



D2000S

Aerial Photogrammetry
Remote Sensing
Patrol Inspection
Emergency System



Overview

D2000S is a small-sized and long-endurance four-rotor UAV platform newly developed by Foxtechrobot, which can meet the civilian needs of high-precision, mapping, remote sensing and video surveillance applications.

Equipped with photogrammetric ortho module, oblique module, LiDAR module, visible light video module, thermal infrared video module, thermal infrared remote sensing module and so on, D2000 is capable of acquiring multisource data. With photogrammetric and remote sensing modules, photogrammetry and remote sensing applications can be fulfilled, Using video module together with long-distance high-definition image transmission unit, D2000s can realize functions such as target recognition, positioning, real-time tracking and position and speed estimation.

The standard take-off weight of the UAV platform is 2.8 kilograms, and the endurance time is 74 minutes.

With the software of UAVManager Professional Edition (for surveying), accurate 3D flight route planning, 3D real-time flight monitoring, GPS fusion solution, control point measurement, aerial triangulation, one-key mapping, one-key exporting of stereo mapping can be realized. And also it provides DOM, DEM, DSM, TDOM and other data processing and results browsing.

System Performance

D2000S

Image control-free topographic mapping

With 20 Hz high-precision differential GNSS, D2000S is able to accomplish topographic mapping without image control points for various application scenarios.

Long endurance, high efficiency and high reliability

The hovering time at sea level for a single flight is 60 minutes. The modules such as IMU barometer, magnetometer and GNSS module adopt redundant design. The components such as ultrasonic wave, optical flow module and dual-differential antennas are utilized to provide multiple guarantees. A number of components and the whole UAV platform have passed the reliability test to ensure product safety and reliability.

Dual-differential antenna

Dual-differential antennas are the standard configurations of the D2000S, which enhance the anti-interference ability and help to operate in complex environments such as mining areas, bridges, and ship-borne take-off and landing platforms.

Modular payload design and multisource data acquisition

D2000S can be equipped with single-head photogrammetric module, penta-head oblique module, LiDAR module, thermal infrared remote sensing module, visible light video module, thermal infrared video module and related software.

Precise terrain following flight

Combined with the UAVManager Professional Edition, a PC software platform, D2000S can achieve accurate terrain following flight, improving image resolution and ensuring consistency of image resolution.

Automatic obstacle avoidance

A front-mounted millimeter wave radar module helps D2000S to avoid obstacles ahead automatically, improving the safety level.

One-stop software solution and advanced data processing workstation

The software of UAVManager Professional Edition supports the whole process from accurate 3D flight route planning, 3D real-time flight monitoring, control point measurement, aerial triangulation to providing and browsing a variety of data results such as DOM, DEM, DSM, TDOM, LiDAR point cloud and so on.

Cloud-based active service

Based on cloud services, the system supports information push, project synchronization, flight data sharing, active UAV maintenance, flight real-time display and playback afterwards. Also, remote monitoring and video streaming can be accomplished based on 4G/5G networks.



D2000S PARAMETERS

Net weight	2.6 kg
Takeoff weight	3.8 kg / 2.8 kg
Maximum payload	1.2 kg
Symmetrical motor wheelbase	598 mm
Dimensions	(Unfold) 495 X 442 x 279 mm, (Fold) 495 X 442 x 143 mm
Navigation satellite	GPS, BeiDou, GLONASS
Power mode	Electric
Maximum speed	20 m/s
Cruising speed	13.5 m/s(50 kilometers)
Hovering time	60 min
Maximum climb speed	8.0 m/s (manual), 5.0 m/s (automatic)
Maximum descent speed	5.0 m/s (manual), 3.0 m/s (automatic)
Hovering accuracy (RTK)	(H) 1cm+1ppm, (V) 2cm+1ppm
Differential GNSS update frequency	20 Hz
Maximum take-off altitude	6000 m
Wind resistance	Force 6
Task response time	Unfold ≤10 mins, Withdraw ≤15 mins
Image transmission distance	10km
Control distance	20km
Take-off and landing mode	VTOL without remote control
Working temperature	-20°C~45°C



Key components



RTK100 GNSS base station (optional)

RTK100 is an independently developed GNSS reference stations by Foxtechrobot, supporting RTK and PPK fusion solution via the software of UAVManager Professional Edition.

