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[1.0.4] Kramax Autopilot: Course guidance and auto-land for spaceplanes (v0.2)

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By Kramer, October 3, 2015 in Add-on Releases

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Kramer
Bottle Rocketeer

●●

Members
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Posted October 3, 2015 (edited)

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V0.2 Download: Github/KerbalStuff

V0.2 Released:

Add first cut at RW27 approach to KSC to default flight plans.

Change window IDs to hopefully now be unique and not collide with PA mod.

Make hitting the target speed button
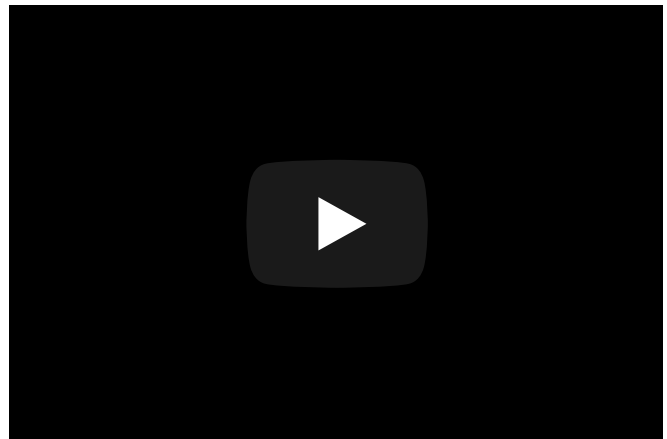
with the auto-throttle off turn it on.

Make app launcher button see the correct state of the GUI window so it should

always toggle properly.

Sample Flight Video

Kramax Autopilot

Recently I started flying spaceplanes in Kerbal and discovered I could never land them successfully. My keyboard flying skills are sub-par. This despite being an instrumented rated pilot of real planes.

I found a very good autopilot mod by Crzyrndm called "Pilot Assistant" (see thread). But it did not have any course following abilities. I have taken the source code for Pilot Assistant and heavily modified it to add course guidance (both horizontal and vertical) so that it can autoland a spaceplane on the KSC runway. Many thanks to Crzyrndm--this mod would never have

happened without the excellent starting point. Note that I did not keep all the capabilities of Pilot Assistant--I was very focused on auto-landing and things that were not really needed for that were omitted.

Flight plans can be loaded from configuration files located in the GameData folder. There is currently no capability to create new flight plans on the fly within the game, but you can edit the GameData/KramaxAutoPilot/FlightPlans.cfg file and add flight plans that way. Look at GameData/KramaxAutoPilot/DefaultFlightPlans.cfg for the format of the flight plans. The "Refresh" button on the flight plan load/save dialog will reload from that file so you do not have to restart the game every time you change a flight plan.

Basic Instructions

You can use the autopilot to depart from KSC runway 09 as well as land on it. Here is a basic flight using the autopilot. You start lined up on KSC RW09.

Departure

- Show the autopilot window by selecting the airplane icon from your toolbar
- Press the "Load/Store" button next to the "Flight Plan" button.

This will display the flight plan loading window.

- Select the plan named "KSC DEP 09". This is a flight plan that takes you straight out on a heading of 090 to space. You can close the flight plan loading window now.
- Select the horizontal mode "NAV" and enable horizontal mode by selecting the button "Roll". The autopilot should track straight down the runway now.
- I normally use "pitch hold" mode for vertical control on departure. You can set this up for use after rotation by selecting the "Pitch" button and entering a desired pitch up amount (10-30 degrees, depending on your thrust to weight ratio).
- Start your takeoff. It should track down the runway and after you liftoff, turn the vertical mode autopilot on by pressing the "Target Pitch" button. It should pitch up to your preset pitch value. It should retract your gear at 150m of altitude.
- Now just control pitch angle to what works for your vehicle. When you get to high altitude where aerodynamics more or less stops, you should turn off the autopilot modes by pressing the "Roll" and "Vertical" buttons.
- Hopefully you get to orbit

