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Abstract

This report, the fifteenth 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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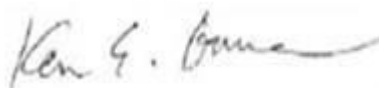
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Cover image credit: "Meeting on commissioning defence industry goods," President of Russia, December 19, 2014, http://en.kremlin.ru/events/president/news/47256

Approved by: **November 2020**

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Contents

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Governance and Legal Developments

1. Government updates parliament on "Digital Economy" program

On November 3, Maksut Shadayev, head of Russia's Ministry of Digital Development, Communications, and Mass Media, spoke for the first time at the Federation Council (upper house of Russia's parliament) about how the Russian government has adjusted the Digital Economy national program to account for the pandemic and new priorities. As discussed in past issues of *AI in Russia,* this program is a key vehicle for the Russian government's civilian AI efforts.

Program goals and hurdles

Shadayev stated the program's goal is to stimulate the development of digital services that will bring comfort and convenience to the lives of Russian citizens, and elevate them to a qualitatively different level. He emphasized that this is applicable to the Russian business community as well, and that digital services should reduce costs, stimulate access, and improve business competitiveness in new markets.

However, he added that the government must solve five problems:

- Ensure that the population has high-speed internet access.
- Teach citizens to use digital services and increase their digital literacy.
- Protect the personal data of citizens and resist cyber threats.
- Allow the high-tech industry to take its rightful place in the world market so that Russia has every opportunity to compete with foreigners.
- Digitalize public administration.

The education sector

Shadayev noted that the government is rewriting parts of the national program to focus on solving practical problems and ensuring quick results, with a particularly large portion of the program now devoted to schools. He stated that schools are now being connected to the internet as part of a project to provide socially significant facilities with information infrastructure. While this does not mean that every classroom will have access to the internet, the authorities agreed that by 2024 schools will have WiFi connections that make it possible

to connect all classrooms to the internet easily and quickly. There is also a problem in that teachers lack necessary equipment, so the national program includes a section providing all teachers with personal tables for work use. The pandemic revealed an additional challenge for the education process: the lack of domestic solutions for video conferencing. According to Shadayev, Russia's two largest internet companies, Yandex and Mail.ru Group, are independently investing in their online communications platforms with Rostelecom (Russia's largest digital services provider) to find video conferencing solutions, and these services should be available by 2022.

Internet for everyone

Shadayev also discussed the importance of ensuring that all Russian regions, even the most remote, have internet access. Within the framework of the national program, the government is working to provide internet access to these areas through such means as underwater cables and satellites. All settlements with 100 to 500 people will also receive mobile communications and 3G/4G mobile internet. Overall, the ministry head said, this means the Russian government will ensure that 97 percent of households in the country have internet access. Though the government previously announced that it was cutting the program to eliminate digital inequality implemented by Rosetelecom, Shadayev said this is no longer the case. He stated that the government had found a solution with the Ministry of Finance that, starting next year, will allow it to restore full financing for this project and connect remote settlements.

5G networks and personnel

Shadayev said the government decided to require that all 5G network equipment be made domestically, adding that it will provide additional funding for this purpose. He did not specify the frequency for the 5G network, but said it will not use the prospective global range of 3.4-3.8 GHz. The government did prepare a plan for conversion of the spectrum and agreed to clear the frequencies of military equipment by moving them to other bands.

On the personnel side, Shadayev said that Russia plans to increase the number of jobs in ICT specialties by 2.5 times. At the largest universities, the government will organize in-depth training programs in areas such as AI, big data, and the internet of things in order to prepare world specialists. Shadayev said that everyone in all roles should have knowledge of these technologies, and that all training programs in traditional specialties will include a module on developing digital skills and the use of digital solutions for industry.

State information systems

Shadayev also emphasized the need to protect all state information systems, and said that, starting next year, his ministry will conduct independent tests of all key state information systems to find vulnerabilities and increase their level of protection. In addition, he said that another aspect of information systems is the need to protect Russian citizens from cyber

threats, such as spam and phishing attacks. He said this is a matter of law enforcement, which must, first of all, ensure a quick response to these cases by quickly blocking numbers committing fraudulent acts, blocking phishing sites, and working on personal data leakage cases.

