

Industrial 4.0 Smart Manufacturing Platform

LIM Wei Yee
Chief Operating Officer
www.vitrox.com



Company Overview

Since its inception in 2000, ViTrox designs and manufactures innovative, leading-edge and cost effective **automated vision inspection equipment and system-on-chip embedded electronic devices** for the semiconductor and electronic packaging industries. Today, we serve more than **300 customers in 22 countries.**



Financial Background

**Shareholders' Equity:
RM262 M (USD 60M)***

**Market Capitalization:
RM1.2 Billion
(USD272Mil)***

***(As of April 2017)**

Workforce

**450 Headcount
(Malaysia)***

**30 Headcount
(Global – China,
Taiwan, Philippines,
USA & others)***

Stock Exchange Listing

Established in 2000

**Listed in MESDAQ
Market in 2005 and
successfully
transferred to Main
Market of Bursa
Securities on 9th
November 2009.**

Product Milestones

Advanced 3D X-ray
Inspection
(AXI)



Advanced Optical
Inspection
(AOI)



Advanced 3-D Solder
Paste Inspection
(SPI)



Tray Vision Handler
(TH & TR)



Advanced Robotic Vision System
(ARV)

Automated Boar Inspection (ABI)



Electronics
Communications
Systems
(ECS)



Automated Optical
Inspection
(AOI)



Machine Vision
System
(MVS)



Achievements

No. **1**
3D in-line AXI

150 AXIs

800 AOIs

Sold Since **3** Years

15,000 vision systems installed,

No. **1** Turret Base Vision Solutions!



150 Tray
Handles
Sold Since **4** Years

12



60

Corporate Product
Awards won in 10 Years

20 countries

255 customers worldwide

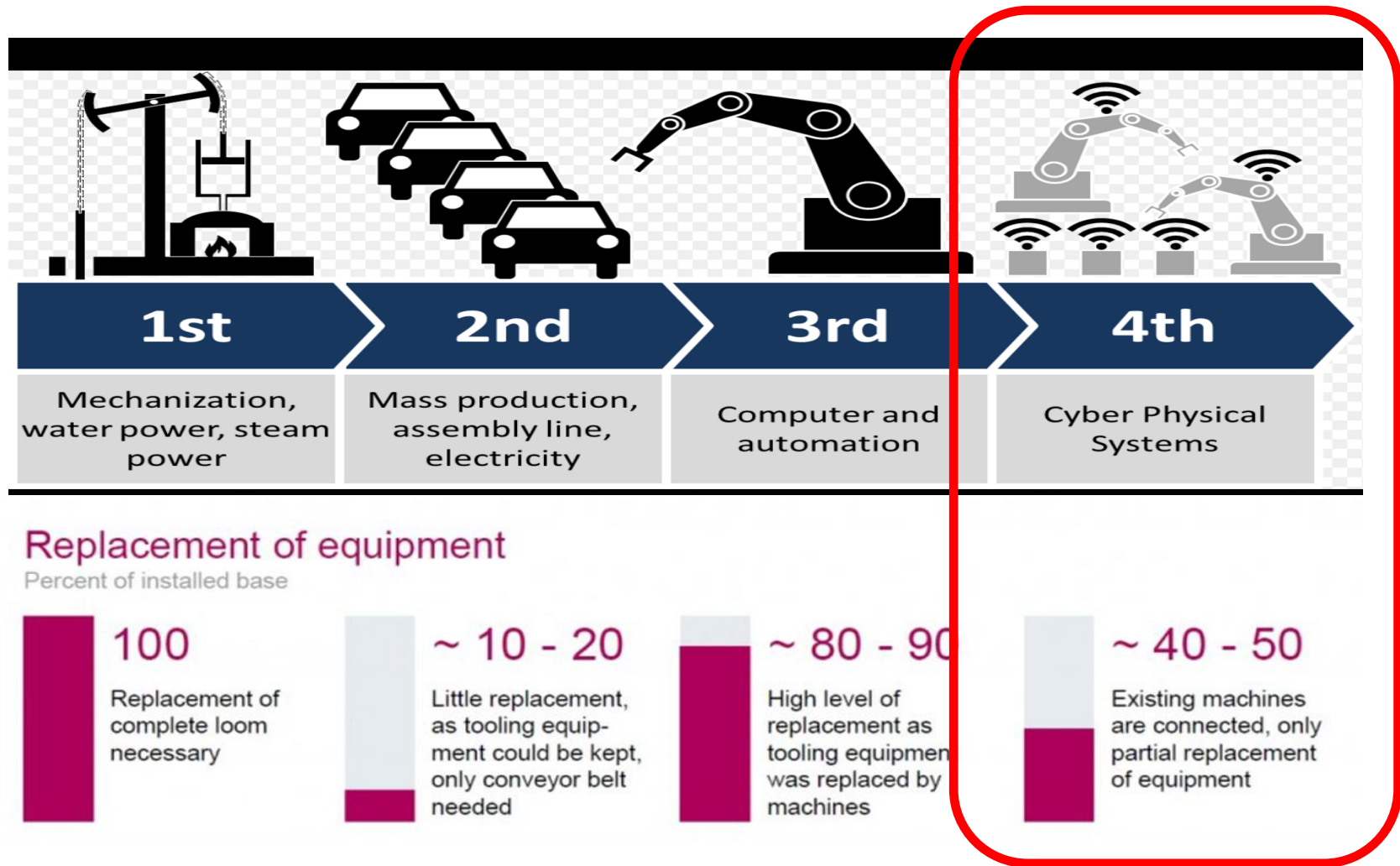
15%
Revenue
invested in
R&D every year



Industrial 4.0

Industrial 4.0

Industrial 4.0 or “**Smart Factory**”, in which cyber-physical systems monitor the cyber physical processes of the factory and make decentralized decisions. The physical systems become Internet of Things, communicating and corporating both with each other and humans in real-time via the wireless web.



Disruptive Technologies

A number of disruptive technologies will enable digitization of the manufacturing sector

Digitization of the manufacturing sector – Industry 4.0



Data, computational power, and connectivity



Analytics and intelligence



Human-machine interaction



Digital-to-physical conversion

Big data/open data

Significantly reduced costs of computation, storage, and sensors

Internet of Things/M2M

Reduced cost of small-scale hardware and connectivity (e.g., through LPWA networks)

Cloud technology

Centralization of data and virtualization of storage

Digitization and automation of knowledge work

Breakthrough advances in artificial intelligence and machine learning

Advanced analytics

Improved algorithms and largely improved availability of data

Touch interfaces and next-level GUIs

Quick proliferation via consumer devices

Virtual and augmented reality

Breakthrough of optical head-mounted displays (e.g., Google Glass)

Additive manufacturing (i.e., 3D printing)

Expanding range of materials, rapidly declining prices for printers, increased precision/quality

Advanced robotics (e.g., human-robot collaboration)

Advances in artificial intelligence, machine vision, M2M communication, and cheaper actuators

Energy storage and harvesting

Increasingly cost-effective options for storing energy and innovative ways of harvesting energy

SOURCE: McKinsey

Next Horizon of Operational Effectiveness

- New value potential created by eliminating inefficiencies across the “digital thread”.
- Paradigm shift from optimizing physical assets to optimising how data and information are leveraged along the product lifecycle

Disruptive technologies increase the value of digital information along the entire product lifecycle

The digital thread is the digital representation of the physical product lifecycle



4 activities are required to manage the digital thread

Information capturing and recording

- Relevant set of data to prevent information overflow
- Automated, real-time capturing via sensors
- Recording and storing of both historical and new data in a single information system

Information transfer

- Digitally transfer information across departments, production sites, value chain steps, and company borders

Information analysis and synthesis

- Identification of relevant data and analysis (ideally, automated)
- Synthesis of analysis into relevant insights

Turning information into outcomes

- Translation of analysis results into recommendations that suggest actions for workers or automatically trigger actions of machines
- Feedback and continuous improvement

SOURCE: McKinsey

Copyright © VITROX All rights reserved.

McKinsey Digital Compass

- Help identifying and prioritize optimization opportunities.
- Paradigm shift from optimizing physical assets to optimising how data and information are leveraged along the product lifecycle

Information leakages cause digital inefficiencies

Data analysis to understand customer demand failed: product finally has more features than the customer is willing to pay for

Information feedback is too slow: 1st prototype showed serious flaws in test, team is waiting for next one

