Samuel Bendett on AI Development in Russia (https://mindmatters.ai/podcast/ep145/)

Austin Egbert:

What's the story on Russian developments in artificial intelligence? This week on Mind Matters News we're benching our conversation with Samuel Bendett about Russian applications of AI, both civilian and military. Now here's your host, Robert J. Marks

Robert J. Marks:

Greetings. Let's talk about Russia and their artificial intelligence research and development. In 2017, Russia's leader, Vladimir Putin said, "Whoever becomes the leader in artificial intelligence, will become the ruler of the world." This probably means both economically and militarily. How have his words taken root in Russia? We have a perfect guest to talk about this today. Our guest is Samuel Bendett. He is an advisor with the CNA Adversary Analysis group where he is a member of the Russia Studies Program. He is also an adjunct senior fellow at the Center for a New American Security. His work involves research on Russian defense and technology developments. He is also a member of CNA's Center for Autonomy and Artificial Intelligence. There is more info in the podcast notes about CNA and CNA's Center for Autonomy and Artificial Intelligence. So we have the perfect guest because he has one leg in the area of Russia, he has another leg in the area of artificial intelligence, and we're going to talk about the intersection of those two specialties.

Robert J. Marks:

Sam, welcome.

Samuel Bendett:

Thanks for having me on your podcast.

Robert J. Marks:

We're delighted to have you. I noticed that you're natively fluent in Russian, right?

Samuel Bendett:

That's correct.

Robert J. Marks:

So if you go to Russia and you talk there, they won't think you have an accent, right?

Samuel Bendett:

They won't, but I was born there.

Robert J. Marks:

Oh, you were born in Russia?

Samuel Bendett:

That's correct.

Robert J. Marks:

Okay. So you spent your youth there. That's the best way to get a language. And how long did you live there? Where are you from in Russia?

Samuel Bendett:

So I was born in Moscow and I lived there until I was about 14 years of age and then my family brought me to the United States.

Robert J. Marks:

So is English an acquired language or did you learn that also?

Samuel Bendett:

It's technically an acquired language, but it is also a second native language.

Robert J. Marks:

Okay. What I want to talk about today is the civilian Russian artificial intelligence development. What is going on in Russia in terms of development of artificial intelligence in, I can't say the private sector, I don't know if Russia has a private sector, but in things which are not military. What is the emerging AI ecosystem in Russia right now?

Samuel Bendett:

You made a very good point about drawing attention to what private sector is or isn't in Russia. Right now, the state, the Russian state, the Russian government, is probably the biggest investor in the nation's high-tech development. In other words, investments in military companies and organizations in military enterprises, in many industrial enterprises are actually done by the state. The private sector also depends to a certain point on the investment from the Russian government and Russian government institutions designed to offer a financial support to high-tech projects. So the state has an overwhelming share in the development of high-tech in general.

Samuel Bendett:

Certainly that's the case for artificial intelligence as well. Until recently, probably until maybe five or six or seven years ago, we didn't really hear much about what Russia is doing with artificial intelligence. By the admission of the Russian government, there wasn't really an ecosystem in Russia to support a lot of the efforts on a lot of the projects that we're hearing about today. A lot of young entrepreneurs, a lot of bright young people, chose to immigrate, or at least work overseas for some time, because they couldn't really bring their projects to fruition in Russia. They couldn't get the same level of funding, investment, they couldn't get the same level of support. In other words, they couldn't get what the Silicon Valley is providing or what, for example, the Israeli high-tech community is providing or what high-tech communities can acquire from their funders and sponsors in the west.

Samuel Bendett:

And so today the government is engaged in trying to develop this support ecosystem almost from scratch. So the Russian government is launching initiatives designed to bolster and support the high-tech

community, designed to offer financial support, professional support, logistics, legal support. Essentially, they're trying to create what the Silicon Valley investors and angel investors and venture capital firms have been offering to the willing parties for decades.

Samuel Bendett:

And so there are multiple projects launched by the Russian government and backed by the Russian government that offer support to the entrepreneurs, as well as to the academia that is engaged in high-tech development. So one such organization is called the National Technologies Initiative. It is supporting multiple projects in high-tech development, including artificial intelligence. NTI, or National Technology Initiatives, is part of the agency for strategic initiatives, a government institution that was stood up to help develop the ecosystem.

