

The background of the entire slide is a high-resolution aerial night photograph of a city, likely New York City, showing a dense grid of streets and bright lights. Overlaid on this are several large, semi-transparent circular images that appear to be satellite or aerial views of the same city area, creating a layered, multi-perspective effect. The circles are arranged in a way that they overlap each other and the underlying city image.

Canon

Small Satellites & Components

MICRO-SATELLITE

1 m GSD micro-satellite
Like observing through a viewfinder with a super telephoto lens from orbit

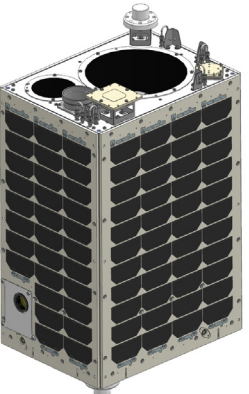
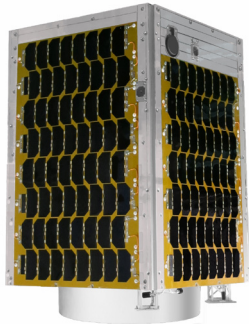
CE-SAT-I	
Dimensions [mm]	Approx. 500 x 500 x 850
Mass [kg]	Approx. 65
In-orbit demonstration	From June 2017 until present
Altitude control system	3-axis zero momentum control
● Supports still images and even video capture (benefit of area sensors)	

High-precision altitude control system designed to accurately capture objects, and ultra high-sensitivity photography which enables recognition of ground features event at night, and not just during the daytime.

CE-SAT-II B	
Dimensions [mm]	Approx. 292 x 392 x 673
Mass [kg]	Approx. 35
In-orbit demonstration	From October 2020 until present
Altitude control system	3-axis zero momentum control
● High-speed transmitter ... supports transmission speeds of up to 100 Mbps or more	

- High efficiency (maximizes mission equipment loading area. Low weight, compact and low power consumption)
- Supports the observation of celestial bodies and space vehicles, not jus tthe surface of the Earth
- Rapid development (CE-SAT-IIB development period was 1 year)
- Long life time (CE-SAT-I currently has over 5 years of use)
- Supports function upgrades (application software can be updated while in orbit)
- CE-SAT series micro-satellite bus production is ongoing
- Bus configuration intended to increase the customer’s mission design flexibility





SPACE TELESCOPE

Lineup of satellite telescopes that make full use of the Canon Group’s optical technology

Aperture 87mm		Aperture 200mm		Aperture 400mm	
Focal length [mm]	809	Focal length [mm]	1860	Focal length [mm]	3720
F number	9.3	F number	9.3	F number	9.3
Image Circle [mm]	Φ11	Image Circle [mm]	Φ16	Image Circle [mm]	Φ43.27
FOV [°]	0.78	FOV [°]	0.49	FOV [°]	0.67
Dimensions [mm]	95x95x160	Dimensions [mm]	Φ260xH400	Dimensions [mm]	Φ500xH700
Mass [kg]	<1	Mass [kg]	6	Mass [kg]	20

- Originally designed high-performance Cassegrain system with correction lenses
- Equipped with focusing actuator
- Equipped with a space camera that makes full use of Canon’s CMOS image sensor
- Ultra-precision mirror processing by Canon
- Uses ultra-low thermal expansion glass-ceramics and radiation-resistant optical glass
- Φ87 mm can support CubeSat 2U dimensions

*specifications and availability subject to change wthout notice

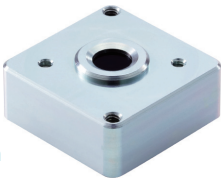
SENSOR

Precision instruments to measure satellite altitude

INERTIAL REFERENCE UNIT		● Low noise performance and high precision lineari using mechanical gyroscopes ● Outputs 3-axis (X, Y and Z) Delta θ ● Compact size and low power consumption 
Direction range [°/s]	±5	
Linearity [%F.S.]	0.05	
Bias Stability [°/h]	0.1 (1σ)	
Allan variance [°/h]	0.3@1 sec	
Dimensions [mm]	96x138x89.5	
Mass [g]	1300 or less	

GEOMAGNETIC FIELD SENSOR		● 3-axis magnetometer manufactured in compact, lightweight and high sensitivity ● The thin magnetic film and flux-gate design make it possible for miniaturization and lightness ● Excellent directivity and orthogonality 
Measuring range [nT]	±100,000	
Sensitivity [mV/nT]	0.025	
Linearity error [%F.S.]	±1.0	
Orthogonality error between axes [°]	±1.0	
Dimensions [mm]	53x53x19	
Mass [g]	80	

STAR TRACKER		● Compact, lightweight and high precision ● Originally designed optical system using radiation-resistant optical glass ● Robust attitude detection using original algorithm ● Lost-in-space star identification in 1 second 
Accuracy ["]	7	
Sun avoidance angle [deg]	35	
Dimensions [mm]	134x60x60 Baffle diameter Φ67.5	
Mass [g]	400	

SUN ASPECT SENSOR		● Compact and lightweight ● Digital output of the sun’s position with 2-axis (X and Y) angle data ● 102° wide field of view with 1° (3σ) angle precision 
Accuracy [°]	1 (3σ)	
FOV [°]	102x102	
Dimensions [mm]	26x26x10	
Mass [g]	13	

ACTUATOR

Satellite drive system based on motor and magnetic component technology

REACTION WHEEL		● High-resolution torque control through the use of angular sensor ● Increased inertia moment and reduced thickness by designing a more sophisticated rotor structure ● Excellent responsiveness due to optimal motor drive control (high-speed response) 
Maximum rotation speed [rpm]	3000@15V/4000@21V	
Angular momentum [Nms]	0.341@3000rpm/0.454@4000rpm	
Torque [mNm]	50@2500rpm/150@2000rpm	
Minimum torque [mNm]	0.1	
Dimensions [mm]	Φ100x52	
Mass [g]	1200	

MAGNETIC TORQUER		● Custom designs are supported to meet user requirements, such as power consumption, output and interfaces 
Magnetic moment [Am²]	4±10%@5V	
Residual magnetic moment [Am²]	0.05	
Linearity [%F.S.]	2 (within ±5V)	
Dimensions [mm]	176x50x29.2	
Mass [g]	350	