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UK space strategy and UK satellite infrastructure: reviewing the licencing regime for launch

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Science, Innovation and Technology Committee

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Contacts

All correspondence should be addressed to the Clerk of the Science, Innovation and Technology Committee, House of Commons, London, SW1A 0AA. The telephone number for general inquiries is: 020 7219 2793; the Committee's e-mail address is: commonssitc@parliament.uk.

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Summary

The UK is on the cusp of establishing Europe's first small satellite orbital launch capability. As well as offering services to one of the world's fastest growing industries, a UK satellite launch sector can help strengthen Britain's position in the design and manufacture of small satellites, and in provision of data and analytical services, by having launch facilities close to the location of space and satellite companies.

However, Britain's first attempt at satellite launch—the Virgin Orbit horizontal launch from Spaceport Cornwall at Newquay on 9 January 2023 did not succeed. The LauncherOne rocket did not reach the required orbit and its payload of small satellites was lost.

Virgin Orbit and some of its satellite customers were highly critical of the UK regulatory process which preceded the launch attempt. This process was led by the Civil Aviation Authority (CAA), who were accused by Virgin Orbit of operating a process that was slow, excessively bureaucratic, and risk averse. The CAA robustly defended the conduct of the licencing process, pointing out that the UK's first launch involved necessary complexity—overflying residential populations and different countries' airspace, for example. The CAA also observed that it had an overriding duty to maintain public safety and that the launch, whilst not successful, failed for reasons unrelated to the licencing process and failed safely, rather than dangerously.

Following consideration of written and oral evidence we conclude that there was no evidence that the regulatory system contributed to the failure of the Virgin Orbit launch. If the first experience of licencing was slow, witnesses said that the CAA since had made progress in its application of the regulations contained in the Space Industry Act 2018 and, in particular, in its communication with applicants.

However, witnesses told us that insufficient coordination between the large number of regulatory bodies involved in licensing launches continues to place more burdens of complexity and administration than is needed on companies—many of them small—in the launch sector. We recommend that the Government should convene all relevant bodies without delay to take steps now to improve the licensing system of UK satellite launch. These include:

- improving the regulatory interfaces between the multiple regulatory bodies—including but not limited to, the CAA, the Health & Safety Executive and the Environment Agency—so that more information relating to applicants can be shared;
- conducting regulatory processes in parallel rather than sequentially wherever possible; and
- establishing framework agreements with neighbouring states over the use of airspace.

Following the first launch attempt and the experience of dealing with other applicants, it is opportune to examine whether the regulations contained in the Space Industry Act 2018—which was passed by Parliament in anticipation of launch—need amendment in the light of experience in practice.

Given the fast-moving and internationally competitive character of the space and satellite industry, these matters must be carried out urgently, and conclude by the end of this year, to avoid the UK losing its head start in launch.

During our Inquiry the Government responded to our Report of 4 November 2022 on "UK space strategy and UK satellite infrastructure". We are pleased that some recommendations have been, or are being, implemented—such as adopting a variable liability approach to licensing. However, we are not satisfied with the Government's response on the need for more effective co-ordination across government of space and satellite policy, implementation, and leadership. The National Space Council, an inter-ministerial group that was promised in the Government's response to our report on 30 March 2023 is yet to meet for the first time, and its responsibilities are unclear. The establishment of the Space Sector Industry Forum provides an opportunity for the Government to take advice from the sector and we recommend that a leader should be appointed without delay to ensure its success.

We also note with dismay and alarm that the vital UK Position, Navigation and Timing (PNT) strategy—which we identified as vital in our Report of 4 November 2022—has not been published. This is despite our Committee being told by the Minister with responsibility for Space on 17 May 2023 that it was expected in weeks. The strategy is shrouded in mystery since we were told as long ago as June 2021 that it was ready in draft form. It is symptomatic of a disjointed approach to concrete policy and leadership for the UK's space and satellite sector which now risks hampering its potential. We call on the Government to publish the strategy without further delay.

Time is running out in this Parliament for the Government to translate high-level ambitions into practical plans. There is now not a moment to lose if the UK is to realise the full potential of this extraordinary sector, which is booming worldwide, and in which we have a world class capability and reputation.

1 Introduction

Our work on UK space launch

1. Our Committee has previously carried out an in-depth inquiry into "UK space strategy and UK satellite infrastructure", publishing our conclusions on 4 November 2022.[1] That work looked at issues, including the development of UK launch capabilities and the progress being made on the new spaceflight regulations. This Report should be considered as a follow-up to that previous work, in particular in relation to Chapter 3, *Development of UK launch*.[2]

First Report and Government response

2. In our previous Report we made various recommendations on improvements that should be made to help ensure the success of the UK launch sector, focused mainly around improving the approach to regulation, including that:

- the Government should develop proposals for the variable liability approach;
- the Department for Transport should ensure that the Civil Aviation Authority, who undertake regulatory functions for the UK's spaceflight industry, is appropriately resourced; and
- the licencing process should be streamlined so that the Civil Aviation Authority can provide licences at a rate that ensures the UK's spaceflight industry can be competitive.[3]

3. We were pleased that, then Government Chief Scientific Adviser, Sir Patrick Vallance's "Pro-innovation Regulation of Technologies Review" endorsed our recommendation on implementing a variable liability approach to licencing.[4] The Government response to our Report, published on 30 March 2023, confirmed that the Government is developing proposals for a variable liability approach and would open a consultation on this in the near future.[5]

Scope and aims of this Report

4. Our interest in the UK's launch sector has continued after the first launch attempt took place from Spaceport Cornwall in January 2023. In the run up to the launch and in the aftermath, it was clear that there were lessons to be learned about the UK's approach to the launch industry, especially around the spaceflight regulations which were being applied for the first time. We sought views on the sector's experience of the regulators and other important factors, such as support from Government.

