

PARTNERSHIP PROPOSAL

Creation of serial production of UAVs with a payload up to 1500 kg

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We are developing the transport of the future.

About the project



The active development of the market for unmanned and optionally manned systems requires new solutions for use in the government and corporate sector. China, the United States, Austria and a number of other countries are actively developing such solutions today. The global market for professional UAV solutions is already estimated at \$120 billion.

The creation of its own multi-purpose design range of civil drones is dictated not only by the import substitution and development of the Russian element base in the high-tech aviation industry, but also by the creation of its own competitive solutions with access to the international market. In this regard, in 2015, a group of highly qualified designers in the field of helicopter engineering, led by Mikrukov Sergey, began development of design documentation of universal multi-purpose civil UAVs with a payload up to 1500 kg.

- Patents received: Patent RU(11) 186 462(13) U1 (Unmanned helicopter)
- Patent RU(11) 2 613 136(13) C1 (control system)
- Patent RU(11) 2015 113 984(13) A (manufacture of blades)
- Patent RU(11) 2 412 081(13) C1 (coaxial bearing system)

To date, the necessary design documentation has been prepared to begin production of the U500 prototype and its testing.

\$25_{B.}

economic damage in the U.S. from wildfires in 2019

\$350_{M.}

economic damage in Russia from wildfires in 2019

150_{HA}

MILLION

of forests burned worldwide in 2019

\$1,2

TRILLION

losses to the global economy from traffic congestion

\$150_B

agricultural losses from food spoilage in the world

* FAO

TEAM



The company's design staff:

- ❖ 2 Honored Designers of the Russian Federation;
- ❖ 1 Candidate of Technical Sciences;
- ❖ 8 designers with more than 30 years of experience in helicopter engineering;
- ❖ 70 patents in the field of helicopter engineering and support systems;
- ❖ More than 300 years of experience in the development and creation of aviation technology;
- ❖ 60% of helicopters at Kamov JSC were created or accompanied by our specialists.

The project team is capable of solving problems:

- ❖ Carrying out development work on creation, modernization and modification of aviation equipment;
- ❖ Development of technical proposals for the creation of aeronautical equipment;
- ❖ Development of design documentation for aviation equipment;
- ❖ Development of aeronautical engineering design documentation;
- ❖ Working out of aerotechnical documentation of aviation equipment;
- ❖ Start of aerotechnics production and service maintenance.

Our specialists participated in the development of the following helicopters:

- ❖ The Ka-27 helicopter is in serial production;
- ❖ Ka-29 helicopter is in serial production;
- ❖ Ka-32 helicopter is in serial production;
- ❖ Ka-31 helicopter serially produced;
- ❖ Ka-50/52 helicopter serially produced;
- ❖ The Ka-226 helicopter is serially produced;
- ❖ Ka-115 helicopter is in technical design;
- ❖ Ka-62 helicopter prototype built;
- ❖ Z-10 helicopter project (project 941) development of the pre-project in the interests of the Chinese side;
- ❖ AP-55 helicopter - the stage of working design documentation issuance has been completed.

Team Experience



Ka-32 helicopter



The Ka-226 helicopter



Z-10 helicopter project (project 941)

DEVELOPED SOLUTIONS



UAV version of the U-500



Passenger version of the U-500

Specification U-500

- Maximum takeoff weight: 1100 kg
- Piston engine Rhythm 7 - 260 hp.
- Maximal speed: 280 km/h
- Cruising speed: 210 km/hour
- Cruising speed: 210 km/hour
- Flight range up to: 1,100 km
- Static ceiling: 4500 m
- Rate of climb: 8 m/s
- Fuel consumption, up to: (72 liters/hour)
- Fuel used: Euro-4 (92)
- Payload up to 700 kg
- Sealed cab with air filters



