

# Payload User Guide

## For Hosted Payloads (Orbital and Reentry)

Varda Space Industries' system has payload availability for a multitude of different manufacturing, experiment, and testing needs. The flight proven system is available commercially and through government contracts.

### A Flight-Proven Reentry Platform

This capability is regularly flying on commercial missions with open rideshare seats and an order of magnitude cheaper than a full-scale orbital reentry flight.

### Research, Flight Demonstrations, and Scaled Operations – Both in Orbit and Reentry

Microgravity Research	Manufacturing	TPS Testing
Sensor Performance	Alternative Navigation	And More



On-board image from Feb 2024 reentry

### Varda's Hosted Payload Offering

- Mach 25+
- High Heating
- Dense Plasma
- Always Recoverable
- Low-Cost
- Frequent Flights
- In Orbit Operations

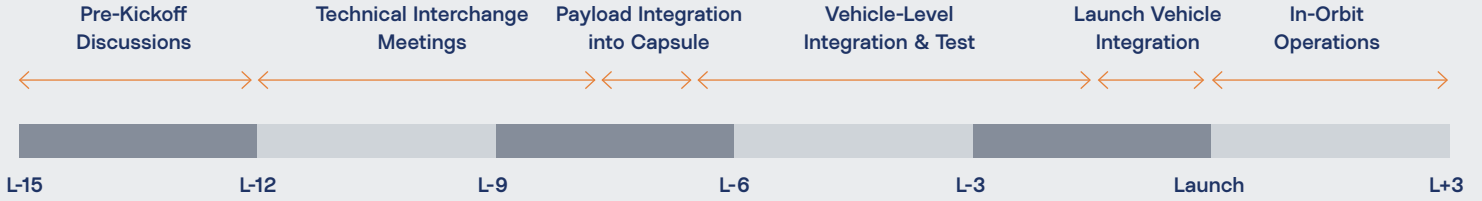
### Varda's Nominal Hypersonic Environments

Mach / Velocity	Mach 25+
Peak Heating	Standard 300W/cm <sup>2</sup> , up to 1500W/cm <sup>2</sup>
Peak Pressure	31 kPa
Peak Dynamic Pressure	16.3 kPa
Wall Temperature	>2000K
Peak Heat Load	21 KJ/cm <sup>2</sup>
Novel Chemistry Exposure	Rarified Nitrogen and Oxygen
Sustained G-Load	-13gs
Distance Traveled At Hypersonic Conditions	Over 5000 Miles



Varda's W-1 capsule after successful orbital reentry and recovery in Feb 2024

## Typical Mission Integration Timelines



## General Dimensions and Limitations

Interior Payload Mass	Up to 10kg supported
Interior Payload Dimensions	Up to 17" diameter and 8" height*
Exterior Payload Dimensions (Mass and Volume)	Contact Varda for more information

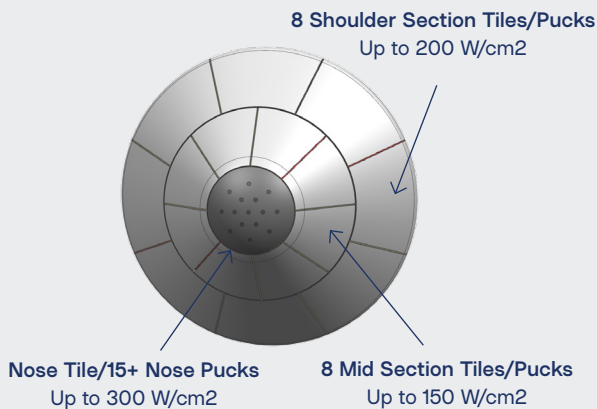
\*Increased payload volume feasible with non-standard accommodations

## Applicable Environments for Interior\* Payload Exposure

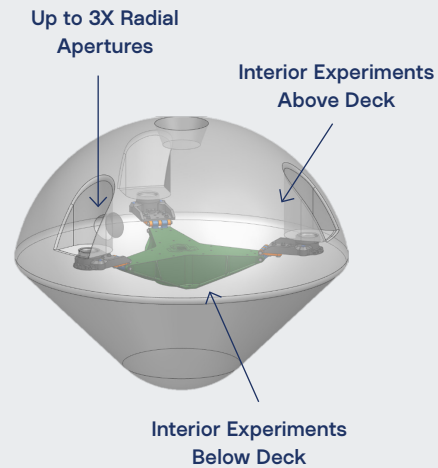
Interface Temperature	-40°C to +60°C typical* supported
Vacuum	<10 <sup>-9</sup> Torr
Random Vibration	24.3 grms
Quasi Static Acceleration	Up to 23gs

\*Exterior payloads: Contact Varda for details (ITAR/EAR)

## Varda Hosted Payload Testbed Accommodations



TPS Carrier Structures & Instrumentation Support Available



Alternative Accommodations Possible with Additional NRE



### Standard Mission Profile

- 1 Varda launches to orbital velocity (27,000 mph), performs on-orbit operations before initiating reentry
- 2 After a series of de-orbit maneuvers, Varda's capsule enters the atmosphere reaching Mach 25+
- 3 The mission concludes with a soft landing under parachute
- 4 Payloads and flight data recorders returned to customers

### Services Provided

<b>Power</b>	In Orbit: Up to 35W continuous power @ 28 VDC unregulated (standard). Up to 480W intermittent available (non-standard). Reentry: Up to 100W continuous power @ 28 VDC unregulated.
<b>Control</b>	<b>Standard:</b> Control of load channels according to pre-determined flight sequence. <b>Possible non-standard accommodations:</b> Ethernet interface with PTP, commanding in response to payload telemetry downlink, uplink of data to payload.
<b>Data</b>	<b>Standard:</b> Power and RTD channel telemetry. <b>Optional Services:</b> Data acquisition system for RS-232/422/485 data and analog voltage sensor data. Non-standard accommodations possible for other data types and in-orbit telemetry downlink.
<b>Exterior View</b>	Access to up to 3 transparent windows.
<b>Time in Orbit</b>	Up to 3 months standard, 1+ years possible with non-standard accommodation.

### Payload Recovery

Payloads will be returned to customers for post-flight analysis. Post-flight recovery allows collection of up to terabytes of flight data.

### About Varda

Founded in 2021 and headquartered in El Segundo, CA, Varda's commercial reentry missions are dual-purpose to provide the government and industry with hosted payload services.

### Test With Us

Varda is currently scheduled to fly experiment payloads from both the government and private industry. Reach out to Varda for further details regarding interfaces, flight opportunities, and non-standard accommodations at [testbed@varda.com](mailto:testbed@varda.com).

Learn more

