2025 ASTROPHYSICS SMALL EXPLORER (SMEX)
ANNOUNCEMENT OF OPPORTUNITY (AO)
LAUNCH SERVICE INFORMATION SUMMARY

NASA-Provided Launch Services Ground Rules/Policy

This document provides additional information for NASA-provided launch services. Any commercial Launch Vehicles (LV) provided by NASA will be procured and managed by the NASA/Launch Services Program (LSP) using government contracts.

Under this AO, the Proposer may not arrange alternative access to space.

Under the provisions of the NASA Launch Service II (NLS II) contract, the launch service includes the launch vehicle (LV) and associated standard services, non-standard services (mission unique options), all engineering and analysis, and minimum performance standards. LSP also provides launch service contract management, technical management of the launch service, technical insight into the LV production/test, coordinates and approves mission-specific integration activities, provides mission unique LV hardware/software development, provides payload-processing accommodations, and manages the launch campaign/countdown.

At the appropriate time, following mission selection, LSP will competitively select a launch service provider and award a Launch Service Task Order (LSTO) for the mission based on customer requirements. The LSTO is awarded to the Contractor that provides the best value in launch services to meet the Government's requirements based on technical capability/risk, reasonableness of proposed price, and past performance. Accordingly, assumption of a specific launch vehicle configuration as part of the AO proposal will not guarantee that the proposed LV configuration will be selected unless there is firm technical rationale for sole source. Any such rationale should be clearly identified and explained in the proposal.

All NASA-procured launch services are to be consistent with NASA Policy Directive (NPD) 8610.7, NASA Launch Services Risk Mitigation Policy. Launch services acquired by NASA will be managed in accordance with NPD 8610.23, Technical Oversight of Expendable Launch Vehicle (ELV) Launch Services and NPD 8610.24, Launch Services Program (LSP) Pre-Launch Readiness Reviews. These NPDs can be accessed through the AO Program Library (https://explorers.larc.nasa.gov/APSMEX25/SMEX/programlibrary.html).

NASA Launch Services Program Point of Contact for Additional Information

Additional launch vehicle information including performance quotes, mission integration inquiries, and non-standard or mission-unique services costs may be obtained from the point of contact below. Otherwise, questions must be directed as indicated in section 6.1.5 of the AO.

Genevieve Futch
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NASA Launch Services Program
Code VA-C
Kennedy Space Center, FL 32899
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LAUNCH SERVICE INFORMATION SUMMARY

Launch Service Information/Configuration/Performance

Two scenarios are depicted in this summary, which must be addressed in the proposal (see Requirement 98 in the AO). Any areas that are not compatible with the launch vehicle scenario's capabilities and characteristics must be addressed in the proposal along with any impacts needed to meet these areas (see Requirement 100 in the AO). The proposed spacecraft must be designed to all of the enveloping launch vehicle characteristics (static fairing envelope, sine and random vibe, acoustics, CG Load factors, and shock) and capabilities for one of the scenarios provided in Attachment 1. If both scenarios cannot be enveloped, then an explanation must be provided as to why a scenario is not enveloped.

The LSP has developed a performance website for vehicles currently on contract to NASA. This website contains information relevant to NASA-procured launch services. This website does not include emerging vehicles not yet on-ramped to the NLS-II contract. This planning tool can be found at the following web address:

https://elvperf.ksc.nasa.gov/Pages/Default.aspx

Access to this site is available to anyone with an internet connection and is generally available at any time. For questions, utilize the point(s) of contact listed in this document.

For variations from the data found in Attachment 1, refer to the LSP Point of Contact for an assessment.

Launch Services Costs

The Astrophysics Explorer Program within the Science Mission Directorate will hold the launch service costs. Services provided in the launch service costs to be covered by the Astrophysics Explorer Program are:

- the launch vehicle, engineering, analysis, and minimum performance standards and services provided by the NLS II contract in place at the time of LV selection;
- mission integration;
- launch site payload processing;
- range safety support;
- down range telemetry support (launch vehicle data only);
- nominal allocation for non-standard/mission unique launch vehicle modifications/services – items typically necessary to customize the basic vehicle hardware to meet spacecraft driven requirements (see Attachment 2 within this document).

The Astrophysics Explorer Program launch service budget set aside does not include funding for PI/payload-caused launch delays.

Evaluation Criteria

Attachment 3 shows a preliminary Risk Assessment checklist to be used as a guide for the launch service evaluators during the proposal evaluation phase. This checklist provides an indication of the types of information that are expected in the proposals. If the proposal does not provide sufficient information to be evaluated for each section, the launch vehicle section of the proposal may not be evaluated for full content and may be listed as a finding.

Attachment 1

Launch Vehicle Characteristics/Capabilities

Performance Information:
Proposals should select the minimum launch service performance class that meets their requirements including adequate performance margins. Attachment 1 describes these performance ranges in terms of mass to orbit (kilograms) for a range of C_3 values. The performance data in Attachment 1 is based upon the NASA Launch Services II (NLS II) contracted performance data, industry surveys, emerging vehicle design reviews and recent awards and is to be used for planning purposes only. Proposals should specifically state the launch service performance range to meet their requirements for this mission.

Performance Ground Rules:

- This LV performance shown, available on the NLS-II contract, generally does not include impacts associated with orbital debris compliance; this must be evaluated on a mission-specific basis. Depending on the LV configuration, this could result in a significant performance impact to ensure full compliance with orbital debris policy.
- Guidance reserves have been allocated to account for 3-sigma flight performance.
- Baseline 1194-mm marmon-type clampband separation system and payload adapter.
- Mass of the entire separation system is accounted for on the launch vehicle side. Proposers wishing to use a different separation system should contact the POC in this document for information on potential performance and cost impacts.
- Performance is for baseline launch service configuration; non-standard, mission-unique hardware will require additional assessment.

Attachment 1

Scenario 1:

Table 1. Reference Performance Cases

Orbit	Performance (kg)
500 km Sun-synchronous	265
500 km 0° Inclination	340
500 km 51.6° Inclination	390