Agricultural version of the U-500

**ESTIMATED COST OF THE U-500
IN PRODUCTION WILL BE**

\$250 000

UAV MARKET VOLUME

\$100B

UAV market volume in 2020
* Goldman Sachs

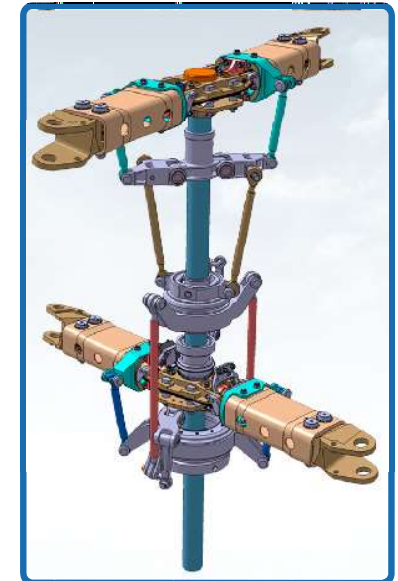
\$2,9T

UAV market volume in 2040
*Morgan Stanley

State of readiness of design documentation for the U-500 UAV



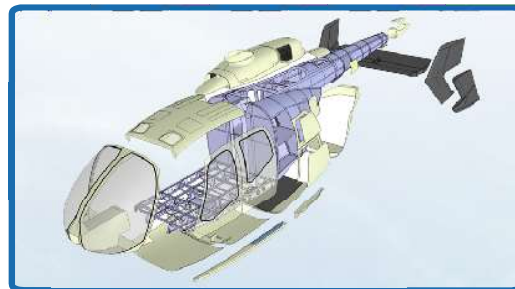
45%



100%



85%



85%



100%



100%

ROADMAP OF THE PROJECT UAV - 500KG



STEP 1 - R&D of the U500 UAV was completed.
Invested \$3 million of own funds.



STEP 2 - Prototype production and testing

Placement of orders for production, assembly of 2 prototypes

7-9 months
\$2,87M.

UAV ground testing

2-3 months
\$0,25M.

Flight tests

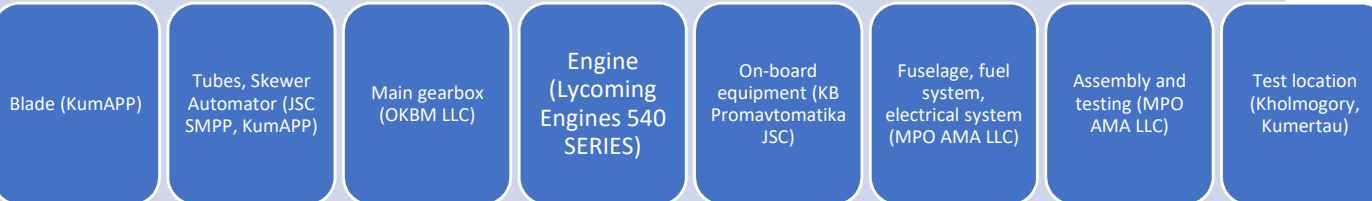
4-6 months
\$0,27M.

INVESTMENT REQUIREMENTS

\$3,4 MILLION

FOR STEP 2 PROTOTYPE PRODUCTION
AND TESTING

Cooperation scheme for the preparation of prototypes



INVESTMENTS

The project to create a new civilian helicopter-type unmanned aerial vehicle consists of three main stages:

1. Creation of prototypes - investments \$3.4 mln.
2. Creation of serial production: design development, certification and creation of industrial production;
3. Creation of service and after-sales service infrastructure.

The total cost of establishing mass production and completing R&D work is \$59 million. The second phase of the project is planned to be financed from the company's own funds raised through soft contracts from future customers.

The payback period of the project according to the pessimistic forecast is only 3 years, which is a very good indicator for this industry.

The ability to take a market share of even 1% of the global market in time gives the company a potential sales volume of more than \$3 billion per year of UAVs with a profitability of 30-35%!

As a result of the project return on investment of \$ 59 million will be made in 2029, the planned income from the sale of only one model of UAV in the period from 2023 to 2033 will be \$ 5.2 billion, costs \$ 1.8 billion respectively.

Thus, the gross profit for the period will be \$3.6 billion.

FMEA PROJECT RISK VALUE

14%

Problems solved by using the U-500



EMERGENCY RESPONSE SERVICES:

- emergency services - EMERCOM, police and similar, ambulance.

STATE STRUCTURES AND COMPANIES OF THE FUEL AND ENERGY COMPLEX:

- Monitoring of remote objects.
- Various types of object and environmental monitoring in conditions of complex transport accessibility.
- Providing transportation and monitoring services for government agencies.
- Monitoring of extended and remote objects - in particular by fuel and energy complex enterprises (FEC).
- 3D laser scanning, GPR (land sounding), hyperspectral analysis.
- Monitoring of extended objects (power lines, pipelines).

TRANSPORTATION ACCESSIBILITY SOLUTION:

- cargo delivery in areas of difficult transport accessibility.

AGRICULTURE AND COMMERCIAL OPERATION OF UAVS

The annual increase in the population of the planet has led to the penetration of high technology in agriculture and the creation of precision farming.

