



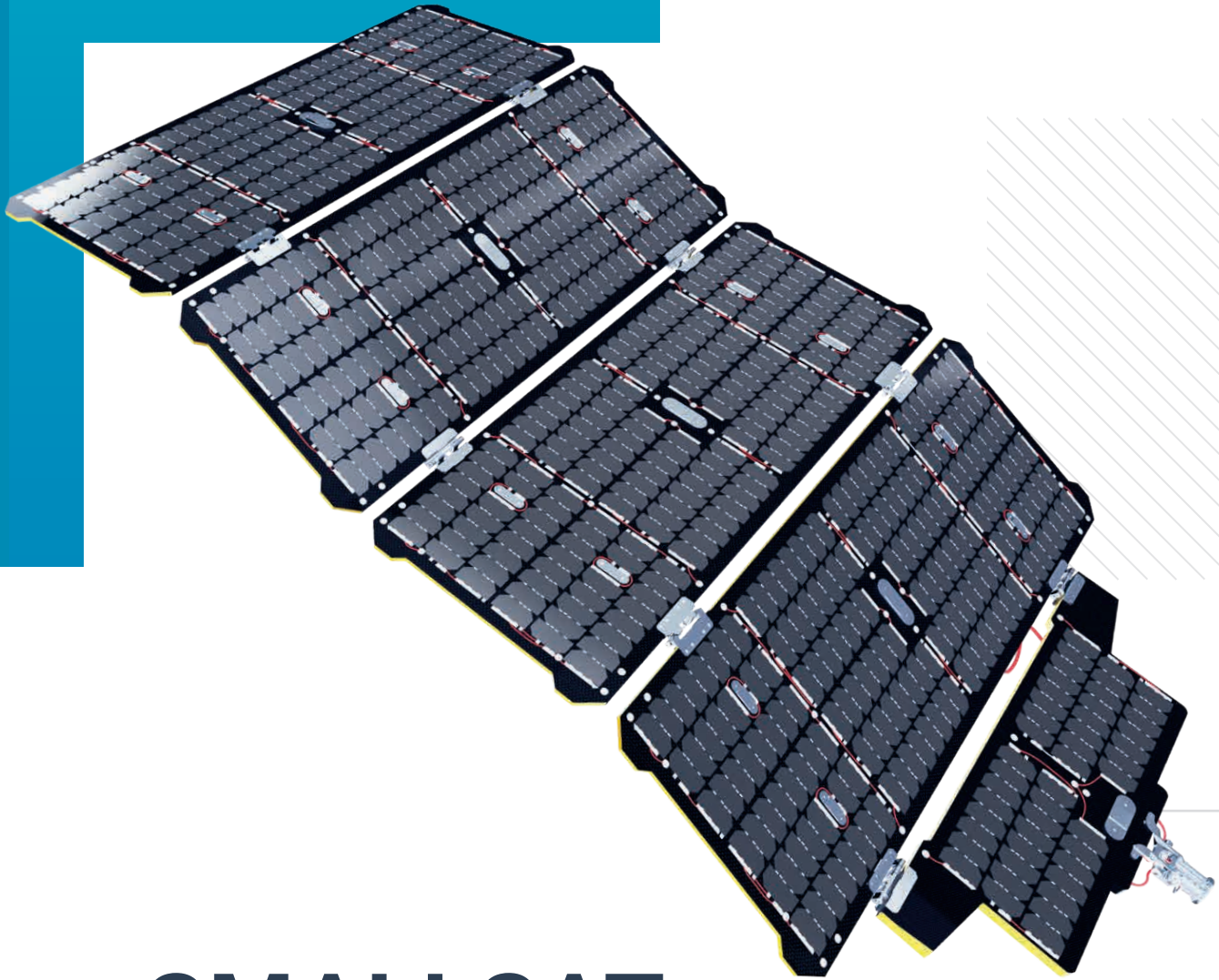
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dhvtechnology.com



SMALLSAT POWER SOLUTIONS

High-quality solar panels and power subsystems for Small Satellites.

Products overview for Small Satellites

Deployable and body mounted solar panels, PCDU, MLI blankets and qualification services.



