SPACE INVENTOR

PRODUCT CATALOGUE

Let’s work together

Don’t hesitate to reach out for inquires, collaboration or any specific questions you may have. We’re always available for a discussion about your project and eager to assist you in achieving your space goals.

Sales@space-inventor.com

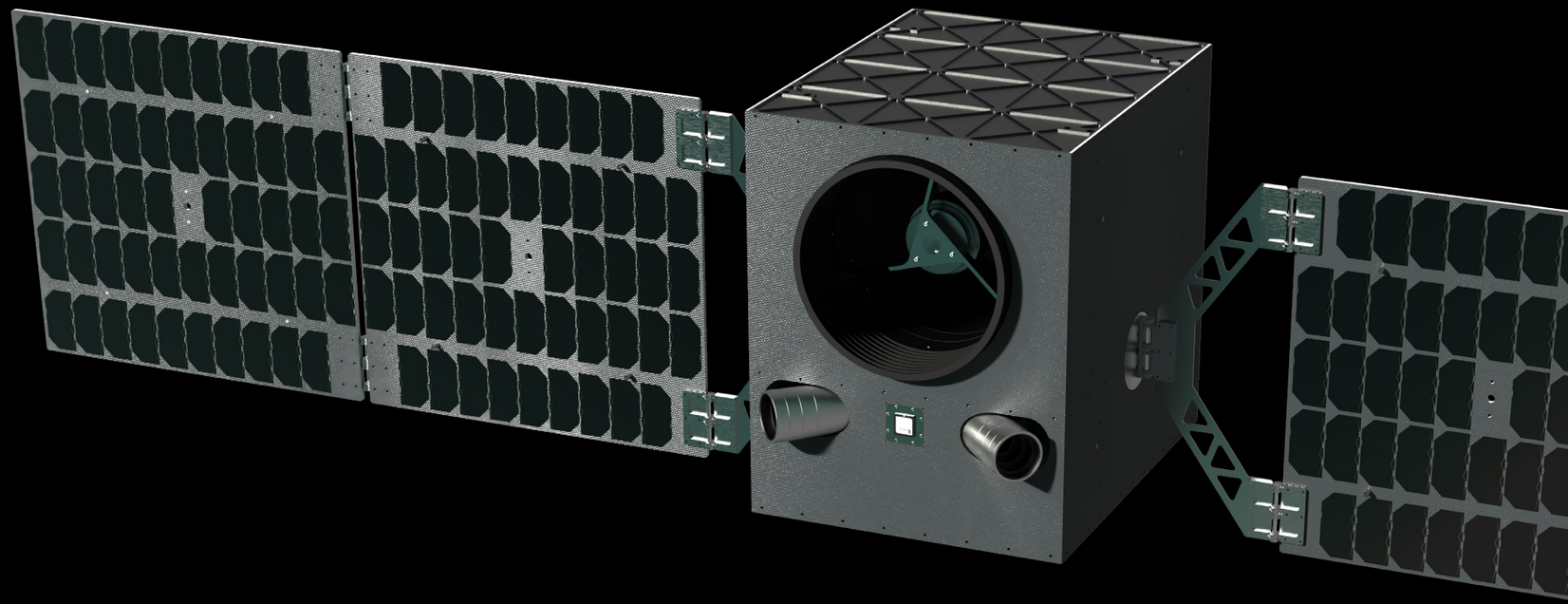
Experience in space

Space Inventor is a respected satellite manufacturer specializing in crafting microsatellites within the 10 kg to 200 kg range. We do this through a flexible and scalable platform, known for its steadfast dedication to high performance, proven reliability, and an unyielding spirit of innovation.

Our experienced team at Space Inventor collectively brings over 250 years of expertise to the space industry. Our mission is simple: to consistently challenge the boundaries of satellite engineering, aiming to bring elegance and innovation to the field of space technology.

With a well-rounded understanding of the complete life cycle of space missions, Space Inventor is your trusted partner from initial planning and concept development through satellite manufacturing, launch, and operational phases.

Our heritage



Modules on orbit

500+

Satellites in production

15

Space proven in

GEO

Space proven in

LEO

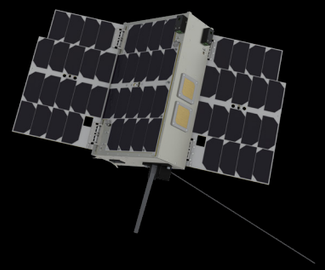
Projects delivered

100+

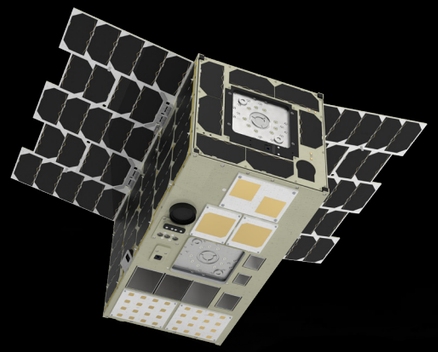
Modules in production

200+

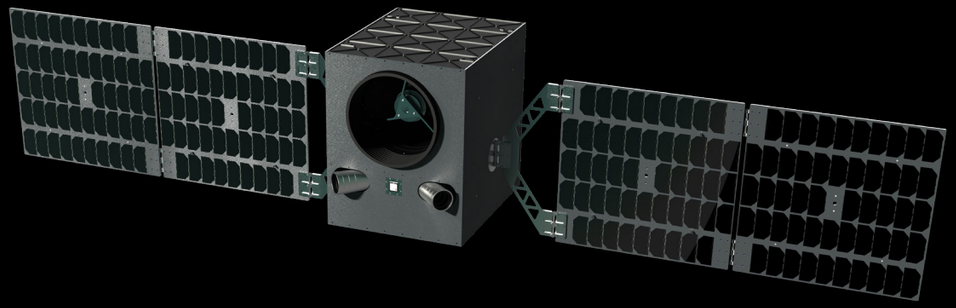
Our satellites



6U SATELLITE



16U SATELLITE



MICROSATELLITE

Flight proven
TRL 9

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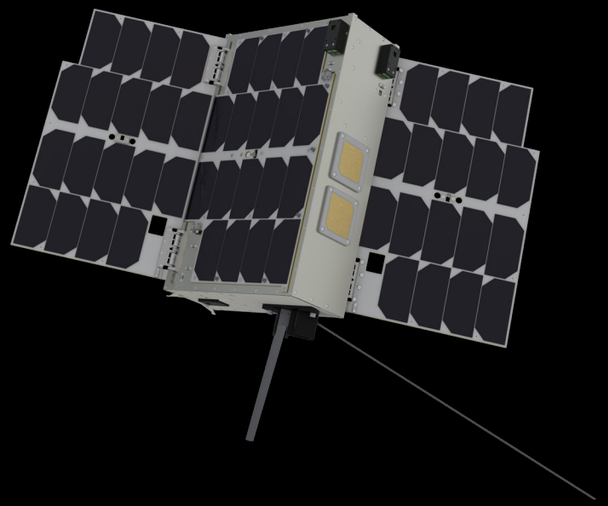


6U SATELLITE

A dependable and high-performance 6U CubeSat, offering multiple platform enhancements.

