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Abstract

This report, the tenth 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.

Approved by: **September 2020**
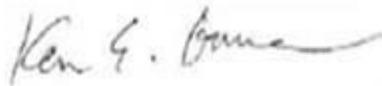
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Introduction to this Special Issue on Army-2020

This issue of *AI in Russia* is dedicated to the artificial intelligence / machine learning (AI/ML) and related innovations in the Russian Federation (RF) armed forces that were featured at the Army-2020 forum, the largest annual military expo and conference organized by the Russian Ministry of Defense (MOD). This year, the forum took place on 23-29 August, primarily in the Moscow region, and was attended by nearly 1.5 million people, including 320 people representing 92 countries' delegations and exhibitors. There were also small Army-2020 satellite events in other parts of Russia.

The event, the fifth since the inception of the Army forum in 2015, featured over 5,000 weapons systems and technologies, including those of the RF armed forces science troops (special recruits from Russia's universities who serve in highly technical areas of the Russian military). Numerous military competitions were held, including some in operations of unmanned systems and tanks. Over 40 government contracts with various defense entities were signed at the event, which also featured awards for innovative defense technologies.

As in the past forums, Army-2020 had a scientific-business portion, which featured over 180 briefings and roundtables and was attended by over 11,000 experts, as well as a special conference titled "AI Technologies in the Interests of Defense and Security of the State" that was moderated this year by Russian Deputy Minister of Defense Ruslan Tsalikov. Numerous Russian political and military officials made remarks that focused on the role of AI and defense innovation in the Russian military in the context of Army-2020.

Systems showcased and discussed at Army-2020 were consistent with the prioritization of the "intellectualization of weapons" stated in the 2024-2033 State Armament Program and an emphasis on defense innovation across the RF military, including robotic systems across Russia's conventional and nuclear forces. There are still debates, however, as to the role of AI in defense-related technologies. For example, the issue of Russian military robotic systems conducting fully autonomous operations is still the subject of debate across the MOD. Currently, the "human-in the-loop" approach is the standard CONOPS when discussing and developing autonomous and unmanned military systems. At the same time, the MOD R&D institutions discuss the ever-lessening role of human operators in future combat.

This special issue first presents background information on the Army conference series and highlights past conferences on AI/ML and related innovations in the RF armed forces. It then highlights key statements made by Russian defense officials at the 2020 forum and offers a discussion of key systems involving AI/ML that were exhibited at the forum. Following that, it profiles discussions at the special roundtable on AI technologies and other panels that focused on AI/ML and related issues.

Source: Anastasiya Sviridova, "Forum Army-2020: results overcame all expectations," *Krasnaya Zvezda*, Aug. 31, 2020, http://redstar.ru/forum-armiya-2020-rezultaty-prevzoshli-vse-ozhidaniya/?attempt=1.

The Army Forum Since its Inception

Since its inception, the annual Army forum has paid special attention to AI and related innovation in the RF armed forces. The focus on AI has grown in complexity over time. Initial iterations of the forum focused much more on robotics, UAVs, and information security. Later iterations highlighted broader applications of AI and related innovations, discussing technologies that utilize big data, modeling, AR/VR, and AI algorithms, with an increasing proportion of the program content each year. More recently, the forums have included separate conferences on AI, each with a different theme, as discussed below.

The first Army forum took place in 2015 with the stated objectives of "creating conditions for the search and implementation of advanced solutions in the production of military and special equipment" and "popularizing military service." Over a span of four days, more than 80 plenary events were attended by 6,500 representatives from the MOD, military schools, the military-industrial complex, the scientific community, and delegations from 59 countries. Specific attention was paid to the rearmament of the RF armed forces, the improvement of C2 and communications, the development of military robotics, innovations for the Arctic, and new technologies in military medicine. Some of the key roundtables in the scientific-business portion focused on the following topics:

- Systems for detecting, collecting, and processing information in technical protection complexes
- Applying AI and decision-making support
- Key military robotics technologies: current state and development prospects
- Future IT technologies for processing and transferring information: their selection and the challenge of adapting them to the requirements of the armed forces

Forum attractions displaying armored robots and test flights of UAVs drew crowds, including over 50,000 people on the forum's first day. President Vladimir Putin gave the keynote address, noting: "Unlike specialized exhibitions, this one will feature the broadest range of military products, including small arms and armored vehicles, combat robots and control systems that will determine the current and future status of our Armed Forces. Equipping them with modern and advanced technology weapons remains a key task of our military capability development."