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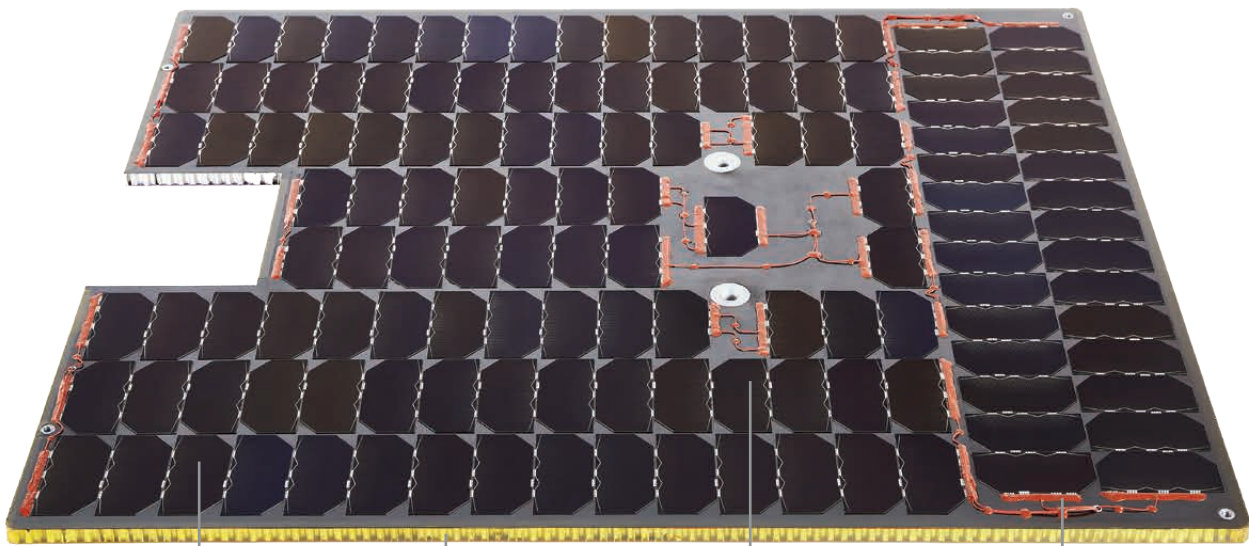
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Solar Panels for SmallSats

• Body mounted solutions

We have a wide experience manufacturing and developing body mounted solar array solutions for small satellites.

Our solar arrays are customized solutions in order to meet the power requirements from our client's missions and provide the maximum efficiency with the challenge of meeting the highest space industry standards.



High quality solar cells

Multi junction assembly with 30% efficiency class

Laydown design

Design of the most efficient configuration to provide the maximum power

Space qualified substrates

Customized substrate with different configurations

ATOX protection

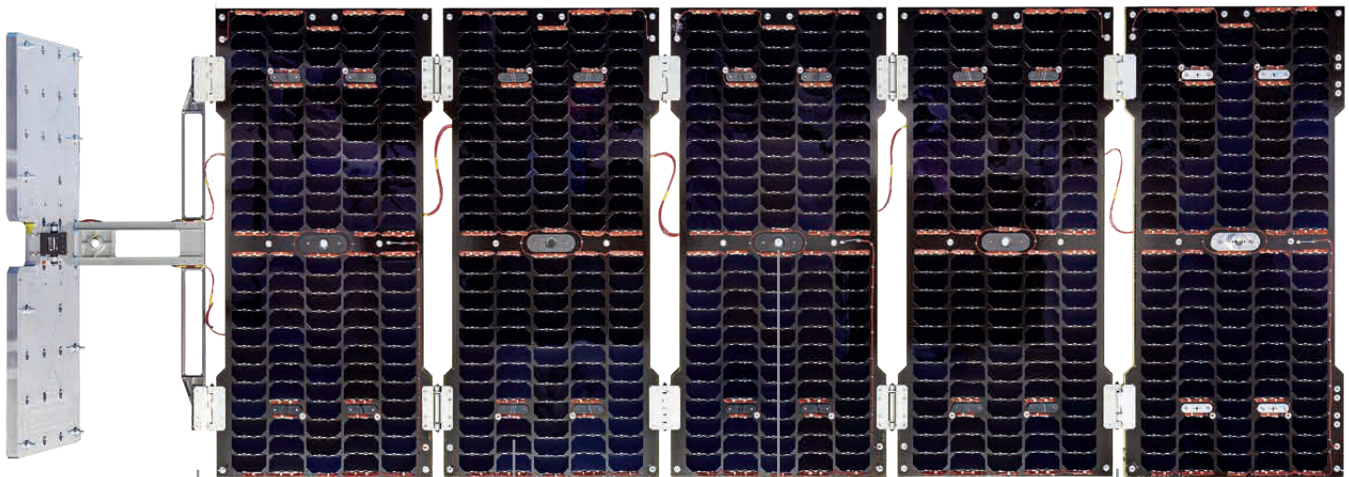
Soldered or welded connections protected by an ultra-low outgassing polymer

A long heritage of more than 150 satellites flying with our technology and working with the top worldwide companies of the aerospace industry, support our experience supplying high-quality solar array solutions.