DESCRIPTION

Space Inventor's 6U satellite is highly versatile, with modular subsystems that enable customization for diverse missions. These satellites feature robust, shielded subsystems, each with its own radiation and EMI shielding, thermal conduction, and mechanical support.

The 6U platform has two deployable solar panels and can expand with up to 4 deployable panels or 2 double deployable panels. These panels can even become large flexible solar panels with 192 PVP cells. The ADCS system optimizes power generation by rotating the satellite for maximum solar energy harvesting.

We continuously enhance our avionics designs for reliability and improve our platform concepts annually. Timely satellite integration and deployment are crucial for mission success, alongside technical excellence and reliability.

Our latest 6U satellite platform is compact and capable, offering nearly 4 units of payload volume. Combined with third-party payloads, it delivers science-grade performance, defense-level reliability, and commercial viability.

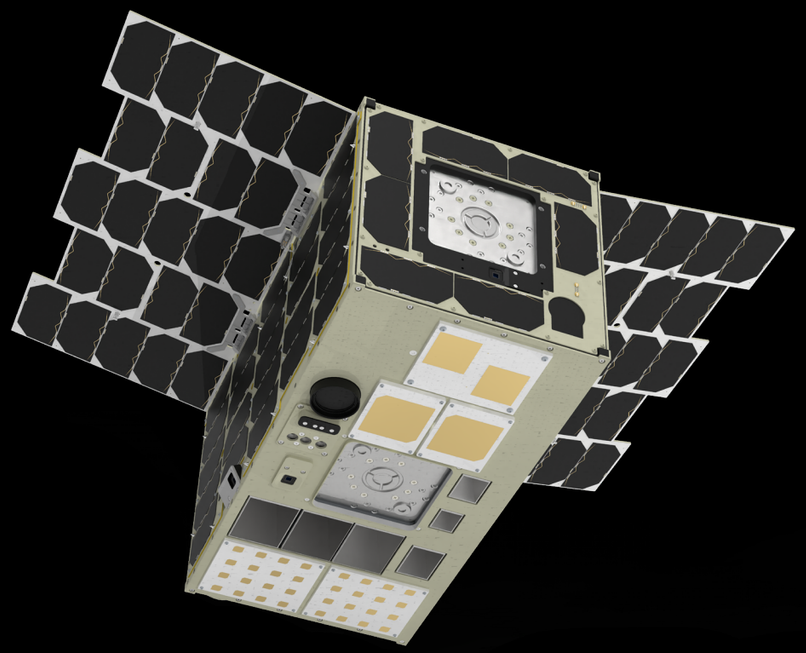
FEATURES

- **Payload Mass (Kg)**
  3-6 kg
- **Payload Volume**
  2-5 Units
- **Propulsion**
  1-2 x gas or ion
- **Payload power peak**
  100 W
- **Reaction wheels**
  4 x WHL 100
- **Payload power average**
  16 W / 50 W / 120 W
- **Battery Capacity**
  100-200 Whr
- **Data Buses**
  Redundant CAN / Ethernet / SpaceWire
- **On-Board computer**
  Redundant Cortex-M7 /redundant Zync-7030
- **Bus provided redundant user data storage**
  Up to 64 GB
- **ADCS Pointing accuracy adv. option 1**
  Down to 5 arcsec
- **ADCS sensors**
  6 Fine sun sensors, 1 star tracker, 2 gyros
- **Primary communications**
  S band 4 Mbps
- **High Speed links**
  2 x S/X band 4 - 200 Mbps

SATELLITE | 16U

Flight proven
TRL 9

State of the art report 2022



16U SATELLITE

Reliable and high performing 16U CubeSat with several options available to enhance platform capabilities.

Fun fact: The geostationary satellite reached its designated slot in the geostationary orbit, concluding an extraordinary journey of more than 28 million kilometers while painstakingly raising its orbit by 1000 km. All done with a 16U using electrical propulsion.

DESCRIPTION

Our 16U satellite, featuring GEO options, allowing buyers to customize it precisely to their needs. Our agile development process ensures smooth integration and interchangeability of modules, backed by rigorous analysis and annual subsystem updates.

Designed for geostationary orbit with reduced payload capacity and link speed, the 16U boasts high-reliability subsystems with individual radiation and EMI shielding, thermal conduction paths, and mechanical support. It can expand with deployable solar panels, optimizing power generation through bore-axis rotation for peak solar energy harvesting.

This groundbreaking 16U satellite by Space Inventor is the first ever of its kind to propel itself into position, marking a historic milestone as the world's first of its kind to do so!

FEATURES

- **Payload Mass (Kg)**
  10-12 kg
- **Payload Volume**
  8-12 Units
- **Propulsion**
  1-4 x gas or ion
- **Payload power peak**
  200 W
- **Reaction wheels**
  4 x WHL 100/200
- **Payload power average**
  20 W / 55 W / 180 W
- **Battery Capacity**
  100-400 Whr
- **Data Buses**
  Redundant CAN / Ethernet / SpaceWire
- **On-Board computer**
  Redundant Cortex-M7 /redundant Zync-7030
- **Bus provided redundant user data storage**
  Up to 64 GB
- **ADCS Pointing accuracy adv. option 1**
  Down to 5 arcsec
- **ADCS sensors**
  6-8 Fine sun sensors, 1-2 star tracker, 2 gyros
- **Primary communications**
  S band 4 Mbps
- **High Speed links**
  2 x S/X band 4 - 200 Mbps
- **Solar Peak power production**
  42 W /90 W / 280 W
- **Available for GEO with reduced payload capacity and reduced link speed**

SATELLITE | Custom Microsatellite

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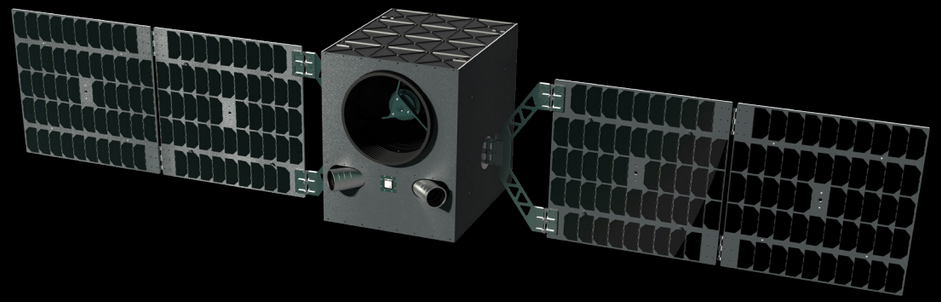


MICROSATELLITE

Customised microsatellite configured from our modular subsystems to enable buyers to tailor the satellite to their needs in both Low Earth Orbit and Geostationary Orbit.