The second Army forum, Army-2016, drew similar crowds. In addition to the objectives of the 2015 forum, it also included the following goal: "the development of military-technical cooperation between the Russian Federation and foreign countries and the promotion of

Russian-made military products on the international market." Some of the key roundtables in the scientific-business portion discussed the following topics:

- Intellectualization of processes and high technologies of electronic warfare
- Topical issues of automation and "informatization" of everyday activities of the Ministry of Defense of the Russian Federation
- Prospects for the development of navigation support for aviation systems and complexes of combat manned and unmanned aerial vehicles

The following year's forum, Army-2017, included two additional (to 2015 and 2016) objectives: "stimulating the growth of promising young specialists of research organizations of the Russian Defense Ministry and the defense industry" and "the patriotic education of citizens." Some of the key roundtables in the scientific-business portion included the following topics:

- Digital army: application of IT, Internet of Things and Industry 4.0 approaches in the daily activities of the RF armed forces
- Supercomputer technologies in scientific research of the National Institute of Education and the Military Training and Scientific Center of RF MOD
- AI led by the Ministry of Economic Development of the Russian Federation

Army-2018 paid particular attention to AI issues as the agenda included a two-day conference titled "Artificial Intelligence: Problems and Solutions," organized by the Ministries of Defense and Education, the Russian Academy of Sciences, and the Russian Association of Artificial Intelligence. Panel discussions were held on data mining; intellectual analysis of unstructured data; intelligent mechanic and robotic systems; decision-support algorithms and management support systems; cognitive models, multi-agent and distributed systems; fuzzy sets and soft computing; and Big Data processing. Additionally, there were plenaries with representatives from the Russian Academy of Scientists, Kurchatov Institute, Moscow Institute for Physics and Technology (MIPT), and other such institutions.

The following year, Army-2019 held another AI conference, titled, "AI: Technologies for the Defense and Security of the State." The goal of the event was to improve the mechanism for introducing AI technologies for automated products with military applications. The conference was attended by military and executive officials, National Technical Initiative centers, and representatives of higher education. The conference had panels and plenaries focused on foreign AI technologies, as well as the following roundtables:

- Analysis of modern AI technologies used in foreign and domestic automated systems
- The state of affairs and obstacles to implementing AI technologies for the creation (or modernization) of automated systems

- Forecasting the development of artificial intelligence in the field of applied decision-making support systems

Sources: "International military-technical forum "Army,"" RF MOD, http://mil.ru/armyforum.htm; "The results of the scientific and business program of the IMTF "Army-2015" will be summed up today," RF MOD, June 19, 2015, https://function.mil.ru/news_page/country/more.htm?id=12041694@egNews; "Speech at ceremony opening Army-2015 International Military-Technical Forum," President of Russia, June 16, 2015, http://en.kremlin.ru/events/president/transcripts/49712; "Conference: "Technologies of Artificial Intelligence of Interest for the Defense and Security of the State - 2019,"" Patriot Expo, June 28, 2019, http://www.patriot-expo.ru/2905/; "Conference Program," Patriot Expo, Mar. 14, 2018, http://www.patriot-expo.ru/1372/.

Official Statements at Army-2020

On several occasions, prominent Russian officials made statements about AI/ML and developments in information technologies related to the topics discussed in Army-2020. This section offers an overview of those statements:

- Based on his impressions from Army-2020, **Russian Defense Minister Sergei Shoigu** stated that "robots have been created that actually perform the function of a fighter, but are less vulnerable." He added that these robots "actually have neural control networks, elements of artificial intelligence." Following this, he announced the MOD's plans to conclude large contracts with Russian manufacturers for the development of UAVs and robotic systems by the end of 2020.

