



德律科技股份有限公司

www.tri.com.tw

Nov. 2023

報告人：陳冠元/財務長兼代理發言人

德律科技股份有限公司



- 成立時間：1989年4月10日
- 創立人：陳玠源董事長
- 資本額：新台幣23.62億



製造廠區擴展



地點: 德律林口二期廠區 (地上10層樓, 地下4層樓)

二期廠區面積: 35,000 平方米 / 10,600 坪

預計完工日程: 2023 Q4 (2023 Q3已取得使用執照)

提升產能及產品開發/驗證使用空間

各產品線及智慧工廠應用展示

研討會/代理商大會舉辦



ESG應用方案進展

發行永續報告書



🏠 / 投資人關係 / 永續報告書 / 永續報告書

投資人關係

敬股東信

財務資訊

永續報告書

永續報告書

公司治理

股東專權

活動訊息

利害關係人

QA

永續報告書

日期	標題
2023/08/28	2022年永續報告書

Click to download the ESG Report



主力產品: 電路板組裝檢測設備



☆ 自動光學檢測設備(IT/Image Tester)

- ☆ 錫膏自動光學影像檢測機(SPI)
- ☆ 自動光學影像檢測機(AOI)
- ☆ **X-ray**自動檢測機(AXI)

☆ 電路板測試機(BT/In-Circuit Board Tester)

- ☆ 組裝電路板測試機(MDA)
- ☆ 全功能電路板自動測試機(ICT)

全球唯一“一條龍”電路板組裝檢測設備廠



德律產品在客戶的電路板組裝產線的應用





主要競爭對手

- 韓國: Koh Young, Pemtron, Parmi, Mirtec
- 日本: Omron, Saki
- 中國大陸: Jutze/Sinic-Tek/Holly
- 馬來西亞: Vitrox
- 美國: Keysight/Teradyne
- 德國: Viscom/SPEA

全球銷售服務網



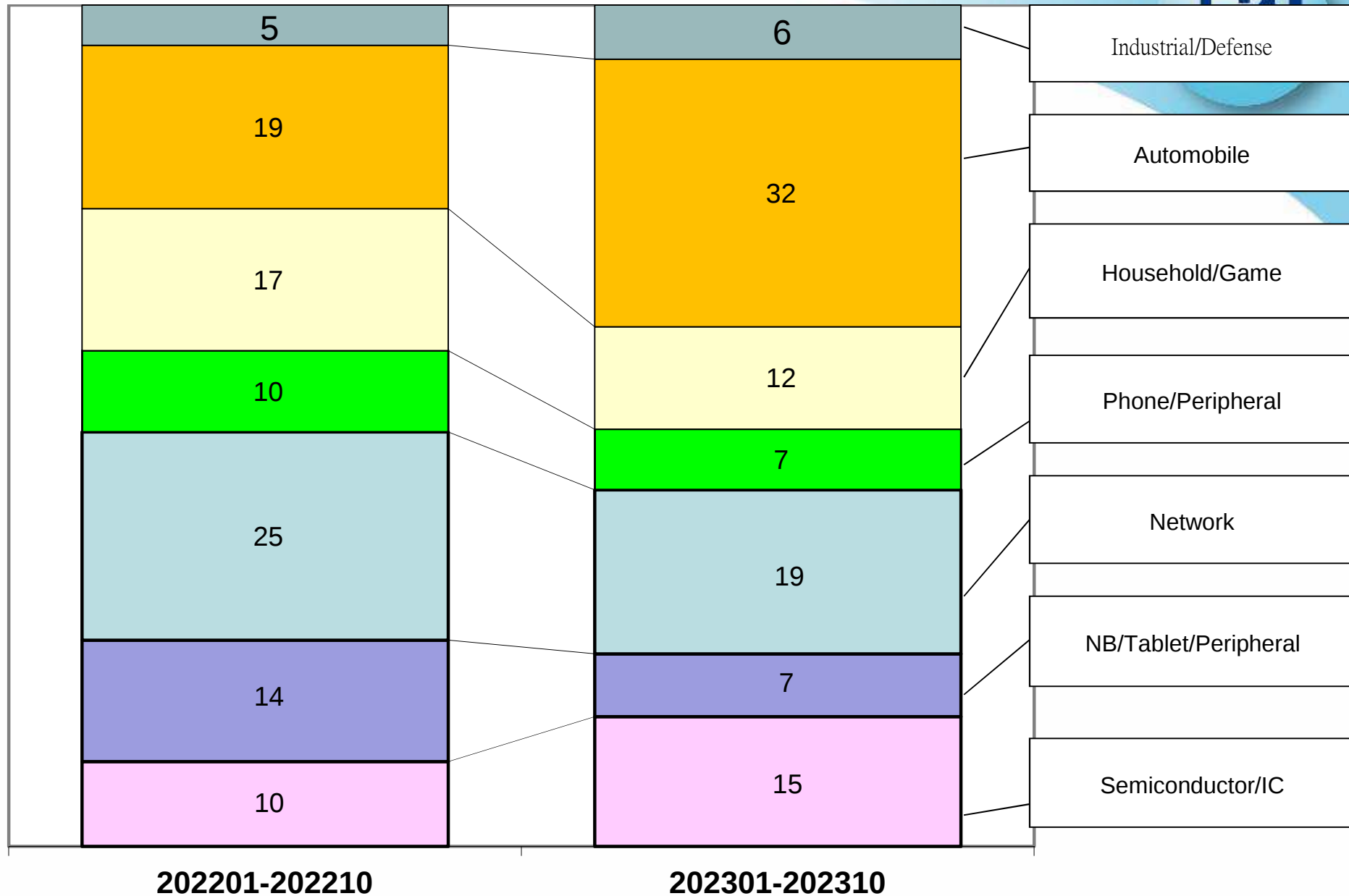
More than 3000 customers have been serviced through worldwide partners.

More than 50 distributors and Rep. worldwide.

