SpaceScotland

Scotland's Path to Sustainable Space

How Scotland's Space Businesses Are Shaping a More Environmentally Conscious Future for the Sector

Scottish Enterprise

Environmental Task Force

ASTROAGENCY®

Foreword

In the rapidly evolving global space sector, sustainability has emerged as a critical challenge and an opportunity for Scotland to lead by example. Scotland's space ecosystem, with its blend of innovation, expertise and strategic vision, is positioning itself at the forefront of sustainable development.

The case studies presented here showcase Scottish companies pioneering sustainable approaches across upstream and downstream segments. From reducing mass in satellite components to developing eco-friendly propellants and optimising logistics chains, these organisations demonstrate that commercial success and environmental responsibility can advance hand-in-hand.

Space Scotland's Environmental Task Force, through initiatives like the Sustainable Space Challenges (2021) and Space Sustainability and Net Zero Roadmap (2021), provides the framework for capturing and supporting these innovations. We're witnessing the emergence of a distinctly Scottish approach to space sustainability - one that balances technical excellence with environmental stewardship.

These examples represent more than individual success stories; they illustrate Scotland's collective commitment to responsible space practices, in support of wider UK and international space sustainability ambitions. As we address crucial challenges like orbital debris, propulsion emissions and material consumption, Scottish innovation continues to create solutions with global impact.

Together, we're building a space sector that can support the development of the commercial space economy while safeguarding our planet's future - demonstrating how space is providing people, businesses and governments with the tools to meet environmental challenges, mitigate climate risks, and unlock prosperous opportunities.

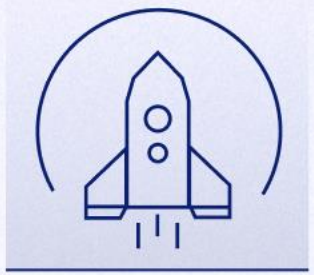
Categories

Each icon in the top-right corner represents the company market category:

AgriTech

Data Analysis

Energy

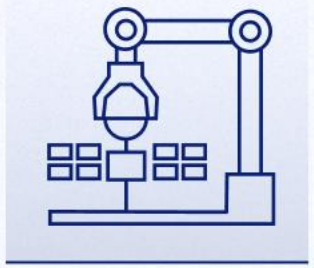


Launch

Logistics

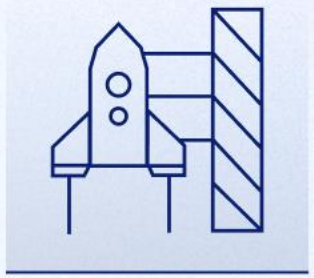
Positioning, Timing, & Navigation (PNT)

Regulatory & Business



Satellite Manufacturing

Space Situational Awareness (SSA)



Spaceports

AAC Clyde Space

Empowering Sustainable Development Across the Globe

From improving global weather forecasting, supporting safer and sustainable oceans, accelerating sustainable development in Mauritius to helping tackle Scotland's decling forest health.

AAC Clyde Space are using **Scottish built satellites** to tackle Scotland's declining forest health for Scottish Forestry.

The spacecraft capture **multispectral images** on a global scale, with a resolution capable of individual tree identification.

The constellation of **Earth observation satellites** will help rapidly and accurately gather and analyse stress, pests, and disease data in trees and wild plants to aid **early detection** at national levels.

Existing solutions include helicoptor surveys which is expensive, time consuming, difficult to replicate and has limited coverage.

AAC Clyde Space's satellites enable **individual tree analysis** at **lower costs** saving customers time and money in the USA and Scotland.

Canopy images collected allows data users to track long and short term changes, **assess tree maturity, monitor plant health** and **perfrom land cover classification.**

- Providing tailored imagery at a resolution of 1.5 metres vs. typical image resolution detail at around 10 metres.
- Multispectral imagery powered across 7 spectrum bands.

Founded: 2005

Headquarters: Uppsala, Sweden
Scotland Location: Glasgow

Expertise: Small satellite technologies and space data services
Contact information: enquiries@aac-clydespace.com

Burges Salmon

Providing Legal Advice to the Space Sector for 25+ Years

Burges Salmon is an independent UK law firm with a wealth of experience supporting and advising clients to be more economically and environmentally sustainable to benefit businesses, people and our planet.

