Kerbal Space Program - Bug #18060

Drag caused by parachutes depends on direction from root part

03/15/2018 02:15 PM - rudi1291

Status:	New	**Start date:**	03/15/2018
Severity:	Low	**% Done:**	0%
Assignee:			
Category:	Physics		
Target version:			
Version:	1.4.1	**Language:**	English (US)
Platform:	Windows	**Mod Related:**	No
Expansion:	Core Game		

Description

The drag caused by parachutes placed in symmetry depends on their direction from the root part. This means, that the same part will fall with a different speed under parachute depending on where you attached it in the editor. See the attached craft.

Reproduce:

1)Load the attached craft and set it on the pad.
2)Launch the craft. Once the Flea has burned out and speed drops below ~20ms, stage again to decouple.
3)Cycle through the detached parts.

Once the chutes fully deploy, the parts start to fall with different speeds. The one of to the west falls fastest (about 12ms), followed by the one north, the one east, and the one to the south falls slowest, with 10ms. Once you rotate the root part (the Flea in the attached craft) 90deg anti-clockwise, the one to the south falls fastest. This seems to affect all parachutes, altough most noticable with the drogues, and only happens if they are attached in symmetry.

Expected:
All parts fall with the same speed.

Notes:
Mass as reported by the map screen is the same, as well as parachute settings.

History

#1 - 03/15/2018 02:59 PM - Tomator

rudi1291 wrote:

> The drag caused by parachutes placed in symmetry depends on their direction from the root part. This means, that the same part will fall with a different speed under parachute depending on where you attached it in the editor. See the attached craft.

The part has its own drag that depends on its orientation to the airflow. This drag adds to the parachute. Obviously, under drogue parachute the speed is higher and part's own drag is more significant part of the couple. I can see the fastest falling part is oriented much more along the airflow and I'd expect that without parachute it would fall faster too.

If you find a part that won't fall faster in one orientation than it falls in another without parachute but does wit it, please share.

#2 - 03/15/2018 03:34 PM - rudi1291

- File screenshot24.png added

True, orientation matters for drag, however at the speeds involved here (10-12ms) that shouldn´t create any significant difference in amounts of drag the parts receive. But to exclude that possibility i tested with parts where orientation really shouldn´t matter: the spheres (russian capsules) added by MH. Their drag should approximate that of a sphere and therefore not be orientation dependant. The observed speeds range from 35ms to 50ms, with the same result regarding the direction from the root part as previous tests.

#3 - 03/18/2018 10:28 AM - Tomator

- File 20180318100929_1.jpg added

- File 20180318101223_1.jpg added

- File 20180318103445_1.jpg added

- File Parachooter.craft added

I ran few tests on my own and found that when parachutes collide, one is affected by the collision while the other is not (which is is in contradiction with third law of dynamics). The initial collision object becomes "pinned": even far from the original colliding object the behaves like it was still touching it. This *residual collision* might be the reason for different falling speeds. Some parachutes on your screens also seem deviated.

My ship was made of two symmetrical flea/pod assemblies, so left and right had exactly equal masses, shapes and balances. When decoupled and opened parachutes differences were not very significant for pods (54 one and 5.4 another) while fleas were falling with 4.3 / 5.2. Despite the fleas were far from each other an their parachutes opened far from any colliders, one of them deviated from the vertical.

In KPS 1.3 parachutes collided with each other an they shoud, due to tde veiation from the vertical, inflict some repulsion force to separate eventually. They were falling with equal speeds, however.

Now, I've recorded movies:

https://youtu.be/UzL5I8omBvM (pod's parachute deviates from the vertical)
https://youtu.be/cljRbVoaeWI (here also the flea's parachute deviation is documented)

I'm sharing tester ship. Enjoy :)

Files

screenshot20.png	1.23 MB	03/15/2018	rudi1291
DDc6.craft	25.9 KB	03/15/2018	rudi1291
screenshot24.png	1.24 MB	03/15/2018	rudi1291
20180318101223_1.jpg	212 KB	03/18/2018	Tomator
20180318100929_1.jpg	303 KB	03/18/2018	Tomator
20180318103445_1.jpg	265 KB	03/18/2018	Tomator
Parachooter.craft	46.2 KB	03/18/2018	Tomator