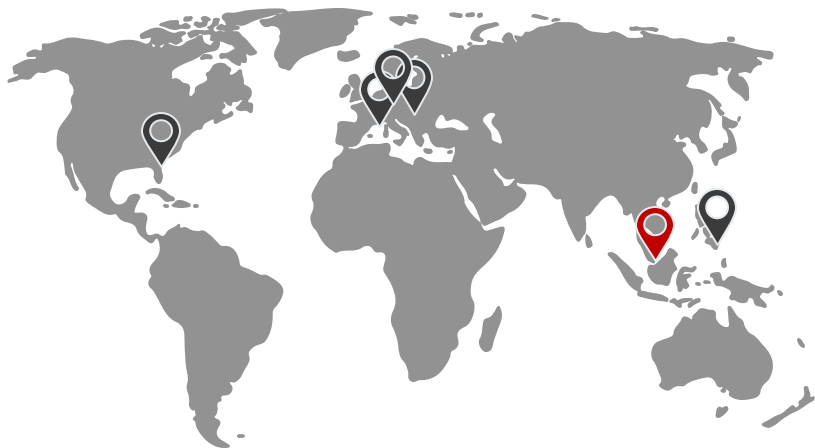**ATTONICS**
Systems

Revolutionising
Visual Inspection with
Cutting-Edge and
AI-Powered
Optical Systems

Our Company

Mission:

Precision & Speed: Transforming visual inspection and quality control by combining cutting-edge optical systems with AI, enabling precision, affordability, and seamless integration

Employees:	5 FT, 5 PT
HQ:	Singapore
Distributors:	US, EU, JP
Total Funding:	> S$ 6 m
Investors:	Ability, Wavemaker, ESG, MoveOn
Core Business:	Optical Design & Engineering, AI

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Systems

Our Unfair Advantage

High-end optical (spectral) sensors are powerful, yet bulky, costly and too slow for mass deployment.

In manufacturing, high-end optical sensors are cost-prohibitive, while low-cost solutions cannot meet the growing demands for accurate inline sensing.

Thanks to our patented and **proprietary optical design** and **application know-how,** we offer high-end optical measurement systems at a **unique price and form factor.**

Attonics' existing solutions

AttoIC   Atto V   Atto S

High - End

Mid - Range

Low- End

Performance (e.g. accuracy, speed, etc.)

Filter-based Eg: RGB-based (SCIO)

Grating Ex: Konica: $12k X-Rite: $8k

Interferometers Ex: Bruker: > $ 50k

Cost (& Size)