Burges Salmon leverages its **award-winning** cross-practice specialisms, gained in sectors such as energy, infrastructure, technology and the built environment, to bring knowledge and expertise to the **space sector** in order to support both **sustainability** and **commercial** goals.

- **Burges Salmon** has lawyers who specialise in helping clients navigate the **environmental, social** and **governance (ESG)** regulatory landscape supporting their decarbonisation for greater transparency and accountability.
- The company utilises their knowledge and their own reporting tools, such as their **ESG supply chain** disclosure tool, to provide insights for **space companies** using raw materials, ensuring environmentally sound supply chain management.
- **Greening space technologies** while on Earth, enables other sectors to leverage their sustainability insights while in orbit.

Space sector experience: ESG compliance, procurement law, intellectual property protection & sustainability initiatives.

Burges Salmon's cross-practice **Space and Satellites** team includes highly regarded specialists working in all areas of law needed by those operating in a complex field such as space. This ensures clients are able to meet evolving **commercial challenges, regulatory changes** and **environmental targets.**

- Burges Salmon has supported the UK Ministry of Defence's **SKYNET space sector programme** for over 25 years, supporting the MoDs growing satellite communications capability.
- The firm's relationship with **Space Scotland** provides the foundation for working closely with Scotland's space community to address barriers to **sustainable growth** and **environmental stewardship.**
- They have a **specialism in supporting early-stage** and **scale-up companies,** providing **free legal advice to Space Scotland** members on investment readiness, commercial contracts, employing and retaining top talent and more.

Founded: 1841

Headquarters: Bristol
Scotland Location: Edinburgh

Expertise: Full-service law firm with focus on space & satellites
Contact information: https://www.burges-salmon.com/contact-us/

Craft Prospect

Secure Satellite Tech with Quantum and AI Computing.

Space engineering on a mission to create a better world for humans and the planet through autonomous space payloads. Using mission-proven experience to develop new **space technologies** to enhance data security and **improve everyday life.**

- Developing **Quantum Key Distribution (QKD)** technologies through the European Space Agency's (ESA) **OPS-SAT VOLT** project.
- Leading a consortium of **11 industrial and academic** partners, with support from **ESA** and the **UK Space Agency** to leverage high quality imagery for **Earth observation** and provide **secure communications** for end users.
- Keeping the project local, with a Scottish and UK consortium, minimising travel and associated environmental impact.
- Sustainability in-orbit is core to the Craft Prospect mission, **repurposing** their satellites and utilising propulsion systems to de-orbit quicker, **reducing space debris.**

Building climate resilience capability, enabling sustainable and efficient crop management.

High perceptual imagery onboard OPS-SAT VOLT to launch in 2026 delivering actionable intelligence across geographical regions.

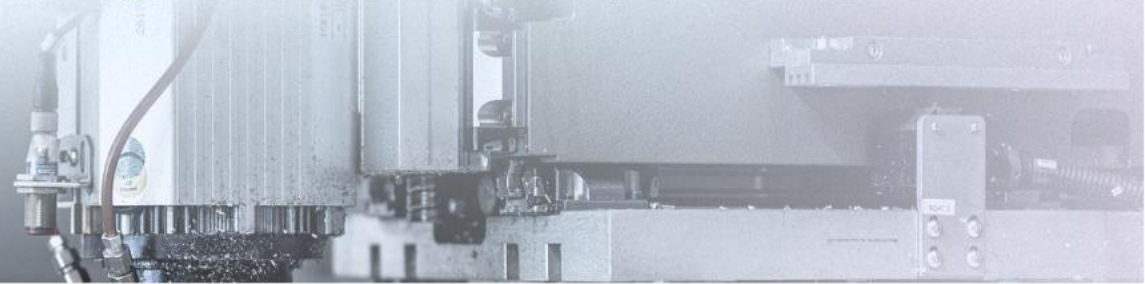
Delivering sustainable value through quantum technologies, uniting expertise from academia, telecom, and software.

