

VEXCEL  
IMAGING

ULTRACAM DRAGON 4.1

# Expand your perception



THE ULTIMATE HYBRID  
AERIAL MAPPING SYSTEM

UltraCam Dragon 4.1 is Vexcel's first hybrid aerial mapping system for deep insights into complex environments at highest collection rate. The system produces high-resolution nadir and oblique aerial imagery enriched with precise elevation information obtained by a high performance 2.4 MHz *RIEGL* Waveform LiDAR scanner collecting up to 2 million measurements per second.

Experience sharp imagery at best geometry and radiometry, paired with a unique LiDAR scan line pattern at 5 different angles including a nadir view to see into urban canyons and measure facades. The integration of best-in-class sensors results in extensive, multi-dimensional information gain allowing you to explore, analyze, and understand environments like never before.

# HYBRID AERIAL MAPPING SYSTEM

## DRAGON 4.1 UNIT

### Components

Camera, LiDAR scanner, UltraNav v7 610

### Height | Width | Cylinder Diameter

80 cm | 43 cm | 39.5 cm

### Weight

<75 kg

### Power Consumption

475 W (average)  
665 W (peak)

## PERIPHERALS

### Displays

Vexcel Interface Panel Touch (IPT) for camera, LiDAR scanner and UltraNav (plus pilot display)  
2 kg per IPT

### Mounting

UltraMount (GSM 4000 and GSM 3000)  
29 kg | 35 kg

### Unit Lifter (optional)

20 kg

## DATA STORAGE

### Type

4x NVMe SSD

### Features

In-flight exchangeable  
Optional redundancy  
4th generation compatible

### Storage Capacity

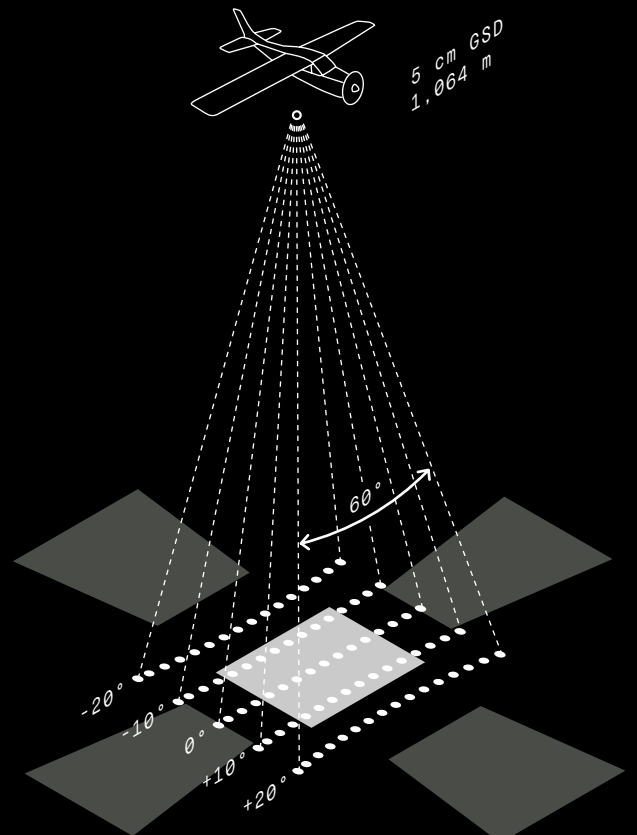
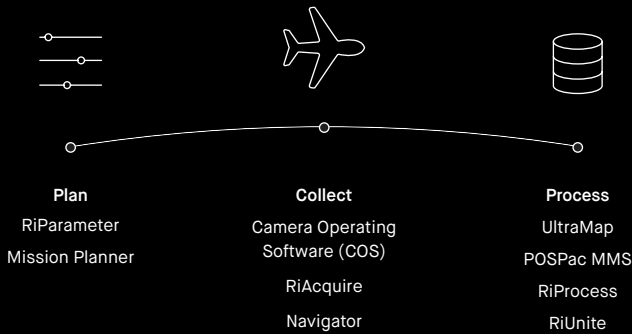
8, 16, 32 TB

### Weight

1 kg

DATA COLLECTION: Several operating modes

## SOFTWARE



## OPERATIONAL SPECIFICATIONS

<p><b>Flight Altitude</b> ≤5,600 m above sea level (non-pressurized)</p>	<p><b>Humidity</b> Max. rel. humidity of 80% at ≤31 °C; linearly decreasing to 50% at +40 °C; non-condensing</p>
<p><b>Installation</b> Dragon 4.1 unit with UltraMount: &lt;104 kg 525 W (average) 845 W (peak)</p>	<p><b>Temperature</b> 0 °C to 40 °C -5 °C to +40 °C<sup>1</sup> (operation) -10 °C to +50 °C (storage)</p>

### Nadir Footprints

	1,228.6 x 774.5 m
	710.9 x 530.7 m

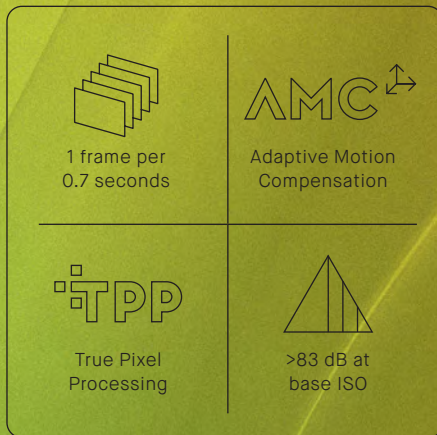
<sup>1</sup> Camera cylinder exposed to outside airflow only.



