



ROSA's Transformative Technology for GEO and Resilient Spacecraft Applications

Space Power Workshop 2025
April 30th, 2025

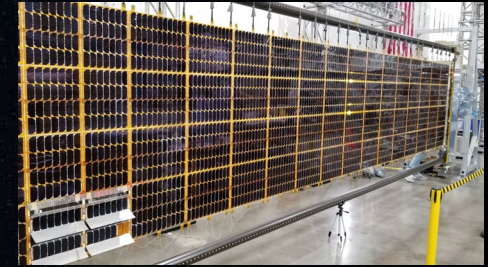
From Flight Demo to DART: The Journey of ROSA



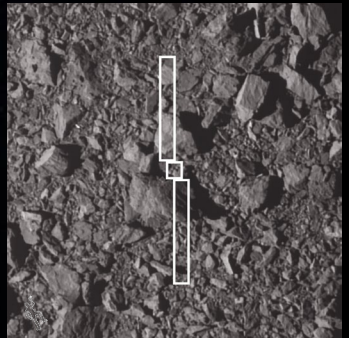
ISS Flight Experiment ROSA



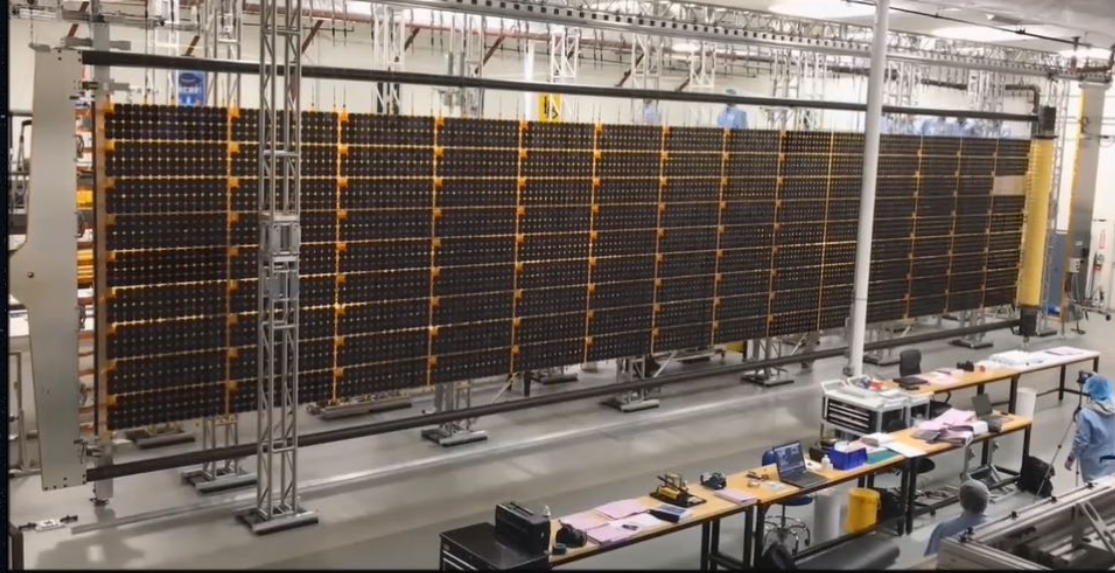
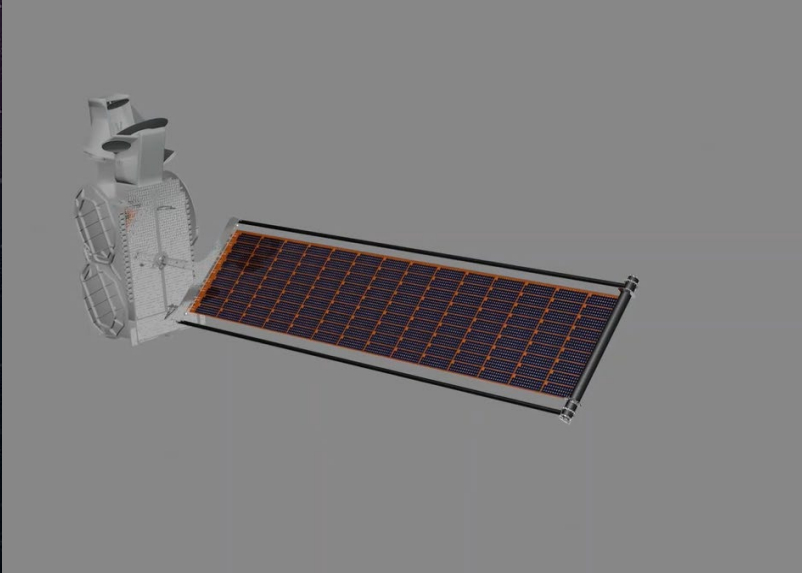
International Space Station ROSA (iROSA)



