



The Aerocopter AK1-3 is flown in many countries around the world. (Aerocopter photo)

# Ukrainian Ultralights Begin to Grow

By Ian Frain and Mike Hirschberg

**A**lthough Ukraine is well known for its aerospace industry — particularly Antonov airplanes and Motor Sich turboshaft engines — the former Soviet Republic is a relative newcomer to the helicopter industry. After an early false start, three companies now have lightweight helicopters to offer.

## Vertical Beginnings

In the late 1990s, the new country initiated an indigenous light helicopter effort to free itself of dependence on more expensive helicopters from Russia and Poland. The state-controlled TVT Corporation formed an aviation division, Aviaimpex. In March 2000, the company held a competition for a light helicopter and selected Design Bureau Aerokopter, which had been formed in December 1999 in Poltava. After the two companies briefly had a tie-up, Aviaimpex formed its own design team

and the two companies split in May 2000. In August 2001, the Aviaimpex team, now dubbed the Vertical Design Bureau (“KB Vertical”), unveiled its three-seat demonstrator, the KT-112 Yanhol (“Angel”). It was the first helicopter developed and



The KT-112 was the first Ukrainian helicopter, but production was stillborn in 2008. (Photo courtesy of Viktor Vashchenko)

built in Ukraine. The aircraft was built at state-owned AVIANT production plant (now known as The Antonov Serial Plant) and ground testing began in March 2002. The helicopter made its first flight on Jan. 18, 2004.

Later that year, KB Vertical flew a second KT-112 — a four-seat production prototype called the Kadet. This aircraft used two 95 hp (70 kW) Rotax 912 ULS piston engines, and had a 1,200 lb (545 kg) empty weight and a 2,040 lb (925 kg) maximum take-off weight. The Kadet received experimental certification in April 2004, and began testing to the Ukrainian AP-27 certification (harmonized with the European CS-27 standard and FAR Part 27). By September 2004, the two prototypes had flown 120 and 15 hours, respectively.

The Ukrainian government had intended

to purchase 27 Kadets for the national highway police, while the military and oil companies in Ukraine and Russia also expressed interest. A production line was planned for up to 50 helicopters per year for missions such as agriculture, training and rescue.

Certification of the KT-112 was finally completed in 2006, but bankruptcy proceedings and a criminal investigation into misappropriation of funds shut down the company in 2010.

## Aerocopter

Design Bureau Aerokopter — now known as “DB Aerocopter Ltd” or just “Aerocopter” — later designed a 5-bladed helicopter, dubbed the ZA-6, with a Subaru EJ22 automobile engine that produced 160 hp (119 kW). First flight was in October 2001.

A more advanced prototype, the AK1-5, was displayed at the 2002 Kiev Manufacturing and Security Exhibition. At the same time, an incomplete three-bladed version, the AK1-3 Sanka, was also exhibited; it flew in July 2003.

The AK1-3 Sanka light utility helicopter kit is powered by a Subaru EJ25 four-cylinder, water-cooled, four-stroke automotive engine, which produces 156 hp (116 kW) on 95 octane automotive gasoline (“petrol”). The AK1-3 has a simplified system for



Safat O2 on static display at Dubai Airshow 2015. (Ian Frain photo)



SL-222 (Photo courtesy of Viktor Vashchenko)

starting up and shutting down the engine, removing the need for priming the engine or mixture control. Other advantages of the engine are its high reliability and the low price of gasoline versus aviation fuels.

The airframe construction of this two-seat helicopter combines both modern composites and titanium alloys, using computer numerical control (CNC)-machined parts, and is built to CS-27/FAR-27 regulations. The flex bearingless main rotor head consists of three blades made of composite materials, and as such the blades can be detached and re-attached in 15 minutes by only two people. The same is true of the tail rotor, which also consists of composite materials.

In terms of performance, Aerocopter says the AK1-3 design has good flight control and stability and low vibration, because of having a neutral collective counterbalance and light control forces. The company notes that the AK1-3 Sanka has a power-to-weight ratio of 3.75, and can thus out-climb the Sikorsky (formerly Schweizer) S300CBi by 500 fpm (150 m/min), both with two people onboard. Aerocopter says the AK1-3 also has a low noise signature and “ease of maintainability.”

The AK1-3 is operated in 17 countries: Austria, Australia, Belarus, Belgium, Georgia, Italy, Canada, China, Korea, the United Arab Emirates, Russia, Slovakia, Sudan, Uzbekistan, Ukraine, France, and the Republic of South Africa. The French civil aviation authority (Direction générale de l’aviation civile, DGAC) has approved and certified the helicopter for flight training. In Africa, the South African Civil Aviation Authority (CAA) has certified the AK1-3 for commercial operations (flight training, crop spraying and photography).

