# Complete sensor solutions for automated guided vehicles and mobile platforms

SICK presents its modular Eco-System for smart mobile automation

Waldkirch / Hannover, April 2018 – Current innovations are coupled with future-proof sensor and control technologies and aligned upon the current and future requirements of Logistics 4.0 in SICK’s modular Eco-System for smart automation. Sensors and control units can be configured to create complete customer- and application-specific solutions for mobile material flow technology – whether automated guided vehicles, mobile picking robots, or driverless and autonomously navigating platforms. The Eco-System offers a variety of solution approaches with which tasks involving personal safety, localization and collision prevention, as well as the handling and identification of transport loads, can be conveniently implemented from a single source.

# Flexible production and logistical processes require transportation that can be adapted for the particular tasks – also in terms of its sensor and control system technology. The aim is intelligent autonomous vehicles and vehicle fleets that meet the growing need for flexibility, and thus efficiently network internal material flows as well as complex production and logistical transport processes. Whether localization, personal safety, collision prevention or load handling – the modular Eco-System from SICK makes complete sensor solutions possible for automated guided vehicles and mobile platforms, offering maximum economic efficiency, functional reliability, and future-proofed investments.

**Users want maximum flexibility...**

Hardly any two application- or location-related scenarios are alike when it comes to using automated guided vehicles, mobile picking robots, or driverless and autonomously navigating platforms. So no one sensor solution with one physical operating principle or one safety or control concept is sufficient to cover all cases.

This becomes clearer when one looks at the example of line guidance for vehicles – for which SICK offers three solution concepts: optical or magnetic line guidance and grid localization. Optical line guidance is suitable, for example, wherever reinforcements or other metal objects in the floor or ground complicate magnetic line guidance. Conversely, magnetic line guidance in the floor or ground is advantageous wherever heavy-duty use of the pathways by fork-lift trucks or road vehicles could damage the optical line guidance tape. As an alternative – or as a complement to either line guidance technology – a solution for determining the absolute vehicle position can be implemented with a system for grid localization via data matrix codes.

The Eco-System from SICK is similarly flexible when implementing safety-related requirements. Safety-certified sensor and control components of differing Performance Levels according to EN ISO 13849-1 are available depending on the particular individual risk analysis for using automated guided vehicles or autonomous mobile platforms. Safe encoders and safe non-contact limit switches monitor speed as well as the current and maximum permissible steering angle of vehicles. Safety laser scanners with individually programmable protective fields detect persons and obstacles on the driveway and slow movement down to a safe stop. All-round 360° protection can be set up with just two safety laser scanners. In addition, 2D LiDAR sensors enable the setting up of vertical protective fields next to the vehicle to detect the approach of a person, or an object jutting out into the driveway at any particular height. All sensors on the vehicle can be evaluated and monitored, either with a modular safety control system or an SIM Sensor Integration Machine – each of which also centrally merges the signals of, for example, safe limit switches and emergency stop buttons.

The Eco-System also includes a variety of options that offer task-oriented integration in the overall solution and implementation on vehicles used for the automatic handling and identification of pallets, mesh boxes and other loading aids. On fork-lift trucks, for example, distance sensors monitor the lifting fork approaching a pallet. After picking up the load – verified by an ultrasonic sensor – a wire-draw encoder measures the lifting path of the fork while inclination sensors detect the current angle of the lifting mast. At the same time, the pallet can be automatically identified with a bar code scanner, a camera-based code reader or an RFID interrogator. In addition to precise positional information, when measuring the path in the hydraulic cylinder of the lifting fork innovative linear encoders also provide diagnostic functions (allowing optimized maintenance routines and the prevention of machine failures, increasing vehicle availability).

**...with minimum complexity**

SICK thus offers a broad portfolio of solutions for automated guided vehicles, semi-automated industrial trucks and mobile platforms. In addition to the flexible, individual arrangement of a solution, the objective is also to minimize its complexity. Firstly, all components are coordinated with one another, interfaces are harmonized, and everything is available from a single source – reliably minimizing integration and functional risks. Then there is the possibility of transferring the information from different sensors to higher-ranking control systems as pre-processed raw data – simplifying their integration in a customer-specific control environment. Moreover, SICK offers software tools that support, for example, the integration of a vehicle control unit directly in the cloud. Finally, sensors themselves also reduce complexity by dynamically reacting to changing framework parameters. Thus, for instance, the supplementary ‘Map Update’ localization functionality allows the vehicle to dynamically adapt line guidance in response to changes in its surroundings. Modifications of a current infrastructure, for example by a temporarily placed pallet or relocated shelving, no longer require any new programming of the path layout. The 2D map is either dynamically adapted or the scanned environmental information of a 3D LiDAR sensor (which measures several levels simultaneously) is used to automatically change affected transport routes.

**Solution prospects for smart mobile intralogistics**

SICK underlines its solution competence throughout the entire process chain of internal transport tasks with its modular Eco-System and the resultant, individually configurable, complete sensor solutions for automated guided vehicles, mobile picking robots, or driverless and autonomously navigating platforms.

Picture: SICK\_mobile-platforms.jpg  
SICK’s complete sensor solution for driverless transport vehicles and mobile platforms covers all aspects of personal safety, localization and collision prevention, as well as the handling and identification of transport loads.

SICK is one of the world’s leading producers of sensors and sensor solutions for industrial applications. The company, founded in 1946 by Dr. Erwin Sick and based in Waldkirch-im-Breisgau near Freiburg, is a technology and market leader with a global presence – with more than 50 subsidiaries and associated companies, as well as numerous sales offices. SICK achieved Group sales of about EUR 1.5 bn. in the 2017 fiscal year with almost 9,000 employees worldwide.

Further information on SICK is available at http://www.sick.com or by phone at +49 (0)7681 202-4345.