Data recording is done manually: worker spends time documenting process

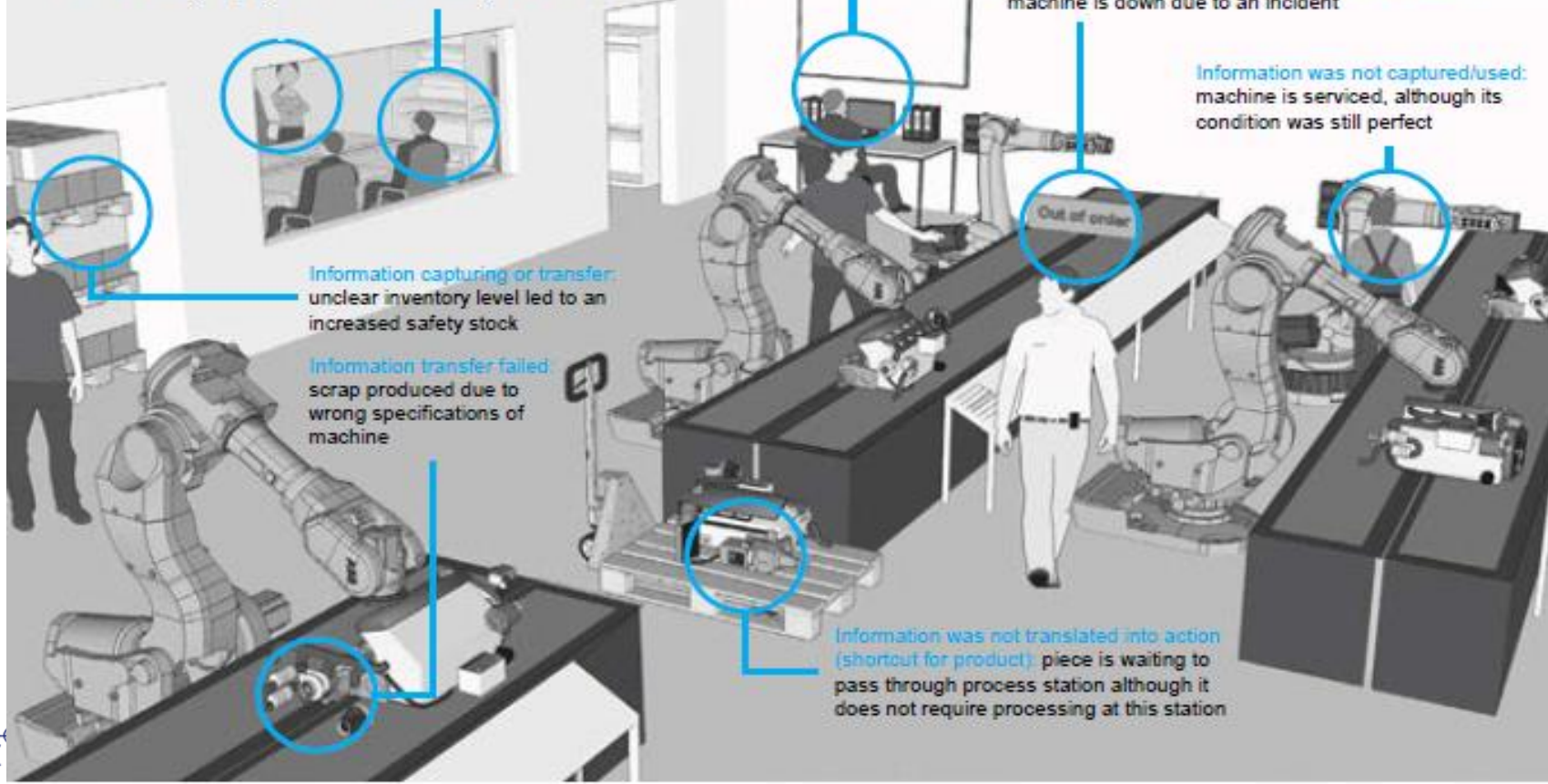
Information was not captured/used for forecasts: machine is down due to an incident

Information was not captured/used: machine is serviced, although its condition was still perfect

Information capturing or transfer: unclear inventory level led to an increased safety stock

Information transfer failed: scrap produced due to wrong specifications of machine

Information was not translated into action (shortcut for product): piece is waiting to pass through process station although it does not require processing at this station