HGS2000 handheld ground station (Optional)

Portable ground station, compatible with D2000S, built-in tablet computer and digital radio, supporting route planning, flight monitoring and flight control.



Exploded View



- Battery
- Dual-differential antennas
- Blade
- Quick release structure
- Millimeter wave radar
- Magnetometer
- Payload
- Motor
- Landing gear
- Optical flow
- Ultrasonic

D-CAM5000

Weight	400g
Sensor effective pixel	2520M
Sensor cell size	3.76um
Len	28mm
Resolution	6144 × 4096
Video resolution	1080p
Frame frequency	25fps
Storage space	128GB(standard)

D-CAM5000



D-CAM3000

Camera model	SONY A7RM4
Sensor size	35.7×23.8mm(Full frame)
Effective pixel	About 61M
Lens parameter	40mm fixed focus

D-CAM3000



D-OP4000

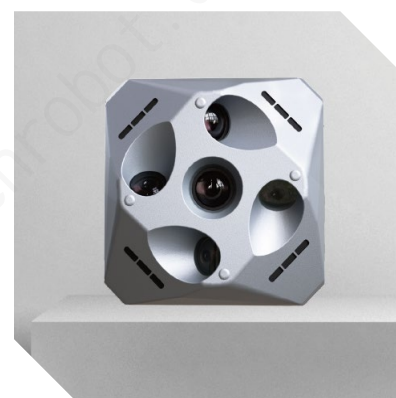
Camera model	Sony A7R4×5
Resolution	9504×6336
Effective pixel	61×5MP
Pixel size	3.76μm
Effective sensor area	35.7mm×23.8mm
Focal length	down view 40mm, tilt view 56mm



D-OP5000

Sensor Size	APS-C 23.1mm×15.4mm
Resolution	6144×4096
Total effective pixel	130MP
Pixel size	3.76μm
Work mode	Photo mode
Minimum photo interval	0.5s
Shutter speed	Maximum 1/2000s
Shutter type	Mechanical shutter
Focal length	down view 28mm, tilt view 40mm
Aperture	F5.6

D-OP5000



video module

Dual-visible light video module

D-EOV2000		
Video	Sensor Size	1 inch+1 inch
	Effective pixel	20M+20M
	Video resolution	3840×2160, 2376×1536, 1920×1080, 1280×720
	Video resolution for transmission	1920×1080, 1280×720
	Frame frequency	30fps
	Zoom	12X(720p), 8.3X(1080p)
	Focal length	12mm+35mm
	Aperture	F/4.0+F4.0
	Storage format	Mp4
Gimbal	Number of axes	Triaxial
	Gimbal stabilization accuracy	(relative)±0.005°, (absolute) ±0.1°
	Controllable rotation range	(Tilt)-20°~+120°, (Pan)±270°
	Structural designed rotation range	(Tilt)-60°~+160°, (Pan)±370°, (roll) -65°~+65°
Image transmission	Working frequency	1427 MHz~1447 MHz
	Transmitting power	24±2 dBm
	Channel bandwidth	supporting 1,4,3,5,10, 20MHz
	Image transmission distance	10 kilometers (no interference, no occlusion)
Visual tracking	Target size	15 to 510 pixels
	Automatic target detection	supported
	Target turn and U-turn tracking	supported
	Secondary tracking	supported
	Tracking target dynamic switching	supported

