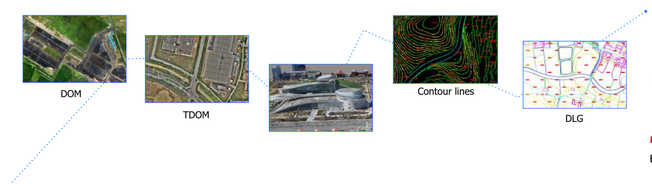
what surveyors really need...

A professional-level drone made for survey-grade mapping applications...

1. Simple assembly and quick hand launch
2. Humanized GCS software with interactive interfaces
3. Excellent flight attitude due to moderate drone weight
4. Quality imageries to generate survey-grade outputs
5. Reasonable costs versus high work efficiency
6. Trusted local dealer and renowned survey manufacturer standby



DKART
DESCARTES ENGINEERING COMPANY

SANDING
EVERY POINT MATTERS

APPLICATIONS

SANDING
EVERY POINT MATTERS

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SKYCRUISER
A22

A Mapping Drone
That Better Understands What Surveyors Need

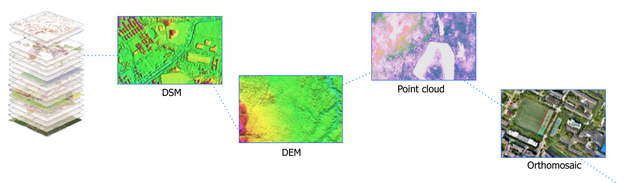
SKYSOLUTIONS

SkyCruiser A20 series understands 100%

What shall be considered before purchasing a mapping drone?

1. Easy operation
2. Automated control
3. Output quality
4. Survey-grade demand
5. Cost efficiency
6. Responsive support

OUTPUTS



Standard Version: A22
Professional Version: A22-Plus

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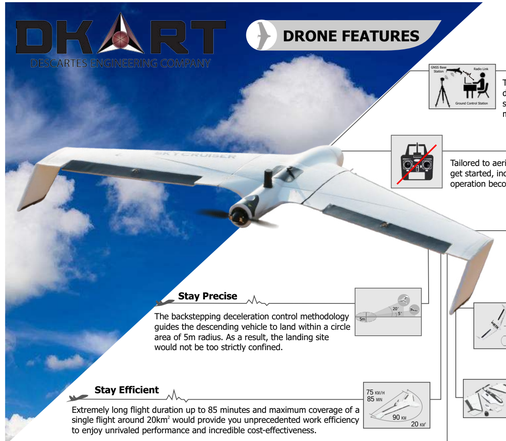
DRONE FEATURES



Stay Accurate

The inbuilt PPK module synchronously records observations with base station, and the kinematic differential corrections greatly improve the positioning accuracy down to centimeter level that satisfies survey needs. Consequently, the tough work of ground control point measurements might be minimized up to 80%-90%, or even totally eliminated.

Stay Inspired

Tailored to aerial photogrammetry, this professional package solution enjoys just a few quick steps to get started, including the easy hand launch for take-off. Therefore, the unmanned aircraft flight operation becomes much easier than ever, which will just take you half a day to learn!

Stay Simple

With detachable wings, the highly integrated product consists of several components only. And the soft nylon case and hard metal box well fit your daily hand carry and transportation use.

Stay Precise

The backstepping deceleration control methodology guides the descending vehicle to land within a circle area of 5m radius. As a result, the landing site would not be too strictly confined.

Stay Intelligent

The specialized control algorithm in autopilot computer enables this SkyCruiser to minimize the skyway deviation and yaw angle deviation up to 50% and 80% respectively. The inbuilt RTK module helps the drone with precise waypoint navigation and landing point control by realtime kinematic positioning.

Stay Efficient

Extremely long flight duration up to 85 minutes and maximum coverage of a single flight around 20km² would provide you unprecedented work efficiency to enjoy unrivaled performance and incredible cost-effectiveness.

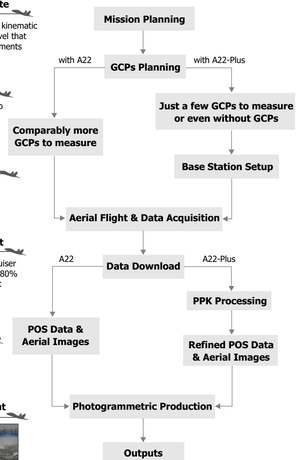
Stay Tough

This UAS made of industrial-level EPO foam material is designed to address its extraordinary durability and undertake hundreds of missions with proper maintenance, which is sharply distinguished from a consumer-grade drone.

