DMS
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IT AND NETWORKS
& INDUSTRIAL MAINTENANCE

DMS Education

Creative engineering for quality education

precise positioning by linear axis

sensor diversity
incremental encoder, zigbee wireless sensor, 3 inductive sensors & IO-Link

PLC Schneider or Siemens

Links studied
- Modbus TCP
- Ethernet IP
- wired on/off
- IO-Link
- IoT MQTT
- Wifi
- Zigbee
- Bluetooth

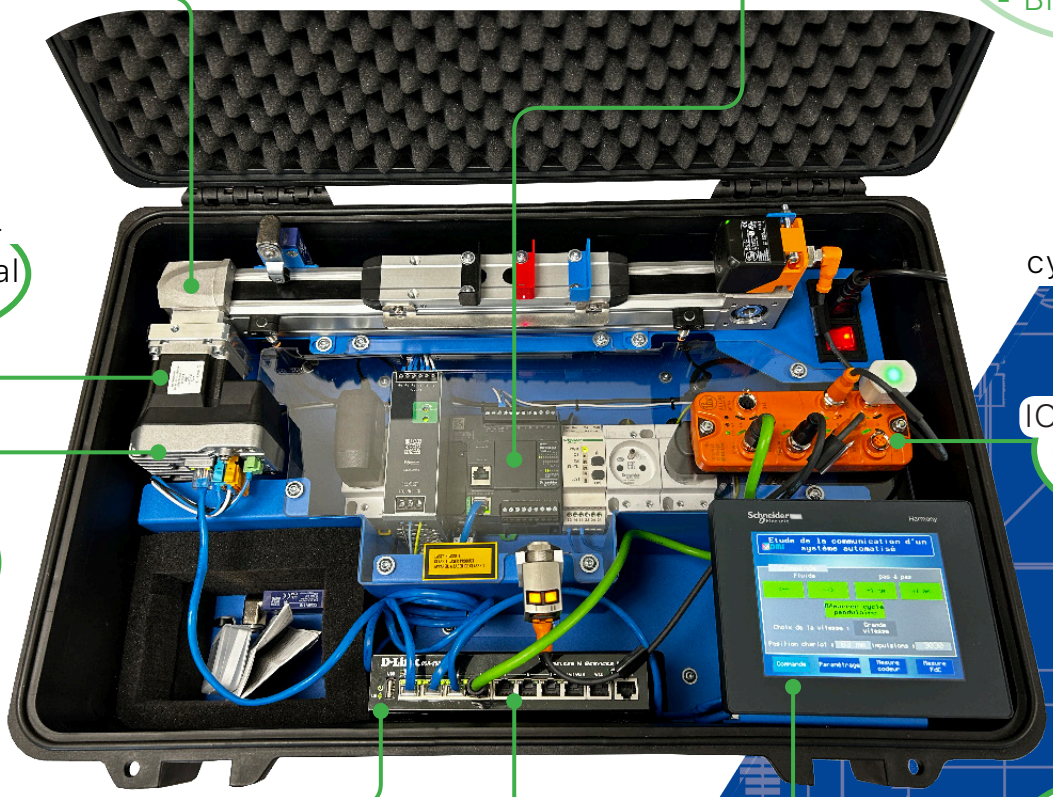
industry 4.0

Stepper motor with incremental encoder

cyber security

IO-Link master + Bluetooth adapter

Industrial variable speed

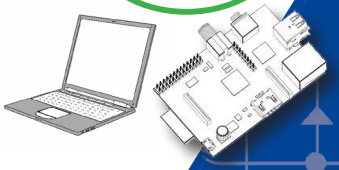


integrated wifi router

network connections available

Schneider or Siemens color touch **HMI**

Raspberry integrated
InfluxDB database
Node-RED server



Schneider Electric
or
SIEMENS

ifm

STORMSHIELD

STUDY OF COMMUNICATION OF AN AUTOMATED SYSTEM

IT and networks & industrial maintenance sectors

DESCRIPTIF

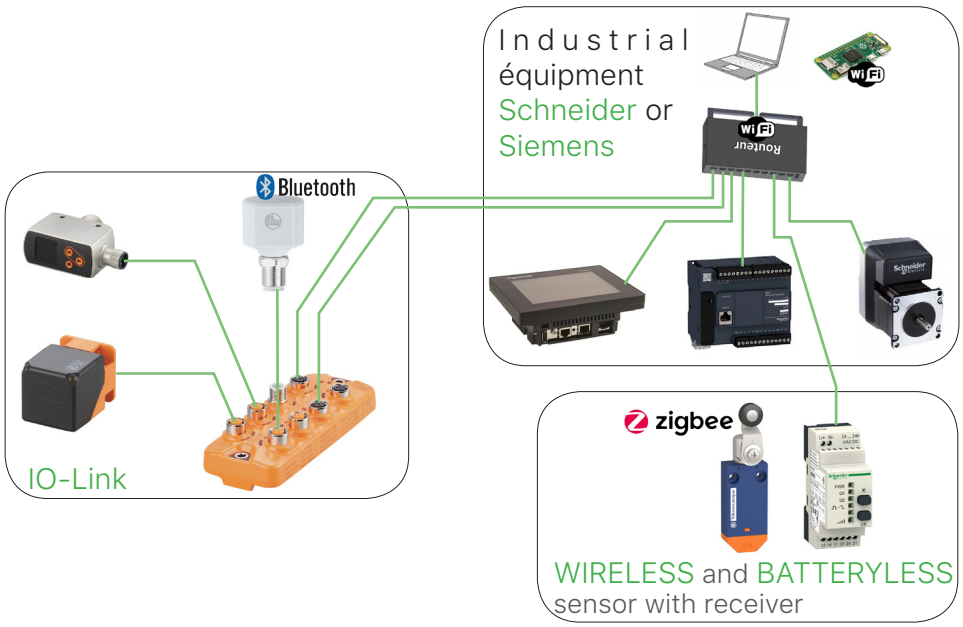
This multi-disciplinary system (compact and mobile) covers skills for studying and understanding different industrial communications networks using a simple, representative operating part.

The wide-ranging operations enable learners to study and implement industrial networks using current technical solutions.

The heart of this system is its Multimedia Learning Environment (MLE), in full compliance in full compliance with all components of the computer and network professions, as well as industrial maintenance.