Landing

- You need to de-orbit. For KSC RW09, I found that when coming from an 80km orbit, a 100m/s retrograde burn just before I get to the huge impact crater seems to work well. Depending on how fast your craft decelerates you may need to burn slightly earlier or later.
- Setup the autopilot by loading the landing flight plan. You want to open the flight plan load/save window and select "KSC ILS 09" (ILS stands for "instrument landing system"). This flight plan has an initial point to aim for that is named "MAXKY". It is at 12000m, more or less on the equator about 75km West of KSC.
- Descend into the atmo and try to stay on a heading of 090. I generally enable the autopilot around 20000m altitude. I initially will enable it in Bank mode (level) and pitch hold mode (4 to 6 degrees).
- As you near 12000m altitude enable NAV mode and altitude hold of 12000m.
- When you get very close to MAXKY, enable GS mode to follow the vertical guidance.
- Now setup your landing speeds. Open up the "Approach Speeds"

pane at the bottom. Change the speeds to match your craft. You want to land as slow as possible, so make your final speed something that is a good margin above stall speed.

- After passing MAXKY you can enable auto-throttle "Landing" mode to hold current speed and then decrease it to match the approach speeds as it heads for the next fixes.
- At 500m (above ground) it should auto-lower your landing gear. But a good pilot makes sure he has 3-green before touching down! If all goes well it will cut your throttle right over the threshold, touchdown, and turn on max braking.

Attributions

This plugin is a heavily modified version of "Pilot Assistant" by Crzyrndm (https://github.com/Crzyrndm/Pilot-Assistant). At least half (if not more) of the code is his. Many thanks to him, as this would never have been possible without it. In addition, I drew heavily on algorithms for calculating great circle routes from http://www.movable-type.co.uk/scripts/latlong.html. Many thanks for that information.

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This work is a derivative of "Pilot Assistant" by Crzyrndm that was distributed under the same license. The original work was found at https://github.com/Crzyrndm/Pilot-Assistant.

Edited October 7, 2015 by Kramer
Added embedded video.

jlcarneiro, RickKermen, martinezfg11 and 5 others like this

-Kramer

"Neutrinos have one important advantage over most other dark matter candidates: it is known that they exist."

meyerweb
Rocketry Enthusiast
●●●

Posted October 4, 2015 (edited)   Report post

This looks fantastic, Kramer! Quick question: does the threshold adjust for the different runway lengths in career mode, specifically the shorter ones? I

ask because past auto-landers I've used didn't, and crashed my planes short of the runway.

Edited December 12, 2015 by meyerweb
Cleaned up forum migration errors (Unicode and hyperlinking were both botched—sigh)

"If I didn't believe the universe was *totally meaningless*, I'd go crazy." — John DeChancie

---

Gaalidas

Capsule Communicator

●●●●●

Members
➕ 266
1,707 posts

Posted October 4, 2015   Report post

Now if we could just get this combined with the mod it was built from we'd have a grand all-in-one space-plane autopilot.

...It all made a LOT more sense when it was still in my head.

Official mascot of Kerbal Foundries.

Kramer

Bottle Rocketeer

Posted October 4, 2015   Report post

⌄ **meyerweb said:**

This looks fantastic, Kramer! Quick question: does the threshold adjust for the different runway lengths in career mode, specifically the shorter ones? I ask because past auto-landers IÃ¢â¬â„¢ve used didnÃ¢â¬â„¢t, and crashed my planes short of the runway.

Thanks! No, I forgot that the runway changes length. Does the threshold of RW09 actually move? Is the midpoint always in a constant location? In any case, it would be easy to just create some alternate approaches (ILS 09 1000M RW say) that have the threshold point (RW) adjusted. You could just copy the ILS approach from the DefaultFlightPlan.cfg file into FlightPlan.cfg and adjust the longitude of the RW point.

