



Leif Capital

Q4 2021

Precision Sustainability



Alexander Westlake

**Investor-in-Residence,
Leif Capital**

"I believe some of today's most exciting and impactful investment opportunities are to be found in precision sustainability. What do I mean by this? Well, there's a precision revolution going on. In how we optimize the resources we use and re-use, in how we design and manufacture, in how we improve our supply and distribution chains and above all in how we leverage ubiquitous data gathering and analysis.

Precision manufacturing is enabling sustainable technologies to become more efficient, more cost-effective and more scalable. Equally, precision manufacturing is enabling the data revolution, which in its turn is making precision manufacturing more effective. A virtuous cycle has been created which will accelerate the transition to a sustainable world.

In my own investments in cleantech, in health food restaurants, in digital education and in manufacturing, I can see directly how precision is transforming what is possible.

In this report, we share an overview of some of these trends and some stand-out companies driving the precision sustainability revolution. I hope you enjoy the report."

Disclaimer

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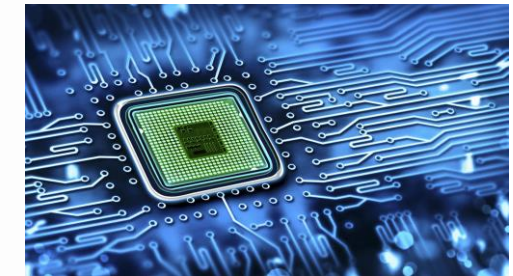
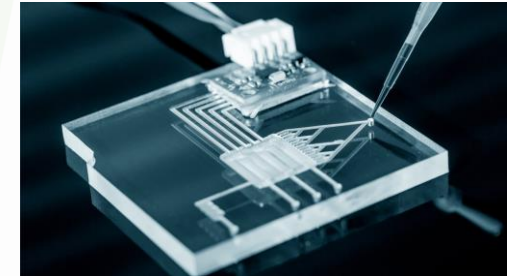
Introduction

This report outlines Leif Capital's taxonomy of Precision Sustainability, explaining its virtuous relationship with Industry 4.0 technologies. We identify two pillars of precision: Manufacturing and Organizational and Supply Chain Precision. We demonstrate the range of investment opportunities in the Precision Sustainability landscape.

Microbas, a Swedish precision manufacturing company chaired by our Investor-in-Residence Alex Westlake, is used as a case study to demonstrate how precision is fundamental to many sectors. Further case studies are introduced as real world examples of our Precision Sustainability taxonomy.

We are in the middle of a 'Great Reset'. Every industry is challenged by the supply chain disruption set off by the COVID-19 pandemic. These challenges are accelerating the transition to 'Industry 4.0': the digitization of manufacturing. Increasing net zero commitments and climate legislation are also increasing demand for sustainable solutions.

The World Economic Forum* anticipates four shifts in the manufacturing and supply chain. Agility and customer centricity, supply chain resilience, speed and productivity and eco-efficiency. Precision Sustainability is a vital component in each of these shifts.



Who we are

Leif Capital is an independent British investment bank with 20 years' experience in B2B communications, corporate finance, capital-raising and investment. We specialize in energy, transport, materials and manufacturing.

We advise start-ups that need to raise capital and 'grown-ups' that want to invest capital. Independent investment companies, corporate VCs and government innovation agencies seek our support in sourcing investments and co-investors. All are united in seeking out sustainable growth.

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Website

Team



Tom Whitehouse
CEO: Leif Capital
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Tom Whitehouse has over twenty years' experience in the financing of early and growth stage sustainable technology businesses; in energy, materials and manufacturing, and investment management. He founded Leif Capital after a ten-year career as a foreign correspondent with the BBC and the Guardian



Alex Westlake
Investor-in-Residence: Leif Capital
alex@leifcapital.com

Dr. Alex Westlake has over twenty years' experience in founding and financing sustainable technology businesses in Europe and Asia. He co-founded and led the £100m AIM IPO of Camco, a global emissions reductions business, and has raised over \$1bn in project and carbon finance for over 1GW of renewable power across China. He is Chairman of Microbas, a Swedish precision manufacturing business. His current portfolio of private investments is valued at more than \$100m.



Matthew Stamp
Investment Analyst: Leif Capital
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Matthew Stamp joined Leif Capital in March 2021. Previously, he worked for a management consultancy. He studied Philosophy at Bristol University.



Ella Westlake
Summer Associate 2021

Ella Westlake completed a research internship at Leif Capital in the summer of 2021. She is completing a BAsC in Arts and Sciences at UCL in London.

Executive Summary

Section 2: Case Studies

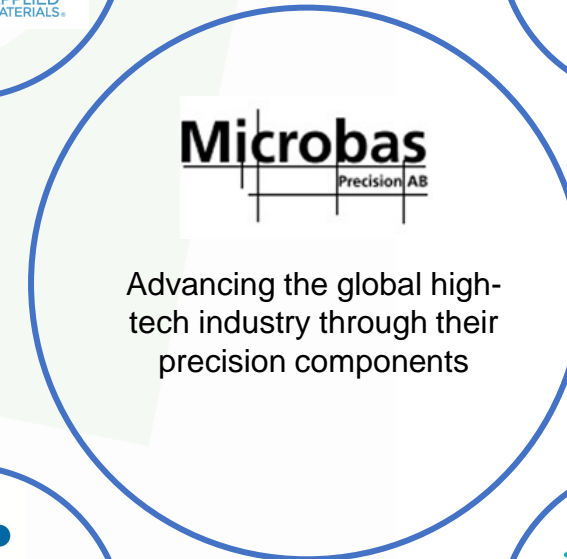
Section 1: The Big Picture



Precision
Sustainability



Industry 4.0



MakinaRocks

Intelligent Industrial tech,
delivered as transformative
solutions



for to

Advanced supply chain
platform provider



Circular

Traceability for industrial
supply chains



Microbas

Precision AB

Advancing the global high-
tech industry through their
precision components

CarbonScape

Sustainably engineered
graphite produced from
renewable feedstocks.

CLEARWORLD ENERGY



Myriota

Provides IoT connectivity
without the need for any
ground-based
infrastructure.

BOEING **HORIZONX**

Greenbird

Big Data iPaaS in the
Utility Sector, providing
sustainable data-driven
services



metalenx

TRANSFORMING LIGHT

Transforming light via
breakthrough flat-
lens technology



pellucere

TECHNOLOGIES

Advanced optical coatings

FORTISTAR



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1. Taxonomy of Precision Sustainability

Precision is crucial in ensuring sustainability

Enabling advancements in sustainable technology





- Advancements in manufacturing precision have enabled the innovation of technological solutions to climate change, which were not possible using traditional machinery.
- This is partly because precision manufacturing has enabled companies to produce components with very tight tolerances, which has also reduced the process costs.

