

SICKinsight

MAGAZINE

: FOCUS MOBILE ROBOTS

A futuristic industrial factory floor with various mobile robots and a worker. The scene is brightly lit with a blue and white color scheme. In the center, a large blue mobile robot with a white top is moving. To its left, a smaller blue robot with a vertical sensor array is visible. To its right, a blue robot with a white robotic arm is moving. Further right, a blue robot carrying a stack of red and white pallets is moving. In the background, a worker in a blue uniform and hard hat is walking. The floor is highly reflective, showing the robots and the worker's reflection.

MOVE INTO NEW DIMENSIONS
SENSOR SOLUTIONS FOR ALL TYPES
OF MOBILE ROBOTS



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MOVE INTO NEW DIMENSIONS – IN PRODUCTION, LOGISTICS OR FOR SERVICE WORK

Robotics are on the move, whether in production, logistics or for service work. Mobile robots in particular are gaining momentum. Intelligent sensor solutions are what they need to move safely. The models range from AGVs to cobots to autonomous mobile robots. In short: The future belongs to autonomous mobile robots. They are making robotics more flexible overall and opening up completely new business models and areas of application.



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RETAIL, HYGIENE OR LOGISTICS: METRALABS AND SICK ARE MOVING MOBILE ROBOTICS

EVERYTHING IN FLUX

More and more, autonomous robots are shaping our everyday lives and routines. They mow lawns, vacuum living rooms and clean windows, and can even do this non-stop if needed. But what MetraLabs has in its product range goes far beyond these popular uses: The specialists in mobile service robotics offer mobile robots for a wide variety of functions and applications, from inventory robots for retail to disinfection robotics and automated mini-stackers for intralogistics. What all models have in common is that they move safely, thanks to safety laser scanners and 2D LiDAR sensors from SICK – this is what's required for successful services and efficient flows of goods.

Two and a half times around the world

Since 2007, MetraLabs, based in the German city of Ilmenau, has put more than 300 robots on the market and set them in motion. Put together, they have now traveled more than 100,000 km, which is actually two and a half times around the world. According to Sabrina Greul-Nothnagel, who is responsible for the Industry and Health Care Division, there is a good reason why they have counted on SICK since the beginning: "We've had very good experiences with SICK. The quality and technology are very impressive, and there is simply nothing comparable on the market in terms of safety technology." The best foundation for moving the next kilometers together.

The versatility of mobile robotics – more than just a trend

An example from the world of fashion: Autonomous robot TORY finds its way between racks of clothes in a clothing store all on its own. Once it has been installed and given a map, it carries out automated inventory work with the help of RFID identification and can also be linked to the respective ERP system in order to automatically trigger orders, for example. That alone is absolutely fascinating, but that's not all – the TORY also works both at night and during the day. Foot traffic, small children and objects such as shopping bags or boxes don't tire it out. This is made possible by safety laser scanners from the S300 and TiM7xx



CARY is an autonomous mini-stacker who transports loaded floor rollers.

series. They combine intelligent field evaluation and measurement data output in one device, so they can both record data about the presence of an object in a defined area as well as output exact measurement data of the scanned area. This is important, as it means that the safety laser scanners fulfill two of the most important requirements at the same time, namely safeguarding of the driving movements for personal protection and simultaneous environment perception via non-secure measurement data for vehicle localization. In addition, the compact design of the TiM7xx makes it particularly well-suited for mobile platforms, automated guided vehicles (AGVs) and mobile service robots.

Non-stop disinfection with the strength of an artificial sun

Other applications also show the wide range of tasks performed by mobile robotics. Disinfection robots have recently become the center of attention, and they will rightly stay there, even when the currently crucial need no longer exists. Hygiene and disinfection requirements go far beyond the health sector. Mobile robots like the STERYBOT from MetraLabs make use of the principle of solar radiation. With the help of short-wave UV-C radiation, up to 99.99% of all viruses and bacteria are eliminated, while sensitive surfaces and medical equipment remain unharmed. The disinfection robot moves through the operating environment completely independently – and this, too, only works with the help of the safety laser scanners. The integrated functional safety and navigation software optimized over tens of thousands of kilometers ensure reliable orientation and avoidance of people and obstacles. This ability to freely navigate is what makes the high disinfection rate and thus the efficiency of the entire system possible in the first place when compared to robots that follow predefined routes. In addition to surface disinfection in hospitals and doctors' offices, UV disinfection can also be used just as effectively for disinfecting supermarkets, shopping centers, hotels, offices, schools or manufacturing facilities – a sunny outlook indeed.



Autonomous robot TORY finds its way between racks of clothes in a clothing store all on its own.

Mini-stacker – maximum safety

And when it comes to production, the Ilmenau-based company also offers CARY, another mobile robot with safety laser scanners from SICK, for the wide range of requirements in production processes. An autonomous mini-stacker, it successfully fills a niche in the transportation of loaded floor rollers – even and especially when they are loaded with very sensitive parts. The robots in this series can be easily integrated into existing intralogistics processes, either individually or in groups.



We've had very good experiences with SICK. The quality and technology are very impressive, and there is simply nothing comparable on the market in terms of safety technology.

Sabrina Greul-Nothnagel, Sales & Global Partner Management, MetraLabs GmbH

Spirited mobile research

The example of MetraLabs makes one thing clear: As diverse as the fields of application of mobile robotics have become, the interest of bright minds in this booming industry is just as strong. "For years, we have been cooperating with Ilmenau University, among others, in research projects – the students' interest in this is huge," says Sabrina Greul-Nothnagel. This is cooperation that SICK also supports to the best of its ability in order to keep curiosity and the spirit of research moving, day in and day out. (mw)

HOW MAGAZINO IS CLOSING A GAP IN AUTOMATED
REPLENISHMENT TOGETHER WITH SICK

A NEW MOBILE ROBOT FOR INDUSTRIAL PRODUCTION

Rarely has a gap filler been so innovative: Robotics company Magazino developed the new SOTO, a supply chain robot for those in-between areas of production that have not been automated until now. Together with SICK, a mobile robot was designed for the assembly of production lines. This revolutionary little worker is sure to take hold in the automotive industry and many other sectors.





