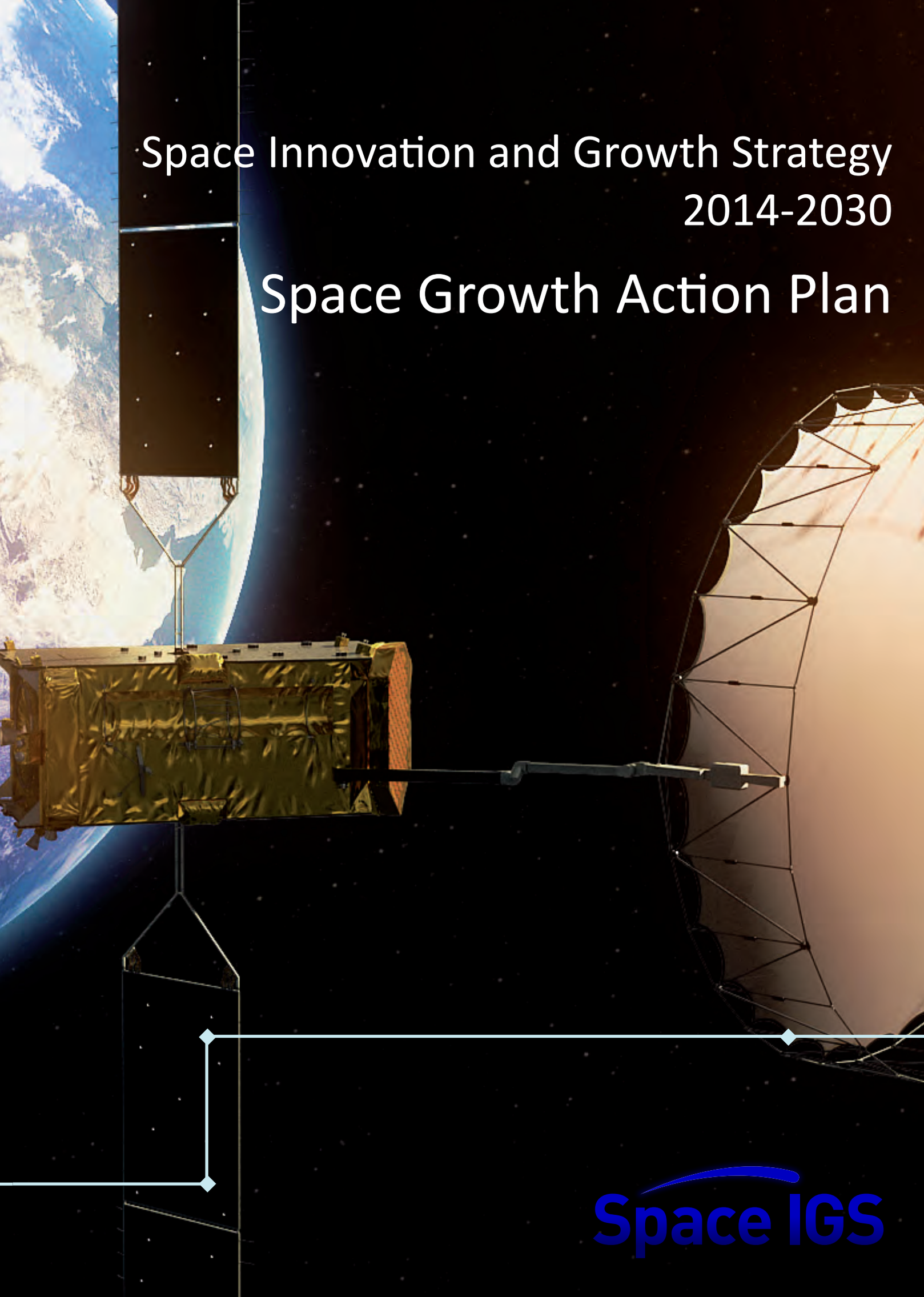
Space Innovation and Growth Strategy 2014-2030

Space Growth Action Plan



Space IGS

A rare cloud-free view of Ireland, Great Britain and northern France.
Credit: ESA.

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Space Growth Action Plan

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“We have a tremendous opportunity in front of us. We remain committed to the goal of raising our share of the expected £400 billion global space-enabled market to 10% by 2030. We have added an interim goal of growing the UK space industry to £19 billion turnover by 2020.”

Andy Green

Industry Foreword

Space is an extraordinary business. It enables us all to enjoy the benefits of communication, entertainment, and mapping and managing our lives, virtually anywhere on the surface of our planet. It stretches the innovative skills of our best scientists and engineers and it inspires young people to develop the skills to push forward the frontiers of scientific knowledge. Most importantly it offers the promise of helping the human race to solve some of the biggest challenges it will face over the next few decades.

The UK punches above its weight in the global space business. Since the Space Innovation and Growth Strategy was published in February 2010, we have achieved an enormous amount. We have created the Space Leadership Council, the UK Space Agency and the Satellite Applications Catapult and brought ESA's European Centre for Space Applications and Telecommunications (ECSAT) to the UK. Government, industry, business and academia have worked together to create major successes for the industry and the UK economy.

I would particularly like to pay tribute to David Willetts, Minister for Universities and Science, for the way he has championed the industry, delivered new investment and created a supportive environment for growth.

As a result of our collective actions, the UK now features much more strongly on the global space map, attracting start-ups and inward investment alike. This is a great foundation on which to build.

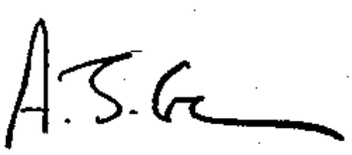
We have a tremendous opportunity in front of us. We remain committed to the goal of raising our share of the expected £400 billion global space-enabled market to 10% by 2030. We have added an interim goal of growing the UK Space industry to £19 billion turnover by 2020.

An experienced team drawn from across the sector has analysed the challenge and come up with a concrete growth action plan that forms the basis of this report. I would like to thank them for their energy and commitment.

The benefits from delivering this Space Growth Action Plan are tangible. Billions of pounds worth of new exports, up to 100,000 skilled jobs in a leading edge sector, a range of new value-adding applications and a vibrant regional SME sector spread across the UK.

Think too of the intangible benefits. The young people inspired to train in STEM subjects by the excitement of space. The scientific advances driven by great minds solving the problems of creating reliable services in the most hostile environments. The increased economic activity and understanding that will be generated by interactions with emerging space nations – and the value of helping solve global challenges in areas such as the environment, ageing populations and food and water security.

My colleagues in the industry are committed to supporting the implementation of this Space Growth Action Plan. Please consider what support you can offer.



Andy Green
Chair IGS Steering Board & President UKspace

Executive Summary and Recommendations

Executive Summary

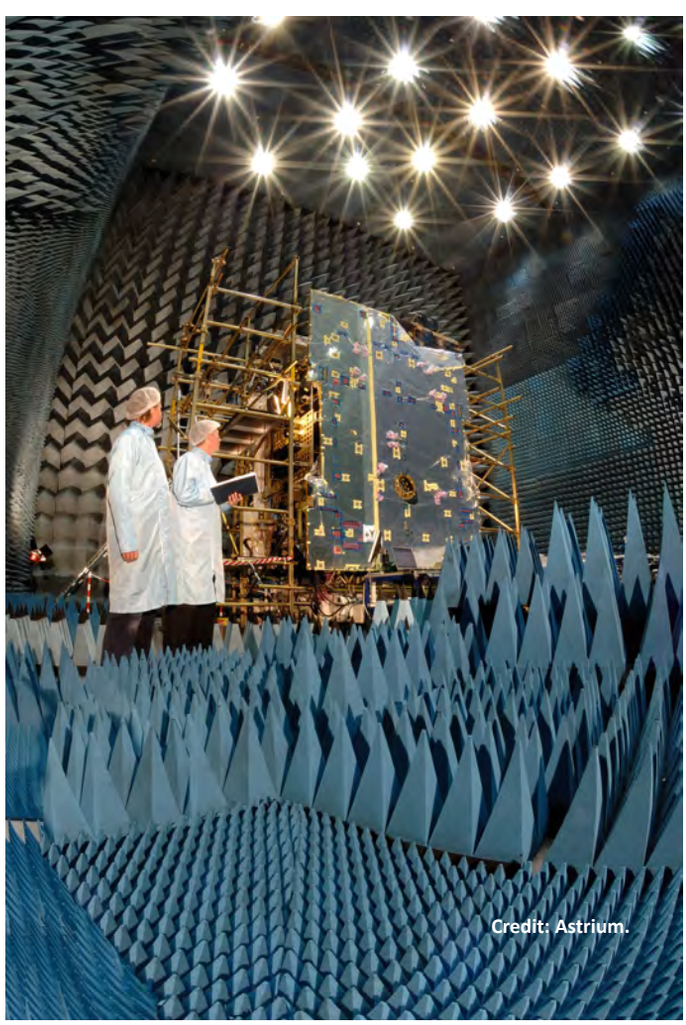
Introduction

The Space Innovation and Growth Strategy, published in February 2010, created real momentum in the sector. It brought industry, academia and Government together around the common cause of driving economic growth and provided the foundation for a transition of the UK space sector from a niche industry towards a high-technology, mainstream, industrial and science sector. The report, and its subsequent implementation, transformed the landscape for the UK's space sector. Furthermore, in a period characterised by spending austerity, it has acted as the focal point that underpinned increased Government commitment and investment in the sector. Industry is now turning that investment into economic growth and jobs. Indeed, it has sustained its decade-long growth trend, increasing by an average of nearly 9% per annum in real terms since the Innovation and Growth Strategy was published.[1]

This report re-affirms our ambition to grow; and identifies the new actions that are needed to deliver further growth. These actions underpin the target set in 2010: to grow the UK's share of the world's space economy from 6.5% to 10% by 2030. By today's estimates this would lead to a UK sector with £40 billion per annum of space-enabled turnover and the creation of 100,000 new jobs. This Space Growth Action Plan also sets an interim target of 8% of the world's space economy by 2020 that will secure a space-enabled turnover of £19 billion in today's terms.

