From Space Race to Disgrace: A Summary of The Russian Federation's National Space Legislation and Its Recent Decline in the Global Space Sector

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INTRODUCTION

This paper seeks to summarize the national legislation governing the Russian Federation's activities in space while providing additional insight into how this body of law has affected the Russian Federation and its space endeavors throughout its complicated history. The first section provides a history lesson of space endeavors under the former Soviet Union and how its collapse helped shape the space sector in today's Russian Federation. The second section summarizes the Russian Federation's main body of legislation governing space activity enacted in 1993. The third section provides updates regarding additional legislation passed since 1993 as space activities have advanced over the past few decades. The fourth and final section offers a glimpse into the Russian Federation's future space endeavors.

HISTORY

Space Endeavors Under the Soviet Union

Before there was the Russian Federation, there was the greater Soviet Union. Whenever the rich history of past developments in outer space is discussed, one cannot provide an all-encompassing summary without mentioning the endeavors of the Soviet Union. Specifically, the Soviet Union and the United States played a pivotal role in the "Space Race" during the 1950s and 1960s. Arising out of tensions during the Cold War, the "Space Race" was "a series of competitive technology demonstrations between the United States and the Soviet Union, aiming to show superiority in spaceflight."[1] During the early days of the "Space Race," the Soviet Union was even considered to be "winning" because of a string of "firsts" that even the United States space sector had yet to experience. In 1957, the Soviet Union launched "Sputnik 1," the "world's first artificial

[1] Adam Mann, *What was the Space Race? Origins, Events, and Timeline,* SPACE.COM (July 8, 2022), https://www.space.com/space-race.html.

satellite and the first man-made object to be placed into the Earth's orbit."[2] "In April 1961, Soviet cosmonaut Yuri Gagarin became the first person to orbit Earth, traveling in the capsule-like spacecraft Vostok 1."[3] Despite these "firsts" and more than a decade of completing many other successful projects, the Soviet Union is considered to have ultimately lost the "Space Race" when the United States' Apollo 11 spacecraft, containing famous cosmonauts Neil Armstrong and Buzz Aldrin, successfully conducted the first lunar landing attempt in 1969.[4]

Although the general hostility between the Soviet Union and other nations continued in the political sense during the Cold War, space endeavors in the 1970s and 1980s can be viewed as one catalyst for improving relations between the Soviet Union and the rest of the world. In 1975, a joint mission was conducted by the United States and the Soviet Union, where an American Apollo spacecraft and a Soviet Soyuz spacecraft docked together in orbit.[5] When the captains of each spacecraft shook hands, this "'handshake in space' served to symbolize the gradual improvement of United States-Soviet Union relations in the late Cold War era."[6] The Soviet Union began opening its flights to other nations under the Interkosmos Program in 1978, which saw many missions launched with Soviet Soyuz spacecraft that "included more than a dozen other nations [participating] through the late 1980s."[7]

Although the Soviet Union was one of the most active and successful nations to engage in early space endeavors, they had no specific non-classified legislation dealing with space activities. Rather, space activities in the Soviet Union "'were regulated' by numerous secret decisions adopted by the Central Committee of the Communist Party, by the Government, and various ministries and agencies," which were inaccessible to the public in the country and abroad.[8] However, "certain relations pertaining to space activities [such as labor, tort liability, and contract matters, among other things] were regulated in the former Soviet Union, like in other countries, by general national legislation."[9] While there was no specific legislation in space activities up to this

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[2] History.com Editors, *The Space Race*, HISTORY.COM (Feb. 22, 2010), https://www.history.com/topics/cold-war/space-race.
[3] *Id.*
[4] *Id.*
[5] *Id.*
[6] *Id.*
[7] Elizabeth Howell, *Baikonur Cosmodrome: Russian Launch Complex*, SPACE.COM (June 15, 2018), https://www.space.com/33947-baikonur-cosmodrome.html.
[8] Elena Kamenetskaya, *The Present Development of Legal Regulations of Space Activities in Russia and Commonwealth of Independent States*, 26 AKRON L. REV. 465, 470 (1993).
[9] *Id.*

point in the Soviet Union's history, the Soviet Union abruptly underwent a major transformation that required clear legislation and agreements regarding space activities.

The Collapse of the Soviet Union

Due to a wide array of factors beyond the scope of this paper, the Soviet Union collapsed in late 1991.[10] After "the breakaway of some of its republics," the Russian Federation was the new name of the country of what was left of the Soviet Union.[11] Additionally, "[t]he Commonwealth of Independent States (CIS) was founded in 1991 after the dissolution of the Soviet Union," which includes all of the now-independent states of Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan that used to form the greater Soviet Union.[12] The CIS served to "cooperate in various fields of external and internal policies, and announced the guarantees for the implementation of the international commitments of the former Soviet Union."[13] Because the various ground facilities of the space industry of the former Soviet Union were spread across these now-independent states, cooperation among them was needed to maintain the success that the former Soviet Union experienced. The first agreement between the member states of the CIS was the Minsk Agreement in 1991, a "somewhat vague document" reflecting the intent for cooperation between former Soviet Union states.[14] Another agreement reached in 1992, the Tashkent Agreement, developed the former Minsk Agreement regarding the utilization of space facilities and infrastructure.[15] The only CIS member state that was not a party to either of these agreements was Moldova (they were not a party to both).[16]

Perhaps the most important agreement among member states of the CIS involving the Russian Federation is the bilateral agreement between the Russian Federation and Kazakhstan regarding the utilization of the Baikonur Cosmodrome. Entered into in 1992, "[t]his agreement confirms that the Baikonur Cosmodrome is the property of Kazakhstan and sets forth rights and

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[10] *Political Map of the Russian Federation*, NATIONSONLINE.ORG, https://www nationsonline.org/oneworld/map/russia-political-map.htm.
[11] *Id.*
[12] Yuri Yarov, *Commonwealth of Independent States (CIS)*, NTI (May 2007), https://www nti.org/education-center/treaties-and-regimes/commonwealth-independent-states-cis/.
[13] *Id.*
[14] Kamenetskaya, *supra* note 8, at 471.
[15] *Id.* at 472.
[16] *Id.* at 471-72.

obligations of Kazakhstan and Russian Federation in the utilization of these facilities."[17] The "Baikonur Cosmodrome in Kazakhstan has been the launch site for Soviet and Russian space missions since the beginning of" their space endeavors and "is [still] heavily used for Soyuz astronaut launches to the International Space Station."[18] All of these developments and engagements with the outside world ultimately led to a new era in space activities for the newly-established Russian Federation, and it logically followed that the Russian Federation needed national legislation to regulate space activities in the national and private context.