For localization and navigation purposes, three microScan3 safety laser scanners are installed under the vehicle floor.

“Magazino and SICK have a long history together,” explains Raphael Vering, Product Manager at Magazino. The latest chapter in this story is the SOTO 2 mobile robot, which supplies industrial production facilities with small load carriers with complete autonomy.

Automated material supply in industrial production processes

Whereas manual operations were almost always required for upstream and downstream processes in production lines, the SOTO was a real turning point: It drives to the warehouse, picks up small load carriers, loads them up on its back, and then chauffeurs the boxes to the assembly station to deliver them – and all of these processes are completely autonomous and done just in time. “Gripping different heights and racks, transporting up to 24 containers at one time and delivering them to different assembly locations with complete flexibility, the SOTO is probably the only product available now that combines these three steps in one vehicle,” says Raphael Vering.

Surrounded by sensor solutions from SICK

This is one more milestone on the road to “Factory 4.0,” and SICK, a specialist in intelligent sensor solutions for mobile robots, was also involved. “By working with SICK, we were able to build a robot that can safely perceive its surroundings and work well with humans,” adds Vering. For localization and navigation purposes, three microScan3 safety laser scanners are installed under the vehicle floor. Safety light curtains also prevent humans from interfering with the moving vehicle. The DFS60 incremental encoders are also from SICK. And finally, the Visionary-T Mini 3D camera controls the travel path from above to help with navigation and detect obstacles that are not at the height of the safety laser scanners.

Visionary-T Mini, an Argus eye in real time

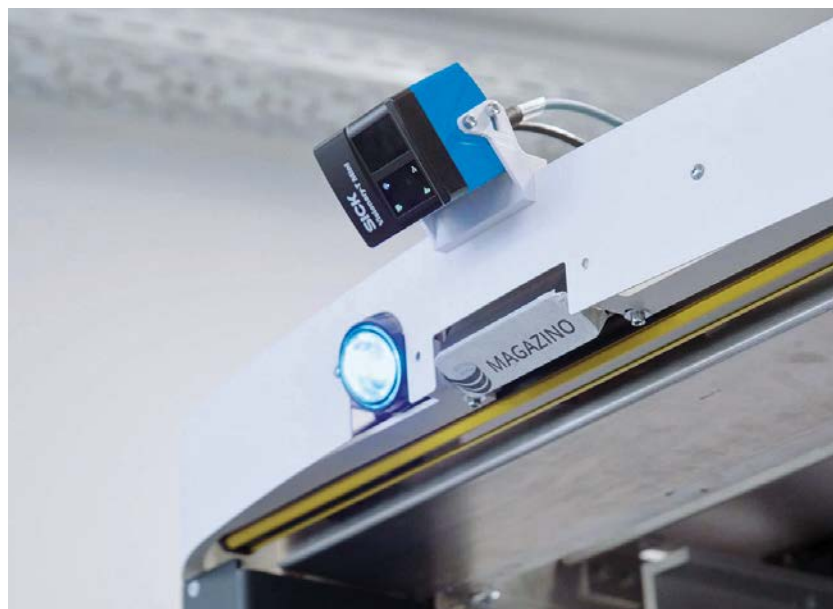
It was this 3D vision sensor in particular that helped Magazino put the SOTO 2 on the track to production. With up to 30 frames per second, the 3D snapshot image recording process registers potential obstacles in the travel path: For instance, manned forklift truck prongs or large screws and nuts just above ground level can be detected with ease. The Visionary-T Mini also identifies objects attached to walls, such as fire extinguishers or monitors. The same applies to obstacles floating in space (e.g. protruding bars or palletized goods), and, last but not least, “negative” obstacles such as sloping stairs or ramps.

The Visionary-T Mini also proved its practical worth in industrial environments with its various options for stable mounting, a good Internet connection, high resolution and smooth processing of

data as well as a large scanning range. And all of this was helped along by the productive collaboration of a team of experts: For example, Magazino received a prototype of the 3D vision camera early on so it could tackle the complex development steps with the support of the SICK experts.

A pioneer in production logistics

The SOTO 2 is a new piece of the puzzle in smart production logistics. It increases the automation of production processes, relieves employees and helps make processes more efficient. The mobile robot will first be used by vehicle manufacturers and suppliers, but will later also help in the production of household appliances and electronic devices. “We will continue to lean on SICK and its sensor solutions for mobile robotics,” assures Vering. The mutual success story is just getting started. (gm)



The Visionary-T Mini 3D camera controls the travel path from above to help with navigation and detect obstacles that are not at the height of the safety laser scanners.





GROCERS GET A HELPING HAND
FROM MOBILE ROBOTS

COBOT OR COWORKER?

Following in the footsteps of Google, Pierre Legendre and Benjamin Loize caught the start-up bug in 2015 and focused their energies fully on innovation: Both worked as engineers at UGIE-IRIS in France on a solution to facilitate manual work in the drive-in branches of Système U supermarkets. This new way of shopping is becoming increasingly significant. However, it also increases the risk of back problems or exhaustion among staff due to the high physical strain of putting together the purchases. At the same time, cost-effectiveness plays an important role. Organization and productivity are the big challenges. For example, products are placed on the shelves by employees, but then removed by others for drive-in pickup.