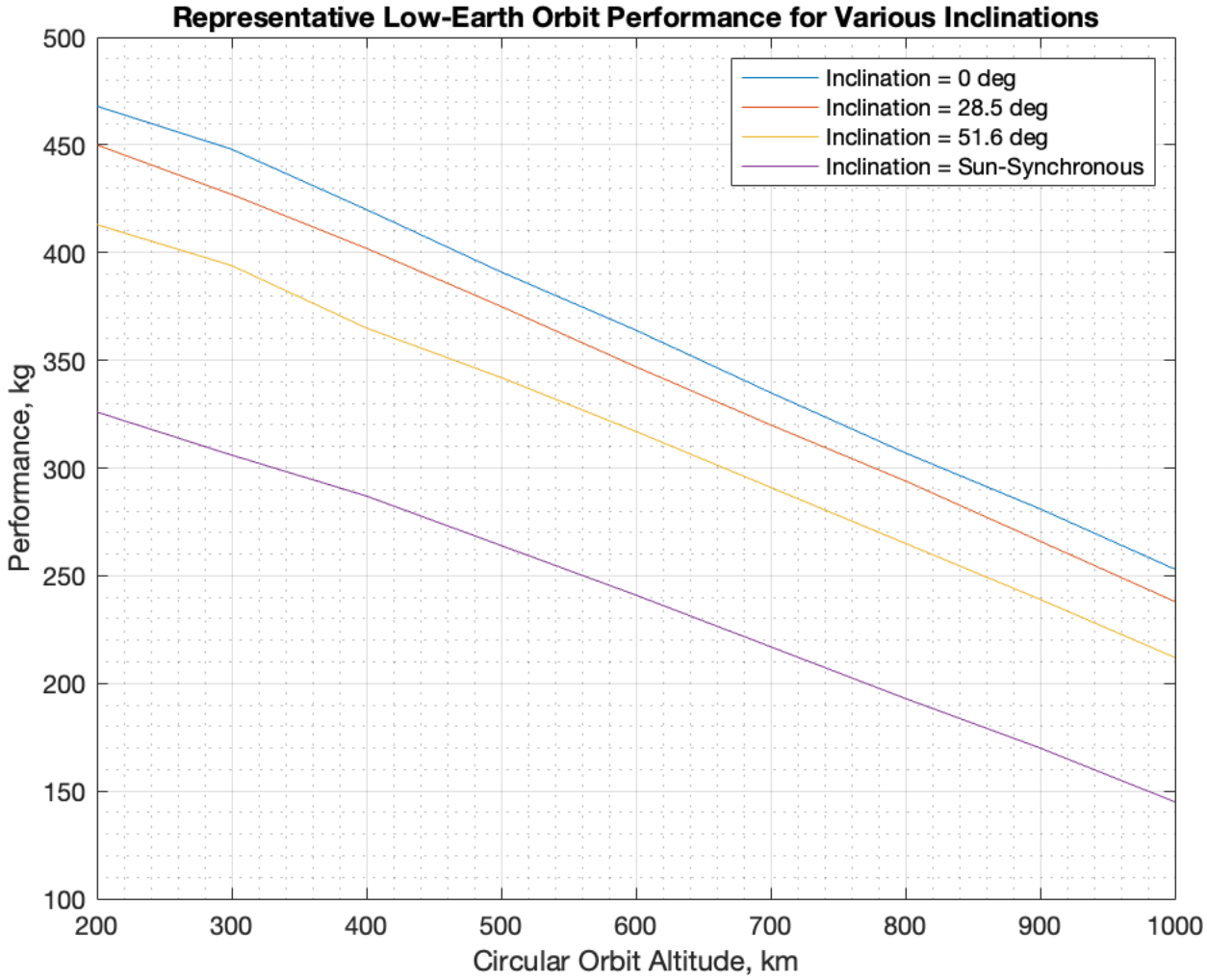

Figure 1. Constraining Performance Curves

Attachment 1

Scenario 2:

Table 2. Reference Performance Cases

Orbit	Performance (kg)
700 km Sun-synchronous	6050
Lunar (C_3 = -1.8 km^2/s^2)	1925
L1/L2 (C_3 = -0.6 km^2/s^2)	1820

