



Innovation and Development of Inventronics

Wilson Zhang

01 **Company Introduction**

02 **Product Introduction**

03 **Tonglu Production Base**



01

Company Introduction

- Headquartered in Hangzhou, China and subsidiaries in the United States and Europe
- One of the world's top LED driver manufacturers
- Builds innovative, high quality, long-life products that are certified compliant to all major international safety and performance standards
- Exceptional technical support and best in class customer service
- Seeks to create value for its customers by working to extend and increase the return on investment for solid state lighting systems



Inventronics By the Numbers

1400

Employees

247

Patents

20

Certifications

385

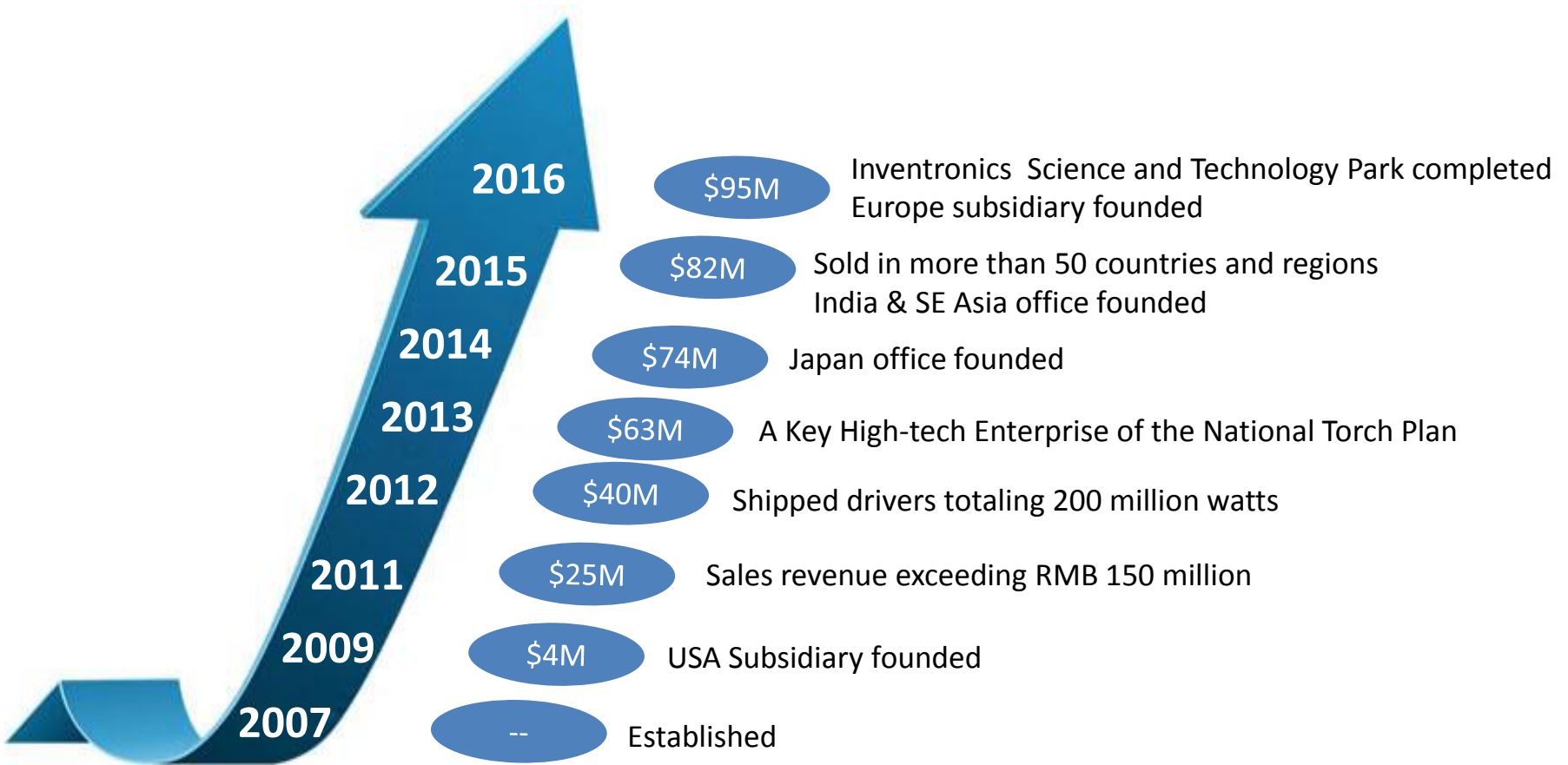
Technical
Professionals

50

Countries

1500
+

Standard Models





Dr. Gary Hua

1993, Co-founder and Vice President of VPT, Inc.