Double Asteroid Redirection Test (DART) ROSA

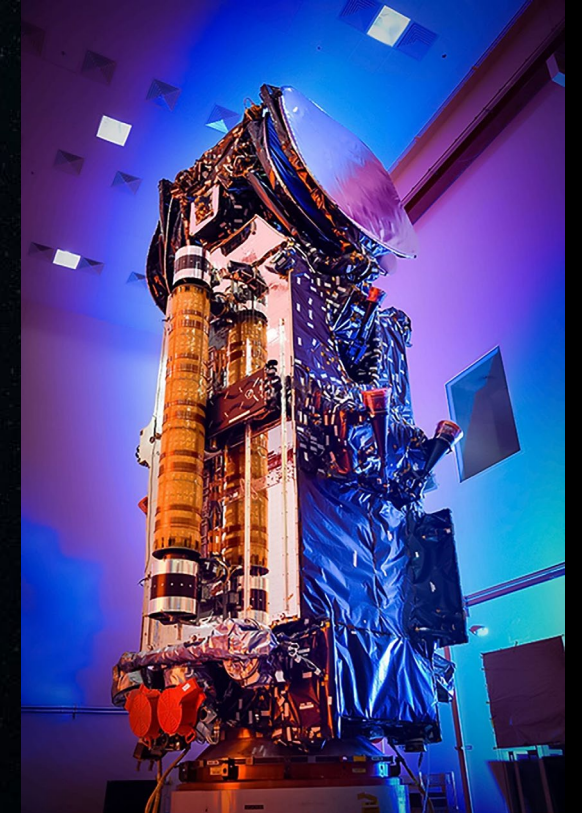
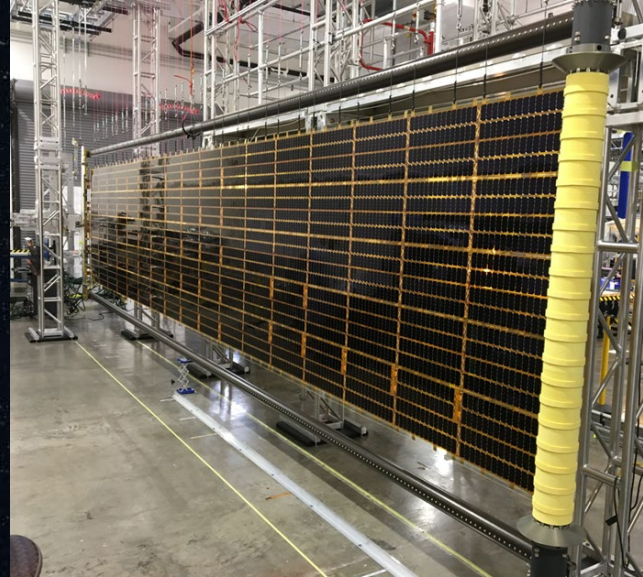


A flashback to GEO ROSA's genesis with SSL



- **Design and qualification of 14 kW BOL GEO ROSA for Maxar 1300 bus**
 - Funded by Maxar/SSL IRAD efforts
- **Completed functional deployments, spacecraft vibration, and other coupon test campaigns**

GEO ROSA takes flight on Maxar's Ovzon 3 mission



- Launched in January 2024 – completed EOR and now in GEO
- First Commercial application of ROSA
- Used multiple PV options