MAIN LEGISLATION IN 1993

Overview

After the collapse of the Soviet Union, the Russian Federation faced the difficult task of replacing the Soviet Union from an international perspective. One obvious strain was in trying to maintain the might of the former Soviet space program. This duty, coupled with "increasing opportunities for private or quasi-private entities to become involved in such activities," led to the enactment of the "'Law of the Russian Federation on Space Activities'" (the "Law") in August of 1993.[19] This body of legislation is still revered as the main legislative act regulating space activities in the Russian Federation. From a broad perspective, the Law "sets out the goals and principles of space activities in Russia, defines the licensing procedure, space activity financing, certification of conformity of space equipment, and touches on security and international cooperation in space."[20] According to the Law, the Supreme Soviet (now the Federal Assembly) has the power to "determine the space policy of Russian Federation," the President (currently Vladimir Putin) has the power to "implement[] space policy of Russian Federation," and the Council of Ministers has the power to supervise space policy on "space activities."[21]

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[17] *Id.* at 473.
[18] Howell, *supra* note 7.
[19] Frans G. von der Dunk, *Two New National Space Laws: Russia And South Africa,* SPACE, CYBER, AND TELECOMMS. L. PROGRAM FAC. PUBL'NS, 251-52 (1995) https://digitalcommons.unl.edu/spacelaw/47.
[20] Roman Buzko, *Regulation of Space Activities in Russia*, BUZKO KRASNOV (Feb. 2, 2021), https://web.archive.org/web/20211205000530/https://www.buzko.legal/content-eng/legal-regulation-of-space-activities-in-russia.
[21] Law of the Russian Federation on Space Activities, § 2, Art. 5 [Decree No. 5663-1 of the Russian House of Soviets]. The text of this document is available in English (unofficial translation) online: United Nations Office for Outer Space Affairs website <https://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/russian_federation/decree_5663-1_E.html> (date accessed: 24 February 2023).

The Law first defines "space activity" as

> any activity immediately connected with operations to explore and use outer space, including the Moon and other celestial bodies. Space activity shall include: space researches; remote sensing of the Earth from outer space, including environmental monitoring and meteorology; use of navigation, topographical and geodesic satellite systems; piloted space missions; manufacturing of materials and other products in outer space; other kinds of activity performed with the aid of space technology.[22]

The final provision involving "other kinds of activities performed with the aid of space technology" appears to cast a large net for what is considered a "space activity."[23] According to the Law, space activities "shall be carried out with the goal of promoting the well-being of the citizens of the Russian Federation, the development of the Russian Federation and ensuring its security, as well as solving global problems of mankind."[24] The Law also lists some prohibitions related to space activities, including the testing of nuclear weapons; conducting space activities as a means "to influence the environment for military and other hostile purposes;" "creat[ing] deliberate immediate threat to safety of space activity;" and causing " harmful contamination of outer space which leads to unfavourable changes of the environment."[25] Although the Law defines many terms, the one that would likely provide the most clarification—"outer space"—is notably absent.

Responsibility

The most central component of the Law involves the establishment of a licensing regime for private entities that wish to partake in space activities. The Law "establish[es] a licensing (permission) procedure for the pursuit of space activity in scientific and national-economy purpose."[26] The space activities subject to licensing are "space activit[ies] of organizations and citizens of [sic] Russian Federation [("nationality-based jurisdiction")] or space activity of foreign organizations and citizens under the jurisdiction of Russia if such activities includes tests, manufacture, storage, preparation for launching and launching of space objects, as well as control

[22] *Id.* § 1, Art. 2.
[23] *Id.*
[24] *Id.* § 1, Art. 3.
[25] *Id.* § 1, Art. 4.
[26] *Id.* § 2, Art. 9.

over space flights [("territorial jurisdiction")]."[27] This phrasing appears to cover "both the Russian responsibility for any private national activities in outer space, and Russian liability for private space activities involving a space object launched from Russian territory."[28] In terms of the Liability Convention, a treaty enacted in 1972 that governs liability rules of outer space activities for all participating countries, "Russia will be held internationally liable for private entities' space activities which it has no territorial or nationality-based jurisdiction over."[29] For example, if a satellite was launched from within the Russian Federation, but a foreign company operates that satellite on foreign soil, the Russian Federation can still be held liable for damages under the Liability Convention even though they do not have nationality-based or territorial jurisdiction over the space activities.[30] Narrow instances like these "consequently will have to be dealt with by means of the relevant contracts."[31]

The Law also notes that "[c]arrying out of space activities by an organization or a citizen without a license or in wilful [sic] violation of the terms of the license shall be punishable by virtue of legislation of [sic] Russian Federation."[32] It is important to note that the Law often leaves some narrow matters up to subsequent legislation. In most cases, like the prior example involving licensing violations, these matters have not been expressly addressed in subsequent legislation and instead are left up to "the discretion of the applicable government body" on a case-by-case basis.[33]

The Law establishes a certification system for all "space technology." "Space technology" is defined as "space objects, ground and other objects of space infrastructure created for scientific and national-economy purposes, and equipment used in creation and use of space technology."[34] According to the Law, all space technology must receive proper certification to ensure compliance with the requirements established by legislation of the Russian Federation.[35] The law further requires "[a]ny space activity shall be carried out in observance of the safety requirements laid

