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Abstract

This report, the twenty-second 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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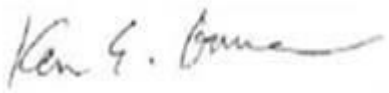
Approved by: **March 2021**



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Governance and Legal Developments

1. AI federal project head discusses implementation, notes AI ambitions

In February 2021, Deputy Minister of Economic Development Oksana Tarasenko, head of the AI Federal Project, spoke to C-News about Russian AI development thus far and further development for the near future. She said that Russia is starting on a path to widespread use of AI technology and, by 2030, the country plans to move to pervasive use of AI for solving a range of problems. She cited a number of Russian strengths in this regard, including a fairly well developed infrastructure for accessing broadband internet, the presence of strong players in the IT field, a high level of basic physics and math education, and dynamic conversion of public services into electronic form.

Tarasenko listed the US and China as the world leaders in AI, stating that the size of their markets makes it possible to create and develop globally competitive projects. She then said that Russia seeks to take its place in the leader cohort next to countries such as Germany, England, France, and Canada. She also said that Russia is successfully competing with Chinese, American, and Asian megacities in terms of AI use in the everyday life of those residing in cities.

The deputy minister also spoke about delays in the implementation of the AI Federal Project until 2021, after the government signed the National Strategy in 2019. She cited COVID as the primary reason for the lag, because the process of seeking funding slowed down amidst shifting priorities. However, Tarasenko said, COVID also gave a powerful impetus to technological development and AI turned out to be the most in-demand technology. She said that Russians began to trust the technology more, and that, while government funding for AI development did decrease, private funding grew. Because the Federal Project is now in its first year of implementation, Tarasenko said, the implementers are currently searching for best solutions and creating incentives, including in the business, science, and education spheres.

In addition, the deputy minister discussed the implementation of regulations in this space, stating that the past year was incredibly fruitful for creating the necessary regulatory framework, given the adoption of a number of documents and measures, including the launch of an experimental AI legal regime in Moscow. The government is working on the formulation of an action plan for adopting both federal laws and government acts to remove barriers to the introduction of AI technologies. Plans for 2021 include the development of general regulations,

as well as regulations in the areas of healthcare and transport. Tarasenko also stated that the Russian government believes regulation should not prevent the emergence of new uses for AI. She said, "You cannot draw some 'red lines' if the danger of using AI has not been proven. If there are concerns, appropriate research should be carried out. If in the course of it the risk of using AI is confirmed, then and only then can it be prohibited or limited."

Source: Alexandra Kiryanov and Igor Korolev, "Deputy Minister of Economic Development Oksana Tarasenko in an interview with CNews-one the development of artificial intelligence in Russia" (Замминистра экономического развития Оксана Тарасенко в интервью CNews — о развитии искусственного интеллекта в России), C-News, Feb. 9, 2021, https://www.cnews.ru/articles/2021-02-09_zamministra_ekonomicheskogo_razvitiya.

2. New director appointed for Digital Economy's AI portfolio

In February 2021, Alexei Sidoryuk was appointed director of the AI portfolio of the Digital Economy organization. Sidoryuk, who previously served as development director at Rostelecom, with responsibility for Digital Economy national program projects, will coordinate the activities of the AI working group and oversee implementation of AI as part of the digital transformation of industries. Sidoryuk's appointment comes after the previous director, Sergei Nakvasisn, decided to leave the organization.

Sources: "Alexey Sidoryuk appointed to oversee the direction of artificial intelligence in the Digital Economy organization" (Курировать направление искусственного интеллекта в организации «Цифровая экономика» назначен Алексей Сидорюк), D-Russia.ru, Feb. 25, 2020, https://d-russia.ru/kurirovat-napravlenie-iskusstvennogo-intellekta-v-organizacii-cifrovaja-jekonomika-naznachen-aleksej-sidorjuk.html.

3. Senior official discusses Russia's digital transformation progress

In a February 18, 2021, interview, Russia's vice-premier Dmitriy Chernyshenko discussed progress made in Russia's digital transformation efforts across the country. He summarized them as follows:

> Digital transformation is a natural process of adding "digits" to everything that surrounds us—home, transport, hospital, school. It's no accident that digitization is included in the number of Russia's national development goals. It should make people's lives safer and more comfortable, provide competitiveness of any facet of the economy. What is most important in digital transformation? It is, of course, the increase in the quality of state services, the

decrease of expenses for business and public administration, the increase in effectiveness and security of information systems, the decrease of the shadow economy.

Chernyshenko noted that the COVID pandemic provided a strong stimulus to digitize interactions between citizens and government services (medical, labor, legal, and others). At the federal, regional, and municipal levels of government and in key government agencies, there are officials responsible for digital transformation who are held accountable for progress. As discussed in past issues of *AI in Russia,* Russian government ministries and agencies have digitization tasks, including ones that have to do with incorporation of AI-enabled systems. Chernyshenko stated that, among all of Russia's government ministries and authorities, about 18—including oversight bodies Roskomnadzor and Rostechnadzor, the Russian patent agency Rospatent, the Ministry of Agriculture, and the Ministry of Emergencies—have been the most effective in terms of digitization. Such efforts will be reviewed frequently by the government, beginning in April-May 2021. Chernyshenko noted that there are ongoing efforts to develop requirements for the ministries and agencies to follow when creating large datasets.

Across Russia's regions, governments are seeking to meet President Putin's requirement to create regional management centers. Piloted in five regions, including Moscow, these centers collect requests and complaints from their citizens on healthcare, education, transportation, energy, housing, roads, and other topics, and seek to monitor, analyze, and facilitate their implementation.

Source: "TAdviser interview: vice-premier Dmitriy Chernyshenko on the strategy and tactics of the state's digital transformation" (Интервью TAdviser: вице-премьер Дмитрий Чернышенко – о стратегии и тактике цифровой трансформации государства), TAdviser, Feb. 18, 2021, https://www.tadviser.ru.

4. Lawmaker proposes scaling back regulations on AI in medical software

On February 21, Tatiana Kusayko, deputy chairman of the Federation Council Committee on Social Policy, proposed simplifying the state registration process for medical software utilizing AI by invalidating Clause 15.1.1, which currently divides medical devices by class. As the regulation stands now, it classifies all software using AI technologies as having a high degree of risk, regardless of the conditions of its use or the type of information obtained using the software. According to Kusayko, the current regulation also sets increased barriers to registration, even if the software is used to diagnose or treat diseases with a low risk to public health. The lawmaker states that this regulation significantly slows down the development of AI and medical decision support systems, though such systems "are aimed at providing reference information to a specialist who makes an independent decision."

Source: "Kusaiko proposed to simplify the implementation of artificial intelligence in medicine" (Минздрав РФ попросили упростить внедрение в медицину искусственного интеллекта), *Parlamentskaya Gazeta,* Feb. 21, 2021, https://www.pnp.ru/politics/kusayko-predlozhila-uprostit-vnedrenie-v-medicinu-iskusstvennogo intellekta.html?utm_source=yxnews&utm_medium=desktop.

5. Transport Ministry to introduce biometrics into airports

On February 17, the Russian Ministry of Transport published a plan to equip 6 percent of Russian airports with biometrics to identify passengers and AI for processing data by 2023, a move intended to "simplify transport procedures." At the end of 2019, Russia had 202 airports; therefore, by the beginning of 2024, at least 12 airports should have this new system, and that number could reach up to 30 if additional funding appears. To use the technology, the airport operator will have to conclude an information interaction agreement with the operator of the Unified State Information System for Transport Security.

The plan does not indicate where funds for equipping airports with this system will come from. The federal budget provides 585.2 million rubles for development of the Unified State Information System, and implementation of the baseline plan (i.e., equipping 12 airports) will require another 3.8 billion rubles. In total, the Ministry of Transport intends to spend 8.7 billion rubles to implement the digital transformation program, and the estimated amount of additional funding needed is 12.7 billion rubles.

At least five Russian airports outside the Moscow area are currently negotiating the introduction of a facial recognition system. While the Ministry of Transport previously considered using fingerprints to identify passengers, the onset of the coronavirus pandemic made contactless methods preferable. In order to use this new system, a Russian citizen will need to submit their data to the Unified Biometric System at a bank branch and consent to the use of biometrics for specific purposes.