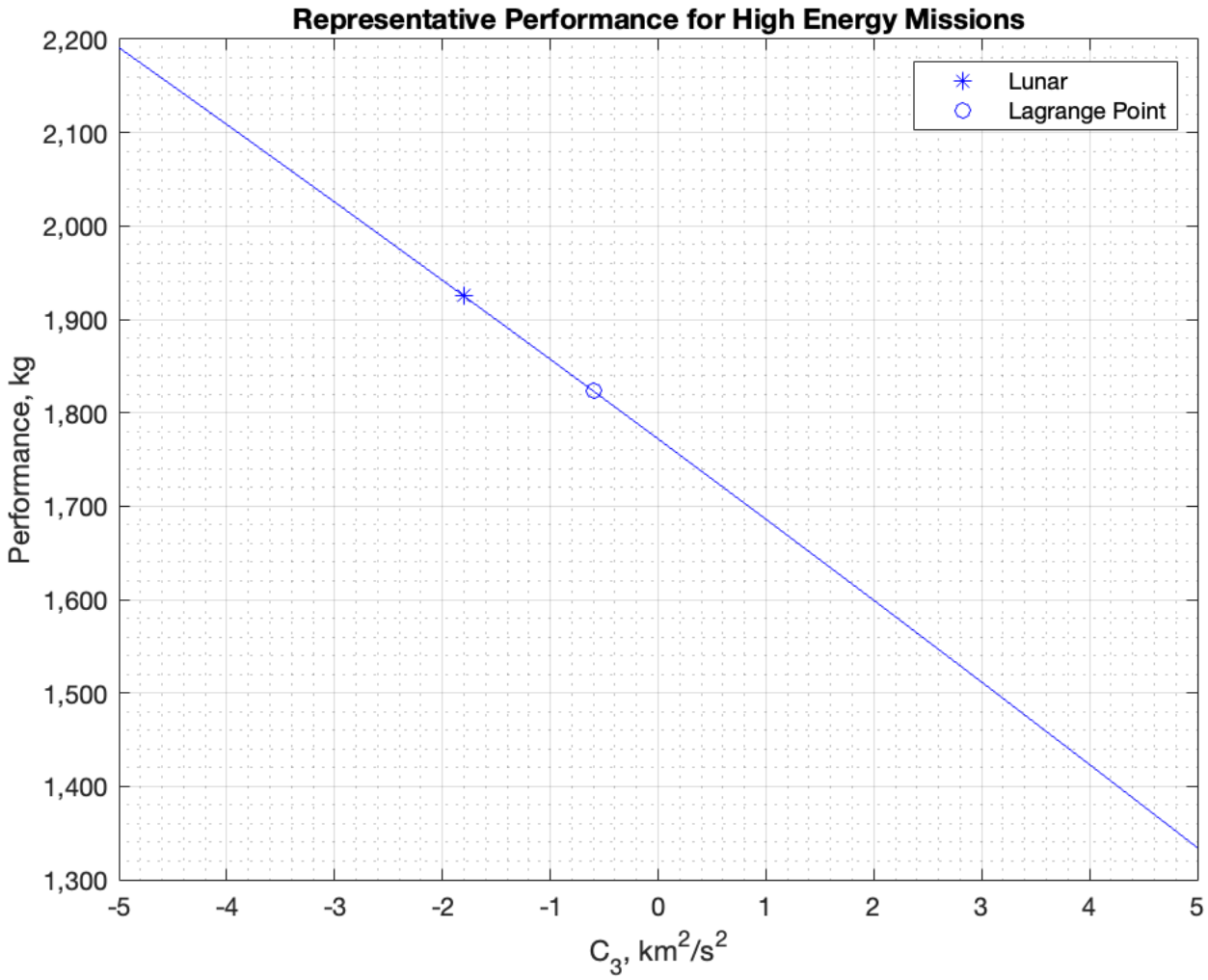

Figure 2. Constraining Performance Curves

Attachment 1

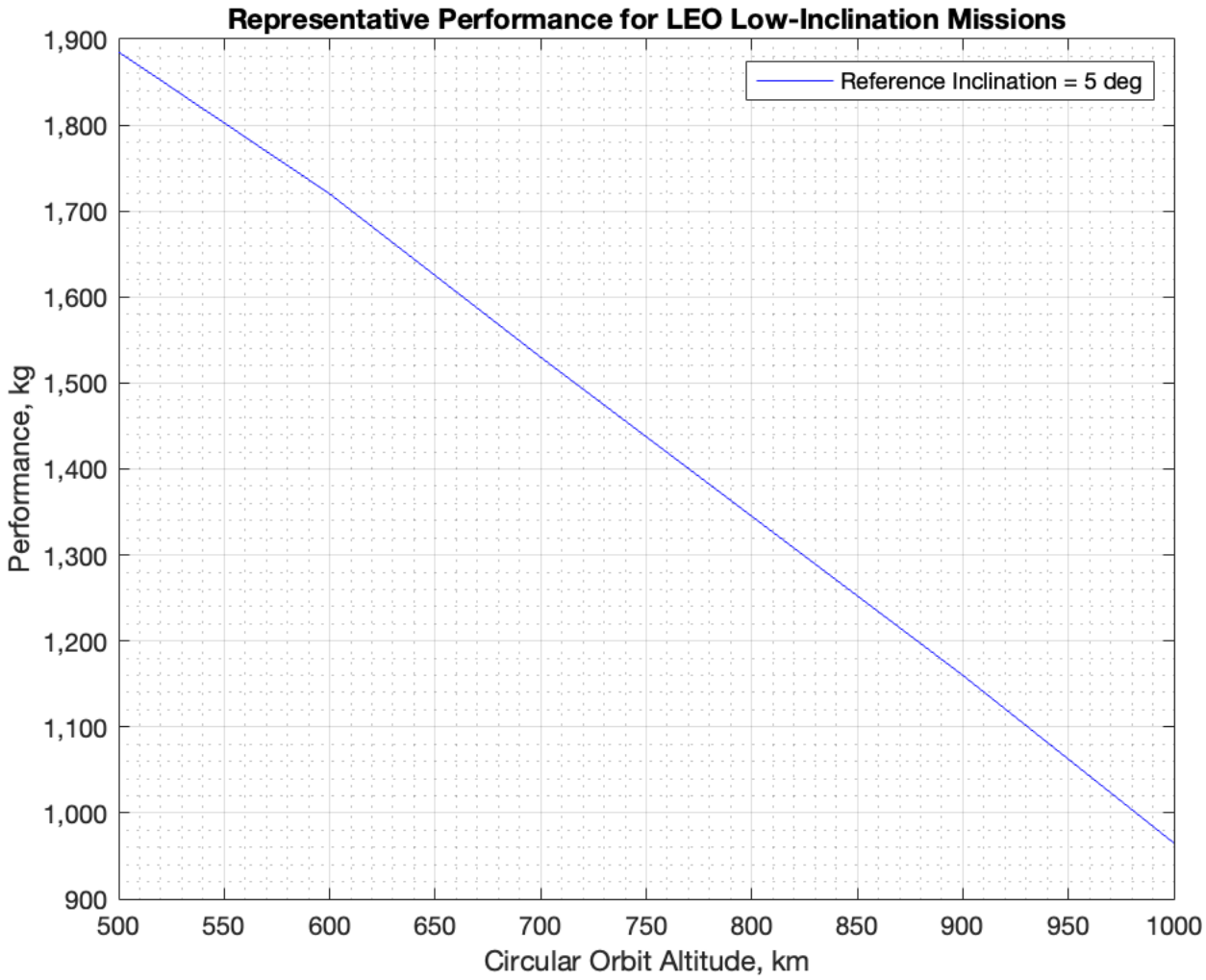

Figure 3. Constraining Performance Curves

Attachment 1

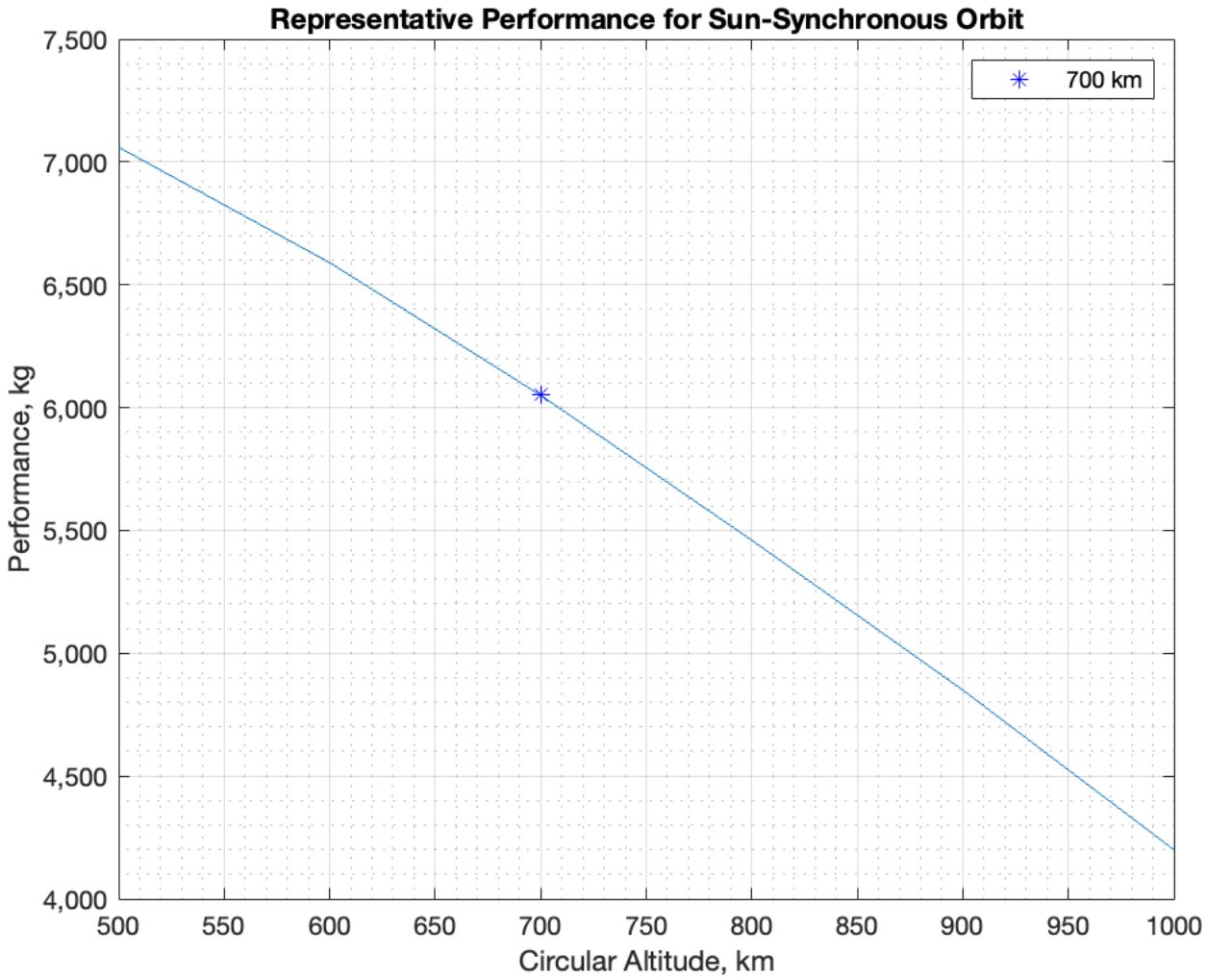

Figure 4. Constraining Performance Curves

Attachment 1

Payload Fairing Envelope:
Figure 5 and Figure 6 below show the performance-specific static payload fairing envelopes. Figure 5 is the static envelope associated with the Scenario 1 and Figure 6 is the static envelope associated with Scenario 2. Proposers must use the payload envelope associated with the accompanying performance scenario to ensure compatibility with all known potential launch vehicle configurations.

Scenario 1:

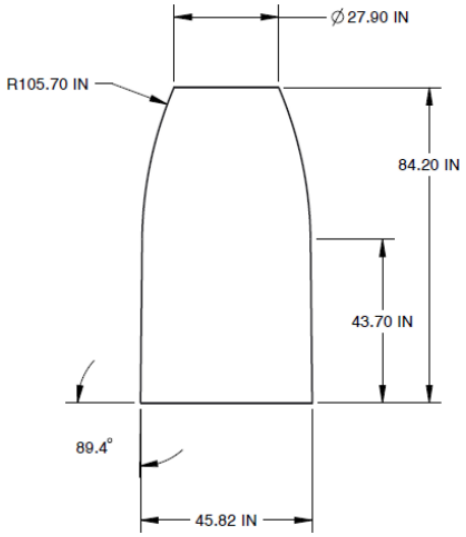

Figure 5. Scenario 1 Static Payload Fairing Envelope

Scenario 2:

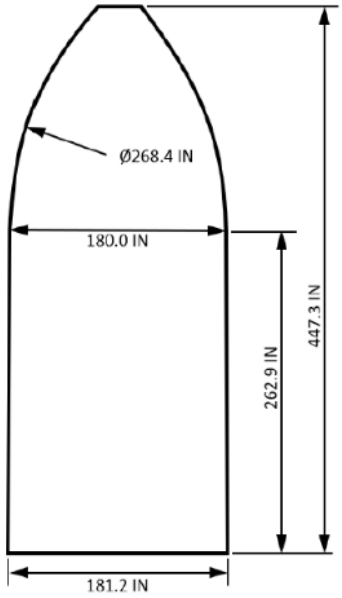

Figure 6. Scenario 2 Static Payload Fairing Envelope

Attachment 1

Launch Vehicle Environments

Composite launch vehicle environments depicted herein are only for the baseline launch services.

