

DMSA 12U

Multifunction Solar Array with embedded antennas and sensors



SUMMARY

The EXA DMSA 12U (Deployable Multifunction Solar Array for 6U and 12U) is the upgraded version of the latest DMSA line, it is one of our 6U/12U size products of a family of deployable solar arrays based on artificial muscles for CubeSats in the range of 1U to 12U. The arrays fold into a panel attached to the CubeSat structure just as another solar panel and once in orbit it deploys to full extension, it includes deploy and release contact sensors and its own deploy control board.

Now, in a world's first, it includes embedded antennas that range from VHF to L band, no longer do you need to buy and manage antenna systems, the DMSA has them embedded in its structure as 2 monopoles or 1 dipole and they deploy with the solar array, you just connect the cable to your radio.

It also has embedded sun and temperature sensors. These solar panels feature a very high efficiency for very high-power missions; the maximum stowed thickness is 7.05 mm for the 3-panel array. Every array is tested and qualified in our own facilities and shipped with full reports, the DMSA 12U yields the best results when coupled with our high-capacity batteries.

FEATURES

- Configurations from 17.5W to 52.5W
- Heritage release with artificial muscles, spring operated deploy
- Release within 5 seconds, Deploys immediately
- Embedded antennas can be configured as 2 monopoles or 1 dipole, frequency range from VHF to L-band
- Includes Release control board and contact sensors
- Sun sensors and temperature sensors embedded
- Designed for LEO missions and requirements
- Manufactured according to space standards and custom mission design
- Functional, performance, thermal bake out and vibration tests provided with documentation.
- Very thin, 7.05mm stowed, each panel is only 1.65mm thick
- Integrated UMPPT and Deploy/Release control circuitry
- Integrated deploy/release sensors and reporting to your OBC
- Compliant to CubeSat Standard
- Compatible with QuadPack and ISIPOD Launch Adapters



PERFORMANCE

- **Supply Voltage (depends on configuration):**
 - From 8V to 20V
- Bypass and protections diodes integrated
- **Power Delivered:**
 - **From 17.5 to 52.5W**
 - Integrated UMPPT controller, 1 per panel
- **Cell Efficiency:** >30%
- **Integrated RELEASE/DEPLOY CONTROLLER**
 - Release within 5 seconds
 - Deploys immediately
 - Activates via 5V TTL signal
 - Deploy and Release sensor reports
 - Automatic disconnection upon successful deploy
- **Embedded Antennas:**
 - Band Range: VHF to L-band
 - Gain:
 - Monopole configuration = 2.1 dB max
 - Dipole configuration = 3.1 dB max
 - Extended Monopole = 2.3 dB max
 - Lambda: from 1/4 to full wave
 - Connectors: User defined
 - Cable: RG316 or User defined
- **Sun Sensor:**
 - Analog, GPIO, 5 to 16V
 - Linear response range from 0.2V to 5V
 - Working current: 50 mA
 - Working FOV: 65 degrees H/V
- **Temperature sensor:**
 - Analog, GPIO, 4 to 12V
 - Linear response range from 0.3V to 1.5V
 - Working current: 80 mA
 - Working temperature: -65 to 135C



PRODUCT PROPERTIES

- **Mass (exact mass depends on configuration):**
 - 1 panel: 324g
 - 2 panels: 660g
 - 3 panels: 790g
- **Assembly Thickness:**
 - Stowed:
 - 1 panel: 3.1 mm
 - 2 panels: 4.85 mm
 - 3 panels: 7.05 mm
 - Per panel: 1.65 mm
- Deploy/Release control board included, TTL 3.3 or 5V operated.
- **Operating Temperature:** -80 to +130°C
- **Radiation Tolerance:** 4 years minimum in LEO

MATERIALS

- **Panels:**
 - Side panel: FR4-Tg180
 - Deployable panels: FR4-Tg180 1.25mm thick
- **Contact sensors:** Deploy and Release
- **Actuators:**
 - Deploy: Spring operated
 - Release: EXA MDR/R1C, 50 grams max torque
- **Cell Material:** GaAs (High power) or mono crystalline Silicon (low cost)
- **Cell Interconnector:** Invar Silver plated.
- **Interfaces:**
 - Custom choice, normally 3 Molex PicoBlade inline 4 pin connector with gold plated contacts
 - PTFE (Teflon) space grade cables, single strand, silver plated copper (AWG26, AWG24)



TESTING

All panels are provided with tests reports regarding:

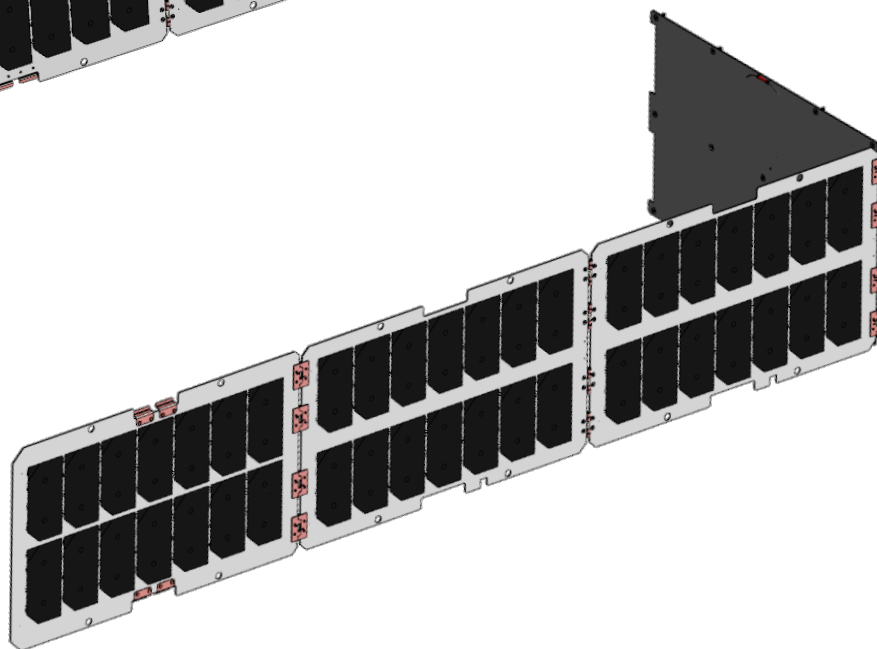
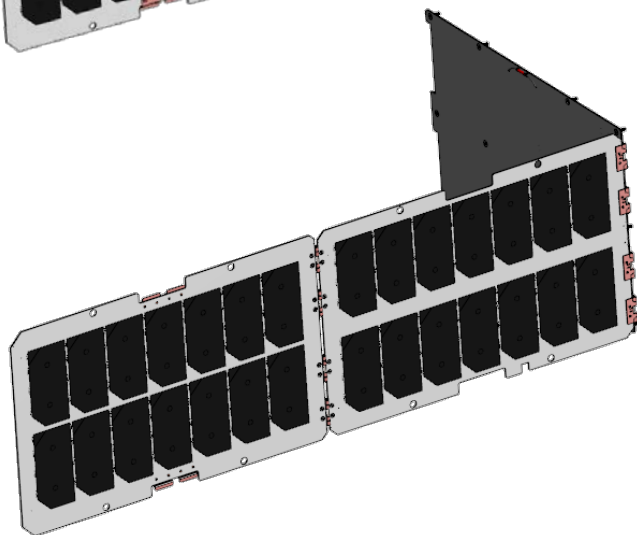
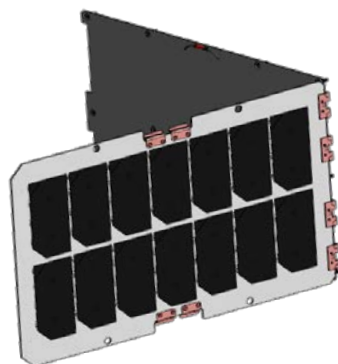
- Continuity isolation between cells and substrate
- No cracks warranty.
- Thermal Bake out (10E-7 mbar @ 50C for 24 hours)
- Full vibration test for Falcon 9, Vega, Electron, Soyuz, Dnepr, and Long March 2D
- QT and AT is performed on the unit to be shipped.

Test	QT	AT
Functional	✓	✓
Vibration	✗	✓
Thermal Cycling	✗	✓
Thermal Vacuum	✗	✓
Continuity Isolation	✓	✓
Solar cells Cracks	✓	✓
Flasher Test	✓	✓
Performance	✓	✓



CONFIGURATIONS

- 1 Panel 17.5W
- 2 Panels 35W
- 3 Panels 52.5W



EXTRA OPTIONS

- Integrated NEMEA Anti-Radiation, Thermal Regulation MLI shield (EM, Gamma, X-Ray, Alpha, Beta, L-neutron): 3,000€
- Coarse Sun Sensor – Vishay: 500€
- Embedded UHF/VHF Antennas: 3,000€