The birth of SUitee Cobotics

Pierre Legendre and Benjamin Loize worked for two years on a project aimed to reduce workload and increase the profitability of drive-in service. They suggested to company management that employees in the stores be provided with a life-size robot to assist them with particularly strenuous tasks, such as transporting heavy products to restock shelves or frequently moving merchandise between the warehouse and the sales area. Système U gave them free reign in implementing this autonomous assistance robot. In cooperation with other industry partners, they developed a mobile robot that was tested in various markets.

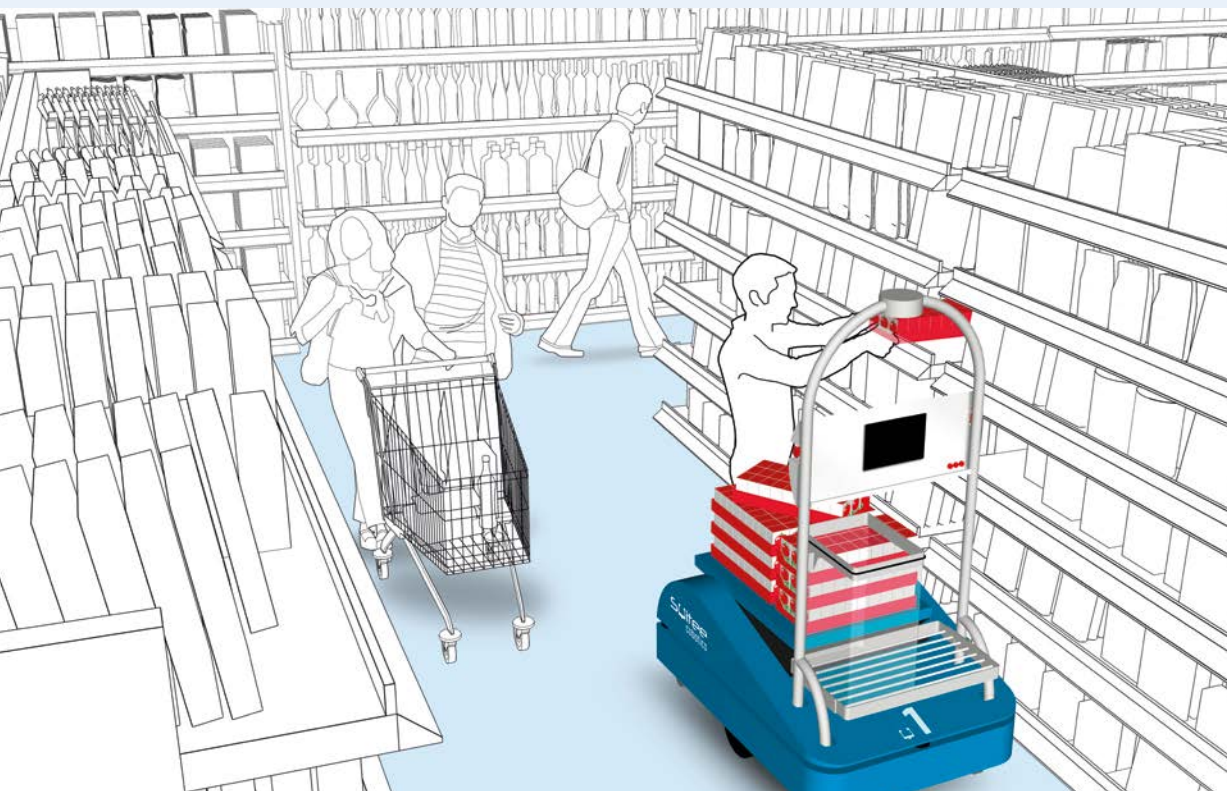
The two engineers presented their project to the shareholders and owners of Système U. Their ideas were met with interest, but since the manufacture of mobile robots does not exactly fall within the core business of UIE-IRIS, the innovative program was discontinued. So they were faced with a choice: Return to their earlier projects, or leave the company to create the mobile robots themselves?

Setting out on a new adventure with SICK

In March 2018, they decided to found their own start-up. Six months later, SUitee Cobotics sees the light of day. An agreement is made with Système U that Legendre and Loize will be allowed to use all the results of their previous project, enabling them to simply pick up where they left off. However, they soon discover that not everything is as ready as they thought – and they start all over again.

For two years, they rework the entire concept, from design and form to technology. The mobile robot must be able to work in two modes: On the one hand, it must move autonomously (independent motion between the warehouse and the sales area), and on the other hand, it must assist staff in restocking goods (motion with a person). Since the robot will be moving in confined areas, often among many customers, a very high level of safety must be achieved to avoid collisions and accidents.

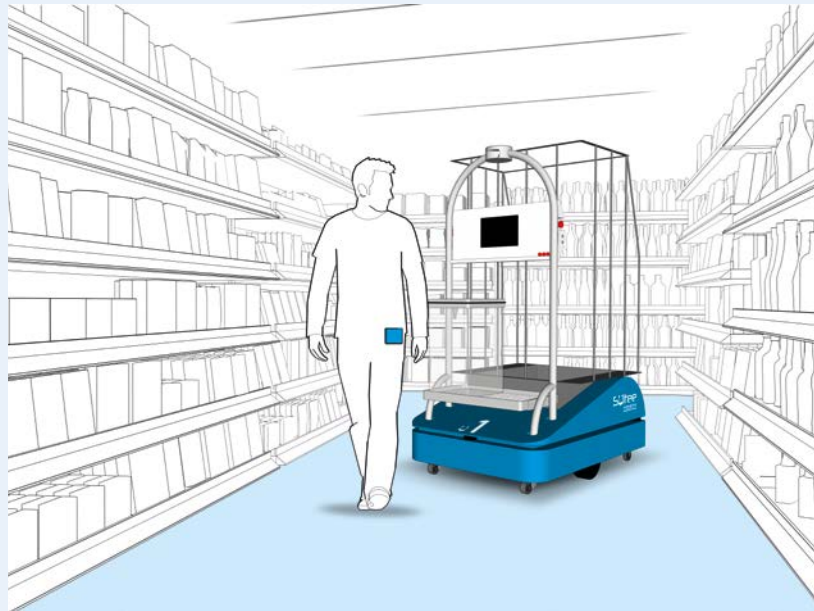
The founders of SUitee turned to SICK in France to figure out how to best meet the safety requirements of a mobile robot.