1994, Doctoral Degree from Virginia Tech

1999, Founder and CEO of E-Power Co., Ltd

2007, Founder and CEO of Inventronics

- Awarded over 20 US patents
- Published over 70 papers
- Selected as China Thousand Persons Plan
- CCTV 2010 nominated Economic Person

Global Footprint

INVENTRONICS



INVENTRONICS (HZ)

Headquarters



Oklahoma, USA



Dongen, Netherlands

Subsidiaries



Tokyo



Mumbai



Singapore



South China

Offices

What Sets Us Apart

INVENTRONICS



- Primary Focus on LED Drivers
- Design Capabilities
- Product Development Process
- Manufacturing
- Quality Assurance
- Customer Service and Support

Focused solely on LED drivers and accessories enables us to stay at the forefront of technologies to better empower the next generation of LED luminaires. This includes:

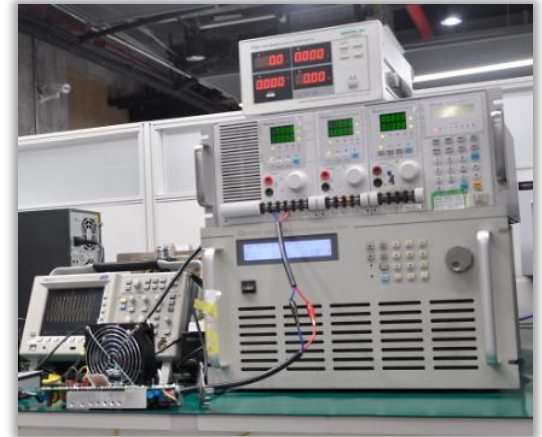
- Longer Lifetime
- Higher Reliability
- Constant Power Programmable Output
- Controls Ready
- Wireless Technologies including EnOcean and ZigBee
- Digital Protocols including DALI and DMX
- External Over Temperature Protection
- Surge Protection L-L 6kV, L-E 10kV



Design Capabilities

INVENTRONICS

- In-House R&D Team with over 185 employees.
- Advanced Research team
- Solely Focus on LED drivers
- 247 Patents (Up to December. 2016)
- Extensive Portfolio Suitable for Nearly Any Application
- Modified or Customized Solutions Available Upon Request



Product Development Process

- Specialized Teams for Low, Mid, and High Power Designs
- Samples are Built and Undergoes Design Qualification Process
- 3 Safety Labs Within HQ for Expedited Product Release
- UL, TUV, CB
- Conduct Trial Production Runs
- Quality and Reliability are Ensured and Product is Released



Inventronics has built strong teams and processes around the core quality initiatives.



- Inventronics has dove-tailed its processes with customers working to ensure a seamless customer interface.
- Process improvements are on-going to improve the handoffs between customer, channels and Inventronics.
- A streamlined process has been defined and implemented for small quantity failures to provide rapid replacement or credit.
- Inventronics has expanded its resources to provide faster reaction times.

Customer Service and Support

INVENTRONICS

- Regional Lighting Representatives Available for In-Person Visits
- Worldwide Distributors able to Provide Local Support
- Timely Support for Sales and Technical Issues
- Website with Up-to-Date Datasheets and Software for all Products
- Stocking Locations in US, Europe and China
- Worldwide Lighting Exhibitions and Fairs