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[27] *Id.*
[28] von der Dunk, *supra* note 19, at 253.
[29] *Id.* at 252.
[30] *Id.*
[31] *Id.* at 253.
[32] Law of the Russian Federation on Space Activities, § 2, Art. 9 [Decree No. 5663-1 of the Russian House of Soviets].
[33] von der Dunk, *supra* note 19, at 255.
[34] Law of the Russian Federation on Space Activities, § 2, Art. 10 [Decree No. 5663-1 of the Russian House of Soviets].
[35] *Id.*

down by the legislation of [sic] Russian Federation."[36] It is the task of the Russian Space Agency and Ministry of Defense (entities to be subsequently defined) to provide overall guidance of the work to ensure safety, provide information on threats arising while carrying out space activities, and inform appropriate parties upon the origination of a threat to public safety and the environment.[37]

More specific safety-related matters are also set forth in the Law. First, "[i]ncidents, including accidents and disasters," occurring during space activities are "subject to investigation."[38] Second, "[s]earch-and-rescue works, as well as clean-up of an accident while carrying out space activities, [is to] be accomplished by appropriate state services."[39] Finally, legislation of the Russian Federation is to set an amount of "compulsory insurance coverage" to be carried by "organizations and citizens, which exploit space technology or to whose order the creation and use of space technology in scientific and national-economy purpose is carried out."[40]

The actual licensing bodies for space activities under the Russian Federation are split between space activities for scientific and national-economy purposes and space activities for security and defense purposes.[41] The Russian Space Agency (whose current legal successor is "Roscosmos") is the "body of federal executive power responsible for carrying out space activity in scientific and national-economy purposes under the jurisdiction of the Russian Federation in accordance with the space policy of [sic] Russian Federation."[42] "Space activities for defense and security" purposes are "pursued by the Ministry of Defense," which is "responsible for the implementation of the long-term program and annual plans of works to create and use military space technology in conjunction with other ministries and departments of the Russian Federation."[43] The Ministry of Defense has the right to mobilize any object of space infrastructure expressly stipulated by legislation of the Russian Federation, as well as "temporarily transfer idle objects of space infrastructure under its jurisdiction to the Russian Space Agency on a contractual basis to be used for space activity for scientific and national-economy purposes."[44] The "Federal

[36] *Id.* § 5, Art. 22.
[37] *Id.*
[38] *Id.* § 5, Art. 23.
[39] *Id.* § 5, Art. 24.
[40] *Id.* § 5, Art. 25.
[41] *See id.* § 2, Arts. 6, 7.
[42] *Id.* § 2, Art. 6.
[43] *Id.* § 2, Art. 7.
[44] *Id.*

Space Program of Russia" is the document that provides where state orders are placed "for the creation and use of space technology for scientific and national-economy purposes" and also includes "the procedure for interaction [between] the Russian Space Agency and the Ministry of Defense" regarding licensing matters.[45] The current Federal Space Program of Russia is in place through 2025.

Liability

Compared to other aspects of the regulation of space activities that provide detailed steps for handling certain issues, the Law deals with liability and reimbursement from a relatively broader scope. With respect to incidents arising from private space activities, the "Russian Federation shall guarantee full compensation for direct damage inflicted as a result of accidents occurring while carrying out space activities in accordance with legislation of [sic] Russian Federation."[46] The Law goes on to state that "[c]ompensation for damage inflicted as a result of accidents occurring while carrying out space activities shall be paid by the organizations and citizens responsible for operation of the space technology involved."[47] Liability also "arise[s] regardless of the fault of the inflictor" as long as there are "damages inflicted by a space object of the Russian Federation within the territory of the Russian Federation, or outside the jurisdiction of any state, except outer space."[48] The concept of joint and several liability applies to incidents arising from space activities, as the Law states that liability for damages is to be "partly of [sic] fully laid upon the appropriate organizations and citizens" with the party or parties to be held "at fault and in proportion to their fault."[49] Therefore, if multiple private parties are involved in a space activity that results in an incident, they will be held liable for the damages they have caused based on the degree to which they are at fault.

Unlike the national legislation of some other countries, the Russian Federation does not provide a mechanism in the Law to set maximums for reimbursement of any incidents where liability can arise. Rather, the Law addresses liability reimbursement more ambiguously. The Law states that liability for "damage inflicted as a result of accidents occurring while carrying out space activities shall be limited to the amount of the insured sum or insurance indemnity provided

[45] *Id.* § 2, Art. 8.
[46] *Id.* § 7, Art. 30.
[47] *Id.*
[48] *Id.*
[49] *Id.*

in contracts of insurance of space technology and risks involved in space activity."[50] The Law then immediately appears to counter this provision by stating that "[i]f the insured sum or insurance indemnity is insufficient for compensation of the damage inflicted as a result of accidents occurring while carrying out space activity, recourse may be taken against the property of relevant organizations and citizens in the manner specified in the legislation of [the] Russian Federation."[51] The wording of these two provisions suggests that the initial rule follows the concept of unlimited liability reimbursement. However, the last word has yet to be said on the proper meaning of the phrases mentioned regarding liability and reimbursement requirements. At the very least, this suggests an initial limit to reimbursement "whilst nevertheless allowing the Russian authorities a basis for claiming reimbursement of amounts above such limits if warranted by special circumstances."[52] This area serves as another example where the final say on matters appears to be left up to the discretion of the applicable government entity.