Shadayev also discussed import substitution, saying that the government plans to help companies implement import substitution measures. He stated that state-owned companies are still using foreign software, and said that the next phase of the ministry's work is to ensure these companies purchase domestic solutions.

Digitalization of the government

Lastly, Shadayev discussed digitalization of public administration, saying that Russia faces two main tasks: the digitalization of public services, and the digitalization of state data. He said that they had managed to create a complete centralized database based on data from the Ministry of Internal Affairs and the Federal State Registration Service [Rosreestr], which helped reduce the period for obtaining a certificate by at least five days thanks to improved interdepartmental data exchange. In addition, he discussed the details of a pilot project for using digital duplicates for documents instead of the originals, which is set to begin in December 2021 in Moscow. Through the program, the Russian government will allow digital counterparts to be used for driver's licenses, vehicle registrations, hunting licenses, and even passports.

Source: "In practice and result: Maksut Shadaev spoke about the future of the 'Digital Economy'" [На практику и результат: Максут Шадаев рассказал о будущем "Цифровой экономики"], The Future of Russia [Будущего России], Nov. 3, 2020, https://futurerussia.gov.ru/nacionalnye-proekty/na-praktiku-i-rezultat-maksut-sadaev-rasskazal-o-budusem-cifrovoj-ekonomiki.

2. Russia wants AI cooperation with EU

In a recent statement, Russia's foreign minister Sergey Lavrov reiterated that Russia remains open to dialog with the European Union, which remains an important economic partner for Russia. He highlighted artificial intelligence as one of the areas in which cooperation would bring benefit to both sides. At the same time, he noted that cooperation can only be equal, taking into account the interests of both parties. He noted that Russia will not make any one-sided goodwill gestures.

According to reports, Russian cooperation with Europe on AI has been constrained by several factors, including Western sanctions on technology transfer to Russia, security issues that make both sides cautious about revealing their vulnerabilities, a general lack of trust on cooperation in technology due to the fear of hacker attacks, a sense of economic competition, and a slump in the Russian economy that has made Russia less attractive to European partners. At the same time, there are some areas in which synergies are possible and cooperation may

be advantageous to both sides. These include the use of AI in megascience projects where cooperation already exists, such as particle physics and the international space station. Healthcare R&D is another potential area for cooperation, because it can be kept largely separate from the more sensitive security issues. Similarly, smart cities and smart infrastructure could be an area for cooperation.

Sources: "Россия не допустит "игры в одни ворота" с Евросоюзом, заявил Лавров" [Lavrov says that Russia won't allow games into one goalpost with the EU], Nov. 3, 2020, https://ria.ru/20201103/evrosoyuz-1582872350.html; Ivan Danilin, "hDigital Transformation: (re)constructing EU-Russia dialogue (the case of AI)," EUREN Brief 2, May 2019, http://eu-russia-expertnetwork.eu/en/analytics/euren-brief-02.

3. Sberbank exec elected to Council of Europe Ad Hoc Committee on AI

According to reports, on November 9, the intergovernmental group for global consultation of the Council of Europe Ad Hoc Committee on AI Technologies elected Andrey Neznamov, executive director of the Center for Data Research for State Bodies of Sberbank, as the group chairman. Neznamov is a co-author of the National Strategy for the Development of AI and the Concept of Regulation of AI and Robotics Technologies. As chairman of the intergovernmental group until the end of 2021, he will facilitate the organization and conduct of global consultations between European states and representatives of the science and business spheres on the regulation of AI technologies in Europe.

According to Alexander Vedyakhin, first deputy chairman of the Sberbank Board:

> International cooperation is one of the priorities for the development of artificial intelligence. All states are actively discussing AI rules and they are on the agenda of many international organizations. We are very attentive to this. The support of the Council of Europe member states for the candidacy of a Sberbank representative is the result of our long-term expert work on many international platforms.

