

SPACE WALES



WALES
A SUSTAINABLE SPACE NATION
BROCHURE, DIRECTORY & CAPABILITY MATRIX

WALES A SUSTAINABLE SPACE NATION

Wales - A Sustainable Space Nation	03
Space Wales Leadership Group	08
WASP & Academia	10
Research Centres & Catapults	11
RPAS and T&E in Wales	12
Capability Matrix	14
Company Directory	18

Wales, with a population of 3 million people, totals around 5% of the UK populace. In the aerospace sector Wales has around 10% of the overall UK workforce and arguably punches above its weight. When it comes to the space sector Wales has only around 1% of the overall UK personnel and so there is a huge opportunity for growth in a sector which is growing significantly. The UK space sector has set a target of achieving a 10% share of the predicted £400 billion per annum global space market in 2030. A 5% share of this for Wales would equate to £2 billion per year and this is a realisable target which we aim to achieve and will work to exceed.



Space has proved to be one of the UK's fastest growing sectors trebling in size since 2010. It now employs 42,000 people and generates an annual income of £14.8 billion. The global space economy grew by 6.7% on average per year between 2005 and 2017, almost twice the average yearly growth of the global economy of 3.5%.

The growth of the sector also has the potential to help us address some of the key issues facing Planet Earth and the challenges within Wales itself.

Currently there are around 5000 satellites circling the earth in various orbits. Only 2,000 of these are operational. If OneWeb, Starlink and other potential networks continue with their projected growth that number could increase by a massive 4,500% in the next five years!

Demand for data is on the increase, and launching satellites that offer broadband internet service will help to drive down the cost of that data. Reusable rockets and satellites will also help drive down costs and so too will the mass-production of satellites and the development of satellite technology. Earth observation is currently the biggest user of satellite manufacturing and launch services and remains a key driver for the overall industry.

Further to the funding already received by the Welsh Government and the UK Space Agency for the space sector in Wales, an agreement on further funding is essential to support the future growth of the sector. To develop the opportunities in Wales funding support will also be required from UK Government. All parties need to work together to maximise the return on investment and to ensure alignment with the policies and priorities of UK and Welsh Governments.

THE CURRENT AND POTENTIAL FUTURE SPACE SECTOR IN WALES

With support from the UK Space Agency a mapping exercise of the sector was completed using a mixture of survey data, workshops and individual interviews. A Space Wales Leadership Group and Space Wales network have been established to offer guidance to the project team and will drive our aspirations forward.

Wales has the following key elements and associated opportunities:

Space launch, training, and experience capability.

Spaceport Snowdonia based at Llanbedr Airfield is one of the UK's potential horizontal spaceports and has a route map to achieve certification in 2022. It has a legacy as a flight test and evaluation site, linked to an MoD/QinetiQ segregated airspace and tracking range. Partners include a B2Space, with their stratospheric balloon launch system, Newton Launch Systems and Spaceflight Academy and continues to be used by emerging technology-based aircraft. Spaceflight Academy is looking to establish a comprehensive spaceflight training and experience facility at the site. Snowdonia has a niche capability for test and evaluation together with sub-orbital flights including some horizontal orbital launches.

As an alternative to land based vertical or horizontal launch a group of companies, including Black Arrow Space Technologies, are proposing to establish the Port Talbot Space Centre as a centre for research and manufacturing supporting a sea-based launch system for space vehicles.

In-Space Manufacturing and the associated ability to recover space vehicles.

Space Forge has established a facility in the Compound Semi-conductor Applications Catapult in Newport to develop a reusable manufacturing LEO satellite and the capability to return satellites to Earth for repair and refurbishment. Significant funding has been made available to support this venture in what is seen as an area with high growth potential.

Existing advanced manufacturing capability and technology clusters.

Wales has several established clusters which have capabilities relevant to both the upstream and downstream elements of the space sector. For example: aerospace, automotive, electronics & software, medical, compound semiconductors, photonics/optoelectronics/optics, life sciences and cyber security. Many companies in these sectors already service the space sector.

Test and evaluation eco-system based on existing facilities.

These include Llanbedr and Aberporth Range, Radnor Range and Pendine, open to both military and civil use.

A network of research and teaching facilities.

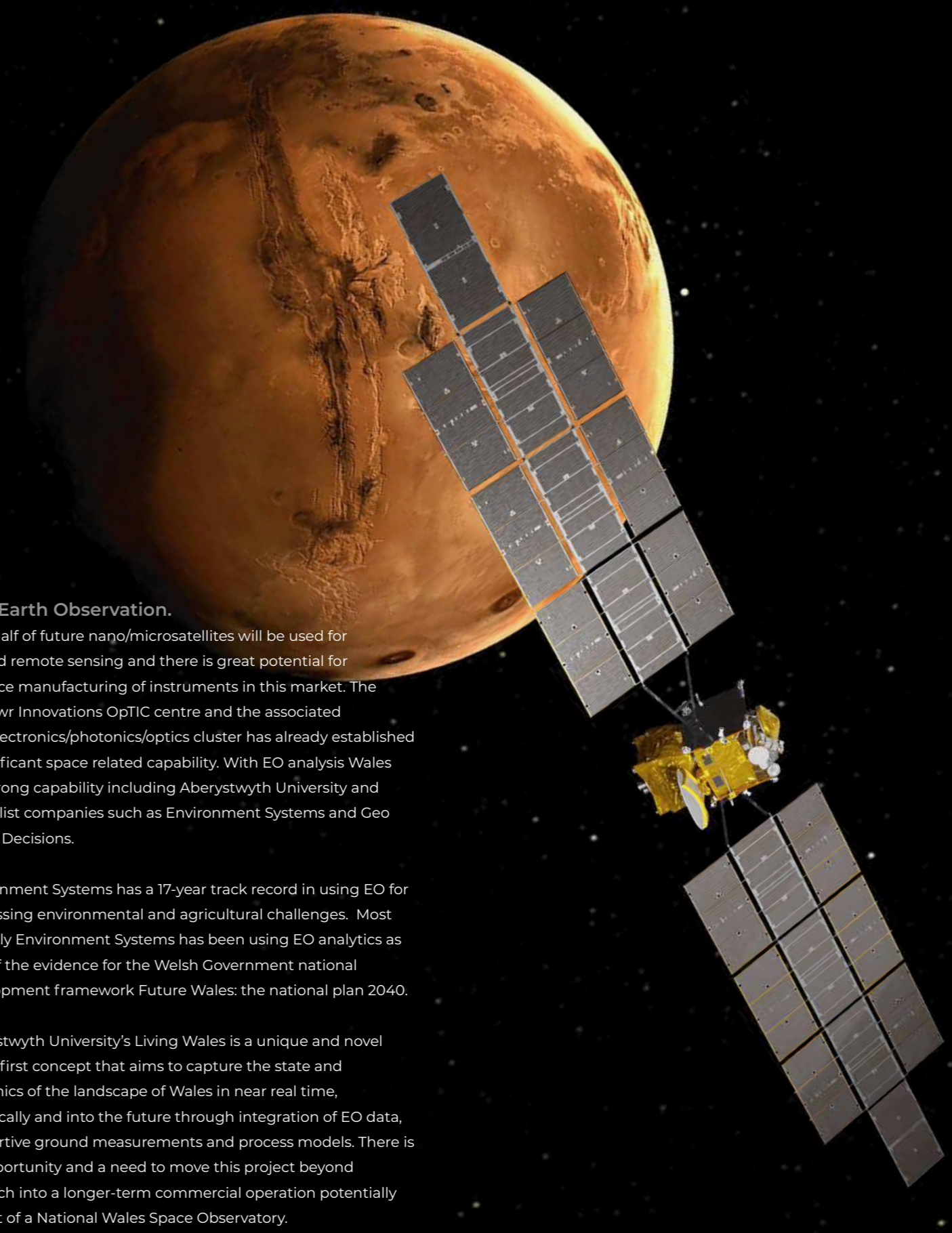
The WASP (Wales Academic Space Partnership) and catapult sites are referred to as "the arc of innovation." The Compound Semiconductor Applications Catapult is based in Newport and AMRC Cymru at Broughton. The Satellite Applications Catapult operates an outstation at Llanbedr in support of demonstrator programmes and discussions are ongoing about a potential DISC (Disruptive Innovative Space Capability) facility in Wales. Welsh Government, MoD and DECA are developing a proposal for the creation of ATRC, the Advanced Technology Research Centre, based at Sealand with a focus on defence electronics, including space related elements.

EO - Earth Observation.

Over half of future nano/microsatellites will be used for EO and remote sensing and there is great potential for advance manufacturing of instruments in this market. The Glyndwr Innovations OpTIC centre and the associated optoelectronics/photonics/optics cluster has already established a significant space related capability. With EO analysis Wales has strong capability including Aberystwyth University and specialist companies such as Environment Systems and Geo Smart Decisions.

Environment Systems has a 17-year track record in using EO for addressing environmental and agricultural challenges. Most recently Environment Systems has been using EO analytics as part of the evidence for the Welsh Government national development framework Future Wales: the national plan 2040.

Aberystwyth University's Living Wales is a unique and novel world-first concept that aims to capture the state and dynamics of the landscape of Wales in near real time, historically and into the future through integration of EO data, supportive ground measurements and process models. There is an opportunity and a need to move this project beyond research into a longer-term commercial operation potentially as part of a National Wales Space Observatory.



WALES CHALLENGES AND OPPORTUNITIES

Wales has an environment which poses challenges and opportunities for the downstream application of space data in terms of geography, transportation, communication, health, social inclusion, management of natural resource etc. supported by the resources of a devolved administration, local authorities, NHS Wales, Natural Resources Wales and the Life Sciences cluster. Wales can use the technology and services facilitated by the space sector to help grow the economy and to help deliver enhanced essential services across the nation.

It costs about five times more to get fibre connections to Welsh homes and businesses than the UK average. However, the emergence of networks such as OneWeb have the potential to deliver broadband connectivity worldwide to bridge the global Digital Divide by offering everyone, everywhere, access to the Internet of Things (IoT) and a pathway to 5G. A combination of fibre, land, air and space-based services could transform data and communications services across Wales, particularly in rural areas.

Swansea based Annwen provides an excellent example of the innovative use of space data. It is creating a voice-activated 'digital companion', providing public information in Welsh or other minority languages, particularly for citizens in remote locations, vulnerable members of society and those not used to using technology. They plan to deliver a satellite & 5G connected monitoring system for Wales.


WALES – A SUSTAINABLE SPACE NATION, LEADING TO A GREENER SPACE

Wales and the UK are committed to a range of policies and actions to support a sustainable future. Space operations themselves can be made greener by the development of new propulsion systems and propellants, and the application of earth observation will play a key role in our stewardship of the Earth's precious resources.

Wales is proposing to establish a Sustainable Space Accelerator (SSA). Although this could be based in a university initially, perhaps in partnership with one or more companies, it is envisaged as being distributed across the nation rather than in a single dedicated building. The SSA will promote sustainable practices upstream and stimulate awareness and demand downstream whilst also driving demand-driven research and development.

KEY RECOMMENDATIONS

- The Space Wales Leadership Group and Space Wales network will continue to operate and progress the short-term actions identified in partnership with Welsh Government. Space Wales will continue to operate as an arm of the Aerospace Wales Forum Ltd and discussions will be held with members and Welsh Government to determine future funding and governance models.
- Space Wales, Welsh Government and UKSA will agree the framework for measurement of the size of the sector in Wales to determine progress toward our goal of £2 billion by 2030.
- Working groups will be established to address specific opportunities and drive forward our ambitions. These include the Sustainable Space Accelerator, National Wales Space Observatory, space enabled broadband and communications system for Wales, public-sector engagement, application of advanced manufacturing to the space sector, Defence and Cyber and the development and marketing of test facilities.
- Key programmes such as the development and use of Spaceport Snowdonia, Port Talbot Space Centre and in-space manufacturing should continue to be developed through industry and government partnerships.
- WASP, the Wales Academic Space Partnership, will be encouraged to develop and grow and work in close partnership with Space Wales and Welsh Government
- These actions and recommendations will be reviewed and refined on a regular basis by the Space Wales Leadership Group. They will also continually be reviewed by the Welsh Government to ensure alignment with the UK and Welsh Government's policies and strategies.

Further details can be found in the main report
[Wales – A Sustainable Space Nation](#) 

SPACE WALES LEADERSHIP GROUP



John Whalley Co-Chair

We are delighted to present to you the first edition of the Space Directory for Wales, which reflects the wealth of capabilities and innovations we have in our nation.

Wales has a track record of delivering high value manufacturing and innovation which puts our companies in a prime position to operate in this growing sector.

The global space industry is rapidly transforming with space technology getting smaller and entry to space becoming more accessible and affordable. In all our day to day lives we are becoming more reliant on the space sector and the data it provides, from weather forecasting, internet banking and Sat Nav in our vehicles. In Wales we not only have a strong foundation of companies and institutions operating in these downstream applications, but we also have a vibrant base of companies working in the upstream sector specialising in space hardware and systems.

The UK Government has taken the positive decision to support the Space industry, with ambitions to double the size of the sector by 2030. We fully back this growth and we will work closely with the UK Space Agency to ensure that our national strategy for Wales aligns with the UK's ambitions.



Helen Swift Co-Chair

Space Wales have established a Space Wales Leadership Group to shape the outputs for delivering a new National Space Strategy for Wales and are committed to the long-term development of the growth strategy for Wales. The group will liaise with the other Devolved Administrations, UK Government, Local Authorities, the UK Space Agency, Aerospace Growth Partnership & Defence Group Partnership etc. which will help to reinforce that Wales's National Strategy compliments the aspirations of the UK as a whole.