Making the overall process chain sustainable

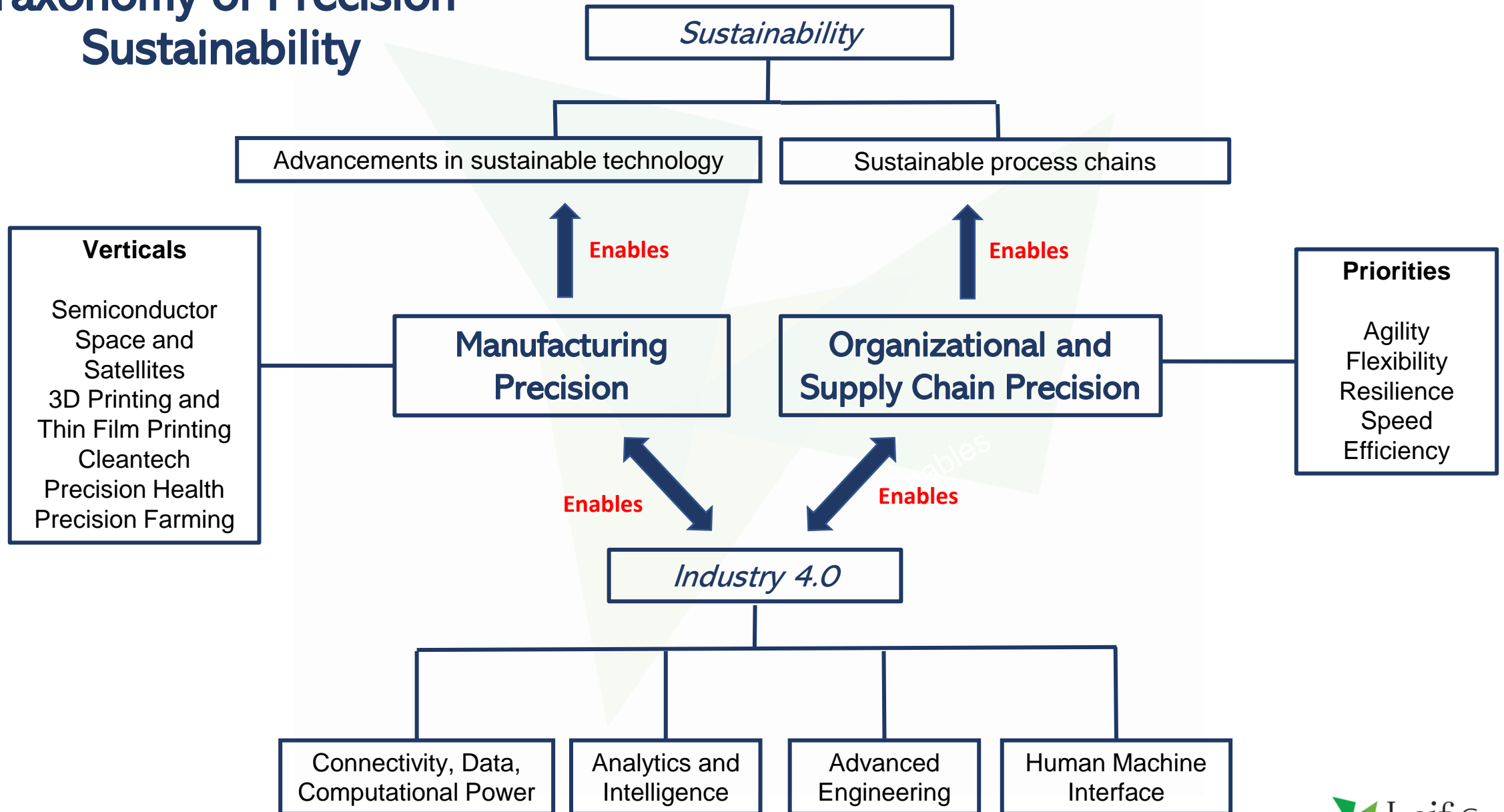
- Precision machining, such as CNC machining technology, reduces the amount of waste produced.
- Improving supply chain precision results in greater transparency, which reduces inequalities, especially for those at risk. This leads to more responsible consumption and production.
- Supply chain precision also lowers the carbon emissions and waste produced along the supply chain.



Precision sustainability has been accelerated by the 'Great Reset'

What has changed in the world?	What are the shifts stemming from these challenges?	What is the role of precision in each shift?	How will each shift promote sustainability?
Demand uncertainty and disruptions are challenging planning systems	 Agility and Customer Centricity	Precision manufacturing companies can adapt to increased mass personalization at a low cost.	Increased agility will result in fewer discarded and wasted products during disruptions.
National security interests, trade barriers and logistics disruption will demand alternatives to globalized supply chains Disruption of global manufacturing and supply chains are challenging manufacturers	 Supply Chain Resilience	Precision in a supply chain, through the increased use of tracking data, will improve the supply chain's accuracy and minimize disruptions.	A precise and resilient supply chain minimizes waste and allows for greater transparency.
Forced transition to remote management and digital collaboration , displacement of large parts of workforce Economic recession necessitates rapid operational and capital cost reduction	 Speed and Productivity	The increased organizational precision of a company, through digitization and IoTs, will streamline operations and increase productivity.	As manufacturing processes become faster and more productive, the rate of innovation for new sustainable technologies will also increase.
Increased global concern for environmental impact of human activities	 Eco-efficiency	Precision enables advancements in the Cleantech industry and makes the overall value chain more sustainable as waste is minimized and transparency increased.	Responsible consumption and production is promoted.

Taxonomy of Precision Sustainability



Pillars of Precision

Precision is defined as: “the quality, condition, or fact of being exact and accurate”.



