



Product Brochure
SKYSPOTTER 150

The SkySpotter 150 is designed to perform a wide range of civilian and rescue tasks.

PRODUCT SPECIFICATION

The **SkySpotter 150** is a fully autonomous and independently operating unmanned helicopter.

The platform of the **UAV SkySpotter 150** offers multiple advantages:

- Allows tasks to be undertaken in close proximity to the object under observation at the lowest possible altitude,
- Does not endanger the pilot while performing tasks in a hazardous area,
- Allows the use of autopilot,
- Allows changing the speed and altitude of the flight over a large scale (allows hovering).

Flight preparation does not take more than 15 minutes. **The SkySpotter 150** has a Wankel engine of Austrian origin, which runs on commonly available automotive gasoline.

The development of this unmanned aircraft is based on the long-term experience of our qualified aviation engineers, designers and programmers and it meets all the applicable standards. The aircraft can be used for complex tactical tasks in difficult-to-reach locations, coastal and mountainous terrains, in subarctic and desert environments, under diverse weather conditions and at high altitudes and, at the same time, within a large temperature range. It allows the users to attach a wide variety of payloads.

KEY PROPERTIES

- Easy operation and pre-flight preparation.
- It can fly and hover at extremely low altitudes, even in close proximity to objects.
- Extensive possibilities for use in a wide range of applications.
- Cost-effective operation compared to the manned aircraft.
- No runway needed.
- It can operate in a hazardous environment and within a limited space.



BASIC CONFIGURATION OF THE LIAZ SKYSPOTTER 150 A COMPLEX

SkySpotter 150 A unmanned aircraft	2 units
LIAZ GSOS gyro-stabilized electro-optical sensor	2 units
LIAZ GCS ground control station	1 unit
LIAZ TC transport container	1 unit

TECHNICAL DATA

FLIGHT CHARACTERISTICS

Max. speed	120 km/h
Flight time	up to 5 hrs
Max. altitude	4 300 m
Capacity for the attachment of payloads	40 kg
Operating temperature	-20 to 50 °C
Control range	up to 100 km

AIRFRAME

UAV empty weight	110 kg
Max. takeoff weight	150 kg

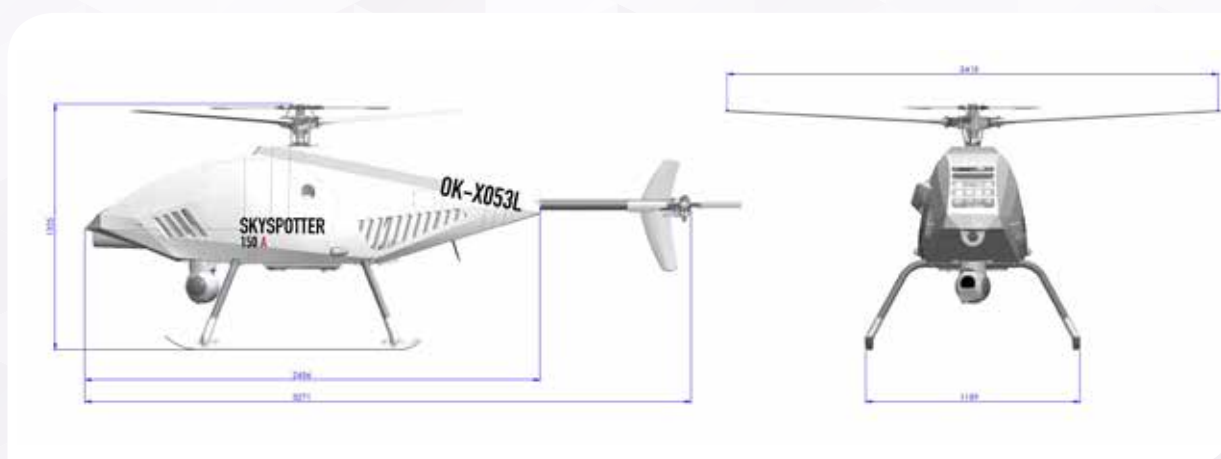
DRIVE UNIT

Wankel rotary engine
Fuel tank 41 L
Generator output power 2 kW

OPERATION

UAV pilot
Payload operator
Data operator for master systems (non-compulsory)

NOTE: Some technical data of the SkySpotter 150 aircraft and of the ground control station may vary depending on the configuration of the payloads.



