

LNC Technology Company Introduction



2021/01

More information, please visit our website:

<https://www.lnc.com.tw/en-us/>



Enable Intelligent Machines



About LNC Technology



Enable Intelligent Machines



Enable intelligent machines

ABOUT

about LNC Technology

Established: 2000

- President: Michael Kou
- HQ: Taichung, Taiwan
- China: LNC Dong Goun
- Manufacturing Center: Precision Machine Industrial Park, Taichung

Company

- Capitality: 10 Million
- Employee: Over 300

Main Product Lines

- CNC Controller
- Wood Working Machine Controller
- Industrial Robot Controller
- Injection Molding Machine Controller
- Automation Equipment Control System
- AI Inspection System
- EtherCAT Servo Motor and Accessories
- LNC SCADA (Cloud Platform)



About-LNC



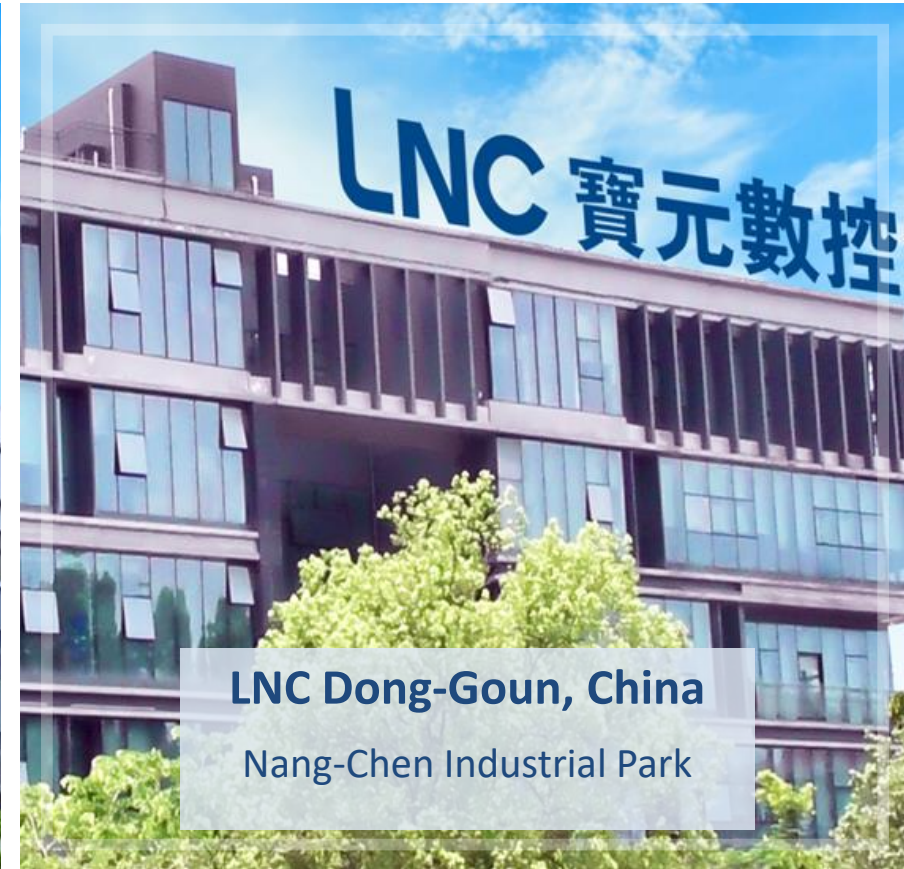
Headquarters

Taichung, Taiwan



Manufacturing Center

Precision Machine Industrial
Park, Taichung



LNC Dong-Goun, China

Nang-Chen Industrial Park

I

Taiwan Headquarters

- Company developing strategy
- R&D of product & technology
- Worldwide sales management
- Marketing campaign planning

II

Manufacturing Center in Taiwan

Precision Machine Industrial Park, Taichung

- Manufacturing and Assembly
- Test and Validation
- Repair and Technical support1

III

China –LNC Dong Guan

- Sales management
- Product training and Co-development
- Technical support and after-service
- Demonstration of full series products center



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Service Network in China

Service Network

Service Office

- | | | | |
|----------------|-----------|--------------|-----------------|
| 1 LNC Dong Gun | 6 Kunshan | 11 Zhengzhou | 16 Changsha |
| 2 Zhong Shan | 7 Nantong | 12 Xi'an | 17 Wuxi |
| 3 Xia Men | 8 Foshan | 13 Suzhou | 18 Shijiazhuang |
| 4 Chong Qing | 9 Qingdao | 14 Hangzhou | |
| 5 Ning Bo | 10 Yuhuan | 15 Wuhan | |

Distributor

- | | | |
|-------------------------|------------------------|--------------------------|
| 1. Beijing Smart | 6. Shanghai Haoxinfeng | 11. Nantong Kontron |
| 2. Beijing Coen Zhonghe | 7. Xiamen Zongfu | 12. Shanghai Migao |
| 3. Jinan I JI | 8. Zhongshan Haoke | 13. Suzhou Bensheng |
| 4. Suzhou Huichuan | 9. Dongguan Pintian | 14. Henan Oshima |
| 5. Shanghai Ercheng | 10. Dongguan Shiquan | 15. Qingdao Longshengxin |



Service Network -Worldwide



companyt : MARKET Elektrik otomasyon San. Ve Dis Tic. A.S.
TEL : + 90-212 674 80 60
ADD : Abdi Ipekci Caddesi No: 129/5 34040 Bayrampasa – ISTANBUL / TURKEY



Company : SEAGULL TEC
TEL : + 91-9960416427
ADD : Unit No.205, Second Floor, Richa Trade Centre, Waliv Phata,
Sativali Road, Landmark - Vasai East. Maharashtra, India. Pin - 401208.



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2.

Product and Professions



Experienced and Profession R&D Team



PM Team

- Product Development and management
- Product Life cycle management
- Market/Trend analysis
- Technical support and consulting



Software Team

- Core software functions developing
- Software version maintenance
- Technical Support



Hardware Team

- ID design
- Thermal design
- PCB layout/System assembly
- Validation verification/Test



LNC Product Divisions



1. Milling machine

- Milling machine
- Central machine
- Drilling and tapping machine
- Engraving and milling machine
- High light machine
- polisher
- Double-head milling
- Shoe body polishing machine
- Metal dental carving machine
- Glass Edger
- Stone processing machine
- laser cutter
- Aluminum profile processing machine
- Five-axis industrial machinery special machine



2. Turning machine

- Standard lathe
- Turning and milling
- Double system lathe
- Double feedback lathe
- Gear Hobbing Machine



3. Gantry Robot

- Lathe robot
- Injection robot
- Punch Robot
- Automated robot
- Robot Integration Service



4. Articulated Robot

- Polishing robot
- Spraying robot
- Welding robots
- Handling robot
- APAC Industrial Machinery
- Waterjet cutting machine
- Mirror milling



5. Injection Molding machine

- Hydraulic vertical machine
- Hydraulic horizontal machine
- Special hydraulic machine
- Vertical full motor
- Horizontal full motor
- Grooving machine



6. AI and Vision system



7. Industry 4.0 system

- IFC controller
- LNC SCADA
- Smart Sensor
- 3D sensor



8. APAC WIN



9. Woodworking machine

- Solid wood machine
- Cutting machine
- Tongue and groove machine
- Banding Machine
- Six-sided drill
- Acrylic Processing Machine



10. Grinding machine

- Grinding machine
- Reverse engineering machinery
- Glass cutting machine
- Deep hole processing machine



11. Bending machine

- Spring machine
- Winding machine
- Bender
- Bending machine



12. Shoe machine

- Sewing machine
- Cutting machine



13. Laser processing

- Laser cutting machine



14. LNC Home



15. WIL intelligent furniture production line



16. Medical Equipment

- Mask machine



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EtherCAT Product Family

Ether**CAT**®



Ether**CAT**®

EtherServo

- LNC Brand Servo motor and Drive
- Co-op with Japanese manufacturer, high quality and reliability
- Scalable performance



Ether**CAT**®

EtherPower

- LNC Brand Invertor
- Co-op with Japanese manufacturer, high quality and reliability
- Scalable performance



Ether**CAT**®

EtherIO

- Stackable Design
- AI(max. 64), AO(max.32), DI/DO (max128)
- 1 power module supports 8 slaves (max.)



Ether**CAT**®

EtherCAT TC

- EtherCAT thermal control
- Real-time temperature monitoring



Ether**CAT**®

EtherSensor

- EtherCAT Intelligent sensor
- Vibration and thermal sensors are ready
- Intelligent function developing and machine status monitoring



Strength of LNC CNC Controller



Capability of development

Providing developing tools of **PLC, Macro and HMI** for further development



Flexibility of integration and expansion

EtherCAT Protocol for highly external expansion flexibility; ability of accessories control and integration.



CNC Motion control kernel

Improving the precision, and multi-axis control with adopting real-time OS, acceleration-deceleration control and multiple compensation technologies.



Synthesis of Multi-Axis control

Multi-Axis control technology to optimize programming and processing efficiency.



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Dual-path Control System

Solution

01.

LNC Lathe Controller+ LNC Robot Controller

02.

LNC Lathe controller with Robot control (Dual-path controller)



R6800 robot controller



T688D Lathe Controller

案例一



東台精機股份有限公司
Tongtai Machine & Tool Co., Ltd.

Customer: TongTai Machine (TW)
Controller: T688D Lathe controller+R6800 Robot controller

案例二



Customer : Xi Chuan (China)
Controller : T5800D Lathe controller with Robot control (Dual-path controller)



T5800D Lathe Controller





Customers in Show



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Robot controller: Gantry type and Multi-Joint type



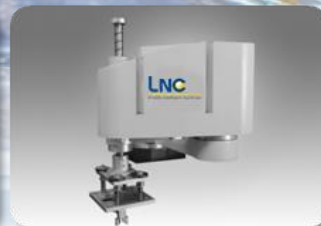
R6800

Gantry robot
controller



R8800

Multi-joint robot
controller



- Protocol : MII, RTECH, EtherCAT
- All in One design; Full IP65 protection; 1.2M dropping test
- Hand-wheel for convenient adjustment and operation
- Built-in various working art for different application

- Dedicated functions for various application (Gantry robot): Turning machine, injection molding machine, punching machine and automation
- Dedicated functions for various application (Multi-joint): Pick-and place, Soldering/welding, Polishing/grinding, Spraying



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Wide range of Applications



LNC robot controllers are widely applied for various applications and bring customers exception performance, stable quality and user friendly operation.



