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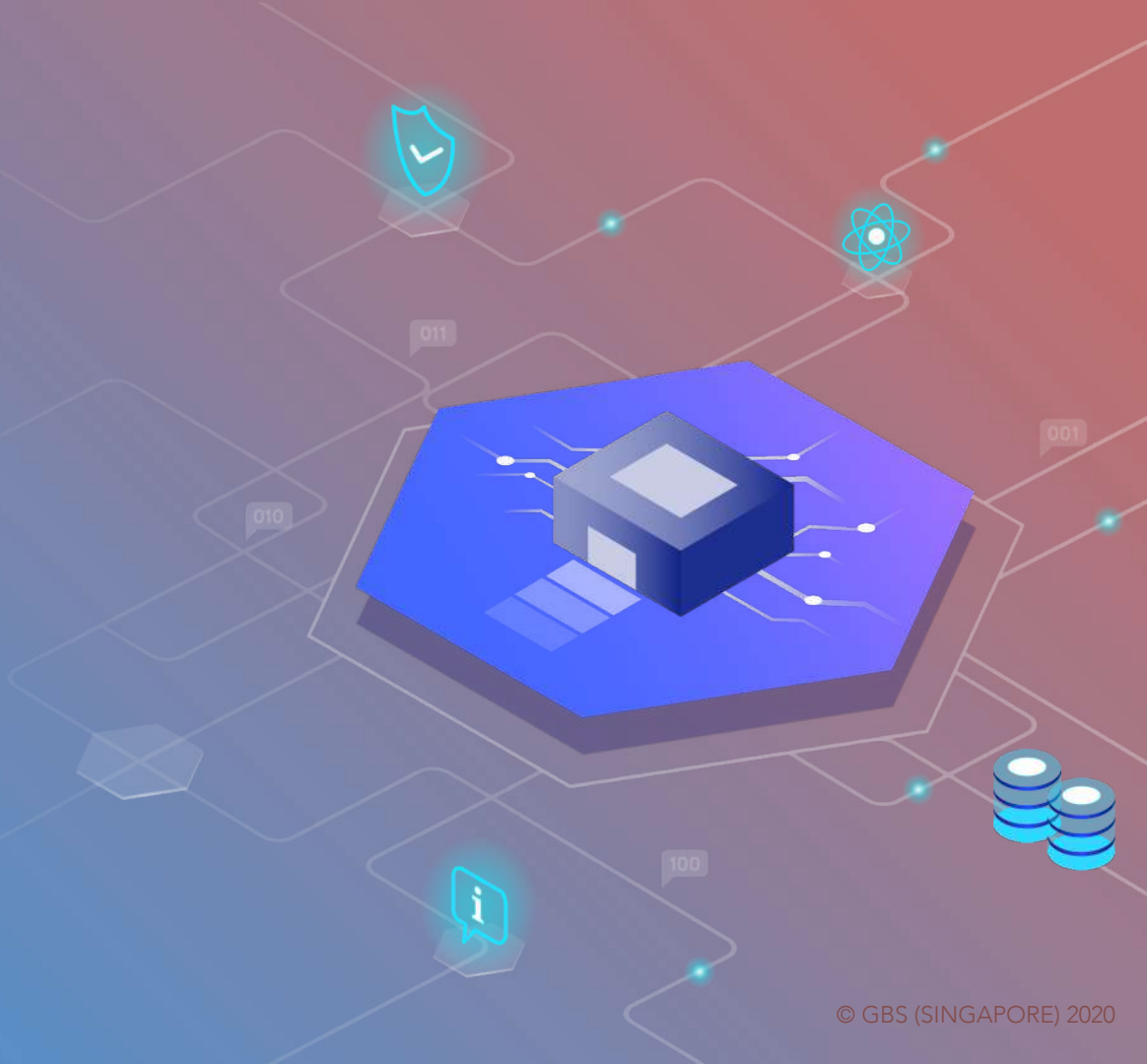