Contact the LSP POC for additional enveloping environments of other launch services performance classes, lower masses, alternate fill fractions, or any other mission unique requirements or constraints.

Acoustics Environment: Acoustic environments (fill factor varies from 40-60%)

Scenario 1:

Candidate LV Payload Acoustics Design Envelope (P95/50 MPE)	
Frequency [Hz]	**SPL [dB]**
12.5	108
16	108
20	108
25	105
31.5	105
40	105
50	103
63	103
80	103
100	103
125	105.5
160	108
200	110
250	110
315	110
400	110
500	111.5
630	115
800	119
1000	114
1250	114
1600	111.5
2000	111
2500	108

Attachment 1

3150	106.5
4000	106
5000	102
OASPL	**124.8**

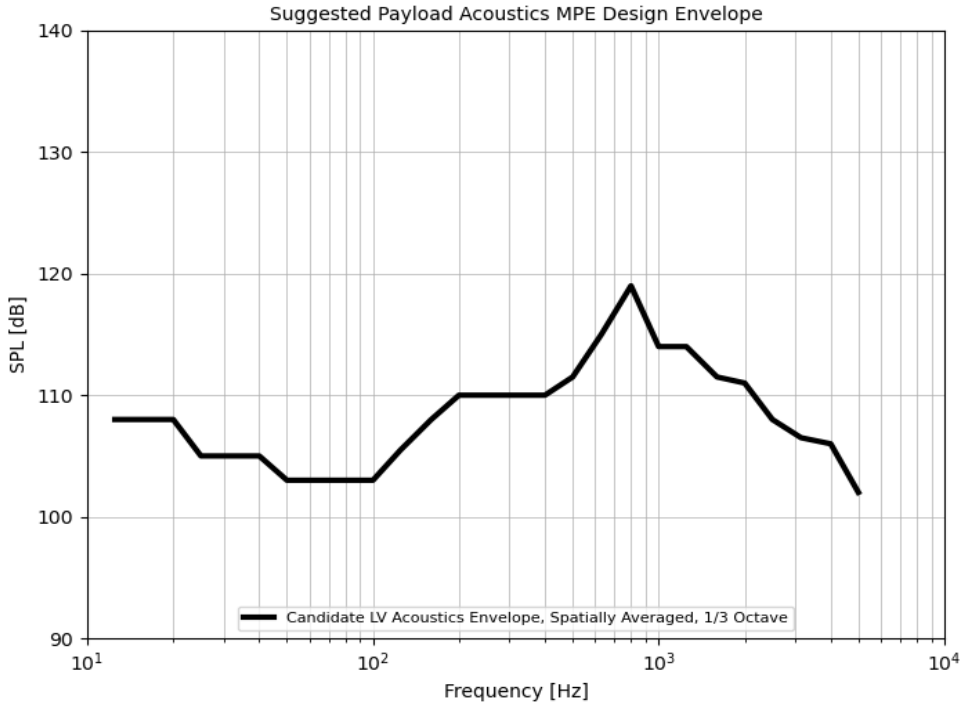

Figure 7. Scenario 1 Acoustics Environment

Attachment 1

Scenario 2:

Candidate LV Payload Acoustics Design Envelope (P95/50 MPE)	
Frequency [Hz]	**SPL [dB]**
31.5	120.6
40	122.4
50	123.8
63	125.1
80	125.9
100	126.4
125	126.6
160	126.3
200	125.1
250	123.6
315	122.2
400	120.9
500	119.5
630	118.1
800	116.7
1000	115.4
1250	114
1600	112.6
2000	111.2
2500	109.9
3150	108.5
4000	107.1
5000	105.7
6300	104.4
8000	103
10000	101.6
OASPL	**135.7**

Attachment 1

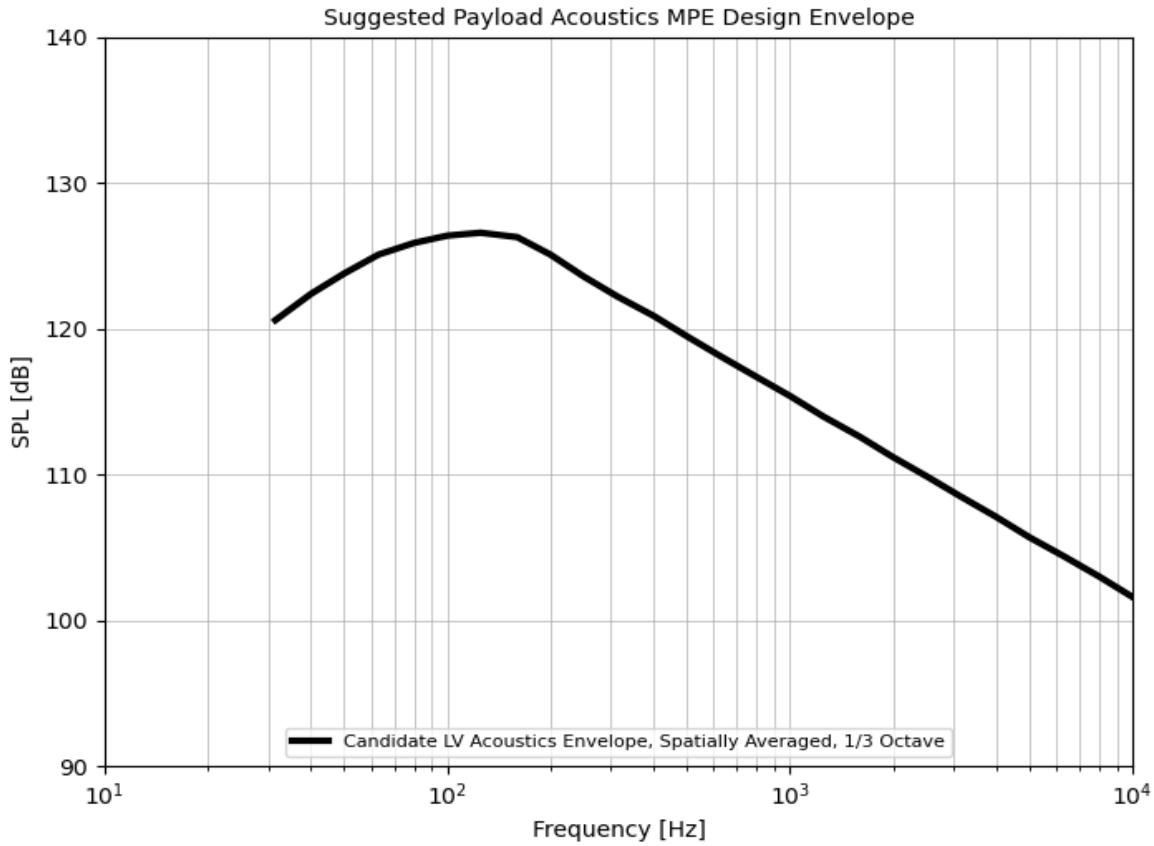

Figure 8. Scenario 2 Acoustics Environment

Attachment 1

Shock Environment:

Scenario 1:

Candidate LV Separation Shock Design Envelope (P95/50 MPE)	
Frequency [Hz]	**SRS [G-peak]**
100	55
1000	3500
10000	3500

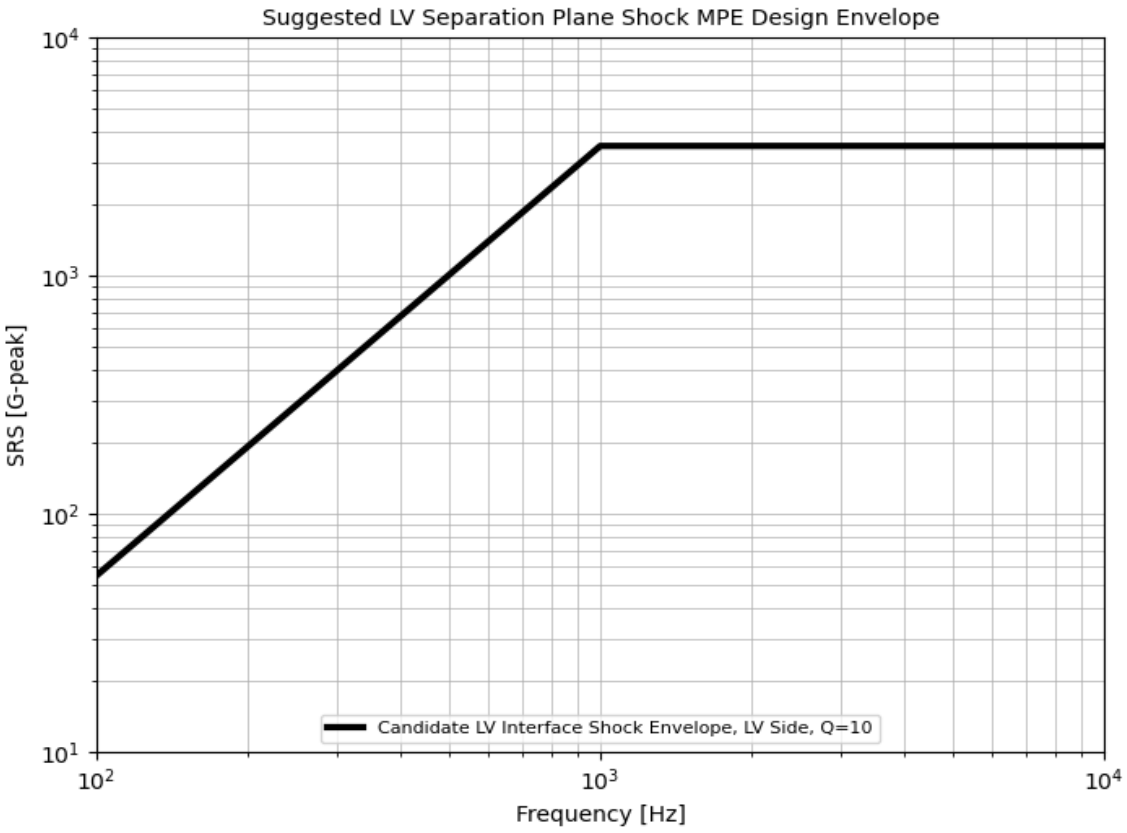

Figure 9. Scenario 1 Shock Environment

Attachment 1

Scenario 2:

Candidate LV Separation Shock Design Envelope (P95/50 MPE)	
Frequency [Hz]	**SRS [G-peak]**
100	70
1000	1554
1550	2000
10000	2000

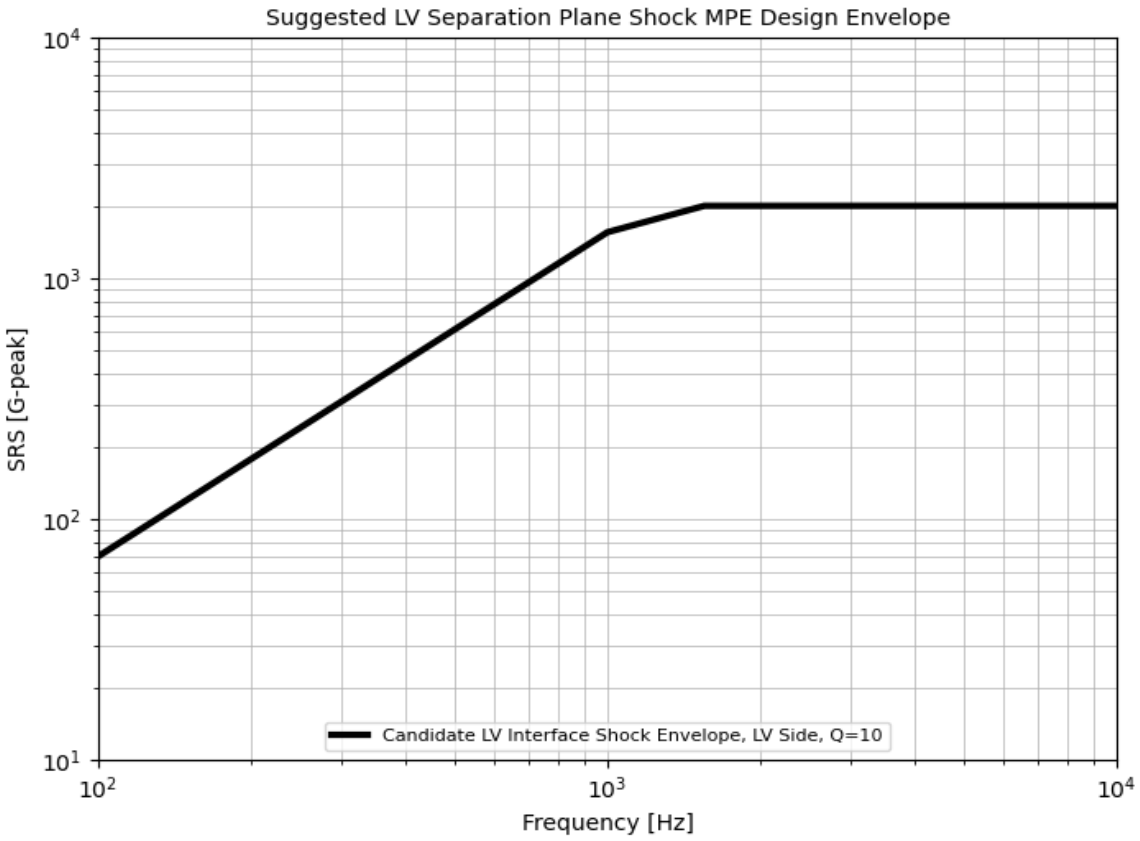

Figure 10. Scenario 2 Shock Environment

Attachment 1

Random Vibe Environment:

Scenario 1:

Candidate LV Random Vibration Design Envelope (P95/50 MPE)	
Frequency [Hz]	**PSD [G^2/Hz]**
20	0.004
35	0.004
40	0.008
70	0.008
85	0.004
100	0.0008
400	0.0008
500	0.004
600	0.005
800	0.005
2000	0.001
Grms	**2.23**