Introducing Redwire's GEO ROSA Product Line

ROSA
ROLL OUT SOLAR ARRAY



Opal ROSA



Sapphire ROSA



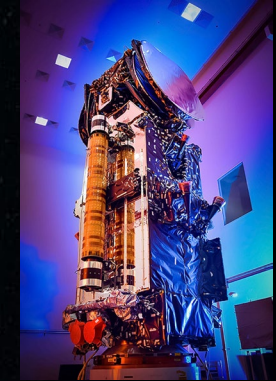
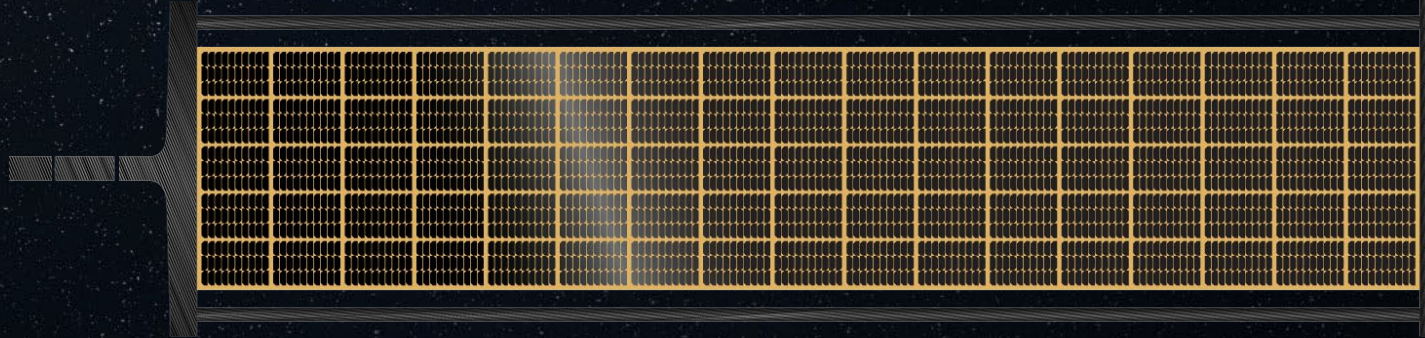
Tanzanite ROSA

One Platform. Three Standard Sizes. Customizable for Any Mission.

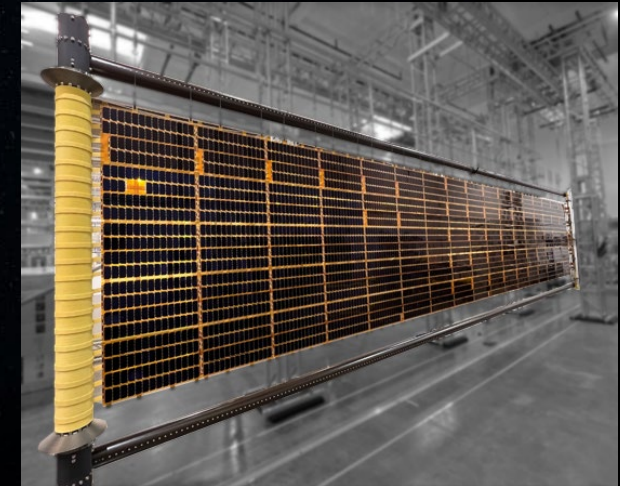
Opal ROSA – Compact solution for Agile Missions



6 ft / 1.8 m

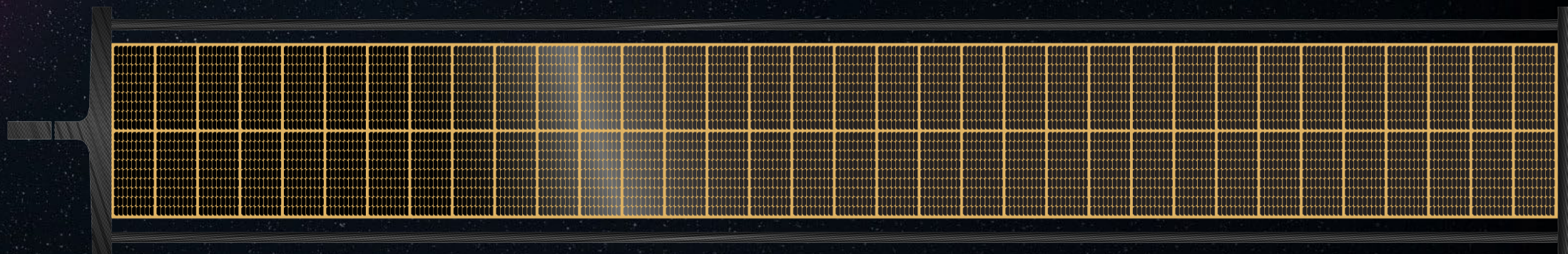


- **6-kW† Class GEO ROSA**
- **Opal ROSA variant used on the Maxar Ovation mission, currently flying in GEO, and the APL/JHU DART mission**





