



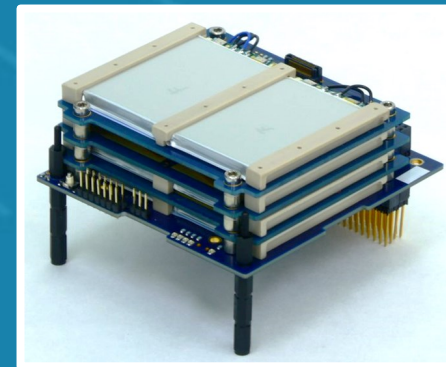
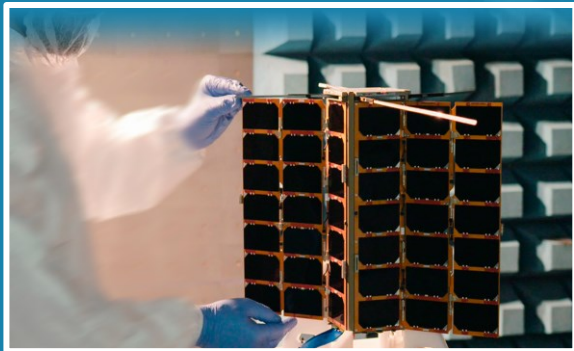
DHV Technology

CDW2021

Power Subsystems for Cubesats

Dr. Miguel A. Vazquez

Managing Director & Co-Founder



Outline Presentation

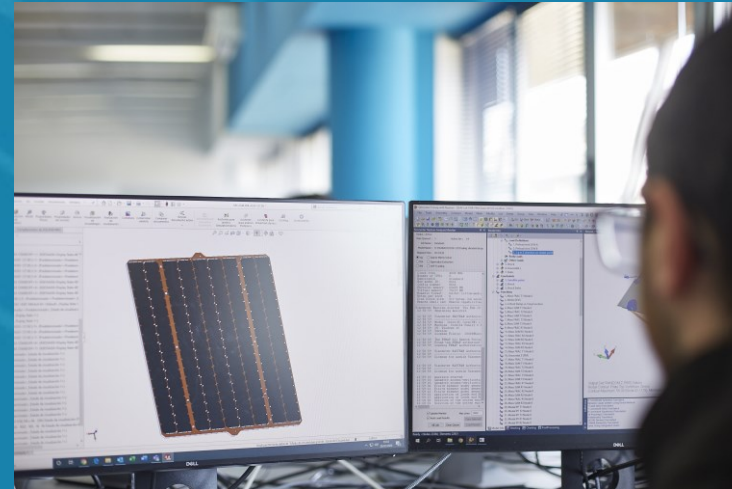
- **Company Description**
- **Portfolio of products**
- **Solar Panel for Cubesats**
- **Other power subsystems components**
 - **Battery Module / Power Conditioning Module**
 - **SADA for CubeSats**
- **Some relevant missions**

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Company Description

- DHV Technology was funded in 2013, located in Malaga (Spain)
- Staff: 60 employees focused on Mechanical & Electrical design, Power Subsystem, FEM analysis and simulations, solar panel testing and validation, solar cell assembly.
- Facilities: 3700 m². ISO-8 clean room 1200 m²



Our customers



Flight Heritage (Feb 2021)

