



BRIEFING PAPER SPACE STARTUPS & SCALEUPS

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In partnership with



FOREWORD



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The space sector has changed enormously over the last few years, increasing in importance globally for economic growth, for security and for international partnership. As we look forward, ever more of the major challenges we face as a planet will have solutions, or parts of solutions, from space. The economic development of space to support the sustainable development of Earth is a critical opportunity for the UK.

Over the last decade, the UK has been a leader in the development of the new space economy, particularly in the areas of small satellites and applications. I am delighted that the All-Party Parliamentary Group for Entrepreneurship has recognised the critical importance of entrepreneurs in the space sector. Entrepreneurs have played a central role in the step changes we have seen in the space sector to date, bringing new ideas, delivering new services and re-shaping the industry with their visions.

Through the creation of the Seraphim Space Fund, and a very strong start-up support ecosystem the UK has also been second only to the US for a long-period in terms of private investment into start-ups. The National Space Strategy has also had a huge galvanising effect for the sector. The measures in the National Space Strategy to grow and level up our space economy around access to finance, procurement, regulation, and nurturing talent are all having a positive impact. This support to entrepreneurs has resulted in a vibrant applications community that connects the benefits of space with the community.

However, we are now a year on from the publication of the National Space Strategy and the sector is changing enormously. As the sector has continued to develop at pace globally, the UK position in terms of investment into start-ups has now dropped to fourth and the UK is still lacking scale-up of businesses compared with global peers. We need to step-up.

With advances in launch, from an era focused on developing low-Earth orbit constellations, the space industry is now moving to a phase focused on capitalising on those constellations to deliver growth and societal benefit. Alongside this there is the opportunity for building new, large infrastructure in space for next generation services and beginning an in-orbit economy.

Supporting entrepreneurs with even bolder ideas is going to be key for the next phase of growth. The shape of the opportunity ahead is changing and we need measures to enable some of the more capital intensive start-ups to succeed alongside continued growth in applications.

“We now need to re-energize support to entrepreneurs with the next set of support innovations to keep ahead.”

We now need to re-energize support to entrepreneurs with the next set of support innovations to keep ahead. The recommendations in this report are a good first step and the support ecosystem in the UK can adopt these and develop others to help the UK space sector succeed. Together we can enable the growth of a sector that can deliver huge benefits for citizens, alongside high value jobs and open a new frontier of economic opportunity for the UK.

INTRODUCTION

Supporting entrepreneurs with even bolder ideas is going to be key for the next phase of growth. The shape of the opportunity ahead is changing and we need measures to enable some of the more capital intensive start-ups to succeed alongside continued growth in applications.

As this report is published, Spaceport Cornwall will see the first ever commercial rocket launch from Europe. It has the potential to inspire future generations of space entrepreneurs. But the space industry isn't just about rockets – it offers ever-increasing opportunities for applications.

Applications includes the use of Synthetic Aperture Radar satellites to predict when bridges will collapse; the provision of insights to help food retailers and producers eliminate products causing deforestation; or the empowerment of the nations of Fiji, Vanuatu and the Solomon Islands in the use of satellite remote sensing capabilities in their efforts to build resilience to the devastating impacts of climate change.¹

In line with the global boom, the UK space sector has nearly quadrupled since 2000, with UK space-related organisations producing £16.5 billion in income in 2019/20. The UK has a strong commercial focus, with 83% of income derived from direct-to consumer and business-to-business sales. The industry directly employs over 47,000 people,² with space employment growing 6.7% from 2018/19.³ The UK's space sector is expanding, but despite the good news, some competitors are growing faster, so we are still at risk of falling behind.

Last year, the UK government produced its first ever UK Space Strategy, which set out five goals to make the UK a leading space nation: namely, growing the space economy, promoting Global Britain, supporting research and innovation, defending national interests, and using space to tackle

1 Catapult – projects.

2 Lison, A. & Osrin, D. Five difficult choices for the National Space Strategy.

3 UK Space Agency (2001). Size and Health of the UK Space Industry 2021.

major challenges like climate change. It aims to achieve these objectives through four strategic pillars and a high-level 10-point plan. The much-anticipated strategy wasn't short on ambition:

“We will build one of the most innovative and attractive space economies in the world, and the UK will grow as a space nation. We will protect and defend UK interests in space, shape the space environment and use space to help solve challenges at home and overseas. Through cutting edge research, we will inspire the next generation and sustain the UK's competitive edge in space science and technology.”⁴

The strategy draws attention to the diversity of spacetechnology applications that many of us take for granted – everything from satellites and space activities for navigation, to weather forecasting, power grid monitoring, financial transactions and television and other digital communications.

As the Strategy acknowledges, the UK already excels in the manufacture of satellites, spacecraft, highly complex payloads, end-to-end satellite service delivery, satellite communications, and high-end navigation systems. It also has ambitions to lead in high-growth areas, such as earth observation (EO), navigation applications and services, and satellite broadband, as well as establish leadership in the emerging high-growth markets of in-orbit servicing, energy from space, space travel and habitation, and active debris removal.

None of these ambitions will be possible without entrepreneurs. While 'NewSpace' isn't exactly new, the role of the private sector in the space sector has taken off, with commercial space revenues now accounting for 80% of the global space economy.⁵ Globally, private sector investment in 2021 was \$15.4bn – doubling the \$7.7bn record set in 2020.⁶ As NASA concluded in 2017, “the established state-run industrial space sector is no longer the only game in town.”⁷

If the UK wants to punch above its weight in the space sector, this and future governments need to ensure that space entrepreneurs are able to flourish. This was acknowledged by both the Defence and Business Secretaries in their joint foreword to the Strategy: “Most importantly, this strategy sends a signal to businesses and innovators across the UK and further afield to take advantage of this moment of opportunity, and to come together and work with government to deliver on the strength of the UK's ambitions.

4 Department for Business, Energy & Industrial Strategy, Ministry of Defence, & UK Space Agency (2021). National space strategy.

5 The Space Economy Scorecard.

6 Boggett, M. (2022). Seraphim identified as leading VC in Bryce Start-Up Space Report 2022.

7 Martin, G. (2017). NewSpace: The emerging commercial space industry.

ACCESS TO FINANCE

Any company with ambitions to scale needs access to finance. The government has a key role to play. When scaleups are asked, the thing they most want from government are access to public sector funding for innovation and R&D (45%), and access to Innovate UK (43%).⁸ Although the Strategy stated that the government will “take action to unlock growth in the UK space sector, using government to unleash the potential of our industry, entrepreneurs, and innovators,” there are still questions about how this will be achieved.

