



德律科技股份有限公司
www.tri.com.tw

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



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)

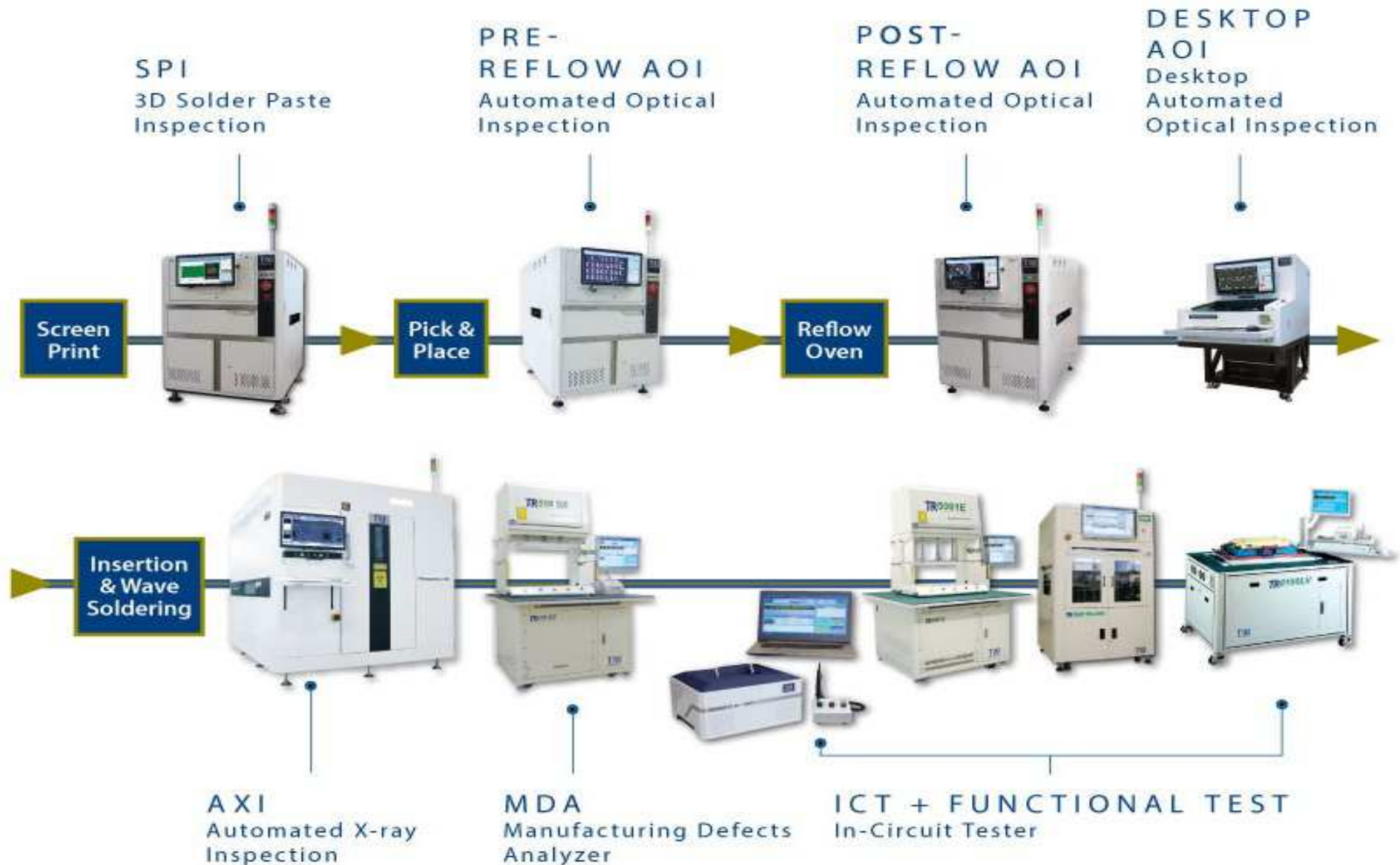
☆ 電路板測試機(BT/In-Circuit Board Tester)

- ☆ 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

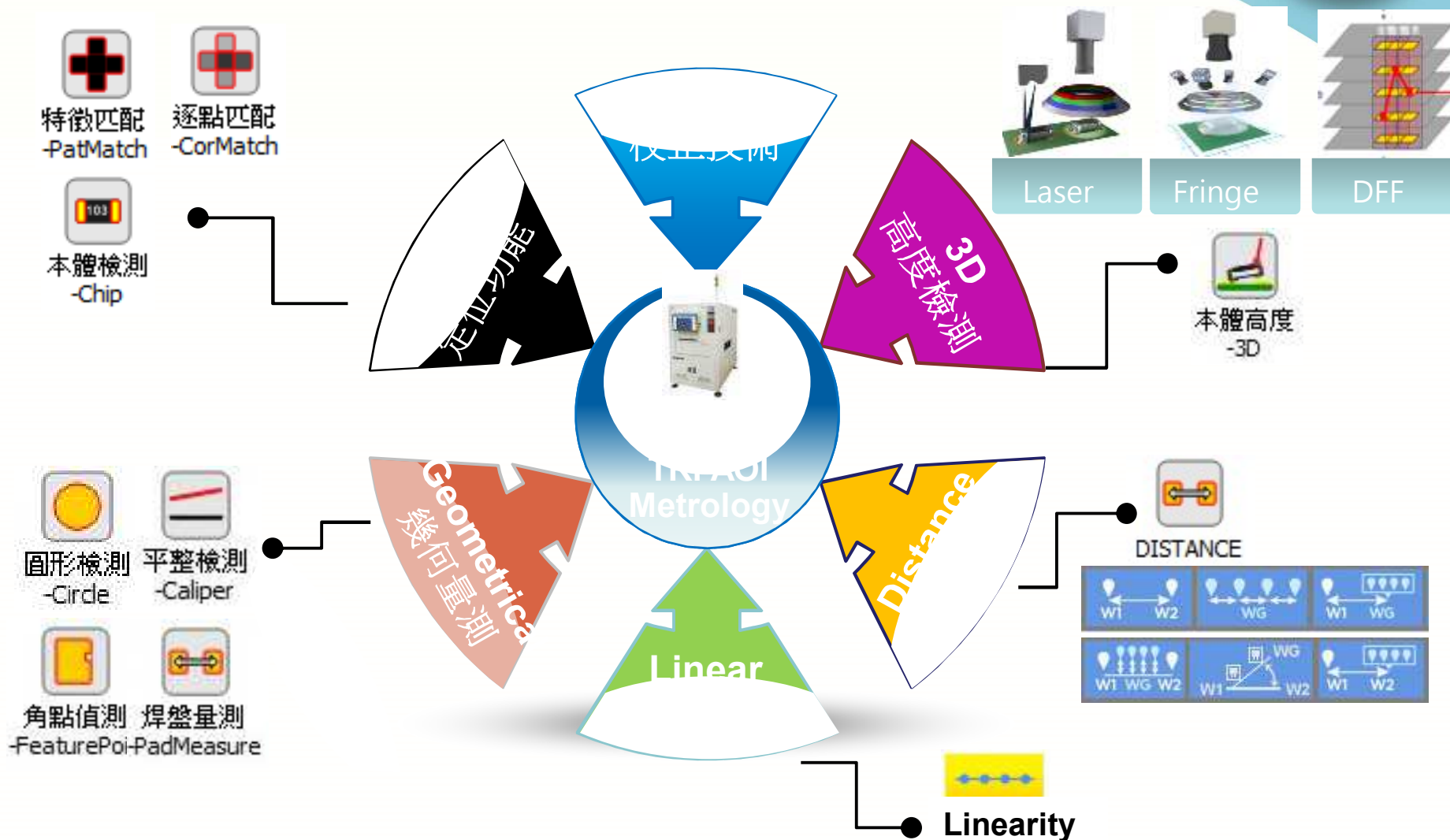


德律產品在客戶的電路板組裝產線的應用



整合多項視覺核心新技術 因應:

- 高精密電子料件量測需求
- 先進半導體製程/封裝檢測需求

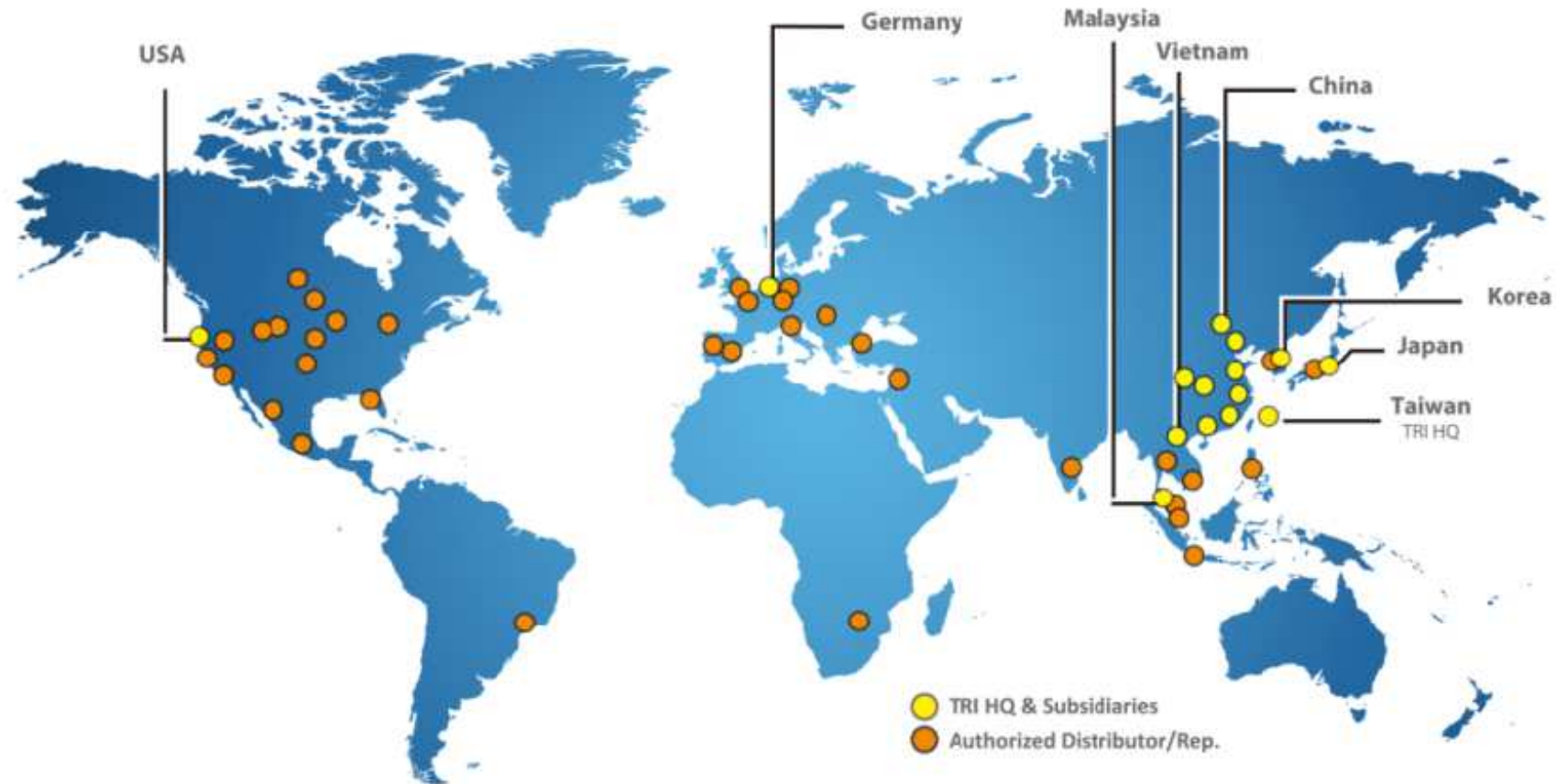


全球銷售服務網

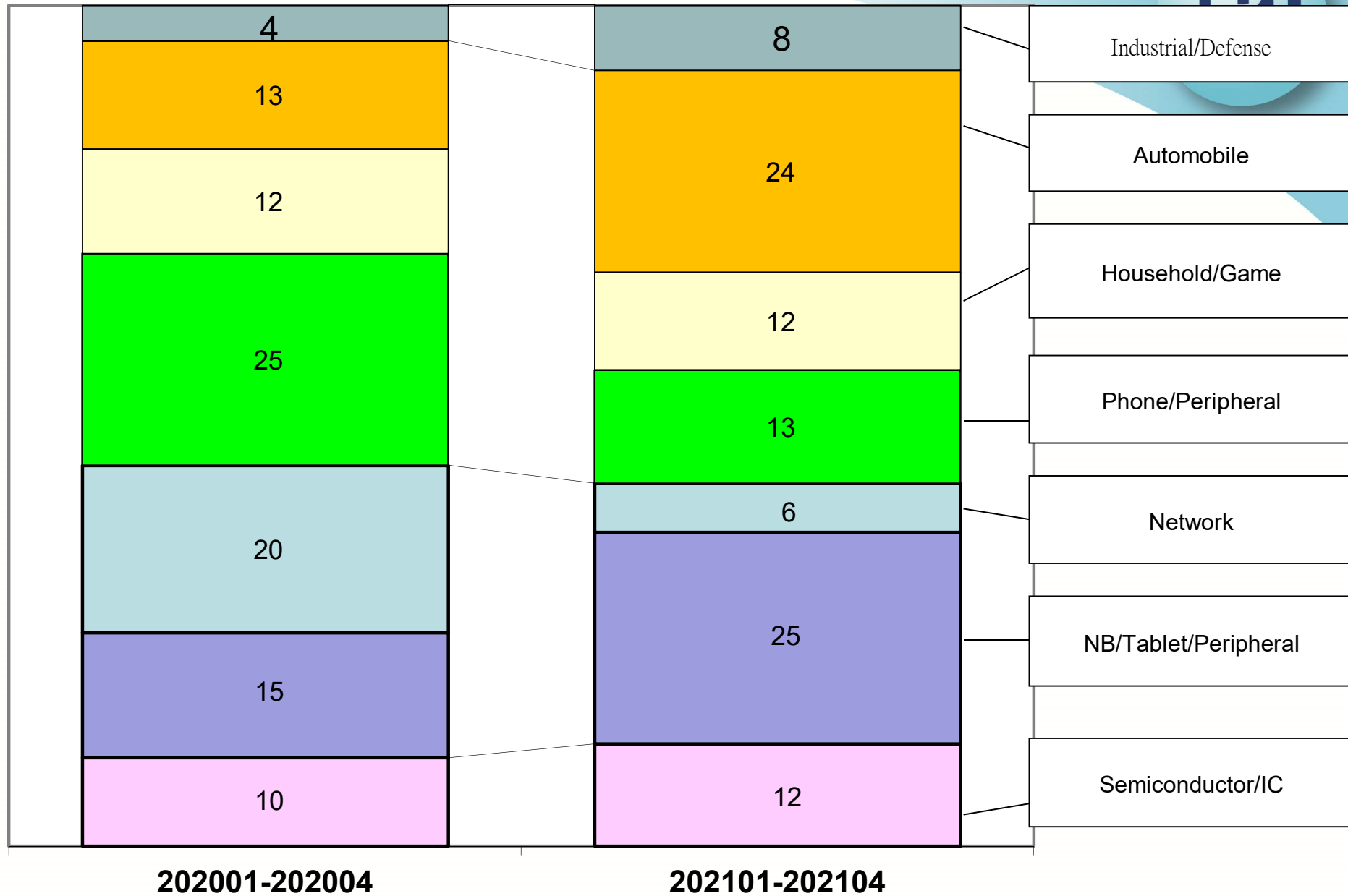


More than 3000 customers have been serviced
through worldwide partners
More than 50 distributors and Rep. worldwide.

