

WingtraOne

Technical Specifications



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The all-in-one drone: large coverage, high resolution and accuracy



WingtraOne

| | |
|-------------------|---|
| Resolution | down to 0.7 cm (0.3 in)/px GSD |
| Accuracy | down to 1 cm (0.4 in) absolute accuracy |
| Coverage | 400 ha at 3 cm/px (988 ac at 1.2 in/ px) GSD |

WingtraOne drone offers broad coverage, brilliant resolution and high accuracy in one mapping device.

With such unprecedented functionality, WingtraOne can map a quarry the size of 240 American football fields in an hour's flight. The resolution of the final map allows to zoom in and see tiny details such as a coin lying on the ground. And what is best—it is possible to know the exact coordinates of the coin down to an absolute accuracy of 1 cm (0.4 in).

Hardware

| | |
|---|--|
| Drone type | Tailsitter VTOL (Vertical take-off and landing) |
| Max. take-off weight | 4.5 kg (9.9 lb) |
| Weight (empty) | 3.7 kg (8.1 lb) |
| Max. payload weight | 800 g (1.8 lb) |
| Wingspan | 125 cm (4.1 ft) |
| Dimensions of WingtraOne | 125 × 68 × 12 cm (4.1 × 2.2 × 0.4 ft) (without middlestand) |
| Dimensions of Pilot Box | 57 × 37 × 20 cm, 8.6 kg (1.8 × 1.2 × 1.0 ft, 19 lb) |
| Battery capacity | 99 Wh (a pair of batteries required) |
| Battery type | Li-ion, Smart battery technology, UN compliant |
| Radio link | 8 km (5 mi), bi-directional antennas for optimal range |
| Onboard GPS | Double redundancy, using GPS, Glonass and ready for Galileo and Beidou |
| Dimensions of travel hardcase (optional) | 141 × 74 × 26 cm, 16 kg (4.6 × 2.4 × 0.9 ft, 35 lb) |

Software & Tablet

| | |
|---|---|
| Flight planning & mission control software | WingtraPilot |
| Tablet (supplied) | Android tablet; pre-installed; ready-to-fly. Interfaces to Telemetry module (data link for automated drone control) and manual back-up controller |
| Updates | free |

Operation

| | |
|--|--|
| Operational cruise speed | 16 m/s (35.8 mph) |
| Climb speed cruise | 6.0 m/s (13.4 mph) |
| Wind resistance | up to 45 km/h (12 m/s, 28 mph) in cruise, up to 30 km/h (8 m/s, 18 mph) for landing |
| Maximum flight time | 55 minutes |
| Min. space for take-off and landing | 2 m × 2 m (6.6 ft × 6.6 ft) |
| Designed temperature range | -20° C to 50° C (-4° F to 122° F) |
| Tested and warranted temperature range | -10° C to 40° C (14° F to 104° F) |
| Max. altitude (a.m.s.l.) | 3000 m (9800 ft) |
| Weather | No precipitation, resists light rain |
| Ground Control Points required | No (with PPK option) |
| Descent speed cruise | 4.0 m/s (8.9 mph) |
| Climb and descent speed hover | 6.0 m/s (13.4 mph) and 1.0 m/s (2.2 mph) |
| Auto-Landing accuracy | < 5 m (< 16 ft) |
| Max. flight altitude above take-off point | 500 m (1640.4 ft) |

Results

| | |
|--------------------------------------|---|
| Coverage at 120m (400ft) * | 320 Ha (790 ac) |
| Max. coverage ** | 24 km ² (9,2 mi ²) |
| Minimal ground sampling distance *** | Down to 0.7 cm (0.3 in)/px |
| Mapping accuracy with PPK (w/o GCPs) | + Absolute accuracy (RMS): horizontal: down to 1 cm (0.4 in); vertical: down to 2 cm (0.8 in) + Relative accuracy: horizontal: down to 0.003 % |
| Mapping accuracy w/o PPK (w/o GCPs) | + Absolute accuracy (RMS): 3 to 5 m (9.8 to 16.4 ft) + Relative accuracy: horizontal 0.15 % |

