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Kerbal space program manual

Note: This should only be used to report spam, advertising, and problematic emails (harassment, fights, or rude posts). From Kerbal Space Program Wiki This page or section needs to be up to date. Please help Kerbal Space Program Wiki by arable inaccurate or outdated information. This guide is intended to help you through your early hours with kerbal Space Program. It's far from complete, but it provides a decent understanding of the basics like modifying and launching a rocket. The rest will be explored with your intuition or guidance from other tutorials For an alternative tutorial, including orbiting, see Tutorial: Ye Compleat Beginner Tutorial. For an overview of game mechanics, see Tutorial:Game Manual. Squad provides a fairly straightforward showcase from which you can buy KSP. Visit Create a new account or log in to your existing account Click the store, there must be a program labeled Kerbal Space Program available for purchase. There are also two DLCs available for purchase: Make History and Breaking Ground Alternatively, one can buy KSP through Steam, or some other smaller software distribution platform, such as The Humble Store. Currently downloading, the entire current version of Kerbal Space Program is downloaded at once. There are plans for a Patcher, and the Steam version takes care of this automatically. Go to the store. Sign in with your username and password. Click the Profile button. Scroll down to the bottom and select the download link next to your purchase invoice. Download the version of your platform. Mac users: Install Mono from the included .dmg file, if necessary. Unzip the file to an empty folder. Ensure that the run permission is set in the Patcher.command file. Windows users: Install the .NET Framework 4.0 or higher, if necessary. (New versions of Windows already have it.) Unzip the file to an empty folder that is not located in Program Files. A program like 7-zip can be useful. Linux users: You know what to do and Linux users help you. [1] Running the game Run the game after installing it by navigating to the folder where the game was unpacked and running KSP.exe (KSP.app on OSX, KSP.x86_64 or KSP.x86 on Linux depending on whether you want to run 64-bit or 32-bit versions; we recommend running the 64-bit version unless your computer is 32-bit). A shortcut can be done on the desktop to this file to speed up the opening of the game, but it is unnecessary if you want to run KSP from a USB drive to bring all the game information with you to play on any Figure 1 : KSP Home Screen The main screen has the following options: Start Game Settings (This allows you to customize settings, such as decreasing graphics quality to improve performance) KSP Community Addons & Mods (This brings you to the network of curses, curses, You can download add-ons) Credits (This lists kerbal Space Program developers) Exit by selecting the Start Game menu item, the Start menu and load game will appear. Figure 2 : Start Menu / Resume Game Click the Start New button to start a new game. When starting a new game in Sandbox mode, which is what this article is supposed to assume, the name of the save game does not have to remain 'default'. Change this to any name you want to be the saved file. For other options, see the Science page and Career mode. You can also change the difficulty settings here as well. Let's start a Sandbox mode game, and keep the difficulty settings as normal! Figure 3 : New Game Window Once the new game starts, the Kerbal Space Center (KSC) will appear with the following installations: To access an installation, simply click on it, or its icon The director (Gene Kerman) of the installation will welcome you by giving some tutorials on each first time you visit an important installation. Read it if you wish, and click the Thank you button, I have it below. Figure 4 : The Space Center Building a Rocket Since a rocket is needed, select the tall, square structure in the center of the KSC (or click the building with the rocket inside in the button row in the lower-left corner of the screen), will say Vehicle Assembly Building. From here we'll build our first rocket! Selecting the orange folder in the upper-right section of the window opens the menu shown in Figure 5. Find and select Kerbal X (stock) to load. This rocket is quite simple and can easily achieve orbit around the planet. If you are using the demo version, here is a simple rocket that can achieve orbit with more than enough fuel to return to the planet. If you prefer to build the rocket yourself check out this tutorial to learn how to build a rocket capable of reaching orbit. Try to make sure you have at least 3,500 m/s of fuel and an aerodynamic rocket. Once you're done building, come back here and jump to the Rocket Launch section to learn how to fly your wonderful creation. As the ship loads, the editor gizmos appear (they are visible when the first part is placed). They are Place, Offset, Rotate, and Root in order, and change the behavior of the editor. The editing method can be changed by left-clicking the selected method icon or using the 1234 equivalent keystrokes. While we are learning the basics of the game in this tutorial, we will use the place method only, the rest of them will be detailed Go ahead. This rocket is very simple and easy to explain. On the right side of the screen, shown in Figure 6, there are orange folders that have numbers ranging from 0 to 8. These are the rocket launch stages. The launch stages differ from the