Russian airports began considering biometric systems in 2019, when Domededovo Airport in Moscow announced the introduction of automated turnstiles at its gates. In February 2020, the airport announced the introduction of face biometrics for passenger control as early as 2021. At the end of 2019, Moscow's Sheremetyevo Airport began testing biometric identification booths for border crossings. A spokesman for Sheremetyevo said they are still using biometric data processing to ensure transport and aviation security and "are developing a number of projects to introduce these technologies when serving passengers."

Source: Vladislav Skobelev, Roman Kiryanov, and Timofey Dzyadko, "The Ministry of Transport proposed to introduce biometrics at airports en masse" (Минтранс предложил массово внедрять биометрию в аэропортах), RBC.ru, Feb. 17, 2021, https://www.rbc.ru/technology_and_media/17/02/2021/602a97209a7947d41f3ef011?from=from_main_1.

Military and Security Developments

6. Russia to develop new aerial concept of operations based on combat drones

The Russian military is building on its current UCAV RDT&E by developing a new concept of operations and tactics for aerial combat. Russian media recently reported that the S-70 Okhotnik heavy UCAV will be able to use long-range and hypersonic missiles, and that weapons testing is already underway. Okhotnik is one of MOD's flagship projects to develop cutting-edge aerial combat capability. The stealthy S-70 is supposed to have onboard AI for air defense and interceptor roles, and the Russian military recently carried out Okhotnik flights with the Su-57 fighter jet in a "loyal wingman" configuration.

Russian military experts Anton Lavrov and Alexei Ramm note that Okhotnik will receive new high-precision bombs weighing 50-100 kilograms, created specifically for UAVs. At the same time, the drone's internal compartments are unified in size with those on the Su-57 combat aircraft, which makes it possible to use much more advanced and lethal ammunition. Okhotnik may be equipped with hypersonic guided missiles created as part of Russia's Gremlin project. Lavrov also notes that there are no fundamental technical obstacles to the S-70's also using modern long-range air-to-air missiles. According to another military export, Vladislav Shurygin, the Su-57 and Okhotnik working as a pair with such weapons will be able to conduct strike missions that previously required entire aircraft squadrons. This concept of operations ensures that aircraft no longer need to break through enemy ground defenses and adversary combat aircraft—the targets can instead be hit by hypersonic missiles from a distance of up to 1,500 kilometers. At the same time, pairs of Su-57s and Okhotniks would be able to cover a space of hundreds and even thousands of kilometers with an "impenetrable" air shield.

The Russian military experts note the transformation of Okhotnik UCAV into a combination of a "bloodhound" and a "faithful squire" that helps the pilot find targets, warns of potential threats, and carries additional ammunition. They also note that the interaction of manned and unmanned vehicles will not be easy to employ. The Su-57 pilot should not be distracted by direct control of the drone, and so it is necessary to "teach" Okhotnik to independently maintain the formation during maneuvers, to automatically respond to threats, and to choose the optimal direction of attack. According to Evgeny Frolov, a military test pilot, the Su-57 pilot need not say anything to give the command to the drone—the Su-57 itself determines who should engage which target, and Okhotnik is supposed to strike with information derived from the plane. Frolov notes that the Okhotnik ground-based operator is equipped with control

knobs similar to those of a manned fighter, a keyboard, and several multifunctional screens displaying information from S-70 onboard systems and cameras. He thinks that in the future, this C2 device will be completely automated and UCAV manual control will be eliminated.

Sources: Anton Lavrov, "Closed skies: an innovative air combat system is being created in Russia" (Закрытое небо: в России создается инновационная система воздушных боев), Iz.ru, Feb. 24, 2021 https://iz.ru/1127710/anton-lavrov/zakrytoe-nebo-v-rossii-sozdaetsia-innovatcionnaia-sistema-vozdushnykh-boev; Alexei Ramm, Anton Lavrov, ""Hunter" in the fifth generation: Su-57 and drones will be used together" («Охотник» в пятом поколении: Су-57 и дроны станут использовать вместе), Iz.ru, Feb. 17, 2021, https://iz.ru/1125699/anton-lavrov-aleksei-ramm/okhotnik-v-piatom-pokolenii-su-57-i-drony-stanut-ispolzovat-vmeste; "The test pilot revealed the capabilities of the S-70 "Okhotnik" drone" (Летчик-испытатель раскрыл возможности беспилотника С-70 "Охотник"), Ria.ru, Feb. 21, 2021, https://ria.ru/20210221/bespilotnik-1598515173.html.

7. Kalashnikov develops VTOL and loitering munitions drones

Russia's ZALA Aero Group (part of Kalashnikov Holding, which is part of Rostec) recently unveiled a new hybrid ZALA VTOL drone at the IDEX 2021 International Defense Exhibition and Conference in Abu Dhabi. ZALA manufactures a lineup of ISR drones for the country's military, security, and private sector customers. ZALA touts this VTOL drone as a solution for monitoring the energy infrastructure, conducting search-and-rescue operations, and ensuring a safe takeoff/landing from unprepared sites in urban environments.

This drone has interchangeable wings, including a conventional wing used for a catapult launch. Its wings can also be equipped with additional rods that have four horizontally positioned propellers, which allow this UAV to perform vertical takeoff and landing. Its payload can include photo and video cameras, thermal imagers, combined tele-thermal imaging systems, a laser designator, and other systems. ZALA notes that in the traditional aircraft version, the drone can fly for four hours, while the VTOL version can fly up to two hours. According to ZALA, the drone combines the best qualities of fixed-wing and multirotor UAV types and it can be reconfigured depending on the assigned tasks. The developer notes that using this system can reduce the role of the operator and fully automate the UAV flight processes. According to ZALA, the drone has a ZX1 onboard computer, which is based on artificial intelligence, to process video and photos via encrypted communication channels. ZALA designed this drone for full compatibility with all existing ZALA UAV payloads. Although it was developed and marketed for the civilian operations, its interoperability with other ZALA platforms displays that capability, long desired by the MOD for the multiple military unmanned platforms currently in development.

Kalashnikov is also answering the MOD call for loitering munitions. One of Russia's lessons from the recently concluded 2020 war in the Nagorno-Karabakh (NK) was the successful use of loitering munitions drones by the Azerbaijani forces against the Armenian military, and a noted absence of such technology in Russian military ranks. While the MOD was already testing its loitering drones when the NK conflict broke out, the war's rapid conclusion reinforced the MOD's drive to acquire this technology. This year, Kalashnikov announced that it will complete state tests for the KUB loitering drone, while at the same time developing its export version. KUB can stay in the air for up to 30 minutes, flying at speeds of 80 to 130 kilometers per hour, while carrying three kilograms of explosives. Another loitering drone in development is Lancet, which can carry either one or three kilograms of payload. Kalashnikov notes that Lancet is equipped with a television guidance channel that allows the operator to follow the drone until it hits the target. Kalashnikov also claims that Lancet's onboard artificial intelligence is able to independently find and hit targets. Rostec is suggesting that there is interest in this type of technology from unnamed Middle Eastern customers, although there are no concrete export plans at this time.

At IDEX-2021, Rostec CEO Sergei Chemezov noted the foreign customer interest in Russian unmanned military systems, which includes UAVs, unmanned vehicles, and combat modules. He stated that AI has been used in the Russian defense industry for a long time in missile homing systems and autopilots. He also specifically noted that UAVs are "part of artificial intelligence technologies" development at Rostec. Also at IDEX-2021, Bekkhan Ozdoev, Rostec's industrial director, said that both KUB and Lancet were tested in Syria in "combat conditions." Ozdoev noted that such loitering munitions are cheaper than conventional missiles and are difficult to track by radar, and that the Russian military will acquire them first before any are exported.

