

THE **ULTIMATE** **DRONE** SOLUTION

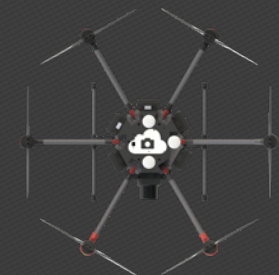
LX-1 ECHELON LiDAR MULTIROTOR
Brochure & Technical Specifications



OVERVIEW

The LX-1 “Echelon” is a professional-grade hexacopter equipped with a LiDAR sensing payload, and designed for a wide range of high-resolution 3D mapping and surveying applications. With a total take-off weight of 12kg, the LX-1 can produce stitched 3D maps with 2-3cm accuracy—allowing surveyors to measure topography on a wide scale, and power line operators to inspect their lines and surrounding vegetation. The software system is plug-and-play, so the pilot can record and process data without the need for advanced remote sensing or GIS expertise. The complete package flies for up to 20 minutes, and is built with survey-grade dependability and all-round user friendliness in mind.

LX-1 ECHELON



WHY THE LX-1

There are several aerial mapping services currently in market. The LX-1 however, is the best solution for customers seeking a simple LiDAR system that provides the essentials of topographic, power-line, and other large-scale 3D mapping imagery.

No expensive live-streaming of data over cell networks. No need for expensive GIS software if you don't already have it. Just one LiDAR package gets the job done quickly and efficiently.

LX-1 Features:

Accurate Data. LiDAR resolution <3cm with telemetry, RTK, and Kalman filtering for stitching.

Simple Software. User interfaces for operating the LiDAR payload and the 3D stitching.

First Person Views. The LX-1 comes integrated with a front-facing camera that live streams to the pilot's hand controller, making it easier for experts and non-experts to fly.

3D-Printable Spares. The LX-1 is based on DJI's M600 hexacopter platform with all mechanical modifications fully 3D-printable! Should you ever require spare parts, you can print them yourself or we can print and send them to you.

Rugged transport case. The LX-1 package is delivered in a rugged transport case that can easily fit into pickup truck bays or be shipped as oversized baggage.

Topography Scan



LX-1 KEY APPLICATIONS

The LX-1 generates compelling 3D models of large objects over wide areas, such as power line infrastructure, vegetation and forestry, mining pits, and topographic models used in various industries.

Power Lines & Linear Corridors

- Lines: sag, clearance to vegetation, roads, other nearby infrastructure
- Poles: pole height, leaning poles

Forestry & Environmental Management

- Precision forestry (e.g. wood estimates)
- Flood modeling
- Canopy characteristics (e.g. bulk density and base height)
- Canopy fuel maps for fire behaviour models

Transportation & Construction

- Pre-construction models for engineering analysis
- As-built surveys and inspections
- Right-of-ways

Topographic Surveying & Mapping

- Large-scale DEMs, DSMs, and DTMs for many industries

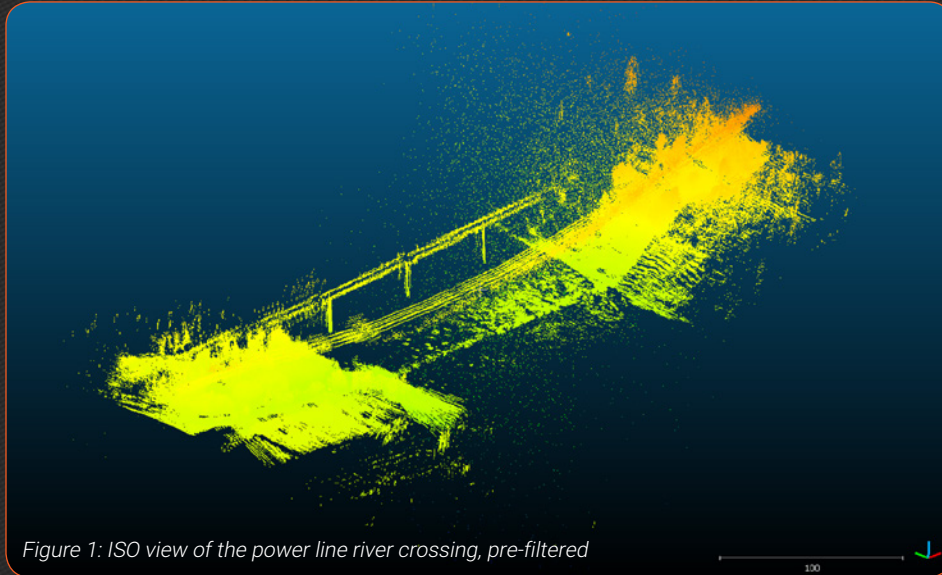
Volumetrics and Aggregates

- Mining pit 3D models and ore extraction estimates
- Volume estimates for large mounds of ore