- Answering a question about ongoing discussions of the increase of automation in defense production, **Deputy Prime Minister for Defense and Space Industry Yuriy Borisov** stated: "[The] role of the human factor will only continue to grow. No matter what new technologies could come to the aid of humans, including robotics and AI, all these technologies are created and used by humans. All of these technologies do not work without humans." He also highlighted the importance of recruitment of talented young people for work in the defense sector and emphasized the role of ongoing efforts to motivate recruitment, including grants, housing benefits, and salaries. In addition, he noted the importance of working on "interesting projects … in a … [great] and motivated work environment with the opportunity to self-realize and achieve set scientific, technical, or engineering goals."

- **Lieutenant General A.V. Gulyaev, Chief of the Russian Ministry of Defense (MOD) Main Armament Directorate**, stated that Army-2020 is taking place in advance of the development of the State Armament Program (SAP) 2024-2033, the formulation of which will take place in more technologically advanced conditions in which the use of digital information will expand to "all spheres of human activity." The "intellectualization of weapons" will also impact the formulation of the SAP, particularly [systems] aimed at more effective decision-making based on large volumes of data, and an expanded range of weapons and military equipment, including, importantly, UAVs and robotic systems. Gulyaev said that new weapons and military equipment must include new automated communication systems, information warfare means, robotic combat weapons, and UAVs. In addition, Gulyaev spoke about the process of speeding up the development of these systems and weapons through practical testing, and particularly praised the testing carried out at the Robotics Center.

- **Colonel S.E. Pankov, Head of the Russian MOD's Department for Advanced Interdisciplinary Research and Special Projects**, said that, in the near future, significant technological breakthroughs in a number of areas—including military robotics, informatics, and nanotechnologies—will spur the development of new weapons systems for the Russian armed forces.

- **Commander of the Strategic Missile Forces Colonel-General S.V. Karakaev said that the Strategic Rocket Forces'** research organizations and universities are involved in the ongoing development of robotic complexes for military use. The armed forces have already tested the findings generated from this research in various exercises, and the Strategic Missile Forces will utilize the results of this testing when they develop robotic complexes for their own usage in the future.

- **Lieutenant-General Yu.M. Stavitsky, Chief of the Engineering Troops**, discussed the continuing development of robotic systems for his forces, including the heavy IMRTK-RT, a multifunctional robotic complex for demining operations, and the IMRTK-ShR, a multifunctional robotic complex designed to assist engineering units that are completing tasks while under enemy fire in urban and industrial settings.

- On August 24, Roscosmos, the Russian space agency, conducted a presentation in which **Sergei Prokhorov, Director of Roscosmos' Department of Advanced Programs**, discussed the entity's new "Sphere" program, which aims to integrate the development of space information technologies (see the following section for more details). Prokhorov also urged the domestic space industry to develop new technologies, including AI for use in the management of multi-satellite orbital constellations.

Sources: Mikhail Moshkin, "Russian military robots turned out to be dependent on Google," Vzglyad, Aug. 25, 2020, https://vz.ru/society/2020/8/25/1056665.html; Interview with Deputy Defense Minister Yuri Borisov, Vesti, Aug. 25, 2020, https://www.vesti.ru/article/2449057; "Abstracts of the speech of Lieutenant General A.V. Gulyaev, Chief of the Main Armament Directorate of the Ministry of Defense of the Russian Federation, on the topic of the International Military-Technical Forum "Army-2020,"" RF MOD, Apr. 10, 2020, http://mil.ru/army2020/statements/more.htm?id=12297890@egNews; "Speech by Colonel S.E. Pankov, Head of the Department for Advanced Interdisciplinary Research and Special Projects of the Ministry of Defense of the Russian Federation, on the topic of the International Military-Technical Forum "ARMY-2020, "" RF MOD, July 9, 2020, http://mil.ru/army2020/statements /more.htm?id=12301192@egNews; "Abstracts of the speech of the Commander of the Strategic Missile Forces, Colonel-General Sergey Viktorovich Karakaev on the topic of the International Military-Technical Forum "Army-2020,"" RF MOD, Aug. 19, 2020, https://function.mil.ru /news_page/country/more.htm?id=12308132@egNews; "Abstracts of the speech of the Chief of the Engineering Troops of the Armed Forces of the Russian Federation, Lieutenant-General Stavitsky Yu.M. on the topic of the International Military-Technical Forum "Army-2020,"" RF MOD, Mar. 4, 2020, http://mil.ru/army2020/statements/more.htm?id=12274641@egNews; ""Sphere" program presented at Army 2020," На «Армии-2020» представили программу «Сфера», Roscosmos, Роскосмос, Aug. 24, 2020, https://www.roscosmos.ru/29080/.