主要客戶為全球各大電子產品組裝廠



Electronic Industry/Revenue Movement

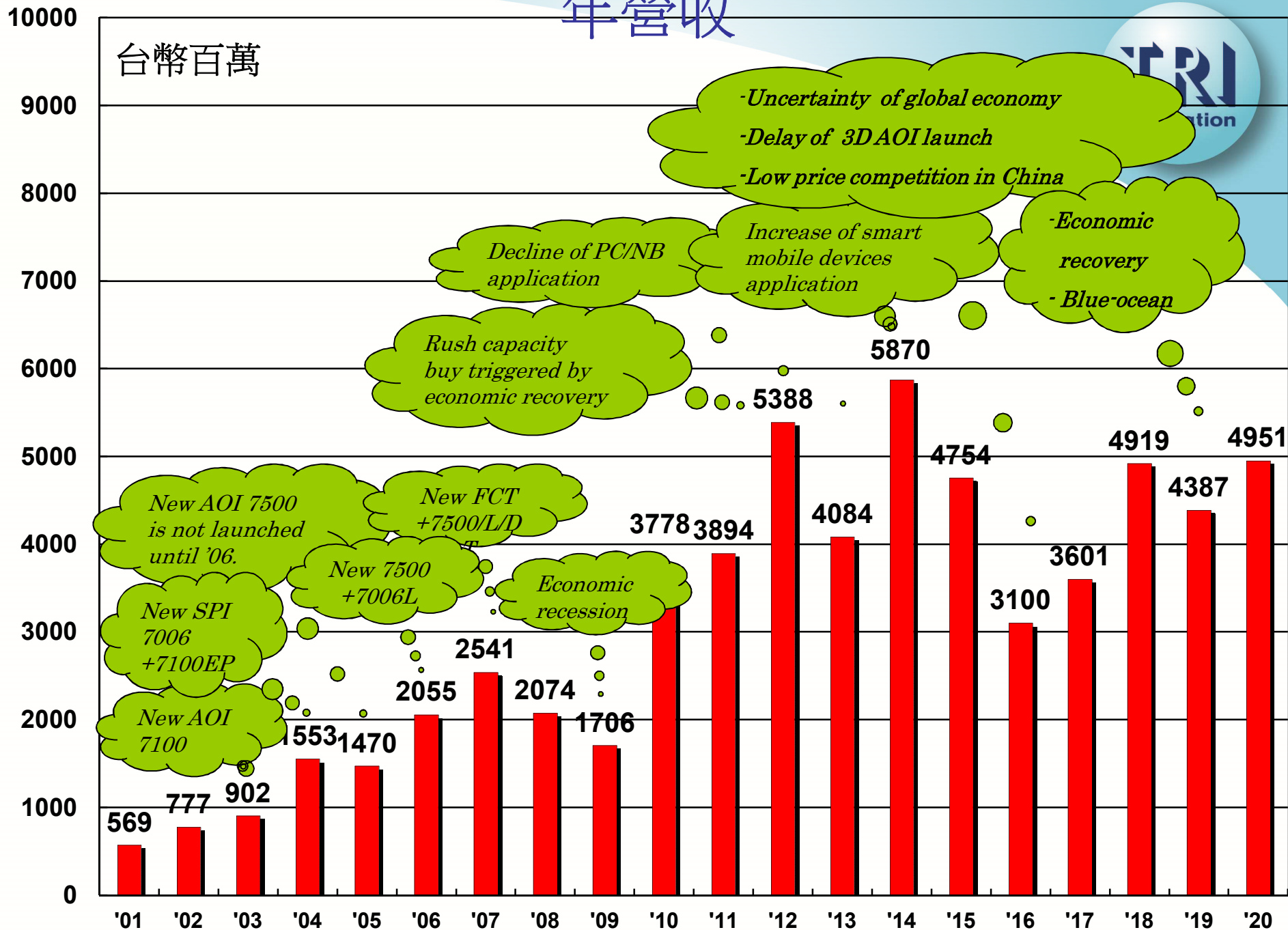


主要競爭對手

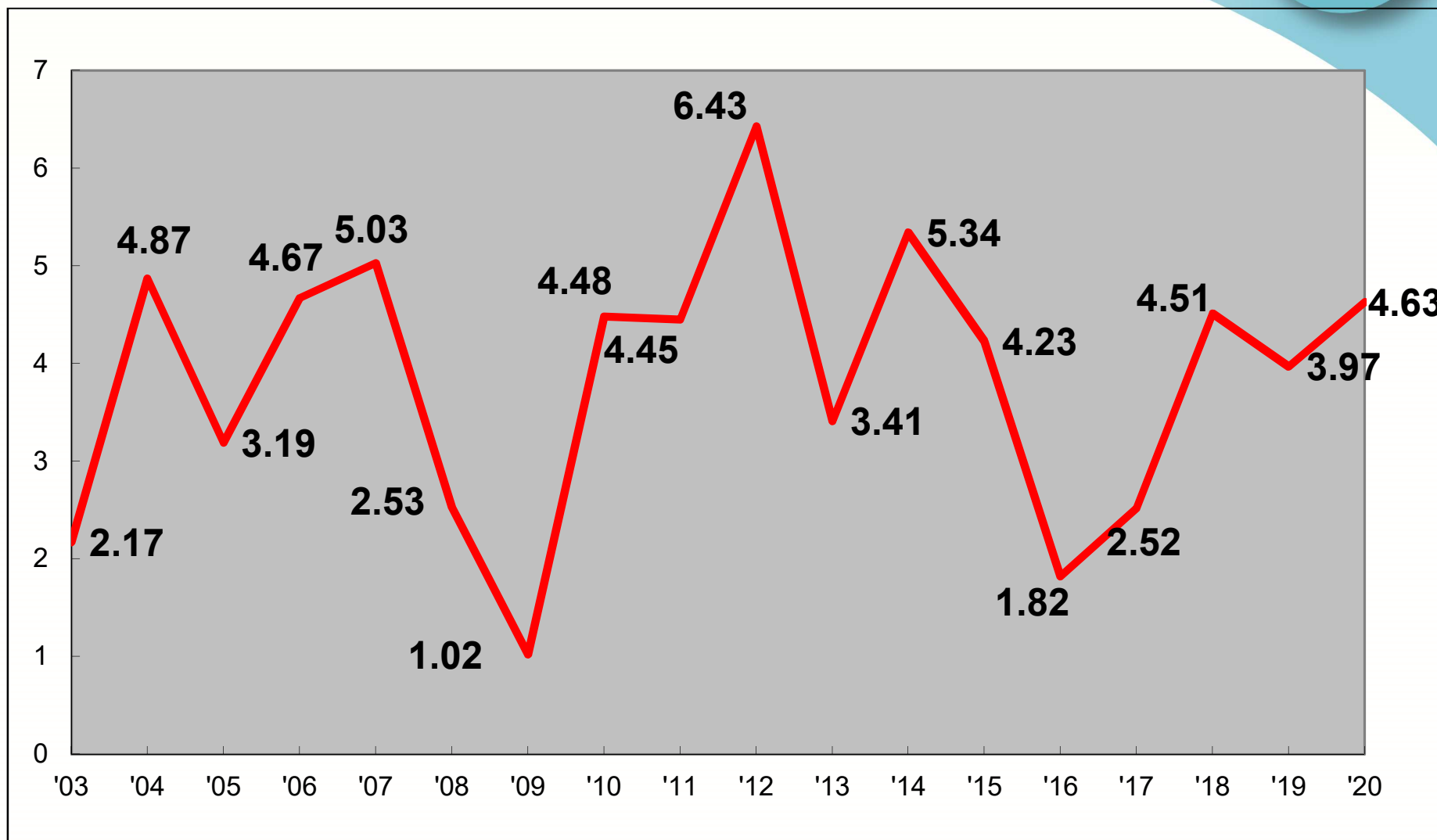


- 韓國: Koh Young
- 日本: Omron
- 中國大陸: Jutze/Sinic-Tek/Holly
- 馬來西亞: Vitrox
- 美國: Keysight/Teradyne
- 德國: Viscom/SPEA