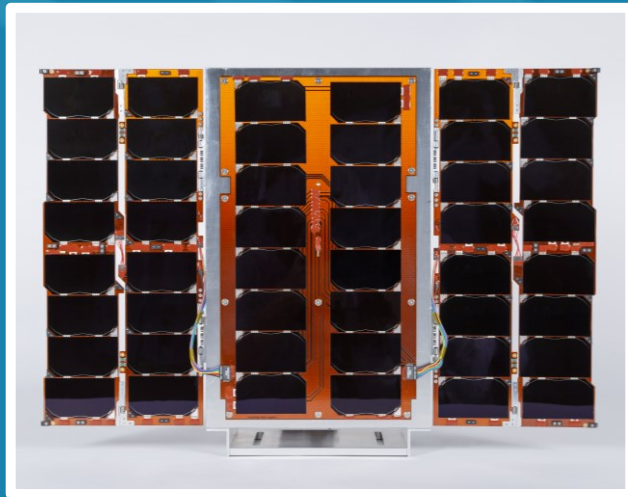
TYPE	CUSTOMER	MISSION	DESCRIPTION	QTY	QTY	QTY
Cubesats	SPIRE GLOBAL	LEMURs	Double Deployable 3U	25	88	115
	SPIRE GLOBAL	LEMURs	Triple Deployable 3U	49		
	OHB IT	EAGLET-I	Double Deployable 3U	1		
	ASTROCAST	ASTROCAST X1-X5	Triple Deployable 3U	5		
	GUMUSH	ASELSAT	Double Deployable 3U	1		
	NTU	AOBA-VELOX-IV	Double Deployable 2U	1		
	HEMERIA	ANGELS	Double Deployable 12U	1		
	OpenCosmos	QBEE-I	2U Body mounted	1		
	SkyFox Labs	Solar cells	Solar cells	1		
	CICESE	Painani 1	3U Body mounted	1		
	ISIS	DIDO-3	3U Simple deployable	1		
University of Maribor	TRISAT	3U Simple deployable	1			
Smallsats	ICEYE	ICEYE-X1, X2, X4, X5, X6, X7, X8, X9, X10	SmallSat (deployables)	9	27	
	GAUSS	UNISAT-6	SmallSat (body mounted)	1		
	Satellogic	ÑUSAT	Smallsat (Body mounted)	13		
	D-Orbit	ION-SCV 1, ION-SCV 2	Smallsat (Body mounted)	2		
	ROCCOR	GNOMES-I	Smallsat (Deployable)	1		
	OHBS	GMS-T	Smallsat Body Mounted	1		

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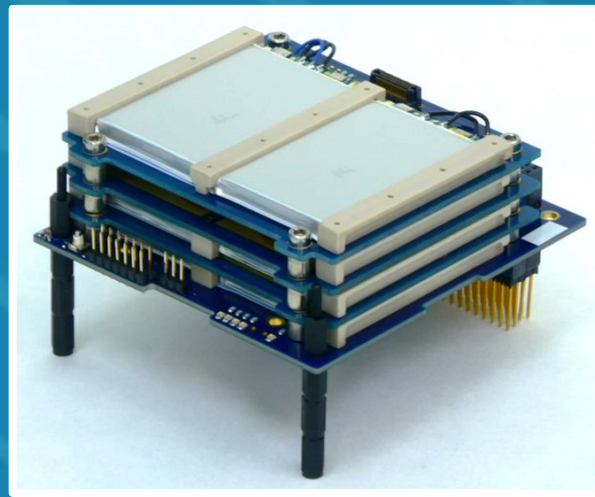
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Portfolio of products

Solar Panels



Power Storage/Control

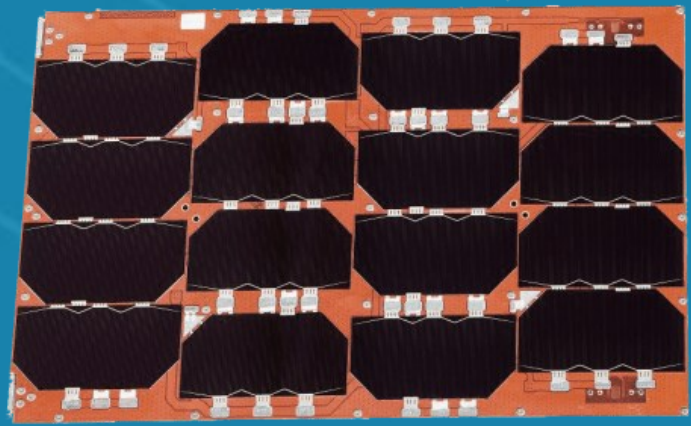
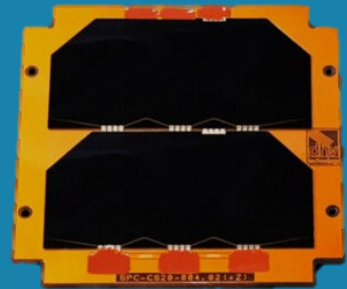
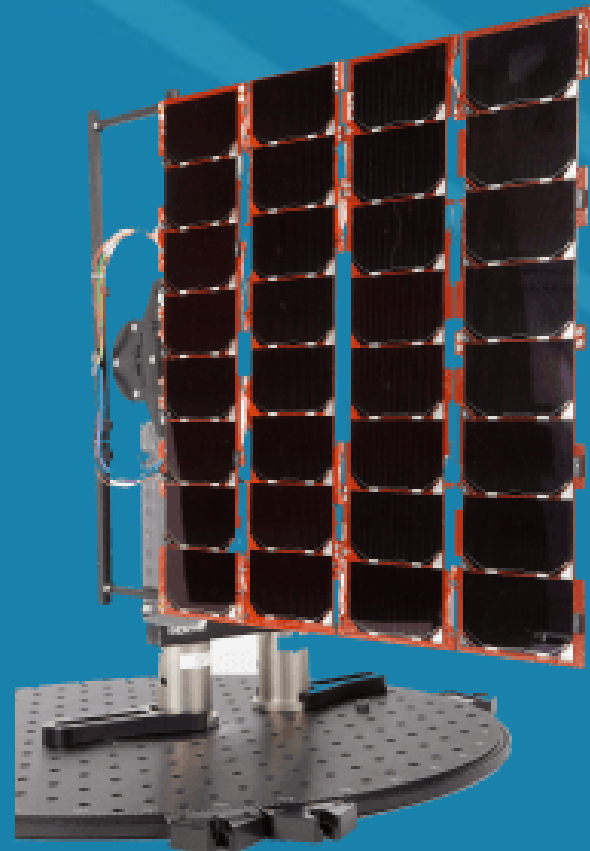