That being said, it currently tends to land most of my spaceplanes about 1/5 the way down the runway (as in, when the wheels touch). It aims for a point 30M above the runway at the threshold before starting a flare. So for some configurations the stock ILS would probably work fine.

-Kramer

Kramer

Bottle Rocketeer

●●

Members

⊕ 49

31 posts

Posted October 4, 2015   Report post   ⤴

> **Gaalidas said:**
>
> Now if we could just get this combined with the mod it was built from we'd have a grand all-in-one space-plane autopilot.

Well, Gaalidas, its open source, so have at it! But I actually did not remove that much stuff. Curious if you tried it, what was it you were actually missing?

-Kramer

-Kramer

"Neutrinos have one important advantage over most other dark matter candidates: it is known that they exist."

cttw

Rocketry Enthusiast
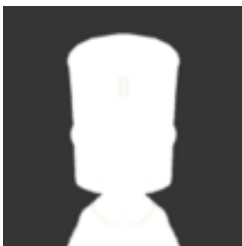
●●

Posted October 4, 2015   Report post   ⤴

Wow...
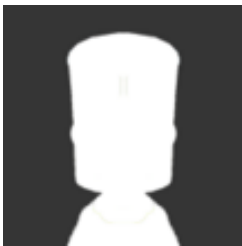
Members

⊕ 8

88 posts

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skykooler

Launch Engineer

● ● ● ●

Members

⊕ 155

739 posts

Report post   ⤳
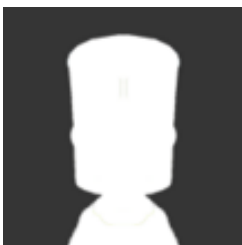
Interesting. Would it be possible to set this up to auto-land at other airports in KerbinSide?

[?]   ✕ ▾

Van Disaster

It needs more wings.

● ● ● ● ●

Members

⊕ 868

3,155 posts

[caption]

Report post   ⤳

Very nice, might make heavy use of this post 1.1. I generally land on 27 (avoids dodging the mountains) so I couldn't use ILS for this, but no doubt it's possible to set that up - maybe this can read the runway cfg from Navutilities if that's installed? that would make a lot of sense; either that or coordinate with the author of that to put something in a common location. I installed a rather larger 09L/27R which might get it a bit confused...

Hopefully you've made allowances for future use on other worlds without having to go back & rewrite half of it 🤢

Edit: ah, I see; no actual ILS, TD/landing are also waypoints? so it should work anywhere, even on random terrain? so what we need is a library of waypoints 🤢

Edit again: rediscovered an old album I did as a demo spaceplane run for someone, might be good to see how other people fly their descents just to check they're covered.

Javascript is disabled.
View full album

Edited October 5, 2015 by Van Disaster

Random KSP screenshottery - Prototypes which would make it to KSP if I was motivated - Random unfinished and currently outdated KSP Gubbins

Kramer
Bottle Rocketeer
● ●

> skykooler said:
>
> Interesting. Would it be possible to set this up to auto-land at other airports in KerbinSide?

Yes, that should be very possible. People just need to create the flight plans for approaches to the runways in question. It takes some work but is not too hard. If there are no big obstacles it is pretty easy. You just create waypoints lined up with the runway at the proper distances and altitudes and it should work.

--- Updated ---

> **Van Disaster said:**
>
> Very nice, might make heavy use of this post 1.1. I generally land on 27 (avoids dodging the mountains) so I couldn't use ILS for this, but no doubt it's possible to set that up - maybe this can read the runway cfg from Navutilities if that's installed? that would make a lot of sense; either that or coordinate with the author of that to put something in a common location. I installed a rather larger 09L/27R which might get it a bit confused...
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> Edit: ah, I see; no actual ILS, TD/landing are also waypoints? so it should work anywhere, even on random terrain? so what we need is a library of waypoints 😳

I didn't worry about landing on RW27 since I wanted a straight in approach with no circling and was always orbiting in the normal direction.

