

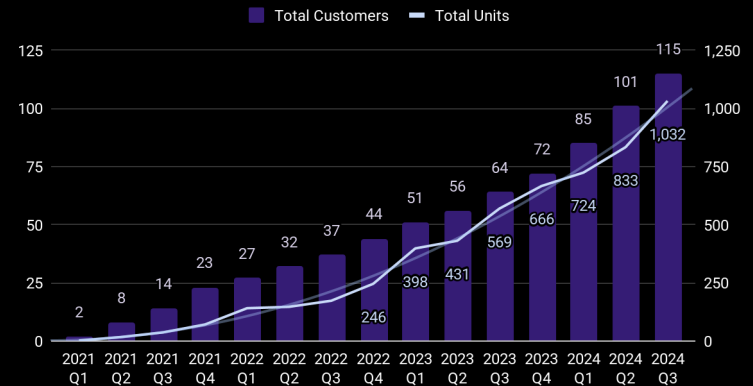
UnitX AI Inspection

Lithium Ion Battery

UnitX: Automated Visual Inspection

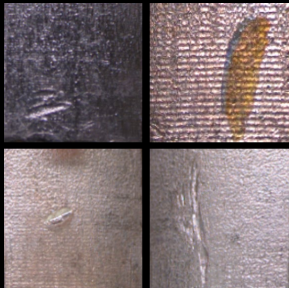
- Deployed in **114** op manufacturing customers
 - **10** of world's top **30** Battery manufacturers
 - **10** of world's top **50** automotive manufacturers
 - **9** of world's top **100** electronics manufacturers
 - **2** of world's top **20** EV manufacturers
- Inspects over **\$6.1 billion products** for mission-critical defects 24/7/365
- Raised **\$59+ million**
- Run by a **world class team**

Customers & Units Growing Rapidly

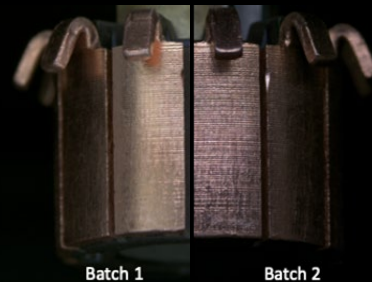


Traditional Machine Vision Challenges

Cannot Handle
Variable Defects



Cannot Handle
Variable Surfaces



Cannot Handle
Variable Products

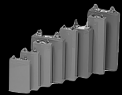


Cannot Be Optimized
For Yield



UnitX solves complex defect inspection challenges w/ 6 months ROI

- **6 Months ROI** w/ automated inspection & integration-ready PLC, MES, FTP support
- **3% Scrap Reduction** w/ lower overkill & earlier alert on process drifts
- **10X Lower Escape** w/ precise quality control & traceability



Prismatic

Core components

Prismatic cosmetic
Lid cosmetic
Valve
QR code



Pouch



Cylindrical

Upstream

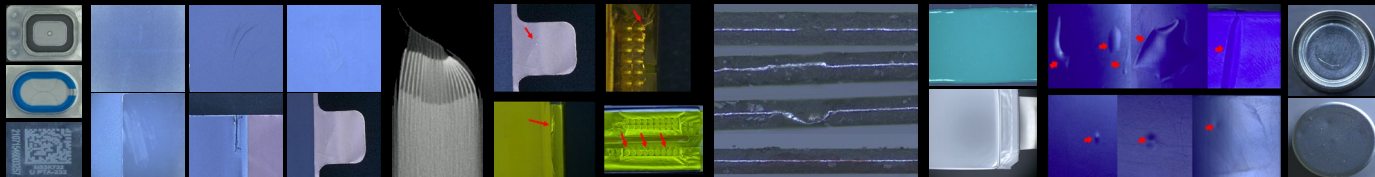
Slitting
Tab
X-Ray/CT

Midstream

Tab weld
Pack weld
Electrode weld

Downstream

Adhesive
Prismatic cosmetic
Mylar



UnitX Works with All 3 Cell Types



Prismatic



Pouch



Cylindrical

UnitX automates inspection across entire Libattery manufacturing process

Electrode



Calendaring



Slitting



Cutting



Stacking



Tabbing

Cell



Mylar



Casing



Filling

Cell



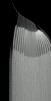
Capping



Sealing



Film



CT

Module



Wire-bonding

Pack



Connectors



Bar code



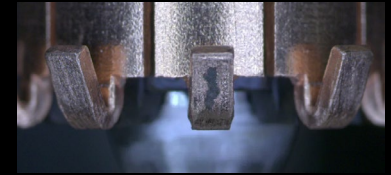
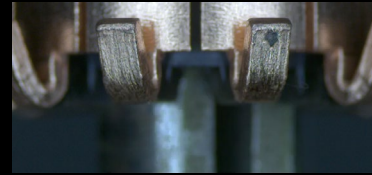
Tab welding