ATTONICS Systems
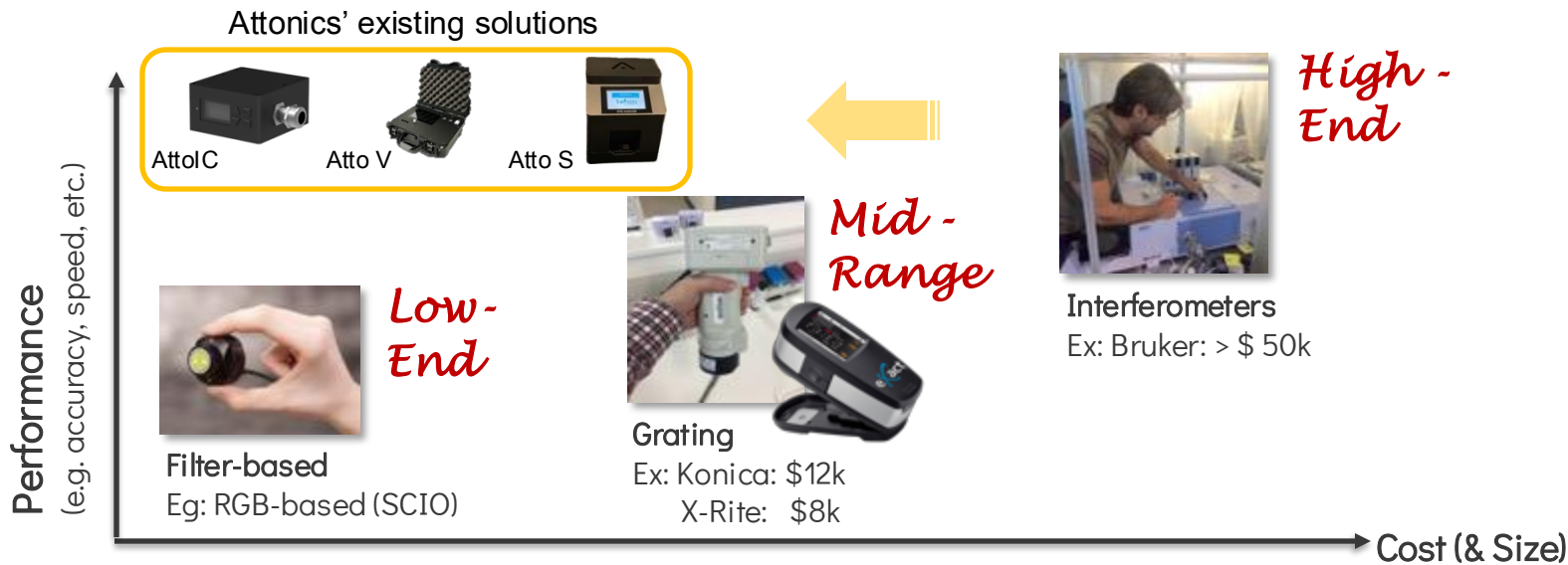
Challenges in Visual Inspection in Manufacturing

Visual Inspection - Key Challenges

- Increasing standards, requiring zero-defect manufacturing (e.g. in Automotive)
- Customer recalls are extremely expensive (on operations and reputation)
- Manual inspection is slow, inconsistent, and costly:
  > Total Labour Costs in Visual Inspection in Manufacturing: ~ US$ 8.7bn
  > Annual Savings Potential through automation expected in next 10 yrs: 50-60%

Example Case Study Attonics - Automating Visual Inspection of defects in Automotive:

Cost Factor	Manual Inspection Cost Impact	Automation Savings Potential
Labour Costs	High – labour-intensive, subjective, slow	50-70% reduction
Defects / Rework, Scrap	Missed & recurring defects, expensive rework	20-50% (defect) reduction
Throughpout efficiency	Slower, dependent on inspector speed	10-30 % faster

RoI of ~ 2 years for customer mfg plant (in India)

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Example I - Industrial Colour Detection

Market Potential:
- Industrial Automation Sensors: ~ US$ 22 bn (2022)
- Industrial Colour Sensors: ~ US$ 1.8 bn (2022); CAGR of 8% → 15-20% of overall visual inspection market

Fundamental Problems in Colour Measurement:
- **Colour Measurement** is primarily done in 2 ways:
  1) **Manually** - subjective (affected by gender, age, ambient light, etc.), error-prone, slow, non-digitised
  2) **Optical systems** - too costly (e.g. spectral sensors) or inaccurate (e.g. RGB, affected by ambient light)

Our Solution: Attonics disrupts the market with its novel
AttoIC colour sensor system

Key Benefits AttoIC:
- > 5x **cost reduction** compared to comparable colour sensors
- **Accurate**: colour accuracy up to ΔE ~ 0.3 (inline) on matt / gloss
- **Non-contact**: Inline detection integrated into production lines
- **Reduces rework and material waste**, increasing efficiency
- **Advanced analytics** for process monitoring & improvement

