



Artificial Intelligence in Russia Issue 20, February 16, 2021

The Russia Studies Program

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Abstract

This report, the twentieth in a series of biweekly updates, is part of an effort by CNA to provide timely, accurate, and relevant information and analysis of the field of civilian and military artificial intelligence (AI) in Russia and, in particular, how Russia is applying AI to its military capabilities. It relies on Russian-language open source material.

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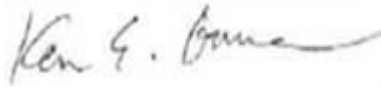
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Approved by:

February 2021



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Governance and Legal Developments

1. Lawmakers discuss advanced technology development at Sberbank conference

At a digital transformation conference held January 21 at Sberbank's corporate university, government deputies and industry experts discussed potential legislation aimed at promoting further development of advanced technologies. State Duma chairman Viacheslav Volodin said legislators need to create the conditions for developing digital technologies, and expressed the view that Russia needs to become a leader in this sphere. As Volodin put it, "If you own technology, you own the world."

However, Anatoly Aksakov, chairman of the Duma Financial Market Committee, said Russia is still at the beginning of the road in many areas of development of the digital economy with a major lag behind the leading countries. He said it will not be possible to overcome that lag quickly, because such progress will require passing relevant laws, though he also said the Duma is actively working to this end. Aksakov expressed hope that the Duma will accept some new laws aimed at this development in the spring session. According to Alexander Zhukov, first deputy chairman of the Duma, the laws being considered by the Duma include those related to the protection of personal data.

The conference participants specifically discussed the development of AI as a priority, with Vladimir Zhironovsky, head of the LDPR political party, stating that the most important thing is the search for intelligence equal to the level of human development. Some participants, such as Gennady Zyuganov, head of the Communist party, expressed a nuanced view of the topic. Zyuganov said that AI is a tool to help humans solve problems, and that, when inventing an AI product, the creator must remember their moral responsibility to humanity, as they will be responsible for how it is used. Aksakov also warned of the consequences of ignoring risks in the digital sphere, saying there is a need to regulate the ethics of the relationship between humans and AI.

Sources: "Deputies and experts consider it important to create legislation for the development of advanced technologies in the Russian Federation" (Депутаты и эксперты считают важным создание законодательства для развития в РФ передовых технологий), State Duma, Jan. 21, 2021; "Deputies gather to regulate the relationship of man and robot" (Депутаты собираются отрегулировать отношения человека и робота), *Rossiskaya Gazeta* (Российская Газета), Jan. 21, 2021, <https://rg.ru/2021/01/21/deputaty-sobiraiutsia-otregulirovat-otnosheniia-cheloveka-i-robota.html>.

2. Government cleans house after failures in implementing digital transformation

In January 2021, the Russian government announced that it would fire and replace 10 out of 62 deputy heads of government for digital transformation, for failing to carry out the tasks entrusted to them. These deputies received low ratings for their performance in a number of related areas, including preparing for departmental digital transformation programs and implementing AI projects.

According to the Russian deputy prime minister, only 18 federal agencies have so far demonstrated high performance in the field of digital transformation. They include the Ministry of Emergency Situations, the Federal Tax Service, the Ministry of Industry and Trade, the Ministry of Agriculture, Roskomnadzor, Rospatent (the federal service for intellectual property), and Rostekhnadzor (the federal service for environmental, technological, and nuclear supervision). The agencies that showed the worst performance included the Ministry of Natural Resources, Rosarkhiv (the federal archive agency), Rosmolodezh (the federal agency for youth affairs), and Rosmorrechflot (the federal agency for maritime and river transport).

The assessment of the departments and chief digital transformation officers took into account a variety of matters, including the quality and pace of implementation of government orders and the fulfillment of budgetary obligations.

Source: “Mass layoffs of heads of state digital transformation began in Russia” (В России начались массовые увольнения руководителей государственной цифровой трансформации), C-News, Jan. 27, 2021, https://www.cnews.ru/news/top/2021-01-27_v_rossii_nachalis_massovye.

3. Law on digital sandboxes comes into force

The law “On Experimental Legal Regimes in the Field of Digital Innovation in the Russian Federation” came into force on January 28, removing many restrictive regulations on testing new technologies. Discussions are now ongoing about the first eight cases for the experiment, with the development of draft programs carried out under a framework of expert groups and with the involvement of the potential sandbox participants, the expert community, and representatives of regulatory bodies and the Ministry of Economic Development.

Source: “Law on digital sandboxes comes into force” (Закон о «цифровых песочницах» вступил в силу), C-News, Jan. 28, 2021, https://www.cnews.ru/news/line/2021-01-28_zakon_o_tsifrovyyh_pesochnitsah.

4. Roskomnadzor drafts requirements for consent to personal data processing

In January 2021, Roskomnadzor issued a draft order specifying how individuals can give consent to the processing of their personal data. The requirements include providing consent via the Roskomnadzor information system in Russian, indicating the purpose of the data processing, and giving certain pieces of identifying information, such as the individual's full name and contact information, as well as information for the operator receiving consent. The subject can restrict or prohibit the operator from distributing their personal data however the subject chooses, and must include the period for which the consent is valid.

The Big Data Association was not fully satisfied with Roskomnadzor's draft, and proposed the addition of more details for the subject of the data. While some experts expressed concern over parts of the draft, including the wording and the lack of additional funds from the federal budget, others extolled the value of updated rules around consent to personal data processing, saying it will allow for more careful and conscious treatment of data transfer.

Roskomnadzor developed the draft in order to implement the provisions of Federal Law No. 519-FZ, "On Amendments to the Federal Law 'On Personal Data,'" passed December 30, 2020. The federal law gave Roskomnadzor the right to establish requirements for consent to personal data processing. The discussion of the draft law will last until February 10, and the law will come into force on March 1.

Source: "Specifics added to personal data" (Персональным данным добавят конкретики), Comnews, Jan. 29, 2021, <https://www.comnews.ru/content/212826/2021-01-29/2021-w04/personalnym-dannym-dobavyat-konkretiki>.