Polishing/Grinding

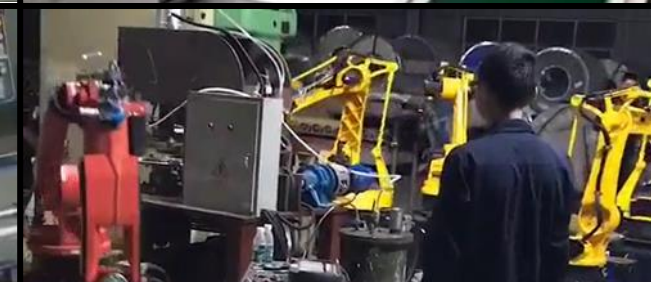
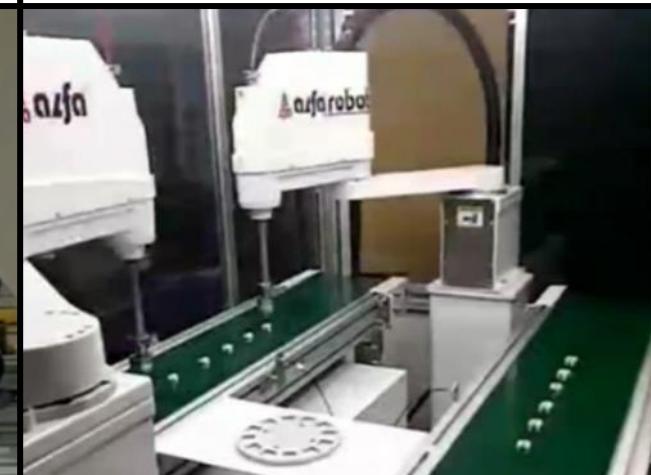
Soldering/Welding



Palletizer/
Material handling

Spraying/
dispensing



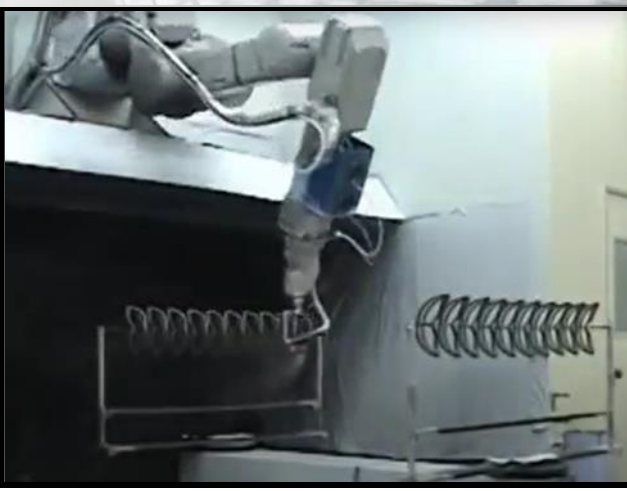


Robots for **M**ovement & **H**andling



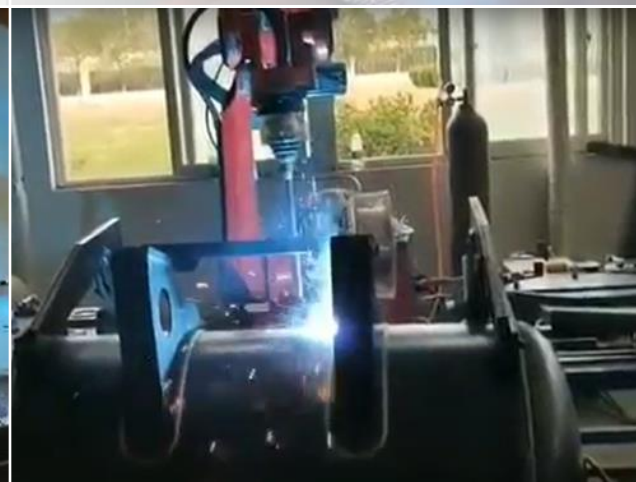


Robots for **S**praying & **C**oating





Robots for **W**elding & **S**oldering





Robots for **V**arious **A**pplications





Injection molding machine controller



IN2000



IN5800



IN6800



IN7800



ELC-6100

- Temperature module
ADC7510
- I/O expansion
DIO1216
- Communication IO
SIOA1700



ETS IO Expansion ELC-6200D3

- TC Module
- AD/DA Module
- DI/DO Module
- Robot Module
(Support Euromap67)



APAC Second Developing platform for Automation



Multi-axis motion Kernel

1. Look ahead
2. Acceleration-Deceleration control
3. Arc and corner speed control
4. Tolerance control



Single axis control

1. Various methods of back home
2. Jogging
3. Positioning



Electronics setting

1. Gear ratio, command format
2. IO convert chart
3. Axis control convert chart



Path control

1. Dynamic adjustment
2. MPG dry-run
3. Position check





APAC-AOI Equipment

Key to Win

Higher trigger frequency

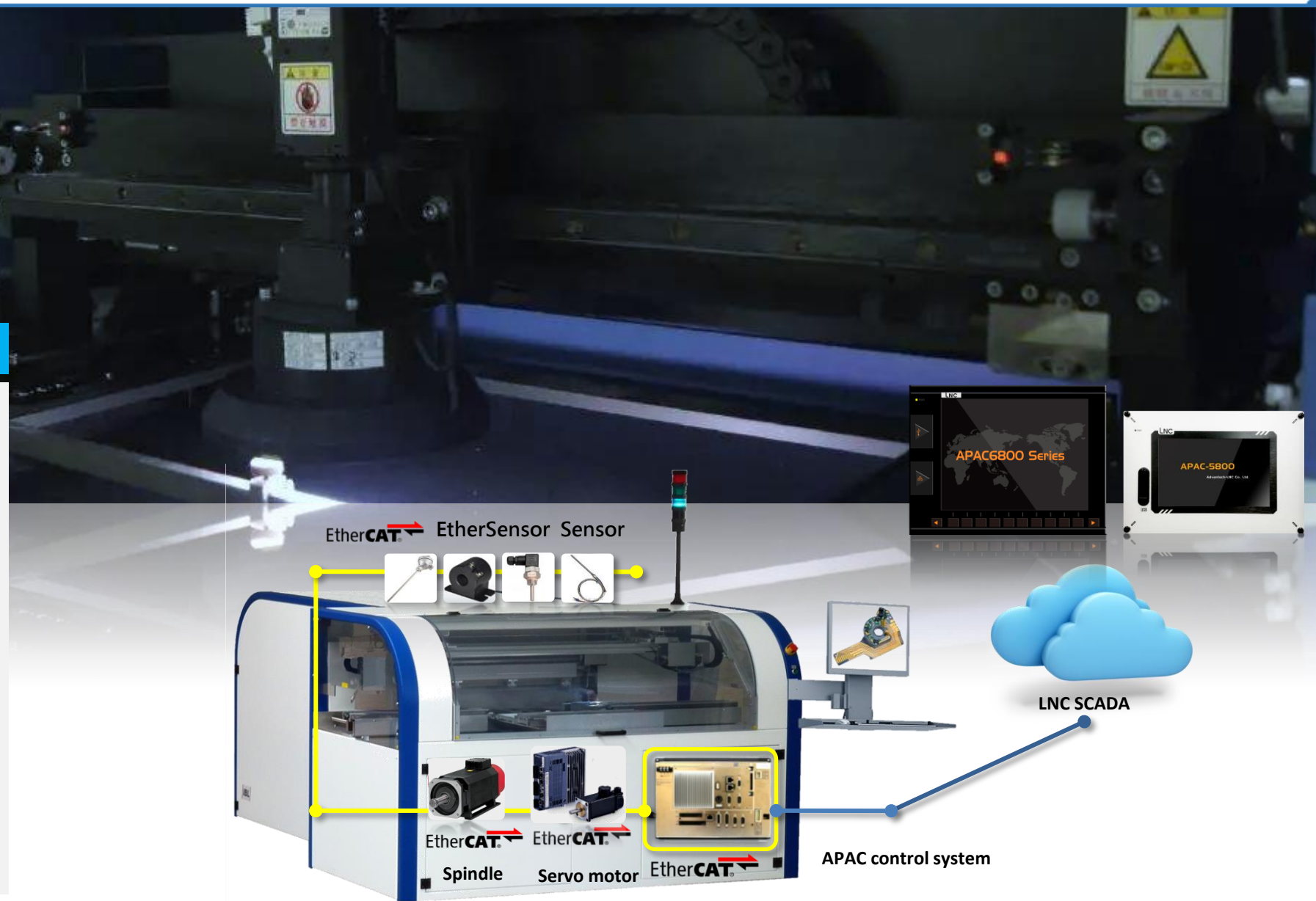
- Customer Required: 100KHz
- LNC Achieved: 500 KHz

Various methods of positioning

- Customer Required: easy way to path planning
- LNC Achieved: Providing 3 ways: Isometric, software trigger, Points upon requests

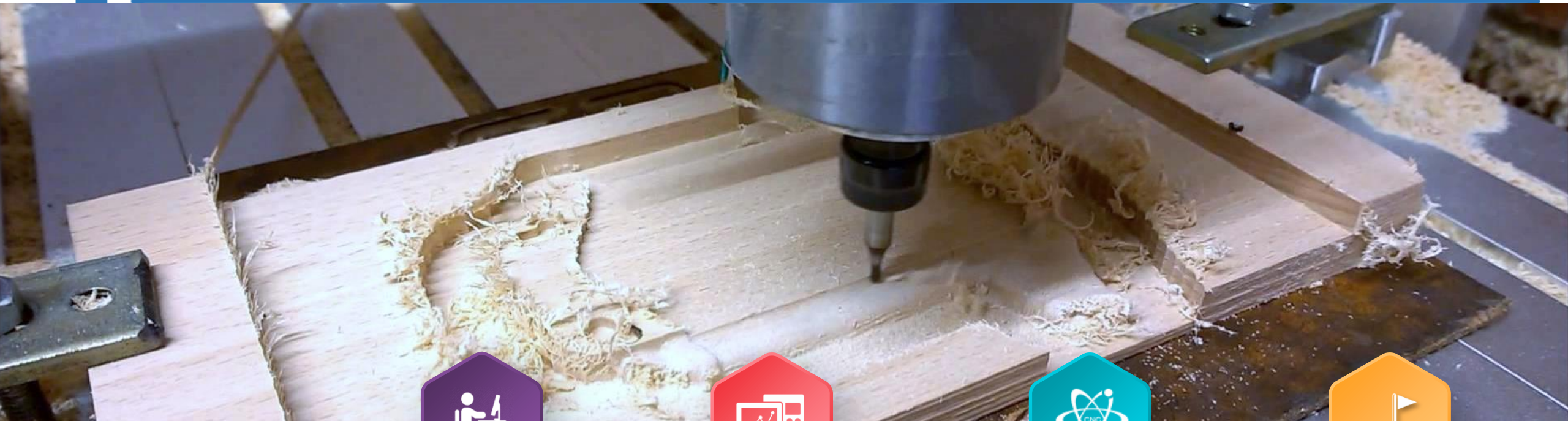
Developing tools

- LNC provides developing tools of PLC, Macro and HMI for more function development.