Jurisdiction

The Russian Federation takes appropriate measures within the Law to ensure they retain jurisdiction over their objects and people engaged in space activities. The space objects of the Russian Federation are "subject to registration and shall have markings certifying their appurtenance to [sic] Russian Federation."[53] The Russian Federation "retain[s] jurisdiction and control over space objects registered in it, during the ground time of such objects, at any stage of a space flight or stay in outer space, on celestial bodies and also on return to the Earth outside the jurisdiction of any state."[54] In other words, this provision provides that the Russian Federation exercises jurisdiction and control over its registered space objects at all times, except when the space object is rightfully under the jurisdiction of another foreign state. The Russian Federation also retains jurisdiction and control over "any crew of a manned space object registered in it, during the ground time of such object, at any stage of a space flight or stay in outer space, on celestial

[50] *Id.*
[51] *Id.*
[52] A. Kerrest de Rozavel & F. G. von der Dunk, *Liability and Insurance in the Context of National Authorisation*, SPACE, CYBER, AND TELECOMMUNICATIONS LAW PROGRAM FACULTY PUBLICATIONS, 5 (2011) http://digitalcommons.unl.edu/spacelaw/78.
[53] Law of the Russian Federation on Space Activities, § 4, Art. 17 [Decree No. 5663-1 of the Russian House of Soviets].
[54] *Id.*

bodies, including extra-vehicular stay, and on return to the Earth, right up to the completion of the flight program, unless otherwise specified in international treaties of [sic] Russian Federation."[55]

The Russian Federation also notes how international agreements with foreign states affect jurisdictional issues. First, "[t]he rights of ownership over space objects shall remain unaffected, . . . unless otherwise specified in international treaties of [sic] Russian Federation."[56] Additionally, "[i]f a space object is designed and manufactured by Russian organizations and citizens jointly with foreign organizations and citizens or international organizations, the issues of the registration of such object, the jurisdiction and control thereover and also the questions of the rights of ownership thereof, shall be decided on the basis of the appropriate international treaties."[57] Therefore, international treaties entered into by the Russian Federation preempt the Law on questions of jurisdiction, control, and ownership rights.

Other Important Aspects

Many aspects of this Law regarding space activities fall outside the principal legal framework addressing responsibility, liability, and jurisdiction. Section III addresses the economic conditions of space activities, mainly the financing of space activities under the Russian Federation.[58] First, for "purposes of defense and security," financing "shall be provided by the republican budget of [sic] Russian Federation as part of defense expenditures."[59] Second, "for scientific and national-economy purposes," financing is to be "executed from the republican budget of [sic] Russian Federation in accordance with the Federal Space Program of Russia, and figured in the republican budget of [sic] Russian Federation as a separate item."[60] The Law also establishes "[t]he Russian Space Fund . . . with the aim to support and promote space science and industry."[61] The assets of the Russian Space Fund are provided by, among other things:

> allocations from the republican budget of Russian Federation granted on a purpose-oriented basis as part of the financing of the Federal Space Program of Russia; extra-budgetary funds created by state customers for works to create and use space technology; part of the profit received by organizations and citizens at the expense of

[55] *Id.* § 4, Art. 20.
[56] *Id.* § 4, Art. 17.
[57] *Id.*
[58] *Id.* § 3.
[59] *Id.* § 3, Art. 12.
[60] *Id.*
[61] *Id.* § 3, Art. 13.

> tax exemption granted in connection with space activity; profit resulting from the realization of space projects financed by the Russian Space Fund; insurance payments made by organizations and citizens involved in space activity in the form of obligatory or voluntary insurance; voluntary contributions of Russian and foreign organizations and citizens.[62]

In addition to establishing a financing framework, Section III also provides information on state orders for projects with contractors, as well as the use, transfer, and property rights of space technology.[63]

Section IV addresses the various regulations surrounding the space infrastructure of the Russian Federation. Most importantly, "ground and other objects of space infrastructure" in the Russian Federation, considered as such to the extent that they are used for ensuring or carrying out space activities, among other things,

> consist of: cosmodromes; launching complexes and installations; instrumentation and command complexes; space objects flight control centers; data acquisition, storage and processing terminals; space equipment storage bases; space object landing grounds and runways; experimental base facilities for the creation of space technology; cosmonaut training centers and equipment; any other ground facilities and equipment used for carrying out space activities.[64]

The Law states that "[s]pace flight control at all stages from the launching of a space object of [sic] Russian Federation to completion of the flight shall be exercised by the organizations in charge of the ground and other objects of space infrastructure."[65] "Launch and landing" operations for space objects also "shall be carried out in preset area [sic] under an arrangement made with the appropriate bodies of state power and administration."[66] Another interesting detail regarding infrastructure is that Russian cosmonauts are to be "selected for preparation and realization of space flights on the basis of competition."[67]

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[62] *Id.*
[63] *See id.* § 3.
[64] *Id.* § 4, Art. 18.
[65] *Id.* § 4, Art. 19.
[66] *Id.*
[67] *Id.* § 4, Art. 20.

Section VI addresses international cooperation regarding the regulation of space activities by the Russian Federation.[68] According to the Law, one specific goal of Russia is to "promote the development of international cooperation in the field of space activities, as well as the solution of international legal problems that may arise in the exploration and use of outer space."[69] International treaties entered into by the Russian Federation on questions of space activities, ratified by the Federal Assembly, preempt this Law.[70] This matter was specifically highlighted previously regarding questions of jurisdiction, control, and ownership rights. The Law also expresses an intent by the Russian Federation to provide legal protections regarding "technologies and commercial secrets to foreign organizations and citizens carrying out space activity under the jurisdiction of [sic] Russian Federation."[71] Furthermore, in the case of a conflict of rules of legislation between the Russian Federation and a foreign state, the Law states that "the legislation of [sic] Russian Federation shall prevail, unless otherwise specified in international treaties signed by [sic] Russian Federation."[72] These provisions addressing international cooperation allow for more opportunities for foreign investment into space activities of the Russian Federation, which can help speed up the growing private space sector.