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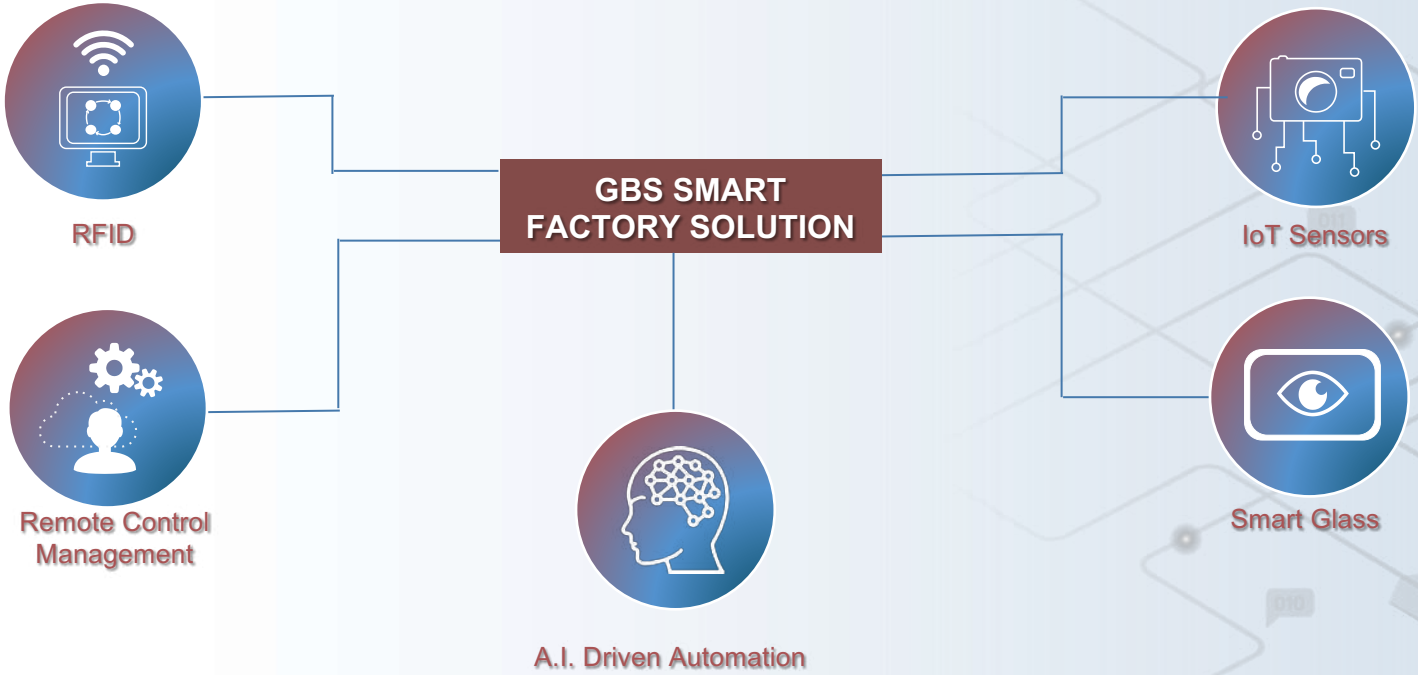
The All-in-one Smart Factory Solution



SMART FACTORY SOLUTION

RFID SYSTEM

RFID System

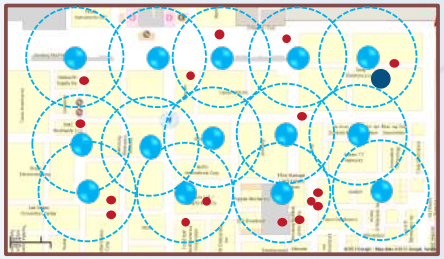
With our extensive RFID system, we can deploy a locator tag to every machinery, tool and personnel within the factory. Via RFID, personnel can easily track the whereabouts of their team and the location of shared special calibration tools. Proper ID identification also limits the access of the machines to authorized personnel; presence of unauthorized personnel detected within the vicinity would cause the screen to be automatically locked.

Features

1. Information Theft Prevention
2. Personal ID Double Authentication
3. Assets Tracking
4. Intuitive User Interface
5. Personnel Location Tracking

Benefits

1. Improve operational efficiency
2. Excellent data protection
3. Secure access system



SMART FACTORY SOLUTION
REMOTE CONTROL MANAGEMENT

Remote Control Management (RCM)

A system that allows user to operate equipment (key asset) remotely via TCP/IP communication protocol from a centralized control room.