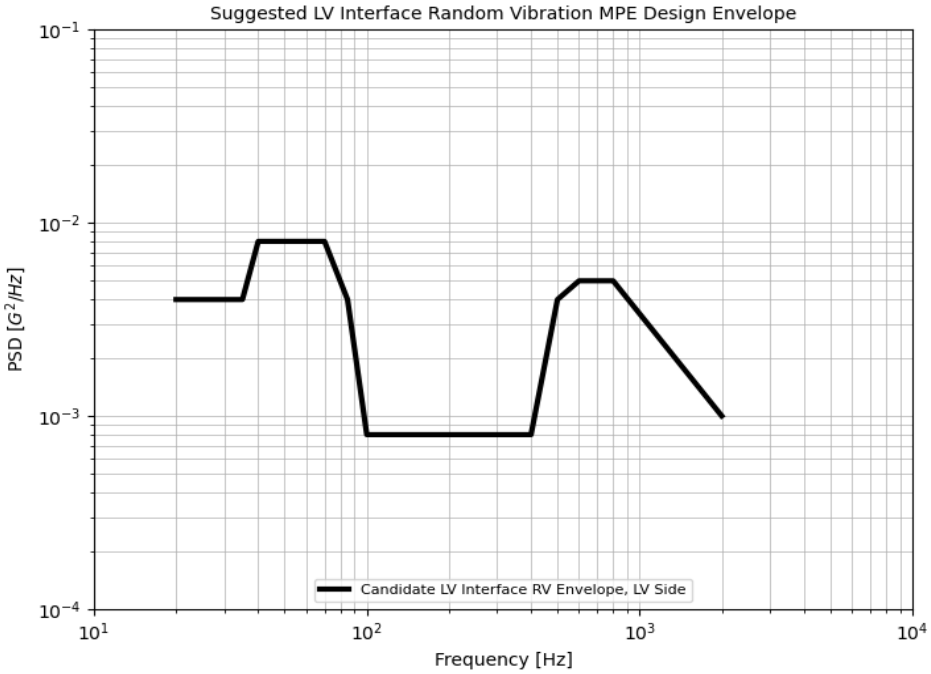

Figure 11. Scenario 1 Random Vibration Environment

Attachment 1

Scenario 2:

Candidate LV Random Vibration Design Envelope (P95/50 MPE)	
Frequency [Hz]	**PSD [G^2/Hz]**
20	0.0044
100	0.0044
300	0.01
700	0.01
800	0.03
925	0.03
2000	0.00644
Grms	**5.13**

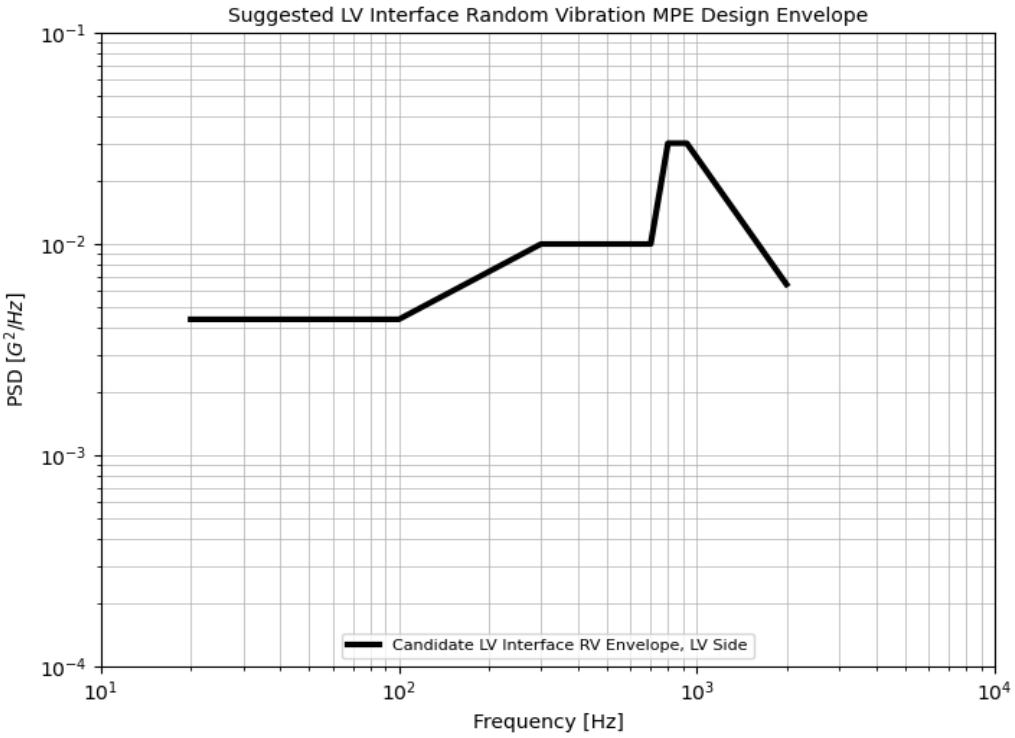

Figure 12. Scenario 2 Random Vibration Environment

Attachment 1

Sine Vibe Environment:

Scenario 1:

Envelope	
Frequency (Hz)	**Axial**
20	**0.2**
65	**1.85**
75	**1.85**
100	**1.2**

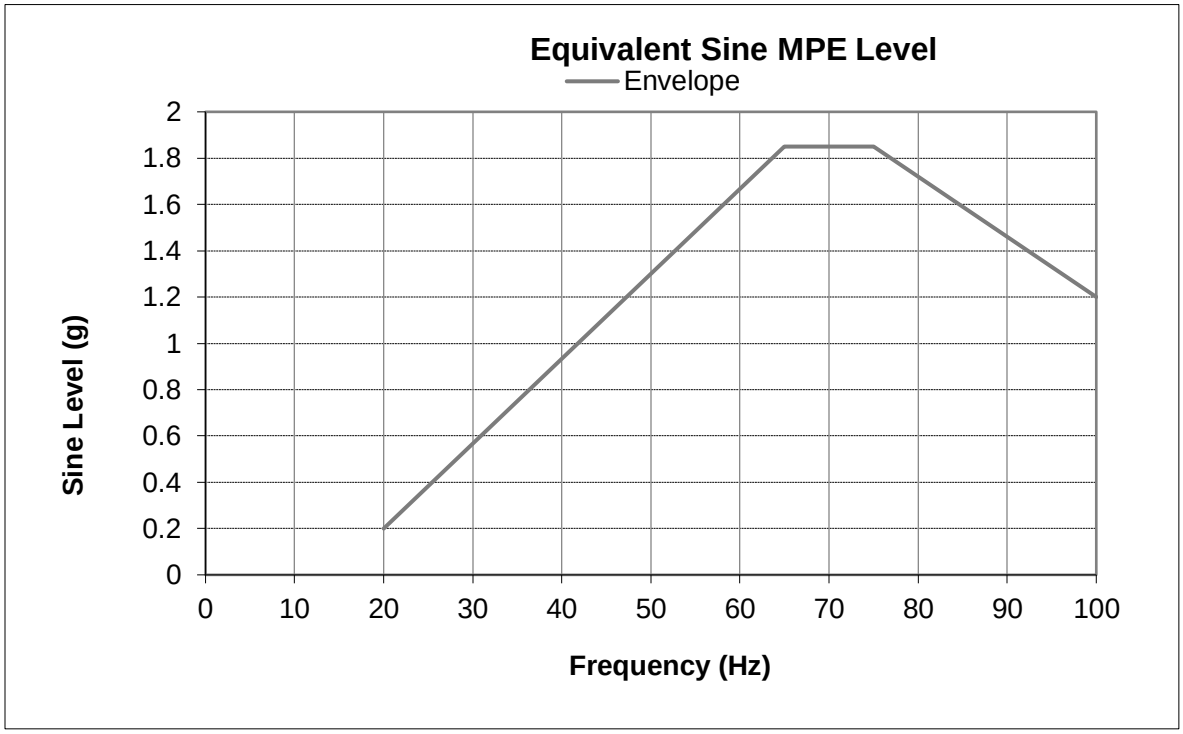

Figure 13. Scenario 1 Sine Vibration Environment

Attachment 1

Scenario 2:

>500 kg				<500 kg			
Frequency (Hz)	Axial (g)	Frequency (Hz)	Lateral (g)	Frequency (Hz)	Axial (g)	Frequency (Hz)	Lateral (g)
5	0.8	5	1	5	1.6	5	1.4
15	1.1	85	1	15	2	40	1.4
30	1.1	100	1.2	60	2	50	1.8
35	1			70	1.8	100	1.8
100	1			100	1.8		