Solar Panel Drives Assembly



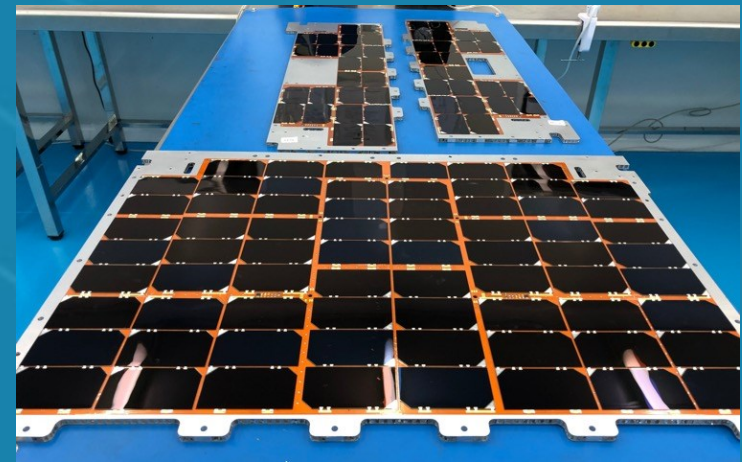
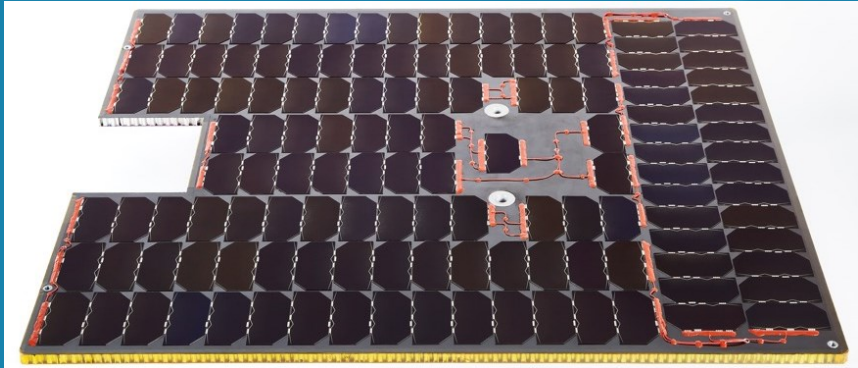
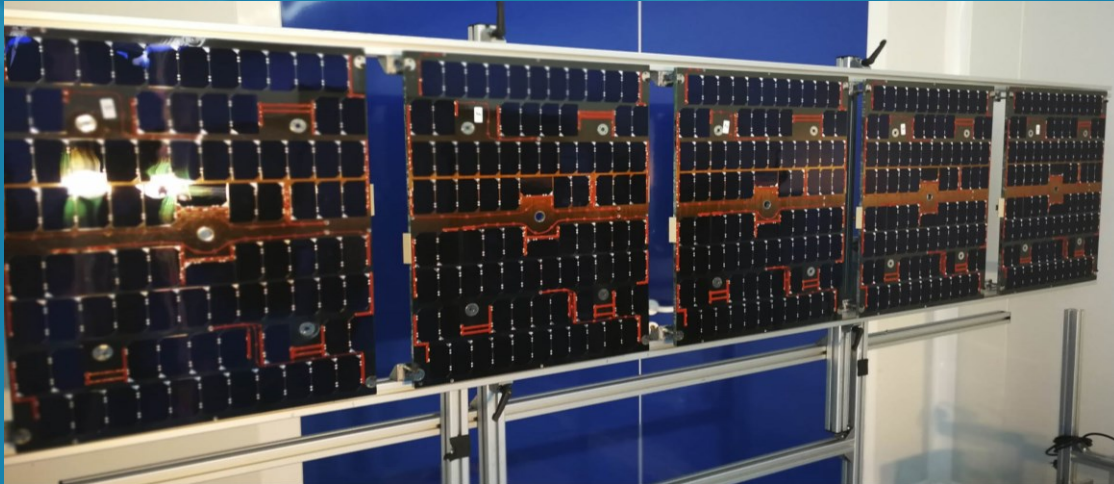
Portfolio of Products