Woodworking Machine Controller



Easy maintenance

- One key back-up
- IO setting by demands



Smart system

Auto scheduling and forecasting for improving processing efficiency and reducing processing time.



Highly customization

Provide developing tool of PLC, Macro and HMI. Customization service is available by requests



Multiple protocol

- Pulse type
- Digital protocol: MII/RTEX/EtherCAT





Smart Machine Box-IFC Series



EtherSensor

EtherCAT Intelligent Sensor: vibration, temperature, force/pressure...



Industrial Robot

Control gantry/SCARA/Delta/6-joint robot through IFC6900



EtherCAT PLC module

Connect EtherCAT PLC module for external accessories control if necessary



EtherCAT I/O module

Support DI/DO/AD/DA IO module for peripherals connection



CCD vision system

Connect vision system thru EtherCAT protocol for positioning, appearance analysis...etc.



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4

Successful Case-Campro Machinery

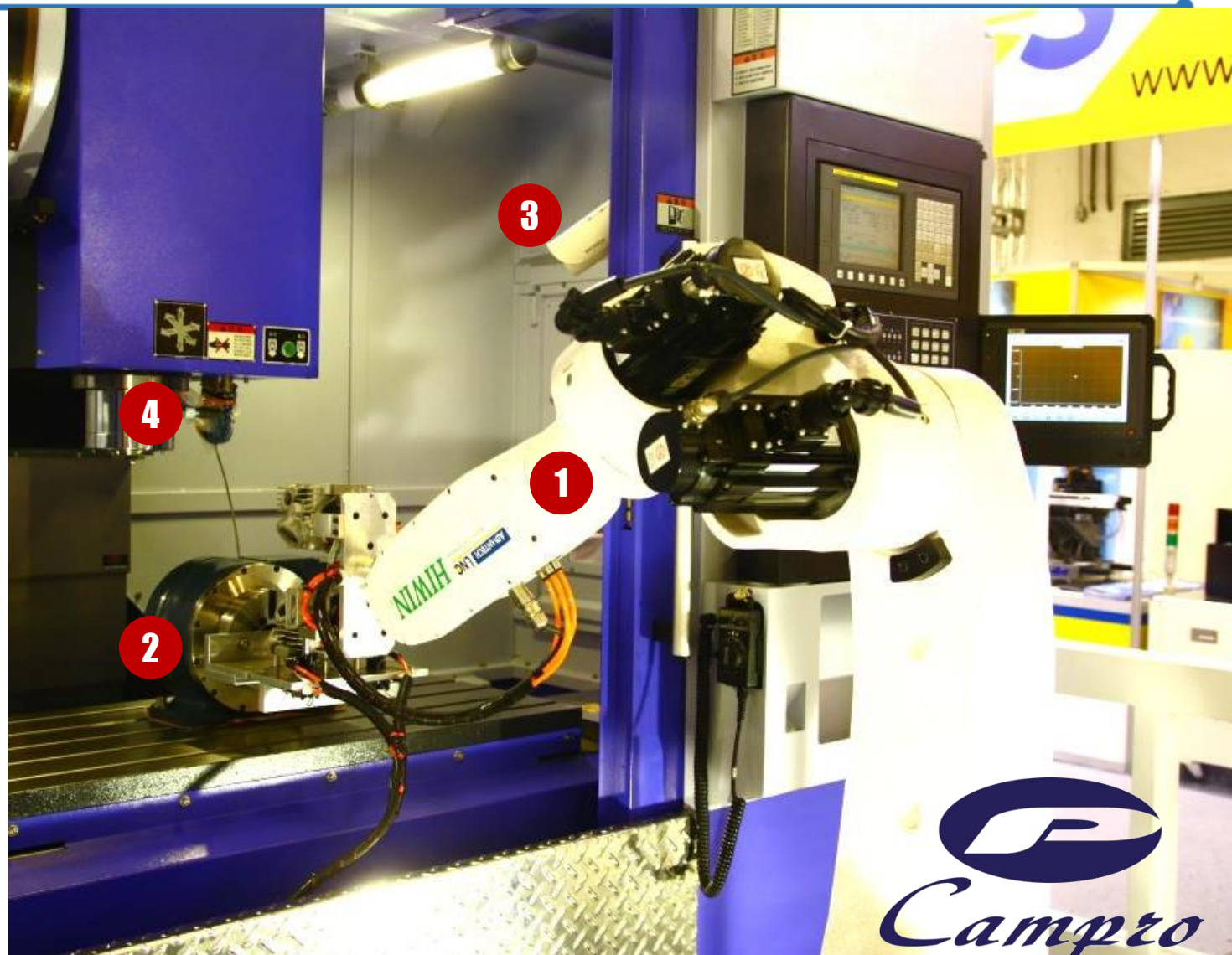
Customer, Campro Machinery integrates robot, rotary table, IP camera and vibration sensor on milling machine with LNC IFC6900 in ONE Week!

1 6-Axis Robot 
Integrate control of 6-joint robot to do the pick-place with IFC6900: auto-material-loading/unloading

2 Rotary Table (4th Axis Control) 
IFC6900 offers additional axis control, ex: rotary table (4th axis max. 32 axes) with LNC brand servo motor, EtherServo to provide customers the most cost-effective axis control solution.

3 IP Camera 
IP camera is installed on machines for remote monitoring and generate trigger signal to take photos by IFC6900 when necessary.

4 Vibration Detection for Spindle Protection 
Vibration sensor to detect vibration status. IFC6900 will stop milling machine immediately once abnormal vibration signal is detected to protect spindle.




Campro

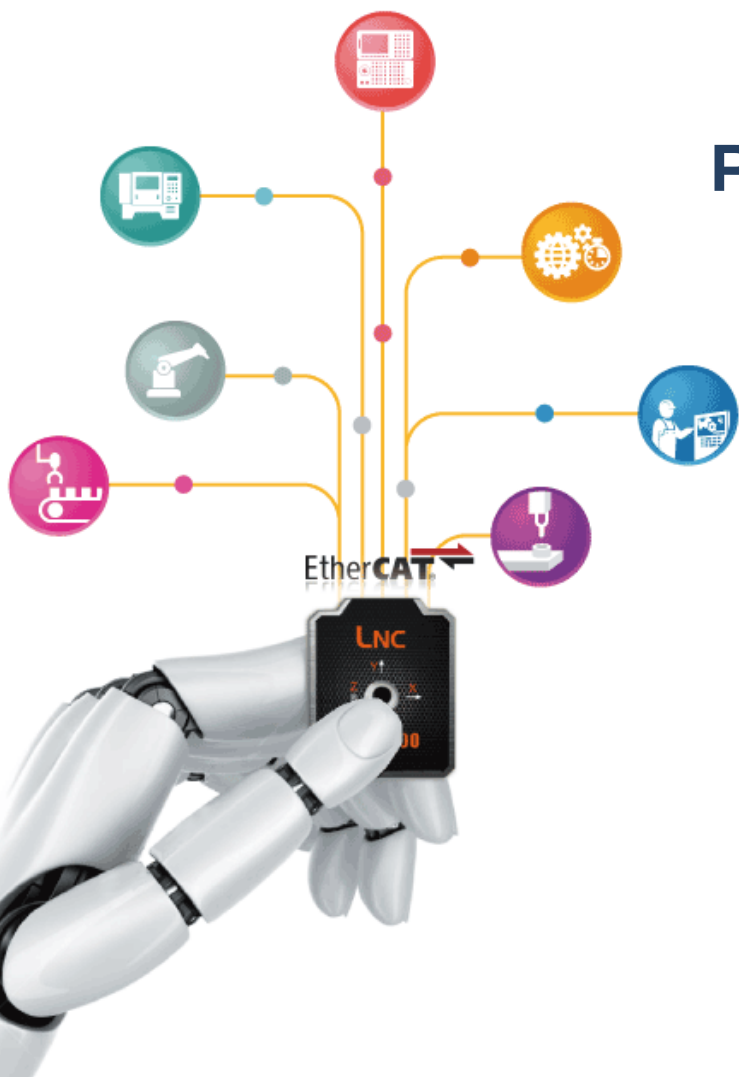
LNC

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Intelligent Sensor-SVI1000

The Best Cost-effective Vibration Sensor in Precision Machinery Industry: SVI-1000/SVI-2000



Applications

- Various Machine Tools
- Industrial Robots
- Automation Equipment
- Optimized Machine Tunings
- Measuring Vibration during Cutting
- Equipment Diagnosis

Software Function

- Time Domain Graph
- Frequency Domain Graph
- Vibration Analysis for the Machining Program

SPEC.

- Max. Acceleration: ± 16 G
- Impact Resistance Acceleration: 10,000 G
- Sampling Frequency: 1660 Hz
- Measurement Bandwidth: 830 Hz
- Operating Temperature Range: -10 to +75°
- Three-axis (X, Y, and Z) Vibration Detection

4

Application of Smart Sensor-Abnormal Vibration Detection



Abnormal Vibration detection

The LNC smart vibration sensors is a very useful device to protect machines from abnormal processing or Incorrect operation by detecting unusual vibration and send out single to the controller to stop machine immediately.

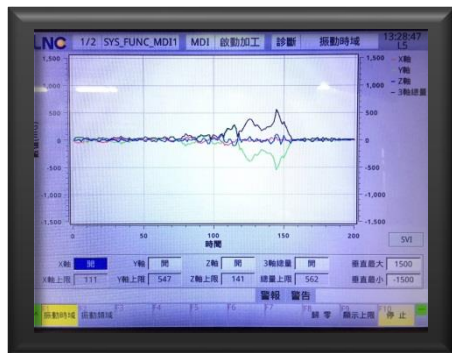


LNC Vibration sensor – Abnormal vibration detection function

Normal: When processing is normal, everything is ok



A machine equipped with vibration sensors



Real-time monitoring the vibration signal of machines

Machines without sensors



When abnormal processing occurs and machine is not equipped with vibration sensors~



The processing won't stop until the motors are overload

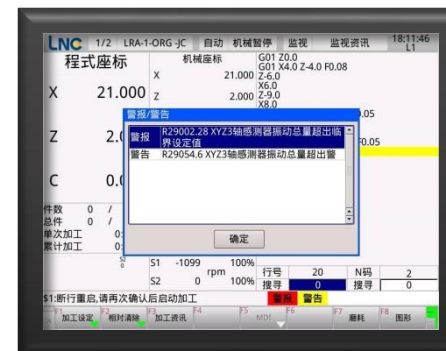


The blade is damaged; even worse: so is the machine

Abnormal: The sensor sends out a signal to the controller to stop the machine once the abnormal vibration is detected.