The mobile robot supports the staff with filling the shelves.

“ SICK is one of the few manufacturers in the world that makes products with the high safety standards we are aiming for with our robot.

Pierre Legendre, SUitee Robotics



The mobile robot should be equally capable of reaching a precisely defined goal on its own and of safely following a person.

“SICK is one of the few manufacturers in the world that makes products with the high safety standards we are aiming for with our robot,” says Pierre Legendre. “There are many manufacturers of LiDAR sensors, but when it comes to complying with mandatory safety standards, the herd is quickly thinned out,” adds Benjamin Loize.

That’s why SUitee Robotics contacted Yannick Planchenault, the responsible sales engineer at SICK, to find the right LiDAR sensors for the planned prototype. Once on site, they selected the appropriate sensor solution together with the expert for mobile applications, Jeffrey Yannou. A product training course was then held at the SICK agency in Nantes.

First-class equipment for the safety of us all

The mobile robot had to be introduced in stores without any structural changes. That means marking lines on the ground as well as GPS antennas or transmission towers were out of the question. Instead, the robot had to be equipped with extremely precise sensor technology, because ultimately it should be equally capable of reaching a precisely defined goal on its own and of safely following a person.

The SUitee mobile assistance robot features various 2D LiDAR sensors and safety laser scanners. These include three

for safety (S300 XX and TiM-S safety laser scanners), a 3D infrared camera, on-board AI, a safety controller (Flexi Soft) as well as incremental encoders with safety functions (DFS60S Pro) and a control developed by SUitee Robotics.

LiDAR sensors from SICK are used for point-by-point mapping of the building interior. The raw data is then retrieved, which engineers use to generate a map of the supermarket. This map is then stored in the system. The TiM510 2D LiDAR sensor and the TiM-S safety laser scanner, both specially designed for mobile applications, are characterized by high reliability when detecting obstacles or measuring the surroundings.

Thanks to the various sensors, the mobile robot can move from point A to point B on its own. It can set its route, weave between stationary obstacles (lift trucks, boxes), slow down or stop when it encounters people, and even calculate a new route if a path is blocked. It is also capable of following and accompanying a person in the appropriate mode.

Despite delays due to lockdown restrictions, the founders of SUitee Robotics were able to complete their tests before the summer thanks to the extensive availability of the SICK teams. These produced the desired results and the first autonomous assistance robots have already been delivered. (aa)

TRAYSHUTTLE FROM BRAUN SONDERMASCHINEN OPTIMIZES PROCESS CHAIN

ONE PALLET TO THE NEXT

Autonomous mobile robots have many applications. They are ideal for use in the logistics and transport area where many products are loaded and shipments prepared for dispatch. Loading and unloading: this is the core business of mobile robots. The company Braun Sondermaschinen GmbH has developed an autonomous mobile robot called the BS Trayshuttle that can autonomously pick up stacks of small load carriers or trays from one pallet handling machine and put them down in another pallet handling machine. More specifically, the task of the BS Trayshuttle is to determine positions, take distance measurements, and navigate reliably. Comprehensive sensor solutions from SICK have been employed to enable them to master all of these different challenges.

Using the BS Trayshuttles from Braun Sondermaschinen, companies can transport loads from one location to the next along an assembly line in an automated manner. The mobile robot can pick up loads completely independently from one pallet handling machine and put them down in another. They safeguard and increase the productivity and efficiency of the entire assembly line by making the internal transport logistics as effective as possible. This is an inestimable advantage for companies that use the autonomous mobile robot. When selecting the sensors, Braun Sonder-

maschinen turned to SICK. SICK listened to the objectives and requirements of its long-standing customer and then implemented them in a tailored manner. The result was a mobile robot whose software can be programmed to precisely suit the processes on-site.

The components: complete solution from SICK

To implement the BS Trayshuttle, an autonomous mobile robot (AMR) from the company MiR was selected. These AMRs have already been successfully used in other applications. The technical setup

of the BS Trayshuttle is mounted on an MiR250. The AMR is equipped with a Flexi Soft safety controller and a nanoScan3 safety laser scanner as standard. Thanks to the small and compact construction of the nanoScan3, it was possible to achieve a space-saving design for the MiR250. The two nanoScan3 devices provide all-around protection to the vehicle. The Flexi Soft, which is installed as standard, ensures safe operation even when one of the up to 128 freely configurable protective fields of the laser scanner is breached, for example by an employee. Besides safe operation, this combination also offers a maximum level of flexibility for adapting the speed and direction of travel of the vehicle.

All sensors in the autonomous mobile robot come from SICK. A PowerProx WTT12L MultiTask photoelectric sensor is used for determining the position of the trays, and a W4-3 miniature photoelectric sensor for querying their end position. And the position of trays on the vehicle itself is determined by an IME2S inductive proximity sensor.

Other challenges associated with the BS Trayshuttle have also been solved using the sensor technologies from SICK. For example, a WTT12L measures distances within the vehicle in order to correctly load and unload the tray. Inductive sensors check whether the correct location has been reached.



