



# DEVELOPING GOOD PRACTICES IN EXPORT CONTROL OUTREACH TO THE NEWSPACE INDUSTRY

KOLJA BROCKMANN AND LAURIANE HÉAU\*

## I. Introduction

The increasing commercialization, innovative approaches, new business practices and capitalization models seen in the space industry have given rise to what is now commonly referred to as ‘NewSpace’. The rapid growth of this sector in spacefaring states and beyond and the influx of start-up companies make it a highly dynamic industry.<sup>1</sup> NewSpace companies develop and make use of emerging and dual-use technologies, many of which are relevant to missile technology and other strategic military-related technologies. For example, NewSpace companies develop, test, produce, use and market emerging and dual-use technologies, including small and micro launchers, the technology and components for which could potentially be used for delivery systems capable of carrying weapons of mass destruction (WMD), including chemical, biological and nuclear weapons. This also means that an increasing number of private commercial actors are becoming developers and holders of missile-related technology and dual-use technologies—something previously confined to state agencies (i.e. national space agencies), large aerospace and arms producing companies, and a smaller pool of companies and research institutes tied to or integrated in state-run space programmes. As a result, NewSpace has become a topic of increasing discussion in multilateral forums dedicated to the non-proliferation of missiles and other uncrewed delivery systems capable of carrying WMD, including the Missile Technology Control Regime (MTCR) and the Hague Code of Conduct against Ballistic Missile Proliferation (HCOC).<sup>2</sup>

Trends linked to NewSpace pose a range of export control enforcement challenges for national authorities, as well as compliance challenges for the NewSpace stakeholders involved. Moreover, awareness of proliferation risks and security issues, as well as implementation of compliance programmes, varies significantly among NewSpace industry stakeholders.<sup>3</sup> Relevant stakeholders include companies, start-ups, launch service providers, spaceport

<sup>1</sup> Brukardt, R. et al., *The Role of Space in Driving Sustainability, Security, and Development on Earth* (McKinsey & Company: New York, May 2022).

<sup>2</sup> Brockmann, K. and Raju, N., *NewSpace and the Commercialization of the Space Industry: Challenges for the Missile Technology Control Regime* (SIPRI: Stockholm, Oct. 2022); and Maitre, E. and Moreau-Brillat, S., ‘The Hague Code of Conduct and space’, HCOC Research Papers, no. 10, Fondation pour la Recherche Stratégique, Mar. 2022.

<sup>3</sup> Brockmann and Raju (note 2), pp. 20–21.

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## SUMMARY

● NewSpace is changing the nature of the space industry, exacerbating missile proliferation risks and posing challenges for the effective implementation of export controls. NewSpace companies develop, test, produce, use and market missile-related emerging and dual-use technologies, including small and micro launchers. One of the measures states can take to address these developments is to step up targeted outreach to NewSpace actors, raising awareness of such risks to strengthen compliance with export controls and foreign direct investment (FDI) screening mechanisms. Key elements of an effective outreach strategy for the NewSpace sector include tailored use of established outreach tools, mapping stakeholders, incentivizing participation in outreach activities, consistently engaging with launch vehicle manufacturers, inter-agency cooperation, and raising awareness of FDI-related risks. The Missile Technology Control Regime, the Hague Code of Conduct and the Wiesbaden Process provide multilateral forums through which states can begin sharing experiences and develop good practices for outreach to the NewSpace industry.



operators, universities and research institutes. Confronting these challenges while seizing the economic opportunities offered by the NewSpace industry and many of the emerging technologies it uses requires states to actively engage with stakeholders. Effective engagement and mutual feedback can inform the creation and maintenance of appropriate regulatory, compliance and self-regulatory frameworks.<sup>4</sup> A key recommendation to emerge from previous research is that states with nascent or established NewSpace industries should pursue targeted outreach to relevant stakeholders in order to raise awareness and strengthen resilience against illicit procurement attempts.<sup>5</sup>

Industry outreach and awareness raising generally refer to a range of activities conducted by states in order to engage, provide information and foster dialogue with a particular group of stakeholders. In the context of this paper, the provision of guidance materials and creation of communication channels are considered to be part of the outreach toolbox. Outreach to industry is an essential component of states' export control systems, with industry commonly perceived as the first line of defence against illicit procurement and proliferation. United Nations Security Council Resolution 1540 of 2004 obliges states to 'develop appropriate ways to work with and inform industry' regarding their legal obligations in the context of export controls.<sup>6</sup> Germany set up the 'Wiesbaden Process' as a dedicated forum to strengthen outreach to and engagement with industry on export controls under the 1540 umbrella. Most states with an export control system conduct some form of awareness-raising programme for industry. States seek to convey the importance of due diligence; strengthen compliance with national regulations (primarily export controls); and engage in dialogue with stakeholders that enables mutual feedback and calibration of regulatory tools. However, the extent to which states conduct outreach and the tools they use vary considerably.

The development and expansion of NewSpace sectors in a growing number of states and the related increase in proliferation risks mean that now is the time for states to step up awareness-raising activities directed at NewSpace stakeholders regarding missile proliferation and other security risks. States should tailor outreach strategies and targeted industry outreach to the make-up of their domestic space industries, regulatory frameworks, available resources and threat perceptions. The choice, combination and focus of outreach tools deployed should reflect which types of actors are prevalent and make the best use of NewSpace stakeholders and related forums to facilitate outreach in a sustainable way. This paper therefore seeks to contribute to the development of good practices for outreach to the NewSpace industry through collecting insights from states' experiences with industry outreach and any lessons learned from the so far limited implementation of targeted outreach to NewSpace stakeholders.