The main task of the Council of Europe Ad Hoc Committee on AI is to determine the order of regulation for AI technologies in Europe. The committee was created in 2019 by decision of the Committee of Ministers of the Council of Europe. It includes representatives of Council of Europe member states, as well as observers from various international bodies and representatives from the science and business spheres.

Source: "Chairman of the intergovernmental group for global consultations of the Council of Europe" [Председатель межгосударственной группы по проведению глобальных консультаций Совета Европы], TAdviser, Nov. 9, 2020, https://www.tadviser.ru/.

4. Russia to create own approach to internet regulation, Putin says

On October 29, Russian president Vladimir Putin said Russia will create its own approach to internet regulation and personal data protection, rather than borrowing any foreign models. "We will not follow any already-established patterns," Putin said. "We will have a Russian one."

Putin also noted the importance of personal data protection, stating that it relates to the human right of each person "to protect himself [and] his family from abuse in this area." As a result, he said, the Russian government will be very deliberate in allowing industries to develop in this sphere while still ensuring that citizens feel protected. He declined to give specifics on the scheme, but said that the government is thinking about it.

Source: "Russia is creating is own internet regulation scheme – the President of Russia" [Россия создаст собственную схему регулирования Интернета – президент РФ], D-Russia.ru, Oct. 29, 2020, https://d-russia.ru/rossija-sozdast-svoju-sobstvennuju-shemu-regulirovanija-interneta-prezident-rf.html.

5. Moscow launches website on AI solutions

The city of Moscow recently launched a digital platform called ICT. Moscow, which will house all relevant information on AI development in one place. According to Moscow deputy mayor Natalya Sergunina, ICT.Moscow will allow users to find information on the latest Russian and international AI practices, which are divided into functional areas such as science, retail and e-commerce, culture, and art. The site features a showcase of 300 AI solutions implemented in Moscow, and users also have access to a daily news feed about AI, including job postings, analysis, announcements of industry events, and datasets for developers. The overall goal of the project is to assist in the search for new AI ideas and uses. Eduard Lysenko, head of the Moscow Department of Information Technologies, said that combining such functionality in one platform will allow business to receive the most relevant information.

Source: "A project on world experience with the development of AI launched in Moscow" [В Москве запущен проект о мировом опыте развития искусственного интеллекта], C-News, Nov. 5, 2020, https://www.cnews.ru/news/line/2020-11-05_v_moskve_zapushchen_proekt_o.

Military and Security Developments

6. Armata tank may turn into UGV

While the Russian military has not yet adopted the newest Russian Armata T-14 tank, it is reportedly already working on this tank's successor model. A recent Russian Ministry of Defense media report referenced unnamed sources in the Russian military-industrial complex as saying that the future tank will be unmanned and equipped with weapons based on "new physical principles." This may indicate an electrothermochemical gun.

Reports suggest that the tank will be crewless and controlled by artificial intelligence but that it can also be controlled remotely if necessary. The military already tested the T-14 Armata in unmanned mode, but no information about the results of the tests was publicly reported.

The Russian Ministry of Defense (MOD) is moving forward with plans for greater automation of its military equipment. AI is slated to play a primary role in unmanned systems' C4ISR; the MOD is already testing AI on prototypes such as the Marker unmanned ground vehicle, as discussed in past issues of *AI in Russia*.

Sources: "Plans to turn Armata MBT into a UGV" [«Армату» планируют превратить в сухопутного беспилотника], TVZvezda.ru, Nov. 5, 2020, https://vpk-news.ru/news/59419; "Vitaly Davydov: terminators will replace living fighters" [Виталий Давыдов: живых бойцов заменят терминаторы], RIA.ru, Apr. 21, 2020, https://ria.ru/20200421/1570298909.html.