UPDATES SINCE 1993

Space Endeavors Under the Russian Federation

After enacting the Law in 1993, the Russian Federation began expanding its operations in the space sector and worked on joint missions with more foreign states than it likely ever had before. The first of these joint endeavors involved the Russian Federation's Mir Space Station, which "was humankind's first continuously inhabited research station in space" and "orbited Earth from 1986 to 2001."[73] From 1995 until 1998, NASA offered paid flights to the Mir Space Station for several astronauts under the "Shuttle-Mir Program."[74] In addition to the United States, the

[68] *See id.* § 6.
[69] *Id.* § 6, Art. 26.
[70] *Id.*
[71] *Id.* § 6, Art. 27.
[72] *Id.* § 6, Art. 28.
[73] MasterClass Staff, *What Is Mir? Learn About the Mir Space Station's Origins and 9 Key Milestones From Its History*, MASTERCLASS (Sep. 29, 2021), https://www masterclass.com/articles/what-is-mir-learn-about-the-mir-space-stations-origins-and-9-key-milestones-from-its-history.
[74] Elizabeth Howell, *Roscosmos: Russia's Space Agency*, SPACE.COM (Jan. 29, 2018), https://www.space.com/22724-roscosmos html.

Russian Federation also engaged in a joint venture with France.[75] Entered in 1996, the French-Russian "Starsem joint venture" functioned to "market[] Russia's Soyuz rocket" and perform "launches for government and commercial customers."[76] The Russian Federation also played a major role in constructing and operating the International Space Station ("ISS") since its first element was launched in 1998.[77] The ISS dictated a large focus of the Russian Federation's space activities throughout the early 2000s. All of these engagements in new space activities helped the Russian Federation get back on track regarding its space sector after it experienced a natural setback from the collapse of the Soviet Union. Furthermore, the Russian Federation experienced "average annual economic growth of 7 percent from 2003 to 2007," which helped the Russian space program experience a "remarkable 'resurgence.'"[78] This growth, coupled with NASA's "considerable problems in the early 2000s" and its retirement of the aging Space Shuttle, [79] led to the development that all trips to the ISS were launched from the Russian Federation's Baikonur Cosmodrome in Kazakhstan.[80] By 2018, the Russian Federation was charging NASA more than $80 million per astronaut leaving for the ISS.[81]

There have also been some significant developments over the past few years that have signaled an intention of the Russian Federation to re-prioritize its space infrastructure and explore potential new space endeavors. In April 2021, the Russian Federation successfully launched a Soyuz rocket from the Vostochny Cosmodrome, their "newest spaceport" "in Russia's Far East."[82] The construction of the Vostochny Cosmodrome is being conducted to establish it as the Russian Federation's principal launch site and is "intended to remove Russia's dependence on—and $115 million in yearly rent payments for—the former Soviet launch facility at Baikonur in Kazakhstan."[83] However, the plan for Vostochny has experienced some crucial setbacks from a series of failed launches and corruption scandals in recent years.[84] Specifically, "Vostochny . . .

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[75] SpaceNews Editor, *Starsem Role to Evolve After Soyuz Arrives at French Guiana*, SPACENEWS (June 7, 2007), https://spacenews.com/starsem-role-evolve-after-soyuz-arrives-french-guiana/.
[76] *Id.*
[77] Howell, *supra* note 74.
[78] James Clay Moltz, *The Changing Dynamics of Twenty-First-Century Space Power*, 12 J. OF STRATEGIC SEC., no. 1, 2019, at 23.
[79] *Id.* at 22.
[80] Howell, *supra* note 74.
[81] *Id.*
[82] Stephen Clark, *OneWeb Adds 36 More Satellites to Internet Network*, SPACEFLIGHT NOW (Apr. 26, 2021), https://spaceflightnow.com/2021/04/26/oneweb-adds-36-more-satellites-to-internet-network/.
[83] Moltz, *supra* note 78, at 24.
[84] *See id.*

failed to meet its operational goal of a 2015 launch due to rampant corruption, which resulted in politically embarrassing hunger strikes by unpaid workers, the loss of hundreds of millions of dollars, and the firing of two successive managers."[85] Additionally, after a failed launch in 2017, even "Russian analysts began to downplay previously rosy prospects for the facility, discounting the possibility of any near-term cosmonaut launches."[86] Despite the various troubles that have affected Vostochny, its most recent successful mission suggests that the Russian Federation's plan of establishing it as its principal launch facility is back on track.

The Russian Federation also recently engaged in a joint mission planned with the European Space Agency ("ESA"), titled ExoMars, to reach Mars's surface.[87] Up to this point, only the United States and China have conducted successful missions to reach the surface of Mars.[88] The ExoMars mission was planned for launch in September 2022, and landing scheduled for June 2023.[89] The mission's group of spacecraft "consists of a rover and a surface science platform" and "[b]oth contain instruments designed to answer whether life has ever existed on Mars."[90] While this would be considered a huge accomplishment even amidst the Russian Federation's rich history in space, this joint mission has been suspended in light of recent developments between the Russian Federation and Ukraine (a matter to be subsequently discussed).[91] Furthermore, while ESA aims to launch the ExoMars mission in 2028, it is currently unclear if the Russian Federation will be involved.[92] Russian experts previously involved in the ExoMars mission have not come to Europe to assist with the project since the Russian Federation's invasion of Ukraine, and NASA has recently expressed interest in potentially replacing the Russian Federation by providing immediate support.[93]

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[85] *Id.*
[86] *Id.* at 25.
[87] Stuart Clark, *Europe and Russia Plan to Put Spacecraft on Mars*, THE GUARDIAN (May 20, 2021), https://www.theguardian.com/science/2021/may/20/europe-and-russia-plan-to-put-spacecraft-on-surface-of-mars.
[88] *Id.*
[89] *Id.*
[90] *Id.*
[91] Juliette Colleen, *Long-Delayed ExoMars Mission Still Dreams of 2028 Launch*, PHYS.ORG (Feb. 3, 2023), https://phys.org/news/2023-02-long-delayed-exomars-mission html.
[92] *Id.*
[93] *Id.*