Thanks to these features, especially its carrying capacity, the **SkySpotter 150 A** can carry a wide range of payloads over a long distance and for a long period of time. Thus, it can be used in a variety of applications in the civilian sector, in Integrated Rescue Systems (IRS).

The **LIAZ GSOS** is the UVA's key component that enables the **SkySpotter 150 A** to perform a wide range of real-time monitoring tasks: detecting and tracking objects, searching for and locating objects, with transmitting image signals captured in the visible or infrared spectrum in day and night mode, including the precise focusing of the tracked target.

Optical tracking parameters

Visibility	Person 1.8m x 0.5m	Vehicle 4.0m x 1.5m
	Usual conditions	Usual conditions
DETECTION (m)	> 10 000	> 20 000
RECOGNITION (m)	3 150	9 557
IDENTIFICATION (m)	1 575	4 314

Thermal tracking parameters

Visibility	Person 1.8 x 0.5 m	Vehicle 4.0 x 1.5 m
	Usual conditions	Usual conditions
DETECTION (m)	4 300	6 400
RECOGNITION (m)	1 200	1 900
IDENTIFICATION (m)	800	1 200



LIAZ GYRO-STABILIZED ELECTRO-OPTICAL SENSOR

The **LIAZ GSOS**, a gyro-stabilized electro-optical sensor (also called a Gimbal), is the basic component of the **SkySpotter 150** aircraft equipment, enabling it to perform standard observation, reconnaissance and monitoring tasks.

The **LIAZ GSOS** system include a high-sensitivity camera, a high-resolution infrared camera, a laser range-finder and a gyro-stabilized suspension.

Gimbal is equipped with an inertial system for stabilizing and calculating the artificial horizon, together with its own high-torque drive, which ensures image stabilization with a maximum deviation of 150µrad. The system enables the functions of object tracking (Geo-tracking) and their localization (Geo-localization). Control of Gimbal is provided from the operator's control panel at the ground control station. In addition, the system is equipped with a registrar (VIPER) for data processing, storage and transfer with significantly increased resolution. The camera sensor has a high resolution of 1920x1080 pixels, an image sensor (CMOS) and 30x optical zoom/12x digital zoom. The minimal sensitivity of the camera is 0.5Lx and the focus system operates in automatic or manual modes. The high-resolution infrared camera has a pixel size of 17µm and is equipped with 8x digital zoom and its spectral range is 7.5µm to 13.5µm. The accuracy of the laser sensor focusing is 4, 8 and 15 cm depends on distance. The total weight of the **LIAZ GSOS** sensor is 3,5 kg.

OTHER OPTIONAL PAYLOADS

- Radar SAR (Synthetic Aperture Radar, X-band) (Special Permit)
- Radar GPR (Ground Penetrating Radar)
- Special geophysical radar (P-band)
- Laser sensor LIDAR (Light Detection And Ranging)
- Aerial Gamma Measuring Device
- Gas detector
- Magnetometers
- Spectrometer
- Heartbeat and respiration detection sensor
- Cameras for "Precision Agriculture"

- Transport box
- Searchlight
- Loudspeaker

Additional and special accessories can be installed upon the customer's requests. These include, for example:

- Parachute system
- Flight noise silencer
- Tank for spraying
- Enlarged fuel tank 56 L
- System for displaying the airspace situation

GCS GROUND CONTROL STATION



The **LIAZ GCS** ground control station remotely controls the aircraft and provides control and data communication with attached equipment (payloads).

The **LIAZ GCS is equipped with a 12m telescopic mast with the antenna orientation system.** The installed antennas on the telescopic mast are used for long-distance communication with the UAV. The first channel provides flight-control communication and positioning via

GPS (Glonas/RTK). The second channel is used for data transmit. This channel transmits the following data – a video from the heading hold camera, from the thermal camera, TV camera and the laser sight.

Furthermore, the LIAZ GCS is equipped with three 3-metre high antennas that support weather station operations and provide communication with area control centres and ground services (e.g. IRS).

All antennas are equipped with an automatic lift system.



The **SkySpotter 150 A** helicopter is equipped with two antennas, for communication with GCS antennas for communication with PCU, enabling the possibility of pre-take-off checks of all systems, using a joystick. The helicopter also has a 480MHz radio beacon to detect UAV in case of an emergency landing and an altimeter to prevent collisions during the landing.