5. Federation Council leadership concerned about AI impact

Valentina Matvienko, the speaker of Russia's Federation Council, indicated that she would like to get involved in the regulation of new technologies and artificial intelligence because she is concerned that humans might become "living robots."

Matvienko noted that people were concerned about AI robots replacing humans in various jobs or even in their personal lives. Referring to the main character in a video shown by Sber head German Gref, she said, "Will there be one or another profession? Or maybe human avatars will replace them at workplaces? ... Of course, it's scary. Because, God forbid, you wake up in the morning, and instead of your husband there is a teakettle." She expressed concern that AI

would eliminate emotions and culture, turning humans into living robots. She has expressed concerns in the past about a future robot uprising, as described in science fiction movies and books. Matvienko's views are commonplace across the Russian public.

Source: "Matvienko concerned by the risk of people transforming into live robots from AI technologies" (Матвиенко встревожил риск превращения людей в "живых роботов" из-за технологий ИИ), Interfax, Jan. 27, 2021, <https://www.interfax.ru/russia/748101>.

Military and Security Developments

6. Rostec develops fourth-generation combat gear

Russia's Rostec State Corporation, the nation's largest military-industrial conglomerate (see issues 3-19 of *AI in Russia* for Rostec activity) has commenced research to create combat equipment for the soldiers of the future. This new development is supposed to replace the third-generation Sotnik gear.

This project will pull in expertise and resources from the Kalashnikov Holding, the Central Scientific Research Institute of Precise Mechanical Engineering, and other Rostec institutions, to study advanced combat gear used by armies around the world, and to establish the RDT&E scope necessary for creating the new generation of combat equipment. According to Rostec, the ultimate goal will be the formation of an interdepartmental comprehensive target program titled "Military gear development for 2035," and the MOD has authorized the enterprise to conduct research on this topic.

The Rostec announcement points to the fourth-generation plans for soldier combat gear. Today, Rostec is developing the third-generation Sotnik outfit, and its several elements are already undergoing preliminary tests. According to Bekkhan Ozdоеv, Rostec's industrial director, the new-generation gear will consist of new technologies, such as robotic equipment and integrated systems for information exchange. Earlier Rostec and MOD statements indicated that Sotnik is a further development of the Ratnik combat system currently in use across the Russian military, and that future designs would have onboard AI along with other advanced technologies. By the end of 2020, Rostec had delivered more than 300,000 second-generation Ratnik combat gear outfits to soldiers serving in Russia and Syria.

Sources: "Rostec Develops 4th Generation Combat Gear," Rostec official website, Jan. 29, 2021, <https://rostec.ru/en/news/rostec-develops-4th-generation-combat-gear/>; "Infantry: Ratnik, Sotnik And Invisibility Capes," StrategyPage.com, Aug. 9, 2020, <https://www.strategypage.com/htmw/htinf/20200809.aspx>.

7. Russian space robots with AI to appear in 2023-2024

According to TASS state media service, the Android Technology (AT) enterprise announced that the first robots that can intelligently interact with astronauts will appear in 2023-2024.

The Russian company is famous for developing the FEDOR android robot that flew to the International Space Station in 2019. FEDOR was also developed in cooperation with Russia's Advanced Research Foundation (please see issue 5 of *AI in Russia*).

According to AT, key technology elements currently under development will allow the robot—named “Teledroid”—to interact with astronauts. The company specified that certain elements of artificial intelligence will be used in the Teledroid creation for work in outer space. The company specified that this new robot will work primarily in a remote-control mode; its fully autonomous operation is a secondary function, because its work should be done under human supervision.

In October 2020, AT announced that the first robot prototype for outer space work will begin testing in the second half of 2021. Following these tests, the company will start developing the robot's appearance, its functions, and its specific protocols for working at the International Space Station.

Sources: “Space robots with artificial intelligence will appear in Russia in 2023-2024” (Космические роботы с искусственным интеллектом появятся в России в 2023-2024 годах), tass.ru, Feb. 1, 2021, <https://tass.ru/kosmos/10590965>; “FEDOR's developer discussed robot's current state” (Разработчик "Федора" рассказал о состоянии робота), Tass.ru, Aug. 24, 2019, <https://tass.ru/kosmos/6794823>.

8. New scientists join ERA Technopolis

In January 2021, MOD's ERA Technopolis hosted a ceremonial swearing-in of young military scientists. The new cohort consisted of 150 university graduates from more than 30 regions across Russia. According to Major General Andrei Goncharov, the head of the MOD's Main Directorate of Scientific Research Activities, in order to be accepted into ERA's highly competitive program, the graduates had to have certain STEM backgrounds. The new scientists are combining their technical research with active military duty. Prior to their swearing-in, the cohort took a course on combined-arms training to familiarize themselves with military regulations and service. In the near future, these young scientists will begin their research in a number of disciplines, such as artificial intelligence technologies and supercomputers.

In 2018, the MOD launched the ERA Technopolis (“Technology City”) as the military's R&D and S&T institution, where young military officers can work alongside the non-military and civilian high-tech institutions to develop breakthrough technologies for the country's armed forces. In 2019, the MOD designated ERA as the military's main AI RDT&E hub, and opened an artificial intelligence laboratory there in 2020.

Source: "Scientific companies of Technopolis "Era" were replenished with young scientists" (Научные роты технополиса «Эра» пополнились молодыми учеными), TvZvezda.ru, Jan. 23, 2021, <https://tvzvezda.ru/news/forces/content/20211231717-fhJQt.html>; ERA Technopolis official webpage, <https://www.era-tehnopolis.ru/>.

9. Russian unmanned aviation comes of age

On January 21, 2021, Aleksei Ramm, one of Russia's premier military journalists, discussed the current state of the MOD UAV fleet. He noted that at this time, unmanned aircraft are part of all Russian military branches, and that the Ground Forces have the largest drone fleet, with more than 1,500 UAVs.