1 UK Space revenues grew from £6.6 billion in 2006/07 (the base year used for the SIGS 2010) to £9.1 billion in 2010/11, the base year used in this report. All data from the UK Space Agency's Size & Health Report 2010/11

This Executive Summary is designed to be read as a stand-alone document. It summarises the key points in the main report and contains the headline recommendations and all of the actions in a short form style. The main report, available online, sets out in more detail the logic used to identify and prioritise actions: the barriers to growth or issues that an individual action is intended to address, the owner responsible for delivery, exactly what is planned for delivery by when; and the stakeholders that will have to work with the owner for successful delivery.



Credit: Astrium.

The landscape for Space in 2014 is different to 2010

The publication of the Space IGS has led to substantive changes in the structures and governance of the Space sector in the UK. The most significant developments comprise:

- The creation of a Space Leadership Council, bringing together Government, Industry and Academia as the most senior group in the UK advising on Space policy.
- The creation of the UK Space Agency tasked with providing a unified voice in championing the sector, advising on policy, setting strategy and co-ordinating funding, with a budget of around £250 million per annum.[2]
- A 33% increase in optional funding to the European Space Agency at the ESA Ministerial in 2012, increasing the UK's work and influence in crucial areas such as satellite communications and Earth observation.
- A National Space Technology Strategy, produced and updated by industry, that Government has backed with £35 million in funding, creating a National Space Technology Programme.
- A Satellite Applications Catapult centre at Harwell, Oxford, one of only nine Catapults in the UK, initiated using Technology Strategy Board funding.
- ESA's establishment of the European Centre for Space Applications & Telecommunications ('ECSAT') at Harwell, recognition of the UK's innovative approach.

The Space Growth Action Plan fits the new landscape

The recommendations in the original report have been built on by the new institutions created. The UK Space Agency published its Civil Space Strategy 2012-2016 in 2012, drawing extensively on the IGS report. This strategy has cross-government support. The Satellite Applications Catapult is already working with industry to stimulate and support new UK space businesses, space applications and services.

A recommendation to involve the space industry in future security and defence planning, together with the launch of the Security and Defence Review in 2010, has resulted in a National Space Security Policy (NSSP) that will be published in the next three months. The analysis that underpins the NSSP highlights how closely the UK's security and growth objectives are aligned and the importance of resilience. It is crucial that future growth plans set out how security, growth and new industrial capabilities move forward in a co-ordinated fashion. By the time it is published, this policy will also be endorsed across Government. Further, it is envisaged that the IGS Implementation Team will work closely with the Defence Growth Partnership (DGP), a forum set up by the Prime Minister in 2012 in which the government, the UK's top defence companies, the sector trade association and SMEs are working together for growth, under the DGP strategic vision.

It remains a Space IGS ambition for Government to publish a National Space Policy, an original recommendation of IGS 2010, drawing on the foundations of the Civil Space Strategy 2012-16, the National Space Security Policy and the growth actions in this report.

This IGS 2014-2030 Space Growth Action Plan supports the Civil Space Strategy, the National Space Security Policy and the objectives of the Satellite Applications Catapult. It provides detailed actions with clear ownership and timescales derived from an industry and government consensus on the approach necessary to create growth. In this way, it allows the whole of the UK space sector to coalesce around a national growth objective.

2 UK Space Agency Annual Report & Accounts 2012-13

The momentum from success already exceeds that envisaged in 2010

Key achievements already in place or committed in the sector that are crucial to accelerating growth comprise of:

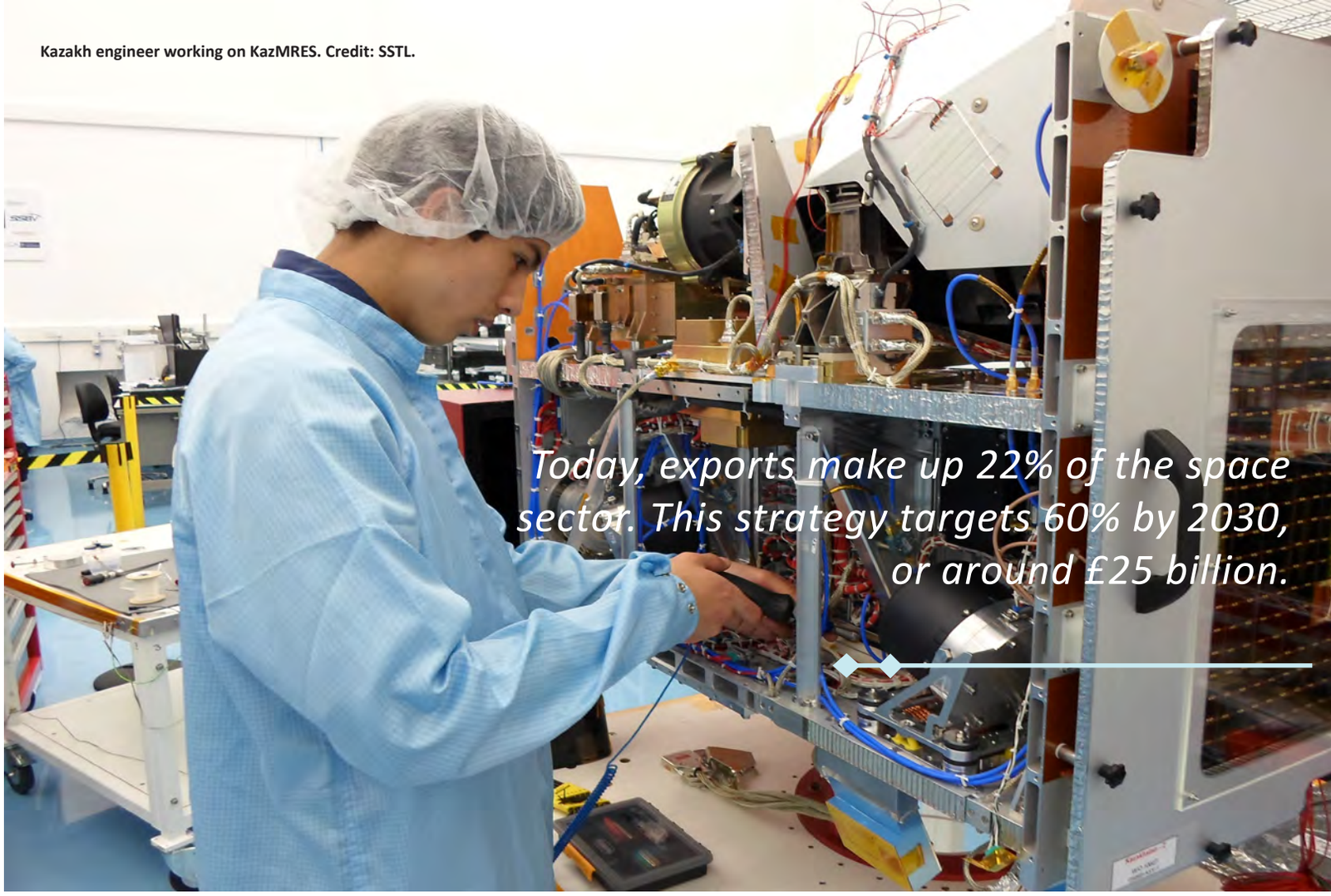
- Government providing over £140 million in capital project support for the sector since 2011, enabling projects such as Surrey Satellites Technology Limited's (SSTL) NovaSAR low cost space radar satellite and Reaction Engines' SABRE space plane engine to proceed.
- The Technology Strategy Board and UK industry jointly developing TechDemoSat, due to be launched in 2014, which will demonstrate 30 new British technologies in orbit.
- The sector providing significant support to STEM education projects with Astrium alone providing more than 60 STEM ambassadors visiting 300 schools last year.
- The National Space Academy, established in 2010 generating a new Higher Apprenticeship in Space Engineering. The programme will commence in 2014 and over 300 candidates have already expressed their interest in this course.
- The establishment of an industry-led Satellite Finance Network with over 150 members, which has run financing and regulation conferences. These have provided contact between the sector and finance communities resulting in £20 million being made available in supporting SMEs to develop space businesses.
- The UK's participation in ESA's human spaceflight programme, resulting in a flight for Britain's first ESA astronaut, Tim Peake in 2015.