Section II of this paper outlines the main missile technology proliferation risks and export control challenges posed by the advent of the NewSpace

<sup>4</sup> Viski, A. and Jones, S., *Outreach 2.0: Emerging Technologies and Effective Outreach Practices* (Strategic Trade Research Institute: Washington, DC, Feb. 2021), p. 22.

<sup>5</sup> Brockmann and Raju (note 2), pp. 23–24.

<sup>6</sup> United Nations Security Council Resolution 1540, 28 Apr. 2004. See also United Nations, Security Council, 1540 Committee, '1540 fact sheet', [n.d.].



industry. Section III maps the stakeholder types that could be the targets of or help facilitate outreach, before section IV describes the range of outreach tools states can deploy as well as good practices for effective engagement with specific industry stakeholders. Finally, section V draws conclusions on a tailored approach to strengthening outreach to the NewSpace industry and identifies forums through which good practices could be refined and promoted.

## II. Missile technology proliferation risks posed by NewSpace

The trends associated with NewSpace and the rise of the NewSpace industry pose a range of proliferation risks, particularly related to ballistic missiles and military-related uses of space.

### **Expansion of the pool of dual-use missile technology holders**

NewSpace has led to a significant increase in the number of private actors participating in the commercial space industry and enabled a substantive rise in the number of states with space ambitions and some commercial space activities. The types of actors participating in the space industry has also diversified, with an increasing number of start-up companies seeking to establish themselves in areas such as space launch vehicle manufacturing, satellite manufacturing, specialized technology for space applications, Earth observation data and launch services, while a whole range of new and established companies are providing specific components, technology or services as part of the space industry supply chain.<sup>7</sup>

Moreover, companies in the NewSpace industry, along with innovation hubs and research laboratories and institutes, are often particularly willing to adopt novel and emerging technologies—for example, additive manufacturing of components—while bearing the higher risks of building their business models around the use of such technologies.<sup>8</sup> As a result, the growth of the NewSpace industry is expanding the pool of missile and space-related dual-use technology holders considerably. The dual-use nature of many space technologies means that goods, technology and technical assistance provided by commercial space actors could contribute to missile programmes and other military-related end-uses. In particular, the development of small and micro launchers, driven by technological advances and the demand created by smaller, lighter and low-cost satellites, is significantly increasing the number of commercial launch vehicle projects being undertaken and thus the number of dual-use missile technology holders.<sup>9</sup> Moreover, advances in small and micro launchers are moving some new launch vehicles

<sup>7</sup> Denis, G. et al., 'From new space to big space: How commercial space dream is becoming a reality', *Acta Astronautica*, vol. 166 (Jan. 2020), pp. 433–35.

<sup>8</sup> Brockmann and Raju (note 2), p. 9; and Brockmann, K., *Additive Manufacturing for Missiles and Other Uncrewed Delivery Systems: Challenges for the Missile Technology Control Regime* (SIPRI: Stockholm, Oct. 2021).

<sup>9</sup> Wekerle, T. et al., 'Status and trends of smallsats and their launch vehicles—An up-to-date review', *Journal of Aerospace Technology and Management*, vol. 9, no. 3 (July–Sep. 2017), p. 270; and Denis et al. (note 7), pp. 437–38.



technologically closer to medium- and intermediate-range ballistic missiles and potentially even intercontinental-range ballistic missiles.<sup>10</sup>

### **NewSpace as a possible target for illicit procurement activities**

Start-up companies in the NewSpace industry are often relatively unaware of the risk of technology transfers contributing to missile programmes or other sensitive military-related end-uses, while some also lack in-depth understanding of national export control regulations and compliance obligations. The increase in dual-use missile- and space-related technology holders, combined with lower resilience arising from a lack of effective compliance procedures, can increase proliferation risks. State and non-state actors seeking to illicitly acquire missile and sensitive space technologies can now target a larger pool of technology holders. Companies and research institutes in the NewSpace sector might therefore become attractive targets for illicit procurement activities by state and non-state actors.

### **NewSpace as a possible target of technology acquisition efforts**

In many states, the NewSpace industry is experiencing rapid, national and foreign investment-driven expansion characterized by sharp competition.<sup>11</sup> In this context, there is a risk that states or non-state actors could acquire sensitive technologies through foreign direct investment (FDI), including company acquisitions and other investments (e.g. joint ventures, controlling shares), granting them access to proprietary technology and data. As in other sectors involving emerging technologies, NewSpace start-up companies reliant on venture capital and other funding models may be particularly vulnerable to foreign investors leveraging their capital to gain access to controlled dual-use technologies and know-how, which could then be diverted to a missile programme or other military end-uses—for example, in a state under a UN embargo. While most foreign investors have no malicious intent and are not involved in illicit procurement efforts, companies' due diligence and compliance with national investment screening procedures is important for identifying and preventing illicit procurement by means of FDI.

If the boom in the NewSpace industry is followed by a period of contraction, companies—but also individual engineers—holding dual-use space technology and know-how could be left in a vulnerable financial situation open to exploitation.<sup>12</sup> In a favourable economic situation, FDI offers will often also appear beneficial to companies, albeit with less acute financial pressure. Companies should always exercise due diligence and thoroughly check offers before committing to arrangements resulting in foreign access to missile-related dual-use technology.

<sup>10</sup> Maitre and Moreau-Brillatz (note 2).

<sup>11</sup> Sheetz, M., 'Investment in space companies hit record \$14.5 billion in 2021, report says', CNBC, 18 Jan. 2022.