In Sudan, the aircraft company Safat Aviation Group assembles the Safat O2, which is based on the Aerocopter AK1-3. Rotor F/X in Van Nuys, California, is the distributor for the Americas, where it is available as an experimental helicopter in kit.

In 2009, Dubai-based Perla Group acquired Aerocopter. The company is now exploring an unmanned version of the AK1-3 and a five-seat helicopter.

• [www.aerocopter.com.ua](http://www.aerocopter.com.ua)

## Skyline

Another ultralight helicopter to come from Ukraine’s aerospace industry is the three-seat Skyline SL-231 Scout. The



Safat O2 cockpit and engine assembly during the static display at Dubai Airshow 2015. (Ian Frain photos)

three-bladed aircraft was also designed to the Ukrainian AP-27 standard.

## What’s in a Name?

The company known in English as Skyline, is called “КБ Горизонт-12” in Russia. This would be transliterated as “KB HORIZONT-12” or “Design Bureau Horizon-12.”

On the company’s website ([www.skyline.ua](http://www.skyline.ua)), they refer to themselves as Horizon Research and Engineering Center, “A team of professionals with years of experience in the development of aviation [in] Ukraine and abroad designing and building helicopters and multi-purpose aircraft, aircraft engines and automated control system.”

The Kiev-based company previously built a twin-engine helicopter, the SL-222. The aircraft used two water-cooled, three-cylinder inline two-stroke Hirth H37-E engines that produced 90 hp (67 kW). The SL-222 was sized for 2–3 seats and was planned for single-engine operations as

## Ukrainian Light Helicopters

Model	KT-112 Kadet	AK1-3	SL-222	SL-231 Scout	Softex Aero VV-2	Softex Aero V-52
Manufacturer	KB Vertical	DB Aeroceptor	Skyline	Skyline	Softex Aero	Softex Aero
Seats	4	2-3	2	2-3	2	5
Rotor Diameter	8.22 m / 27.0 ft	6.84 m / 22.4 ft	7.14 m / 23.4 ft	8.16 m / 26.8 ft	8.5 m / 27.9 ft	9.12 m / 29.9 ft
Gross Weight	925 kg / 2,040 lb	650 kg / 1,430 lb	637 kg / 1,404 lb	882 kg / 1,945 lb	1,100 kg / 2,425 lb	1,450 kg / 3,196 lb
Engine	Rotax 912 ULS	Subaru EJ25	Hirth H-37E	Lycoming IO-379	PBS TS 100 ZA	R300 Softex Invest
Power	2x 70 kW / 95 hp	1 x 116 kW / 156 hp	2 x 67 kW / 90 hp	1 x 168 kW / 225 hp	1x 180 kW (245 hp)	2x 276 kW / 370 hp
Cruise Speed	160 km/h / 86 kt	165 km/h / 89 kt	159 km/h / 86 kt	187 km/h / 101 kt	220 km/h / 120 kt	250 km/h / 135 kt
Max Speed	200 km/h / 108 kt	186 km/h / 100 kt	194 km/h / 105 kt	209 km/h / 113 kt	240 km/h / 130 kt	270 km/h / 145 kt
Price (USD)	n/a	\$150,000	\$149,000	\$195,000	TBD	TBD
First flight	Sept. 2004	July 2003	July 2011	Jan. 2015	June 2016	TBD 2017

well. The maximum weight was 1,404 lb (637 kg) and maximum speed was 105 kt (194 km/h). It made its first flight on Feb. 14, 2012, but the design was later abandoned. A five-seat version, called the SL-252, with a Fenestron-type tailrotor and stub wings, was also under consideration, but never built. The designer for both of these aircraft was Viktor Vashchenko.

For the SL-231 Scout, however, development began in August 2012, when the company hired the Lebedev

Studio for the conceptual design of a low-cost personal helicopter. After detailed discussions of objectives, and reviewing current light helicopters — such as the Robinson R44, Rotorway Exec and the Safari (formerly the “Baby Belle”) — Lebedev drafted numerous ideas of what the helicopter should look like before Skyline approved the SL-231 Scout design.



The SL-231 Scout was designed for excellent visibility and piloting comfort. (Photo courtesy of Scout Aero, LLC)



The Skyline SL-231 Scout was designed by the Lebedev Studio. First flight was in January 2015. (Photo courtesy of Scout Aero, LLC)

Born in Kiev in 1965, Viktor Vashchenko began developing his first aircraft, a single-seat glider at the age of 14; he flew it four years later. He built two more gliders in school, then flew the Antonov An-2 for Aeroflot, and later the An-24. He designed several amphibians, including what became the Skyline SL-122.

In 1999, his “Hummingbird” design placed in the top three in the Ukrainian helicopter competition run by Aviaimpex.