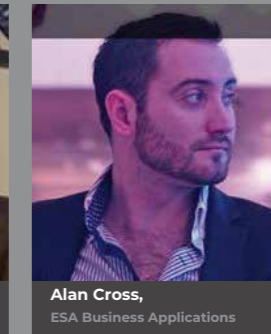
JOHN WHALLEY,
Aerospace Wales Forum Ltd



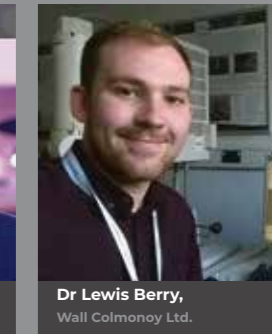
HELEN SWIFT,
AIRBUS



Rachael Blackburn,
Aerospace Wales Forum Ltd



Alan Cross,
ESA Business Applications



Dr Lewis Berry,
Wall Colmonoy Ltd.



Marie Caruso,
Arcanum Information Security Ltd.



Glen Cornhill,
Artemis Space Technologies



Alan Davies,
Ddiwydiannol Limited



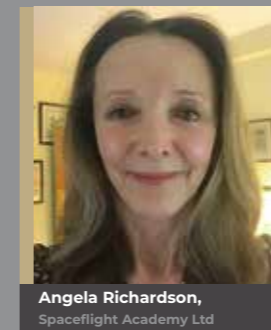
Caroline Gray,
Glyndwr Innovations Ltd.



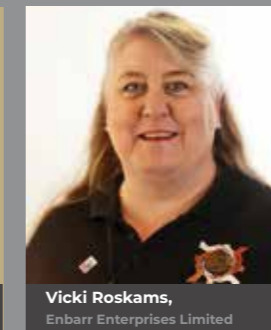
Jeremy Howitt,
Snowdonia Aerospace



Steve Keyworth,
Environment Systems



Angela Richardson,
Spaceflight Academy Ltd



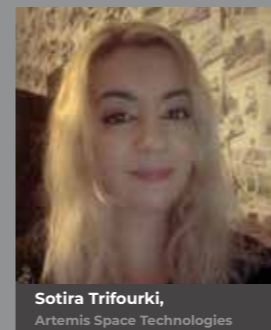
Vicki Roskams,
Enbarr Enterprises Limited



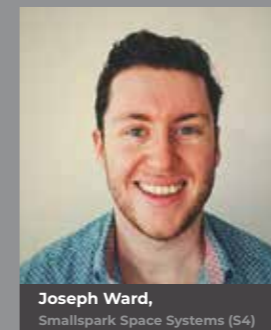
Andy Sellers,
CSA Catapult



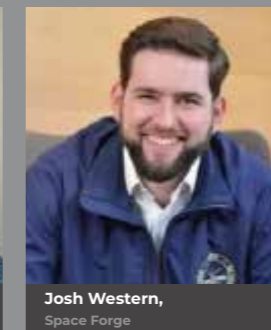
Jon Sharp-Fisher,
Raytheon UK



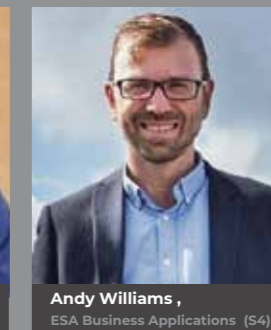
Sotira Trifourki,
Artemis Space Technologies



Joseph Ward,
Smallspark Space Systems (S4)



Josh Western,
Space Forge

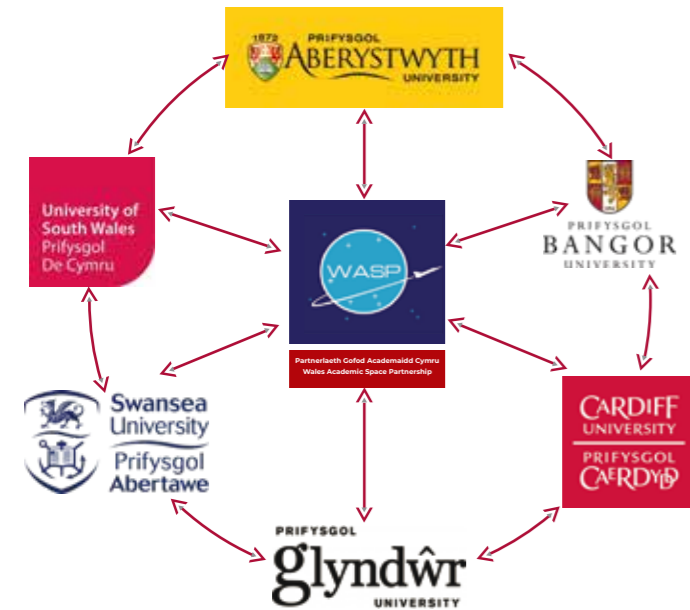


Andy Williams,
ESA Business Applications (S4)



Paul R.H. WILLIAMS,
Black Arrow Space Technologies Ltd

WASP & ACADEMIA

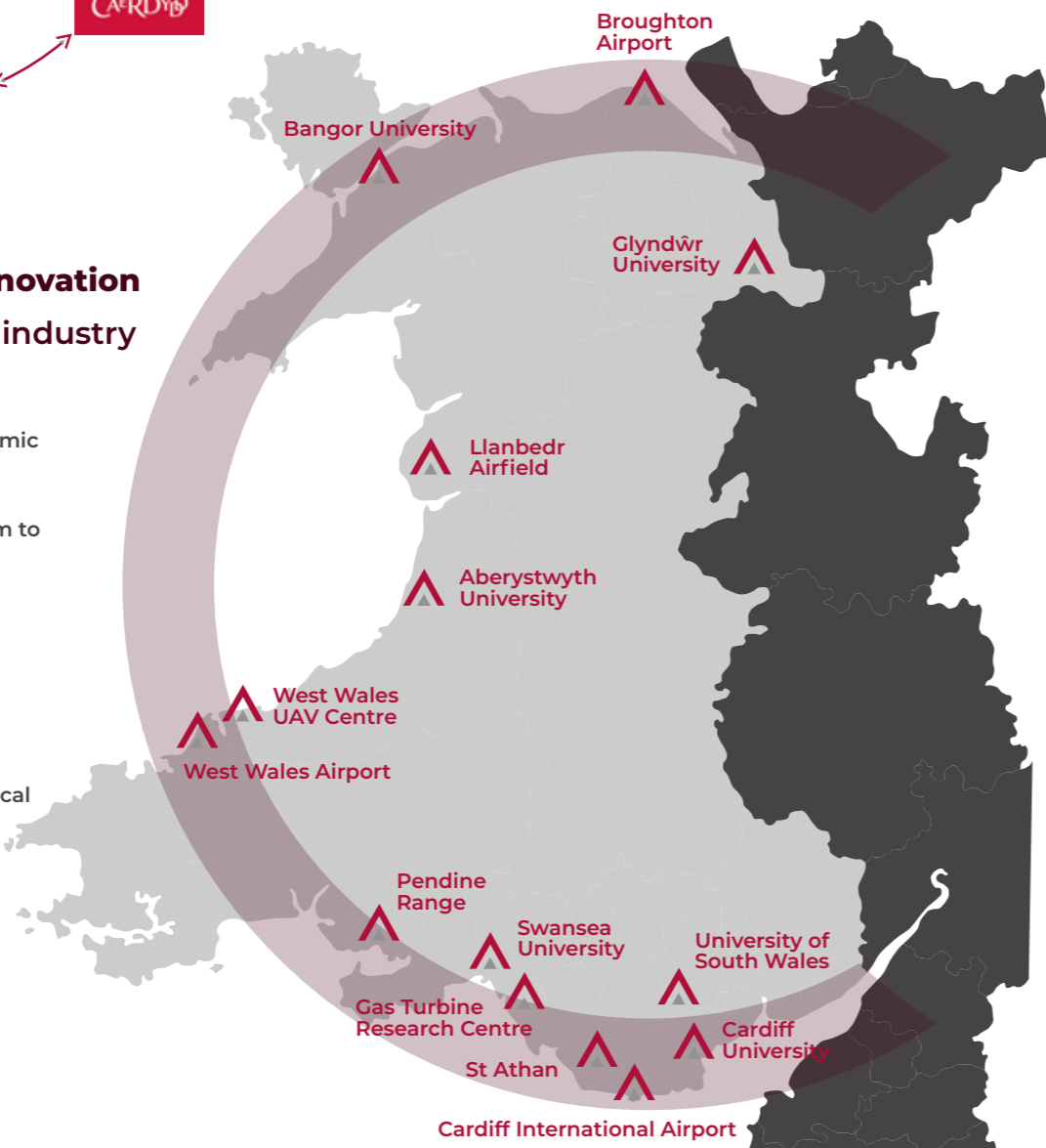


Wales has an advanced academic sector that already supports the global space sector. Wales Academic Space Partnership (WASP), provides a single voice and strategic pathway for its members (and therefore for Wales) and strengthens the goals of the UK National Technology Plan. This approach is supported by the Wales Aerospace Forum and the Welsh Government.

WASP was founded with the following mission:
 To support the development of space technologies; to protect planet earth, advance global connectivity, protect human kind and further the exploration of space.

WASP supports The Arc of Innovation which offers the global space industry a winning combination.

- > World class R&D through the Wales Academic Space Partnership.
- > Strategic sites with airside access and room to locate and grow.
- > Space Innovation Support Facilities to support developments
- > Up and down stream space companies.
- > 2,500 sq miles of segmented airspace (supported by state-of-the-art, electro optical tracking, radar and telemetry), with the potential for direct and controlled access to space.



RESEARCH CENTRES & CATAPULTS



The University of Sheffield AMRC Cymru is a cutting-edge R&D facility, providing an open innovation platform accessible to all manufacturers of any size. Part of the University of Sheffield Advanced Manufacturing Research Centre and a member of the High Value Manufacturing (HVM) Catapult, a consortium of leading manufacturing and process research centres backed by Innovate UK, our team de-risk R&D investment to drive step-change improvements in productivity, quality and sustainability.

Our ability to draw on the proven R&D talent of the University of Sheffield AMRC and the seven-member HVM Catapult, provides immediate strength in depth to support the Welsh Government in its ambition to make North Wales the epicentre of innovation driven, advanced manufacturing.

The AMRC's global reputation as the go-to-place for aerospace R&D, whether in new engine manufacturing processes, inspection and verification, materials and methods for wing



manufacture and connected factory development, makes us a natural fit for North Wales which is a national hub for aerospace engineering and manufacturing excellence.

The R&D talent at AMRC Cymru is accessible to all. Working with the Welsh Government, our goal is to drive innovation across the wider economy of Wales, supporting sectors such as aerospace, food and drink and automotive, where Wales has great strengths, along with the extended SME supply chains that form the backbone of the economy.

www.amrc.co.uk

CATAPULT Compound Semiconductor Applications

The CSA Catapult is a non-profit research and technology organisation helping UK companies develop advanced electronic systems using compound semiconductors.

The Catapult is focussed on three market areas: efficient power technologies to achieve Net Zero, future telecom networks and advanced sensor systems. All three market areas are crucial to the development of space-based technology including low earth orbit satellite constellations for 5G and 6G service provision.

The Catapult combines business expertise with highly qualified research teams and world leading facilities. In the past 2 years, the Catapult has initiated over £100m of projects, building UK

manufacturing supply chains for high performance power conversion modules to help the automotive industry transition from internal combustion engines to electric traction.

In 2020, the Catapult formed a strategic partnership with the Industrial Technology Research Institute (ITRI) of Taiwan, providing access to complementary technologies of critical importance to our key markets.

www.csa.catapult.org.uk



Dr Andy G Sellars
 Strategy Director,
 CSA Catapult

RPAS AND T&E IN WALES

Wales has several sites suitable for RPAS (Remotely Piloted Aircraft System) and T&E (test and evaluation)/verification of space system hardware, materials and components, especially those with hazardous products, or the potential for disruptive emissions.



▲ MOD Pendine

Pendine lies in South Carmarthenshire, at the Western end of the Loughor estuary. The site has several different areas, each with individual capabilities. The shoreline has been used in the past for aircraft landing training sorties, while the large Sea Danger Area stretches into Carmarthen Bay. It also has an Air Danger Area which extends up to 23,000ft. The facilities mostly consist of prepared, safe areas with permanent buildings and power supplies. The Long Test Track (LTT) facility, suitable for high-speed dynamic trials, is unique in the UK. The Eastern end of the range is most suitable for space related use.