<sup>12</sup> Denis et al. (note 7), p. 440.



## NewSpace as a possible means of camouflaging missile programmes

States engaged in missile programmes reliant on foreign supplies and assistance sometimes camouflage their illicit missile programmes and procurement activities by presenting them as being part of state-run civilian space programmes, thereby circumventing export controls, sanctions or other missile non-proliferation mechanisms.<sup>13</sup> In the past, states (and non-state actors) have used different ways of deceiving suppliers, including masking the real end-use or end-user of a transfer or technical assistance, hiding a covert missile programme, or establishing a certain level of public deniability regarding missile activities. The spread of the NewSpace industry means that states may turn to commercial space activities to disguise their missile programmes and procurement activities.<sup>14</sup> It is therefore vital that states raise awareness among industry about the possibility of these risks and share information about cases where covert missile programmes or illicit procurement may be taking place.

## III. Relevant actors for outreach to the NewSpace industry

There is a diversity of actors in the NewSpace industry, with varying levels of awareness concerning proliferation risks and applicable regulations. These actors are situated in a growing number of states, including increasingly in the Global South.<sup>15</sup> The structure of the NewSpace industry varies between states. National regulations, including export controls and their alignment with the MTCR and other multilateral export control regimes, also vary. This section therefore outlines the actors, processes and initiatives of particular focus for export control-related outreach to the NewSpace industry. It should be noted that individual companies or institutions potentially fall into several categories.

### Start-up companies

Start-ups are among the main drivers of NewSpace, leading much of the sector's innovation towards cheaper and less complex systems.<sup>16</sup> They have been particularly active in the development of small launchers and small satellite technology. In addition, they have focused on many novel space applications, such as in-space manufacturing, which uses additive manufacturing capacities in space, and on-orbit servicing, which involves carrying out operations on in-orbit satellites.<sup>17</sup> Another key feature of these start-ups is their global reach and establishment in an increasing number of

<sup>13</sup> Zaborsky, V., 'Missile proliferation risks of international space cooperation', *World Affairs*, vol. 165, no. 4 (spring 2003), p. 186.

<sup>14</sup> Brockmann and Raju (note 2), pp. 9–12.

<sup>15</sup> Aliberti, M. et al., *Emerging Spacefaring Nations: Review of Selected Countries and Considerations for Europe*, European Space Policy Institute (ESPI) Report no. 79 (ESPI: Vienna, June 2021).

<sup>16</sup> Denis et al. (note 7); and Freeland, S. R., 'NewSpace, small satellites, and law: Finding a balance between innovation, a changing space paradigm, and regulatory control', eds M. T. Ahmad and J. Su, *NewSpace Commercialisation and the Law* (McGill University, Centre for Research in Air and Space Law: Montreal, 2017).

<sup>17</sup> Vernile, A., *The Rise of Private Actors in the Space Sector* (Springer International Publishing: Cham, Mar. 2018), pp. 25–31; and Howlett, A., 'Astroscale receives Prime Minister's Award during Japan Startup Awards', *Astroscale*, 2 June 2022.



states, with varying sets of regulation and awareness-raising programmes in place. While many are established in North America and Europe, there are, for example, around 120 major NewSpace start-ups in China and around 50 each in India and Japan.<sup>18</sup> NewSpace start-ups commonly adopt the lean organizational structures associated with internet start-up companies. Compliance departments are often either very small or non-existent, which can be challenging when it comes to establishing robust internal compliance programmes that take into account the specific export control-related risks the company might face.

### **Space launch vehicle manufacturers**

The field of space launch vehicle manufacturers has changed significantly, with more private commercial companies pushing into a sector previously dominated by government-funded national space launch programmes. The trends associated with NewSpace have led to greater emphasis on the development of small and micro launchers to put small satellites in orbit as well as reusable rocket boosters such as those used by SpaceX's Falcon 9. Both these trends make access to space more affordable and have led to the multiplication of launches. Commercial launchers are also increasingly being used to launch military payloads, the first example of this being the use of a Falcon 9 rocket to launch a satellite from the United States National Reconnaissance Office in May 2017.<sup>19</sup> The proximity of space launcher technology—especially small and micro launchers—to missile technology poses evident proliferation risks, heightened in the current context by the increasing number of actors developing such technology.

### **Launch service providers**

Alongside established actors, such as International Launch Services or Arianespace, innovations and increased demand in the area of space launch vehicles have resulted in a multiplication in the types of launch services offered and the number of providers supplying them. Available launch services include sales and marketing, mission management, launch operations, on-orbit delivery and legal support. Providers support not only satellite launches but also the suborbital flights offered by private actors such as Blue Origin or Virgin Galactic, including for space tourism purposes.<sup>20</sup> Space launch services commonly involve both tangible and intangible technology transfers—that is, transfers of controlled technical data and software rather than physical items. In addition, these technology transfers take place between many types of stakeholders, including the launch service providers, spaceport operators and launch vehicle manufacturers.<sup>21</sup> Thus, it is key that each of these stakeholders is fully aware of export control-related risks.

<sup>18</sup> ESPI, *New Space in Asia: Experts Views on Space Policy and Business Trends in Asian Countries*, ESPI Report no. 77 (ESPI: Vienna, Feb. 2021).

<sup>19</sup> 'Commercial space', *Janes Defence and Intelligence Review*, vol. 2, no. 2 (Feb. 2023).

<sup>20</sup> Denis et al. (note 7).

<sup>21</sup> Spaceflight, 'Your mission is our mission', accessed 18 Feb. 2023.