New Technology

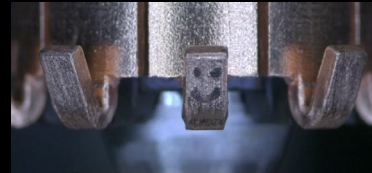
In Gen-AI & 3D

Generative AI Technology Accelerates AI Training

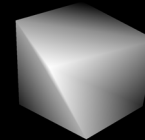
- **Market need** rare defects samples are difficult to collect. AI training needs such samples. This delays customer acceptance. Generated data can rapidly train AI models.
- **Latest progress** deployed AI from generative models based on domain-specific data & inhouse training mechanisms.



Realistic generated images



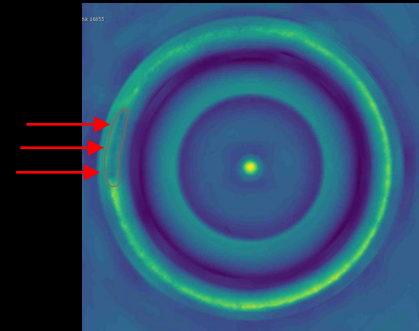
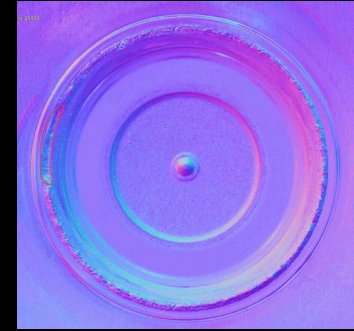
Shane control



Depth control (experimental)

3D Technology Detects Subtle Defects at High Speed

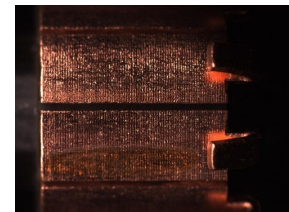
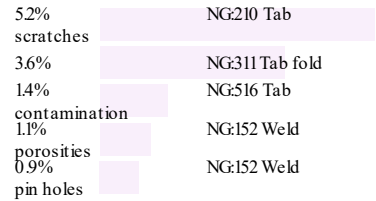
- Market need 2D only vision system cannot detect depth. E.g. cannot tell difference between pinholes vs. discoloration
- Latest progress UnitX 2.5D achieves 28um z repeatability @ 382mm/s line speed



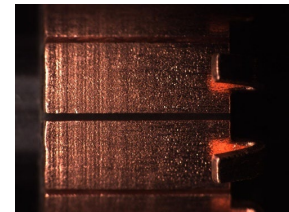
AI-Powered Manufacturing

For Improved Yield & Quality

	Last 24 Hours	1/15 AMShift	1/15 PMShift	7Day Avg	Variation
<p>85%</p> <p>Yield</p>	83%	86%	91%	-6%	
<p>9.2k</p> <p>Volume</p>	4.8k	4.4k	9.4k	+2%	
<p>83%</p> <p>Up Time</p>	96%	70%	92%	-9%	



Tab contamination
1/24 3:23 pm



Tab scratches
1/24 1:19 am

Your path to AI-powered manufacturing

Rule-Based Inspection

Over/under-rejects
& still requires
manual inspection

Today

1

AI for Final Inspection

To prevent
escapes at
end of the line

2

AI Inspection at Scale

Across entire
processes to reduce
labor costs

3

Closed Loop Data Insights

To improve
yield across
processes

4

AI-Powered Manufacturing

To optimize OEE
autonomously
at scale

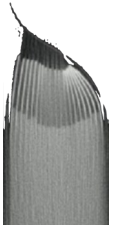
With UnitX

Case Studies

CT Scan Inspection

Cell Formation

Cell CT Scan Deployment Summary



Pain Point

Operators were manually inspecting each bicell for overhang.

The process was **slow and inaccurate** resulting in **escapes**

Process

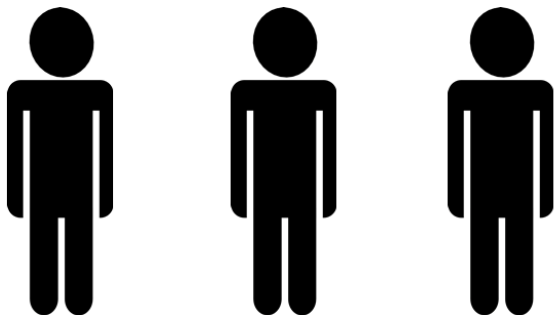
Unit X inspects **internal battery cells for overhang** caused by manufacturing error.