All sensors in the autonomous mobile robot come from SICK.



The BS Trayshuttle autonomously picks up small load carriers or trays from one pallet handling machine and puts them down in another pallet handling machine.

The BS Trayshuttle in use

The BS Trayshuttle is precisely programmed for its application on-site and knows its way around. To set it in motion, all you have to do is press a green start button on the vehicle and it automatically starts to move. It leaves its station and travels to the specified target location to start loading and unloading goods. The transport system moves itself into position at a precisely defined area in front of the rack. Sensors assist with correctly determining the location. Having arrived there, the BS Trayshuttle extends its tray. This is a surface integrated into the vehicle onto which goods can be placed. How far the tray needs to be extended in order to optimally transfer the goods is also controlled by sensors. The unit itself is height-adjustable so the transfer can occur at different

points. Once the exchange is complete, the tray retracts again. For a more efficient process, it is of course possible to visit multiple bays in sequence, i.e. the BS Trayshuttle first transfers a product to one bay, then moves up to the next bay to pick up a new product which it then transports to the next location. This is no problem at all thanks to the variable tray transfer height of 200 mm up to 1,200 mm. When the autonomous guided robot is no longer required, it returns to its charging station and waits for the next job.

Listen well and program precisely

To enable the autonomous mobile robot to glide about the factory at up to 7 km/h with apparent childlike ease, it is necessary to have a precise knowledge of the

requirements. Particular attention needs to be placed on the safety technology. How should the vehicle respond in specific situations, and what solutions are required to achieve a smooth process?

To find this out, Braun Sondermaschinen collaborated intensively with SICK. Braun Sondermaschinen was able to access the same experts at SICK throughout the course of the project. This made it possible to find solutions to a wide variety of challenges on site. In the end, a mobile robot was created that is tailored to the specific requirements of Braun Sondermaschinen's customers. The existing collaborative relationship between Braun Sondermaschinen and SICK was also strengthened as a result of this project. (Lein)

MOBILE

Logistics

Load Handling

Fine Positioning

Identification and tracking

Service Areas

Mapping

Localization



ROBOTS

Production

End-of-Arm Tooling

Position Feedback


Environmental Perception

Personnel Safety

Robot Vision

Motion Control

Navigation

AGC 1.1 

Location

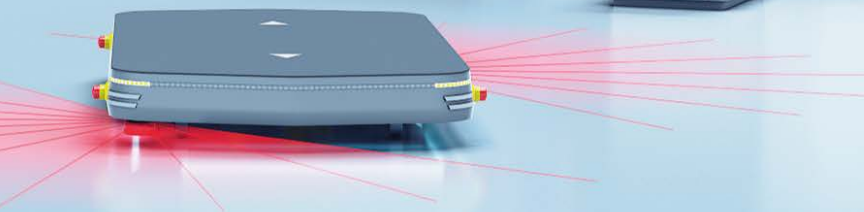
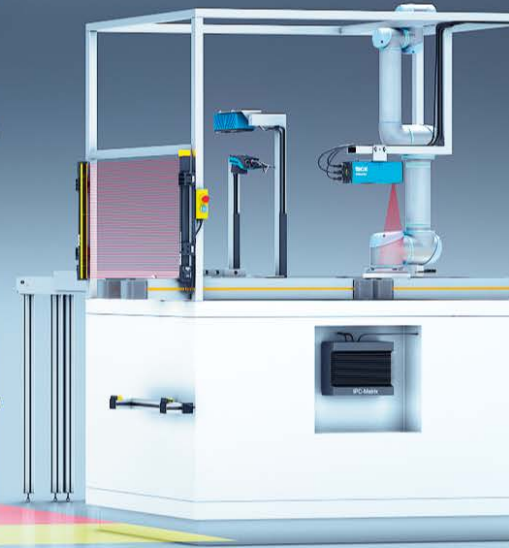
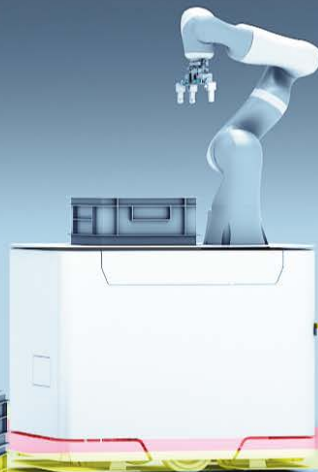

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DISINFECTION USING UV LIGHT AND NANOSCAN3

LIGHT AT THE END OF THE TUNNEL

Sunglasses and sunscreen protect us from it during summer. For viruses, however, there's no escaping it. We're talking about UV light. As damaging as it may be for the skin and eyes, its destructive effect on viruses is very useful. That's why UV light is regularly and successfully used these days, in particular for the disinfection of rooms. And to protect humans in this application as well, some ingenious people have developed robots for the task. The Chinese start-up Youibot selected the nanoScan3 from SICK as a tried-and-proven solution for controlling mobile platforms.



Equipped with a nanoScan3, the ARIS-K2 moves safely around the room like a mobile platform.



Its main applications include shopping centers, manufacturing plants, and any areas where lots of people come together.

Benny Liu, Product Manager SICK China

While the hunt is on globally to find solutions for stopping the pandemic, UV light is being employed more and more often for disinfecting surfaces and rooms. Companies all around the world are working on mobile surface disinfection solutions based on UV light. So has the Chinese start-up Youibot, which has developed a disinfection robot. The somewhat martial arts suggestive name “ARIS-K2 Virus Killing Robot” refers unmistakably to the most important function of this new development. But it also features particular “intrinsic qualities,” to which SICK as a partner has contributed in the form of the nanoScan3. These ensure, amongst other things, that the robot can carry out its work without actually posing any hazard to the people involved.