Industrial exploitation is the acid test

The above factors have resulted in an increase of momentum and urgency in delivering the growth targets. The UK's global reputation as a space nation has evidently grown and more and more space related businesses are considering establishing themselves here. The sector has enjoyed many successes in the last 18 months. Industrial exploitation of these new opportunities is, however, crucial to growth. To address this, UK industry has created, for the first time, a comprehensive list of commercial space activities by value, based on new opportunities created by additional ESA and national funding committed since 2011.

This value-added activity exceeds £3 billion. This is likely to be an under-estimate as it is very difficult to factor in the 'spill over' take up of services and applications beyond that in core business cases. Key examples comprise of:

- AlphaSat- Europe's largest telecoms satellite – has become the largest ever public-private European space project between Inmarsat and ESA.
- Avanti has raised $800m of capital in London and New York to finance its fleet, following the initial R&D contribution of £25m from ESA to its first satellite. It concluded the EDRS-C PPP with ESA in 2012 and won the right to acquire the Artemis satellite from ESA in 2013, showing strong UK benefits from ESA participation
- UK industry securing key roles within the Neosat next generation European telecoms satellite, which positions them for a share of an estimated £25 billion global market for future communications platforms.
- GNSS/EGNOS being approved by the Civil Aviation Authority for precision approaches to Alderney, allowing services to be run in conditions that would otherwise result in cancellations, and paving the way for other regional airports.
- Galileo being close to operational with four validation satellites operational and the first eight fully operational capability satellites due to be launched with British-built payloads in 2014, with a British-built ground control system.
- UK industry being selected for the Iris satellite precursor – setting the potential future for satellite-based air traffic management for Europe.
- UK industry being awarded key technologies for space science programmes that also have exploitation routes in terrestrial markets. These include the ESA Solar Orbiter, ExoMars and the NASA Curiosity and Orion programmes.
- SSTL continuing to lead the way in UK export success with two new constellations in build – one giving one metre resolution pictures of the Earth from three satellites providing novel managed Earth observation services to China and 12 satellites for Taiwan for a global weather forecasting system.



Kazakh engineer working on KazMRES. Credit: SSTL.

Today, exports make up 22% of the space sector. This strategy targets 60% by 2030, or around £25 billion.

IGS 2014-2030 Analysis

A joint team drawn from industry, Government and academia came together during 2013 to analyse the commercial space market and propose actions to underpin and take forward the UK growth objective. Implementation of the recommendations in the IGS 2010 has proven successful in delivering fundamental structures and investment; the main emphasis for IGS 2014 is on growing the UK's share of the global market for services and applications and the manufacturing activity to support that. The highest growth space markets over the next two decades will be in space-based services and applications using space data, services and infrastructure.

The Challenge

The greatest challenge now is for the space industry to become more outward looking. It needs to 'reach out' to other sectors of the UK and global economy that can benefit from space applications, data and services. The aim should be to create a space-enabled economy where space components provide new advantages that lead to growth, new jobs and increased market share in areas not traditionally linked to space.

In order to do this, we must work together to create compelling business cases that demonstrate how this space-enabled economy will grow both existing and new businesses.

To achieve 10% of the global space economy by 2030, it will be necessary to both identify existing and stimulate new user demand whilst simultaneously increasing supply capacity to meet that demand.

New programmes will need to address both domestic and overseas users, with the aim to grow the domestic market from £7 billion to £15 billion over the period and to dramatically grow the export market from £2 billion to £25 billion. Consequently, specific actions are planned to increase the proportion of space based products and services exported from the current 22%, to the required 60%, with particular focus on the applications and services sector.

The £40 billion goal will be achieved through a mix of space infrastructure and space-enabled services, with the aim to grow downstream revenues (user equipment, space-enabled applications and services) from £8 billion to £37 billion and upstream revenues (satellites and ground supporting infrastructure) from £1 billion to £3 billion. The growth in space data, services and applications will, however, stimulate demand for new and improved space infrastructure.

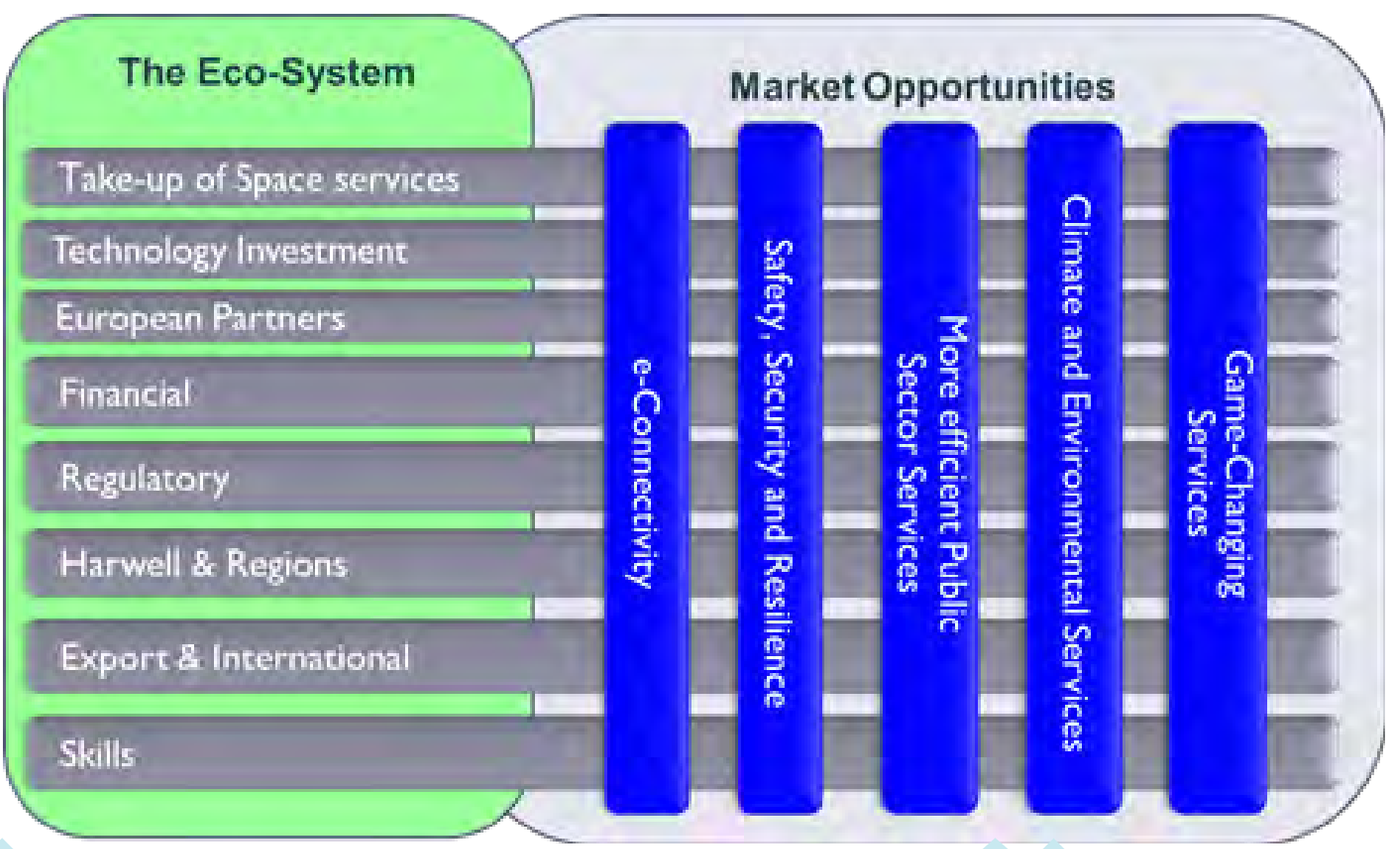
This analysis highlights a 'virtuous circle' of increased demand from customer sectors pulling through improved technology and greater infrastructure capacity. The evidence suggests that much of this activity can be space sector led, with improved reliability, lower cost and better availability of space services and applications needed to drive take up by other sectors.

The Approach

The IGS analysis work was split into two broad work streams:

- The identification and analysis of the high-growth markets
- A study of the enabling interventions needed to form a supportive eco-system, enabling companies to take advantage of these growth opportunities.

This approach is represented in the diagram below.



The strategy targets specific market opportunities while creating the best conditions for business to thrive.

The market analysis was undertaken by an expert panel and their findings have been validated by both space and non-space specialists. The map of identified high growth markets is shown over-page. Within this map of market areas, we have identified 15 priority markets where the UK has the greatest opportunity to enter the market and grow. Each market will be worth at least £1 billion annually to UK-based suppliers within 20 years.

This thorough market analysis was then combined with the analysis from the ecosystem themes to create a clear set of actions. The initial findings and actions were developed into a consultation document and a public consultation process followed including a web-based questionnaire and a road show across the UK.

Subsequently, the initial recommendations were revised in the light of feedback received to form those contained in this document. Further details of this process are provided in the main report and the consultation report is available.

The intention is that these actions will become the agenda for the Space Leadership Council (SLC). The SLC has had full oversight of the development of this report and will be the forum in which the UK Space Agency and other branches of Government will respond to the detailed proposals.

Recommendation 1
Develop the high-value priority markets identified to deliver £30 billion per annum of new space applications by promoting the benefits of Space to business and Government and engaging service providers.

