This is an addendum to *2002367F Payload Specification for 3U, 6U, and 12U* to highlight the differences between the Canisterized Satellite Dispenser (CSD) and Advanced Satellite Dispenser (ASD) payload specifications. The section numbers correspond to 2002367's sections. This addendum only covers 6U and 12U sizes. The 3U size is planned for a future release.

The high-level differences are

1. The ASD payload can be dimensionally larger than the CSD in certain axes.
2. The ASD payload's dynamic response can be higher than the CSD and therefore payloads can typically be more massive.
3. The ASD payload's tabs have relaxed strength (material) requirements.
4. The ASD payload's tabs have relaxed edge fillet requirements.
5. The ASD payload cannot have dispenser constrained deployables on the -Y face.
6. The ASD payload has a triangular contact zone with the -Z Ejection Plate face.
7. The ASD payload's tabs cannot have gaps as standard.

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3. PARAMETERS

Table 3-1: Parameters

Symbol	Parameter	Conditions	Unit	6U		12U	
				Min	Max	Min	Max
TL (1)	Tab Load			See 2004600 ASD Data Sheet			
CM_X	Center of mass, X	Stowed in ASD	mm [in]	-40 [-1.57]	40 [1.57]	-40 [-1.57]	40 [1.57]
CM_Y	Center of mass, Y	Stowed in ASD	mm [in]	10 [.39]	70 [2.76]	55 [2.17]	125 [4.92]
CM_Z	Center of mass, Z	Stowed in ASD	mm [in]	133 [5.24]	233 [9.17]	133 [5.24]	233 [9.17]
Height	Maximum payload height, +Y dimension		mm [in]	-	109.70 [4.319]	-	234.06 [9.215]
Width	Maximum payload width from origin, ±X dimension		mm [in]	-	122.24 [4.813]	-	122.24 [4.813]
Tab Width	Outer width of tabs, ±X dimension		mm [in]	239.0 [9.409]	239.4 [9.425]	239.0 [9.409]	239.4 [9.425]
Tab Length	Length of tabs, +Z dimension		mm [in]	361 [14.213]	366 [14.409]	361 [14.213]	366 [14.409]
Tab Thickness	Thickness of tabs, See Figure 5-2		mm [in]	2.95 [0.116]	3.05 [0.120]	2.95 [0.116]	3.05 [0.120]
F_{DS}	Force from optional deployment switches, summated, Z axis (2)	When contacting ASD ejection plate. Per ASD ejection Spring.	N	-	5.0	-	5.0
D_{DS}	Payload separation from ejection plate necessary to change deployment switch state, Z axis	If switches reside on –Z face.	mm [in]	1.3 [.05]	12.7 [.50]	1.3 [.05]	12.7 [.50]
F_{FD}	Friction force deployables impart on ASD walls during ejection	summated (all deployables), per ASD ejection spring	N	-	2.0	-	2.0
TML	Total Mass Loss	Per ASTM E 595-77/84/90	%	-	1.0	-	1.0
CVCM	Collected Volatile Condensable Material	Per ASTM E 595-77/84/90	%	-	.1	-	.1
D_X	Location of optional separation electrical connector, +X dimension		mm [in]	103.84 [4.088]	104.34 [4.108]	103.84 [4.088]	104.34 [4.108]

(1) The total loading at the payload tabs, not the overall mass, is the design driver and limitation for the accompanying dispenser. The load is a function of the payload's stiffness, mass distribution, damping and external loading environment. Typically, the maximum loading results from random vibration or shock and not the launch vehicle load factors.

(2) Ensures payload will not gap from ASD ejection plate prior to separating.