- Flagship project **VOLT** will support farmers in making key decisions on crop selection, helping support more efficient, **financially and environmentally sustainable** and prosperous decisions
- **Space data** derived from Craft Prospect focuses on; the sustainability of the land, crop classification, soil health, water resources and more.
- Craft Prospect is **supporting governments** through their space data, compressing and detecting potential and ongoing wildfires, allowing decisions to made confidently and rapidly.

Founded: 2017 Headquarters: Glasgow

Expertise: Space systems engineering and complex payload design

Contact information: hello@craftprospect.com



DDK Positioning

Showing What Difference 5cm Makes

DDK Positioning delivers robust, resilient and accurate **Global Navigation Satellite** System (GNSS) solutions that demonstrates benefits for businesses and our planet. DDK Positioning supports multiple industries through accurate navigation, on sea and land.

- Combining environmental leadership with economic advantage, DDK Positioning leverages the Iridium® satellite communications network for **ultra precise global, pole-to-pole coverage.**
- Enhanced navigation through GNSS technologies helps **extend equipment lifespan** through operational efficiency and shorter transit times.
- These innovations result in **lower maintenance costs** and improved overall performance.

Founded: 2016 Headquarters: Aberdeen

Expertise: Global Navigation Satellite Systems
Contact information: info@ddkpositioning.com

How much does 5cm save?

Agricultural Operations

5% reduction in overlap = $16,250 per 1000 hectares

Maritime Operations

5% reduction in course deviation = $30,000 per 10,000nm trip

Offshore Energy Operations

5% reduction in unnecessary dynamic positioning = $900 per 12 hour operational day

- DDK Positioning's solutions **optimise shipping routes, reduce dynamic positioning variations** in offshore energy platforms, and **minimise waste of seed, fertiliser, herbicide** and **fuel.**
- Even a 495cm difference from the 5m of GPS accuracy translates to huge savings across these sectors.
- This very high level of precision enables more **efficient business operations whilst contributing to reduced emissions** thus a cleaner more sustainable environment.

Oversite Earth

Making a Sustainable Reality via Space Derived Data

Oversite Earth is a new Scottish company that combines the **Earth observation** and data analysis expertise of **Terrabotics**, with the risk management, ESG consultancy, and research capabilities of **Satarla**. This innovative approach delivers and promotes sustainable solutions across **agriculture and environmental management,** as exemplified by the **FarmBalance project.**

- **FarmBalance** is a **DEFRA-funded Innovate UK** initiative that combines analytics, Earth observation and advanced monitoring techniques to deliver dynamic, cost-effective insights across **soil health, emissions, water** and **biodiversity indicators.**
- Through collaboration with industry leaders, **FarmBalance empowers farmers** to own and understand environmental and commercial data about their farm, enabling them to make informed land-use decisions that balance productivity and **environmental stewardship.**
- **FarmBalance** offers enhanced visibility for **supply chain** and financial partners, driving net-zero, nature, and sustainability goals whilst **de-risking the green transition.**

Founded: 2025 Headquarters: Aberdeen

Expertise: Earth observation data
Contact information: salina@satarla.com

Oversite Earth
Sustainability Intelligence Services

The FarmBalance project leverages data analytics and machine learning for precision and efficiency.

Oversite Earth's space-enabled technologies empower farmers to tackle environmental challenges while optimising investment strategies.

- **FarmBalance addresses the gap in cost-effective and reliable insights,** particularly in metrics like **carbon footprints,** which typically rely on manual processes and incomplete information.
- **HabiTracker**, another Oversite Earth initiative, leverages **Earth observation** and **IoT data** to provide real-time ecosystem insights, recommendations and regulatory-compliant reports that **unlock nature-based financial incentives.**

Safe Passage

Charting the Uncharted From Space

Funded by the **European Space Agency** (ESA), the Safe Passage project is led by researchers at the **University of Strathclyde** working with **Creative Help Ltd. and Nith Inshore Rescue** in the South of Scotland to create quicker and safer maritime routes.

