



# Product Brochure

# **SKYSPOTTER 151**

The Skyspotter 151 is designed to perform a wide range of civilian, rescue, monitoring, protective and defensive tasks

## PRODUCT SPECIFICATION

The **Skyspotter 151** is a fully autonomous and independently operating unmanned helicopter.

The platform of the **UAV Skyspotter 151** 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.
- Supports an autonomous flight mode.
- Allows extensive changes of flight speed and altitude (ability for a long-term hanging position).
- Vertical take-off and landing.

Flight preparation does not take more than 15 minutes. The **Skyspotter 151** has a special two-stroke engine, which runs on commonly available automotive gasoline.

From long experience of qualified flight technicians, designers and software engineers emerged drone, which can be used for carrying out complex tactical tasks. Operates in inaccessible areas, coastal and mountain terrains, in subarctic and desert environment in all weathers. Manages high altitudes and wide temperature ranges with option of connecting various scale of useful payloads. Aircraft complies with all valid aviation standards.



### 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 – carrying out useful tasks.
- 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 151 COMPLEX

## COMPLEX A COMPRISES

Skyspotter 151 unmanned aircraft	2 units
Gyro-stabilized electro-optical sensor LIAZ	2 units
Ground control station combined with transport vehicle (built in a car, mobile container)	1 unit
LIAZ TC transport container	1 unit
Technical documentation	1 set



## COMPLEX B COMPRISES

Skyspotter 151 unmanned aircraft	1 unit
Gyro-stabilized electro-optical sensor LIAZ	1 unit
Ground control station combined with transport vehicle (built in a car, mobile container)	1 unit
Technical documentation	1 set



## TECHNICAL PARAMETERES OF PLATFORM

### FLIGHT CHARACTERISTICS

Max. speed	120 km/h
Flight time	up to 7 hrs
Max. altitude	4 000 m
Capacity for the attachment of payloads	80 kg
Operating temperature	-20 to 50 °C
Control range	up to 100 km

### AIRFRAME

UAV empty weight	120 kg
Max. takeoff weight	200 kg

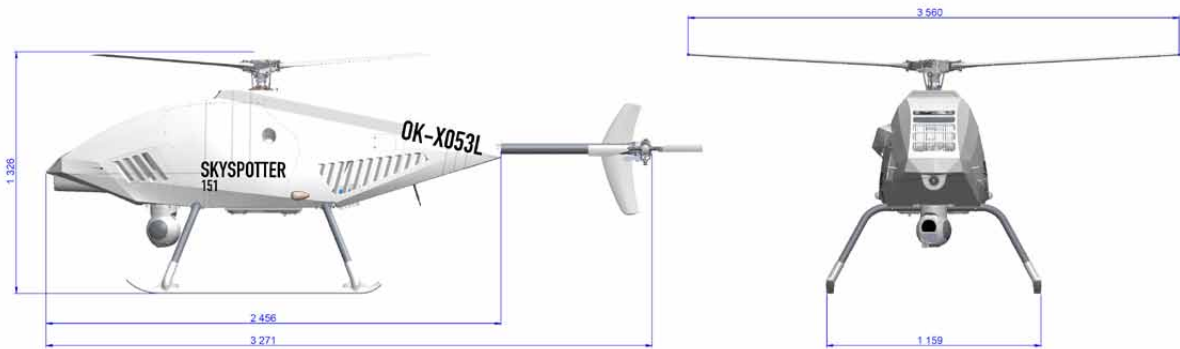
### DRIVE UNIT

Special two-stroke engine
Fuel tank 70 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 151 aircraft and the ground control station may vary depending on the configuration of the payloads and flight conditions.



## LIAZ GIMBAL

**LIAZ Skyspotter** platform allows to install any Gimbal available on market.



The **LIAZ Gimbal** is the UVA's key component. It is composed of a gyro-stabilized suspended hinge and an electro-optical sensor that enables the **Skyspotter 151** to perform a wide range of real-time monitoring tasks: object detection and tracking, object search and localization, image capture and transmission in visible or infrared spectrum, nightvision and precise focus on the tracked object.