Manufacturing Precision

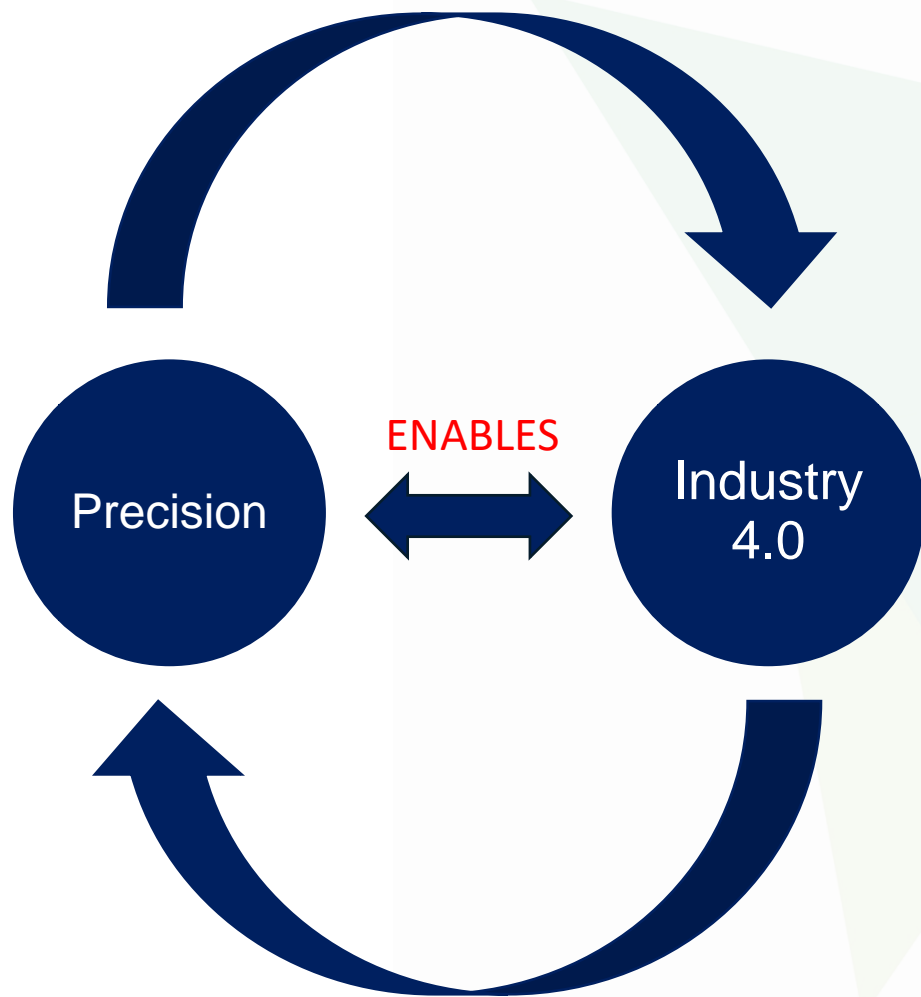
- The precision of the machinery used in manufacturing.
- Defined in this report as Micro, Nano and Optical (M,N,O) precision.
- Micro precision is measured in microns where one micron is one-millionth of a metre; the width of a human hair is around 70 microns.
- Nano precision is conducted at the nanoscale, where 1 nanometre is one billionth of a meter.
- Optical precision is the use of wavelengths of light, measured between 4,000-7,000 angstroms where one angstrom is 0.1 nanometre.



Operational and Supply Chain Precision

- The precision of the company's business model, administrative processes, warehouse logistics and supply chains, both between suppliers as well as clients.
- This is achieved through digitization and the increased use of data to improve efficiency and tracking along the value chain.





There is a Virtuous Cycle Between Precision and Industry 4.0

Industry 4.0 is enabled by the Internet of Things (IoT) and the Internet of Systems (IoS), both of which is advancing thanks to Precision Manufacturing. Aspects of Organizational Precision, such as Precision Data, also underpin this revolution within industry.

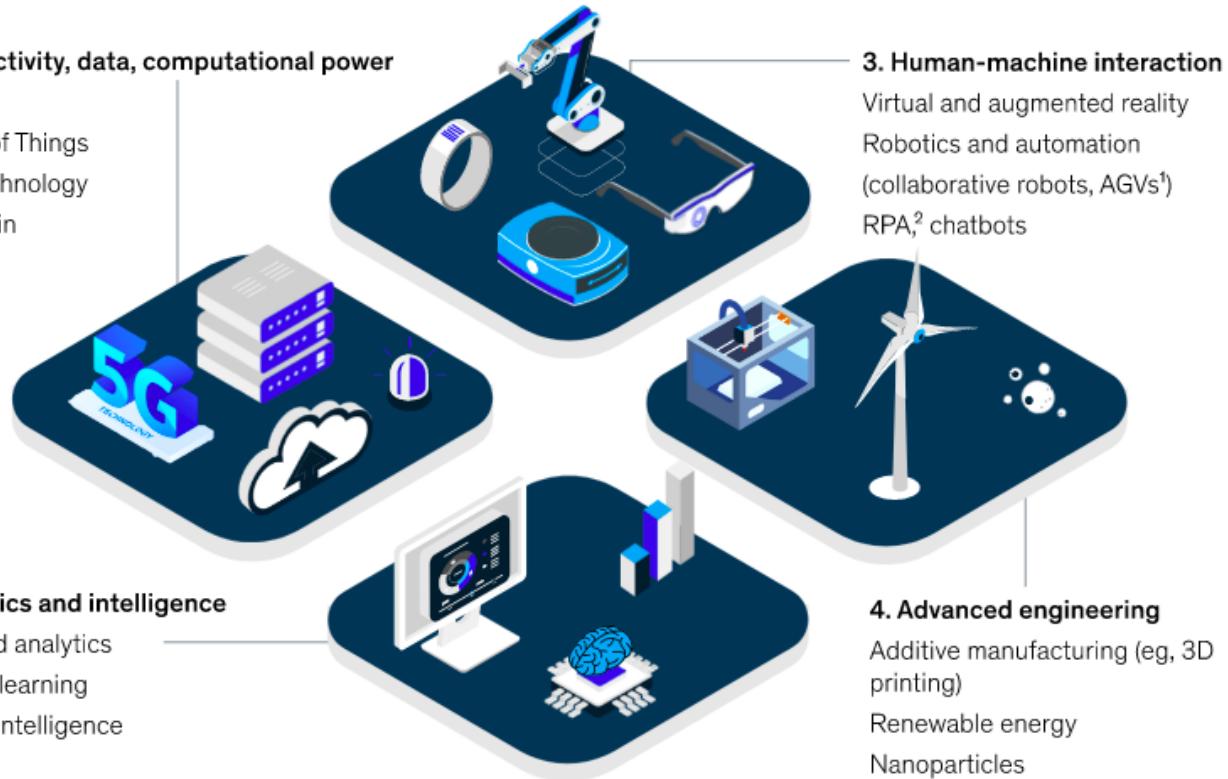
Precision and Industry 4.0 have a virtuous relationship. They enable each other simultaneously. The effective digitization of manufacturing requires extreme precision, whilst innovation within Industry 4.0 technologies enables Manufacturing, Organizational and Supply Chain Precision.

Industry 4.0 Technologies as Enablers of Precision

Industry 4.0 is characterized by 4 foundational technologies applied along the value chain.

1. Connectivity, data, computational power

Sensors
Internet of Things
Cloud technology
Blockchain



2. Analytics and intelligence

Advanced analytics
Machine learning
Artificial intelligence

3. Human-machine interaction

Virtual and augmented reality
Robotics and automation
(collaborative robots, AGVs¹)
RPA,² chatbots

4. Advanced engineering

Additive manufacturing (eg, 3D printing)
Renewable energy
Nanoparticles

¹Autonomous guided vehicles

²Robotic process automation

Connectivity, data, computational power*

- Enables the value chain to be more precise and efficient,
- Enhanced machine monitoring and automated decision-making saves time
- IoTs provide affordable yet powerful storage, transmission and processing.
- The cost of IoTs has also drastically reduced and is expected to continue to decrease.**

Analytics and Intelligence

- AI and Machine Learning (ML) design optimizes material use and function.
- Advanced manufacturing techniques like 3D printing enable AI and ML designs to be realized.

Human – machine interaction

- This interaction can both reduce human error and increase the precision of tasks.**

Advanced engineering

- Increases the level of accuracy and precision in manufacturing.
- Additive manufacturing has been able to progress thanks to advancements in precision.
- Far more cost-effective solutions are being discovered in advanced robotics ,energy storage and harvesting

“In all industrial revolutions throughout history, it has been **precision engineering that has driven success**, turning seemingly impossible ideas into cost-effectively produced products and components. It is our view that when it comes to **sustainable energy**, the same pattern will develop.”