Payloads

| | |
|---------------------|---|
| Payload flexibility | Yes, with a single USB-C connector |
| Power supply | by flight batteries (12 W) |
| Payload protection | Yes, fully integrated into WingtraOne and smooth vertical landing feature |
| Available cameras | + Sony RX1RII / 35 mm lens, full-frame sensor, 42 MP, RGB + Sony QX1 20mm (optional 15 mm Voigtländer lens), APS-C sensor, 20 MP, RGB + Micasense Rededge, 5.5 mm, 5 × 1.2 MP, Multi-spectral camera + FLIR Duo Pro R640, 13 mm, 0.32 MP (thermal), 12 MP (visible), Thermal camera" |

Telemetry / Remote Control

| | |
|-----------------------------------|---|
| Frequency range Telemetry | Country Specific ***** EU 868 - 869 MHz US 902 - 928 MHz AUS 915 - 928 MHz CN 915 - 928 MHz World 2400 MHz |
| Transmission power Telemetry | < 27dBm**** |
| Frequency range Remote Control | All countries 2.404 - 2.479 GHz |
| Transmission power Remote Control | < 20 dBm |
| Specified max. range telemetry | 40 km (25 mi) |
| Tested max. range | 8 km (5 mi) |

* 2.8 cm/pixel (1.1 in/pixel), WingtraOne QX1 + 15 mm

** max. reconstructable area, 1950 m (6400 ft) flight altitude, WingtraOne RX1RII

*** For WingtraOne RX1RII. For WingtraOne QX1 1.4 cm/px (0.6 in/px) (depending on frontal overlap)

**** Country specific power settings according to local regulations

***** Country specific telemetry will be discontinued in 2020

Technical Specifications Telemetry

WingtraOne Telemetry 868 MHz (EU)

| | |
|--------------------|---|
| Module name | WingtraOne Telemetry 868 |
| Main function | Telemetry connection for remote operation |
| Frequency range | 868-869 MHz |
| Occupied bandwidth | 25 kHz |
| Transmitting power | < 27 dBm |
| Operation mode | FHSS (Frequency Hopping Spread Spectrum) |
| Typical max. range | 1.5 to 8 km (0.9 to 5 mi) |
| Typical datarate | 128 kb/s |

WingtraOne Telemetry 900 MHz (US)

| | |
|--------------------|---|
| Module name | WingtraOne Telemetry 900 |
| Main function | Telemetry connection for remote operation |
| Frequency range | 902-928 MHz |
| Occupied bandwidth | 500 kHz |
| Transmitting power | < 27 dBm |
| Operation mode | FHSS (Frequency Hopping Spread Spectrum) |
| Typical max. range | 1.5 to 8 km (0.9 to 5 mi) |
| Typical datarate | 128 kb/s |

WingtraOne Telemetry 915 MHz (world)

| | |
|--------------------|---|
| Module name | WingtraOne Telemetry 900 |
| Main function | Telemetry connection for remote operation |
| Frequency range | 915-928 MHz |
| Occupied bandwidth | 325 kHz |
| Transmitting power | < 27 dBm |
| Operation mode | FHSS (Frequency Hopping Spread Spectrum) |
| Typical max. range | 1.5 to 8 km (0.9 to 5 mi) |
| Typical datarate | 128 kb/s |

WingtraOne Telemetry 2400 MHz (world)

| | |
|--------------------|---|
| Module name | WingtraOne Telemetry 2.4 |
| Main function | Telemetry connection for remote operation |
| Frequency range | 24016-24835 GHz (ISM band) |
| Occupied bandwidth | 82.9 MHz |
| Transmitting power | < 20 dBm |
| Operation mode | FHSS (Frequency Hopping Spread Spectrum) |
| Typical max. range | 1.5 to 8 km (0.9 to 5 mi) |
| Typical datarate | 57.6 kb/s |

Technical Specifications Remote Control

WingtraOne Remote Control

| | |
|---------------------------|---|
| Module Name | FRSky Taranis |
| Serial number | X9D Plus |
| Main function | Remote Control for manual control of WingtraOne |
| Frequency range | 2404-2479 GHz |
| Frequency tolerance | < 0.1 ppm |
| Channel separation | 0.300 MHz |
| Number of used channels | 47 |
| Transmitting power | < 20 dBm |
| Spurious emission Llimits | < 40 dBuV/m |
| Operation mode | FHSS (Frequency Hopping Spread Spectrum) |
| Modulation mode | 2-FSK (Frequency Shift Keying) |
| Typical max. range | 1.5-8 km (0.9-5 mi) |
| FCC-ID | XYFX91216DK |