But it would be easy to add an approach to RW27 as it is just over water so no obstacles.

The RW09 approach was a real pain because of those mountains. Who locates a spaceport right next to Mt. Everest (oh, a Kerbal does, dumb question)?

The RW09 approach kind-of threads the needle to avoid the peaks. As long as your are more or less on course it is no problem. RW27 would be safer

but require a lot more maneuvering down low.

I was hoping that people would contribute approaches to other runways. I would then include them in the default flight plans.

Also it organize the approaches per-planet so flight plans for other planets

will not show up.

This is my first release and I am sure there are bugs and such that I would hope to fix as well as adding approaches.

-Kramer

"Neutrinos have one important advantage over most other dark matter candidates: it is known that they exist."

---

martinezfg11

Kerbal Atmosphere Program

●●●

Members

⊕ 317

471 posts

This mod is awesome.. Have rep!

AoA Tech - Aviation Parts | **IVA Everything**

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jonrd463

Spacecraft Engineer

●●●

Awesome! I'm all over this after I get off from work.
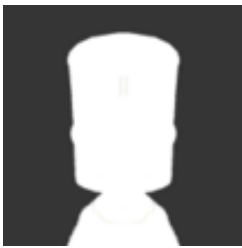
👍

Van Disaster
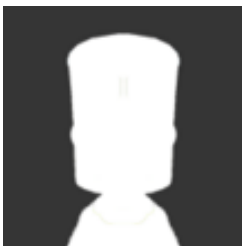
It needs more wings.

●●●●●

Posted October 5, 2015 (edited)

Report post ⌁

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> but require a lot more maneuvering down low.

I use 09 sometimes, but it's not just the mountains that get in the way - there's the terrain just short of the runway that I find I generally need to skim if I use that one too, and in the past I've had some *really* heavy spaceplanes that would end up doing a carrier-style landing if I went in that way. However empty spaceplanes usually have a really low wing loading - if they don't then they're probably nearer a rocket than a plane - so I've never really had problems with maneuvering on the way down. On the way up is something else.

Would it actually be terribly hard to add fixed localiser & GS? I'm wondering if perhaps you might want to seperate out defining waypoints from your flightplans, or at least have a seperate waypoint section in the default plans and refer to the WP in an individual plan by it's label (perhaps referring by label would flip the entry values to offsets rather than absolute values) - that way you could add any speciality fixed WP type you wanted, as well as not have to re-enter WP details for similar flight plans. Having ILS element waypoints would maybe save the need to create a bunch so you're lined up properly, but not an essential feature. I've historically used Kerbinside bases in my games which puts runways all over the place, so a library of waypoints rather than flightplans would suit me

much better.

There's a couple of other possible features like target velocities & nav mode for altitude (edit: actually can you just leave it in GS mode for that?) that I'd like to see, but really this is impressive stuff, well done and thanks 🤢

Edit: hehe, this went about as well as expected; think it shed maybe 100 kts by the runway. I think I'd better do my own plans 🤢

[?]

Edit: bug - window doesn't go away with F2: PA used to do this, so maybe you can just lift the appropriate code straight from that.

Edited October 5, 2015 by Van Disaster

Kramer

Bottle Rocketeer

●●

Posted October 5, 2015   Report post

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https://farm6.staticflickr.com/5660/21964566312_a08953b89d_z.jpg

Edit: bug - window doesn't go away with F2: PA used to do this, so maybe you can just lift the appropriate code straight from that.

A waypoint database could make sense. I am afraid I was going kind-of quick and dirty at that point. For approaches I am not sure

how much you would really reuse them. They are pretty specific to the approach. For general "fly around some

waypoints" use it

would make a lot more sense.

Although I refer to the approaches as "ILS" they are really modeled after the real-life GPS approaches (LPV) which I normally

would fly with the autopilot all the way in from some initial fix. So that is how I made this work.