Abnormal processing occurs



Vibration sensor sends signal to the controller to trigger an emergency stop



Slightly damaged, avoid sever damages, lost and risk



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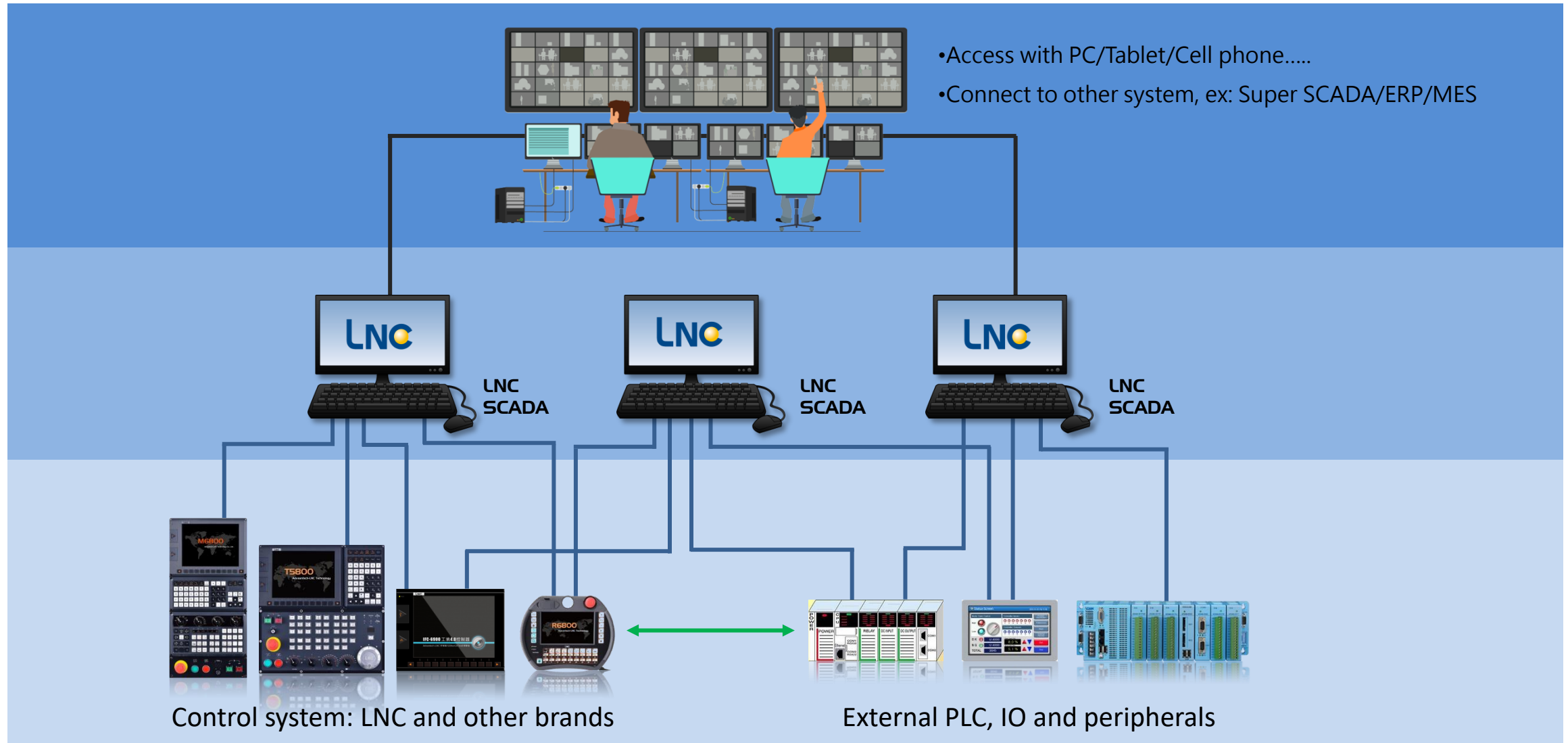


Customers Using LNC SMB & Sensors



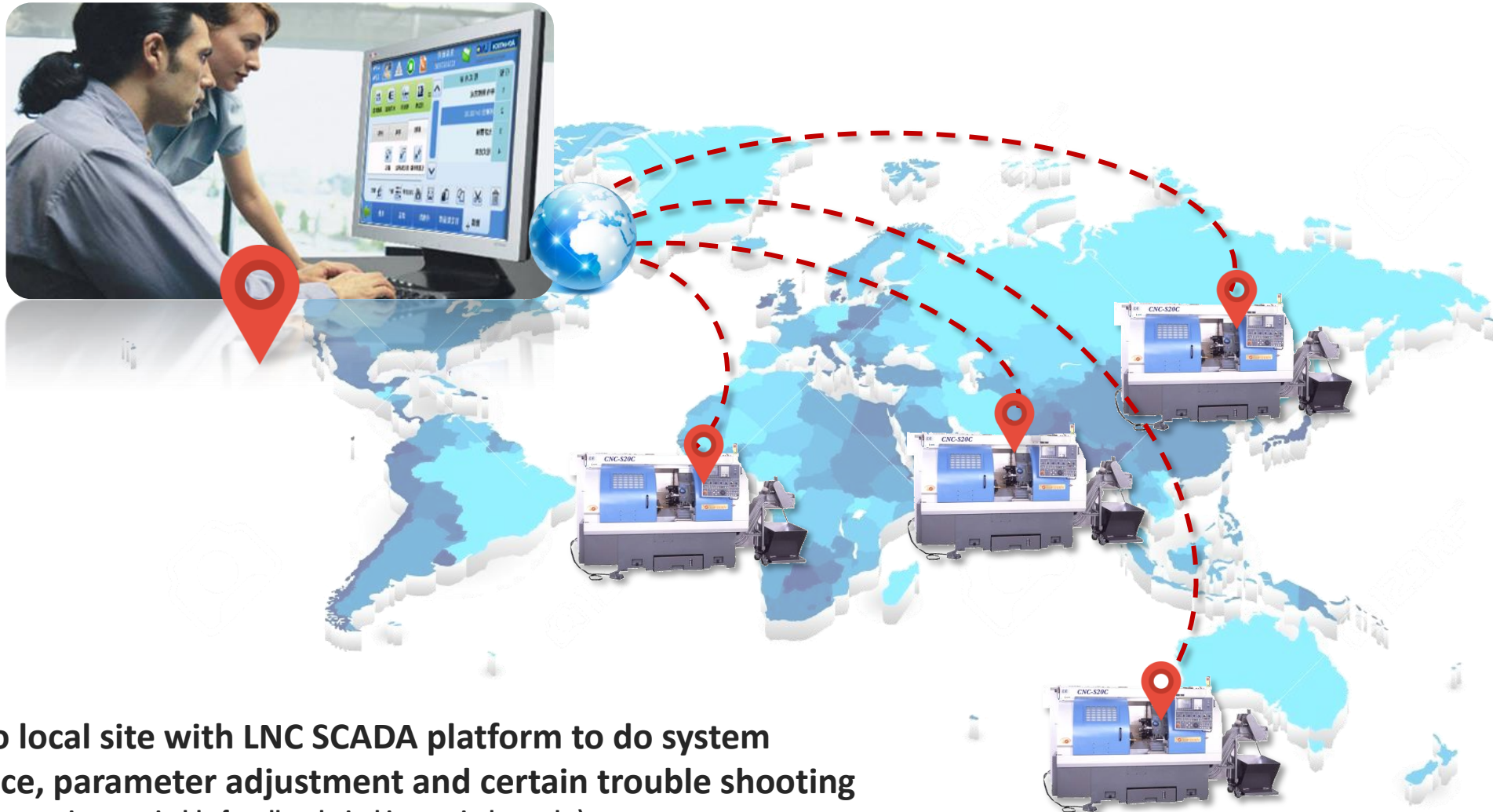


LNC SCADA





Remote monitoring and maintenance



Accesses to local site with LNC SCADA platform to do system maintenance, parameter adjustment and certain trouble shooting
(remote maintenance is not suitable for all technical issues, it depends.)



SCADA Case-1



Customer: Plastic Product Manufacturing Factory

Successful case 1

FLYCO 飞科 注塑智能车间生产动态 2019/07/01 15:43:33

总览		产量		警报		设定		报表	
设备名称	设备编号	设备状态	产品名称	计划产量	实际产量	完成率	设备名称	设备编号	设备状态
BT80V-III	001	运行	310-2QK	3080	440	14.3%	BT80V-III	061	运行
BS80-III	002	运行	312-C2F...	4214	602	14.3%	BS80-III	062	运行
BS120-III	003	运行	371-3DJ	6139	877	14.3%	BS120-III	063	运行
MA1200...	004	关机	310-6QK	966	483	50.0%	MA1200...	064	运行
MA900 L...	005	运行	371-1DJ	4431	633	14.3%	MA900 L...	065	运行
BS150-III	006	运行	999-1QK	2744	686	25.0%	BS150-III	066	运行
BT80V-III	121	运行	310-2QK	488	122	25.0%	BT80V-III	181	运行
BS80-III	122	运行	312-C2F...	30	3	10.0%	BS80-III	182	运行
BS120-III	123	运行	371-3DJ	480	80	16.7%	BS120-III	183	运行
MA1200...	124	运行	310-6QK	1089	363	33.3%	MA1200...	184	运行
MA900 L...	125	运行	371-1DJ	1420	355	25.0%	MA900 L...	185	运行
BS150-III	126	运行	999-1QK	1968	328	16.7%	BS150-III	186	运行



- Control Center (Shown as upper picture)
- Monitoring center in each working station (Picture in right)



- Grab the production information through LNC Gantry robot controllers
- 216 machines in each plant



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SCADA Case-2



Customer: traditional manufacturing company

- Challenge 1: Requirement of connection of many types of machines : lathes, machining centers, grinders, semi-manual machines...a single factory area owns more than **180** machines
- Challenge 2: Integrate multinational factories through the customer's private cloud, including factories in different regions such as Taiwan, Suzhou, Vietnam, and Thailand

机台行军图

稼动率

时间

机台状态

时间

比例 分钟

生产占比	69	125
人为停机占比	8	15
机台停机占比	0	0
调机占比	0	0
超时产出占比	0	0
闲置占比	22	41
故障占比	0	0
超时调机占比	0	0



Case I

- **Industry:** Injection molding
- **Product:** Badminton
- **Mission:** Defection inspection of badminton