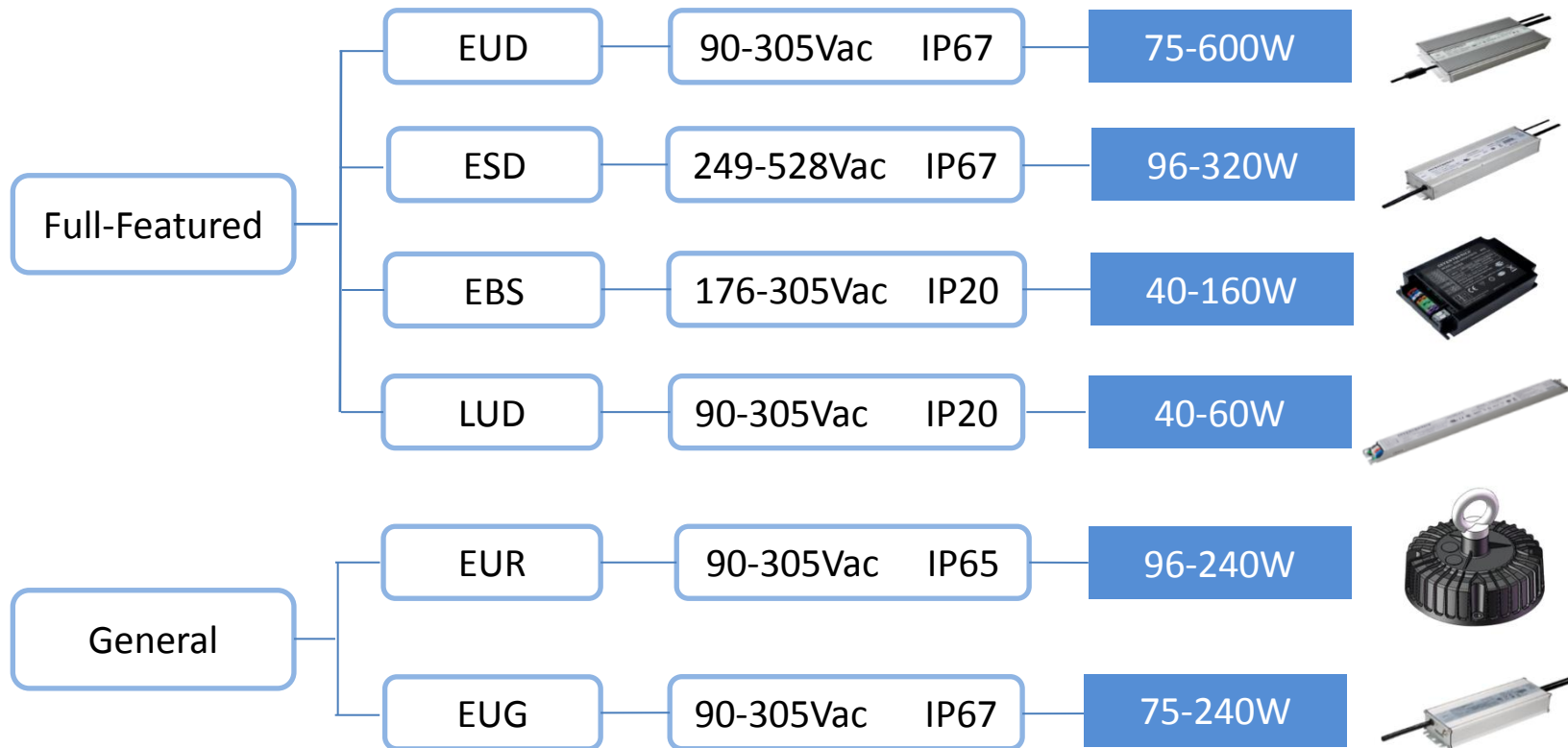
02

Product Introduction

- General Purpose
- Programmable
- Controls Ready
- Wireless Controls
- Linear
- Round

- Constant Current
- Constant Voltage
- High Voltage Input
- Multiple Channel
- IP 67
- SPDs







[19 Feb 2014, Courtesy of Caltrans]

East Span Bay Bridge, San Francisco, USA



Berchem, Luxembourg



Marginal Pinheiros à project



High Bay Lighting(for American Airlines Hangar), Dallas, TX



Jiaozhou Bay Bridge in Qingdao, China



Yuandang Lake, Xiamen, China



23 Avenue, St Paul, Brazil



Test Center



SVT



Stress Analysis



Software Test



System Test



DVT



Safety Test

- Increased test requirements
- Expanded variety of tests required
- Wider array of environmental conditions
- Increased investment in test equipment
- Made an DQA group more autonomous
- Strengthened the skill set of the team
- Thorough audit of design changes



Thermal Test



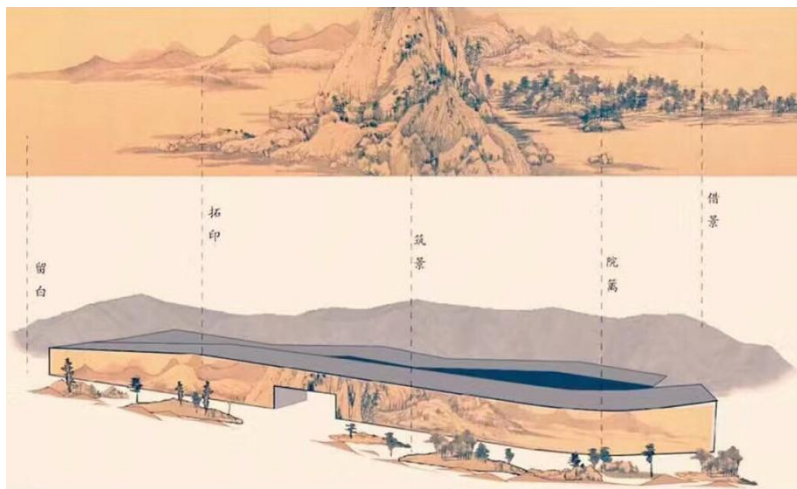
Reliability Test

03

Tonglu Production Base

Tonglu Production Base

INVENTRONICS



Main Site Introduction

INVENTRONICS

Site Area	204,555m ²
Production Line	16
Employee	1000
Capability	1Million pcs/Month



Main Site Introduction

INVENTRONICS

- 75,000 m² manufacturing facility
- Monthly capacity: 1 million pcs
- Traceability quality control system
- Auto-potting/testing/aging machines
- Manufactured within own facilities to eliminate unforeseen changes for greater control