Sapphire ROSA – Middleweight Power for Versatile Missions

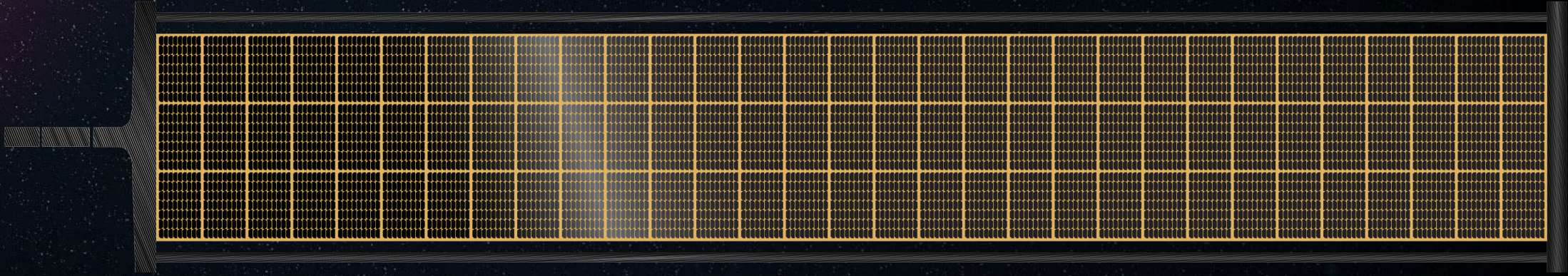


- 13-kW Class GEO ROSA
- Sapphire ROSA balances large power with a compact stowed volume





Tanzanite ROSA – Big Power for Demanding Missions



- **18-kW Class ROSA Wing**
- **New Redwire production facility capable of six Tanzanite wings in parallel**



Qualifying ROSA for the Demands of GEO

- **Challenges for GEO:**

- High Radiation for EOR ($> 1e16$ 1-MeV e⁻ fluence), ESD, Thermal Extremes ($< 210^{\circ}$ C)

- **Qualification efforts:**

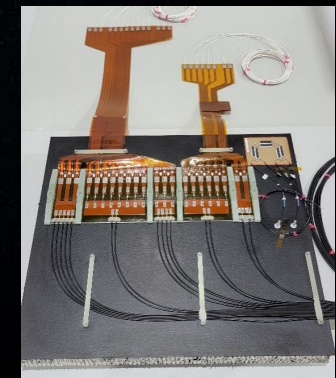
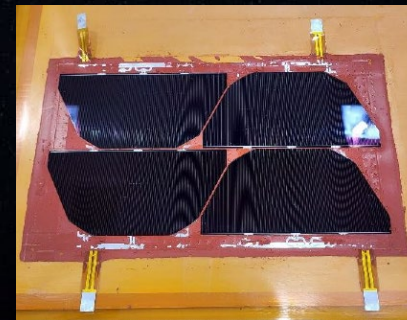
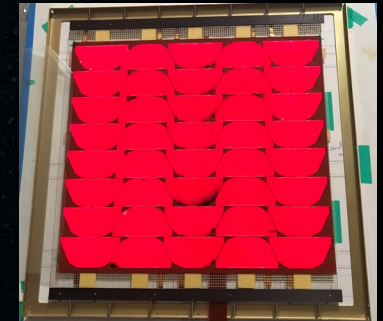
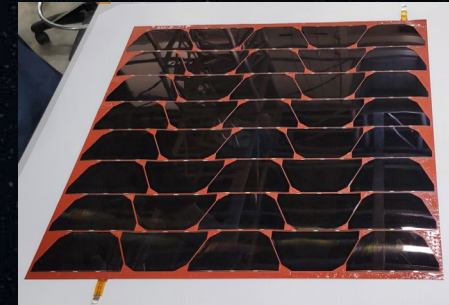
- SPM Life Cycle Coupons

- Coupon 1: 2000 ambient cycles, -175°C to 125°C
- Coupon 2: 5300+ cycles, ranges from -175°C to $+125^{\circ}\text{C}$, plus -210°C deep cycles and TVAC