▲ Radnor Range

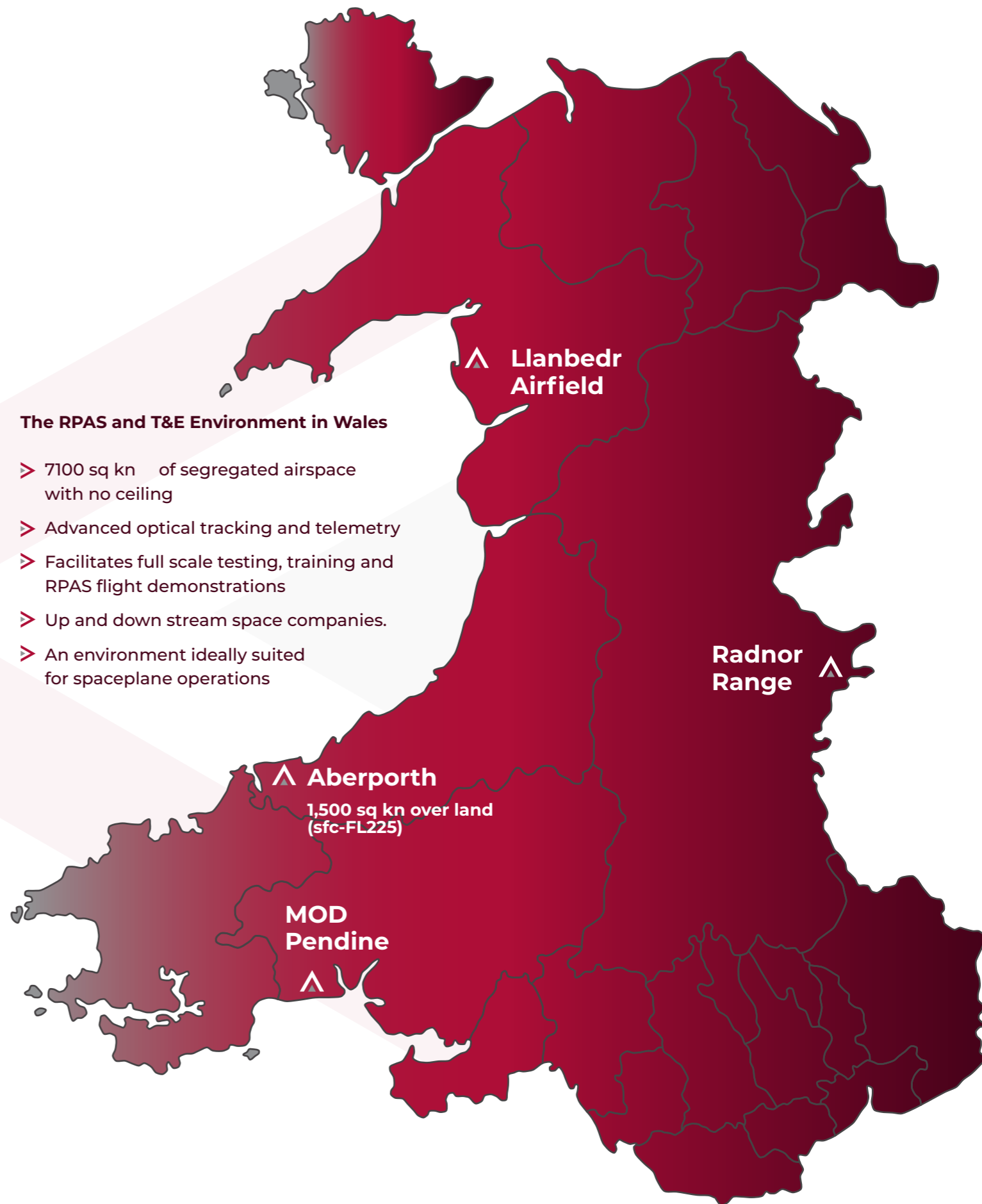
Radnor Range is a UK MoD accredited independent test house offering a unique blend of capabilities to conduct assessment and trials at the range complex or other facilities. Radnor conducts fully instrumented testing of armoured vehicles (civilian and military), armoured materials and fully engineered armoured structures to all international test standards, and supports the flying of drones and counter-drone activity.

▲ Aberporth

Aberporth Range, located on the west coast of Wales, provides a controlled safe environment for the release of land, air and sea-launched missile firings as well as instrumentation verification, passive and active IR/RF jamming, and the ability to manage supersonic trials activity in its 7,500km² of sanitised airspace from surface to unlimited altitude. The Range has a fully-instrumented 3D area for Test and Evaluation, and space for training activities. It provides both live and virtual environments, real-time data, and deployable systems, all supported by a wealth of expertise. Recent investment has created the Parc Aberporth Centre of Excellence, securing access for civil UAS to the existing Ministry of Defence (MOD) airspace danger areas over Cardigan Bay and the establishment of new segregated airspace, with unlimited height over water, dedicated to UAS testing and evaluation.

▲ Llanbedr Airfield

The Welsh Government has invested in developing Llanbedr in Snowdonia to provide infrastructure to support the Wales and UK UAS environment. It is anticipated that there will be further development as a space and aerospace hub in NW Wales. This will be home to a spaceport and a spaceflight experience, training and aeromedical facility, (Spaceflight Academy).



CAPABILITY MATRIX

Companies A-H

- Operating Sectors:
- Space Products and Services:
- Satellite Products and Services:
- Support Services:

	Space	Defence	Aerospace & Aviation	Automotive	Health	Agriculture	Media	Energy	Maritime	Transport & Logistics	Tech - Software / Hardware	Infrastructure & Smart Cities	Safety & Security	Mining	Environmental	Internet of Things	AI & Big Data	Finance
Airbus Defence and Space	▲	▲	▲										▲					
Arcanum Information Security	▲	▲	▲					▲	▲			▲	▲			▲		▲
Arctic Scaffolding Co Ltd			▲		▲							▲						
Artemis Space Technology Ltd		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
AVoptics (Lightworks) Ltd	▲	▲	▲	▲	▲						▲							
Awen Collective		▲	▲					▲	▲	▲		▲	▲			▲	▲	
Axiom Process Ltd			▲	▲	▲	▲			▲						▲			
B2Space Ltd	▲		▲								▲		▲				▲	
Bangor University and Menai Science Park Ltd			▲		▲	▲	▲				▲	▲	▲			▲	▲	▲
Black Arrow Space Technologies Ltd	▲								▲		▲	▲	▲		▲			
Capital Options Ltd																		▲
Celtic Engineering Inc		▲	▲									▲						
Centre for Integrative Semiconductor Materials	▲		▲	▲	▲			▲										
Centre for Solar Energy Research: Swansea Uni	▲							▲										
Charcroft Electronics Ltd	▲	▲	▲	▲				▲	▲					▲				
Compound Semiconductor Applications Catapult	▲	▲	▲	▲	▲			▲		▲	▲					▲		
Control 2K Limited			▲	▲	▲	▲	▲	▲			▲	▲			▲	▲	▲	
Curtiss-Wright Surface Technologies		▲	▲	▲				▲										
Deva Technologies Ltd		▲	▲								▲							
DRB Group Limited				▲	▲			▲		▲	▲				▲			
Electroimpact UK Ltd	▲	▲	▲															
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Ensinger Precision Engineering Ltd	▲	▲	▲	▲	▲			▲	▲				▲	▲				
Environment Systems						▲		▲							▲		▲	
Formagrind Limited	▲	▲	▲	▲	▲				▲									
GEM Engineering And Maintenance Services Ltd	▲	▲	▲	▲														
Geo Smart Decisions Ltd															▲			
GJM Engineering		▲	▲	▲				▲	▲									
Glyndwr Innovations Ltd (Precision Optical Systems Group)	▲	▲	▲															
HAMERTECH LTD	▲	▲	▲	▲				▲										

	Education	Tourism	Launch Services	Launch Vehicle Manufacturing and Assembly	Component and Subsystem Manufacturing	Launch Support Services	Ground Segment Subsystem & Equipment Supplier	Antenna/Ground Station Component or Material Supplier	System Engineering and Technical Support Services	Ground Station / Operator	Telemetry & Command Operations	Satellite Manufacture	Navigation	Observation Imagery	Robotics	Satellite Communication	Satellite Operation	Satellite Positioning	Satellite Software	Space Data Collection	Space Security	Space Research	Telecommunications	Weather Forecasting	Legal Services	Financial Services	Consultancy Services
			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲			
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Airbus Defence and Space

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Airbus Defence and Space

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Arcanum Information Security

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Arcanum Information Security

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Company Overview:

Airbus in the UK is recognised as a global leader in the design and manufacture of advanced telecommunications satellites, and is a trusted prime contractor for some of the most complex space science and exploration missions in the world – including the European Space Agency’s Exomars Rover and Solar Orbiter. We support our UK armed forces by delivering and operating the Skynet military communications system – a unique programme which has also generated £1bn of exports to thirteen countries including the US and NATO. Airbus subsidiary SSTL has 40% of the world’s small satellite export market, providing nation states with ready-made space capability.

Airbus uses its position as the UK’s leading space company responsibly and constructively; our leadership role in global satellite constellations and space missions anchors 3,000 highly skilled UK personnel and supports an extensive supply chain across every region of the country.

We operate in a commercial marketplace where more than 85% of our business is won in international competitions. Both our commercial and institutional work directly supports a wide range of government activities. Our space manufacturing and test facilities are recognised internationally as the most advanced and well-equipped in the UK.

Airbus Defence and Space operates from several sites across the UK, and has a large presence in Newport, South Wales.

Company Capabilities:

Newport is home to Airbus’ secure data centre which receives processes, archives and stores vast amounts of space based data and imagery every year.

- Our main customer is the European Space Agency, for which Airbus holds the largest archive in Europe from the European Space Agency’s SENTINEL satellites as part of the Copernicus earth observation programme.

- For wider government, blue light and commercial customers, Airbus in Newport securely hosts over 500 types of data, which can be accessed via our online portal: GeoStore.

- Skynet 5: The Newport-based Secure Communications team provide engineering support to Skynet - UK’s military satellite communications programme delivering services to our armed forces, including mobile voice, video, Internet and broadcast communications. This service is operated via a constellation of Skynet satellites - the world’s most powerful, nuclear hardened and protected, commercially controlled military X-band and UHF satellite constellation.

- Airbus in Newport is also delivering space based research and technology initiatives in Wales collaboratively with Welsh Universities through the Airbus Endeavr Wales programme.

Space Related Products & Services:

Telecommunications - 25% of the world’s telecommunications satellites are delivered by Airbus with UK leading on the design and manufacture of the payloads

- Earth Observation - Recent key efforts include leading the Solar Orbiter programme, the £250 million European Space Agency (ESA) mission to study the sun; the scientific mission LISA Pathfinder designed to test the concept of gravitational wave detection, Sentinel 5P as part of EU’s Copernicus programme, Aeolus which studies solar winds to improve the accuracy of weather forecasting and BioMass Earth observation satellites that will tackle climate change.

- Military Satellites - Manufacturer and Operator of UK’s military satellite communications services - armed forces, including mobile voice, video, internet and broadcast communications. This service is operated via a constellation of 7 Skynet satellites - the world’s most powerful, nuclear hardened and protected, commercially controlled military X-band and UHF satellite constellation. Our satellite communications are used by 18 armed forces worldwide, including NATO and the European Defence Agency.

- Small Satellites - Airbus subsidiary SSTL has 40% of the world’s small satellite export market, providing nation states with ready-made space capability and training new national space experts for governments around the world - ‘the Sandhurst of Space’.

- Scientific Missions - Airbus is leading the manufacture of ESA’s ExoMars rover ‘Rosalind Franklin’, Europe’s first planetary rover. It has completed its assembly in Airbus in Stevenage. Capable of drilling as deep as two metres below the surface of the red planet.

Company Overview:

Arcanum Information Security was formed in 2008 and provides bespoke Cyber Security Consultancy and Digital Forensics services. We have 25 employees and a turnover of £1.7million.

While Arcanum now supports clients across multiple sectors, our roots are in Defence and most of our Consultancy Team have served in the Armed Forces, with many still being serving Reservists. Outside Defence, we work in areas as varied as Academia; heavy engineering; space; maritime; IT outsourcing and the charity sector. We are also very active in Critical National Infrastructure for which we have developed specific skills for Operational Technology (OT) systems and have very recently conducted National Cyber Security Centre (NCSC) Cyber Assessment Framework (CAF) audits and assessments on several CNI sites.

Arcanum is also an IASME certification body for Cyber Essentials and Cyber Essentials Plus.

Arcanum is certified by the NCSC as a Certified Cyber Security Consultancy (CCSC) for both Risk Assessment and Risk Management, and the only CCSC Registered in Wales.

Our Digital Forensics Laboratory is one of very few operated by an SME to achieve ISO 17025 as required by the Forensics Science Regulator.

Company Capabilities:

Our Principal Consultants operate at the Chief Security Officer / Chief Information Security Officer level and have filled several CSO / CISO roles on an interim basis.

We have extensive experience in Security Service Integration, including:

- Security Architecture Design
- SOC service development and delivery
- Incident Response & Security Incident Management Security Education & Training

Every consultant is, as a minimum an NCSC Certified Cyber Professional (CCP) Security and Information Risk Advisor (SIRA) and has at least 12 years’ experience in a specialist cyber security role in Defence, either when serving in the Armed Forces or in commercial consultancy. In addition, many also hold additional NCSC CCP certifications (up to Lead) including IA Architect; IA Accreditor; IA Auditor and IT Security Officer. Arcanum consultants also have a number of other qualifications including cyber related Master’s degrees, CISSP and ISO 27001 Lead Auditors. They all hold high-level security clearances maintained by us.

Arcanum are a 2019 recipient of the Employer Recognition Scheme Gold Award by the MoD in recognition of our support of the Armed Forces community. We are also ISO 9001 and Cyber Essentials PLUS certified and are registered with JOSCAR, G-Cloud, Crown Commercial Services and a number of other frameworks.

Space Related Products & Services:
Cyber Security Consultancy

Space Related Projects Worked On:
The Arcanum Cyber Security team has experience of working on defence satellite communications systems.