DESCRIPTION

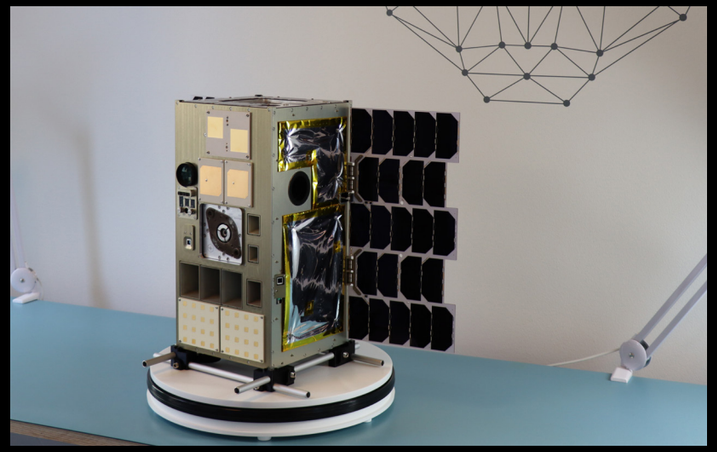
Space Inventor presents an advanced customizable microsatellite solution, crafted from modular subsystems for tailored missions. Our novel design reduces components, simplifying integration with easy 360° access.

The Micro8 platform is specifically engineered for the Falcon 9 quarter plate payload adapter, utilizing an 8-inch separation ring from ExoLaunch.

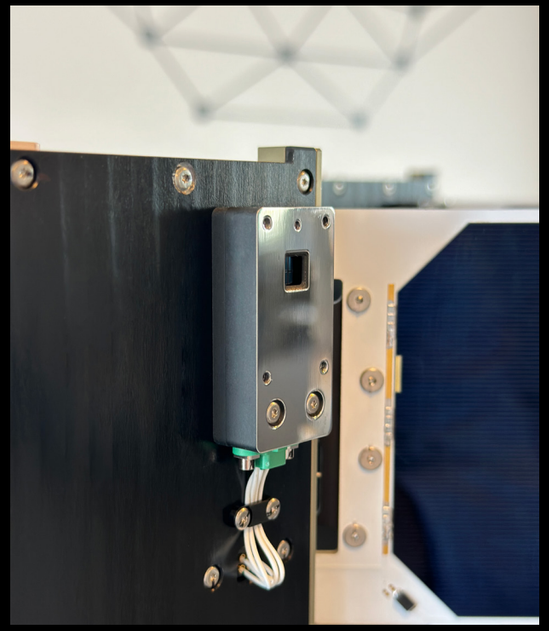
Micro8 platform configured for astro-observation, offers reliability with options for deployable solar panels and precise orientation for optimal power generation.

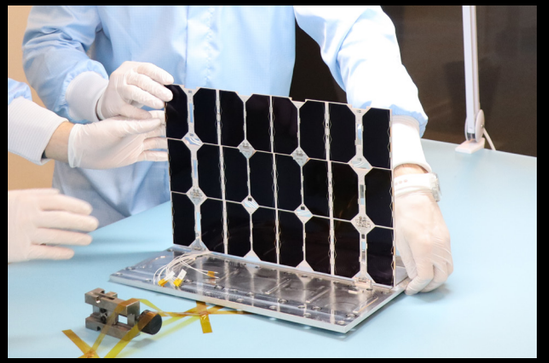
FEATURES

- **Payload Mass (Kg)**
  5-100 kg
- **Payload Volume**
  36 cm x 46 cm x 28 cm
- **Propulsion**
  Custom
- **Payload power peak**
  > 1 kW
- **Reaction wheels**
  4-8 x WHL 500/1000/5000
- **Payload power average**
  Up to 300 W
- **Battery Capacity**
  Up to 1200 Whr
- **Data Buses**
  Redundant CAN / Ethernet / SpaceWire
- **On-Board computer**
  Redundant Cortex-M7 /redundant Zync-7030
- **Bus provided redundant user data storage**
  Up to 64 GB
- **ADCS Pointing accuracy adv. option 1**
  Down to 5 arcsec
- **ADCS sensors**
  6-12 Fine sun sensors, 1-2 star tracker, 2 gyros
- **Primary communications**
  S band 4 Mbps
- **High Speed links**
  2-4 x S/X band 4 - 200 Mbps
- **Solar Peak power production**
  Up to 500 W
- **Available for GEO, MEO and LEO**




INVENTOR





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MOMENTUM WHEEL

High performing momentum wheels for microsatellites.

DESCRIPTION

Space Inventor presents high-performance momentum wheel units, meticulously designed for microsatellite missions with mission lifetimes of up to 5 years. These units feature an integrated 3-phase outrunner permanent magnet synchronous motor (PMSM) equipped with fully integrated motor control electronics and software, ensuring seamless and efficient satellite attitude control.

Our reaction wheel assembly is engineered with advanced materials and design:

The body is constructed from Al-6061-T6 for strength

The rotor is made of ferritic stainless steel for durability, and Neodymium magnets enhance magnetic properties

The rotor is precisely suspended between two hybrid ceramic high-precision bearings, ensuring longevity and low friction in vacuum conditions. Each wheel operates autonomously with an internal microcontroller, controlling momentum and torque based on onboard computer commands.

Each wheel also includes a redundant CAN bus interface for seamless integration into the satellite communication network via CSP and basic telemetry sensors (temperature, current, speed).

For comprehensive three-axis control, we recommend a momentum wheel assembly with four powerful reaction wheels arranged in a classic configuration. These 500 and 1000 Nms reaction wheels prioritize reliability through redundant stator windings and driver electronics.

FEATURES

- Compact, integrated reaction wheel unit for 10-200 kg satellites
- Control modes: Momentum, torque, or motor voltage
- 3-Phase Permanent magnet synchronous motor (PMSM)
- CAN bus or RS-422 interface with CSP
- Long life brushless motor design
- Hybrid ball bearings
- 5 years design lifetime

PLATFORM	WHL 1000	WHL 500	WHL 200	WHL 100
MASS	980 g	804 g	423 g	350 g
MOMENTUM	1000 mNms	500 mNms	200 mNms	100 mNms
MAX TORQUE	100 mNm	100 mNm	25 mNm	20 mNm

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SUN SENSOR

Compact sun sensor.