The Orlan-10 UAV forms the core of the Ground Forces' unmanned fleet, along with Granat, Eleron-3, and Tachyon short-range drones. UAV company units are based in motorized rifle and tank brigades and divisions. Ramm notes that similar drone units are being formed in the newly created separate reconnaissance brigades. Each combined-arms army, brigade, and division has two drone platoons for every UAV company. The first is a short-range platoon with Orlan-10 and Tachyon-4 drones. The second platoon is also called "short range," because it has Granat-1, 2, 3, and 4, Zastava, Tachyon, and Eleron-3 drones, all with a range of less than 100 km. This structure is replicated across the Airborne Forces and Naval Infantry, with UAV companies present in the 61st (Northern Fleet) and 40th (Pacific Fleet, Kamchatka) marine brigades.

Ramm further notes that there are unmanned units in the artillery, engineer-sapper, missile, reconnaissance, and even railway brigades. These units are separate platoons with short-range UAVs, like the ones mentioned earlier. Engineers use drones for reconnaissance of minefields and enemy fortifications; railway workers use them to assess the condition of the railroad bed and to assess bridges and other infrastructure. In missile brigades, drones are used to select suitable positions for the Iskander systems and to guard them. Ramm specifically notes an interesting organizational and staff structure of UAV units as part of artillery brigades. In addition to platoons equipped with Orlan-10s, they also include the latest Orion-30 drones, as well as platoons with unmanned artillery reconnaissance systems. It is expected that unmanned units in the Airborne Forces' newly formed artillery brigade will be organized similarly. Orlan-30 drones are also used to guide Karsnopol mortar's high-precision guided missiles, and this new drone has a range of up to 300 km.

Several UAV squadrons have been formed in the Aerospace Forces. The Forpost drones were once the sole UAVs in service there, but recently this fleet was replenished with Orlan-10s. Ramm notes that the Russian Navy has the most original UAV organization. Only the navy has separate UAV regiments, which are equipped with Forpost and the ubiquitous Orlan-10

drones. It is noteworthy that Orlan-10 can also operate at sea—since 2018, the Navy has based Orlan-10 crews on corvettes and frigates.

Ramm further notes new UAV additions for the Russian armed forces. The new Korsar drone could become part of separate unmanned aviation companies of combined-arms brigades and divisions, as well as separate reconnaissance brigades. At least one Korsar platoon could be added to each unmanned company to conduct visual and electronic reconnaissance, and to deliver high-precision strikes. Korsar was shown to the general public at the May 2018 Victory Day Parade. Ramm writes that together with monitoring and radar stations, as well as light bombs and missiles, Korsar, with its range of 200 km, will become an essential element at the brigade and division level, and for the combined arms army—it will be able to operate in the tactical rear of the enemy, identifying command posts, artillery positions, etc. In local conflicts, the Korsar drone can track radio traffic, monitor combatant movement, and strike buildings and vehicles.

Ramm further notes the MOD plans to organize long-range heavy drone units; it is assumed that such units will be formed in the individual reconnaissance aviation squadrons. In late 2020, the Russian military finally received the first batch of MALE Orion UAVs—each drone complex includes a command post and three aircraft. Ramm notes that the Orions will perform tasks similar to those of the Turkish Bayraktar drones. In addition to conducting reconnaissance at a depth of several hundred kilometers, this drone will destroy targets and provide direct support to the troops. Ramm thinks it is noteworthy that at this point, the Altius long-range drones are unlikely to form unmanned aviation squadrons—numerous production delays, in addition to changes among drone developers, seriously slowed down its construction and testing program. Meanwhile, the Russian Navy is clearly interested in the Altius; photos of this drone with the St. Andrew's flag have already been published on the internet.

The main advantages of the Altius are its unique flight time and range. As planned, the drone can stay in the air for over 48 hours and cover a distance up to 10,000 km. Therefore, this drone could become an excellent naval reconnaissance aircraft that will support naval surface groups, naval aviation, and submarine forces. The carrying capacity of the Altius also makes it possible to carry guided weapons—in particular, the Kh-35U antiship missiles. Ramm thinks that at least one Altius squadron will be included in each marine unmanned aviation regiment, and that one or two Altius squadrons can be part of each UAV aviation squadron in the Aerospace Forces.

Ramm further confirms that the S-70 Okhotnik is the most high-tech unmanned aerial vehicle in the Aerospace Forces arsenal. Although this UAV has not yet completed its full test program, assumptions already are that it will conduct surveillance or deliver surgical strikes at strategically important targets in the enemy rear. Using its stealth design, and its ability to carry the most modern radar and radio equipment on board, the Okhotnik will be able to

overcome adversary high-tech air defense systems, radar stations, and military aircraft. One or two S-70 squadrons will be included in each UAV company.

At the same time, an important element of the Okhotnik program is its integration with Su-57 manned fighters; the S-70 squadron could be included in the composition of three air regiments of Russian fifth-generation aircraft. This will simplify the maintenance and operation, since the Okhotnik and Su-57 operate common equipment and weapon systems. Ramm notes that fighter pilots will constantly practice “loyal wingman” cooperation with these drones, and a Su-57-S-70 unit can be actively used during combat training with other military branches. Earlier, the Russian MOD hinted that both Altius and Okhotnik drones will have AI on board for C4ISR (see issues 10 and 14 of *AI in Russia*).

Source: Aleksei Ramm, “Unmanned aviation’s destination” (Куда летит беспилотная авиация), IZ.ru, Jan. 21, 2021, https://nvo.ng.ru/armament/2021-01-21/1_1125_aviation.html; Aleksei Ramm, Bogdan Stepovoi, “Drone to the field: “Orlan-30” will find targets for artillery” (Дрон — в строй: «Орлан-30» найдет цели для артиллерии), Iz.ru, Oct. 2, 2019, <https://iz.ru/925283/aleksei-ramm-bogdan-stepovoi/dron-v-stroi-orlan-30-naidet-tceli-dlia-artillerii>.