It’s perhaps of little surprise that spending announced in the Space Strategy has been welcomed by the industry. For example, the trade association Tech UK highlighted the UK’s first Defence Space Portfolio, investing £5 billion over 10 years in the military’s satellite communications and £1.4 billion in new technologies and capabilities.⁹ Yet the entrepreneurs we spoke to suggested that much of this expenditure had already been set aside for specific projects and suppliers when the strategy was published.

The government’s position is that: “it should provide support only where it is needed and where only government can intervene.” And nobody wants government to crowd out private sector activity. But as the Strategy also acknowledges: “[O]ther nations have invested proportionally more and the UK lags behind our international peers. As a result, whilst the UK sector has continued grow, it is not currently increasing its share of the global space economy.”

Just to keep pace with global growth the UK would need to see sector growth of 5.6%.¹⁰

As part of the European Space Agency (ESA), the UK remains a leading contributor to the third biggest space agency in the world, with a budget of €7.15 billion – behind only China and the US.¹¹ The UK Space Agency will increase its own individual budget to £600 million¹², but as a percentage of GDP, the UK is one of the lowest public investors among the advanced economies. Germany invested 0.05% of GDP compared to the UK’s mere 0.014%. France has invested five times more cash in growing its space sector, and smaller economies, such as Saudi Arabia and Luxembourg, are starting to punch above their weight.

“Just to keep pace with global growth the UK would need to see sector growth of 5.6%.”

8 ScaleUp Annual Review (2021).

9 TechUK (2021). The UK’s first ever National Space Strategy.

10 Aerospace Technology (2021). UK national space strategy reliant on private sector for many of its goals.

11 ESA (2022). Funding.

12 GOV.UK (2022). Government announces plans for largest ever R&D budget.

Of course, the UK's space economy is more heavily dominated by commercial space companies than France and Germany, which is a competitive advantage that must be maintained. More public funding isn't the only option. Our competitive advantage may lie in taking a more commercial approach than our competitors, unlocking the City of London for financing space. The government should consider development financing mechanisms and incentives that would work to unlock private sector investment to support space businesses which are more capital intensive and take a longer time to generate revenues

Regulation is also a key tool for supporting business growth. With respect to the space sector, the government's Taskforce on Innovation, Growth and Regulatory Reform called for: "ensuring that the Government has a clear regulatory vision, which is properly prioritised by the Civil Aviation Authority, Ofcom and the UK Space Agency, all acting in concert to support innovation and growth."¹³ This will be particularly important for future markets such as in-orbit services.

For startups and scaleups, the majority of UK funding comes from programmes run through Innovate UK, with amounts ranging between £25,000 and £10 million. Innovate UK is also piloting a programme of innovation loans, with small- to medium-sized enterprises (SMEs) that want to carry out late-stage innovation projects able to borrow between £100,000 and £1 million. There is also Regional Innovation Funding, distributed via the devolved administrations in Scotland, Wales and Northern Ireland and Local Enterprise Partnerships. One complaint from conversations with entrepreneurs, however, is the dearth of specifically identified space technologists and experts within Innovate UK to support the sector. There used to be a dedicated Innovate UK Space Team, that should be reinstated.

The Advanced Research & Invention Agency (ARIA), a new research body to fund high-risk, high-reward scientific research, may also be a source of support for the space sector, assuming it follows the sort of work of the US Arpa (now Darpa) upon which it is based. That is certainly the hope of David Morris, Member of Parliament for Morecambe and Lunesdale:

"Britain has over 1,000 companies in what's called "new space" – the term given to the innovators and entrepreneurs whose use of technology has expanded the market so dramatically from what was originally a collection of big aerospace firms. These are the companies, whose success will define the UK's future economy, that can really benefit from ARIA's encouragement and involvement. As we have learned from other sectors with big established players, markets need stimulation and disruption to be truly dynamic."¹⁴

But with ARIA only just getting going, and with it purposefully being independent of political concerns, it's simply too early to tell whether it will

13 Taskforce on Innovation, Growth and Regulatory Reform (2021).

14 Morris, D. (2021). Conservative Home.

do something in the sector.

ESA Business Applications offers funding and support to businesses from any sector that intends to use space – satellite navigation, earth observation, satellite telecommunication, space weather, space technologies – to develop new commercial services. It also has an ESA Business Incubation Centre, which can provide £40,000 of funding, and has regular calls for selection. One entrepreneur complained that the UK was at a competitive disadvantage, as funding via this programme in the UK is capped at 50%, while SMEs in other member states are capped at 70-80%: “Throw in R&D tax credits and these players are at 95% against UK max of 65%.”¹⁵

One entrepreneur noted that their “experience with ESA funding is that the ESA machine results in huge losses on the project, potentially causing distress to the business. The ESA system is more suited to large companies who understand the nature of the funding, budget for the additional overhead and don’t lose money as a result.”¹⁶ However, this isn’t unanimous. Another entrepreneur argued the exact opposite: “ESA has been by far our greatest supporter. Both the technology and transport teams we have engaged with have provided technical support, helped find us European partners for capabilities we don’t have in the UK, and have learned to ask about the business side in a much more commercial approach in recent years. They are our largest programmes, and most successful too.”¹⁷

The ESA is aware of the challenges. In 2021 it published a new vision, *ESA Agenda 2025*,¹⁸ declaring that boosting commercialisation is one of its top priorities and setting out commitments to action and investment on talent, access to capital and fast innovation. It states that “ESA has to supplement its role of a risk mitigator with that of a risk taker in areas with commercial growth potential.”

To this end, the ESA has established a new commercial directorate to focus on this, and all ESA programmes have been required to consider how to use their programme activities to boost growth for startups and scaleups. This marks a potentially important change for how startups work with the ESA in future, and the UK’s membership in the ESA must allow UK startups to take full advantage of that.

While beyond the scope of this paper, many space entrepreneurs have highlighted the geopolitical risks of underinvestment. For the foreseeable future we will remain reliant on the US and remain in the ESA, but with the increased role of EU funding and institutions in space, we may become more dependent on infrastructure provided by other powers – despite the Ministry of Defence declaring space an operational domain of the same importance as air, land and sea.¹⁹

15 Conversation with a space entrepreneur.

16 APPG for Entrepreneurship roundtable.

17 Conversation with a space entrepreneur.

18 Aschbacher, J. (2021). *ESA Agenda 2025*.

19 Huges, S. (2020). *Securing our future in space*.

The UK's first Defence Space Strategy announced £1.4 billion to “bolster our national interests in space,”²⁰ while the Levelling Up report pointed to pre-announced funding in space, including a range of industry-led projects to help grow UK spaceflight capabilities. This included £31.5m to help establish launch services from Scotland, and £20m to support launch from Spaceport Cornwall.²¹

In addition to being the largest domestic backer of venture capital funds in the UK, some of which is channelled into the space sector, the UK government also co-invests alongside the private sector in R&D-intensive companies, including space companies, through its £375m Future Fund: Breakthrough programme, as well as commercial space through its National Security Strategic Investment Fund (NSSIF), the government's corporate venture capital arm for dual-use advanced technologies.