launch stages in that the launch stages are events that each press of the active spacebar. Each stage contains at least one each icon symbolizes an event from that stage. The launch stages are: Rocket Launch Stage 8 Initial Launch Stage Seven Liquid Fuel Thrusters. Rocket Launch Stage 7 Second Stage Launch Releases the support brakes, called TT18-A Launch Stability Enhancers, at the bottom of the Kerbal X Rocket (the open frame supports red cap capping) Rocket Launch Stage 6 This, the third, launch stage releases two of the main Trigger rocket thrusters this stage only after the first set of two boosters are out of audio fuel and visual signals indicate that an engine Rocket is out of fuel Launch stage 5 After a short time two more engines will run out, and pressing the spacebar will activate this stage to free them from the rocket. Again, activate this stage only after two more engines have run out of Rocket Launch Stage 4 fuel the same as the previous two launch stages However, it is the last set of booster engines. Rocket Launch Stage 3 The end of the first stage of the Spacebar Pressure rocket separates the main engine that helped the thrusters get the rocket into space from the second stage of the rocket. Rocket Launch Stage 2 Activates the smallest engine directly connected to the Rocket Launch Stage 1 Capsule The last stage before the parachute opens Release the latest engines; Activate when falling towards the planet Rocket Launch Stage 0 That is the drop of the orange lashes on the right side of the screen. While there's nothing you really *need* to do to the Kerbal X Rocket, I strongly advise you to add a couple of elements that will make getting into orbit a little easier. To change the order of the staging events, click them, and if the parts they represent are mirrored, it will expand. Use the left mouse button in Ctrl click (on Windows) to select multiple icons and drag them to the desired stage. Figure 7 : Preparation for sas module Figure 7 shows the main stage of the rocket removed in the preparation of the black SAS module, from the Control tab, to be added. To break the rocket in the right place, simply point the mouse at the section below the separator ring, the black and yellow ring with the red square on it, and left mouse click (LMC) once. This selects the fuel cell below the separator ring and everything below that section of the rocket. Then simply move it out of the way, * but not in the gray component selections on the left* or else it will be shattered, and make another LMC to place the rocket components there. The SAS module will greatly help you spin your rocket, that provides torque. A simple T keystroke, after the rocket moves towards the launch pad, will allow the rocket to remain almost perfectly centered while in flight. There are other concerns to keep the rocket stable, but those will be covered later. Figure 8 : The SAS added to the main stage of the rocket in order Add the SAS module, make an LMC on the black SAS module, and then move the cursor to the rocket sections. There should now be the SAS module following the cursor, and if not just go back and make another LMC to select the module again. Using the module that follows the cursor, drag it to the base of the decoupling ring and you will see the SAS turn green when placed correctly. Make one last LMC and the module will be placed under the decoupler as shown in Figure 8. The last step is to merge the bottom section back into the SAS module. This is done in the same way that it was removed, just the other way around. Figure 9 : Selecting the RCS module Another SAS module can be added to the section directly below the capsule. Simply repeat the same process to the separator below the capsule. By adding the SAS to the Capsule section, adding some RCS fuel, Figure 9, will also help keep the rocket stable in flight by pressing R to start the rocket in flight. The last step is to add some RCS thrusters like the RV-105 RCS thrust block, which I added to the capsule decoupling ring, see Figure 10. To add these thrusters to any type of symmetry, use the mirror icon at the bottom left of the screen, see Figure 11. Each LMC in this indicator will traverse all cloning options, i.e. 1 - 8 duplicates of any element you are placing. Figure 10 : RCS Thrusters Added to Figure 11 of the Capsule Separator Ring : The Symmetry Indicator Once the rocket is attached again, it is time to move the rocket to the launch pad. Referring to Figure 6, the home platform is the green icon in the upper-right corner of the screen. Clicking this icon will move the rocket to the launch pad. Rocket Launch About stages shortly It's time to learn more about your rocket. The parts editor in the VAB is simple enough to use, but if I were you I would stay away from space planes for a while longer. You know a little bit about staging, but I'm going to generalize it even more for you. The launch stage This part of the rocket is usually called a launch vehicle. Here you have a lot of high power engines and large fuel tanks, solid rocket rockets are most often used here. The motto here is to pack as much as you can because you're not taking it with you. If you don't already know, you can mount things radially (on the side) of other things, and by the magic of the symmetry button (bottom of the parts menu) you can have things mounted radially that don't make your poor rocket overturn. Staging is one of the most important aspects of building a rocket, despite a lot of people have quickly traded it for action groups. On the right is a high bar with