## Spaceport operators

New space launch sites have recently emerged in states that previously lacked active space launch facilities. These spaceport initiatives are currently burgeoning, with for instance the first space launch from New Zealand taking place in 2017 from the commercial spaceport Launch Complex 1.<sup>22</sup> In Europe, meanwhile, a commercial micro launch site in the North Sea is planned in Germany, and several spaceport initiatives are also being developed in the United Kingdom.<sup>23</sup> Notably, there is still substantial public authority involvement in spaceports, though the role of private actors is increasing. The first UK spaceport established in Cornwall is run by a consortium of both public and private entities: the local authority owns the spaceport, the UK Space Agency provides funding for it, while private entities are in charge of mission management and satellite tracking, as well as launch operations.<sup>24</sup> Given this, it needs to be ensured that all stakeholders involved, especially newly established private actors, have detailed awareness about export control-related risks.

## Satellite companies

Significant developments in small satellite technology are partly responsible for driving overall expansion of the NewSpace industry. Many private actors have emerged in the area of Earth observation. These actors can notably provide satellite imagery in increasingly high resolution, with higher revisit, and at much lower prices than before.<sup>25</sup> Image analytics services are developed for a range of new private markets, as well as for national authorities. In May 2022, for example, the US government almost doubled its purchase of low-earth orbit (LEO) imagery from commercial service providers.<sup>26</sup> The significant increase in the number of actors involved in developing satellites and the military-related applications these can have, make it all the more important to raise awareness among new entrants to the sector.<sup>27</sup> Satellite imagery can, for example, be used to provide information for the targeting of missiles.

## Innovation hubs and programmes in established aerospace companies

Established space companies are often closely linked to the aerospace and defence sector and have long been involved in developing civilian and military technology. The advent of NewSpace prompted some of these companies to create hubs or programmes designed to foster innovation, several of which focused on areas, such as in-orbit services, that initially saw limited development among start-ups due to doubts over the technology's

<sup>22</sup> Rocket Lab, 'Launch with us', accessed 19 Feb. 2023.

<sup>23</sup> Sprenger, S., 'German industry pushes for space launch site in the North Sea', *Defense News*, 8 Oct. 2020; and UK Space Agency, Department for Transport and UK Civil Aviation Authority, 'Launch UK: A guide to the UK's commercial spaceports' accessed 17 Feb. 2023.

<sup>24</sup> Spaceport Cornwall, 'About us', accessed 17 Feb. 2023.

<sup>25</sup> Denis et al. (note 7).

<sup>26</sup> 'Commercial space' (note 19).

<sup>27</sup> Freeland (note 16); and 'Commercial space' (note 19).



feasibility and reliability.<sup>28</sup> Some of these innovation hubs or programmes are new projects developed within larger, established space companies, while others are created as subsidiaries owned by the parent company. In addition, established space companies are active in financing start-ups and innovation programmes. Airbus, Thales Alenia and Telespazio have all, for example, invested in a UK-based fund that invests in downstream and upstream NewSpace opportunities.<sup>29</sup> These established companies usually have good knowledge and resources when it comes to implementing export control compliance programmes. Projects within innovation hubs, however, often develop items or emerging technologies which, due to their novelty, are not covered by export control lists. In some cases, the projects may also be compartmentalized away from the parent company and its compliance functions, without dedicated trade compliance resources.

### Universities and research institutes

Universities and research institutes have long contributed to space developments, and such cooperation has continued with NewSpace, as they have been integrated into innovation hubs, together with start-ups.<sup>30</sup> Moreover, many NewSpace start-ups were created out of projects initially developed at university research laboratories.<sup>31</sup> Research institutions in particular struggle to control intangible technology transfers. These can occur, for example, through the publication of research findings and as part of collaborative research projects. In many cases, universities and research institutions have been reactive, rather than proactive in putting effective export control compliance mechanisms in place, often following the discovery of a violation.<sup>32</sup>

### Supply chain companies

The space sector relies heavily on complex supply chains due to the complexity of the products developed and used, a situation that remains true for NewSpace, with an increasing number of companies choosing to externalize non-core business tasks.<sup>33</sup> Companies are relying on their supply chains for key subsystems, equipment and components, such as sensors, electric propulsion engines and software-defined radio modules.<sup>34</sup> Some supply chain companies are actively using emerging technologies, such as additive manufacturing, to build satellite parts.<sup>35</sup> Engaging the entire space industry supply chain can also be challenging given the number of actors involved. In many cases, suppliers will be established across several states, with the

<sup>28</sup> La Rocca, G. et al., *In-Orbit Services*, ESPI Report no. 76 (ESPI: Vienna, Dec. 2020). See e.g. Northrop Grumman, 'Northrop Grumman and Intelsat make history with docking of second mission extension vehicle to extend life of satellite', News release, 12 Apr. 2021.

<sup>29</sup> Vernile (note 17), pp. 25–31.

<sup>30</sup> Vernile (note 17), pp. 25–31.

<sup>31</sup> ESPI (note 18), p. 27.

<sup>32</sup> Starks, B. and Tucker, C., 'Export control compliance and American academia', *Strategic Trade Review*, vol. 2, no. 3 (Autumn 2016).

<sup>33</sup> SIPRI and Ecorys, *Final Report: Data and Information Collection for EU Dual-use Export Control Policy Review* (European Commission, Brussels: 6 Nov. 2015); and Denis et al. (note 7).

<sup>34</sup> Denis et al. (note 7).