Sources: “Swarming jet-propelled drones in development for Russian aerospace forces” (Источник: для ВКС создают работающие в стае реактивные беспилотники), Ria.ru, Mar. 1, 2021, https://ria.ru/20210301/bespilotniki-1599368302.html; “The newest unmanned complex ZALA VTOL is presented at IDEX 2021,” Zala-aero.com, Feb. 2021, https://zala-aero.com/en/news/zala-vtol/; Official ZALA drone lineup webpage: https://zala-aero.com/en/production/bvs/; “Deadly kamikaze drones are tested in Russia” (Серия смертоносных дронов-камикадзе проходит испытания в России), Sputnik.by, Feb. 22, 2021, https://m.sputnik.by/defense_safety/20210222/1046974288/Seriya-smertonosnykh-dronov-kamikadze-prokhodit-ispytaniya-v-Rossii.html; “Kalashnikov presented a new tiltrotor drone” ("Калашников" представил новый беспилотник-конвертоплан), Ria.ru, Feb. 22, 2021, https://ria.ru/20210222/bespilotnik-1598536889.html; “"Our products are not inferior to Western ones": the head of Rostec on the export of weapons, Russian UAVs and US sanctions” («Наша продукция не уступает западной»: глава «Ростеха» об экспорте оружия, российских БПЛА и санкциях США), Russian.rt.com, Feb. 24, 2021, https://russian.rt.com/russia/article/835793-chemezov-rosteh-intervyu-oruzhie-eksport; Aleksei Ramm, “Russia has its own lineup of kamikaze drones” («У России есть своя линейка беспилотников-камикадзе»), Iz.ru, Feb. 19, 2011, https://iz.ru/1126653/aleksei-ramm/u-rossii-est-svoia-lineika-bespilotnikov-kamikadze.

8. Russian industry all in for unmanned aerial combat aviation

Russia’s defense industry continues to develop its ever-growing military drone lineup. Rostec recently noted that its Korsar MALE UAV is undergoing trials, and that the Luch Design Bureau may commence mass production of this drone once the Ministry of Defense is ready to sign the contract. Anticipating export potential, Luch is also developing a Korsar-E export version. Rostec specifically noted that this project is also getting “Western sanctions proofed” by using only domestic high-tech and electronic components, citing “unfair competition that is growing from the West.” Korsar is a MALE-class drone with a range of up to 250 kilometers. Once fielded, it would join a growing number of UAV projects that include Orion, Okhotnik, and Altius mid- and long-range drones.

The Modern Aviation Technologies Bureau (MAT) recently unveiled an AR-10 “Argument” UCAV based on the domestic SR-10 jet trainer aircraft. According to public materials, Argument’s cruising speed is up to 800 km/hr, with a range of up to 1,300 kilometers. Its design incorporates X-38 high-precision air-to-surface missiles. In 2016, the MOD stated that development of the SR-10 light jet trainer aircraft (also developed by MAT) should continue, ordering official state tests. Given several UCAV projects currently undergoing testing and evaluation by the MOD, it is unclear how far MAT’s proposal can progress at this point.

Meanwhile, UZGA, developers and manufacturer of Altius HALE UCAV, finally signed a state contract for the drone delivery to the MOD. Altius serial production is supposed to commence

in 2021. This will be Russia's longest-range drone; its range is approximately 10,000 kilometers, making it equivalent to the American Global Hawk combat drone. (For more on Altius, please see issue 14 of *AI in Russia*.)

Sources: Russia showcased combat "Argument" (Россия показала ударный «Аргумент»), Lenta,ru, Feb. 27, 2021, https://lenta.ru/news/2021/02/27/argument/; Aleksei Ramm, "Russia has its own lineup of kamikaze drones" («У России есть своя линейка беспилотников-камикадзе»), Iz.ru, Feb. 19, 2011, https://iz.ru/1126653/aleksei-ramm/u-rossii-est-svoia-lineika-bespilotnikov-kamikadze; "Russia to furnish advanced Korsar drones with electronic warfare systems," Tass.com, May 8, 2018, https://tass.com/defense/1003325; "A state contract was signed for the supply of Altius-RU drones created in Kazan" (Подписан госконтракт на поставку беспилотников «Альтиус-РУ», созданных в Казани), Tatar-inform.ru, Feb. 20, 2021, https://www.tatar-inform.ru/news/business/20-02-2021/podpisan-goskontrakt-na-postavku-bespilotnikov-altius-ru-sozdannyh-v-kazani-5808072.

9. MOD develops maritime unmanned and autonomous capabilities

The Russian Ministry of Defense will commence state tests of the Avrora small-sized deep-sea multipurpose autonomous vehicle (UUV). According to Major General Andrei Goncharov, head of MOD's Main Directorate for Research and Technological Support of Advanced Technologies (Innovative Research), Avrora is one of the maritime projects overseen by his agency that is developed specifically for the military.

The UUV was developed by Avrora Design Bureau, and is capable of operating at a depth of up to 1,000 meters. It has a modular system for using different types of equipment, and its lithium iron phosphate battery provides for up to six hours of autonomy. The project costs 500 million rubles ($6.7 million). Its development work should be completed in October 2023, and it should enter service in 2024–2025.

Another UUV project in development is Sarma, first announced in 2017 by the Advanced Research Foundation (ARF), which is currently prepped for serial production in 2024. Sarma was specifically developed for the Arctic region, and can be used for transporting cargo and providing situational awareness under the ice. Almaz-Antey, UUV developer, notes that the prototype will be ready this year, another test vehicle will be built in 2022, and its power plants and equipment will be completed in 2023. Sarma will also be a universal platform that can utilize different mission-specific modules.

Sarma is a long-range vehicle: its estimated cruising range is up to 8,500 kilometers, with autonomy for up to 90 days, provided it is equipped with a power plant based on electrochemical generators and a system for cryogenic storage and supply of reagents. Igor

Denisov, ARF's deputy general director, noted that Sarma is a project aimed at creating a test platform-demonstrator for an unmanned underwater vehicle with extended autonomous operation.

Earlier, CNA highlighted the Varan aircraft carrier concept developed by the Nevsky Design Bureau (NDB), one of the largest domestic vessel developers and the only designer of aircraft carriers and training complexes in Russia. In a February 2021 highlight by the Tass state news agency, Varan was described as an aircraft carrier with a high degree of automation and the ability to use robotic systems. NDB envisions Varan to carry 24 multipurpose aircraft, six helicopters, and up to 20 unmanned aerial vehicles. Tass highlights that Varan's air group could be formed on the basis of the MiG-29K carrier-based fighters and their modifications, as well as concept aircraft in development, such as vertical takeoff and landing platforms. According to NDB, promising robotic systems are also included in Varan's air group, while a high level of automated control is provided by an integrated combat control system. Tass quotes NDB's statement that Varan's design "will make it possible to position the ship globally as an innovative and balanced platform that corresponds to the Russian Navy's modern needs." NDB also considers that the Varan project's priority is "high economic feasibility, coupled with the necessary combat effectiveness, ensuring the maintenance of the military-political status of the Russian state." Currently, Varan is still in the design stages.

Sources: "Avrora" underwater drone sent for state tests" (Подводный беспилотник "Аврора" отправили на госиспытания), Flotprom.ru, Feb. 26, 2021, https://flotprom.ru/2021/%D0%98%D1%81%D0%BF%D1%8B%D1%82%D0%B0%D0%BD%D0%B8%D1%8F8/; "MOD will get "Avriora" deep-water drone" (Минобороны получит глубоководный беспилотник "Аврора"), Tass.ru, Feb. 26, 2021, https://tass.ru/armiya-i-opk/10785637; Roman Azanov, Dmitry Fedyushko, "Varan will hunt: Russia is developing new naval technology" ("Варан" выходит на охоту. В России создают новый класс военно-морской техники), Tass.ru, Feb. 25, 2021, https://tass.ru/armiya-i-opk/10773887; Svetlana Tsigankova, "arma underwater drone to be created in Russia" (Подводный беспилотный аппарат "Сарма" создадут в России), RG.ru, Feb. 15, 2021, https://rg.ru/2021/02/15/podvodnyj-bespilotnyj-apparat-sarma-sozdadut-v-rossii.html.

10. Armata T-14 tank to become more robotic

In February 2021, Uralvagonozavod (part of Rostec) announced that the Armata T-14 next-generation main battle tank's fire control system can find and recognize targets on the battlefield without the participation of a human crew. The developer noted that this system has a digital catalog with signatures of typical battlefield targets, including tanks, APCs, military vehicles, helicopters, and combat equipment. The system's artificial intelligence elements allow Armata's onboard computing mechanisms to independently search for targets against a complex background and to carry out target selection according to pre-determined priorities.