4. COMMON REQUIREMENTS

1. Tabs
   a. Tabs shall be aluminum alloy with yield strength ≥35ksi. 6061-T6 is common but numerous other alloys also meet this strength requirement. See Metallic Materials Properties Development and Standardization (MMPDS, formerly MIL-HDBK-5) for details.
   b. Holes, countersinks, and any protruding features are prohibited anywhere along the clamped interface (between N and M in Figure 5-2).
   c. Tabs shall be Hard Anodized per MIL-A-8625, Type III, Class 1 along the clamped interface (between N and M in Figure 5-2). All dimensions apply AFTER hard anodize. Note that anodize thickness refers to the total thickness. As a guideline, approximately half will penetrate, and half will build-up (example .002 thickness ≈ .001 penetration + .001 build-up).
   d. Max surface roughness is N7 (1.6 µm Ra, 63 µin AA).
   e. Discontinuities or gaps are only allowed per Section 7.
2. Dimensions and tolerances in Figure 5-2 shall be maintained under all temperatures. Consider deformation and warping if structure is not aluminum.
3. The structure comprising the –Z face (face that contacts ASD ejection plate) may be a uniform surface or consist of discrete contact points. The discrete contact points shall be located such that they envelope the payload's C.M. and any deployment switches. See the ASD/payload CAD model for this allowable zone.
4. Contact the launch service provider to determine if payload inhibits (deployment switches) are required. If required, locating on the –Z face such that they contact the ASD's Ejection Plate is recommended. The deployable contact areas may also be used but consider the effect of tolerance build-up in the dispenser. See sections 5 and 12. Also consider using the optional Separation Electrical Connector as a loopback.
5. Deployables shall be verified with the ASD prior to flight.
6. If electrical grounding to the ASD is desired, the Separation Electrical Connector (in-flight disconnect) must be used.
7. The two tabs and the structure that contacts the ASD Ejection Plate on the –Z face are the only required features of the payload. The rest of the payload may be any shape that fits within the max dynamic envelope.
8. The maximum dimensions stated in this document are the payload's dynamic envelope while canisterized and shall include all load cases (vibration, thermal, acoustic, etc.).
9. No debris shall be generated that will inhibit separation.