Samuel Bendett:

Another organization is the Russian Direct Investment Corporation and its subsidiary Russian venture capital firm, the RVK. RVK also funds artificial intelligence support and so on and so forth. So there are multiple projects and multiple organizations that are now supposed to convince a lot of Russians that they can in fact get the same level of support and backing in Russia proper that they could potentially get overseas if they chose to leave.

Robert J. Marks:

This is very interesting. I think in the United States there's something similar. I don't see in the United States a lot of financial backing of private businesses. There are certain programs called SBIRs, for example, that are given to small businesses, but most of the US backing is through grants to universities and such. I think we'll be talking about that later.

Samuel Bendett:

Well, that's because in the United States the private sector backing is very developed and very mature. So we're talking about investment firms, investment corporations, venture capital firms, and this entire kind of financial/logistical infrastructure that exists to support an idea that could be taken from its inception to market capitalization. So an organization, a team, in the United States can travel to the Silicon Valley to pitch their ideas, to venture capital and to angel investors who can then take it upon themselves to back and support this project through and through. We're referring to that type of infrastructure.

Samuel Bendett:

In Russia, until recently, that infrastructure really was at the very nascent level or was absent altogether. In other words, for many entrepreneurs, for many ideas, especially when it comes to artificial intelligence and machine learning, there weren't that many outlets that they could go to in order to get their idea funded and supported. And that is what the government has recognized and that is what it is trying to mitigate right now, develop an ecosystem almost from scratch.

Robert J. Marks:

So they're trying to jump start the financial backing that already exist in the United States then?

Samuel Bendett:

That's part of it, yes. And that comes on a recognition that Russian STEM talent, or Russian talent in science, technology, engineering and mathematics has been strong consistently for many decades. Even after the end of the cold war, the Russian STEM education has been very strong. In fact, that was recognized by the Russian president when he spoke about AI development in his country last year. But a lot of these bright young people who have great education in math or physics and other STEM sciences, again, they couldn't quite get the same level of support in the private sector, which really wasn't there, or the government sector when it came to getting funding and support for their high-tech ideas, including artificial intelligence development.

Samuel Bendett:

I'll give you an example. One of the most famous Russian artificial intelligence companies is NtechLab. They develop facial recognition software and they are a globally recognized brand and their solutions are actually some of the best in the world. So the NtechLab founder basically argued against the concern over the brain drain by saying, "Give people the money. Give them the support." So his company received backing and for three months the founder and his colleagues were basically just locked away in their basement, tinkering away with a program and they were left alone, but they were given money and support. And once they had the product, that product was taken sort of to the market. Russia, until recently, wasn't quite the market for facial recognition that it has become now with the COVID and other restrictions that were imposed on the population.

Samuel Bendett:

But this high-tech entrepreneur, this private sector success story basically said, "Look, government has to act like a Silicon Valley venture capital firm. Support the ideas and most importantly, take risks." In fact, this is something that as is probably uniquely Russian. When we think about high-tech development, when we talk about high-tech products like AI and machine learning, there's a certain level of risk involved, right? Not every high-idea makes it through. So, a venture capital firm, when it funds let's say a dozen projects has to recognize that all of those dozen projects, maybe one, two, maximum three will actually make it. Other ideas will not make it. The project will fold. And so that type of risk taking is part and parcel of the Western and in some parts of Asia venture capital or financial support mechanism for high-tech investment.

Samuel Bendett:

In Russia, until recently, there was a lot of fear of failure. So a lot of, let's say a lot of financial firms were afraid to fund the projects because they weren't sure if they were going to succeed. A lot of entrepreneurs were also afraid to get funding because they weren't sure if their idea would succeed. So the president of the country and the government spoke recently about the need to incorporate risk taking in backing high-tech projects, because that type of risk taking is part and parcel of the very process of developing high-tech products.

Robert J. Marks:

Yes, absolutely. Yeah. I think that entrepreneurism requires high risks in order to be successful. Do I get the sense from you, Sam, that Russia is turning the corner and starting to embrace free enterprise and capitalism, at least in an indirect sense?