Corporate and Market Developments

10. National Technology Initiative IWG meets to discuss Neuronet roadmap

On January 22, 2021, the Interdepartmental Working Group (IWG) meeting took place to deal with the development and implementation of the National Technology Initiative. It was held under the chairmanship of Valry Falkov, the minister of science and higher education, with the participation of Dmitry Peskov, special representative of the president of the Russian Federation for digital and technological development, and leaders of the NTI markets. This is a translation of the results of the meeting.

During the meeting, Andrey Ivashchenko, the leader of the working group on the development and implementation of the NTI Neuronet roadmap, presented an updated version of the Neuronet roadmap. As a result, a recommendation was made to the Government Commission for Economic Modernization and Innovative Development of Russia to approve NTI's "Neuronet" action plan (the roadmap).

The first stage of the Neuronet Roadmap implementation was the creation of, and work with, hundreds of startups in Neuronet technologies. The second stage deals with the emergence of dozens of medium-sized firms that in turn should give rise to national leaders who can be competitive globally (third stage). The new NTI Neuronet roadmap version reflects the adjusted community priorities, taking into account the results achieved for 2020, as well as current social and technological trends, such as changes due to the pandemic and its consequences. There are new sub-segments and updated performance benchmarks to 2025:

- There are now "Exorehabilitation," "Neurosubstitution," and "New generation of TCP" segments in the "Neuromedtekhnik" section.
- The "NeuroEconomics" sub-segment was added in the "Neurocommunications and marketing" section.
- A products and services sub-segment was added for the "AI in telecom" and "AI in industry" areas in the "NeuroAssistant" segment.
- Targets related to the volume of the Russian market and the export of Russian high-tech products were also added to the roadmap. The text of the updated roadmap will be published shortly.

The composition of the Neuronet Working Group was also updated with two experts:

- Ilya Dimitrov – ombudsman for the development of the digital economy; executive director of the Association of Electronic Trading Platforms (AETP); president of SELDON Group
- Aleksey Paevsky – science journalist; editor-in-chief of the Neuronovosti.ru website; scientific editor of the Indicator portal; co-author of a blog on the history of medicine; author of popular science and news articles

The Interdepartmental Working Group meeting summed up the results of several large projects supported by the National Technology Initiative. The NeuroIntellect iPavlov project results were recognized as successful. The essence of the project was to develop deep machine learning algorithms, taking into account the architectural principles of the human brain, along with "conversational" machine intelligence in the form of a technological platform to automate a targeted dialogue with the user.

The technological quality of iPavlov's developments is recognized not only at the Russian level, but also at the international level. For the 2020 Alexa Prize Socialbot Grand Challenge 3, the Alexa Prize committee selected 10 finalists from 375 applications. The Russian team was selected, and received a \$250,000 research grant, access to the Extended Topical Chat dataset, and support from the Alexa developers. On December 25, 2020, the DeepPavlov project received a diploma at the Technological Breakthrough 2020 award ceremony. The results of the iPavlov project will be applied in the Sberbank digital ecosystem.

The previous version of the NTI Neuronet roadmap was approved on June 24, 2016, by the Presidium of the Council under the RF president for economic modernization and innovative development.

The following took place during the 2016–2020 performance period:

- A community of several thousand technology leaders was created to coordinate and involve new members working in the Neuronet technologies and the Neuronet Industry Union fields.
- Funding was launched for more than 110 small businesses (FSI, Razvitie-NTI, Start-NTI programs).
- Twelve key platform projects were launched (Government Decree No. 317).
- Funding was launched for over 130 youth projects (UMNIK program, VIF).
- A partner network of children's circles (Robbo, Bitronics, Robotrek) was formed.
- More than 400 events registered in the Leader-id system were held.
- Seven business missions were organized, to Germany, Switzerland, the UK, and the US.

Performance indicators formulated in 2016 were reportedly achieved and exceeded in 2020.

The Neuronet Industry Union is a nonprofit partnership that brings together developers, manufacturers, and researchers in the field of neurosciences and neurotechnologies, with the aim of creating a competitive Russian market for Neuronet—the next-generation information exchange environment.

NTI is a long-term comprehensive program to create conditions for ensuring the leadership of Russian companies in new high-tech markets in the next 15–20 years. NTI is a broad coalition, involving the formation of groups of like-minded individuals such as technology entrepreneurs, representatives of leading universities and research centers, large business associations of Russia, development institutions, expert and professional communities, and interested executive authorities. Currently, NTI has 12 working groups, which have roadmaps for the development of nine promising markets and three cross-market areas.

Source: “Meeting of the Interdepartmental Working Group (IWG) on the development and implementation of the National Technology Initiative” (Заседание Межведомственной рабочей группы (МРГ) по разработке и реализации Национальной технологической инициативы), RusNeuro.net, Jan. 2021, <http://rusneuro.net/novosti/22-anvara-2021-goda-sostoalose-zasedanie-megvedomstvennoi-rabojei-gruppy-mrg-po-razrabotke-i-realizazii-nazionalenoi-tehnologijeskoi-iniziativy>.

11. New \$10 million fund to invest in AI projects

On January 19, 2021, Begin Capital reportedly launched a new \$10 million fund to invest in artificial intelligence projects. Alexey Menn, founder of Begin Capital, said that funding will go to startups at an early stage of development that can count on investments in the amount of \$100,000 to 250,000. The fund is focused on the European market, and investments will take place at the Seed and Series A stages.

Menn said that AI is a catalyst that can accelerate the development of most industries, and his firm believes that companies that will effectively use AI solutions will have a huge advantage over competitors, because they will have “AI DNA” at the start. Menn also stressed that the fund remains very active, and plans to close five to seven new transactions with a target of \$1 million per transaction in 2021.

Menn also clarified that his fund is not looking for speculative deals; rather, he and his colleagues are interested in helping talented entrepreneurs build global companies that they would not want to leave. This fund, along with a growing number of similar investment mechanism and tools, are crucial to the budding AI entrepreneurs who need capital and support to develop their ideas into actual products. This private sector fund is also an essential

balance to the growing share of government-backed funding mechanisms that seek to foster AI innovation ecosystem.