We are inspecting **32 cells** on a single pass within **3.5 seconds**

Deployment

US Deployment
Deployed on **1 CT Scanner**

Reduced Number of Operators by 3x*



Previous Inspection



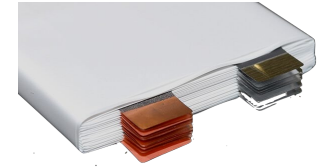
Inspection with Unit X

*1 Person to operate CT scanner and review AI results

Battery Tab Inspection

Ultrasonic Weld

Tab Deployment Summary



Pain Point

Customer's manual inspection was **inaccurate** and they had issues with FR/FA rates for years. This caused **serious quality issues** that resulted in **customer complaints due to escapes**

Process

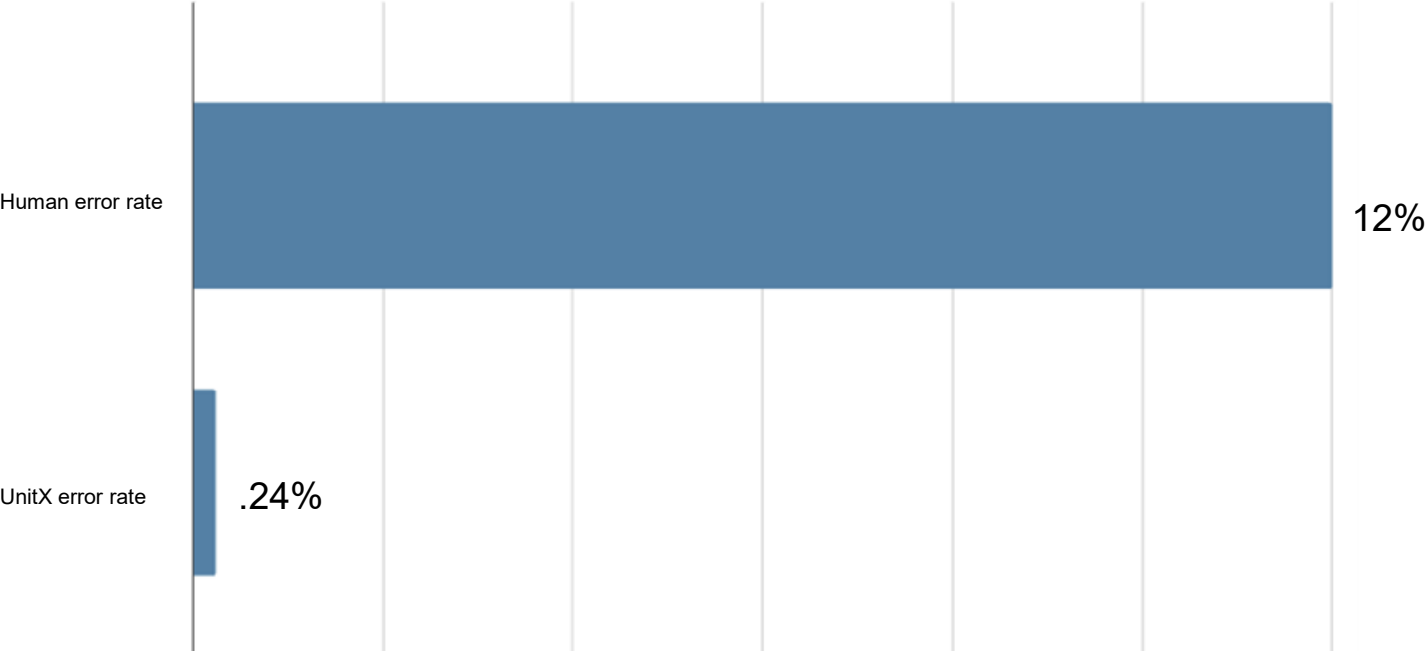
Unit X inspects 100% of **battery cell tabs for ultrasonic weld defects** such as tears, shifts, and FOD.

We are inspecting a **single cell tab** within **1.5 seconds**

Deployment

Asia Deployment
Deployed on **1 line**

Reduced Error Rate by 50x



UnitX accurately inspected 99.76% of parts out of 2,216 cells in recent accuracy audit (0.04% FA and 0.2% FR)



Battery Pack Module Inspection

Laser Weld

Pack Deployment Summary



Pain Point

Customer's manual inspection was **inaccurate** and they had issues with FR/FA rates for years. This caused **serious quality issues** that resulted in **battery-related fires**