The market analysis has identified exciting, fast growth opportunities for British business to develop space applications businesses and to use space to drive global competitiveness. This report challenges the UK space sector to face outwards and engage other industrial sectors and government, both in the UK and globally, in seizing these opportunities. As a first step it will be necessary to consolidate this market insight, initiate dialogue with prospective customer communities and prepare the ground for UK industry to actively engage.

The Satellite Applications Catapult, working closely with UKspace (the trade association of the UK space sector) will lead the majority of the actions in this area with support from the UK Space Agency and the Technology Strategy Board.

We endorse and encourage further work that organisations are already undertaking to promote cross-sector collaboration. ESA's Integrated Applications Promotion (AIP) Team at Harwell is already running a number of these research projects. The Satellite Applications Catapult has developed a programme to promote space capabilities with the other Catapults.

The main report sets out a discussion on the future growth of commercial remote sensing services arising from applications and services that exploit institutionally-provided data. There is a huge opportunity to capitalise on the wealth of UK expertise in remote sensing analysis.

ACTION 1.1	**Satellite Applications Catapult supported by UKspace, to undertake an integrated marketing campaign to champion the use of space services, applications and data in other sectors of the global economy.**
ACTION 1.2	**Satellite Applications Catapult supported by UKspace to develop a delivery roadmap plan for each of the priority markets initially identified and to ensure that this activity is coordinated with stakeholders and is visible to the SLC.**
ACTION 1.3	**Satellite ApplicationS Catapult to update and re-validate priority market delivery roadmaps at least annually.**
ACTION 1.4	**Technology Strategy Board to launch R&D calls that require cross-sector collaboration as part of the call scope and require a business case that promotes value in the space and recipient industries.**

Understanding the needs of other market sectors is key to growing the space economy.

We also intend to build on an IGS 2010 recommendation to secure world leadership in technologies and services related to climate-change, following on from the report 'Leadership in Climate Technologies & Services' published in 2013.

A UK Climate Data Office will enable organisations to network and plan for the institutional data highway required to underpin the exploitation industry. The office will develop UK concepts for climate services based on EO data and is a precursor to a Climate Services Centre. It would also demonstrate a UK 'first to market' approach, staking claim to the ground internationally as a first step.

ACTION 1.5	**UK Space Agency to lead the positioning of the UK's exploitation of Earth Observation data by supporting the community to implement a Climate Services Centre for Europe in the UK.**

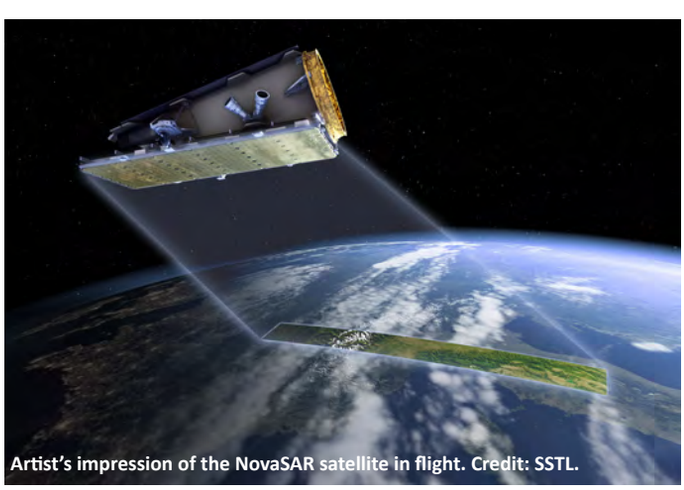
There is an important opportunity over and above core institutional EO data for companies to offer premium data services or remote sensing satellites to customers that are seeking more operational control and flexibility, coverage, higher resolution imagery or improved re-visit times. There is an urgent and possibly time-limited opportunity for the UK to take the initiative in developing commercial constellations. These will need to be complementary to institutional satellites and industry may have to consider new business models for service provision.

ACTION 1.6	**UK Space Agency to work with the Earth Observation community to identify and invest in new commercial opportunities for premium services beyond those supplied by institutional satellites.**

IGS 2010 recommended that Government collated potential cross-government applications for Earth observation data to assess the viability of a Sovereign UK Earth observation data service. In response, the UK Space Agency has launched a National Space Applications Programme, aimed at growing the use of space data, services and space-enabled applications across Government.

IGS 2014 strongly endorses this approach but would like to see the operations and funding for this service develop more quickly given the importance of business-to-government take-up of products and services to potential UK and overseas customers. Funding can be drawn from a number of sources, including UK Space Agency, Technology Strategy Board, SBRI and Horizon 2020, with the aim of showcasing services and developing capabilities and de-risking products that the UK can procure. Given this, a budget exceeding £3 million by 2015 is strongly recommended.

ACTION 1.7	**UK Space Agency to move the National Space Applications Programme from a set up to an operational phase, with the aim of increasing its base funding to a level twice the current published budget by 2015.**



Artist's impression of the NovaSAR satellite in flight. Credit: SSTL.

Recommendation 2
Make the UK the best place to grow existing and new space businesses and attract inward investment by providing a regulatory environment that promotes enterprise and investment in the UK.

The UK has already done much to promote high-technology businesses such as those involved in the space sector. Competitive corporation tax, the patent box regime and the Enterprise Investment Scheme all provide a helpful background. The Government set out in the Growth Review in March 2011 that it would:

- Cap the unlimited third-party liability for UK satellite operators under the Outer Space Act ('OSA').
- Work with the international regulatory authorities to define regulations for novel space vehicles that offer low cost access to space.
- Continue to work with Ofcom to ensure that British industry has full and fair access to the limited supply of satellite orbit slots.

The UK provides a strong and internationally highly regarded framework of regulatory principles. We welcome the expansion of the UK space industry through inward investment of new entrants, because an increase in activity helps drive growth. However, it does not serve the interests of the UK to allow new companies to set up minimal operations in the UK, or its dependent territories solely to access spectrum or OSA licences, potentially depriving existing UK companies, whilst making negligible contributions to the UK's economy.

Regulation is a globally competitive area and others such as the US, France and Luxembourg are doing more to reduce the regulatory burden on their industry and to encourage economic growth in the space sector. We have identified a series of areas where we can move quickly to improve the business environment further. It is crucial that the UK's regulatory, financial, legal and insurance framework is regularly monitored to assess its competitiveness and provide early warning of potential problems and case studies of benefits.

There are three principles that underpin these actions:

- To achieve our growth objectives, we need to promote the UK as the place to run a space business and ensure that the regulatory environment is (and is seen to be) competitive;
- Scarce national resources such as: Spectrum allocations and orbit slots; Government guarantees to limit 3rd party liability; and even the UK's capacity to process licences, should all be allocated in a way that maximises UK economic and social benefits in terms of investment, competitiveness and jobs; and avoids non-UK companies using the UK for 'brass plate' reasons.
- The regulatory burden on SMEs and start-ups should be lightened as much as possible.

The UK Space Agency, Ofcom and industry will need to work closely together and in good faith to balance these principles. We therefore strongly support the UK Space Agency's decision to form a working group, including industrial participants, to identify specific options to reform licensing criteria and the benefits and costs of such changes. Industry will also be provided with an opportunity to contribute to a UK Space Agency-led study to assess the future spectrum needs for industrial and science users in the UK. This will assess the economic and social benefits and options for incentivising operators to make full use of allocated spectrum and ensuring that companies using UK services significantly contribute to UK economic growth.

The first step is to understand the competitiveness of the UK's financial, legal, insurance and regulatory framework compared to other nations. Government and industry will need to respond to the findings.

ACTION 2.1	**UKspace to review the competitiveness of the UK's Space business environment on a three-yearly basis. The priority is to produce a regulatory benchmark report with relevant evidence by March 2014.**

UK Industry needs a strong champion at international regulatory meetings where the allocation and protection of satellite spectrum and orbital slots is resolved. We recognise the position of Ofcom as the UK national regulator, and the constraints that this will occasionally impose, but we need to match other nations who are seen to be more supportive of their industrial goals.

This will require the UK Space Agency, the Department for Culture, Media and Sport (DCMS) and Ofcom to work together to support increased competitiveness of the UK space industry.

ACTION 2.2	**UK Space Agency to lead the creation of a Space Regulatory & Spectrum group, reporting to the space leadership council (SLC), Department for business, innovation and skills (bis) and Department for Culture, Media and Sport's Ministers, to prepare support for the UK's agreed Space growth agenda at international regulatory meetings, secure satellite spectrum needed for new services, and provide advice and support for future regulatory reform.**

As set out above, the UK should prioritise its access to scarce spectrum, as far as is practicable, to companies that already significantly contribute to the UK's economic growth or that intend to grow in the UK. Ofcom should therefore ask applicants for UK satellite network filings to the International Telecommunication Union (ITU) and UK space licences, providing evidence of their existing and future plans to significantly grow employment and facilities in the UK and to use UK suppliers and services.

ACTION 2.3	**Ofcom should prioritise the interests of UK satellite operator companies creating wealth, employment and taxes in the UK, in matters related to access to international satellite spectrum allocated by the International Telecommunication Union (ITU), treatment of satellite network filings by the UK to the ITU and to framing of international satellite regulations at the ITU.**

If a company with UK space assets fails, then responsibility for both the entirety of third-party liability and operation of the spacecraft reverts to the UK Space Agency. This is a significant risk and cost issue. Therefore, as part of its review, the UK Space Agency should similarly set growth targets for companies applying for OSA licences. The UK should also clarify how companies registered in British Overseas and Crown Dependent Territories will measurably contribute to the space growth agenda, including investment and jobs.