While funding less, the British state has a track-record in stimulating investment in the space sector. Most notably, in 2017, the British Business Bank was instrumental in creating the dedicated space fund: Seraphim Capital. Under the Enterprise Capital Funds programme, it joined European space industry giants such as Airbus in creating the London-based VC fund.²²

However, many people we spoke to believed gaps remained in funding. For example, Sam Adlen, chief strategy officer at the Satellite Applications Catapult, called attention to a gap in scale-up funding in the Call for Evidence:

“We are starting to see a few unicorns now such as Arqit (due to a SPAC deal). Seraphim floating should enable continued investment but not enough compared with other sectors. The important bit is bringing scale-up financing. The UK still lacks a tier of middle-sized companies.”²³

In his submission to the Call for Evidence, Adlen referenced the Size & Health of the UK Space Industry report. The latest findings show that: the industry is dominated by a few large organisations, with nine organisations accounting for 81% of total space-related income. A further 130 organisations each earn in excess of £5 million and contribute the next 16% of income, whilst an additional 1,154 organisations account for the remaining 3%.²⁴

In the Call for Evidence, Oxford Space Systems called for more consistent support for innovation and SMEs through the UK Space Agency (UKSA)/ESA funding mechanisms:

“The important bit is bringing scale-up financing. The UK still lacks a tier of middle-sized companies.”

20 GOV.UK (2022). UK cutting-edge space defence backed by £1.4 billion.

21 GOV.UK (2022). Levelling Up the United Kingdom.

22 Concini, A. & Toth, J. (2019) The future of the European space sector.

23 Call for Evidence submission.

24 UK Space Agency (2001). Size and Health of the UK Space Industry 2021.

“This needs to enable development of world leading capability through ongoing support to build industrial capability and commercialise products. Other countries invest far more heavily into R&D/product development and the UK will not meet its objective to be world-leading without this investment. The UK needs to have programmes that SMEs can rely on to build a growth strategy, recruit and raise funds against. This means multi-year, stage-gated support, rather than intermittent and low chance of success, narrow scope, grant project support.”²⁵

In conversation, another entrepreneur added: “While it would be fantastic to see greater money deployed into the sector from public sources, the real issue is in its distribution and claiming. For example: UKSA grants are to be claimed in arrears. As a startup we came dangerously close to hitting 0 in the bank each month because we had to spend the money, make payroll, and then get the claim back into the bank. ESA, however, gives a 35% advance payment for SMEs that is off-set against future milestones. This would be a huge help to startup cash flow.”²⁶

There has been talk of patient capital at an earlier stage, perhaps through UK Innovation & Science Seed Fund (UKI2S), which has a very credible track record, developing a space fund.²⁷ The success of Seraphim Capital is proof that government can take a leading role in market-making.

Applying for Innovate UK funding is a long, costly endeavour. Responding to our Call for Evidence, the experience of Tristan Fletcher, co-founder and CEO of ChAI, which uses satellite imagery to predict commodity prices, was similar to many:

“We have applied for Innovate UK funding several times and come frustratingly close to receiving funding but not actually being successful in doing so, despite significant effort.”²⁸

One entrepreneur noted that an Innovate UK application can score extremely high and still fail to secure a grant. The whole process can cost a business 6 months of lead time on a project. By contrast, ESA BIC processes can deliver an outcome within 3 months from start to finish.²⁹

Mike Lawton, co-founder and director of Oxford Dynamics, which is developing a range of next-gen AI based tools, also shared some of his challenges around funding:

“I appreciate that the distribution of public tax money needs to be undertaken with care and attention to detail but it does feel that

25 Call for Evidence submission.

26 Conversation with a space entrepreneur.

27 Cook, J. (2020). Assessment of the Economic Benefits and Wider Performance of the UK Innovation and Science Seed Fund.

28 Call for Evidence submission.

29 Conversation with a space entrepreneur.

certain UK agencies have become punctilious. DASA [the Defence and Security Accelerator] and DSTL [the Defence Science and Technology Laboratory] are the least bureaucratic and offer the least amount of overhead in applying for 100% grant funding. We've found them easy and pragmatic to deal with.

The UKSA used to be relatively painless (when compared to ESA) but recently the level of detail, form filling and validation to secure relatively small sums of co-funding I feel has become disproportionate. It's not quite at the point of, "is the light worth the candle?" (as can be the case with many ESA calls if you're a startup/SME). We're regrettably now having to look at whether it's actually worth the overhead opportunity cost of applying for UKSA and ESA funding.

I would suggest that if DASA and DSTL [Defence Science and Technology Laboratory] are able to provide grant funding in a really SME and startup friendly way, then the UKSA and ESA should be able to do so too."³⁰

In last year's UK Innovation Strategy, the challenges of bureaucracy were acknowledged. Multiple bodies with overlapping activities are hard for early-stage businesses to access. As such, to make finance more accessible and signposted, Innovate UK will develop an online Innovation Hub to sit alongside and complement the British Business Bank's existing Finance Hub.

In addition, Innovate UK (as part of UKRI) and the British Business Bank are jointly investigating how businesses interact with different parts of the public support landscape. They are:

- exploring how the UKRI system could be simplified, and bureaucracy reduced, so that applicants are not required to submit the same information twice;
- signposting the availability and application requirements of future funding opportunities, to help businesses access the right financing options to scale;
- enhancing investment readiness through Innovate EDGE, which helps businesses to develop the evidence they need to access further public finance and move towards private investment;
- linking these services to the Innovation Hub where appropriate, saving time and effort for businesses and SMEs by providing them with a single portal for their innovation finance needs.

There are perhaps lessons to be learned from the speed of the Future Fund scheme, which was set up during the pandemic to help equity-backed

30 Call for Evidence submission.

companies. This scheme issued convertible loans between £125,000 to £5 million to innovative companies. It was widely praised at the time – not least for the ease of bureaucracy. Tristan Fletcher, co-founder and CEO at ChAI stated:

“We obtained a matched investment as a Convertible Loan Note from the British Business Bank through the Future Fund scheme. We found this remarkably straightforward and free from unnecessary bureaucracy. The ongoing reporting obligations are pretty substantial, but understandable and don’t feel over the top. I feel like this scheme was very impressive in how rapidly it was rolled out, how well it was communicated and the material reduction in ChAI, and many other companies’, existential risk it represented.”³¹

Speed of funding came up as a major hurdle in discussions with space entrepreneurs. As one explained in an APPG for Entrepreneurship roundtable:

“We’ve got a fantastic bunch of mechanisms to pay small companies, unfortunately they really disadvantage you if you haven’t got significant cash in the bank, because cash flow is king, and you’re always getting paid in arrears on a grant. Sometimes the milestones can be many months apart, so often you have this fantastic idea, you’ve got support from the government to help you develop it, but you can only charge after you’ve done the work. Historically this isn’t how we used to do things.”³²

Competition for oversubscribed grant schemes reduces the net value of what is spent. In some cases, as many as 1,200 companies are bidding for £20-25m – wasting the time of a lot of entrepreneurs and their employees, and wasting money if they turn to external experts to write the grants. It’s conceivable that in some cases the cost in grant-writing and staff time outweighs the value of the grant.

