



# Development of Modern Robotic System Solutions for Industrial Applications

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# Agenda

- Schneider Electric Innovation Platform
- **Physical** Robotic System Solutions
  - Development & Delivery Approach
  - Recent Use Cases
  - Recent Proof-of-Concept Customer Implementation
- Recent **Virtual** Robotic System Solution Examples
- Conclusions

# Schneider Electric Innovation Platform

# Schneider Electric Innovation Platform



## For Industry 4.0



# Physical Robotic System Solutions

# Development & Delivery Approach

Schneider Electric Collaborators & Partners



Mobility/Platform

Schneider Electric & Subsidiaries



Analytics  
(Video, etc.)



Services &  
Local  
Support



End to End  
Robotics  
Inspection  
Solution

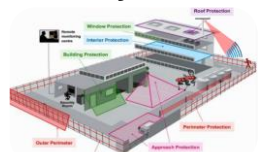
Integration (Payloads/Sensors,  
Software, TeleComms) & Services

# Recent Use Cases



**Safety Officer**

- PPE Detection
- PTW Interface
- Abnormal Behavior Monitoring
- Evacuation Support
- Environment Monitoring
- Gas/Fire Detection
- Integration w/ Control Room for alarms/events



**Security Officer**

- Guard Tour
- Intrusion Detection
- Face Recognition
- Abnormal Behavior for threat detection
- Un-Identified / Dangerous Object Detection(Threat)
- Unauthorized Access detection
- Integration w/ Control Room for alarms/events



**Remote Op. Officer**

- Remote Site Inspection
- Live Feed to Control Room
- Security Features like intrusion detection etc.
- Process Environment Monitoring
- Auto Operation incase of Communication failure
- Integration w/ Control Room for alarms/events



**Health Officer**

- Face Mask detections
- Social Distancing
- Person Temperature Detection
- Announcement
- Integration w/ Control Room for alarms/events

## Payloads



Barcode scanner



Optical / Thermal Camera



5G Router



Digital Signage



Speakers



Gas Analyzer



Printer



RFID

# Recent Proof-of-Concept Customer Implementation

Locomotion tests performed

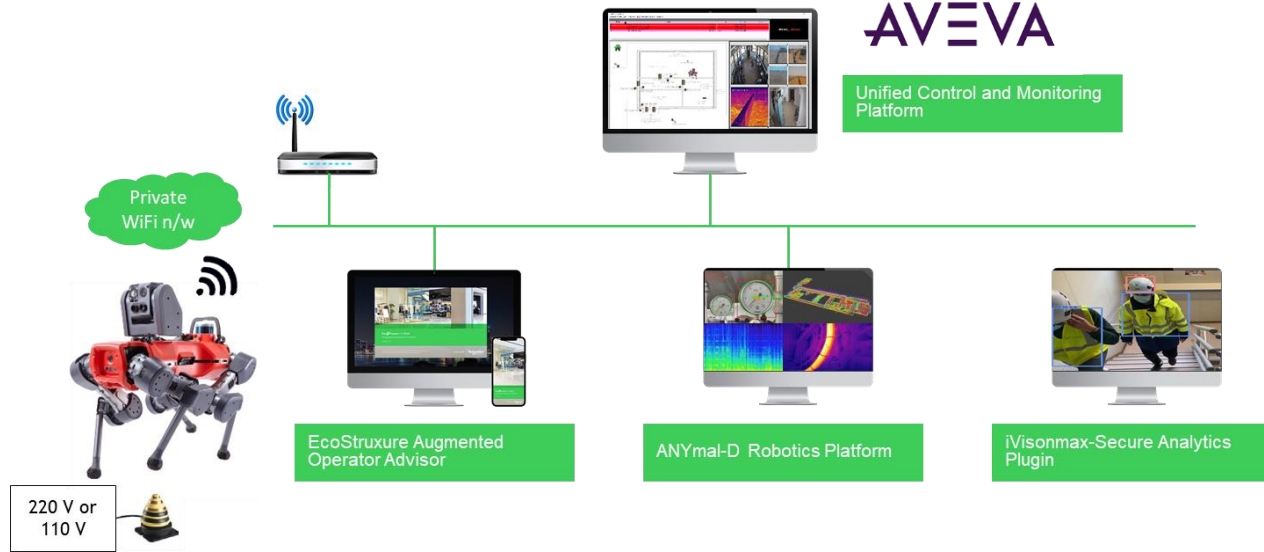
- Walk over flat concrete, metal gratings & inclined terrain
- Climb up/down: single step, stairs
- Walk through narrow passages
- Walk underneath equipment