Licensing Procedures

As mentioned, under the licensing regime structure, the current legal successor to the Russian Space Agency is "Roscosmos." It was formed under federal law in 2015[94] by "merging the [former Russian Space Agency] with United Rocket and Space Corporation, a joint-stock entity, meant to bolster the space sector."[95] This move, made by President Vladimir Putin, was made "to eradicate corruption and raise quality control after a series of Roscosmos launch failures."[96] In addition to space activity licensing, some of the broad powers of Roscosmos include:

> Ensuring the implementation of state policy in the field of space activities together with federal agencies; [d]evelopment of Federal Space Program projects and other federal programs in the field of space activities; [p]lacement of state orders for the development, production and delivery of space equipment and space infrastructure facilities for scientific and socio-economic purposes; [a]rrangement and support of commercial space projects; [c]reation and maintenance of the federal data fund; and [s]pace activity licensing.[97]

With a revitalized licensing agency in Roscosmos, the Russian Federation then looked into updating the actual substance of their licensing regulations.

In 2020, the Russian Federation adopted a new set of licensing regulations through a federal decree.[98] This was seen as a first step in "preliminary work to improve legislation and remove administrative barriers in the development of the private sector."[99] Some new requirements under the new regulations for licensing applicants include certain safety and sanitation requirements for infrastructure, certain employment contracts and qualifications, an established quality control system, availability of duly approved study programs, and necessary protection systems for acquired information.[100] By forming Roscosmos and updating their licensing regulations, the Russian Federation has signaled a newfound willingness to get "[i]n line with the global trend for

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[94] Buzko, *supra* note 20.
[95] Howell, *supra* note 74.
[96] Moltz, *supra* note 78, at 24.
[97] Buzko, *supra* note 20.
[98] *Id.*
[99] *Id.*
[100] *Id.*

the development of private space exploration."[101] While these developments are promising, it may not be revealed to what extent the private space sector fits into the Russian Federation's overall space program plans until they reveal their new Federal Space Program in 2025.[102]

Telecommunications

The Russian Federation is heavily involved in the global telecommunications sector.[103] Within the space realm, the State Commission for Radio Frequencies ("SCRF") is widely responsible for regulations regarding telecommunications.[104] The SCRF is an "interagency coordination body under the Ministry of Digital Development, Communications, and Mass Media of the Russian Federation."[105] The SCRF has broad power to exercise full authority in the field of radio frequency spectrum regulation, perform the main functions of regulating satellite communications in the Russian Federation, and prepare the position of the Russian Federation Communications Administration at all International Telecommunication Union ("ITU") forums.[106] In addition to exercising a wide range of authorities within the Russian Federation, the SCRF also makes decisions regarding satellite communications with foreign states.[107] In a recent federal decree, the Russian Federation established that "the use of foreign satellite systems for creation of satellite networks (lines) for the purpose of development of Russian communication networks and ensuring their integration with international communication networks is permitted on the basis of the decisions of the State Commission for Radio Frequencies."[108] Therefore, if there is a decision that needs to be made by the Russian Federation regarding satellite communications or other space-related telecommunications matters, the SCRF will be principally involved.

Earth Remote Sensing

Another area within the space sector that has developed significantly under the Russian Federation is Earth remote sensing. In a federal decree in 2005, the Russian Federation defined Earth remote sensing as

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[101] *Id.*
[102] *Id.*
[103] *Id.*
[104] *Id.*
[105] *Id.*
[106] *Id.*
[107] *Id.*
[108] *Id.*

> a process of obtaining information about the Earth surface from space by observing and measuring the intrinsic and reflected radiation of land surface, ocean and atmosphere elements in different ranges of electromagnetic waves in order to locate, describe the nature and temporal variability of natural parameters and phenomena, natural resources, the environment, as well as anthropogenic factors and formations.[109]

"The main source of obtaining Earth remote sensing data from space [under the Russian Federation] is the Federal Earth Remote Sensing Database ('ERS Database')," which is operated by Roscosmos. "The ERS Database [also] must store data obtained both from state spacecraft and data purchased by the state from third parties."[110] It is important to note that information from the ERS Database is provided to third parties "on a paid basis."[111] However, certain data "disclosing the results of remote sensing activities of important defense or economic significance" constitutes a state secret and is limited in access.[112] The various space activities involving Earth remote sensing, as well as telecommunications, licensing, and other matters, are all considered in the Russian Federation's Federal Space Program.

Federal Space Program

As previously discussed, The Russian Federation's Federal Space Program is the document that provides where state orders are placed for creating and using space technology for scientific and national-economy purposes. The current Federal Space Program was established by a federal decree in 2016.[113] The purpose of the program is

> to form and maintain the required composition of orbital constellation of spacecrafts, providing services in the interests of the socio-economic sphere, science and international cooperation, including protection of population and territories from natural and technogenic emergencies, as well as implementation of a manned program, creation of means of launching technical equipment to space, laying scientific and technical groundwork for advanced space complexes and systems.[114]

[109] *Id.*
[110] *Id.*
[111] *Id.*
[112] *Id.*
[113] *Id.*
[114] *Id.*

The current Federal Space Program is split up into two stages.[115] The first stage, from 2016 to 2020, "stipulates the increase of the orbital group of spacecrafts for socio-economic and scientific purposes and modernization of technological and experimental bases."[116] The second stage, which the Russian Federation is currently engaged in from 2021 to 2025, stipulates "to maintain the minimally required composition of the orbital constellation of spacecraft, partially re-equip it with new generation spacecraft, and create certain key technologies, elements, and target devices for the space complexes of highest priority."[117] The phrase "certain key technologies, elements, and target devices for the space complexes of highest priority" is made up of somewhat ambiguous language, and could mean a variety of different space developments are in the fold for the Russian Federation in the coming years. Whether their plan involves developing more internal launching within the Russian Federation, improving their spacecraft to accommodate for more common manned transportation in space, or even beginning to engage in space mining, one can expect "certain key technologies, elements, and target devices for the space complexes of highest priority" of the Russian Federation to resemble what other leading countries in the space sector, such as the United States and China, are also heavily investing in as well.