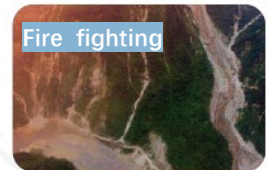
D-EOV2000



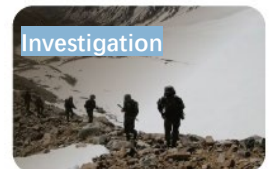
Power line inspection



Fire fighting



Investigation



Powerplant inspection



River inspection



Personnel rescue



Forest fire prevention



Pipeline inspection



Railway inspection



video module

Thermal infrared visible light video module

D-TRIV1000		
Thermal infrared	Detector type	Vanadium Oxide Uncooled Infrared Focal Plane Detector
	Video resolution	640 x 512 (thermal infrared)
	Frame frequency	50 Hz/30 Hz
	Response band	8~14μm
	Focal length	13 mm (equivalent focal length 57mm)
	Digital zoom	1.0-8.0x Continuous zoom (step of 0.1)
	Pixel size	12μm
	NETD	W50mK@25°C,F#1.0
	Stabilization gimbal	Three-axis stabilization gimbal
	Temperature measurement range	-20 °C~+150 °C, 0-+550 °C
Visual sensor	Sensor size	1 inch
	Effective pixels	20M
	Focal length	12 mm
	Stabilization gimbal	Three-axis stabilization gimbal
Image transmission	Transmission power	24±2 dBm
	Channel bandwidth	Supporting 1, 3, 5, 10, and 20MHz
	Image transmission distance	10 km (no interference, no blockage)