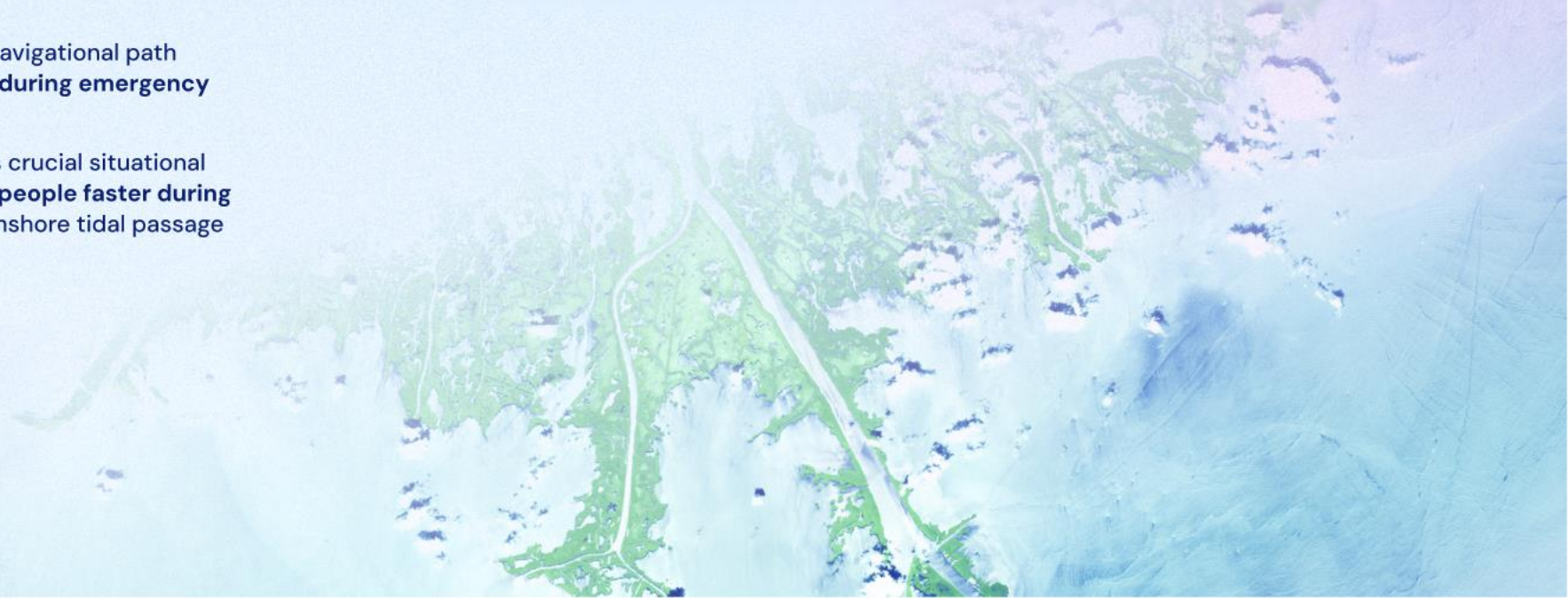
> The Nith Inshore Rescue Team aims to enhance charting to make the world's **13 million hectares** of tidal flats more accessible.

Space Technologies Create Safer Maritime Environments

- The project uses **satellite imagery** to create navigational path waypoints of tidal regions, **saving lives at sea during emergency responses.**
- Synthetic **aperture radar (SAR) data** provides crucial situational awareness for lifeboats, helping teams **locate people faster during search and rescue operations**, and tracking inshore tidal passage movement due to climate change.

Maritime Navigation to Sustainable Business Opportunities

- Operating in the **B2B sector**, Safe Passage provides navigational maps to boat **technology suppliers, plotters,** and **government agencies** including **coastguards**.
- After 4 years of **algorithm development** and **ground truth testing**, the Safe Passage project successfully created a validated model used routinely used by Nith Inshore Rescue.
- The organisation is moving to **commercialisation** with ambitions to return revenue to lifeboat services on a sustainable basis.



Founded: 2019 | Headquarters: Dumfries

Expertise: Satellite imagery

Contact information: safepassage@creativehelp.org

SaxaVord Spaceport

A Sustainability "North Star" for the UK Space Industry

SAXAVORD
UK SPACE PORT

SaxaVord Spaceport, located in the remote location of Unst, Shetland, is the UK's only licensed vertical orbital spaceport. Its location ensures the spaceport is safe and secure and gives the most direct route to polar orbit.

