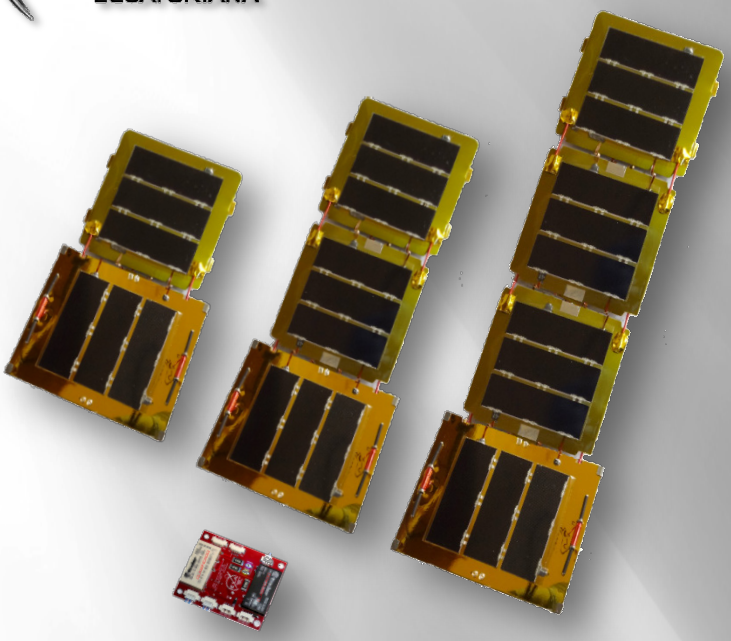
AGENCIA ESPACIAL CIVIL ECUATORIANA

DSA: 1U DEPLOYABLE SOLAR ARRAYS



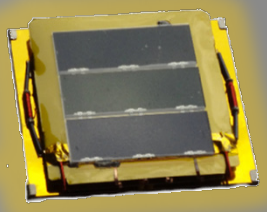
Expand the limits of your 1U mission with our record-setting Deployable Solar Arrays (DSA) providing from 3.75W to 21.6W depending on the chosen solar cells and number of panel configuration.

Check this amazing video showing how our DSA release and deploy gently and flawlessly.

Our DSA are powered by our unique **Artificial Muscle Technology**, which is far superior than common thermal knife techniques. **And very much proven in space…**

FLIGHT HERITAGE (TRL9)

Our DSA has **flight heritage since 2013** in 4 missions still in orbit and have been selected to fly in 10 more upcoming U.S. missions from 2019 to 2029. Almost 6 years now and our first DSA is still in

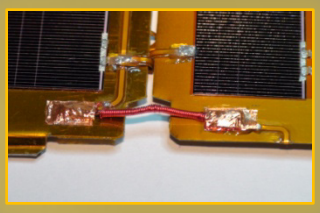


SUPER THIN

Fully compatible with ISIS and Pumpkin structures, they fold into Amazing 5.5 mm thickness, the thinnest solar array available.

POWERED BY ARTIFICIAL MUSCLES

Our unique **AMT** Artificial Muscle Technology allows for a gentle, safe and repeatable (unlike thermal knife systems) release and deploy both on ground (for testing) and in orbit. And they are

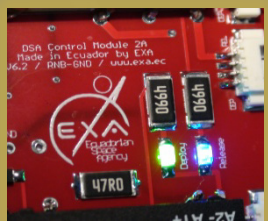


PROTECTED BY NEMEA SHIELDING

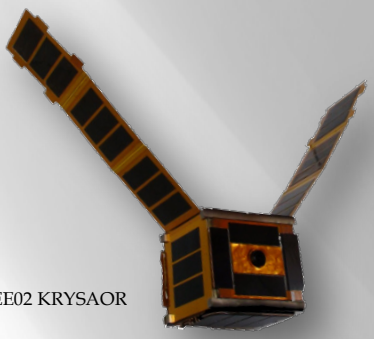
Our unique thermal regulating, anti-EM, anti-radiation NEMEA MLI shielding lets you use COTS components inside your cubesat allowing a 10-fold cost reduction on your mission's financial budget. We take care of the space environment so you can focus on

AUTOMATIC RELEASE/DEPLOY

You only need to send the 3v3 or 5V deploy signal to our **included** DSA control module and it will release and deploy your solar arrays to your pre-programmed final position. Includes a safety featured that will ensure release and deploy even if everything else fails!. No matter what, you will get powered in orbit.