D-TRIV1000



Continuous zoom



Local image transmission



Pointing and positioning



Remote transmission



Photo and video recording



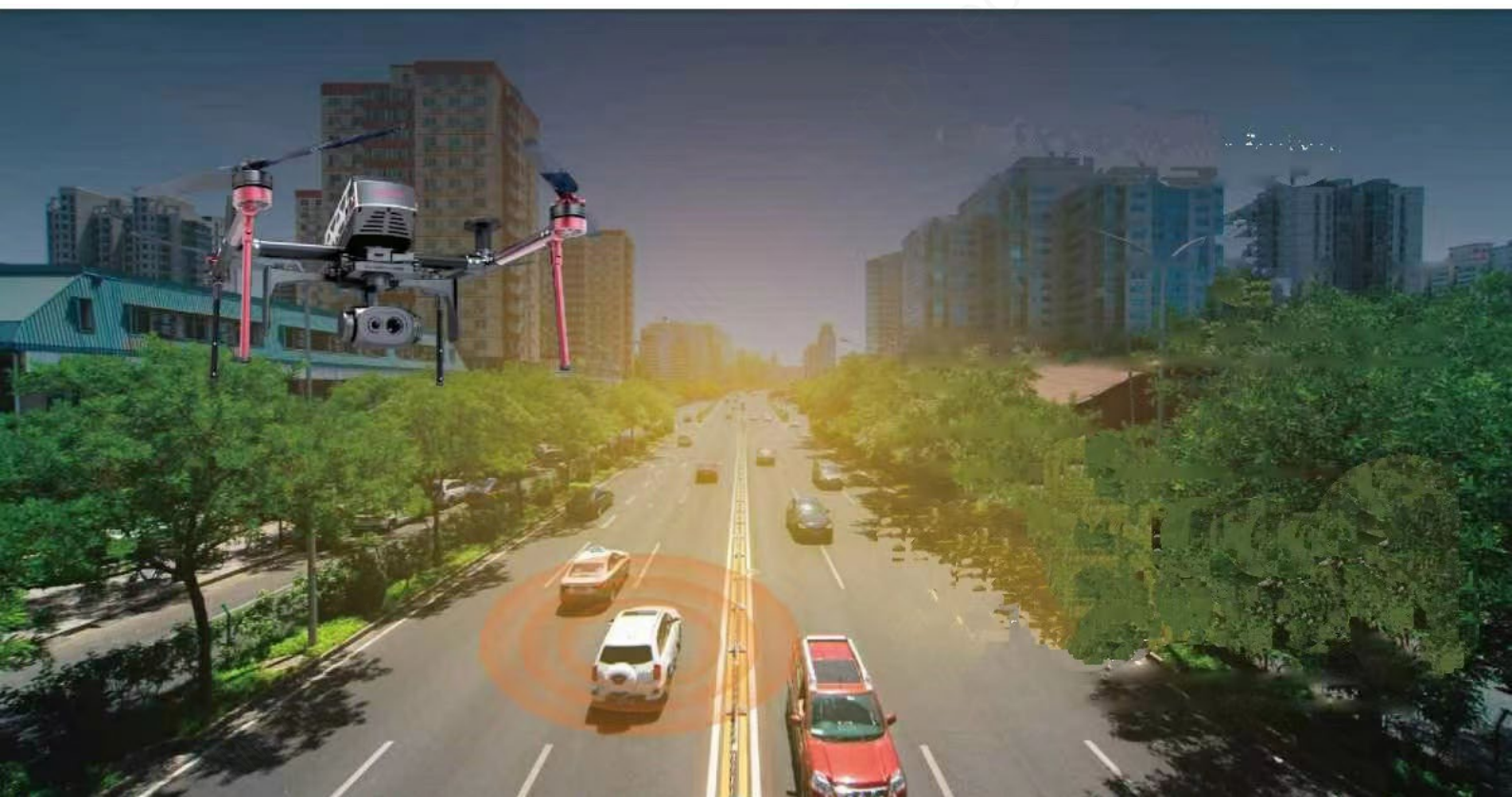
PIP



Visual tracking



Visual surrounding



D-MSPC2000

Sensor parameters	CMOS: 1/3" global shutter
Effective pixels	1.2 million
Resolution	1280 X 960
Sensor size	4.8 mm x 3.6 mm
Focal length	5.2 mm
Field of view	HFOV:49.6°, VFOV: 38°
Aperture	F/2.2
Shooting speed	one time per second
Ground Resolution	GSD:8.65 cm/pix, AGL:120 m
Storage	128 GB (Maximum)
Number of bands	6
Band Configuration (standard)	450 nm(35 nm), 555 nm(25 nm), 660 nm(22.5 nm) 720 nm(10 nm), 750 nm(10 nm), 840 nm (30 nm)

D-MSPC2000



Land feature classification



Forestry survey



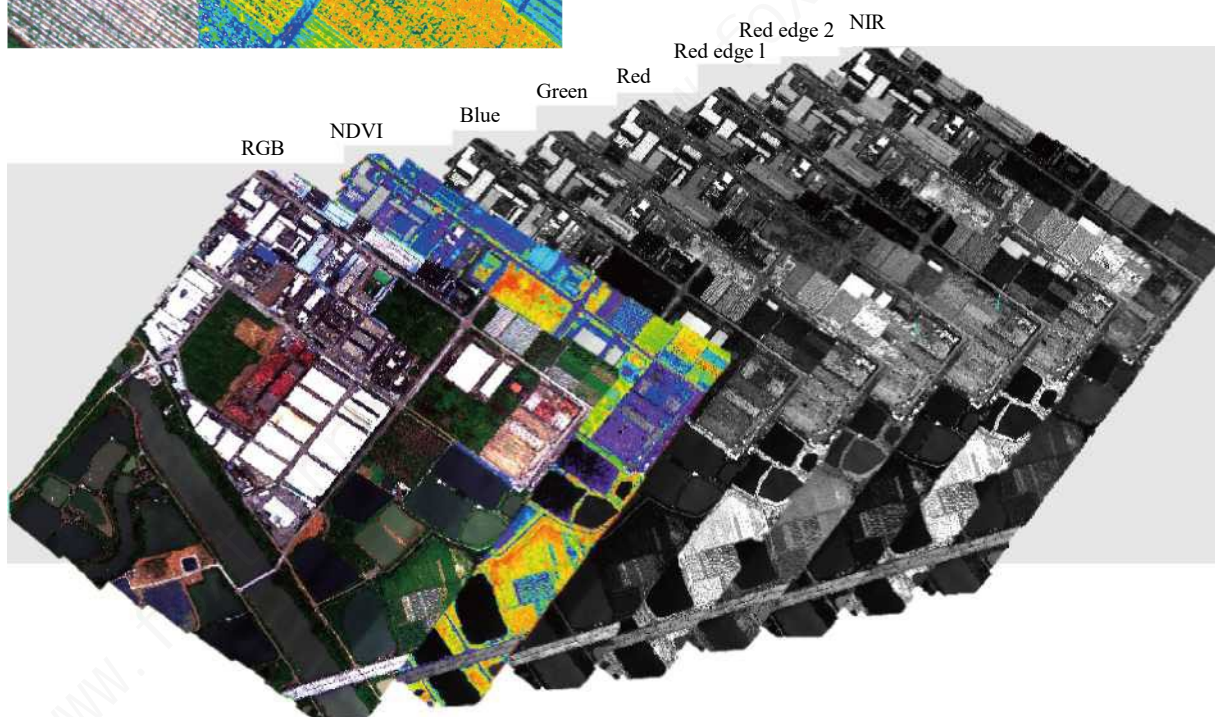
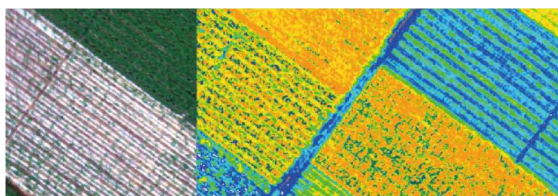
Vegetation statistics