1 Science and Technology Committee, Second Report of Session 2022–23, *UK space strategy and UK satellite infrastructure*, HC 100
2 Ibid, p 29-47
3 Science and Technology Committee, Second Report of Session 2022–23, *UK space strategy and UK satellite infrastructure*, HC 100, para 70-88
4 HM Government, Pro-innovation Regulation of Technologies Review Digital Technologies, March 2023, p 13
5 Science and Technology Committee, Second Special Report of Session 2022–23, *UK space strategy and UK satellite infrastructure: Government Response to the Committee's Second Report*, HC 1258, p 7

5. We took oral evidence across two sessions from launch vehicle providers, satellite manufacturers, spaceports, the Civil Aviation Authority, and the Department for Science, Innovation and Technology. In response to these sessions, we also received further written evidence which we have considered and published.[6] Using this evidence, we have decided to set out new conclusions and recommendations that we hope will contribute to the success of the UK's launch sector.

6 See: Black Arrow Technologies Ltd (SPA0105); UK Civil Aviation Authority (SPA0106); Newton Launch Systems (SPA0107); UKspace (SPA0108)

2 Regulating the UK launch industry

Run up to the UK's first launch

6. The timeline for the first UK launch received much interest throughout our original inquiry. It was initially predicted, by the Government,[7] Spaceport Cornwall, and Virgin Orbit that the first attempt at an orbital launch from UK soil would take place in the summer of 2022.

7. In October 2022, after the expected timeline of the summer had passed, Virgin Orbit announced that preparations were underway for its first launch from UK soil.[8] Around the same time, the UK Government announced in a press release that everything was on track for a November launch from Spaceport Cornwall.[9] Despite these announcements, neither Virgin Orbit nor Spaceport Cornwall had received the licences that were required to allow the launch to go ahead.

8. On 9 December 2022, after the November launch date had been missed, Virgin Orbit posted an update on the mission:

> With licenses still outstanding for the launch itself and for the satellites within the payload, additional technical work needed to establish system health and readiness, and a very limited available launch window of only two days, we have determined that it is prudent to retarget launch for the coming weeks to allow ourselves and our stakeholders time to pave the way for full mission success.
>
> All stakeholders continue to drive in a coordinated effort towards a historic milestone, which will soon establish the UK as the first nation with the capability to launch to orbit from western Europe.[10]

9. The Civil Aviation Authority (CAA) responded to this update, arguing that it was not the licencing process that was holding up the launch:

> The UK space regulation process is not a barrier to a UK space launch. Virgin Orbit has said in its statement this morning that there are some technical issues that will need to be resolved before launch. These in no way relate to the timing of when a licence will be issued by the Civil Aviation Authority.
>
> Effective licensing forms an integral part of UK space activity. Spaceport Cornwall's licence already permits Virgin Orbit to undertake its testing programme prior to launch. Our dedicated team has been working closely with all partners to assess applications and issue the remaining licences within the timelines we set at the outset.

7 HM Treasury, Budget and Spending Review – October 2021: What you need to know, 27 October 2021; Q268
8 Virgin Orbit, Virgin Orbit rocket ready for Cornwall flight, 5 October 2022
9 UK Space Agency, Start Me Up: Countdown to first UK satellite launch, 11 October 2022
10 Virgin Orbit, 'Start Me Up' Mission Update, 9 December 2022

> We continue to work with Virgin Orbit, and other stakeholders, to play our part in delivering a safe UK launch.[11]

10. Spaceport Cornwall eventually received its licence on 16 November 2022,[12] and Virgin Orbit received its licence on 21 December 2022.[13] In its announcement, the CAA said that it had granted the licences within 15 months, which was "well within the expected timescales for these types of licences, putting the UK's regulatory framework on a competitive footing with other international space regulators".[14]

The first UK launch attempt

11. The first launch attempt by Virgin Orbit took place from Cornwall on Monday 9 January 2023.[15] Virgin Orbit used its small-satellite launch system, where a modified Boeing 747 (Cosmic Girl) carried a rocket (LauncherOne) containing the satellites to be launched. Although the LauncherOne rocket deployment went to plan and the Cosmic Girl plane returned safely to Spaceport Cornwall, the rocket did not reach the required orbit and the satellites were lost as a result.[16]

Reviewing the UK's launch sector prospects and licencing regime

12. In our evidence session with those involved with the Cornwall launch, representatives from Space Forge Ltd, a satellite manufacturing company who lost a satellite in the launch attempt, and Virgin Orbit, told us that they were concerned that the requirements of the UK's licence process were too stringent and that the Civil Aviation Authority (CAA) was not processing licence applications at a quick enough pace.[17]

13. Josh Western, CEO of Space Forge Ltd, said that although Space Forge's interactions with the CAA's engineering teams were generally positive, there were "gaps" between these engagements that he thought had delayed the licencing process.[18] He pointed out that engagement with regulators in other countries, such as Portugal had been more frequent.[19] Mr Western also said that there were administrative issues that made the licencing process challenging, with queries having to be answered by email rather than through an online portal, adding that this had ultimately led to the licencing of the satellite costing more than its launch.[20] He told us that his company would be using Space-X in the US to launch its next satellite as it could not afford to wait for next launch from Cornwall, especially as there was uncertainty as to when this would take place.[21]

11 Civil Aviation Authority, Civil Aviation Authority response to Virgin Orbit's status update: Start Me Up Mission, 8 December 2022
12 HM Government, Spaceport Cornwall receives first-ever UK spaceport licence, 16 November 2022
13 Civil Aviation Authority, UK Space regulator issues Virgin Orbit licences ahead of UK launch, 21 December 2022
14 Civil Aviation Authority, UK Space regulator issues Virgin Orbit licences ahead of UK launch, 21 December 2022
15 BBC News, Cornwall space launch: Virgin Orbit targets Monday for UK mission, 6 January
16 UK Space Agency, First launch from the UK, 5 October 2022
17 Qq530–542; Q564
18 Q530
19 Qq532–533
20 Q533
21 Q529