• Deployable solutions

When more power is required, we design and manufacture different deployable configurations providing a complete solution to our customers, including mechanical parts, EEE components and integrating deployment systems and sensors.

Our deployable solar panels also guarantee the highest levels of reliability thanks to a complete test and qualification campaign carried out before delivering the manufactured hardware to our customers.



Yoke design

Customized yoke design and mechanical parts

Deployment mechanisms

HDRM integration in deployable configurations

Snubbers integration

Improvement of the stiffness of the solar array in stowed position

Hinges design

Customized hinges and latching systems design with different deployable angles

Key features

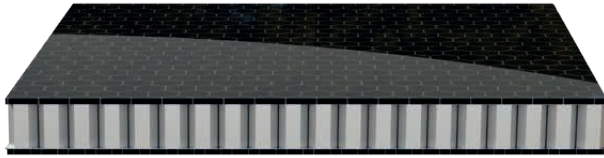
- Customized laydown design according to mission requirements
- High and low temperature resistant materials
- TRL9 solar cells up to 30% efficiency
- Body mounted and deployable configurations under request
- Qualification and test campaign under request

All components and processes are qualified for space environment

Solar Panel Substrates

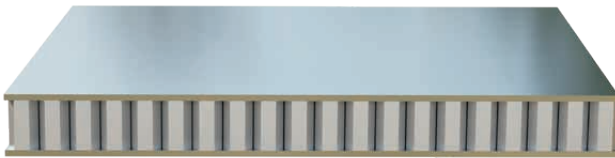
• Materials and technologies

Our solar arrays are manufactured on different substrates in order to provide the most efficient solution in terms of mass, strength and thermal efficiency.



CFRP skins with honeycomb core

Carbon fiber reinforced polymers skins with aluminium honeycomb core



Aluminium skins with honeycomb core

Sandwich-structured aluminium honeycomb with aluminium skins



Monolithic CFRP substrate

Reinforced composite to ensure more flexibility



PCB polyimide based substrate

High resistance to temperature gradients film with a high dielectric strength

Key features

- Customized solutions: dimensions, geometry, skins, cores, insulation layers, etc.
- Honeycomb core structures
- CFRP (Carbon fiber reinforced polymer) and aluminium skins
- ATOX protection under request
- Low outgassing properties

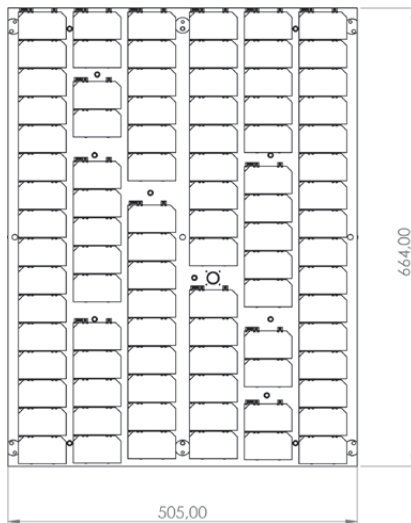
All components and processes are qualified for space environment

Laydown Design

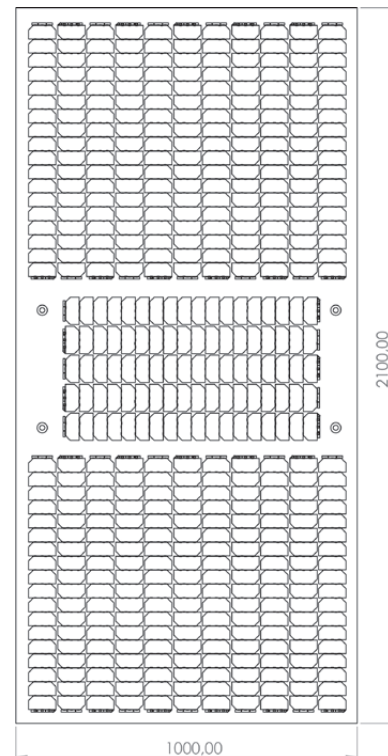
- Power and efficiency

Our knowhow, experience and heritage back up to support our customers analyzing their mission and power requirements, to finally provide a reliable and efficient solution.