5. DIMENSIONS

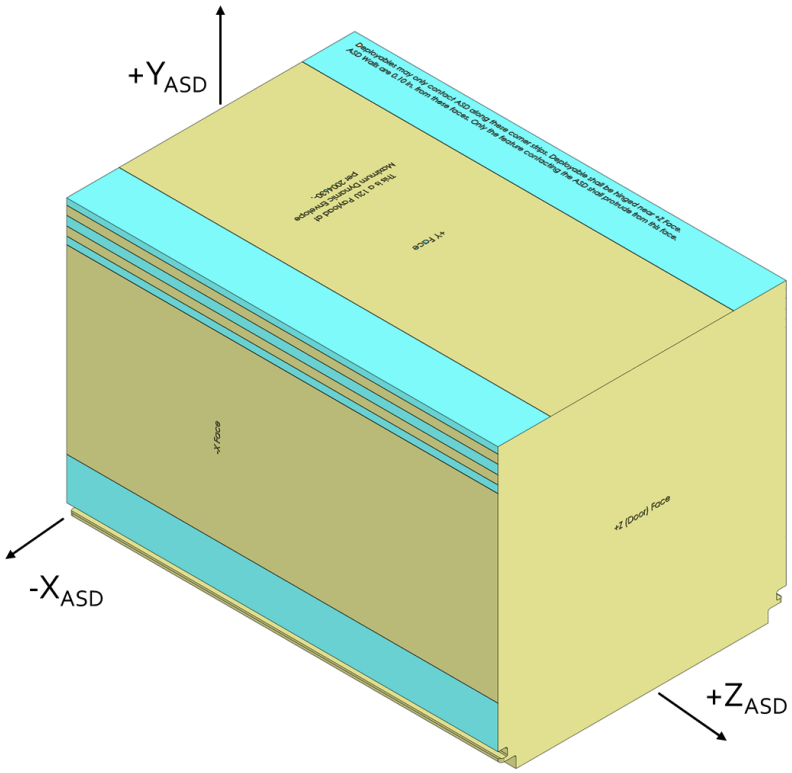
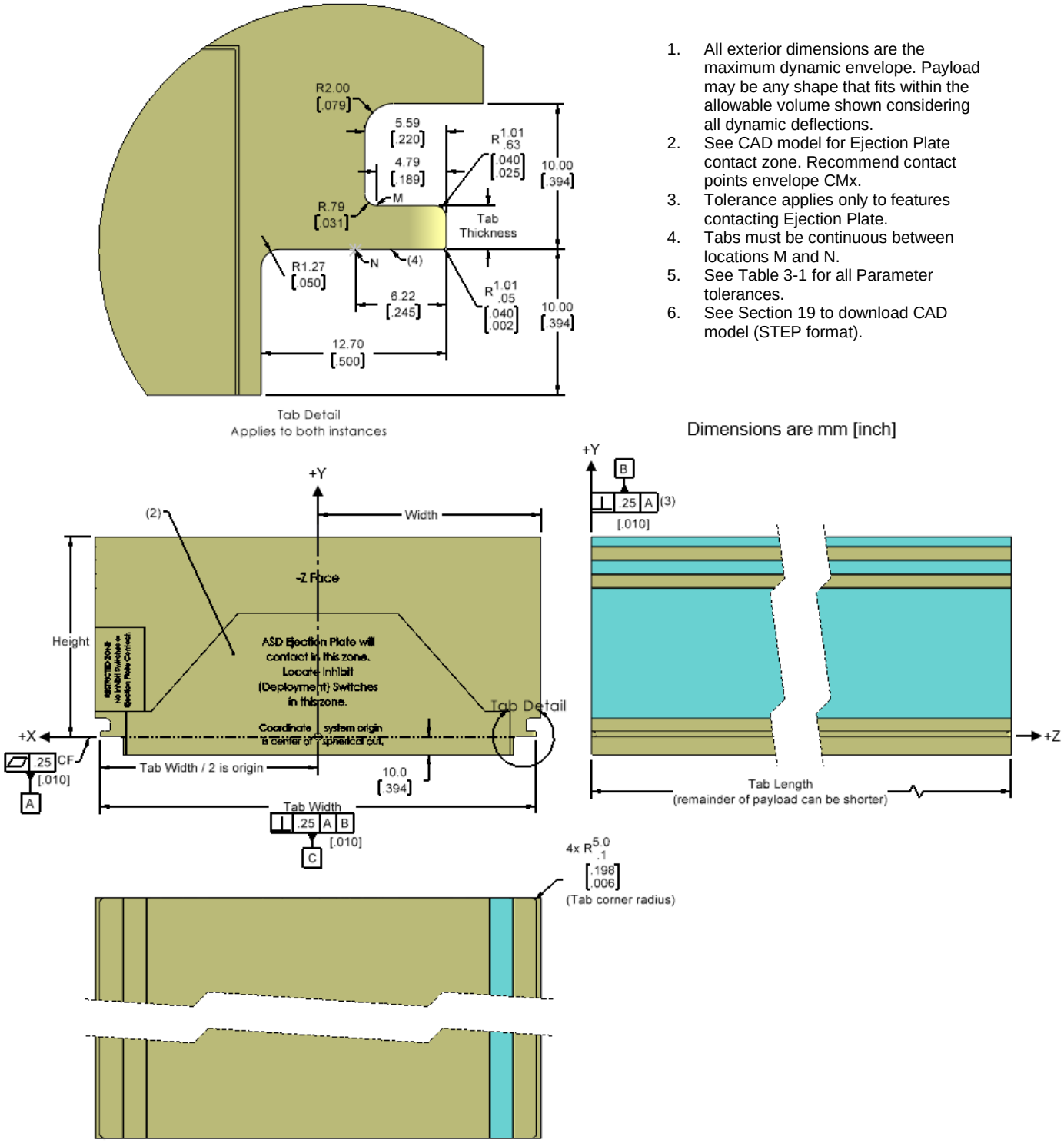
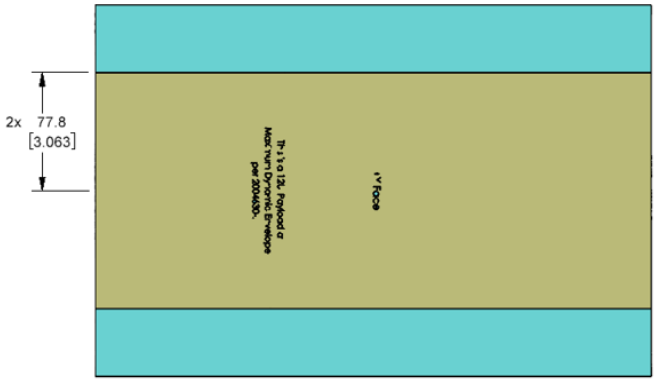