David Billington, Executive Director of euspen (European society for precision engineering and nanotechnology)

The background of the slide features a lightbulb on the left and four stacks of gold coins of increasing height on the right, all set against a blue gradient background. A semi-transparent white circle is positioned over the lightbulb and the first two stacks of coins. The text "2. Growth Opportunities" is centered within this circle.

2. Growth Opportunities

Shift in Priorities Calls for Supply Chain Precision

Due to ongoing disruption in supply chains during the pandemic, agility, flexibility, and manufacturing efficiency are common priorities for all sectors.*

The pandemic has confirmed that digitization is most effective when it extends beyond the walls of an organization. More companies are investing in technologies which aid collaboration and visibility across the end-to-end supply chain,

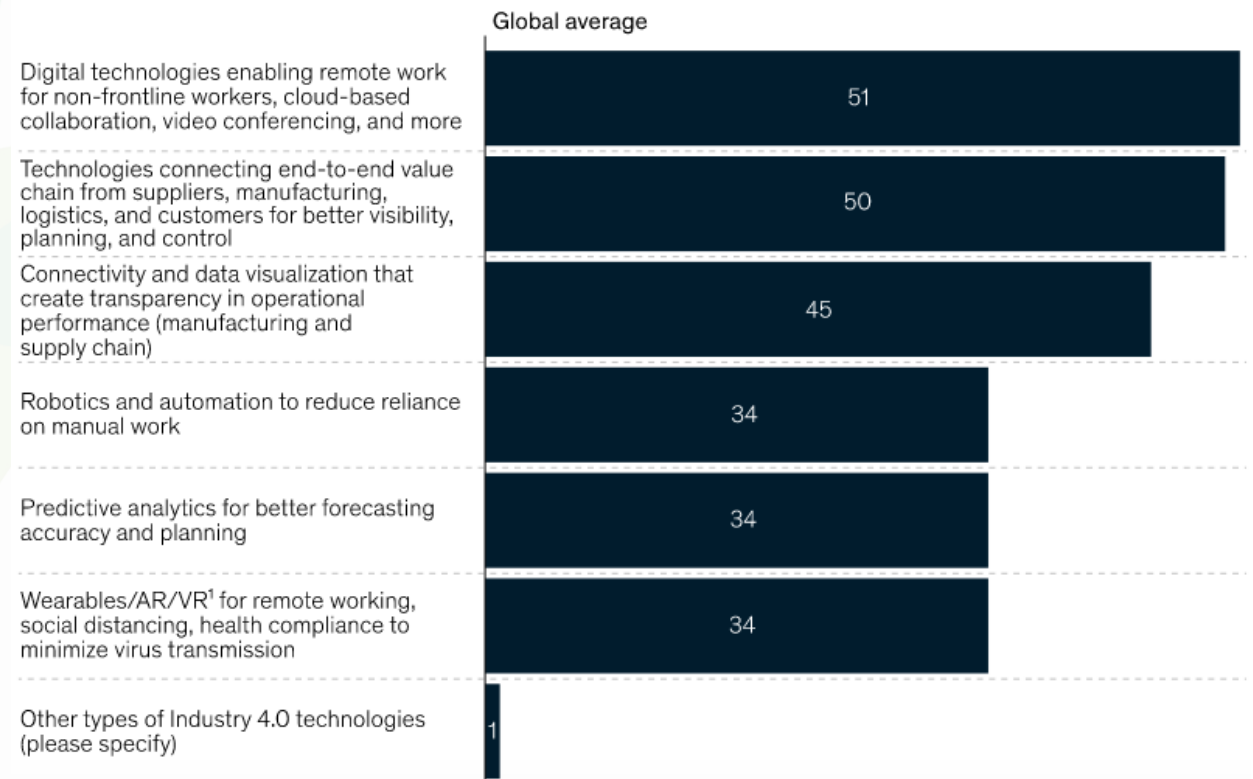
The management consultancy McKinsey affirms that “supply chains need to become much faster, more granular, and much more precise.”**

This has led to greater focus on Supply Chain 4.0**, which stems from the Industry 4.0 framework and involves “the application of the Internet of Things, the use of advanced robotics, and the application of advanced analytics of big data in supply chain management”.

Remote work, supply-chain connectivity, and operational transparency are major focus areas for Industry 4.0 technologies.*

Which technologies are you focusing on the most when implementing Industry 4.0 use cases?

Respondents, %



Manufacturing Precision Enables Sectors Worth Over \$1.3 Trillion



Semiconductor

Global market size:
\$425.96 bn in **2020**.

Projected to reach
\$803.15bn by **2028**.

Precision manufacturing provides this industry with custom, high-quality, cost-effective solutions.



Space and Satellites

Global market size:
\$13.9bn in **2016**.

Projected to reach
\$9.75bn by 2027
with **18.99%** CAGR.

Precise and accurate time measurement is required to determine exact locations used for earth observation.



3D Printing & Thin Film Printing

3D printing market is projected to reach
\$40.8bn by 2024

Global thin film and printed battery market size is projected to grow to **\$296mn** by **2025** with **24.7%** CAGR.

Precision increases range of materials available, the reduction in cost, and advances additive manufacturing.



Cleantech

Cleantech global market projected to reach **\$452.8bn** by **2027**.

Thin-film solar PV is projected to grow with **23.02%** CAGR 2020 – 2025.

Precision manufacturing increases the efficiency and environmental impact of sustainable solutions within cleantech.



Precision Health

Projected to reach **\$9.40 bn** by **2027** with **7.90%** CAGR.

Precision improves the preventing, diagnosing, and treating of a wide range of diseases.



Precision Farming

Global market size was **\$6.00 bn** in 2020.

Projected to reach **\$16.35 bn** by **2028** at a CAGR of **13.1%**.

Precision helps to monitor and reduce the environmental impact of farming.

Virtuous Cycle between Industry 4.0 and Precision: a \$4 Trillion Opportunity



Digitisation and IoTs

The application of IoTs is projected to generate **\$1.2 to \$3.7tn** of value globally by **2025**.



Analytics and Intelligence

Global artificial intelligence market size is projected to reach **\$228.3bn** by **2026**.

Global machine learning market size is projected to reach **\$152.24bn** by **2028**.



Human-Machine Interface

Valued at **\$4.3bn** in **2020**

Projected to reach **\$5.6bn** by **2025**, growing at a CAGR of 5.2% from 2020 to 2025.



Additive Manufacturing

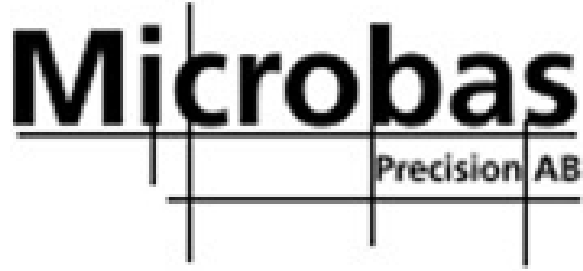
The additive manufacturing market is projected to reach **\$51bn** by **2030**.