Regarding your snapshot--good news is you are on course and glideslope! Bad news--you are going like a bat out of hell.

You definitely need to be able to slow down when using the RW09 approach. You just cannot get low fast because of

the mountains and so you cannot start really slowing until the initial fix. If your plane does not have some type

of braking (either natural drag or airbrakes or ...) you may have problems. But this is just like in real life. If you

come into final approach in a citation jet at 250 knots you will not be able to get it down and stopped. So speed

management is important. For spaceplanes that cannot slow down while descending this approach would probably just not work.

So a RW27 approach would be useful in those cases. It can be made to be have a much more gradual descent over the water.

It manages your speed only once you are inbound to the IAF fix. Before that you have to manage it yourself. I don't think

I would want to tackle speeds before that fix. You can leave it in GS mode once you are inbound to any fix. But I normally

do not enable GS until I am level at the next fix altitude and passing it. Also, I really need to make it save the approach speeds on a per-vessel basis.

It is annoying to have to set them each time. But v0.2 for that.

Not sure about the F2 key--was not even aware that was there. I probably disabled it without knowing. Thanks for trying it out!
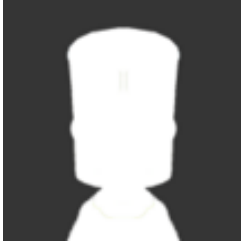
-Kramer

"Neutrinos have one important advantage over most other dark matter candidates: it is known that they exist."

stuff

Bottle Rocketeer
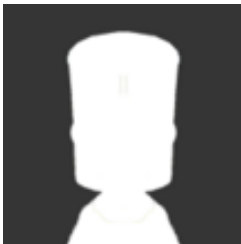
● ●

Members

+ 9

83 posts

is there a video on how to use this if there isnt one could someone make one. I am not sure how to use this.

- - - Updated - - -

Van Disaster

It needs more wings.

● ● ● ● ●

Members

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That plane is slick even for a FAR craft, which generally glide better - which is why I use 27 most of the time - but I thought I'd test out the flightplan to check the mod. Once I fiddled with the crosstrack PID a bit it worked fine for directions (possible to get a bank limiter for that like the heading one?), and the big circuit plan even gave me room to attempt to slow down so it did actually put wheels on the runway, it was just doing 300kts still 🐵 but success. I like the way it loaded my PA presets too.

I'm in two minds about velocity management - I was thinking of targets for re-entry too, but then you're getting into complicated areas of energy management and you're right, it would be quite a hassle. A re-entry manager might be a nice companion mod for

this & PA though if someone wants to try it, if it can pull waypoint info and craft control settings from one or the other (and perhaps hand over control somehow).

However just setting Vel targets so you don't overspeed low down might be a painless addition, it's still up to the pilot to manage energy when they're making the plan. There's no weather to worry about (yet) so it should be more feasable than real life...

@stuff:

- Put plane brakes on, stage/enable engines, throttle down
- Click Load/Store next to Flight Plan, load flight plan from the popup window that appears by clicking on the plan name.
- Click NAV button under Roll (at the top), and then click Roll until it's blue
- Brakes off, throttle up, use pitch controls to get off the runway; at this point probably turn on SAS as the quickest way to keep pitched up while you fumble around 🙄. Raise gear.
- Once you're clear of the runway end waypoint, click GS under Vertical and click Vertical to turn the bar blue if it's not enabled. Turn off SAS
- **Alternatively:** Check Alt for

active WP from the flight plan section - it should say Active in the left column. Click Alt in the Vertical section, put the altitude in the box, click the button to the left of the box; this should turn the Vertical bar blue. Turn off SAS. At this point your plane might start plummeting into the sea, if so click one of the arrows by the altitude setting box under Vertical to force an update. If that fails, click the big blue Vertical bar until it's red again, enable SAS, pull the plane up by hand and then try again. PilotAssistant has a habit of not initialising properly like that also.