This is an example of what the Russian military experts and officials refer to as increasing "digitization" of the military that allows existing systems and weapons to operate in a semi-autonomous or optionally manned mode. CNA recently noted that Armata's sophisticated design allowed for testing this tank in an autonomous mode, although Uralvagonozavod has indicated that it will not manufacture an unmanned T-14 version, instead using it as a concept demonstrator. Russian military expert Dmitry Litovkin remarked that while Armata can detect targets in automatic mode, the final decision to destroy the target will be made by a human. Armata's human control is consistent with MOD's current thinking that a human will be in control of AI-enabled weapons systems (please see issue 10 of *AI in Russia*).

Sources: "Source: "Armata" for the first time in history found targets without the participation of the crew" (Источник: "Армата" впервые в истории сама нашла цели без участия экипажа), Ria.ru, Feb. 25, 2021, https://ria.ru/20210225/armata-1598859233.html; ""Armata" was tested in unmanned mode" (Танк "Армата" прошел испытания в беспилотном режиме), Ria.ru, Aug. 24, 2020, https://ria.ru/20200824/armata-1576231396.html; "Advanced Research Foundation believes robots will lead the future wars" ("Фонд перспективных исследований считает, что войны будущего поведут роботы), Ria.ru, July 6, 2016, https://ria.ru/20160706/1459555281.html; ""Practrically a robot". A military expert on the unique capabilities of "Armata"" ("Практически робот". Военный эксперт об уникальных возможностях "Арматы"), radiosputnik.ria.ru, Feb. 25, 2021, https://radiosputnik.ria.ru/20210225/armata-1598921025.html; ""Uralvagonzavod" is working on unmanned armored vehicles" ("Уралвагонзавод" работает над созданием беспилотной бронетехники), Tass.ru, Feb. 21, 2021, https://tass.ru/armiya-i-opk/10755979; Viktor Syrik, "Colonel Volodymyr Sidorenko: "Our center has proven its right to hold a leading place in the world in humanitarian demining"" (Полковник Владимир Сидоренко: «Наш центр доказал право занимать ведущее место в мире в деле гуманитарного разминирования»), TvZvezdaweekly.ru, Feb. 24, 2021, https://zvezdaweekly.ru/news/20212161155-HvERt.html; "Russian artillery will receive systems with elements of artificial intelligence" (Артиллерия РФ получит системы с элементами искусственного интеллекта), Iz.ru, Feb. 22, 2021, https://iz.ru/1128145/2021-02-22/artilleriia-rf-poluchit-sistemy-s-elementami-iskusstvennogo-intellekta.

11. Linking military AI to domestic audiences

Military applications for artificial intelligence are a hotly debated topic in Russian media and society. Writing for *Vechernaya Moskva* (*Evening Moscow*), foreign policy and defense commentator Aleksandr Hohlov noted that AI in the Russian military is no longer in the realm of science fiction, and already has practical applications. *Vechernaya Moskva* is not a military periodical, and his analysis was meant to describe current achievements to an average non-technical reader. Hohlov gives an example of the "Strelets-M" tactical intelligence, control, and communications complex (KRUS) as one such AI platform that is available to Russian motorized rifle platoon commanders. Hohlov also notes that commanding military units is

increasingly "reminiscent of a computer game," with information and the speed of its transmission becoming the most important components of combat.

Hohlov describes Strelets-M as "the primary link of military-purpose AI." This system provides servicemembers with a communication range of up to one and a half kilometers. It is designed for the automated control of units and weapons, and information support for the decisions made by the commander. Strelets-M, obtaining digital photographs and "overlaying" them on another system's data, increases the effectiveness of artillery and strike aircraft by helping soldiers accurately determine the coordinates of targets. Hohlov notes that this system obtains information and exchanges combat data with higher levels of command. Moving to operational and strategic command levels, Hohlov notes the Russian military's automated command and control systems (ACCS). The Russian military's operational-tactical and tactical control is carried out by the Unified Tactical Control System (ESU TK). The Ground Forces' ESU TK is "Sozvezdie-M2," and the Airborne Forces have "Andromeda-D."

Hohlov gives the example of a February 8-11, 2021, airborne military drill that took place in three regions at once—Ivanovo, Kostroma and Yaroslavl—and that utilized the ESU TK systems. During the exercise, parachute and artillery regiments marched to the indicated areas. The maneuvers included complex, rapidly changing situations characteristic of modern combat operations. Hohlov admits that his publication was informed that the soldiers used "Andromeda-D" ESU-TK, which allows for control of all levels of Airborne Forces, from the high command to each combat vehicle and each individual servicemember. Hohlov notes that "with the help of AI during the drill, the "adversary" was utterly crushed by the paratroopers."

As more information about military AI RDT&E is becoming available to Russian society, experts are attempting to explain the positive effects of AI for military purposes. These discussions complement a robust discussion on military AI in military journals and periodicals such as *Voennaya Mysl* (*Military Thought*), cited in previous issues of *AI in Russia*.

Sources: Aleksandr Hohlov, "A bullet is no longer dumb" (Пуля больше не дура), VM.ru, Feb. 15, 2021, https://vm.ru/science/861589-pulya-bolshe-ne-dura; Evgeny Fedorov, "Artificial intelligence in the Russian army: catching up with a departing train" (Искусственный интеллект в российской армии: догоняя уходящий поезд), Topwar.ru, Feb. 16, 2021, https://topwar.ru/179975-iskusstvennyj-intellekt-v-rossijskoj-armii-dogonjaja-uhodjaschij-poezd.html.

Corporate and Market Developments

12. Industry working group approves government changes to private sector support

On February 26, 2021, the Working Group on Digital Technologies, a part of the "Digital Economy" organization, approved government amendments on preferential lending for digital transformation projects and on support for projects related to the development and implementation of domestic IT solutions.

Key changes on preferential lending include the following: a reduction in the minimum loan size for borrowers; tightening of the requirements for using Russian hardware and software in supported projects; opportunities for a larger number of financial organizations to receive concessional loans (those extended on terms substantially better than market loans) by eliminating requirements for the size of funds; and additional benefits for companies with approved digital transformation strategies. The Russian Fund for the Development of Information Technologies will carry out the provision of subsidies from the federal budget for state grant support to projects for developing and implementing domestic IT solutions. The Russian Fund will determine the minimum and maximum size of the grant for each type of support in agreement with the Russian Ministry of Finance.

According to Mikahil Goland, director of Digital Technologies at the Digital Economy organization, who chaired the working group meeting:

> The issues discussed are of great importance for the development of Russian companies implementing projects for the development and implementation of modern IT solutions. With regard to concessional lending, large businesses with an investment volume of billions of rubles implemented the majority of projects in 2020. The approved changes will help attract small- and medium-sized businesses to participate in the program, and will increase the demand for Russian technologies. Grant support will allow support for both Russian developers and those companies implementing advanced domestic digital technologies.

Source: Vladimir Bakhur, "The Digital Technologies Working Group approved changes to the rules for domestic IT project support" (Рабочая группа «Цифровые технологии» одобрила изменения правил поддержки отечественных ИТ-проектов), C-News, Feb. 26, 2021, https://www.cnews.ru/news/line/2021-02-26_rabochaya_gruppa_tsifrovye.

13. Skolkovo and Gazprombank agree to monitor grants and compliance

Grants and other funding streams given by the Skolkovo Foundations will now be monitored by Gazprombank, thanks to a recent agreement between the two entities. Concerns over misuse of funds by grant recipients have prompted Skolkovo to ensure a more controlled setting for the disbursement and management of funding. Gazprombank will host the funds and provide direct banking services to recipients, while also ensuring spending compliance.

This is the first such agreement between the two entities. Oleg Melnikov, Gazprombank's executive vice president, stated that the program will "significantly expand the scope of banking support" for national projects, and hopes that it will also attract new clients in the digital technology and digital innovation spheres. Kirill Kayem, Skolkovo Foundation's senior vice president for innovation, noted that Gazprombank is both a partner and a client of Skolkovo startup technology companies through its AI-driven banking processes and services.

Sources: "Gazprombank will help the Skolkovo Foundation ensure the targeted use of grants" (Газпромбанк поможет фонду «Сколково» обеспечить целевое использование грантов) CNews, Feb. 15, 2021, https://www.cnews.ru/news/line/2021-02-15_gazprombank_pomozhet_fondu.

