GEN 1 CLOSED LOOP ADCS

CubeADCS is a complete turn-key nanosatellite attitude determination and control solution for users aiming to rapidly develop satellites using flight-proven components. These systems combine robust, radiation-tolerant flight computer, flight-proven ADCS algorithms and FDIR mechanisms, and our wide range of our sensors and actuators

CUBE ADCS

IN ORBIT SINCE 2014
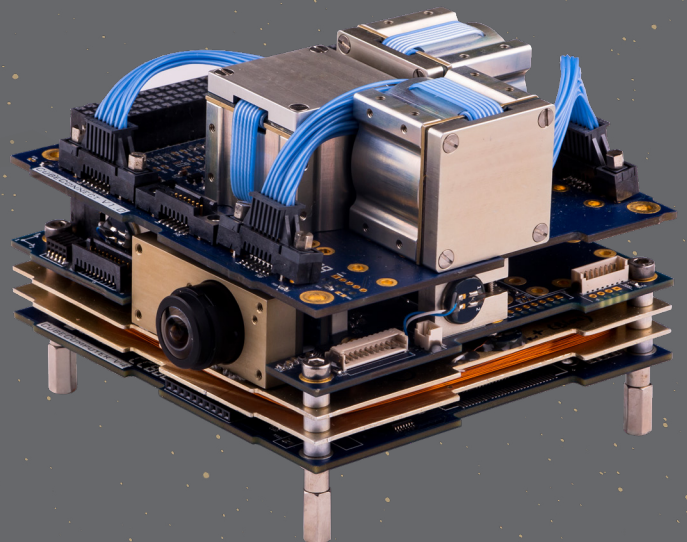
CubeADCS
Y-MOMENTUM

CubeADCS Y-Momentum is a compact and low-power ADCS solution for satellites that require nadir pointing, without full 3-Axis tracking. It uses a single reaction wheel placed in the orbit normal direction. The wheel is biased to an offset speed to provide gyroscopic stiffness to the satellite, and magnetorquers are used to control the orientation of the satellite to stay nadir pointing. The base system can be upgraded with larger wheels for larger satellites, and a variety of sensors can be selected as part of the system, depending on the mission requirements.

FEATURES

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Typical satellite size	2U - 16U
Estimation Modes	MEMS Rate Filter, Magnetic Rate Filter, TRIAD, Full-state EKF, MEMS Gyro EKF
Control Modes	Detumbling, Y-Thomson, Sun Spin, Nadir Pointing, Pitch Control

PHYSICAL

Mass (approximate) [g]	< 300
Dimensions [mm]	90x96x48
Operating Temperature	-10°C to 60°C

HARDWARE

Computing Unit	ADCS computer with 3-axis MEMS rate sensor
Default Sensors	Deployable magnetometer, coarse sun sensors
Optional Sensors	Redundant magnetometer, fine sun & earth sensors, star tracker
Actuators	1x CubeWheel Small, 2x CubeTorquer Small, 1x CubeCoil

ORDER INFO
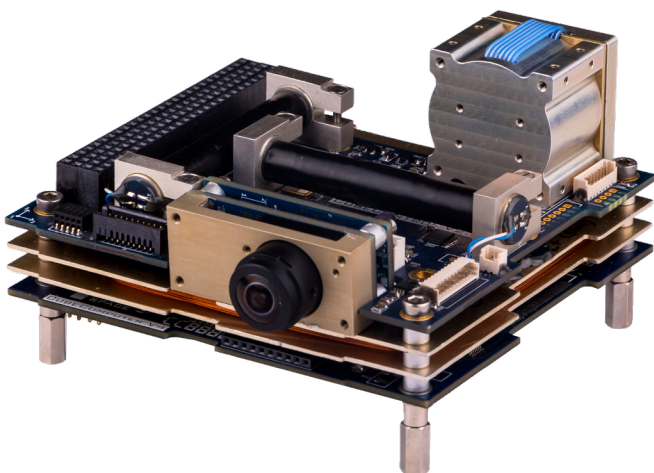
Price [USD]	
BASE CONFIGURATIONS	
CubeADCS Y Momentum Small	25,510
OPTIONS	
Upgrade to Small+ Actuators	1,380
Upgrade to Medium Actuators	3,270
Upgrade to Large Actuators	5,530
Fine Sun Sensor	3,250
Star Tracker	15,390
Backup Magnetometer	2,280