7. AI-enabled catamaran USV for Russian naval cadets

According to Russian Ministry of Defense media, two Russian radio-controlled catamarans have successfully passed tests in the Gulf of Finland. Built for the Kronstadt Naval Cadet Military Corps, the catamarans, called "Kadet-M," are mobile multipurpose robotic systems (USVs). Kronstadt Naval Cadet Military Corps' innovation labs developed the educational and technological mission sets for these USVs, with the assistance of cadets and teachers at the school's "Engineers of the Future" club. The project is being implemented by a major public-private partnership that involves the Kronstadt Naval Cadet Military Corps; Peter the Great St. Petersburg Polytechnic University; United Shipbuilding Corporation's Sredne-Nevsky shipyard (responsible for the creation of composite hulls); the Innovation Promotion Foundation; the scientific and technical center "Hevel" (responsible for solar panels); Itekma

(responsible for carbon fiber); and NPK "Morsvyazavtomatika" (manufacture of the catamaran frame).

The catamaran project reportedly implements AI solutions, and is equipped with technical vision and navigation sensors. The radio-controlled vessel is incorporated into the educational process at the naval school, as a teaching tool.

The Russian Navy reportedly believes that introducing high-tech educational equipment into the military education system can significantly increase cadets' interest in studying and raise their technical skills and competence. Admiral Nikolai Evmenov, the commander-in-chief of the Russian Navy, instructed the navy to analyze the experience of using radio-controlled catamarans in naval educational institutions. On his orders, the proposal for creating a fleet of maritime unmanned vehicles is discussed within the framework of establishing the naval IT technologies school at the Kronstadt Naval Cadet Military Corps.

Source: "Video of unmanned catamarans testing in the Gulf of Finland published" [Опубликовано видео испытаний беспилотных катамаранов в Финском заливе], TvZvezda.ru, Nov. 6, 2020, https://tvzvezda.ru/news/forces/content/2020116040-sP0yg.html.

8. Medvedev announces new cyber testing range

According to TASS, Dmitry Medvedev, the deputy chairman of the Security Council of the Russian Federation (and the former Russian president and prime minister) said that Russia plans to create a cyber training range for information security specialists. This "testing range" will be part of the Information Security federal project. Medvedev made this announcement at the October 2020 meeting on the implementation of federal and industry projects using artificial intelligence technologies. He noted that the project's main goal is to support the production of domestic ICT services and related ICT products, which is one goal of the national AI strategy.

Medvedev stressed the importance of the national strategy for the development of artificial intelligence adopted through 2030. He also discussed the "Artificial Intelligence" federal project currently implemented by the Russian government, and mentioned the creation of a special alliance with the participation of key Russian companies to support domestic AI solutions. Medvedev noted that every year, more attention will be paid to AI in Russia and more tasks will be solved with the help of AI, and this technological implementation may produce more challenges for state security.

Earlier, Russian government officials went public on the use of AI in the broadly defined information operations space. For example, in an address by MOD deputy minister Yuri Borisov at the inaugural 2018 "Artificial Intelligence: Problems and Solutions" conference hosted by

the MOD and the Russian Academy of Sciences, he noted that AI technologies will help Russia effectively counter in the information space and win cyber wars. He noted that cyberwar has already become a reality and that today's battles first play out in the information space, with victory depending on which party is most capable of controlling and organizing it. Borisov also specifically noted that humanity is approaching a new era, in which intelligent systems will be needed in order to process and store terabytes of information flows, and that AI should manage the necessary information.

Source: "Medvedev announced the upcoming opening of a cyber testing range in Russia" [Медведев сообщил о предстоящем открытии в России киберполигона), Tass.ru, Oct. 29, 2020, https://tass.ru/ekonomika/9852635; "The development of artificial intelligence is necessary for successful cyberwarfare" [Развитие искусственного интеллекта необходимо для успешного ведения кибервойн], Russian MOD website, Mar. 2018, https://function.mil.ru/news_page/person/more.htm?id=12166660@egNews.

Corporate and Market Developments

9. Sberbank expanding AI role

Sberbank has continued to evolve away from its origins as a savings and loan bank. In September 2020, it officially rebranded itself as the tech company Sber, dropping the word "bank" from its name and logo. At that time, it unveiled a number of new devices and services that go beyond traditional banking products and are expected to cement its reputation in the tech sector. These devices include a TV streaming device called "SberBox," a smart speaker with gesture and voice recognition called "SberPortal," and a virtual assistant called "Salute" that is modeled on Siri and Alexa.