Samuel Bendett:

Well, I wouldn't take it that far, but they are actually turning the corner when it comes to certain parts of private sector or even government sector development, and specifically talking about high-tech development. Meaning, in order to back high-tech projects, you need to take risks, you need to have financial backing, you need to have institutions in place that can not just back an idea financially, but walk them through all the logistics to provide them with an environment where entrepreneurship and idea generation can thrive. And so the National Technologies Initiative that I mentioned earlier is one such institution, one such initiative that is national in scope, and is supposed to provide support to the Russian high-tech community. Of course, on paper everything looks very positive. Reality will be very different as more and more NTIA efforts are rolled out across the country.

Samuel Bendett:

Again, private sector in Russia is still very small. A lot of private sector is state dependent and so I would label it as state and non-state efforts.

Robert J. Marks:

Let's talk about the initiative of these people that are doing the research and I want to return to the idea of capitalism. Are they guaranteed in some sense that they are going to harvest some of the fruits of their work if successful? Do they get to keep the money or does it all go back to the government? I'm wondering this because I think that keeping the money is a big incentive for entrepreneurship.

Samuel Bendett:

That's a very good point and certainly based on the previous private sector experience in Russia, one would be completely correct in expressing that concern. Until recently, there was a lot of concern amongst the private sector whether they could keep the fruits of their labor. But again, there's a recognition the Russian government and a lot of the institutions that manage high-tech development that they must allow entrepreneurs and idea generators to keep the fruits of their labor, at least up to a certain point. Otherwise people will simply immigrate. And so a lot of high-tech entrepreneurs, a lot of very bright young people left Russia in the 90s and early 2000s precisely for that reason, because they weren't sure if they were to develop a high-tech product, they weren't sure if they would be allowed to keep it and to enjoy the financial landfall from it.

Samuel Bendett:

Now, again, there's a recognition to government that it must support entrepreneurs at all levels and especially when it comes to high-tech development. It must assure the young people that the fruits of their labor are theirs to keep.

Robert J. Marks:

Excellent. You mentioned Ntech, who are some of the other major players that have been successful in Russian development of artificial intelligence?

Samuel Bendett:

Well, there are multiple. There's a company called Abbey. There are a range of organizations, both in the kind of private sector, as well as in the academia. In fact, one of the focal points for Russian AI development in the academia is Moscow Institute of Physics and Technology, MIPT, or PhysTech As it is known by the Russian acronym. And so PhysTech, MIPT works with a lot of private sector companies. It works with other universities. It works with the state and government sector on developing artificial

intelligence solutions. But I mentioned NtechLab because it is a very relevant success story. The facial recognition software they develop is in fact used right now in Russia to monitor the population because of the COVID restrictions, which are slowly been lifted.

Samuel Bendett:

But at the same time, MIPT and another big organization, kind of a state defense contractor, state defense enterprise called RussTech, or Russian Technologies, a massive umbrella organization that has several hundred subsidiaries working on all kinds of industrial and high-tech development. RussTech is also engaged in artificial intelligence development for the military and for the civilian. What the government has recognized is that there are a lot of interesting ideas in the civilian sector that are not necessarily used by the state and so it has called for the private entrepreneurs in the private sector to work with the state. How that turns out still remains to be seen.

Robert J. Marks:

What are some of the other products? You mentioned facial recognition. What are some other shining examples of Russian entrepreneurship?

Samuel Bendett:

Image recognition and speech recognition are some of the shining examples of Russian entrepreneurship. In fact, my CNA Russia team is compiling news and information on Russian AI development every two weeks. And we actually put out a newsletter on our CNA website where you can read about the major developments in the civilian and the military sectors of Russian AI. And so I invite your listeners to check it out. And so our newsletter has recognized multiple projects. Again, a lot of them are coming out of universities and a lot of them are also coming from state backed entities, but speech and image recognition is something that the Russians are getting better and better at.

Robert J. Marks:

We will make available links to the CNA site on the podcast notes. I'm wondering, I still get back to this idea of free enterprise. This kind of intrigues me. The role of government I guess is to fund and vet these different projects. Is there ever going to be a case where, and is this allowable, where a company becomes so successful that they're allowed to seed other businesses?