年營收



每股盈餘



紅海與藍海市場營收變化



台幣百萬

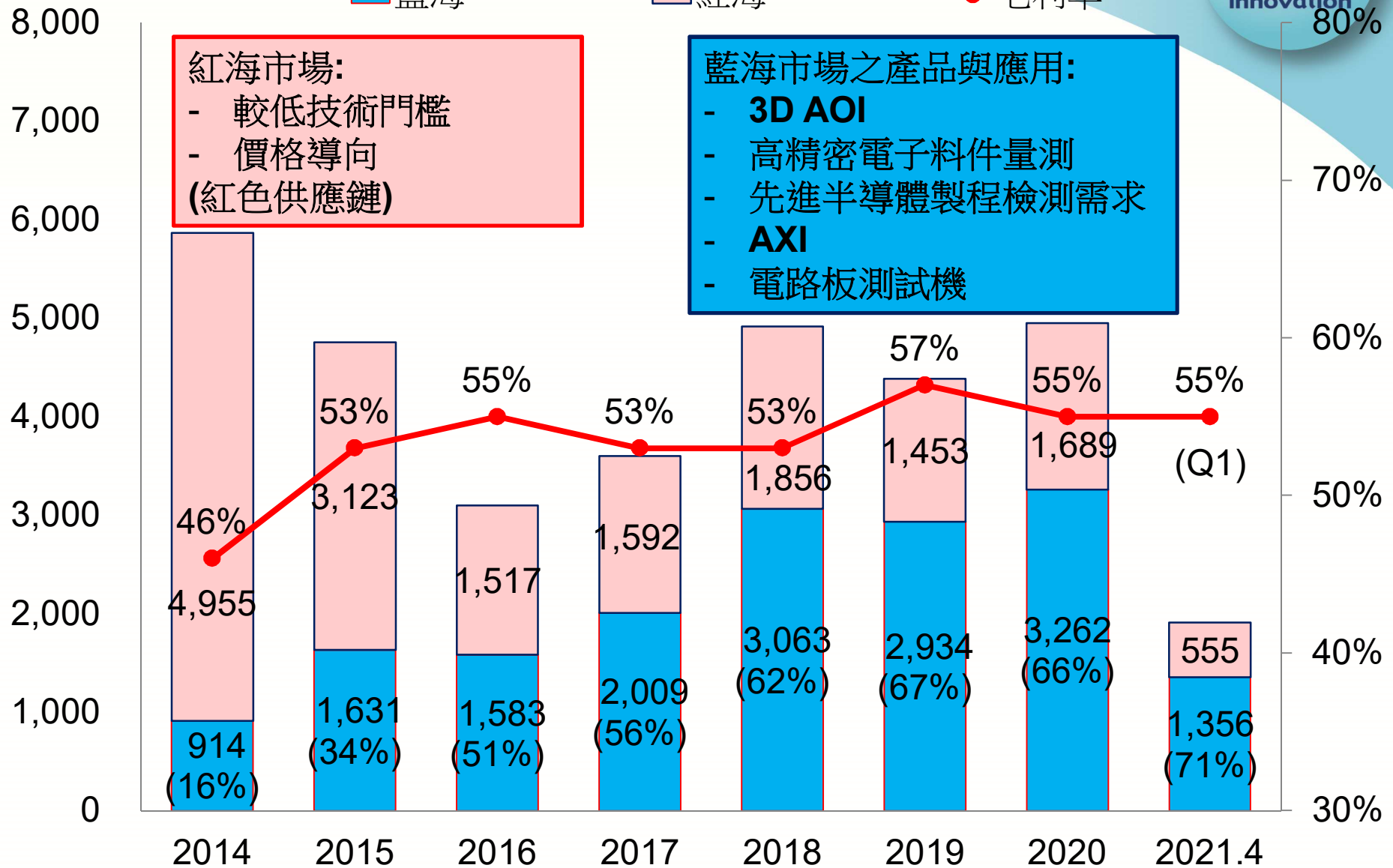
藍海

紅海

毛利率

紅海市場:
- 較低技術門檻
- 價格導向
(紅色供應鏈)

藍海市場之產品與應用:
- 3D AOI
- 高精密電子料件量測
- 先進半導體製程檢測需求
- AXI
- 電路板測試機



TRI 整合完整的解決方案



**multiOptical
Multi-Sensing**

An icon of a red Swiss Army knife with various tools extended, symbolizing multi-sensing capabilities.

**Metrology
AOM**

OMM
OIMM

**2D/3D
AOI & AVI**

A hand pointing to the word 'Defect' written on a chalkboard, illustrating defect detection.

Industry 4.0

Icons representing Industry 4.0: a crane, a car, a robotic arm, and a server tower, with a numbered sequence 1, 2, 3, 4 below them.

Hermes/CFX

SECS/GEM

A diagram showing the SECS/GEM architecture. It includes a 'Manufacturer System' with a 'MES System SECS/GEM Host' and 'Equipment Hardware & Software' with a 'GEM Interface'. An arrow labeled 'protocol' connects the MES System to the GEM Interface.

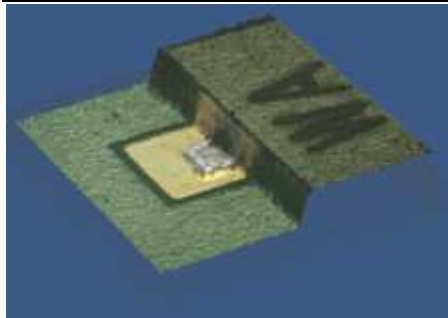
**TRI
AOI**

An icon of a human head profile filled with circuitry and the letters 'AI', with a neural network diagram below it, representing artificial intelligence.

升級 DFF 3D 科技



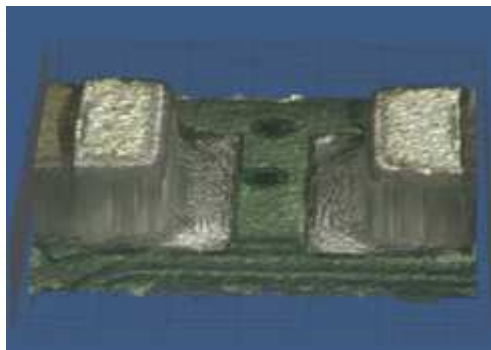
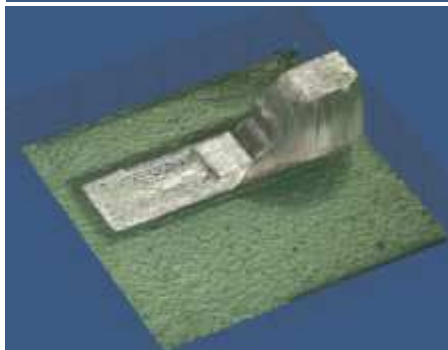
- Optimal **focus** position
- **Clearer** 2D Images
- **Sharper** images
- **Shadow-free** 3D Image