- Sort your throttle out so you're not under/overspeeding.
- Click Vel under Auto-Throttle, click the big Auto-Throttle button to enable it, choose a speed target; put that in the box, click the button to the left, that should set the Auto-Throttle. If you set a target speed first and then turn the autothrottle on it will override it, which is probably a bug.

Now the plane should follow waypoints. Somewhere before you reach the IAF waypoint - maybe as you pass the previous one - click LAND under autothrottle, and as you reach the IAF waypoint click GS under Vertical (this bit is probably open to

interpretation), and if the plane can slow down in time it should auto-land. I need to check if GS mode will follow the altitude WP settings all the way or if you have to hand-set those (edit: it appears to).

Edit: thinking about it, re-entry management is somewhat similar to auto-land in terms of glideslope management so ... dunno. Was wandering how to improve the final moments after a test craft flared too late - default large circuit flight plan - & ended up on the berm rather than the runway. At least my re-entry profiles are, I usually glide all the way in so it's *all* an approach really.

Edited October 5, 2015 by Van Disaster

Random KSP screenshottery - Prototypes which would make it to KSP if I was motivated - Random unfinished and currently outdated KSP Gubbins

Kramer

Bottle Rocketeer
●●

> stuff said:
>
> is there a video on how to use this if there isn't one could someone

make one. I am not sure how to use this.

--- Updated ---

I edited my first post and added a video with a demo flight. Hope that is helpful.
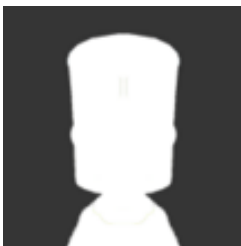
-Kramer

"Neutrinos have one important advantage over most other dark matter candidates: it is known that they exist."

Van Disaster

It needs more wings.

●●●●●

Posted October 6, 2015 (edited)

Report post

I'm just flying a self created plan at the moment (well tbh half of it I stole off a default); the cfg file needs an example plan as a comment even if it's just one WP. A few points I'm sure are already self-raised:

- It'd be much more helpful if there was a directory you could throw flightplans into in individual files (or libraries of a few at a time) - they'd be easy to share and easier to manage.
- Similarly the plan list in the store pane is going to get large and hard to use very rapidly.

- There needs to be some considerably easier way of setting waypoints/getting lat/long, although I didn't try one of the map sites which could be the answer. MechJeb and the other existing waypoint mod (well that I remember) have ways of setting WPs directly on the planet map.
- Reloading the current in-use plan should keep the active waypoint in the same place, or there needs to be a pause before the plane starts working on changing course so you can sort out which WP you want active. I suppose I should have picked a different Roll mode while I was doing that, but it's easy to forget.

That's it I think - any more problems are likely to be either my flight plan or the slightly untuned PA profile this plane is using.

Edit: aaand later - well the first plan worked until the landing part, when it tried to land inside the bank rather than on the safe tarmac, so I adjusted things to attempt to plan a spaceplane approach test circuit. I suspect it's too tight at the final end, and this is also a long thing to test, but experience will help. Kerbal Maps is fine for general WP settings but not precise enough for anything near a runway.

[?]

Edit: rather huge bug - don't open a Pilot Assistant window with this running, it'll take over this' window rather than create it's own.

Edited October 6, 2015 by Van Disaster

👍

Kramer

Bottle Rocketeer

● ●

Members
⊕ 49
31 posts

Posted October 6, 2015   Report post   ⌯

> **Van Disaster said:**
>
> I'm just flying a self created plan at the moment (well tbh half of it I stole off a default); the cfg file needs an example plan as a comment even if it's just one WP.

The file DefaultFlightPlans.cfg has sample flight plans in it. You can just copy them out of that file.

I did not want to install a FlightPlans.cfg file cause I was worried it would overwrite a user's carefully crafted plans when they update the mod.

Yes, I think I am going to make the next version improve on this. I think that we can already use multiple config files for different planets or even spaceports.