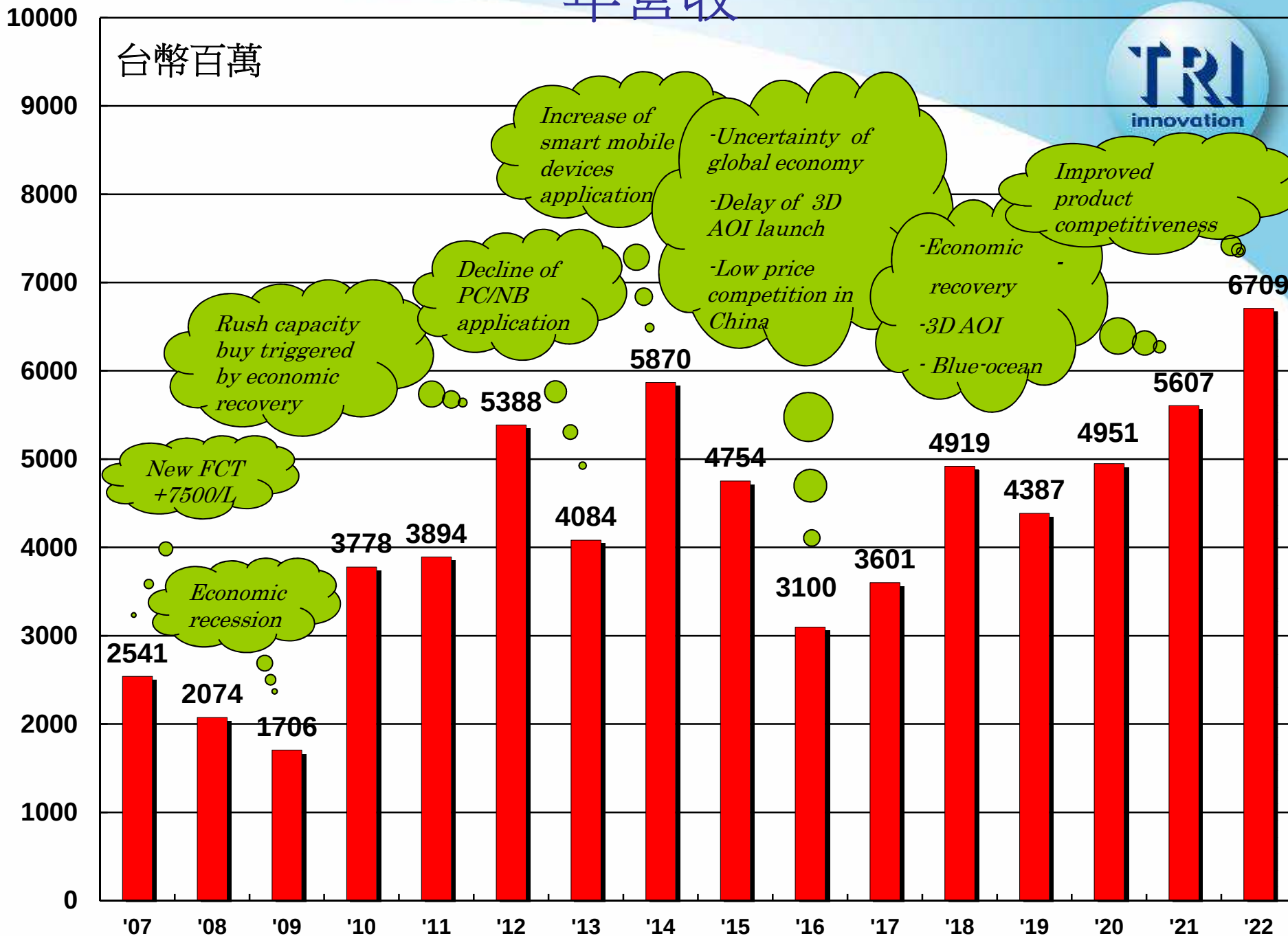
主要客戶為全球各大電子產品組裝廠



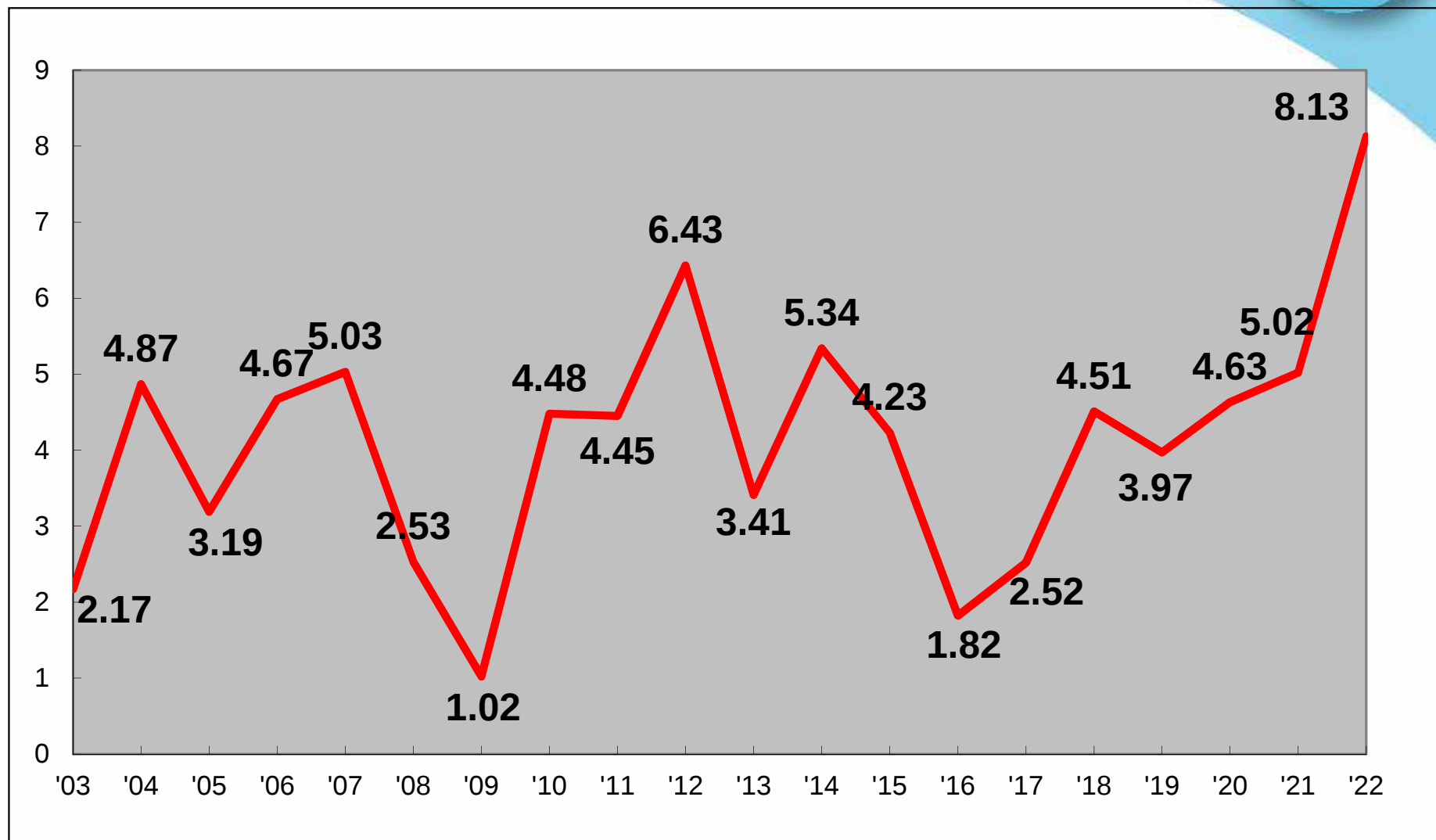
Electronic Industry/Revenue Movement



年營收



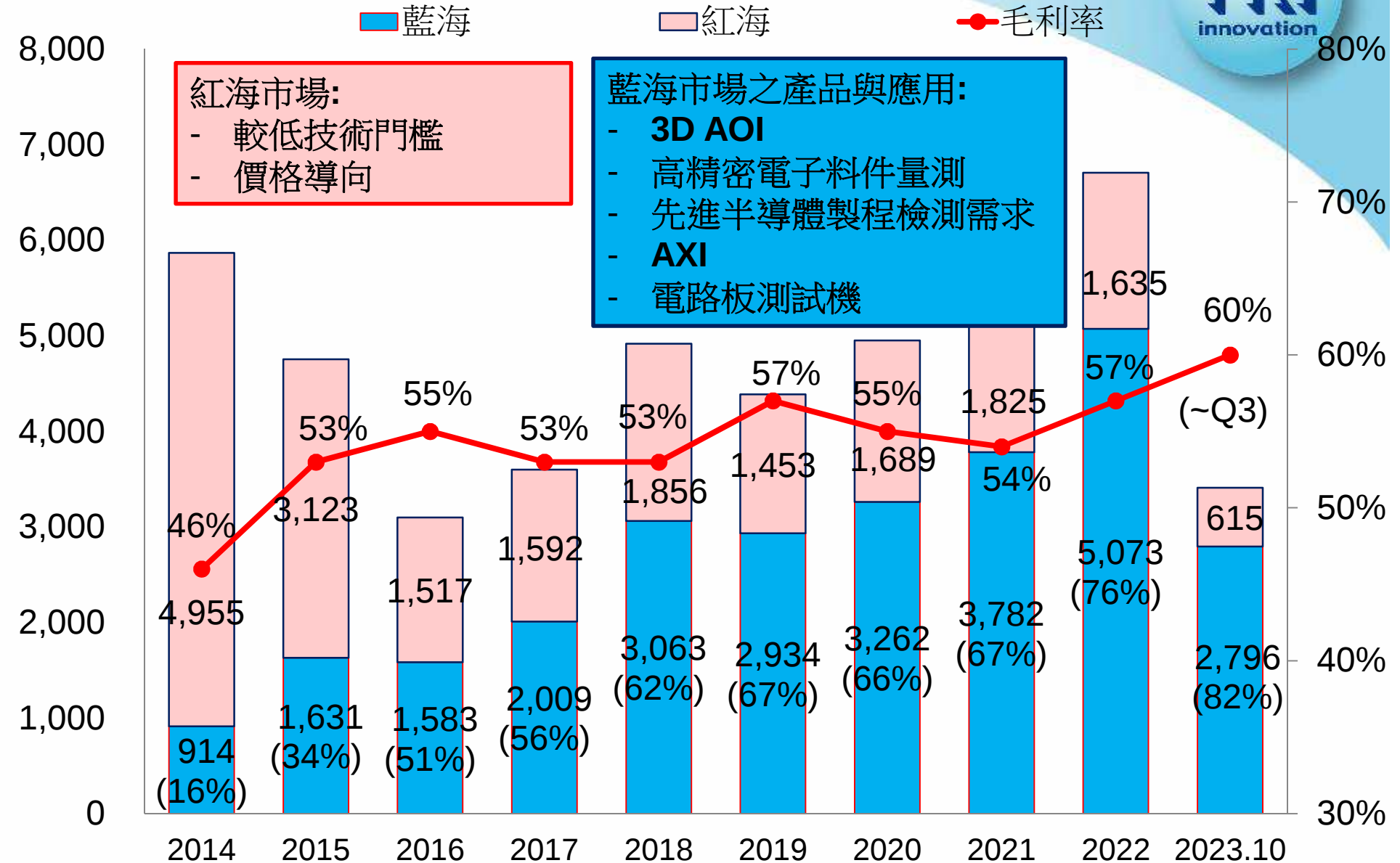
每股盈餘



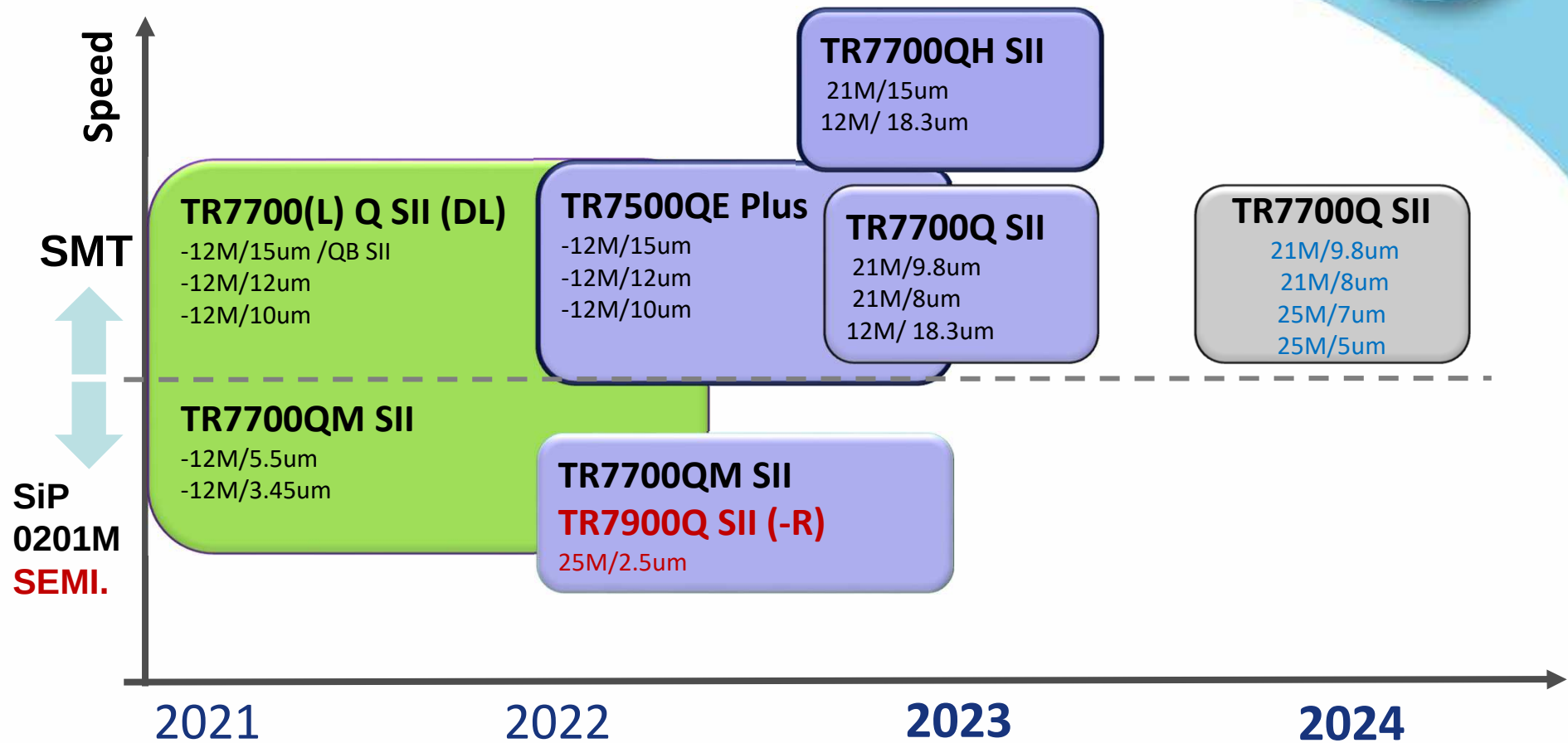
紅海與藍海市場營收變化



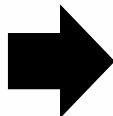
台幣百萬



TRI 3D AOI Product Roadmap



- AOM & AI SW module
- Optional Laser module
- Optional DFF module
- Optional SWIR module



- **Complete AOM & TRI-AI solution**
- **Optional Laser module**
- **Optional 2X speed DFF module**
- **Optional 2X speed SWIR module**

NEW

TR7700QH SII 3D AOI 特點



The TR7700QH SII is **3X⁺ Faster** than the previous model

TR7700QH SII

80 cm²/s

TR7700Q

23 cm²/s

Large Board
Size PCBA
Production

Whole Board
Inspection

Wide depth
coverage –
40mm

Fastest Cycle
Time

Robust
Mechanical
Platform

Data
Traceability

MES