SMT
-Solder joint



Semiconductor
-Wire bond



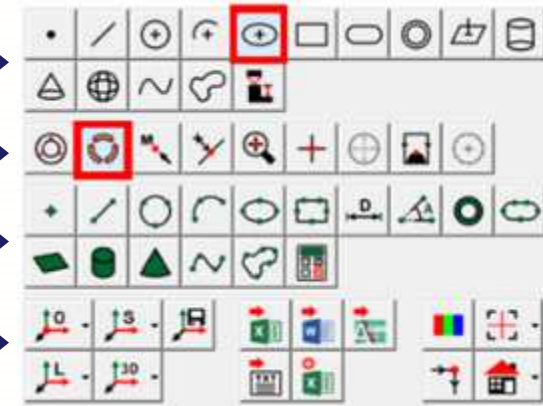
全新TRI量測功能(AOM)



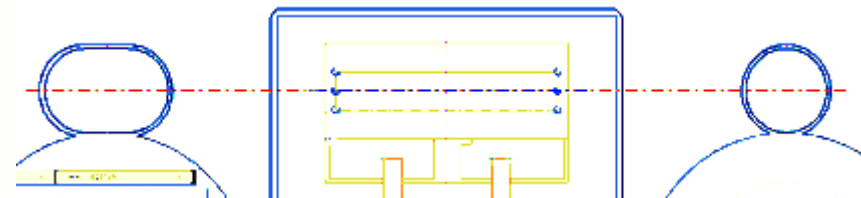
- ❖ UI: New designed and friendly user interface



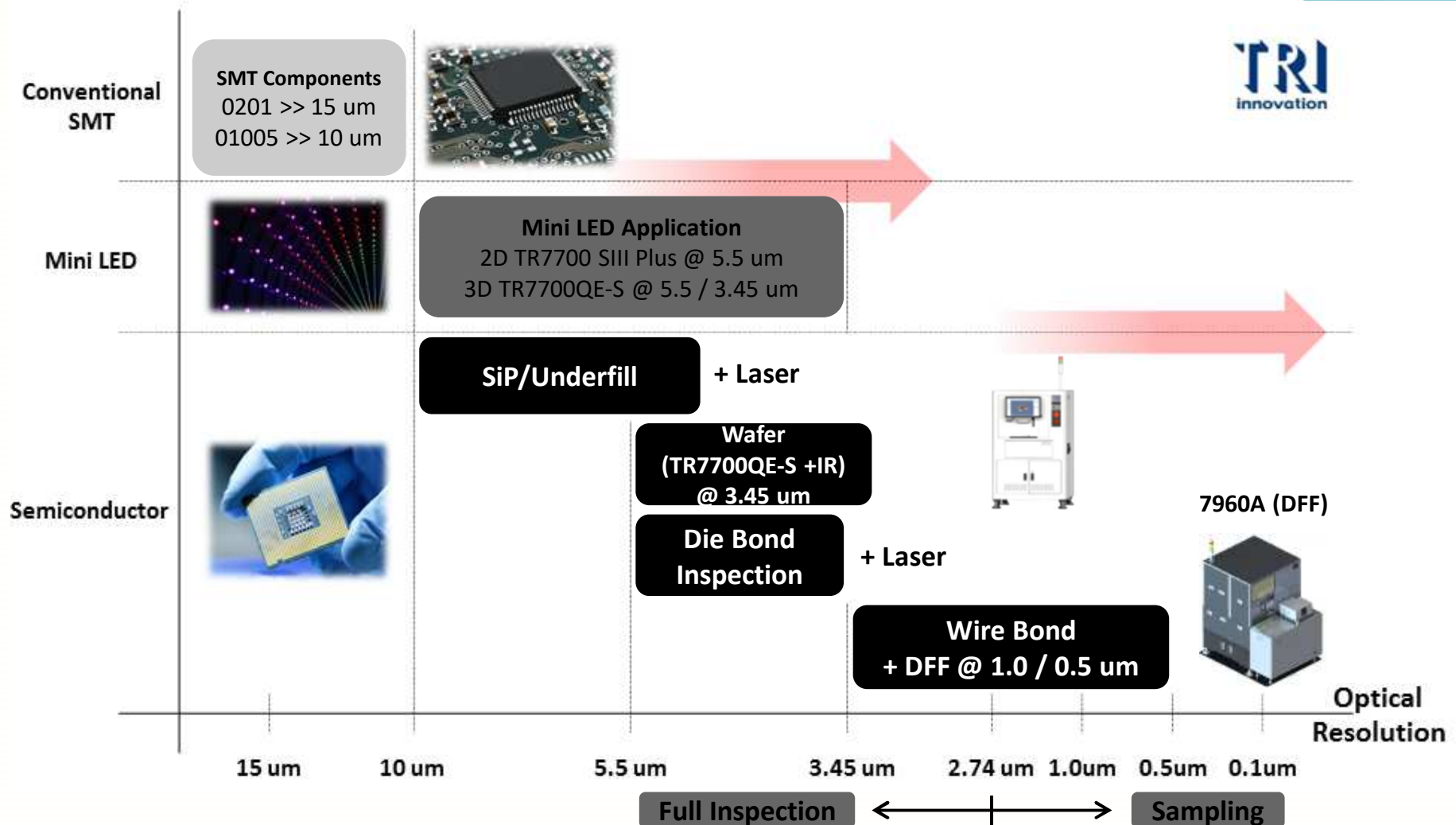
- ❖ Features: More complete measurement functions will be available



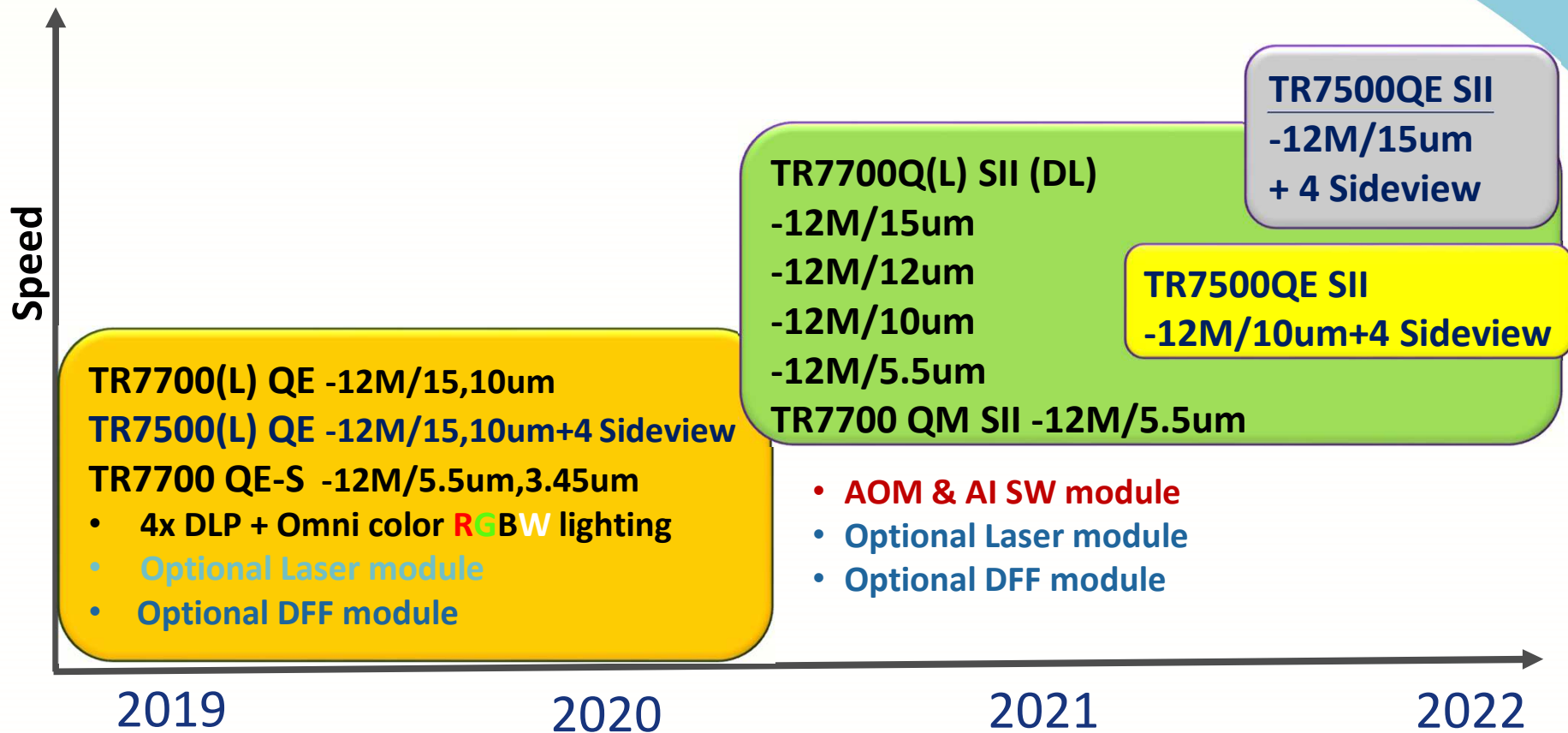
- ❖ High Flexibility: Multi-Layer measurements