Systems Exhibited at Army-2020

Army-2020 hosted multiple Russian defense companies, enterprises, and organizations that advertised AI-enabled military products and weapon systems. Given the current R&D effort in Russia and the challenge of developing and testing breakthrough technologies, it is not surprising that the nation's largest defense companies presented many AI-related technologies. Going forward, it will be interesting to track the public efforts by mid- and small-sized businesses to develop military AI applications.

"Resonance-N/E" early warning radar station

One system on display at Army-2020 was the Resonance-N (export version NE) stationary early warning radar utilizing a phased antenna array and AI-related technologies. The Resonance Research Center designed the system to counter low-observable aircraft and missiles; it has a purported maximum range against aerodynamic targets of 600 km and ballistic missiles to 1,100 km. The radar system is already in service in the Russian Arctic regions, and Russia has sold the system to both Iran and Egypt. "Resonance-NE" consists of several large structures that cover an area of approximately 2.5 acres and have a 360-degree view.

During the Army-2020 expo, Alexander Shcherbinko, the deputy head of the Resonance enterprise, drew attention to the cognitive function of the radar, claiming that its computer equipment analyzes the detection results, identifies errors, and corrects those errors. Furthermore, Shcherbinko suggested that the system utilizes machine learning in that it can learn from experience, subsequently developing more-advanced detection algorithms. The developer claims that it can potentially track Israeli US-made F-35S stealth aircraft. Russian military developers tend to inflate some of their products' characteristics; however, the Russian MOD has long been concerned about US aerospace technologies and is looking to AI-augmented systems to enable its early warning radars to process faster and yield better analysis and decision-making.
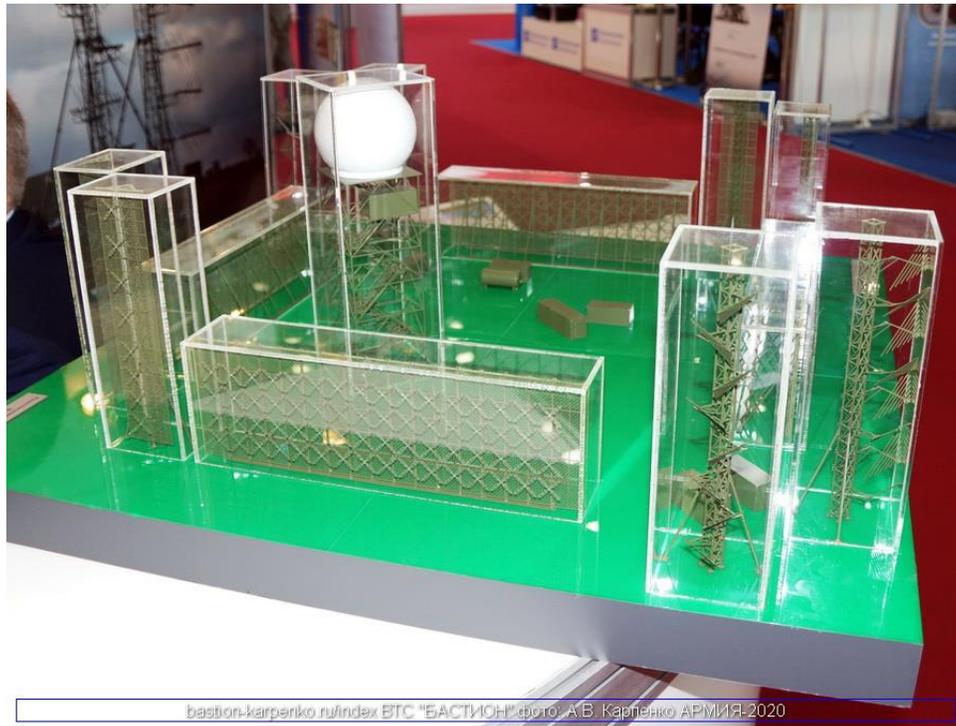
Model of the Resonance system on display at Army-2020, http://bastion-karpenko.ru/rezonabs-ne-rls-armia-2020/.