DESCRIPTION

The highly integrated fine sun sensor uses four photodiodes to estimate the sun direction vector with a precision of 1º. The module has a built-in microcontroller which enables connectivity to a CSP network via CAN bus and readily integrates the fine sun sensor with an attitude determination and control system.

FEATURES

- 28V unregulated battery voltage supply input
- Data interface: CAN bus with CSP
- 2-axis sun direction sensor based on quad photodiode array
- Measurements (L, W, H): 40x20x10 mm
- 1º precision
- 55º half-cone FoV

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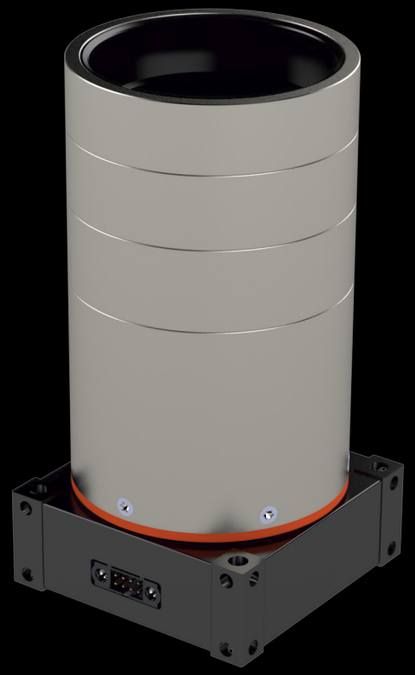

STAR TRACKER

High precision star tracker unit for mini and microsatellites.

DESCRIPTION

The star tracker is based on advanced star tracking algorithms developed by Space Inventor. The embedded computer processing unit is built on highly reliable COTS components. The compact rad-hard camera's optics collect enough signal to track across the entire celestial vault with full performance up to 0.3º/s.

The standard baffle provides an impressive Sun exclusion half-angle of 30º. The optical head is based on a CMOS Active Pixel Sensor with global shutter read-out, which presents itself as ideal for star tracking purposes. With a design based on very few components, this star tracker provides a supreme combination of high reliability and low recurrent cost.

The integrated processing unit accommodates the star catalogue and the software algorithms providing autonomous attitude determination, both during initial acquisition (lost-in-space) and continuous tracking.

FEATURES

- **Accuracy (1 sigma)**
  Pitch/yaw: < 1.5 arcsec
  Roll: < 10 arcsec
- **Timing - Max Update rate**
  5 Hz
- **Time to first Acquisition**
  3-10 sec
- **Slew-rate**
  Up to 0.3º/s (full performance)
  Up to 1.5º/sec (reduced performance)
- **Sun exclusion angle**
  30º (half cone)
- **Mass**
  300 g
- **Interface**
  CAN or RS422
- **Connector**
  High reliability Harwin M80
- **Power consumption**
  2W
- **Supply voltage**
  5V regulated or 7-28V unregulated
- **Reliability**
  Radiation total dose tested COTS parts
  Vibration rated for all launch vehicles
  5 years design lifetime

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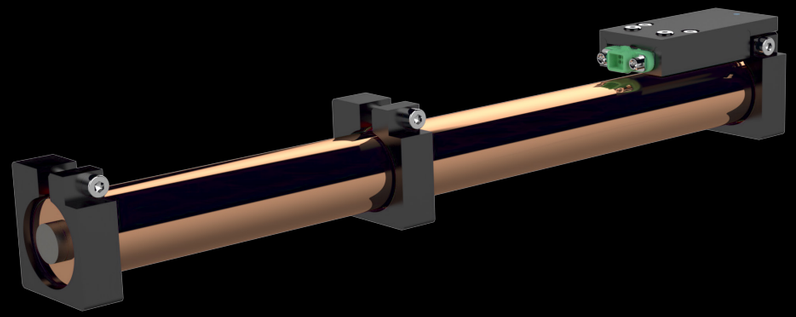

MAGNETORQUER

Magnetorquer rod for momentum dumping of LEO satellites.

DESCRIPTION

The MT-P4 magnetorquer rod is an integrated solution designed for momentum dumping of LEO satellites. The core is annealed Alloy 79 wound with enameled copper winding and optimized for low power consumption at nominal magnetic dipole of 2 or 6 Am2. The MT-P4 has built-in control electronics and is simply interfaced by 28V unregulated battery voltage and redundant CAN busses. The MT-P4 comprises redundant input supply connected using diodes, redundant torquerrod windings and redundant driver electronics for enhanced reliability. The mounting brackets can be moved to accommodate various mounting features on the satellite bus.

FEATURES

- Redundant input supply, driver electronics, and windings
- Magnetorquer rod with integrated controller
- Interface: Redundant CAN with CSP 2.0 protocol
- Low residual dipole

PARAMETER/VARIANT	MT-2-P4	MT-6-P4
NOMINAL DIPOLE MOMENT	2 Am^2	6 Am^2
POWER CONSUMPTION	250 mW	300 mW
MASS	375 g	500 g
ROD DIMENSIONS	Ø17 mm x 200 mm	Ø17 mm x 300 mm

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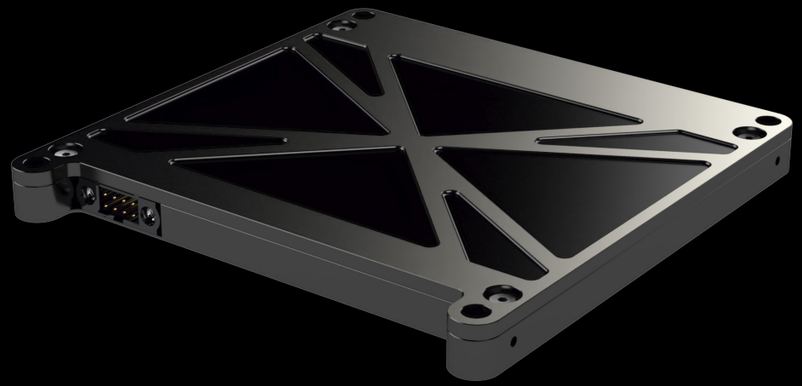

INERTIAL MEASUREMENT UNIT

Inertial measurement unit with integrated gyroscope, accelerometer and magnetometer for satellites.