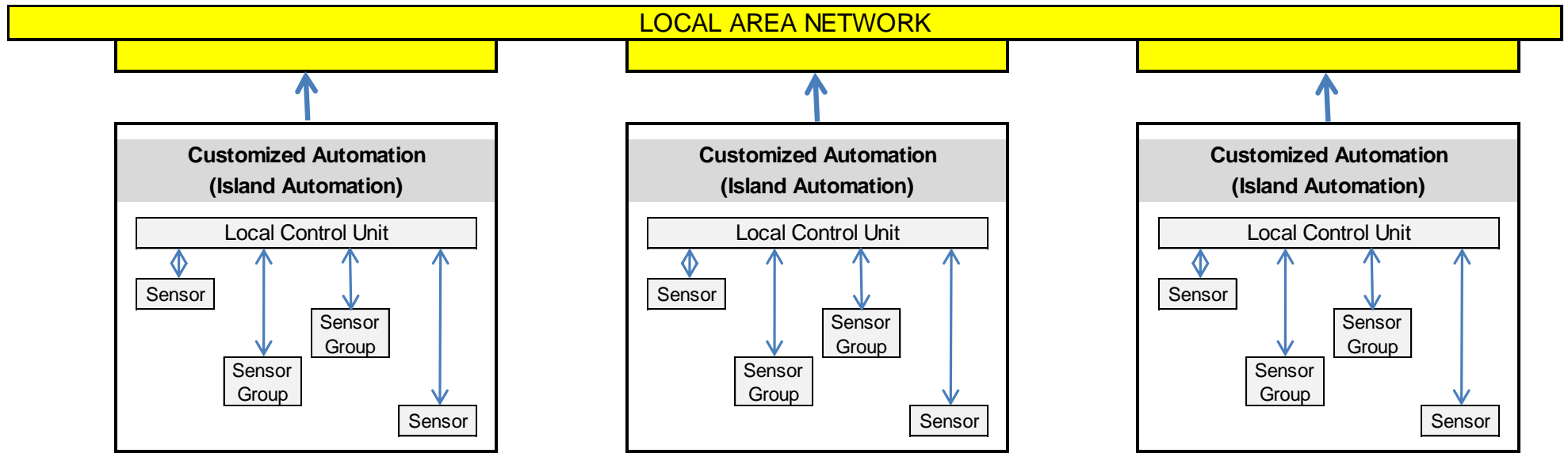


McKinsey Digital Compass

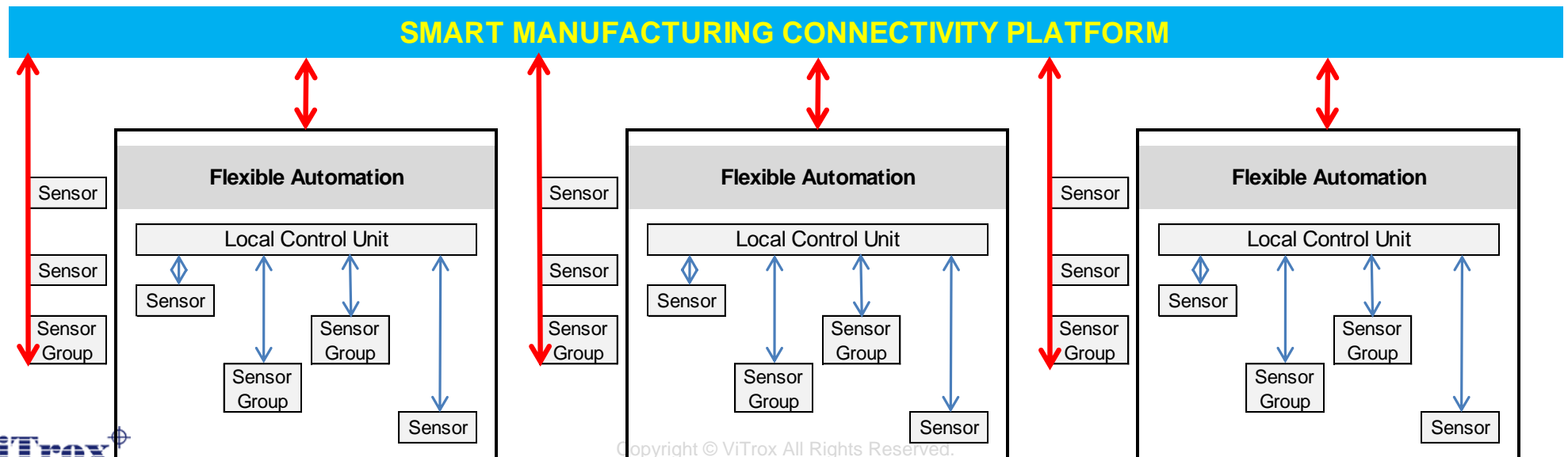


Manufacturing in Industrial 4.0

Industrial 3.0 Manufacturing

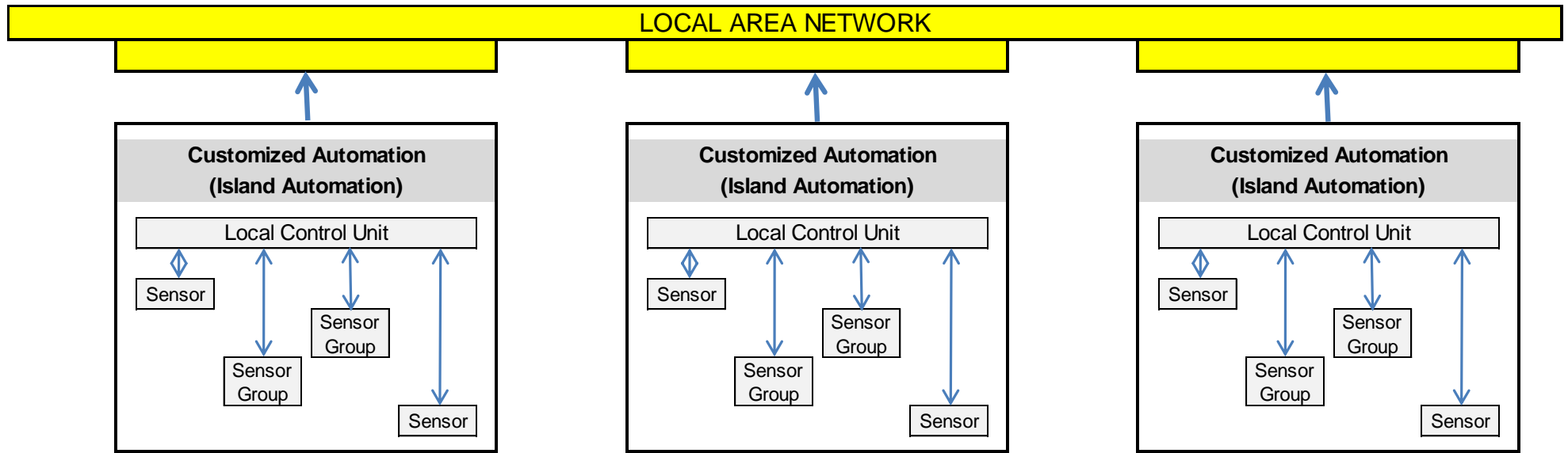


Industrial 4.0 Manufacturing

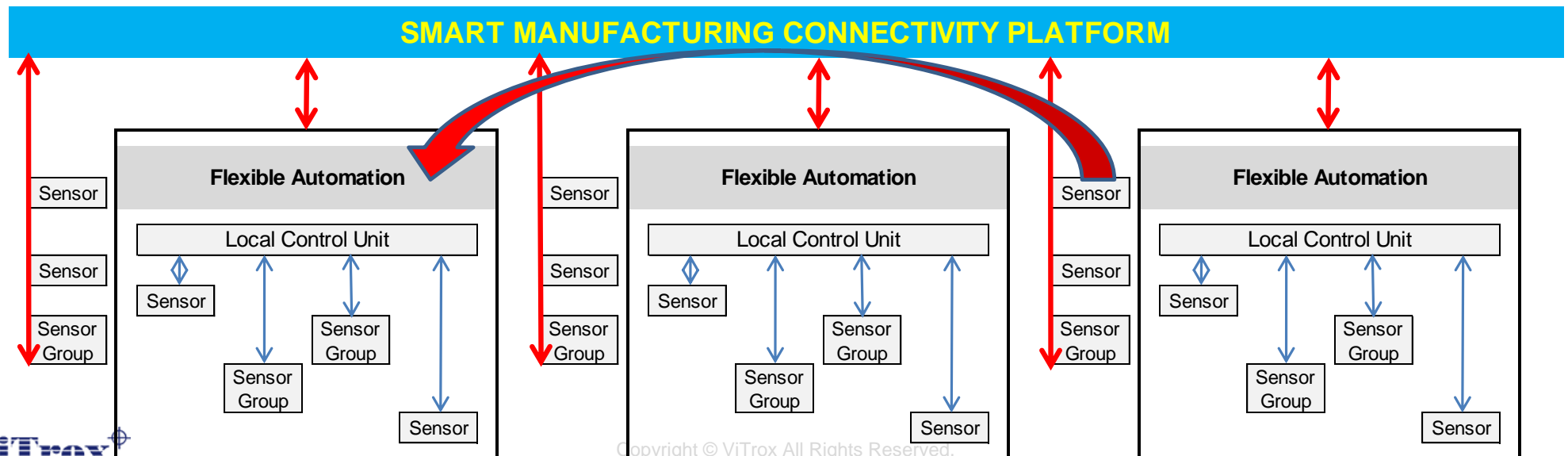


Manufacturing in Industrial 4.0

Industrial 3.0 Manufacturing




Industrial 4.0 Manufacturing



V-ONE

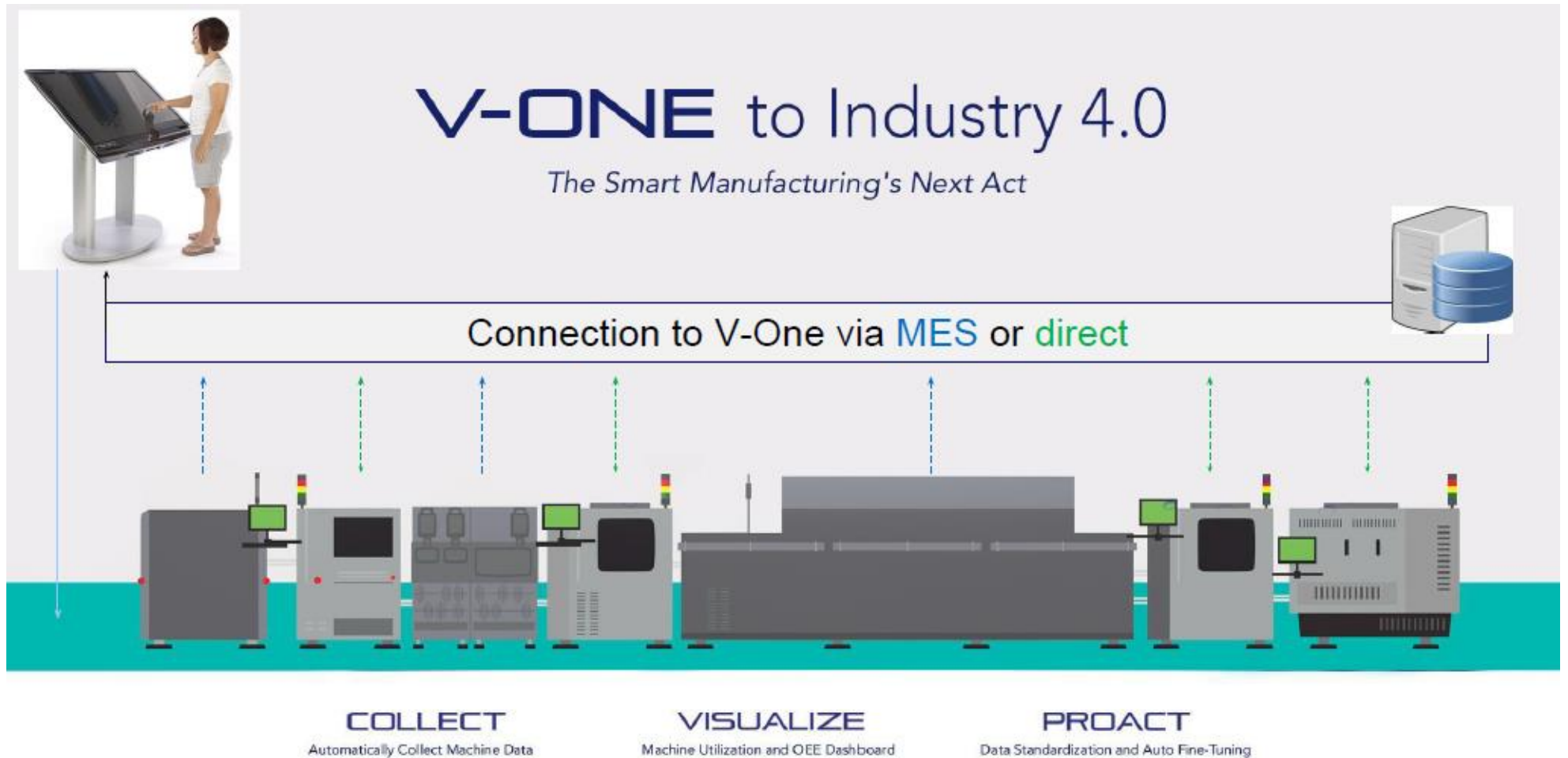
...connecting vision



A Smart factory tool at your fingertip, visualize, respond and proactively predict the inspection results in various stages of the production lines making your process indicators live both pre and post inspections and giving the capability to control the production process in a smarter way with less time and resources.

V-ONE Smart Manufacturing Platform

Single Line in Local Network Solution



V-ONE

Connect the inspection machines in SMT lines to monitor their performance on a real-time basis.



1. Collect:

Automatically Collect Machine Data



2. Visualize:

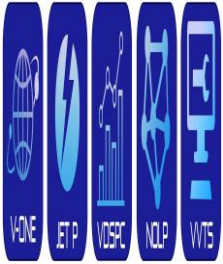
Machine Utilization and OEE Dashboard



3. ProAct:

Data Standardization and Auto Fine-Tuning

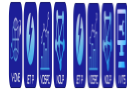




V-ONE Smart Manufacturing Solution



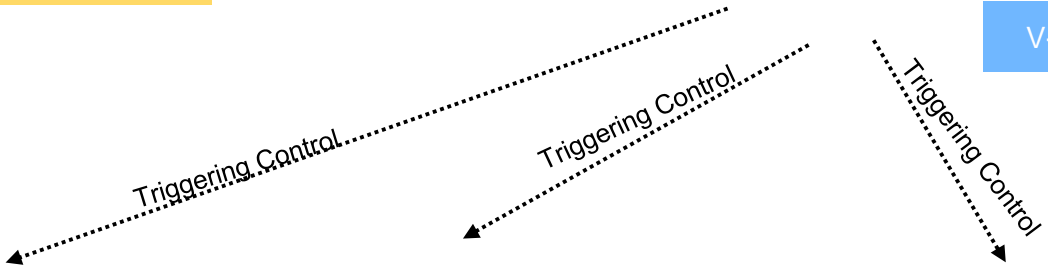
User Group



V-ONE Web



Touch Screen TV



SPI Status

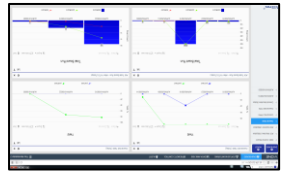
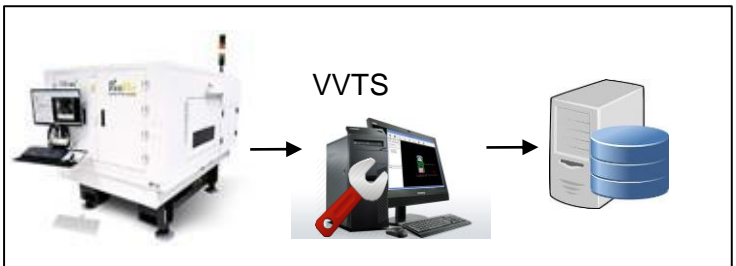
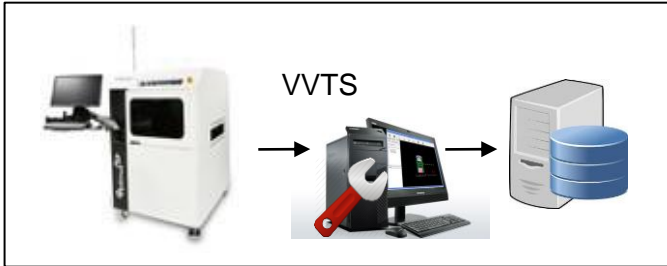
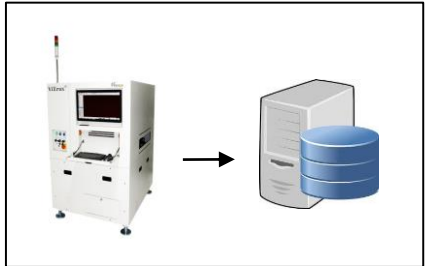
VDSPC