As part of this transformation and rebranding, Sberbank has continued to innovate in the AI field. It has created a robotic lawyer that can recognize and process legal information from a variety of documents to ensure that the business it is tracking has not filed for bankruptcy or been liquidated or reorganized. During the eight-month testing period, the robot lawyer has issued more than 2.5 million legal opinions, speeding up business processes and reducing errors at Sberbank. The final stage of the robot lawyer's work is to form a legal opinion based on the facts extracted from the documents. The robot was developed by Sberbank's legal department, taking into account the company's internal architecture, and was integrated with its internal systems. However, Sberbank said that the robot lawyer is universal, enabling implementation of the decision-making system not only in the legal field but in a wide range of areas.

Please see the "In Brief" section for a discussion of a joint project between Sberbank and Cognitive Technologies on AI-based navigation and autonomous driving for agriculture.

Source: "Robot lawyer gets Sberbank role," Nov. 3, 2020,
https://www.computerweekly.com/news/252491484/Robot-lawyer-gets-Sberbank-role.

10. St. Petersburg seeks to build AI industry

The St. Petersburg city administration has announced that it will be starting a research center focused on the role of AI in industry. The center will be organized by city universities and by the Gazprom Neft energy company, and will be led by Gazprom Neft's director for digital transformation, Andrey Belevtsev. The center will be part of the Digital Economy national project.

Source: "В Петербурге создадут центр разработок в сфере искусственного интеллекта в промышленности" [AI industry development center announced in St. Petersburg], Nov. 6, 2020, https://futurerussia.gov.ru/nacionalnye-proekty/v-peterburge-sozdadut-centr-razrabotok-v-sfere-iskusstvennogo-intellekta-v-promyshlennosti.

11. Skoltech cooperates on AI in energy field

An international group of scientists, including a group from Russia's Skoltech, developed an algorithm that can determine the viscosity of oil by analyzing nuclear magnetic resonance scanning. The international group also includes scientists from the University of Calgary and Curtin University in Australia, and the study results were published in the journal *Energy and Fuels*. According to reports, the work shows that machine learning can be used to analyze materials through indirect measurements. This will allow for the analysis of petroleum deposits directly in the well, without having to remove samples for laboratory analysis. Similar techniques may be used in agriculture, where soil quality could be analyzed over large areas, and in food science, where fruit quality could be determined without cutting the fruit.

Source: "Искусственный интеллект научился определять вязкость нефти" [AI is able to assess the viscosity of oil], Nov. 3, 2020, https://www.cnews.ru/news/line/2020-11-03_iskusstvennyj_intellekt.

Education and Training Developments

12. MIPT expert praises online courses to build Russia's ICT workforce

A November 3 column in TASS featured insights from Alexei Maleev, the director of distance programs at the Moscow Institute of Physics and Technology (MIPT) and head coach of the Russian national computer science team. In this column, Maleev shared ideas on ways to increase the size of Russia's ICT workforce, which is identified as a goal of the "Human Resources for Digital" federal project. He identifies the utility of online training programs that have become popular during the pandemic, noting that it is quite possible to take a three-month, intensive IT course and then become a successful entry-level specialist. There are also internships, hackathons, and training competitions, where newly developed skills can be tested. A variety of intensive programs are available to interested students, ranging from AI, to data analysis, to interface design. According to Maleev, these programs exemplify "not only how to quickly collect ideas that can increase revenue or reduce costs, but also a solution to the personnel issue. In turn, for specialists living from Yakutia to Kuban, this is an excellent chance to find a dream job." He notes, too, that it is "not surprising that the newest telecom companies are permanent partners of a variety of hackathons and courses" related to these topics.

Source: "Project approach: how to train IT professionals for the Russian digital economy" [Проектный подход: как готовить IT-профессионалов для российской цифровой экономики], TASS/Future Russia, Nov. 3, 2020, https://futurerussia.gov.ru/nacionalnye-proekty/proektnyj-podhod-kak-gotovit-it-professionalov-dla-rossijskoj-cifrovoj-ekonomiki.