Solar Panel for Cubesats



Portfolio of Products

Solar Panel for SmallSats

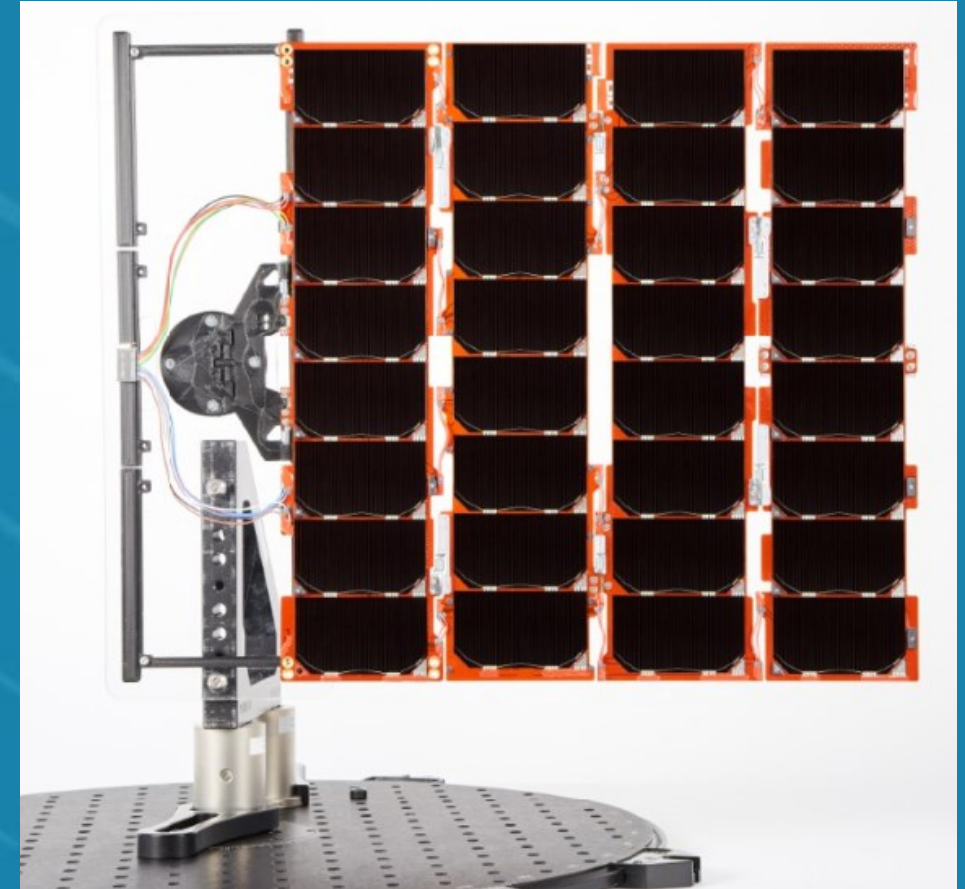