The «**studying the communication of an industrial automated**» system addresses a large number of key Industry 4.0 technologies used for production optimization, equipment/process monitoring and maintenance .

This support is fully integrated into a simulation case, and includes a simple operating section animated by a control section representing a robot axis.



THIS DIDACTIC SYSTEM CONSISTS OF :

A **power chain** with :

- industrial power supply (230V AC / 24V DC)
- a communicating variable speed drive
- a stepper motor
- a linear axis from a real industrial multi-axis “Pick and Place” system.

An **information channel** with :

- Schneider M221 or Siemens PLC communicating via Modbus TCP
- a color touchscreen HMI
- a wifi router
- Raspberry server
- motor encoder
- 2 on/off inductive limit switches
- 2 wireless, battery-free Zigbee sensors with receiver
- IO-Link master (Modbus TCP & IoT- MQTT communication) with Bluetooth connection dongle
- 2 configurable IO-Link sensors (inductive and laser)

17 activities developed

Measurements from the inductive sensors and motor encoder are sent directly to the HMI, and the signals can also be observed on an oscilloscope using the cable supplied...

CYBERSECURITY

This complementary STORMSHIELD firewall enables you to implement advanced network and security functions (antivirus, antispam, IPS, web/URL filtering, IPsec VPN, SSL VPN...) to meet the constraints and threats of industrial networks.

STORMSHIELD is a French company, subsidiary of Airbus, R&D based in Lille, Lyon and Paris. The Stormshield Network Security range has been awarded ANSSI Standard Qualification.