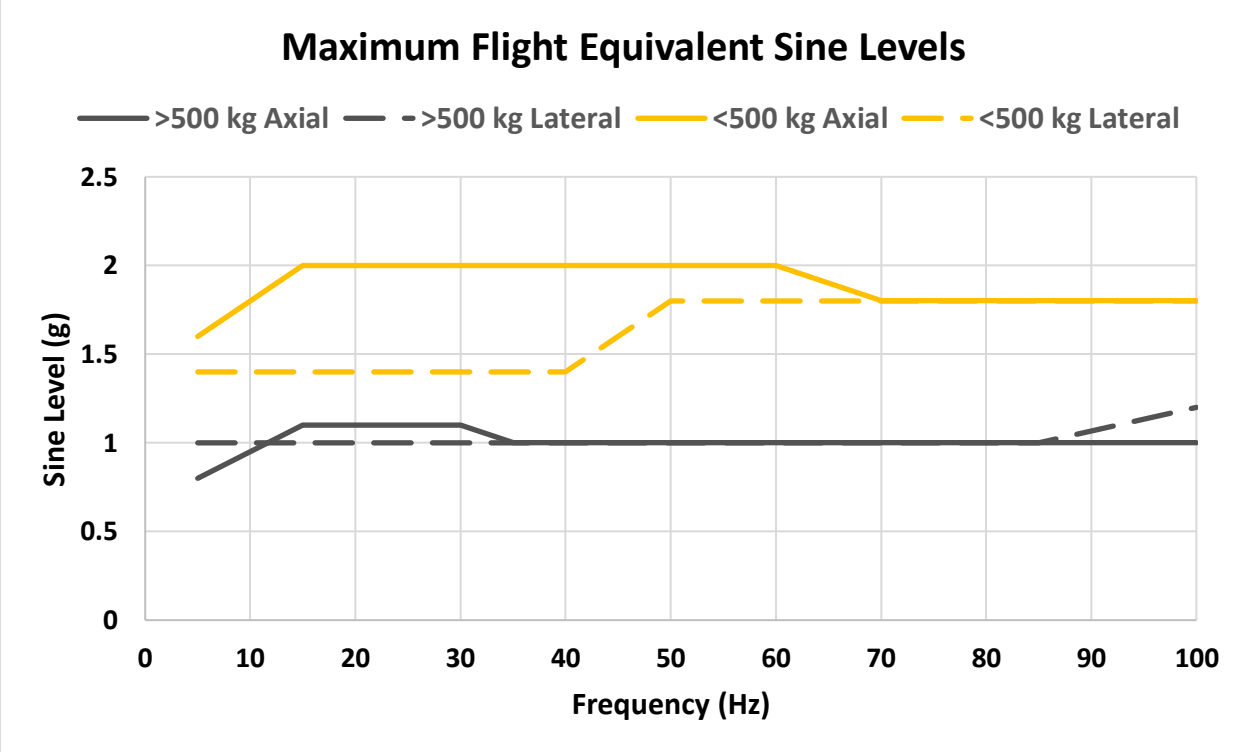

Figure 14. Scenario 2 Sine Vibration Environment

Attachment 1

CG Load Factors:

Scenario 1:

Load Factors cover LEO missions <500 kg

Envelope	
Lateral (g's)	Axial (g's) *
1.7	10
3.6	4.7
3.7	1
6.75	0.5
6.75	-0.5
3.7	-1
3.15	-1.2
-3.15	-1.2
-3.7	-1
-6.75	-0.5
-6.75	0.5
-3.7	1
-3.6	4.7
-1.7	10
1.7	10

*** positive sign in axial load factor denotes compression**

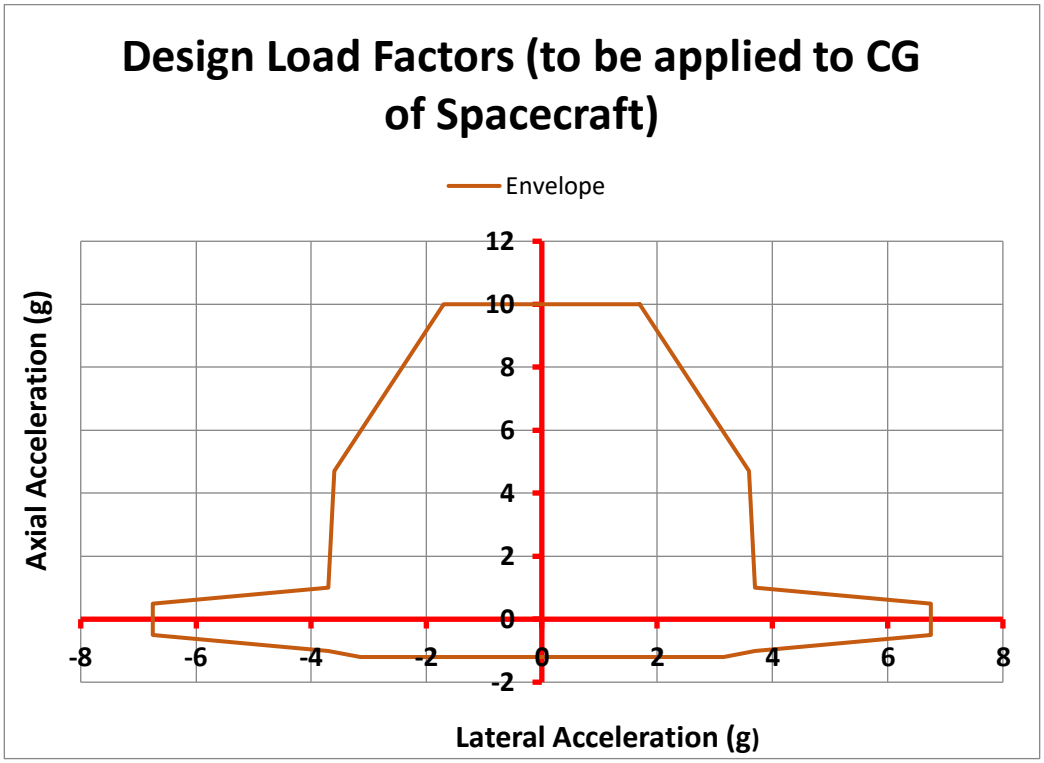

Figure 15. Scenario 1 Enveloping Design Load Factors (to be applied to CG of Spacecraft)

Attachment 1

Scenario 2:

>500 kg		<500 kg	
Lateral (g's)	**Axial (g's)**	**Lateral (g's)**	**Axial (g's)**
4	**9.5**	**6**	**11**
4	**5**	**-6**	**11**
5	**5**	**-6**	**-6**
5	**-2.5**	**6**	**-6**
4	**-2.5**	**6**	**11**
4	**-5**		
-4	**-5**		
-4	**-2.5**		
-5	**-2.5**		
-5	**5**		
-4	**5**		
-4	**9.5**		
4	**9.5**		

