

# Impact Beyond Orbit

Marks & Clerk and Space Network on the dual-purpose value of space tech innovation



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# Foreword



**Andy Campbell**

Founder & CEO  
Space Network

The Space sector is experiencing unprecedented and transformative growth, characterised by commercialisation rather than purely government-funded exploration, with private capital driving rapid advancements. Greater opportunities present fresh challenges. The competition to secure investment has become more intense than ever before.

The following content from leading, international intellectual property firm Marks & Clerk, highlights how space-driven technology has transitioned from a distant scientific pursuit to a driver of social and environmental change.

At the Space Network, our mission is to support the global growth of a resilient and innovative space ecosystem. Central to that mission is the recognition that groundbreaking research can only reach its full potential when it is supported by commercial expertise. Marks & Clerk's deep technical knowledge is exactly what is required to translate complex innovation into protected, commercial reality. Even the most transformative research risks failing without a robust IP strategy. We are proud to have worked with Marks & Clerk since Space Network's inception, and their partnership and market leading expertise continues to prove invaluable to our members.

The Space sector is a market of immense potential, and investors should view the landscape as ripe for growth and return, particularly where the underlying IP is protected with the same precision and technical depth applied to the science.

As you read through these insights, you will discover how the innovations born from space-tech – medical breakthroughs, water purification and global connectivity – are solving some of our most pressing societal challenges. Space is no longer just a destination. It is a catalyst for a better, more sustainable world. We are proud to be a part of this journey, and we hope this series inspires you to see the domain of space as a source of endless high-value solutions.



# An international outlook



## Canada

“The Canadian space sector is evolving rapidly, with exciting developments happening across the industry. Notably, Canada is quickly developing sovereign launch capability, making the country a key player in the global space market. The Canadian government has also pledged \$1.3 billion in investments to support development of space-related technologies including navigation, satellite communication, Earth observation, space exploration and space science, and dual use technologies related to the space and defense sectors. Our Impact Beyond Orbit campaign highlights expertise from our colleagues in Canada, including a discussion on Canada’s role in space-driven technologies like Medical Imaging Enhancements and Infrared Thermometers.”

- Wilfred So, Senior Patent Agent

## Singapore

“Singapore is increasingly becoming a hub for space-enabled innovation, and the establishment of the National Space Agency of Singapore shows the nation’s ambition to expand its domestic capabilities and play a meaningful role in the global space community. In a context whereby the global space sector is projected to increase from \$630 billion in 2023 to \$1.8 trillion by 2035, Singapore’s existing strengths in advanced manufacturing, AI and microelectronics make it an ideal setting for an Asia-Pacific launchpad. Our Impact Beyond Orbit campaign highlights expertise from our colleagues in the region, including a discussion on Singapore’s role in space-driven technologies like 3D printing.”

- Daniel Poh, Partner

## UK & Europe

“Space-driven innovation represents a significant and immediate commercial opportunity. The UK already demonstrates exceptional scientific strength, ranking second globally for highly cited space science publications and hosting a broad ecosystem of universities, observatories and contributors to major international missions. However, this capability is arguably not translating into comparable commercial success, with UK patent filings in key space technologies lagging behind peer economies and public investment falling short of the nation’s proven expertise. For investors, this gap between scientific excellence and market realisation signals a sector rich in untapped potential, where advances made for space frequently yield transformative applications on Earth. Engaging early with innovative research groups and start-ups can therefore offer substantial long-term value, and our firm stands ready as the intellectual property partner that ensures this innovation is investment-ready and positioned to achieve its full commercial impact.”

- Phil Merchant, Principal

# Contents

## Materials & manufacturing

- Prosthetics powered by space innovation
- Measuring Success: Precision Measurement Instruments Find Uses Spanning Orbits to Eyewear
- ESA to analyse first metal parts manufactured in space.
- 3D Printing in Space and Singapore's Role

## Data, imaging & sensing

- The Voyager spacecraft had compressed images of rice on board...?
- MRI's to Infrared Thermometers: How NASA Technology Transformed Modern Healthcare

## Tools & hardware

- From Moon Missions to Modern Workshops: The Evolution of NASA's Cordless Drills and Their Earthbound Impact

## Earth observation & climate

- Satellites and the triumphs of modern weather forecasting and climate models

## Environmental & life-support

- Water purification in space
- Space technologies for food securities

## Authors





# Materials & manufacturing

## Prosthetics powered by space innovation



Click the titles to explore the full articles

Originally developed to insulate NASA's Space Shuttle, specialised foam has become a vital material in modern prosthetic manufacturing. Its light weight, strength and machinability enable the creation of highly accurate limb models, resulting in prosthetics that offer improved fit, comfort and mobility for amputees.



## Precision measurement instruments find uses spanning orbits to eyewear



Originally developed to ensure the James Webb Space Telescope's optical surfaces met extraordinary precision requirements, advanced interferometry systems from 4D Technology now support high-end commercial optics, from cameras to VR headsets. This article highlights the engineering behind these tools and the vital role of IP protection in enabling their post-NASA commercial success.