Multiple functions, mobile platform

Equipped with a nanoScan3, the ARIS-K2 moves safely around the room like a mobile platform. The nanoScan3 is the smallest safety laser scanner from SICK. It is perfectly suited for the protection and localization of mobile platforms. The ease-of-use of the Safety Designer configuration software and the intelligent integration options it provides were an additional

plus point for the Chinese robot builders. They provide a high degree of flexibility and save time, even during the implementation of the disinfection application. “We are very pleased to have had the opportunity to support Youibot in implementing this robot in such a short time.

Using our nanoScan3, it is certain to navigate around safely on its disinfection rounds,” summarizes Benny Liu, the responsible product manager at SICK.

Comprehensive disinfection

In addition to the UV lamps, the mobile robot is also equipped with a thermal camera. This enables it to perform two functions: during the day the robot checks the body temperature of passers-by, and during the night it uses its vertically mounted lamps to disinfect, for example, empty production halls.

“Its main applications include shopping centers, manufacturing plants, and any areas where lots of people come together”, explains Benny Liu.

This fascinating robot is already irradiating factories, airports, and a hospital – a true ray of hope on the horizon. And with the nanoScan3 onboard, it's always on the safe side. (mw)

FABMATICS AND SICK ARE MAKING MOBILE ROBOTS SAFE

NO HALF-MEASURES

Cleanrooms in semiconductor manufacturing are clearly their domain: robots are the order of the day here in all their various guises. Track-guided, stationary or mobile, they assist with production and loading/unloading. Mobile robots are gaining importance in this area. In contrast to tracked guided systems, they are more flexible and can move around freely within the room. For the specialists at Fabmatics, mobile robots have already become an integral part of any intelligent robotics solution for transporting wafers – the silicon discs on which microchips are produced. In the case of the freely moving HERO®FAB, the safety laser scanners and photoelectric sensors from SICK play a decisive role, particularly in the area of safety and the positioning of the gripper. While not always evident at first glance, they are the hidden “Heroes of safety” in the HERO®FAB.



Specialists in semiconductor production

Fabmatics GmbH in Dresden develops intelligent automation and robotics solutions for customers in the semiconductor industry. The company has a unique expertise in supplying complex automation, robotics and handling systems for use in cleanroom conditions. A task with a great deal of responsibility: “Our various robots are, after all, transporting very valuable goods within the semiconductor production environment. It is therefore par for the course that each single one of our robots carries the value of a single family home ‘on its shoulders,’” says Martin Däumler, Group Manager Product Development & System Integration at Fabmatics. That makes it all the more important to find reliable solutions. The prerequisites for safe mobility can be fulfilled, amongst other things, with the help of partners like SICK who can offer both hardware as well as software, planning and development, manufacture and installation right through to after sales service from a single source. In this application, the S300 Expert safety laser scanner, and in future the microScan3, take care of tasks relating to horizontal and vertical protection within the room. The miniature photoelectric sensors from the W2S-2 family create an intelligent sensor solution for loading and unloading by the grippers – small, smart and light.

“ Our various robots are, after all, transporting very valuable goods within the semiconductor production environment. It is therefore par for the course that each single one of our robots carries the value of a single family home ‘on its shoulders’.

Martin Däumler, Group Manager Product Development & System Integration at Fabmatics

Mobile in the cleanroom

The HERO®FAB brings mobility to the cleanroom. It combines an established, clean and safe robot system with an innovative automated guided vehicle platform. It was developed to fully automatically load and unload production equipment and to enable items to be quickly transported between individual process steps and also intermediate storage areas within the cleanroom. Specifically, it can move up to four containers at a time – in cleanrooms, these containers are typically used to transport 25 individual 200 mm or 300 mm wafers. Special versions of the HERO®FAB with a large 60l water basin are also used. Based on the earlier tried-and-proven HERO®Rail rail solution, the further development of the HERO®FAB now makes it possible to move around freely within the cleanroom without a rail or cable connection. Thanks to the safety laser scanners from SICK, the mobile robot not only fulfills the object safety requirements, but also the most demanding safety requirements for the interaction of humans and machines within the same working space. Various levels of personal safety can be guaranteed depending on the degree of interaction and the local requirements.





In the case of the freely moving HERO@FAB, the safety laser scanners and photoelectric sensors from SICK play a decisive role in the area of safety and the positioning of the gripper.

Perfect for small installation spaces

The miniature photoelectric sensors in the W2S-2 family guide the robot arm safely and reliably when gripping the valuable items. The particularly useful aspect is also their size. Installation spaces can often be very tight, in particular in mobile robots. The controller already takes up about 80 % of the available space inside the robot. That is another reason why the W2S-2 was chosen. The ultraflat G2 flat sensors can be integrated into miniature systems and very tight installation spaces. They are also characterized by their outstanding detection thanks to a high-performance background suppression feature. Even very small objects can be detected without difficulty starting at distances of just 8 mm. Jet black, reflective, transparent and shiny objects can also be reliably detected.

Tried-and-proven interfaces for the future

Ease of installation is another advantage when integrating a safety controller into the mobile robot. The safe EFI-pro System is a targeted further development of the successful EFI interface and enables the mobile robot to be protected in an intelligent manner. The industrial Ethernet-based EFI-pro network technology exchanges and transfers safety and non-safety data at all communication levels. The central component is the EFI-pro gateway, which ensures safe and fast networking as well as direct integration of robot controllers into the Flexi Soft safety controller via EtherNet/IP™ CIP Safety™. The Safe EFI-pro system therefore represents a decisive step forward for digital transformation.

“ We grow with our customers at each new challenge – that’s what drives us each and every day!