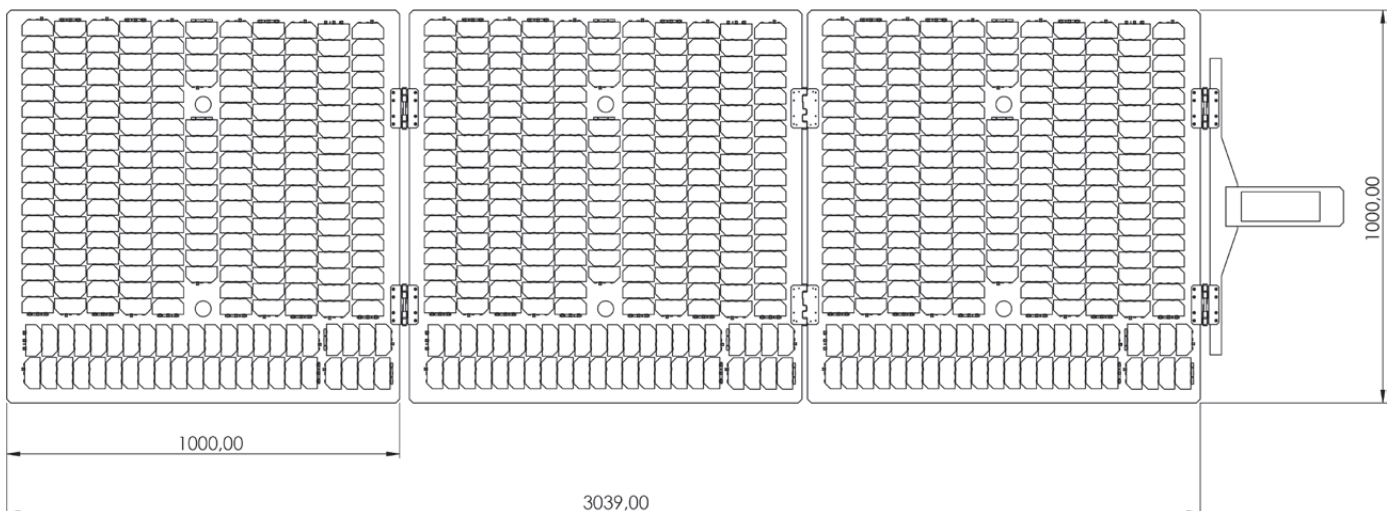
100 W



500 W



1000 W

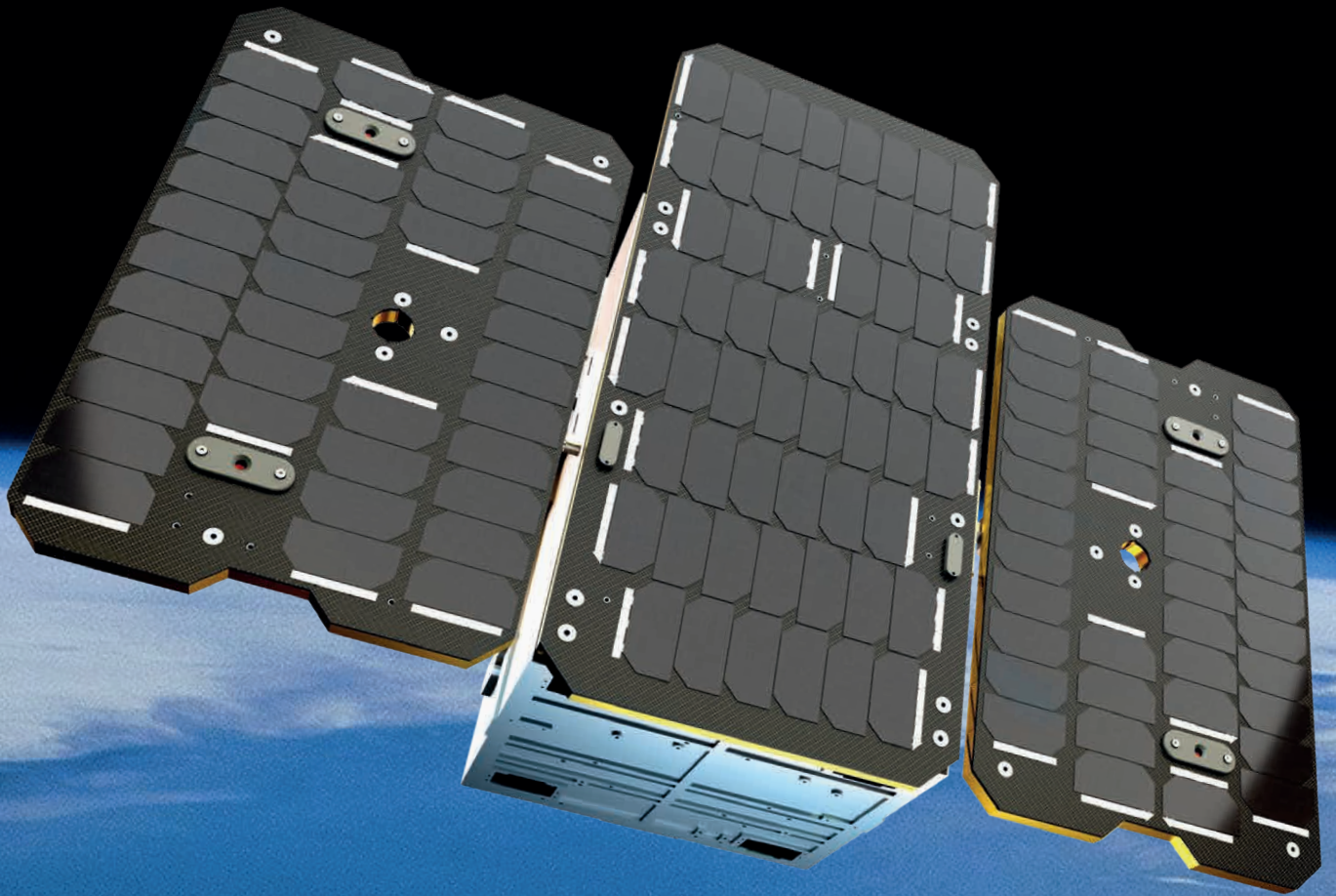