14. Patrick McCall, non-executive Director of Space Forge Ltd, believed that the current approach to licencing was too risk averse and would prevent the UK's launch sector from being competitive. He thought that investors were unlikely to want Space Forge to pursue another launch from Cornwall as the risk of delay was too great.[22]

15. Dan Hart, CEO of Virgin Orbit, echoed some of Mr McCall's comments on regulation. He said that whilst he had expected to be able to use documentation and analysis that had previously been used by the United States Federal Aviation Authority (FAA), he had to reformulate this in a specific way to meet the CAA requirements.[23]

16. In our second evidence session—with witnesses involved in the development of vertical launch sites in Scotland—representatives from SaxaVord Spaceport told us that their experience of the CAA's licencing approach had been more positive. Dave Ballance, Launch Operations Manager at SaxaVord Spaceport, said that the licencing had got off to slow start, explaining that the CAA were assessing their application in a particular order:

> […] to get from the initial screening through to the assessment phase the process is set up so that everything has to go at the same time. For example, we had to revisit one particular area several times. All the other stuff that was ready, from our perspective, was not being assessed. Whether it could have been assessed at that time, I do not know.[24]

Despite this slow start Mr Ballance and Frank Strang, CEO of SaxaVord Spaceport, said that they now had a "very good relationship with the space regulation team",[25] and that they had "no issues at the moment" with the way their licence application was progressing.[26]

17. Dr Jonas Bjarnø, Chief Technical Officer of Orbex, a company developing a low-carbon orbital micro-launch system, also described a similar experience of the CAA, with a "somewhat slow and sluggish start" that had now progressed into a "solid working relationship and good, competent technical engagement".[27] Dr Mario Kobald, CEO of HyImpulse Technologies, a German start-up that is developing a small launcher system for small satellites, also reported an overall positive experience of the regulator, but noted that it is clear that the space regulations are still new to the CAA, and that processes were sometimes slow. Dr Kobald also said that the CAA were approaching safety margins more conservatively than other regulators, such as the FAA do.[28]

18. Although they praised the CAA's approach, witnesses from SaxaVord Spaceport suggested that the regulations themselves could be improved,[29] noting that they were not designed with multi-use launch facilities in mind, such as the facility under construction at SaxaVord.[30]

22 Q535-536
23 Q562
24 Q651
25 Q629
26 Q638; Q651
27 Qq658–659
28 Q661
29 Qq635–636
30 Q640

19. During our evidence sessions, the CAA said that it had applied the regulations appropriately, and that safety was always its key priority throughout the process.[31] Tim Johnson, Policy Director at the CAA, explained that in response to requirements of the space sector, the CAA had increased the size of the team working on spaceflight regulations and that it was continuing to increase its level of engagement with applicants throughout the licencing process.[32] The CAA also highlighted that it was a "learning organisation" and that it was doing what it could to improve the licencing process and the experience of applicants.[33]

20. In his evidence, George Freeman MP, Minister for Science, Research and Innovation, told us that the new Department for Science, Innovation and Technology (DSIT) would be conducting a regulatory review:

> […] I am keen to make sure with officials that we learn those lessons as well about how we can make this a more streamlined process, without in any way undermining what the public and all of us would absolutely rightly expect to be line 1, which is public safety and environmental sustainability.[34]

Rebecca Evernden, Director of the Space Directorate in the Department for Science, Innovation and Technology, explained that this review would look at three aspects:

- Lessons learnt from the first launch—Ms Evernden highlighted that this would feed into ongoing work within CAA and Department for Transport (DfT), who were reviewing the Space Industry Act and related secondary legislation.
- The variable liability limit approach—the UK Space Agency is due to publish a consultation on how to implement a variable orbital liability limit approach, after accepting the recommendations made by this Committee in our previous report.
- Sustainability—the Department is in the process of developing a "sustainability mark"; a volunteer standard that would aim to drive sustainable behaviours for launch and orbital activities.[35]

Ms Evernden said that the Department hoped to make "some progress by the autumn across all three bases".[36] When we asked if progress on the regulatory aspects was possible before the autumn, Minister Freeman said "if we can come back to you with the proposals on the regulatory lessons learnt, we will do so before the summer".[37]

21. **The evidence that we have taken indicated that the Civil Aviation Authority (CAA) got off to a slow start with implementing the spaceflight regulations. Some people in the launch sector reported that their engagement with the CAA was more cumbersome than they would have wished. However, it is clear that during the past year, the CAA has taken steps to expand its team dedicated to space launch and to improve its engagement with licence applicants. We are pleased to hear that the regulatory experiences of the**

31 Q588
32 Q590
33 Q588; Q596; Q670
34 Q684
35 Q686
36 Q686
37 Q688

UK launch sector are moving in a positive direction, and we encourage the CAA to continue this trajectory. However, more can be done to streamline the regulatory process to help ensure that the UK launch sector can reach its full potential. ***As the spaceflight regulations were put in place before any implementation could take place, there is now a need for the regulations and their implementation to date to be reviewed. We are encouraged to hear that the Government does intend to conduct this review, but recommend that it does so at pace, publishing the outcomes of the review and the planned improvements to the regulatory process by September 2023. Focus should be placed on streamlining the process and improving the experience for both licence applicants and the CAA, whilst maintaining the best safety standards.***

Licencing timelines

22. Throughout our work on the spaceflight regulations, we have sought to understand whether the CAA's licencing timelines are appropriate and have previously recommended that these timelines be reviewed.[38] During our follow-up work, Frank Strang, CEO of SaxaVord Spaceport told us, on 17 May 2023, that he would like the spaceport to receive its licence within three months.[39] He said that this was essential as there was lots of young space companies who want to come to the UK for launch, but they need certainty that their activities will be licenced in a timely manner.[40] In response to this, Colin Macleod, Head of Space Regulation at the Civil Aviation Authority (CAA) said that he "do not foresee a particular problem as we sit here today in being able to license that in the summer, assuming all the tests can be met".[41] He also pointed that to date, the CAA had not delayed any launch activity and that all licences had been provided ahead of all activities reaching "technical readiness".[42]