Features

1. Local/Remote switch & lock - allows local priority and configurable users access control
2. DLL controlled - efficient, modular architecture that ease deployment.
3. Ensure no data can be transmitted from remote PC to local equipment.

Benefits

1. Improve operational efficiency – reduce the need for non-valued added activities (e.g., gowning up, walking) & improve engineer to tool ratio (one control point to multiple equipment) and reduce cycle time
2. Fast response to deescalate emergencies & minimize loss in production time.
3. Data is protected (No data loss)

Case Study

Increase Productivity With Lesser Manpower

	EE Fab Entry	EE Ts Time	MFG Petrol Time	MFG TS Time	Total Time	Freq/ Day	Manpower & Total time
WITHOUT RCM	15	5	-	-	20	2	Manpower 100%  Total Time **70 min.**
	-	-	5	5	10	3	
WITH STANDARD RCM	3	5	-	-	8	2	Manpower 49%  Total Time **34 min.**
	-	-	5	5	6	3	

EE: Electrical Engineer
MFG: Manufacturing
TS: Troubleshooting

*All data do not include idle time.

SMART FACTORY SOLUTION

AI DRIVEN AUTOMATION

AI Driven Automation

Advanced AI driven scripts can automatically operate the equipment according to customer's preset conditions and eliminate human errors.

Features

1. Automatically perform Scripts according to MES schedule.
2. Communicate through MQTT or SECS/GEM to automatically control device
3. Real-time capture for any production parameters of the screen data. Data can be uploaded into the SPC (Statistic Process Control)/FDC (Fault Detection Control).
4. Algorithms developed to perform Text, Image & Color recognition for graphic comparisons
5. User-Friendly Macro editing interface, flowchart like architecture to compile scripts

Benefits

1. Increase productivity
2. Prevent unexpected downtime

Case Study

PM Script to Increase Productivity

Objective: Change chamber to offline mode, then perform chamber conditioning for Chemical Vapor Deposition process.

Type: Heat up and cool down CVD chambers

Description:
To prepare for a periodic preventive maintenance (PM), the user would trigger a script to cool down the chambers, before conducting the PM. During which, it requires more than 12 hours to complete. Our smart system will perform the conditioning and monitoring throughout the entire process; ensuring that the parameters match the required parameters before completing the PM. Thereafter, process chambers will be heated up again back to optimal operating

Case Study

Alarm Clearing Script To Increase Throughput

Objective: To clear an alarm based on SOP

Types:
Wafer mapping alarm
Wafer alignment alarm RDA and CD-SEM,
General alarm clearing D.E team, Retry alarm Diffusion

Description:
When an alarm is triggered, the alert is sent to the MQTT server. Our smart solution receives the alarm ID and triggers the relevant script to follow that corresponding ID. The alarm clearing is based on series of mouse action, image and text comparison. These action is following SOP that the user has previously defined into script form.

Case Study

Monitoring Script To Prevent Unexpected Downtime

Objective: Continuous monitoring of tool user interface, then perform pre-program action based on changes

Type: Hang Detection Etch process

Description:
As machines run 24/7, there are times where the User Interface (UI) may hang and miss out on alerting any faults that occur. Our solution monitors the UI via image comparison. If the image captured earlier is the same as the image captured at a later time (e.g. no mouse movement/clicking action) , this means the tool has hanged. Our solution then automatically triggers a script to reboot the UI.

SMART FACTORY SOLUTION
IOT SENSORS

IOT Sensors

At GBS, we provide a wide selection of sensors including AI driven image and acoustic sensors for 24/7 monitoring the condition of key assets. Data mining from our additional sensors can be used for Big Data analytics for process optimization or alert for any anomalies detected. Also, we offer customization of sensors applications according to customer's needs (e.g. smoke detectors, cameras, special tachometer etc.)