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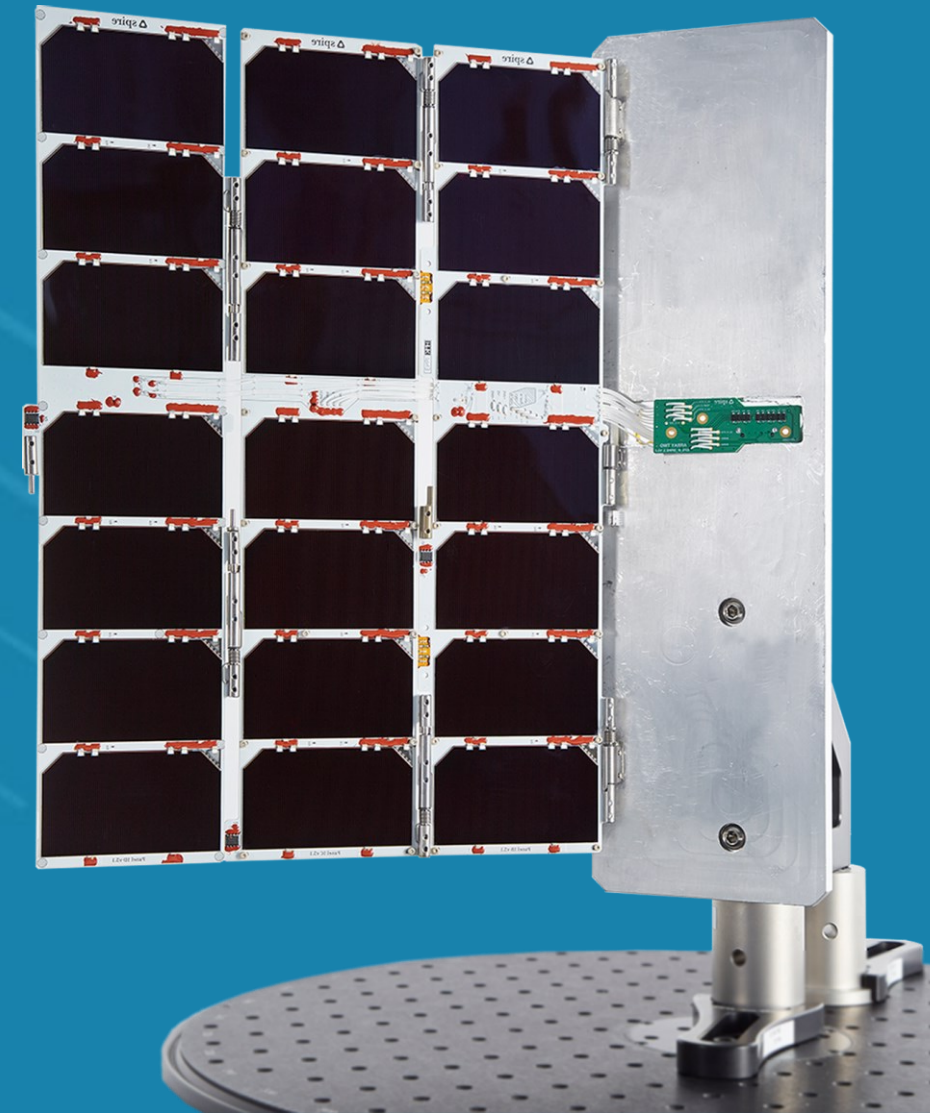
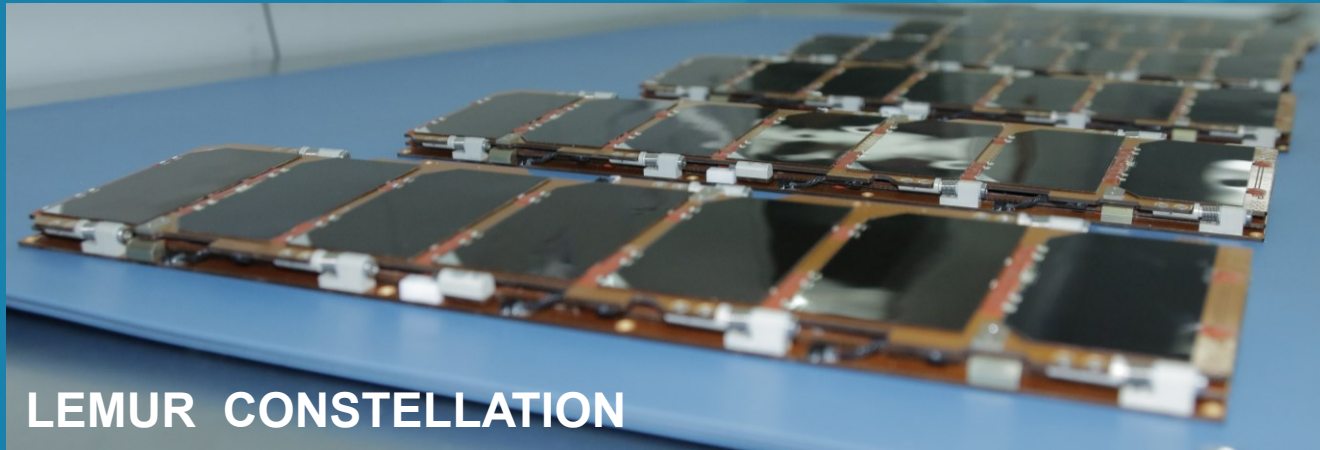
Solar Panel for Cubesats