14. Samara University develops UAV simulator

A simulation program for unmanned aerial vehicles (UAVs) was developed at Samara National Research University with the intention of use by Russian UAV pilots. The training package includes a flight simulator connected to a real UAV that has been modified to sit within a "baby jumper" that prevents any damage from poor maneuvering. The physical UAV is suspended in a special structure that allows for freedom of movement within a small box that can mimic the conditions of the simulation. The developers hope to make the simulator compliant with current Federal State Education Standards so that it can be widely used by Russian pilots in training modules.

Sources: "A simulator for UAV operators, including VR, was developed in Samara"("Тренажер для операторов БПЛА, включающий VR, разработали в Самаре), RIA Novosti, Feb. 15, 2021, https://ria.ru/20210215/samarskiy-universitet-1597525601.html.

15. ALP Group announces indigenous robotic process automation software

The ALP Group's Department of Information Systems announced a new AI-enabled technology for improving corporate information systems and internal management processes. The system supplements existing Process Mining software developed by ALP (the "1C" platform) to test new uses of such systems for personnel management and project risk questions. The ALP Group is a Russian IT developer focusing on corporate management systems and is the only domestic developer of Robotic Process Automation software that does not depend on imported technology. Process Mining allows for the automatic and continuous monitoring of business processes that are entered into corporate information systems, which allows for real-time recording and flagging when discrepancies or unusual data patterns emerge. The new technology is designed to test hypotheses regarding different ways of analyzing and interpreting data from the 1C platform, thus widening its scope of application and supplementing existing methods. In this way, the new update is a diagnostic tool that can better utilize broader corporate information systems.

Sources: "DCIS ALP Group Process Mining" (ДКИС ALP Group Process Mining), TAdviser, Feb. 17, 2021, https://www.tadviser.ru.

16. VTB Bank announces new fraud prevention system

VTB has introduced a new system that uses AI algorithms to identify and prevent fraudulent banking and credit card transactions. The system analyzes transactions by referencing big data sources to determine whether a client needs to be given extra notifications about activity, or whether the activity should even be suspended until the client can contact the bank directly. The system is one of several new initiatives by VTB to combat fraud, including a graphical platform introduced earlier last year to highlight suspicious transactions.

Sources: "VTB introduces a new level of AI-based fraud protection for clients" (ВТБ внедряет новый уровень защиты клиентов от мошенничества на основе ИИ), CNews, Feb. 18, 2021, https://www.cnews.ru/news/line/2021-02-18_vtb_vnedryaet_novyj_uroven.

17. Russian startup announces chatbot for Microsoft Teams

The Russian startup CraftTalk has developed an AI chatbot platform that is now fully integrated with Microsoft Teams and is available on the Microsoft Azure and AppSource platforms. The chatbot platform provides organizational infrastructure for managing chatbots through an omnichannel chat platform, as well as supporting databases, analytics, and monitoring systems. Microsoft Teams is used by 115 million people every day, and the CraftTalk system is already deployed in Russian contact centers, banks, and logistics companies such as Alfa-Bank, Rosselkhozbank, and Magnit.

The article notes that the chatbox market is expected to grow from $2.6 to $9.4 billion between 2019 and 2024, given the high demand for 24/7 customer self-service as well as the benefits to cost efficiency. Chatbots provide a variety of useful services for customer service as well as for the automation of internal business processes, including HR, tech support, document management systems, and information directories. The CraftTalk software is claimed to be intuitive and simple, relative to other competitors.

Sources: Vladimir Bakhur, "Russian platform for creating corporate chatbots CraftTalk is integrated with Microsoft Teams" (Российская платформа для создания корпоративных чат-ботов CraftTalk интегрирована с Microsoft Teams), CNews, Feb. 18, 2021, https://www.cnews.ru/news/line/2021-02-18_rossijskaya_platforma_dlya.

18. VisionLabs continues work on epidemiological control systems

The Russian AI startup VisionLabs is working on new security infrastructure that will provide automated epidemiological control functions for government and educational institutions in the city of Odintsovo in Moscow Oblast. The contactless VisionLabs Thermo suite of installable hardware will be able to automatically detect elevated body temperature without relying on security guards to measure and log the temperature. The automated system will be able to immediately flag those with elevated temperatures as they enter into controlled buildings and can block further entrance. This project is part of the Sber IT ecosystem and is expected to be scaled up for installation at many further interested public institutions. Please see past issues of *AI in Russia* for discussion of VisionLabs and other companies tools developed as part of a response to the demands of the COVID pandemic.

Sources: Vladimir Bakhur, "VisionLabs' anti-ghost solutions will help digitalize Odintsovo" (Антиковидные решения VisionLabs помогут цифровизации Одинцово), CNews, Feb. 19, 2021, https://www.cnews.ru/news/line/2021-02-19_antikovidnye_resheniya_visionlabs.

19. Russian institute uses AI-enabled technologies to study salmon migration

The Russian Federal Research Institute of Fisheries and Oceanography (VNIRO) is using AI and drone technology to conduct research on Pacific salmon populations in the Far Eastern Federal District and collect photographic data on fish migration patterns. The project, which was tested last year in the Kamchatka and Khabarovsk regions, has been granted 60 million rubles in funding this year. The project's goal is to determine which sorts of fish are populating spawning grounds and how they are doing so, all in real time, using AI imagery algorithms.

Sources: "Drones and artificial intelligence will help scientists study the situation with salmon in the water area of the Far East" ("Беспилотники и искусственный интеллект помогут ученым изучить ситуацию с лососями в акватории Дальнего Востока"), Interfax, Feb. 19, 2021, https://www.interfax-russia.ru/far-east/news/bespilotniki-i-iskusstvennyy-intellekt-pomogut-uchenym-izuchit-situaciyu-s-lososyami-v-akvatorii-dalnego-vostoka.

20. Buryatia Republic adopts medical software developed by Sber

New speech-to-text software is now being used by medical specialists in the Republic of Buryatia. The software, Voice2Med, was developed by the STC (Speech Technology Center) group of companies that work within the Sber IT ecosystem. Voice2Med allows for the conversion of medical practitioners' voices into texts that can be input into medical documentation. According to the head of the Buryatia Republican Pathological Bureau, the new system is currently being used for biopsy and surgery descriptions. According to the company, documents can be filled out 22 percent faster using the new software.

Dmitry Dyrmovsky, CEO of the CRT group, stated that the Russian language is particularly difficult for speech recognition and transcription because the grammatical complexity demands high accuracy per word. The implementation of this software was a step forward in eliminating barriers to speech analysis caused by language differences. Please see past issues of *AI in Russia* for discussion of developments of AI-enabled technologies in healthcare.

Sources: "STC Group AI System Helps Medical Workers in Buryatia to Fill Out Documents" (ИИ-система группы ЦРТ помогает медработникам Бурятии заполнять документы), CNews, Feb. 25, 2021, https://www.cnews.ru/news/line/2021-02-25_iisistema_gruppy_tsrt_pomogaet.

Education and Training Developments

21. November 2021 is Russia's "Month of AI"

On December 25, 2020, President Vladimir Putin announced that 2021 would be the Year of Science and Technology in Russia. According to a February 22nd TASS article, each month will be dedicated to a specific topic (as listed below) and events and discussions dedicated to the topic will be featured. The month of November will be dedicated to the field of artificial intelligence. The purpose of this initiative is to "attract talented young people to this area, to increase the involvement of the professional community in the implementation of the strategy of scientific and technological development of the Russian Federation, and to form among citizens an idea of the initiatives and achievements being implemented in the country." The topics each month are as follows:

- March - new developments in the medical field
- April - development of the space industry
- May - challenges, threats and security
- June – industrial production technologies
- July - problems of territorial connectivity
- August - climate and ecology
- September - genetics and quality of life
- October - energy of the future
- November - artificial intelligence
- December - discussion of the topic "Man and Society"

Sources: "Each month of the Year of Science will be dedicated to a specific topic" (Каждый месяц Года науки будет посвящен определенной теме), National Projects of Russia, Feb. 22, 2021, https://xn--80aapampemcchfmo7a3c9ehj.xn--p1ai/news/kazhdyy-mesyats-goda-nauki-budet-posvyashchen-opredelennoy-teme.