13. MIPT team in Amazon social bot competition final

According to a November 5 article, among the nine teams that have been selected as finalists to compete in the Alexa Prize Socialbot Grand Challenge is a team from MIPT. MIPT's team, named "DREAM," is competing for the second year in a row and is led by Mikhail Burtsev. Team members include graduate students from Phystech and employees from the DeepPavlolv project at MIPT's neural network and deep learning laboratory. The team's bot from last year combined 40 communication skills utilizing various natural language processing (NLP) algorithms. MIPT's team is the only Russian team in the competition, and is competing against

eight other teams, including ones from Spain and the Czech Republic, as well as ones from the University of Southern California and Stanford. In the competition, teams are asked to develop a bot that can interact "fluently and coherently" with English speakers on topics including sports, politics, entertainment, current events, technology, and fashion. Each team is allotted a $250,000 grant to support its research. The winner of the competition will be announced in August 2021.

Source: "MIPT team for the second year in a row in the competition from Amazon - Alexa Prize Socialbot Grand Challenge 4" [Команда МФТИ второй год подряд в конкурсе от Amazon — Alexa Prize Socialbot Grand Challenge 4], Habr, Nov. 5, 2020, https://habr.com/ru/company/mipt/blog/526564/.

14. Center in Samara to focus on AI

According to an October 30 article in the Regnum newswire, the Samara Scientific and Education Center will focus on the development of AI alongside new engineering systems, new-generation propulsion and fuel systems, and smart transport systems. Its research program was approved by all the members of the advisory board, and it has now submitted an application for world-class accreditation. The head of the Samara Region ordered the creation of the Scientific and Education Center in 2019. As discussed in past issues of *AI in Russia,* over a dozen similar centers are being developed around Russia under the framework of the "Development of Scientific-Industrial Cooperation" segment of the national "Science" project.

Source: "Samara REC claims world-class status" [Самарский НОЦ претендует на статус мирового уровня], Regnum, Oct. 30, 2020, https://regnum.ru/news/innovatio/3103265.html.

15. SPbPU to expand supercomputer capacity

According to reports, leadership of the St. Petersburg Polytechnic University (SPbPU) Supercomputer Center recently presented a summary of its first five years of work. Since 2015, the university has seen a surge in grant applications related to "supercomputer simulations." The center currently supports research for more than 500 such grants related to artificial intelligence, numerical modeling, machine learning, medicine, physics, cybersecurity, and material sciences. According to the report, the supercomputer system has been particularly useful in helping develop solutions in the fields of aerospace and aviation machinery, and to discover oil and gas reserves. The center's supercomputer, called "Polytechnic RSK Tornado," has a current peak capacity of 1.6 petaflops, and was ranked number 22 in the IO500 world ranking in July 2020.

The center's director, Andrei Ivanovich Rudskoy, noted that the further development of supercomputer systems is in line with the goals of the Digital Economy national program. Rudskoy announced that within the next three years, SPbPU intends to become the "backbone of the National Supercomputer Infrastructure" by increasing its computing power to 10 petaflops, and by applying supercomputer technology to create intelligent systems.

Source: "In the SCC "Polytechnic" of Peter the Great SPbPU told about the prospects for further development" [В СКЦ «Политехнический» СПбПУ Петра Великого рассказали о перспективах дальнейшего развития], CNews, Oct. 30, 2020, https://www.cnews.ru/news/line/2020-10-30_v_skts_politehnicheskij.

Spotlight: Russia's National Defense Management Center

One example of how AI-enabled technologies could be implemented in a decision-making capacity in the Russian military is the National Defense Management Center (NDMC), the Russian military's "nerve center" tasked with daily, round-the-clock assessment and coordination of military and national security activity domestically and internationally.

According to the open-source data available, the Russian military will utilize AI at the NDMC but will not outsource decision-making to AI systems. Instead, AI technologies will assist in decision-making, including collecting and submitting all the necessary information in order for the human operators to clearly understand the status of Russian forces and the state of military units in the country and on international deployments.