But I think I need to add spaceports as an organizational field so that you can see flight plans associated with a particular spaceport. That way all the KSC approaches will be together and with something like Kerbinside each spaceport will be separate. Thinking of maybe using a search field to pull up the plans

you want to look at.

Well you can get lat/lon using the debug window. The only place you have to be super accurate is on the runway start and end points.

The best way to get those is to just land or start a craft on the runway and then taxi it to both ends and record the lat/lon.

It would be nice to be able to make a waypoint at that lat/lon automatically but just did not want to put in yet another GUI for it.

> **Quote**
>
> - Reloading the current in-use plan should keep the active waypoint in the same place, or there needs to be a pause before the plane starts working on changing course so you can sort out which WP you want active. I suppose I should have picked a different Roll mode while I

> was doing that, but it's easy
> to forget.

Yes, that would be nice, but it only comes up when working on creating approaches. It would be very hard to implement.

> ⌄ **Quote**
>
> Edit: aaand later - well the first plan worked until the landing part, when it tried to land inside the bank rather than on the safe tarmac, so I adjusted things to attempt to plan a spaceplane approach test circuit. I suspect it's too tight at the final end, and this is also a long thing to test, but experience will help. Kerbal Maps is fine for general WP settings but not precise enough for anything near a runway.

When I was developing the approach flight plans I would create a quick-save with my craft stable out a little from the first points of the approach.

That way I could modify the approach and then F9 back to that point and try it out. You can even do this for the final segment if your craft

is slower and stable to test the actual flare and land out.

> Edit: rather huge bug - don't open a Pilot Assistant window with this running, it'll take over this' window rather than create it's own.

Oops, sorry about that. I need to change the unique ID that identifies windows. I think I am using the same ones that were in PA.

I will fix that. Thanks for trying to make an approach and the feedback. If you get a workable approach to RW27 I would be happy
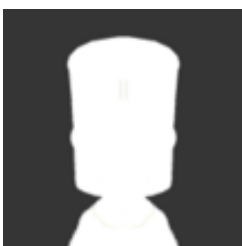
to include it in the built-in approaches.

-Kramer   ✕ ▾

"Neutrinos have one important advantage over most other dark matter candidates: it is known that they exist."

Van Disaster

It needs more wings.

●●●●●

> ∨ **Kramer said:**
>
> The file DefaultFlightPlans.cfg has sample flight plans in it. You can just copy them out of that file.

> I did not want to install a FlightPlans.cfg file cause I was worried it would overwrite a user's carefully crafted plans when they update the mod.

Took me a little to notice I had to add a nest level for the planet - the example was mostly for the aid of those users less used to parsing data structures.

> **Kramer said:**
>
> Well you can get lat/lon using the debug window. The only place you have to be super accurate is on the runway start and end points.
>
> The best way to get those is to just land or start a craft on the runway and then taxi it to both ends and record the lat/lon.
>
> It would be nice to be able to make a waypoint at that lat/lon automatically but just did not want to put in yet another GUI for it.

And indeed I just use KerbalMaps (a site rather than another addon) - mapping the runway approach is a PITA and one reason I would like to see a WP database, but at least most of the general WPs are easy to work out.

Maybe it could warn if you're in Roll-NAV and/or Vert-GS mode, but not a big deal.

Well I have an approach that works for a couple of my rather undeveloped in this install spaceplanes, but whether it's any use to you or anyone else is another matter 🤢

A couple of very rough circuits to 27 here just so you or anyone else can have a fiddle - one is short & just circles behind the airfield, the other is rather longer than even your long circuit, for testing inbound behaviour for empty spaceplanes. Could do with a lot of smoothing, tbh, but I haven't spent that long on anything. My approach to 27 is long and flat - I usually allow for 10km over ground per 1km loss of altitude (at most) for the actual approach which has historically been about the right slope for my

spaceplanes to glide in, but obviously that is not going to be the same for everyone.