22. IT shortage discussed by deputy minister of digital science

According to a February 17th CNews article, Yevgeny Kislyakov, deputy head of the Ministry of Digital Science, said there is a current shortage of between 500,000 and 1 million Russian specialists in various fields of IT. Kislyakov is quoted as saying, "When we meet with companies that are involved in the implementation of the Digital Economy [National Program] or are themselves implementing digital transformation programs, and we ask them what kind of help from the state they need in the first place, we almost always hear about qualified personnel." This shortage includes specialists in specific areas as well as generalists.

Prior issues of *AI in Russia* have discussed Russia's "brain drain" problem: experts predict that up to 15,000 IT personnel could leave Russia by the end of 2021. The brain drain is primarily attributed to the availability of higher salaries in competing countries. The CNews article notes that IT salaries vary widely by the individual profession and location of the employee. For example, an experienced programmer in Moscow could make up to 400,000 rubles a year ($5,360), but a Windows systems administrator could make as little as 35,000 rubles ($469) in a remote place such as Orenburg. But Kislyakov commented, "Now, in terms of wages, our specialists are definitely quite competitive by international standards," noting that a variety of additional issues also contribute to brain drain. He stated, "If a country is competitive, people stay in it, it is appealing to live and work here. Our task is to make our IT industry competitive."

Separately, the chairman of the Skolkovo Foundation, Arkady Dvorkovich, has said that Russian tech specialists who accepted opportunities in Europe and the United States are gradually returning to Russia. He also noted that Skoltech has been able to attract foreign talent, with "40 percent of professors being foreign professors, the other 60 percent returned to Russia from abroad, and 20 percent of students are also foreign." He noted that "this is an excellent channel for colleagues' return to Russia. I can say that more have come to us than have left us—this is absolutely certain."

Sources: "There is a catastrophic shortage of IT specialists in Russia. Employers 'forced to pay them more'" (В России катастрофический дефицит ИТ-специалистов. Работодатели «вынуждены платить им больше»), CNews, Feb. 17, 2021, https://www.cnews.ru/news/top/2021-02-17_v_rossii_katastroficheskij; "Dvorkovich told from which countries the "drained brains" return to Russia" (Дворкович рассказал, из каких стран в Россию возвращаются "утекшие мозги"), RIA Novosti, Feb. 17, 2021, https://ria.ru/20210217/mozgi-1597773117.html.

23. Standards for eight digital professions to be created

According to a February 15th TASS article, standards for the accelerated training of eight digital professions are being developed. Each of the eight professions—which include machine learning specialist, data engineer, game designer, cloud specialist, and virtual and augmented reality (VR / AR) specialist—are in high demand. The standards will be jointly drafted by the National Technological Initiative's (NTI's) "University 20.35," the Agency for Strategic Initiatives, and the Agency for the Development of Professional Communities and Young Professionals (WorldSkills Russia). This was announced at the NTI's conference, "Human resource shortage: how to develop a generation of IT specialists."

Source: "Russia will develop accelerated learning standards for 8 digital professions of the future" (В России разработают стандарты ускоренного обучения для 8 цифровых профессий будущего]), TASS, Feb. 15, 2021, https://tass.ru/obschestvo/10702091.

24. Finals of the NTI Olympiad underway

According to an article on the National Projects of Russia website, more than 1,300 Russian high school students are participating in the final rounds of the 6th Circle Movement Olympiad, which are being held from February 22 to April 17. Each contestant can compete in up to three of 28 focus areas, including quantum dot synthesis, aquatic robotic systems, genomic editing, computer vision, and virtual and augmented reality (VR/AR). Individual in-person and online finals are being held for each of the 28 focus areas.

According to a February 25th Center Coop article, more than 100,000 students from all regions of Russia applied to participate in the 2020-2021 Olympiad. The largest number of applications received was for the "Information Security," "Artificial Intelligence," and "Automation of Business Processes" categories. The NTI Olympiad was covered in previous issues of AI in Russia.

Sources: "More than 1,300 high school students will take part in the finals of the Olympiad of the NTI Circle movement" (Более 1300 старшеклассников примут участие в финалах Олимпиады Кружкового движения НТИ), National Projects of Russia, Feb. 20, 2021, https://xn--80aapampemcchfmo7a3c9ehj.xn--p1ai/news/bolee-1300-starsheklassnikov-primut-uchastie-v-finalakh-olimpiady-kruzhkovogo-dvizheniya-nti; "More than 1,300 high school students from all over Russia participate in the finals of the NTI Olympiad" (Более 1300 старшеклассников со всей России участвуют в финалах Олимпиады НТИ), Center Coop, Feb. 25, 2021, https://centercoop.ru/press-tsentr/novosti/bolee-1300-starsheklassnikov-so-nbsp-vsey-rossii-uchastvuyut-v-nbsp-finalakh-olimpiady-nti/.

25. RANEPA offers digital transformation courses online

According to a March 1st article on the National Projects of Russia website, RANEPA's Digital Transformation Leadership Training Center has begun recruiting for its online courses. Three courses will be available: "Implementation of digital transformation projects" (228 academic hours), "Digital transformation and digital economy: technologies and competencies" (60 hours) and "Fundamentals of digital transformation" (20 hours). Applicants must pass an entrance test in order to be selected, and will receive a training certificate upon completion of their course(s).

Federal and municipal government employees are particularly encouraged to apply. According to the article, "Employees of public agencies, local governments and subordinate institutions (подведомственных учреждений) will have the opportunity to improve their competence in the planning and implementation of digital development projects in various sectors of the economy, working with data, state information systems and digital platforms, digital transformation of public administration and the provision of public services." The courses are being offered in line with the "Human Resources for Digital Economy" national project. Last year, 9,775 people were selected for training at the center.

Sources: "Recruitment has begun for training leaders of digital transformation" (Начался набор на обучение руководителей цифровой трансформации), National Projects of Russia, Mar. 1, 2021, https://xn--80aapampemcchfmo7a3c9ehj.xn--p1ai/news/nachalsya-nabor-na-obuchenie-rukovoditeley-tsifrovoy-transformatsii.

26. MIPT neural network lab opens

According to a February 15th DNI article, the Laboratory of Physics of Programmable Functional Materials recently opened at the Moscow Institute of Physics and Technology. The lab will be led by Nobel laureate Konstantin Novoselov, and is partially funded by oligarch and former first deputy chairman of Russia Vladimir Potanin, who recently provided 500 million rubles towards the first five years of the lab's operation. The main focus of the lab will be to study how neural connections work, and to try to synthesize the networks by creating nanosensors using 2-D materials, such as graphene.

In a *Vedemosti* article, Potanin writes the following:

> In the distant future, the applied significance of these studies is that, for example, a computer based on neural networks—today it still sounds futuristic—will be able to solve problems of a completely different caliber, which a classic or quantum computer cannot do. In particular, in the field of

> artificial intelligence, it is the study of the neural networks of the human brain that allows us to count on the development of [these types of computers].

Neural networks were also discussed by Vadim Filippov, general director of the Association of Cognitive Associative Systems (ОКАС) company, to an audience for Russia's National Science Day. ОКАС is a resident of the Skolkovo innovation center and a member of the Neuronet Industry Union. According to Filippov, scientists are now faced with the task of creating the next generation of artificial intelligence, which will be able to think logically, learn, and read text, all as a person does. "Neural networks may even have subjectivity, and they will orient themselves in time and space." According to Filippov, Russian scientists have a chance to make a significant contribution to the development of new technologies and solutions for creating new cognitive functions, which will be the next step in furthering the field of artificial intelligence.

Sources: "Vladimir Potanin: Computers on neural connections are the future of the coming decades" (Владимир Потанин: Компьютеры на нейронных связях – будущее ближайших десятилетий), DNI.Ru, Feb. 15, 2021, https://dni.ru/tech/2021/2/15/471320.html; "Why should businesses invest in fundamental science" (Зачем бизнесу инвестировать в фундаментальную науку), *Vedemosti,* Feb. 12, 2021, https://www.vedomosti.ru/opinion/articles/2021/02/12/857636-zachem-biznesu; "The future of artificial intelligence: "Boiling Point - Tyumen" took part in the marathon of scientific practices" (Будущее искусственного интеллекта: «Точка кипения – Тюмень» приняла участие в марафоне научных практик), Official Portal: State Authorities of the Tyumen Region, Feb. 10, 2021, https://admtyumen.ru/ogv_ru/news/subj/more.htm?id=11894184@egNews.

