

## Kerbal Space Program - Bug #2049

### Orbital Hell's Kraken (theory and reproduction steps included)

01/25/2014 07:12 PM - TruePikachu

<b>Status:</b>	Closed	<b>Start date:</b>	01/25/2014
<b>Severity:</b>	Normal	<b>% Done:</b>	100%
<b>Assignee:</b>			
<b>Category:</b>	Physics		
<b>Target version:</b>			
<b>Version:</b>	0.23	<b>Language:</b>	English (US)
<b>Platform:</b>	Any	<b>Mod Related:</b>	No
<b>Expansion:</b>			

#### Description

The Hell's Kraken. While many people are familiar with the effects it has, I actually managed to execute it in a way which can be reproduced:

1. Get to a point of orbit where you have a low orbital speed
2. Use low-thrust engines (I used 3 of the orange radials) to nullify your orbital velocity (I was trying to drop in on Kerbin, after having cycled some crew near Minmus)
3. Time acceleration (probably other rails would work as well, like saving, but I used TA)
4. ???
5. Hell's Kraken

I had a handful of mods installed, but none of them affect the physics of the game. Notably, I had MechJeb, which helped me with nullifying my orbital velocity (Translatron might work, but I SmartASS'd to retrograde).

My theory is based on the events of what happened in the Kraken - my velocity went to NaN, which is probably the root cause of the Kraken. I'm thinking that there is something in the on-rails physics which divides by orbital velocity; this was practically zero, which would result in the floating point returning NaN. Then, operations on a NaN return another NaN. This would get propagated throughout the physics, and eventually result in a complete breakdown.

In a related, but not nearly as severe bug, with respect to NaN, if one matches a target's orbital plane well enough, the angle between the two can become NaN°; I haven't seen any odd side effects of this however.

A potential fix would be to establish more checks for zero and NaN in the rail physics.

#### Related issues:

Related to Kerbal Space Program - Bug #2501: Quicksave during landing on Pol ...	<b>Closed</b>	<b>05/25/2014</b>
Related to Kerbal Space Program - Bug #5235: Ship quicksaved below 700 m abov...	<b>Closed</b>	<b>07/13/2015</b>

#### History

##### #1 - 01/26/2014 02:11 PM - TruePikachu

- Status changed from New to Confirmed

- % Done changed from 0 to 10

After a lot of struggle, I confirmed in Vanilla. I recommend either very experienced players or people with a joystick to do Vanilla testing, due to how easy it is to screw up your velocity vector on manual, but the cause is not from a mod, so MechJeb can be used to help with testing since it is less likely to bork the vector.

Also, after a slight bit of searching online, I found <http://redd.it/1ikd35>, which confirms the bug for other people. However, that test was wrt to the Sun, while my test was wrt to Kerbin, so it is likely that the body is independent of the result. For the record, I also experienced a full graphics breakdown, as did the poster.

Fakeedit: <http://redd.it/1he2dz> confirms Kerbin for someone else. Someone with more experience should probably see what happens if e.g. debris hits zero when on-rails and unloaded. If it results in the Kraken, I'd request priority elevation by a single level, due to how uncontrollable debris orbits are (as in you can't control it, and it is a random chance it would end in a crash).

Realedit: Just realised my OP is slightly inaccurate.

+x / +-0=+-oo

-x/-+0=+-oo  
oo-oo=NaN

where "+-" is plus/minus, "-+" is minus/plus, and "oo" is infinity. Sorry for all the edits :(

#### #2 - 01/27/2014 05:41 AM - Ted

- Status changed from Confirmed to New
- % Done changed from 10 to 0

Very interesting, will give this a check over.

Just as a note, please don't confirm your own issues or report ones that you can't initially reproduce in stock - glad to see you could though!  
Thanks.

#### #3 - 01/27/2014 01:05 PM - Dinokin

i have a similar problem too when i switched from one ship to another (both are geostationary satellites) during the time acceleration and when the target loaded, it broked into hundreds of parts

ps. i didn't try to reproduce it, i became very pissed after this episode and ragequit from the game

#### #4 - 01/27/2014 04:42 PM - TruePikachu

- Status changed from New to Confirmed
- % Done changed from 0 to 10

I marked it as confirmed because I found that other people have experienced the same issue under extremely similar circumstances - see the second Reddit for near-identical setup.

#### #5 - 01/27/2014 04:45 PM - TruePikachu

err...I didn't actually mark it as confirmed in the combobox just then, what the heck.

Dinokin: That seems like Deep Space Cthulu, which is completely different. I didn't just get *ships* destroyed, no, the entire UNIVERSE unwrapped (even the starry skybox thing vanished).

Also, I actually don't have a confirm on the ships destroying themselves, just the universe.

#### #6 - 01/29/2014 10:43 PM - hermes47

- Status changed from Confirmed to New
- % Done changed from 10 to 0

TruePikachu wrote:

err...I didn't actually mark it as confirmed in the combobox just then, what the heck.

In that case I'll fix it for you.

Anyways, i've had a quick go at reproducing it but no luck thus far. I have a few more ideas to test out that I'll get around to in the next few days or so.

#### #7 - 07/15/2015 01:03 AM - Squelch

- Related to Bug #2501: Quicksave during landing on Pol - ship explodes on quickload, stays motionless in space. Game locks up. added

#### #8 - 07/15/2015 01:04 AM - Squelch

- Related to Bug #5235: Ship quicksaved below 700 m above terrain on Pol is destroyed on quickolad added

#### #9 - 07/17/2016 09:25 AM - TriggerAu

- Status changed from New to Needs Clarification

#### #10 - 08/08/2016 12:53 PM - TriggerAu

- Status changed from Needs Clarification to Closed
- % Done changed from 0 to 100

Closing this report out for now. If you find it is still occurring in the latest version of KSP please open a new report (and this one can be linked to it.) For best results, the wiki contains really useful info for when creating a report <http://bugs.kerbalspaceprogram.com/projects/ksp/wiki>.

You can also ask questions about the bug cleanup in the forum here:  
<http://forum.kerbalspaceprogram.com/index.php?/topic/143980-time-to-clean-up-the-bug-tracker/> and tag @TriggerAu to get my attention