LOOKING FORWARD

Uncertainty Surrounding the Space Sector

Despite the ups and downs that the Russian Federation's space sector has experienced over the past three decades, its future may be as cloudy as ever since the collapse of the Soviet Union. One major known development regarding Russian space infrastructure that has seen several issues involves the construction and operation of the Vostochny Cosmodrome. "The Vostochny project near the Chinese border was intended to reduce Russia's dependence on the Soviet-era Baikonur Cosmodrome in Kazakhstan for manned rocket launches," as discussed previously.[118] In 2021, "[a] Russian court . . . sentenced four people to lengthy prison terms after finding them guilty of embezzling 400 million rubles ($5.6 million) during the construction."[119] Although the Vostochny Cosmodrome has experienced successful launches of late, its corruption scandal and reputation

[115] *Id.*
[116] *Id.*
[117] *Id.*
[118] RFE/RL's Russian Service, *Four More Jailed for Corruption at Cosmodrome Project in Russia's Far East*, RADIO FREE EUROPE/RADIO LIBERTY (Nov. 12, 2021), https://www.rferl.org/a/russia-vostochny-cosmodrome-corruption/31558418 html.
[119] *Id.*

from past failed launches have raised lasting questions surrounding the Russian Federation's ability to make it a reliable investment for the future. [120]

Even under the Russian Federation's current Federal Space Program, ambiguous language dictates its provisions, and there is a sense of secrecy behind what their "certain key technologies, elements, and target devices for the space complexes of highest priority" will turn out to be. Perhaps that ambiguity will disappear with the new Federal Space Program that is expected to come after the expiration of their current program in 2025, but even then, it may be difficult to find accurate and trustworthy reports on the state of the space sector.[121] In 2021, the Russian Federation passed a law "expand[ing] previous press restrictions to ban any independent coverage of Roscosmos, Russia's space agency, and the space industry at large."[122] The law further states that "any [Russia]n media organizations or writers who continue to write about the space industry will be declared 'foreign agents.'"[123] This development will severely threaten any objective reporting outlets from covering space activities under the Russian Federation for the foreseeable future and could potentially "help Russia paint Roscosmos in a better light and draw attention away from the country's declining status as a leader in space."[124]

Another foundational aspect that can potentially serve as a detriment to the development of the Russian Federation's space sector is its continuing reliance on the government of the Russian Federation. While previously discussed measures have been taken regarding the Russian Federation's licensing regime to provide opportunities for the private space sector, "institutional problems across Russia [are expected by some to] limit efforts for Roscosmos to keep up with commercial trends in space."[125] The space sector "remains heavily dependent on the government, and the workforce itself is aging along with the enterprises that build Russian space hardware."[126] Furthermore, "[a] funding and legal environment do not yet exist for space startups to fully flourish."[127] One notable Russian space industry expert, Pavel Luzin, has noted that "without the liberalization of domestic politics and the economy, [the Russian Federation] will not even be able

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[120] Moltz, *supra* note 78.
[121] *See* Dan Robitzski, *Russia Bans Journalists From Covering Its Space Program*, FUTURISM (Oct. 6, 2021), https://futurism.com/the-byte/russia-bans-journalists-covering-space-program.
[122] *Id.*
[123] *Id.*
[124] *Id.*
[125] Matthew Bodner, *60 Years After Sputnik, Russia is Lost in Space*, SPACENEWS (Oct. 4, 2017), https://spacenews.com/60-years-after-sputnik-russia-is-lost-in-space/.
[126] *Id.*
[127] *Id.*

to repeat Soviet achievements in space" because the Russian Federation's "institutions contradict the idea of space exploration."[128] If these concerns hold any merit, there is likely no short-term solution that can fix the problems deeply rooted within the current government structure of the Russian Federation.

In addition to the overall government's control of the space sector, President Vladimir Putin's leadership of the Russian Federation has also contributed as a separate foundational aspect that can potentially serve as a detriment to developing its space sector. In 2021, Putin stated: "[i]n the 21st century, Russia must properly maintain its status as one of the leading nuclear and space powers, because the space sector is directly linked to defence [sic]."[129] It appears reasonable to assume that "[n]uclear missiles remain Russia's only real guarantee of national defense [because i]ts territory is simply too large to reasonably defend conventionally."[130] While Putin's remarks about the importance of the space sector have merit, many still believe that the peak of the Russian Federation's space sector is behind them. The post-Soviet Russian Federation is often called a "nostalgic nation" rather than an "ideological nation."[131] "This nostalgia has been viewed as being expertly co-opted by the government under President Vladimir Putin[, and u]nder him, Russians largely draw pride from looking back, rather than looking forward."[132] If this view holds any merit, the space program has already provided what it needs to. In addition to operating under a backward-looking nation, a space sector being run principally for military and defense concerns harbors the possibility of detrimental consequences already coming into fruition under the Russian Federation.