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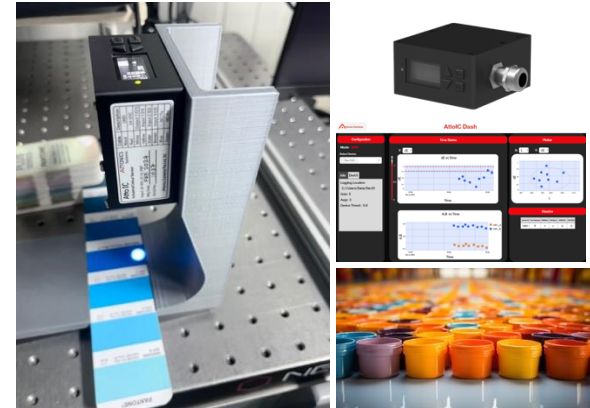
Example II - Defect Detection
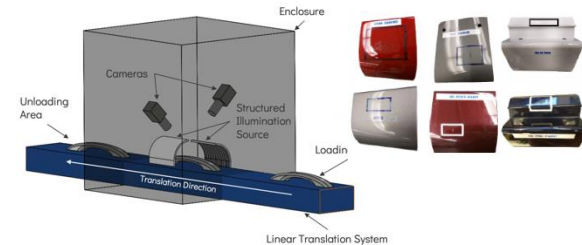
Market Potential:
- Defect Detection Systems Market: US$ 3.67 bn (2023); **US$ 6.7 bn** (by 2027)
- <u>35-40%</u> <u>of overall visual inspection market</u> in manufacturing

Fundamental Problems in Defect Detection (e.g. in Automotive):
- **Defect Detection** is done in 2 ways:
  1) **Manually** - extremely labour intensive, non-repeatable, manual logging / analytics
  2) **Vision Systems** - exist, but costly (> US$ 500k) and only viable for large components (e.g. car bodies)
- There is a clear **lack of automated defect detection systems** for smaller components, especially for glossy and complex 3D surfaces, (e.g. side mirrors, bumpers, etc.)

Our Solution:
- Attonics is developing the automated defect detection system **AttoD**, incl. high-end optics, software, and integrated AI models:
  - ✓ **10 X cost advantage** compared to existing solutions (see Appendix)
  - ✓ Full spectrum of defects (from scratches to oil sag), and colour
  - ✓ Detects **0.2 mm defects**, works on **matt and glossy** 3D surfaces
  - ✓ **AI-driven system** improving accuracy and scalability over time
  - ✓ **Expected RoI: < 2 years***

*Figures are estimates based on our pilot project and business case at client manufacturing site in India

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Why Attonics?