According to the official statements, the NDMC supposedly houses Russia's most powerful hardware and software systems, as well as a powerful military-related computer. The center was launched on December 1, 2014. As the closest equivalent to the US National Military Command Center in the Pentagon, this first-of-its-kind Russian facility performs the following official functions, as articulated by the Russian Ministry of Defense:

- Maintains the centralized combat control system to ensure combat readiness
- Monitors the state of the armed forces and strategically deployed forces, and assists them in performing their combat duties
- Informs the leadership of the Ministry of Defense, the Situation Center of the Ministry of Defense, and state officials on the military-political situation around the world and the socio-political situation across the Russian Federation
- Controls and coordinates Russian military forces' flights and air traffic
- Manages, coordinates, and controls naval forces during combat and international operations, and provides logistics and programmatic support to naval activities

To fulfill these functions, NDMC consists of three main departments:

- The Control Center of Strategic Nuclear Forces manages Russia's use of nuclear weapons and may deploy such weapons following the decision of senior military and political executive officials.

- The Combat Control Center monitors military-political developments around the world, forecasts potential threats to Russia and its allies, and manages armed forces that are not part of the Ministry of Defense, such as the national guard.
- The Daily Activities Control Center manages supply, maintenance, and logistics, as well as the health conditions of the nation's armed forces.

At the official opening of the NDMC, Defense Minister Sergei Shoigu stated that the center is "a step toward forming a single information space for solving tasks in the interests of the country's defense." Shoigu further stated that NDMC was envisioned as a 24-hour mechanism for managing all spheres of the Russian armed forces' activities. For example, it must ensure the ability and readiness of the troops to perform their tasks; enable the fulfillment of the state defense order; handle financial and material resources, including the recruitment of troops and training of personnel; solve medical and housing issues; and help manage Russia's international activities.

The center collects key information from regional and territorial commands, as well as military units and control posts. NDMC was designed to receive information from the lowest military unit levels, and, following analysis and evaluation, feed the data directly to those at the strategic level. It integrates the work of military management, executive authorities, and local governments in the shortest possible time, enabling the Russian National Security Council, the General Staff of the Armed Forces, the leaders of the federal executive bodies, and various defense structures to work together.

According to reports, NDMC officials claim that the center monitors and coordinates, via video feeds and in real time, all major stages of manufacturing and repair of military equipment, starting with the signing of a state contract and the launch of products and ending with the delivery of a specific weapon to a specific military unit. To accomplish this task, the NDMC staff monitors such activity via 700 cameras in 500 military-industrial sites across the country, and their content is purportedly analyzed six times per every NDMC shift. Prior to NDMC's creation, such information exchange was "inconceivable" and the most complex and laborious task for the military involved dealing with various data and information collections and analyses.

According to Defense Minister Sergei Shoigu, the center's supercomputer, which is the only one in the Russian defense system, can store 236 petabytes of data (versus the Pentagon's 12 petabytes), and its productivity is estimated at 16 petaflops (versus the Pentagon's 5 petaflops); the speed of information processing is equivalent to 50 Lenin Libraries per second (the Lenin Library is Russia's State Library and has 17.5 million books). The center's supercomputer, developed by Russia's United Instrument-Making Corporation, is reportedly protected from cyber-attacks; NDMC's hardware and software have been fully made in Russia.