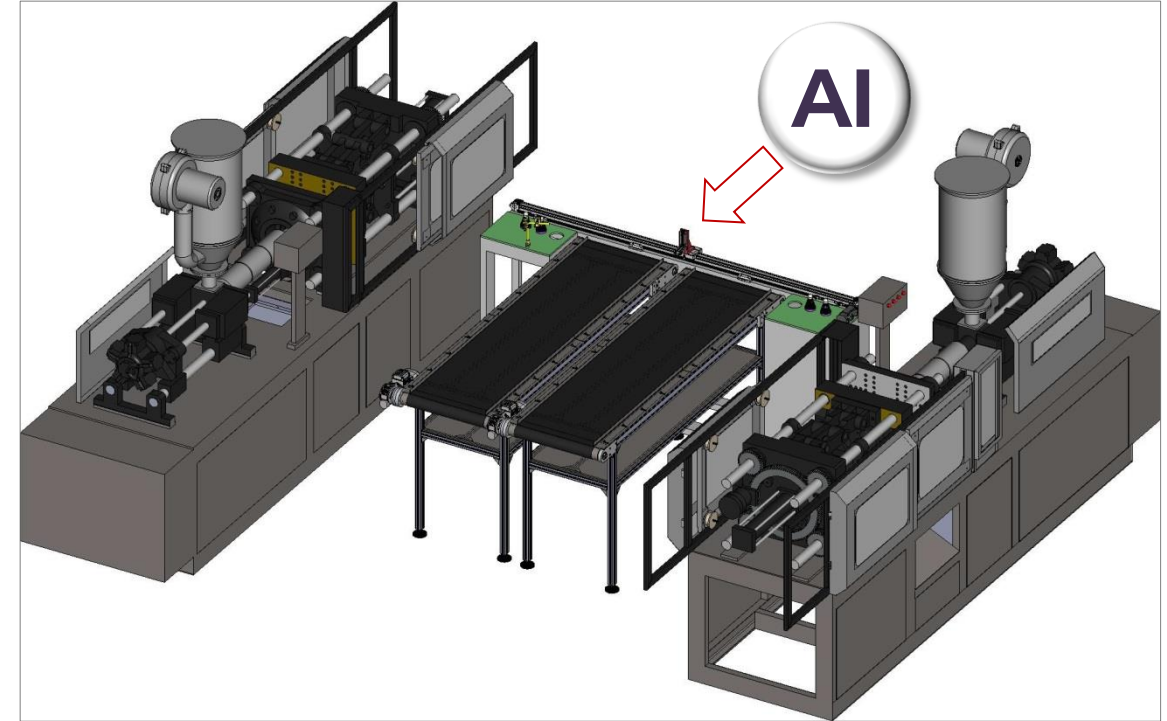
Defection Inspection-Badminton

Case introduction: Customer is a badminton manufacturer. In the past, customers do the quality control with manual inspection, however, it takes lots of time and effort. Furthermore, because of the diversity of defection, it's very difficult for traditional AOI system to verify all the defections completely.



Previous Production Process

The badminton formed → Taken out by the gantry robot → arrangement by 6-joint robot → manual inspection



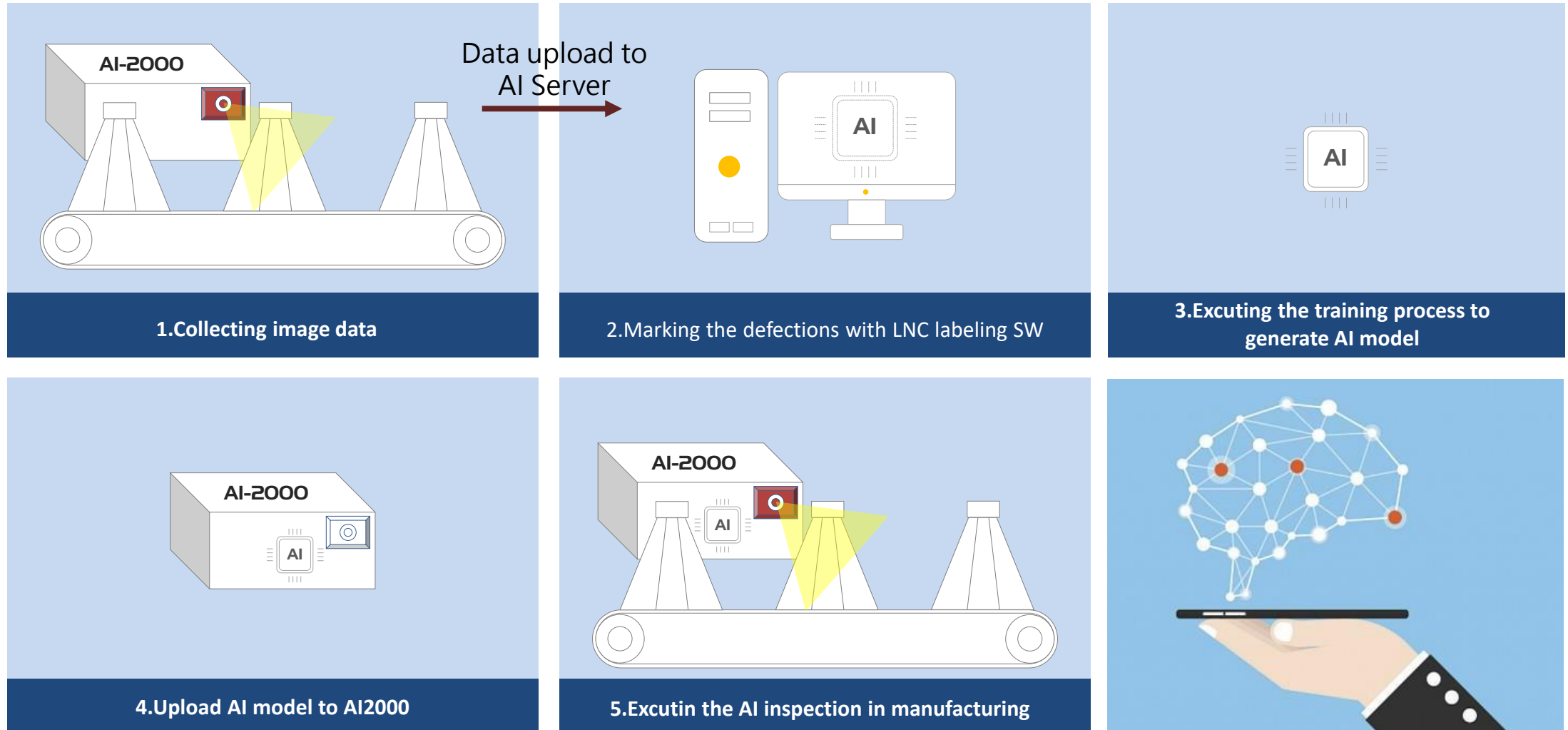
New Process

The badminton formed → Taken out by the gantry robot
→ **AI Inspection** → NG goes to NG position → Packing



Defection Inspection-Badminton

How to integrate LNC AI-2000AI defection inspection system to real manufacturing process?





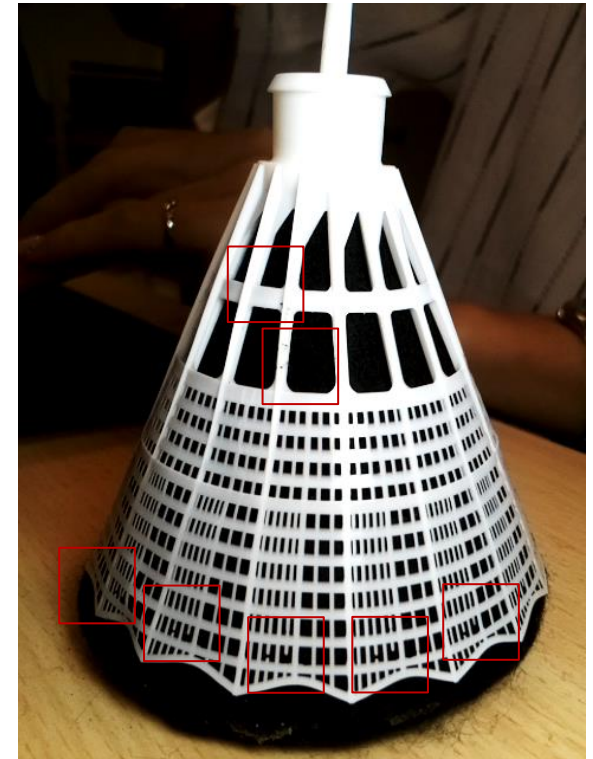
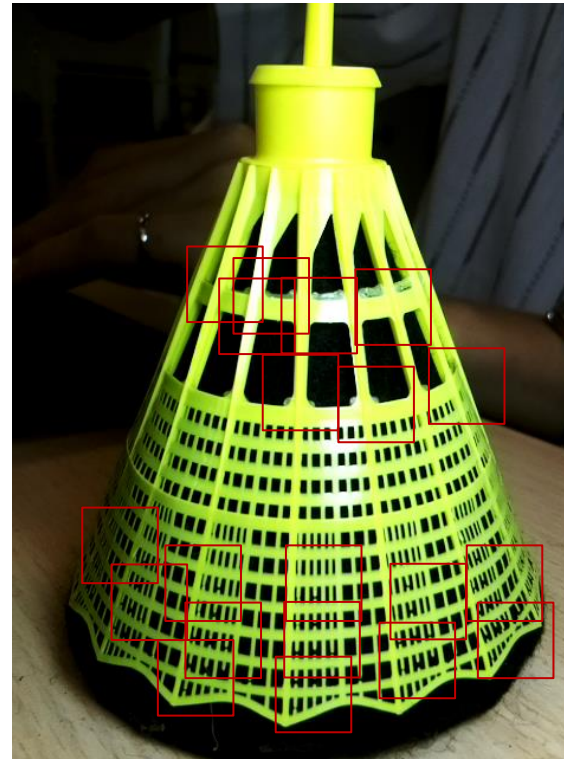
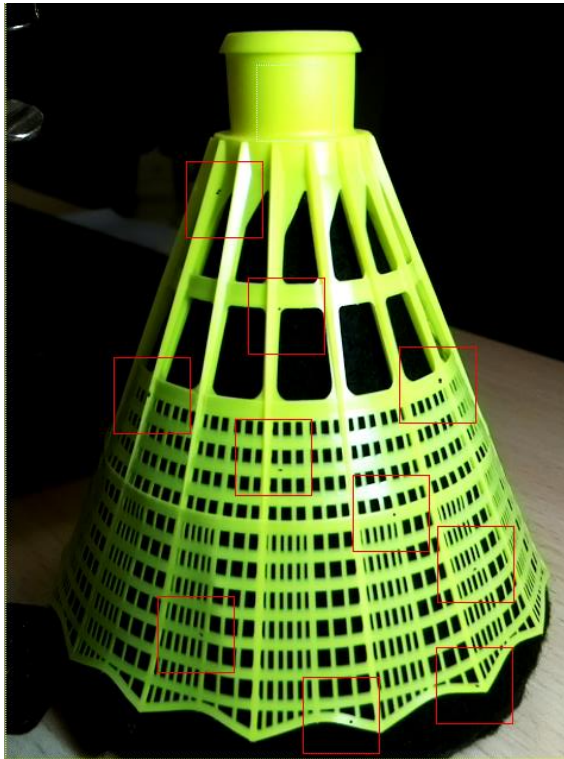
Defection Inspection-Badminton