<sup>35</sup> Rainbow, J., 'Reaching the tipping point for 3D printing satellites', *SpaceNews*, 27 Jan. 2022.





various sets of export control regulations in place creating compliance challenges.<sup>36</sup> There is also a risk that transactions may be routed through the weakest point in a supply chain.<sup>37</sup> While supply chain proliferation risks have been well documented in other sectors, limited attention to date has been paid to the specific risks that arise in the context of NewSpace activities.

#### IV. Good practices in outreach to NewSpace industry stakeholders

The toolbox of instruments utilized by states in their outreach to industry regarding export controls includes active engagement and dialogue with stakeholders, as well as passive instruments, such as the provision of targeted guidance materials, frequently asked questions (FAQs) pages and dedicated communications channels (e.g. specific e-mail contacts or inquiry hotlines). The national export licensing authority is usually among the government authorities tasked with conducting outreach to industry, often alongside ministries responsible for the economy, commerce, business, trade and foreign affairs. However, export controls are only one part of the wider regulatory framework for the space sector, which also includes treaty-based international legal obligations such as space object registration and related liabilities.<sup>38</sup> In some contexts, specialized agencies—for example, a national space agency—may also be involved in facilitating outreach activities due to their special position and frequent engagement with relevant stakeholders. There are also some awareness raising activities that do not, or only tangentially, involve national authorities, which are most effective when implemented peer-to-peer between companies.

States use outreach to raise awareness about the rationale underlying export controls and screening mechanisms, including the non-proliferation of WMD and their delivery systems, as well as other national and international security concerns. They may also conduct outreach to clarify applicable regulations, explain the processes through which companies apply for export licences, clarify record-keeping and other compliance obligations, and strengthen communication with relevant stakeholders. States and industry can both benefit if outreach results in a dialogue that goes both ways. Governments can inform companies about risks applicable to their sector, concerns about specific recipients, illicit procurement agents' *modus operandi* and interpretation of regulations. This can enable industry to better comply with regulations and spot situations where so-called 'catch-all controls'—i.e. controls on transfers that pose a proliferation risk but which are not captured by the national control list—may apply.<sup>39</sup> Industry, in turn, can provide governments with valuable information about technological developments, the impact of regulations on international competitiveness,

<sup>36</sup> Stewart, I. and Brewer, J., 'Engaging the private sector in nonproliferation: Reflections from practitioners', *Strategic Trade Review*, vol. 2, no. 3 (Autumn 2016).

<sup>37</sup> Finlay, B., 'Minding our business: The role of the private sector in managing the WMD supply chain', Stimson Center, 18 Feb. 2009.

<sup>38</sup> See e.g. 1972 Convention on International Liability for Damage Caused by Space Objects; and 1976 Convention on Registration of Objects Launched into Outer Space.

<sup>39</sup> Viski and Jones (note 4), pp. 10–11.

the overall development of their sector, and any suspicious inquiries or procurement attempts.<sup>40</sup>

### **Awareness-raising instruments and outreach to the NewSpace industry**

States have at their disposal a variety of tools for targeted outreach to the NewSpace sector. Not all tools should necessarily be employed by all states, and some may be more appropriate than others for engaging particular actors.

#### *Dedicated industry outreach events for NewSpace companies*

One of the most proactive outreach instruments a state can use is organizing dedicated outreach events targeting NewSpace stakeholders, or even a specific sub-group of stakeholders—for example, NewSpace start-ups. Targeted outreach events can take the form of conferences, workshops, seminars, webinars, briefings or company visits.<sup>41</sup> Organizers can curate the list of participants, inviting companies that might require information due to shortcomings in their compliance systems, as well as stakeholders that can share their experiences to the benefit of others, thereby helping build a community of peers. Ad hoc events, such as workshops or company visits, may be organized to address questions specific to a particular company or issues relevant to a sub-group of NewSpace stakeholders (e.g. small and micro launcher companies), with larger, more regular conferences used to provide updates on regulations and risks applicable to a wider group of stakeholders.

Outreach to manufacturers and other relevant companies that occurs at these events is sometimes characterized by a one-way delivery of information around export control regulations and their implementation.<sup>42</sup> Companies and research institutions can, however, provide useful insights into illicit procurement efforts and even help to identify procurement networks. Moreover, as technology developers, users and exporters, stakeholders will often have a unique appreciation of technological developments and capabilities as well as their applicability to military, chemical, biological and nuclear weapon and delivery system-related end-uses.

In-person meetings or other direct interactions between national authority representatives and industry stakeholders are usually perceived as the most beneficial.<sup>43</sup> One NewSpace company representative suggested that direct engagement with the national licensing authority is particularly valuable when it comes to improving internal compliance practices and understanding underlying proliferation risks.<sup>44</sup> In-person meetings can also reduce the perceived distance between regulator and regulated, build trust and create an environment conducive to mutual feedback without fear of repercussions. It can also help in clarifying regulatory obligations and

<sup>40</sup> Viski and Jones (note 4), p. 10.

<sup>41</sup> Rosanelli, R., 'Pitcher and catcher: The private sector's role in export control outreach activities', *Strategic Trade Review*, vol. 3, no. 5 (Autumn 2017), p. 112.

<sup>42</sup> Stewart and Brewer (note 36), p. 145.

<sup>43</sup> Rosanelli (note 41), p. 113.