Sources: "Russian National Defense Management Center uses artificial intelligence" (Национальный центр управления обороной РФ применяет искусственный интеллект), Regnum.ru, Jan. 27, 2020, https://regnum.ru/news/polit/2836730.html; "NDMC is ready for action" (Национальный центр управления обороной готов к действию), Viktor Mysanikov, Nov. 7, 2014, http://nvo.ng.ru/realty/2014-11-07/1_action.html; "National Defense Management Center of the Russian Federation," Ministry of Defense of the Russian Federation (Национальный центр управления обороной Российской Федерации, Министерство обороны Российской Федерации (Минобороны России), Official MOD website, http://structure.mil.ru/structure/ministry_of_defence/details.htm; "Russian Federation's NDMC begun military service" (*NTSUO Rossikoi Federatsii zastupil na boyevoye dezhurstvo*), RVO, Dec. 2014, http://sc.mil.ru/files/morf/military/archive/rvo_2014-12.pdf; "Ministry of Defense: The general on duty monitors the defense of the Russian Federation every day" (Минобороны: За обороной РФ ежедневно следит дежурный генерал), Life.ru, Dec. 19, 2015, https://life.ru; "Russian Federation's NDMC begun military service" (*NTSUO Rossikoi Federatsii zastupil na boyevoye dezhurstvo*), *Rossiskoye Voyennoye Obozreniye,* Dec. 2014, http://sc.mil.ru/files/morf /military/archive/rvo_2014-12.pdf; "How the Russian defense management system works - two years of NTSUO " (Как работает российская система управления обороной - два года НЦУО), Geopolitika, Dec. 1, 2016, http://geo-politica.info/kak-rabotaet-rossiyskaya-sistema-upravleniya-oboronoy---dva-goda-ntsuo.html; "Digital military machine" (Цифровая военная машина), Lenta.ru, May 29, 2017, https://lenta.ru/articles/2017/05/29/command/; Mikhail Mizintsev, "The key to assessing the situation" (Ключ к оценке обстановки), *Military-Industrial Courier,* issue 46 (612), Dec. 2, 2015, http://vpk-news.ru/articles/28280.

In Brief: AI in Russian Agriculture

AI research and development in agricultural issues is an important aspect of the Russian government's broad plans for AI-based modernization through its "Digital Economy" national project. Although the largest Russian agricultural companies are privately held or publicly traded, they are deeply connected to state development planning and receive significant state subsidies. Russian agriculture is a top exporter of wheat and other grains and has seen profits in food exports rise considerably over the last decade. A major focus for AI integration in Russian agribusiness has been in automated driving for large machinery.

An interview with Olga Uskova, a major Russian AI researcher and CEO of the agricultural company Cognitive Technologies, was featured in an American farming news source and highlighted Russian advances in the field of AI usage in the agricultural industry. Cognitive Technologies operates a joint project with Sberbank on AI-based navigation and autonomous driving, called Cognitive Pilot. Uskova identified several primary concerns for integrating AI into agricultural production: improving food security, reducing human inputs in labor-intensive aspects of agriculture, and promoting efficiency gains. She notes that most current successful integration of AI into agricultural spheres occurs through AI-based neural net systems. One example is Cognitive Agro Pilot, which is a new autonomous driving system for combines, tractors, and field sprayers that does not rely on GPS or RTK (real-time kinematic) navigation systems. By removing more tedious basic navigation duties from a human operator, that operator can concentrate on fine-tuning driving details to achieve increased efficiency and closer, more accurate cutting along crop edges, rows, and windrows.

The Cognitive Agro Pilot program was successfully tested in Russia by the farming conglomerate Rusagro, providing estimated efficiency gains of $6.5 million mostly through reductions in fuel usage and human error, and through the optimization of business processes. Importantly, the program is brand-neutral, and can be attached to any combine harvester vehicle regardless of make or manufacture.

In September 2020, Cognitive Agro Pilot won the Overall Harvesting Innovation of the Year award at the Agriculture Technology Breakthrough Awards 2020 and the AVT ACES award in 2019, organized by the US *Autonomous Vehicle Technology*. The Cognitive Agro Pilot program is being introduced to the United States in February 2021, and one manufacturer of agricultural machinery is already testing the system. Rollout of new testing on tractors, in addition to combines, is also expected to begin next year. Interest in the United States, China, Brazil, and other major agricultural producers in the system is reportedly already extensive, and Uskova calls the "Russian school of artificial intelligence" to be the only effective and practical player in AI-based agricultural innovation at present.

Cognitive Pilot works on more than just agricultural automation; it has an important project on autonomous rail transport as well. It is separately developing superior forms of imaging techniques for both these kinds of systems, replacing LIDAR laser sensors with different types of radar sensors that can provide better data to the AI systems that run these programs. A new factory in Tomsk is now building these distinct kinds of imaging systems specifically for AI-based autonomous vehicles.

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