition, the estimated task duration can be entered in a timeline column.

2. Know team capacities

A good project team will always have a mix of heterogeneous characters – each with their individual characteristics and strengths. This allows the various tasks to be successfully addressed. Managers therefore need to be aware of this, as well as the availability of team members. The latter point is essential for capacity planning.

Again, there are aspects that may not be immediately apparent at first glance. Are there any part-time employees and when do they work? Are there different time zones to consider? Are there different public holidays in different federal states? The list goes on. A tool like monday.com makes it easy to organize project teams in this regard as well. Once employees have been defined, they can be assigned to projects as needed and kept up-to-date via direct communication; notifications and project boards also facilitate collaborative work.

3. Set priorities, allocate tasks correctly

Tasks should always be distributed accurately and strategically. This requires a consideration of the various options for prioritization. Should what takes the least amount of time be done first? Should the most important part in terms of content be at the fore? Path dependencies also play a role. One soft but important aspect is the need to take into account that

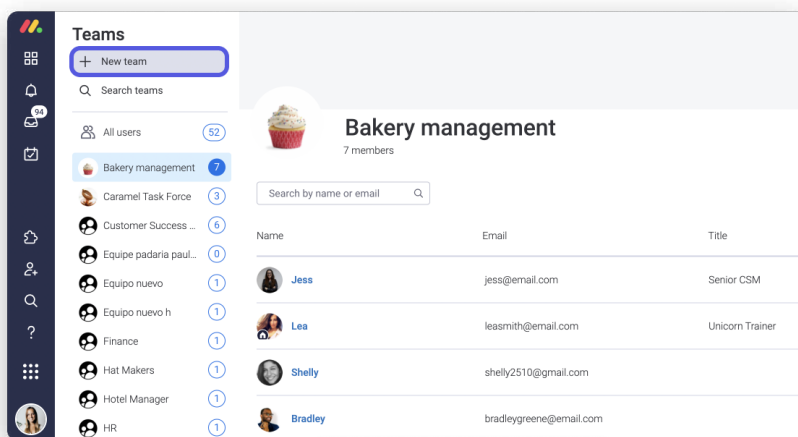
/ how much employees appreciate and need variety. It is also generally advisable to allocate unpopular activities “fairly”.

Again, monday.com is a great help for managers with its range of options – from Gantt charts to the possibility of integrating existing project management tools. This ensures that status and progress are easily visible at all times – and that any bottlenecks can be avoided, or at least quickly resolved. Regular assessment over the course of the project in order to re-evaluate tasks is recommended, as there may be some that are no longer necessary. Or there may be new ones. And so on.

4. Communicate and recalibrate

A regular exchange of information within the team and recalibration of tasks help to manage projects successfully over the long term. As many as 26 percent of respondents to a survey* conducted by the Project Management Institute (PMI) said in the Signpost Report 2020 that they believe that inadequate/poor communication contributes to project failure. Working from home – for all its advantages – has increased the need for this task even further.

This makes it all the more important to resist its onset – see “Recognizing Overload” above. Once a particular issue has been identified, it must be addressed in a sensitive and yet firm manner. A regular exchange of information within the team is essential, not least in order to strengthen the sense of togetherness. Another extremely important factor is a way of providing feedback. monday.com provides teams with a place



2 Allocating employees to different teams and thus simplifying project-related communication – it’s so simple in monday.com

* <https://www.pmi.org/-/media/pmi/documents/public/pdf/learning/thought-leadership/pulse/pmi-pulse-2020-appendix.pdf>

to communicate and collaborate on tasks down to the last detail; it's also a centralized repository for documents, graphics, messages, etc.

Workload Management with monday.com

So much for the four most important steps for successful workload management – now a few concrete tips on how to implement it using monday.com, the “Work OS” for every company. As an operating system for day-to-day work, it can also be used as a workload management tool in any of the associated project boards. A specially created board view makes it easy to see the team workload at a glance.

