DEFENCE AND SPACE
Space Products

STELLAR-BATT

A battery product line made for LEO constellations

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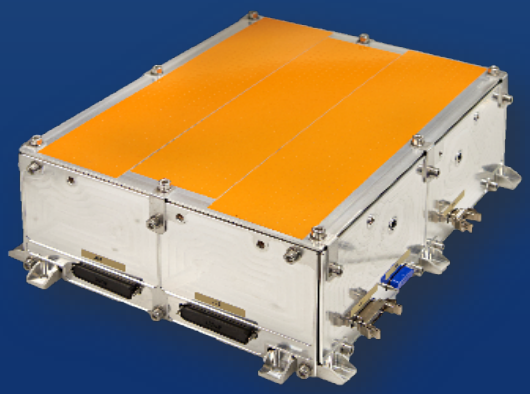

STELLAR-BATT is a product line developed by Airbus Space for **LEO constellations**. It has a strong **flight heritage** as this product is used on the OneWeb satellite constellation, with more than **630** satellites in orbit (first launch in February 2019).

The **STELLAR-BATT** product line consists of **two different modules** that can be used stand-alone or in series/parallel:

- **STELLAR-BATT Small** (-S) – providing ≈ 1,700 Wh, designed for an external mounting configuration, thermally insulated from the spacecraft. The module has its own radiator.
- **STELLAR-BATT Large** (-L) – providing 900 to 3,600 Wh (modular configuration). Thermal management of the unit is ensured by direct contact between the unit baseplate and the spacecraft panel.

To meet the new challenges of the space industry and to achieve a breakthrough in the battery market, the module is equipped with automotive EEE COTS components and COTS lithium-ion cells, fully qualified by Airbus for Space applications and with flight heritage.

Thanks to its industrial design, **STELLAR-BATT** offers **competitive lead times** and **high production rates** on Airbus's dedicated Battery Assembly Line in Toulouse (France).

AIRBUS

		STELLAR-BATT Small (-S)	STELLAR-BATT Large (-L)			
			1 BRICK	2 BRICKS	3 BRICKS	4 BRICKS
Electrical	Battery type	COTS Li-ion				
	Voltage range	22.5 to 37.8 V *Recommended use at 36.9 V during cycling operations*				
	Nominal capacity[1]	51 Ah	27.2 Ah	54.4 Ah	81.6 Ah	108.8 Ah
	Nominal energy[1]	1,685 Wh	900 Wh	1,800 Wh	2,700 Wh	3,600 Wh
	Energy density	170 Wh/kg	90 Wh/kg	135 Wh/kg	155 Wh/kg	170 Wh/kg
	Max. continuous charge current	15 A	27.2 A	30 A	30 A	30 A
	Max. continuous discharge current	15 A	27.2 A	54.4 A	81.6 A	108.8 A
	Max. pulse discharge current	55 A (< 22.5 min.) 70 A (< 1 min.)	41 A (< 1 min.)	82 A (< 1 min.)	122 A (< 1 min.)	140 A (< 1 min.)
Physical characteristics	Dimensions (L x W x H)	338 x 275 x 110 mm	434 x 400 x 114 mm			
	Weight	9.8 kg	10 kg	13.7 kg	17.4 kg	21.1 kg
Environment	Mounting configuration	Inside the S/C	Inside the S/C			
	Thermal control	Radiative through module own radiator on top	Conductive coupling between unit baseplate and S/C panel			
	Vibrations	Sine: 20 g Random: 8.5 g RMS in plane, 11.6 g RMS out of plane	Sine: 20 g Random: 9.3 g RMS in plane, 12.6 g RMS out of plane			
	Shock	20 g 100 Hz, 2,000 g 2 kHz, 2,000 g 10 kHz				
	Radiation	8.5 years in LEO, SEP tolerant	9.5 years in LEO, SEP tolerant			
Embedded functions	Thermal hardware	3 regulation thermistors 4 heaters, 2 nominal and 2 redundant	3 regulation thermistors 4 double-layer heaters			
	Electronics	Passive balancing function Timer (delay between strap removal and ON state) ON/OFF power switch (based on straps connection/disconnection) Shunt current measurement				
Use case example	Mission type	LEO, 9.5 years				
	Typical cycle life	On ground: 2 years at +25°C, 50% SoC 6 months at +25°C, 100% SoC In operation: 9.5 years 52,000 cycles at mean C/2, 15% DoD				
	Nominal temperature range (at cell level)	+10 to +40°C Startup at -20°C				
	Failure	1 cell failure compatible at least				
	Reliability	> 0.999				

[1] *At C/5, 25°C, on 2.5-4.2 V range at cells level*

Airbus Defence and Space
space.products@airbus.com
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