TRI 3D AOI Product Roadmap



TRI 3D AOI Product Roadmap



NEW

TR7700Q SII 3D AOI 特點



**Industry-Leading Inspection
Speed up to 57 cm²/sec**



**Ease of Programming with
TRI's Smart Library**



**Multiple 3D Technologies:
Zero-escapes Inspection**



TR7700QE-S 3D AOI 特點



NEW



**Supports 3.45 / 5.5um
Ultra High Resolution**

**Inspection Solutions for
Semiconductor Packaging Level:**

SMD

Bump

Die / Wire Bonding

Underfill



TRI's SPI 最新應用項目



Fast Inspection Speed



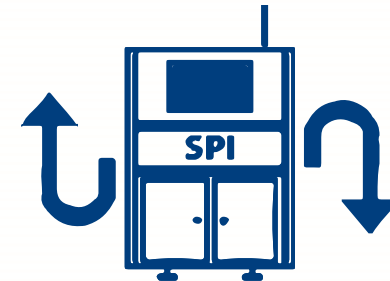
- Large FOV
- CoaXpress Technology
- Dynamic Imaging
- Stop & Go Imaging

Precision Inspection

5.5 μm

- High Resolution
- Shadow Free
- Smart Warpage Technology
- High Inspection Range

Smart Factory



- Closed Loop
- IPC-CFX
- Smart Library
- YMS 4.0

完備的3D在線型 AXI



TR7600 SIII

為TRI新一代具指標性的在線型PCBA檢測解決方案。
TR7600SIII包含可配合生產線速度達到100%檢測覆蓋率的設計，結合了業界最快速的高解析取像速度，並在業界最先進的自動X光檢測中大大提升了影像品質。



TR7600TL SIII

針對大型伺服器、網通應用和大型PCB所設計的高性能、高速3D AXI。



TR7600F3D SII

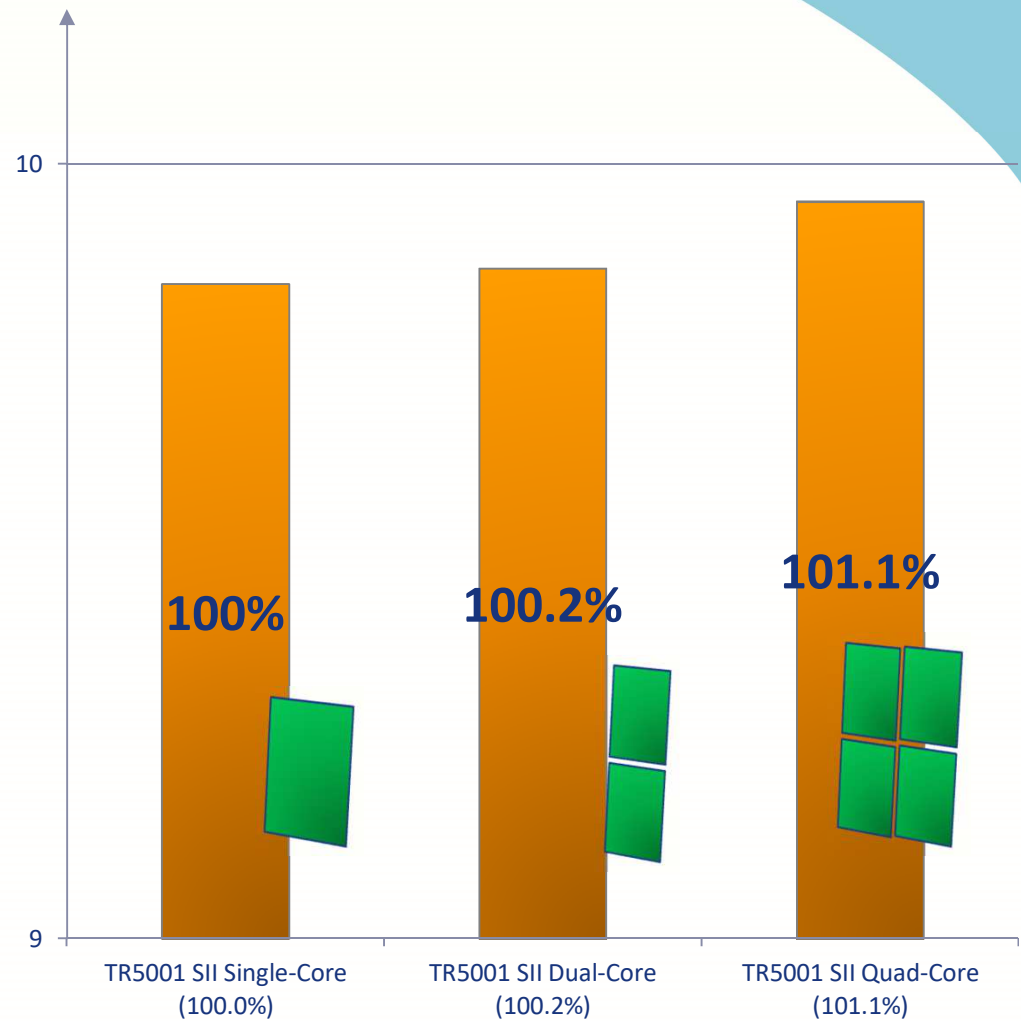
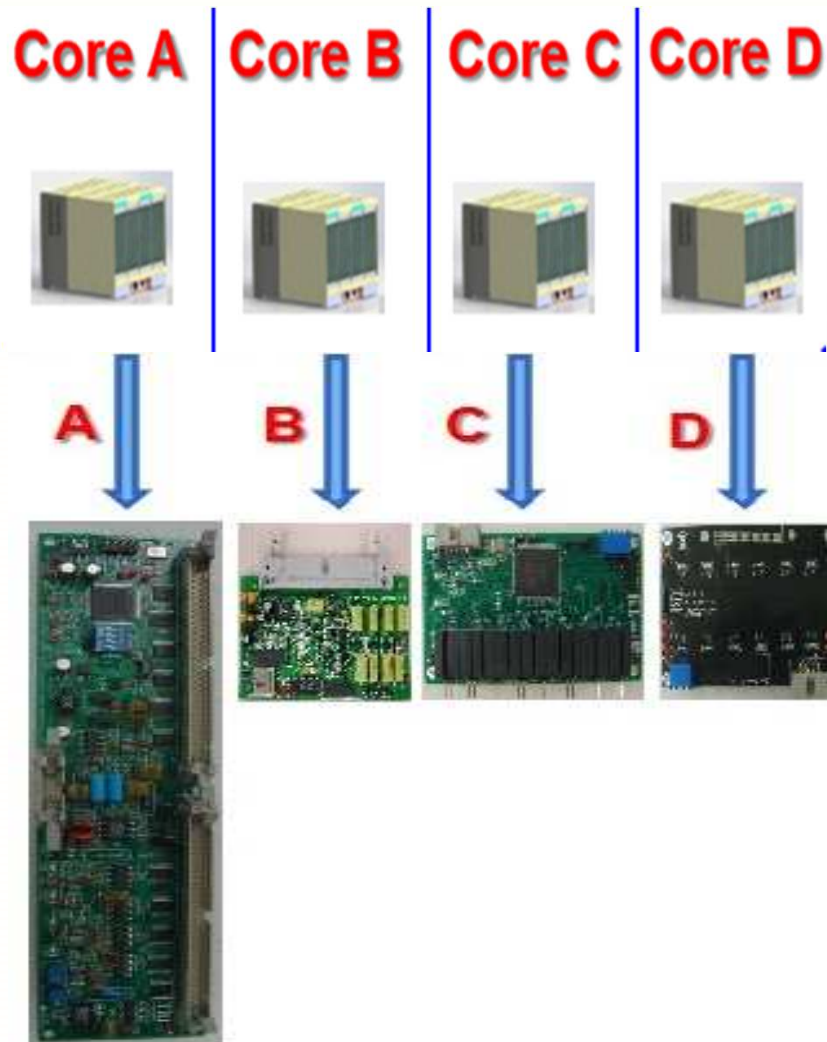
大幅提升檢測速度的高解析度在線型3D AXI，並可應用CT電腦斷層掃描科技，專門用於檢測需要高影像品質的組裝電路板和軟板組件。