DESCRIPTION

The IMU-P4 is a compact and rugged inertial measurement unit comprising two redundant Murata SCHA63T 6-DOF XYZ-axis Gyroscope and XYZ-axis Accelerometer and two RM3100 magnetometers as well as temperature sensors. The two redundant sets of sensors are interfaced via two redundant microcontrollers and redundant CAN bus interfaces.

FEATURES

- **Dual redundant sensors**
  6 Degree of freedom IMU sensor
  3 axis magnetometer
  Temperature sensor
- **Gyro**
  Bias instability down to 1°/h level
  Noise density level 0.0015°/s/√H
- **Accelerometer**
  Range: +/- 3g
  Sensitivity: 4905 LSB/g
- **Magnetormeter**
  Range: ± 1100 µT
  Noise: 15 nT
  Bandwidth: 147 Hz
- **Interface**
  CAN bus + CSP 2.0 protocol
- **Power**
  Power consumption: 200 mW
- **Mechanical**
  Aluminum housing
  50.5 x 50.5 x 10 mm
  Mass: 150 g
- **Reliability**
  Radiation total dose tested EEE parts
  Vibration rated for all launch vehicles
  5 years design lifetime

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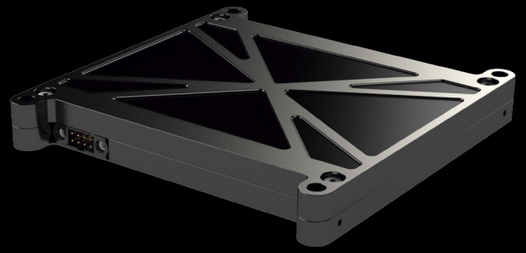

MPPT-1C5A-P4

MPPT-4C1.2A-P4

POWER POINT TRACKER

A maximum power point tracker and battery charger module designed to condition the power delivery from the satellite solar panels to the battery while aiming at maximum efficiency.

MPPT-P4 CONFIGURATIONS

1 channel @ 5A	4 channel @ 1.2A
MPPT-1C5A-P4	MPPT-4C1.2A-P4

DESCRIPTION

The MPPT-P4 system is available in two variants: a single-channel variant with an input current of 5A and a variant with four PV input channels each with an input current rating of 1.2 A. Each channel consists of a DC-DC buck converter that ensures optimal operating voltage for each solar cell array at all temperatures and irradiance levels. After conversion, the channels are combined through ideal diodes to minimize loss, and connected to a redundant battery output.

To enable the use of parallel PV strings connected to the same MPPT input channel that are not illuminated at the same time, one can connect the two strings usings diodes to the same MPPT input channel. This effectively reduces the number of input channels needed for a mission.

Housekeeping data for all channels are available through CSP telemetry. The MPPT-P4 is built for durable, simple and robust satellite integration.

FEATURES

- Maximum power point tracker for satellite solar panels
- Integrated battery charge management
- Up to 110W PV input power per MPPT
- PV input voltage from Vbat up to 60V (23 triple junction cells in series per string)
- Two MPPT variants
  4 channels x 1.2 A input current
  1 channel x 5 A input current
- Converter efficiency of 95%
- Data interface: Redundant CAN bus with CSP
- Ruggedized enclosure for maximum thermal performance, radiation shielding and EMI reduction
- Suitable for microsatellites and CubeSats
- Measurements
  4-channel variant: (L, W, H)
  93 x 93 x 8.75 mm // 180 g
  Single-channel variant: (L, W, H)
  93 x 93 x 12.75 mm // 180 g

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POWER DISTRIBUTION UNIT

8 Channel Power Distribution Unit. The PDU-P4 comes in three variants featuring three different output voltage levels all communicating via CAN protocol.

VERSIONS OF PDU-P4

INTERFACE/VOLTAGE	VBAT	5V	12V
	PDU-BAT-P4	PDU-5V-P4	PDU-12V-P4

DESCRIPTION

The PDU-P4 is an 8-channel power distribution unit in a rugged, compact and modular enclosure. The unit includes four output connectors, each equipped with two power lines and redundant CAN. With this, each of the four output connectors can be utilized for multiple purposes:

Supplying two individual loads from one output connector

Paralleling the power lines to achieve higher power capability to a load

Supplying a load with a fully redundant set of power lines

The PDU-P4 architecture allows designers to allocate one subsystem per power channel, whereby many of the EMI issues experienced on shared power buses are eliminated. This makes the PDU-P4 ideal for missions with demanding payloads and sensitive receivers.

All outputs have independent power monitoring and latch-up protection. Monitoring and configuration is enabled through the CSP protocol and onboard redundant MCUs.

FEATURES

- Battery input voltage of 12-33.6 V
- Two battery input channels with combined input current capability of 25.5 A
- 8 output channels or 4 dual redundant outputs per PDU-P4
- PDU-P4 output power capabilities
  PDU-BAT: Up to 720 W
  PDU-5V: Up to 60W
  PDU-12V: Up to 144 W
- Programmable overcurrent and latch-up protection
- Interface
  Redundant CAN
- Redundant MCU cross protection feature
- Automatic programmable battery protection modes
- Programmable on/off timers
- Measurements
  (L, W, H) 93 x 93 x 8.75 mm // 160 g

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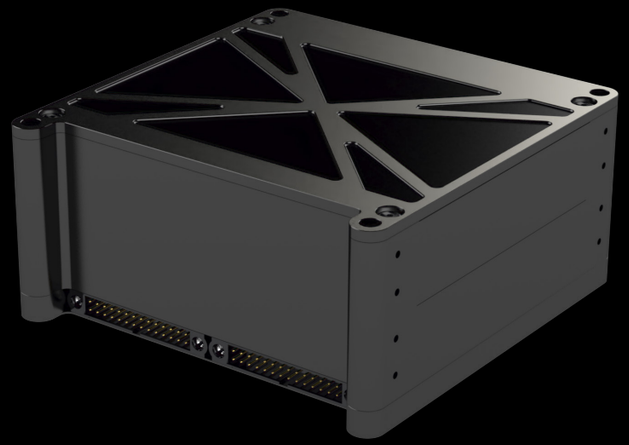

BATTERY

4-8 cell integrated Li-Ion battery module with 50/100 Wh capacity.

VERSIONS OF BAT-P4

4S1P (14.4V)	8S1P (28.8V)
BAT-14-P4	BAT-28-P4

DESCRIPTION

BAT-P4 comes in two variants: a 4 cell 14 V version and a 8 cell 28 V version. The BAT-P4 is a Lithium-Ion battery system designed for high battery lifetime, easy integration, and safety. The battery system is designed for high battery lifetime, easy integration, and safety. The battery configuration can either be 4s1p or 8s1p providing 50Wh and 100Wh in nominal capacity, respectively.

