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# Agricultural Drones Replacing Tractors: UAVs Working Farmland in Russia

Today there are 300 thousand agricultural drones circling over farmlands across the world. According to expert estimates, the global agricultural UAV market will grow to $18,6 billion in just 10 years. Nikita Strelnikov, “Agro Tekhnologii” Head of Projects, spoke of the situation with the current application of “smart birds” across Russian fields and explained what a modern agricultural drone is in his interview to the BM Moscow Foresight magazine.

- Today the USA, Russia and India are actively developing their own ag drones. However, experts say that Chinese drones are equipped with cutting-edge electronics and proprietary software (SW). Furthermore, their drones are more reliable in operation. This is the very reason for Chinese “birds” soaring over farmlands everywhere – from Mongolia to Brazil.

According to FAO, the share of ag drones, made in the PRC, today comprises about 90% of the global market! Meanwhile, a single Chinese firm, DJI, commands 70% of the global UAV market. The second position is occupied by yet another Chinese company, XAG, though products by this company have been gradually disappearing over the latest months, including from the Russian market. And it is also gradually losing ground back at home.

Chinese company Vector AGR is confidently moving into the third place, focusing specifically on agriculture and rapidly increasing production of next-generation agricultural drones.


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According to a research by Fact.MR consulting company, in 2024 the global ag drone market was estimated at $4,9 billion. According to expert forecasts, by 2034 the volume of the market will grow up to $18,6 billion with the average annual growth rate of 14,1%.

**- What is an agricultural drone, and why do you think this machine is so necessary for agriculture?**

- Over just a few years in existence, agricultural drones have made human field labor much easier and saved large amounts of money for farmers. But most importantly, UAVs are becoming part of the “smart economy”.

Today, agricultural drones are used in almost all types of field work, with the exception of direct seeding and harvesting. The primary and most popular spheres of ag drone applications are herbicide, insecticide and fungicide treatment.

For farmers, UAVs by and large represent an in-house aviation capability, providing significant autonomy in harvest preparation and mitigating agricultural scheduling risks. These smart machines easily operate over wet soil, on windy days and even at night.

Ag drone is also viewed as an important tool for controlling farming activities, reducing impact of external factors and making the process of growing crops predictable.

A separate important area is the introduction of mineral fertilizers into the soil. This technology is especially relevant for early spring fertilizing, for frozen and thawed soil — over the period, when farm equipment cannot operate in the fields due to waterlogged soil, and use of all-terrain vehicles involves high risks and costs. In such conditions, agricultural drones, which do not exert pressure on the soil, become the optimal and often the only possible solution.

Agricultural drones can also be used to sow small seeds that do not need to be buried in the soil. These crops include rapeseed, buckwheat, rice and a number of others.

An important category includes drones designed for monitoring crop conditions, assessing crop development, identifying outbreaks of diseases, pests, and stress zones, predicting yields, and forecasting potential risks.

Drones are equipped with sensors and infrared cameras. These tools help identify soil moisture and fertility, map topography, and locate soil erosion, drought-stricken, or swampy areas. If necessary, sensors can detect sick animals in the herd.


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It is worth noting that, that the RF Ministry of Agriculture officially included ag drones into subsidized programs. Thus, the government acknowledges that this is not just an experiment, but a working tool, tried and tested by the whole agricultural complex.


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**- Is it true that the demand for ag drones in Russia has been growing by 20% every year?**

- This is true. The market growth is confirmed by the RF Ministry of Agriculture and by independent research: the annual growth rate in Russia is ≈25–28%. The Federal Center for Unmanned Aircraft Systems (FC UAS) expects that the market for drone-based pesticide application is expected to grow to approximately ₽57 billion by 2030.
By the way, this has been a general trend worldwide since 2016. The number of ag drones in operation at the Philippines, Malaysia, China and other countries grows by about 20-30% every year.
“Agro Tekhnologii” company is seeing growing agricultural UAV sales: farmers got a good look at them and now are moving to create full-fledged drone fleets and buying not just one drone, but 2–4–6 drones per farm.

**- Please, tell us what is the design of an ag drone, how high can it fly, what payload can it carry?**

- All ag drones have similar design: frame, motor, a tank for liquid or a hopper for dry preparations, spraying system, autopilot and navigation.

Drones usually fly at 3-6 meters above crops. A new generation of heavy drones can carry up to 70 kg, which is a major productivity improvement.

The very philosophy of ag drone operation is about speed, mobility and operational capability. Drones are highly valued for fast field deployment, they do not require any complex infrastructure and can be put into operation right away. As technology becomes more complex, this advantage fades away.

There are examples of heavy-lift drones with high payload capacity on the Russian market, such as the Russian-made ID-100A. This is a really powerful drone, but its operation requires a truck with a winch, a large mixing station, significant amounts of fuel and highly skilled operators.

At the same time, classic ag drones weighing up to 70 kg require only two operators and a mixing station of about 1000 liters.

For these reasons, the development of drones today does not focus on drastic increases in tank sizes and volumes, but follows the path of streamlining the existing solutions — higher operational speed, precision, better logistic and autonomy capabilities, so that a drone remains a mobile and fast tool and does not turn into a complex and heavy piece of equipment.
**- What are the main agricultural applications for ag drones?**


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- The largest areas of application are grain crops, corn, sunflower, the classic large field crops.

But gardens and vineyards offer great potential. Drones perform best in the areas where equipment could damage plants, where there are complex logistics and special equipment is very expensive. We are now actively working to demonstrate the total effect for gardeners and winegrowers. And the results are very impressive.

**- Nikita Yurievich, who buys drones more often: farmers or large agrocomplexes?**

- They all buy drones, but for their specific needs.