Process

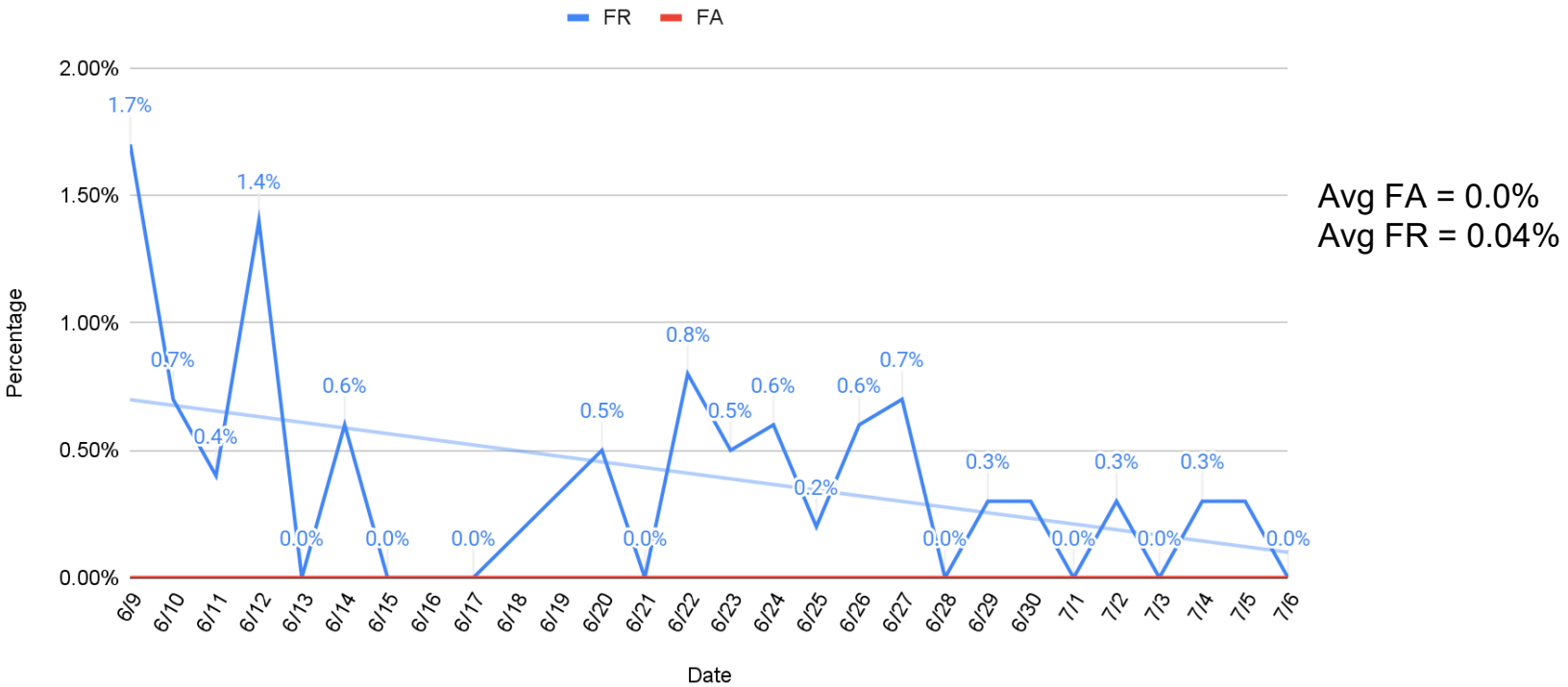
Unit X inspects 100% of battery packs for **laser weld defects on wire bonds** such as porosity, over weld and under weld.

We are inspecting **12 battery cells** on a single pack within **8 seconds**

Deployment

Asia Deployment
Deployed on **2 lines**

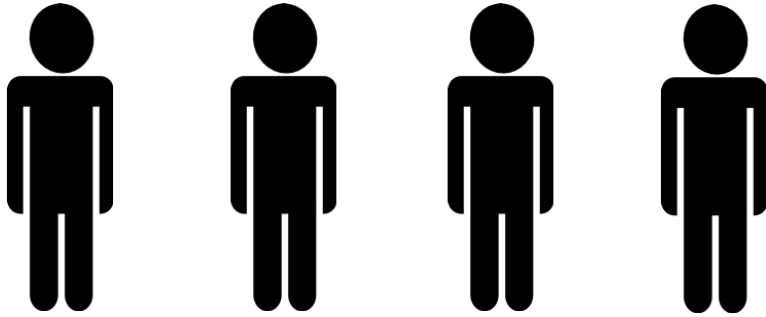
False Acceptance (FA) & False Rejection (FR) by Day



*Average 344 cells inspected per day



Reduced All Manual Inspection



Previous Inspection



Inspection with Unit X

Automate Visual Inspection

Improve Quality & Yield

Contact today:

info@unitxlabs.com