Sources: SRC "Resonance," CJSC, Company Stand at Army-2020,
https://www.rusarmyexpo.ru/army2020/catalog_exhibitors/members/33303, https://rg.ru/2
020/08/26/rossijskaia-rls-v-irane-zasekla-f-35.html; http://bastion-karpenko.ru/rezonabs-ne-
rls-armia-2020/.

AI-enabled C-UAS systems

During Army-2020, Avtomatika JSC enterprise, a division of Rostec, demonstrated portable counter-UAV systems capable of integrating across a range of Russian air defense weapons systems. This year the Army-2020 exhibition awarded Avtomatika the prize for "best project in the field of information technologies" for its counter-UAV systems. These systems, such as the Bastion-Avtomatika, have varying degrees of automation enabling them to identify aerial targets independently, including those masking themselves as other than hostile. All these systems appear to keep a human in the decision chain, if only to confirm the findings and recommendations of the systems and approve engagements. According to Avtomatika, each C-UAS complex can work separately, or as part of an integrated system with other antiaircraft weapons such as the well-known Sa-22 "Pantsir" self-propelled, medium-range, surface-to-air and antiaircraft artillery system.

The portable Bastion-Avtomatika C-UAV system, https://www.aviaport.ru/digest/2020/08/25/650725.html.

Another system presented by Avtomatika at Army-2020 was the "Kupol" ("Dome"), which creates an electromagnetic field that the company claims is impenetrable for unmanned aerial vehicles. Once the UAV encounters it, the drone loses control and lands without incident. Kupol's latest modernization has made the system more automated, minimizing the role of the human operator.

As the Russian military and security forces encounter the persistent threat from UAVs, as experienced in Syria, the domestic defense industry is looking to new and upgraded systems that incorporate more automation to help mitigate the threat of multiple incoming UAVs and drone swarms.

Various Avtomatica systems on display at Army-2020, https://www.aviaport.ru/digest/2020/08/25/650725.html.

Source: "Rostec presented C-UAS system with AI," RIA Novosti, Aug. 24, 2020, https://ria.ru/20200824/armiya-1576259567.html, https://www.aviaport.ru/digest/2020/08/25/650725.html; https://rostec.ru/news/razrabotka-kontserna-avtomatika-priznana-luchshey-sredi-innovatsionnykh-na-forume-armiya/.

"Sphere" space program

Roscosmos, Russia's state space agency, presented its "Sphere" program for integrating space-related information technologies. Of note was the developer's claim that the system will need AI-augmented technologies to best handle the multi-satellite orbital constellations, although the company said little more about what aspect or discipline of AI the company was considering. The presentation noted that during the program's implementation through 2030, there will be more than 500 different Russian spacecraft in orbit. Sphere is supposed to develop five communication orbital constellations and five new orbital constellations for Earth remote sensing. As Russia faces unprecedented competition in space from both international state

agencies and private industrial efforts, it is seeking to reinvigorate the domestic industry via new and breakthrough technologies.