Customization



21/15
MP/
μm

NEW

半導體先進封裝檢測應用 -SEMI AOI



TR7720S
2D SEMI
AOI



TR7900Q SII
Magazine & Strip
3D SEMI AOI



TR7900Q SII-R
3D SEMI AOI &
Reject Station

TRI AOI可支援多種3D技術



Quad Digital
Fringe Pattern
Technology

General Application



Laser
Module

**Reflective &
Transparent
Part Inspection**



Depth from Focus (DFF)
Module

**Optimal Focus
0.5/1 μ m
High Resolution**

Depth from Focus (DFF) 應用優點



**REDUCE OPERATOR
RE-INSPECTION**

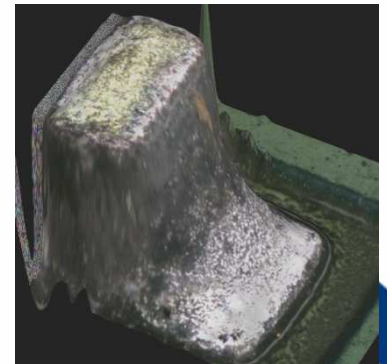
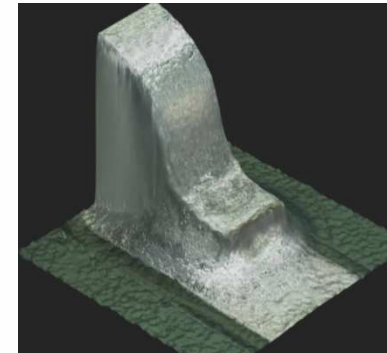
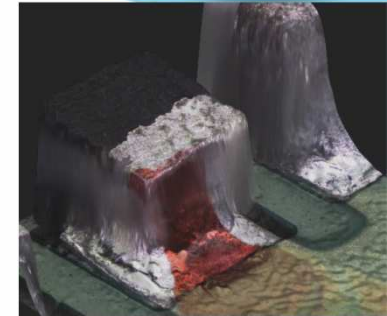
DFF



High Resolution

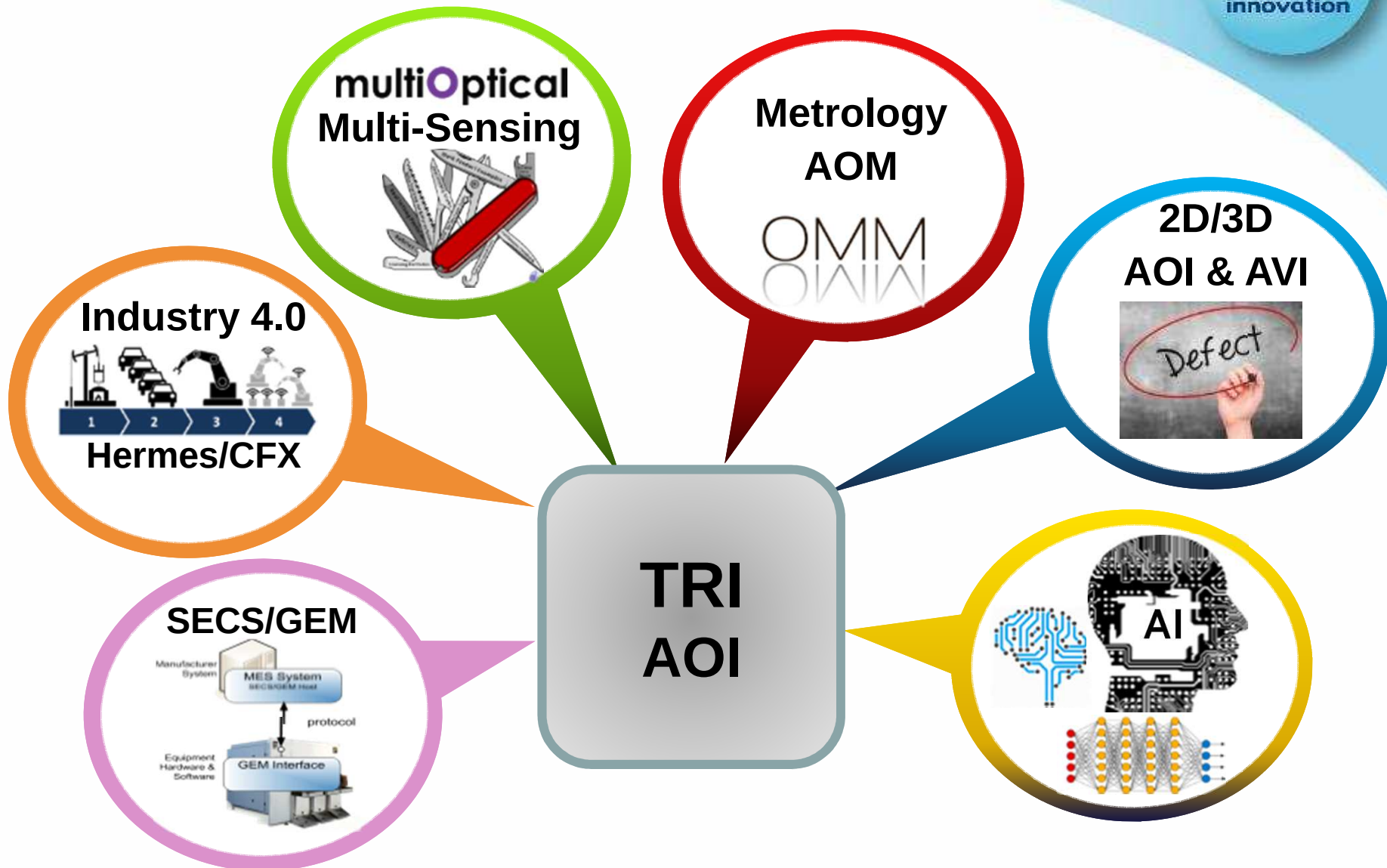
Better Quality

Strong Reliability



innovation

TRI 整合完整的解決方案



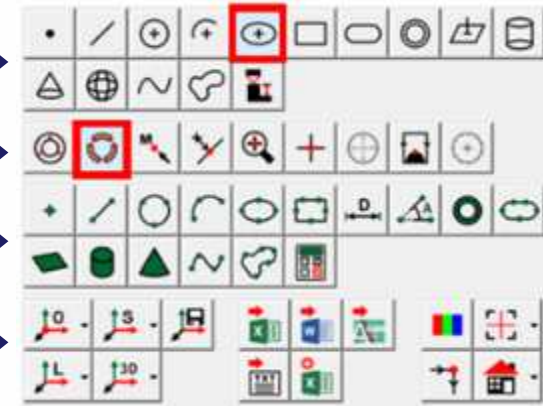
TRI量測功能(AOM)



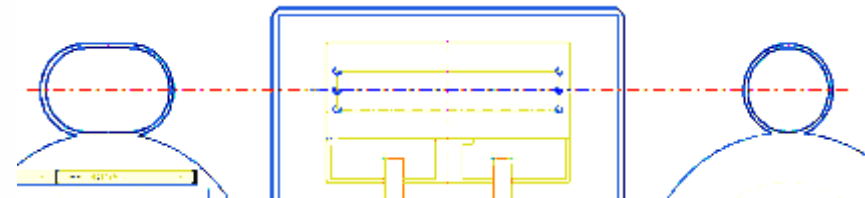
- ❖ UI: New designed and friendly user interface