One of the areas of precision agriculture is the use of UAVs, which can be used for the following tasks:

- inventory of agricultural lands,
- creating electronic maps of fields,
- assessment of the scope of work and control over their implementation,
- on-line monitoring of crop condition,
- assessment of crop germination,
- farmland protection,
- terrain analysis and creation of vegetation indices map PVI, NDVI;
- hyperspectral analysis of soil and crop conditions,
- treatment of crops with pesticides for pest control.

The use of UAVs in agriculture can make a real breakthrough by significantly reducing production costs. The use of drones in crop production is widely practiced in the United States, China, Japan, Brazil and many European countries.

According to AUVSI, in a report titled "The Economic Impact of Unmanned Systems Integration in the United States", UAV applications in agriculture will prevail over all other applications ("dwarf all other") and by 2025 about 80% of the unmanned vehicles ("drones") market will be occupied in agriculture in the USA.

In monetary terms,
the volume of the
world market for UAV
services in the
agricultural sector is

\$40 billion.

MARKETING

By 2025, at least 100 thousand unmanned aerial vehicles will be constantly in the air over the U.S. territory. According to the estimates of the author of the AeroNet roadmap, the global UAV market may reach over \$200 billion, of which Russia may account for more than \$35-40 billion / RoboTrends.ru based on the materials of AeroNet.

Commercial use of drones in the U.S. will create over 100 thousand jobs and over \$82 billion in profits over the next five years. By 2025 UAVs are expected to make up to a million flights per day. More than 600,000 commercial UAVs will be in use in the U.S. within a year. By 2025, UAV sales could grow to 90 million UAVs. With 2/3 of the revenue coming from entertainment UAVs / ABI Research in 2018. Teal Group predicts the UAV industry will grow to \$14 billion in 2025. Goldman Sachs predicts the UAV market will reach \$100 billion as early as next year, 2020.

By 2025, UAV sales in China could exceed \$11 billion, a forecast made by iResearch in 2018. The main areas of application are expected to be aerial surveys, pollination of agricultural plants, forest protection and security systems.

The use of UAV systems in medicine can reduce the cost of services due to the lower cost of a flight hour in UAVs, as well as increase responsiveness due to minimal preparation for flight - which is often a critical parameter. In the U.S. today, the total cost of a flight hour in the medical sector is estimated at \$7,000 to \$10,000 per patient (health care professionals union data). The use of UAVs will reduce this value by up to 10 times.

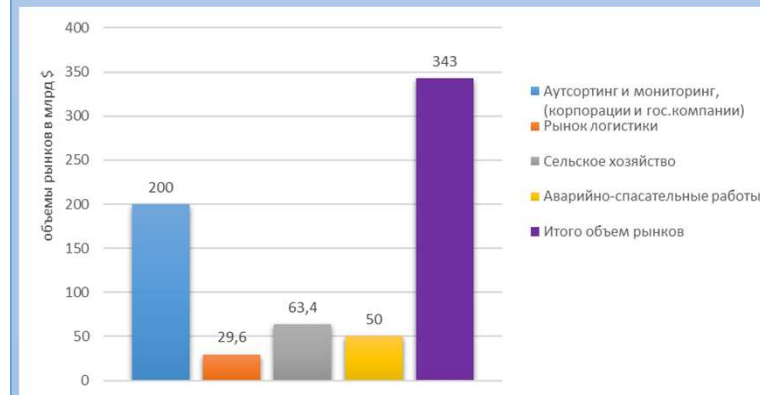
Operational monitoring and extinguishing fires using UAVs is the most effective method resulting in saved lives and property of people.

In recent years, unmanned aerial vehicles (UAVs) have been increasingly used in the oil and gas sector. According to Goldman Sachs, the world market for drones for this industry is estimated at \$ 1.15 billion. For comparison: by 2020, the total volume of the UAV market, according to Goldman Sachs, will reach \$100 billion. Experts believe that the share of oil and gas companies in the total volume of UAV use will grow, these vehicles will increasingly replace manned planes and helicopters. Today, UAVs are used in exploration and infrastructure monitoring.

A drone can survey more than 240 km of a pipeline a day - on a par with a helicopter crew, whose flight hour costs \$2,500. At the same time, the drone's work costs the company six times less. International oil and gas corporations began using drones earlier than Russian companies. Many experts call 2006 the starting point, when the US Federal Aviation Administration authorized BP to use drones in its operations in the Alaskan oil fields. Today, the American market, for example, has a large supply of drones that can conduct magnetic surveys of territories with potential oil and gas deposits. Anglo-Dutch Shell, among others, is using them to monitor equipment at a gas terminal in Bacton, UK, BP, to survey drilling platforms in the Gulf of Mexico, and ExxonMobil, US, to check tanks at the Foley refinery in southern England.