23. **It is clear from the evidence that we have taken that more certainty around licencing timelines could bring benefits to the UK launch sector, through providing a signal that the UK is ready and open for business.** ***Throughout the licencing process the Civil Aviation Authority should seek to keep licence applicants informed about the progress of their application and likely timelines for receiving their licences. Where possible, it would be optimal for the CAA and the applicant to agree a timetable for licencing.***

Improving the regulatory interfaces

24. Dan Hart, CEO of Virgin Orbit, told us that one of the key issues during the licencing process was the large number of organisations Virgin Orbit had to work with to achieve launch:

> […] many organisations had an interest or a statutory requirement to have an interest in the launch, including maritime, environmental, health and safety, nuclear and lots of other organisations. We found that we needed to rehash information many times, and sometimes the asks would change

38 Science and Technology Committee, Second Report of Session 2022–23, *UK space strategy and UK satellite infrastructure*, HC 100, para 87
39 Q630
40 Qq629–632
41 Q669
42 Q679

> in terms of the level of depth or the kinds of information we needed. There was not what I would call a central clearing house, where you put your information in and then the system is satisfied.[43]

25. Representatives from SaxaVord Spaceport agreed with this, explaining that as well as the licences required under the Space Industry Act, other licences were needed, such as marine licences.[44] They described the process as "quite complicated, with the number of bodies that have to be engaged with".[45] Dr Bjarnø from Orbex said that having a single point of contact for all the licences required would be sensible.[46]

26. Sir Stephen Hillier MBE, the Chair of the CAA, agreed that establishing some sort of "central gateway" to coordinate work between launch operators, satellite operators, the CAA, and the numerous other authorities would be helpful.[47] Rob Bishton, interim Joint Chief Executive of the CAA, also said that there was an opportunity for everyone involved with licencing to "make sure that [the] co-ordination role, whether it is with the CAA or not, is clarified for the sake of applicants and ultimately speed of decision making".[48] On the other hand, Colin Macleod, Head of Space Regulation at the CAA, said it was too early to makes changes to the regulatory approach:

> I would simply hesitate to make too many changes until we have tested them again in a couple more areas, because, as I said earlier, we have improved things significantly on our engagement with the marine organisations, health and safety, and other bodies. Whether or not that would be an immediate help or a hindrance or something else we would have to learn to do again for the next launch, I am not sure.[49]

When we asked Minister Freeman if the CAA or the Government (through DfT or DSIT) should be taking steps to improve the regulatory interfaces, he said that he saw this as a "cross Government responsibility," which he viewed as an important part of delivering "smarter, more agile regulation in the global race".[50]

43 Q562; Mr Hart followed up writing to provide a list of these organisations. UK organisations: Civil Aviation Authority, UK Space Agency, Department for Transport, Health and Safety Executive, Maritime & Coastguard Agency, Marine Management Organization, UK Hydrographic Office, His Majesty's Coast Guard, Maritime Rescue Coordination Centre, Ministry of Defence, National Air Traffic Services, Cornwall Police Department, Airport Fire Department, MI-5. Non-UK organisations: Eurocontrol, ACC Shannon – Ireland's aviation authority, ENAIRE – Spain's aviation authority, NAV Portugal, Irish Coast Guard, Irish Aviation Authority, US Federal Aviation Authority

44 Q649

45 Q649

46 Q662

47 Q610

48 Q670

49 Q683

50 Qq694–696

27. **Following the initial launch attempt, it is clear that there are streamlining improvements that should be made to ensure that the regulatory processes leading up to launch are best aligned.** ***The Government should convene all of the regulatory bodies involved with licencing and ensure that:***

- ***There is consistency in the information required of applicants by regulatory bodies in the licencing process. A central portal should be used, rather than the applicant having to repeat the same information, in different formats, to multiple organisations.***
- ***Wherever possible, regulatory processes should be conducted in parallel rather than sequentially to minimise the time taken to issue a licence.***
- ***The Department with responsibility for Space (the Department for Science, Innovation and Technology) should establish a lead body to convene the different regulatory organisations to ensure communication is effective and clear and to reduce the need for applicants to address different bodies in different ways.***

Airspace

28. Sir Stephen Hillier, Chair of the CAA, highlighted challenges with regulating launch from the UK, where various countries' airspace is involved compared with, for example, launching in the Mojave desert.[51] Dan Hart, CEO of Virgin Orbit, explained that for the launch from Spaceport Cornwall, Virgin Orbit had to coordinate with Ireland, France, Spain and Portugal for use of their airspace, which was challenging.[52] Mr Hart also said that compared to his experience of launching in the United States, the amount of airspace determined to be within the "hazard area" for the launch from Cornwall was much greater.[53]

29. When we asked the CAA what it was doing to improve this complex coordination process, representatives told us that it was working with its counterparts in other countries to create an ongoing agreement on how launches, and the use of airspace, would be managed.[54] The CAA also explained that DfT had an important role to play in leading government-to-government conversations with other states, to ensure that there is "political comfort to undertake these activities in partners' airspaces".[55]

30. **Due to the complex nature of conducting launches from the UK, where many countries' airspace is involved, it is not surprising to hear that this has been a challenge for both launch companies and the Civil Aviation Authority.** ***The Department for Transport and the Civil Aviation Authority should continue their work to create ongoing agreements with the necessary nations on the use of the airspace to ensure that this process proceeds more smoothly in the future.***

51 Q592
52 Q535
53 Q577
54 Qq675–676
55 Qq675–676

3 Supporting the UK launch industry

Financial support

31. Whilst significant public investment has been provided to establish Spaceport Cornwall and Sutherland Spaceport (approximately £19.85 million and £14.6 million, respectively),[56] SaxaVord Spaceport has been built using only private funding so far.[57] Frank Strang, CEO of SaxaVord spaceport, described this a "sore point" but said that SaxaVord had used a "siege mentality" to build the spaceport. SaxaVord Spaceport is now closest to achieving the first vertical orbital launch from the UK.