- ❖ Features: More complete measurement functions will be available



- ❖ High Flexibility: Multi-Layer measurements



TRI SPI 應用項目



Fast Inspection Speed



Large FOV

CoaXpress Technology

Dynamic Imaging

Stop & Go Imaging

Precision Inspection

3.5 μm

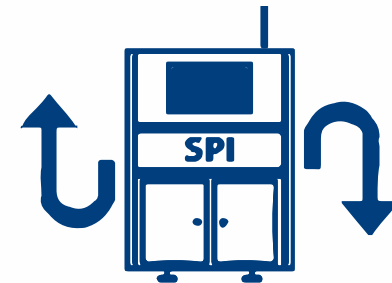
High Resolution

Shadow Free

Smart Warpage Technology

High Inspection Range

Smart Factory



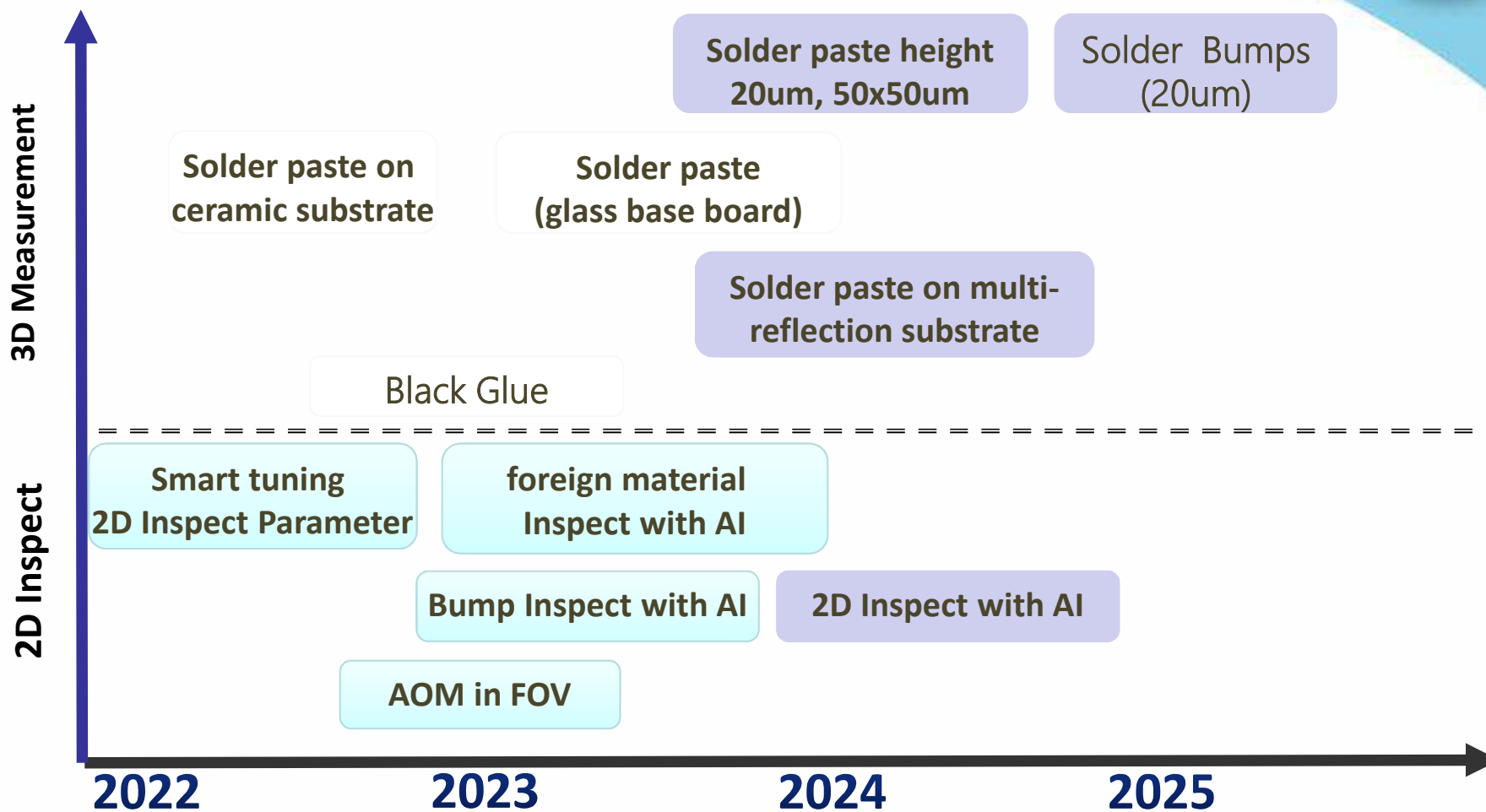
Closed Loop

IPC-CFX

Smart Library

YMS 4.0

TRI 3D SPI - 應用發展



NEW

TR7007Q SII SPI

高速及高解析度檢測



High-Speed Platform



Improved Accuracy and Stability
for Precise Solder Measurements



Wide Spectrum Light for
Enhanced Contrast and
Detection Rate



TRI AXI Product Roadmap



Line scan

TR7600 SV

10~20% performance improvement with SIII

TR7600 SIII Plus

2um, 100kV tube

Area scan

TR7600F3D SII

5~30um

PCB size : 900 x 460 mm (31D), 700 x 320 (45D)

TR7600F3D LL SII

5~30um, PCB size : 1000 x 660 mm (45D)

TR7600F3D LL SII Plus

3~15um, PCB size : 1000 x 660 mm (50D)

20um, PCB size: 1000 x 660 mm (45D)

25um, PCB size: 920 x 660 mm (45D)

30um, PCB size: 760 x 660 mm (45D)

TR7600F3D SII Plus

3~15um

PCB size : 780x 260 mm

TR7600F3DB SII (2024)

TR7600F2D

Pulse tube: 20% performance improvement

TR7600F2D TL

PCB size : 1200 x 660 mm

TR7600F2D Plus

Improved HW design

10% performance improvement from F2D

TR7600F2D QL

PCB size : 2100 x 510 mm

Special Application

TR7600HP (2024)

High Power AXI Model
IGBT, SiC application

2021

2022

2023

~2025

TR7600 SV 3D AXI



NEW



High-Speed Robust Platform,
20% Performance Improvement*



AI-Powered Inspection Algorithms,
AI-Void Detection, AI Repair Station, and more



Smart Factory Ready for
Easy MES Connectivity

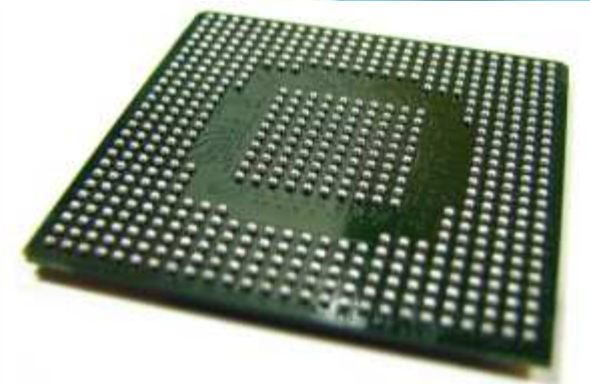


**Compared to Previous Mode, TR7600 SIII*

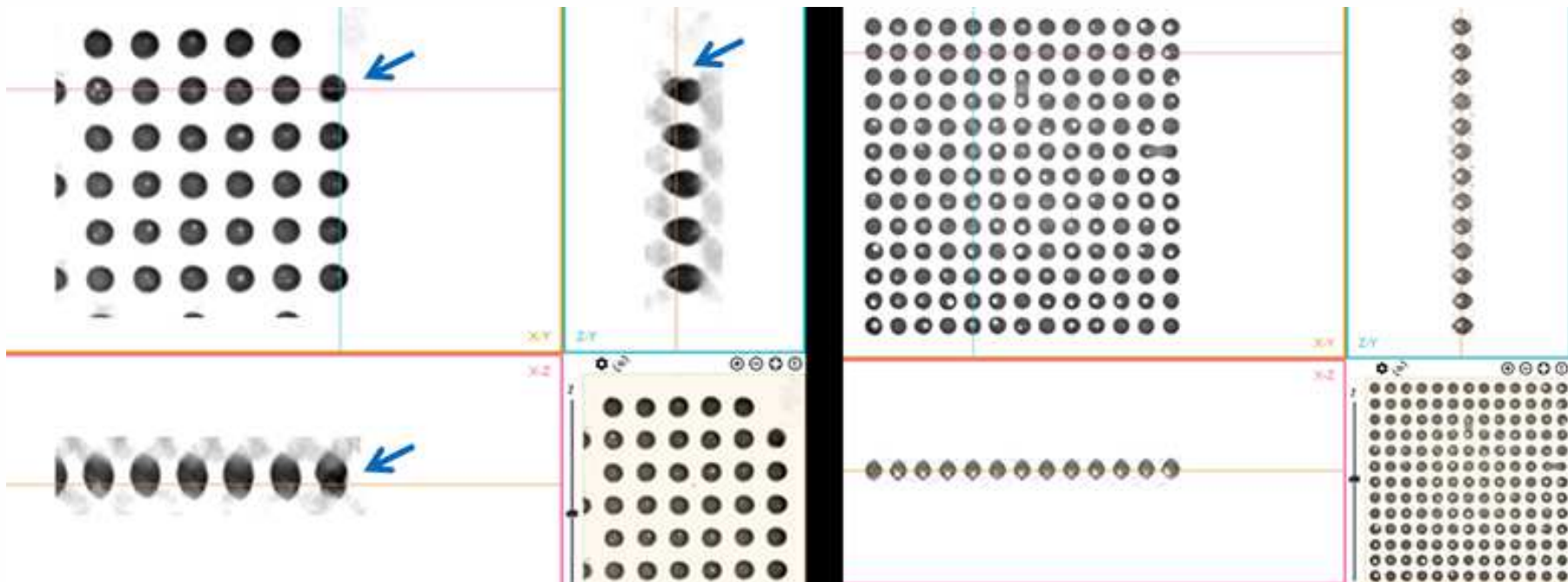
TRI AXI - BGA 檢測應用



Product Type Examples	ADAS, Radar Module, Communication Module
Inspection Criteria	<u>BGA Void, Open</u>
TRI AXI Application	3D CT Inspection