Technical Specifications Battery

Product details

| | |
|---------------------------|--|
| Module name | Wingtra Battery 2 |
| Trade name | Lithium-ion-battery |
| Model number | 10.00342.02 |
| Battery capacity | 99 Wh (a pair of batteries required) |
| Battery type | Li-ion, Smart battery technology, UN compliant |
| State of charge indicator | Integrated 5 level SoC indicator |
| Smart charging | Auto cell balancing |

Technical Specification

| | |
|---|---|
| Rated energy content | 99 Wh |
| Nominal voltage | 14.4 V |
| Rated charge | 7.5 A, 16.8 V cutoff |
| Rated discharge | 35 A, 12 V cutoff |
| Cell type | Samsung_INR_18650_25R |
| Configuration | 4s 3p configuration |
| Charging time | 1 h |
| Max. continuous discharge | 35 A |
| Battery dimension | 80 × 60 × 75 mm (3.15 × 2.36 × 2.95 in) |
| Battery weight | 604 g (1.3 lb) |
| Operating temperature | 10° C-50° C (50° F-122°F), discharge |
| Storage temperature (90% capacity recovery) | 0° C-25° C (32° F-77°F) |
| Shock protection | yes |
| Overvoltage protection | yes |
| Undervoltage protection | yes |
| Temperature protection | yes |
| Short circuit protection | yes |
| Material safety data sheet (MSDS) | Available on request |

Technical Specifications Battery Charger

Product details

| | |
|--------------|--------------------------------|
| Module name | Wingtra Charger |
| Charger type | Dual AC/DC Lithium Ion Charger |

Technical specification

| | |
|------------------------|--|
| Input Voltage AC | 110-120 V / 220-240 V (manual switch), 50 / 60Hz |
| Input Power AC | 350 W |
| Input Voltage DC | 11 - 18 V (optional, e.g. for charging from car) |
| Input Power DC | 300 W (reduced power possible) |
| Modes | Charge / Storage / Balance |
| Charging cycle | Standard Lithium Ion CC-CV cycle |
| Charging time | 1 h |
| Max. charge current | 7.5 A |
| Charge end voltage | 16.4 V (4.1 V per cell) |
| Max. discharge current | 0.6 A |
| Discharge end voltage | 3.7V (30% charge) |
| Additional Outputs | USB 5V / 2.1 A |
| Dimensions | 190 × 140 × 70 mm (7.5 × 5.5 × 2.75 in) |
| Weight | 1170 g (2.6 lb) |
| Operating temperature | 10° C - 50° C (50° F - 122°F) |

Modular WingtraOne payloads: RGB and specialty cameras



WingtraOne can be equipped with a range of cameras and lenses for diverse aerial surveying applications. The payloads are easy to swap, so one drone can be used for different use cases.

In addition, smooth vertical landings of the WingtraOne drone protect the expensive cameras even in rough and complicated environments.

RGB Cameras



Sony RX1RII
The highest quality payload for 1 cm (0.4 in) accuracy and 1 cm/px (0.4 in/px) GSD



Sony QX1
Professional payload for surveying



Sony QX1 15 mm (0.6 in)
A high quality payload for 3D reconstruction

| | | | |
|------------------------------------|---|---|---|
| Technical specification | 35 mm lens, Full-frame sensor, 42 MP | 20 mm lens, APS-C sensor, 20 MP | 15 mm Voigtländer lens, APS-C sensor, 20 MP |
| Main quality features | Ultra-high quality, best coverage to GSD ratio, sub-cm GSD | High image quality, flexible lens options | Ultra-high quality, largest coverage at limited flight altitude, flexible lens options |
| Camera weight (incl. mount) | 575 g (1.27 lb) | 330 g (0.73 lb) | 600 g (1.32 lb) |
| GSD Range | 0.7-25 cm/px 0.28-9.8 in/px | 1.4-25 cm/px 0.55-9.8 in/px | 1.4-25 cm/px 0.55-9.8 in/px |
| Coverage at Lowest GSD* | 100 ha (at 0.7 cm/px) at 57 m flight altitude 247 ac (at 1.18 in/px) at 188 ft flight altitude | 150 ha (at 1.4 cm/px) at 66 m flight altitude 370 ac (at 0.55 in/px) at 218 ft flight altitude | 130 ha (at 1.4 cm/px) at 50 m flight altitude 320 ac (at 0.55 in/px) at 164 ft flight altitude |
| Coverage at 120m/394 feet* | 210 ha (at 1.5 cm/px) 520 ac (at 0.61 in/px) | 270 ha (at 2.6 cm/px) 670 ac (at 1.0 in/px) | 320 ha (at 3.4 cm/px) 790 ac (at 1.3 in/px) |