Ideally, three columns are used to make an appropriate calculation:

- » One for the individuals – the same column that is used for task allocation

- » A timeline or date column to define a task's time frame
- » A number column with the expected task duration (optional)

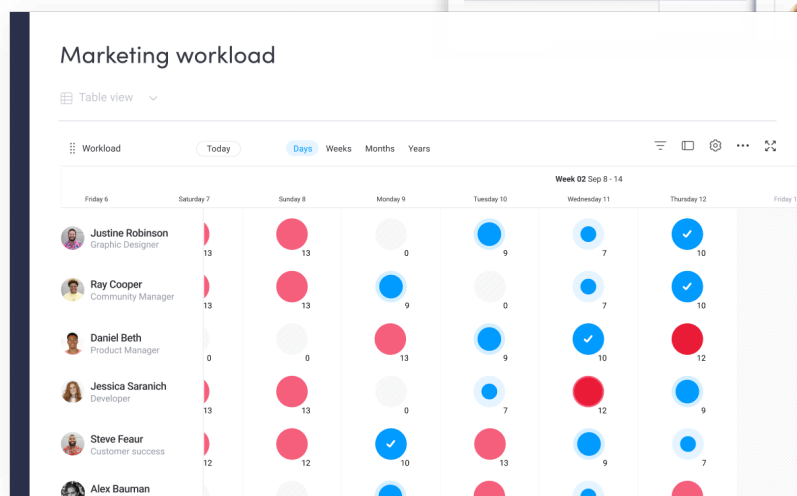
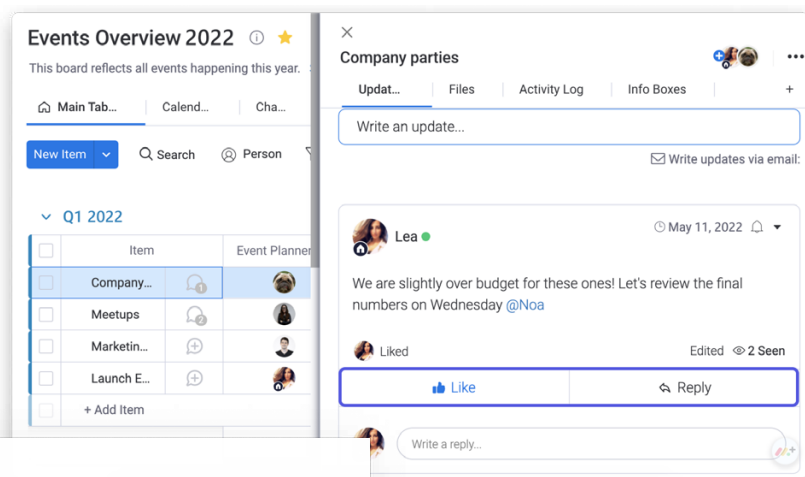
Once these elements have been created, the workload view can be added to any board using the corresponding menu. There are two options for calculation: a simple task count and the – more precise – use of a metric for effort. The latter is derived from the estimated duration of the task in the number column.

Now it is necessary to enter the work capacity for each person in the team as a number of hours. monday.com can

then calculate the individual workload as a breakdown of the allocated work in terms of the available hours. Circles are used for the representation (see figure).

The light blue circle represents the total capacity of each user. The darker blue circle indicates the current status of the work allocated. Underutilized employees have a lighter outer circle, overutilized have a red circle. The ideal or desired state would be that each team member is utilized to the optimum – this would be represented by a dark blue circle with a check mark in it. Clicking on the circles is sufficient to display the corresponding task list and make changes.

Chat function within a task **3**



4 Workload overview: visualizations show team member capacities in monday.com.

Summary

Effective workload management makes for a happier team. Missed deadlines, budget overruns, quality problems, quiet quitting, staff churn ... the potential consequences are many if resource management is not understood in strategic terms. Companies can spare themselves and their customers all this trouble – to ensure that the next surveys on stress in the workplace prove to be more positive. ■

Energy: Exchange between University and Industry

Professors and students from Munich University of Applied Sciences discuss innovation opportunities in the field of energy supply at MicroNova.

TEXT: Editorial staff **PICTURE:** © MicroNova

Whether climate or global politics – the energy supply is currently under scrutiny, especially in Germany, and is very likely to change significantly. On July 5, 2022 in Vierkirchen, teachers and students of the course "Regenerative Energies / Electrical Engineering" of the Munich University of Applied Sciences discussed the how with representatives of MicroNova AG

For many years now, MicroNova from Vierkirchen near Munich has been mathematically achieving CO2 neutrality: the founding family owns a hydroelectric power plant in nearby Weichs, which generates around 300,000 kWh/a with an expansion capacity of 60 kW. In addition, a photovoltaic system with over 40 kWp will soon be installed on the new company building. Together with a whole bundle of other energy-saving measures, the company has already done a lot to reduce its carbon footprint – a topic that is attracting increasing interest in view of the challenges surrounding the global climate. In addition, there has recently been an increased focus on the issue of security of supply or the associated independence.