Attachment 1

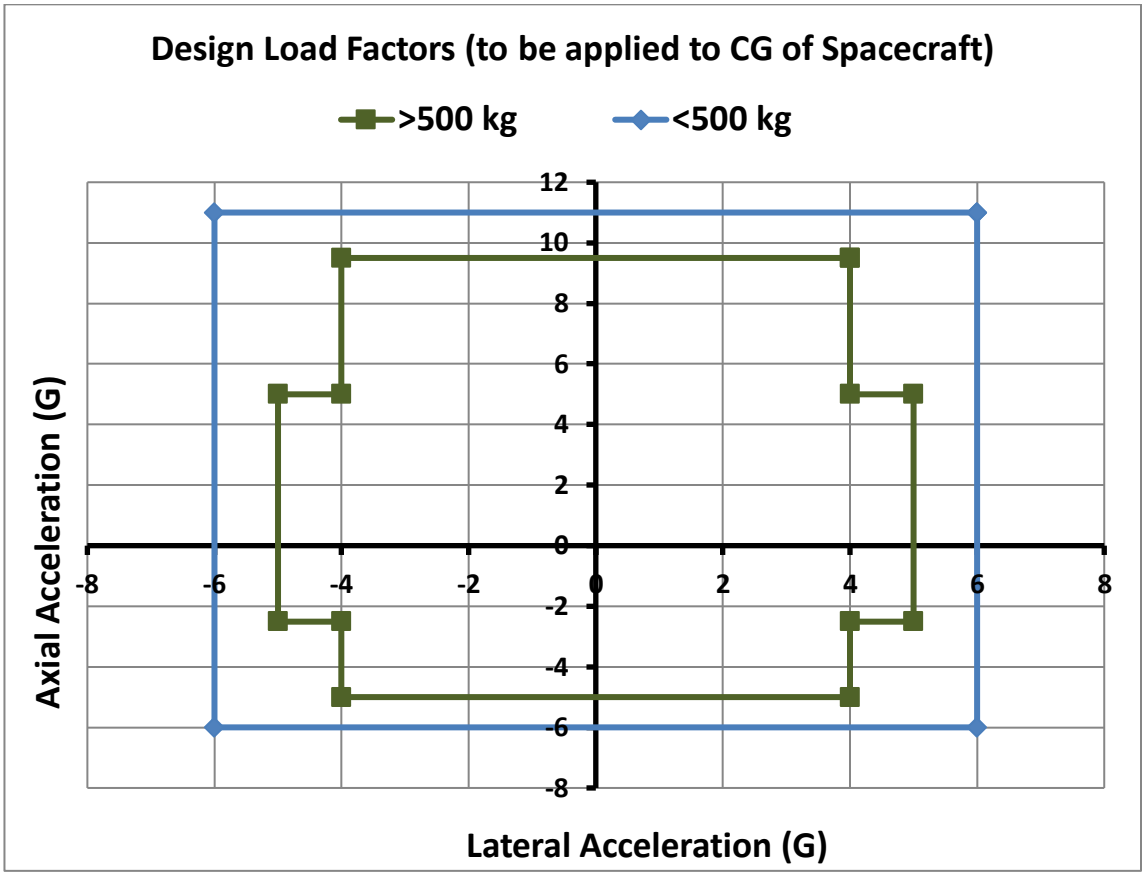

Figure 16. Scenario 2 Enveloping Design Load Factors (to be applied to CG of Spacecraft)

Attachment 2

This list provides an overview of the standard and mission-specific services the spacecraft customer receives with the NASA-LSP **Baseline** launch service for this AO. If additional services are required but not listed herein, or for any questions, please contact the NASA LSP POC listed in this document.

Integrated Services:

- Range support and services
- Payload processing facility and support
- Contractor engineering support
- Base support contractors and logistics
- Hazardous support

Nominal Launch Vehicle Services:

- Launch vehicle that meets customer's performance needs
- Payload fairing with a minimum of 1 access door in a standard location, with thermal and/or acoustic blankets
- Standard LV-provided payload separation system
- Standard payload adapter
- Standard test payload adapter availability
- Spacecraft spin/de-spin capability for separation (if required)
- Single-Spacecraft Collision/contamination avoidance maneuver (CCAM) capability if needed
- Electrical interface connectors (approximately 3 sets)
- Mission-Unique Reviews (approximately 3)
- Readiness Reviews (approximately 4)
- Risk management
- Launch vehicle insight and approval per NPD 8610.23
- Mission integration management & engineering support
- Launch campaign management
- Down range telemetry assets for LV data

Baseline Mission-Unique Services:

- T-0 Grade B GN2 or pure air purge
- ISO 14644-1 Class 7 integration environment

Attachment 3
Risk Assessment/Evaluation Form

Proposal Name: _____

Proposal #: _____

Evaluator: _____

Phone: _____

Email: _____

Launch Service Risk Evaluation:

Overall Assessment: - Given the ground rules in the AO, is the proposed launch vehicle (LV), standard services, mission unique services, performance class, costs and concept feasible for this application? (☐Yes or ☐No)

Areas of risk: _____

LV Performance Summary: Area of risk? (☐Yes or ☐No

Proposed Launch Date: _____

Launch Period (MM/DD/YYYY to MM/DD/YYYY): _____/____/_____ to _____/____/_____

Launch Window (On any given day of the launch period Minutes:Seconds): _____ : _____

Orbit requirements: Apogee: _____km Perigee: _____km Inclination_____deg.

High Energy requirements: C_3: _____km^2/sec^2 DLA: _____deg RLA: _____deg

AO Baseline Performance Class (5-m Medium)? (☐Yes or ☐No)
If not, Proposed Performance Class (4-m, 5-m Low/High)?: _____

CBE Launch Mass (including reserves Wet Mass: _____ kg
NTE Launch Mass (including reserves) Wet Mass: _____kg

Launch Mass Margin _____kg _____%

Formulas:
Mass Margin kg = LV Performance – S/C Mass (including reserves)
Mass Margin % = [(Mass Margin kg)/ S/C Mass (including reserves) kg] X 100

Does candidate launch vehicles have adequate performance for the proposed mission? (☐Yes or ☐No)

LV Performance Risks: _____

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Attachment 3

LV to Spacecraft Interface Summary: Area of risk? (☐Yes or ☐No)

Payload Fairing (PLF) Interfaces and Access:

Spacecraft (S/C) Dimensions: Radial:_____ m Height _____ m

Any intrusions outside of the AO Baseline PLF usable **STATIC** volume for the given performance class? (☐ Yes or ☐No)

If so, list risks:_____

Are there any special access requirements post-fairing encapsulation? (☐Yes or ☐No)

If so, list risks:_____

Mechanical Interface:

Is the AO Baseline Adapter (1194) proposed? (☐Yes or ☐No)

If not, list risks:_____

Electrical Interface:

Are there unique electrical interfaces proposed? (☐Yes or ☐No)

If so, list risks:_____

Mission Unique or Non-Standard Requirements Proposed:

List of Mission Unique Non-Standard Services proposed that are not part of the AO Baseline launch service offered:

_____

_____

_____

_____

Planetary Protection Requirements:_____

Unique launch or processing Facility Requirements (not yet approved):_____

List Radiological Sources (if applicable):_____

Are facilities, not already approved for use, required to store/process the Radiological Sources? (☐Yes or ☐No)

Are any LV modifications not included in the AO Baseline service required for additional safety or Launch approval? (☐Yes or ☐No)

Launch Service Budget Assessment Summary: Area of risk? (☐Yes or ☐No)

Are the additional Mission Unique or Non-standard Services not included in the AO Baseline service covered by mission flex funding allocated by LSP? (☐Yes or ☐No)

If not, list risks:_____

Has additional funding been identified in the PI-Managed Mission Cost (PI-MMC)? (☐Yes or ☐No)

If not, list risks:_____

Attachment 3

S/C Schedule Summary: Area of risk? (☐Yes or ☐No)

Launch Service Integration time 30+/-3 months? (☐Yes or ☐No)

SC Environmental Test program end date L-_____mo

Delivery of verified SC loads model delivery to LSP at L-10 months or earlier? (☐Yes or ☐No)

SC Ship date L-_____mo

SC to LV integrated operations L-_____days

Describe risk of missing the proposed launch date due to spacecraft schedule (environmental testing, launch processing, LV integration):_____

Other identified cost, technical, schedule risks?: Area of risk? (☐Yes or ☐No)

List Risks:

_____

_____

_____

END OF DOCUMENT