The BAT-P4 is both flexible enough and sufficiently powerful for most nano- and small- satellite missions. The automatic balancing circuit maximizes cell lifetime, and the automatic heater keeps the cells operational at low temperatures. Short-circuit and over/under voltage circuits protects the cells from damage. To accommodate different launch vehicle requirements, each module has connectors for both soft and hard inhibits.

The BAT-P4 comes in a rugged and modular 1.5 mm Al enclosure, which both acts as on-orbit radiation mitigation, as well as a practical short-circuit protection during satellite assembly. An always-on ultra-low-power Real Time Clock provides timer-continuity during satellite shutdown.

FEATURES

- 4/8 Li-Ion 18650 cells
- 14.4V or 28.8V nominal voltage
- Over- and under-voltage protection
- 50/100 Wh nominal capacity
- Automatic Cell balancing
- Short-circuit protection
- Redundant CAN bus with CSP protocol
- Battery backbone connector for redundant battery bus connection and daisy chaining
- Inhibit connector for insert-before-flight and separation switches
- Output power up to 173 W per battery
- Measurements
  BAT-14V-P4: (L, W, H) 93 x 93 x 23 mm // 314 g
  BAT-28V-P4: (L, W, H) 93 x 93 x 46.55 mm // 544 g

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ON-BOARD COMPUTER

Two Cortex M7 On-Board Computers with Dual Redundancy.

DESCRIPTION

The OBC-P4 is an onboard computing platform consisting of four independent ARM Cortex-M7 modules, each with separate power supply, interfacing, and storage. The dual architecture makes the OBC-P4 a suitable choice for hot/cold redundancy solutions often desired for mission critical subsystems, such as T&C, GNC, or management of valuable payloads. The application of the OBC-P4 is further enhanced by the powerful DSP functionality provided with the Cortex-M7 architecture, which makes it possible to port heavy floating- point processing (e.g. ADCS algorithm without severe performance penalties, or error-prone quantization).

FEATURES

- Four fully independent onboard computer modules in a shared enclosure
- 4x ARM® Cortex-M7 Main Processing Units
- Memory (per computer)
  384 kB SRAM, 64 MB SDRAM, 128 MB NOR Flash and 2 MB Internal NOR flash
- Interface: Redundant CAN and four independent RS-422 outputs
- Ruggedized encosure for maximum thermal performance, radiation shielding and EMI reduction
- Measurements
  (L, W, H) 93 x 93 x 8.75 mm // 160 g
- Always-on ultra-low-power real time clock

State of the art report 2022

Z7000

Versatile Payload and Onboard Computing Platform.

DESCRIPTION

The Z7000 is a powerful system on a chip FPGA based payload computer with a dual-core ARM Cortex-A9 MP-Core™ and FPGA logic with 125K programmable cells. The Z7000 is a suitable choice as a payload computer with requirements for high data-rates and processing capabilities.

The Z7000 offers a broad range of interfaces including LVDS/SpaceWire and up to 1Gb Ethernet. Furthermore traditional OBC interfaces such as CAN, UART, I2C etc are supported. For standard control interface for commanding and telemetry, Space Inventor recommends using the CAN bus.

For storage of payload generated data a mass memory system is included with a capacity up to 16 GB.

The processing platform consists of a dual-core ARM Cortex-A9 processing unit which is assisted with a NEON™ media-processing engine and a single and double precision Vector Floating Point Unit (VFPU). The supported operating system is FreeRTOS but Linux can also be implemented. The control software will enable the application to be reprogrammable in a secure environment with a fallback system in case of failure. This also includes reprogramming of the logical blocks in the FPGA.

The Kintex®-7 FPGA logic has 125K programmable logic cells and contains support for look-up tables, flip flops, DSP blocks, IO blocks etc.

FEATURES

- On-board computer based on Xilinx Zync 7030 SoC
- Dual ARM® Cortex-A9 Main Processing Units 667 MHz
- Memory: 256KB on-chip memory, 256 MB RAM, 16 GB eMMC mass storage
- FPGA: 125K programmable Logic Cells
- Interfaces
  28V unregulated supply
  CAN bus
  LVDS, SpaceWire
  RS-422
  Ethernet
- Power consumption: <1.5 W idle.
  Up to 20 W.

State of the art report 2022

TELEMETRY, TRACKING & COMMAND

Modular software-defined radio platform for TTC and payload communication.

DESCRIPTION

The transceiver system is designed to work with the latest CCSDS Cat A recommendations for high data rate transmissions and high spectral efficiency. Using constant envelope GMSK or low crest factor SRRC filtered OQPSK modulation for higher power amplifier efficiency and lower linearity requirements. The ranging functionality supported is transparent pseudo noise ranging according to CCSDS 414.0-G2 standard where the transceiver frequency-translates the uplink ranging signal to the downlink without code acquisition (i.e., non-regenerative ranging or turnaround ranging). The SDR is based on a powerful Xilinx Zync-7030 SoC and high performance Analog Devices SDR front-end, the AD9361.

FEATURES

- Full duplex
- Channels: 2 receive, 2 transmit
- CCSDS compliant (401.0-B-30)
- GMSK or OQPSK - 9600 bps to 10 Mbps
- Up to 100 Mbps with QAM/ASK
- FEC: Convolutional Coding and Reed Solomon
- Modem fully implemented in FPGA with DMA
- CSP 2.0 protocol
- 16 GB eMMC storage
- 256 MB DDR3 RAM
- High-reliability Harwin M80 connector for power and data Interfaces
  28V unregulated supply
  CAN bus
  LVDS, SpaceWire
  RS-422
  Ethernet
  Four rear-mounted RF connectors to front-end module
- Currently, three different RF front-ends are available. The three TTCs variant are
  TTC-SS-P4: Two full duplex S-band channels
  TTC-SL-P4: One full duplex S-band channel and one full duplex L-band channel
  TTC-SX-P4: One full duplex S-band channel and one X-band transmit channel

VERSIONS OF TTC-P4:

NAME	L-BAND	S-BAND	X-BAND
UPLINK	1518 - 1560 MHz	2025 - 2110 MHz	-
DOWNLINK	1626 - 1675 MHz	2200 - 2290 MHz	7250 - 7750 MHz & 8025 - 8400 MHz
RX/TX	Full duplex	Full duplex	Transmit only
TX/RX POWER	Up 10 Mbps RX and TX	Up 10 Mbps RX and TX	Up to 100 Mbps TX
OUTPUT POWER	2W	2W	2W

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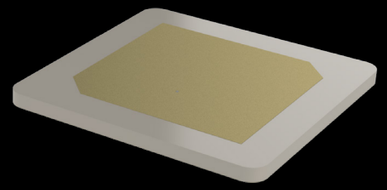

Compatibility:
1U and larger satellites

L-BAND SINGLE PATCH

This antenna design offers simplicity and efficiency, making it suitable for various applications like GPS systems, satellite communication, and remote sensing due to its ability to maintain a stable connection within this frequency range.