Do you need support selecting the right sensors for your mission?
Contact us at sales@cubespace.co.za for a free ADCS analysis.
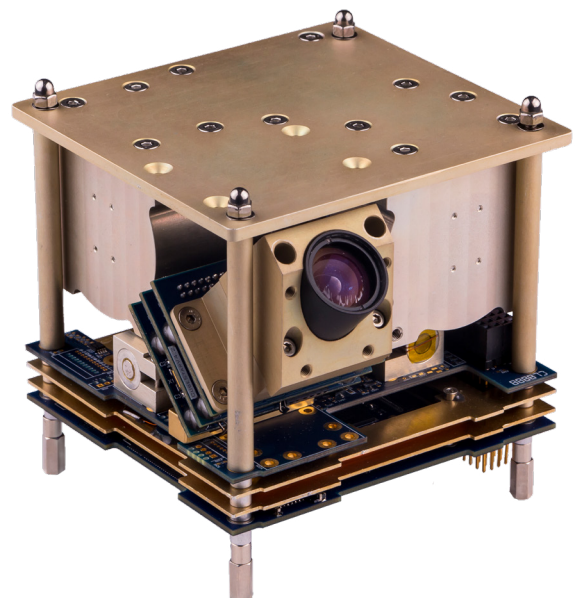
CubeADCS
3-AXIS

CubeADCS 3-Axis uses three reaction wheels, one in each principal axis of the satellite, to do full 3-axis pointing and tracking. A variety of CubeSpace sensors can be integrated with the system depending on the nominal mission control modes, and on the pointing accuracy required. Actuators can be scaled for satellites up to roughly 16U. The system includes features such as TLM logging, sensor and actuator power control and FDIR, communication bus monitoring, SGP4 orbit propagation, as well as estimator and control algorithms for virtually all ADCS control modes.

	3-Axis Small	3-Axis Medium	3-Axis Large
FEATURES			
Typical satellite size	2U - 3U	6U - 8U	12U - 16U
Estimation Modes	MEMS Rate Filter, Magnetic Rate Filter, TRIAD, Full-state EKF, MEMS Gyro EKF		
Control Modes	Detumbling, Y-Thomson, Nadir Pointing, Inertial Pointing, Sun Pointing, Ground Target Tracking, XYZ Wheel Control		
PHYSICAL			
Mass (approximate) [g]	<500	<800	<1300
Dimensions [mm]	90x96x57	90x96x32 (excl. actuators)	
Operating Temperature	-10°C to 60°C		
HARDWARE			
Computing Unit	ADCS computer with 3-axis MEMS rate sensor		
Default Sensors	Deployable magnetometer, coarse sun sensors, fine sun & earth sensors		
Optional Sensors	Redundant magnetometer, star tracker		
Actuators	3x CubeWheel Small, 2x CubeTorquer Small, 1x CubeCoil	3x CubeWheel Medium, 2x CubeTorquer Small, 1x CubeCoil	3x CubeWheel Large, 3x CubeTorquer Large

ORDER INFO

	Price [USD]
BASE CONFIGURATIONS	
CubeADCS 3-Axis Small	42,750
OPTIONS	
Upgrade to Small+ Actuators	3,960
Upgrade to Medium Actuators	7,700
Upgrade to Large Actuators	12,010
Fine Sun Sensor	3,250
Star Tracker	15,390
Backup Magnetometer	2,280

Are you unsure whether an ADCS system can meet your payload's pointing requirements?
Contact us at sales@cubespace.co.za

FREQUENTLY ASKED QUESTIONS

### WHAT IS THE POINTING ACCURACY OF CubeADCS?

The control performance is dependent on factors such as which sensors are selected, the orbital parameters and the satellite configuration. We work with you to assess the expected performance of the system when used in your unique mission, and with your unique satellite design.

HOW QUICKLY CAN CubeADCS BE DELIVERED ?

In most cases, CubeADCS can be shipped within 4 months from order and once all the client's inputs have been provided. Please contact us to receive a quotation and an accurate lead time based on current production loads.

WHICH SENSORS AND ACTUATORS DO I NEED?

The first step to getting one of our CubeADCS systems is giving us a preliminary idea of your mission design, and for us to advise on sensor selection, actuator sizing, and to give you a simulation report.
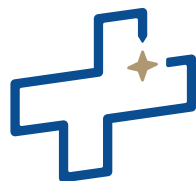
CUBESPACE

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.

For more information, please visit our website at www.cubespace.co.za