GEN 1 SENSORS & ACTUATORS

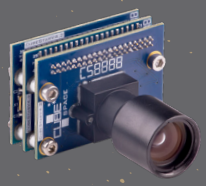
Our Gen 1 range of products include attitude determination sensors and control actuators to cover all sizes of CubeSat missions, from 2U to 16U.

We pride ourselves on building robust, low-power and class-leading products that are available either as standalone components or as part of our integrated CubeADCS units.

CubeSense

Fine Sun Sensor

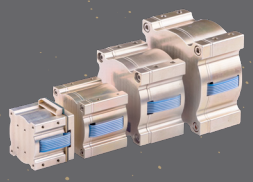
A CMOS-based Sun sensor with a wide field of view, low power usage and high accuracy. It is immune to albedo effects, making it highly robust and versatile. All sensors are calibrated in our state-of-the-art dark room.



CubeStar

Star Tracker

A miniature, low-power, medium accuracy star tracker. It outputs inertially-referenced attitude quaternions or matched vector pairs for use in an external ADCS application. Custom baffles are available on request.



CubeWheel

Reaction Wheel

A family of four different sizes able to control satellites ranging from 2 to 20kg. It includes a highly balanced flywheel disc and integrated electronics. The wheels can be given speed reference commands through I2C, UART or CAN.

CubeTorquer

Magnetorquer

A nanosatellite magnetic torquer that uses a specially treated ferrous core with ultra-low remanence and high linearity. It can be used for detumbling, coarse attitude changes and to desaturate reaction wheels.

IN ORBIT SINCE 2014

www.cubespace.co.za

SENSORS

	CubeSense	CubeStar
PERFORMANCE		
Accuracy	0.2° (pitch and yaw) 1-sigma	0.02° (across boresight) 3-sigma
Max Slew Rate [°/s]	10	0.3
Update Rate [Hz]	Up to 2	Up to 1
Field of View [°]	170	42
PHYSICAL		
Mass [g]	30	55
Dimensions [mm]	41.7 x 17.7 x 22.9	50x35x55
Operating Temperature [°C]	-10 to 60	
POWER & DATA		
Supply Voltage	3.3V	
Average Power [mW]	100	142
Peak Power [mW]	200	264
Communications	I2C/ UART	
QUALIFICATION		
Vibrations	14g RMS	
Radiation	24kRad	
ORDER INFO		
Unit Price	USD 3,250	USD 15,390

TRADE-OFF TABLE

	CubeSense	CubeStar
PERFORMANCE		
Eclipse Performance	N/A	Very high
Eclipse Availability	N/A	High
Sunlight Performance	Very high	Very high
Sunlight Availability	Very high	Sensitive to sun in FOV
Attitude Determination	Pitch and yaw	Roll, pitch and yaw
TYPICAL APPLICATIONS		
	Mid-performance EO Communications (sunlight only)	Earth observation (EO) Communications

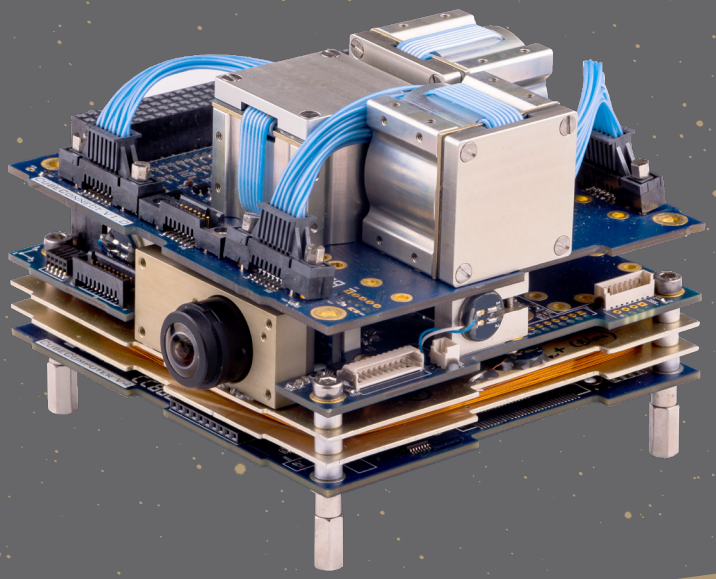
Do you need support selecting the right sensors for your mission?
Are you unsure whether an ADCS system can meet your payload's pointing requirements?
Contact us at sales@cubespace.co.za for a free ADCS analysis.