A person wearing a blue protective suit, hood, and mask is working on a piece of electronic equipment. The person is wearing white gloves and is focused on the task. The equipment has various wires and components visible. The background is dark and out of focus.

3. Case Study: In Focus

Microbas
Precision AB

Advancing the global high-tech industry through their precision components



- Microbas is a Swedish precision manufacturing and lapping company, which has world-leading capabilities in creating optimal precision in a wide range of materials.
- Microbas' sectors of expertise include Semiconductors and displays, Metrology, Cleantech, Life Sciences, Machinery and Mechatronics, as well as Aerospace and Optics.
- The combination of lapping, grinding and measurement within the same company enables micron-mechanical precision.

Techniques

Precision lapping

An abrasive method where a lapping tool and a slurry is used to make objects with fine tolerances in flatness and parallelism.



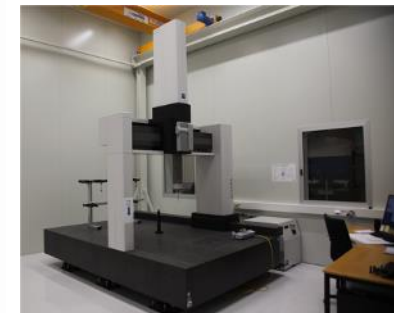
Grinding and Milling

Microbas has an extraordinary set of CNC milling and grinding machines in terms of size and capabilities.



Metrology & Quality Assurance

High precision tools are used multiple times daily to accurately ensure the correct result at the micron level.

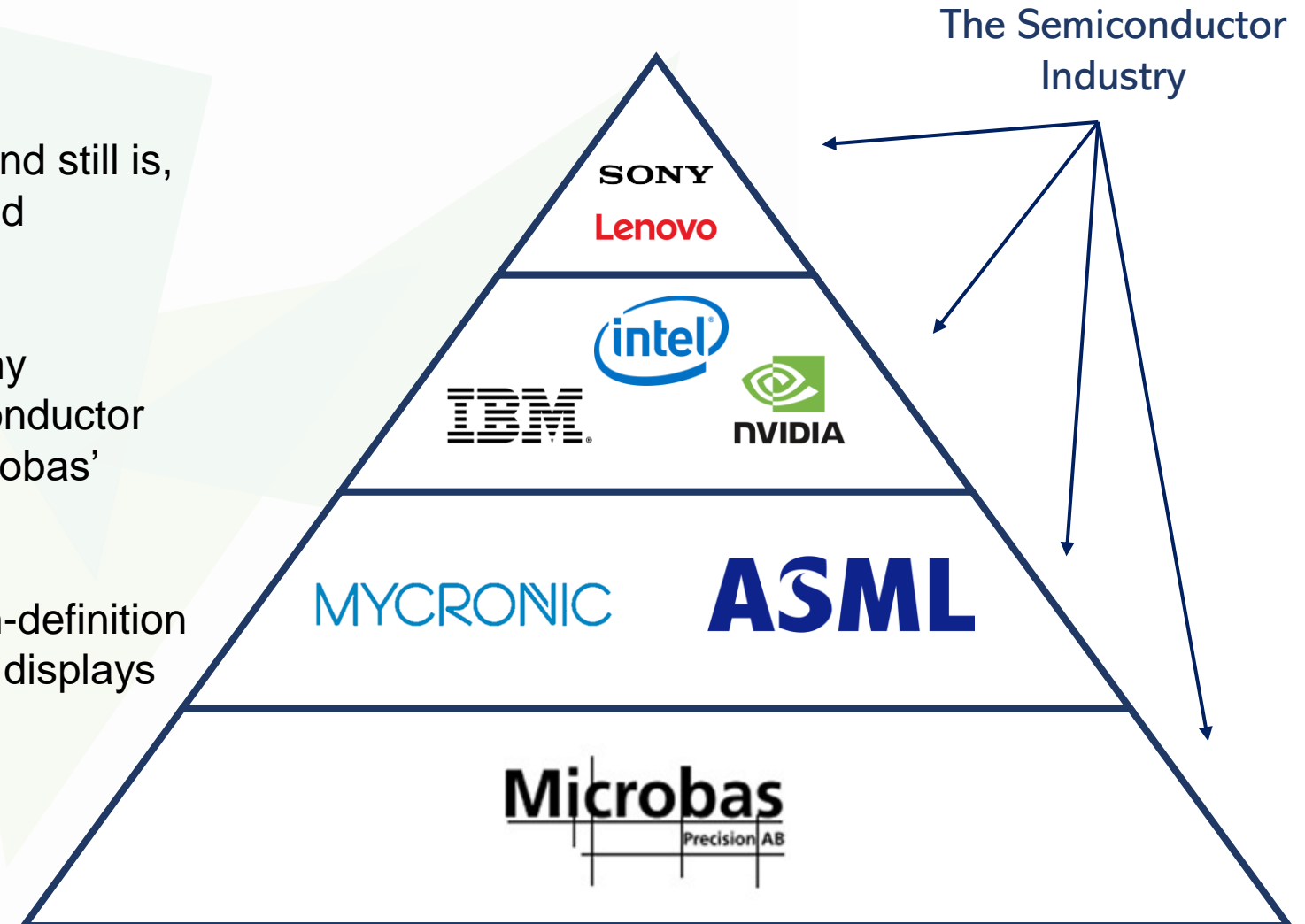


Microbas Lies at the Foundation of Precision Engineering

Microbas has for the past 20 years been, and still is, at the forefront of display manufacturing and semiconductor manufacturing.

The manufacturing of Mycronic's lithography machines, which are used by many semiconductor and display manufacturers, starts with Microbas' precision.

Mycronic has been responsible for the high-definition resolution of 98% of the world's flat screen displays for TVs, phones and laptops.



Microbas is at the Forefront of Several Industries which Promote Sustainability



Semiconductor

Their ultra-stable machine bases in Zerodur and diabase result in world-leading pattern generators.



Space and Satellites

Their capabilities in lapping glass ceramics (Zerodur, CLEARCERAM-Z, ULE, Sital) is essential for this sector .



3D Printing & Thin Film Printing

Their high precision techniques enable 3D-printer manufacturers to optimize their supply chain.



Precision Machining

They are a clear market leader in lapping, grinding and CNC machining.



CleanTech

They provide the precision required for clean technology solutions, such as solar PV or waste heat recovery engines.

Microbas' value

Link to Sustainability

The sustainable value provided by the semiconductor industry offsets any environmental challenges faced in the production process.

Satellites used for earth observation can monitor the outcomes of sustainable development programs and locate sources of contamination more accurately

3D printing minimizes waste and enables sustainable production through recycled materials and end-of-product-life-cycle solutions

Precision machining drives innovation in sustainable technology and enables mass personalization of products, which minimizes waste.

Cleantech provides solutions to global environmental challenges, such as climate change and scarcity of resources.

Case Study: Microbas is Enabling the Thin Film Revolution



FOM technologies produces and sells cutting-edge slot-die machines and equipment used for slot-die coating; a new precise method for depositing a thin liquid film to the surface of a substrate.