- Sustainability is a priority for SaxaVord. They take significant steps to **measure** and **manage the spaceport's impact on the natural environment, promote sustainable practices** and **reduce emissions.**
- SaxaVord's efforts include **assessing the environmental impact of its construction and operation, adding additional holts, adding protected nesting for local otters** and **birds and habitat restoration.**
- SaxaVord's planning consent and spaceport licence include strict environmental commitments, and are developing an **operational environmental management system aligned with ISO 14001:2015.**
- SaxaVord is advancing sustainability across the company including **rewilding efforts** and **installation of PV panels** at ground stations.
- SaxaVord are proactively developing an energy transition plan going beyond regulatory expectations to **monitor, control** and **reduce emissions.** They aim to become **carbon neutral by 2030.**

SaxaVord's SaxaZero

- SaxaVord Spaceport will see **satellites launched into Low Earth Orbit (LEO)** from **British soil for the first time in UK history.** A critical role of the satellites will be to help **tackle climate change** and **advance sustainability.**
- To help its efforts, SaxaVord have established **SaxaZero**, a **sustainability centre** to support space industry **efforts to reduce emissions.** SaxaZero will **support innovators** with similar efforts clustering near SaxaVord and **promote satellite data** to protect the planet.

Founded: 2017

Headquarters: Grantown On Spey

Expertise: Launch, Ground Station, Data & Range Services, Licensing, Logistics, STEM, Environmental Management

Contact information: info@shetlandspacecentre.com

SEKO Logistics

Pioneering Space-Enabled Sustainable Supply Chains

Providing specialist shipping services to meet the **safety, security** and **technological** needs of **next-generation space technologies** to be delivered around the world and to its most sensitive areas.

Taking measurable action to help global customers achieve realistic sustainability goals.

Partnership approach to logistics and **supply chain management** offering cost effective, **sustainable** and secure solutions to clients.

Aviation Secure Premises, with on-site packaging experts – producing bespoke and sustainable options.

Provide **GHG emission client reports,** creating transparency and accountability throughout their **logistics operations.**

UN Global Compact member with goals aligned to **UN Sustainable Development Goals.**
Independent **ESG Governance at Board level** and driving sustainability training for colleagues and suppliers.

Living Wage certified employer

Greenhouse gas baseline experts are establishing measurable targets for SEKO.

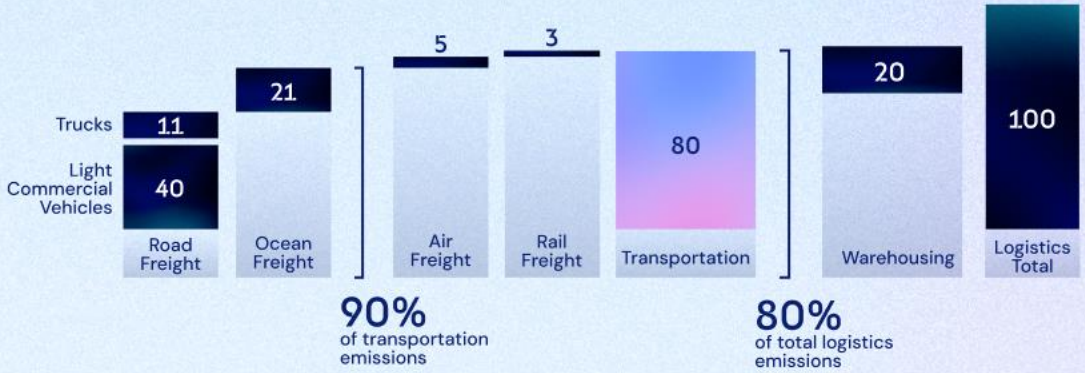
SEKO offers access to sustainable aviation fuel, made from renewable materials reducing carbon emissions by up to 80%.

Founded: 1976 USA
2009 Scotland

Headquarters: Glasgow

Expertise: Shipping, logistics, packaging and sustainable supply
Contact information: Tristin.martin@sekologistics.com

Share of global annual logistics CO_2 equivalent emissions (%)



Expert logistics solutions tailored for the space sector.