AOI Status

VDSPC

AXI Status

VDSPC



Single SPI Control Board

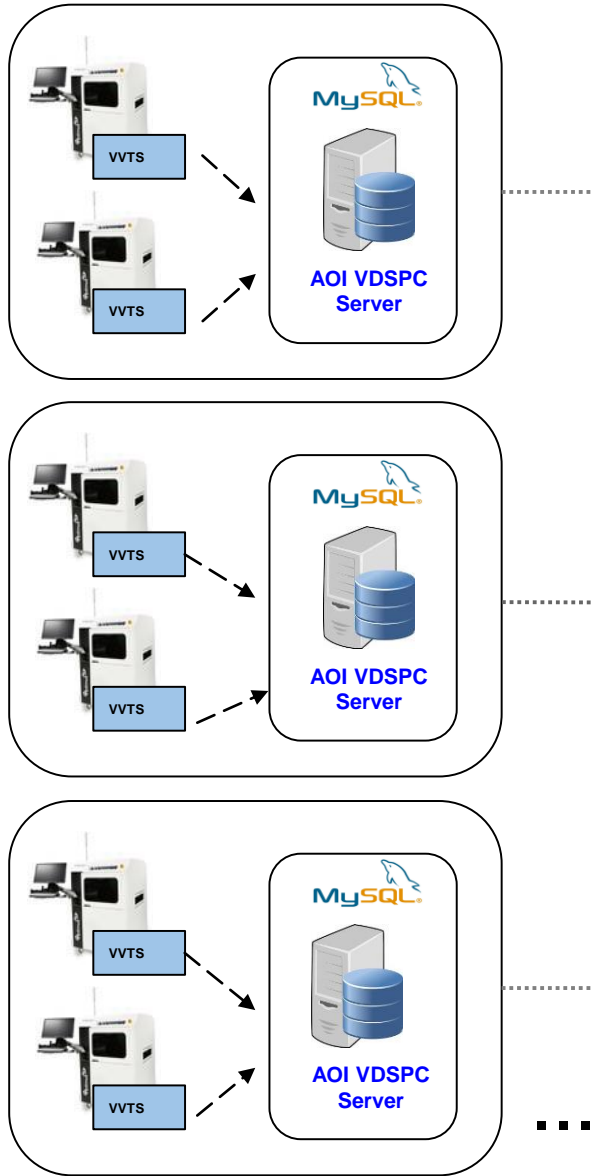


Single AOI Control Board

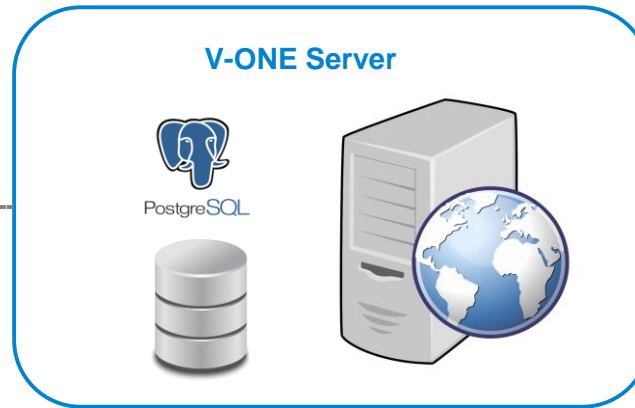


Single AXI Control Board

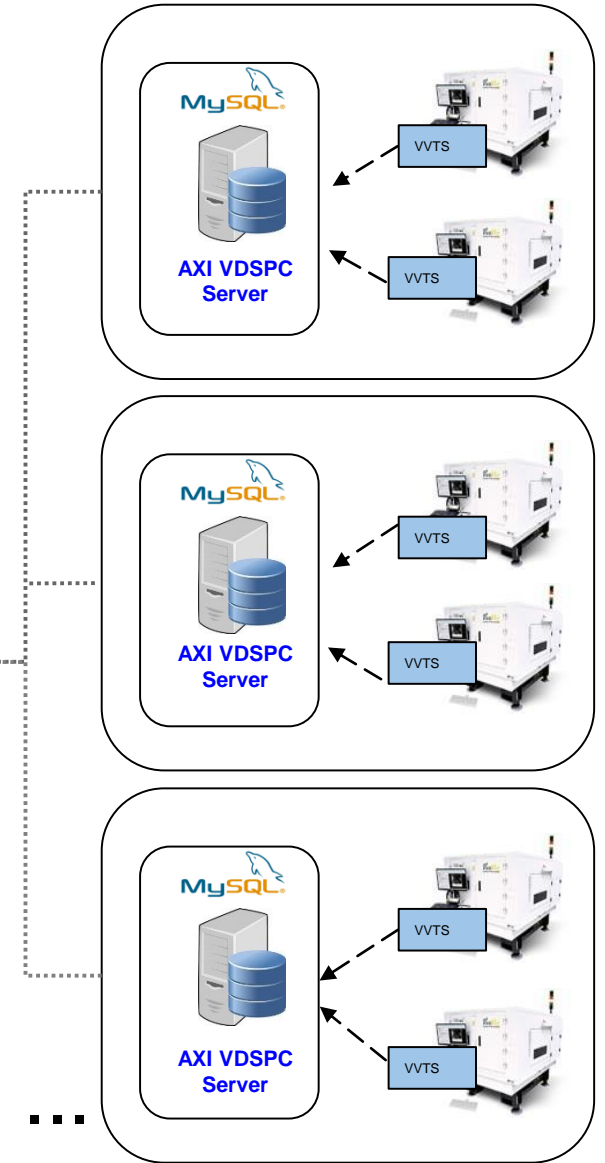
Multiple AOI Pools

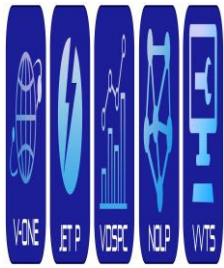


Scalable Data Structure



Multiple AXI Pools





V-ONE Features (1 / 5) - Dashboard

V-ONE

DASHBOARD

STATUS MONITORING

DATA ANALYSIS

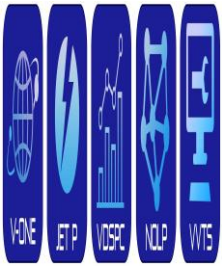
REMOTE CONTROL

ALERT

Dashboard

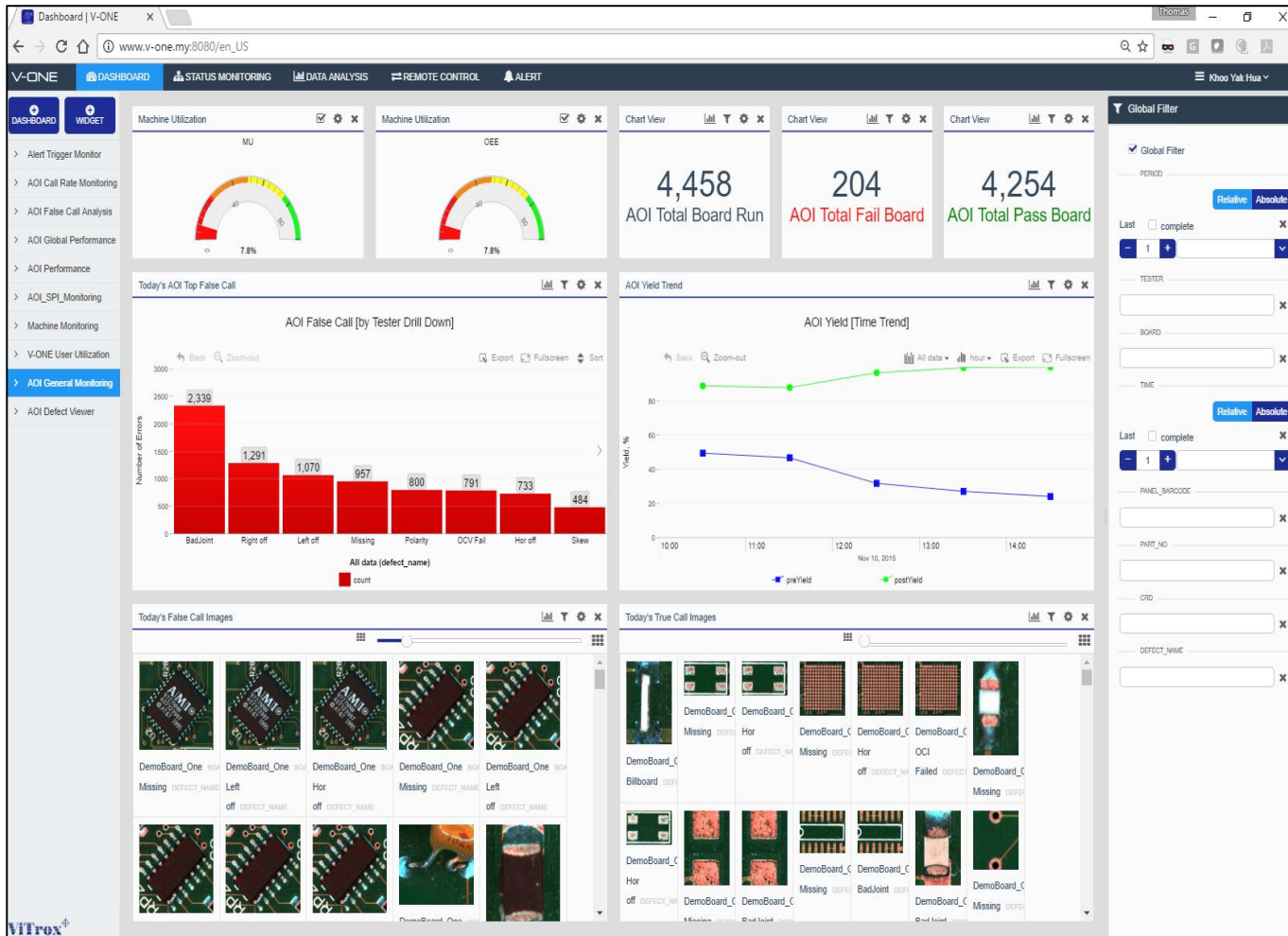
a fully flexible and configurable dashboard that allow user to configure dashboard that suitable to their process needs. Machine status, call rate, yield, chart analysis, floor plan, machine utilization, machine error and etc are able to be viewed even in a single dashboard.