Defection Inspection-Badminton

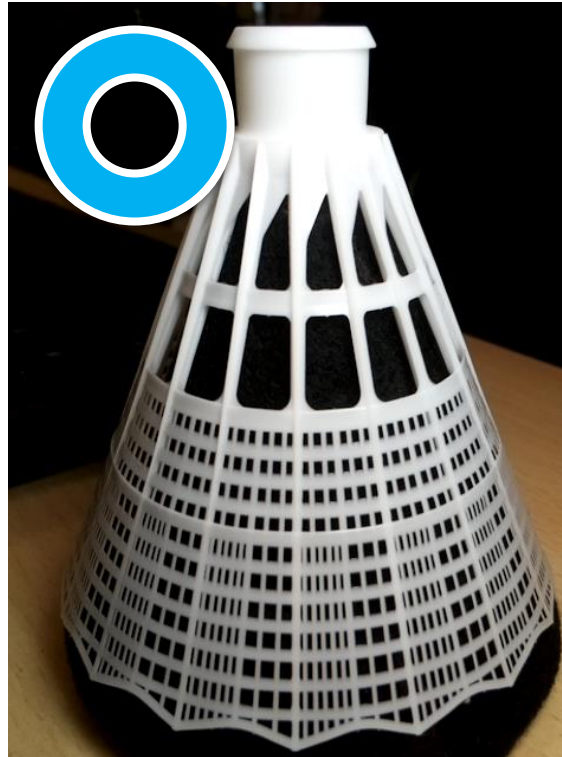
**2. Marking the defection area with LNC labeling software
(Stain, flaw ,short shot/breakage, overshoot....)**





Defection Inspection-Badminton

3.Training result





Video





Case 2

- **Industry:** Injection molding
- **Mission:** AI defection inspection of certain area
- **Challenge:** The inspection is possibly bothered by background



Defection Inspection-Background bothering

Case information:

Process

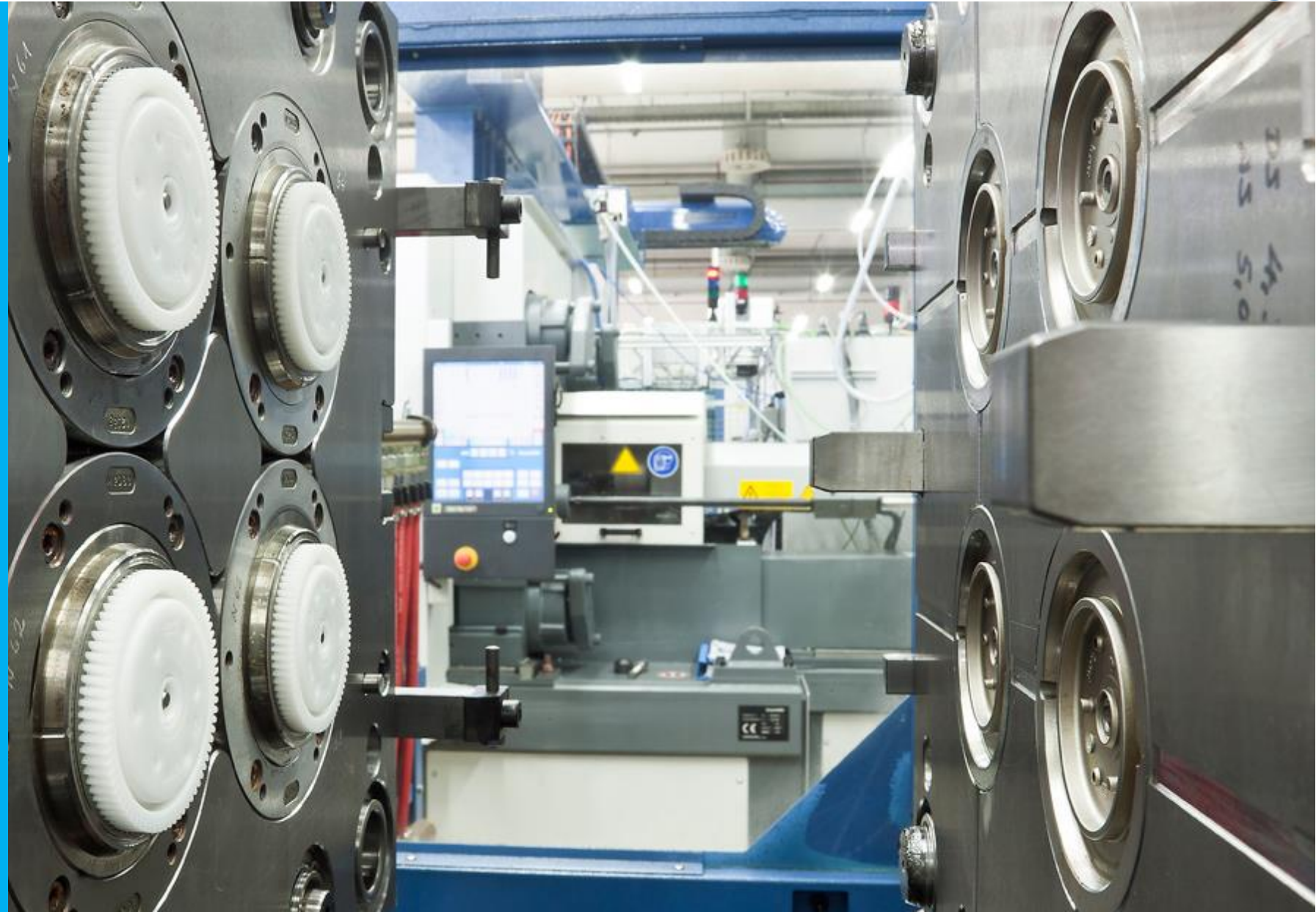
Formed product taken by robot
→ sent to manual inspection

Requirements

Once product formed, robot sends the product to AI2000 for inspection immediately.

Challenge

1. Modification of Robot action
2. How to eliminate the background bothering



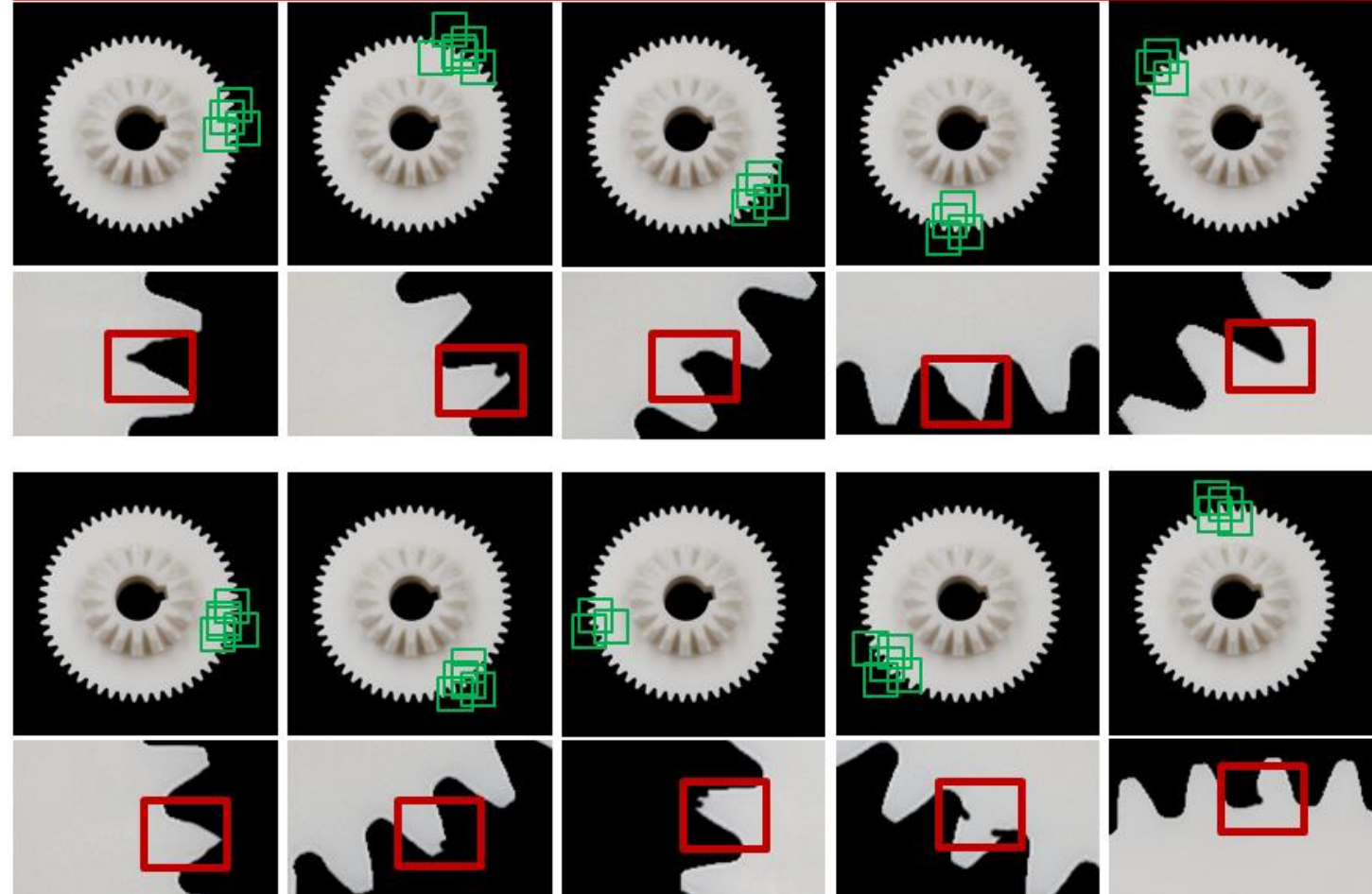
4 Defection Inspection-Background bothering

STEP1: Marking the defection area with LNC Labeling software then start the training with single color background