- Combined Effects Coupon

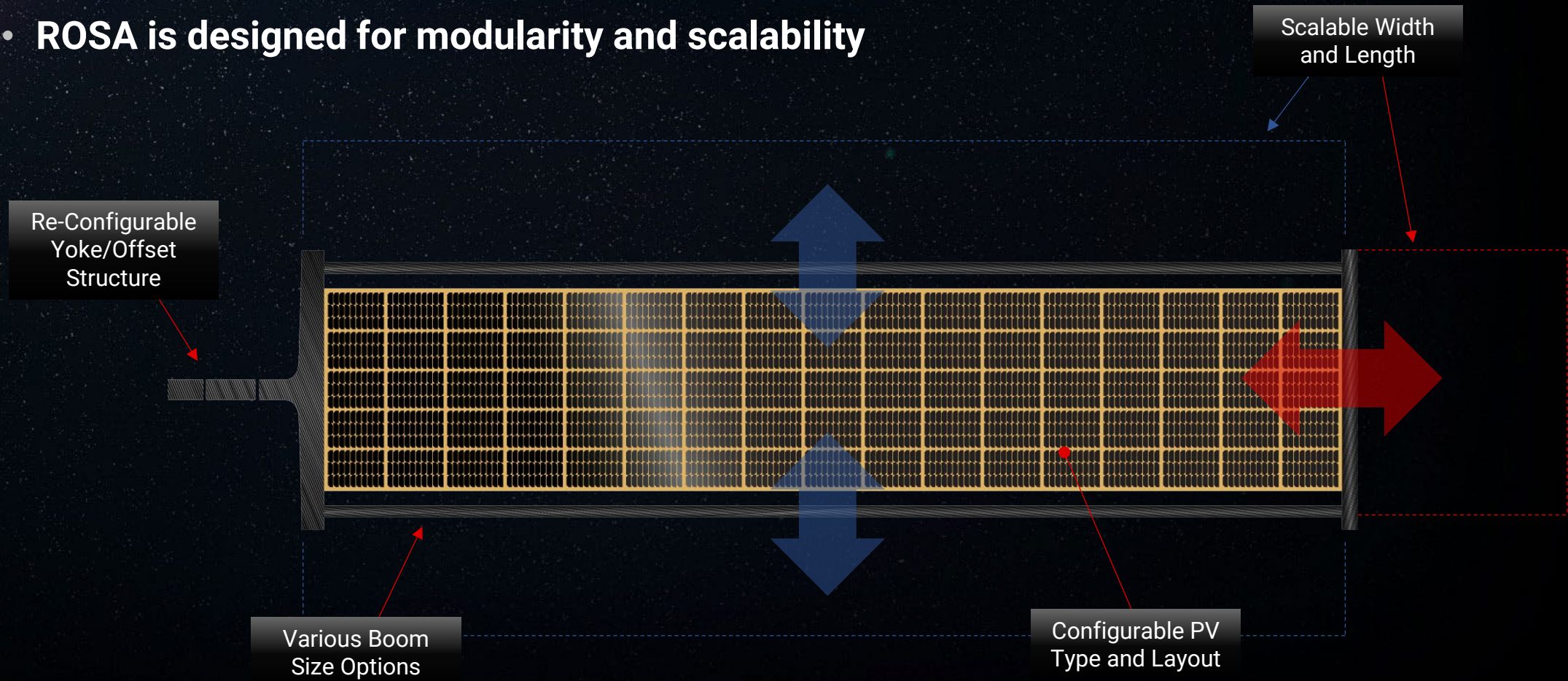
- Pre-ESD $\rightarrow$ 1/3 Life Cycles $\rightarrow$ UV $\rightarrow$ 2/3 Life Cycles $\rightarrow$ Radiation $\rightarrow$ 3/3 Life Cycles $\rightarrow$ Post-ESD

- Diode Board, Bleed Resistor, and Harness Coupons



Flexible by design – solutions for every mission

- ROSA is designed for modularity and scalability



LEO to GEO... and Back Again



iROSA



LEO
Adaptation



Sapphire ROSA



Tanzanite ROSA

- ISS ROSA (iROSA) heritage being applied to GEO products for LEO applications
- Customers exploring ROSA options for LEO habitats and other missions
- LEO provisions include Atomic Oxygen protection and Fracture Control implementation for Human Space Flight

Resilient Supply Chain. Resilient Spacecraft. Resilient ROSA.