ACTION 2.4	**UK Space Agency to revise its guidance and due diligence process for Outer Space Act licences such applicants or their parent groups must meet agreed targets in terms of investment, jobs and use of UK services. They must also conduct the operations to be licensed substantially from the UK and with their primary tax base from these operations in the UK. To minimise the administrative burden for applicants this should be a common criteria used by Ofcom when companies first apply for a satellite filing that will subsequently need an OSA licence.**

Recognising that there is some tension between growth and regulatory certainty in the principles set out above, we recommend that the UK Space Agency's regulatory review should reflect an ambition that start-up and SME companies in the UK can access a simpler licensing process that meets their entrepreneurial business models. Although the regulatory process is perceived as onerous, companies do balance this with the knowledge that receiving a UK OSA licence offers credibility at international level.

ACTION 2.5	**UK Space Agency should simplify its licensing procedures wherever practicable to reduce fees and introduce unambiguous, flexible and achievable criteria for SMEs and start-up companies in the UK, taking into account the outputs of its regulatory working group and uk economic growth.**

Access to Space

The UK Space Agency, Civil Aviation Authority, Department for Business Innovation & Skills and the Department for Transport are researching a framework for safe commercial space plane operations in the UK. This study will report by July 2014. In the light of the findings, Government will determine the further steps necessary to allow commercial space plane or other commercial space flight operations in the UK. To achieve a competitive and permissive regulatory environment for commercial space flight may require changes to the Outer Space Act, particularly if the regulatory environment in the US remains more favourable for operators.

Access to space is a barrier to growth for UK companies as well as a commercial opportunity. The ability of UK companies to secure timely launch slots is decreasing and launch costs are increasing, particularly for satellites to low Earth orbit (around 80% of all satellites). This is largely because the availability of low cost launch vehicles in Eastern Europe is diminishing and may harm growth prospects for low cost satellite manufacturers.

To address this problem the UK must consider a variety of solutions both in the short-to-medium and long terms, and this will be taken forward in the low-cost access to space road-map. But the UK must take action now if it wishes to host commercial space flight.

ACTION 2.6	**UK Space Agency to champion policy and investment to establish a Space Port in the UK by 2018 and identify further reforms to regulation needed to allow commercial space flight in the UK.**

Precision farming in use in fields aound Harwell. Credit: Satellite Applications Catapult.

The UK must be seen as the go-to location for space business, built with sustainable inward investment.

Recommendation 3

Increase the UK's returns from Europe by continuing to grow the UK's contributions to European Space Agency (ESA) programmes and securing greater influence in large European-funded programmes.

The European market and the UK's position as a key contributor to the European Space Agency are central to achieving the goals of this report. IGS 2010 recommended that the UK should invest earlier, more consistently, and at higher scale in ESA space programmes in order to maximise the UK's economic and social benefits from these programmes as part of a doubling of total UK spend on space by 2020.

A direction of travel has been established with a 25% increase in the UK's contribution at the 2012 ESA Ministerial Council. Continued progress towards the original IGS goal, as UK economic commitments allow, should remain a cornerstone of UK space policy. The UK's standing in the global space community has grown as a result of our positive stance, with benefits to the UK directly from increased spend, inward investment and greater influence over optional programmes. The involvement of UK companies in ESA Public-Private Partnership projects, which this report strongly encourages as a mechanism to exploit ESA technology, is magnifying this impact.

The European picture is becoming more complex, with potential opportunities to win work and secure investment from many institutions, including the European Space Agency, the European Union (acting as procurer of products and services, regulator, and investor), Eumetsat and defence and security agencies. A work group, run under the IGS has started analysing and mapping these different institutions.

Although ESA continues to provide the majority of investment and mission opportunities for UK companies in Europe, the European Union is now becoming increasingly active in terms of space programmes and is likely to commit in excess of €12 billion over the next 7 years on its navigation (Galileo and EGNOS), remote sensing (Copernicus) and Horizon 2020 research programmes.

It is clear that other major EU member state space nations use a strongly co-ordinated approach between government and industry to advance their industrial interests in EU and other wider European programmes, supported by strong and permanent national representation in Brussels.

It is crucial that the UK develops clear plans to gain the maximum benefit from European investment and programmes. Currently there is insufficient attention and resources being made available from within UK industry or institutions to influence effectively how EU programmes are set up and run. The relevant European bodies place great weight on governmental articulation that supports proposals put forward by industry and industry bodies.

In particular, the UK Space Agency needs to increase its deployed resources to influence EU space policies and opportunities, raising its effort in line with the EU's increasing spend on space. It is also important that industry more effectively co-ordinates its interests across Europe.

ACTION 3.1 **UK Space Agency to create a European Space Engagement plan.**

UKspace will constitute a European Affairs Group to handle the co-ordination of industry's policy interests and to make a contribution to the European Space Engagement plan.

The UK can play a more influential role in Europe and contribute expertise to EU institutions by ensuring that skilled UK representatives are appointed onto EU bodies.

ACTION 3.2 **UKspace and the UK Space Agency to ensure the UK plays a bigger role in the European space sector by seconding industry experts into the EU and other European bodies.**

ESA has pioneered the use of Public-Private Partnership (PPP) models in telecommunications satellites. It is important to sustain this model.

ACTION 3.3	**UK Space Agency supported by industry to promote the wider use of ESA PPPs to drive ESA programmes into new services that the UK can exploit.**

We also encourage ESA to continue its long-term build-up of capability at Harwell Oxford.

ACTION 3.4	**UK Space Agency and UKspace to secure a British Operational Director position at ESA in the next reorganisation as part of strengthening the presence of UK nationals in senior positions in ESA.**

European governments and industries coordinate to advance their common space interests. It is crucial that the UK is as joined-up.

Credit: Satellite Applications Catapult.

Recommendation 4

Support the growth of UK Space exports from £2 billion to £25 billion per annum by 2030 by launching a National Space Growth Programme and defining an international policy that will improve collaboration with nations across the world, enhance the UK's competitive edge in export markets and enable targeted and market-led investments in leading edge technology.

Strong export growth in space technologies and space enabled applications and services is a cornerstone of this report. A key enabler of this is the development of a National Space Growth Programme alongside our contribution to ESA. Many elements of this programme already exist and therefore its creation does not necessarily require a large increase in Government spending. It does however call for a strategic approach driven by the National Space Policy and a multi-year commitment.

The UK has adopted a successful but largely ad-hoc approach to funding national R&D or commercial space missions over the past three years. Whilst this is hugely appreciated by the sector (and individual programmes are likely to provide high economic returns) it has made strategic planning virtually impossible and has reduced the agility that the UK needs to grow, competing against higher spending space nations.

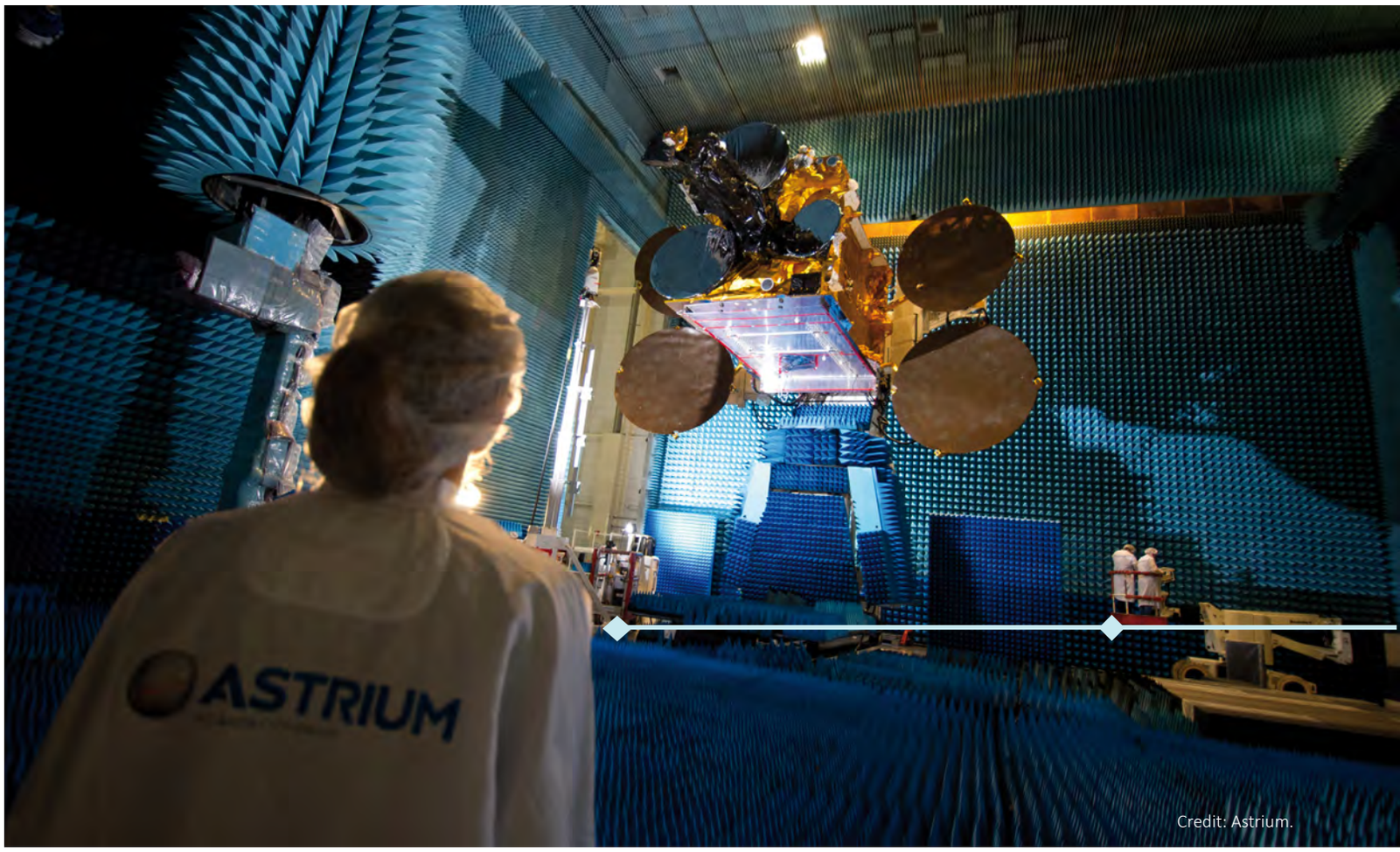
The UK does not at the moment fund potentially high value bi-lateral or multi-lateral projects or missions, despite the fact that such activities are likely to generate good returns, open up future commercial opportunities and provide the UK with opportunities to project 'soft power'. For the same reason, it is also virtually impossible to exercise sovereignty in high value or dual-use missions, or to deliver wider UK policy objectives. This is in contrast to many other competitive space nations.