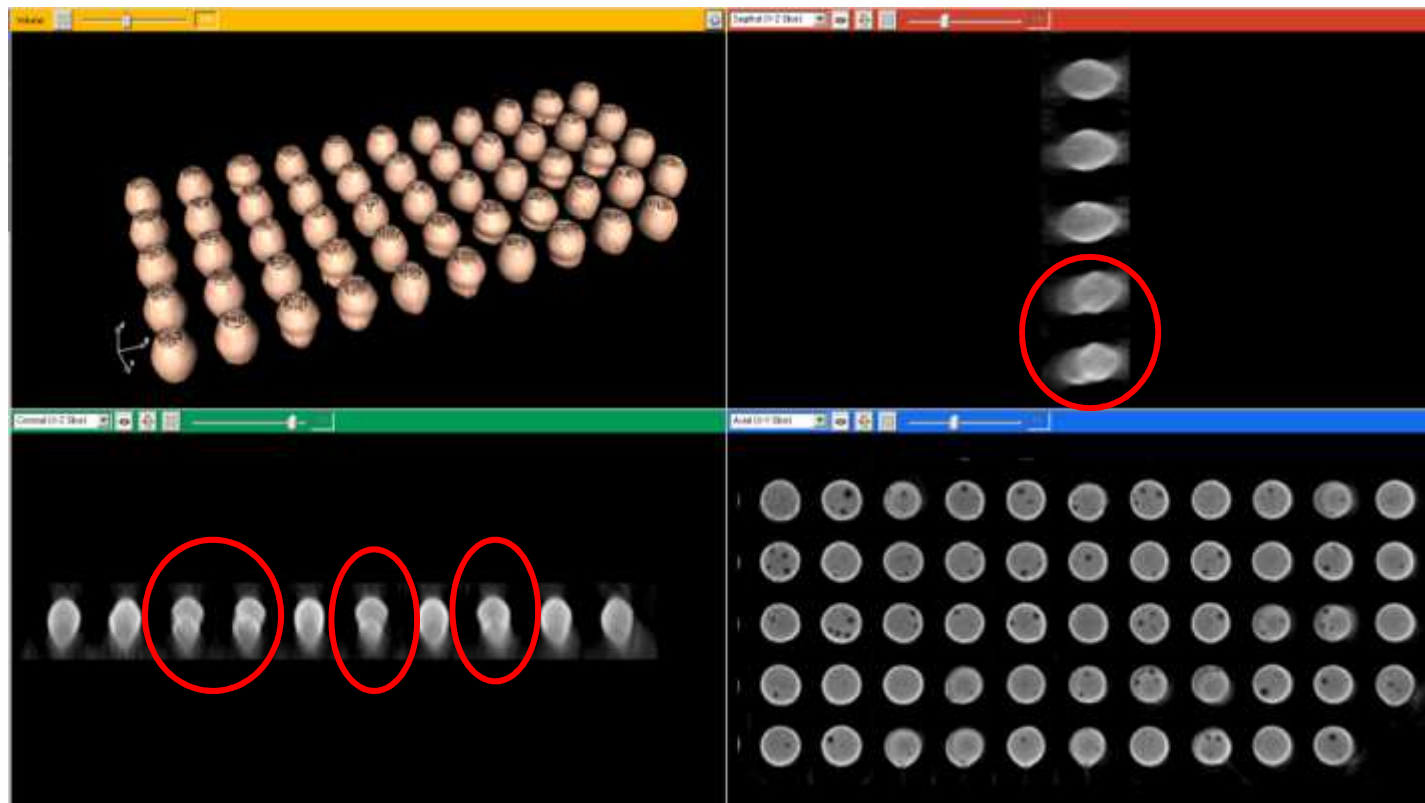
3D CT (電腦斷層掃描)



BGA CT Review at Repair Station



Users can confirm with XY / XZ / YZ interface



CT viewer is sent to repair station



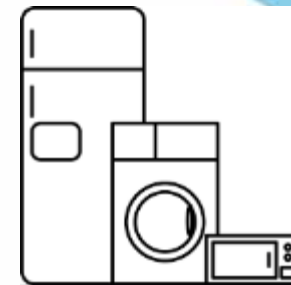
TRI ICT/BT 應用



Automation



Laptops



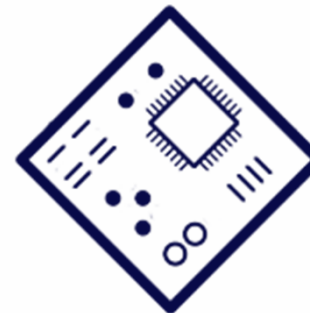
White Goods



Flex Boards



Smart Factory



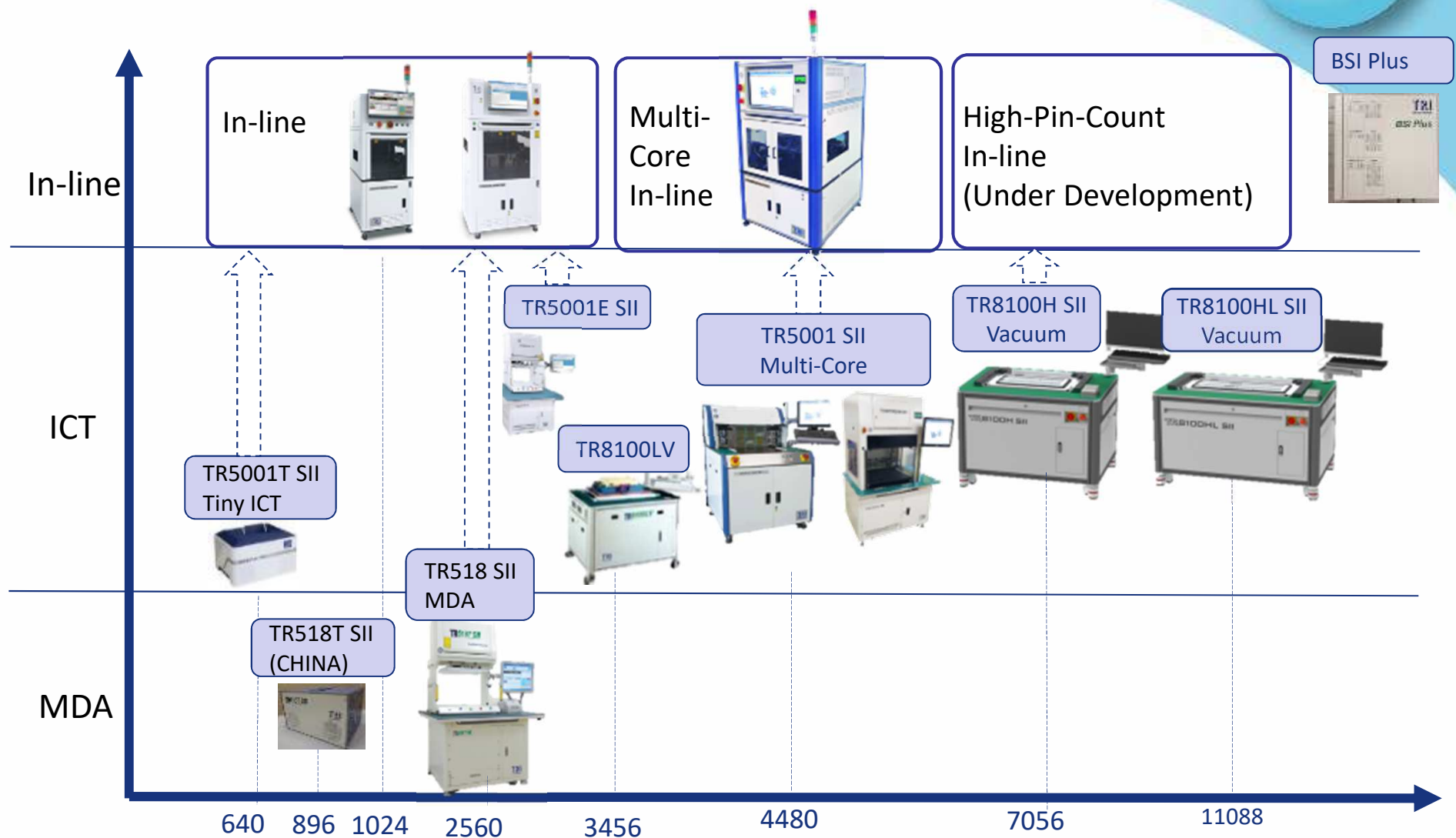
Customized FCT



Automobile



TRI ICT/BT 產品組合



BSI Plus



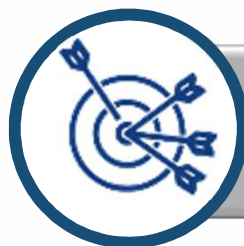
TR8100H SII 系列 ICT應用特點



NEW



High Pin-Count ICT
Up to 11,088 Testing Points



Full Coverage Test Solution
with Vacuum Fixture



High Speed Testing

TRI 測試及檢測特點

- 汽車電子產業客戶應用



Multiple 3D Technologies



Metrology-driven Technology



AI-Powered Inspection



Full Coverage 3D CT AXI



Foreign Material Inspection



High Gauge R&R



LED Testing



Smart Factory Ready

Flexible Production Line Solutions

Dual Lane Interface

Extra Large PCB Inspection
(up to 1200 mm X 660 mm)