Figure 5-1: Payload Coordinate System



1. All exterior dimensions are the maximum dynamic envelope. Payload may be any shape that fits within the allowable volume shown considering all dynamic deflections.
2. See CAD model for Ejection Plate contact zone. Recommend contact points envelope CMx.
3. Tolerance applies only to features contacting Ejection Plate.
4. Tabs must be continuous between locations M and N.
5. See Table 3-1 for all Parameter tolerances.
6. See Section 19 to download CAD model (STEP format).

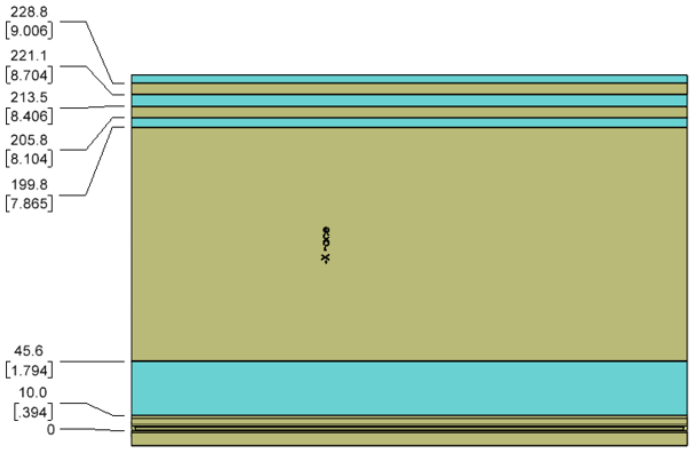
Figure 5-2: Payload dimensions



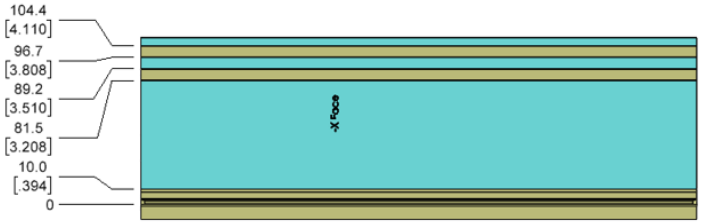
6U/12U +Y Face

Allowable Contact Zones

Dimensions relative to payload origin.
Units are mm [inch].



12U ±X Face



6U ±X Face

Figure 5-3: Allowable Wall Contact Zones (green shaded areas)

6. ELECTRICAL SCHEMATIC

The electrical schematic with respect to the payload is the same as 2002367F Payload Spec for 3U 6U 12U. The location of the separation electrical connector is also the same as specified in 2002367F Payload Spec for 3U 6U 12U.

7. TAB GAPS

Tab gaps may be accommodated with a custom ASD, please contact PSC if required.

8. DISCRETE PAYLOADS

The ASD can accommodate discrete payloads as specified in 2002367F Payload Spec for 3U 6U 12U. If tab gaps are present between discrete payloads, a custom ASD may be required per Section 7.