Dashboard Use Model - 1

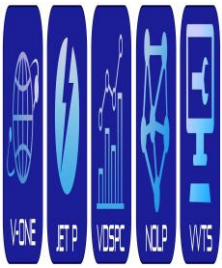
Production Line Performance Monitoring



Use Model:

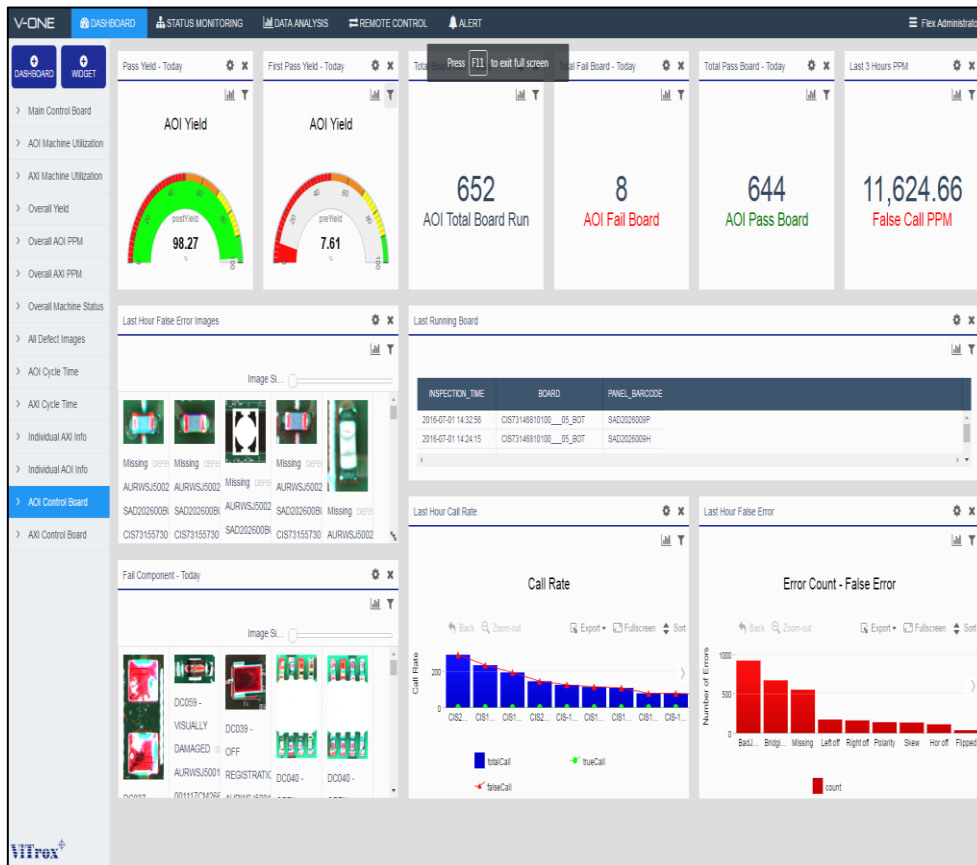
Line information in one page

Summary **auto reporting**



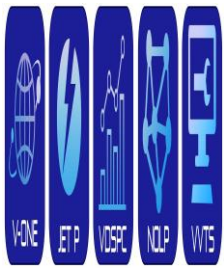
Dashboard Use Model - 2

AOI Machine Performance Monitoring

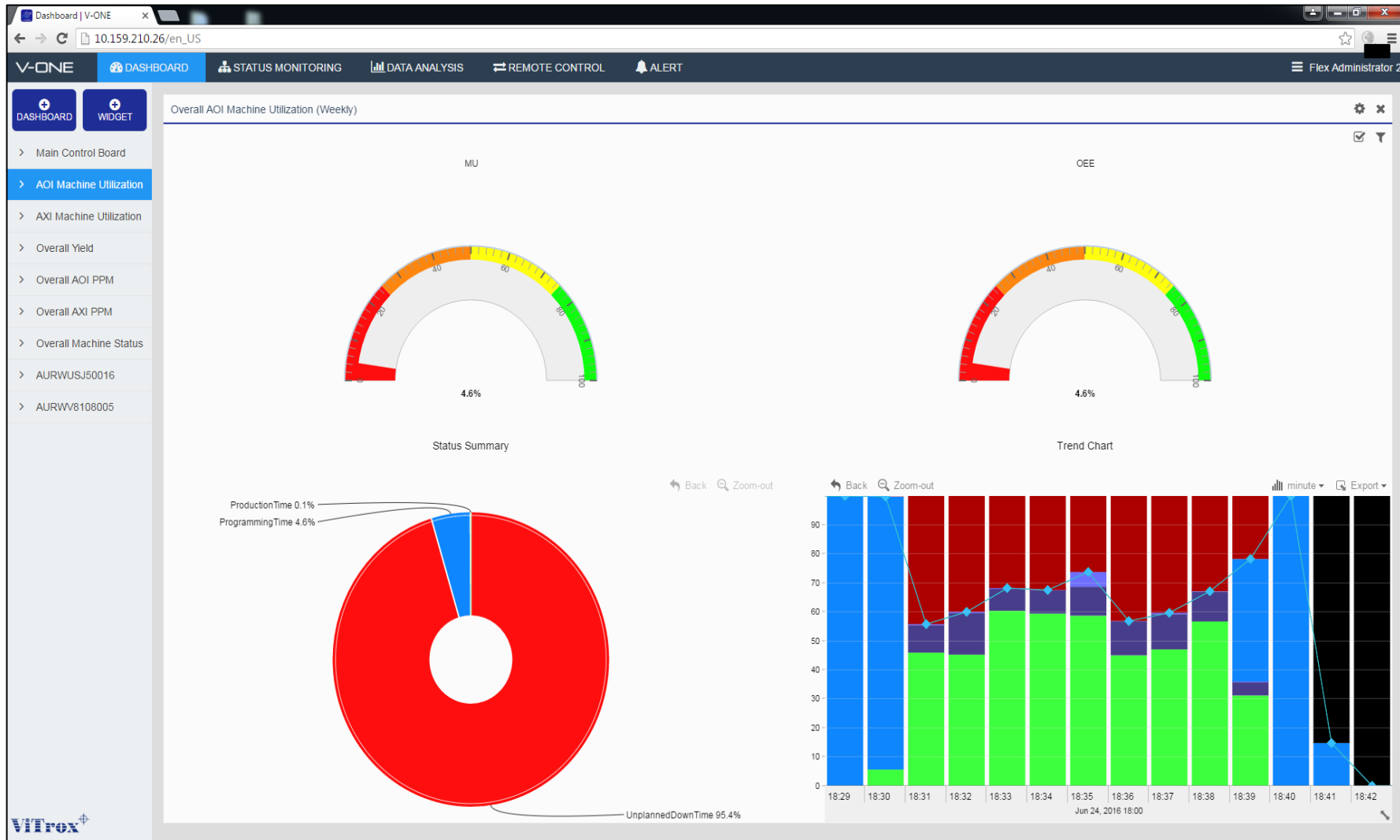


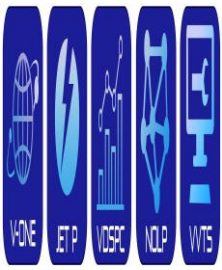
AXI Machine Performance Monitoring



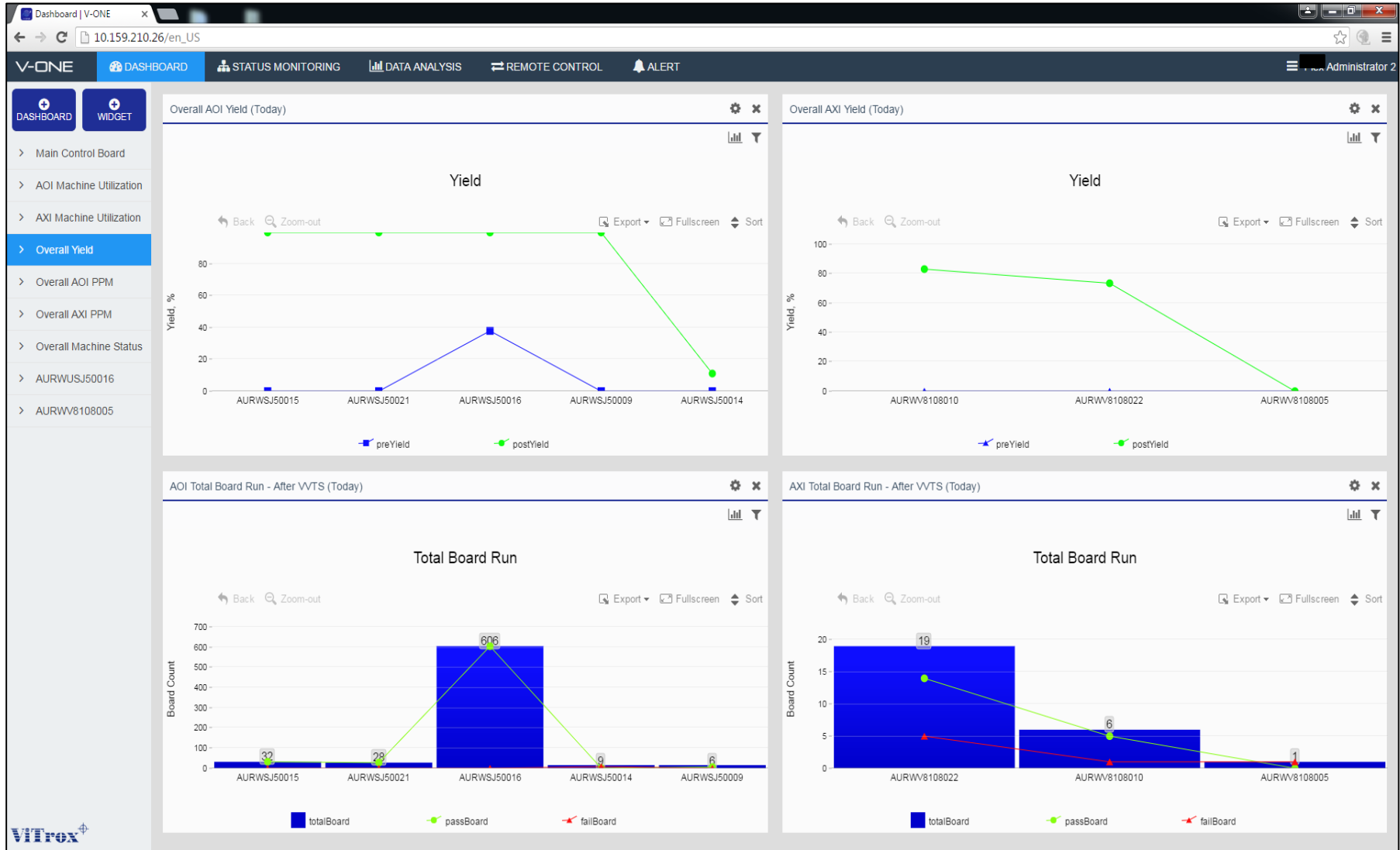


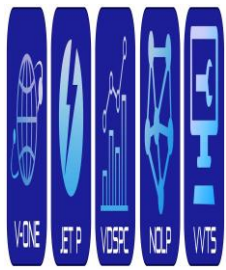
Dashboard Use Model – 3: Machine Utilization





Dashboard Use Model - 4: Yield





V-ONE Features (2 / 5) - Data Analysis

V-ONE

DASHBOARD

STATUS MONITORING

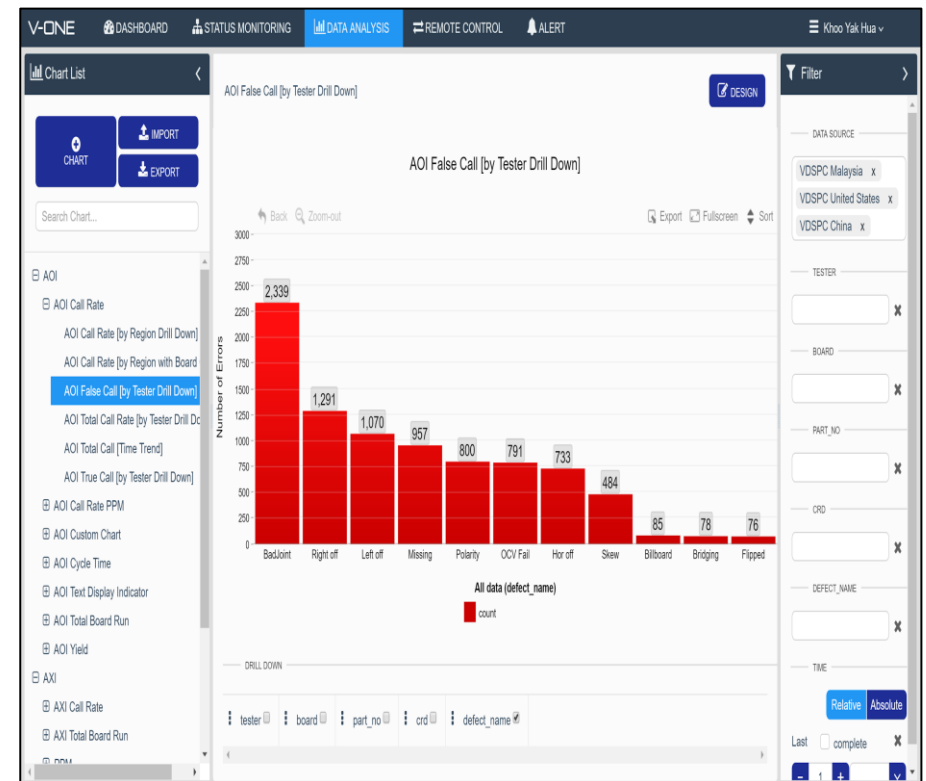
DATA ANALYSIS

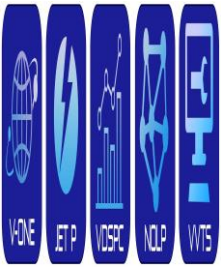