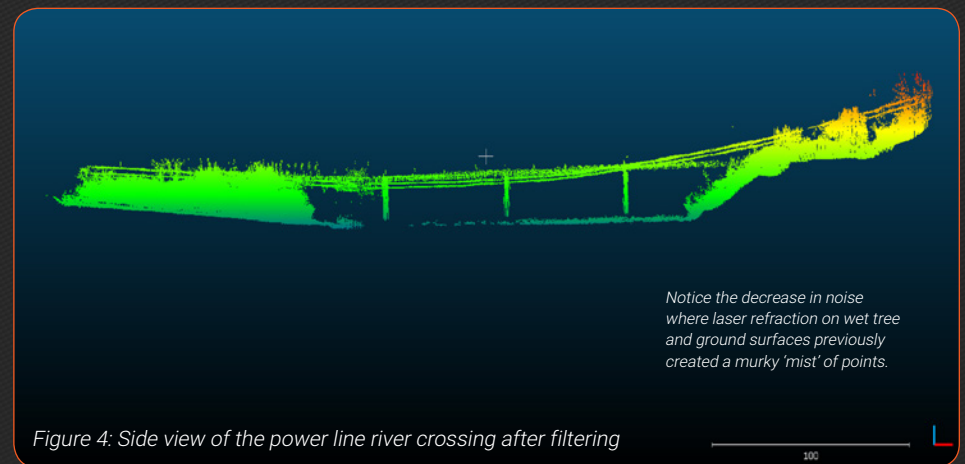
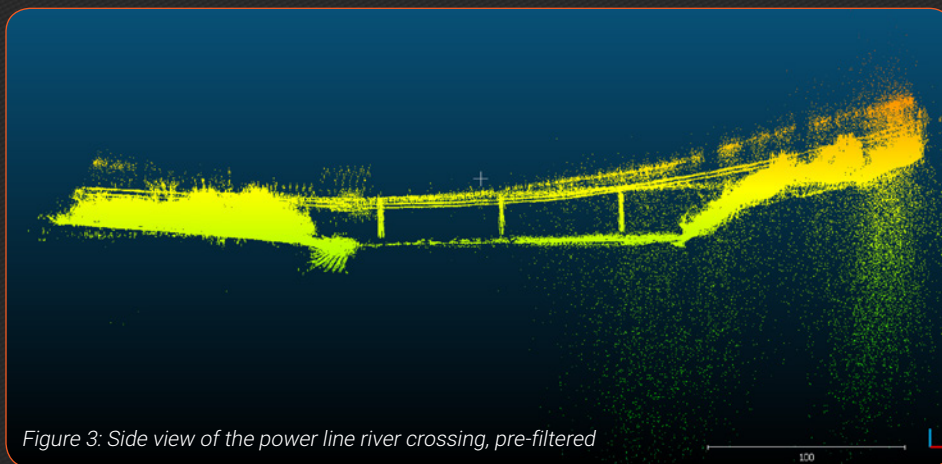
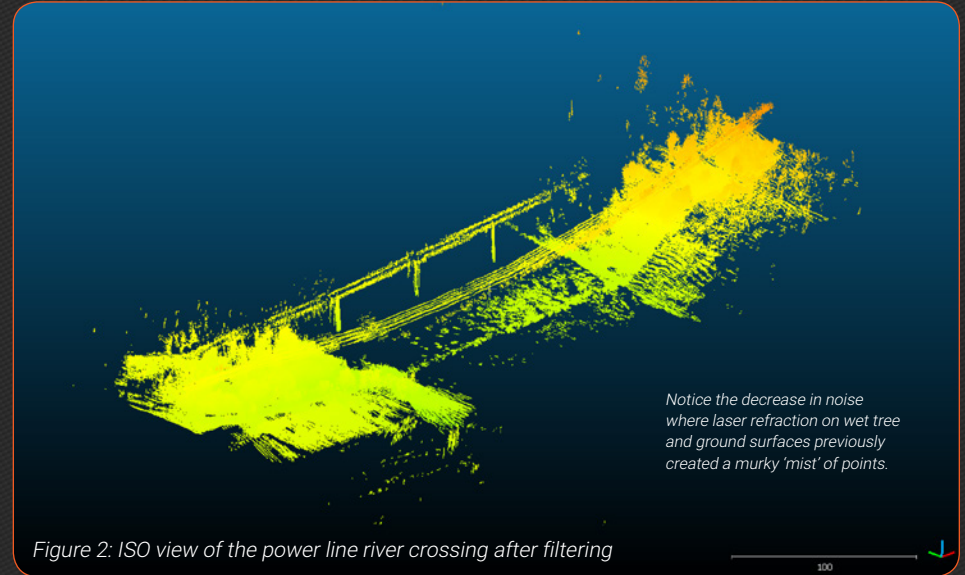
SAMPLE SOFTWARE OUTPUTS

In the case below, the LX-1 was flown over a power line river crossing during winter, when laser refraction through water and wet surfaces would normally complicate data capture and stitching. Here the pre-filtered data is presented to show the challenges of dealing with RAW data. The filtered data demonstrates the noise filtering, accuracy-assured mapping ability of the LX-1 (Figures 3 and 4).