Nationally, some £60 million per annum on average has been announced for space related science and technology programmes since 2011. A National Space Growth Programme can build on this foundation by providing certainty of investment over a multi-year period. This would enable a much stronger strategic approach to investing in the technology, science, commercial missions and facilities that will deliver growth. It will secure better value-for-money for government investment by providing the UK Space Agency with the ability to plan and deliver multi-year investments in new technology, infrastructure and services for the most crucial projects for the UK. It will also have the agility to act quickly where high value market or wider opportunities arise unexpectedly.

ACTION 4.1	**UK Space Agency to establish and seek funding for a National Space Growth Programme that enables the UK to seize growth opportunities that exploit bi-lateral collaboration with other nations, national technology research and demonstration, national science projects and national missions in a way that secures continuity of funding for planning and maximises value-for-money.**

A National Space Growth programme should include provision for repayable investments. This should clearly focus on the priority markets identified. The aim would be to support exceptionally high value projects that are close to market and hence drive export of services from the UK.

ACTION 4.2	**UK Space Agency with HM Treasury should develop a repayable investment funding mechanism similar in principle to the civil aviation "repayable launch investment" scheme that can provide support for innovative platform, payload, services and/or applications.**



Credit: Astrium.

Industry clearly recognises the importance of continuing to demonstrate excellent economic returns for investments in ESA and a National Space Growth Programme.

ACTION 4.3 **UKspace to produce and update an economic analysis to demonstrate industry has driven economic growth and social benefits from Government investment in ESA and national programmes**

As recognised in the Civil Space Strategy, Space Science can make a direct contribution to growth in the UK space sector by:

- Providing the basis for collaboration between the UK and other nations in a spirit of common endeavour that will build confidence in each other's capabilities in space and pave the way for future commercial relationships that are not possible today
- Pioneering and developing cutting edge 'game changing' technologies or materials that cannot be done commercially because of the high risks involved;
- Catalysing spill-over benefits from developing technology in uses that cannot be predicted today.
- Increasing numbers of skilled workers in the space industry relevant to the growth agenda.

Given these benefits, there is a case for some funding from a National Space Growth Programme to fund low-cost bi-lateral science projects.

ACTION 4.4 **The UK Space Agency to use the National Space Growth Programme to launch three bi-lateral science projects with nations offering new opportunities for export growth.**

A critical factor in determining the UK's export success is its technological and cost effectiveness. Industry and Government have established a strong track record in planning technology delivery since IGS 2010. Industry published a National Space Technology Strategy in 2011, together with a set of technology roadmaps. This strategy was updated in 2012. Government launched the National Space Technology Programme with £10 million in funding in 2011 and announced a further £25 million in funding in January 2013. The first £10 million has been estimated to have already generated a benefit of between £50 million – £75 million to the UK economy.

As part of IGS 2014, industry is again refreshing the technology roadmaps. The crucial difference however in the on-going analysis is a change of approach that will enable the sector to:

- Deliver a technology plan for the UK that is fully market-led
- Prioritise those enabling technologies that will deliver the most benefit in the target high growth markets and enhance the UK's competitive edge and export opportunities
- Fit technology funding needs to the funding likely to be available from industry, a national programme, or ESA and EU funding sources.
- Identify, for the first time, cross-cutting technologies that will benefit several sectors and levels in the supply chain.
- Provide information about gaps in the UK's supply chain (both upstream and downstream).
- Identify and run demonstrator projects to prove new and high risk technologies
- Identify the game-changing technologies where the UK can establish leadership in all new space activities.

The National Space Technology Strategy will be published in due course.

ACTION 4.5	**UK Space Agency and Technology Strategy Board to align R&D calls with the set of market-led and prioritised technology roadmaps developed by the National Space Technology Steering Group. This should include increasing the number of opportunities for industry to demonstrate new innovative technologies in space.**
ACTION 4.6	**UK Space Agency to work with industry and academia to create a programme to understand and spur increased commercial and Government investment into game-changing technologies.** **Specifically, to be included should be:** • **Feasibility studies to establish the technology development and business cases for game-changing technologies.** • **Prizes or other promotional activity to spur entrepreneurial investment.** • **The evaluation by industry and ESA of the benefits of establishing a Disruptive Technology Centre at Harwell with a view to supporting such an initiative in 2014.**

In addition to these programme interventions, companies need support in their export efforts. Companies share their individual export plans with the UK Space Agency and UK Trade & Investment. These plans are usually commercially sensitive and thus confidential. There is, however, a need for a coordinated activity to identify, develop and promote opportunities, and then ensure the structures and networks are in place to efficiently support those businesses.

This will include prioritising those nations and customers of most importance for space exports, the tools available for UK export finance, export licensing and ministerial support for missions and initiatives.

ACTION 4.7	**UK Space Agency to establish a strategic export group and develop a high level export promotion plan.**
ACTION 4.8	**SLC to promote the use of space to achieve overseas aid and other UK policy objectives.**
ACTION 4.9	**UKspace to run four 'Are you Export Ready' symposia per year, aimed at SMEs.**
ACTION 4.10	**Technology Strategy Board and UK Trade & Investment to help secure 20 new partnerships in the next 5 years by running missions to fast-growing overseas 'hot spots' in priority markets.**
ACTION 4.11	**UK Space Agency and UK Trade & Investment to develop a plan to support world-leading companies establish space services and applications businesses in the UK.**

Credit: Astrium.

Recommendation 5
Stimulate a vibrant regional space SME sector by improving the supply of finance, business support, information, skills and industry support

If the UK is to achieve its growth targets it needs to grow its current SMEs and attract and anchor many more in the UK, either as inward investors or as start-up businesses. To do this, all SMEs in the UK will need a supportive business environment. The majority of these companies will be spread around different regions in the UK and there is a need to co-ordinate activity with existing space institutions, regional space champions and local economic partnerships to achieve the totality of impact needed for growth.

Support for SMEs

The concept of a comprehensive 'one stop' service to support SMEs is crucial in this sector given the growth targets that require many SMEs to grow and locate in the UK. A supportive business environment is also required to anchor their high value activities in the UK as their businesses grow.

Therefore, in addition to web-based access to core services, the Satellite Applications Catapult, UK Space Agency, UK Trade and Investment, Technology Strategy Board, the Knowledge Transfer Network (KTN) and UK Export Finance will come together to develop value-added services including:

- A commercially focussed facility to aid SMEs with regulatory licensing processes.
- A potential business opportunities service for overseas opportunities based on UK Trade & Investment information from posts and the EU's Journal.
- Information and a road map to navigate Government's generic and space finance grant schemes for SMEs.

ACTION 5.1	**UKspace to run a Space Manufacturing and Services Supply Chain Challenge with the aims of increasing the number of SMEs in the UK's space supply chains and increasing the number of suppliers to UK primes and first-tier companies by highlighting opportunities for UK-based suppliers and improving supplier performance.**
ACTION 5.2	**Satellite Applications Catapult to provide a comprehensive package of measures to support the growth of SMEs in the Space sector, with a single point of access, comprising improved access to finance, business management tools, skills training, and mentoring. It will promote these activities in regular regional road shows.**
ACTION 5.3	**Technology Strategy Board to elevate the current Space Special Interest Group to become a full space community within the new Knowledge Transfer Network structure.**

Growing Space in UK regions

The Satellite Applications Catapult and ESA centre based at Harwell Oxford will provide a central hub of Space activity in the UK but it is essential that this is used to support growth of space revenues and capabilities across the UK. Some 95% of all new jobs and activities are likely to be located away from Harwell. Regional champions are a good way to promote regional agendas.

