INDUSTRIAL AUTOMATION TECHNOLOGIES AND THE REALIZATION OF FACTORY 4.0

Cameron Gieda – Vision Systems Specialist – Sick Inc. USA
SICK - AT A GLANCE

- Founded in 1946 - more than 65 years of sensing technology

- About 5,800 employees around the world

- Present in more than 80 countries: With almost 50 subsidiaries and equity investments + numerous specialized agencies

- Group sales of EUR 902.7 million in the fiscal year 2011

- Widest product and technology range in the sensor industry

SICK - one of the leading manufacturers of sensors and sensor solutions for industrial applications worldwide
INDUSTRY INVOLVEMENT

Process automation
- Power
- Waste & Recycling
- Cement
- Combustion Engines
- Chemical & HPI
- Metal & Steel
- Mining
- Oil & Gas

Factory automation
- Packaging
- Food & Beverage
- Pharma & Cosmetics
- Consumer Goods
- Print & Paper
- Electronics & Solar
- Machine Tool
- Metal Working
- Wood & Furniture
- Construction Materials & Glass
- Tire, Rubber & Plastic
- Textile
- Handling & Assembly
- Automotive and Part supplier
- Robotics
- Motion & Drives

Logistics automation
- Storage & Conveyor
- Retail
- Courier, Express, Postal & Cargo
- Airports
- Industrial Vehicles
- Traffic
- Ports
- Cranes
- Building Management
- Building Security
PRODUCT SNAP SHOT

- Photoelectric sensors
- Proximity sensors
- Magnetic cylinder sensors
- Identification solutions

- Detection and ranging solutions
- Fluid sensors
- System solutions
- Analyzers and systems

- Gas flow measurement
- Motor feedback system
- Encoders
- Vision

- Opto-electronic protective devices
- Safety switches
- sens:Control – safe control solutions
- Registration sensors

- Distance sensors
- Automation light grids
- Software

: Schilling (2011-1-18)
## HISTORY OF DEVELOPMENT

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1950</td>
<td>First photoelectric switch based on autocollimator principle</td>
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<tr>
<td>1952</td>
<td>First light curtain for accident prevention</td>
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<td>1956</td>
<td>First flue gas monitor</td>
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<td>1978</td>
<td>First in-situ gas measurement device</td>
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<td>1989</td>
<td>First distance sensor based on laser time-of-flight technology</td>
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<td>1993</td>
<td>First time-of-flight safety scanner</td>
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<td>2001</td>
<td>High-speed 2-D code reader</td>
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<td>2004</td>
<td>First 3-D smart camera / ultrasonic gas flow meter</td>
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<td>2007</td>
<td>High-end CCD sensor with integrated illumination</td>
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<td>2009</td>
<td>Navigation based on natural landmarks</td>
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<td>2010</td>
<td>Color Ranger E: the world's first high-speed 3D camera with high-performance color color measurements</td>
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At Sick we have a term called “Sensor Intelligence “ which is a core philosophy for our future product development.

If we take the example of a simple photoelectric switch – Sensor Intelligence describes all the information a switch can provide beyond it’s state of on or off such as diagnostics.

Over a sensor network like IO-Link we can pull the following data –
- Time stamped switching events
- Temperature
- Sensor health ( LED life, dirty lens etc.)
- Sensor settings ( for cloning or swapping out and old sensor)

All of this data can be viewed remotely in real time.

It’s also possible to set up simple logic operations among connected sensors.
The IO-Link technology is the equivalent to the USB interface for the sensor/actuator level in industry automation.
IN AN ACTUAL APPLICATION -
IO-LINK COMMUNICATIONS – WIRE REDUCTION

Overview of IO-Link communication

- Serial, bidirectional point-to-point connection for signal transmission and power supply – and no new bus system!
- Backward-compatible with discrete PNP output sensors.
- Operating modes: standard I/O mode (SIO), IO-Link mode
- Three transmission rates: 4,800 (COM 1), 38,400 (COM 2), 230,400 baud as an option (COM 3)
- Unshielded, standard 3-wire industrial cable for connections
- M12 plug connector
- Pin assignment: pin 1: 24 V, pin 3: 0 V, pin 4: switching and communication cable (C/Q)
- Maximum cable length: 20 m
- Maximum power consumption for power supply: 200 mA
- Process data (such as switching signals or distance values) is transmitted cyclically; service data (such as parameters) is transmitted acyclically
FLEXI-LOOP INDUSTRIAL SAFETY NETWORK
DESIGNED TO REDUCE SAFETY I/O AND INCREASE FLEXIBILITY

- Flexiloop Sensor cascade eliminates most of the safety I-O in a systems and distributed each node around the machine.
- Not only is there a large reduction of hardware, many feet of wire is saved as well as the time required to terminate safety circuits.
Sick’s new CX Camera can provide real-time 3D data.

- **Box Dimensioned**
- **Collision Avoidance**

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**Point Cloud Snap Shot**
VIELEN DANK FÜR IHRE AUFMERKSAMKEIT.