REMOTE CONTROL

ALERT

Data Analysis

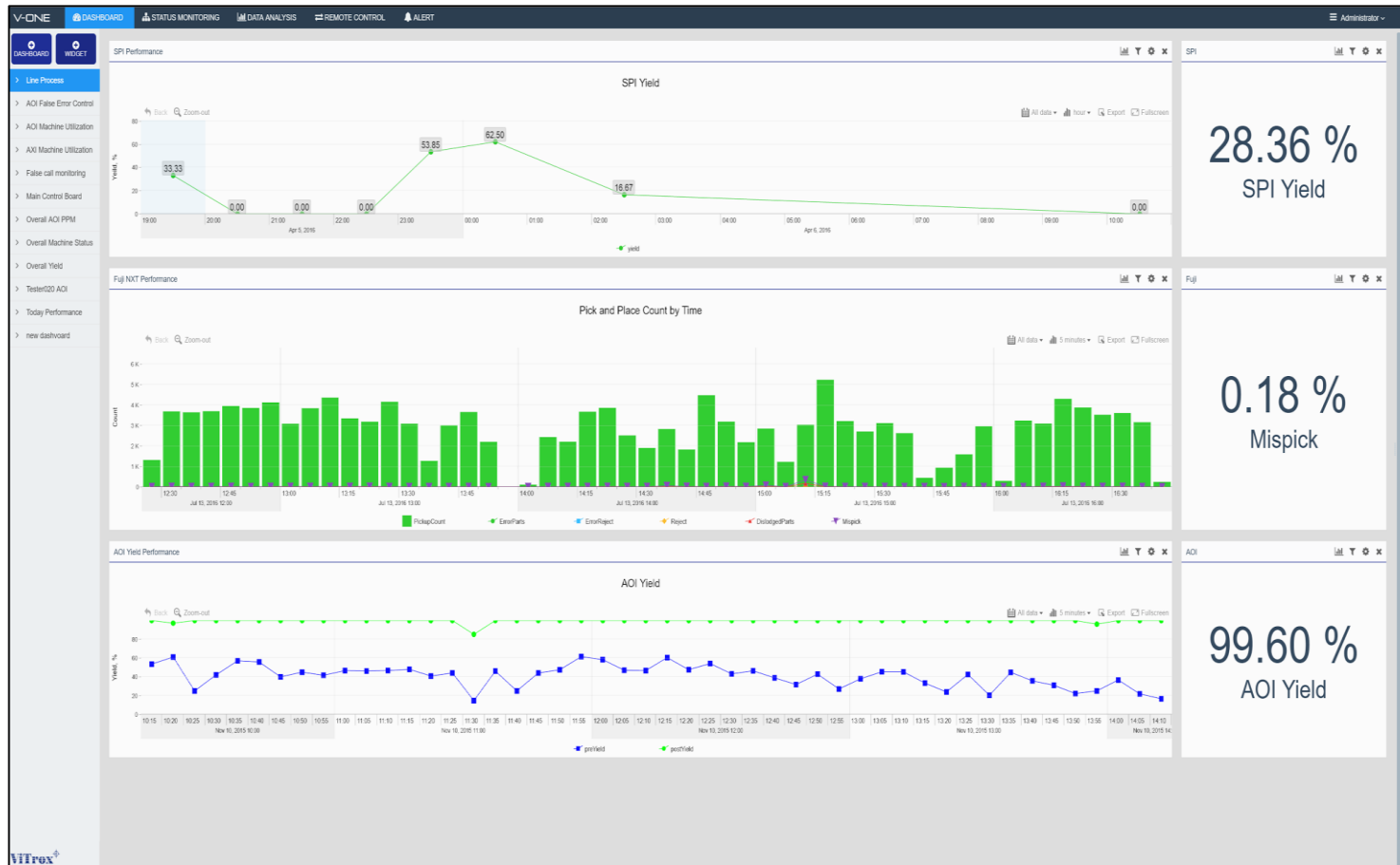
a fully configurable SPC tools for user to analyze machine data in more efficient way. Real time SPC allows user to monitor the performance and re-act on production defect instantly.





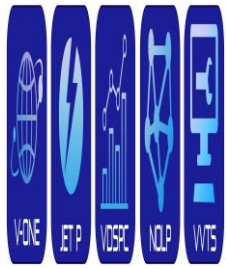
V-ONE Data Analysis Use Model (Example - 1)

Line cross machine monitoring



Use Model:

- Visualize different machine process indicator
- Monitor and alert to react in real time.



V-ONE Features (3 / 5) - Status Monitoring

V-ONE

DASHBOARD

STATUS MONITORING

DATA ANALYSIS

REMOTE CONTROL

ALERT

Machine Status Monitoring

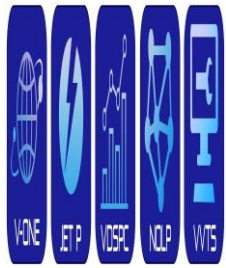
a machine monitoring window to track machine activities in real time basis.