- Building their space presence, **SEKO partners with multiple space companies** to solve unique logistics **challenges in government space and defence.**
- SEKO's shipping expertise enables **efficient movement of products globally,** reducing costs and complications for manufacturers.
- SEKO helps clients optimise spending by focusing on "**carbon rather than money,**" creating economically viable sustainability solutions.

Skyrora

Taking a Sustainable Approach to Rocket Science

Focusing on **rocket development**, Skyrora is working on two main rocket projects (XL and XXL) incorporating sustainability into their design and operations. **In-orbit** and **satellite servicing** forms part of their long-term vision with current projects serving as stepping stones toward these goals.

Skyrora supports the planet and local communities through innovative technology and outreach.

- **Skyrora's Ecosene** fuel produces approximately 850 times **fewer NO_x and SO_x pollutants** than traditional **kerosene** and can reduce carbon emissions by up to **70%.**
- Skyrora use 3D printing for engine manufacturing, maintaining localised localised supply chains, and recovering up to **80%** of rocket components post-launch to minimise environmental impact.
- Skyrora have developed **carbon-capturing** processes at launch sites to offset emissions and focus on alternative propellant combinations (Ecosene and H_2O_2) that are more sustainable than traditional rocket fuels.

Founded: 2017

Headquarters: Cumbernauld

Expertise: Designing, manufacturing and deploying
Contact information: info@skyrora.com

Social Sustainability

Skyrora delivered **10 hours of STEM classes** at schools around their workshop in Cumbernauld.

They are committed to **educating** and **developing** the future of the space industry.

Skyrora's business model integrates **financial viability** with **environmental responsibility** through strategic **local partnerships** and **innovative materials.**

- Skyrora prioritises **local suppliers** with strong environmental approaches, particularly for **carbon fibre** components sourced from Glasgow.
- Skyrora are actively exploring and implementing more **sustainable materials** across their product lines.

ThinkTank Maths

Precision Mathematics for a Sustainable Space Future

ThinkTank Maths

ThinkTank Maths, founded in Edinburgh in 2008, exemplifies how advanced **mathematical modelling** in space is **decreasing satellite operator costs** and maximising value in the lifespan of satellites. Meanwhile, as an **Astra Carta signatory, they reduce a satellite's impact on Earth and in the sky.** ThinkTank Maths' algorithms enable sustainability on **Earth, in orbit,** and **for businesses.**

ThinkTank Maths' Space Domain Awareness (SDA) solutions enhance space environment protection:

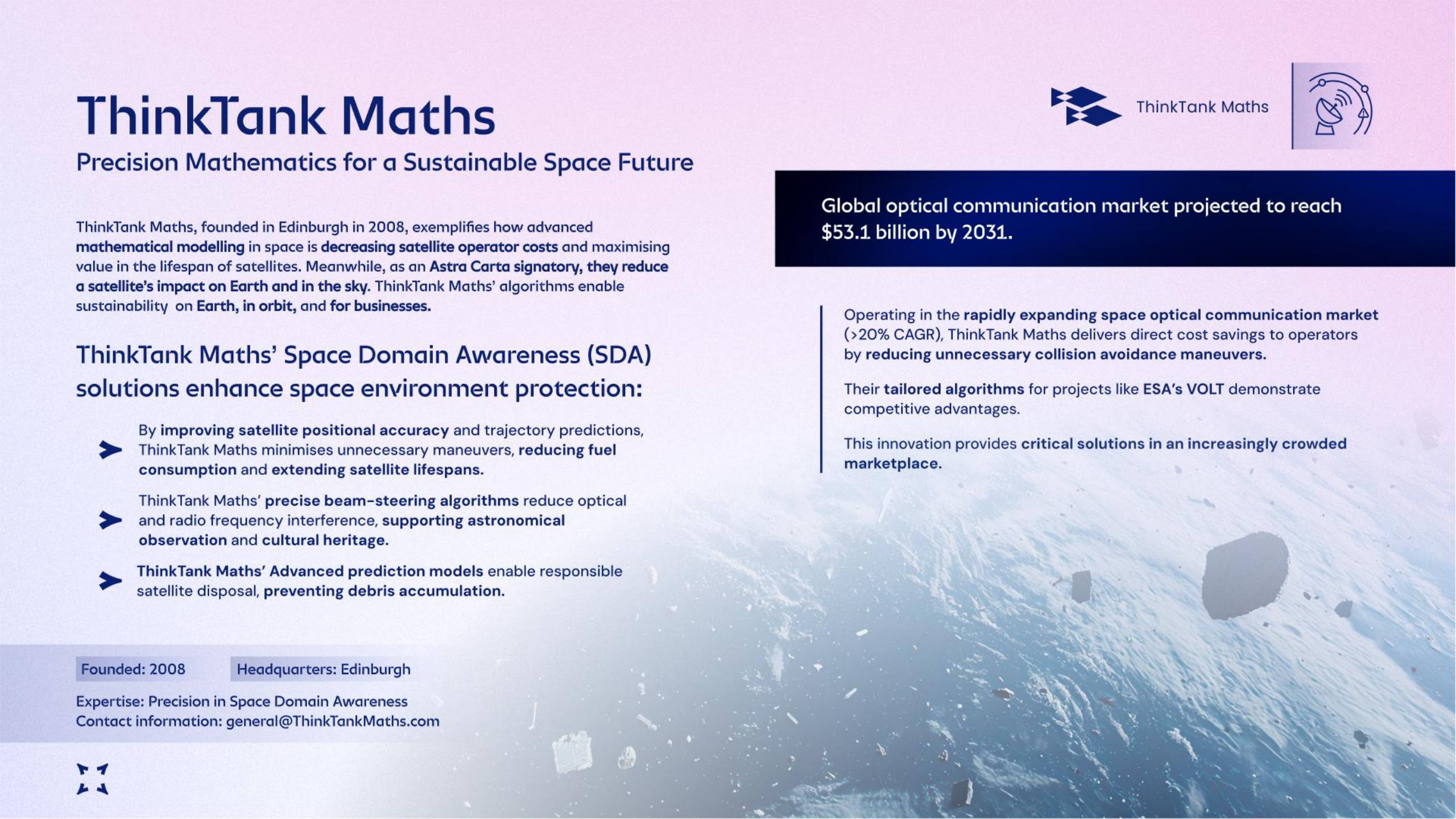
- By **improving satellite positional accuracy** and trajectory predictions, ThinkTank Maths minimises unnecessary maneuvers, **reducing fuel consumption** and **extending satellite lifespans.**
- ThinkTank Maths' **precise beam-steering algorithms** reduce optical and radio frequency interference, **supporting astronomical observation** and **cultural heritage.**
- **ThinkTank Maths' Advanced prediction models** enable responsible satellite disposal, **preventing debris accumulation.**

Global optical communication market projected to reach $53.1 billion by 2031.

Operating in the **rapidly expanding space optical communication market** (>20% CAGR), ThinkTank Maths delivers direct cost savings to operators by **reducing unnecessary collision avoidance maneuvers.**

Their **tailored algorithms** for projects like **ESA's VOLT** demonstrate competitive advantages.

This innovation provides **critical solutions in an increasingly crowded marketplace.**



Founded: 2008 Headquarters: Edinburgh

Expertise: Precision in Space Domain Awareness

Contact information: general@ThinkTankMaths.com

Thistle Rocketry

Reducing Mass, Cost, and Environment Impact

Thistle Rocketry creates sustainable launch and orbital operations with **scalable propellant pumps** for **in-space** and **rocket propulsion.**

Thistle Rocketry prioritises **reducing mass** sent to orbit and **utilising local supply chains** in the Scottish Borders to minimise environmental impact.