Samuel Bendett:

I think so. I think that's where a lot of these efforts are actually heading. Russia doesn't want people to leave the country and basically use their talent to the benefit of let's say, United States in the Silicon Valley or other countries. It wants those young people to stay in Russia. And in order for the high-tech community to thrive, which in many ways is a very different goal than allowing, for example, industries or agriculture to thrive. It must allow for the people's creative elements to flourish and function unimpeded. It may be a difficult mental sort of challenge right now for a lot of Russian government officials and institutions because of the overwhelming role of the state in country's life for the past several decades, and obviously stretching all the way back to the cold war.

Samuel Bendett:

And so everyone is learning as they go. The entrepreneurs are slowly starting to utilize the Russian high-tech support ecosystem, the government and ministries that are administering this assistance, and other parts of this sort of ecosystem, which are supposed to function together.

Samuel Bendett:

Another element is that all of this is very new. So unlike the Silicon Valley, which had many decades to mature, unlike American financial sector, which also had many decades to kind of go through high-tech support cycles and investment cycles through booms and the busts, in Russia, all of this is less than five years old in total. And so a lot of the projects were launched and we don't quite know how they are going to succeed. But the fact remains that they have been launched. Now, some of the private sector are skeptical and some of the government may be skeptical as well. And so everyone is kind of feeling through as they go along.

Robert J. Marks:

I want to talk about academia a little bit. I know that in Japan and Europe, universities are very closely linked with industry and most projects, which are going on that I'm aware of in Japan and Europe are linked to private industry. That's much different than the United States. We are funded, university professors like me are funded by private companies, but usually it's not very much money compared to what we can get from the US government, from the National Science Foundation, National Institutes of Health and the Department of Defense. Which side would you say that Russia is on, more the American side or more the European/Japanese side where they're tightly linked to industry?

Samuel Bendett:

Right now, all of the top Russian universities, the ones that make it into the national ratings, the MIPT, the Higher School of Economics, the Moscow State University, the MGO, and many, many others are actually state funded. They have the name state or federal in their title. And so the government funds a very significant portion of the nation's best education. I wouldn't say that the universities are specifically tied to the industry, at least not yet, but the industry is recognizing the importance of high-tech talent in the country's academia and so more and more companies and corporations are starting to establish their own centers of excellence OR research and development efforts within Russian universities. But again, to reiterate, the state supports most of Russia's top education and probably will do so for the foreseeable future.

Robert J. Marks:

One of the things about artificial intelligence is that you hear it used all the time without a lot of definition. I think the media talks about artificial intelligence as being any "gee whiz" application that involves computers. Does Russia have a specific definition of artificial intelligence and specifically, how does the Russian military define artificial intelligence?

Samuel Bendett:

Well, a Russian definition Of artificial intelligence for the military, similar to kind of the global debate, in very general terms, Russian military defines AI as the ability to make decisions in conditions of uncertainty the way a human is supposed to. And so Russian military has been developing its AI development ecosystem for a number of years as well. So the civilian effort and launching different institutions, different organizations, different efforts to foster high-tech development, including AI machine learning, goes on the civilian side and it also happens on the military side as well.

Samuel Bendett:

The Russian military wants to use artificial intelligence at this point in time as a decision making tool. A lot of discussions, a lot of announcements about Russian militaries use of AI in weapons basically comes

down to this particular AI in that particular weapon, collecting all of the available data on potential targets, presenting solutions to address these targets so that a human can make a final decision. For Russian military, AI today is a human in the loop approach, but again, it is a decision-making tool and that is what has been discussed publicly by various military organizations and institutions in Russia.

Robert J. Marks:

Okay, excellent. I suspect we would probably talk about cyber things in terms of a subset of being artificial intelligence. In the media, in the United States, we hear all this news about Russia doing deep fake postings of generating fake emails and postings that are generated automatically by AI. What's your opinion about this? Is there a modicum of truth in this that you know about?

Samuel Bendett:

Well, in the spring of 2018, Russian Ministry of Defense, the MOD, hosted a conference with the Russian Academy of Sciences and several other government institutions in order to kind of understand what is the level of AI development in the country and what is the level of AI development internationally? And so this conference brought together a lot of academia researchers and developers, a lot of government officials, military officials, and at that conference, one of the Russian MOD officials said that AI will help us in cyberspace and help us win info wars, information operations. He didn't elaborate, but he did indicate that AI is going to be an essential element in this type of competition.

Robert J. Marks:

Okay. So there is at least an indication of a modicum of truth?

