

Space Edge Computer

Data Sheet

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1 Product Description

Spiral Blue has developed the Space Edge Computer - an onboard computing system that will give Earth observation satellites the ability to process captured images on the satellite itself. This has the potential to increase the capacity of Earth observation satellites carrying Space Edge Computers by as much as 20x.

Space Edge Computers use the NVIDIA Jetson series modules, maximising processing power while keeping power draw manageable. They carry polymer shielding to protect against Single Event Effects, as well as additional software and hardware mitigations.

2 Specifications

Table 1: SE-Z & SE-1 Specifications

	Space Edge Zero (SE-Z)	Space Edge 1 (SE-1)
Chip architecture	NVIDIA Jetson Nano	NVIDIA Xavier NX
Processing Power	0.5T FLOPS	21 TOPS
GPU	128-core Maxwell	384-core Volta
CPU	4-core ARM A57	6-core Carmel
Memory	4 GB	8 GB
Storage Options	16 GB	256 GB to 2 TB
Size	0.25U (25x100x100mm)	0.25U (25x100x100mm)
Weight	250g	250g
Power usage	3W idle, 10W peak, 6 W avg	3W idle, 20W peak, 7W avg
Radiation	25 krad max total ionising dose	
Software	Linux Ubuntu 18.04 based OS, Docker based containers	Linux Ubuntu 18.04 based OS, Docker based containers
Connections	Ethernet, USB 2.0, UART	Ethernet, USB 2.0, USB 3.0, CAN, UART
Product TRL	8	8
Lead Time for Delivery	Discontinued	In stock
Flight model Price (AUD)		\$50,000 +GST
Engineering model Price (AUD)		\$5,000 +GST (with Flight model), \$25,000 +GST (standalone)
Included extras		40 hours of engineering support (with Flight Model)

2.1 Dimensions

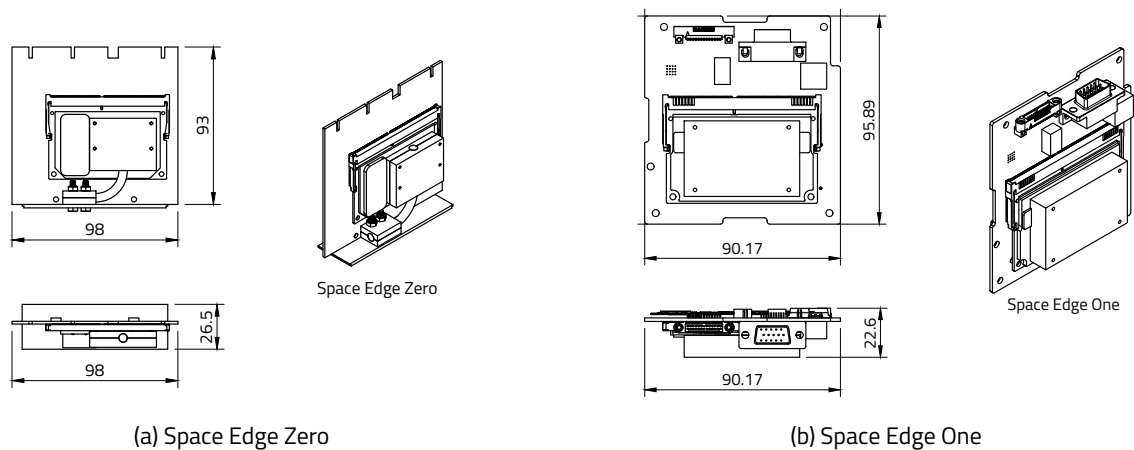


Figure 1: Space Edge Computer drawings. All dimensions are in mm.

3 Heritage

3.1 Space Edge Zero

- Integration shake testing carried out in SatRev satellite.
- *1st July 2021*: 1 x SEZ launched aboard SatRev Stork satellite via Virgin Orbit.
- *13th January 2022*: 2 x SEZ launched aboard SatRev Stork satellite via SpaceX.

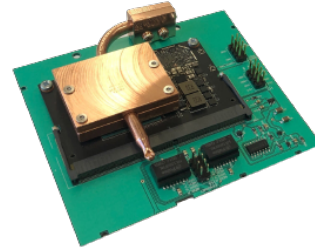


Figure 2: Space Edge Zero

3.2 Space Edge One

- Thermal vacuum testing carried out at UNSW.
- Integration and shake testing carried out in Satellogic satellite.
- *3rd January 2023*: 1 SE-1 launched aboard Satellogic NuSat via SpaceX.
- *3rd April 2023*: SE-1 became operational in LEO after commissioning completed and testing results were nominal.

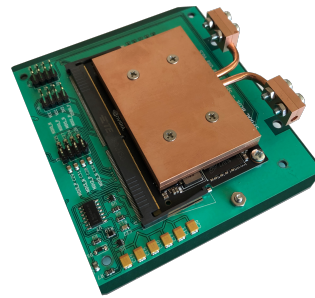


Figure 3: Space Edge One

4 Add-Ons

The system can be customised with a range of options specific to a customers requirements, such customization can include:

4.1 Enclosure/mounting brackets

- Machined aluminium brackets are available to suit a cubesat form factor satellite bus starting from \$1200 +GST.
- Alternative form factor brackets can be made on request.

4.2 Onboard software

Available for:

- Application management software
- Telemetry logging
- Software maintenance

4.3 Thermal management

- Standard thermal management includes copper plate and pipes (as pictured in figures 2 & 3).
- Customised thermal management solutions are available depending on satellite requirements.

4.4 Cabling

Spiral Blue can manufacture cabling to suit the mission requirements, including:

- Low out-gassing Ethernet and CAN cables for computer to satellite bus connections (power and data)
- Custom made USB2 and USB3 cables for computer to payload (i.e. imager) connections.

4.5 Machine Learning Applications

Spiral Blue proprietary applications optimised to run on the Space Edge Computer include:

- Vessel Detect
- Cloud Clipper
- Canopy Mapper
- Fire Severity
- Water Body Mapper

Additional applications can be developed to suit mission requirements.

5 On the Horizon

5.1 Space Edge One

A mission to flight-prove the SE-1 was launched in January 2023 aboard a Satellogic satellite. Commissioning was completed 3rd April 2023, raising the TRL to 8. This hardware is now available for commercial operations is servicing a variety of customers who demonstrating their AI/ML technology via the Spiral Blue 'Your code in Space' service.

5.2 Space Edge Two

Preliminary design work has begun on development of a Space Edge Computer based on the new NVidia Orin architecture. Anticipated specifications are outlined in Table 2.

Table 2: SE-2 Specifications

Product Name	Space Edge 2 (SE-2)
Chip architecture	NVidia Orin
Processing Power	50 TFLOPS
GPU	2048-core Ampere
CPU	12-core ARM A78
Memory	64 GB
Storage Options	1 TB, 2 TB, 3 TB
Size	0.5U (50x96x90mm)
Power draw	10-20 Watts