Good: smooth edge



NG: Notch, breakage, over-sharp



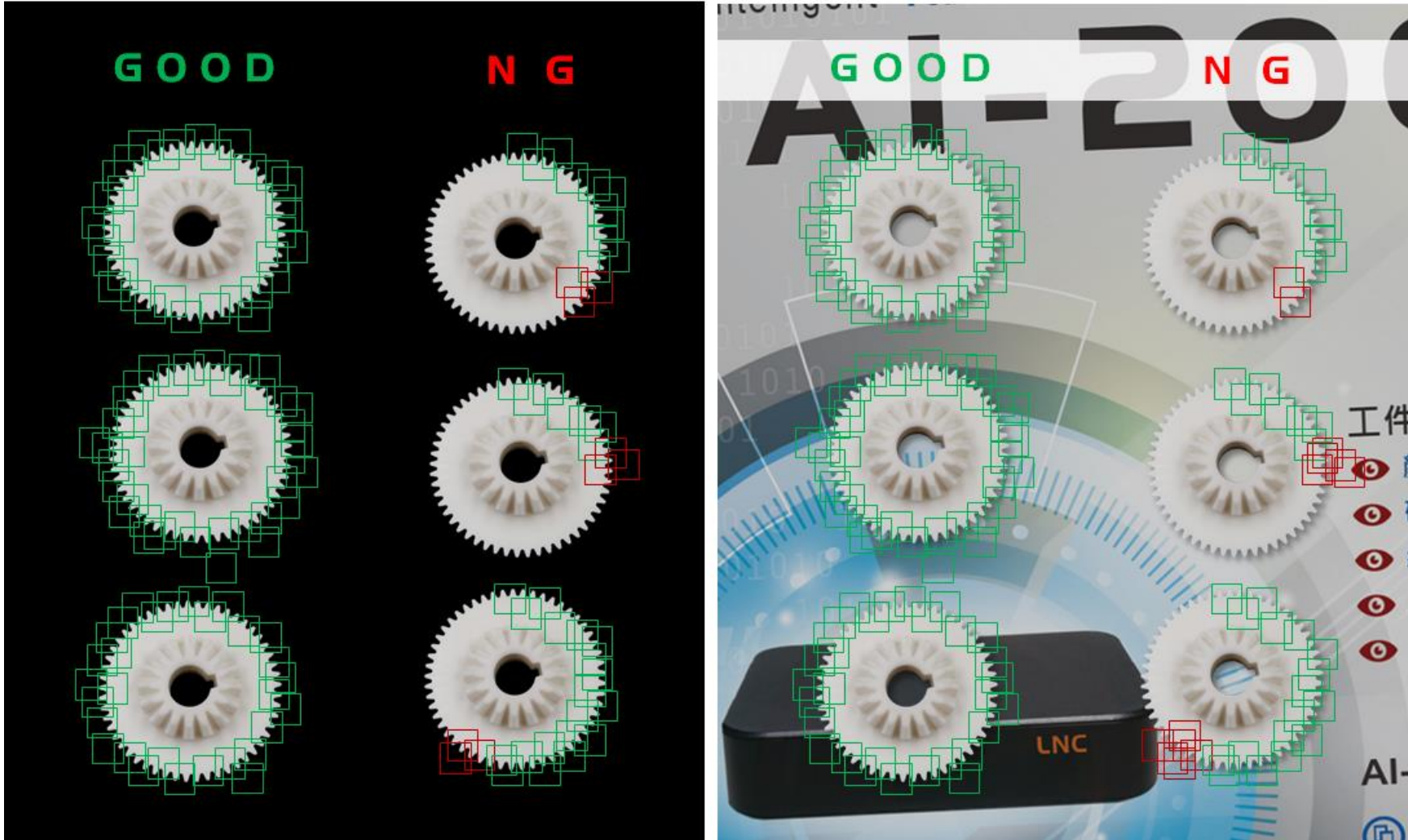
4 Defection Inspection-Background bothering

STEP2: Collecting data images with different background then do the labeling and training.



4 Defection Inspection-Background bothering

STEP3:AI2000 is able to successfully verify the defection in pure or complicated background



3.

OEM/ODM Service



OEM/ODM Service- LNC Strength



01 Core technology

- EtherCAT Technology leadership
- Decades of motion control experience

02 One stop shop

- Complete Product line
- EtherCAT peripherals
- One-stop shop across industry sectors



LNC OEM/ODM Service



03 Manufacturing cost control

- Supply-chain management
- Central Purchase and buying power

04 After-service

- SOP for great after service
- Distinguished quality and services

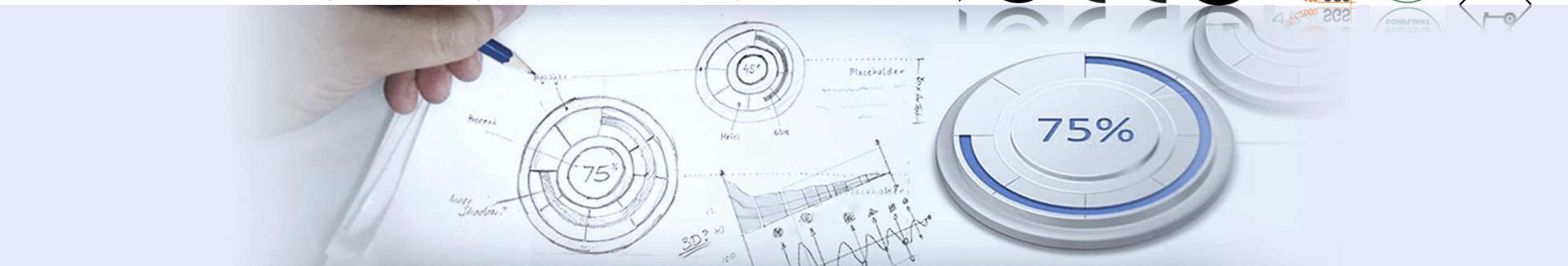




OEM/ODM Service

Our Custom-manufacturing Service Includes

- Design for manufacturability and testability
- Prototyping, pre-production and mass production
- Printed circuit assembly and test
- System assembly and test
- System Integration
- Traceability from component to finished product





4 ways to fit your requirements



1.Private Label Product

Apply your brand to one of our standard products: the quickest way to go-to-market

2.Semi-Customization Manufacturing

Using one of our standard products as a basis for design, hardware and software are modified to meet your requirements. Leverage our experience and expertise to reduce design risk and speed time-to-market.

3.Customization Design Manufacturing

Partner with us for your manufacturing and logistics needs. Using your proven designs, we source components locally, manufacture, test and warehouse your finished goods.

4.Integration Orientation Service

Offer consulting and customization integration service based on customers' application and requirements to create tailored-made solutions.



Product Customization Service



System Customization

- CNC controller Series
- Robot Controller
- Injection molding machine controller
- Automation equipment control system

Servo Motor Customization

- EtherCAT Servo Motor, EtherServo
- EtherCAT Invertor, EtherPower
- By Case/
Further Discussion

Slave module Customization

- IO module
- Communication module
- Various Function modules

Board Customization

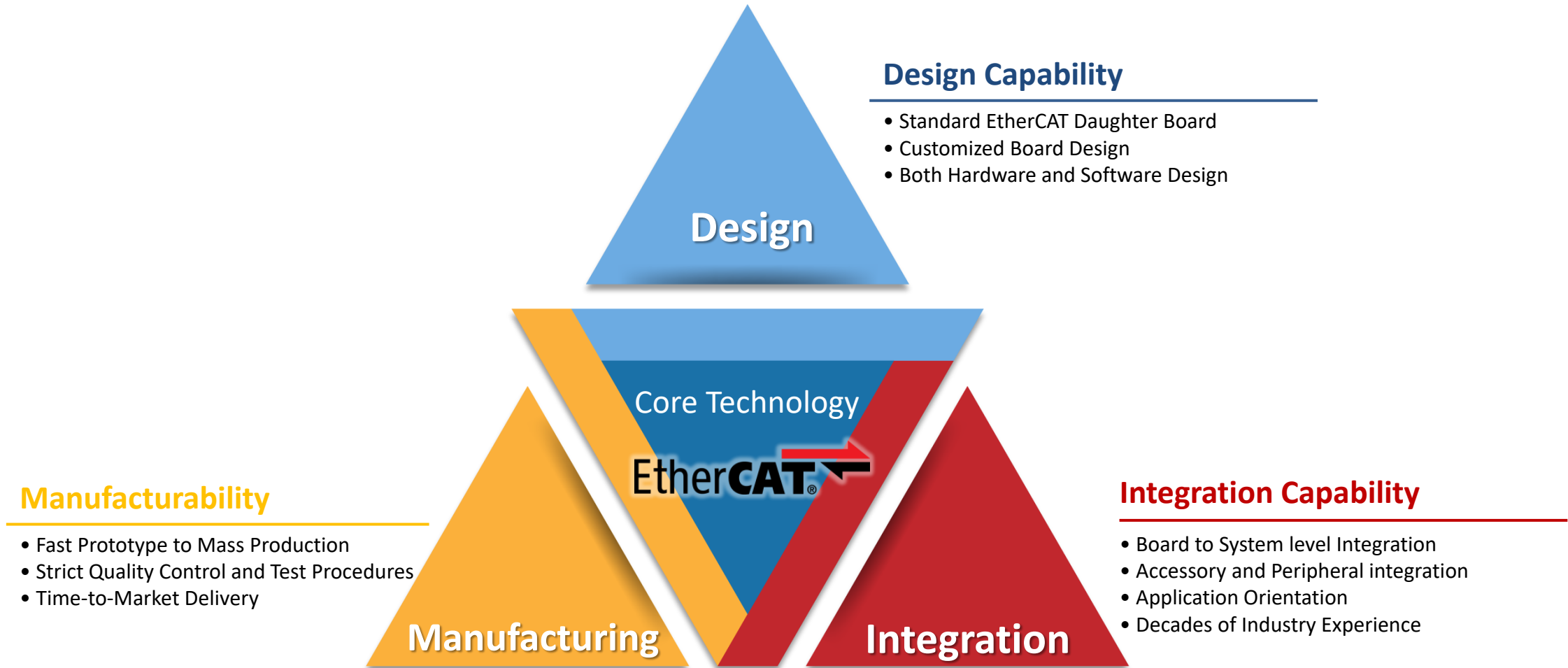
- IO board
- Communication board
- Various function board

Accessories Customization

- Sensor
- Vision system
- AI Inspection system
- Accessories & Peripherals



Capabilities of Customization Service





OEM/ODM Project Management Process

1. Project Initiation

- Over all project discussion
- Product selection
- Define specification
- Comprehensive document support