Custom Solutions

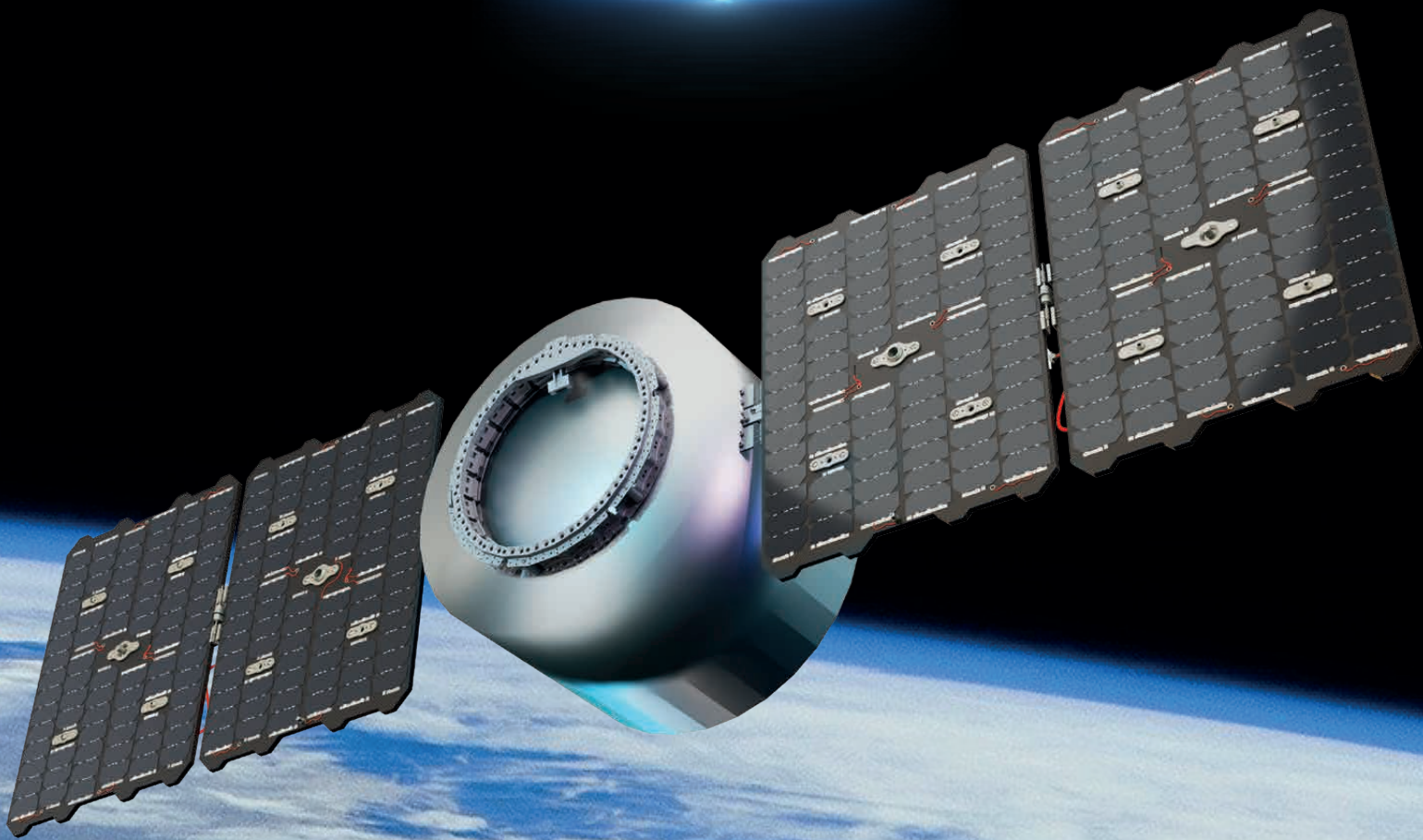
- Do you need a custom solution?