Meik Kettinger, Key Account Manager
Electronics & Solar, SICK Vertriebs-GmbH

Together into the future

For Martin Däumler and Meik Kettinger, Key Account Manager Electronic & Solar at SICK, the technical maturity of the solutions from SICK are a good reason for future collaboration: “Our R&D is a dynamic process. SICK is an ideal partner, especially when it comes to technical requirements, the preparation of requirements specifications, and fast response times to queries and when exchanging ideas,” describes Däumler. Kettinger adds: “We grow with our customers at each new challenge – that’s what drives us each and every day!” The basis for a successful cooperation is in-depth knowledge and a high level of technical expertise – a certain long-standing flexibility. The partners can then jointly follow the path to success into the future. The continuous advances in mobile robotics are not limited to just the semiconductor industry, but are happening in other industries too. We therefore look forward to the challenges of tomorrow and are ready to transfer our shared know-how to the pharmaceutical industry or medical technology as well. (mw)



HERO@FAB combines an established, clean and safe robot system with an innovative automated guided vehicle platform.



Fabmatics and SICK would like to continue on their successful path in the future.



SENSORS CONTROL THE COLLABORATIVE ROBOTS OF THE FUTURE

THE NEW MOBILITY

The ongoing development of small, powerful and flexibly positionable robots that can collaborate with humans is progressing in leaps and bounds. The sensors from SICK are an important component in this. Sensor intelligence plays a vital role not only in orienting and positioning mobile cobots, but also in reliably monitoring their surroundings. Lightweight cobots that are transported to their working position on automated guided vehicles and autonomously position themselves are the newest development in this area. These cobots are making fence-free and flexible work an increasingly standard feature in robotics and a new foundation for functional automation.

Gone are the days when the majority of industrial robot applications where robots coexist with humans incorporated fixed guards. Smaller and more flexible systems now make them suitable for a wider variety of applications. Mobile cobots mounted on automated guided vehicle systems and weighing no more than approximately 15 kilograms are garnering particular interest. SICK's complete range of sensor solutions for robots and mobile platforms is being employed in these areas: robot vision, safe robotics, end-of-arm tooling, position feedback, environment perception, and safety.

Cobot and mobile platform unite

The advantages of collaborative robots are readily apparent. They are especially suitable for flexible applications that can also be temporarily employed in production lines. The cobots are either permanently integrated into the production line or, more recently, installed on mobile platforms. This provides a further boost to productivity because it drastically reduces the time required to set up the cobots at their workstation. How is this achieved? By employing the sensor solutions from SICK to move the cobot to its workstation and to reliably position it. The cobot is combined with an automated guided vehicle system to create a mobile unit that can autonomously find its safe position and independently carry out any necessary base corrections with the aid of a robot guidance system. Robot guidance systems such as the PLR, or any of the other robot vision systems from SICK, are especially suited for this task.

As they move into position, these mobile platforms with cobots must pose no risk to persons or machines, and sometimes need to travel through narrow passageways in production. Sensor and system solutions from SICK help to reliably protect humans and property from collisions, while at the same time collecting all necessary data for the dependable and flexible navigation of automated guided vehicles. These vehicles manage high speeds even when going around curves thanks to the switching of protective fields.

Collaboration begins in the community

A cobot solution can be implemented efficiently by utilizing the so-called Robot Operating System (ROS). ROS is an open source framework that was developed in a university setting. Thanks to a very active community, it has also found its way into industrial applications around the world in recent years. Here, too, SICK is in step with the times and working on an equal footing with its partners to bring the cobots to life with the help of ROS. Small and mid-sized companies, in particular, can benefit from this because it enables them to save on development costs and resources.



Humans and robots will work even more hand in hand in the future.

Robots without fences, sensors without limits

Cobots generally have a high level of movement flexibility on account of their degrees of freedom. A wide range of sensor solutions are therefore required to protect their entire working space when in use. SICK's broad portfolio offers solutions for all aspects of this application. Laser scanners not only guarantee the reliable positioning of the cobots in the workspace but also protect the workers nearby. This includes monitoring the surroundings using safety laser scanners, which reduce the speed of the cobot when a person approaches. An automated restart after a complete stop that requires no manual intervention from the worker is also part of the solution.

Furthermore, the motor feedback systems integrated into the cobot reliably and dependably report the position of the robot arms to the controller. This data enables the entire Cartesian workspace right through to the end-of-arm tooling to be securely monitored.

The last mile firmly in view

Similar to the field of logistics, the field of robotics also uses the concept of the "last mile." The logistics experts are referring to the final, fully-automated steps in delivering the goods to the customer. In robotics, "the last mile" describes the great challenge of ensuring that a deployed robot operates in a safe manner and can be controlled right down to the last millimeter. Particularly in the case of precisely calibrated robots working in an open space with no protective fences, meeting this challenge calls for great mastery and sophistication. It is the interplay of a large number of sensors, especially the motor feedback systems, that allows safe and trouble-free end-of-arm tooling on the gripper. New solutions at the end of the arm for completely eliminating injuries to worker's hands will be available soon. These will employ 2D and 3D image-based robot vision solutions, i.e. a type of "Cobot Vision," proving that SICK has the last mile in robotics firmly in view. (mw)

NEW MARKETS, NEW POSSIBILITIES FOR ROBOTS IN SERVICE APPLICATIONS

AMR, AT YOUR SERVICE

Greater automation is not only evident in production and manufacturing environments, but also in everyday life. Service robots are already taking on many tasks in hospitals, cruise ships, hardware stores, airports, and hotels. Robots are booming in the industrial sector and now for private use.

In banks and other businesses, service robots can distribute flyers, entertain those waiting in lines or lobbies, and provide information to potential customers. Robots in the travel industry take on some of the tasks of the personnel, providing relief to human workers.