It’s not the fault of those judging what to fund. After all, they’re often required to pick between lots of good proposals. As Sam Dumitriu, former Research Director of The Entrepreneurs Network, has argued: “A new approach, funding lotteries, may reduce administrative costs. Under the system judges would still weed out unsuitable applications, but after that funding would be allocated at random. New Zealand’s Health Research Council uses this approach to allocate funding to proposals that are transformative, innovative, exploratory or unconventional, and have potential for major impact.”³³

In ‘Modernising the United Kingdom’, Policy Exchange calls for the UK to invest more in its burgeoning Space sector to realise its potential in this area of increasing economic and strategic importance. To this end, the report

“In some cases, as many as 1,200 companies are bidding for £20-25m.”

31 Ibid.

32 APPG for Entrepreneurship roundtable.

33 Dumitriu, S. & Salter, P. (2020). Unlocking Growth: How to Expand Access to Capital.

suggests we establish a UK Space Business Fund (SBF) to support FDI in national and regional space sector areas, as well as homegrown companies: “At present, UK investment in innovation support infrastructure, like the Satellite Applications Catapult, is about ten times smaller than in competitor countries like Germany.”³⁴

The report adds that given that governmental record on ‘picking winners’ is generally mixed, the SBF’s investment decision-making process should involve private sector investors to ensure they also have “skin in the game”. It also suggests that SBF-funded grant-based investments should be coordinated – via the Satellite Applications Catapult – with the specific strengths and growth potential of regional space industries and space hubs.³⁵

It’s important to note the potential security risks of not properly funding UK companies. Respondents to the consultation shared that they’ve found overseas investors, including from China, are much more proactive in seeking deals with UK space startups than UK investors and even UK grant awarding bodies.

As the debate and fallout of Galileo shows, the UK needs to think clearly about security. Beyond the ongoing debate on the adequacy of Galileo’s replacement with Oneweb, it is widely accepted that the UK needs resilient access to assets such as earth observation and positioning, navigation and timing (PNT). As mentioned at an APPG for Entrepreneurship roundtable, the UK has developed some great applications business only for the non-UK data supplier to switch off the data supply and/or copy the application.

A study by RAND,³⁶ published alongside the Defence Space Strategy, points out that countries like Australia, Canada and Japan are pursuing dynamic growth of high-tech, highly skilled, space startups and supporting commercial space activity, with ambitions for future growth. RAND recommends approaching space strategy, policy and capability development through the aegis of NATO, as well potentially other multilateral frameworks (e.g. the Five Eyes alliance or the Joint Expeditionary Force). Separately, a UK space entrepreneur added that “from an in-space manufacturing perspective. Germany’s, France’s, and Italy’s agencies are much better placed to assist with the development of these capabilities. DLR [the German Aerospace Center] even has its own ISM division. There is a gap not only in funding, but in the technical competence of our agencies vs other nations – and why we need ESA so sorely to plug that gap.”³⁷

Following the publication of the Defence Space Strategy, the MoD needs

34 Elefteriu, G. et al. (2019). Modernising the UK.

35 Ibid.

36 Retter, L., Black, J., & Ogden, T. (2022). Realising the Ambitions of the UK’s Defence Space Strategy.

37 Conversation with a space entrepreneur.

to clarify which space capabilities the UK will invest in as core “sovereign-owned”, and which they will access primarily through collaboration with allies. If the MoD worked proactively with UK startups to build those sovereign capabilities and supported them in forging relationships with potential customers and investors in allied markets, that would be a key driver of growth.

POLICY RECOMMENDATIONS

- Officials should be tasked with revising space R&D grant funding programmes to address the barriers entrepreneurs face, in particular: addressing cashflow issues by allowing a proportion of grant awards to be drawn upfront rather than in arrears; and making it easier for micro businesses (with fewer than 10 employees) to participate in grant application processes.
- The Small Business Minister, Business Minister and Science Minister should be tasked with coming up with proposals to tackle the “valley of death” funding gap challenge and to stimulate more scale-up funding, including incentives to encourage more private sector investment in these areas.
- Innovate UK’s new Innovation Hub must be sophisticated enough to ensure that space startups and scaleups are directed to all the potential sources of funding particular to their expertise. If it’s too generic it will fail entrepreneurs. A dedicated Innovate UK space sector specialist should be appointed to help entrepreneurs navigate the funding landscape
- Given the challenges of bureaucracy and differences in how schemes are run – and even how bureaucracy has changed over time – an add-on survey to the Size and Health Study that tracks entrepreneurs’ views, experience of barriers, feedback on existing programmes, and generates insights over time. This would give the government some hard evidence (baseline and trends over time) about whether attitudes are changing and needs are being met.
- For businesses that meet a minimum standard, we should experiment with lottery style grants. Data should be collected to determine the cost-effectiveness and economic impact of lottery grants compared to standard grants.
- We would echo the recommendation by RAND for the MoD to analyse and address enduring barriers to working with industry and academia – in particular how to develop more strategic longer-term partnerships with startups and innovative new startups.

CASE STUDY: GRAVITILAB AEROSPACE SERVICES

Gravitilab is an aerospace engineering company focused on providing low-cost and accessible microgravity environments for scientific experimentation, research and equipment testing, verification, and qualification.

It's in the R&D phase, it's developing proprietary (patented) technologies to address the demand for microgravity. It has two generic products: rocket launch vehicles providing extended and high-quality microgravity; small vehicles dropped from a drone providing shorter duration high-quality microgravity (and partial gravity in future versions).

Removing the constant 'g' (gravity) from modelling equations and experimentation allows scientists to better observe and control processes that are masked by gravity. Advances in integrated circuitry, silicon solar cells and memory foam were made through microgravity experimentation. Currently microgravity is provided by very expensive rocket and aircraft solutions or drop towers (ESA and NASA) and mainly accessible only to research projects.

When it comes to funding, Gravitilab's Managing Director Mark Roberts finds it "deeply frustrating" to be in a business that directly touches so many policy/strategy areas – space, sustainability, levelling up, resilience, high tech UK etc etc – and yet "find it extraordinarily difficult to access any government funding. In short, the UK government yearns for NewSpace growth but meets the agility with turgidity, innovation with risk aversion and pace with process."