Samuel Bendett:

Absolutely. Absolutely there is.

Robert J. Marks:

Okay. Who is working on the Russian military AI? Is it military research labs? Is it the academia? Who's doing it?

Samuel Bendett:

All of the above. So there are two major lines of effort where AI is undergoing development. So one is called Advanced Research Foundation, or [foreign language]. This is Russia's DARPA-

Robert J. Marks:

Wait, say that again. That sounded so cool in Russian.

Samuel Bendett:

Okay. Advanced Research Foundation, or [foreign language].

Robert J. Marks:

Okay, you are a native Russian speaker. Okay.

Samuel Bendett:

I sure am. I sure am. And so this is Russia's DARPA like institution. It was officially inaugurated in 2012 and launched in 2013. It has a similar mission to the American DARPA to develop breakthrough technologies and concepts and proof of concepts, whether or not they're actually fielded. So Advanced Research Foundation works on military robotics. It also works on artificial intelligence development. And in 2018, this foundation made a proposal to the MOD in how AI should develop in Russia, the four principles. And ARF thought that AI should develop as speech recognition, image recognition, control of autonomous military systems, and control of the weapons' life cycle. So, that's one major institution.

Samuel Bendett:

Another institution is a recently launched ERA Technopolis, or the tech city. ERA stands for [foreign language 00:24:54] or the Russian military elite and it is a 75-acre campus on the Black Sea coast. Think of it as kind of a very small university where researchers live and work. ERA is developed for the young military scientists from across the military so that they can work side by side with state defense corporations and the private sector in designing and developing breakthrough technologies. And recently, the ERA has been designated as the focal point for Russian military artificial intelligence development. So they are actually working on multiple projects and they're hosting a lot of debates and discussions on the topic.

Samuel Bendett:

Other major actors are some of the biggest state corporations and enterprises. In our previous podcast, I mentioned RussTech, which is a Russian Technologies, which is a huge umbrella corporation that has several hundred subsidiaries working on all manner of technology development. And a lot of RussTech subsidiaries are actually working on artificial intelligence development too for the military and the civilians. Also MOD has started to establish relationships with some of the best high-tech universities across the country. And one of them is the Southern Federal University. And Southern Federal University houses one of MOD's research and development center robotics.

Samuel Bendett:

So we have government institutions, we have academia, and no doubt in the near future, we can even have some private sector efforts that will also be part of the MOD military AI development ecosystem.

Robert J. Marks:

You talked about the equivalent of Russia's DARPA. DARPA in the United States I've heard it referred to as the department of mad scientists.

Samuel Bendett:

Yes.

Robert J. Marks:

You also referred to the idea last time of the incredible amount of risk that it takes many times to get new innovative ideas out into the public and DARPA is remembered as the origin of GPS, of the internet, and even self-driving cars, at least the first research into self-driving cars. I guess Russia's trying to do exactly the same thing.

Samuel Bendett:

And in fact, ARF has a similar mission. They have, well I wouldn't say a carte blanche, but they have a lot of freedom in what they are working on. And the point now for the ARF is that they are working on proofs of concept. So whether the project succeeds or fails is irrelevant. What is actually important is that they can prove that something can work, something can function. And so ARF works on a lot of robotics development for example, a lot of swarming applications for robotics. It works on different AI applications, and at least in the public statements there's a certain degree of freedom in that type of work that probably wasn't there before, prior to the establishment of this specific institution, whose mission is to try and see if a certain breakthrough product or technology can in fact be developed.

Robert J. Marks:

You piqued my interest when you mentioned the word swarm, because that's an area that I'm very interested in. The US Army recently developed a swarm, or they're developing a swarm that's going to go around helicopters. And these little swarm agents are going to do sophisticated things from electronic warfare to acting as decoys in case they're attacked. Are you aware of any of the specific swarm intelligence projects which are going on in Russia now?

Samuel Bendett:

Well, ARF and the ERA together are working on conceptualizing and developing swarm applications. So ARF is working on a robotic military platform, which they call the marker, and the marker is supposed to be the test bed for swarming applications for unmanned ground vehicles and unmanned aerial vehicles. In other words, how an unmanned ground vehicle can cooperate and work together with multiple UAV platforms. So absolutely they're working on that. In fact, ERA students recently tested several swarming applications and conducted several swarming projects as funded by the Advanced Research Foundation. So they understand the significance of swarm applications for military, especially for unmanned military systems. They have been working on it for years and they will continue to develop and refine their products.