ACTION 5.4	**UK Space Agency and Satellite Applications Catapult to develop a mutually supportive national environment for Space with the Harwell Space Gateway acting as the focus for UK inward investment by promoting the capabilities of regional clusters and championing the use of regional centres of excellence.**

Skills & Education

As in all high-tech sectors there is a shortage of skilled graduates and space has a special role in using its exciting science and engineering to inspire young people to take STEM subjects at school and university. Events such as Missions to Mars and of course the impending space flight of Major Tim Peake amongst many others provide great inspiration and opportunities to further interest young people in space and STEM subjects.

The Space Academy in Loughborough will establish its Higher Apprenticeship scheme in 2014 and also next year, a Space Studio school is to be launched in Banbury.

ACTION 5.5	**UK Space Agency and Satellite Applications Catapult to work with Northern Ireland, Scotland, Wales, Local Economic Partnerships and Councils to develop regional growth plans for Space and secure non-Space funding for new projects, centres-of-excellence and business incubation centres across the UK.**
ACTION 5.6	**UK Space Agency, Satellite Applications Catapult, Research Councils and Regions will develop a nationwide plan to co-ordinate investment in ground segment infrastructure and technology centres-of-excellence to secure facilities that support exploitation and growth, and provide value-for-money from Government investments and to ensure that the UK takes a global lead in exploitation of space infrastructure.**

The idea of a National Skills Academy for space was assessed. The perception was that whilst an academy would benefit the sector, it is currently too small to fill courses at what is necessarily an employer led entity. This should be revisited in two to three years as the level of employment grows. It is also necessary to consider the skills training required by space-enabled down-stream businesses, where the staff levels are growing faster than for up-stream space employers.

It is crucial to all space businesses, particularly SMEs, that a skills base is developed to meet the needs of this fast-growing sector.

ACTION 5.7	**UK Space Agency to establish a national space skills 'point of contact' to support SMEs in finding training in business and specialist skills that their staff need to succeed and grow the business by supplying 'one stop' information about UK-based training providers.**
ACTION 5.8	**UK Space Agency to provide financial support for a cross-disciplinary Space Doctoral Training Centre that will support PhD Students that are moving into the Space sector to build relevant specialist and business skills that are needed in both the upstream and down-stream space sectors.**

To make the most of the UK participation in the ESA astronaut programme, industry should engage young people in a specific schools challenge.

ACTION 5.9	**UKspace to lead, coordinating with the UK Space Agency and the sector skills community, a National Schools Challenge to engage school children in the space flight of Major Tim Peake.**

While large companies will continue to grow, it is growth among start-ups and SMEs that is required to meet the demanding 10% target.

Making it happen

Delivery

Making it happen

The Space Leadership Council, as the most senior space sector advisory group in the UK, will take overall responsibility for governance and delivery of the IGS 2014-2030 Space Growth Action Plan. Their role will be to ensure that actions are implemented and that progress is visible to Ministers and industry.

The UK Space Agency will establish a senior-level implementation group to manage the implementation activities and provide necessary resources. This group will comprise the UK Space Agency, UKspace (with an industrial team), Satellite Applications Catapult, Technology Strategy Board and UK Trade & Investment. This team will meet quarterly in advance of SLC meetings to review the implementation of the growth actions. Progress will then be reported to the SLC.

The chairs of the two groups to be established under separate actions in this report; the spectrum and regulatory group, and the export strategy group, will also be invited to SLC meetings.

UKspace, UK Space Agency, Satellite Applications Catapult and Technology Strategy Board will each provide resources to form an implementation team and a working budget, as agreed with the senior-level implementation group. The remit of this group will be to provide week-by-week implementation activity and to co-ordinate and work with action owners to support and ensure delivery. This team will report to the senior-level implementation group.

We welcome the Technology Strategy Board's decision to consider elevating the Space Special Interest Group to become a full Space Community within the new KTN structure. This move would strengthen the UK's ability to deliver innovative technology, regional growth and support for new businesses and build on a unique and excellent set of space players.

Finally, we will need to measure success. Although much will depend on successfully delivering the actions, the highest-level metric will be growth in UK revenues, drawn from the UK Space Agency's 'Size and Health of the UK Space Industry' report. Given the focus in this plan of delivering growth from services and space-enabled applications, this may require us to modify the methodology to produce this. However, any changes to the definition of the sector will be carefully monitored to ensure the analysis remains credible. Future reports will contain a like-for-like comparison with existing data to enable a historic analysis of growth. The implementation team will work closely with expert external bodies such as the Organisation for Economic Co-operation and Development (OECD) in developing any new analyses.

Conclusion

Space plays an increasingly essential role in our daily lives and our well-being. As a sector it continues to provide an excellent opportunity to grow the UK economy and provide the new services and applications that contribute to an ever more connected and secure world.

Government, Industry and Academia should be proud of the progress made since the IGS 2010 report. Working together, they have radically improved the UK's standing in the international space community.

Building on these foundations, we now have the opportunity to demonstrate to wider business and Government the further benefits that space can bring in both economic and social terms. The UK has a great opportunity to grow businesses, export products and services, and attract the best companies in the world to work in the UK.

Completing these actions will, we believe, make the UK the best place to conduct space business and result in a material increase in UK jobs and economic growth.

The Space Innovation & Growth 2014-2030: Space Growth Action Plan Document set

Alongside this Innovation & Growth 2014-2030: Space Growth Action Plan Executive Summary and Recommendations report, the team will be publishing the following documents:

- The full Innovation & Growth 2014-2030: Space Growth Action Plan
- The third update of the National Space Technology Strategy
- Two page summaries of 'Eco System' theme group reports for:
  - Awareness
  - Skills
  - Regulation
  - Access to Finance
  - European issues
  - Regional Growth
- IGS 2014 Consultation Report

These documents will be posted as they are finalised, over the next two months and will be located at https://connect.innovateuk.org/web/space/space-igs-2014-30

Action Table

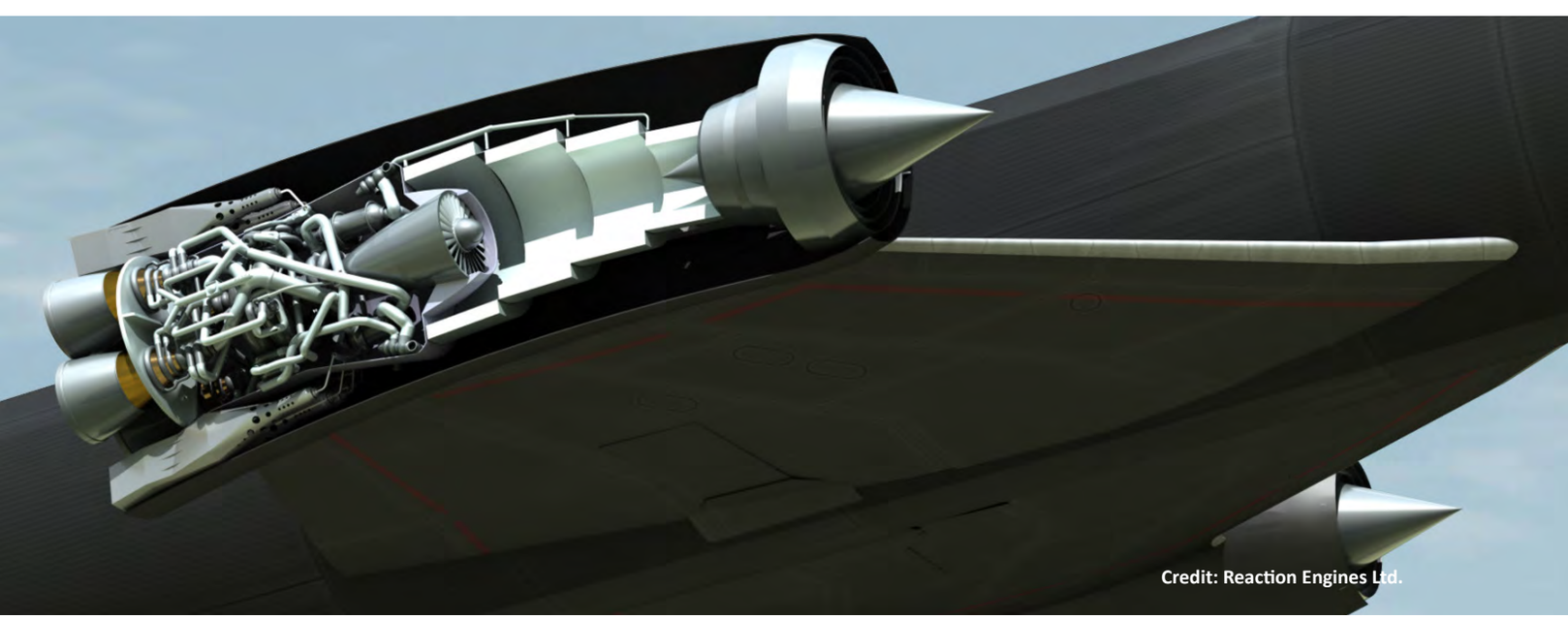
Action	Description	Owner	Partners	Completion Date
1.1	Invest in an integrated marketing campaign to champion the use of space services, applications and data in other sectors of the global economy	Satellite Applications Catapult	UKspace, UK Space Agency	First campaign running by September 2014
1.2	Develop a delivery roadmap plan for each of the priority markets initially identified and to ensure that this activity is coordinated with stakeholders and is visible to the SLC	Satellite Applications Catapult	UKspace, UK Space Agency	Markets pack completed by March 2014 and updated annually thereafter.
1.3	Update and re-validate priority market delivery roadmaps at least annually	Satellite Applications Catapult	UKspace, UK Space Agency	Market roadmaps completed by March 2014 and updated by March 2015
1.4	Launch R&D calls that require cross-sector collaboration as part of the call scope and require a business case that promotes value in the space and recipient industries.	Technology Strategy Board	Satellite Applications Catapult, ESA, UK Space Agency	First cross-sector R&D call run by Dec ember 2014
1.5	Position the UK at the leading edge of exploitation of a wealth of institutional Earth observation data by creating a Climate Services Centre for Europe in the UK	UK Space Agency	Satellite Applications Catapult, Met Office, BARSC, NERC	December 2015
1.6	Work with the EO community to identify and invest in new commercial opportunities for premium services beyond those supplied by institutional satellites	UK Space Agency	BARSC, UKspace	Review progress March 2015
1.7	UK Space Agency to move the National Space Applications Programme from a set up to an operational phase, with the aim of increasing its base funding to a level twice the current published budget by 2015	UK Space Agency	Technology Strategy Board, Satellite Applications Catapult	NSAP fully operational by April 2014
2.1	Review the competitiveness of the UK's Space business environment on a three-yearly basis. The priority is to produce a regulatory benchmark report with relevant evidence by March 2014	UKspace	UK Space Agency, Ofcom, BIS, Satellite Applications Catapult	Regulation benchmark report by March 2014; 1st competitiveness review by Dec 2014.
2.2	Create a Space Regulatory & Spectrum group reporting to the SLC and BIS and DCMS Ministers to prepare support for the UK's agreed Space growth agenda at international regulatory meetings, secure satellite spectrum needed for new services, and provide advice and support for future regulatory reform	UK Space Agency	UKspace, Ofcom, BIS, DCMS	Constitute group by June 2014