Source: ""Sphere"" program presented at the Army-2020," Roscosmos.ru, Aug. 24, 2020, https://www.roscosmos.ru/29080/.

Neural nets for controlling military robots

During the exhibition, Roselectronics enterprise (part of Rostec) displayed what it claimed to be an automated intelligent control system for robotic formations that utilizes neural networks. The system integrates target information obtained from any number of sources, including satellites, drones, or radar, and transmits those data to robotic systems. Rostec noted that the new development increases the effectiveness of combat systems threefold by minimizing human participation in the command and control process. Rostec claims that the use of mathematical models with elements of artificial intelligence increases the reliability and stability of the system.

The development announced by Rostec is consistent with Russian military efforts to incorporate lessons learned in the Syria conflict. During the expo, General Yuri Stavitsky, commander of the Russian engineering forces, announced that Russian scientists are working on the creation of a neural network that will control robotic systems during demining operations—something Russian forces are encountering on the battlefields of Syria. These systems will apparently use terrain scanning and underground object identification by unmanned systems. These developments are also consistent with Russian military writing in recent years on the need to create a unified information space—something they hope AI-enabled technologies will make possible.

A concern noted by Russian military technology experts is that neural networks are vulnerable to hacking. Equally interesting is the fact that some Russian defense companies not only use Google software to work with neural networks, but also use foreign-made processors to create drones. Foreign technological products are attractive in terms of ease of use and general availability; however, they do have disadvantages, recognized earlier by the MOD, in that they can contain software and hardware backdoors and can be subject to sanctions. Several Russian companies develop neural network technologies for the Russian government: STC "Module" and Federal Scientific Center "GosNIIAS."

Sources: "Russian scientists are working on the creation of a neural network that will control robots during mine clearance operations," TvZvezda.ru, Aug. 26, 2020, https://tvzvezda.ru; "Rostec presented a neural network for controlling groups of combat robots," TASS.ru, Aug. 24, 2020, https://tass.ru/armiya-i-opk/9272011; Mikhail Moshkin, "Russian military robots turned out to be dependent on Google," Vzglyad, Aug. 25, 2020, vz.ru/society/2020/8/25/1056665.html.

Okhotnik UCAV

Although it does not appear that the MOD showcased the Okhotnik UCAV platform during the Army-2020 forum, the TASS news agency reported from the forum that the Russian Ministry of Defense will use artificial intelligence in the UCAV, enabling the platform to complete missions autonomously. Okhotnik is reportedly controllable by both ground assets and air assets, such as the Su-57 fighter. However, AI-enabled capabilities will reportedly enable the UCAV to operate "fully autonomously… [and]…independently search for certain types of targets, report on them and attack."

According to the TASS source, the MOD is also equipping the UCAV for a long-range interceptor role to take on adversary aircraft before they enter Russia's airspace. The Russian MOD maintains that the Okhotnik should start entering service in 2024.

MOD image of Okhotnik in flight, https://tass.ru/armiya-i-opk/9299951.

Source: "The Ministry of Defense decided to make Okhotnik an interceptor," Tass.ru, Aug. 26, 2020, https://tass.ru/armiya-i-opk/9299951; "Okhotnik UCAV will employ AI," TAdviser, Aug. 27, 2020, https://www.tadviser.ru; "Attack drone "Okhotnik" will begin serial delivery in 2024," Tass.ru, Aug. 3, 2020, https://tass.ru/armiya-i-opk/9109873.

Military videoconferencing

The RTI technology company presented a videoconferencing system based on Russia's own Elbrus microchips. According to the company, it is offering a system designed for the analysis and visual presentation of data, as well as for analyzing open-source data by using artificial intelligence technologies. The system also functions as a videoconferencing platform built on

domestic technologies. The developer claims that this system has substantial security protecting it from hacker attacks.