Slot-die coating enables researchers, scientists, and professionals, to discover, develop and commercialize new functional materials for a cleaner and more sustainable world.

What is Microbas' role?

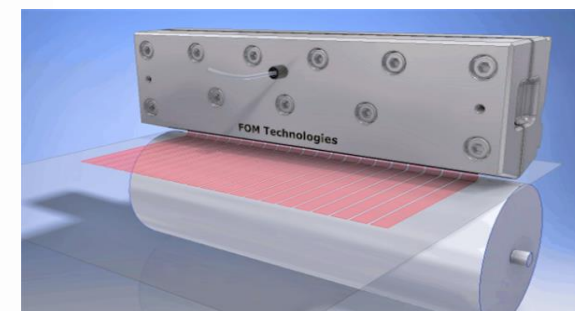
FOM contacted Microbas because they knew that Microbas understood the concept of 5 microns and could provide them with the level of precision they required.

Microbas applied their knowledge of lapping, that they used for granite processes, to FOM's new material. In Thin Film Printing it is essential to keep the tolerances of the printer head as small as possible, and Microbas is one of very few companies, globally, that can achieve this.

Why is FOM Technologies relevant?

Slot-die coating already has applications in some of the world's most important commercial products, but what's even more exciting is its increase in lab-scale R&D applications in recent years.

FOM Technologies coating equipment is now supporting cutting-edge research into 3rd generation solar cells, OLED and electrochromic devices, fuel cells, batteries, sensors, membranes, printed electronics, medical diagnostics, conductive thin films, and more.



“Creativity through Craftsmanship”

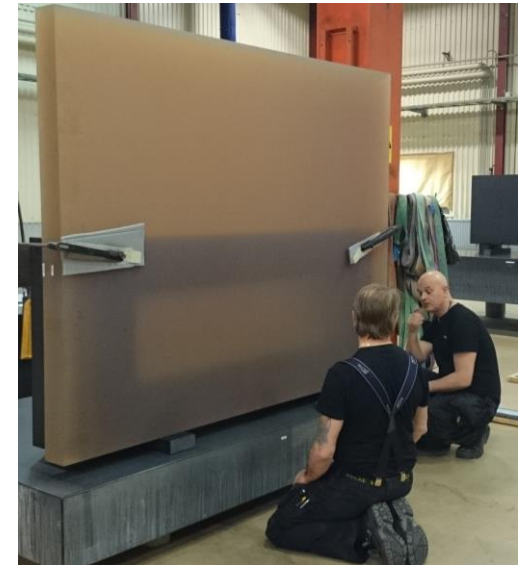
Advancements in precision are often credited to the tremendous power of data and digitization.

However, it is important and refreshing to remember that human craftsmanship is still very much part of the process.

For their lapping process, Microbas uses precision lapping machines as well as manual lapping. The Senior Lapper at Microbas, **Benny Persson**, explains that manual lapping enables them to be adaptive in their process as they can feel the material and respond quickly to any unexpected issues. The work of Microbas, which involves managing material risks daily, requires a confident team that doesn't crack under pressure, even if the glass they are working on sometimes does.

Although lapping may be challenging and demanding, Benny Persson asserts that the job is also very rewarding; *“Knowing the Microbas’ precision is enabling cutting edge technologies globally is a great feeling”*.

The increased demand for robotic, determined precision raises concerns that automated lapping machines will eventually completely replace humans in this sector. However, Benny explains that the programming required to ‘train’ an automated lapping system in complex lapping processes remains highly complicated. A master craftsman doing it directly is still somewhat preferable. Benny concedes that automation will eventually prevail. *“It will happen one day but not in my lifetime,”* he says.



A wireframe model of a car is shown on the left, composed of glowing blue lines and dots. To its right is a larger, more complex cloud of similar glowing blue lines and dots, suggesting a network or data structure. The entire scene is set against a dark blue gradient background.

4. Case Studies



Provides the most advanced supply chain platform with data driven logtech solutions



- Forto's platform allows customers to efficiently manage all of their shipments and take proactive actions on exception handling.
- Get instant quote access, online document management, 24/7 track and trace with real time location data and get pro-actively notified on transport changes.
- Forto's logistic solutions include sea freight, air freight, rail freight and multimodal transport.



Reliable

Allows companies to make better business decisions through accurate, real-time data, and achieve 15% higher on-time performance.



Efficient

Streamlines and optimizes logistics processes and reduces overall cost by 15%.



Easy

Minimizes the complexity of the supply chain, and saves customers 30% on administrative work.



Sustainable

Increases the transparency of companies' supply chain, doubles CO₂ compensations, and all Sea LCL shipments are 100% carbon-neutral by default.

System Integration Service

Reduce update delays and eliminate manual errors through seamless and holistic system integration.



Receive and analyze high-quality data from real-time shipment updates via Forto's Event API.



Create shipments and book them automatically via Forto's Booking API.

Backed by



MAERSK
Growth

INV/EIN
CAPITAL

CEZ GROUP



Traceability for industrial supply chains

- Circular provides **Traceability-as-a-Service**, to verify responsible sourcing, underpin effective recycling and to improve efficiency.
- Their service uses Industry 4.0 technology, and includes supply chain mapping, verification, specialist responsible sourcing expertise and implementation know-how.
- Circular supports manufacturers to address the UN Sustainability Goals by tracking carbon emissions, verifying responsible production and reducing inequalities through increased transparency.

Sectors



Plastic Waste and Recycling
Ensures that recyclable waste enters and exits the recycling process successfully.



Extractive Industries

Enables suppliers and buyers to follow raw materials through the production process to ensure that they are not associated with human rights abuses, theft of natural resources or environmental damage.



Electronic Waste

Circular's platform can ensure closed loop recycling and responsible disposal of electronics.

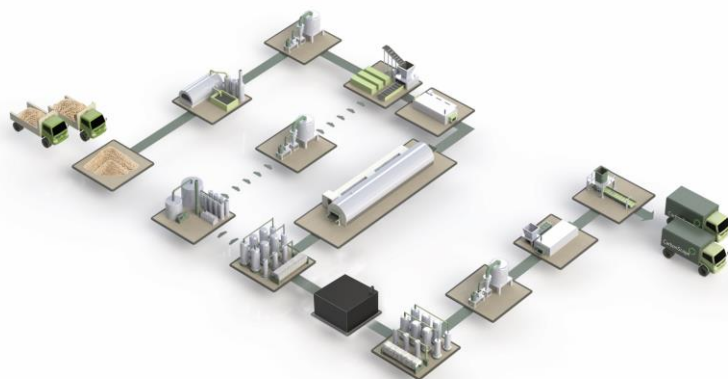


Agriculture & Industry
Tracks the provenance of any material, such as palm oil, cotton, beef and timber, allowing users to demonstrate sustainable sourcing and recycling practices.