Action	Description	Owner	Partners	Completion Date
2.3	Prioritise the interests of UK satellite operator companies creating wealth, employment and taxes in the UK, in matters related to access to international satellite spectrum allocated by the ITU, treatment of satellite network filings by the UK to the ITU and to framing of international satellite regulations at the ITU	Ofcom	UKspace, UK Space Agency	Review process by end 2014
2.4	Revise its guidance and due diligence process for Outer Space Act licences such applicants or their parent groups must meet agreed targets in terms of investment, jobs and use of UK services. They must also conduct the operations to be licensed substantially from the UK and with their primary tax base from these operations in the UK. To minimise the administrative burden for applicants this should be a common criteria used by Ofcom when companies first apply for a satellite filing that will subsequently need an OSA licence	UK Space Agency	UKspace, Ofcom, BIS, DCMS	Introduce new guidelines and process by criteria by 1 Jan 2016
2.5	Simplify its licensing procedure to reduce fees and introduce unambiguous, flexible and achievable criteria for SMEs and start-up companies in the UK taking into account the outputs of its Regulatory Working Group and UK economic growth	UK Space Agency	Ofcom, UKspace	New licensing procedures in use by 1 Jan 2016
2.6	Champion policy and investment to establish a Space Port in the UK by 2018 and identify further reforms to regulation needed to allow commercial space flight in the UK	UK Space Agency	Department for Transport, UKspace, Civil Aviation Authority	Establish operational Space Port by 2018
3.1	Create a European Space Engagement plan	UK Space Agency	UKspace, BIS, FCO	Plan to be completed by December 2014
3.2	Ensure the UK plays a bigger role in the European space sector by seconding industry experts into the EU and other European bodies	UKspace and the UK Space Agency	BIS, FCO	First secondments by March 2015
3.3	Promote the wider use of ESA PPPs to drive ESA programmes into new services that the UK can exploit	UK Space Agency	UKspace	First new PPP by 1st Jan 2015
3.4	Secure a British Operational Director position at ESA in the next reorganisation, as part of strengthening the presence of UK nationals in senior positions in ESA	UK Space Agency	UKspace	Secure Op Director by December 2015

Action	Description	Owner	Partners	Completion Date
4.1	Establish and seek funding for a National Space Growth Programme that enables the UK to seize growth opportunities that exploit bi-lateral collaboration with other nations, national technology research and demonstration, national science projects and national missions in a way that secures continuity of funding for planning and maximises value-for-money	UK Space Agency	BIS, UKspace, SLC	2014
4.2	Develop a repayable investment funding mechanism similar in principle to the civil aviation "Repayable Launch Investment" scheme that can provide support for innovative platform, payload, services and / or applications	UK Space Agency	HM Treasury	December 2014
4.3	Produce and update an economic analysis to demonstrate the extent to which industry has driven economic and social benefit from Government investment in ESA and National programmes	UKspace	SFN	March 2015
4.4	Use the National Space Growth Programme to launch three bi-lateral science projects with nations offering new opportunities for export growth	UK Space Agency	UKTI, FCO	3 programmes committed by March 2016
4.5	Align R&D calls with the set of market-led and prioritised technology roadmaps developed by the National Space Technology Steering Group. This should include increasing the number of opportunities for industry to demonstrate new innovative technologies in space	UK Space Agency	Technology Strategy Board	1 Jan 2014
4.6	Work with industry and academia to create a programme to understand and spur increased commercial and Government investment into game-changing technologies. Specifically, to be included should be: • Feasibility studies to establish the technology development and business cases for game-changing technologies. • Prizes or other promotional activity to spur entrepreneurial investment. • The evaluation by industry and ESA of the benefits of establishing a Disruptive Technology Centre at Harwell with a view to supporting such an initiative in 2014	UK Space Agency	UKspace, academia	Package defined by September 2014
4.7	UK Space Agency to establish a strategic export group and develop a high level export promotion plan	UK Space Agency	UKTI UKspace SAC UK export Finance	Group established by March 2014. Plan by end 2014
4.8	Promote the use of space to achieve overseas aid and other UK policy objectives	SLC	DfID	First project committed by 2016

Action	Description	Owner	Partners	Completion Date
4.9	Run four 'Are you Export Ready' symposia per year, aimed at SMEs.	UKspace	SFN, UKTI, UK Export Finance, UK Space Agency	First symposium by June 2014
4.10	Secure 20 new partnerships in the next 5 years by running missions to fast-growing overseas "hot spots" in priority markets	Technology Strategy Board	UK Trade & Investment	1st mission by September 2014
4.11	Develop a plan to support world-leading companies establishing space services and applications businesses in the UK	UK Trade & Investment	UKSA	Plan by March 2015
5.1	Run a Space Manufacturing and Services Supply Chain Challenge with the aims of increasing the number of SMEs in the UK's space supply chains and increasing the number of suppliers to UK primes and first-tier companies by highlighting opportunities for UK-based suppliers and improving supplier performance	UKspace	Satellite Applications Catapult, UK Space Agency, UK Trade & Investment	1st event by September 2014
5.2	Provide a comprehensive package of measures to support the growth of SME's in the Space sector, with a single point of access, comprising improved access to finance, business management tools, skills training, and mentoring. It will promote these activities in regular regional road shows	Satellite Applications Catapult	UK Space Agency	In place by Q3 2014
5.3	Technology Strategy Board to elevate the current Space Special Interest KTN Group to become a full Space Community within the new KTN (Knowledge Transfer Network) structure	Technology Strategy Board		June 2014
5.4	Develop a mutually supportive national environment for Space with the Harwell Space Gateway acting as the focus for UK inward investment by promoting the capabilities of regional clusters and championing the use of regional centres of excellence	UK Space Agency	Satellite Applications Catapult	Review progress by end 2014
5.5	Work with Northern Ireland, Scotland, Wales, Local Economic Partnerships and Councils to develop regional growth plans for Space and secure non-Space funding for new projects, centres-of-excellence and business incubation centres across the UK	UK Space Agency	Satellite Applications Catapult	March 2015
5.6	Develop a nationwide plan to co-ordinate investment in ground segment infrastructure and technology centres-of-excellence to secure facilities that support exploitation and growth, and provide value-for-money from Government investments and to ensure that the UK takes a global lead in exploitation of space infrastructure	UK Space Agency	Satellite Applications Catapult, Research councils, Regions	December 2015

Action	Description	Owner	Partners	Completion Date
5.7	Establish a national space skills 'point of contact' to support SMEs in finding training in business and specialist skills that their staff need to succeed and grow the business by supplying 'one stop' information about UK-based training providers	UK Space Agency	Satellite Applications Catapult, SEMTA	September 2014
5.8	Provide financial support for a cross-disciplinary Space Doctoral Training Centre that will support PhD Students that are moving into the Space sector to build relevant specialist and business skills that are needed in both the upstream and down-stream space sectors	UK Space Agency	BIS, UKspace, SEMTA, BSC, RCs	Q4 2014
5.9	Promote a National Schools Challenge to engage schoolchildren in the space flight of Major Tim Peake	UKspace	UK Space Agency and the sector skills community	June 2015


Credit: Reaction Engines Ltd.

Artist's impression of Alphasat.
Credit: ESA.