In addition to designing the Skyline SL-222 and SL-252, Vashchenko designed the Softex Aero VV-2 and VV-52 helicopters. He has designed full-scale unmanned helicopters, one of which he built in the United Arab Emirates; a two-seat, quad propeller flying platform; and a single-passenger VTOL tailsitter. He is currently designing the four-seat VAI-14 and five-seat VAI-225TS light helicopters.

His website is [www.vashchenkoaircraftinnovations.com](http://www.vashchenkoaircraftinnovations.com).



The Scout has three-abreast seating and is now being prepared for sale in the US. (Photo courtesy of Scout Aero, LLC)

The first prototype was assembled in 2014 and presented at the IX International Aviation and Space Salon (AVIASVIT) in Kiev that September. It first took to the air on Jan. 9, 2015 and was debuted that summer at AirVenture in Oshkosh, Wisconsin, USA.

The SL-231, which is very similar in size (and appearance) to the Schweizer S-300CB, is powered by the supercharged 225 hp (168 kW) Lycoming IO-379 engine and flies at a comfortable cruising speed of 101 kt (187 km/h), and a maximum speed of 113 kt (209 km/h). It has an airframe constructed of riveted duralumin alloy, and energy-absorbing landing gears and seats.

The digital cockpit is provided by two Nesis displays produced by the Slovenian company Kanardia, which specializes in the design and manufacture of avionics for ultralight aircraft and gyrocopters.

In 2015, the company created an official US representative and Scout helicopter kit manufacturer, Scout Aero, LLC. Headquartered in Coatesville, Pennsylvania, the company promotes a price tag of \$195,000 for the completely ready-to-fly 3-seat helicopter, stating: "Assembled in USA! Made from US materials, powered by legendary US Lycoming Engine!"

• [www.scout.aero](http://www.scout.aero)



A stunning visual history of the design of the Scout can be seen through the eyes of the design company, Lebedev Studio:

• [www.artlebedev.ru/scout/exterior](http://www.artlebedev.ru/scout/exterior) (in Russian).

Lebedev Studio is headquartered in Moscow, with large offices in Kiev and New York. Founded in 1995, the company — which specializes in everything from industrial design and urban design to interface design and navigation systems — consists of more than 300 people. They call themselves "the largest design studio in Russia with the largest portfolio."

## Softex Aero

Softex Aero is another up-and-coming company, based in Kiev, which has designed and built the VV-2 and V-52 helicopters. Viktor Vashchenko was again the designer behind these two helicopters.

The VV-2 is a four-blade, two-seat tandem helicopter that the company also proposes as an unmanned option. The design started in 2013, with fabrication beginning in 2014, and the first flight took place on June 10, 2016. The first public flight demonstration of the VV-2 took place during the 8th International Iran Airshow, in November 2016.

The aircraft flies at a maximum cruise speed of 140 kt (260 km/h) with a never-exceed speed ( $V_{NE}$ ) of 155 kt (287 km/h). It has an all-composite structure. The engine, a Czech Republic PBS TS100 ZA, produces 190 shp (140 kW) and is compatible with JET A, A1, B, TS-1, T2, and RT fuel.

The V-52 is a high-speed, five-seat, all-composite helicopter with the sleek airframe slightly resembling the Airbus Helicopters H145 from the front. The heart of the V-52 is two R300 Softex Invest motors, which are V-6 piston engines running on automotive gasoline, producing 250 hp (185 kW) in cruise and 300 hp (220 kW) as an emergency rating. The aircraft maximum take-off weight is 3,200 lb (1,450 kg).

The cruise speed for the V-52 is 135 kt (250 km/h) with a  $V_{NE}$  of 155 kt (280 km/h). The avionics fit is predominantly a glass cockpit with two large displays, complete with autopilot and the latest navigation equipment. First flight is expected in 2017.

The VV-2 and V-52 are equipped with modern navigations instrumentation, autopilot and the flat-panel Integra electronic flight instrument system (EFIS)/engine management system (EMS) produced by TL-Elektronik in the Czech Republic. Both helicopter types are available factory assembled or as kits.

• [www.softex.aero](http://www.softex.aero)



The Softex Aero VV-2 in flight. The tandem-seat aircraft is available as a kit, as an attack helicopter and/or unmanned. (Photo courtesy of Viktor Vashchenko)



The five-seat, twin-engine V-52 is expected to fly in 2017. Vashchenko is on the left with the pilot, Mark Kochergin. (Photo courtesy of Viktor Vashchenko)

## The Future

Despite not having a heritage in helicopter development, Ukraine has proven its capabilities in light helicopters over the past decade. More recently, larger and more innovative designs are nearing market entry. ✈

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