32. During our main inquiry into UK space strategy and UK satellite infrastructure, we heard evidence that argued that Government support was vital for the success of a spaceport. Nik Smith, Regional Director for UK and Europe at Lockheed Martin Space told us:

> I am not aware […] of any spaceport anywhere in the world that does not have some level of direct or indirect ongoing Government support, either as a role as an anchor customer or maybe even more directly by providing things like range services or support to the spaceport itself, because, coming to the point about these being infrastructure, there is a recognition that it is important to support these systems for the long term so that they can be globally competitive. The reality is that we will be competing with spaceports that have quite substantial direct Government support.[58]

33. **We are pleased to see the progress being made at spaceports across the country and with the pace at which SaxaVord Spaceport, which has been almost entirely privately funded, is developing. SaxaVord Spaceport is now likely to be the first spaceport ready for vertical orbital launch activities. International experience shows that spaceports usually require ongoing support from government. *The Government should address how it intends to support the UK launch sector during the years ahead. It should set out, in response to this Report, whether it will provide ongoing financial support and in what form that support will take.***

Cross-Government coordination

34. In our report on "UK space strategy and UK satellite infrastructure", we identified issues around cross-Government coordination on space.[59] We were especially concerned about the abolition of the National Space Council and asked for clarity on what governance structure would be put in place to ensure the Government could meet its ambitions for the

56 BBC News, Spaceport Cornwall: From pasty memes to rocket launch, 9 January 2023; Orbex, Construction Begins at Sutherland, the UK Mainland's First Vertical Launch Spaceport, 5 May 2023

57 Qq621–622; Frank Strang, in oral evidence, explained that SaxaVord had received a small grant (£378,000) from the UK Space Agency to build a launch rail, Press and Journal, Shetland's SaxaVord boosted by £378,000 in space agency funding, 14 December 2022

58 Q56

59 Science and Technology Committee, Second Report of Session 2022–23, *UK space strategy and UK satellite infrastructure*, HC 100, para 168–172

space and satellite sector. Witnesses in our follow-up sessions described this as an issue within the sector. Frank Strang, CEO of SaxaVord Spaceport, told us that the UK needed a "Space Tsar":

> I would appoint someone we might call a space tsar. I do not mean someone with the usual DNA, from the same gene pool, but someone who understands new space, old space, defence and the internationalism of it, and the way the regulations work, to pull it together.[60]

35. In comparison to the UK, other leading space nations have a clearer governance structure for space. For example, the Administrator of the National Aeronautics and Space Administration (NASA) in the United States, and the Director General of the European Space Agency (ESA) in Europe (a non-EU body of which the UK is a member) have clear leadership responsibility for large programmes, which allows them to make strategic decisions and increase the profile of their agencies. Bill Nelson, the Administrator (in effect, the CEO) of NASA reports directly to the President of the United States. In contrast, policies and decisions around the UK space and satellite sector are influenced by multiple organisations, including the UK Space Agency, UKspace, the Department for Science, Innovation and Technology, the Department for Transport, the Ministry of Defence, and UK Research and Innovation. By comparison with other countries, there is a lack of clarity around who drives the UK space programme. Many from the industry had hoped that the establishment of the National Space Council would go somewhere to solving this issue,[61] which is why we requested clarity on what governance structures the Government would put in place after its abolition.

36. In the Government's response to our first Report on "UK space strategy and UK satellite infrastructure", it said that the National Space Council had been re-established as an "Inter-Ministerial Group", chaired by the DSIT Secretary of State, but provided no clarity on the group's membership and how often it would meet.[62] When we asked Minister Freeman about the group, he told us that it had not yet met, but said that he thought it should be "constituted as a leadership forum for the nascent and emerging space sector".[63] The Committee's view is that while the space and satellite sector has many exciting further opportunities, it is already much more than "nascent and emerging". This is important because the right leadership structures and policies are required now, not only in the future.

37. At our request, the Minister followed up in writing with further details on the establishment of National Space Council:

> I am pleased to inform you that, following our discussion on 17 May, we have since formally established the National Space Council as an Inter-Ministerial Group, which we expect to meet in the coming months. The National Space Council will play a vital role in progressing our ambitious space agenda across all of Government. It is tasked with considering issues relating to prosperity, diplomacy and national security in, through and from Space, as part of coordinating overall Government delivery of the 2021

60 Q647
61 Q26; Q36; Q37
62 Science and Technology Committee, Second Special Report of Session 2022–23, UK space strategy and UK satellite infrastructure: Government Response to the Committee's Second Report, HC 1258, para 36
63 Q707

> National Space Strategy. The Council will be chaired by the Secretary of State for Science, Innovation and Technology, with Secretaries of State from across Government invited to ensure a single national voice on the UK's space interests. The membership and Terms of Reference for this group will be published on gov.uk in the coming weeks. I look forward to updating you further on our progress in future sessions.[64]

38. Minister Freeman also wrote that he would be establishing a "Space Sector Industry Forum", which would replace the Space Leadership Council,[65] and provide "a regular and enduring opportunity for industry leaders to meet with Ministers to help inform the Government's long-term strategy for space".[66]

39. **Whilst we welcome the progress being made on the creation of the National Space Council, we are disappointed that it was only after our questioning on the topic that the Government confirmed that the group would be established. The UK space and satellite sector is much more than a "nascent and emerging" sector (in the words of the Minister) and it urgently needs clear and strong organisation in Government to match its current importance as well as its future strengths.**

40. **The establishment of the Space Sector Industry Forum provides an opportunity for the Government to take advice from space and satellite sector experts. *The Government should appoint a leader from the sector to ensure the success of this Forum by the end of 2023, in the same manner as when Simon Bowen was appointed to lead the establishment of Great British Nuclear.***