Process




- Thermo-catalytic patented technology is a proprietary process developed 100% in New Zealand
- “Our economic advantage comes not only from utilizing low-cost forestry residue, but in a technology operating at less than half the 3000°C temperature of modern synthetic processes”

Enabling Sustainable Battery Technology



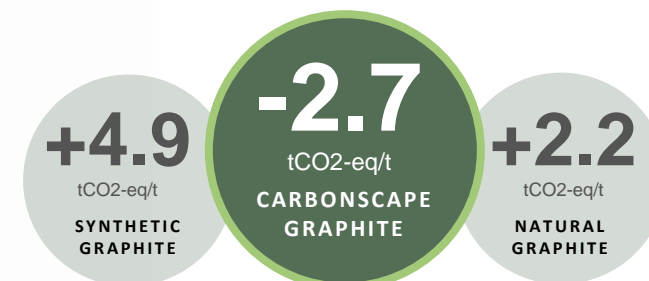
- CarbonScape has developed a patented technology and process to produce graphite from renewable feed-stocks, to be used as lithium ion battery anode material (BAM)
- The demand for graphite is set to increase tenfold by 2040, and is currently only sourced from non-sustainable practices, along a supply chain which is prone to disruption.
- CarbonScape’s engineered graphite is sustainably produced at a competitive cost with negligible environmental impact and is carbon negative.
- CarbonScape has good market traction with cell and battery manufacturers in the consumer products and EV supply chain.

Product

	CarbonScape 	Synthetic	Natural
Production time	Hours	Very long (months)	Long
Performance	High	High	Low
Customisable	Yes	Yes	No
Cost to Manufacture	Low	High	Low
Sustainable	Yes	No	No

- Benefits include:
- Carbon negative footprint
- Renewable feedstock
- Shortens and localises the supply chain
- Price competitive with synthetic graphite
- Equal if not better lithium-ion battery performance compared to synthetic graphite

Carbon Reductions



Backed by:

CLEARWORLD ENERGY



Danny Chan Investments





Transforming light via breakthrough flat-lens technology

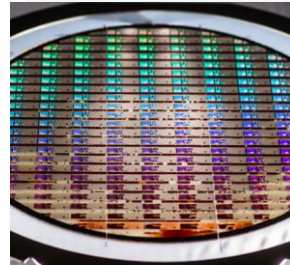
- Commercializing a revolutionary flat optical technology and transforming optical sensing in consumer electronics and automotive markets.
- Meta-optics are fabricated using standard semiconductor processes resulting in an ability to produce meta-optics in mass volume with a single step of optical lithography and with high manufacturing yield.

Products



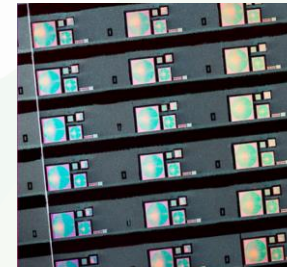
Imaging Lens

Outperforms multi-element refractive lens systems for many 3D sensing imaging systems.



Illumination Optics

Provide improved eye safety, better part-to-part repeatability and no variation in performance over wide temperature ranges.



Pattern Generators

Provide the ability to, in a single element, convert a VCSEL array or laser diode into a dot pattern, which determine the accuracy in structured light.



Orion

Replaces refractive lens and diffractive element optical stacks with a single meta-optic, enabling 3D depth sensing.

Applications

Mobile Devices



AR/VR



Automotive Sensing



Backed by





Develops and manufactures advanced optical coatings for a wide range of energy and industrial needs



- The Pellucere Technologies include MoreSun, a patented solar coating and application system, and Talus Dirt Rejection Technology, which uses silica-based coatings to prevent dirt and dust from adhering to a surface.
- Pellucere Technologies is also actively developing a number of new coatings products that build on its core nano-technology such as architectural grade window coatings, military-grade dirt rejection shields, high-definition AR coatings, and lens AR coatings.

Products



- The world's only anti-reflective, anti-soiling, field-installable solar coating.
- In direct axis light **MoreSun®** outperforms leading competitors by more than 30%.



- Optimizes the unique physical properties of their silica shield's nano-structure to prevent the build-up of dirt, dust and other particulates more effectively than any commercially-available anti-soiling solution.
- Incorporated into MoreSun® and other Pellucere Technologies products used in construction, vehicles, agriculture, mining, construction and defense industries.

Backed by



Energy
Innovation
Capital

FORTISTAR



Leading Big Data iPaaS to the Utility Sector to provide sustainable data-driven services

- With pre-built integration flows, connectors and its energy data mesh, the Utilihive platform simplifies the complexity of Big Data Integration for utilities to start their digital transformation faster.
- Greenbird also offers their platform Cloudwheel, a proven integration Platform as a Service (iPaaS) offered as a managed service enabling rapid digital transformation and fast time to market for any organization driving innovation with new services and products.
- Advanced software solutions for controlling generation and consumption of power will be crucial for enabling a future with a substantial shift towards clean energy.

Utilities



Optimize Grid Operation

Embrace technology for predictive maintenance and self-healing grids.



Embrace Data Economy

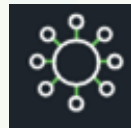
Future profitability will be determined by the ability to fully utilize data from the digital grid infrastructure.



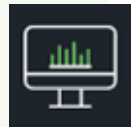
Enable Smart Cities

Driving innovation for smart cities, the energy revolution and shift to renewable energy sources.

Utilities



Transforms Utilities into platform operators, enabling the energy revolution by managing the data flow faster and more smoothly.



Drives innovation by connecting new software solutions without the need to code.



Greenbird's technology is cloud native and built to scale.

Backed by

nysnø
Climate Investments

EnBW
New Ventures

etf
partners

Statkraft



Provides low cost IoT connectivity without the need for any ground based towers or other infrastructure

- Global leaders in low-cost, low-power, secure direct-to-orbit satellite connectivity for the Internet-of-Things.
- Myriota has pioneered a new way to retrieve data from anywhere on earth, either on land or at sea.
- Myriota delivers secure, long battery life connectivity at a reduced cost and with simpler deployment, maintenance and network management.

Technology

1. Low-power Myriota Modules

Securely transfer data direct to the cloud via their nanosatellites, without the need for ground-based infrastructure, and contain patented technology which saves power and delivers long battery life.

2. Low Earth orbit nanosatellites

Can simultaneously listen to massive numbers of almost imperceptible signals from Myriota Modules.

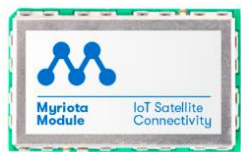
3. Information transfer to the cloud

Messages are securely received by a global network of satellite ground stations and processed by software hosted in the cloud.

4. Data distribution

Data from Myriota Modules is accessible via their cloud API anywhere in the world.

Products



Myriota Module



Myriota Sense & Locate



Myriota Developer Toolkit



Myriota IoT Connectivity

Backed by

Singtel innov8 IQT

IN-Q-TEL

BOEING HORIZONX



MakinaRocks

Process

1. Customized ML

Predicts equipment failures and product defects successfully, and develops autopilot capabilities with data points in Anomaly Detection and Intelligent Control.

2. Operational ML Platform

Makes ML models fully operational in a dynamic manufacturing environment through model management, update, monitoring and labelling.