Robert J. Marks:

That's really fascinating. It turns out in the United States there is DARPA, which is the department of mad scientists and then there is the more down to earth applied research offices from DOD, like the Army Research Lab, the Office of Naval Research, and AFOSR, the Air Force Office of Scientific Research. It sounds like the strata being developed in Russia is similar to what is happening in the United States.

Samuel Bendett:

Absolutely. So in 2012, the MOD, the Ministry of Defense launched several centers that are actually housed in the MOD and one of them is the Center for Research and Technological Support of Advanced Technologies. The MOD also has a robotics research center. It has a separate center on UAV development. So while there are separate agencies that can work on breakthrough technologies, agencies like the ARF, MOD also has its own research and development efforts so that technologies can go through the entire research development testing and evaluation life cycle.

Robert J. Marks:

What about academia? I know in the United States, we have things called UARCS. Where I used to work at the University of Washington we had the applied physics lab, which was associated with the University of Washington that did work for the United States Navy. At Penn State, they have something called the applied research lab, which also does work for the Navy. And there's a number of these labs

which are associated with universities that do military focused work. Do we see any of that happening in Russia right now?

Samuel Bendett:

Yes, we do. In fact, I mentioned Southern Federal University as one of the focal points for MOD's development of robotic swarms. So MOD is starting to reach out to the academia and establish centers of excellence dealing with breakthrough technologies. Another interesting center is located at the Voronezh State University and the city of Voronezh in Russia and that center also works on the MOD kind of breakthrough technologies. So that process is starting out. In many ways, it is probably kind of revitalization of some of the practices enjoyed during the cold war when the state would be able to kind of engage with Soviet academia at will in both classified and unclassified work. So right now we have some public efforts. I'm sure there are some classified efforts that the MOD is not discussing.

Robert J. Marks:

You mentioned swarm as one of the list of the different military applications that are being pursued in Russia. What are some of the other ones that they are pursuing? Anything on missiles? On autonomous warfares? That's a big flashpoint in the United States debate as to whether we should have automatic military weapons. Anything of that sort going on?

Samuel Bendett:

Yes, absolutely. And in fact, the MOD is engaged in a public debate on what the military autonomy means for the future of warfare. Certainly there's a lot of desire on behalf of the Russian military to develop eventually weapons that can function autonomously without human interference, or that can perform 99% of the tasks and leave a human operator to kind of make the final decision. So military autonomy is very much under development right now and very much under the discussion. I mentioned ERA, the ERA Technopolis, tech tech city. In fact, ERA is a host for an annual military conference called the Robotization of the Russian Armed Forces where they bring together the military, the academia, the end users, and the developers to discuss the ongoing development and application of military robotics.

Samuel Bendett:

And of course the issue of autonomy is always at the top of the agenda. What is the autonomy, how it can be maintained, how it can be developed and ultimately how it could and should be controlled?

Robert J. Marks:

Sam, the takeaway I have from our chat together is that Russia in some way is duplicating the infrastructure of the United States military in the establishment of these UARCS, of these think tanks, you know DARPA sort of think tanks, and would you say that that's a fair assessment?

Samuel Bendett:

I would, I would. Of course. Why reinvent the wheel? You can just borrow proven concepts and apply them in your own unique fashion.

Robert J. Marks:

That's very interesting. Imitation certainly is a great way to flatter people so I think the US infrastructure is being flattered here.

Samuel Bendett:

It would seem so, yes.

Robert J. Marks:

Okay. Well, that's great. Thank you, Sam. I've learned a lot from our conversation. I really appreciate the time you've spent with us. We have been talking with Samuel Bendett. He's an advisor with the CNA's Advisory Analysis Group. He's a member of the Russian Studies Program. He's also a member of CNA's Center for Autonomy and Artificial Intelligence.

Robert J. Marks:

That wraps it up for this podcast until next time, be of good cheer.

Announcer:

This has been Mind Matters News with your host, Robert J. Marks. Explore more at mindmatters.ai. That's mindmatters.ai. Mind Matters News is directed and edited by Austin Egbert. The opinions expressed on this program are solely those of the speakers.