Specific experience outside of Defence includes:

One of our Principal Consultants was the Global Head of Security Operations for the global satellite/Telco organisation OneWeb for 2 years. This work included:

- Mapping all LEO satellite design, build and launch processes and providing a security threat/risk view of all assets across the business including satellite build factories, transport processes, launch sites and delivery of telco services via 44 earth stations established globally. Establishing and maintaining required compliances for ITAR/EAR data with US DoD. Also mapping and securing/monitoring customer service delivery (eTOM) processes.

- Design and development of business threat focused 24/7 global SOCs hosted in UK/US and all associated resourcing, technologies and service delivery for a global Hybrid Cloud/On Prem business environment. This included supervision of UK SOC service development and technical support team via a service manager (UK) and a US based 24/7 security operations team via a service manager (US). Specifying and evaluating security products/technologies (Including Azure/AWS cloud security capabilities), strategic designs, critical security monitoring supporting services (IDAM/RBAC/JML etc) and driving the development of a number of security/business risk focused SOC security services to achieve specific risk mitigation targets.

- Exercising day to day responsibility for providing an evolving business focused security service operations capability to protect critical business assets across the globe and detect anomalies. This includes investigating all security incidents/anomalies detected by, or reported to, the SOC operational teams. Providing professional guidance to the business in major security investigation principles and practice including direct support to sensitive disciplinary and criminal/fraud investigations.



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Artemis Space Technology Ltd

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Artemis Space Technology Ltd

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Company Overview:

We are a medium sized, family run company who have traded for over 40 years. We employ around 35 people from the local area, majority started with us on apprenticeship and stayed, we still run a successful apprenticeship scheme and our workforce are all direct employed. We are NASC approved, and haveSSIP approval. We use an external Health & Safety Consultant.

Company Capabilities:

We run an extensive training and development scheme to ensure our workforce are qualified for all aspects of our role. We own a vast array of stock to ensure we can meet the needs of our work – we have the back up of technical support, scaffold design and if required additional stock. We have the ability for any number of works, with an experienced workforce in technically demanding/unusual works.

Company Overview:

From Concept To Design, Build and Launch, We Provide Disruptive Access to Space. At Artemis Space we provide low-cost access to space through a range of innovative products and services. Our focus is on developing technologically advanced spacecraft and robotics to meet the needs of our customers, and open access to new markets. Our mission is to use science and technology as a tool to provide practical solutions to the global challenges we face. Whether we are developing a new satellite platform, advanced robotics for planetary exploration, or a revolutionary application of technology, our team is driven to explore space and make space accessible to all. Artemis Space Technologies was founded in 2012 as a spin-off company through participating in the Google Lunar X Prize. The company is currently recruiting, and it has three company employees. Sotira Trifourki is founder and CEO of Artemis Space. She leads the overall business operations and company strategy. Glen Cornhill is CTO and leads spacecraft and robotics design, and oversees our advanced manufacturing, mission operations and satellite platform development. The company has formed a partnership with the Enbarr Foundation to develop the John Summers site into a manufacturing and engineering facility for community use and to establish our satellite and robotics manufacturing facility.

Company Capabilities:

Micro Satellites
Ranging from 1 to 27U, the Xplora Platform's flexible form factor revolutionises the Cubesat concept, providing increased mission capability

Developing the next generation of lightweight, , technologically advanced CubeSats for Earth Observation, IoT Constellations, Telecommunications, and Security and Defence. incorporating robotic capabilities, our platform enables: in-space servicing and refuelling of satellites, space-debris removal, in-space manufacturing, and in-space networking to support advanced space missions. We offer Payload Hosting and Launch Rideshare opportunities through our 27U Cubesat. We have

established partnerships with Launch providers to offer Launch services. We specialise in High Altitude Experiments and Aerial Imaging ranging from Balloons to Pseudo Satellite Drones
Space Applications and Services - innovative solutions to sourcing, analysing and deploying satellite driven data
Driving innovative technologies for robotics space exploration and future missions to the Moon, Mars and Deep Space
We are developing and manufacturing advanced composites for space exploration and terrestrial applications
3D Printed Modular Buildings and Domes
Using additive manufacturing processes and composites to develop technologies for future manned space exploration, Lunar and Mars bases, Analogue Stations and terrestrial greenhouses to support biodiversity and sustainability.
Xploraverse Media
Finding solutions to Big data challenges is our niche.
Offering a suite of business support services for big data, analytics, insights, cloud applications, cloud hosting etc.

Any Space Related Products & Services:

Artemis Space is building a telecommunications infrastructure for in-space assets that will drive the new space economy. Through our Beacon IoT CubeSat Constellation our downstream space data services will provide connectivity for IoT and 5G services, enabling users to track assets, leading the way for millions of devices to be connected.

Use of satellite data for IoT hardware and software development for Infrastructure and SmartCities, Transport, Environment Monitoring, Disaster Monitoring, Transport, Agriculture, Health, Energy, Maritime, Safety and Security and Mining.

Space Related Projects Worked On:

Google Lunar XPrize Team Synergy Moon – development of CubeSat Lunar Constellation for providing telecommunications between the Moon and Earth

Artemis Xplora 27U CubeSat
Design and Manufacture of the 27U CubeSat platform

BEACON IoT Constellation
Artemis Space is manufacturing and launching a 120 CubeSat Constellation for creating a real-time network and building a cellular network in space.

Artemis Create Digital Manufacturing Platform and Marketplace
Artemis Create offers a One Stop Shop for Digital Manufacturing, supporting the space and aerospace supply chain. The network enables hundreds of manufacturers from around the globe specialising in space and aerospace to source suppliers, materials and connect to customers
www.artemiscreate.com

In 2020 during the COVID 19 Pandemic, Artemis Space created the Artemis Gaia Centre for Sustainability, and formed a partnership with the Enbarr Foundation to host a suite of Biodomes to act as a research centre for developing an earth Analogue Station.

Our new project can be found here at www.artemisgaia.com

Company Overview:

Founded by two Photonics Engineers from the Aerospace Industry in 2005, AVoptics has now grown to 18 personnel and has an annual turnover of £2 million. AVoptics specialises in providing (mostly) optical products, design engineering and consultancy. We offer high quality engineered photonic, electronic and electrical solutions for use in harsh environments in Space, Aerospace and Defence sectors.

Company Capabilities:

AVoptics have a world class team of optical and photonic Scientists, Engineers and Technicians who can cost-effectively support a range of requirements in realising a product or part of a system design. We specialise in Free Space Optics, enabling secure communications between satellites, or between satellites and ground stations.

Our strength is the ability to provide technical solutions with low SWaP (size, weight and power) demands, which makes them ideal for space and aerospace applications.

We can allocate a consultant to a specific task, with access to the latest design modelling software, including Zemax, LabVIEW and Solidworks. With a team of Scientists and Engineers, a well-equipped laboratory, rapid-prototyping and additive material printers, AVoptics is able to take a project from concept to prototype to full production. Our capabilities cover most of the optical and photonic areas and include:

- Structural Health Monitoring
- Free Space Optical Communications
- Media Converters
- Laser Characterisation and Modelling
- Lens design

Space Related Products & Services:

We specialise in Free Space Optics, enabling secure communications between satellites, or between satellites and ground stations.

Company Overview:

A cyber-attack to an aerospace & defence, energy, water, transportation or manufacturing organisation could cause significant disruption to society.

Awen Collective is a Welsh Cyber Security Software company whose mission is to reduce the impact of cyber-attacks on society's critical infrastructures. Awen does this by developing software which helps these industrial organisations to increase visibility into their operational networks and decrease cyber risk.

Company Capabilities:

Awen has two products:
*Dot a software system to help industrial organisations to discover devices and vulnerabilities on the Operational Technology (OT) networks, so that those organisations can gain as much actionable intelligence about their cyber risks, thereby enabling them to use budget wisely to reduce risk and increase resilience.
* Profile is a Software as a Service system enabling critical infrastructure operators and their suppliers to adhere to the EU and UK-wide NIS Directive. It provides an easy-to-use web interface for collaborating, checking and monitoring compliance to the implemented directive.

Space Related Products & Services:

Our Dot software product, which is for the asset and cyber vulnerability detection on Operational Technology (OT), is applicable to the aerospace and defence domain. Previous clients include the UK Ministry of Defence, as well as aerospace & defence private sector large enterprises.

Space Related Projects Worked On:

No specific space-related projects yet. However, spacecrafts and aerospace devices make use of Operational Technology (OT).


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B2Space Ltd

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Company Overview:

Axiom Process specialise in Hygienic Engineering, with Expertise in Filtration and Membrane Separation Technology. Our Diverse Customer Portfolio included the, Aerospace, Nuclear, Pharmaceutical, and Biotech, industries.

As a key supplier to leading aerospace interiors & gallery corporations we manufacture precision machines parts and fabrications, producing both high volume and bespoke aircraft components. With 75 staff and operating over two decades we have designed and manufactures and extensive range of Hygienic Process Systems and Precisions Fabrications, delivering a complete Engineering Service encompassing, Stainless Steel, Hastelloy, and Aluminium Alloys.

Company Capabilities:

- Thin wall, lightweight tube and customer fabrications in stainless steel and aluminium
- Machined components – stainless steel and aluminium
- AOG support, batch and bespoke components
- Full materials traceability
- Welding to CAA BCAR A8-10, ASME IX, BS EN ISO 9606
- Special operations such as Electro-Polishing, bead blasting, anodising and mechanical metal polishing to mirror finish

We operate a Quality Management System which is certified to EN 9100:2018 (AS9100D and JISQ9100:2016) for the aviation industry.

Company Overview:

Based in Wales, B2Space is developing innovative and disruptive launch solutions for the Space industry, creating technologies and systems applicable in multiple sectors.

Inspired by a video from Red Bull Stratos mission, the company started with the vision of democratizing the access to orbit for small satellites, creating a novel launch system based on stratospheric balloons.

We saw the opportunity and used the technologies and synergies created in our work for the launch system to start additional business lines:

- Near Space Testing
- HAPS
- Telecommunications & Cybersecurity

Company Capabilities:

B2Space is the next revolution in the launch industry for small and micro-satellites, an exponentially growing market.

- Reliable, flexible and low-cost access to space for small satellites

- Disruptive concept : A stratospheric balloon platform lifts a rocket to 35 km of altitude, above 99.9% of the atmosphere

- This allows to use 70% less propellant and save 80% cost, thanks to a much lighter, improved and optimized vehicle design as a result of the lack of aerodynamic drag at that height.

- We make use of innovative technologies to drive further efficiency and cost reduction: Generative Design, Additive Layer Manufacturing, Autonomous Systems & Advanced Materials

At the ESA Business Incubation Centre Harwell, UK, B2Space developed a Near Space Testing service : a "flying lab" based on stratospheric balloons to test Space technologies. We took advantage of the work done for our launch system to develop another revenue stream using common technologies to tests, qualify and validate technology in a more cost-effective way, while performing an in-flight demonstration or proof of concepts.

Based on the Near Space testing service and balloon capabilities developed with ESA, we are adapting our stratospheric balloon platforms to perform different HAPS missions

Company Overview:

Established in 1884, Bangor University has a long tradition of excellence and exceeds expectations, both for academic standards and student experience. Bangor University has a long tradition of academic excellence and a strong focus on the student experience. Around 10,000 students currently study at the University, with teaching staff based within fourteen Academic Schools. Bangor University is ranked in the top 40 in the UK for research*, according to the Research Excellence Framework (REF) 2014. The REF recognised that more than three-quarters of Bangor's research is either world-leading or internationally excellent, ahead of the average for UK universities. The new group, set up in 2017 is growing a team of internationally leading academics here at Bangor University looking to advance nuclear technologies in the North Wales region. Nuclear energy has played a key role in the area for many decades and the end of the Magnox era has opened up great new opportunities with two exceptional nuclear licensed sites – Wylfa and Trawsfynydd on our doorstep – and a rapidly growing industrial and academic resource at Bangor University and our science park, M-SParc. Since its inception in late 2017 – the Nuclear Futures Bangor group has built extraordinary facilities that are being used by leading industry stakeholders to aid nuclear technology development. These facilities are ideal for application to aerospace technologies, researching materials in extreme environments (e.g. ultra-high temperature ceramics). We are also very keen to use our expertise in nuclear to advance the exciting engineering opportunities in space reactor and power technologies.

Company Capabilities:

The university combines a very wide range of expertise and capabilities over our engineering and science faculties, from computer science and electronic engineering, materials science to ocean and environmental sciences. We have expertise in manufacture and design, material testing, computer vision, instrumentation for extreme environments, materials sciences, sensor development and testing. Our computer scientists provide expertise in data analysis, data visualisation, artificial intelligence, virtual and mixed reality, simulation, modelling, across a range of application areas in earth sciences, ocean and climate change, medical, nuclear, physics, engineering, arts, humanities, and social sciences. We also have

world-leading capabilities in computing, modelling and simulation research across a broad range of activities throughout the University. Additionally, we have new manufacture and characterisation facilities focused on working with radioactive and novel materials for extreme environments.

Space Related Products & Services:
Services and development at the university includes:

- Satellite Earth Observation information analysis. Typically used to derive forest estimates and land use / land cover classifications as well as other proxies for human activities (e.g. night lights – population density). Further, these datasets are the basis for modelling a wide variety of anthropogenic impacts on species and ecosystems (and the services they provide, e.g. carbon storage, water regulation).

- Also Satellite Earth Observation analysis is being used to track sea ice decline over the Arctic. Ocean and recently identify a sea ice regime shift in the southern Barents Sea a key area in the determination of UK weather. More over techniques have been developed to track warm water in the Atlantic which will be further pursued by Lenn in the recently funded NERC ARCTICConnect highlight topic proposal.