<sup>44</sup> Thompson, A., Head of Government Affairs, Skyrora Ltd, Interview with authors, 3 Aug. 2022.



understanding unwritten rules about interacting with licensing authorities that may be unclear from published guidance.<sup>45</sup>

#### *Export control authority participation in NewSpace industry events and trade fairs*

Export licensing authorities and other relevant government representatives can directly engage NewSpace stakeholders by giving presentations about export controls, proliferation risks and relevant enforcement cases—as well as the wider regulatory framework for the space industry—at industry conferences, trade fairs, open days or other gatherings organized by, for example, the national space agency. Moreover, export licensing authorities can set up booths at such events to offer companies the opportunity to make first contact in a relatively informal way, renew existing contacts or make arrangements for subsequent engagement. Meanwhile, licensing authority representatives with relevant technical expertise can learn about the current state of technologies through informal engagement with companies, research institutes and universities. Particularly in the area of emerging technologies, this provides an opportunity for states to combine technology monitoring with outreach in a single activity.

#### *Provision of targeted guidance materials for the space industry*

Guidance materials are a useful way of providing detailed information on export control policies, regulatory requirements, good practices for internal compliance programmes and relevant case studies, as well as contact information and links to helpful sources. Most states publish general guidance materials for all exporters, while some states produce targeted guidance materials for specific sectors, such as oil and gas, the arms industry, or stakeholders in research and academia.<sup>46</sup> Targeted guidance materials for the NewSpace industry are rare, however, with the exception of those provided by the US Federal Aviation Authority and the US National Aeronautics and Space Administration.<sup>47</sup> Given that many smaller companies and young start-ups in the NewSpace industry lack the resources and personnel to regularly attend outreach events, national authorities should ensure guidance, information and regular updates are freely available online.<sup>48</sup> Moreover, targeted guidance materials should be provided to target audiences during dedicated outreach events, as well as at relevant industry events and trade fairs. Ideally, such materials should include practical examples and relevant case studies sourced from companies in the sector, thereby making guidance more tangible and improving the effectiveness of compliance procedures.

<sup>45</sup> Rosanelli (note 41), p. 113.

<sup>46</sup> See e.g. German Federal Office for Economic Affairs and Export Control (BAFA), *Export Control and Academia Manual* (BAFA: Eschborn, Feb. 2019); and Bauer, S. et al., *Challenges and Good Practices in the Implementation of the EU's Arms and Dual-use Export Controls: A Cross-Sector Analysis* (SIPRI: Stockholm, July 2017).

<sup>47</sup> US National Aeronautics and Space Administration (NASA), *NASA Export Control Program Operations Manual* (NASA: 30 Sep. 2021); and US Department of Commerce's Office of Space Commerce and the Federal Aviation Administration's Office of Commercial Space Transportation, *Introduction to US Export Controls for the Commercial Space Industry*, 2nd Edition (US Department of Commerce and Federal Aviation Administration: Washington, DC, Nov. 2017).

<sup>48</sup> Rosanelli (note 41), p. 113.



### *Export control authority engagement in meetings of space industry and compliance professionals' associations*

Industry associations can function as a 'multiplier' when raising awareness about missile proliferation risks and export controls, providing a forum for the regulator to interact with a large group of sector-specific companies and disseminate relevant information or guidance. This also allows the regulator to compile feedback from a group of stakeholders rather than having to resort to continuous bilateral engagement with many companies individually. Gathering such feedback is important for understanding the unintended effects of regulations as well as the implementation challenges faced in a specific sector or among a particular stakeholder group.<sup>49</sup> This is especially so for the NewSpace industry, where there is a large number of new entrants, a variety of new business models (e.g. on-orbit servicing, active debris removal and space mining) and emerging technologies (e.g. additive manufacturing) are pursued, and regulatory impact is still uncertain. It also allows a state to monitor and, where necessary, clarify or adjust regulations in order to reduce any negative impacts on competitiveness. While other outreach activities may also provide opportunities for garnering such feedback, relevant groups within space industry and compliance professionals' associations will likely contain the most pertinent company representatives.<sup>50</sup>

### *Availability of export control authorities for inquiries*

Guidance materials cannot fully address all questions that may arise from a particular licensing application or for a specific business, especially where companies feel their business model is new and are uncertain about how export controls apply. In such cases, a discussion with the licensing authority may be helpful, though there will inevitably be resource constraints when it comes to the personnel and time assigned to this task. Here, an FAQs section on the licensing authority's website can reduce the number of simplistic or inadmissible inquiries, point the way to relevant existing guidance materials and clarify when an individual inquiry or company visit may be appropriate. Moreover, guidance materials should provide clear, basic guidance and stipulate when it is appropriate for stakeholders to approach the licensing authority directly. This can help NewSpace stakeholders be more comfortable about if and when they should engage the licensing authority directly.

### *Awareness raising by industry up and down the supply chain*

Beyond outreach conducted by national authorities, states can also encourage companies—particularly the larger, experienced industry 'primes'—to engage in awareness raising towards peers up and down the supply chain.<sup>51</sup> This can help strengthen awareness of proliferation risks, possible military end-uses and suspect procurement behaviour.<sup>52</sup> In particular, companies

<sup>49</sup> Rosanelli (note 41), p. 115.

<sup>50</sup> Shaw, R. and Dill, C., 'Benchmarking and professional associations: An immersive exploration of non-traditional channels for industry outreach', *Strategic Trade Review*, vol. 2, no. 3 (Autumn 2016), p. 138.

<sup>51</sup> For an example of a possible approach to such peer-to-peer networking see Roeser, T. and Jalabert, A., 'Enabling broader compliance with international legal obligations through an industry network', *Nonproliferation Review*, vol. 25, no. 1-2 (2018), pp. 163–70.