Growth assessment



River monitoring



Model	D-LiDAR2100	D-LiDAR2200
Dot frequency	240kpts/s	
Echo mode	Triple return	
Laser field of view	70.4°(H), 77.2°(V)	
Trajectory accuracy	0.01m(H), 0.02m(V), 0.02°(roll/pitch), 0.02°(Heading)	
Precision of results	±5cm @100m	
Camera pixels	-	24 millions pixels
Lens focal length	-	20mm
Ground resolution	-	3cm@150m
Camera field of view	-	60.8°× 42.6°
Storage space	64G	Laser 64G, camera 64G
Dimension	100mm×92mm×111mm	116mm×133mm×120mm
Weight	668g	1008g

D-LiDAR2100/2200



High precision



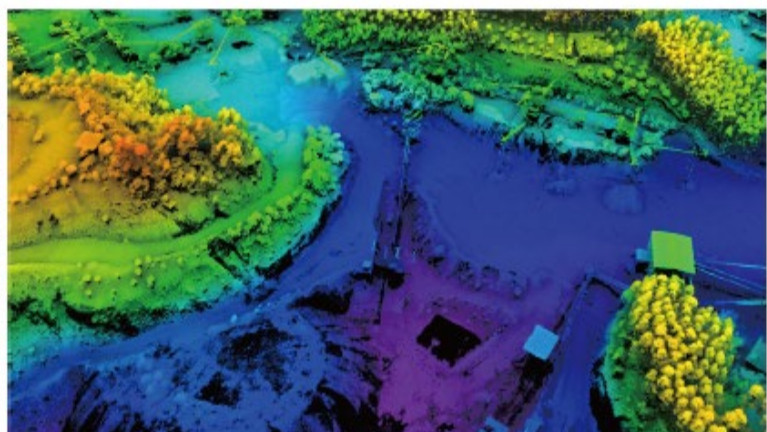
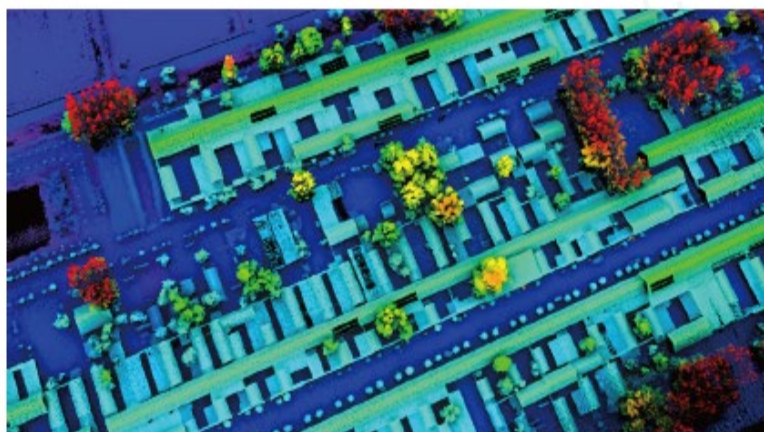
450m Measuring range



Three echoes



70.4° X 77.2° field of view



Model	D-LiDAR2110	D-LiDAR2210
Dot frequency	100kpts/s	
Echo mode	Double return	
Laser field of view	70.4°(H), 70.4°(V)	
Path accuracy	0.01m(H), 0.02m(V), 0.02°(roll/pitch), 0.02°(Heading)	
Precision of results	±5cm @100m	
Camera pixels	-	24 millions pixels
Lens focal length	-	20mm
Ground resolution	-	3cm@150m
Camera field of view	-	60.8°× 42.6°
Storage space	64G	Laser 64G, camera 64G
Dimension	97mm×64mm×62.7mm	
Weight	580g	