Data collection/processing from onboard sensors to **Command Control Center**

**Remote Inspection Use Case:**

visual, gauge reading, thermal imaging & acoustic measurement, Augmented Reality

**HSE Use case:** Detect PPE (includes helmet & safety vest), Mask detection, Social distancing



## Key Takeaways

- Routine inspections in hazardous areas to ensure people safety.
- Avoid human errors in repeated tasks for data collection
- Ensure HSE compliance 24x7



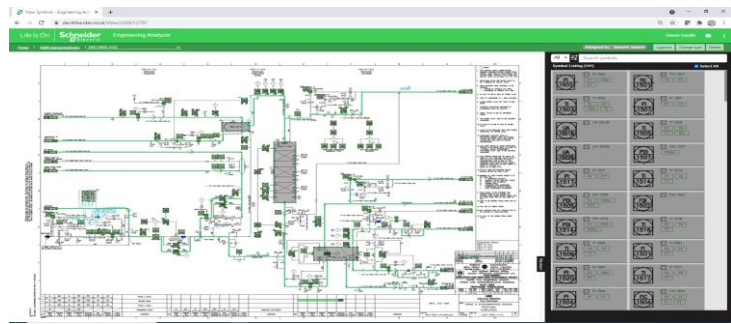
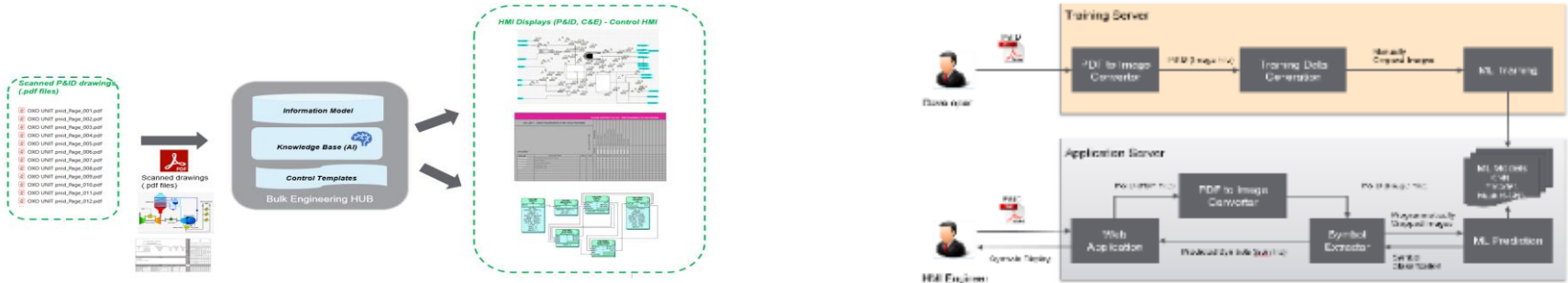
# Recent **Virtual** Robotic System Solution Examples

A robot is understood to be any system w/ AI that makes decisions & performs actions w/o (or w/ minimum) participation of a person based on data available to it

# Engineering Analyzer

Automatic identification of symbols, alarms & other meta data from scanned drawings using image processing & ML to automatically create HMI displays (P&ID, C&E display) & Control Application. Benefits:

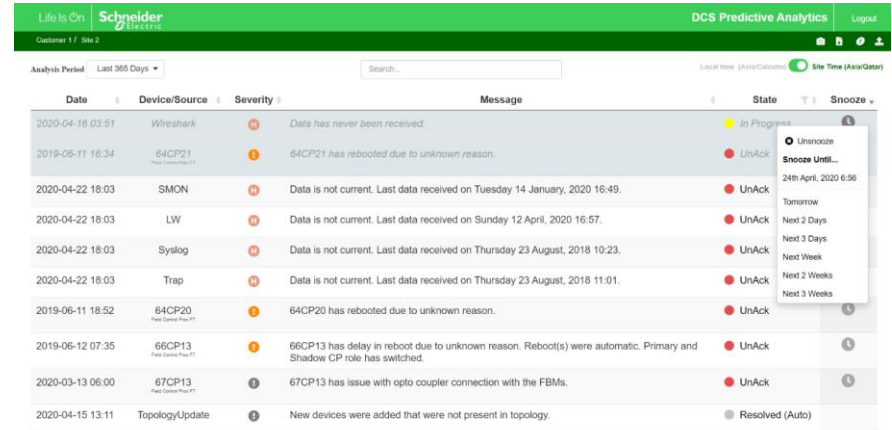
1. Reduce HMI Engineering efforts by ~80%
2. Improve Quality by reduction in human errors involved in graphics generation
3. Step to achieve the “ZERO ENGINEERING” vision with automation and latest State-of-the-art technologies



# DCS Predictive Analytics

Collects all logs and analytics them for potential issues. It detects and predicts faults, identifies the root cause and recommends action to fix the problem. Benefits:

1. Minimize unplanned downtime
2. Save manpower from performing the tedious monitoring activities



The screenshot displays the Schneider Electric DCS Predictive Analytics interface. The header includes the Schneider Electric logo, the product name 'DCS Predictive Analytics', and a 'Logout' button. Below the header, there are navigation options for 'Customer 1 / Site 2', an 'Analysis Period' dropdown set to 'Last 365 Days', and a search bar. The main content is a table of alerts with columns for Date, Device/Source, Severity, Message, State, and Snooze. A 'Snooze Until...' dropdown menu is open over the 'UnAck' state of the second row, showing options: '24th April, 2020 6:56', 'Tomorrow', 'Next 2 Days', 'Next 3 Days', 'Next Week', 'Next 2 Weeks', and 'Next 3 Weeks'.

Date	Device/Source	Severity	Message	State	Snooze
2020-04-18 03:51	Wireshark	🔴	Data has never been received.	In Progress	🔒
2019-06-11 16:34	64CP21 <small>Prod Control Room FT</small>	🟡	64CP21 has rebooted due to unknown reason.	UnAck	🔒
2020-04-22 18:03	SIMON	🔴	Data is not current. Last data received on Tuesday 14 January, 2020 16:49.	UnAck	🔒
2020-04-22 18:03	LW	🔴	Data is not current. Last data received on Sunday 12 April, 2020 16:57.	UnAck	🔒
2020-04-22 18:03	Syslog	🔴	Data is not current. Last data received on Thursday 23 August, 2018 10:23.	UnAck	🔒
2020-04-22 18:03	Trap	🔴	Data is not current. Last data received on Thursday 23 August, 2018 11:01.	UnAck	🔒
2019-06-11 18:52	64CP20 <small>Prod Control Room FT</small>	🟡	64CP20 has rebooted due to unknown reason.	UnAck	🔒
2019-06-12 07:35	66CP13 <small>Prod Control Room FT</small>	🟡	66CP13 has delay in reboot due to unknown reason. Reboot(s) were automatic. Primary and Shadow CP role has switched.	UnAck	🔒
2020-03-13 06:00	67CP13 <small>Prod Control Room FT</small>	🟡	67CP13 has issue with opto coupler connection with the FBMs.	UnAck	🔒
2020-04-15 13:11	TopologyUpdate	🟢	New devices were added that were not present in topology.	Resolved (Auto)	🔒

# Conclusions

# Conclusions

- Robotic (physical & virtual) solutions quickly emerging & have key role to play in future of autonomous & operator-assisted plants
- Different SE/Partner robotic solution integration using SE Ecostruxure Platform opens up immense opportunities
- SE can offer end-to-end robotics solutions, working w/ customers & partners to define the appropriate robotic platform, needed payloads, software & network infrastructure to best meet target use case requirements
- Ability to efficiently integrate robots w/ different payloads & plant control/other systems critical to mission success

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