Source: “\$10 million fund is launched for investing in AI projects” (Запуск фонда на \$10 млн для инвестирования в ИИ-проекты), T Adviser.ru, Jan. 20, 2021, <https://www.tadviser.ru/>.

12. Russia to test flying taxi by 2025

According to Alexander Atamanov, the general director of the Hover unmanned aerotaxi project, pilot tests of flying unmanned taxis will take place in three Russian regions by 2025. Atamanov provided this update during the presentation of the taxi drone that took place on January 25, 2021.

An unmanned flying taxi is a passenger drone that can lift two people into the air at the same time (with a total weight up to 300 kg), and is capable of taking off from an unprepared site, such as a parking lot. The vehicle is controlled by a digital system that completely excludes the passenger from controls. Passengers are in a protective capsule, which can absorb an impact in case of an accident. There is a rescue parachute for emergencies, which can gently lower the car to the ground. The drone’s dimensions are similar to those of a conventional car, and it can stay in the air for up to half an hour.

The Moscow City Department of Entrepreneurship and Innovative Development is involved in allowing unmanned taxi flights around the city. According to Atamanov, the tests became possible thanks to the organizational and administrative support of the Moscow City government. An air taxi was successfully tested at Skolkovo, and the company plans to fly over industrial zones, overpasses, rivers, lakes, and canals. If the project is successfully completed, Hover plans to launch mass production of flying cars at the end of this year. In parallel, negotiations are underway with the leadership of other country regions.

Hover plans to provide flying cars to service aggregators and other new market players similar to Uber. Atamanov noted that by 2025–2030, unmanned flying taxi flights will be 100 times cheaper than helicopter flights, and three times cheaper than taxi rides during rush hour. Hover has raised about \$3 million since 2016. The startup is a member of the Aeronet Association of the National Technological Initiative (NTI), and is a resident of the Skolkovo Foundation. As part of supporting NTI projects, the company received 10 million rubles from the Innovation Promotion Fund, and another 20 million rubles in 2018. NTI remains an active player in the rapidly growing Russian civilian AI ecosystem.

Source: “Russia will test a flying taxi in three regions by 2025” (К 2025 году летающие беспилотные такси испытают в трех регионах РФ), Iz.ru, Jan. 26, 2021, <https://iz.ru/1116031/2021-01-25/k-2025-godu-letaiushchie-bespilotnye-taksi-poiaviatsia-v-trekh-regionakh>.

Education and Training Developments

13. Companies create computer vision tool to remotely proctor exams

Companies Visionlabs and Examus have reportedly jointly created a product named “Luna Exam” that is able to monitor students taking exams remotely. The companies, both residents of the Skolkovo Innovation Center, developed this tool using computer vision based algorithms which analyze biometric data from webcams. In addition to initially verifying the identity of the test-taker, the software is able to detect his or her head position and gaze direction, the constant presence of the student in the field of view of the camera, the presence or absence of conversation, and the presence of strangers in the frame. The tool will be used by education centers, but could also be used for certifying the training of employees.

Source: “Visionlabs and Examus Introduce Remote Exam System” (Visionlabs и Examus представили систему для удаленной сдачи экзаменов), CNews, Jan. 25, 2021, https://www.cnews.ru/news/line/2021-01-25_visionlabs_i_examus_predstavili_sistemu.

14. Education Ministry plans to include AI education in school curriculums

According to a January 25 Rambler article, Russia’s Ministry of Education has announced that computer science coursework within Russian schools will soon include material on artificial intelligence. According to the article, the training materials will be prepared by May 2021, and the first trial courses will take place in September 2021. The courses will include support from digital platforms, perhaps including Sberbank’s SberClass platform or Yandex’s “Textbook.”

The Ministry of Education’s announcement cited statistics from the information technology market consultancy Gartner, which highlight the need to develop the next generation of Russian IT and AI experts. According to the research, because of the active introduction of AI in various sectors of the economy, the number of jobs created will exceed the number of those eliminated by 2 million by 2025. By 2022, every fifth employee who is engaged in “non-standard tasks” will use AI.

Source: “The basics of artificial intelligence will be taught in primary school” (Основам искусственного интеллекта будут обучать в начальной школе), Rambler, Jan. 25, 2021, <https://news.rambler.ru/education/45676470-osnovam-iskusstvennogo-intellekta-budut-obuchat-v-nachalnoy-shkole>.

15. Moscow technopark is hosting free AI course for teens

According to a January 26 Interfax article, a free AI training program for Moscow students aged 14-18 will run from February to May 2021. The training program is jointly organized by the Mosgormash children's technopark and the Moscow Technical University of Communications and Informatics (MTUCI). Around 30 students are expected to take part in the program. The students will be split into two groups focused on different concentrations: "Artificial Intelligence in Medicine" and "Artificial Intelligence for Ensuring Security at Enterprises." According to the press release, the Mosgormash children's technopark was founded in May 2016 and has offered courses in a variety of related areas: geoinformatics, virtual and augmented reality, robotics, neurotechnologies, modern cosmonautics, information technologies, unmanned vehicles, and high tech.

Source: "Courses on working with artificial intelligence will be launched for the first time in the capital's children's technopark" (Курсы по работе с искусственным интеллектом впервые запустят в столичном детском технопарке), Interfax, Jan. 26, 2021, <https://www.interfax-russia.ru/moscow/news/kursy-po-rabote-s-iskusstvennym-intellektom-vpervye-zapustyat-v-detskom-tehnoparke-mosgormash>; "Schoolchildren will be taught how to work with artificial intelligence at the Mosgormash children's technopark" (В детском технопарке «Мосгормаш» школьников начнут обучать работе с искусственным интеллектом), Mos.Ru, Jan. 25, 2021, <https://www.mos.ru/news/item/85504073/>.

16. Primorsky region implements tech training courses in schools

Russia's Primorsky region has reportedly been experimentally implementing education tools from "Robbo," an educational tech developer company, for the last year and a half, with success. Robbo is a member of the National Technology Initiative's Circle Movement. The Robbo courses and equipment were distributed to Primorsky as a result of the updated "Concept of Teaching the 'Technology' subject area in educational institutions of the Russian Federation." Primorsky was the first region to receive these learning tools.