SMT Workshop



Production Workshop

Tonglu Manufacturing Base– Brief Introduction of Automatic Equipment

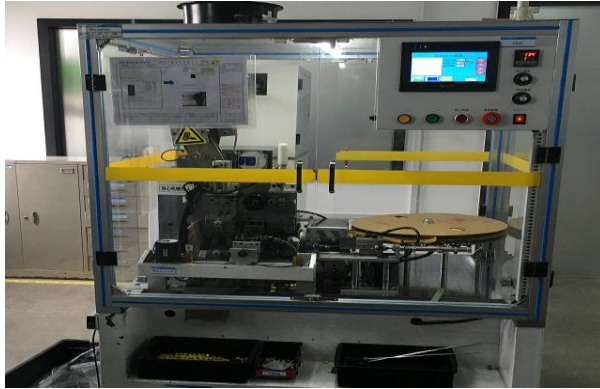
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Fully Automatic High-speed SMT Lines(6)



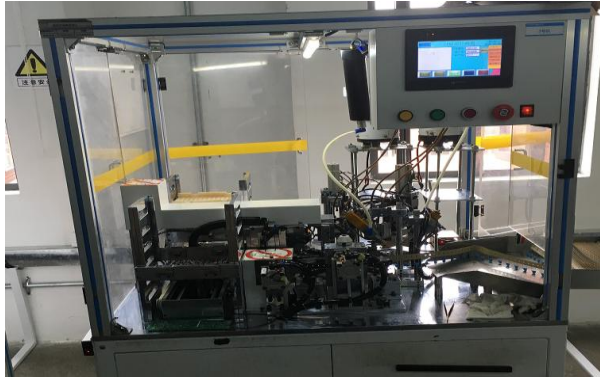
Automatic Potting Lines(7)



Automatic Heat-shrink Tube Slewing Machine



Automatic Bead Threading Machine



Automatic Bead Slewing Machine
(for Y Cap)



Automatic Deflector Attachment Machine
(in Mylar)

Burn-In Room and ALT



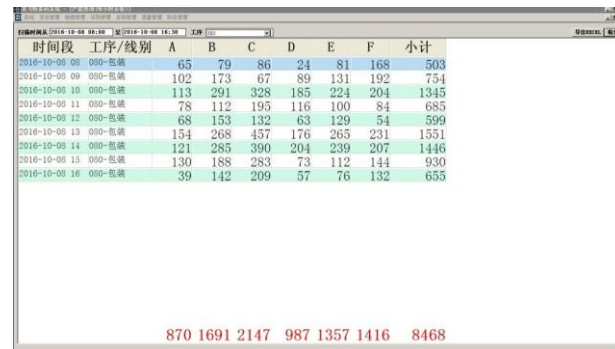
- Electrical burn-in machine
- Strong reliability screening ability
- Burn-in status record
- Find out potential reliability issue



■ test station -Hi-pot, LED Load, ATS



■ Multiples of test efficiency

[illegible]

Real-time Monitoring of Production Process/Qty

Numerous processes have been developed to ensure the quality of the material being used by manufacturing.

- Critical Component List
- Supplier Audits
- Source Control
- Inspection Quality Control
- Performance Reviews
- Failure Analysis



Cross Section Analysis



RoHS Test



E-cap Life Test

Factory team is responsible for manufacturing process including SMT, assembly, potting, test and packaging – working closely with manufacturing engineering. The team works to ensure

- Process Definition and Documentation
- Statistical Process Control
- Automation
- Continuous Incremental Improvement
- Enhancement of Inspection and Test Processes

Three key initiatives/investments have been

- On-going Reliability Testing
- Fully Automated Potting Process
- Rain Test



Potting



Vacuum



- World class engineering capability
- Strict design & product development procedures
- Market and technology driven
- Focus on quality control
- Strong customer support
- Exceptional customer service

Inventronics (Hangzhou), Inc.

+86-571-56565800

sales@inventronics-co.com

Inventronics Europe B.V.

+31-857-470-061

eu-sales@inventronics-intl.com

Inventronics USA

1-405-600-7480

usa-sales@inventronics-co.com

Asia-Pacific

+65-9848-2413

sales@inventronics-co.com

India

+91-98-2154-2220

in-sales@inventronics-co.com

Brasil

+55 (11) 3522-4288

contato@lablumens.com

South China

+86-0755-27201716

sales@inventronics-co.com

INVENTRONICS

英飞特电子

THANKS!



Add: Inventronics Science and Technology Park, #459 Jianghong Road,
Binjiang District, Hangzhou, Zhejiang, China, 310052

Tel: +86-571-56565800

Fax: +86-571-86601139

E-mail: sales@inventronics-co.com

Website: www.inventronics-co.com