Since spring 2016, a Rostock-based shipping company has been using a humanoid called Pepper on its cruise liners. Pepper helps guests check in, offers orientation on board, and provides tips on events and excursions in German, English, and Italian.

Kurt, another robot, is friendly, clever, communicative, and helps with household chores. Kurt understands people in its surroundings and can support them in their everyday life. This intelligent service and cleaning robot is currently being developed at the Ravensburg-Weingarten University of Applied Sciences.

Collaboration between humans and robots is enabled by sensor solutions such as the 2D LiDAR sensors of the TiM series. With the help of the TiMs, service and security robots detect every detail of their surroundings, dynamically adapting to changing conditions in order to interact with people and react to unknown situations – similar to a human. The TiM team at SICK AG in Germany keeps an eye on market changes. “The rapidly changing market in mobile platforms and robots requires continuous further development of the portfolio of 2D LiDAR sensors,” said Tiberius Pischke, Product Manager for 2D & 3D LiDAR sensors. “With the introduction of the product families TiM3xx (for field evaluation) and TiM5xx (for measurement data), SICK has successfully proved its leading role in the area of 2D LiDAR sensors.”

In recent years, demand has also risen for a sensor that offers both field evaluation and the output of measurement data, which is met with the new TiM7xx. The main feature of this sensor is the simultaneous use of the measurement values for localization tasks and the field evaluation for collision avoidance. The smallest safety-oriented sensor of the TiM-S series is another new development.

“With the two safety-oriented 2D LiDAR sensors, TiM361S and TiM781S, we can now adequately serve new mobile and stationary robot applications in accordance with current standards. The main focus here is on the rapidly changing market of service robotics,” said Christoph Hirt, Product Manager Safety Distance & LiDAR.

Sensor fusion and multi-sensor systems

The topic of sensor fusion will play a decisive role in the future – particularly regarding outdoor automation and smart manufacturing applications – to ensure the constant high availability of mobile machines under difficult ambient conditions. TiM sensors are real team players in the fusion of 3D cameras, 3D LiDAR, ultrasonic, or distance sensors. The various sensors generate significant added value for customers through intelligent evaluation of the individual measurement data. (mn)



Collaboration between humans and robots is enabled by sensor solutions such as the 2D LiDAR sensors of the TiM series.



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The rapidly changing market in mobile platforms and robots requires continuous further development of the portfolio of 2D LiDAR sensors.

Tiberius Pischke, Product Manager for 2D and 3D LiDAR sensors, SICK AG



SICK AND STEERING MACHINES JOIN FORCES TO OPTIMIZE LOADING AND DISPLACEMENT BY AUTONOMOUS MOBILE ROBOTS

TAKE A LOAD OFF

The automated guided vehicles (AGVs) and autonomous mobile robots (AMRs) from Steering Machines significantly increase productivity in industrial environments – thanks to the help of SICK sensor solutions. The alliance between both companies has provided a rugged and safe solution to the production chain of Comexi, a multinational company dedicated to the manufacturing and marketing of capital goods for the flexible packaging, printing and converting industry.



A safety encoder quickly provides the data with the important parameters.



Safety laser scanner microScan3 ensures optimal and safe operations of the AMRs and proves high resistance to dirt, dust, and the incidence of sunlight thanks to the innovative safeHDDM® scanning technology.

The use of AGVs/AMRs for the development of tasks and movements in industrial environments is no longer just a trend, but now another part of the production chain. However, external elements are needed to allow these AGVs/AMRs to be safe without losing productivity.

AGVs and AMRs for loading and transportation in production plants and logistics centers

SICK offers optimal and safe operations of AGVs/AMRs in industrial environments. This is demonstrated by Barcelona start-up, Steering Machines, which is a developer of omnidirectional AGVs/AMRs for loading and transportation in production plants and logistics centers.

Steering Machines require sensors to obtain accurate and safe information about the movement, in context of speed and direction level, of its omnidirectional Moby AGVs/AMRs. To do this, they use the absolute and incremental safety encoder with SICK components, which quickly provides reliable data with the important parameters.

This encoder stands out for being operational, being only one instead of the usual two, and it is compatible with the safe speed controllers of the Flexi Soft MOCO

and MOC1 family. SICK's integral solution for Steering Machines is completed by the microScan3 safety laser scanner, a device with high resistance to dirt, dust, and the incidence of sunlight thanks to the innovative safeHDDM® (High Density Distance Measurement) scanning technology. The Flexi Soft safety controller offers optimized scalability for each application, depending on the complexity.

Successful application at Comexi

The combination of SICK and Steering Machines has been successful in the production chain of Comexi, a multinational company dedicated to the manufacturing and marketing of capital goods for the flexible packaging, printing, and converting industry. Comexi wanted to contribute to increasing the productivity of its customers with AGVs/AMRs by reducing the downtime between machines and other incidents, such as displacement in small environments or lack of material.

Thanks to the Moby AGVs/AMRs and the SICK methodology, they obtained the results they expected: "SICK and Steering Machines provided us a robust and safe final solution to minimize errors in our customers' production chain. The AGV/AMR allows them to move large loads

without taking much space, which increases their efficiency," explains Pedro Jiménez, Comexi's Digital Brand Manager. "Our alliance with Steering Machines has served to provide the solutions that COMEXI was looking for. We have managed to generate security while, at the same time, improving productivity because of the solidity of our products," assures Mikel Saez de Buruaga, Product Manager of SICK Spain. "SICK sensors and solutions are the natural accompaniment to our products. In addition, it allows us to achieve a safety performance level d in movement, speed, and turn, following the current regulations for this type of application," highlights Carles Domènech, CTO of Steering Machines. (BNC)



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