

# PUMPKIN<sup>TM</sup>

## SPACE SYSTEMS

# Update Q2 2023

## Spacecraft Buses

Pumpkin is currently building a second 12U SUPERNOVA bus for the USSF SMC EWS RROCI2 EO/IR mission. RROCI2 is manifested on the Q1 2024 SpaceX Transporter-10 launch.

Part of the SUPERNOVA family of buses, RROCI2 includes:

- 12U tabbed structure w/8U payload volume
- 145W BoL dual articulated solar arrays
- 280W+ power & 200Wh smart battery energy storage
- GHz-class OBC w/Ethernet-connected payload(s)
- GUTS flight software (FSW):
  - Buildroot-based with full OTA update capability
  - Linux kernel & EXT4 file system
  - C-, Rust- and Python-based microservices
  - GraphQL requests over HTTP/MQTT
  - AES-256 encrypted CCSDS radio support
  - Seamless InfluxDB integration with Grafana
- ADCS with dual star trackers & four reaction wheels
- S/X-band comms w/demonstrated KSAT compatibility
- Bidir Iridium Short Burst Data (SBD) service comms
- 2x2 MPT-based thruster w/micro-impulse control for deorbiting



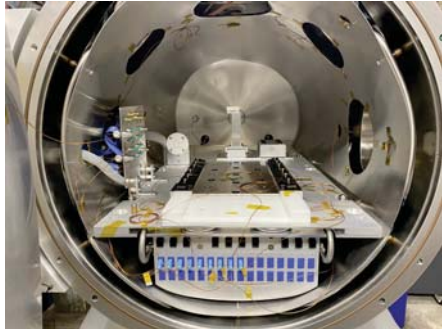
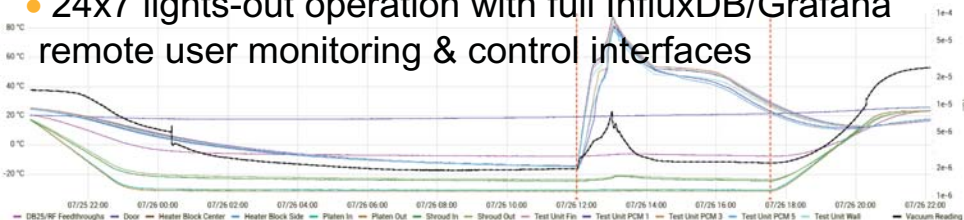
EWS RROCI2  
12U SUPERNOVA  
stowed (left) & deployed (right)



## Testing

Pumpkin now offers TVAC testing at its San Francisco HQ:

- -50C to +60C platen & shroud temperature range
- Large selection of pre-existing thermocouple, fiber, Ethernet, RF, GPIO/power & GNSS feedthroughs
- >1000W of programmable PSUs
- 24x7 lights-out operation with full InfluxDB/Grafana remote user monitoring & control interfaces



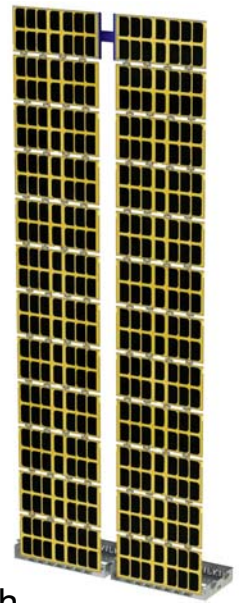
View into Pumpkin's 488 liter  
1E-6 Torr-class TVAC  
chamber

# Solar Arrays

- In response to customer demand, Pumpkin has updated its space-proven Deployable Clamshell Solar Array (DCSA) from 200W to 375W while maintaining the same user-friendly ICD and while staying within a slightly enlarged footprint of around 9U. Each DCSA presents itself as two independent 35V / 188W BoL arrays that deploy automatically after the user-supplied release mechanism frees the upper clamshell to pivot away from the lower one. Pumpkin's DCSA family of scalable solar arrays are trivially easy to integrate into a wide range of spacecraft.



375W 24-panel DCSA  
stowed (above) and deployed (right)



# Software

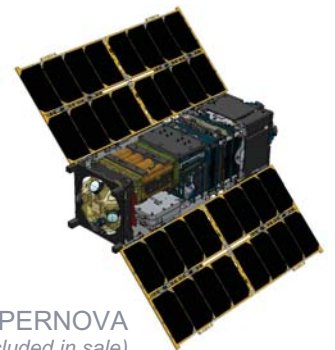
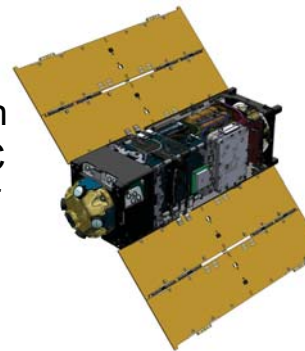
- Pumpkin has been busy improving its GUTS flight software (FSW) with enhancements, including reducing on-orbit incremental upgrade times to the root FS from 10m to 45s, on-orbit SupMCU reflashing via the FSW, radio service upgrades that support primary (S/X-band) and backup (Iridium) radios, faster downlink rates (70+Mbps) and rewriting the telemetry & SupMCU interface services in Rust instead of Python for better performance. GUTS FSW runs on SUPERNOVA buses and on the RS3 SUPERNOVA Satellite Simulator (available to rent or buy).

Rackmount  
SUPERNOVA Satellite  
Simulator (RS3)



# Overstock

- Because of an imaging mission that never fully materialized, Pumpkin currently has one 3U SUPERNOVA bus available for sale. With a 33W solar array, a Linux-based 1GHz OBC that can run Pumpkin GUTS FSW, 100Wh of battery energy and payload / ADCS accommodations on both ends, this may be your chance to make an upcoming launch sooner than you imagined. Priced at \$145k and with immediate delivery, better act fast!



3U Imaging SUPERNOVA  
(some components shown not included in sale)

Pumpkin Space Systems serves demanding government, commercial and educational customers with P-POD and CSD-compatible nanosatellite spacecraft and buses. Our integrated designs are based on our own flight-proven CubeSat Kit™ and SUPERNOVA™ components and have completed flight qualification.



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