- Our MERLIN facility is able to facilitate the development of new fuel concepts, radiation shielding materials, ultra-high temperature ceramics and a range of other useful aerospace applications.

- The NFI £6.5m project is also developing sensors and low-power systems for extended control and instrumentation applications that will have direct applications in the nuclear field.

- The materials engineering group also has an ability to model materials and predict behaviour in extreme environments, accelerating the licensing of new materials for use in commercial space-flight and satellite applications.

Space Related Projects:
Sensors for space applications.
Shielding for spacecraft.
Reactors for space.
Powering applications using beta/gamma-voltaics.

Company Capabilities:

Black Arrow was incorporated in 2017. The mission is to provide the UK with an integrated space hardware provider, comprising spaceflight structures and systems, facilities and a space launch site, located on a converted merchant vessel.

The integration and launch operations centre are to be sited in Port Talbot, with test centres in Carmarthenshire and Powys. This approach maximises the current resources and industrial capabilities within the region to offer the most environmentally sustainable, safe and secure satellite launch operation in the UK and the European region.

The Company will be based in the English Midlands, within the high-performance space, aerospace and automotive triangle linking Stevenage, Portsmouth and Swindon, which includes much of the UK's provenance and expertise in these sectors.

The Company will have core manufacturing capabilities for flight structures (pressure vessels and launch vehicles), and control a network of joint ventures to provide a secure supply line for critical subsystems, such as propulsion (engines, pumps and feed systems), secure avionics (all electronic flight control and data transfer systems) and maritime assets (acquisition and conversion of the fleet). Facilities will be managed in partnership with local councils and landowners.

Company Capabilities:

The Company will control and manage all the IP resulting from applied knowledge and expertise required to design and produce materials, parts and systems within the core responsibility, as required to produce core products.

Where responsibilities lie outside of the Company, joint ventures or Special Purpose Vehicles will be established to secure the supply of critical services and systems or provided through standard COTS supply contracts.

Such ventures have been created and the major,



Black Arrow Space Technologies Ltd

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Celtic Engineering Inc

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long-lead projects allocated to industrial partners, highly knowledgeable in their fields. All resulting deliverables from these projects will build Black Arrow's IP value.

Where major items are procured by standard contract, these items will be 'commercial off-the-shelf' adjusted to Company requirements. These items will remain the ownership of the suppliers, with design licenses, terms-of-use waivers and specific detail control retained with the Company IP.

All projects will be managed and overseen through a team of experienced counterparts within the Company, to ensure compliance with requirement.

The Company has the commitment from a number of established leaders in various technology, management and financial affairs and the expertise of the management team is second-to-none.

The Company will integrate all provided parts, systems and assemblies within Company facilities in Port Talbot and/or the test centres and operate the seaborne space-fleet, with tracking and range operations provided through a joint venture in South Wales (Recurved-Space).

Space Related Products & Services:

Intention to use:
Galileo / UK LEONA navigation services,
EDRS data relay (if available),
Meteosat (meteorological and sea state),
Inmarsat maritime communications (or similar)

Company Overview:

Delivering finance & leasing options to business. The Directors of Capital Options have over 30 years' experience within the finance industry and was established to offer tailor made leasing/HP/refinancing and business loan solutions for organisations like yours. Capital Options can arrange finance on equipment for any business use with no upper limit on the amount of finance required. Our commitment is to offer you the right solutions for your business needs, contact us today to find out more.

Company Capabilities:

We specialise in Tax Loans and VAT Funding, Sale and Leaseback, Loans for New Equipment, Leasing and Equipment Finance and Working Capital Loans.

Company Overview:

Located in McKinney, Texas we are a premier supplier of contracting services to numerous companies and government agencies. Founded in Wales the company incorporated in Texas in 1984. The company has grown to establish itself as a reliable, efficient and professional source of specialised engineers, and as a result of continued customer satisfaction with its performance CEI now has an international team with high quality standards of workmanship, innovative design and unique engineering skills.

We specialise in solving unique engineering problems such as Grounding Protection and Noise Mitigation for telecommunications applications. CEI's role is in the delivery of quality transmission service providers by the nation's largest companies.

Company Capabilities:

The company is staffed by eight highly qualified and experienced engineers and technicians all trained to perform top quality work to exacting standards and procedures laid down by MCI, and IEEE.

In 1989 CEI started in-house testing of equipment being prepared for shipment to the Peoples republic in China, Analog and digital Microwave Radios, associated Modems and Switching equipment fully tested and shipped in accordance with the requirements of MCI International with venture in promotion of equipment and services to the Chinese Ministry of Posts and Telecommunications.

The Companies facility of over 6,000 feet of spatially designed space is equipped for functional operational and simulation tests of Fiber Optic, Microwave and Satellite Communications.

Manufacturing is achieved by design prototyping and subsequent production of specialised particular telecommunications applications. CEI has designed and manufactured the upgraded Loran-C Antenna for MCI. This system is now employed throughout the MCI Worldcom network designed and manufactured the cable tray grounding kits and components for the GPS equipment MCI Worldcom Network Synchronisation.

Any Space Related Products & Services:

National Test and Development Laboratory in Reston, Virginia.

West Coast Data Processing Centre in Rancho Cordova California

Satellite Tracking and Control Centre in Clarksburg, Virginia

IBM Satellite Terminal in White Plains, New York

El Centro Junction, Dominguez Hill, California

Mount Woodson, Signal Peak Repeater Site

US Navy Weapons Training Center (Top Gun), Miramar, California

West Peak, Connecticut

Grounding protection enhancement and upgrades at other MCI repeater sites New Satellite system between Haiti and Crystal Lake New York.

Company Overview:

Research Centre at Swansea University specialising in advanced semiconductor technologies for Clean Energy Systems, Nanohealth, Power Electronics. ~ 50 researchers.

Company Capabilities:

Semiconductor device design, modelling, fabrication and testing. Wafer-level process development including advanced dielectrics and packaging. Semiconductor physics and engineering. Expertise across silicon, compound semiconductor (including wide gap) and next generation semiconductors.

Space Related Projects Worked On:

High power density, radiation hard solar photovoltaics for space and aerospace applications.

Company Overview:

Research Centre within Swansea University

Company Capabilities:

Swansea University's CSER team produce Cadmium Telluride (CdTe) thin film solar cells directly onto space grade cover glass. The CdTe is inherently radiation hard and coupled with the cover glass yields a high specific power, potentially low-cost and flexible solar array for emerging space applications. The CdTe on cover glass has flown on the UK Space Agency's AlSat-Nano mission producing the first performance data for thin film CdTe from space.

Each area has its own autonomy and acts almost as separate companies.

We are also heavily involved with research projects and much of our innovation stems from these projects. We have a very wide network of companies and academics across the whole of Europe.

Space Related Projects Worked on:

UK & Algerian Space Agencies AlSat-Nano mission, RCUK funded research projects, current project with German Funder, WEFO funded SPARC II operation funds a work package in this area.



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Company Overview:

Charcroft Electronics Ltd is a specialist, CECC/BS approved distributor of passive, interconnect, power, magnetics, optoelectronics & electromechanical components.

We are also a CECC approved manufacturer of commercial and CECC released passive components.

Charcroft is certified to AS 9120, is JOSCAR accredited, and is approved to BS9000, IECQCECC and BS EN ISO9001:2015 and has over 40 years of experience as an Approved Supplier.

Employing over 60 people from three operational sites in Wales, Charcroft is a significant employer in the local area and makes a significant contribution to the local economy with an annual turnover of over £10m.

Company Capabilities:

Charcroft Electronics are an established supplier to the Space sector, offering a wide range of EEE components including Passive, Active, Protection, Sensors, Frequency Tuning Components, RF materials and Electro-mechanical solutions from Franchised manufacturers with established Space-heritage.

Charcroft staff have 100's of years of combined experience supplying into the High-Reliability market and we are able to aid component selection at every stage of development; BB, EM, EQM & FM levels.

We can consider COTS & Automotive grades utilised for low-cost nano- and cube-satellites to 'New Space' electronics considered for the latest missions, up to EPPL and ESCC-QPL (or the relevant MIL-PRF) components specified for fully qualified ESA programmes such as Telecom or GNSS satellite systems, launch-vehicles, spacecraft & rovers.

Charcroft is 100% UK-owned and located, with in-house technical support linking and established relationships with our Franchised Manufacturers, who we work closely with to provide the best

solution for our customers – including custom products and bespoke screening levels.

Challenge Charcroft today for your EEE component requirements!

Space Related Projects Worked On:

Ariane, Earthcare, Galileo, DMC, LISA, Sentinel, TechDemo, WSO. Applications across the board, from electrical propulsion systems to, power distribution and instrumentation

Company Overview:

- Established in 1999
- Emerged from automotive sector, originally as a training provider
- Services designed to support and develop automation, manufacturing and process industry in Wales, UK and EU
- Specialist provision of Digital Manufacturing skills, Industry 4.0 software and integration
- Collaborative R&D project partner, driving industry forward through innovation.

Company Capabilities:

Control 2K is primarily an Innovation company with a focus on Control Systems. We have 3 divisions:

- Training
- Systems
- Design

Each area has its own autonomy and acts almost as separate companies.

We are also heavily involved with research projects and much of our innovation stems from these projects. We have a very wide network of companies and academics across the whole of Europe.

Company Capabilities:

Shot Peening, Shot Peen Forming, Laser Peening, Thermal Coatings, Liquid Coatings, Peentex, NDT, Parylene Coating.

Company Overview:

Research intensive Physics Department at the University of Swansea. In the 2014 Research Excellence Framework (REF), over 80% of our Physics' research outputs were judged to be world-leading or internationally excellent. Our state-of-the-art facilities include: a low-energy positron beam with dedicated instrumentation for the study of positronium, a number of continuous-wave and pulsed laser systems, and scanning tunnelling, near-field optical and Raman microscopes. High-performance computing resources are available via clusters and dedicated supercomputers.

Staff members lead the ALPHA collaboration, based at CERN, whose goal is to create, trap and manipulate anti-hydrogen. Results of the ALPHA collaboration are regularly published in Nature and featured on the BBC, CNN and other media.

Company Capabilities:

Adaptive optics and laser spectroscopy, including LIBS, Raman, and ultrafast. Open quantum systems and quantum information, including experimental and theoretical research. Working Group Leader (Technology) for MAQRO Consortium, including advisory role on ESA CDT of Quantum Physics Platform. Quantum Technologies in Space (EU COST Action) member.

Big data capabilities including infrastructure requirements for LHC at CERN, UK's GridPP. UKRI CDT in Artificial Intelligence, Machine Learning and Advanced Computing host institution.

Anti-matter creation and measurement. Extreme resolution spectroscopy. Downstream user of high-accuracy satellite timing information.

Space Related Products & Services:

Use of high accuracy timing information.

Space Related Projects:

MAQRO Consortium. ESA Concurrent Design Study CDF-183(C)

Company Overview:

Deva Technologies Ltd are a specialist engineering design company providing bespoke design and verification services to 1st and 2nd tier companies in the UK, European and International aerospace and defence markets.

We specialise in the design and production of innovative electronics, software and mechanical products for electro-mechanical actuation systems, precision motor control and complex drive systems, and qualify their use in safety critical applications and harsh environments. Turnover: up to £500,000 Employees: 5

Company Capabilities:

- Deva Technologies Ltd offer the following capabilities:
- Systems & Sub-System Design
 - Electronics & FPGA Design and Verification
 - Power Electronics Design
 - PCB Layout
 - Software Design and Verification
 - Control Systems Design
 - Mechanical & Electro-Mechanical Design
 - Design Analysis, Modelling & Simulation
 - Design Rescue & Obsolescence Management
 - Design Verification and Qualification
 - Prototype & Production Manufacture
 - Final Assembly
 - Test Development
 - Qualification Testing

Deva Technologies currently operates a ISO 9001:2015 Quality Management System and holds several major customer quality approvals.


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Enbarr Foundation CIC

continued...


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www.envsys.co.uk

Company Capabilities:

The Ensinger Group is engaged in the manufacture of engineering plastic materials, precision machined parts, profiles, injection moulding and thermoplastic composites. With a total of 2,700 employees at 35 locations, the company is represented worldwide in all major industrial regions with a turnover in 2019-20 of 469m Euro. Ensinger Precision Engineering employs more than of 50 permanent staff with a turnover in excess of £5.5m reported FY 2019-20.

Company Capabilities:

Ensinger Precision Engineering is at the forefront of complex machining and assembly of high-performance engineering plastics for use in many applications in industry sectors including; Medical, Life Science, Oil & Gas, Aerospace, Defence, Space, Automotive, Nuclear Power and carbon neutral energy platforms. We offer engineering excellence for finished parts starting with prototypes through to full production volumes and we can offer design advice for the selection of materials such as Acetal, PEEK, PEI, Polyimides, Nylons, PAI and PTFE. Group approvals include ISO9001, ISO13485 & AS9100 – your quality guaranteed. Our engineers and group global expertise are on hand to offer constructive advice, innovative solutions and material selection to find the optimal solution for whatever the application.

Any Space Related Projects & Services:

Components supplied into Airbus Defence and Space Stevenage.

Company Overview:

Electroimpact is a highly experienced aerospace automation company with an exceptional concentration of engineers. Our wide range of projects include complete automation assembly systems for commercial aircraft wings, riveting machines and tools for wing panel and fuselage assembly, advanced fiber placement machines, robotic assembly systems, and spacecraft handling equipment. Our company was designed by the founder as a haven for engineers, with vertical responsibility for all work from concept to customer acceptance with minimal bureaucracy and barriers to success.