9. BENEFIT OF TABS

The ASD shares the same benefits listed in 2002367F Payload Spec for 3U 6U 12U.

10. PREDICTING DESIGN LIMIT LOADS

The same process shown in 2002367F Payload Spec for 3U 6U 12U should be used to predict design limit loads.

11. TAB MANUFACTURING

The same process shown in 2002367F Payload Spec for 3U 6U 12U should be used to manufacture payload tabs.

12. ASD CONSTRAINED DEPLOYABLES

The payload may use the ASD to constrain deployables in designated areas as defined in Figure 5-3. At these designated contact zones the ASD interior surface is nominally 2.6 ±.8 mm [.1 ±.03 in] from the maximum allowable dynamic envelope of the payload defined as 'Width' and 'Height'. Only the portion of the payload directly contacting the ASD Walls (bearing, etc.) may exceed the payload dynamic envelope in Section 5. Ensure all other areas of the deployable remain within the dynamic envelope.

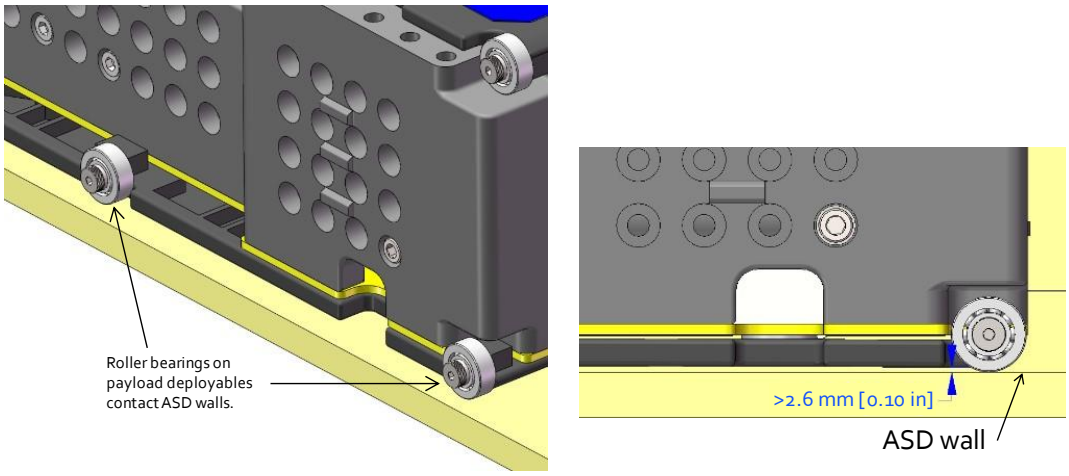


Figure 12-1: Deployable contact with ASD

Deployable Design Notes:

1) Ensure sufficient ASD contact spacing and panel stiffness to prevent the panel from rubbing on the dispenser as the payload ejects.
2) Deployables should have features to react shear loading at end opposite hinge. This prevents excessive loading on the hinge and deflection at the end of the deployable during launch.
3) The deployable panels shall be sufficiently preloaded against the payload structure to minimize rattling during launch. This can be accomplished by incorporating a leaf spring, spring plunger, etc.
4) Consider potential disturbance torques from the deployable adjacent the ASD door remaining in contact after the payload has ejected the ASD.
5) Account for tolerance build-up in the deployable preload system. By necessity, the dispenser width will be greater than the payload's tab width. During payload installation there could be up to .5 mm [.020 in] of play relative to nominal in the +X or –X positioning of the payload. Therefore the +X or –X contact walls of the dispenser will also shift relative to the payload. These values are estimates.

13. PAYLOAD VOLUME

The allowable volume of the payloads is larger than existing CubeSats.