2. Research and Design

- Design and development of prototype in LNC RD center
- Schematic review/layout review/thermal design/ID design...etc.
- Communication/discussion/modification

3. Debug and Validation

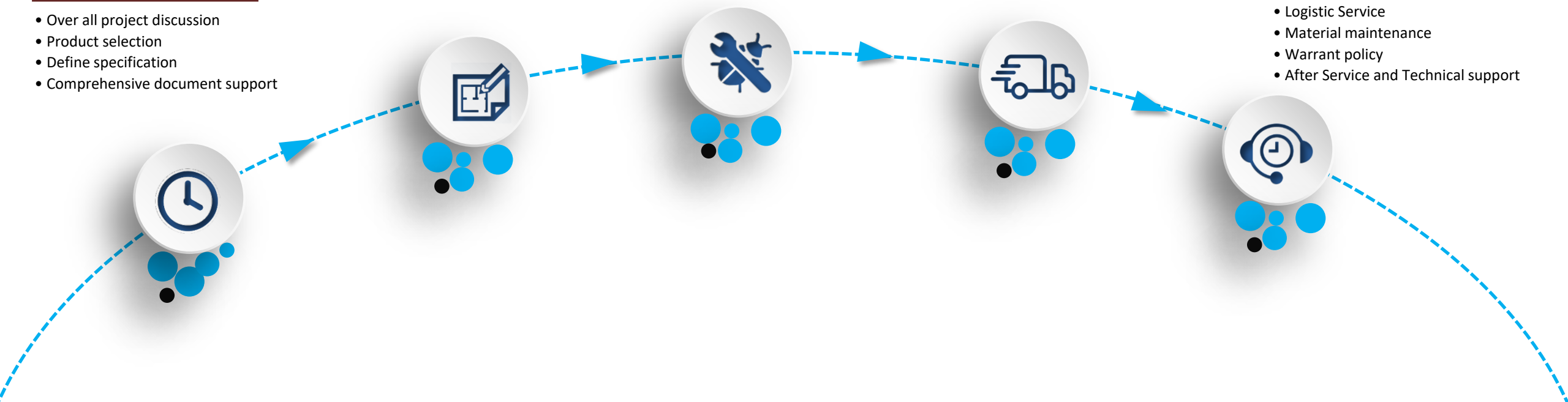
- Full function test
- Reliability and safety test
- Thermal profile test
- Electrostatic signal compatibility
- Certification test
- Analysis & verification
- Solution & suggestion

4. Manufacturing and shipping

- Batch manufacturing in LNC factory
- Production assembly/package
- Quality test
- Logistic & schedule control

5. Service and Support

- Logistic Service
- Material maintenance
- Warrant policy
- After Service and Technical support



4.

Manufacturing and Quality



Manufacturing Capacity

Taiwan-Taichung



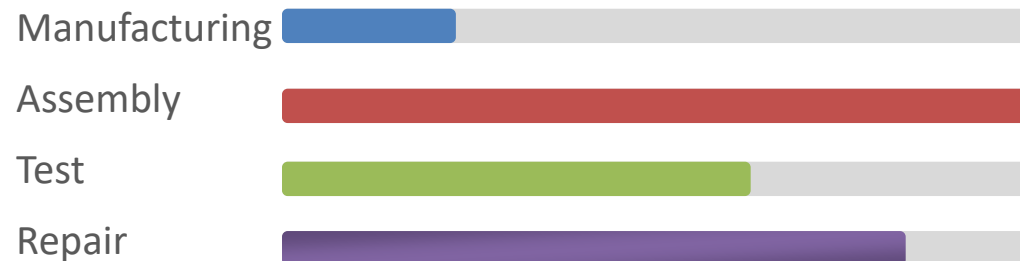
Manufacturing Center in Taiwan



China-DonGuan



LNC China in DonGuan





Manufacturing and Quality Control



DQA

Design Quality Assurance starts at the conceptual stage of a project and covers the product development stage to ensure quality is designed in by highly qualified engineers.



MQA

Manufacturing Quality Assurance is carried out in accordance with standard process and strict quality control. our Total Quality Control (TQC) program includes: **Incoming Quality Control (IQC), In-Process Quality Control (IPQC) and Final Quality Control (FQC).**

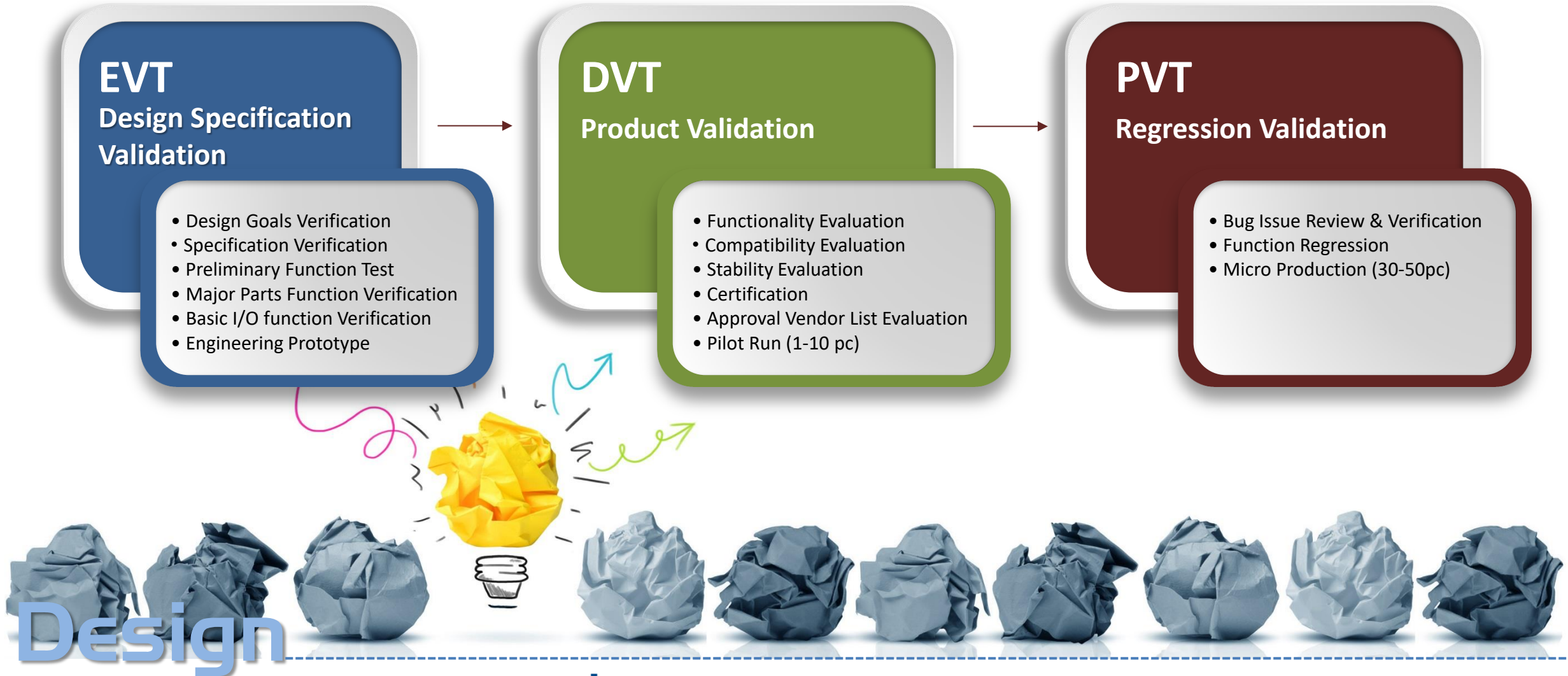


SQA

Service Quality Assurance includes technical support and repair service. These are important windows to serve our customer needs, receive their feedback and work with R&D and Manufacturing to strengthen our response time in resolving customer concerns and improving service levels.



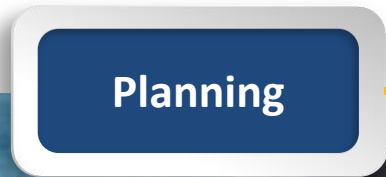
DQA Process





MQA Process

- Production plan
- Forecast
- Schedule



Production
dept.



Purchase



Production &
Manufacturing



NG

- Reproduction
- Amendment

QC



Production
Dept.



Shipment

- Test plan
- Sampling
- Random test

Manufacturing



OEM/ODM Service SQA



LNC Technology

Discussion & Design

Manufacturing

Delivery

After-sale

Service Assurance

Vendor Quality

- Vendor/Supplier Auditing
- Containment & Failure Analysis
- Vendor Corrective Actions
- Charge-back-Cost Recovery
- Supplier Scorecard

Internal Quality

- Inspections/Audits
- Nonconformance
- Containment & Failure Analysis
- Change Control
- Training and Education
- Equipment Calibration
- Document Control
- Safety Management
- Quality Scorecard

Customer Satisfaction

- Customer Issue Management
- Complaint Management
- Containment & Failure Analysis
- Version Change Control
- Product Notification
- Document Control



Enable Intelligent Machines



Conclusion

LNC OEM/ODM Service benefits customers with:

1. Project Management

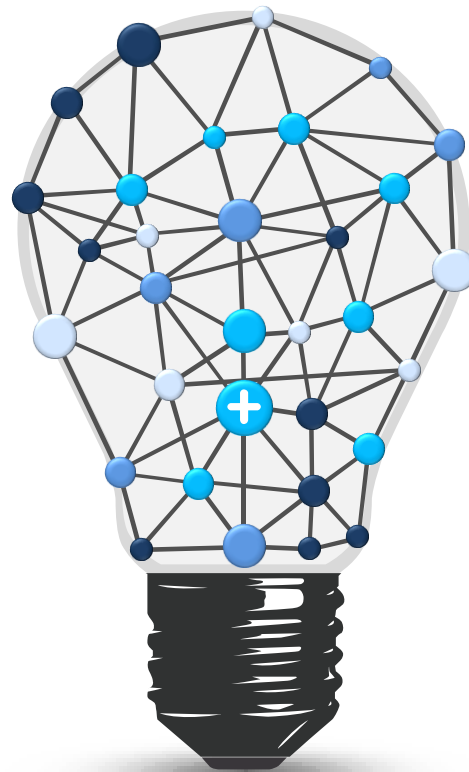
Project Management offers end-to-end services with a local Single Point-of-Contact

3. Time-to-Market

Committed product delivery and On-Time-to-Market

5. Cost-Saving

Cost savings throughout the product supply value chain



2. Complete Process Management

Regional support with Build-to-Order production, logistical technical support and after service

4. Product Longevity

Long Life-Cycle Management

6. Inventory Management

Reduced Investments in R&D, Production Overheads and Inventory



感謝
聆聽

Thank You!