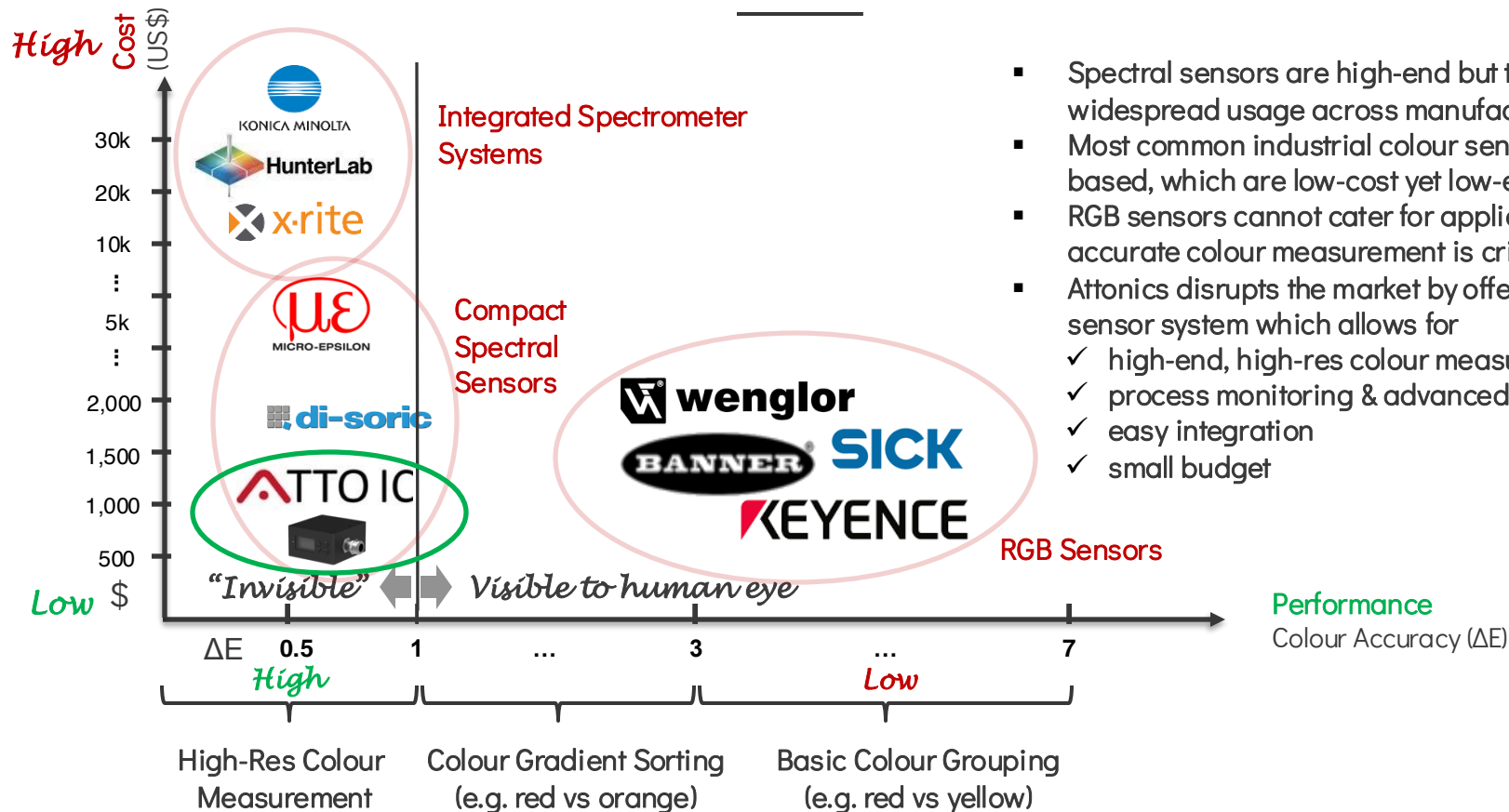**Attonics: Where Cutting-Edge Optics Meets AI-Driven Automation**

- Attonics is a pioneer in high-precision optical systems, leveraging patented interferometry and optical nanotechnology to deliver industry-leading solutions.
- Driven by a team of scientists and engineers, we seamlessly integrate AI and Machine Learning to unlock new levels of accuracy, automation, and efficiency—while overcoming the challenges of AI variability and uncertainty.
- With deep expertise in quality control and visual inspection, we empower global industries with fast-deploying, scalable, and high-performance solutions that merge engineering excellence with Machine Learning and AI.
- Join us and our partners in Factory Automation, Environmental Sensing, Life Sciences, and beyond—transforming industries through optical and AI innovation.

Appendix

Industrial Colour Detection - Competitive Landscape

Cost (US$) — High / Low

- 30k
- 20k
- 10k
- 5k
- 2,000
- 1,500
- 1,000
- 500

KONICA MINOLTA
HunterLab
x·rite

Integrated Spectrometer Systems

MICRO-EPSILON

Compact Spectral Sensors

di-soric

ATTO IC

wenglor
BANNER
SICK
KEYENCE

RGB Sensors

"Invisible" ⟷ *Visible to human eye*

ΔE   0.5   1   …   3   …   7   **Performance** Colour Accuracy (ΔE)
High   *Low*

- High-Res Colour Measurement
- Colour Gradient Sorting (e.g. red vs orange)
- Basic Colour Grouping (e.g. red vs yellow)

- Spectral sensors are high-end but too costly for widespread usage across manufacturing shop floors
- Most common industrial colour sensors are RGB based, which are low-cost yet low-end
- RGB sensors cannot cater for applications where accurate colour measurement is critical
- Attonics disrupts the market by offering a sensor system which allows for
  - ✓ high-end, high-res colour measurement
  - ✓ process monitoring & advanced analytics
  - ✓ easy integration
  - ✓ small budget

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