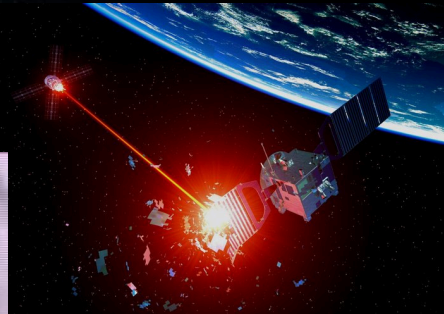
Robust Supply Chain for Proliferated Space

- All components can be multiple-sourced
- ROSA can accommodate many PV options



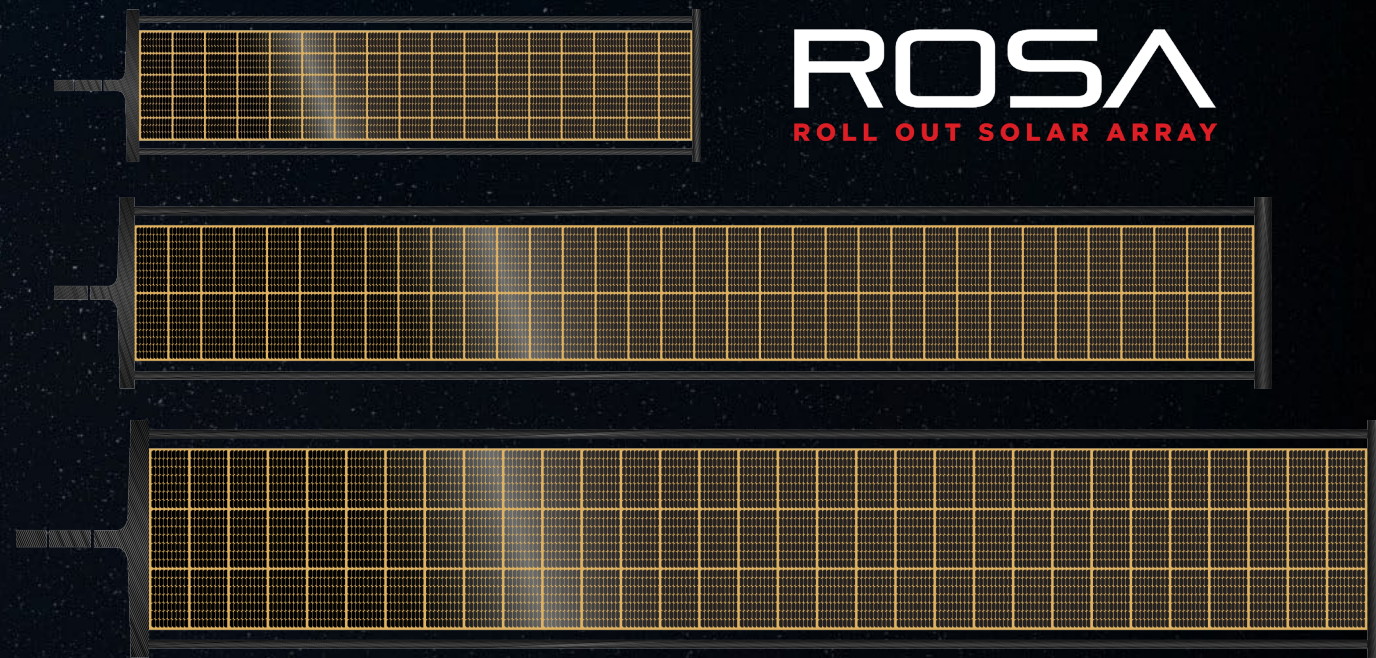
Spacecraft Survival and Maneuverability

- Retraction can be added to all ROSAs
 - 2X strength at 40% retraction





GREAT THINGS IN BUSINESS ARE NEVER DONE BY ONE PERSON.
THEY'RE DONE BY A TEAM OF PEOPLE. WE'VE JOBS



ROSA
ROLL OUT SOLAR ARRAY

**Thank you to our dedicated Redwire team
and all our customers and partners!**