DESCRIPTION

An L-band single patch antenna is a compact and specialized microwave antenna designed for the L-band frequency range, typically spanning from 1518-1560 MHz or 1626-1675 MHz. There are multiple design options across different frequencies, and we can offer solutions tailored to specific needs. This antenna features a single port radiating patch element on a dielectric substrate and a ground plane, similar to other single-patch designs.

The patch is carefully engineered to resonate at L-band frequencies, making it ideal for applications in satellite communication, GPS systems, and remote sensing, where L-band signals are prevalent. These antennas are valued for their efficiency, simplicity, and reliability in delivering stable performance within the L-band frequency range.

KEY SPECIFICATION

UPLINK

Parameter	Typical Value	Unit
RF CHARACTERISTICS		
Operating Frequency Band	1518-1560	MHz
Return Loss <	-10	dB
Max Gain	6	dBi
Axial Ratio <	5	dB
F/B Ratio >	20	dB
Polarization	RHCP (LHCP optional)	
HPBW >	+/- 43	Degrees
Bandwidth >	42	MHz
Power Handling	2	Watts
PHYSICAL CHARACTERISTICS		
Mass	38	Gram
Dimension	77x60x4	mm^3
Connector Height	7	mm
INTERFACES		
Mechanical Interfaces	4xM3	
RF Connector	SMA	
Antenna Type	Patch	

Downlink

Parameter	Typical Value	Unit
RF CHARACTERISTICS		
Operating Frequency Band	1626-1675	MHz
Return Loss <	-10	dB
Max Gain	6	dBi
Axial Ratio <	5	dB
F/B Ratio >	20	dB
Polarization	RHCP (LHCP optional)	
HPBW >	+/- 46.5	Degrees
Bandwidth >	49	MHz
Power Handling	2	Watts
PHYSICAL CHARACTERISTICS		
Mass	38	Gram
Dimension	77x60	mm^3
Connector Height	7	mm
INTERFACES		
Mechanical Interfaces	4xM3	
RF Connector	SMA	
Antenna Type	Patch	

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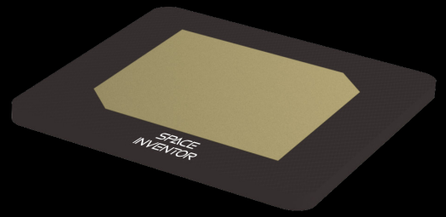

Compatibility:
1U and larger satellites

S-BAND SINGLE PATCH

An S-band is widely used in various applications, including satellite communication and radar systems, for its simplicity and effectiveness in this frequency range.

DESCRIPTION

An S-band single patch antenna is a compact single port antenna designed for the 2025-2110 MHz or 2200-2290 MHz S-band frequency range. There are multiple design options across different frequencies, and we can offer solutions tailored to specific needs. S-band patch antennas are favored for their directional radiation patterns, which can be fine-tuned for specific applications, and their ability to provide good gain and impedance matching.

They are often utilized in situations where high-frequency precision is required, such as in radar systems for target detection and tracking, or in satellite communication for data transmission between ground stations and satellites in Earth's orbit.

KEY SPECIFICATION

UPLINK

Parameter	Typical Value	Unit
RF CHARACTERISTICS		
Operating Frequency Band	2025-2110	MHz
Return Loss <	-10	dB
Max Gain	7.5	dBi
Axial Ratio <	5	dB
F/B Ratio >	20	dB
Polarization	RHCP (LHCP optional)	
HPBW >	+/- 43	Degrees
Bandwidth >	85	MHz
Power Handling	2	Watts
PHYSICAL CHARACTERISTICS		
Mass	28	Gram
Dimension	60x60x3.14	mm^3
Connector Height	3.4	mm
INTERFACES		
Mechanical Interfaces	4xM2.5	
RF Connector	Mini SMP	
Antenna Type	Patch	

Downlink

Parameter	Typical Value	Unit
RF CHARACTERISTICS		
Operating Frequency Band	2200-2290	MHz
Return Loss <	-10	dB
Max Gain	7	dBi
Axial Ratio <	5	dB
F/B Ratio >	20	dB
Polarization	RHCP (LHCP optional)	
HPBW >	+/- 43	Degrees
Bandwidth >	90	MHz
Power Handling	2	Watts
PHYSICAL CHARACTERISTICS		
Mass	28	Gram
Dimension	60x60x3.14	mm^3
Connector Height	3.4	mm
INTERFACES		
Mechanical Interfaces	4xM2.5	
RF Connector	Mini SMP	
Antenna Type	Patch	

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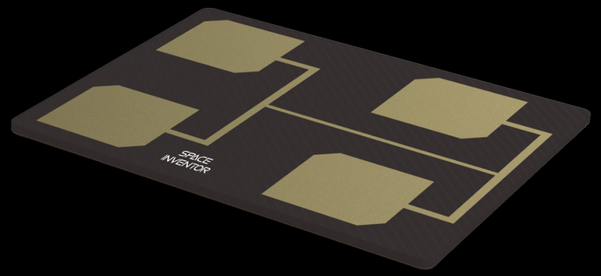

Compatibility:
6U and larger satellites

S-BAND 2X2 ANTENNA ARRAY

An S-band 2x2 antenna array is a compact yet powerful configuration of four antenna elements designed to operate in the S-band frequency range.

DESCRIPTION

An S-band is a compact and efficient single port antenna array designed for operating in the 2025-2110 MHz or 2200-2290 MHz frequency range. There are multiple design options across different frequencies, and we can offer solutions tailored to specific needs. It features four antenna elements on a substrate with a feed network, and have a single port offering improved gain, reliability, and versatility for applications like satellite communication, radar systems, and wireless networks. This antenna is particularly valued in satellite, maritime, and military settings for its stable performance in challenging conditions.