Like thousands of teachers, you can benefit from free training courses at the Stormshield Academy, enabling you to define and implement filtering and routing policies, configure authentication policies and set up different types of VPN networks.

The **"study of communication in an automated system"** teaching aid enables you to tackle the following topics

Table of maintenance activities

Activities	Use of support / session
1 - Discovering and getting to grips with the system 2 hours + 3 hours	Using the technical documents, identify the hazardous phenomena and risks associated with the system's operation. Using the various procedures, commission the system for an operating cycle (manual, automatic mode).
2 - Study of power and information and information chains - 2x 3 hours	Analyze the structural organization of power and information chains.
3 - Study of different sensors 2x 3 hours	Analyze constructive solutions: discrete, digital, analog and intelligent.
4 - Discovering different communication networks 6x 3 hours	Identify and analyze constructive link solutions: Modbus TCP, Ethernet IP, TOR wired, IO-Link, Wifi, Zigbee and Bluetooth.
5 - Network configuration 2x 3 hours	Configure and set network addresses for the various components.
6 - Cybersecurity 3x 3 hours	Understand risk analysis, communication flow management, industrial firewall implementation, user and access management, VPN design and implementation.
7 - Discovering the IO-Link network 3 hours	Identify the latest IO-Link intelligent industrial sensor technologies from functional technical documents. Set up IO-Link master and sensor parameters in MQTT. Program dashboards on Node-RED.
8 - Implementation of a connected sensor 2x 3 hours	Study the specifications for the modification: choice of sensor. Install sensor and configure IO-Link master and PC server to validate operation. Collect information and enter it into a database; Set monitoring limits; Interpret results and initiate intervention request.

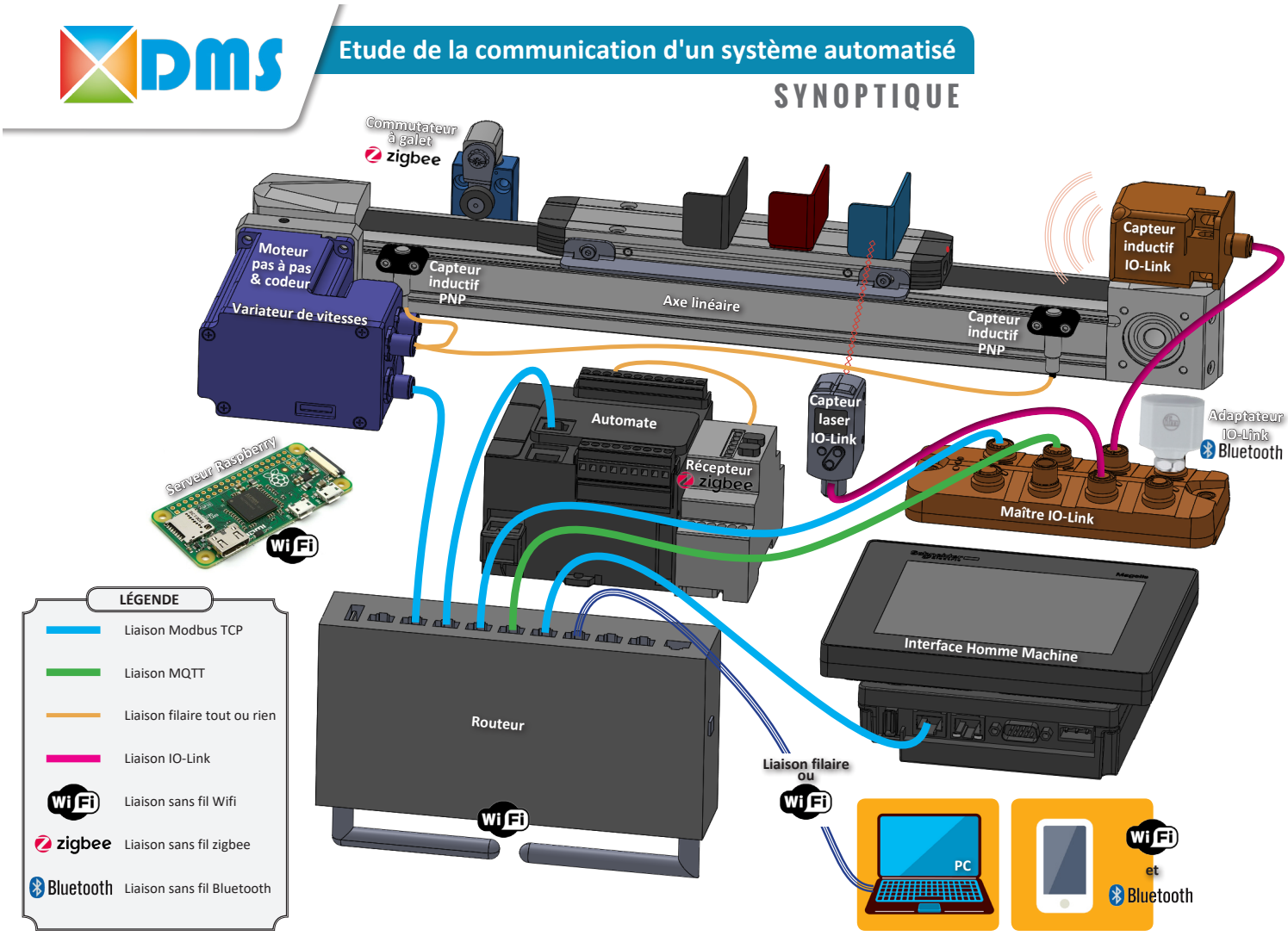
Table of activities developed in IT and network

