Kerbal Space Program - Bug #21949

Control Surfaces' Pitch/Yaw/Roll Direction Wrong Depending on Rotation of the Surface

04/22/2019 04:59 PM - Vycma

Status:	Updated	**Start date:**	04/22/2019
Severity:	Low	**% Done:**	10%
Assignee:	victorr		
Category:	Controls and UI		
Target version:			
Version:	1.8.0	**Language:**	English (US)
Platform:	Windows	**Mod Related:**	No
Expansion:	Breaking Ground, Core Game, Making History		

Description

Depending on the rotation of a control surface the pitch/yaw/roll (deployment) direction is opposite to a given control input. It is counter to the direction that should be chosen, based on the relative longitudinal position of the control surface to the center of mass of a craft.

Minor deviations in rotation (~10°) are enough to invert the actual control input.

Issue exists at least since version 1.1.0 (see related issues).

Limitation of Workarounds (Inverted Deployment / Authority Limiters)

For simple toggled deployment the issue can be resolved by setting "Deploy Direction" to "Inverted". This setting however does not effect flight control inputs.

Setting a negative Authority Limiter value as a workaround for flight controls does not resolve the issue, since only pitch/yaw can be adjusted this way to give the desired direction, however previously correct roll behaviour is then simultaneously incorrectly inverted.

Reproduction Steps

1. Attach swept wing sections to a fuselage.

2. Attach control surfaces to the wing sections.

3. Rotate every other control surface in the XY-plane (even 10° should be enough).

4. Launch the craft and pitch.

5. Observation: Some control surfaces in front and behind the CoM will pitch correctly even when rotated. Closer to the CoM the rotated surfaces will invert the input.

Related Issues

https://bugs.kerbalspaceprogram.com/issues/9407
https://bugs.kerbalspaceprogram.com/issues/9460
https://bugs.kerbalspaceprogram.com/issues/20847

History

#1 - 04/22/2019 05:01 PM - Vycma

- Description updated

#2 - 04/23/2019 08:08 AM - Vycma

- Description updated

Correction: The minimum angle of rotation compared to a reference control surface seems to be ~10° (not 7.5°).

#3 - 06/13/2019 08:40 AM - Vycma

Update:

Issue still exists in 1.7.2

#4 - 06/13/2019 08:41 AM - Vycma

- Subject changed from Control surfaces' Pitch/Yaw/Roll direction wrong depending on rotation of the surface to Control Surfaces' Pitch/Yaw/Roll Direction Wrong Depending on Rotation of the Surface

- Version changed from 1.7.0 to 1.7.2

- Expansion Breaking Ground added

#5 - 07/23/2019 01:09 PM - Vycma

- Version changed from 1.7.2 to 1.7.3

Update:

Issue still exists in 1.7.3

#6 - 10/29/2019 07:46 PM - Vycma

- Version changed from 1.7.3 to 1.8.0

Update:

Issue still exists in 1.8.1

#7 - 10/29/2019 08:48 PM - victorr

- Assignee set to victorr

#8 - 10/29/2019 09:15 PM - victorr

- File Test 21949.craft added

- File Control surface deploy angle after rotated.png added

- File Control surface deploy angle after rotated more wings.png added

- Status changed from New to Need More Info

Have not been able to reproduce in 1.8.1. I'm attaching a test ship with lots of tilted control surfaces and the CoM way back. All control surfaces move in unison and with the expected behavior. We'd like some more input.

#9 - 10/30/2019 10:25 AM - Vycma

- File Bug21949.craft added

- File Test 21949 alt.craft added

- File Test 21949 alt.jpg added

- File Test 21949 swept.craft added

- File Test 21949 swept.jpg added

Thank you for your post, victorr. The key to reproduce this bug is to rotate the wings, so that they are no longer perpendicular to the main fuselage. Once they are swept, some of the slightly differently rotated surfaces will pitch opposite to adjacent ones, especially closer to the CoM.

I attached two modifications of your test craft and my own test craft, where I hope it is more apparent, what the problem is.

#10 - 10/30/2019 12:05 PM - Vycma

- File Test 21949 mod.craft added

- File Test 21949 mod.jpg added

I hope the following reproduction steps are a bit clearer:

1. Attach wing sections to a fuselage.

2. Attach control surfaces to the wing sections.

3. Rotate the wing sections in the XY-plane backwards.

4. Rotate every other control surface in the XY-plane so that it is again approximately perpendicular to the fuselage.

5. Launch the craft and pitch.

Note:
The problem also appears if you increase (not decrease) the angle of every other control surface in step 4, however it seems to be less pronounced in this case. Perpendicularity is also not strictly necessary, as stated, 10° deviation is enough.

I attached another modification of victorr's test craft to point out those steps.

#11 - 02/13/2020 10:10 AM - Vycma

Update:

Issue still exists in 1.9.0

#12 - 07/01/2020 04:34 PM - Vycma

Update:

Issue still exists in 1.10.0

#13 - 07/01/2020 04:34 PM - Vycma

- Status changed from Need More Info to Updated

- % Done changed from 0 to 10

#14 - 12/19/2020 09:05 PM - Vycma

Update:

Issue still exists in 1.11.0

#15 - 01/30/2021 09:37 PM - Vycma

Update:

Issue still exists in 1.11.1

#16 - 06/24/2021 07:59 PM - Vycma

Update:

Issue still exists in 1.12.0

#17 - 08/04/2021 01:01 PM - Vycma

Update:

Issue still exists in 1.12.2

Files

General Layout.jpg	269 KB	04/22/2019	Vycma
Pitch Up Input.jpg	283 KB	04/22/2019	Vycma
Test 21949.craft	432 KB	10/29/2019	victorr
Control surface deploy angle after rotated.png	1.66 MB	10/29/2019	victorr
Control surface deploy angle after rotated more wings.png	1.66 MB	10/29/2019	victorr
Bug21949.craft	208 KB	10/30/2019	Vycma
Test 21949 alt.craft	420 KB	10/30/2019	Vycma
Test 21949 alt.jpg	285 KB	10/30/2019	Vycma
Test 21949 swept.craft	433 KB	10/30/2019	Vycma
Test 21949 swept.jpg	298 KB	10/30/2019	Vycma
Test 21949 mod.craft	221 KB	10/30/2019	Vycma
Test 21949 mod.jpg	274 KB	10/30/2019	Vycma