KEY SPECIFICATION

UPLINK

Parameter	Typical Value	Unit
RF CHARACTERISTICS		
Operating Frequency Band	2025-2110	MHz
Return Loss <	-10	dB
Max Gain	12.5	dBi
Axial Ratio <	5	dB
F/B Ratio >	20	dB
Polarization	RHCP (LHCP optional)	
HPBW >	40	Degrees
Bandwidth >	85	MHz
Power Handling	2	Watts
PHYSICAL CHARACTERISTICS		
Mass	167	Gram
Dimension	160x130x3.14	mm^3
Connector Height	3.4	mm
INTERFACES		
Mechanical Interfaces	8xM2.5	
RF Connector	Mini SMP	
Antenna Type	Patch	

Downlink

Parameter	Typical Value	Unit
RF CHARACTERISTICS		
Operating Frequency Band	2200-2290	MHz
Return Loss <	-10	dB
Max Gain	7	dBi
Axial Ratio <	5	dB
F/B Ratio >	20	dB
Polarization	RHCP (LHCP optional)	
HPBW >	40	Degrees
Bandwidth >	90	MHz
Power Handling	2	Watts
PHYSICAL CHARACTERISTICS		
Mass	167	Gram
Dimension	160x130x3.14	mm^3
Connector Height	3.4	mm
INTERFACES		
Mechanical Interfaces	4xM2.5	
RF Connector	Mini SMP	
Antenna Type	Patch	

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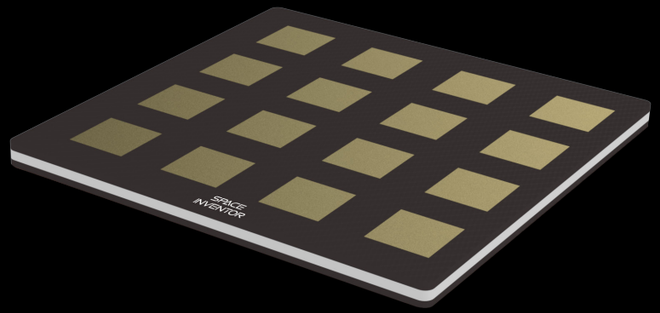

Compatibility:
6U and larger satellites

X-BAND 4X4 ANTENNA ARRAY

This configuration provides exceptional performance, making it crucial for advanced radar systems, satellite communication, and high-frequency applications requiring precise directional control and enhanced signal strength.

DESCRIPTION

An X-band 4x4 antenna is a high-frequency single port array designed to operate in the X-band frequency range, typically ranging from 7250-7750 MHz. There are multiple design options across different frequencies, and we can offer solutions tailored to specific needs.

It is known for its compact size and high-performance capabilities, making it ideal for a wide range of applications, including radar systems, satellite communication, weather monitoring, and defense technologies. X-band antennas are valued for their ability to provide precise and focused beam patterns, making them suitable for applications requiring high-resolution and accuracy in both transmission and reception. Their versatility and reliability have made them a crucial component in modern communication and sensing systems.

KEY SPECIFICATION

Parameter	Typical Value	Unit
RF CHARACTERISTICS		
Bands	7250-7750	MHz
Gain	13-14.5	dBi
Return Loss	< -10	dB
Polarization Type	RHCP (LHCP Optional)	
HPBW	17-18	degrees
Axial Ratio	< 5	dB
Impedance	50	Ohm
Efficiency	< 85	Percent
PHYSICAL CHARACTERISTICS		
Dimension	95x95x5	mm^3
SMP	Male	

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Compatibility:
1U and larger satellites

UHF/VHF MONOPOLE ANTENNA

The UHF/VHF monopole antenna for Satellite is a high-performance, compact antenna designed specifically for satellite communication applications in the UHF & VHF bands. This antenna is a critical component of satellite systems, facilitating reliable data transmission and reception.

There are multiple design options across different frequencies, and we can offer solutions tailored to specific needs.

DESCRIPTION

The UHF/VHF monopole antenna is a 2-element version antenna, where the modularity of the antenna construction and the boom allows the UHF monopole to expand to any number of elements given the size constraints of the satellite and any stiffness requirements.

The rigidity of the deployed antenna comes from tension of the inter-element stabiliser sheets which are held in tension by the continuous outward force of the folded strips.

FEATURES

- Gain >2 dBi over the band 250-270 MHz
- Gain >2 dBi over the band 399-405 MHz
- Return loss below -10 dB
- Linear polarised antennas
- Two antenna elements are placed 90 degrees from each other which provides omni-directional coverage.
- Both Antennas have type doughnut type radiation patterns
- Modular design philosophy where design can be optimised to customer requirements
- Customisable RF features
- Scalable for a range of applications
- Flight-proven design for both deployment and operational mode on commercial satellites with concept of yagi antenna
- Optimised for volume production
- Low mass and complexity

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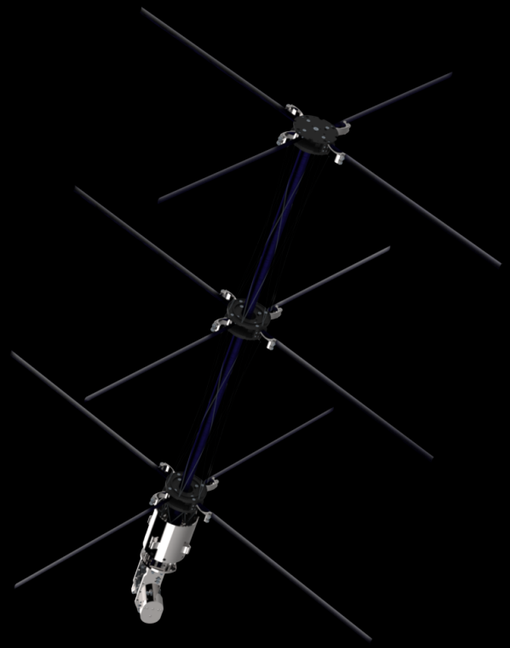

Compatibility:
6U and larger satellites

VHF YAGI

VDE-SAT 3-Element Crossed Yagi Deployable Antenna.

DESCRIPTION

The Yagi-3X is the 3-element version of Space Inventors modular deployable YAGI antenna based on a titanium STEM boom system. The modularity of the antenna construction and the boom allows the YAGI to expand to any number of elements given the size constraints of the satellite and any stiffness requirements.

The rigidity of the deployed antenna comes from tension of the inter-element stabiliser sheets which are held in tension by the continuous outward force of the STEM boom. This provides excellent torsional rigidity and does not rely on the STEM boom itself to possess any rigidity as long as the outward force does not exceed the margin for buckling.

There are multiple design options across different frequencies, and we can offer solutions tailored to specific needs.

FEATURES

- Gain >7 dBi over the band 157-163 MHz
- Return loss below -10 dB
- Circularly polarised Yagi antenna
- RHCP and LHCP on 90-degree hybrid ports
- Modular design philosophy where design can be optimised to customer requirements
- Customisable RF features
- Scalable for a range of applications
- Flight-proven design for both deployment and operational mode on commercial satellites
- Optimised for volume production
- Low mass and complexity
- Stowage efficient
- Utilises tuna can for spacecraft space optimization

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