D-LiDAR2110/2210



High precision



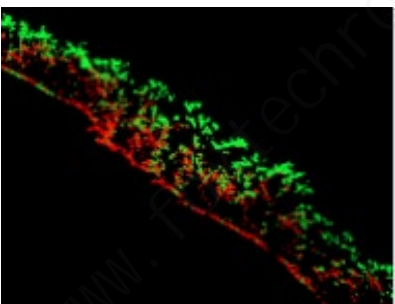
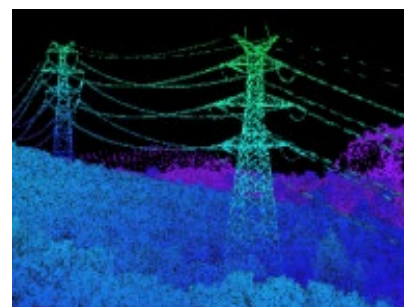
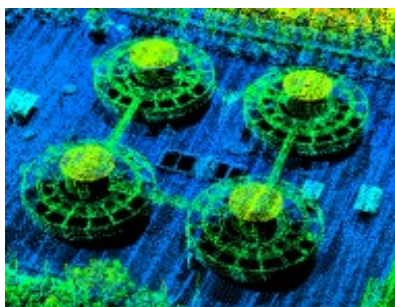
260m Measuring range