Machine sensors activities will be tracked and Machine Utilization can be computed automatically in real time.

The screenshot displays the V-ONE Status Monitoring interface. The main table lists machine data with columns for Machine Name, Machine IP, Product, Version, Location, Last Update, Tags, and Program. The machine MY_V810_001 is highlighted in blue. To the right, the Machine Detail panel shows a diagram of the machine, its IP address (192.168.10.101), and various status indicators like MU (78%) and OEE (78%). A Status Summary and Trend Chart are also visible.

MACHINE NAME	MACHINE IP	PRODUCT	VERSION	LOCATION	LAST UPDATE	TAGS	PROGRAM
CN_Tester001	192.168.3.101	AOI	1.04.02F	Company A fire	07/01/2016 03:31:40 AM		DemoBoard3
CN_Tester005	192.168.3.105	AOI	1.04.02F	中国	07/01/2016 03:31:50 AM		DemoBoard2
MY_3DV510_1	192.168.0.1	AOI	1.03.09B	Company A fire	01/19/2017 05:33:12 PM		NG_64410fb_OK
MY_Tester001	192.168.1.101	AOI	1.04.02J_MainGui_02		11/17/2016 10:24:34 AM		test_addcomponen
MY_Tester003	192.168.1.103	AOI	1.04.02F	マレーシア	07/01/2016 03:31:01 AM		DemoBoard
MY_Tester004	192.168.1.104	AOI	1.03.04B	マレーシア	07/01/2016 03:31:04 AM		DemoBoard
MY_Tester005	192.168.1.105	AOI	1.04.01	マレーシア	07/01/2016 03:20:11 AM		DemoBoard2
MY_V810_001	192.168.10.101	AXI	-	マレーシア	11/22/2016 08:28:49 AM		
MY_V810_DEMO	192.168.22.70	AXI	-	マレーシア	01/18/2017 05:22:43 PM		
US_Tester001	192.168.2.101	AOI	1.04.02F	アメリカ	07/01/2016 03:31:20 AM		DemoBoard
US_Tester002	192.168.2.102	AOI	1.02.01	アメリカ	07/01/2016 03:31:31 AM		DemoBoard3
US_Tester003	192.168.2.103	AOI	1.04.02F	アメリカ	07/01/2016 03:31:34 AM		DemoBoard3
US_Tester004	192.168.2.104	AOI	1.04.02	アメリカ	07/01/2016 03:31:36 AM		DemoBoard2
US_Tester005	192.168.2.105	AOI	1.03.01	アメリカ	07/01/2016 03:31:38 AM		DemoBoard





V-ONE Features (3/5) - Use Model

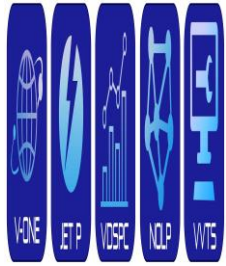
Machine Utilization Tracking



Use Model:

- Machine activities problem tracking
- Daily MU auto reporting
- Trend and Optimization





V-ONE Features (4 / 5) - Remote Control

V-ONE

DASHBOARD

STATUS MONITORING

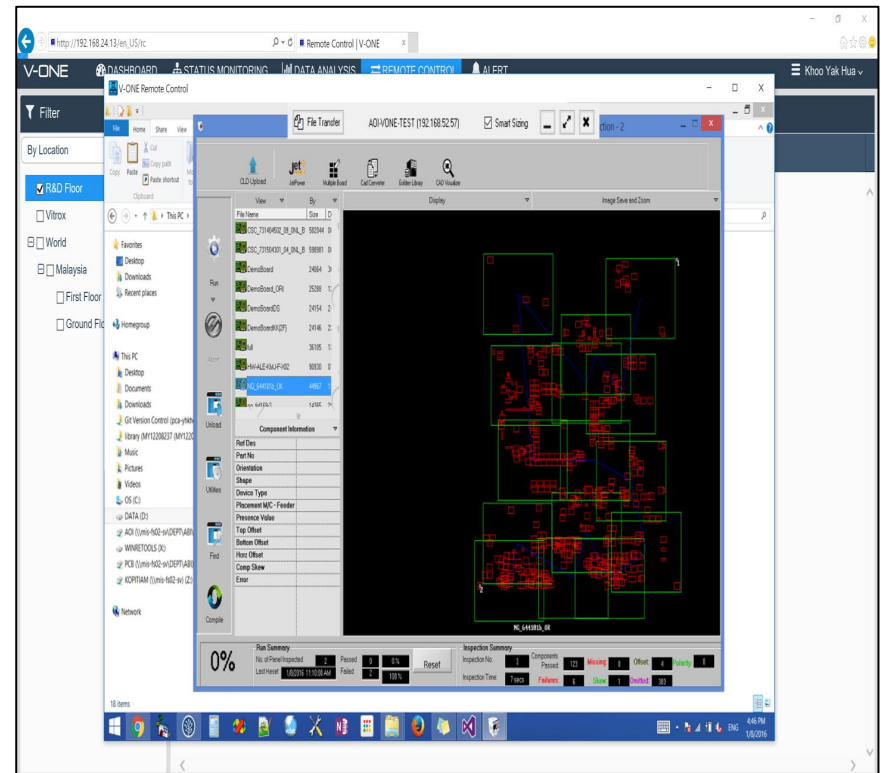
DATA ANALYSIS

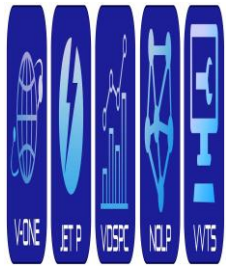
REMOTE CONTROL

ALERT

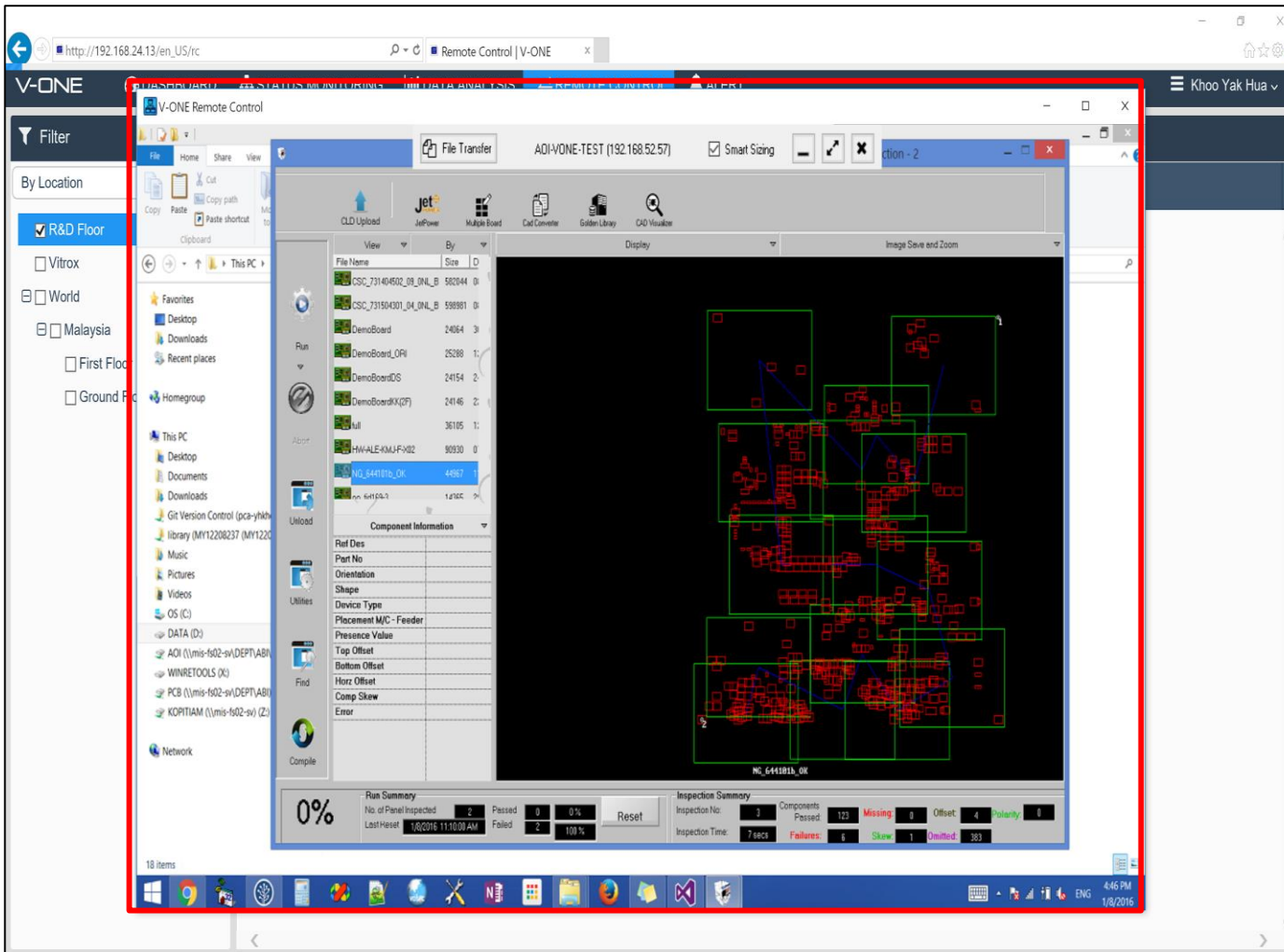
Remote Control

Allow user to remote control to the machine PC via web.