According to the article, each of the "Robbo classes" includes a set of equipment, software, and teaching materials for training students in engineering and technological innovation: "Robbo platform," "Robbo laboratory," a set of materials for assembling an interactive robot "Otto," "Robbo 3D printer Mini," and others. The classes have been used in 47 schools and 37 technology groups.

Robbo's founder and producer, Pavel Frolov, is quoted as saying the following:

In the process of building an innovative economy in Russia, it is equally important to develop in the growing generation both the culture of using the most modern technologies and the ability to develop not yet existing IT products. To do this, you need to teach schoolchildren to make and assemble technical devices in practice. Because of the introduction of Robbo classes, the Primorsky region was one of the first among Russian regions to bring the content of the Technology subject area in full compliance with the requirements of a high-tech society.

Source: "Primorsky schoolchildren are trained in robotics in technology and computer science lessons in "Robo classes"" (Приморские школьники обучаются робототехнике на уроках технологии и информатики в «Роббо классах»), CNews, Jan. 28, 2021, https://www.cnews.ru/news/line/2021-01-28_primorskie_shkolniki_obuchayutsya.

International Collaboration

17. Russia makes its first UAV export sale and its drones act in peacekeeping missions

On January 22, 2021, the Russian Federation agreed to supply Myanmar with Orlan-10E unmanned aerial vehicles, along with Pantsir-S1 anti-aircraft systems. Sergei Shoigu, Russia's defense minister, and his counterpart Senior General Min Aung Hline, signed the agreement during Shoigu's visit to the country.

This is Russia's first UAV export, and it is finally entering a very competitive marketplace that is currently occupied by drone export leaders such as the United States, Israel, and China, with Turkey and Iran playing an increasingly active role. Orlan-10 is the mainstay of Russia's military drone fleet, and makes up nearly half of MOD's 2,000 UAVs. This particular drone is a tactical ISR UAV with a range of up to 120 kilometers; it is also used in an electronic warfare role as a Leer-3 system that carries cell tower jammers. Orlan-10s have performed relatively well in Syria, and it makes sense that Russia is selling a technology that was proven in combat. Earlier, Russia announced that it would be willing to export its new Orion MALE ISR UAV.

Since 2001, Russia and Myanmar have created a legal and regulatory framework for effective bilateral military-technical cooperation. Russia supplied Myanmar with combat and training aircraft, helicopters, and anti-aircraft missile systems, along with radar stations, armored vehicles, and artillery systems. With this first Orlan-10 sale, Russia no doubt hopes that more orders can follow from nations that are looking for a simple ISR drone with proven combat characteristics. So far, there is no evidence that Russia is backing out of this deal because of the coup launched by the Myanmar militia in February 2021.

The Russian MOD recently opened a joint Russo-Turkish Center in the Nagorno-Karabakh (NK) in order to monitor the ceasefire enforcement between Azerbaijan and Armenia. In September-October 2020, Azerbaijan and Armenia fought over the disputed NK region. Armenia lost the conflict because of the Azerbaijan military's better preparation for combat, which included acquiring and using a range of Turkish and Israeli ISR and combat drones. The Russian peacekeepers will use Orlan-10 and Forpost ISR drones, both of which were actively used by the Russian military in Syria. Orlan-10 has a range of 120 km, and Forpost MALE UAV has a range of 250 km. Also, both drones allow for round-the-clock, all-weather monitoring of the NK territory. The data from the UAVs go to the Russian contingent, where they are processed and are then transmitted to the monitoring center, where Russian and Turkish servicemembers are on duty around the clock. The duty shift then decides what to do in a

situation when the truce is violated. Russia has been expanding the use of UAVs over the past several years, and many of its military-grade ISR drones conduct missions to monitor natural disasters and developing emergencies.

Sources: “Russia will supply Myanmar with Pantsir-S1 anti-aircraft missile and cannon systems, Orlan-10E unmanned aerial vehicles, and radar stations” (Россия поставит Мьянме зенитные ракетно-пушечные комплексы «Панцирь-С1» беспилотные летательные аппараты «Орлан-10Е» и радиолокационные станции), Official MOD website, Jan. 22, 2021, https://function.mil.ru/news_page/country/more.htm?id=12340128@egNews; Alice Cuddy, “Myanmar coup: What is happening and why?” BBC.com, Feb. 5, 2021, <https://www.bbc.com/news/world-asia-55902070>; “Russia’s Orion-E can be offered for export” (Российский беспилотник “Орион-Э” предложат на экспорт), Voennoe.RF, July 19, 2017, <https://xn--b1aga5aadd.xn--p1ai/2017/%D0%9C%D0%B0%D0%BA%D1%8166/>; Aleksei Ramm, “Unmanned peacekeepers” (Беспилотные миротворцы), IZ.ru, Feb. 1, 2021, <https://iz.ru/1118789/aleksei-ramm/bespilotnyi-mir-v-karabakhe-zarabotal-rossiiskoturetskii-tcentr>; “The Russian military is using unmanned aircraft to monitor the second wave of the flood in Tulun” (Военные подключили беспилотную авиацию к мониторингу второй волны паводка в Тулуне), Tass.ru, July 30, 2019, <https://tass.ru/sibir-news/6714435>.

18. Sber purchases Boston Dynamics robot

According to its Telegram channel, Sber has bought the four-legged dog-like robot Spot from the US company Boston Dynamics. The robot will be used for research on robot behavior in the natural environment and on robot-human interactions. The robot costs \$74,500 and is available to the public. This purchase highlights Sber’s continuing transition from a savings bank (Sberbank) to an IT company focused on AI research.

Source: («Сбер» приобрёл робота у Boston Dynamics для образования и исследований), Jan. 22, 2021, <https://d-russia.ru/sber-priobroj-robota-u-boston-dynamics-dlja-obrazovanija-i-issledovanij.html>.