Invasion of Ukraine

The Russian Federation recently entered into a military conflict with a neighboring nation that has the potential to threaten the vitality of the Russian Federation's entire space sector. In early 2022, "Vladimir Putin ordered Russian troops, tanks, and artillery into two separatist regions [of Ukraine] hours after unilaterally recognizing them as independent countries and declaring them

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[128] *Id.*
[129] Mike Collett-White, *On Gagarin Flight Anniversary, Putin Vows Russia Will Remain Space Power*, REUTERS (Apr. 12, 2021, 11:35 AM), https://www reuters.com/lifestyle/science/gagarin-flight-anniversary-putin-vows-russia-will-remain-space-power-2021-04-12/.
[130] Bodner, *supra* note 125.
[131] *Id.*
[132] *Id.*

allies," which marked "the beginning of a Russian invasion of Ukraine."[133] This act marked the culmination of speculation of a potential invasion since the Russian Federation "had amassed an alarming number of ground forces and support personnel at the border" over the previous few weeks.[134] Some are finding reasoning in Putin's actions in that "Ukraine presents an opportunity for Russia, once and for all, to reassert its geopolitical relevance" that has been dwindling due to a variety of factors including: "the expansion of NATO eastward, the denial of a Russian veto on questions of regional security, and the underlying sense that Russia lost the Cold War."[135] In the first five days of fighting, moderate estimates showed that losses reached "around 1,500 on each side."[136] Recent estimates suggest that, after a year of fighting, the Russian Federation "has [already] suffered between 175,000 and 200,000 casualties during its war in Ukraine."[137]

The rest of the world has reacted negatively to the Russian Federation's attempt to invade Ukraine, and in response, most countries and international organizations are imposing economic sanctions on the Russian Federation.[138] These economic sanctions will directly affect the Russian Federation's space sector in ways that are yet to be entirely seen, but one can assume that in no way will there be a positive impact.[139] Countries that have imposed sanctions on the Russian Federation include the United States, the United Kingdom, Switzerland, Germany, France, Canada, Australia, New Zealand, Japan, and Taiwan.[140] Other sanctions have even been imposed by the European Union and the Society for Worldwide Interbank Financial Telecommunication (SWIFT).[141] Some of these numerous sanctions include: banning transactions with Russian banks, banning Russian-state-owned companies from raising funds within their countries, "impos[ing]

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[133] Robin Wright, Putin Launches His Invasion of Ukraine, THE NEW YORKER (Feb. 22, 2022), https://www newyorker.com/news/daily-comment/putin-launches-his-invasion-of-ukraine.
[134] Joshua Yaffa, *Why is Russia Threatening to Invade Ukraine?*, THE NEW YORKER (Dec. 16, 2021), https://www newyorker.com/news/news-desk/why-is-russia-threatening-to-invade-ukraine.
[135] *Id.*
[136] Helene Cooper & Eric Schmitt, *Russian Troop Deaths Expose a Potential Weakness of Putin's Strategy*, N.Y. TIMES (Mar. 1, 2022), https://www nytimes.com/2022/03/01/us/politics/russia-ukraine-war-deaths html.
[137] Haley Ott, *One Year of Russia's War in Ukraine, by the Numbers*, CBS NEWS (Feb. 23, 2023), https://www.cbsnews.com/news/ukraine-war-news-russia-invasion-by-the-numbers/.
[138] Lara Keay, *Ukraine Invasion: What Sanctions are Different Countries around the World Imposing on Russia and Will They Work?*, SKY NEWS (Mar. 2, 2022, 11:46AM), https://news.sky.com/story/ukraine-invasion-what-sanctions-are-different-countries-around-the-world-imposing-on-russia-and-will-they-work-12554601.
[139] *Id.*
[140] *Id.*
[141] *Id.*

strict export controls;" "[p]ut[ting] sanctions on 'corrupt billionaires' and oligarchs close to the Putin regime;" and banning Russian planes from their airspaces.[142]

Among the United States' wide-reaching economic sanctions against Russia, some penalties will "degrade their aerospace industry, including the space program," but "the new export control measures will continue to allow U.S.-Russia civil space cooperation" for purposes of continuing operations on the ISS.[143] Regarding the ISS, "Roscosmos hasn't renewed its role beyond 2024, even as the United States prepares to extend operations to 2030."[144] In response to the imposed sanctions, Roscosmos chief Dmitry Rogozin claimed that it was Russian expertise that was keeping the ISS in orbit and suggested that sanctions against Russia for its invasion of Ukraine could lead to a catastrophe.[145] Rogozin is referring to the potential for the ISS to fall to the Earth and potentially cause destruction to any given territory that it lands on if the Russian Federation were to stop supporting its orbit in space. In response to this threat, the famed entrepreneur Elon Musk, the founder and CEO of the private space company, SpaceX, recently stated that "SpaceX would save the ISS from an uncontrolled deorbit."[146] Amidst all the chaos resulting from the Russian Federation's invasion of Ukraine, it will be important to monitor how their space sector fares in the foreseeable future, considering the potential negative impact it faces with internal budget allocations and external economic sanctions during wartime.

CONCLUSION

Overall, the Law provides a helpful framework for the Russian Federation to address international issues regarding responsibility, liability, and jurisdiction for private entities. However, as seen throughout the Law, many provisions leave significant discretion up to appropriate state bodies and subsequent legislation. The "large measure of discretion for the relevant government bodies in these respects leave room for both flexibility on the government level and uncertainty on the private level."[147] The Law provides "useful tools for the respective governments to take care of their international responsibilities and liabilities as they may arise in

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[142] *Id.*
[143] Michael Sheetz, *U.S. Space Partnerships with Russia Face 'Greatest Challenge' with Ukraine Invasion, Executive Says*, CNBC (Feb. 25, 2022, 11:29AM), https://www.cnbc.com/2022/02/25/nasa-and-space-partnerships-with-russia-face-ukraine-challenge html.
[144] *Id.*
[145] Anthony Cuthbertson, *Elon Musk Says SpaceX will Save ISS after Russia Threatens to Drop it from Orbit*, YAHOO! NEWS (Feb. 28, 2022), https://news.yahoo.com/elon-musk-says-spacex-save-142256528 html.
[146] *Id.*
[147] von der Dunk, *supra* note 19, at 258.

consequence of partly or wholly private activities."[148] With the help of this broad Law and other subsequent regulations affecting more specific space activities, the Russian Federation has considerably grown its space sector in the wake of the former Soviet Union for the past three decades. While there is much potential for the space sector to continue on this growth trajectory, there are also many considerable potential road barriers that threaten to ruin the progress the Russian Federation has made over the past three decades. There are many issues to monitor to see exactly how the Russian Federation's space sector will evolve in the coming years.

[148] *Id.*