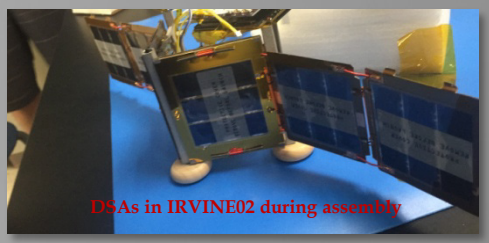


AGENCIA ESPACIAL CIVIL ECUATORIANA



NEE02 KRYSAOR

DSA: TECHNICAL INFORMATION (1)



DSAs in IRVINE02 during assembly

FEATURES

- TRL9 system approved for NASA launches
- Automatic gentle release and deploy with artificial muscles
- Strong Titanium CP-2 scaffold, 99.8% pure.
- Release in 10 seconds, Deploy in 10 seconds, no backlash
- Reflective NEMEA layer-0 Anti-VUV and thermal protection mounted on FR4-Tg180 main panel
- Heritage, robust diodes installed by default
- Includes Release and Deploy contact sensors
- Sun sensors and temperature sensors on demand
- Custom titanium harnessing included
- Manufactured according to space standards and custom mission design
- Functional, performance, thermal bake out and vibration tests provided with documentation.
- Very thin, 5.5mm folded, each panel is only 1.5mm thick
- Onboard sensors like temperature, release and deploy
- Ready to integrate to your 1U structure and fully compliant to CubeSat Standard
- Compatible with QuadPack and ISIPOD Launch Adapters
- Includes its own compatible controller with customizable electrical and sensor data interface

PROPERTIES

Mass (depends on configuration)		
Panels	w/NEMEA	w/o NEMEA
1	67g	57g
2	115g	87g
3	135g	107g

Folded Configuration Thickness		
Panels	w/NEMEA	w/o NEMEA
1	5.5 mm	3.5 mm
2	7.5 mm	5.5 mm
3	8.5 mm	6.5 mm

Deployable Panel Thickness: 1.5 mm

Operating Temperature:
-80 to +130°C

Radiation Tolerance:
2 years minimum in LEO
4 years minimum with NEMEA shielding

PERFORMANCE

Supplied Voltage@Current and Power:
Condition full sunlight in LEO

Low cost solar cells:			@BOL
Panels	Top	Bottom	Array Power
1	3.6V@0.5A	1.8V@0.5A	2.70W
2	5.2V@0.5A	3.2V@0.5A	4.20W
3	7.2V@0.5A	5.2V@0.5A	6.20W

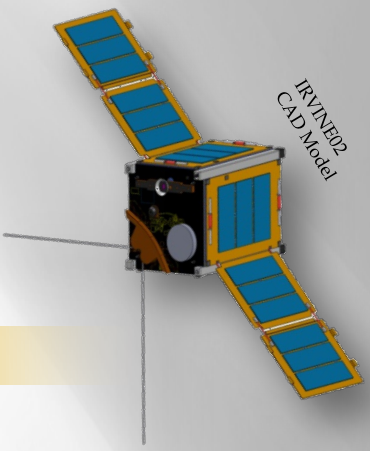
High power AzurSpace 3G-30:			@BOL
Panels	Top side	Bottom side	Array Power
1	9.6V@0.5A	4.8V@0.5A	7.2W
2	14.4V@0.5A	9.6V@0.5A	12W
3	19.2V@0.5A	14.4V@0.5A	16.8W

Protection:
2A@20V Schotky diodes integrated

Cell Efficiency:
30% (High power) or 19% (low cost)

Release/Deploy:
Release in 10 seconds using 52 joules
Deploy in 10 seconds using 30 joules

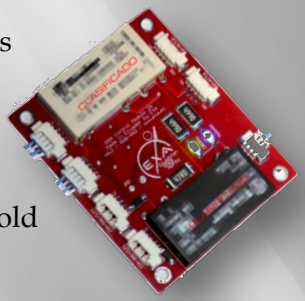
DSA: TECHNICAL INFORMATION (2)



MATERIALS

Panels:
- Side panel: FR4-Tg180
- Deployable panels: Titanium CP2 99.8% pure

Shielding:
- Side panel: NEMEA layer 0 Anti VUV, thermal isolation
- Deployable panels: Kapton 2 mils



Harness: Titanium CP2 0.5mm

Contact sensors:
- Cu spring, Silver plated or 18k gold

Actuators:
- Deploy: EXA MDH/R2, 30 grams max torque artificial muscle strand
- Release: EXA MDR/R1C, 50 grams max torque artificial muscle strand

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 and AWG30)

TESTING and QUALITY

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 Dnepr, Falcon9, Electron and Long March 2D


DSAs in IRVINE01 during assembly

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

QT and AT are performed on the unit to be shipped

CUSTOMIZATION

Each DSA is tailored to the mission needs with customer's choice of connectors, harness, solar cells, shielding and panel count configuration. Detailed blueprints, 3D PDFs, STEP and SolidWorks files can be provided on demand.

CONTACT US:

Email: cco@exa.ec
Web: http://exa.ec
Twitter: https://twitter.com/EXA_ec
Facebook: https://www.facebook.com/Agencia.Espacial.Ecuatoriana/
LinkedIn: https://www.linkedin.com/company/ecuadorian-space-agency

Cdla Nva Kennedy , Calle C #130
Guayaquil - Ecuador
Phone: +593-999-429106
Fax: +593-42-836098