電路板測試機-多核心配置



TR5001 SII Quad-code System

單核心與多核心測試時間比較



高密度測試點數ICT TR8100H SII / TR8100HL SII



| Original Model | Test Points. | New SII Model |
|----------------|--------------|---------------|
| TR8100LV | 3584 pins | 7056 pins |
| TR8100LLV | 5632 pins | 11088 pins |



AI 應用優點



Combines traditional Image process data and AI technology

Integrates different TRI models to enhance the production process

Reduces the labor cost of the production line



TRI的AI應用

檢測階段

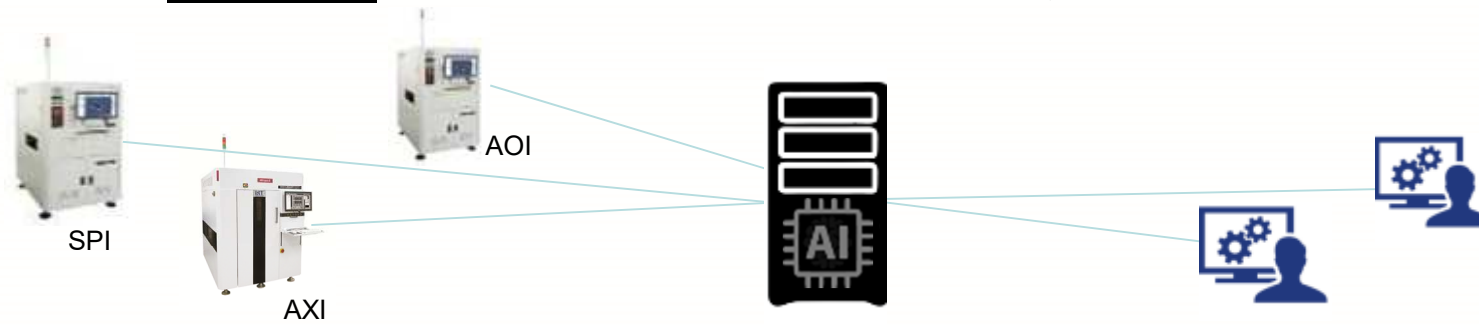
Defect Detection / Character Recognition / Visual Inspection / Measurement assistance

Advantage: Improve Inspection Quality and Reduce False Calls

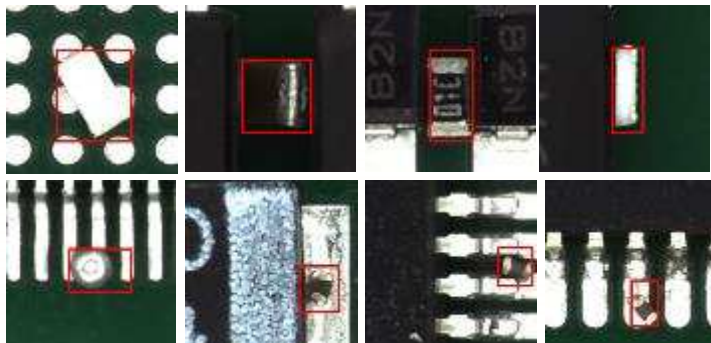
複判階段

Repair Station Defect Classification and Re-Inspection

Advantage: Reduce the workload of manual Re-Inspection



TRI Inspection Solutions



TRI AI Station

| Std-Img | Insp-Img | Gray-Img | Edge | Line | Original Type | Result Type |
|---------|----------|----------|------|------|---------------|---------------|
| | | | | | Missing Parts | Tombstone |
| | | | | | Billboard | Missing Parts |
| | | | | | Billboard | Missing Parts |
| | | | | | Billboard | Billboard |

Repair Station(s)

TRI AI 發展歷程及 Roadmap 規劃



AI Road Map:



❖ Fast development

- ❖ Commercial Library
- ❖ Cooperation

❖ Technical cultivation

- ❖ Open-source Solution
- ❖ Inference/Training Server
- ❖ Faster and more accurate

❖ Unmanned AOI

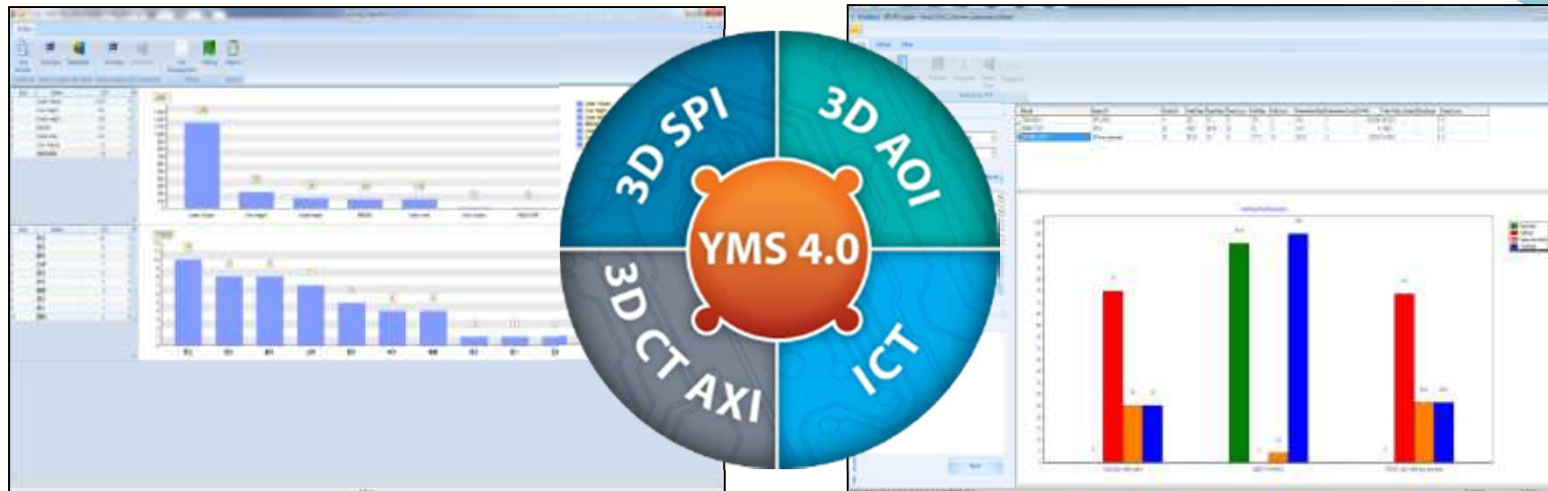
- ❖ Zero escape and false call
- ❖ TRI Standard Spec