Company Capabilities:

Manufacture of Automated Assembly Systems, Automated Fibre Placement, Robotic Drilling, Aerostructure Assembly Fixtures. Design, Development, Manufacture, Installation Commissioning & Support.

Space Related Products & Services:

Our Automated Fibre placement systems are used extensively in the production of Launch System Structural Components such as launch Fairings, Cryogenic Tanks, Payload Adaptors and Primary Structural Components.

Space Related Projects Worked On: We have delivered equipment to Airbus Space & Defence, Nasa, Blue Origin

Company Capabilities:

Enbarr have strong roots in the local and wider communities that we serve; changing lives, inspiring individuals, and their families to take responsibility for their path in life through person centred support and learning and development.

Our mission is encompassing and includes the development of our learners, customers, stakeholders, and employees.

We do this by embracing the following Core Values: Integrity, commitment, partnership, excellence, and investment. We are now using our vast training and recruitment background and foundations to ensure that local people are able to access STEAM (science, technology, engineering, arts and mathematics) alongside Tourism, Hospitality, Caring, Construction, Advanced manufacturing employment opportunities as well as train in some highly skilled sectors like Space and Aerospace and once again and be part of a thriving local community.

Our aim is to engage, connect and coordinate with a range of businesses from multiple industries so as to help support them to up-skill and take full advantage of the £40 billion Space Growth opportunity envisaged in the UK by 2030.

We are also utilising cutting edge Space technology spliced with lost Heritage niche skills to restore and renovate a derelict Iconic building in the heart of North Wales.

Company Capabilities:

Enbarr Foundation CIC is one of the UK's first community focused Education Innovation Studio. We are partnered with the Space, Aerospace and Advanced Manufacturing Industries to inspire people to pursue careers in Science, Technology and SPACE.

In 2018 we launched our Sustainable 3D Printing Centre to provide 3D Printing and recycling education to allow people to not only fly drones but create their own, from printed parts, and to build and programme them.

We support innovation through allowing people to think outside the box and release their creativity

through #STEAM by delivering workshops that harness innovation alongside practical skills to build skills for future generations and open their eyes to transitional sectors like Agriculture and Farming.

We have a foundation of not just working but partnering with some key players like Aerospace Wales and Northern Space Consortium to promote and build frameworks for the future workforce growth and innovation to Inspire, Enable and Connect individuals to Space and Space technology.

The NSC is comprised of passionate professionals from across a broad range of disciplines, from environmental consultants to bona fide rocket engineers, IT experts, industry legends and entrepreneurs.

Not Only can you aspire to be a potential #astronaut we can support and signpost you to potential careers and training to get you involved.

Space Related Products & Services:

High-tech drones allow farmers/agriculture/horticulture/topography, and the drone pilots that operate them, to increase efficiency in certain aspects of the farming/observation process. From crop monitoring to planting, livestock management, crop spraying, irrigation mapping, and planning, to studying flood potentials utilising both Earth observation data, and GPS satellite navigation systems these can be programmed for autonomous flight.

We also train drone pilots to survey heritage and construction sites to utilise pinpoint data analysis to create Point Cloud (x,y,z) including OBJ & MTL & Matterport VR tours of buildings and structures, allowing dollhouse, layered and floor-plans with the advancement of Measurement mode, allowing individuals to visualise the place without being physically there.

Space Related Projects:

At this time we are working on how we can utilise technology to improve food security and efficiency to combat many food insecurities and poverty issues in areas of deep deprivation.

Company Capabilities:

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Components supplied into Airbus Defence and Space Stevenage.



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Glyndwr Innocations Ltd (Precision Optical Systems Group)

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Glyndwr Innocations Ltd (Precision Optical Systems Group)

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Company Overview:

Established in 1983 Formagrind is a high precision engineering company that specialises in machining complexed components in exotic materials (Sourced through our sister company Future Alloys) like Tantalum / Tungsten / Molybdenum / Titanium and many others. We support customers in Space and Defence / Semiconductor and Medical with cutting edge machining through the latest solid modelling solutions. Formagrind employees a total of 30x people the majority of which are skilled engineers. We support our manufacturing with a continuous program or reinvestment into new machinery and most importantly apprenticeships.

Company Capabilities:

Formagrind offers full CNC capabilities in Turning / vertical milling with 3rd / 4th and 5th axis. EDM wire and spark erosion as well as EDM hole drilling. We offer both surface and cylindrical grinding. Solid model design and machining with Solid Cam 4x seats

Also, a wide range of managed sub-contract process of plating and finishing of machined goods.

Space Related Products & Services:

One of our key customers are payload service providers. We machine a wide variety of goods on a regular basis.

Space Related Products & Services:

In 2018 we completed a project for NASA through a UK customer which was for the new deep space telescope WFIRST.

Company Overview:

EM Engineering and Maintenance Services Ltd is a small to medium sized business. Turnover usually ranges from £900K to £1.1M per annum. We currently have 12 personnel.

Company Capabilities:

We offer 3D scanning to aid in design, reverse engineering and information storage. We manufacture /fabricate items from Mild steel, Stainless steel and Aluminium. We supply maintenance services to Airbus and Toyota. We supply bespoke access equipment to Airbus. We manufacture jigs to Airbus Defence and Space to suit their requirements

Space Related Products & Services:

We manufacture Bespoke items used in the building of satellites.

Space Related Products & Services:

Onesat Platens used for manufacture of satellite parts. Turnover frames used for the manufacture of solar panels used on satellites.

Company Overview:

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Onesat Platens used for manufacture of satellite parts. Turnover frames used for the manufacture of solar panels used on satellites.

Company Overview:

£4m T/O with 48 employees covering turnkey tooling packages in the Aerospace and space sectors.

Company Capabilities:

Design, Fabrication, CNC machining, assembly, metrology and maintenance.

Any Space Related Products & Services:

Currently providing Airbus Space and defence with major tooling packages for the E3000 NEO programme.

Any Space Related Projects Worked On:

E3000 NEO.

Company Overview:

Glyndwr Innovations Ltd, a subsidiary of Wrexham Glyndwr University is based at the OptIC Technology centre, a unique business and technology centre in St Asaph, in the heart of North Wales. OptIC links R&D, Industry and Academia and offers conference facilities, meeting rooms, incubation and specialist engineering and research services.

The OptIC technology centre is host to in-house teams specialising in Optics and Photonics as well as several companies involved in leading edge research.

The Precision Optical Systems Group offers complete design and fabrication services for precision and complex optical systems including optical telescopes and instrumentation.

The Centre for Photonics Expertise is a £5.7M ERDF / WEFO funded project developing academic and industrial collaborative partnerships The project is a partnership between four Welsh academic partners, Wrexham Glyndwr University, Aberystwyth University, University of South Wales and Bangor University. All academic partners work together to support the industrial partners and work to provide photonics based technical solutions to businesses in the West Wales and Valleys region with their manufacturing processes and their potential product innovations through the application of photonics technology.

Across the POSG and Business support teams GIL has 22 employees and a turnover ~£1.8M

Company Capabilities:

Precision Optical Systems Group at Glyndwr Innovations specialises in the design and fabrication and test of bespoke optical components and systems. Capabilities include:

- Optical Fabrication spheric, aspheric (on- and off-axis) up to 2m in size

- Optical surface metrology

- Design and implementation of bespoke test systems for Optical Fabrication

- Engineering Design and Analysis

- Integration of Optical Systems

Optical Fabrication at GIL is focussed upon the fabrication of large and challenging optics. The optical fabrication facilities includes both conventional polishing methods and small tool CNC processing for optics up to 2m in diameter.

Verification of Optics: The optical fabrication capabilities are complemented by a high level of competency in surface metrology, both form and texture, with a comprehensive suite of metrology instrumentation in use. For the fabrication of large optics and systems, GIL offers a high level of expertise in the critical mounting of optics required for both processing and verification.

Engineering Design and Analysis includes the design of Airborne Optical Systems, Opto Mechanical systems, FEA and thermal analysis.

Integration of Optical Systems includes the integration and verification of opto-mechanical assemblies. GIL is able to assemble and align complex high tolerance opto-mechanical sub assemblies. It has the metrology capabilities to verify integration.

Space Related Products & Services:

Design, test, manufacture and integration of optical components, sub-systems and optical systems for Airborne and ground based applications

Verification of optics for space and airborne projects.

Space Related Projects:

ESO EELT, DMC3 Ground Support Equipment, J_PAS Telescope



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John Liscombe Limited

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Company Overview:

HamerTech Ltd was set up in November 2020. Its sole employee and owner Carl Hamer has over 35 years' experience in the Non-Destructive Testing Industry especially in the Aerospace sector. This is a new start up business with the ambition to create further jobs in the future.

Company Capabilities:

HamerTech LTD www.hamertech.co.uk was set up to bring an independent solution for end users in order to engage some of the best Equipment, Industrial Cleaning and Non-Destructive Testing companies available to provide added value Asset compliance and Inspection requirements.

To accomplish this HamerTech LTD has partnered with Industry leading equipment and service providers to create a joined-up approach within the Aerospace, Automotive, Oil and Gas, Petrochemical, Renewable Energy and Utility Industries. Its Technical and Sales Director Carl Hamer has over 20 years' industry experience as a NDT/Quality Engineer and 15 years as a Business Development and Sales Manager who remains focused on providing the client with the most efficient service whilst adhering to the strictest Health & Safety rules.

Non-destructive testing of various materials used in the space industry including composites. Currently involved with our partner Dolphitech participating with global space agencies and companies projects providing solutions and equipment for inspection of materials in both pre and post manufacture of components used in space vehicles and satellites.

Company Overview:

Long established Civil Engineering and Construction company based in Flintshire with TO Circa £15m PA, Number of employees 45 – 55. Completed many projects for Airbus in Flintshire over the last 15 years including Radar civil works, Flowline infrastructure and build works (flowline is the line where the wings are made) works also include Runway upgrades, Runway lighting and wing despatch buildings.

Our company has also developed a Digital H&S company called Fusion which stores and delivers all of a Company's H&S documentation to their employees mobiles www.fusion.app

Company Capabilities:

Civil Engineering, construction and industrial property. Specialists working within the complexed industrial sectors delivering bespoke projects with client's timeframes. Our Clients include Airbus, JLR, Vauxhall, Muller, Veolia, NHS and Croda.

Space Related Products & Services:

Radar Base for Aviation tower at Airbus.

Company Overview:

Huntingdon Fusion Techniques have been in business for over 45 years and are inventors, designers and manufacturers of pipe purging equipment.

Based in South Wales we are proud to have won 'Wales Manufacturer of the Year 2019' and 'Exporter of the Year' at the Wales Chamber of Commerce 2019 Awards.

Majority of our products are exported all over the world and mainly to the oil & gas, process, shipbuilding, aerospace and nuclear industries.

Any company welding stainless & duplex steel, Inconel, titanium and other exotic alloys will have a use for our products which help welders achieve bright, shiny, oxide free welds. Using our products will save time and money on expensive argon or other inert gases.

Our weld trailing shields are used by SpaceX and their welding sub-contractors based in and around Florida, USA. This product has recently undergone a major design change and is now wholly manufactured in South Wales with the majority of raw materials being sourced from the local economy.

Company Capabilities:

Weld Purge Monitors for measuring oxygen content in purge gas down to 1ppm

Tandem inflatable purging systems for pipes, tubes, flanges, fittings and contoured fabrications in sizes 1" to 96".

Flexible welding enclosures for the welding of titanium in a completely inert environment

Weld Trailing Shields that fasten to the welding torch to create an inert environment close to the weld. Available as a flat version for sheet and plate and in OD sizes for tube.

Thoria free Tungsten Electrodes for TIG welding. Manufactured with a blend of dopants which produce 10 times more arc strikes than thoriated electrodes.

Soluble purging film for those applications that don't have access following the weld. Film dissolves when area is flushed with water.

Our products are batch numbered and certified for full traceability.

Company Overview:

The IQE Group is clearly recognised as the leading global supplier of advanced wafer products and wafer services to the semiconductor industry, operating across a broad range of markets. The Company was formed in 1988 and is based in South Wales, but has a global footprint with multiple manufacturing sites, employing >600 staff. Company turnover was £140M in 2019. The company operates in two main market areas: wireless and photonics, which provide advanced components into telecommunications, defence, space, energy and environmental markets.

Company Capabilities:

IQE provides unrivalled expertise in manufacturing advanced semiconductor structures for a wide range of electronic and optoelectronic applications and offers materials solutions to customers, utilising its broad portfolio of Intellectual Property.

Any Space Related Projects & Services:

Supplier of advanced semiconductor materials for components.

Any Space Related Projects Worked On:

Multiple UK and European space related projects, primarily supplying advanced semiconductor structures for space power generation and handling.

Company Overview:

John Liscombe Ltd is a privately owned and managed, 143 year old, PPE, Protective clothing, Manufacturing and Supply Company.

Liscombe employs 100+ staff in a National UK Manufacturing and Distribution Centre in Newport, South Wales and is one of the UK's leading specialists in the Manufacture and Supply of Protective clothing (PPE).

Liscombe is unique in that we are the only company that combines PPE distribution, PPE Manufacturing, PPE (own brand) Importing, technical support and tailored supply solutions. We are the market leader in the supply of PPE to the UK Steel Industry and UK Automotive Industry. We are also a major supplier of PPE to the Chemical and Petrochemical, Food, Pharmaceutical, Defence and Utilities.