Stay Excellent

And compared with other extremely light foamy drones, it enjoys very stable flight attitude and excellent wind resistance capability due to its moderate aircraft weight, which brings out extraordinary aerial photography quality and high precision outputs.

WORKFLOW



MODEL COMPARISON

Model	Standard Version A22	Professional Version A22-Plus
Inbuilt GPS Sensor	Yes (for aerial positioning, approx. 2-5m accuracy)	
Inbuilt GNSS Receiver	No	Yes (Base Station receiver built in radio datalink device; Rover receiver built in drone fuselage)
Airborne PPK Mode	No	Yes (for refined POS data with PPK differential corrections)
Airborne RTK Mode	No	Yes (for precise waypoint navigation and landing point control)
Realtime Skyway Deviation Rectification	No	Yes (managed by specialized control algorithm)
Imaging Sensor	Sony ILCE-QX1, Exmor APS HD CMOS, 20.1 MP, Voigtlander Lens, E 21 mm, F 2.8	
Data Acquisition	Aerial imageries + original POS data	Aerial imageries + original POS data + base station observations + PPK records
POS Data Accuracy	Approx. 2-5 m, resulted from original POS data (based on GPS single-point positioning)	Approx. 5-10 cm / 10-30 cm (XY/Z), resulted from refined POS data (based on GNSS RTK aerial positioning + GNSS PPK surveying)
Survey-grade Mapping	Applicable	Applicable, and more suitable and highly efficient
Mapping Accuracy	Centimeter level (with sufficient GCPs that are rationally distributed)	Centimeter level (with just a few or even without GCPs)
GCPs Measurement	More GCPs required for further adjustment to generate precise aerial mapping results	Much fewer GCPs or even no GCP required to generate precise aerial mapping results
Pre-flight Setup	Regular (approx. 3-5 minutes)	Regular + base station setup (approx. 5-8 minutes)
Landing Point Control	Deviation controlled within the confined area of 50 m X 4 m (length X width)	Deviation controlled within the confined circle of 5m radius
Landing Site Clearance	Comparatively bigger	Comparatively smaller

AREA COVERAGE

Resolution (GSD)	Flight Altitude	Area Coverage (per flight)	Area Coverage (per day)
1.5 cm	70 m	2.0 km^2	8.0 km^2
5 cm	235 m	6.1 km^2	24.4 km^2
10 cm	470 m	11.8 km^2	47.2 km^2
15 cm	760 m	17.6 km^2	70.4 km^2
20 cm	940 m	22.2 km^2	88.8 km^2

Note: the data shown above is computed according to the forward overlap 75% and side overlap 60% from a 60-minute effective flight for a survey zone with aspect ratio around 2:1. And the area coverage per day results from 4 flights in the same day (2 flights each before and after lunch break). Theoretically, bigger coverage figures are expectable with rational parameter settings and increased flight arrangements.