3. Scale

Helps manufacturing enterprises migrate to the cloud with their cloud service provider (CSP) partners.

Solutions

Anomaly Detection Solution

Identifies various anomalies which may occur during the manufacturing process and aids in scoping out the root causes.

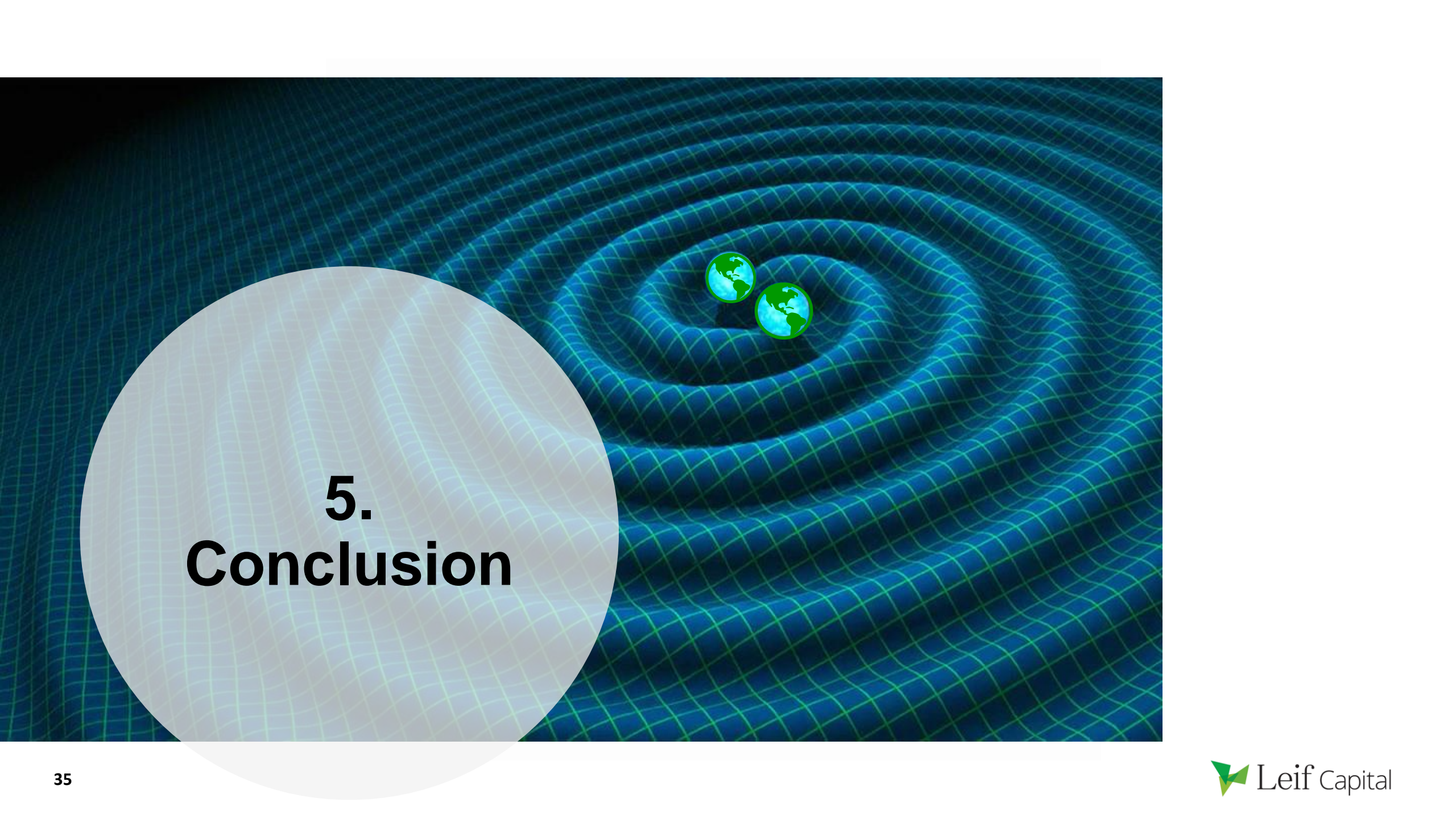
Intelligent Control Solution

Provides autonomous and optimizable data- and ML-driven control options for a wide range of industrial applications.

Backed by



HYUNDAI



5. Conclusion



Conclusion

Approximate isn't good enough. Today, all sustainability must be precise. Near miss 'good efforts' are very cleantech 1.0.

We hope you've enjoyed the report. If you're active in precision sustainability, we'd like to meet you. Please get in touch.

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Appendix for Market Sizes of Manufacturing Precision (Slide 9) and of the Enablers of Precision (Slide 12)

Sector	Source
Semiconductor	https://www.fortunebusinessinsights.com/semiconductor-market-102365
Space and Satellites	https://www.reuters.com/brandfeatures/venture-capital/article?id=12921 & https://www.globenewswire.com/en/news-release/2021/05/10/2226336/0/en/Small-Satellite-Market-Size-to-Reach-USD-9-75-Billion-by-2027-Communication-and-Navigation-Satellites-High-Demand-to-Augment-Market-Growth-Says-Fortune-Business-Insights.html
3D Printing & Thin Film Printing	https://www.statista.com/statistics/315386/global-market-for-3d-printers/ & https://www.marketsandmarkets.com/Market-Reports/printed-thin-film-battery-market-660.html
Cleantech	https://www.globenewswire.com/news-release/2020/09/04/2089187/0/en/Global-Clean-Energy-Technologies-Industry.html & https://www.mordorintelligence.com/industry-reports/global-thin-film-solar-collector-market-industry
Precision Health	https://www.databridgemarketresearch.com/reports/global-lab-on-a-chip-market
Precision Farming	https://www.prnewswire.co.uk/news-releases/precision-farming-market-size-worth-16-35-billion-by-2028-cagr-13-1-grand-view-research-inc--870804390.html#:~:text=Worldwide%20Offices-,Precision%20Farming%20Market%20Size%20Worth%20%2416.35%20Billion%20By%202028%20%7C%20CAGR,%25%3A%20Grand%20View%20Research%2C%20Inc.&text=Grand%20View%20Research%2C%20Inc.,-22%20Apr%2C%202021
Digitisation and IoTs	https://www2.itif.org/2018-manufacturing-digitalization.pdf
Analytics and Intelligence	https://www.prnewswire.com/news-releases/global-artificial-intelligence-ai-market-to-reach-228-3-billion-by-2026--301293951.html#:~:text=Amid%20the%20COVID%2D19%20crisis,32.7%25%20over%20the%20analysis%20period. & https://www.fortunebusinessinsights.com/machine-learning-market-102226
Human Machine Interface	https://www.marketsandmarkets.com/Market-Reports/human-machine-interface-technology-market-461.html?gclid=CjwKCAjwwqaGBhBKEiwAMk-FtIPYwwOcR0yZt9e5CcuISt5rJSIjVFfUSJ8JT9xndc1M6dcAwiKcBRoCYtEQAvD_BwE
Additive Manufacturing	https://www.metal-am.com/am-market-forecast-to-reach-51-billion-by-2030/