Liscombe specialises in the supply of PPE to large industrial customers who value the expertise and focus provided by a dedicated PPE company who are not distracted by other product commodities.

Liscombe is the UK leader in the operation of on-site PPE managed stores.

As an established family company, we still believe in the values of integrity, honesty and providing a personal service to our customers.

Company Capabilities:

Liscombe specialises in PPE and offers a complete Head to Toe solution.

Liscombe's mission is to bring together the very best range of PPE available worldwide to our UK and European customers. Whether the product is a well-known brand, a Liscombe imported own brand or a bespoke made product from our own factory, we aim to have a solution to protect against every hazard.

Liscombe is the UK's leading Specialist Glove Manufacturer. We manufacture, in Newport, specialist heat resisting and cut resisting gloves and mitts.

Liscombe is also a Specialist Heat resisting Clothing Manufacturer specialising in the Heat resistant, flame retardant and molten metal clothing.

Therefore with Liscombe's product range, branded distribution sources, manufacturing capability and importing expertise, we believe we offer the widest most competitive PPE supply solution in the UK.

Liscombe operates probably the most advanced On-line PPE Management tool available today.



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Company Capabilities:

K Sharp is a Human Science Research and Human Factors consultancy that was established in 2011. Based in Llanelli, South West Wales, we have 3 permanent staff and place a great value in teaming with appropriate people to deliver quality outputs.

Company Capabilities:

K Sharp provide strategic and applied human sciences research, cultural and behavioural analysis, and technology adoption consultancy.

Human science research is about understanding how people think, feel and interact in order to predict how they will do it in the future. Understanding how we will act and react to different things means we can make products and services that people will not only find useful but will delight in using.

Our products are the output of this intellectual effort in the form of innovative ideas, strategies, development, action plans, recommendations, and paths to exploit them.

Any Space Related Projects & Services:

K Sharp supplied a consultant to UK Space Agency.

Company Overview:

LMg Solutions Ltd (LMg) was established in 1995 as a provider of Numerical Control Part Programs, now Specialising in Optimisation, working in partnership with leading cutting tool, machine tool and technology companies, developing and implementing the latest machining strategies. We programme components from the smallest prismatic part to the largest & most complex structural Aerospace components in most aerospace material. Working with small general engineering companies to the world leading Aerospace companies, where LMg has gained a reputation for its technical expertise & quality. We possess an in depth working knowledge of Aerospace sectors, with a workforce that has gained unparalleled technical expertise. LMg Solutions Ltd (LMg) Currently Employ 13 NC Programming Engineers. LMg Solutions Ltd (LMg) Current turnover is £800,000

Company Capabilities:

At LMg Solutions Ltd (LMg) we continually review and upgrade our technology infrastructure. Our in-house capabilities include the latest previous release of major system:
Current CAD/CAM Software:
· CATIA V5 Design / Multi-Axis manufacture
· Siemens NX Design / 5 Axis Machining Verification Software
· Vericut / Multi-Axis / Machine Sim/Autodiff/CatV5 Post Processors
· NCCS PWorks Multi-Axis
· IMS-Post
· GEN4AX

Company Overview:

Magellan Aerospace is a global, integrated aerospace company that provides complex assemblies and systems solutions to aircraft and engine manufacturers, and defence and space agencies worldwide. Magellan is a publicly traded company with its headquarters in Canada, and operating facilities in Canada, the United States, The United Kingdom, Poland, France and India. Magellan employs approximately 4000 employees across its operations and in 2019 reported revenue of \$1 billion Canadian.

Company Capabilities:

Magellan Aerospace has more than 60 years of experience providing innovative solutions for suborbital, Earth orbit, and deep space missions. Today, we continue to support our customers with reliable mission-specific solutions to achieve their highest goals.

Any Space Related Projects & Services:

Magellan's space activities include our Black Brant suborbital rocket system used for a variety of space science applications including microgravity research; Our satellite bus products (MAC-100 and MAC-200) and associated satellite bus avionics..

Any Space Related Projects Worked On:

The Black Brant rocket has supported more than 1,000 space science missions for Canada, European and NASA.

Our satellite bus and avionics have been used for the SCISAT-1, CASSIOPE, Radarsat Constellation Mission (RCM), and an interplanetary mission.

Company Overview:

MicroLink Devices UK Ltd is an exciting, dynamic business specializing in the design, development, and manufacture of advance solar arrays for spacecraft, aircraft, and terrestrial applications. MicroLink Devices was founded in May 2000 and has continued to grow, which has resulted in MicroLink Devices UK Ltd being created. Based on the manufacturing process first developed at its Chicago, US facility, MicroLink Devices UK is establishing a high-volume solar cell fabrication facility in Newport, Wales. MicroLink Devices UK Ltd is part of the CSconnected representing the world's first compound semiconductor cluster.

Company Capabilities:

MicroLink Devices UK Ltd manufactures the highest power-to-weight ratio (kW/kg) photovoltaics in the world. The demand for this technology is growing rapidly in applications such as unmanned aerial vehicles (UAVs), solar-powered high altitude pseudo satellites (HAPS), satellites, electric propelled aircraft and personal mobile power generation. The solar cells are delivered with robust, waterproof packaging, using a variety of standard and customised formats. However, for each, the flexibility of the cells are not compromised. Customer specific power output requirements are satisfied by the number of cells inter-connected and layered on to made to order sheets.

Space Related Products & Services:

Solar Cells

Any Space Related Projects Worked On:

NASA, DoD Satellites, DARPA HALE program, Materials International Space Station Experiment (MISSE)

Company Overview:

Founded in Helsingborg, Sweden, in 1997, MilDef has always focused purely on the design and manufacture of rugged, customised electronics solutions for the defence market.

Through acquisitions in 2011 and 2016 MilDef has expanded its footprint into UK, Norway and USA. These acquisitions combined with a focused business strategy and excellent product range have created a truly international defence company supplying equipment to over 60 different country's armed forces in all of the world's major combat zones.

MilDef has 107 employees worldwide and is headquartered in Helsingborg, Sweden. The Group consists of five internationally based facilities, providing rugged computing and electronics solutions to the global defence industry.

As well as the headquarters in Helsingborg, Sweden, MilDef has international sales offices located in Stockholm, Oslo, Cardiff and Los Angeles. MilDef also has a number of remotely based staff providing local customer support as well as in-country business partners and distributors supporting many regions.

Company Capabilities:

MilDef is a leading designer and manufacturer of military-rugged computing, communications, and special electronics for the defence sector. Our comprehensive offering includes handhelds, tablets, laptops, displays, and rack-mountable 19"/2@ integrated solutions. Our 19"/2@ line includes servers, switches, routers, KVMs, and tactical power solutions in half-rack form factors. Any of MilDef's flagship production products can be customised to meet your specific program requirements. MilDef's core business is designing and delivering products that have been proven on land, at sea and in the air with international forces around the world. Our products are mission-fit: designed, tested, and qualified for the most extreme environments and tactical scenarios, and customised for your mission.


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Oriol Science & Related Outreach Activities

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PPG Industries (UK) Ltd

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Company Overview:

Morson Projects are a reputable multi-disciplinary engineering consultancy with over 40 years experience across the UK and overseas. Our highly qualified engineering teams deliver capability and experience across numerous engineering disciplines, enabling the provision of complete end-to-end project management, design and delivery services to our valued long-term client partnerships.

We support our clients across five key sectors:

- Aerospace & Defence*
- Nuclear
- Power & Renewable Energy
- Industrial & Process
- Infrastructure & Transportation.

Morson Projects have an annual turnover of £40m+ and have 700 employees across ten project delivery offices, 300 of these currently deployed on Aerospace & Defence programmes. Our Parent Company, Morson Group has 1200 employees, 96 offices and £1billion turnover.

Morson Projects complies to the requirements of ISO 9001, ISO 14001, ISO 45001, AS 9100 and ISO 27001.

EASA/UK CAA approval covers Avionics, Cabin, Electrical Systems, Environmental Control Systems and Structures for fixed wing and rotor aircraft (CS23 & CS25) and small and large rotorcraft (CS27 & CS29).

Company Capabilities:

Our highly qualified Aerospace & Defence team work with the world's leading military and commercial aerospace organisations.

With combined EASA Part 21J/UK CAA Design Office Approval, Compliance Verification Engineers (CVE) and aircraft engineering specialists, Morson Projects are uniquely positioned to offer a single supplier solution to deliver approved design data packages. Compliance with airworthiness requirements for minor and major changes, repairs and mandatory upgrades:

Company Overview:

NDT Group is a global supplier of Non-Destructive Testing (NDT) & Inspection Services. NDT Group currently has 16 employees with a combined 75+ years of experience and an annual turnover of £1m. Operating in a wide variety of sectors from nuclear to oil & gas to petrochemical to waste & energy NDT Group provides an end to end inspection package providing clients with clarity on the integrity of their assets.

Company Capabilities:

NDT Group is capable of supplying personnel to undertake inspection and testing services on a global scale. Currently operating UK wide and internationally in Ireland, Norway and South Africa, NDT Group can provide both conventional and specialist inspection services both in house and on clients sites. This includes surface inspections such as Magnetic Particle Inspection MPI and Dye Penetrant Inspection (DPI) all the way up to specialist Phased Array (PA), Time of Flight Diffraction (ToF), Eddy Current (EC) and Radiography.

Company Overview:

Newton is a micro SME dedicated to the development of innovative space technology and providing the facilities for others to do likewise. It was initially founded in 2011 to investigate the commercial feasibility of space launch from the UK, but has since diversified to develop launch vehicle subsystems and components and to provide testing and consultancy services related to space launch and defence. Its operational base is at Llanbedr airfield in Gwynedd.

Company Capabilities:

Newton is developing a range of test facilities to meet its own technology development requirements and is making these facilities available on a commercial basis to universities and companies with a similar need. In the short term the facilities include static rocket propulsion testing up to 1 kN thrust (sea level), a vacuum chamber for space environment testing and facilities for mechanical testing of structures, structural components, pressure vessels etc. In the medium term, Newton intends to add vacuum propulsion testing and flight testing of components (on small sounding rocket vehicles) to its portfolio. Newton also designs and builds test equipment and instrumentation for commercial clients and offers a broad consultancy service to the defence, aerospace and construction sectors.

Space Related Products & Services:

Testing of small rocket motors and thermal vacuum chamber. Developing upper stage (kick stage) propulsion systems for small launchers and satellites.

Space Related Projects:

UK Space Agency funded spaceport feasibility study for Spaceport Snowdonia (with Snowdonia Aerospace Centre and partners).

Company Overview:

Oriol Science is a Swansea University project that takes our University's incredible research, packages this into inspiring and interactive exhibits designed to nurture curiosity and showcases these to the community.

Our mission is to enhance the Future Generations' educational and career journeys, to help address under-representations in education, and to enrich the general public's "Science Capital" by feeding their innate appetite for the "wow" factor of science. Permanent site in Swansea. 6 permanent staff.

Company Capabilities:

Permanent exhibition with a track record of successfully capturing people from across society, including those with low STEM engagement. Related activities (not directly Oriol Science) include webinars and schools including Astronomy with Faulks Telescope Network. Further details here: <https://www.swansea.ac.uk/physics/a-quick-guide-to-undergraduate-physics/>

Company Overview:

In business for 44 years. The major weight and balance engineering company in the UK. Carries out W&B certification under CAA licence for all major carriers and MROs in UK and Europe. Also carries out sales, maintenance and repairs of aircraft scales for carriers and MRO worldwide our Swansea workshops. Has term contracts with the MOD for military work. Trains W&B engineers worldwide particularly for the military.

Company Capabilities:

Has carried out over 16000 weigh CAA certifications on all types of aircraft from Spitfires through to A350 and various helicopters.

Company Capabilities:

At PPG, we work every day to develop and deliver the paints, coatings and specialty materials that our customers have trusted for more than 135 years. Through dedication and creativity, we solve our customers' biggest challenges, collaborating closely to find the right path forward. With headquarters in Pittsburgh, Pennsylvania, we operate and innovate in more than 70 countries and reported net sales of \$15.1 billion in 2019. We serve customers in construction, consumer products, industrial and transportation markets and aftermarket.

Company Capabilities:

PPG's global aerospace business is a leading manufacturer of original equipment and replacement aerospace transparencies, PRC® and Pro-Seal™ aerospace sealants, DeSoto® and Deft® aerospace coatings, Cuming Microwave specialty materials, Dexmet lightning strike mesh and Semco® packaging and application systems for commercial, regional, military, space and general aviation, as well as chemical management and other services.

Any Space Related Projects & Services:

Coatings, Sealants, Transparencies (windows), Lightning Strike Protection, Microwave Dampening Systems, Specialty Packaging



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Sierra Nevada Corporation Mission Systems UK

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Company Overview:

QIoptiq Ltd. is part of Excelitas Technologies Corp. Excelitas employs approximately 6,600 people globally. QIoptiq Ltd. employs circa 630 people in North Wales. We are a designer and manufacturer of high end Optronics in support of the global Defence and Aerospace market.

Company Capabilities:

Manufacture of Automated Assembly Systems, Automated Fibre Placement, Robotic Drilling, Aerostructure Assembly Fixtures. Design, Development, Manufacture, Installation Commissioning & Support.

Space Related Products & Services:

Our Automated Fibre placement systems are used extensively in the production of Launch System Structural Components such as launch Fairings, Cryogenic Tanks, Payload Adaptors and Primary Structural Components.

Space Related Products & Services:

We have delivered equipment to Airbus Space & Defence, Nasa, Blue Origin and Space X.