SKYSPOTTER 150

FLIGHT MODES

Selecting a flight mode for UAV is an important and substantial step because all tasks and commands are performed independently. The choice of algorithms for UAV control is based on the selected modes. The total number of flight modes is 15. The flight plan is usually completed by the UAV pilot in four basic modes. The most important are as follows:

- Automatic mode (UAV). This is a flight option according to the preset parameters, allowing the pilot to intervene in the programmed flight at any time.
- Manual mode (MANUAL). Performing of commands such as rising, change of direction and/or speed are executed by the UAV pilot.
- Vertical takeoff and landing mode (VVP). This mode is used for the takeoff and landing of a UAV.
- Automatic mode "To Point". The UAV flies to a specified point (the point settings consist of three values: "Latitude", "Longitude" and "Altitude").

TRANSPORT AND STORAGE OF THE AIRCRAFT

The basic configuration of the **SkySpotter 150 A** complex includes a special transport vehicle that is used for the storage and ground transport of two aircrafts.

The transport container **LIAZ TC** is an aluminium container with hinged side panels and two jacks used for the loading and unloading of two aircrafts. This container is also equipped with a fuel station for filling the UAVs with fuel.



SUPPORT AND MAINTENANCE

The UAV operator training program consists of 186 to 200 lesson hours for every trainee and it also includes simulator lessons and practical flight exercises. The length of the training depends on the intensity of the processes and it usually takes one to two months.

The training program can be extended according to the specific needs of the customer. All operators are trained according to the same curriculum without distinction of specialization in order to achieve their full substitutability.

Range of support:

- Technical documentation.
- Field maintenance services.
- Logistic support.
- Programs for special products and services.
- Training programs.

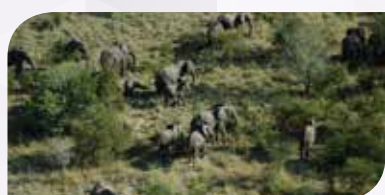
LIAZ a.s. provides qualified technical assistance and maintenance support all over the world.



CIVILIAN APPLICATIONS

- Identification of emergency places and sections: utility networks, solar power plants, gas and oil pipelines
- Monitoring and assessment of the condition of buildings, bridges and larger infrastructure
- Radiation measurements (nuclear power plants)
- Obtaining of precision measurements: cartography, 3D terrain modelling, geophysical exploration of the area to a depth of 120 m (ground water, raw materials)
- Performing of archaeological works: preparation of operative orthoimage maps of archaeological sites
- Monitoring and controls of water surfaces: identification of floodplains, identification of sediments in water streams and reservoirs
- Monitoring of large natural areas: fire protection in natural parks, monitoring of animal migration and their health condition, vaccination and distribution of processed animal feeds
- Evaluation of the crop condition and volume, level of fertilization and cultivation of fields, orchards and vineyards, so-called "Precision Agriculture"
- Geotechnical survey, evaluation of raw materials deposit

Use of the thermal camera or HD camera, which are standard components of the gimbal, in all the above-mentioned tasks.



RESCUE APPLICATIONS

- Surveillance and monitoring of areas during environmental, natural and elemental disasters: participation in search and rescue operations, loss assessment and victim search, transport of rescue equipment and first-aid materials
- Monitoring and evaluation of the level of radiation and of biological and chemical substances in the environment
- Avalanche tracking and victim search
- Detection and monitoring of fires, tracing of persons in areas affected by fire
- Monitoring and surveillance of people gatherings: during demonstrations or sporting events
- Police checks, surveillance of poorly visible sites. Monitoring of crime scenes, movement of weapons, drugs and illegal migrants
- Analysis of the traffic infrastructure situation, surveillance and documentation of traffic violations

Use of the thermal camera or HD camera, which are standard components of the gimbal, in all the above-mentioned tasks.



LIAZ a.s. is a reliable supplier of unmanned helicopter complexes and a provider of specialized systems and other specific services (including a whole range of payloads and software) as well as technical tools associated with the use of the helicopters: **SkySpotter 150 B** and **SkySpotter 150 C** simplified specialty versions. Extensive technical and manufacturing experience enables LIAZ specialists to introduce innovative technical features during the R&D phase and implement ambitious concepts.

With the **LIAZ UAV SkySpotter 150 A** complex, every customer receives a ready-made solution tailored to their own specific needs.

LIAZ a.s.

Your right choice

LIAZ a.s. is a company engaged in the development and production of unmanned helicopters. This line of business is a continuation of the long tradition of LIAZ vehicle production. The company was founded in 1951 and in the past, having already 10 manufacturing plants with 11,000 employees, it produced up to 13,600 trucks a year.



LIAZ a.s.

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