27. Youth tech competition finals begin in Moscow

According to the event website, the project defense segment of Moscow's "3D Boom" competition is taking place from February to April. The annual competition, which began in October, is jointly hosted by the Moscow Aviation Institute and Moscow's Department of Education and Science, and is open to schoolchildren in grades 6-11, as well as college students. According to the website, there are seven engineering and tech categories in which students may participate: robotic systems for the construction of urban underground communications, unmanned aerial vehicles, smart city technologies, smart house technologies, the creation of 3D manuals for visually impaired children, aerospace engineering, and "The Art of Technology: Science-Art." Specialists from the Moscow Aviation Institute lead the educational portion of the program, and offer support to the competition participants as needed. There is also a "3D Boom Junior" competition for students in grades 1-5.

Sources: "3D Boom" (3Д Бум), School of New Technology, http://snt.mos.ru/konkurs/3d-bum.html.

International Collaboration

28. Russian academics expand AI international cooperation projects

The reach of international academic cooperation in the AI field has been expanding in Russia. While most such efforts have involved scientists connected to the Skoltech institute in Moscow, other institutes are getting increasingly involved. Recently, researchers from Samara University announced a successful joint project with the Russian-Armenian University in Yerevan, Armenia, to develop a relatively inexpensive autonomous smart vision capability for satellites and UAVs. The new technology will make it simpler to use hyperspectrometer technology (also known as "hypercubes") on a mass level. The scientists developed a new algorithm that uses neural nets to focus the collection of images on those relevant to the device's current mission and thereby reduce the amount of resources needed to store the images. This will allow for the creation of mobile hypercubes that can analyze images while still in flight. The team plans in 2022 to release a prototype computer system that will use this new algorithm. The project was jointly funded by the Russian State Fund for Basic Research and the Armenian Ministry for Education, Science, Culture and Sport.

A second project involves researchers from Kazan State University, Strasbourg University in France, and Hokkaido University in Japan. These scientists have developed an AI-based process that simplifies molecular synthesis techniques used in the production of medicines. The researchers taught a neural net existing known information about the nature of chemical reactions, which allowed the net to suggest new options for chemical reactions. This will allow them to solve problems related to the manufacture of new pharmaceuticals.

Sources: "Drones smart vision will improve due to scientists from Russia and Armenia" («Умное зрение» дронов станет лучше благодаря ученым из Армении и России), Feb. 23, 2021, https://scientificrussia.ru/articles/umnoe-zrenie-dronov-stanet-luchshe-blagodarya-uchenym-iz-armenii-i-rossii; "AI has been taught to forecast new chemical reactions" (Искусственный интеллект научили предсказывать новые химические реакции), Feb. 25, 2021, https://scientificrussia.ru/news/iskusstvennyj-intellekt-nauchili-predskazyvat-novye-himicheskie-reaktsii.

29. Russia and France launch joint AI forum

On February 26, 2021, the Trianon Dialog forum for Franco-Russian civil society cooperation hosted a videoconference on artificial intelligence. The forum included representatives from business circles, researchers, and government officials. The purpose of the forum is to expand scientific and technological ties between Russia and France and outline joint plans for cooperation in the development of technologies using artificial intelligence. Senior Russian participants included the chairman of the Skolkovo Foundation, A.V. Dvorkovich, and MGIMO vice-rector A.V. Malgin. French officials included the head of the University of West Brittany and the mayor of Bouillon.

The forum had five working sessions: Artificial Intelligence in Public Administration and Regulation; Industry of the Future Today; Use of AI in the Health Industry; Use of AI in Ecology and the Urban Environment; and Opportunities for Franco-Russian Collaboration in AI Research and Education. Participants in the working groups included representatives of the Ministry of Economic Development of Russia, the National Assembly of France, Sberbank, Gazprom Neft, Total, Dassault Systems, Sanofi, Moscow State University, the Russian Academy of Sciences, the Sorbonne, MGIMO, the Moscow Institute for Physics and Technology, and a variety of other private and public institutions in both countries.

Sources: "Russian-French AI Forum" (Российско-французский Форум по искусственному интеллекту), Feb. 25, 2021, https://www.crn.ru/events/detail.php?ID=151726; also see https://fra.minpromtorg.gov.ru/news/?alias=pervyy_rossiyskofrancuzskiy_forum_po_iskusstvennomu_intellektu, accessed Mar. 9, 2021.

30. Tomoru looks to reach India and US markets

Tomoru, an IT company from Russia's Primorsky Krai that produces artificial intelligence software for human interaction, has received a local grant of 2 million rubles that will enable it to launch an effort to expand into the Indian and US markets. The company builds conversational robots with artificial intelligence that can communicate with people, understand natural speech, maintain full communication with a person, and perform customer tasks. These robots can be used for any tasks that require a large volume of communication, such as technical support or automated calls to customers. Through grant funding, the company has developed an automated platform that is capable of assembling the necessary bot without human intervention in just a few hours. This modernization has led to consumer interest from abroad, specifically from the US and India.

The grant program is part of a regional effort to double the volume of export business in Primore by 2024, which itself is part of a national project to increase the share of exports in Russia's GDP to 20 percent by 2024, while also increasing the share of those exports coming from non-energy sources.

Sources: "'My business' center grant helped IT company to enter markets in India and the US" (Грант центра «Мой бизнес» помог приморской IT-компании выйти на рынки Индии и США), Feb. 2, 2021, https://xn--80aapampemcchfmo7a3c9ehj.xn--p1ai/news/grant-tsentra-moy-biznes-pomog-primorskoy-it-kompanii-vyyti-na-rynki-indii-i-ssha.

31. Sber enters Uzbekistan market for AI products

The president of Uzbekistan has announced that the country will be introducing artificial intelligence systems developed by the Sber group of companies. Sber will partner with the Uzbekistan Ministry of Development of Information Technologies and Communications, as well as two banks: the National Bank for Foreign Economic Activity of Uzbekistan, and Aloqabank. In a decree, President Mirziyoyev instructed them, together with Sber, to develop and approve a joint roadmap for the accelerated and efficient implementation of pilot projects and to organize training for local specialists. Sber's role will be to provide consultants on the development of artificial intelligence in the activities of state organizations, as well as in the preparation of the regulatory framework in this area. Specific projects expected to be introduced as part of this initiative include voice biometrics technology, which will allow the implementation of remote banking services through mobile phones and call centers. The banks will also use Sber's technology to analyze credit risks and improve the quality of banking services.

Source: "Uzbekistan intends to incorporate AI systems" (В Узбекистане намерены внедрить системы искусственного интеллекта "Сбера"), Feb. 18, 2021, https://uz.sputniknews.ru/economy/20210218/16033265/V-Uzbekistane-namereny-vnedrit-sistemy-iskusstvennogo-intellekta-Sbera.html.

32. US-UK fund purchased Yandex shares

According to the SEC, the Janus Henderson Group has purchased a 7.6 percent stake in Yandex at a total market price of $ 1.6 billion. Janus Henderson Group was formed in 2017 through the merger of the American fund Janus Capital Group and the British fund Henderson Group. Janus Capital was founded in 1969 by Thomas H. Bailey. In 1984, the fund was acquired by Kansas City Southern Industries. In 2003, the fund acquired its parent structure, Stilwell Financial. Henderson Group is a British foundation founded in 1934. Janus Henderson Group is

headquartered in London. At the time of the merger, the combined fund had assets totaling $360.5 billion. The parent structure of the Janus Henderson Group is listed on the New York and Australian stock exchanges.

American funds have been actively buying Yandex shares since 2019, with significant stakes now owned by the Harding Loevner Fund, Invesco, and the Capitol Group. This may cause a problem for Yandex, as Russia is considering legislation that would prohibit foreigners from owning more than 20 percent of shares in significant internet assets. However, even before the law's adoption, Yandex has reached a compromise with the authorities. Yandex handed over a "golden share" to a specially created Public Interest Fund, whose council includes representatives from five state universities, the Skolkovo Moscow Business School, the Russian Union of Industrialists and Entrepreneurs, and the Moscow Secondary School #57 Support Fund. The fund will be able to block the acquisition of more than 10 percent by anyone and will coordinate transactions for the sale of significant intellectual property to Yandex, the transfer of personal data of Russians abroad, and the conclusion of agreements by the company with foreign countries.