Company Overview:

R-Tech Materials consists of two businesses; R-Tech Services is a UKAS accredited testing company and R-Tech Consultants provides high quality failure analysis and plant integrity services. We have a major business stream in accredited testing of composite materials, some of which is for space applications. We have one of the widest scopes of accreditation in composites testing and are approved by NADCAP for testing for aerospace applications, as well as having Fit4Nuclear accreditation. Our turnover is around £1.66m, and we employ 28 full time equivalent staff. Around half our staff are graduates, most of them with higher research degrees.

We are regularly involved in R&D projects, in addition to our contract testing services.

Company Capabilities:

We have a wide range of mechanical testing capability for metallic and non-metallic materials. We have static test machines with capacity 10kN to 500kN, as well as a wide range of dynamic test machines. We have a chemical analysis capability and a thermal analysis capability for polymer and composite materials. We also have high quality microscopy and electron microscopy capability. We have our own machine shop facilities for manufacture of test samples. With our combination of highly qualified and experienced staff and high quality equipment, we are able to provide a valuable combination of testing, investigation and expertise, much valued by our clients.

Any Space Related Products & Services:

We are not normally aware of the end application of the materials which we are testing.

Any Space Related Projects Worked On:

Testing for European Space Agency Project on Satellite Packaging

Company Overview:

Recurved-Space supports Land and Sea based launch operators with a full suite of secure, reliable and leading-edge space solutions from mission planning to post-mission analysis. Our Avionics solutions have security fully embedded, and along with leading-edge tracking and telemetry solutions give customers confidence and assurance of mission compliance. Managing launch operations begins with close liaison with the customer enhanced through our wide-ranging simulation and test facilities. Leading-edge - fully secure - TT&C between all ground systems and flight vehicles. Secure data networks, data acquisition and analysis are all available in order for you to maximise the investment in your mission. Recurved-Space will also be responsible for the integral tracking stations in spaceport locations, and mobile systems deployed to support the launch and LEOP phases. Mission planning and control systems ensuring peace of mind for testing, simulation, in-mission tracking and post-mission analysis.

Company Capabilities:

Comprehensive Electronic, Software and Systems development
Design development and manufacture of Secure Avionics and Mechatronics modules with software validation
Support for Test Centres, Command Centres, Control Centres and Data Centres
Development of ultra-secure mobile tracking eco-systems
Fully compliant to international development standards

Any Space Related Products & Services:

Satellite data analysis, EO data, Satellite Communications
Command and Control Systems. Reflect where we are going – focus on the list above and write around.

Company Overview:

Agile Group Systems and Services subsidiary Redthorn Systems and Services has been successfully developing and distributing MRP and business intelligence software solutions supporting the aerospace, defence, energy, and advanced engineering and manufacturing sectors for over 25 years. Today Redthorn supports over 200 engineering and manufacturing sites worldwide with more than 3000 individual users. Redthorn has also been delivering business improvement consultancy to the Aerospace sector Worldwide for over 15 years. With twenty years' experience and a string of high profile customers, Agile Group Systems and Services subsidiary Synchronolgy has established itself as a company specialising in software solutions that enable and promote process excellence and enhanced business performance through innovation, user engagement and smooth implementation. Turnover-£2m No of employees-16

Company Capabilities:

Systems and Services is a UK based company with offices situated around the world. We specialise in the development and distribution of MRP and business intelligence software solutions and business consultancy services supporting the aerospace, defence, energy, and advanced engineering and manufacturing sectors. We work alongside our clients to create solutions which will unlock genuine business potential through increased margins, improved productivity and cost efficiencies. Redthorn is one of the UK's leading approved service providers for the National Manufacturing Competitiveness Levels (NMCL) SC21 Competitiveness and Growth (C&G) programme.

We deliver improvement programmes that have been reviewed to meet the requirements of the NMCL Syllabus Guide by an independent panel of industry experts in the Automotive and Aerospace sectors. Our success has been driven by our skilled team, many of whom are experienced Aerospace professionals with extensive working knowledge of OEMs and the variability of demand and capacity management within the supply chain.

Company Overview:

The Space Systems business area, designs and manufactures advanced spacecraft, satellites, propulsion and environmental systems, spacecraft subsystems and components for the U.S. government (including NASA), commercial customers and international organizations.

With more than 25 years of flight heritage, our Space Systems business area has participated in more than 450 successful space missions through the delivery of 4,000+ systems, subsystems and components, reaching seven planets, Pluto and the sun including more than 70 programs for NASA and 50 other clients.

Our drive to dream, innovate and inspire has fuelled SNC's steady expansion from our headquarters in Nevada to 40+ locations around the globe. SNC is a team of nearly 4,000 people—from scientists and cybersecurity experts to software engineers and former military leaders—united in support of our customers' needs. SNC Mission Systems UK currently has 15 UK employees based in Wales and continues with growth and expansion despite the recent COVID-19 Pandemic.

Today, we are shaping the trajectory of space travel. Tomorrow, our technology could be redefining the standard for emergency care to service personnel on the battlefield.

Company Capabilities:

SNC Mission Systems UK was established in 2018 and was set up with the mission of providing best of breed collaboration throughout the SNC enterprise. We can rapidly import/export technology in niche areas including the Space sector when required. Space Systems is the developer of the Dream Chaser® spacecraft, which will provide cargo services to the International Space Station starting in 2020 under NASA's Commercial Resupply Services 2 contract.

Recognized among the world's most innovative companies in space, SNC delivers tailored solutions to government and commercial customers, with applications in space exploration and satellites, aircraft integrations, navigation and guidance systems, threat detection and security, scientific research and infrastructure protection.

Space Related Products & Services:

SNC SPACE SYSTEMS
We are redefining how humanity reaches, explores and utilizes space through the development of high performance, innovative space components and systems. From the Dream Chaser® spacecraft to thousands of mission-centric subsystems and components, we continue to achieve above and beyond.

Space Related Projects Worked On:

With more than 25 years of flight heritage, our Space Systems business area has participated in more than 450 successful space missions through the delivery of 4,000+ systems, subsystems and components, reaching seven planets, Pluto and the sun including more than 70 programs for NASA and 50 other clients



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Company Overview:

Smallspark is a company focused on developing low-cost, high-performance propulsion systems for access to space; targeting sub-orbital launches by 2022 and orbital launches by 2026. Simultaneously the company is developing ground-breaking AI-assisted design tools (www.mooreai.tech) to further improve its commercial offering. The company currently has a team of 7 engineers working on its various technologies.

Company Capabilities:

The company has significant capabilities in mechanical engineering, computational fluid dynamics and AI-assisted optimisation. Furthermore, it is now capable of performing propellant characterisation with its S4-Hive prototype engine that it will be testing in early 2021 (500kg force)

Space Related Products & Services:

Propellant Characterisation (current)
AI-Assisted Design – moore.ai (current)
Suborbital launch (2022)
Orbital Launch (2025/6)

Space Related Projects Worked on: Development of a high performance subscale prot

Company Overview:

Spaceport Snowdonia has a long and distinguished track record in supporting experimental test flying in the UK, which continues to this day providing air and ground services and facilities for the research, development, test and evaluation (RDT&E) of novel aerospace systems and emerging future flight technology, particularly drones, electric aircraft, urban and regional air mobility vehicles, balloons, airships and near-space testing vehicles. Our unique selling point is our flight test heritage and the immediate access we can provide to the fully instrumented D201 Cardigan Bay range with a complete array of Range Control capabilities from Aberporth (in partnership with QinetiQ). Spaceport Snowdonia is the ideal location for preparation and launch of sounding rockets and the conduct of high altitude and near-space testing of space systems, as well as being a base for orbital launch. We also offer a range of ground-based facilities including static sea-level propulsion testing, static altitude propulsion testing, space environment testing, a multi-axis simulator, centrifuge and hyperbaric chamber, all located within a state-of-the-art technology park. Spaceport Snowdonia is a unique national asset at the heart of the UK Space R&D programme, helping companies innovate and accelerate development from proof-of-concept through to full-scale prototype and large-scale market exploitation.

Space Related Products & Services:

Beyond visual line-of-sight (BVLOS) drone using satellite comms and satellite navigation for delivery services, support to emergency services, environmental monitoring, mapping and surveying etc.

Space Related Projects Worked On:

UK Space Agency Horizontal Launch Development

Company Overview:

We are developing a returnable manufacturing platform that uses the benefits of space to make new materials that are not possible on Earth.

Our revolutionary return technology reduces the cost of re-entry and enables satellites to be refurbished for the first time ever. Space manufacture will deliver the next generation of products that are critical to a modern clean society.

Space Forge has grown from 2 people to 10 in 9 months.

Company Capabilities:

Space hardware design, and manufacture. Satellite operations and return from space technology.

Space Related Products & Services:

Development of a satellite re-entry predictive tool offering a step-change in accuracy and atmospheric sensing - useful for early warnings.

Company Overview:

Established 1989. Sales £5M. 50 employees. Design, manufacture, sale and support of industrial laser systems. Global market leader in the supply of specialist laser wire marking and stripping systems used in the production of aerospace electrical wiring interconnect systems (EWIS). Operate globally, 95% export with sales to 60+ countries, subsidiaries in Fort Worth, Texas, USA and Shanghai, PRC.

Company Capabilities:

Design and manufacture of industrial laser systems for applications in advanced manufacturing including but not limited to applications in the production of electrical wiring systems, general purpose laser marking, composite processing, laser wire stripping including magnet wire for motors, alternators etc.

Space Related Products & Services:

Supply of laser wire processing systems used in the manufacture of launch vehicles, satellites and interplanetary probes.

Space Related Projects Worked On:

Our manufacturing equipment has been used by Lockheed Martin for production of wiring systems for NASA Mars Insight, Orion, etc, SpaceX for launchers etc.

Company Overview:

Talent Technik is the new name for Derichebourg UK, formerly part of the France based multiservice company, Derichebourg Group. Following the devastating 2020 impact of the COVID 19 Pandemic on aviation and aerospace, Derichebourg made the decision to cut back on non-French operations including in the UK. Rather than close the business, Derichebourg UK was subject to an MBO by Clive Laudham and continues to trade successfully in the UK and across Europe. Talent Technik is headquartered in Bristol but also has operations across the UK including in Saltney in North Wales. Talent Technik is an active member of Aerospace Wales. Employees – 5
T/O – 820K GBP

Company Capabilities:

Talent Technik is a specialist recruitment company operating in the aviation, aerospace and transport sectors. The principals of the company have extensive experience across the aviation and aerospace sectors having secured and managed recruitment and manpower supply contracts with organisations such as Airbus, Lufthansa Technik, AMAC, Jet Aviation, RUAG, SAS, Air France KLM, Kongsberg and BAE Systems.

Talent Technik's core capability lies in our ability to source and deploy specialist personnel to support companies in the aerospace and aviation sectors. These include design and development engineers, cyber defence specialists, production and manufacturing personnel, and maintenance and operational staff. Talent Technik has a widespread network of connections across UK and Europe enabling us to seek out the technical specialists with the necessary experience and skills required by our clients.

Company Overview:

Based in Presteigne, Teledyne Labtech was founded in 1984 and has specialised in the manufacture of RF/Microwave PCB for over 35 years. With approximately 60 highly skilled employees supporting the UK space and defence industry.

Company Capabilities:

Teledyne Labtech is a specialised PCB manufacturer and supports the manufacture, assembly and test of PCB used in both ground equipment and flight standard equipment (IPC 6018 CS). Teledyne Labtech manufactures high frequency RF/Microwave PCB used in radar and communications equipment, especially for use in high power RF equipment. A key area is the manufacture of large antenna systems to support Ku/Ka band communications for LEO/GEO constellations, including OneWeb, Inmarsat & Globalstar.

Space Related Products & Services:

Teledyne Labtech is the principal supplier of all the RF/Microwave PCB used in the Ku/Ka band communications elements of the OneWeb program and is an approved supplier to Airbus. Space Related Projects Worked On: OneWeb, GAIA, Mars Rover, COSMO.



The Northern Space Consortium

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Company Overview:

The Northern Space Consortium is a not-for-profit company set up to help the space industry in N Wales and NW England expand and develop.

Company Capabilities:

Creates awareness of space opportunities for companies and organisations, holds meetings, facilitates introductions and networking opportunities and promotes the region to other parts of the UK and abroad. Works with organisations already in the space sector as well as those wishing to understand it and get involved. Members include companies, individuals and universities and cover all aspects from manufacturing to software and services.

Company Overview:

Ultranix is a specialist supplier of technical systems and services to a wide range of enterprise organisations in the defence, space and telecoms sectors. Ultranix are experts in the software development of secure and mission critical systems. This includes the Software architecture, design and development of real time systems, mobile, cloud and hyper-secure data systems. Ultranix are partners of some of the world leading software and data companies including Oracle, Microsoft and Precisely Inc.

Ultranix's focus and specialism includes large scale and secure big data products and services, serving a wide range of market sectors and technology platforms. It also includes location-based services, analyses and visualisations of the geographic relationships of key information within areas of interest.

Company Capabilities:

Ultranix has designed and developed some of the largest and most mission critical systems in the UK. This covers very large databases, big data and real time mission critical systems. This includes the design, development and support of the UK national 999 system.

Ultranix Software Development Capability includes:-

- Software architecture, design and development.
- Testing.
- Real-Time systems
- Multiple OS development including Windows, Linux, QNX, VxWorks, Android
- Cloud and Mobile App development.
- Secure software development



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SPACE WALES