Board Testing and
Functional Tests

Intelligent Conveyor System

M2M Communication

Automated Diagnostics and
Calibration

工業4.0應用方案



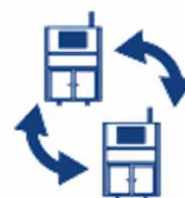
**SMART
FACTORY**



**MES
Connectivity**



**Real Time
SPC Trends**



**Closed Loop
Solution**



Repair Station

連接

數據共享
工業4.0通訊標準
MES 定制

優化

AI 智能複判主機
AI 智能工作站
共享檢測數據庫
遠端微調功能

監控

遠端通報
遠端控制

視覺化

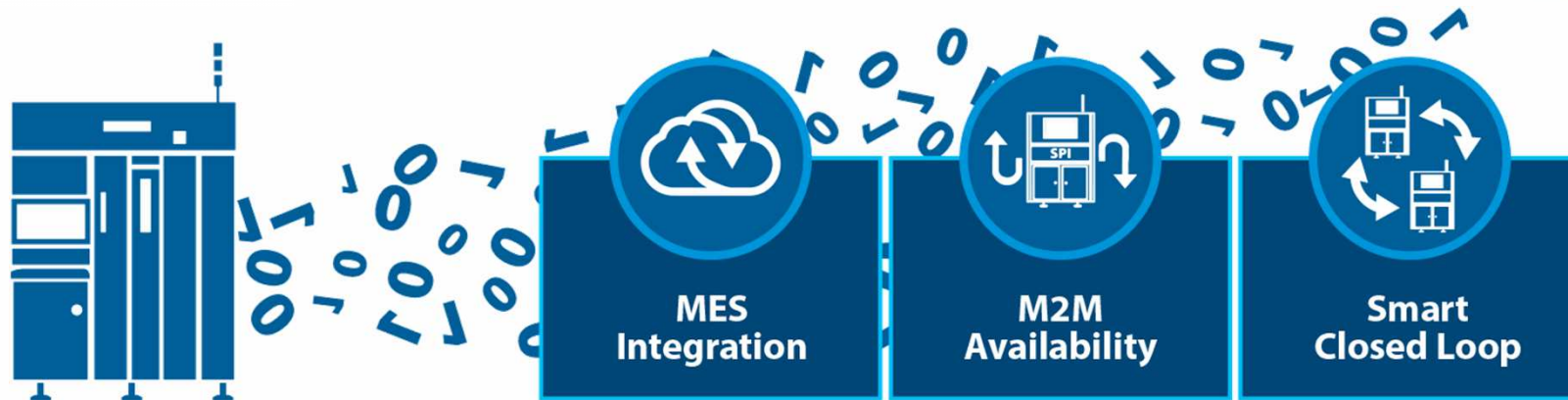
圖表操作介面
即時SPC趨勢
檢測實況狀態



智慧工廠解決方案



Big Data Ready



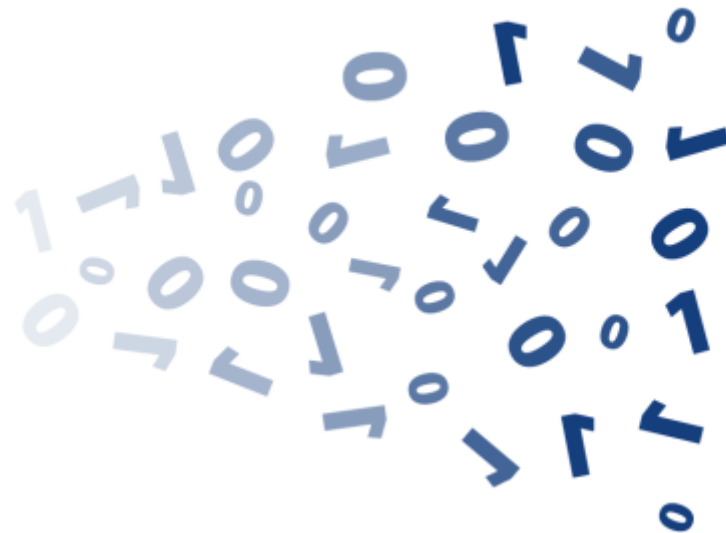
Smart Monitoring



MES 客製化 – 大數據收集



TRI solutions generate  for your MES Applications
To Improve your Production Yield Rate



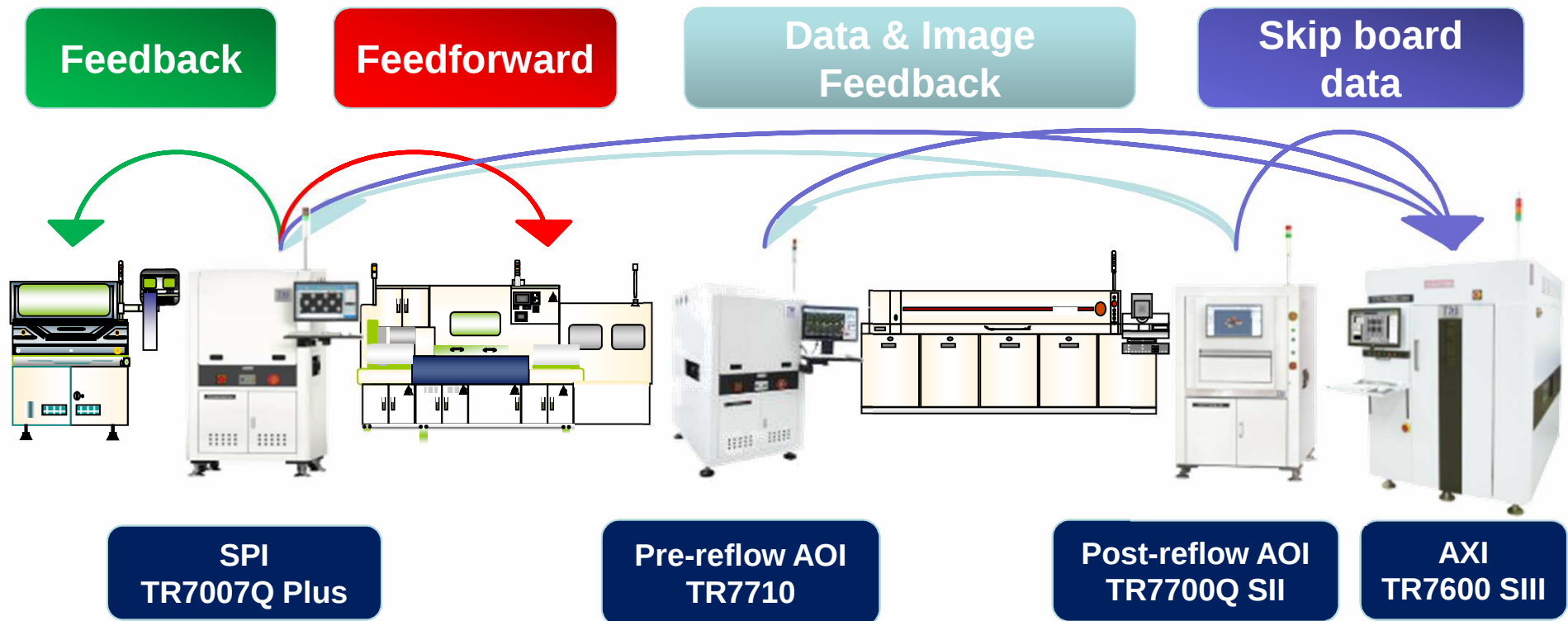
Data

- PCB ID
- Component ID
- Inspection Image
- Area / Height / Volume
- Position (X,Y,Z)
- Shift (X,Y,Z)
- Void %
- *and more...*

TRI支援封閉迴路控制系統



TRI SPI, AOI, AXI 檢測資訊的串流 IPC CFX(data)/HERMES(M2M)



支援 IPC-HERMES-9852 規範



M2M Communication Standard

- Based on TCP/IP and XML
- Automatically Change the Program.
- Automatically adjusts the conveyor belt width.
- Continuous tracing of boards throughout a SMT line.
- Requirement: At least one Bar Code Scanner



支援 IPC-CFX (IPC-2591) 規範



Qualified Products



SPI

TR7007 SII Series
TR7007 SII Ultra
TR7007D Series
TR7007Q Series
TR7007Q Plus Series