High-tech can make many valuable contributions to efficient energy production, distribution and use. The spectrum ranges from sensor-optimized power and heat production to intelligent distribution networks and smart building controls – and everything "in between" that measures, regulates and evaluates in the above-mentioned environment. The playing field for potential innovations is correspondingly large. In order to talk about such, students and teachers from the Faculty of Electrical Engineering and Information Technology at Munich University of Applied Sciences met for a constructive exchange of topics with the management board, supervisory board and experts from MicroNova.

Concrete projects and new ideas

The goals of the discussion between the current and future experts: mutual insights into the status quo of technology and energy supply as well as the discussion of ideas and possible business models with a special focus on an independent and sustainable

production of electricity and heat. In this context, MicroNova presented, among other things, a funding project for a so-called digital twin that maps energy distribution networks in real time. With such digital images, real plants can basically be mirrored in virtual form, based on a bidirectional exchange of data; via this constant data flow, changes to optimize processes can be achieved very quickly. The potential applications are correspondingly diverse, especially in a granular distributed system like the power grid.

"In 2040, we will often have a large surplus of renewable energy for days and hours at a time," said Prof. Dr.-Ing. Simon Schramm, professor at the Faculty of Electrical Engineering and Information Technology at Munich University of Applied Sciences. "So we need smart solutions to be able to store electricity generated from this in a way that serves the grid and make it available again as needed. Munich University of Applied Sciences is already involved in this environment in the course of some interesting spin-offs. Through these and directly, we are



1 Students and lecturers of the course "Regenerative Energies / Electrical Engineering" at Munich University of Applied Sciences with representatives of MicroNova AG.

always happy to join forces with companies that have been successful on the market for many years. Together, we have a great energy mission ahead of us."

Fittingly, another presentation explained projects of the company with a Spanish partner around the "Internet of Things" (IoT), which energy providers are already using to measure and control the power grid – according to Prof. Dr.-Ing. Schramm, the open platform used for this purpose, was a suitable "energy management system" for any larger industrial company to measure and optimize power consumption.

"For universities, closing ranks with industry is existential. After all, our concern is quite clearly to train the next generation of pulse generators for our country," adds Prof. Dr.-Ing. Wolfgang Rehm, Dean at the Faculty of Electrical Engineering and Information Technology at Munich University

of Applied Sciences. "Visits like these are therefore particularly valuable. Because not only do we get insights as guests, but we can directly provide impulses at eye level with our students, who may even implement them themselves later."

Live impressions of renewable energy

The visit concluded with a tour of the hydropower plant in the neighboring town to MicroNova's headquarters in Vierkirchen. There, the students were able to take a close look at the hydropower plant, which was completely renovated just a few years ago by MicroNova founder Josef W. Karl. With a maximum output of 60 kW, enough electricity is generated there around the clock to supply all MicroNova locations in a CO₂-neutral manner. The visitors also inspected the weir system with fish ladder, which has also been renovated - there, as in the power plant room in the mill, an automatic

control system has largely replaced the time-consuming and strenuous manual regulation of the prescribed water level.

"Whether for electricity, heat or mobility: energy, as a central physical quantity, is a reality of life for all of us. Unfortunately, it is finite, which is why we need to use it more efficiently as quickly as possible," said MicroNova founder Josef W. Karl. "We firmly believe that technological innovations will make an important contribution here. There are already some interesting approaches in this area, and we ourselves already have several points of contact. It's nice to see how great the interest is, especially among young academics." ■

MicroNova is one of "Bavaria's Best 50"

TEXT: Editorial staff

The Bavarian Ministry of Economic Affairs, Regional Development and Energy has honored MicroNova as one of Bavaria's 50 best companies 2022. The responsible minister Hubert Aiwanger presented the corresponding award to the CEO Orazio Ragonesi, and the founder, Josef W. Karl, on July 26th at Schleißheim Palace.

The award is given to small and medium-sized enterprises (SMEs) that have achieved particularly strong growth in recent years. Companies are chosen on the basis of increases in the number of employees and in revenue. Growth must be organic and not come predominantly from acquisitions. MicroNova met these targets for the financial years 2017 to 2022 (2022 per forecast). For example, the number of employees alone has increased from 207 in 2017 to 275 in 2021; currently the MicroNova Group employs around 340 people.