41. Although it was not the focus of this work, we have been closely following the status of the UK's Position, Navigation and Timing (PNT) strategy, which we identified as vital in our previous Report.[67] As this important strategy remains unpublished, we took the opportunity to ask the Minister about the Government's progress on this in our follow-up evidence session. Minster Freeman confirmed that progress on the strategy had been made, and that he expected this work to be signed off by Minister within weeks.[68] He later wrote to us to tell us that this predicted timeline was unlikely to be met and that the outcome of the Department's work on PNT would most likely be published "by the autumn".[69]

42. **The Government continues to delay key decisions that need to be made about the UK's critical Position, Navigation and Timing (PNT) capabilities. It has long promised to update its PNT strategy but work on this topic has been passed between departments and teams and is yet to amount to any meaningful plan. This demonstrates how the disjointed approach to leadership of the UK's space and satellite sector is hampering**

64 Correspondence from Minister for the Department for Science, Innovation and Technology in relation to Position, Navigation and Timing, the Space Council and the Space Sector Industry Forum, dated 30 May 2023
65 Gov.uk, Space Leadership Council, accessed 15 June 2023
66 Correspondence from Minister for the Department for Science, Innovation and Technology in relation to Position, Navigation and Timing, the Space Council and the Space Sector Industry Forum, dated 30 May 2023
67 Science and Technology Committee, Second Report of Session 2022–23, *UK space strategy and UK satellite infrastructure*, HC 100, para 43
68 Qq699–700
69 Correspondence from Minister for the Department for Science, Innovation and Technology in relation to Position, Navigation and Timing, the Space Council and the Space Sector Industry Forum, dated 30 May 2023

progress on important matters. ***The Government should not delay the publication of its Position, Navigation and Timing Strategy any further. The strategy should be published alongside its response to this Report.***

Conclusions and recommendations

Regulating the UK launch industry

1. The evidence that we have taken indicated that the Civil Aviation Authority (CAA) got off to a slow start with implementing the spaceflight regulations. Some people in the launch sector reported that their engagement with the CAA was more cumbersome than they would have wished. However, it is clear that during the past year, the CAA has taken steps to expand its team dedicated to space launch and to improve its engagement with licence applicants. We are pleased to hear that the regulatory experiences of the UK launch sector are moving in a positive direction, and we encourage the CAA to continue this trajectory. However, more can be done to streamline the regulatory process to help ensure that the UK launch sector can reach its full potential. *As the spaceflight regulations were put in place before any implementation could take place, there is now a need for the regulations and their implementation to date to be reviewed. We are encouraged to hear that the Government does intend to conduct this review, but recommend that it does so at pace, publishing the outcomes of the review and the planned improvements to the regulatory process by September 2023. Focus should be placed on streamlining the process and improving the experience for both licence applicants and the CAA, whilst maintaining the best safety standards.* (Paragraph 21)

2. It is clear from the evidence that we have taken that more certainty around licencing timelines could bring benefits to the UK launch sector, through providing a signal that the UK is ready and open for business. *Throughout the licencing process the Civil Aviation Authority should seek to keep licence applicants informed about the progress of their application and likely timelines for receiving their licences. Where possible, it would be optimal for the CAA and the applicant to agree a timetable for licencing.* (Paragraph 23)

3. Following the initial launch attempt, it is clear that there are streamlining improvements that should be made to ensure that the regulatory processes leading up to launch are best aligned. *The Government should convene all of the regulatory bodies involved with licencing and ensure that:*

    - *There is consistency in the information required of applicants by regulatory bodies in the licencing process. A central portal should be used, rather than the applicant having to repeat the same information, in different formats, to multiple organisations.*

    - *Wherever possible, regulatory processes should be conducted in parallel rather than sequentially to minimise the time taken to issue a licence.*

    - *The Department with responsibility for Space (the Department for Science, Innovation and Technology) should establish a lead body to convene the different regulatory organisations to ensure communication is effective and clear and to reduce the need for applicants to address different bodies in different ways.* (Paragraph 27)

4. Due to the complex nature of conducting launches from the UK, where many countries' airspace is involved, it is not surprising to hear that this has been a challenge for both launch companies and the Civil Aviation Authority. *The Department for Transport and the Civil Aviation Authority should continue their work to create ongoing agreements with the necessary nations on the use of the airspace to ensure that this process proceeds more smoothly in the future.* (Paragraph 30)

Supporting the UK launch industry

5. We are pleased to see the progress being made at spaceports across the country and with the pace at which SaxaVord Spaceport, which has been almost entirely privately funded, is developing. SaxaVord Spaceport is now likely to be the first spaceport ready for vertical orbital launch activities. International experience shows that spaceports usually require ongoing support from government. *The Government should address how it intends to support the UK launch sector during the years ahead. It should set out, in response to this Report, whether it will provide ongoing financial support and in what form that support will take.* (Paragraph 33)

6. Whilst we welcome the progress being made on the creation of the National Space Council, we are disappointed that it was only after our questioning on the topic that the Government confirmed that the group would be established. The UK space and satellite sector is much more than a "nascent and emerging" sector (in the words of the Minister) and it urgently needs clear and strong organisation in Government to match its current importance as well as its future strengths. (Paragraph 39)

7. The establishment of the Space Sector Industry Forum provides an opportunity for the Government to take advice from space and satellite sector experts. *The Government should appoint a leader from the sector to ensure the success of this Forum by the end of 2023, in the same manner as when Simon Bowen was appointed to lead the establishment of Great British Nuclear.* (Paragraph 40)

8. The Government continues to delay key decisions that need to be made about the UK's critical Position, Navigation and Timing (PNT) capabilities. It has long promised to update its PNT strategy but work on this topic has been passed between departments and teams and is yet to amount to any meaningful plan. This demonstrates how the disjointed approach to leadership of the UK's space and satellite sector is hampering progress on important matters. *The Government should not delay the publication of its Position, Navigation and Timing Strategy any further. The strategy should be published alongside its response to this Report.* (Paragraph 42)

Formal minutes

Wednesday 5 July 2023

Greg Clark, in the Chair

Aaron Bell

Dawn Butler

Rebecca Long-Bailey

Stephen Metcalfe

Carol Monaghan

Graham Stringer

Draft Report (*UK space strategy and UK satellite infrastructure: reviewing the licencing regime for launch*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 42 read and agreed to.