AOI

TR7500QE Series
TR7700 SIII Series
TR7700Q SII Series
TR7700QE Series



AXI

TR7600 Series
TR7600F3D Series

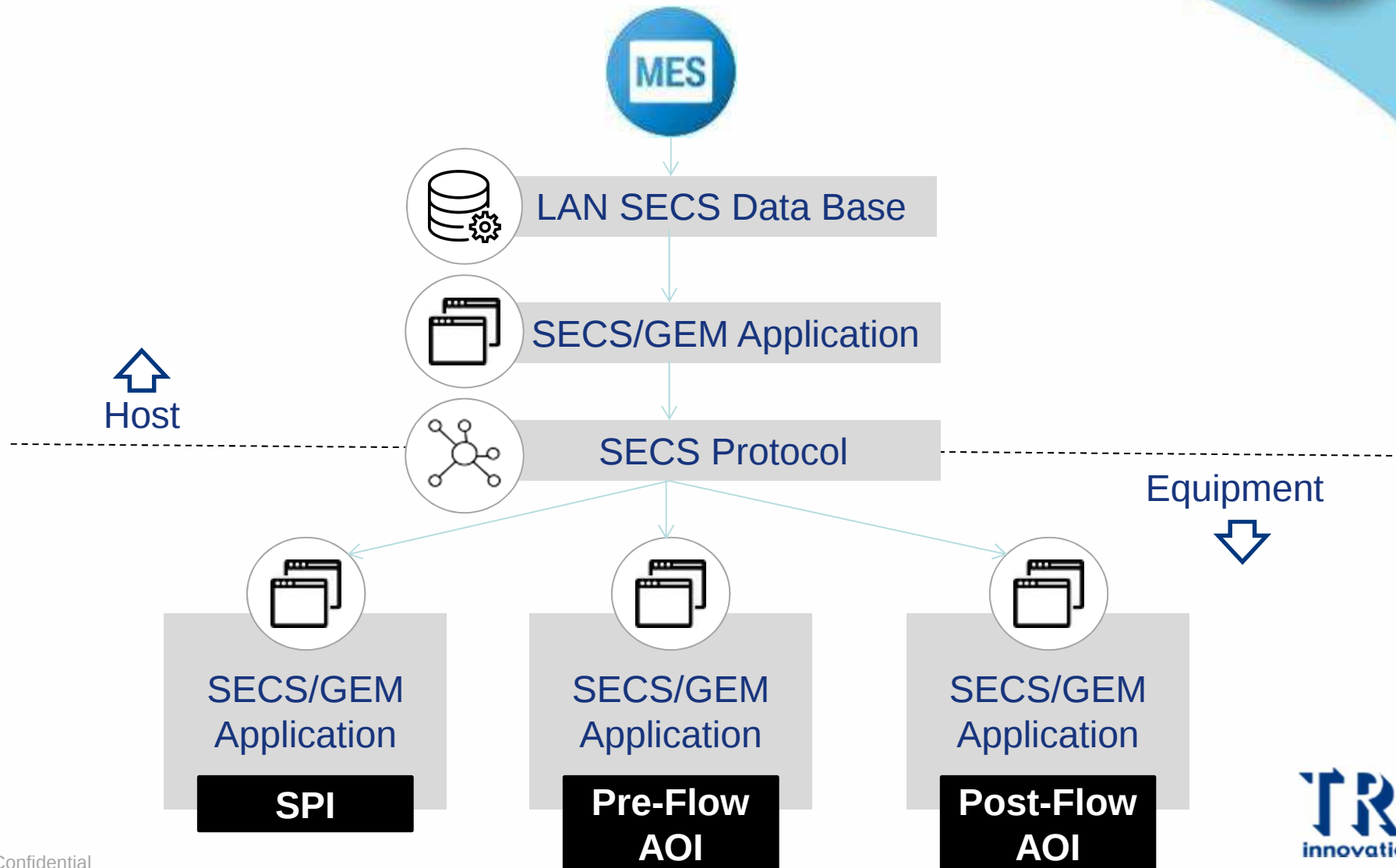


ICT

TR5001 Series

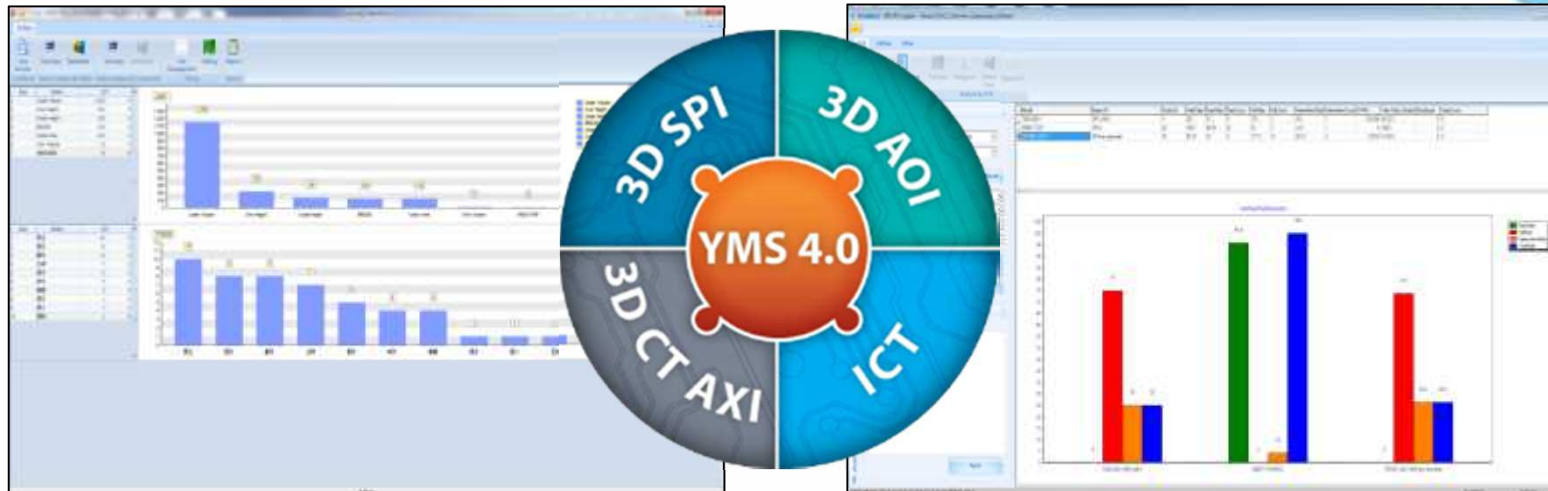
支援SECS/GEM 架構

半導體設備通訊標準



TRI YMS 4.0 良率管理系統

協助客戶提升生產力及品質管理

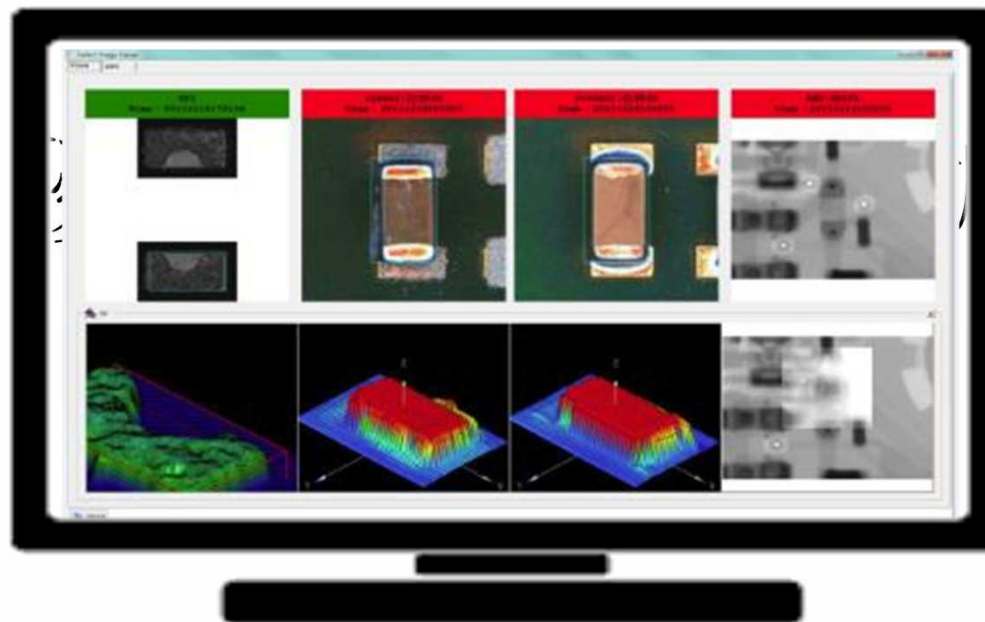


- 實時狀態檢查
- SPC和生產力監控
- 列出排名前10的不良項目和對應圖像
- 依各站別, 線別, 流程找出問題點
- 監控生產問題改善狀況
- PDCA改善循環
- 支持品質優化
- 輸出報告到MES / SFCS

工業4.0解決方案



優化: 缺陷影像分析



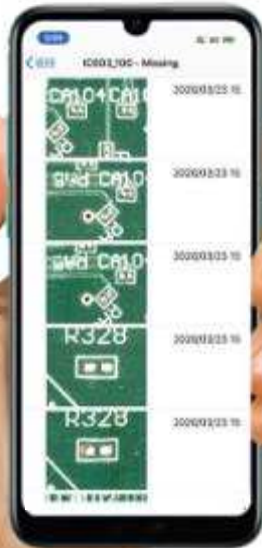
Defect Image Analyzer

View inspection images from SPI, Pre-reflow AOI, Post-reflow AOI and AXI simultaneously from YMS 4.0. Eases the root case traceability by displaying the Inspection Images.

YMS 4.0 App



Portable Monitoring experience for your production line



User-friendly interface to access real-time statistical data such as the Yield Rate, Top defects and Top Defective Components from the comfort of your mobile device.



**Alarm
Notifications**



**Yield
Rate Monitor**



**Real-time
SPC Trends**



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TRI的AI應用



1. AI 智慧編程 (Smart Programing)
2. AI 工作站:伺服器-終端架構的 AI 檢測及調試
3. AI 智慧複判主機 (Verify Host):
AI 維修/複判站(Repair Station) 管理
4. AI 檢測:
 - 字元辨識 (OCV/OCR)
 - 瑕疵檢測
 - 待測物外觀檢測
 - 異物檢測

TRI AI 發展藍圖



➤ Future Plans



❖ 技術深耕

- ❖ AI Station/Training Tool
- ❖ Big Data: 更多內建AI網路
- ❖ 提升檢測能力

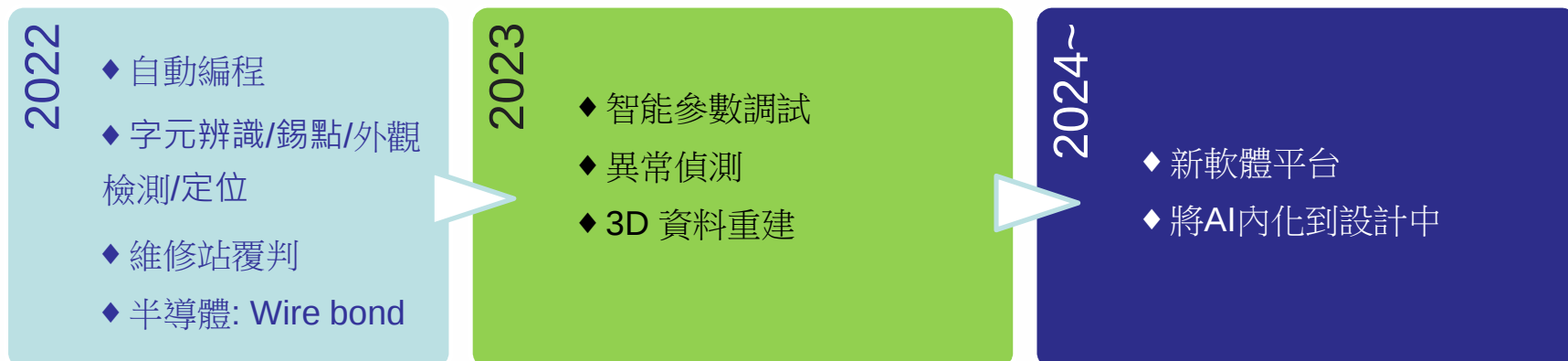
❖ 擴大發展

- ❖ 更快速及更精確
- ❖ 更簡易及更快速的訓練
- ❖ 應用面擴展

❖ 願景

- ❖ 零漏測、零誤判
- ❖ 無人化 AOI

➤ AI 應用:



參與經濟部AOI智慧化升級科專計畫

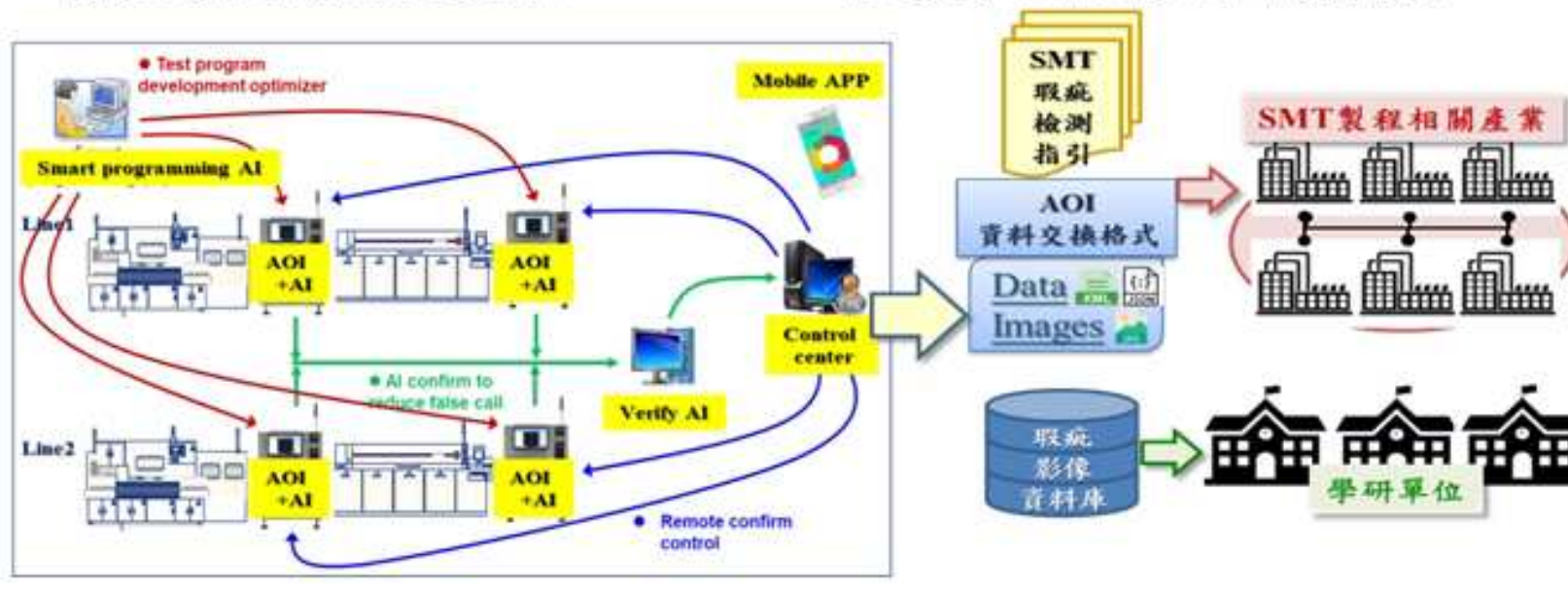
智慧產線設計概念

(一) 提升SMTAOI檢測效率及精準度

- 建立AI自動檢測程式，減少產線停機時間
- 導入人工智慧檢測，提升檢測精確性
- 建立瑕疵多機AI覆判機制與AI管控平台，提高品質控管成效及生產效率

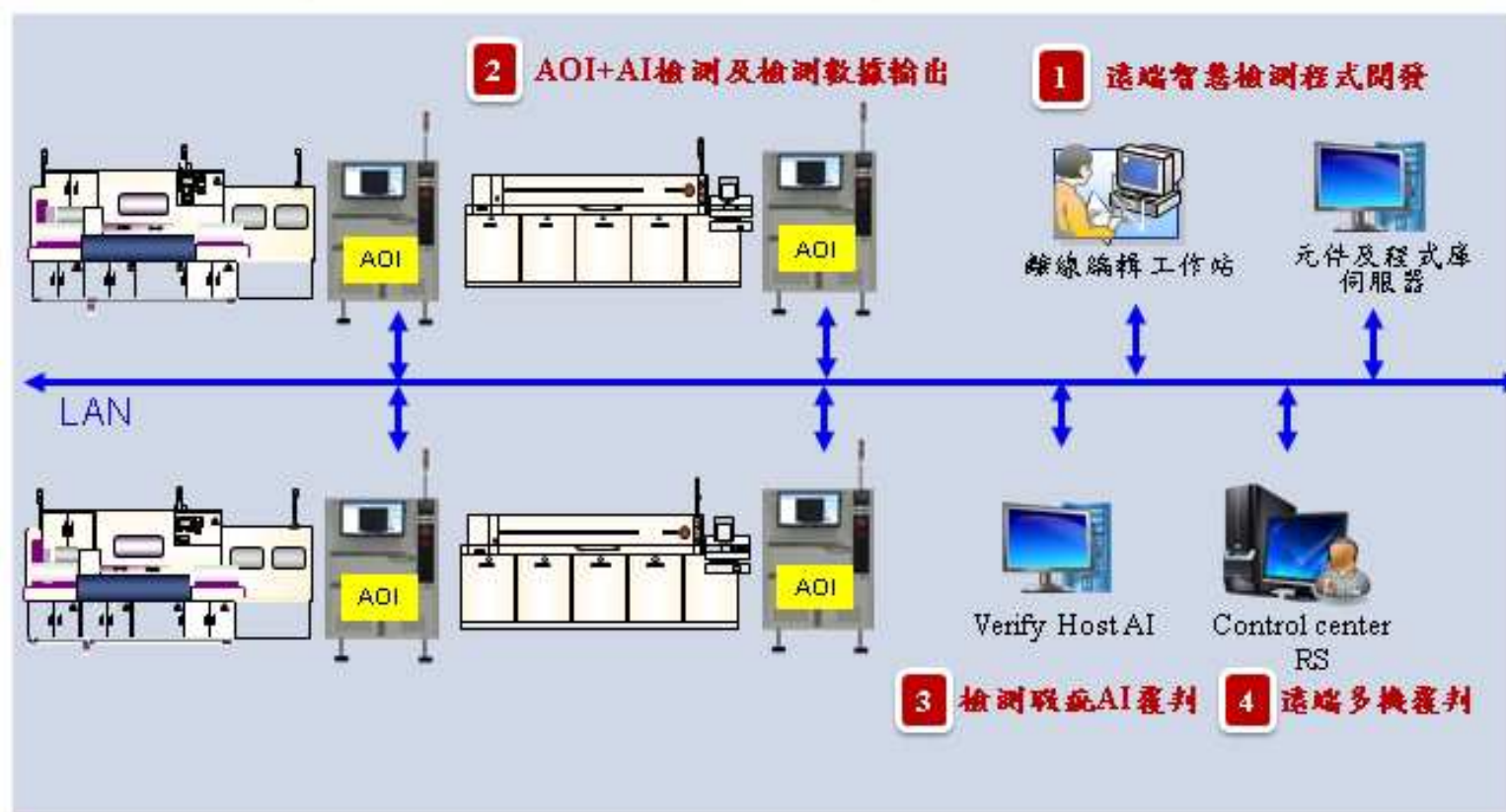
(二) SMT 瑕疵檢測指引訂定及產業推廣

- 制定SMT瑕疵檢測指引及AOI/AI資料交換介面開放格式，作為產業依循準則
- 建立瑕疵影像資料庫，供學研單位研究，促進產學合作及提升學研技術能量



參與經濟部AOI智慧化升級科專計畫

產線機台架構



內部研發團隊



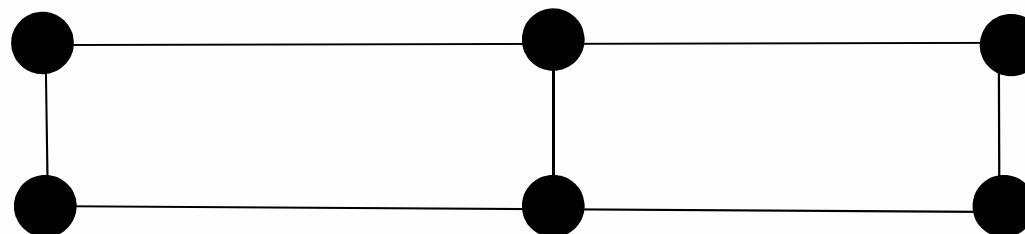
- Optical Dept.
- Mechanical Dept.

- system S/W
YMS, R/S

- PLC control
- Lighting control

光學檢測

電路板測試



220+ RD

外部機構技術支援

Department of Computer science, 台灣大學

- 影像處理 / Understanding

Department of Power Mechanical, 清華大學

- X-ray 3D Reconstruction/Digital Tomosynthesis Algorithm/電腦切層演算法

Center of Measurement Standards, 工研院

- Length/ Camera / 色彩校正

近年獲獎



- 2017 Circuits Assembly NPI Award
- 2017 EM Asia 創新獎
- 2018 Circuits Assembly NPI Award
- 2018 EM Asia 最佳供應商獎
- 2019 Global Technology Award
- 2019 EM Asia 傑出產品獎
- 2020 Global Technology Award
- 2021 EM Asia 創新獎
- 2021 Global Technology Award
- 2022 EM Asia 傑出產品獎
- 2023 EM Asia 創新獎及傑出產品獎

* TRI's Company Milestones:

<https://www.tri.com.tw/tw/about/about-21-1-2.html>

免責聲明



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Better Testing Better Quality



THANK YOU!

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Test Research, Inc.***



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