Do not hesitate to get in touch with us to support your mission with our technology and knowhow.

Our team of experts will be glad to analyze your mission and power requirements to provide the best solution in terms of mass, power and lifetime.



We are open to hearing from your
project and mission requirements



Power Conditioning Distribution Unit

• PCDU - Power supply and storage

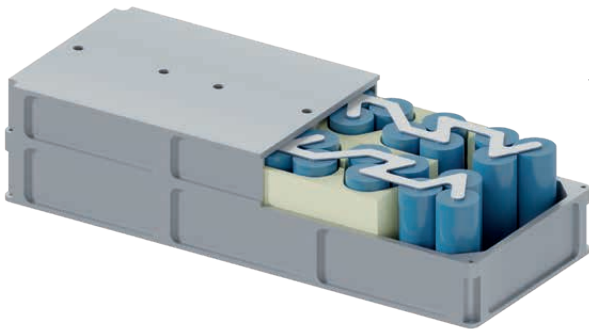
The Power Conditioning and Distribution System PCDU has been designed to be integrated into different SmallSats systems.

This PCDU is developed to provide an efficient power supply and control for any type of mission and it is composed by a power management module and a battery module.



The Power Module of the PCDU is the interface that manages the power of the solar panel inputs, the battery charge and the HDRM control for solar array deployment.

This module is scalable starting at 900W.



The Battery Module of the PCDU is responsible for energy storage, battery thermal control and contains the circuit protection against overloads, over discharges, over currents and short circuits with a 415Wh ~ 1600Wh capacity.

* Images for commercial purposes only

Key features

- Scalable equipment, starting at 900W
- Maximum Power Point Tracking (MPPT)
- HDRM control for solar array deployment
- LFP cells with heaters
- 415Wh ~ 1600Wh capacity with integrated battery cells balancing
- Space qualified

POWER MODULE	BATTERY MODULE
Power generation <ul style="list-style-type: none"> • 8 BCR ~ 16 BCR, 175W per BCR • Maximum input power: 1.4 KW ~ 2.8KW • Solar arrays input voltage: 20V ~ 70V • Battery Charge Regulators Efficiency > 95% Output buses <ul style="list-style-type: none"> • Regulated 3.3V bus (10A ~ 20A max.) • Regulated 5V bus (10A ~ 20A max.) • Regulated 12V bus (10A ~ 20A max.) • Unregulated battery bus (24A ~ 48A max.) • 24 ~ 48 switched and selectable current limited (LCL) outputs • 4 unswitched but current limited (LCL) outputs • Power output efficiency > 90% • Other output voltages available under request 	Electrical parameters <ul style="list-style-type: none"> • Voltage: 27V (discharged) / 28.8V (nominal) / 31.5V (fully charged) • Maximum charge current: 13A per module • Maximum discharge current: 32A per module • Capacity: 415Wh per module (1600Wh max.) • Battery cells: LiFePO₄ (9 in series, 4 in parallel) Battery management <ul style="list-style-type: none"> • LFP cells with heater • Integrated battery cells balancing • Built-in protection: overvoltage, undervoltage, overcurrent and short-circuit • Capacity status and aging estimation • Temperature control (embedded heaters)