Technical specifications of RGB cameras

| | Sony RX1RII | Sony QX1 + SEL20F28 | Sony QX1 + Voigtländer 15mm |
|--|-------------------|---------------------|--------------------------------|
| Sensor type | Full Frame | APS-C | APS-C |
| Sensor size x | 35.9 mm (1.41 in) | 23.2 mm (0.91 in) | 23.2 mm (0.91 in) |
| Sensor size y | 24 mm (0.94 in) | 15.4 mm (0.61 in) | 15.4 mm (0.61 in) |
| mega pixel | 42.4 | 19.8 | 19.8 |
| Shutter type | leaf shutter | focal plane | focal plane |
| Pixel in x | 8000 | 5456 | 5456 |
| Pixel in y | 5320 | 3632 | 3632 |
| Focal length of lens | 35 mm (1.38 in) | 20 mm (0.79 in) | 15 mm (0.59 in) |
| Focal length equivalent (at 35mm) | 35 mm (1.38 in) | 30 mm (1.18 in) | 22.6 mm (0.89 in) |
| Veritcal angle of view | 37.8° | 42.1° | 54.3° |
| Horizontal angle of view | 54.3° | 60.2° | 75.4° |
| Minimal trigger time | 0.6 s | 1.7 s | 1.7 s |
| Minimal trigger distance | 9.6 m (31 ft) | 27.2 m (89 ft) | 27.2 m (89 ft) |

GSD overview RGB cameras

| | Sony RX1RII | Sony QX1 + SEL20F28 | Sony QX1 + Voigtländer 15mm |
|-------------------------------------|------------------------|------------------------|--------------------------------|
| Lowest possible GSD | 0.7 cm/px (0.28 in/px) | 1.4 cm/px (0.55 in/px) | 1.4 cm/px (0.55 in/px) |
| Flight altitude | 54.6 m (179 ft) | 65.8 m (216 ft) | 49.4 m (162 ft) |
| Max. frontal overlap | 74% | 46% | 46% |
| Max. coverage* | 90 ha (230 ac) | 150 ha (380 ac) | 130 ha (330 ac) |
| 1.5 cm/px GSD | 1.5 cm/px (0.59 in/px) | 1.5 cm/px (0.59 in/px) | 1.5 cm/px (0.59 in/px) |
| Flight altitude | 117 m (384 ft) | 70.6 m (231 ft) | 52.9 m (174 ft) |
| Max. frontal overlap | 88% | 50% | 50% |
| Max. coverage* | 210 ha (520 ac) | 160 ha (400 ac) | 140 ha (350 ac) |
| 3.0 cm/px GSD | 3 cm/px (1.18 in/px) | 3 cm/px (1.18 in/px) | 3 cm/px (1.18 in/px) |
| Flight altitude | 234 m (768 ft) | 141.1 m (463 ft) | 105.8 m (347 ft) |
| Max. frontal overlap | 94% | 75% | 75% |
| Max. coverage* | 400 ha (990 ac) | 310 ha (770 ac) | 280 ha (700 ac) |
| 6.0 cm/px GSD | 6 cm/px (2.36 in/px) | 6 cm/px (2.36 in/px) | 6 cm/px (2.36 in/px) |
| Flight altitude | 468 m (1535 ft) | 282.2 m (926 ft) | 211.7 m (694 ft) |
| Max. frontal overlap | 95% | 87% | 87% |
| Max. coverage* | 780 ha (1930 ac) | 610 ha (1510 ac) | 550 ha (1360 ac) |
| 8.0 cm/px GSD | 8 cm/px (3.15 in/px) | 8 cm/px (3.15 in/px) | 8 cm/px (3.15 in/px) |
| Flight altitude | 624 m (2050 ft) | 376.3 m (1230 ft) | 282.2 m (930 ft) |
| Max. frontal overlap | 95% | 91% | 91% |
| Max. coverage* | 1020 ha (2530 ac) | 800 ha (1980 ac) | 730 ha (1810 ac) |
| highest possible GSD** | 25 cm/px (9.8 in/px) | 25 cm/px (9.8 in/px) | 25 cm/px (9.8 in/px) |
| Flight altitude | 1950 m (6400 ft) | 1176 m (3860 ft) | 882 m (2890 ft) |
| Max. frontal overlap | 95% | 95% | 95% |
| Max. coverage* | 2700 ha (6680 ac) | 2240 ha (5540 ac) | 2040 ha (5050 ac) |
| GSD at 120 m flight altitude | 1.5 cm/px (0.61 in/px) | 2.6 cm/px (1 in/px) | 3.4 cm/px (1.34 in/px) |
| Flight altitude | 120 m (394 ft) | 120 m (394 ft) | 120 m (394 ft) |
| Max. frontal overlap | 88% | 71% | 78% |
| Max. coverage* | 210 ha (520 ac) | 270 ha (670 ac) | 320 ha (800 ac) |