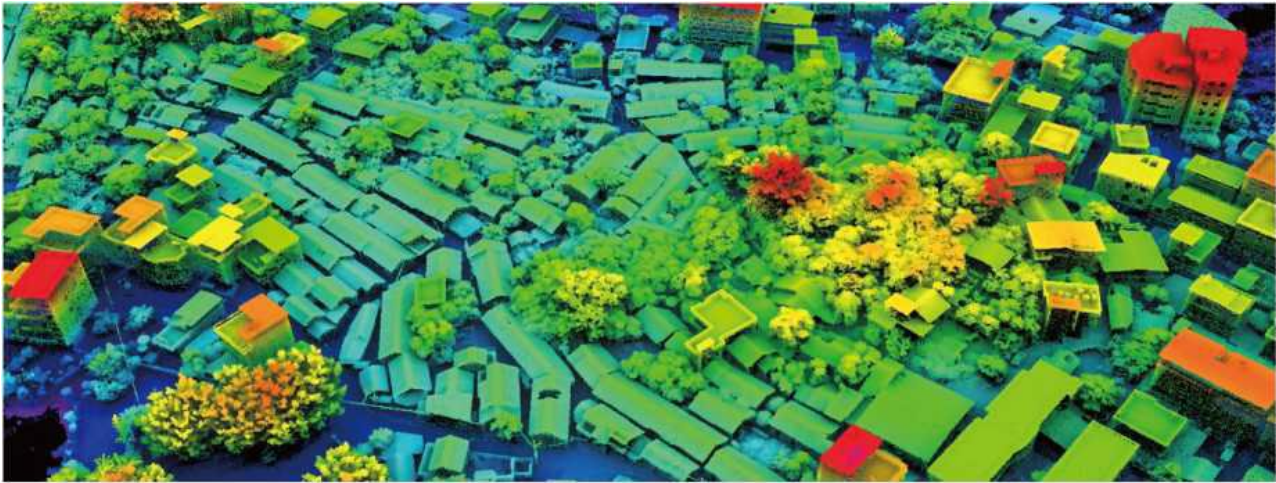


Double echoes



70.4° X 77.2° field of view





300m Measuring range



Three echoes



360° X 40.3° field of view



High laser pulse repetition rate

D-LiDAR500

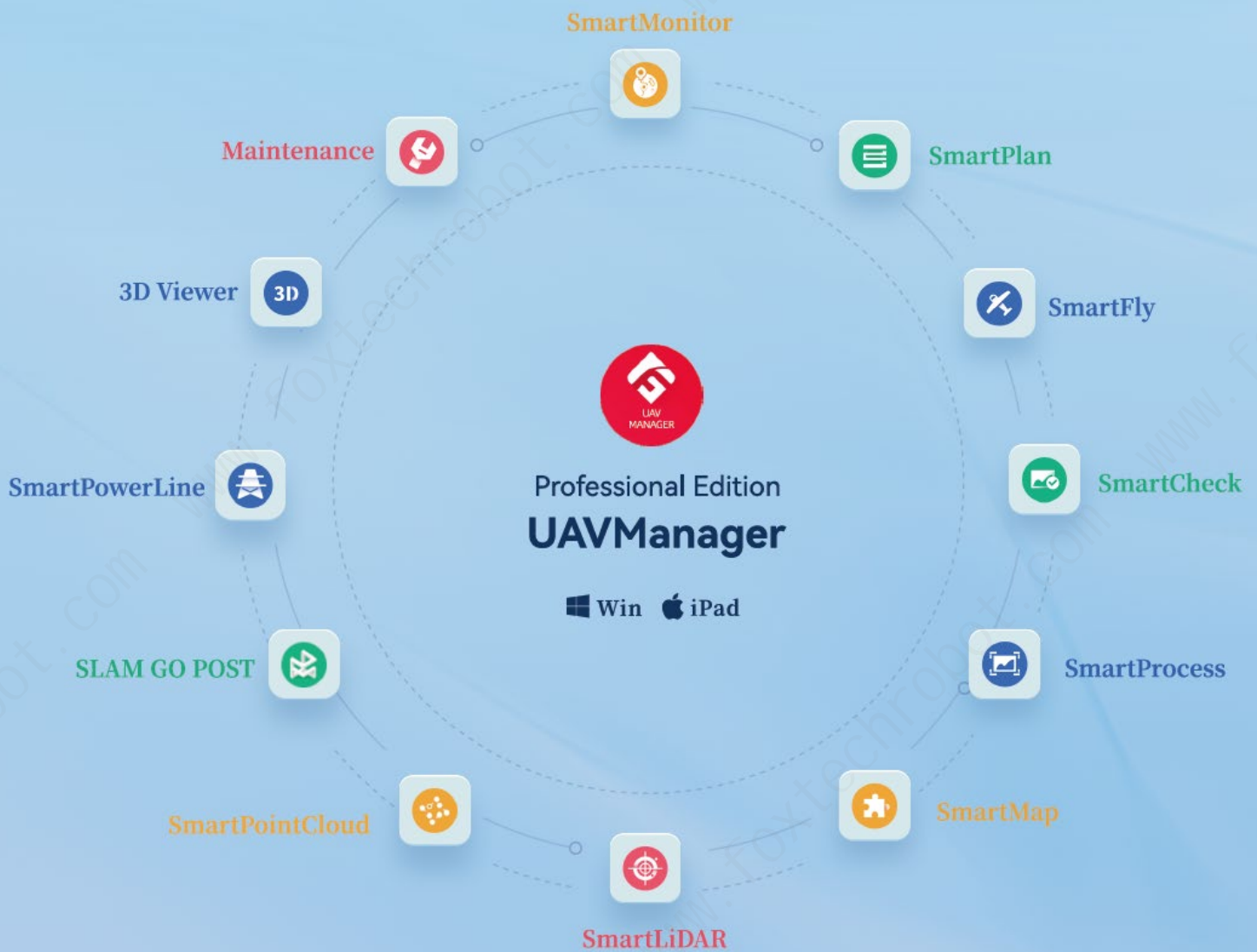
Weight	1060g
Size	145.3mmX110mmx137.2mm



Laser	Ranging mode	TOF	POS	Horizontal positioning accuracy	0.01m	
	Laser class	Class 1		Vertical positioning accuracy	0.02 m	
	Wavelength	905nm		Roll & pitch accuracy	0.006°	
	Laser pulse repetition rate	640 kpts/s		Heading angular accuracy	0.03°	
	Echoes	3		GNSS data update frequency	20 Hz	
	Echo signal intensity	8 bits		Inertial navigation data update frequency	300 Hz	
	Ranging accuracy	±2 cm		Camera	Effective pixels	2.43 million
	Horizontal field of view	360°			Sensor size	23.5 mm x 15.6 mm
Vertical field of view	40.3°	Focal length	20 mm			
Measuring range	300 m	Field of view	61°			

UAVManager

Software



"UAVManager Professional" is a powerful software platform for the drones including fixedwing and rotary wing. It integrates a number of software modules, such as SmartPlan, SmartFly, SmartCheck, SmartProcess, SmartMap, Smartmonitor, Maintenance and so on, to realize many functions such as flight route planning, all kinds of flight data acquisition, point cloud data processing, data display, and maintenance etc. In different practical applications, UAVmanager can plan the accurate flight path according to 3D information of the actual scene, which greatly improves the efficiency of the flight and data acquisition. Moreover, it can also provide flight real-time monitoring, rapid flight quality inspection, flight precision control, automatic mapping and data preprocessing, slam data processing and abundant 4D and 3D results generation. In addition, it also provides lots of cloud services such as system upgrade, smart maintenance and information push.