"In practical terms, funding applications are extremely time consuming," says Roberts. "And SMEs don't have the resources to dedicate time to these applications (with such low success rates). Again, there needs to be a revised process to perhaps have a two-stage application process to allow for less initial work before going through to a more detailed phase two."

"[T]he UK government yearns for NewSpace growth but meets the agility with turgidity, innovation with risk aversion and pace with process"

"There needs to be a much more intelligent approach to SMEs," says Roberts on procurement. "Sadly, and typically, the good work on helping SMEs access procurement is very one-size-fits-all. Micro companies find it extraordinarily difficult to get across the threshold with government procurement. This is a constant frustration because the very thing that government wants – to stimulate and accelerate innovation – is stifled by their processes. Instead of having a rather blunt SME policy, the SME cadre needs to be broken into SME sub-categories and specific considerations

given to making each of those subcategories succeed.”

Roberts thinks Government should host regular webinars with heads of procurement and entrepreneurs to share the system. “The feedback should feed into a thorough review of qualification criteria or other unnecessary hurdles holding back start-ups and scale-ups,” he says. “I am convinced that the UK is simply missing out because it is not an economy that genuinely supports and drives SMEs, despite what is being said.” Roberts says he used to “make exactly the same ‘we will be supportive of SMEs’ remarks” when Head of Capability in the Ministry of Defence in 2010:” that cannot be right.”

“Accessing talent is always tricky and we have to cast our net across the world to find the people we need,” says Roberts. “Not a good reflection on the UK! Having to sponsor skilled workers from overseas is also time consuming and costly for an SME – again, the process and costs are the same whether you are an SME or a multi-national with a large HR department. This results in having to pay inflated rates for international staff compared with UK residents.”

GOVERNMENT & PROCUREMENT

Procurement is the single biggest component of government expenditure. Government spends around £300 billion a year on buying goods and services from external suppliers – around a third of all public expenditure.³⁸

Over recent years, procurement has come to be seen as a potential driver of innovation. As a former UK Science Minister stated regarding the space sector:

“The Government should use its national procurement programmes to encourage inward investment that grows the space sector. This would be improving the sector’s resilience through competition and industrial presence which in turn enables complementary international partnerships to be developed in space with allies in the US, Indo-Pacific and other regions beyond Europe.”³⁹

Government is aware of the challenge and the opportunity, hence the Procurement Bill, which aims to “shake up our outdated procurement system.”⁴⁰

A key message from entrepreneurs we spoke with is that we talk about risk as though the only risk is technology risk, but of course it isn’t. There is also market risk and execution risk. The thing that investors are most worried about is market risk – it’s the only thing they can’t do anything about. As such, if the government can do anything to mitigate market risk – ie. show that the government sees space products and services as valuable and it is likely to use them in the future – then that’s what unlocks investment in technology and actually building businesses: “That’s what Americans do that we miss out on. And that’s why their risk/reward environment is so different from ours.”⁴¹

First and foremost, the challenge for many space startups and scaleups is around a lack of knowledge of how procurement works. Christian Fletcher, co-founder and CEO of ChAI stated:

“We would love to supply the government but have absolutely no idea how to go about doing this. It’s odd that our genesis was

38 GOV.UK (2022) The Procurement Bill – a summary guide to the provisions.

39 Sheldon, J. (2021). Britain and the Geopolitics of Space Technology.

40 GOV.UK (2022) The Procurement Bill – a summary guide to the provisions.

41 APPG for Entrepreneurship roundtable.

through a DIT-funded trade mission to China where we secured our first client but there is no obvious route to making the UK state itself a client. It could make it more obvious how early stage companies can go about engaging with it as an actual customer.”⁴²

More than one entrepreneur mentioned the practice of government running procurement for space-related services where the procurement manager has already cherry-picked both projects and providers in advance, thus wasting everyone else’s time.⁴³

Entrepreneurs we spoke with are generally appreciative of progress that has been made, applauding the government for setting up a Crown Commercial Service (CCS) framework for Space and Geospatial. However, many think more could be done to support those at the smaller end, including Will Lecky, co-founder of know.space:

“Public procurement rules and guidelines, while well-intentioned, can exclude start-ups from being able to win contracts. For example – and from experience - the need for proof of financial standing (e.g. published accounts) often rules out new companies from getting on framework agreements, while the blanket classification of ‘SMEs’ makes no differentiation between micro-businesses (<10 employees) such as ours and a well-established company with up to 250 employees. Furthermore, while we agree with and understand the need for fair competition, the process from advertising an invitation to tender through to contract award can take many months, meaning that it is hard to move quickly on ideas. It also reduces incentives to discuss and shape project ideas with officials, as they often ‘give away your ideas for free’ and put them out for open tender. If procurement is really going to drive innovation and foster entrepreneurship, more flexibility is needed.”⁴⁴

Mike Lawton, co-founder and director of Oxford Dynamics thinks:

“There seems to be a general lack of appreciation of the time / cost pressures early-stage businesses are under from government. Time literally is money. If a business is form filling or in a holding pattern awaiting a funding decision, it’s burning cash. The concept of ‘opportunity cost’ doesn’t seem to exist: if a company is filling out overly long application forms, or dealing with bureaucracy, it’s being distracted from ‘real work’.”

“It therefore seems a pretty easy-win for the Government to set itself the target of being the easiest government in the world to do business with if you’re a startup / growth company. The PR upside and case studies – and genuine success stories – would more than

42 Call for Evidence submission.

43 Conversation with a space entrepreneur.

44 Call for Evidence submission.

compensate for any abuse of the system.”⁴⁵

Oxford Dynamics is under a modest framework contract with the MoD it secured via a competitive process. While finding it a “very positive experience”, they explain that the “framework is specifically for agile developments via a number of ‘sprints’ to explore ideas and thus ‘fail fast, fail cheap’”. The application and assessment processes were similarly constructed, so atypical of usual government procurements.”⁴⁶

In addition, it is common for procuring bodies to specify minimum qualification criteria for suppliers, such as ISO certification or proof of suppliers’ previous ability to deliver contracts of similar size. Some procurers will also ask for large indemnities. In many cases, tenders ask for unlimited liability insurance. This makes it more difficult for startups to qualify, and less likely that innovative solutions will be selected. Innovative startups also face an obstacle in existing requirements on some tenders to demonstrate billable hours.

To make matters worse, new proposals for public bodies to consider past performance when awarding contracts risk unintentionally penalising early-stage businesses. There should be a clearer distinction between negative past performance (such as consistent failure to meet performance metrics), negative behaviour (such as under-bidding with the objective of clawing back profit through change control) and a lack of evidence of good past performance.