RAW (Pre-Filtered) Stitched 3D Model



Filtered 3D Model



LX-1 TECHNICAL SPECIFICATIONS

Dimensions & Weight

Diagonal Wheelbase	1133 mm
Aircraft Dimensions	1668 mm x 1518 mm x 859 mm (Propellers, frame arms and GPS/RTK mounts unfolded)
	640 mm x 582 mm x 673 mm (Frame arms and GPS/RTK mounts folded)
Weight (with six TB47S batteries + LiDAR attachments)	12.1 kg
Max Takeoff Weight	15.1 kg
Returns	1
Output Rate	>400,000 points per second

LiDAR Sensor & Software

Laser Class	IEC 60825-1:2007 –Class 1 Laser Product (eye safe)
Wavelength	905 nm
Measurement Technique	Time of Flight
Measurement Range	1-200m (80% reflectivity)
Range Accuracy (1 sigma at 50m)	<3cm
Frame Rate	5-30 Hz
Angular Resolution	0.03-0.2° dependent on frame rate
Sensors	8 laser/detector pair
Field of View	Horizontal: 360°, Vertical: 20° (+3°/-17°)
Operating Temperature	-40°C to +70°C (-40°F to +158°F)
Storage Temperature	-40°C to +105°C (-40°F to +220°F)
Nominal Power	18 W
Operating Voltage	24 VDC
Nominal Weight	900g
Dimensions	102 mm (diameter) x 86 mm height
Shock & Vibration	ETSI EN 300 019-2-5
Environmental Protection	IP69K rating for ingress protection against dust and water
Laser Security	IEC 60825-1:2007 –Class 1 Laser Product (eye safe)
Output Connection	1 Gbps Ethernet
Data Outputs	Angle, Distance, Intensity, Synchronized Time Stamps
Returns	1
Output Rate	>400,000 points per second

Flight Battery Specifications

Model	TB47S
Capacity	4500 mAh
Voltage	22.2 V
Type	LiPo 6S
Energy	99.9 Wh
Net Weight	595 g
Operating Temperature	14° to 104° F (-10° to 40° C)
Storage Temperature	Less than 3 months: -4° to 113° F (-20° to 45° C)
	More than 3 months: 72° to 82° F (22° to 28° C)
Charge Temperature	41° to 104° F (5° to 40° C)
Max Charging Power	180 W

Remote Controller Specifications

Operating Frequency	5.725 GHz to 5.825 GHz 2.400 GHz to 2.483 GHz
Max Transmission Distance (unobstructed, free of interference)	FCC Compliant: 3.1 miles (5 km)
Dual Users Capability	Master-and-Slave control
Mobile Device Holder	Supports smartphones and tablets
Output Power	9 W
Operating Temperature	14° to 104° F (-10° to 40° C)
Storage Temperature	Less than 3 months: -4° to 113° F (-20° to 45° C)
	More than 3 months: 72° to 82° F (22° to 28° C)
Charge Temperature	32° to 104° F (0° to 40° C)
Built-in Battery	6000 mAh, 2S LiPo
Max Tablet Width	170 mm

UAV Basic Specifications

Intelligent Flight Battery Quantity	6
Motor Model	DJI 6010
Propeller Model	DJI 2170
Retractable Landing Gear	Standard
Operating Temperature	14° to 104° F (-10° to 40° C)
Charger Model	A14-100P1A
Charger Voltage Output	26.3 V
Charger Power Rating	100 W
Max Angular Velocity	Pitch: 300°/s, Yaw: 150°/s
Max Pitch Angle	25°
Max Speed of Ascent	5 m/s
Max Speed of Descent	3 m/s
Max Wind Resistance	8 m/s
Max Flight Altitude above Sea Level	2500 m
Max Speed	18 m/s (No wind) – flying at 5m/s or slower is recommended for best LiDAR quality
Hovering Time	3 kg LiDAR payload attachments: 20 min
Flight Control System Model	A3 + custom microcontroller for LiDAR payload



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