SPECIFICATIONS

Aircraft	**System**
Aircraft Type	Fixed wing, wingspan 150 cm
Model	Standard Version A22 / Professional Version A22-Plus
Dimensions	150 x 70 x 13 cm
Packing Size	98 x 36 x 46 cm (soft carrying case); 98 x 36 x 46 cm (hard transportation box)
Empty Weight	A22: 1.45 kg; A22-Plus 1.55 kg
Body Material	Industrial EPO foam
Propulsion System	electric pusher motor, 12-inch foldable propeller
Electric Motor	500w
Power Supply	Lithium polymer battery, 10000mAh, 14.8V
Onboard	**Sensors**
Autopilot Computer	1X
Airspeedometer	1X
Accelerometer	1X
Barometer	1X
Magnetometer	1X
Gyroscope	1X
GPS Receiver	1X
Integrated RTK/PPK Receiver (for model A22-Plus only)	Built-in chipset, L1/L2, GNSS (GPS/Glonass/Compass, Galileo ready), data refresh baud rate 20 Hz, positioning accuracy up to 3 cm
Imagery	**Payload**
Standard Camera	Sony ILCE-QX1
Sensor Type	Exmor APS HD CMOS
Resolution Value	20.1 Mega Pixel
Lens Configuration	Voigtlander
Focusing Length	E 21mm
Aperture Control	F2.8
Picture Size	23.2 x 15.4 mm
Imaging Resolution	1.5-20 cm GSD (Ground Sampling Distance)
GCS	**Software**
Pre-flight Checks	Automated
Flight Automations	Automatic take-off, flight and landing operations
Camera Triggering	Automated
Low-battery Warning	30%
Auto Return	Upon low-battery indication
Descending Control	Three-section algorithm
Fail-safe Routines	Automated
Fail-safe Commands	Manually controlled
Operation	**Performance**
Pre-flight Setup	3-5 minutes (A22); 5-8 minutes (A22-Plus)
Control Mode	AutoPilot
Weather Limit	10m/s (36km/h), Beaudfort scale 6, light rain
Operating Temperature	-10℃ to 45℃
Environmental Humidity	90% condensing
Radio Datalink	Frequency Hopping Spread Spectrum (FHSS)
Control Frequency	915 MHZ
Transmitting Power	1w
Communication Range	Typical 5-10 km; max. 30 km
Flight	**Performance**
Take-off Type	Hand launch/automatic
Landing Type	Belly landing
Landing Space	Typical 20x6 m; recommended 50x10 m
Endurance	Not less than 59 minutes, best up to 80-85 minutes (customized unit only)
Effective Photography Duration	Best up to approx. 70-75 minutes
Range	Approx. 80-90 km
Cruising Speed	Typical 20m/s (72km/h)
Flight Height	Max. ceiling 4000 m
Height above Take-off Location	70-940 m AGL (Above Ground Level)
Acquisition	**Performance**
Single-point Positioning Accuracy	A22: 2m CEP; A22-Plus: 3cm CEP
Relative Accuracy (XY/Z)	1-3x/1-5x GSD (A22-Plus)
Absolute Accuracy (without GCPs)	A22: horizontal 0.8-2m / vertical 1-2.5m; A22-Plus: horizontal 3-10cm / vertical 5-15cm
Absolute Accuracy (with GCPs)	A22: horizontal 2-3cm / vertical 5-10cm; A22-Plus: horizontal 2-3cm / vertical 5-10cm
Required GCPs	80%-90% or even all to be eliminated (A22-Plus)

Mission Planning Simplicity

The ground control software that goes with this solution, very informative and intuitive, helps the user to optimize skyways and generate waypoints by simply defining GSD and overlap percentage.

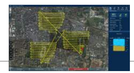
The software algorithm vividly tells what surveyors really expect: Simplicity and Ease of Use!

Low-battery Auto Return

Upon low battery warning, the SkyCruiser would activate Auto-Return function itself and ensure an expected safe landing. Once another charged battery is replaced for a second flight, the remained skyway of previous mission would be continued automatically.

Multi-zone Mission Planning

For the flight zone with complicated terrain conditions, a single flight mission consisting of several separate zones might be defined to deal with different flight heights in elevated areas.



Large Area Photogrammetry

When the survey zone is too large to finish within a single flight, you might still keep it as one flight mission. Upon a second flight, the remained survey zone would be followed up automatically without extra flight planning.

Terrain Condition Evaluation

If the AGL (Above Ground Level) is less than 50m, the corresponding part of skyway would be displayed in red and users are suggested to adjust the flight height. Flight safety is the priority in drone operation, which is always acknowledged to both surveyors and GCS.

GCS Power-off Protection

In case that the laptop shuts down, restart it or change another laptop and run the GCS, the system would ask you whether to synchronize the existing mission from the aircraft. Even if you fail to restart the GCS, the drone would continue its flight and then land itself.

Compulsory Checklist Reminder

Before executing the mission, users would be guided to follow some checklists and double check the necessary procedures for flight safety and efficient operation. In other words, the GCS would always remind surveyors of all proper handlings in order not to make any mistake.

One-key Return Home

The one-key operation for quick landing enables the drone to react then return home immediately in case of sudden rain or birds attack, which would effectively decrease the drone crash ratio.

All-in-one GCS Processing

Instead of operating in a third-party software kit, simply a one-key click in the GCS software will automatically process the PPK records and then generate the highly precise POS data.

Aborting Landing Contingency

Supposed a car stops or some people approach close to the landing point, user can abort this landing for emergency response. The aircraft would switch from landing status to climbing status and fly to start circle point then wait until a better chance for landing comes. Or change another point more suitable for alternative.

Extraordinary Interaction Experience

A mission information preview before flight and a prompt message asking whether to download POS after flight instantly appear, which all contributes to your master control of the aerial survey job.

GCS SOFTWARE