"In light of the impact of the automotive crisis and the Covid-19 pandemic that immediately followed, we are particularly proud of our stable market position in the year that marks our company's 35th anniversary," explained Orazio Ragonesi. "That positioning is an important foundation for our growth, which is supported by key building blocks such as ongoing process optimizations in production as well as in product development and product management. The long-term



1 Bavarian Minister of Economic Affairs Hubert Aiwanger (l.) with the MicroNova award winners Orazio Ragonesi (Chairman of the Board, 2nd from l.) and Josef W. Karl (Founder and Chairman of the Supervisory Board, 3rd from l.) and Stefan Schmal, juror of the competition. © Studio SX HEUSER

strategic development of our portfolio is also essential. Ultimately, however, it is always the brilliant minds working for us at our nine locations that make all this possible."

Success with partners

During the period considered, MicroNova was able to increase its order intake year on year, even under some challenging conditions, and win significant orders from strategically relevant customers as well as from new clients. Furthermore, existing technology and product partnerships made

an important contribution to the success of recent years.

Therefore, personnel and sales growth is also planned for the future. Challenging factors are in particular the chip and energy crisis, as well as the scarcity of skilled workers. "If we can overcome these challenges, I can see us as a candidate for Bavaria's Best 50 in the future, too," summed up MicroNova founder and Supervisory Board chairman Josef W. Karl. "And the award is a nice present for the company's 35th birthday." ■

Project Succession

Dear Reader,

For many years, the following famous lines by Antoine de Saint-Exupéry have guided the path followed by MicroNova: "If you want to build a ship, don't drum up the men to gather wood, divide the work and give orders. Instead, teach them to yearn for the vast and endless sea". Although we have recently refined our vision and our mission, the essence of this sentence is still deeply rooted in MicroNova.

And that's why, if I may be so bold, I am bringing out this motto once again in the year of MicroNova's 35th birthday. Because it also leads me directly to another quote by this famous French author: "As for the future, your task is not to foresee it, but to enable it". Actions count more than words, and accordingly it is important to actively deal with the future.

By transferring MicroNova AG to my son Maximilian in 2019, I laid the foundation for the company to remain in the family for the long term and for it to prosper in accordance with its proven strategy and values. This kind of plan for succession is not a sprint, but a marathon. It required long and thorough preparation, and I am pleased that now – three years after the handover of the AG company – the last building block is in place: Since the end of September 2022 the company ks.MicroNova GmbH in Kassel has also been owned by Maximilian.

I know from experience that being able to call a company your own requires a lot and probably a lifetime of dedication. I would therefore like to thank Maximilian for agreeing to take on this responsibility for the long term. He is currently and with great commitment earning his spurs in an industrial company – not least because he can rely on two experienced managing directors in Dr. Klaus Eder and Orazio Ragonesi. As you may know, the two of them have been very successful members of the board of MicroNova AG for many years and, together with me, are also managing directors of ks.MicroNova GmbH. I will continue to be active on this board, as well as on the supervisory board of MicroNova AG. As long as my health permits and God willing, my motto will remain the same even at 72 years old: A rolling stone gathers no moss. Even after 35 years, MicroNova still gives me a lot of pleasure. Maybe even more than ever.

Whether transferring the ownership or securing the management of the business in the long term: From my point of view, I have done everything possible to ensure that our customers and our employees can see MicroNova as the reliable and innovative partner it has been for the past 35 years, or 13 years in Kassel.

I would like to take this opportunity to express my gratitude to the outstanding team in Kassel, whom I was able to visit not so long ago during our anniversary celebrations for our northern sites. The legal framework may be different for historical reasons, but whoever is on site will see that innovative strength, passion and enthusiasm "are simply MicroNova". I am glad, somewhat relieved and very grateful that I could also make this part of MicroNova's future possible and I know that our customers are in capable hands – now and in the future!

With warm regards,
Josef W. Karl



Josef W. Karl
Chairman of the Supervisory
Board of MicroNova

Publisher:

MicroNova AG
Unterfeldring 6
D-85256 Vierkirchen
Phone: +49 8139 9300-0
Fax: +49 8139 9300-80
Email: info@micronova.de

Editors:

Katharina Hampe
Regina Schwarzenböck
Stefan Karl (GP)
Martina Heinze

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Christoph Liebl

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Phone: +49 8139 9300-0
Email: info@micronova.de

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