UAVManager

Software modules



SmartPlan

SmartPlan is a flight route planning software for fixed wing and rotary wing UAV. It can automatically generate the best flight route according to the terrain fluctuations and image requirements of the mission area, based on high-precision realistic 3D terrain information. In super-large task area, the segmentation at any angle and the adjustment for the course angle can automatically be done to meet the requirement of post-processing. The terrain-following flight algorithm based on high-precision 3D model helps to generate the accurate terrain following flight route and ensure the consistency of acquired data throughout the flight.



SmartFly

Smartfly is a UAV flight monitoring software, which can help us to monitor the real-time flight status and parameters in realistic 3D scene and modify flight status. It can provide smart early warning to ensure the safety of flight missions. It also helps to obtain the data of a single sortie according to the actual field conditions and automatically continue the flight through the software to complete the coverage of the whole area and improve the work efficiency.



SmartMonitor

SmartMonitor is a special module of UAVManager, providing functions such as statistic replay of flight process, analysis of flight records and summary display.



Maintain

It can realize online upgrade of UAVManager software, online health analysis and fault diagnosis for drones, and firmware upgrade for all Foxtechrobot's UAV platforms.



SmartPowerLine

SmartPowerline is software specially designed for inspection and analysis of overhead transmission line. It supports tower position calibration and point cloud data cutting, automatic classification and extraction of tower, power line, vegetation, ground, supports line vector fitting, detection and analysis parameters customization and other functions. It can simulate and predict transmission lines under different working conditions, output safety distance analysis report and line channel inspection report.



SLAM GO POST

SLAM GO POST is a PC software module for SALM100. It can perform data post-processing, generate high-precision and high-definition color point clouds, produce partial panoramic images, display point cloud and do data optimization.



SmartCheck

SmartCheck is a professional and automated software used for on-site flight quality inspections and assessment. It helps to quickly generate quality reports and to improve the efficiency of UAV data quality inspection process and the reliability of subsequent processing.



SmartProcess

SmartProcess is UAV data preprocessing software, which provides advanced camera model self-calibration algorithm, distortion removal tools, and RTK/PPK fusion solution tools etc., to meet the surveying and mapping requirements of high quality and high precision. In addition, it also provides image smoothing and homogenization, enhancement, pyramid creation, format conversion, result accuracy check and other preprocessing functions.



SmartMap

SmartMap is a one-click UAV data processing software, which can complete UAV data ortho and oblique aerial triangulation, self-adaptive feature point matching, control point measurement, orthographic correction, full-pixel high-density point cloud matching, true-orthophoto, 3D reconstruction and other processing. Support high-precision and high-quality results output of DSM, TDOM and realistic 3D models, support control point intelligent measurement, POS assisted aerial triangulation, direct mapping without ground control points.



SmartMap

SmartLiDAR can generate accurate point cloud data based on the original data such as distances, positions, and attitudes obtained by UAV's LiDAR module. Cloud data calculation, LiDAR module calibration, strip adjustment, massive point cloud visualization, standard point cloud output and other functions are integrated in this software.



SmartPointCloud

SmartPointCloud is a point cloud data post-processing software that supports various data sources. It can browse, display, process and edit point cloud data. It includes automate point cloud classification algorithms and comprehensive interactive editing tools, and can produce standard terrain results and other thematic results.



3D Viewer

3D Viewer is an application software for 3D data generation from oblique photography. It supports the import of current popular OSGB format 3D products and provides many functions, such as distance measurement, area measurement, volume measurement, and model import. 3D Viewer provides a unified display platform for existing 3D terrain models, oblique high-resolution 3D terrain models, and fine 3D models.