Earlier, the Russian MOD issued directives that it would start giving preference to domestically produced high-tech systems made without imported components. This is part of the years-long import-substitution drive by both the military and civilian enterprises, initiated following the imposition of Western sanctions on Russia in 2014 and 2015. The MOD has been concerned for a number of years that the use of imported high-tech products in the ICT sector exposes Russian users—individuals as well as entire agencies—to back-door attacks. The use of domestic "clones" of popular systems and products, from Zoom to computers and mobile phones, is meant to safeguard Russian military personnel and command structures, as well as the information they manage, from what the MOD sees as persistent Western cyber pressure against critical military ICT infrastructure.

Source: "High tech: Artificial Intelligence is used at Army 2020," RadioSputnik.ru, Aug. 21, 2020, https://radiosputnik.ria.ru/20200821/1576075820.html.

AI-enabled pandemic prediction system

Russia's RTI technology company is developing an artificial intelligence-based system, purportedly capable of predicting social or political events, as well as pandemics, according to Pavel Laptayev, CEO of RTI. According to Laptayev, the RTI specialists are working to create a system that would autonomously detect risks of certain events, based on data from the media and other sources. "By making certain adjustments, I think we would be able to detect brewing threats, similar to the COVID-19, at early stages, allowing the state to react to them on time," Laptayev said at the Army-2020 forum. This is not the first announcement of AI-enabled predictive analytics systems from Russia. The MOD previously announced that it will use artificial intelligence as a decision-making aid in the National Defense Coordination Center—the main information analysis and management center for the country's armed forces. However, RTI's announcement is open to skepticism, since the growing prevalence and dangers of "fake news" can easily spoof the system into thinking that a significant development is taking place. RTI does not describe how its AI system is going to filter through open-source media.

Source: "AI-based pandemic prediction system in development in Russia," TASS.com, Aug. 24, 2020, https://tass.com/society/1192945.

AI Conference at Army-2020

One highlight of the Army-2020 scientific-business program was the fourth annual conference on AI technologies. The RF MOD Main Directorate of the Science-Research Actions and Technological Support of Technologies at the Forefront (Innovations Research) organized the conference, titled "AI technologies in the interests of defense and security of the state."

Source: A panel at the conference. http://mil.ru/army2020/new_this_year/artificial_intelligence.htm.

The event's attendees included key political and military officials and representatives of higher education, as well as organization and foundations focused on innovation and technological development. Known speakers included Russia's First Deputy Minister of Defense Ruslan Tsalikov; Head of the Russian MOD's Main Directorate for Research and Technological Support of Advanced Technologies Major General Andrei Goncharov; RARAN President Vasily Burenok; Dean of Bauman Moscow State Technical University Anatoly Aleksandrov; Sergey Garbuk of the Higher School of Economics; and Maksim Vakshtein of the Fund of Perspective Research.

While the conference's full program agenda remains unavailable at this time, some of announcements at the event have already made headlines. These included the following:

- **Russia's First Deputy Minister of Defense Ruslan Tsalikov** moderated the discussion. He began by saying that, while AI will not replace people, it will open up new opportunities in the use of data, the efficiency of decision-making, and the improvement of control systems, thus expanding human capabilities. He noted that the Russian defense sector already uses elements of AI, including pattern recognition, to solve various defense and security issues. "Based on the technologies that are now used by the MOD, we are at the forefront of technical and technological development," he said, though he also stressed that AI has application for the whole of society and not

just the defense sector. As an example, he noted that the MOD National Defense Management Center could serve as an example in "any spheres of state activities on the federal and regional level."

- **Head of the Russian MOD's Main Directorate for Research and Technological Support of Advanced Technologies Major General Andrei Goncharov** said that the MOD is working in conjunction with the Ministry of Education and Science to examine the issue of data access for AI research and development. The two state entities are discussing the creation of an interagency information resource for advanced technologies (particularly AI). Goncharov also noted that it was important to transfer AI technologies from the civilian to the military sphere, and that outcomes of national projects on high-tech developments could feed into resolving tasks in the defense sphere. He also said the state is considering creating a public White Book-like resource that would list unclassified information regarding scientific and technical problems stemming from the development of emerging technologies such as AI for the defense sector. Going forward, the military will test technological innovations that have already passed certain phases of development and approval at the military innovation Technopolis ERA.