* at 60% side overlap

** limited by maximum flight altitude (at 2500 m above home)

Specialty Cameras



MicaSense RedEdge-MX
Multispectral payload for precision farming,
forestry and environmental research

| | |
|---|---|
| Technical specification | 5.5 mm lens, 5 individual custom sensors, multispectral |
| Main quality features | High quality multispectral images |
| Camera weight (incl. DSL 2 and cables) | 232 g (0.51 lb) |
| GSD Range | 6.7-50 cm/px (2.6-20 in/px) |
| Coverage at Lowest GSD* | 160 ha (at 6.8 cm/px) at 98 m flight altitude 395 ac (at 2.62 in/px) at 321 ft flight altitude |
| Coverage at 120m/ 394 feet* | 200 ha (at 8.2 cm/px) 490 ac (at 3.2 in/px) |

Technical specifications of specialty cameras

Micasense Rededge-MX

| | |
|--------------------------------|----------------------|
| Sensor type | 5 individual sensors |
| Sensor size x | 4.8 mm (0.19 in) |
| Sensor size y | 3.6 mm (0.14 in) |
| Mega pixel | 5 × 1.22 |
| Shutter type | electronic shutter |
| Pixel in x | 1280 |
| Pixel in y | 960 |
| Focal length of lens | 5.5 mm (0.22 in) |
| Focal length (35mm equivalent) | 40 mm (1.57 in) |
| Vertical angle of view | 36.2° |
| Horizontal angle of view | 47.1° |
| Minimal trigger time | 1 s |
| Minimal trigger distance | 16 m (52 ft) |

GSD overview of specialty cameras

Micasense Rededge-MX

| | |
|-------------------------------------|------------------------|
| Lowest possible GSD | 6.7 cm/px (2.62 in/px) |
| Flight altitude | 97.8 m (321 ft) |
| Max. frontal overlap | 75% |
| Max. coverage* | 160 ha (400 ac) |
| 1.5 cm/px GSD | - |
| Flight altitude | - |
| Max. frontal overlap | - |
| Max. coverage* | - |
| 3.0 cm/px GSD | - |
| Flight altitude | - |
| Max. frontal overlap | - |
| Max. coverage* | - |
| 6.0 cm/px GSD | - |
| Flight altitude | - |
| Max. frontal overlap | - |
| Max. coverage* | - |
| 8.0 cm/px GSD | 8 cm/px (3.15 in/px) |
| Flight altitude | 117.3 m (380 ft) |
| Max. frontal overlap | 79% |
| Max. coverage* | 190 ha (470 ac) |
| highest possible GSD** | 50 cm/px (20 in/px) |
| Flight altitude | 733 m (2410 ft) |
| Max. frontal overlap | 95% |
| Max. coverage* | 1130 ha (2800 ac) |
| GSD at 120 m flight altitude | 8.2 cm/px (3.22 in/px) |
| Flight altitude | 120 m (394 ft) |
| Max. frontal overlap | 75% |
| Max. coverage* | 200 ha (500 ac) |

* at 60% side overlap

** limited by maximum flight altitude (at 2500 m above home)

*** Preliminary specifications, subject to change



For a quote, a live demonstration or more information
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