# CAMERA

## SENSOR SYSTEM

Imaging sensor	IMX-411 (CMOS) 1x RGB nadir 1x NIR nadir 4x RGB oblique
Physical pixel size	3.76 $\mu\text{m}$
Shutter (longlife central leaf)	Prontor magnetic-0 HS2 field exchangeable
Color capability (multi-spectral)	4 channels - RGB Bayer pattern & NIR
Nadir (RGB Bayer pattern & NIR) image size	14,144 x 10,560 pixels
Oblique (RGB Bayer pattern) image size	14,144 x 10,560 pixels
Ratio RGB to NIR nadir	1 : 1.0
Motion compensation (multi-directional)	Adaptive Motion Compensation (AMC)
Analog-to-digital-conversion	14 bits
Spectral bands (FWHM <sup>1</sup> )	R (580 - 690 nm) G (480 - 600 nm) B (420 - 510 nm) NIR (690 - 880 nm)



## LENS SYSTEM

	f80	f50
<b>NADIR</b>		
Color (RGB Bayer pattern & NIR) lens system focal length	80 mm	50 mm
Color (RGB Bayer pattern & NIR) lens aperture	f=1/4.3	f=1/4.2
Total field of view, across track along track	36,8° 27,9°	56,0° 43,3°
<b>OBLIQUE</b>		
Color (RGB Bayer pattern) lens system focal length	123 mm	80 mm
Color (RGB Bayer pattern) lens aperture	f=1/4.2	f=1/4.3
Total field of view, across track along track	45° (+9,2°   -15,1°) 45° (+9,2°   -9,2°)	45° (+14,0°   -22,6°) 45° (+14,0°   -14,0°)
<b>COLLECTION SCENARIOS</b>		
Footprint for lean restrictions of 1 m lean @ 5 m height (across x along)	8,510 x 8,510 pixels	5,319 x 5,319 pixels
Sample flying heights (AGL @ GSD)	426 m @ 2 cm 1,064 m @ 5 cm 1,596 m @ 7.5 cm 2,028 m @ 10 cm	266 m @ 2 cm 665 m @ 5 cm 997 m @ 7.5 cm 1,330 m @ 10 cm

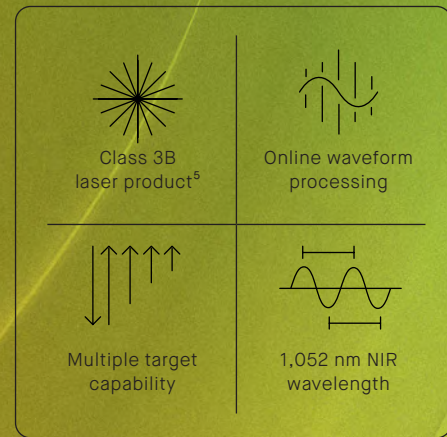
printed by aerial-survey-base

<sup>1</sup> Full Width at Half Maximum.

# LiDAR SCANNER

## RANGE MEASUREMENT PERFORMANCE

Type	RIEGL VQ-680 OEM
Laser pulse repetition rate (PRR)	Up to 2.4 MHz, user selectable
Max. effective measurement rate	Up to 2,000,000 measurements/second @ 2.4 MHz PRR & 60° scan angle
Echo signal intensity	provided for each echo signal
Laser beam divergence <sup>1</sup>	typ. 0.28 mrad @ 1/e <sup>2</sup> typ. 0.22 mrad @ 1/e
Accuracy <sup>2</sup>	20 mm
Precision <sup>3</sup>	20 mm
Max. measuring range, for target reflectance $\geq 20\%$ ( $\geq 60\%$ )	3,000 m (4,450 m)
Max. operating flight altitude, for target reflectance $\geq 20\%$ ( $\geq 60\%$ )	Up to 2,300 m AGL (Up to 3,400 m AGL)
Max. number of targets per pulse <sup>4</sup>	Up to 32



## SCANNER PERFORMANCE

Scanning mechanism	Rotating polygon mirror
Scan pattern	Regular scan grid with 5 parallel scan lines (2 forward, 1 nadir, 2 backward)
Field of view, across track along track	60° 40°
Angular directions along track	-20°, -10°, 0°, +10°, +20°
Total scan rate	50-500 lines per second (configurable)



<sup>1</sup> Measured at 1/e<sup>2</sup> (1/e) points, 0.28 (0.22) mrad corresponds to an increase of 28 (22) mm of beam diameter per 100 m distance.

<sup>2</sup> Accuracy is the degree of conformity of a measured quantity to its actual (true) value.

<sup>3</sup> One sigma @ 150 m range under RIEGL test conditions.

<sup>4</sup> Depending on Laser Pulse Repetition Rate (PRR).

<sup>5</sup> According to IEC 60825-1:2014. The following clause applies for instruments delivered into the United States: Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed.3., as described in Laser Notice No. 56, dated May 8, 2019. The instrument must be used only in combination with the appropriate laser safety box.