ACTUATORS

	CubeWheel S	CubeWheel S+	CubeWheel M	CubeWheel L
PERFORMANCE				
Speed Range [RPM]	±8000	±6000	±6000	±6000
Max Momentum [mNms]	1.77	3.6	10.8	30.6
Max Torque [mNm]	0.23	2.3	1	2.3
Static Imbalance [g-cm]	<0.003	< 0.004	< 0.004	< 0.006
Dynamic Imbalance [g-cm^2]	< 0.005	< 0.0014	< 0.0014	< 0.05
PHYSICAL				
Mass [g]	60	90	150	225
Dimensions [mm]	28x28x26.2	33.4x33.4x29.7	46x46x31.5	57x57x31.5
Operating Temp. [°C]	-10 to 60			
POWER & DATA				
Supply Voltage	3.3V & 6.4 - 16V			
Average Power [mW]	150	190	190	350
Peak Power [W]	0.65	2.3	2.3	4.5
Communications	I2C / UART/ CAN			
QUALIFICATION				
Vibrations [g RMS]	14	8.9	8.9	8.9
Radiation	24kRad			
ORDER INFO				
Unit Price	USD 5,170	USD 6,550	USD 7,540	USD 8,640

	CubeTorquer S	CubeTorquer M	CubeTorquer L	CubeCoil Single	CubeCoil Double
PERFORMANCE					
Magnetic Moment [Am^2]	±0.24	±0.66	±1.90	±0.13	±0.27
Magnetic Gain [Am^2 /A]	2.8	8.2	25	2.1	2.1
Linearity (0-5V)	97.5%	97.5%	97.5%	N/A	N/A
PHYSICAL					
Mass [g]	28	36	72	46	73
Dimensions [mm]	18x14x62	18x14x77	18x14x153	90x96x8	90x96x8
POWER & DATA					
Resistance [Ω]	29-31	63-65	64-66	79-81	35-37
Max Current	150mA				
QUALIFICATION					
Vibrations	14g RMS				
Radiation	24kRad				
ORDER INFO					
Unit Price	USD 870	USD 1,210	USD 1,650	USD 870	USD 1,070

**Gen1 actuators will be replaced with our Gen2 actuators on all component and bundle orders from 2023 Q1*



RELATED PRODUCT

CubeADCS

CubeADCS combines our radiation tolerant on-board computer, flight proven attitude determination and control algorithms, and our robust FDIR mechanisms, with our wide range of sensors and actuators. CubeADCS is a complete turn-key nanosatellite attitude determination and control solution for users aiming to rapidly develop satellites, at an affordable price, using a flight-proven system.

CUBESPACE

CubeSpace is an aerospace company that specializes in small satellite Attitude Determination and Control Systems (ADCS). We offer modular, low-power ADCS components with class-leading performance. Our components are designed to be compatible with almost all commercially available CubeSat suppliers.

We support each customer to evaluate their ADCS needs, choose the correct hardware solution, and tailor this solution to correctly integrate into their satellite. Our service is personalized, and we strive to help customers find the balance between powerful ADCS performance and reliable operations.

Our 480m² facility is equipped with state-of-the-art equipment such as 160m² clean room space with an 8-meter-long dark optics calibration room, humidity controlled thermal chamber, Helmholtz coil, a 75m² test facilities with a 900 mm x 1300mm thermal vacuum chamber, 8kN vibration shaker, auto-winding machine, wheel balancing machine, and high accuracy 3-axis rotation stages.

The CubeSpace team consists of highly qualified aerospace technicians with IPC class 3 training, and engineers specializing in control system research and development. Our company has delivered more than 2000 ADCS components to 130 clients for approximately 180 satellites.

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