

From: Austin Weber

To: Nimesh Sangani

Date: July 02, 2021

Subject: Additional Information Request

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Message:

Hello Nimesh,

Below is the response to your requests.

1) Please provide additional information about the change in the June 11 ODAR regarding surviving debris. What new information prompted this update?

The change that prompted the new information in the June 11 ODAR submission was the inclusion of a ballast within the satellites for improved ADCS and thruster control. The ballast brings the satellite's center of mass closer to the physical center of the spacecraft. This modification improves the functionality of ADCS operations (magnetorquer and reaction wheel operations for spacecraft detumble and pointing) and thruster operations (orbital stationkeeping and maneuvers). The ballast was included in the NASA DAS software analysis to verify compliance with the NASA standard for limiting orbital debris. The human casualty probability and the NASA probability limit are stated in the prompt below.

2) Please provide any information you have concerning the steps taken to design for demise for the spacecraft.

The satellite bus design utilizes COTS hardware, mostly provided by Pumpkin Inc., with flight heritage on numerous CubeSat missions. Through analysis using the NASA DAS v3.1.0 software, the satellite risk of human casualty is calculated to be 1:92900. This risk probability does not exceed the uncontrolled reentry risk limit of 1:10000 for objects with an impacting kinetic energy in excess of 15 joules, per NASA-STD-8719.14B regarding the process for limiting orbital debris.

Best,

Austin