Summary agreed to.

Resolved, That the Report be the Seventh Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

Adjournment

Adjourned till Wednesday 12 July 2023 at 9.20am.

Witnesses

The following witnesses gave evidence. Transcripts can be viewed on the inquiry publications page of the Committee's website.

Wednesday 03 November 2021

Professor Washington Yotto Ochieng, Chair in Positioning and Navigation Systems, Imperial College London; **Lucy Edge**, Chief Operating Officer, Satellite Applications Catapult — Q1–29

Professor Anu Ojha, Director, National Space Academy; **Professor David Southwood**, Senior Research Investigator, Imperial College London — Q30–47

Wednesday 17 November 2021

Dan Hart, CEO, Virgin Orbit; **Nicholas Smith**, Regional Director for UK and Europe, Lockheed Martin Space; **Alan Thompson**, Head of Government Affairs, Skyrora Limited — Q48–96

Melissa Thorpe, Head, Spaceport Cornwall; **Scott Hammond**, Deputy Chief Executive Officer, SaxaVord Spaceport; **Pete Guthrie**, Senior Programme Manager, Space Hub Sutherland — Q97–148

Wednesday 08 December 2021

Yasrine Ibnyahya, Director of Advanced Concepts, Inmarsat; **Professor Sir Martin Sweeting**, Founder and Executive Chairman, Surrey Satellite Technologies Ltd — Q149–206

Dr Hina Khan, Senior Project Manager and UK Stakeholder Engagement, Spire Global Limited; **Jon Styles**, Director, Assimila — Q207–235

Chris McLaughlin, Chief of Government, Regulatory Affairs, and Engagement, OneWeb — Q236–281

Wednesday 12 January 2022

Josef Aschbacher, Director General, European Space Agency — Q282–310

Dr Hiroshi Yamakawa, President, Japan Aerospace Exploration Agency; **Dr Philippe Baptiste**, President, Centre national d'études spatiales—French National Space and Research Centre — Q311–344

Tim Johnson, Director of Strategy & Policy, Civil Aviation Authority; **Colin Macleod**, Head of UK Space Regulation, Civil Aviation Authority — Q345–374

Wednesday 09 February 2022

Paul Bate, CEO, UK Space Agency; **Mark Thomson**, Executive Chair, Science and Technology Facilities Council — Q375–498

Rt Hon Kwasi Kwarteng MP, Secretary of State, Department for Business, Energy & Industrial Strategy; **Rebecca Evernden**, Director for Space, Department for Business, Energy & Industrial Strategy; **Hugo Robson**, Chief Negotiator, Department for Business, Energy & Industrial Strategy — Q434–498

Thursday 10 February 2022

Professor Malcolm Macdonald, Chair of Applied Space Technology, University of Strathclyde; **Professor Iain Woodhouse**, Professor of Applied Earth Observation, University of Edinburgh — Q499–523

Wednesday 01 March 2023

Patrick McCall, Non-executive Director, Space Forge Ltd; **Joshua Western**, CEO, Space Forge Ltd — Q524–559

Melissa Quinn, Head, Spaceport Cornwall; **Dan Hart**, CEO, Virgin Orbit — Q560–588

Ian Annett, Deputy CEO, UK Space Agency; **Sir Stephen Hillier CBE**, Chair, Civil Aviation Authority; **Tim Johnson**, Policy Director, Civil Aviation Authority — Q589–619

Wednesday 17 May 2023

Frank Strang, CEO, SaxaVord Spaceport; **Dave Ballance**, Launch Operations Manager, SaxaVord Spaceport — Q620–652

Mario Kobald, CEO, HyImpulse Technologies; **Jonas Bjarnø**, Chief Technical Officer, Orbex — Q653–667

Colin Macleod, Head of Space Regulation, Civil Aviation Authority; **Rob Bishton**, Joint Chief Executive, Civil Aviation Authority — Q668–683

George Freeman MP, Minister of State, Department for Science, Innovation and Technology; **Rebecca Evernden**, Director, Space Directorate, Department for Science, Innovation and Technology — Q684–713

Published written evidence

The following written evidence was received and can be viewed on the inquiry publications page of the Committee's website.

SPA numbers are generated by the evidence processing system and so may not be complete.

1 AAC Clyde Space (SPA0020)

2 ADS; and UKspace (SPA0056)

3 AWE (SPA0046)

4 Aerospace Medicine and Physiology Research Group, Centre for Human and Applied Physiological Sciences, King's College London (SPA0062)

5 Airborne Engineering Ltd (SPA0044)

6 Airbus (SPA0081)

7 Alden Legal Limited (SPA0033)

8 Applied Space Technology Laboratory, University of Strathclyde (SPA0029)

9 AstrobiologyOU, The Open University (SPA0072)

10 Athena (SPA0083)

11 Berthoud, Lucy (Co-Chair, Space Universities Network; and Professor of Space Systems Engineering, University of Bristol) (SPA0088)

12 Black Arrow Space Technologies Ltd (SPA0095)

13 Black Arrow Technologies Ltd (SPA0105)

14 Blue Skies Space Limited (SPA0054)

15 Border Consulting Ltd (SPA0103)

16 British Standards Institute (SPA0076)

17 Buckinghamshire Local Enterprise Partnership (SPA0080)

18 CFMS Services Ltd (SPA0006)

19 Centre for the Observation and Modelling of Earthquakes, Volcanoes and Tectonics (SPA0082)

20 Cheney, Dr Thomas (Lecturer in Space Governance, AstrobiologyOU, The Open University) (SPA0015)

21 Department for Business, Energy and Industrial Strategy (SPA0101, SPA0102, SPA0026)

22 Deplano, Dr Rossana (Lecturer, University of Leicester) (SPA0005)

23 EMEA Satellite Operators Association (ESOA) (SPA0068)

24 Earth Observation Network, Imperial College London (SPA0031)

25 Eastwood, Dr Jonathan (Director, Space Lab Network of Excellence and Senior Lecturer, Dept. of Physics, Imperial College London) (SPA0035)