The market of cargo transportation by drones is just emerging, but this trend will definitely only develop with a decrease in the cost of transportation per 1 kg of cargo.

J'son & Partners Consulting estimates that by 2022, sales of Cargo UAVs of various models are estimated to be 200 times higher than current levels.



Thus, the confirmed volume of sales and services markets from the use of UAVs In the next 3-4 years will reach \$343 billion.

Using the technological solutions proposed in the project, we estimate the market share that the company can take 10-15% of the world.

CONCURRENTS



Now the UAV market is mainly represented by examples with a payload up to 120 kg, the cost of which is up to \$80,000. The short autonomy time of these solutions - 15-25 minutes - does not allow them to seriously compete with unmanned helicopters.

The cost of unmanned helicopters on the market starts at \$ 1,200,000, plus the cost of ground control stations. As a rule, the cost of such turnkey solutions is \$2.5-3.5 million, with a payload capacity of no more than 120 kg. There are currently no competitors in the segment of UAVs with payloads from 500 kg to 1,500 kg on the world market, which allows them to occupy this niche.

The project will introduce the product to the UAV market, which has been traditionally occupied by foreign manufacturers. In this segment of the market there is a tendency to increase the volume of consumption. Currently, there are no analogues to the solutions proposed for implementation in the project in the world market.

The use of modern construction materials and components, automation of production and technological solutions allow to significantly reduce the cost of production. U-500 UAV is several times cheaper than its foreign counterparts, and therefore more affordable for the buyer in the domestic and foreign markets.

MQ-8C Fire Scout



An MQ-8C

Role	UAV helicopter
Manufacturer	Northrop Grumman Bell Helicopter
First flight	2013
Introduction	June 2019 ^[1]
Status	Development testing
Primary user	United States Navy
Number built	19 ^[2] 96 planned (as of 2015)
Program cost	\$3.06 billion ^[3] (FY15) (includes MQ-8B)
Unit cost	\$18.0 million ^[3] (FY15) (ex R&D)
Developed from	Bell 407 Northrop Grumman MQ-8 Fire Scout

The U-500 UAV is cheaper than its foreign MQ-8C counterparts at

42
times!

Final project indicators

Indicators	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Revenue and other income	0	0	44 550 000	51 300 000	54 000 000	56 700 000	59 400 000	62 100 000	64 800 000	67 500 000
Quantity of goods sold	0	0	110	120	120	120	120	120	120	120
Fixed costs (rent, commercial, management, personnel)	1 452 500	2 682 000	2 682 000	2 682 000	2 682 000	2 682 000	2 682 000	2 682 000	2 682 000	2 682 000
Assets, modernization, maintenance of fixed assets	0	45 440 000	0	0	0	0	0	0	0	0
Funding	54 200 000	0	0	0	0	0	0	0	0	0
Loan repayments	0	0	6 252 632	6 821 053	6 821 053	6 821 053	6 821 053	6 821 053	6 821 053	6 821 053
Taxes	436 427	755 507	3 427 920	3 832 333	3 993 747	4 155 160	4 316 573	4 477 987	4 639 400	4 800 543
EBIT	- 1 452 500	- 2 682 000	41 868 000	48 618 000	51 318 000	54 018 000	56 718 000	59 418 000	62 118 000	64 818 000
EBITDA	- 619 167	4 293 000	49 123 556	55 318 000	58 018 000	60 718 000	63 418 000	66 000 778	68 700 778	71 400 778
Net income	- 2 722 260	- 10 412 507	31 184 524	38 085 667	40 624 253	43 162 840	45 701 427	48 240 014	50 778 601	53 317 188
Cash balance	52 311 073	3 433 566	35 621 015	73 585 629	114 088 830	157 130 617	202 710 991	250 829 952	301 487 499	354 683 904

Analysis of financial results

Total profitability RO, %	- 100,0%	- 100,0%	1 561,1%	1 812,8%	1 913,4%	2 014,1%	2 114,8%	2 215,4%	2 316,1%	2 416,8%
Profitability of sales by net profit (ROS), %			70,0%	74,2%	75,2%	76,1%	76,9%	87,5%	88,7%	88,9%
Return on equity, ROE %	- 1 361,1%	412,8%	- 241,1%	208,7%	72,1%	44,5%	32,6%	29,3%	23,9%	20,2%
Return on investment capital, ROIC %	- 2,1%	- 4,2%	96,2%	65,7%	45,4%	34,8%	28,3%	23,8%	20,1%	17,4%

We are looking for an investor to start serial production of helicopters.
Please contact us if you are interested in the project.



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