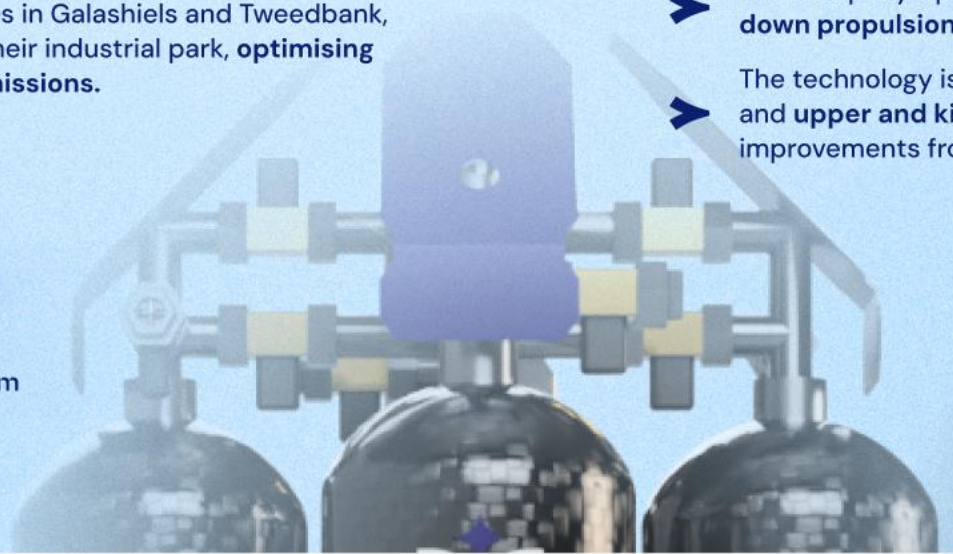
- Thistle Rocketry can **reduce fuel tank mass** by over **90%** significantly decreasing materials launched into space and minimising items that burn up during re-entry.
- The company's **scalable technology** can be altered in shape and size to reduce atmospheric materials, and **pump systems** are compatible with more **sustainable fuels.**
- Thistle Rocketry utilises local companies in Galashiels and Tweedbank, for welding and manufacturing within their industrial park, **optimising the supply chain to reduce carbon emissions.**

Thistle Rocketry secures **40-50%** of their funding from green and sustainability-based grants.

Thistle Rocketry's **lighter spacecraft design** improves **control efficacy, lowers launch costs** and **reduces waste.**

Thistle Rocketry combines innovative design with business efficiency to create commercially viable sustainable solutions.

- The company's patented **scalable pump system,** upgrades **blow-down propulsion systems** to reduce mass and increase performance.
- The technology is designed to be utilised in all **in-space propulsion** and **upper and kick stage systems** allowing for propulsion improvements from **lunar landers** to **satellites constellations.**



Founded: 2019 | Headquarters: Galashiels

Expertise: Scalable propellant pumps

Contact information: contact@thistlerocketry.com

Trios Renewables

Predictive Modelling for Renewable Energy

Specialising in **Operations and Maintenance** (O&M) modelling for **offshore renewables,** Trios Renewables leverages **space-enabled data** to enable offshore wind projects to be more sustainable, socially responsible and maximise economic return.

Trios Renewables utilises SAR satellite radar imagery to provide accurate wave condition data.

Empowering a sustainable future through advanced environmental insights.

- Trios Renewables' sophisticated simulation models (**Trios Model**) helps develop offshore wind projects, reduce environmental uncertainty and support green energy transition.
- By providing detailed **technical and environmental performance data** from space based weather and Earth observation data, Trios Renewables enables informed decision-making for renewable energy infrastructure.
- The company's modelling directly supports **CO_2 impact assessment** and environmental sustainability in the offshore wind sector.

Transforming data into actionable renewable energy intelligence.

- Trios Renewables uses advanced **space-based measurements** and **weather forecasting** to provide **high-precision spatial data** for offshore wind project planning.
- Their innovative **wake modelling and satellite data analysis** helps clients make critical procurement and contractual decisions with reduced financial risk.
- By identifying measurement gaps and leveraging satellite technologies, they create **economic value** through accurate and efficient renewable energy project development.

Founded: 2021

Headquarters: Glasgow

Expertise: Offshore renewables modelling

Contact information: info@trios-renewables.co.uk

Join Space Scotland in Shaping a Sustainable Future

Share Your Space Sustainability Story with Us!

Want to get involved?

Reach out via email or scan the QR code to learn more and connect with us!

etfboard@duck.com

@ScottishSpaceLC

Space Scotland

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