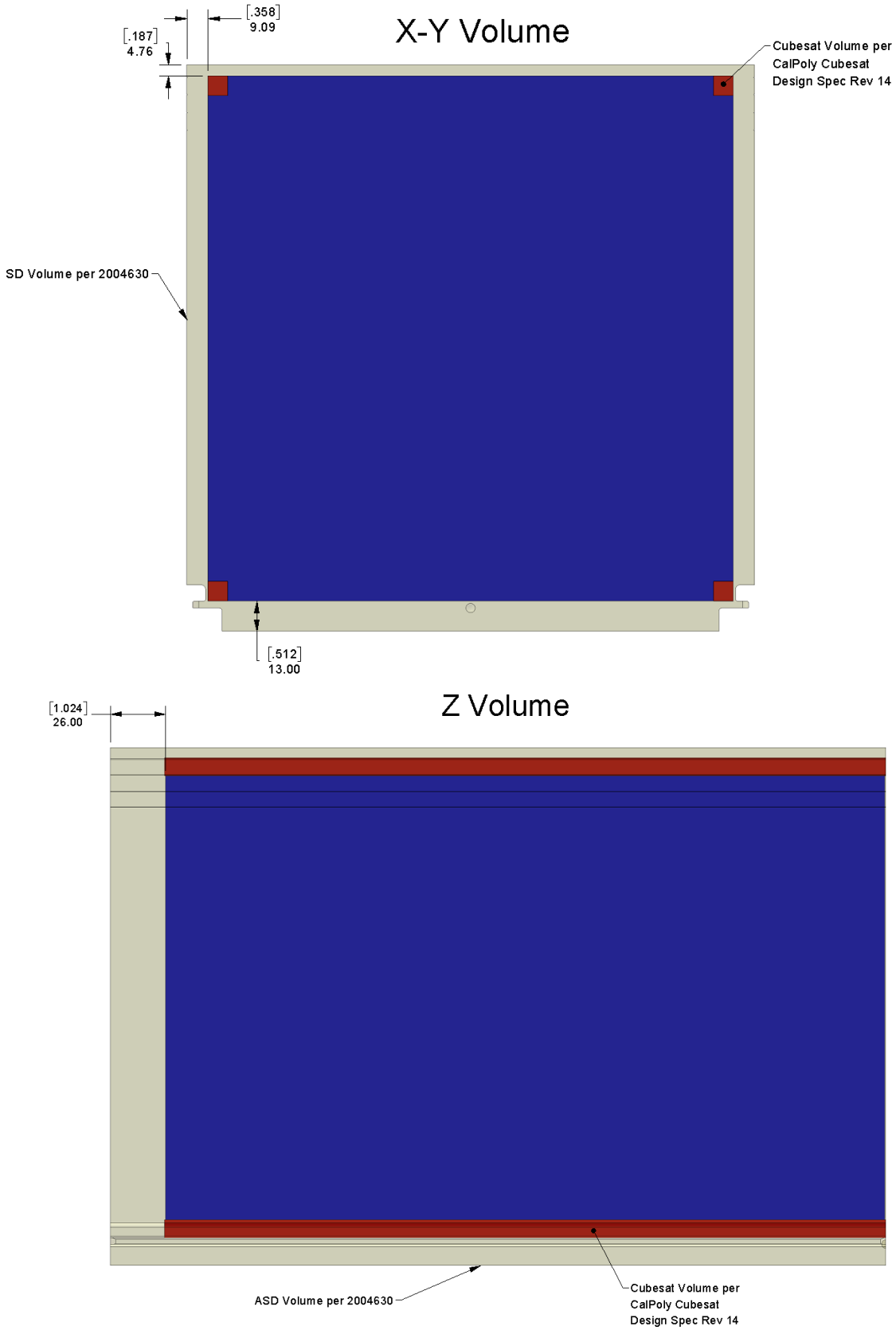


Figure 13-1: Comparison of 12U payload volumes. This specification allows 25% more volume.

14. PAYLOAD DESIGN

See 2002367F Payload Spec for 3U 6U 12U for tips on designing a payload.