Source: "US-UK fund purchased 1.6 billion Yandex stock" (Американо-британский фонд скупил акций Yandex на $1,6 миллиарда), CNews, Mar. 1, 2021, https://www.cnews.ru/news/top/2021-03-01_amerikanobritanskij_fond.

33. Russian IT distributor Treolan to cooperate with Inmagine Group

The Russian IT distributor Treolan, which is part of the Lanit group, and the Inmagine Group, an international company (founded in the United States) that is the developer of the designs.ai online platform, have signed a cooperation agreement. Since January 2021, Treolan has begun supplying designs.ai with electronic annual licenses through its partner channel as an official brand distributor within Russia.

Designs.ai is an integrated online platform using artificial intelligence technology to enable users who lack design experience to independently create logos, banners, videos, and graphic layouts in a few minutes. Treolan is helping Inmagine to make the design.ai platform more widely accessible to a variety of companies and agencies in the Russian market.

Source: "Treolan becomes official distributor of the online-platform designs.ai" (Treolan стал официальным дистрибьютором разработчика онлайн-платформы designs.ai), CNews, Feb. 16, 2021, https://www.cnews.ru/news/line/2021-02-16_treolan_stal_ofitsialnym_distribyutorom.

34. Russian and German researchers develop remote agriculture monitoring system

A new automated imagery processing system for greenhouse monitoring has been developed by a group of researchers from Skoltech and the German Aerospace Center (DLR). The system analyzes sensor images taken from non-manned greenhouses, such as those that might be deployed in Antarctica or on Mars, and processes it through machine learning to then use to inform automated plant cultivation and growth systems. The research was recently published in the *IEEE Sensors Journal*. The system is an advancement because of its more efficient image compression process, which allows for more accurate inputs for machine learning algorithms, given constraints on communication bandwidth to far-flung research stations.

The researchers argue that the approach will be particularly useful for agricultural research applications such as plant and plant disease classification in remote settings, and will provide evidence for a seven-fold efficiency gain using their convolutional neural net system. The project is a joint effort by scientists from the Skoltech Center for Scientific and Engineering Computing Technologies for Big Data Problems (CDISE), the Skoltech Digital Agriculture Laboratory, and the DLR.

Sources: Natalia Safronova, "Artificial intelligence will track greenhouses in Antarctica and Mars" ("Искусственный интеллект проследит за теплицами в Антарктике и на Марсе"), Nauchnaya Rossiya, Feb. 17, 2021, https://scientificrussia.ru/articles/iskusstvennyj-intellekt-prosledit-za-teplitsami-v-antarktike-i-na-marse; S. Nesteruk et al., "Image Compression and Plants Classification Using Machine Learning in Controlled-Environment Agriculture: Antarctic Station Use Case," *IEEE Sensors Journal,* https://ieeexplore.ieee.org/document/9316732?fbclid=IwAR17ObcU7JWpDHLPvkPwQt8ThLonI4CzwMTXwgu5qvkkVmchQ7JhC0GwWUM.

Spotlight: Kronshtadt Design Bureau Offers Swarm and Combat Drone Capabilities

Kronshtadt Design Bureau—which developed Orion, currently Russia's only combat drone—has unveiled a self-initiated project named "Molniya" ("Lightning"). Molniya is a UAV swarm that can be launched from an aircraft to penetrate adversary air defense or conduct swarm electronic warfare together with manned aircraft. Specifically, enemy air defenses can be saturated by a large number of these vehicles. These drones can also act as high-precision guided munitions or reconnaissance target designators. Kronshtadt announced that it will begin work on this project in the near future, without giving exact dates.

According to the developer, Molniya drones are shaped much like cruise missiles, with an elongated fuselage, a jet engine, and a folding wing. Kronshtadt envisions this swarm being used by combat and transport aircraft and launched from external and internal bays and cargo compartments. This jet-propelled swarm can be carried by Su-57, Russia's newest fifth-generation aircraft, as well as by the "Okhotnik" combat drone, indicating that Russian designers are thinking beyond just a loyal wingman conceit for the Su-57–Okhotnik combination (please see issues 19, 20, and 21 of *AI in Russia*). This initiative is similar to DARPA's LongShot project, currently in development. Kornshtadt mentions Okhotnik as a potential Molniya carrier, and it is possible that Russia's entire lineup of long-range UAVs, which include Altius HALE and Orion (Inokhodets) MALE drones, can potentially have this capability.

Molniya drones will be 1.5 meters long, with a 1.2-meter wing span and a speed of 600–700 kilometers per hour. Each drone warhead has an estimated payload of five to seven kilograms, and a combat range of several hundred kilometers. CNA notes that the MOD often uses the vague term "several hundred" for a combat range of projects currently in development, rather than noting precise numbers. The Molniya swarm will also supposedly use stealth technologies that reduce their radar and thermal signature.

Russian military expert Denis Fedutinov noted that the Molniya swarm can include a range of UAVs for different missions—reconnaissance, strike, EW—that can solve different tasks at the same time. He noted that this swarm's efficiency can be ensured by automatic distribution of tasks in a rapidly changing environment, including swarm reconfiguration by adding or taking out individual vehicles based on mission conditions. Fedutinov also noted Molniya's possible use in suppressing enemy artillery, conducting counterterrorist activities, and performing

other potential missions. He especially noted the cost-effective approach in manufacturing a large number of such drones, which can ultimately reduce the cost of individual UAVs in a swarm.

Sources: Swarming jet-propelled drones in development for Russian aerospace forces" (Источник: для ВКС создают работающие в стае реактивные беспилотники), Ria.ru, Mar. 1, 2021, https://ria.ru/20210301/bespilotniki-1599368302.html; Jospeh Trevichik, Tyler Rogoway, "DARPA Is Developing Aircraft-Launched Missile-Like Drones That Fire Their Own Air-To-Air Missiles," TheDrive.com, Feb. 8, 2021, https://www.thedrive.com/the-war-zone/39152/aircraft-launched-missile-like-drones-that-fire-their-own-air-to-air-missiles-are-in-the-works.

In Brief: Sber Releases AI Principles

On March 1, Sber announced the release of ethics principles for AI development and implementation in its ecosystem. According to the company, these principles are consistent with Russia's national AI development strategy. They seek to build trust in AI technologies developed in the Sber ecosystem and are intended to be improved over time.

The ethics principles, by topic, are as follows:

1. **Controllability and management of AI systems (Secure AI)**

- "The development and application of AI technologies at Sber are safe, manageable and controllable to the maximum possible degree.
- Sber takes into account the possible risks associated with the safety of AI technologies, and does not allow them to get out of control or cause harm to humans.
- The implementation of AI at Sber is never an end in itself, and the technologies employed must enjoy the trust of customers, employees, and society."

2. **Transparency and predictability of the functioning of AI technologies (Explainable AI)**

- "Sber is responsible for the use of AI systems in its activities. Sber strives to ensure maximum transparency, internal control and predictability of the process and results of their work.
- Sber applies all AI technologies in compliance with the law, including the requirements of confidentiality, and with respect to the private life of a person, as well as to trade secrets. When working with AI technologies, data security is ensured, and AI systems are never used for illegal processing of personal information of citizens or information of Sber's corporate clients."

3. **Stability and reliability of AI systems (Reliable AI)**

- "Sber ensures the stability and reliability of the functioning of AI systems.
- Sber provides the necessary level of technical support and creates the most favored conditions for the development and implementation of reliable AI systems at Sber.
- Sber implements the highest level of guarantees of all human rights and freedoms in the use of AI, supporting the use of AI technologies exclusively on legal grounds.

4. **Responsible employment of AI (Responsible AI)**

- "When implementing AI, Sber's focus is always on the needs of customers and employees, and AI technologies should be used to improve customer experience.
- Sber takes into account and responsibly treats all concerns that arise in connection with the employment of AI technologies."

5. **Unbiased AI (Fair AI)**

- "Sber applies all AI technologies fairly and objectively on equal terms for all.
- Sber strives to ensure that AI technologies are beneficial for the development of humanity."

Sources: "Sber is one of the first in Russia to agree on AI ethics principles" ("Сбер" одним из первых в России утвердил принципы этики искусственного интеллекта), Sber, Mar. 1, 2021, https://press.sber.ru/publications/sber-odnim-iz-pervykh-v-rf-utverdil-printsipy-etiki-iskusstvennogo-intellekta.

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