- **Standard solutions**
 - **Compatible with the most of the structures**
 - **Low-cost approach**
 - **Qualified parts and materials**
 - **Fast delivery time**
- **Customized solutions**
 - **Fulfil customer requirements**
 - **Qualification or proto-flight models available**
 - **Co-engineering and testing phase**



Solar Panel for Cubesats

- **Deployable Solutions**
 - Compatible with the most common dispensers
 - Thermal knife solutions
 - Hinges deployed using torsion springs
- **Constellation projects**



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Other Power Subsystems

DHV Battery Module



DHV Power Conditioning Module



TRL-9 Q2 2021

- Scalable design: up to 40 Wh capacity
- PC-104 form factor

- Scalable design: from 3 to 8 BCR
- PC-104 form factor

SADA for CubeSats

- The Solar Panel Drive Assembly (SADA) for CubeSats is a rotatory system which increases power generation of CubeSat solar arrays.
- Gimbal for one-axis concept
- PC104 form factor
- SADA system can hold a total of 15 signals per wing
- It is designed to rotate up to +/-180 degrees.
- Customization also available upon request
- Suitable for 3U, 6U, 12U
- Up to 120W



- Lightweight Design
- Flight Heritage 1Q 2022

TRL-9 Q1 2022

Outline Presentation

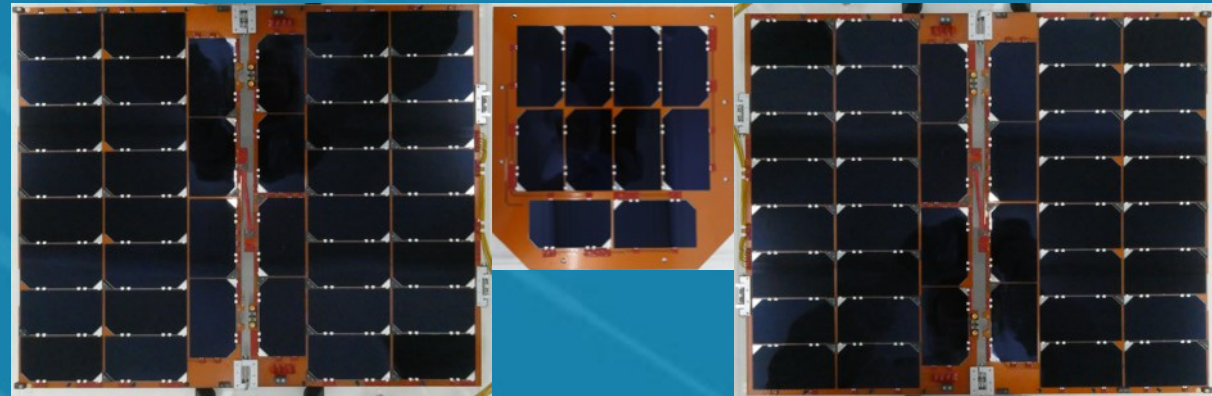
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Some relevant missions

Angels mission – HEMERIA France & CNES

12U CubeSat platform:

- 90 solar cells
- 108 W BOL
- TRL 9 (Q4 2019)



Vibration, Shock, and TVAC tests.