AI applications:



TRI YMS 4.0 良率管理系統

協助客戶提升生產力及品質管理



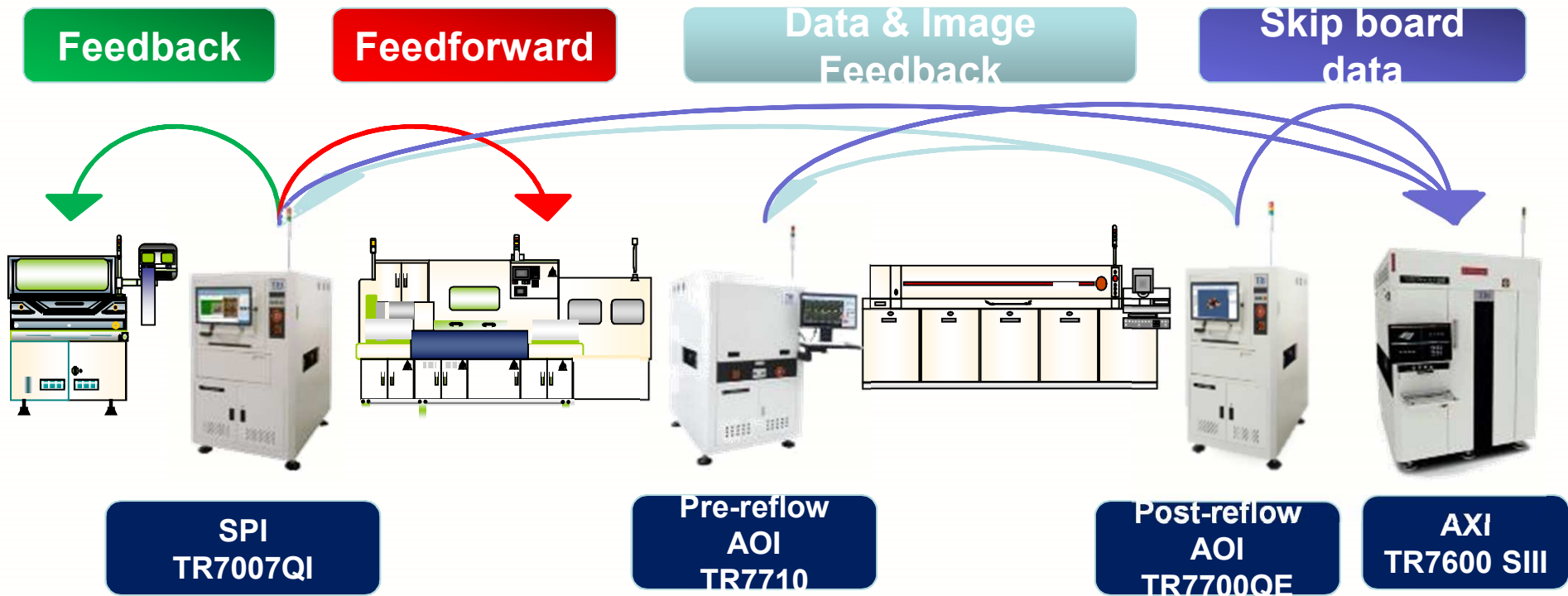
- 實時狀態檢查
- SPC和生產力監控
- 列出排名前10的不良項目和對應圖像
- 依各站別, 線別, 流程找出問題點
- 監控生產問題改善狀況
- PDCA改善循環
- 支持品質優化
- 輸出報告到MES / SFCS

工業4.0解決方案

TRI 支援封閉迴路控制系統



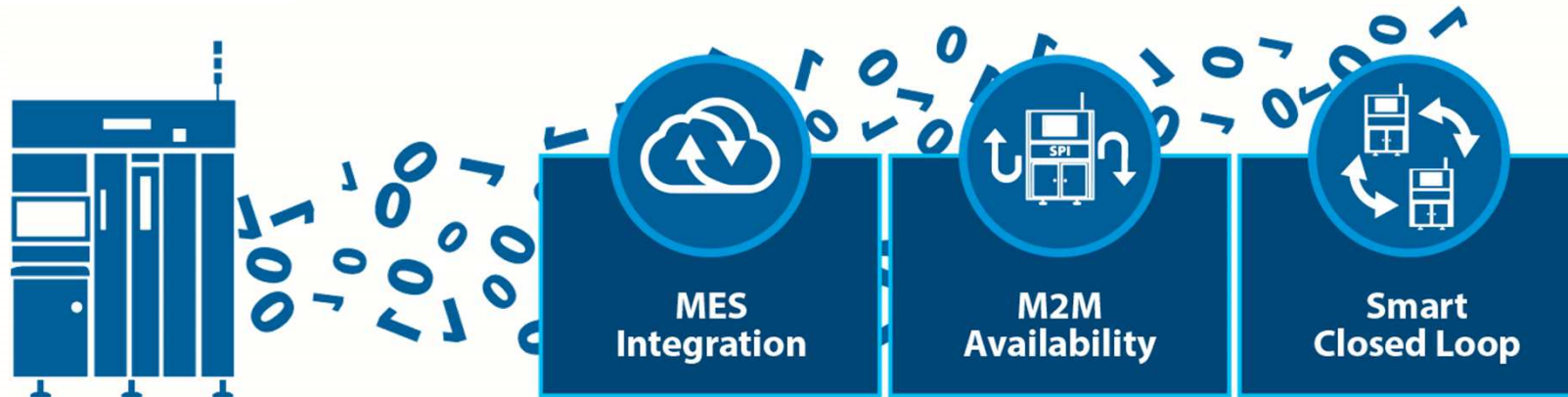
TRI SPI, AOI, AXI 檢測資訊的串流 IPC CFX(data)/HERMES(M2M)



智慧工廠解決方案



Big Data Ready



Smart Monitoring



內部研發團隊



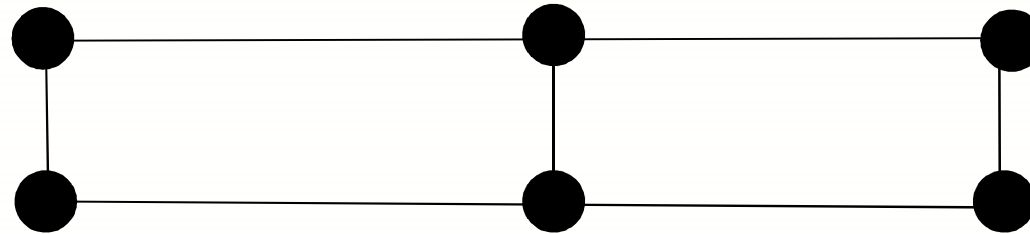
- Optical Dept.
- Mechanical Dept.

- system S/W
YMS, R/S

- PLC control
- Lighting control

光學檢測

電路板測試



200+ 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



- 2016 Global Technology Award
- 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

* 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!

***For more information about
Test Research, Inc.***



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www.tri.com.tw