Buyers are also often stuck in a legacy mindset: their prior experience in tackling a problem shapes not only the solutions they will consider, but also their framing of the problem itself. Procurement requests are often specified in terms of legacy capabilities and legacy performance indicators, which tend to favour incremental innovation over radically new approaches. The legacy mindset often leads to overly prescriptive tenders.⁴⁷

The Space Strategy admits there is currently limited awareness among public sector buyers about the potential uses and benefits of space-based technologies, especially for local providers such as NHS trusts and councils: “This could mean more routes to market similar to an upcoming Dynamic Purchasing System – which enables new suppliers to be included at any time, unlike traditional framework agreements – focusing on space-enabled technologies and geospatial services for use by the public sector.”⁴⁸

At the APPG for Entrepreneurship roundtable, a Member of Parliament explained that more clarity is needed for where entrepreneurs should turn to:

45 Call for Evidence submission.

46 Haley, C. et al. (2022) Procurement and Innovation.

47 Ibid.

48 Stoneman, R. (2021). The UK National Space Strategy will succeed by improving services on the ground.

“Nobody knows which bit of the government to go to. If you’re in the space industry and you want to talk about spectrum, you’re going to DCMS and Ofcom; if you want to talk about licencing agreements you’re going to the Civil Aviation Authority and transport; if you want to talk about the space business you’re going to BEIS; if you want to talk about imports and exports and FDI you’re going to DIT; if you want to talk about Government as a customer the chances are you’re going to the MoD or Defra.”⁴⁹

At the same roundtable, another space entrepreneur made the following observation, which reflects similar conversations we have had with the founders of high-growth firms:

“We have had a great experience with Scottish Enterprise across the board. A single entity that helped the business navigate multiple approaches to help the business from R&D grants to equity to locating a new operation in the country. I would suggest their model be emulated versus trying to coordinate across multiple groups as my experience was with England/Wales, yes it can be done, but not without excessive difficulty. Create a single Enterprise that does that navigation for the startup or early stage companies.”⁵⁰

Another entrepreneur added:

“Early in the business we tried to navigate England and Wales”... “there’s lots of organisations that are there to help you but there is not an entity that you can go to that overlaps all of those organisations. We had very good success integrating with Scottish Enterprise. They gave us a single entity that could integrate resources across Scotland – that covered R&D grants, that covered potential equity, that covered giving us assistance in looking how to locate operations inside Scotland.”

“That is missing from the England and Wales side”... “when you’re very early stage, it’s quite a challenge to navigate individual groups that sometimes have different objectives and different pros and cons of dealing with them. England and Wales should follow a Scottish Enterprise model that links all of that together, really focused on early-stage startup companies.”⁵¹

Another pointed to a lack of “a proper strategic cross-government mandate and appropriate senior championing for using and embedding satellite-enabled solutions across government, which in turn is holding back uptake and so dampening innovation.”⁵² While another explained the challenge of working across multiple departments: “Space presents a unique ability to cooperate with multiple industries and provide data enhancement. But we

“Nobody knows which bit of the government to go to.”

49 APPG for Entrepreneurship roundtable.

50 Ibid.

51 APPG for Entrepreneurship roundtable.

52 Ibid.

face huge challenges in just interfacing with the Met Office and interfacing with the Navy and the Airforce.”⁵³

Many of the problems with public procurement are matters of culture, mindset and process, rather than of law or regulation. Many public bodies are, despite their implicit guarantee against failure, much more risk-averse than private sector organisations. Yet risk is inherent to innovation.

As such, senior leadership must provide “top cover” for junior staff, in order to encourage experimentation. They should laud the successes, but also allow them to learn from the failures without blame. One solution to building expertise and a culture favourable to startups would be creating a central Space Systems & Services Acquisition & Procurement capability within a reformed UK Space Agency to serve cross-government requirements.”⁵⁴

We also need more experimentation in procurement funding and processes. Challenge Prizes, where innovation solutions to pre-identified problems are financially rewarded, and Advance Market Commitments (AMCs), where guaranteed markets are used to accelerate the development of vaccines for Covid-19, are two notable examples.

Challenge prizes work by offering a reward to the person who first (or best) meets a particular challenge or end-goal, while remaining agnostic about the approach. They were most recently used to rapidly increase the number of UK-made ventilators available to the NHS. AMCs are a legally-binding commitment to buy, or to subsidise, an as-yet unavailable good – and so give assurance to firms to invest in R&D or production capacity. They were vital in vaccine development, and are being used in the development of low-carbon technologies.

AMCs are applied when demand-side uncertainty is hindering the development of novel solutions, and have been critical in the development of US space capabilities. NASA’s commercial orbital transportation service program (COTS) sought private sector help to resupply the International Space Station. It contracted with companies to buy their services for a pre-agreed number of years after the retirement of the space shuttle, thereby providing a crucial market for startups.⁵⁵ According to entrepreneurs and experts we spoke with, companies like SpaceX and HawkEye 360 wouldn’t exist without the ability of the US government to procure in a way that is more responsive to what the market is offering.

There is evidence that government innovation could benefit from more bottom-up, decentralised approaches that reduce barriers to entry, minimise lock-in advantages for incumbents, and attract a wider range of new entrants. For example, the US Air Force Small Business Innovation Research (SBIR) program transitioned from ‘Conventional topics’, which

53 Ibid.

54 Elefteriu, G. (2019). What do we want from the next Prime Minister?

55 Haley, C. et al. (2022) Procurement and Innovation.

solicit specific technologies, to ‘Open topics’, which invite firms to suggest any new technology that may be useful to the Air Force.

The Open program attracted new entrants, defined as younger firms and those without previous defence SBIR awards and resulted in those winning an Open award increasing future venture capital investment, non-SBIR defence contracting, and patenting. In contrast, conventional awards had no effect on these outcomes but they did increase the chances of future defence SBIR contracts, fostering incumbency.⁵⁶

This anchor tenancy, or guaranteed government business, provides predictable revenue, validates operational concepts, and reduces future uncertainty.

“For example, NASA’s procurement as an anchor customer of Commercial Crew and Cargo Transportation services led to billions of dollars of additional private investment and helped grow the US market share and capabilities for commercial launch services, while saving the US government billions relative to traditional procurement. NOAA has also played an important role in supporting earth observation companies, Spire and GeoOptics, by incorporating their weather mapping capabilities into operational weather forecasting through multi-million-dollar indefinite delivery-indefinite quantity contracts and supporting the development of emerging solutions.”⁵⁷

A clear example of how the US leverages entrepreneurs to build industrial capacity for future market advantage is the Orbital Prime programme – launched in November 2021 to fund commercial technologies for in-orbit servicing and manufacturing (IOSM). The Orbital Prime programme is a Small Business Technology Transfer (STTR) program, which requires bidding teams to include small businesses, as well as academic or nonprofit institutions. Businesses have to be at least 51% US owned and operated, and the work has to be performed in the United States.⁵⁸

In May, SpaceWERX, the technology arm of the US Space Force, announced they had awarded US\$250,000 each to 125 industry teams to flesh out concepts and do early design work.⁵⁹ Later this year, those teams will have the opportunity to compete for second-phase awards of up to US\$1.5 million to continue development and prototyping – with the aim of one or two of the successful teams being selected in 2024 to conduct an in-space demonstration of their IOSM solutions.