Features

1. Real-time monitoring (24/7)
2. Fault detection and alert
3. Flexible sensor placement
4. Data Acquisition
5. Multi-sensor integration into customer's manufacturing system process control chart
6. Sensor application customization

Benefits

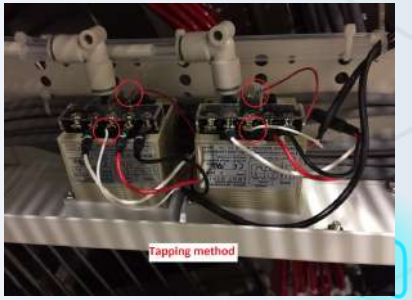
1. Cost reduction (prevent un-expected downtime)
2. Centralized control of data collected – ease of information retrieval
3. Data collected can be use for process optimization

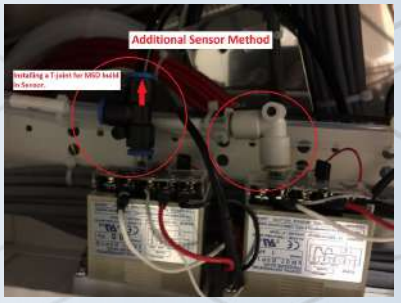
Case Study

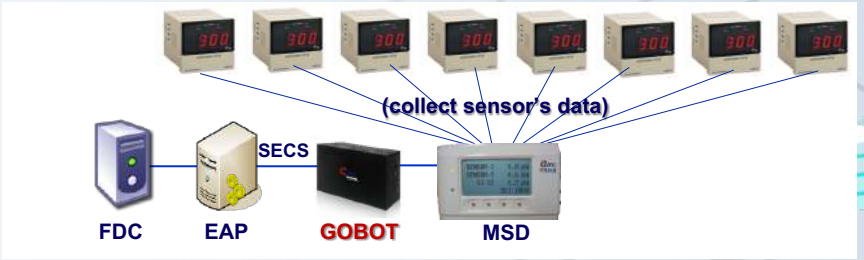
Monitor Critical Exhaust

Most manometers/pressure gauges are only connected to the tool's interlock/alarm system. When a critical alarm is triggered, it is often too late to rectify the issue. Fabs need to abort the production recipe; causing hundreds of wafers to be scrapped.

Through our smart solution, we collect all the information from these manometers/gauges via our multi-sensor device (MSD). Thereafter, these info are fed 24/7 to the customer FPC chart as a preventive measure to avoid wafers scrap.







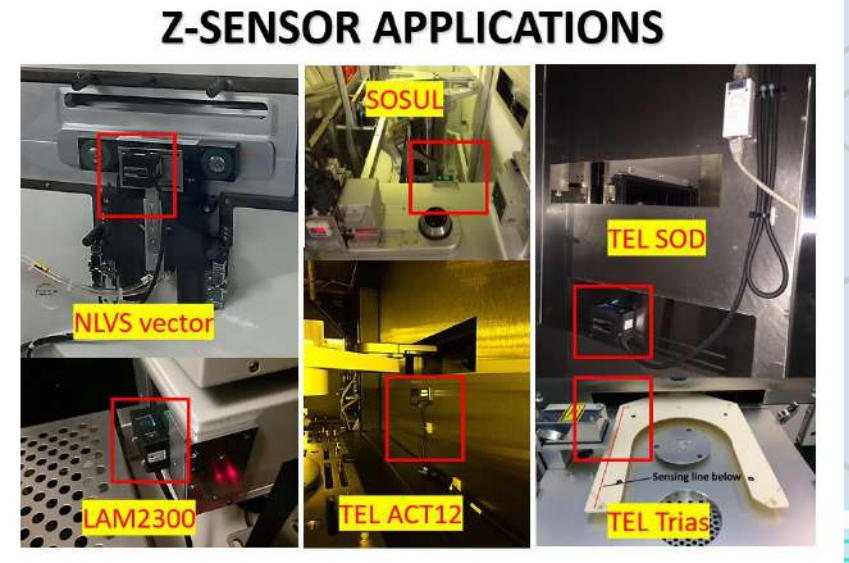
Case Study

Prevent Wafer Scratch

Laser sensors placed under the robot arm/blade to detect any drift in robot blade height within 0.5mm difference.

Records 2 positions (Robot High and Robot low) for every wafer transferred.

This prevent any wafer scratch issues caused by robot Z-axis drift.



※ To avoid influencing a semiconductor's manufacturing process, sensor's laser wave-length was kept away from 248 and 193nm range.

Case Study

IOT - Controlling Process Pump's Green Mode

Objective: Turn Pump and chiller to green mode to save energy when in idle state.

Type: Energy saving

When the chamber is in an "Idle" state, MQTT triggers a command signal to our smart system to trigger a script to switch to Pump green mode. Thus, optimizing the chamber and chiller to a lower operating temperature for energy saving.