19. Russian companies pitching AI solutions for sustainable development

Five Russian startup companies, mostly based at Skolkovo, were involved in the AI for Good Global Summit on Wednesday, January 27, where they pitched their AI-based sustainable solutions. The summit was part of a program aimed at accelerating the United Nations Sustainable Development Goals (SDGs) by connecting AI innovators with problem owners in an effort to solve global challenges related to sustainability. The initial Russian track of the program had 280 entries, with 40 finalists selected. The five winners of the Russian track were invited to the global summit.

The selected companies include EMBLE, a service that performs monitoring and functional diagnostics of equine internal organs, using neural network technology; Intellogic's Botkin.AI, a software-based platform for radiological studies' analysis using artificial intelligence technologies; Oz Forensics, which helps reduce costs and biometry fraud by automating online onboarding and client verification processes, including components that prevent deepfake fraud and spoofing attacks through fake videos; SOL, a distance sign language interpretation platform that enables deaf people to receive the range of services that are available on the market for hearing citizens; and BIOGEOHUB, software that can map seascapes and monitor ecosystems by using photo and video analysis for automatic identification of biological communities and geomorphological features of the seabed.

Arkady Dvorkovich, the chairman of the Skolkovo Foundation, highlighted that Russian AI is working for sustainable development while maintaining the highest ethical standards. He noted that Skolkovo is "making every effort to ensure that the developments of the Skolkovo project participants contribute to the achievement of the global goals formulated by the UN." He continued, "At the same time, we take into account the requests of our industrial partners for the development of technologies for corporate ESG (Environmental, Social, Governance) standards. It was possible to combine these two vectors in the Global Challenge: Artificial Intelligence for the SDGs program, which from this year will become truly global. "

Source: "Five Russian Companies to Pitch at UN's AI for Good Summit," PR Newswire, Jan. 27, 2021, <https://www.prnewswire.com/news-releases/five-russian-companies-to-pitch-at-uns-ai-for-good-summit-301215013.html>; "Winners of the Skolkovo fund will introduce their tools at the UN" (Победители программы Фонда «Сколково» представят свои решения на площадке ООН), CNews, Jan. 27, 2021, https://www.cnews.ru/news/line/2021-01-27_pobediteli_programmy_fonda.

Spotlight: Russian Military Engineers and Sappers To Get Robotics Technologies

In January 2021, Russian military engineers celebrated the 320th anniversary of the founding of their service by Peter the Great. To celebrate this service's key achievements, Russian state media and military journals ran a number of publications dealing with military engineers' latest technological achievements and technologies. Central to these analyses was the acquisition of the latest demining robotic systems, such as Uran-6 and Uran-14, both of which were used in Syria by the Russian military.

To commemorate this military holiday, Tass state news agency published a report on the MOD's International Mine Action Center. Since the center's founding in 2014, its specialists have taken part in international humanitarian demining operations, including in Syria, Laos, and Nagorno-Karabakh. According to Col. Vladimir Sidorenko, center director, instructors with experience in combat and humanitarian demining conduct all classes, with the facilities taking into account their Russian military experience. The center's curriculum and tasking are constantly updated with new information about modified improvised explosive devices used by terrorist organizations and non-state actors all over the world. To date, more than 115 military personnel from Armenia, Belarus, Kazakhstan, Kyrgyzstan, Uzbekistan, and Serbia have been trained at the center. Additionally, 1,200 Syrian sappers have graduated from the center to meet the demining demand back home. The center uses open architecture to simulate different working conditions in various environments and climatic conditions.

According to Sidorenko, the Uran-6 demining UGV is used to minimize the risk of personnel losses, and has already proved its reliability in a high-intensity conflict. Other robotic systems are also mastered at the center and in the field, including Scarab and Sphera small ISR UGVs, and the MICR multifunctional demining engineering complex. Sidorenko confirmed that in addition to Uran-6, Russian engineering troops will soon receive new heavy robots—in 2021, the Russian developers will continue working on the heavy IMRTK-RT demining UGV and the IMRTK-ShR assault and clearing UGV. He also noted that in 2020, Russian sappers received 15 Uran-6 demining robots and 7 Uran-14 fire-fighting robots. In 2021, MOD will supply 20 Uran-6 and 17 Uran-14 units to the engineering divisions.

Also commemorating this military holiday, the *Red Star*, MOD's official publication, published an interview with Yuri Stavitsky, chief of Russian Engineering Forces. He noted that his forces' modern arsenal consists of over 600 technologies in 75 categories, including for

reconnaissance, concealment, and imitation, and for overcoming water barriers, mine-explosive obstacles, and other obstacles. The military engineers are also mastering dynamic simulators and educational multimedia classes for training specialists. Gen. Stavitsky noted that in 2020, his forces acquired almost 640 different vehicles and systems, and more than 195,000 sets of engineering equipment and various ammunition. These vehicles also include initial Uran-6 acquisition by the Western and Southern military districts.

Russia's Izvestia news portal also published an interview with a service member in one of the engineering forces' newest units, the robotics company. He described his unit's use of Uran-14, and a recent acquisition of Uran-6 UGVs. While serving in the Nagorno-Karabakh demining units, he had the opportunity to command the Uran-6. He specifically noted that this UGV saves human lives by locating an explosive device and then either detonating it or making it unusable. The operator is located about a kilometer from the UGV and controls it via onboard cameras, while Uran-6 clears a path 1.5 meters wide. This vehicle is capable of withstanding explosions up to 4 kilograms of TNT, as well as breaking a vertical wall up to 1 meter high and traversing a ditch up to 1.5 meters wide.

Also on January 2021, *Rosssijskaya Gazeta* (RG) published a report by its correspondent who had the chance to operate Uran-6 at a testing range. To activate the UGV, the operator enters a six-digit password on the operating console that is suspended from the operator's neck. RG notes that the console looks similar to a typical video game console, no doubt for ease of operation by increasingly young Russian soldiers who grew up in an era of ubiquitous personal electronics and gaming devices. If the code is correct, a red beacon begins to flicker at the UGV's stern, to indicate that the vehicle has recognized the operator and is ready to follow specific commands.