The Space Strategy identified IOSM as a key strategic priority for the UK:

56 Howell, S. et al. (2021). Opening up Military Innovation: Causal Effects of ‘Bottom-up’ Reforms to U.S. Defense Research.

57 Bryce Tech. Innovative Public Procurement in Space – Phase 1 Summary Report.

58 Erwin, S. (2021). Space Force launches ‘Orbital Prime’ program to spur market for on-orbit services.

59 Erwin, S. (2022). Space Force selects 125 industry proposals for on-orbit servicing technologies.

“We will build on UK early advantage in robotics and in-orbit servicing and manufacturing (IOSM) to establish global leadership in space sustainability.”⁶⁰

In October 2021, UKSA awarded funding to two UK-based SMEs to carry out feasibility studies for a potential future IOSM debris removal mission.⁶¹ UKSA also awarded £1.7million to 13 projects in January 2022 for early stage development of a variety of IOSM related technologies.⁶²

The difference between the approach the US is taking to IOSM and the approach the UK is taking isn't only the size of the budgets. For US entrepreneurs, there's a clear route map through to a commercially viable technology at the end of the programme. For UK entrepreneurs, they have to come up with match-funding, costs are reimbursed in arrears, and there's no assurance that future budget will be forthcoming to fund any further phase of development. If the UK aspires to “global leadership”, it needs to leverage its “early advantages” through bolder approaches to stimulating entrepreneurial innovation with a clear route to commercial outcomes.

DASA does have an open call and iUK has Smart Grants, but they are extremely hard for SMEs to win and founders we spoke with have found the feedback too limited and so are left with little idea of how to strengthen their bids.

The UK has long seen itself as pivotal to international relations. Whether, until recently, in Europe through the EU, bridging the Atlantic through our American special relationship, or our historic ties to countries across the Commonwealth. Whatever the truth of our uniqueness, making Brexit a success will require a global outlook that doesn't cut us off from our largest trading partners and which see us form new partnerships around the world. As a former UK Science Minister stated: “the UK must safeguard its interests in space through deepening international collaborations and fostering its comparative advantage through enacting a wide-reaching and ambitious innovation drive.”⁶³

The Space Strategy recognises this, and trumpets the UK's international relationships and partnerships. Of course, ESA remains pivotal, but links with the USA/NASA, Australia, Japan, India and others will become increasingly important.⁶⁴

On the Strategy, the Royal United Services Institute (RUSI) concludes that it is good to see an assessment of what can be achieved independently and what will require collaboration with others, such as: our continued participation in ESA; the UK's Earth-observation capability, which is set

60 Department for Business, Energy & Industrial Strategy, Ministry of Defence, & UK Space Agency (2021). National space strategy.

61 GOV.UK, (2022), UK working with global partners to clear up dangerous space debris.

62 GOV.UK. (2022). New funding to support sustainable future of space.

63 Sheldon, J. (2021). Britain and the Geopolitics of Space Technology.

64 Lowe, R. (2021), First thoughts on UK National Space Strategy.

to benefit from the EU programme Copernicus; the UK-Australia ‘space bridge’, which will allow the two countries to cooperate; and bilateral partnership projects with NASA and JAXA, the Japanese space agency.⁶⁵

The UK-Australia ‘Space Bridge’ is indicative of the sorts of deals we will need to strike with our allies. The UK Space Agency, UK Department for International Trade, Australian Trade & Investment Commission, and the Australian Space Agency will cooperate to unlock improved access to trade, investment and academic research opportunities, better advice to businesses and innovative bilateral collaborations.⁶⁶ Critical to its success will be ensuring that startups and scaleups are aware of the opportunities this and other partnerships present them.

POLICY RECOMMENDATIONS

- England and Wales should create a one-stop-shop for space businesses, or, at a minimum, the Local Growth team at UKSA should work more closely with the Department for Levelling Up, Housing and Communities (DLUHC) to ensure Growth Hubs can effectively support space startups.
- A Dynamic Purchasing System is already open for Space-Enabled and Geospatial Services, but few founders are aware of it. To spread the word, the government should host regular webinars with heads of procurement and entrepreneurs to share the system. The feedback should feed into a thorough review of qualification criteria or other unnecessary hurdles holding back startups and scaleups.
- Revise eligibility criteria to distinguish between suppliers with a track record of poor performance and suppliers who simply have a limited track record due to being early stage start-ups.
- Experiment with Challenge Prizes, AMCs and SBIR/STRR-type open funding and improve feedback based on what entrepreneurs need.
- Make more use of advance purchasing agreements and other mechanisms to enable government to act as an anchor customer - which would allow start-ups to raise finance and give government the benefit of early access to innovative new products and services.
- Partnerships like the UK-Australia ‘Space Bridge’ should be sought with other countries, with opportunities and clear strategies for startups and scaleups from both countries central to each agreement.
- The UK-Australia ‘Space Bridge’ is indicative of the sorts of deals we will need to strike with our allies. The UK Space Agency, UK Department for International Trade, Australian Trade & Investment Commission, and the Australian Space Agency will cooperate to unlock improved access to trade, investment and academic research opportunities, better advice to

65 Suess, J. (2021), The First UK National Space Strategy.

66 Housley, C. & Rough E., (2021). The UK Space Industry.

businesses and innovative bilateral collaborations. Critical to its success will be ensuring that startups and scaleups are aware of the opportunities this and other partnerships present them.

CASE STUDY: PLASTRON UK LTD

Plastron UK is a leader in Spaceflight safety – developing fit-for-purpose capabilities to enhance and maintain safety standards across upstream space activities through skills development, launch operations ground facilities and supply chain transformation.

Charlie Young, co-founder & joint-MD of Plastron UK thinks there is insufficient funding for businesses to support themselves developing their market entry product. “The best and most reliable funding on offer has been SPRINT which only pays for the services of academics. The ESA Business Incubation Centre (BIC) fund, it should be noted, is not allowed to pay salaries. Thus, without investor support, a start-up has to be self-funded by definition. I’ve worked part-time whilst setting up Plastron over 2 years to bring our business portfolio to market and secure sales.”

Young thinks government procurement needs to do a lot more. “Regional governments need to be tied into a common model, which otherwise creates an unlevel playing field. The Government Digital Service and its supporting digital procurement framework is an indicator of what can be done to support all businesses equally and ensure that procurement due diligence is assured.”