<sup>52</sup> Stewart and Brewer (note 36), p. 149.



should ensure that development partners, suppliers and customers have effective internal compliance programmes in place. Guidance on internal compliance programmes provided by the Wassenaar Arrangement, the European Union and—if available—the relevant national licensing authority can provide a baseline for what supply chain partners and customers up to the end-user should at a minimum implement.<sup>53</sup>

Larger companies often have greater resources and staff dedicated to compliance and can thus participate in more activities providing opportunities to engage directly with licensing authorities. It is in their own interests to communicate information received from the authorities to their business partners, as doing so strengthens the resilience and integrity of the supply chain they are part of. Moreover, it offers a multiplier effect that enables states to raise awareness in an efficient manner, though this depends on stakeholder willingness to go beyond nominal due diligence obligations.

### **Good practices for outreach and awareness raising with actors in the NewSpace industry**

Choosing the right tools to engage a specific sector on export control compliance issues is not always straightforward, varying from state to state depending on the composition, size and awareness levels of stakeholders. Designing a targeted outreach programme for the NewSpace industry therefore requires detailed analysis of a state's national space industry, particularly the NewSpace stakeholders contained therein, and the applicable national regulatory framework. It should also build, where appropriate, on existing outreach to traditional space industry actors. Better understanding concerning the number and nature of companies and research centres, as well as the technology they develop, use and market, in combination with intelligence about the illicit procurement activities of certain states and non-state actors, allows a more complete risk picture to be painted. In addition, it assists states in identifying industry and professional associations they can engage to facilitate or co-organize outreach activities.

#### *Identifying relevant domestic NewSpace companies*

A key first step for states is to map their domestic NewSpace stakeholders and assess the risk environment in which they operate.<sup>54</sup> As outlined above, these stakeholders include not only private sector companies but also universities, research institutes and semi-governmental actors such as spaceport operators. Relevant NewSpace companies may be identified through market research, industry surveys, company registries and industry

<sup>53</sup> Wassenaar Arrangement, 'Best practice guidelines on internal compliance programmes for dual-use goods and technologies', 2011; Permanent Mission of the Federal Republic of Germany to the United Nations New York, 'Cooperation and coordination between the private sector and the regulators: Recommendations and perspectives for effective approaches on the implementation of UN Security Council Resolution 1540 (2004)', 31 May 2022; Permanent Mission of the Federal Republic of Germany to the United Nations New York, 'Private sector engagement in strategic trade controls: Recommendations for effective approaches on United Nations Security Council Res. 1540 (2004) Implementation', 10 June 2016; and European Commission, 'Commission Recommendation (EU) 2019/1318 of 30 July 2019 on internal compliance programmes for dual-use trade controls under Council Regulation (EC) No 428/2009', *Official Journal of the European Union*, L 205/15, 5 Aug. 2019.

<sup>54</sup> Viski and Jones (note 4), p. 12.



association membership, with some states also making use of domestic intelligence service assessments to identify entities that possess or trade sensitive technologies. Another helpful mechanism in the case of NewSpace involves export licensing authorities coordinating and sharing information with the national space agency. In the UK, for example, experience has shown that almost all new entrants to the space industry contact the UK Space Agency at an early stage, not just with regard to export controls but also wider regulations. As such, the space agency is well placed to ask these NewSpace entrants if they are aware of export controls and can either refer them to or directly notify the national licensing authority.<sup>55</sup> States can also monitor the field of applicants seeking national funding for space launch vehicle and other space technology projects. For example, representatives of one licensing authority indicated that this has been a very efficient way of identifying newcomers and developers of relevant sensitive missile-related technologies.<sup>56</sup>

*Engaging with space launch vehicle and major component manufacturers throughout research, development, testing, production and export*

From a missile non-proliferation perspective, space launch vehicle manufacturers, including manufacturers of small and micro launchers and major component manufacturers, represent a particularly relevant stakeholder group. Given that the number of companies with the resources to successfully develop and test launch vehicles tends to be relatively small, some states have pursued bilateral outreach to relevant launch vehicle manufacturers. These companies are usually subject to a wide range of dual-use and space launch-related regulations, including export controls, which may be challenging to implement. As holders of key missile technology, however, it is imperative that they are informed through outreach regarding controls on technology transfers across the cycle of research, development, testing, production and—potentially—export of launch vehicle technology. This includes such issues as licensing and securely transferring information that needs to be provided to test range and spaceport operators. Space launch vehicle manufacturers, particularly those endeavouring to provide a full package of launch services using their own vehicles, are often keen to engage directly with licensing authorities, as they wish to be perceived by customers as responsible actors in the highly competitive launch market. Implementing an effective compliance programme can help them protect their intellectual property and ultimately gain a competitive advantage.<sup>57</sup>

*Incentivizing NewSpace actor participation in outreach activities*

Outreach events targeted at a curated set of NewSpace start-up companies, space launch vehicle manufacturers, satellite companies, established aerospace companies' innovation hubs and supply chain companies can be particularly beneficial in raising awareness about export controls and building

<sup>55</sup> Senior government advisor on export control technical policy, Interview with authors, 10 Feb. 2023.

<sup>56</sup> Space advisor to a national export control authority, Interview with authors, 8 Mar. 2023.

<sup>57</sup> Thompson, A., Head of Government Affairs, Skyrora Ltd, Remarks provided during SIPRI webinar 'The "NewSpace" industry: A challenge for missile non-proliferation and export controls?', 16 Aug. 2022.



community dialogue on compliance practices. However, even if states or other outreach providers—sometimes including think tanks and industry associations—know which stakeholders they would like to attend, they may struggle to convince NewSpace companies to bear the cost of sending company representatives who have an export control compliance or regulatory affairs function. It is therefore important to communicate the benefits of participation in outreach activities. For example, one expert involved in relevant outreach activities observed that companies may be more willing to participate in events that combine training and ‘access’ components. This allows companies to improve their awareness and understanding of compliance obligations while providing them with an opportunity to discuss specific cases and questions with the regulator.<sup>58</sup> Other benefits—which should be highlighted by organizers and possible partners, such as space industry associations—include the opportunity to share their experiences with other stakeholders and build a community of peers.