Launch was on 18th Dec 2019 from Soyuz



Some relevant missions

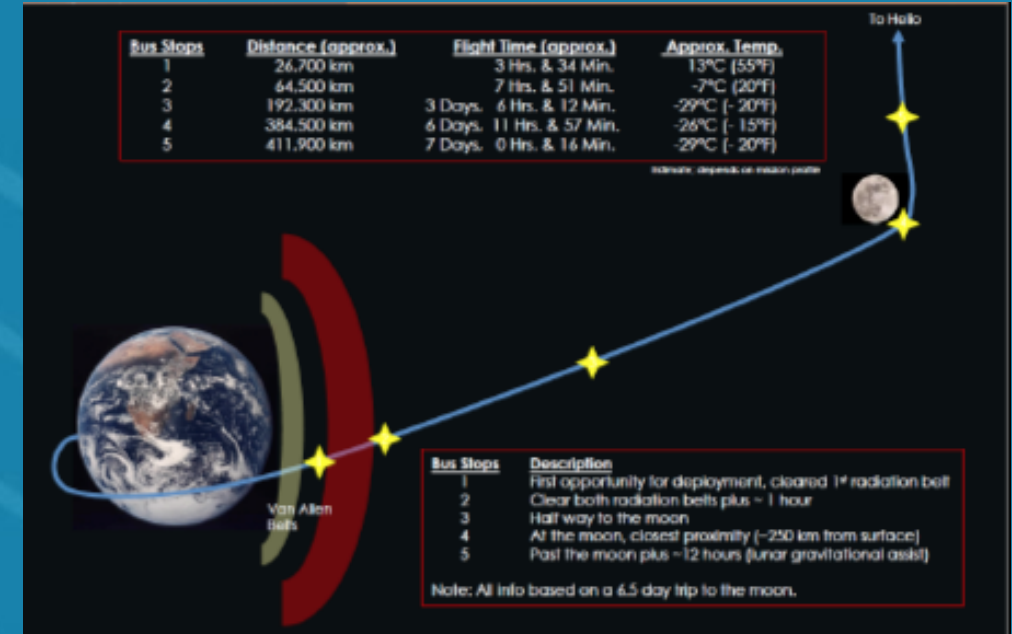
ArgoMoon mission – Argotec

6U CubeSat platform:

- 80 W BOL
- TRL 8

Built by Argotec and coordinated by Italian Space Agency.

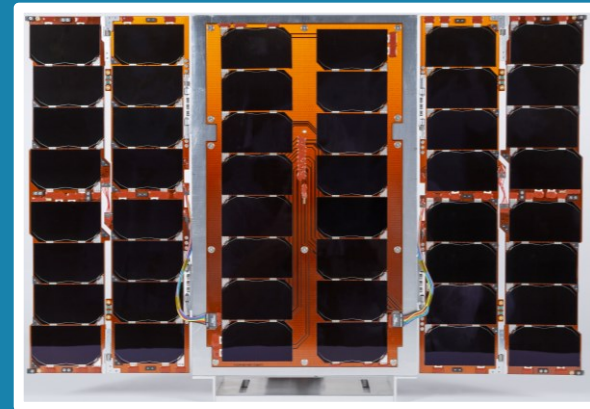
Secondary payload of Exploration Mission 1 of SLS from NASA.



Some relevant missions



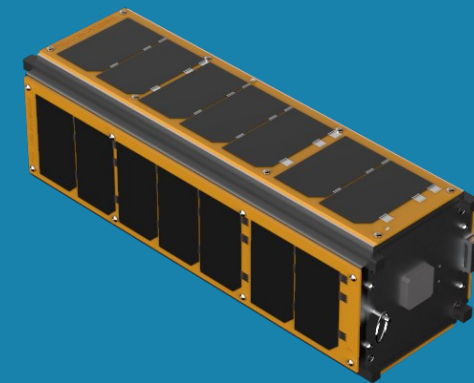
The GTOSat mission is a scientific mission developed by NASA GSFC, The Aerospace Corporation and University of Iowa based on a 6U CubeSat platform to study the electron dynamics in the outer radiation belts.



The SNOOPI mission “SigNals of Opportunity: P-band Investigation” will validate a remote-sensing technique. It is a 6U Cubesat mission developed by Purdue University. Spacecraft by NASA GSFC.



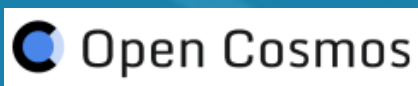
TRISAT-R Mission (MEO), investigate and map ionizing radiation in MEO orbits using several different instruments. It is a 3U Cubesat with body mounted panels of 8W with a special design for Solar cells for high radiation environment.



Customers



NASA GODDARD



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LET US GIVE POWER TO YOUR SPACE MISSION !