SPECIFICATIONS FOR BOTH MODULES

Mechanical specifications

- M4-M5 fastened interface
- PCB material: FR4, High Tg

Mass

- Power module: 1.9Kg ~ 2.6Kg
- Battery module: 4.6Kg

Environmental and functional tests

- Electrical health check
- Vibration (NASA GEVS levels, other under request)
- Thermal cycling test (high vacuum, -40 to +85 °C)
- Radiation TiD 20 Krad

Manufacturing

- PCB IPC Class III
- Assembled in clean room ISO 8 class

Dimensions

- Power Module:
250x180x86 mm ~ 250x180x142 mm
- Battery Module:
250x180x76 mm

Telemetry and control

- TC/TM via Ethernet or CAN Bus
- Transmission error detection codes
- TM voltages, currents, temperatures, capacity, status registers and flags errors
- FPGA controller redundancy under request

Inhibits

- Two redundant kill switches
- One remove before flight switch



- Technical support within 24h
- Customization available under request
- 3D CAD files
- Integration with solar arrays
- EGSE (optional)

Multi-layer Insulation Blankets

• MLI Blankets - Thermal Insulation



We also manufacture and provide Multi-Layer Insulation (MLI) blankets for complex geometries, space instruments and satellites.

The MLI blanket is a thermal insulation conformed by multiple layers of optical and electrically conductive materials separated by a thin netting spacers.

MLI is a fundamental piece in the spacecraft thermal design and critical in preserving the spacecraft from the space extreme temperatures.

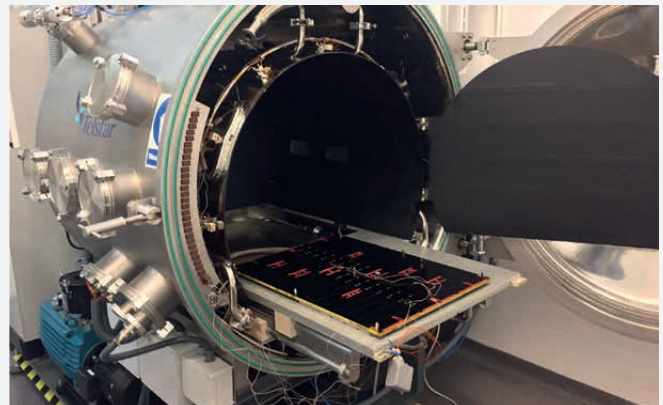
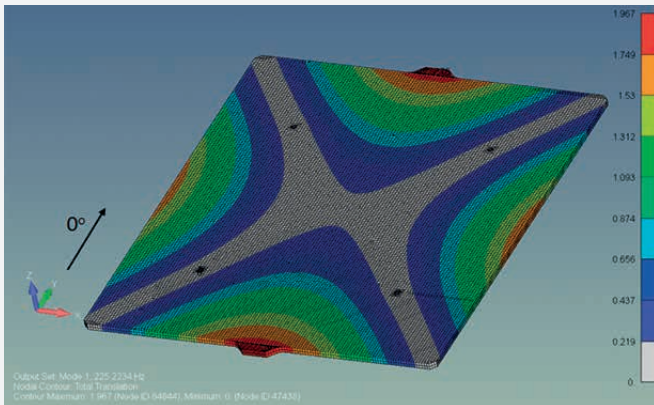
Our production process is adapted to our customers choosing advanced materials with an outstanding performance meeting the customer needs. All the manufacturing process are carried out in our facilities with a dedicated ISO Class 8 temperature and humidity controlled clean room.