The **LIAZ Gimbal** gyrostabilization hinge provides a high level of stabilization thanks to special gyroscopes from leading manufacturers along with modern software algorithms. The camera sensor has FullHD resolution, powerful optical zoom and the sensor is able to operate in very low light levels. The sensor operates in automatic or manual mode. The high-resolution infrared camera has got HD resolution. The accuracy of the laser sensor for precise autofocus is in range of centimetres and dependable on the measured distance. The total weight of the **LIAZ Gimbal** sensor is 3.5 kg.

Delivery includes equipment for increase of VIPER image quality.

### BASIC FUNCTIONS

Geo-tracking, tracking moving object

Geo-location, object localization (GPS coordinates)

### Optical tracking parameters

Person 1,8m x 0,5m

Vehicle 4,0m x 1,5m



Visibility	Usual conditions	Usual conditions
DETECTION (m)	10 000	20 000
RECOGNITION (m)	3 100	9 500
IDENTIFICATION (m)	1 500	4 300

## LIAZ GCS – GROUND CONTROL STATION

**LIAZ GCS** functions and equipment are same for both A and B complexes. It differs in arrangement of individual parts.



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** used for long-distance communication with UAV. It provides communication for flight control, positioning via GPS.

The system also provides data transmission. Transmits following data – video from the course camera, from thermal camera, optical camera and laser sight, or data from payloads.

**Furthermore, the LIAZ GCS is equipped with tilting 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.**

All antennas are equipped with an automatic lifting system. The **Skyspotter 151** is equipped with an altimeter against collision on landing, antennas for communication with GCS, communication antennas for control of all systems before take-off by using a joystick and UAV detection in case of an emergency landing.



## TRANSPORT CONTAINER LIAZ TC

**LIAZ TC** is a special transport container FOR COMPLEX A designed for storing and transporting two aircrafts on land. **LIAZ TC** transport container is aluminous container with folding side panels and lifting device for loading and unloading two aircrafts. The container is also equipped with filling station for fuelling the aircraft.



## SUPPORT AND MAINTENANCE

The UAV operator training program consists 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.







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## FLIGHT MODES

Flight mode selection 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 flight plan is usually completed by the UAV in four basic modes. The most important modes are:

- Fully autonomous mode – automatic mode allows the pilot to intervene in the programmed flight at any time. This mode includes:
  - VTOL (vertical take off and landing) automatic take-off and landing system
  - Flight to point, flight along route, flight around circuit
  - Scan the surface in a specific raster
  - Planning landing spots in case of flight difficulties.
- Manual mode – execution of commands such as ascension, change of direction and / or speed is performed:
  - Through GCS operator and his equipment
  - Through manual controls out of GCS



## OTHER OPTIONAL PAYLOADS

- Radar SAR (Synthetic Aperture Radar, X-band) (Special Permit)
- Radar GPR (Ground Penetrating Radar)
- Laser sensor LIDAR (Light Detection And Ranging)
- Aerial Gamma Measuring Device
- Gas detector
- Magnetometers
- Spectrometer
- Heartbeat and respiration detection sensor
- Transport box
- Searchlight
- Spraying system

Additional and special accessories can be installed upon request:

- Parachute system
- Flight noise silencer

**Skyspotter 151** manages flight with a big payload at a great distance and for a long time. That allows wide range of usage for carrying out useful tasks.

## 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).
- Precision measurements: cartography, 3D terrain modelling, geophysical exploration of the area to a depth of 120 m (ground water, raw materials).
- 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.



# SECURITY AND 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 radiation levels, monitoring 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.



# PROTECTION AND DEFENSE

- Monitoring the movement of individuals, formations, vehicles.
- Monitoring of buildings, hidden stocks, etc.
- Surveying the position of monitored units and objects.
- Data transmission (video, thermo, radar) to evaluate the monitored situations and their transfer to defense activities.
- Flexible secure radio transmission between multiple objects.
- Transport of first aid items or special equipment.
- Search for wounded and hidden persons.
- CBRN







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**LIAZ a.s.** is a reliable supplier of unmanned helicopter complexes and a provider of specialized systems. LIAZ a.s. provides other specific services (including a whole range of payloads and software) as well as technical tools associated with the use of the helicopters: **Skyspotter 151 B** and **Skyspotter 151 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 151** 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 founded in 1951. It used to have 10 manufacturing plants with 11,000 employees and produced up to 13,600 trucks a year.



**LIAZ a.s.**

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