“Talent in the UK is not being supported enough to become employment-ready,” says Young, who sits on the UK Space Agency Space Skills Advisory Panel. “Graduates have limited hands-on experience, no understanding of critical skills, such as problem solving or safe/best working practices and are still being taught PRINCE II as a project management method. Transitional support is fundamentally lacking, which means graduates may end up competing for good jobs in the industry based on their practical experience and hands-on competencies as well as their formal qualifications.”

“Talent in the UK is not being supported enough to become employment-ready.”

TALENT

‘Access to talent’ (66%) is the second most important factor that will allow scaleups to continue to grow.⁶⁷ Nearly a third of respondents cited “recruiting staff” as a key barrier to growth and a quarter reported a “shortage of skills generally”.⁶⁸ Education and training plays an important role, but so does immigration.

Immigrants are behind many of our most innovative companies. While just 14% of UK residents are born outside the country, 49% of the UK’s hundred fastest-growing startups and 11 of our 16 unicorns had at least one foreign-born co-founder.⁶⁹ More broadly, the net fiscal balance of overall immigration to the UK between 2001 and 2011 amounted to a positive net contribution of about £25 billion.⁷⁰

Hiring foreign talent is expensive. Companies must pay for a sponsor licence to employ non-UK nationals, and then there is then a visa application fee, an annual health surcharge, and in most cases an ongoing immigration skills charge. The cost of some visas has gone up by almost 500% over the past 10 years, and in some cases the Home Office makes the equivalent of 800% profit on some applications.⁷¹

In addition to application charges, there is a health surcharge at £400 a year, while companies pay a skills charge of £1,000 a year. A family of five coming to the UK for five years will pay £21,299. That is more than double what it would cost in Australia, around seven times as much as it would cost in France and around 30 times as much as it would cost in Canada.⁷²

In many of our conversations with founders, access to talent was raised as a critical challenge. Tristan Fletcher, co-founder & CEO of ChAI is just one of many founders who struggle with the system:

“The government could make it easier to hire high calibre talent regardless of their nationality or educational background. We may be small and early stage, but we have clients globally and want to employ people globally too. We have had to turn down candidates because we don’t have the resources to sponsor their visa applications. This means that we can’t compete with the larger, more established and consequently better resourced companies at an

“The cost of some visas has gone up by almost 500% over the past 10 years, and in some cases the Home Office makes the equivalent of 800% profit on some applications”

67 ScaleUp Institute (2021). Scaleups: Energising the Economy.

68 UK Space Agency (2020). Size & Health of the UK Space Industry 2020.

69 Dumitriu, S. & Stewart, A. (2019). Job Creators.

70 Dustmann, C. & Frattini, T. (2014). The Fiscal Effects of Immigration to the UK.

71 Owen, J. et al. (2019). Managing migration after Brexit.

72 Ibid.

international level.”⁷³

As Chetal Patel, a partner at the law firm Bates Wells says: “If an employee comes with dependents, charges can add up to £20,000 over five years”... “Some organisations with deeper pockets will cover it all”... “Small and medium-sized enterprises don’t necessarily have those deep pockets.”⁷⁴

Startups and scaleups struggle with the immigration system and some experience the application process as bureaucratic and unforgiving. There are significant delays: “Demand to use the new system is already straining the Home Office’s ability to process visa applications. Patel said lawyers were sitting with their fingers poised to hit send on emails when “coveted” slots for fast-track processing by the department were made available each day.”⁷⁵ Home Office delays mean waiting times are now between six to eight weeks for a Skilled Worker visa.

The High Potential Individual (HPI) visa was created to enable graduates from ‘top global universities’ to come to the UK without a job offer, giving them the freedom to work for startups or start a business themselves. Crucially, there is no job offer requirement, giving individuals the flexibility to work, switch jobs or employers. The route will also allow eligible individuals to extend their visa and settle in the UK, subject to meeting specific requirements.

While welcome, the HPI visa’s eligibility criteria does not reflect the modern world, as the scheme is closed to many of the world’s best graduates. This is because the definition of ‘top global university’ has been defined as a “university which appears on at least two of three internationally recognised rankings of universities”. These rankings are relatively weak predictors of graduate quality, omitting, for example, India’s prestigious Institutes of Technology, top STEM-schools such as Olin College of Engineering in the US, and top global business schools.

But being open to talent isn’t enough. As I’ve argued elsewhere, the Government should proactively chase talent:

“We should not just learn from these past successes, but try to surpass them. The new Office for Talent, for example, should do more than just attract researchers, but actively recruit them, especially in areas where the UK hopes to be at the forefront of technology, such as AI. It could help broker deals between universities and prominent international academics to set up their labs at UK universities. At the moment, international talent sees the visa system as a hurdle to overcome. This approach would flip the perception on its head.”⁷⁶

73 Call for Evidence submission.

74 Strauss, D. & Parker, G. (2021). Boris Johnson’s post-Brexit immigration reforms start to bite.

75 Ibid.

76 Howes, A. et al. (2021). Operation Paperclip 2.0 – The Way of the Future.

If successful, making space researchers and technical specialists a key target for this programme would support the sector. After all, the most famous example of this policy was Operation Paperclip, whereby the US actively recruited over 1,600 German engineers shortly after the Second World War. These recruits became many of the chief architects of the US space programme, including Wernher von Braun. While the tactics would be very different today, bringing in the best and brightest space scientists would be a fillip to the sector.

The National Space Strategy's 10 Point Plan includes a commitment to "upskill and inspire our future space workforce."⁷⁷ And UKSA's 2022-25 Corporate Plan includes this priority under the "Inspiration" heading:

"Improve access to the skilled people that the sector needs to diversify and grow sustainably, regularly surveying its needs, signposting and highlighting the accessibility of careers in the sector to professionals in other sectors, ensuring that professionals can find relevant training, and supporting internships, fellowships, scholarships and bursaries at all levels."⁷⁸

It's vital that the needs of space start-ups and fast-growing scale-ups are understood and addressed in the policies and programmes created to deliver against this priority. One size won't fit all!

POLICY RECOMMENDATIONS

- The Government should cut the cost of visas so we're able to compete for talent.
- To ensure it's a success, the Government should expand eligibility to all universities where average graduate earnings exceed the median university on the existing list. This equates to 100 universities across 13 countries.
- The Office for Talent should proactively seek space sector talent around the world, convincing them to move to the UK.
- UKSA should monitor and report on how well they are meeting the needs of start-ups and scale-ups as part of delivering against the "Inspiration" priority in their Corporate Plan.

⁷⁷ Department for Business, Energy & Industrial Strategy, Ministry of Defence, & UK Space Agency (2021). National space strategy.

⁷⁸ UK Space Strategy, (2022). UK Space Agency Corporate Plan.

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