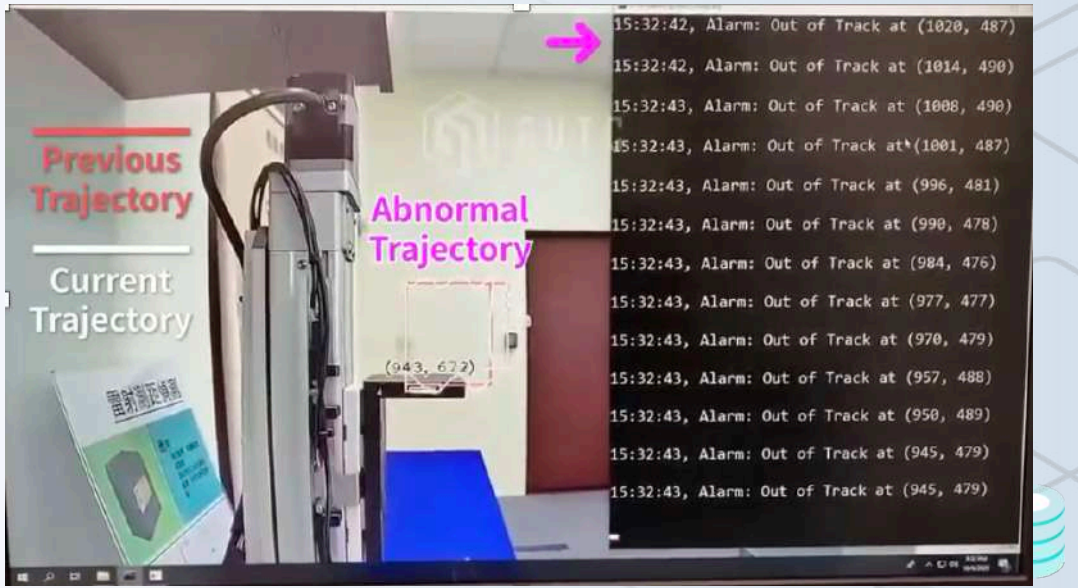
- **Pump green mode** is switched by our system's AI G-handle function through triggering the MSD; which provides either "dry contact" or 24VDC (depending on pump model).
- **Changing of chamber state and temperature setting** is done through preprogramming the steps to be executed on the UI in the script.

Case Study

Smart AI Camera – Trajectory Tracking of Robotic Arm

Our smart factory sensors can identify the robot's position in real-time and ensure that it operates within 0.3mm tolerance of its predetermined axis coordinates.

If the robot functions outside of its designated coordinates, the sensor will send an alert to the centralized system.

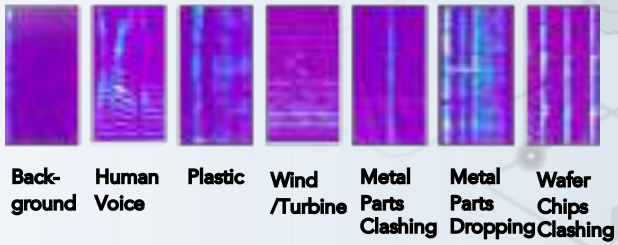


Case Study

Smart AI Acoustic Detection

Microphones, placed within the machine, would record and transmit the sounds emitted and convert it into a graphics report.

Our smart solution identifies these sounds as specific incidents that occurred within the machine. Through A.I. calculation, our system then conducts an audio diagnosis to determine the health of the machine.



Acoustic Sound Pattern Recognition Sample

SMART FACTORY SOLUTION

SMART GLASS

Smart Glass

When a technician/engineer requires external support/guidance, they can wear-on Smart Glass for remote troubleshooting support while preventing confidential information from being exposed.

Features

1. IP camera (Monitoring)
2. Halo Lens (Troubleshoot with engineer supervision/guidance from the outside)
3. Secure IP connection for external call

Benefits

1. Improved efficiency in troubleshooting process
2. Prevent data theft/infrastructure compromise

QUESTIONS?
LET US KNOW!

ADDRESS

No.1 Tampines North Drive 1,

#06-05 T-Space,

Singapore 528559

PHONE

+65 6759 2237

EMAIL

cust_service@gbs.com.sg

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