Qualification & Testing

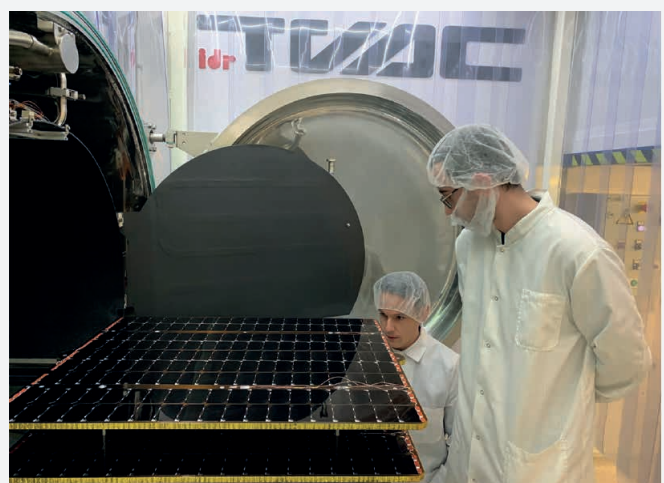
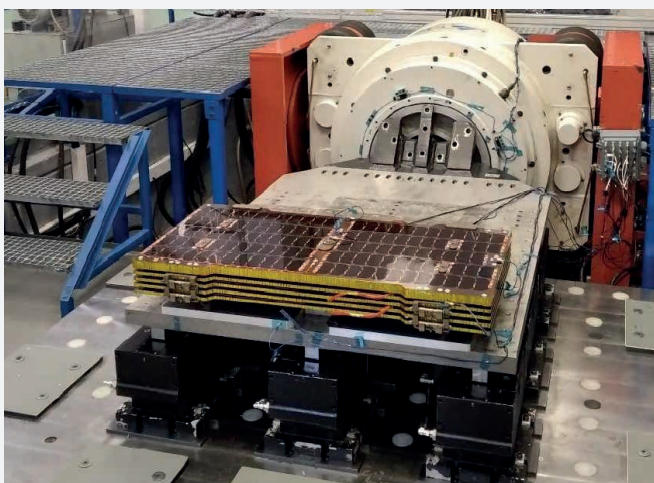
• Services

Before delivering solar panels, we carry a test campaign to our manufactured solutions under request in order to qualify them for the space environment.



These different tests could vary depending on the customer requirements and mission features, covering different fields such as:

- Random vibrations
- Sine vibrations
- Thermal vacuum cycling tests
- Acoustic tests
- Deployment tests
- Standard functional tests



ABOUT US

DHV Technology is a Spain based international company that designs and manufactures solar panels for space applications and other power subsystems for different platforms.

DHV Technology has been providing tailor-made solar arrays systems to different international companies at the same time the company has been developing different power subsystems implementing the most advanced technologies.

Our facilities, with a total of 3700 m², consist of:

- 1200 m² clean room
- 1000 m² offices
- 1500 m² warehouse and others



250+

Projects completed

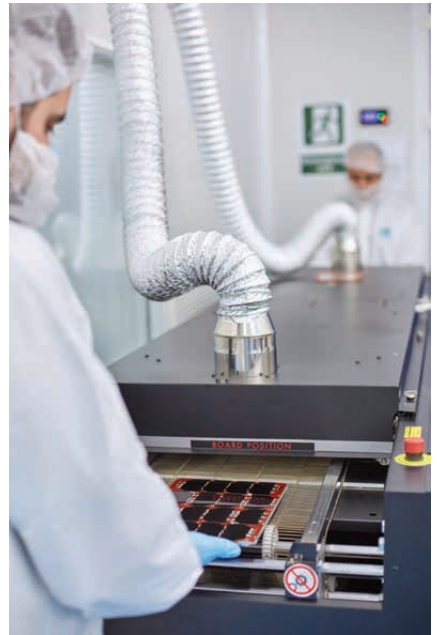
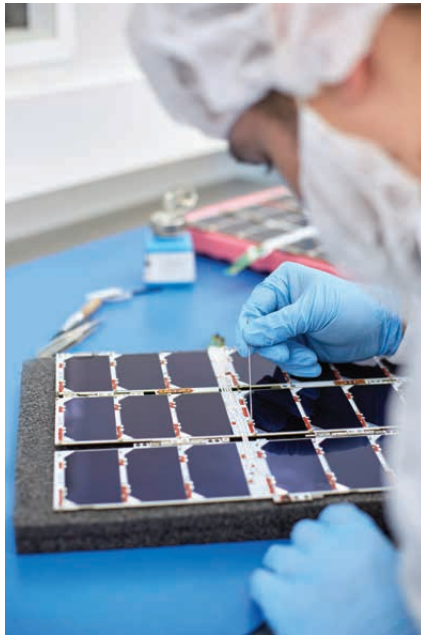
3000+

Days in orbit

150+

Satellites flying
with our solutions





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