A farmer would buy 2-4 ag drones to be able to promptly cover his areas under crops.
Large companies put together massive “drone fleets” –8 drones and more.
**- Which ag drones are in most demand with farmers and why?**

- The choice of our farmers is primarily driven by reliability, ease of maintenance and availability of services nearby.
Today the demand leaders are DJI Agras and Vector drones– a promising range, manufactured in China.
XAG used to be popular too, but the access to the equipment and services is severely restricted due to the sanctions.
**- Could you please name the Top -10 ag drones, made in Russia and worldwide?**

- We are working with the key two lines: DJI and Vector.  DJI is a global leader, the brand is familiar even to those who have never held a drone in their hands. It is a benchmark for stability and precision.
Vector AGR is a Chinese-made range, actively marketed today by “Agro Tekhnologii”. We have the same level of confidence in this brand and see that these ag drones have proven their worth in live operations. These drones are focused on easy field use of their solutions, have less complicated designs to ensure hassle-free maintenance in field conditions.

Just recently a compact Vector AGR HD525 has hit the market, it is a 25-liter capability model, designed specifically for small farmers.

Speaking of Russian developments, today there are several projects worthy of attention, though these are for now at different maturity stages.

One of the most prominent cases is the ID-100A drone, made in Russia by the “Sky Tractor” company. This is a heavy


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agricultural drone with a 200-liter tank, driven by a diesel power unit. According to manufacturer specs, the drone can cover 800 hectares per one work shift. At the same time, it is important to realize that this is not a classic ag drone, but a sophisticated aerial complex, requiring special logistics, a large capability mixing station, fuel and trained staff. This is an interesting drone, technologically ambitious and promising, but it is mostly targeted at large companies and special application scenarios.

The market is also seeing the appearance of Russian mid-range drones with specifications similar to widespread global models. First of all, these are S-80 drone by “Future Transport” (Togliatti) and “Rubin A-50”, designed by “Istok” design bureau. Both drones feature a tank of about 50 liters and according to their performance specifications, are similar to their Chinese counterparts of the segment.

Today these solutions are in the field testing and pilot operation stage. There are no mass sales or a large number of independent reviews yet, but testing, conducted directly at farms with participation of manufacturers, show promise. It is obvious that the developments are focused on hands-on use and aren’t run just for the sake of experimenting.
Generally, the Russian ag drone market is currently searching for its optimal business model: from heavy, high-performance drones to more compact and universal solutions. These projects have potential, and over the next few years a lot will depend on how fast they can move from testing to serial production and actual field operations.
By the way, Indian-made drones and drones from other countries are also present on our market, but these lag far behind the Chinese ones in terms of performance and stability.

“Agro Tekhnologii” has many customers in Russia, from Vladivostok to Kaliningrad. We have extensive regional presence and get enough feedback from farmers. This is why we are perfectly sure of which exact drones should be offered to a customer.

**- If I may ask, how much does a drone cost, could you name prices of the most popular UAVs in Russia?**

- The most popular models on the average cost from □1,8 million to □3,5 million per full set. The set includes a drone, control panel and software, replaceable batteries, generator, charging station – these items are required for uninterrupted field work.

Here is an interesting point: today UAVs are sold at zero VAT rate. As per section 15 of Article 164 of the RF Tax Code, civil aircraft registered in the State Aircraft Register (RosAviation) are to be taxed at 0% VAT, with proof of registration.
This means that 0% VAT and RosAviation registration, available at the time of drone purchase, confirm legal nature of UAV import and use in the territory of our country.


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It is important not to confuse “0% VAT” with “ex VAT” — these are different things altogether.

**- How hard is it to pilot an ag drone? Where do they train to do this?**

- Piloting a UAV isn’t hard, it’s not a plane or a helicopter, but some specific skills are required. “Agro Tekhnologii” experts conduct pilot training: theory, practice, fieldwork, maintenance. Upon completion of a training course, a person can confidently operate during a season and perform almost without any incidents. There is great demand in Russia for this skill set.

**- “Agro Tekhnologii” has its main office in Rostov-on-Don, why is the Moscow market so important for you?**

Moscow is the center of executive decisions, investments and tech expertise, including the agricultural complex. This is where the industry digitalization agenda is determined, this is where all the specialized research institutes, integrators and training platforms are located.

For us, Moscow is a strategic area for development. We are entering the Moscow market with a purpose: we are communicating with agricultural enterprises of the region, taking part in industry events, international exhibitions, considering formats for cooperation with dedicated educational institutions, including the Academy of Human Resources for the agricultural complex.

Our goal is not only to supply equipment to the Russian market, but to build infrastructure for implementation of unmanned solutions: provide personnel training, improve application methods, integration with digital platforms. In this regard, Moscow is one of the most promising and dynamically developing markets of the country.

**- Nikita Yurievich, what is your vision for the future of agricultural drones?**

- The future of agricultural drones is linked to farm automation. The idea is that human labor would shift over to strategic and planning tasks, and routine operations, like field work, would be performed by machines. This means that in the next few years people would not have to work in the field all day: it would be sufficient to set up a machine with a flight mission in the morning and to check its results in the evening, park and charge drones, and review performance quality.
Gennady Chebyshev.

**The first agricultural drone in history was introduced in the USA in 2013, but the drone cost as much as a regular airplane. In*


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*a couple of years, the Chinese, just the usual, sneaked a peek, had a few ideas of their own and gradually flooded the global market with their "flying robots". DJI showed the best results, having built an ag drone with an 8-liter tank. The smart machine would spray chemicals over 2 hectares of crops in just a few minutes, and it was much cheaper than the American design.*

***Can agricultural drones operate under heavy snow, rain or wind? Civilian drones can operate in light rain, but heavy snow, rain or storm are off limits for them— these are physical limitations applicable to all activities involving plant protection products.*


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