There are two screens on the vehicle's remote control. The smaller one, with sensors, displays information about the state of onboard systems: fuel supply, oil temperature, etc. The larger one shows the image from the video cameras; Uran-6 has four of them. One, in the front of the vehicle, shows what is ahead. If the armored shield with a mine sweep is raised, there is no feed from the front camera. In that case, the operator can switch to the two side cameras, which show what is directly in front of the tracks. Finally, Uran's fourth "eye" provides the rear view.

RG notes that the operation console's left handle controls the movement of the machine, while the right handle controls the vehicle's demining attachments; Uran-6 comes with five trawls for different types of mines. A large red engine "stop" button sticks out from the console at the bottom. An even larger red button is located on the UGV itself in the stern area—with its help, an operator can quickly stop the vehicle if necessary. There is also a small round hatch on the vehicle—if the batteries in the operator's backpack are drained, he can insert the cable into the hatch, connect it to the operating console, and continue working. Uran-6's radio control

channel is protected from interference and interception, which is the reason for the many antennas on the console and battery pack.

Viktor Murakhovsky, the chief editor of the magazine *Arsenal Otechetsva* (“Arsenal of the Fatherland”), noted that a UGV’s remote control operation has its drawbacks. The operator, being far from the vehicle, assesses the situation only using television cameras. The cameras do not provide a sense of depth, volume, and other parameters. Nevertheless, he noted that modern robotic systems make it possible to effectively clear the terrain, save the lives of soldiers, and conserve the heavy equipment resources.

Uran-6 UGV will prove a versatile remote-control platform for the Russian forces. It will be used not only by the land forces and sapper units, but also by the Russian Navy. The MOD recently decided to equip the naval engineering regiments with Uran-6 demining UGVs. The Uran-6 will most likely be able to operate at shallow depths off the coast to detect mines, place buoys indicating them, and destroy explosives. Russian military experts commenting on this development noted that saboteurs and infiltration units operating underwater can place small-sized ammunition near the coastal areas, and that Uran-6 can be useful in clearing such devices.

Aleksei Ramm, noted Russian military journalist mentioned earlier, discussed the evolution of Russian engineering and demining forces in his article in *Novoe Voennoye Obozrenie* (NVO, “New Military Review”). Ramm noted that engineer-sapper regiments of combined-arms armies have become reduced brigades: instead of separate engineer, barrage, and assault battalions, the MOD has established one mixed battalion as part of such regiments. It includes one demining engineer company, an assault company, and a company equipped with mine-laying equipment. He further noted that companies equipped with robotic systems are intended to reinforce battalion and brigade companies. In particular, Uran-6 is part of the engineer battalion. Ramm also notes that in the near future, the Uran-9 combat UGVs may also be part of units employed to assault and breach fortifications. Ramm noted that Uran-9 could also support engineer battalions with fire during their demining operations.

And it’s not just the military sappers who are using UGVs. The engineers of OMON “Rusich” units in the National Guard (Rosgvardiya) Main Directorate in the Moscow Region are using MRK-15 mobile robotic complex to conduct engineering reconnaissance, inspect vehicles, and remotely detect, as well as inspect and neutralize, explosive objects. Rosgvardia sappers are also equipped with the Araks mobile complex for the search and disposal of explosive objects. The KRMM-06 mobile robotic complex, part of Araks, is designed to carry cargo weighing up to 1.5 kg for removal up to 200 meters. The complex has two video cameras, and can work in any weather and season.

Sources: "International Mine Action Center" (Международный противоминный центр), MOD official webpage, <http://stat.mil.ru/mpc/info.htm>; Ekaterina Eliseeva, "Scarab, Spher and Uran: RF Mine Action Center sappers are working on demining" ("Скарабей", "Сфера" и "Ураны". Где и что разминируют саперы Противоминного центра РФ), Tass.ru, Jan. 21, 2021, <https://tass.ru/armiya-i-opk/10505797>; Roman Kretsup, "Explosive work: how Russian sappers serve today (Взрывная работа: как несут службу современные российские саперы)", Iz.ru, Jan. 21, 2021, <https://iz.ru/1113924/roman-kretcul/vzryvnaia-rabota-kak-nesut-sluzhbu-sovremennye-rossiiskie-sapery>; Anton Lavrov, Roman Kretsup, "Land mines: robotic sappers are in the fleet" (Суши мины: во флот начали поступать роботы-тральщики), Iz.ru, Jan. 20, 2021, <https://iz.ru/1113622/anton-lavrov-roman-kretcul/sushiminy-vo-flot-nachali-postupat-roboty-tralshchiki>; Anton Valagin, "How to operate Uran-6" (Как управляют боевым роботом "Уран-6"), RG.ru, Jan. 21, 2021, <https://rg.ru/2021/01/21/reg-cfo/kak-upravliat-boevym-robotom-uran-6.html>; "Military engineers of the Western Military District used the Uran-6 in an exercise near Voronezh" (Военные инженеры ЗВО впервые использовали робота-сапера «Уран-6» на учениях под Воронежем), TVZvezda.ru, Jan. 21, 2021, <https://tvzvezda.ru/news/forces/content/2021121026-xJv26.html>; Aleksei Kurilchenko, "Specialists from "Rusich" OMON unit at the National Guard discussed engineering technology" (Специалисты ОМОН «Русич» рассказали о технике инженерных подразделений Росгвардии), TVZvezda.ru, Jan. 21, 2021, <https://tvzvezda.ru/news/forces/content/2021121355-7AAFP.html>; Anton Lavrov "Remote war: the military is getting combat robots" (Война на удаленке: армия массово закупает боевых роботов), Iz.ru, Jan. 24, 2021, <https://iz.ru/1115129/anton-lavrov/voina-na-udalenske-armiia-massovo-zakupaet-boevykh-robotov>; Aleksei Ramm, "Robo-human combat" (Война людей-роботов), NVO.NG.ru, Jan. 28, 2021, https://nvo.ng.ru/realty/2021-01-28/1_1126_war.html.

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