26 FAIR-SPACE Hub (SPA0057)

27 Fujitsu Ltd (SPA0091)

28 Global Partnership for Sustainable Development Data (SPA0028)

29 Hampshire Constabulary (SPA0093)

30 Harkness, Dr Patrick (Reader in Space Systems Engineering, University of Glasgow) (SPA0007)

31 Harwell Space Cluster (SPA0090)

32 Hughes Europe and EchoStar Mobile Limited (SPA0053)

33 Inmarsat (SPA0055)

34 Jacobs (SPA0073)

35 Kingston University London (SPA0061)

36 Lockheed Martin Space (SPA0094)

37 Lockheed Martin UK (SPA0050)

38 London Institute of Space Policy and Law (SPA0067)

39 Magdrive (SPA0104)

40 Mango Space Ltd (SPA0075)

41 Met Office (SPA0058)

42 Micross Components (SPA0078)

43 Midlands Innovation (SPA0022)

44 Mulvihill, Dr Michael (Research Associate, Newcastle University); and Barker, Chloë (Research Associate, Newcastle University) (SPA0038)

45 NATS (SPA0070)

46 NERC SENSE Earth Observation Centre for Doctoral Training (SPA0013)

47 National Centre for Earth Observation (NCEO) (SPA0084)

48 Newton Launch Systems (SPA0107)

49 Northumbria University (SPA0048)

50 OneWeb (SPA0008)

51 Open Geospatial Consortium (SPA0045)

52 Pettorelli, Dr Nathalie (Senior scientist, Zoological Society of London) (SPA0001)

53 Planet (SPA0071)

54 Plymouth Marine Laboratory (SPA0039)

55 Policy Impact Partners and SpaceX (SPA0099)

56 Reaction Engines (SPA0098)

57 RethinkPNT (SPA0100)

58 Royal Aeronautical Society (RAeS) (SPA0079)

59 Royal Astronomical Society (SPA0047)

60 SKA Observatory (SPA0010)

61 Satellite Applications Catapult (SPA0037, SPA0086, SPA0096)

62 Shaw, Dr Peter (Senior Lecturer in Astronautics, Kingston University London) (SPA0003)

63 Skyrora Limited (SPA0064)

64 Southwood, Professor David (Senior Research Investigator, Imperial College London) (SPA0040)

65 Space Forge Ltd (SPA0097)

66 Space Hub Yorkshire (SPA0027)

67 Spire Global UK (SPA0092)

68 Surrey Satellite Technology Ltd (SPA0023)

69 Talibzade, Rahim (SPA0066)

70 Thales (SPA0060)

71 The British Interplanetary Society (SPA0089)

72 The Manufacturing Technology Centre (MTC) (SPA0041)

73 The National Oceanography Centre (SPA0012)

74 The Royal Society (SPA0049)

75 The Space academic Network (SPA0009)

76 Thomas Keating Ltd (SPA0030)

77 Tokamak Energy Ltd (SPA0087)

78 UCL, Department of Space and Climate Physics (SPA0059)

79 UK Civil Aviation Authority (SPA0106, SPA0014)

80 UK Computing Research Committee (SPA0004)

81 UK National Quantum Technology Hub in Sensors and Timing, University of Birmingham; and UK Quantum Technology Hub Sensors and Timing (SPA0011)

82 UK Research and Innovation (UKRI) (SPA0024)

83 UK Space Life and Biomedical Science Association (UKSpaceLABS) (SPA0025)

84 UKSA Space Exploration Advisory Committee Membership (SPA0043)

85 UK Solar Physics Council - Matthews, Professor Sarah (Professor and Head of Solar Physics, UCL Mullard Space Science Laboratory); Harrison, Professor Richard (Chief Scientist, RAL Space); Davies, Dr Jackie (Head of Heliospheric Physics, RAL Space); Cargill, Professor Peter (Honorary Professor, University of St Andrews); Fletcher, Professor Lyndsay (Professor of Astrophysics, University of Glasgow); Morgan, Dr Huw (Head of Solar System Physics, Aberystwyth University); Fludra, Dr Andrzej (Head of Solar Physics, RAL Space); Mathioudakis, Professor Mihalis (Professor of Astrophysics, Queen's University Belfast); Erdelyi, Professor Robertus (Professor of Applied Mathematics, Sheffield University); and de Moortel, Professor Ineke (Professor of Applied Mathematics, University of St Andrews) (SPA0034)

86 UKspace (SPA0108)

87 University of Birmingham; UK Quantum Technology Hub Sensors and Timing; and West Midlands Regional Economic Development Institute (SPA0016)

88 University of Leicester (SPA0021)

89 Virgin Orbit (SPA0069)

90 techUK (SPA0042)

List of Reports from the Committee during the current Parliament

All publications from the Committee are available on the publications page of the Committee's website.

Session 2022–23

Number	Title	Reference
1st	Pre-appointment hearing for the Executive Chair of Research England	HC 636
2nd	UK space strategy and UK satellite infrastructure	HC 100
3rd	My Science Inquiry	HC 618
4th	The role of Hydrogen in achieving Net Zero	HC 99
5th	Diversity and Inclusion in STEM	HC 95
6th	Reproducibility and Research Integrity	HC 101

Session 2021–22

Number	Title	Reference
1st	Direct-to-consumer genomic testing	HC 94
2nd	Pre-appointment hearing for the Chair of UK Research and Innovation	HC 358
3rd	Coronavirus: lessons learned to date	HC 92

Session 2019–21

Number	Title	Reference
1st	The UK response to covid-19: use of scientific advice	HC 136
2nd	5G market diversification and wider lessons for critical and emerging technologies	HC 450
3rd	A new UK research funding agency	HC 778