

Kerbal Space Program - Bug #15392

1.25M Heat Shield Moves Aerodynamic Center To Unstable Condition

05/28/2017 05:41 AM - pieindaface

Status:	Closed	Start date:	05/28/2017
Severity:	High	% Done:	100%
Assignee:			
Category:	Physics		
Target version:			
Version:	1.3.0	Language:	English (US)
Platform:	Windows	Mod Related:	No
Expansion:			
Description			
The Aerodynamic center is moved to an unstable condition when the heat shield is added to the Mk1 cockpit with added hardware(bays, fuel, etc.) below the cockpit and above the heat shield. The only stable condition for the heat shield is when the heat shield is mounted directly to the MK1 Cockpit.			

History

#1 - 05/28/2017 04:22 PM - swjr-swis

- File screenshot3.png added
- File screenshot4.png added
- File screenshot5.png added
- File screenshot6.png added
- File screenshot7.png added
- File screenshot8.png added
- Status changed from New to Need More Info

1.3.0.1804 Win x64

I cannot confirm this assessment.

When tested in actual flight (reentry from LKO), the Mk1 Command Pod stays perfectly retrograde throughout the whole reentry whether with the heatshield alone, or with a 1.25m bay between the pod and heatshield. It does this even with SAS off, which proves the assembly is aerodynamically stable that way.

You are probably referring to the fact that the CoL indicator in the editor (VAB/SPH) is below the CoM indicator, and moves even lower away from the CoM when adding a bay/tank between shield and pod. In the retrograde reentry direction this would seem to put it 'in front' of the CoM, a condition that is generally said to be aerodynamically unstable.

However, the CoL indicator in the editor is only a very rough indication and only part of the equation that decides whether something will be 'stable'. The true test is in flight, and in flight the assembly remains perfectly stable in retrograde reentry (see added screenshots). Note that I tested this with the least favourable state - the bay was left empty; if anything is added to the bay, it moves the CoM down towards the heatshield and can only improve the aerodynamic stability during reentry.

Can you add a craft file that is actually unstable **in flight**?

#2 - 07/31/2019 10:37 PM - chris.fulton

- Status changed from Need More Info to Resolved
- % Done changed from 0 to 100

#3 - 07/31/2019 10:38 PM - chris.fulton

- Status changed from Resolved to Closed

Closing in effort of database cleanup.

Files

screenshot3.png	2.38 MB	05/28/2017	swjr-swis
screenshot4.png	1020 KB	05/28/2017	swjr-swis
screenshot5.png	1.55 MB	05/28/2017	swjr-swis
screenshot6.png	2.15 MB	05/28/2017	swjr-swis
screenshot7.png	1.69 MB	05/28/2017	swjr-swis
screenshot8.png	2.33 MB	05/28/2017	swjr-swis