Activities	Use of support / session
1 - Getting to know the system 3 hours	From the HMI, commission the system for one operating cycle (manual, automatic mode).
2 - Study of the interaction of a computer system with its environment 2x 3 hours	Analyze a SYSML system modeling diagram. Identify the functions and characteristics of an action chain in a computer system.
3 - Characteristics of sensors, actuators and system communication - 3x 3 hours	Choice and characterization of sensors and actuator. Communication parameterization and validation with a software solution.
4 - Discovering different communication networks 6x 3 hours	Identify and analyze constructive link solutions: Modbus TCP, Ethernet IP, TOR wired, IO-Link, Wifi, Zigbee and Bluetooth.
5 - Setting up a computer network 2x 3 hours	Configure and set network addresses for the various components.
6 - Development and validation of cybersecurity software solutions 4x 3 hours	Implementation of software tools (information traceability, vulnerability, testing, network and incident analysis and processing).
7 - Discovering the IO-Link network 2 hours + 3 hours	Identify the latest IO-Link intelligent industrial sensor technologies from functional technical documents. Set up IO-Link master and sensor parameters in MQTT. Program dashboards on Node-RED.
8 - Project: Implementation of a connected sensor and configuration of a database on a Raspberry board external to the system.	Study the specifications for the modification: choose the sensor. Install sensor and configure IO-Link master and raspberry board to validate operation. Collect information and enter it in a database. Set monitoring limits;
9 - Project: Implementing an add-on in the form of an electronic card	Definition of requirements based on specifications and identification of functionalities. Design, component placement, routing and manufacturing of an electronic board. Integration into the environment and validation of operation.

ACCOMPANYING DOCUMENTS DIGITAL

The "Study of communication in an automated system" teaching aid is supplied with accompanying digital

- A technical file with a presentation of the system, its functional and structural description and its specifications.The technical characteristics of all components are given in full.
- A complete teaching pack, with written and corrected practical activities.
- A resource folder containing teaching and technological resources, with additional information to enrich learners' scientific and technological knowledge.



TO ORDER

The Study of the communication of an automated system is proposed :

- Part no. **BACMI3200** corresponds to the Schneider version of the complete trainer.
- Part no. **BACMI3201** corresponds to the Siemens version of the complete training system.
- Part no. **BACMI3210** to order the **STORMSHIELD Firewall add-on**.

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