Sources: "The "Army-2020" Forum: at the forefront of technical and technological development," *Krasnaya Zvezda*, Aug. 28, http://redstar.ru/forum-armiya-2020-v-avangarde-tehniko-tehnologicheskogo-razvitiya/?print=print&attempt=1.

Other Relevant Panels at Army-2020

In addition to the AI panel described above, the Army-2020 scientific-business portion featured over 70 roundtables or mini-conferences (meetings) across 20 topical areas, according to the schedule presented on the MOD website. Of these, a dozen meetings, noted below, focused on the information dimension in the Russian armed forces, with a handful listing AI explicitly in the title:

- "AI technologies in the interests of defense and security of the state," organized by the Main Directorate of the Science-Research Actions and Technological Support of Technologies at the Forefront (Innovations Research) of the RF MOD (as discussed in the previous section of this newsletter)

- "Perspectives to develop automated informational-diagnostic means of technical support of state aviation aircraft," organized by the Main Command of the Air Force

- "Technology to assess risk of emergencies of technological nature to develop an AI system to support Navy command and control decision making," organized by the Navy Main Command

- "Perspectives on the development of complexes with unmanned aerial vehicles to solve tasks in the interest of the Navy," organized by the Navy Main Command

- "Perspectives on the development of robotic complexes of nuclear chemical and biological defense (NCB) forces," organized by the Directorate of the RF RCB defense forces and the 33 Central-Science Research Institute

- "Relevant issues for the development of information systems by the RF Armed Forces," organized by the Department of Information Systems of the RF MOD

- "Employment of supercomputing technologies in the RF MOD," organized by the 12 Main Directorate of the RF MOD and the 12 Central-Science Research Institute

- "Modern information technologies in the legal support of the actions of federal executive authorities in the national security area," organized by the Legal Department of the RF MOD

- "Development of a system of selection and tracking of highly intellectually capable youth to attract them to scientific research in the area of improving the country's defense ability," organized by the Main Directorate of the Science-Research Actions and Technological Support of Technologies at the Forefront (Innovations Research) of the RF MOD and Technopolis "ERA"

- "Information technologies in construction," organized by the Department of Construction of the RF MOD

- "Information technologies and AI in the system of military education: tendencies and innovation," organized by the Command of the Strategic Rocket Forces (SRF) and the Peter the Great Military Academy of the SRF

- "Employment of new information and communication technologies in the SRF," organized by the Command of the Strategic Rocket Forces and the Peter the Great Military Academy of the SRF

- "Information technologies and AI in medicine," organized by the Main Military Medical Directorate of the RF MOD and the Kirov Military Medical Academy

- "Automated information system "Military Psychologist": organizational and methodological support of psychological work," organized by the Main Military-Political Directorate of the Armed Forces

The listings suggest a breadth of stakeholders, including various units of the MOD, uniformed services, a key branch of the nuclear forces, NCB defense troops, and military medics. As past issues of *AI in Russia* have discussed, some of these meetings and the nature of the topics, e.g., employment of AI in military medicine, have been anticipated. The titles suggest that development efforts are spread across the Russian military. Reports written after the panels suggest that attendance was significant. For example, a panel on the employment of information technologies and AI in military education was attended by 90 experts from across 24 organizations in the RF government, the armed forces, and industry.

Still other panels, not listed above, and another meeting, focused on the "Diversification of the defense-industrial base in the interest of national projects: Transformation of the industrial base" also focused on the implementation of national efforts relevant to AI/ML and implementation of innovation across the RF armed forces.

Sources: MOD agenda of the scientific-business portion of Army-2020, undated, http://mil.ru/files/morf/Perechen(2).pdf; "Challenges of adoption of information technologies and AI in the system of military education were discussed at Army-2020 forum," Aug. 30, 2020, Patriot expo, http://www.patriot-expo.ru/3459/, Aug. 30, 2020.

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