#### *Inter-agency coordination on outreach to NewSpace stakeholders*

Given the complex space regulatory environment in many states—within which export controls are only one part—inter-agency coordination is necessary to improve efficiency, both for the authorities and for NewSpace stakeholders.<sup>59</sup> Such inter-agency coordination is essential where states are setting up dedicated funding, subsidies or other incentives to spur space industry growth, as it can help build communication channels and ensure that beneficiaries are aware of export controls and maintain adequate compliance programmes. Particularly where authorities have diametrical objectives, such as promoting foreign trade and industrial development while at the same time controlling exports and foreign investments, inter-agency coordination is important to align messaging and ensure that there is no unnecessary doubling of efforts.

#### *Sensitizing NewSpace start-ups to risks linked to FDI and technology partnerships*

A specific topic that should be addressed by targeted outreach to the NewSpace industry is the risk of missile and other security-relevant technologies being illicitly procured through FDI and acquisitions. Outreach to start-ups and other companies reliant on venture capital and FDI should therefore raise awareness about risks, screening mechanisms and controls related to commercial activities beyond exports, including foreign investment.<sup>60</sup> These outreach activities should be coordinated with, and if possible involve, those national authorities responsible for foreign investment screening mechanisms. It is key that NewSpace companies apply due diligence to any transfer or making-available—whether through technology partnerships or access provided to foreign nationals, third parties or investors—of dual-use missile and space-related technologies, conducting their own screening and, where appropriate, submitting planned investments to national screening procedures.

<sup>58</sup> Nayan, R., Senior research associate, Manohar Parrikar Institute for Defence Studies and Analyses, Interview with authors, 28 July 2022.

<sup>59</sup> Space advisor to a national export control authority, Interview with authors, 8 Mar. 2023.

<sup>60</sup> Viski and Jones (note 4), p. 11.



## V. Conclusions

NewSpace is not only changing the nature of the space industry but posing new missile proliferation and military-related technology diversion risks. One of the measures recommended to states in response to this is stepping up outreach to NewSpace actors, thereby raising awareness of such risks and strengthening compliance with export controls and FDI screening mechanisms.

Now is an important moment for states with nascent or growing NewSpace industries to step up targeted outreach to relevant stakeholders to raise awareness about missile proliferation and other security risks. Key elements of an effective outreach strategy for the NewSpace sector include identifying stakeholders, incentivizing participation in outreach activities, consistently engaging with launch vehicle manufacturers, inter-agency cooperation, and raising awareness of risks related to FDI. States should ensure that NewSpace companies and other stakeholders are aware of missile proliferation risks and create effective internal compliance programmes. These should not only take proliferation risks into consideration but comply with export controls throughout the innovation and life cycles of technologies and products. Given the turnover of compliance professionals, as well as mergers, acquisitions and technology partnerships between companies, there will likely be a natural circulation of awareness within the NewSpace industry, potentially fostering the emergence of effective compliance standards as a competitive advantage. To support this and help prevent proliferation and illicit procurement activities, governments need to build the accompanying narrative, provide appropriate tools and, where necessary, incentivize and enforce compliance and due diligence.

So far, only a limited number of states have experience with targeted outreach to the NewSpace industry and there have been few, if any, exchanges on good practices at the international level. As the NewSpace industry continues to grow globally and more states begin to engage in targeted outreach to NewSpace stakeholders, there will be more opportunities for states to share their experiences and refine good practices. The MTCR and HCOC offer possible forums for states to engage in dialogue and publish and maintain a set of good practices that can be utilized by both partners and non-member states. Within the framework of Resolution 1540, the Wiesbaden Process provides another potential forum through which a global dialogue on good practices for targeted outreach to the NewSpace industry could be advanced.





## Abbreviations

FAQs	Frequently asked questions
FDI	Foreign direct investment
HCOC	The Hague Code of Conduct against Ballistic Missile Proliferation
LEO	Low-earth orbit
MTCR	Missile Technology Control Regime
WMD	Weapons of mass destruction



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**STOCKHOLM INTERNATIONAL  
PEACE RESEARCH INSTITUTE**

Signalistgatan 9

SE-169 72 Solna, Sweden

Telephone: +46 8 655 97 00

Email: sipri@sipri.org

Internet: www.sipri.org

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# DEVELOPING GOOD PRACTICES IN EXPORT CONTROL OUTREACH TO THE NEWSPACE INDUSTRY

KOLJA BROCKMANN AND LAURIANE HÉAU

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## ABOUT THE AUTHORS

**Kolja Brockmann** (Germany) is a Senior Researcher with SIPRI's Dual-Use and Arms Trade Control Programme (non-resident) and project lead of the project 'Quo vadis MTCR? The Missile Technology Control Regime at a crossroads'. His recent work has focused on the multilateral export control regimes, post-shipment controls, and non-proliferation and export control challenges linked to additive manufacturing, hypersonic missile technology and the NewSpace industry.

**Lauriane Héau** (France) is a Research Assistant with SIPRI's Dual-Use and Arms Trade Control Programme. She currently undertakes research on projects focusing on dual-use export controls in the Middle East, risks of diversion and misuse following arms exports, as well as developments within the multilateral export control regimes, including the MTCR.