# ESA to analyse first metal parts manufactured in space



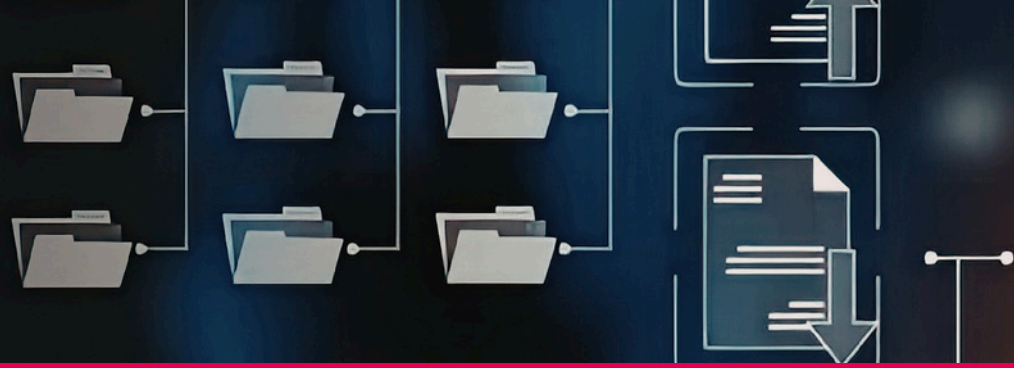
ESA's first metal 3D printer aboard the ISS demonstrates how wire-based laser deposition enables safe, high-temperature manufacturing in microgravity. The system overcomes significant thermal, atmospheric and containment challenges while producing test samples for microscopic, X-ray and tensile analysis – marking an important step toward future in-orbit fabrication and associated IP opportunities.

# 3D Printing in Space and Singapore's Role



In-space manufacturing has progressed from fused-filament plastic printing to metal deposition, regolith-based materials and early bioprinting breakthroughs. Alongside Singapore's recent satellite experiments with 3D-printed structures, these advances support greater mission self-sufficiency and point toward a future where crews fabricate tools, components and even biological tissues directly in orbit.





# Data, imaging & sensing

## The Voyager spacecraft had compressed images of rice on board...?

NASA's Voyager mission prompted the creation of the Rice data-compression algorithm, enabling highly efficient, lossless image transmission across vast distances. The method simplified compression, outperformed earlier Huffman-based approaches, and later spun out into patented commercial hardware. Modern variants remain widely used, including in medical imaging and lossless JPEG formats.

## MRI's to infrared thermometers: how NASA technology transformed modern healthcare



From digitally enhancing lunar images in the 1960s to refining infrared sensing for measuring distant stars, NASA's imaging innovations now underpin essential medical technologies. MRI, CT scanning, non-contact thermometers and multiple diagnostic instruments trace their origins to space-driven research, demonstrating how advances in signal processing and sensor design have shaped modern healthcare.



## Tools & hardware

### The evolution of NASA's cordless drills and their earthbound impact

NASA's need for a compact, low-power lunar drill drove breakthroughs in cordless tool efficiency that later shaped mainstream devices from rechargeable drills to the Dustbuster. With new silicon-anode battery technologies offering higher energy density and faster charging, innovation now flows both ways—advancing tools for space missions while improving everyday consumer technology on Earth.



## Earth observation & climate

### Satellites and the triumphs of modern weather forecasting and climate models

Satellite-based Earth observation now underpins modern weather forecasting and climate modelling, providing global, long-term data on temperature, humidity, radiation and environmental change. These systems support aviation, shipping, renewable energy and climate-impact monitoring, offering insights far beyond the capabilities of ground sensors and transforming our understanding of both short-term weather and long-term climate trends.

# Environmental & life-support

## Water purification in space

Water is a precious resource in space, so NASA engineered advanced filtration and purification technologies to recycle wastewater aboard spacecraft. These systems effectively remove microbes, contaminants, and chemicals. Adapted versions are now used worldwide in portable water filters, disaster relief, rural sanitation projects, and home purification systems.



## Space technologies for food security.

NASA's research on microgravity growth, controlled growth chambers, and soilless farming has not only helped astronauts grow fresh vegetables and herbs, it has also inspired real-life applications such as indoor vertical farming, smart home gardens, hydroponics and aeroponics. These real-life applications support sustainable food production and improve food security.

# Authors

## Phil Merchant

Principal  
Chartered (UK) and European Patent Attorney



## Wilfred So

Senior Patent Agent



## Edward Ng

Senior Associate  
Registered (SG) and Chartered (UK) Patent Attorney



## Franziska Luckert

Senior Associate  
Chartered (UK) and European Patent Attorney



## Callum Cook

Associate  
Chartered (UK) and European Patent Attorney



# Authors

Eric McNeil

Associate

Chartered (UK) and European Patent Attorney



Lim Eng Shan

Trainee Patent Attorney



Louise Spillman

Trainee Patent Attorney



Violet Lee

Trainee Patent Attorney



Yun-Hang Cho

Trainee Patent Attorney



Marks & Clerk is the largest firm of intellectual property advisers in the UK and is recognised as one of the world's leading IP firms. Its patent attorneys, trade mark attorneys and solicitors offer a full range of intellectual property services – covering patents, trade marks, designs, copyright and litigation – for clients ranging from SMEs and spinouts to universities and multinationals. The firm's patent attorneys all have scientific or engineering backgrounds whilst its trade mark attorneys advise on all areas of brand protection. Services include: obtaining patent and trade mark protection worldwide; portfolio management; IP strategy and commercialisation; licensing; enforcement; and due diligence. With a network of 15 offices across the UK (eight locations), continental Europe, North America and Asia, and long-established relationships with other leading IP firms worldwide, the firm is able to assist innovators to protect and maximise the value of their intellectual assets on a local and global basis.

Founded in 2023, we've quickly grown into a dynamic hub for all things space related. Space Network is committed to fostering international collaboration and driving innovation on a larger scale. Our mission is simple yet powerful: to advance the commercial growth of the global space sector and integrate space technology across all industries. At Space Network, we are more than just a network - we are ecosystem builders. Our support is grounded in three core pillars: Support | Connect | Fund. We provide tailored business guidance, meaningful connections between talent, suppliers and intelligent funding solutions to empower space companies to innovate, scale and thrive. Our values are the foundation of everything we do.