15. TYPICAL APPLICATIONS

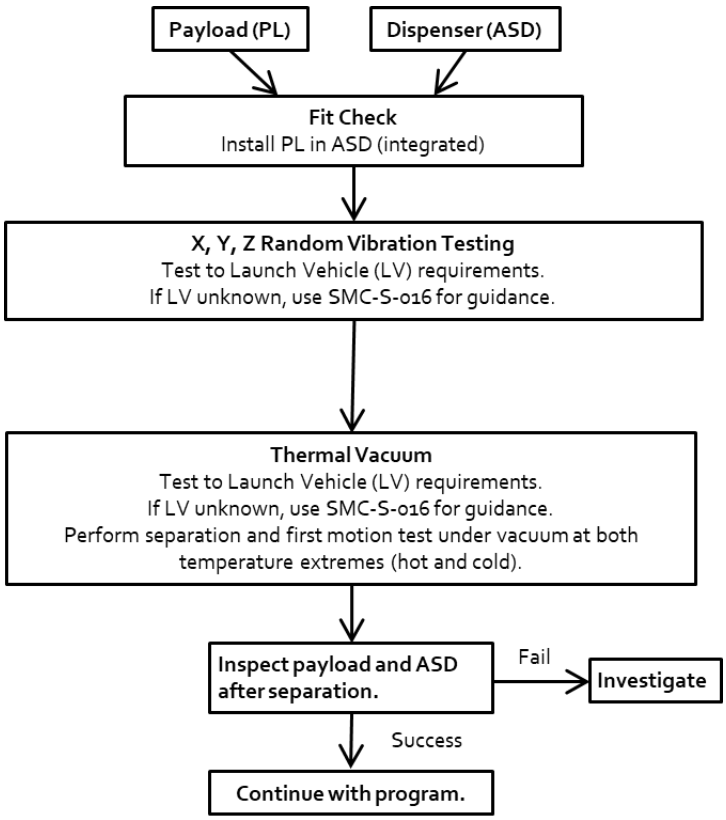
For examples of payloads using the tab spec, see 2002367F Payload Spec for 3U 6U 12U.

16. SEPARATION ELECTRICAL CONNECTOR ATTACHMENT

The separation electrical connector may be attached as shown in 2002367F Payload Spec for 3U 6U 12U.

17. RECOMMENDED TEST AND INTEGRATION

Test levels are for launch and separation environments, not necessarily on-orbit.



Be cognizant that vibration testing with the flight ASD will consume test life margin. See the ASD's qualification test campaign to determine remaining life and margin. It is recommended to test with an EDU ASD early in the development schedule and then verify operation with the flight ASD prior to integration.

18. TIPS AND CONSIDERATIONS

1. Electrical Wiring: Include the electrical harness in the CAD model. Ensure there are sufficient routing options, strain relief and clearances. Also, the harness can consume a significant portion of the allowable payload mass.
2. Installation in ASD: The payload may end up being installed vertically in the ASD (gravity in –Z). Add a removable handle on the +Z face to aide installation.
3. ASD Ejection: When possible, verify complete ejection of the payload from the ASD during testing.

19. CAD MODELS

Solid models of the payloads at their maximum dynamic envelope are available for download at rocketlabusa.com/space-systems/separation-systems/. The payload may be inside a simplified model of the ASD. Reminder that PSC does not design or manufacture payloads, structures, or buses.

20. ADDITIONAL INFORMATION

Verify this is the latest revision of the specification by visiting rocketlabusa.com/space-systems/separation-systems/.

Please contact psc.info@rocketlabusa.com with questions or comments. Feedback is welcome to realize the full potential of this technology.

21. REFERENCES

See 2002367F Payload Spec for 3U 6U 12U.

22. ACKNOWLEDGEMENTS

See 2002367F Payload Spec for 3U 6U 12U.

23. REVISION HISTORY

Revision	Release Date
- (initial release)	10Sep2024