David Hinkley,

Per our request, the AHaB tool was used to assess reentry survivability of

1. AC-10 Camera mount (stainless steel)
2. uCPT Cover (stainless steel)
3. uCPT Vault (stainless steel)
4. uCPT Baffle (tantalum)

AHaB is the Aerospace in-house tool for performing high-fidelity reentry survivability analyses in support of National Security Space missions. For consistency with DAS, it was assumed that each part was released at 78 km altitude, corresponding to the typical DAS approach of assuming spacecraft breakup at 78 km. To obtain an initial trajectory state at 78 km, reentry of the intact AC-10 was simulated from a circular orbit of 250 km and 51.6 deg orbital inclination, down to 78 km. Since initial temperature of each component is not known using this approach, conservative trade studies for initial temperatures were performed by assuming minimum and maximum temperatures corresponding respectively to the initial orbital temperature (300 K) and the melting temperature of materials for the assorted components.

The results from AHaB are as follows:

1. For the Camera, it was found that demise will occur, even if the initial temperature is set to the orbital initial temperature of 300 K. The casualty area for this part will be 0 m^2.

2. For the uCPT Cover, it was found that demise will occur, even if the initial temperature is set to the orbital initial temperature of 300 K. The casualty area for this part will be 0 m^2.

3. For the uCPT Vault made from stainless steel alloy 316, it was found that demise will occur, even if the initial temperature is set to the orbital initial temperature of 300 K. The casualty area for this part will be 0 m^2.

4. For the uCPT Baffle made from tantalum, it was found that survival to the ground will occur, even if the initial temperature is set to the melting point of tantalum (3288 K). The impact kinetic energy of the tantalum uCPT Baffle will be 1mJ, far below the 15 J hazard threshold. The casualty area will be 0 m^2.

- Mike
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