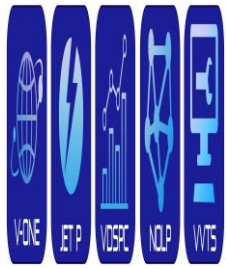


V-ONE Features (4 / 5) - Remote Control

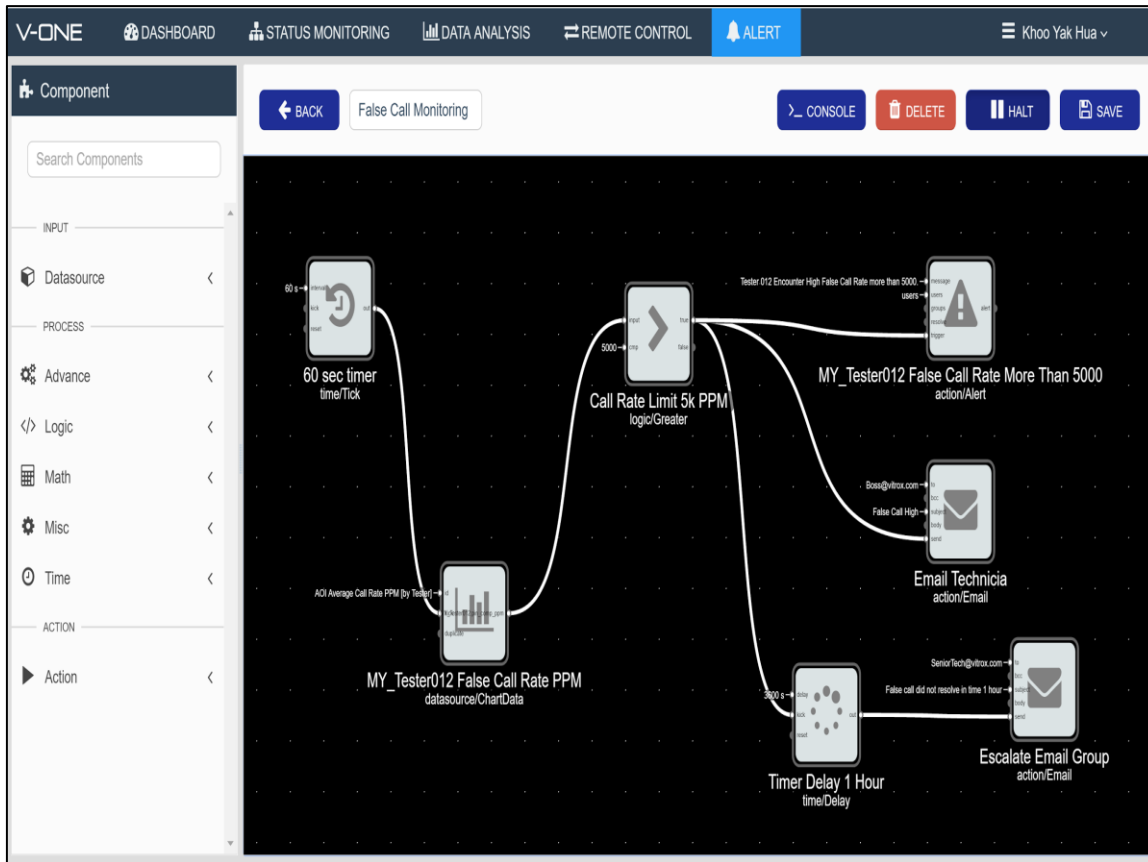


TeamViewer



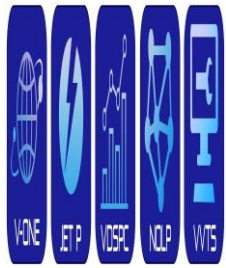


V-ONE Features (5 / 5) - Alert Triggering

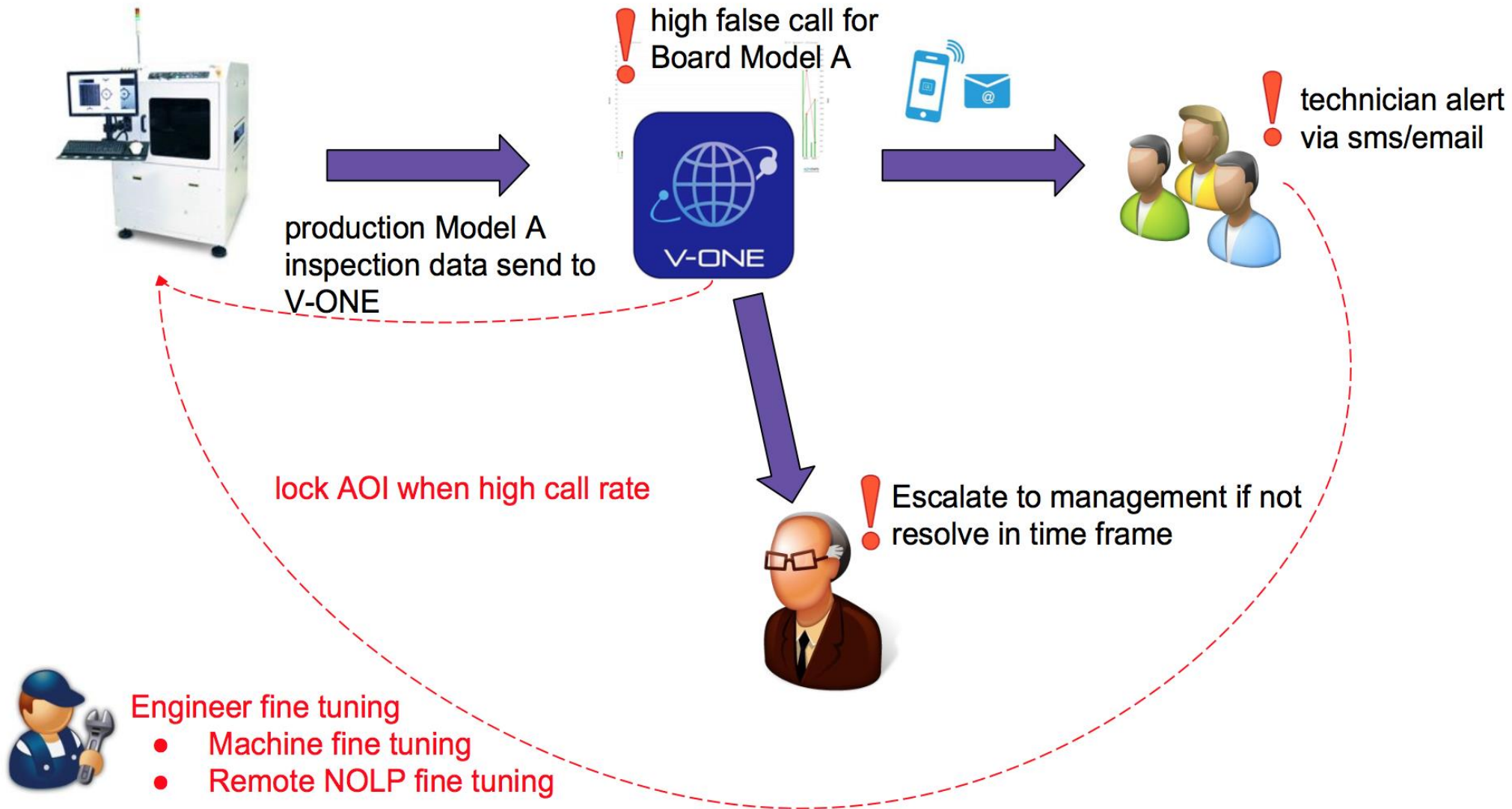


Alert Triggering

A fully flexible and configurable triggering module allow user to configure different use model to help production automate monitoring process in real time basis.



Feature 5/5 - Alert Triggering Use Model



How SME can benefits from V-ONE Smart Manufacturing Platform

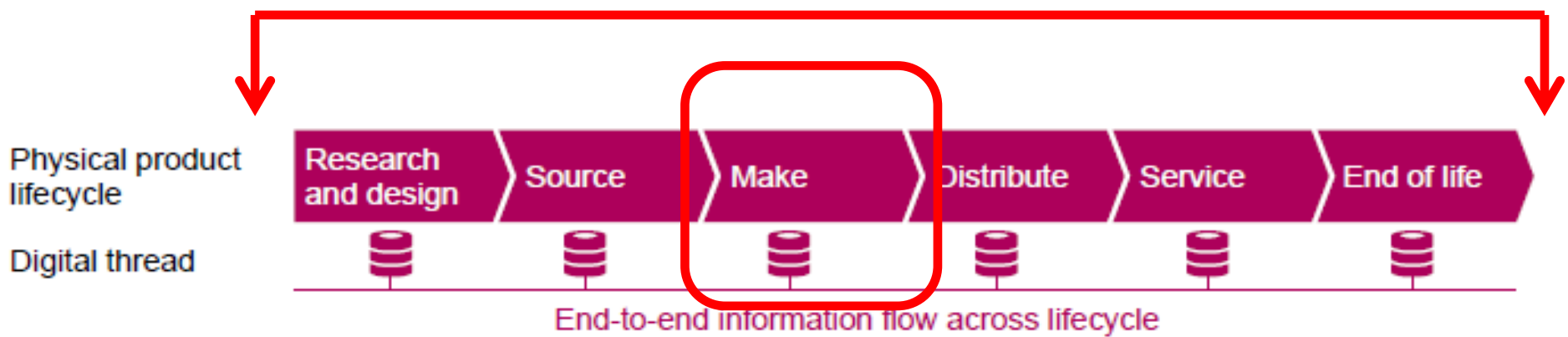
V-ONE SMART MANUFACTURING PLATFORM



1. Collect:
Automatically Collect Machine Data

2. Visualize:
Machine Utilization and OEE Dashboard

3. ProAct:
Data Standardization and Auto Fine-Tuning



Conclusion

- From big data to **smart data** for **value** creation.
- Data-driven **predictive maintenance**
- Automation & human-machine **collaboration**
- Digitized **advanced process control**
- **Interoperability** & standardization.
- Combination of **analytic** and diagnostic with **People**.
- Increase **productivity** through **connected digital** enterprise.
- Reduced cost and scalability.

THANK YOU



www.v-one.my