https://www.dropbox.com/s/5rvalhpxczsz165/FlightPlans.cfg?dl=0

Edited October 6, 2015 by Van Disaster

Crzyrndm
Capsule Communicator
●●●●●

Members
➕ 1,091
2,131 posts

Posted October 6, 2015 (edited)

Report post

Hahaha, someone actually went and did it (🐸). Well done for deciphering my sporadically documented code and a job well done on the waypoint system and its backend. Just taking a wander through the source, this was a bug I recently fixed caused by the "invert output" field in the PID controller being applied one step too early, and the VSpeed measurement correction should be updated for accurate altitude tracking during supersonic flight (I may be a bit obsessive about precision and accuracy of information... Garbage in equals garbage out and all that).

If you have any questions feel free to shoot me a PM

Edited October 6, 2015 by Crzyrndm

Kramer

Bottle Rocketeer

● ●

Members

➕ 49

31 posts

Posted October 6, 2015   Report post

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>
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> If you have any questions feel free to shoot me a PM

Thanks you so very much Crzyrndm, I found your source very readable. I hope you don't mind me hacking it apart. I thought I was just not understanding something about the Preset() call-- there were a number of things where I just couldn't quite figure it out. Don't have any education other than what I read on wikipedia about PID controllers. Thanks again!

👍

-Kramer

"Neutrinos have one important advantage over most other dark matter candidates: it is known that they exist."

Crzyrndm
Capsule Communicator

●●●●●

Posted October 7, 2015 (edited)   Report post   ⌁

> **Kramer said:**
>
> I hope you don't mind me hacking it apart.

Not at all. I find it downright awesome that someone took what I originally made to make up for the deficiencies of flying by keyboard, and used it to make up for the deficiencies of landing

with limited planning and navigational aids. Particularly when you did a decent job of it (if I'd tried to do something like this it would have ended up totally half-assed because I didn't really want it.)
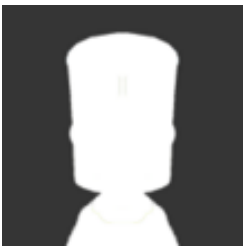
My Mods: **Pilot**
Assistant
Filter
Extensions
The Plugin Workshop

Van Disaster
It needs more wings.

● ● ● ● ●

Members
➕ **868**
3,155 posts

Report post

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Funny given our conversation of the other day, and then poof! this pops up 😜 I still want my scripted airshow though.

Kramer

Bottle Rocketeer

●●

Members

➕ 49

31 posts

Posted October 7, 2015   Report post ⤳

> **Van Disaster said:**
>
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https://www.dropbox.com/s/5rvalhpxczsz165/FlightPlans.cfg?dl=0

That's great, thanks for contributing! The fun thing about creating an approach is you get to name all the waypoints; you'll be immortalized 😈

I took what you had and tweaked it a little and made it just ILS 27 without any extra points.

Seems to work OK. I went and took things a little farther south, because I think with our spaceplanes we need a big wide

turn for the course reversal. I added an extra point to make a box at the end when it turns around. You can try it out if you like:

```
FlightPlan
                {

planet = Kerbin

name = KSC ILS 27

description = KSC ILS
27 V1.0

WayPoints

{

WayPoint
```

"Neutrinos have one important advantage over most other dark matter candidates: it is known that they exist."

mark7

Rocketry Enthusiast

●●●

Report post

well I have edit the cfg to land my plane to the Cape Ã¯Â¼Å'yepÃ¯Â¼Å'in RSS

works fine Ã¯Â¼Å'thanks for the great modÃ¯Â¼Å'I can now finally land my

space shuttle fully automaticlyÃ¯Â¼Â
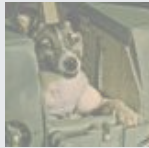
Members

+ 36

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[1.0.4] Kramax Autopilot: Course guidance and auto-land for spaceplanes (v0.2)

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