



LM 50 Payload Accommodation

INTRODUCTION

Lockheed Martin Space offers the LM 50 product line—its smallest buses yet—and encourages payload concepts and solutions hosted by these versatile space vehicles. Consisting of nanosats ranging up to 100 kg, the LM 50 product line is focused on small, low-cost spacecraft technology. Because of the small size of the spacecraft, there is only a limited size, weight and power (SWaP) available for LM 50 class payloads. The information in this document is focused on the 12U bus size, as it provides a favorable combination of payload volume and low-cost development and launch. A 4-6U bus is also available. Both are provided in conjunction with Tyvak.

Figures 1 and 2 provide an example of the payload volume available in the LM 50 platform and is provided as illustration only. Actual space available will be dependent on the specifics of the payload and mission implementation.

Table 1 provides a summary of typical interfaces and performance capabilities provided by the LM 50 12U platform. These serve only as a guide to those interested in flying payloads on the LM 50. Actual compatibility assessment is best done through an exchange of detailed information and interface requirements. In many cases, specific interface adaptations can be easily created.

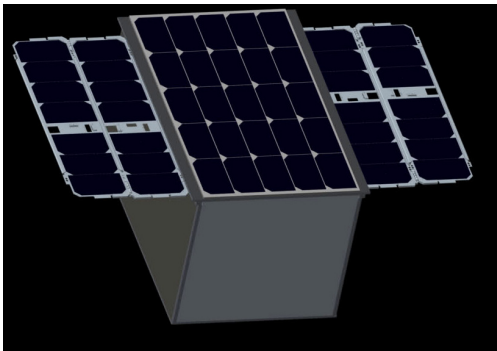


Figure 1: 12U external envelope

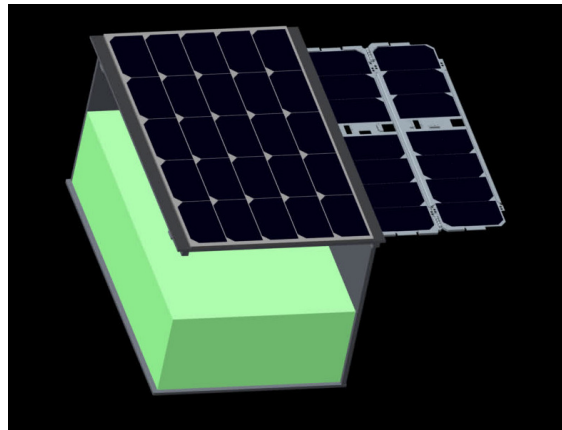


Figure 2: Payload envelope (4-6U)

Table 1. LM 50 Hosted Payload Accommodation Information

Typical¹ Hosted Payload Resource Allocations, Performance Characteristics and Interface Requirements	
Maximum Hosted Payload Resource Allocations	
Payload Mass Limit	10 kg
Payload Power	15 W
Payload Volume (contiguous)	4-6U
Key Platform Performance Characteristics	
Attitude Control (Including Stationkeeping Maneuvers)	
Attitude Control System	ACS Thruster and Reaction Wheel Control
Orbital Maneuvering	>20 m/s of Delta-V
Pointing Knowledge, 3 σ	0.1 deg per axis
Total Pointing Accuracy, 3 σ	<0.25 deg per axis
Mission Parameters	
Orbit	LEO or GEO
Duration	3-6 months
Nominal Program Schedule	12-18 months
Key Platform Interface Characteristics²	
Command and Data Handling Interfaces	
Standard Payload Data bus	RS-422 derived bi-directional serial bus
Alternate Serial Bus Interface(s)	Ethernet, SPI, I2C, USB
Telemetry Types available	Active analog, passive analog, discrete, serial (bidirectional serial bus), software 16 Bit / 32 Bit words, and memory dumps
Payload Downlink	No specific constraints. Data rates 10 kbps to 100 Mbps and above are readily accommodated.
Power	
Main Bus Voltage (Standard)	12 V Regulated to 9.6-14 V
Vibration	
Standard Component Random Vibration Environment	0.2 G ² /Hz 20-1000 Hz -6 dB/Oct 1000-2000 Hz
Standard Component Sine Vibration Environment	0.5" D.A. 10-24 Hz 15.0 G 24-35 Hz 20.0 G 36-55 Hz 7.0 G 56-100 Hz
Thermal	
Internal Temperature Environments	In-Orbit Temperature Range -5°C and +55°C
Reliability / Survivability / Electromagnetic Compatibility	
Radiation Tolerance	20 kRad(Si) Total Dose
Single Event Effects	System-Level SEE mitigation techniques appropriate to NASA Class D missions currently, and Class B/C by Q2-2019
<p>1. The LM50 is a scalable platform with enhancements for unique scientific, communications, and other payloads available as options.</p> <p>2. Actual environments may be tailored to meet specific hosted payload needs</p>	