everything in its respective stage, however, if you had to put half of your rockets in one stage and the other half in another, you would go almost 3 3 so far, in twice as long! The other stages are usually divided into one stage of circularization (I did not invent that word), and an interplanetary stage. For now all you really need to know is everything after the stages in the atmosphere should be light, with medium to low power. Once you're out, if you're going into orbit all you need is an LV-N, 909 or a Poodle, depending on your preference. Once you've made or selected a rocket, press the big green Launch button on the top right. This deploys the rocket created on the VAB on the launch pad, where we can begin our short mission, which contains a takeoff, an orbit and a return. Flight controls aren't exactly easy. WSAD move the ship around, but they are relative to its rotation, controlled with Q and E. The easiest way to keep your rocket on target with WSAD is to look at the navball at the bottom center of the screen. Before launching the rocket, take a second to look at your map, pressing M. This will bring Kerbin on the map. Scroll out to show the kerbins moons, and even further away to see the rest of the solar system. It will be a while before you even learn how to make a rocket that can escape Kerbin's sphere of influence, so experiment with different rocket designs, and see what works best for you. The ship is conductable in the map view if the navball appears from the lower middle, although the staging is mot working in this case. The navball holds its position, so it's best to leave it appearing state before launching. If you want to keep an eye on the ship's resources, click the jerry can icon in the upper left corner. This shows the vehicle's resources. The rocket engines of this rocket consume oxidizer and liquid fuel. If one of those resources runs out, the engines will shut down. Launching your rocket is the easy part. Just accelerate with scrolling to the left and press the space. But don't do it yet, press T to activate SAS. SAS is essentially autopilot, without SAS that just won't spin as well. The SAS allows you to control the movement of your rocket with the WSADQE keys faster, and with more power, and allows your rocket to use thrust vectors (you'll also learn about it later) and keeps you on course, rather than having to rotate manually. If SAS is enabled, the address selector table appears to the left of navball. Some

possible addresses to be chosen in this table. Leave it in the default stability assistance for now. Each time you run out of fuel at one stage, press space until the next stage of fuel and the engines start to burn. If you've ruined something, or you want to pause the game (e.g. read the wiki), press the Ⓞ Esc button. This pauses the game, and a menu appears with the following options: Resume Flight - you can continue the paused game without any other space center action - this falls to the Central construction selector menu (not available during flight) Reverse flight - cancels the gear, returns to a previous state Revert to launch - reverts the game just before launch Revert to vehicle assembly - takes you back to the EDITOR of the VAB Cancel - go back to the previous menu (what more) Settings - opens the settings menu. Run If you don't want to read everything I said about everything you need to know is before launching the T press, press and hold the shift left until the throttle is at full throttle, then press the space for launch and if your rocket stops going, press the space again. You can also mimic real-life pitches, execute a slow gravity turn. The main point of gravity rotation is that motors can spend all their thrust to increase speed and fight gravity and endurance, the rotation of the velocity vector (this is basically a wasted job) done by gravity on a trajectory minimizes loss by aerodynamic resistance and gravity. Saves a lot of fuel during ascent. As I mentioned, the essence of gravity rotation: the rocket always flies towards the course - this direction called prograde and signed in the navball by this mark: . During the ascender keep the level indicator in the middle of the navigation ball near the prograde mark. And keep an eye on the right speed - as the terminal speed has reached, just keep the acceleration around the 2g avoiding too large drag and too steep trajectory. The first step is vertically ascending - this sequence is usually called vertical ascent. This is necessary to gain altitude and speed and pass the dense region of the atmosphere causing high resistance - fast and at low fuel cost. Highlighting the speed of 50-60 m/s and approaching the altitude of 250 ms pitch with an angle of 10 degrees (relative to vertical) to the east (this is called pitchover maneuver), and after this maneuver slowly, gently and continuously increase the angle following the prograde mark, maintaining a course of 90 degrees to the east, give an inclination of 30 degrees to 5 km, but do not give a greater inclination over 45o until reaching 10 km. At this altitude you can lower the throttle a little bit, and start increasing (slowly, gently and continuously) the pitch to 25-30 degrees above the artificial horizon, more than 20 km of altitude increase the inclination over 15 degrees to 30 km, and the course would differ horizontally less than 40 kms altitude, but as the altitude passes from 30 km and separates the last stage of the launch rocket, switch to the map view. Open the navball to keep the rocket airship - though the staging won't work this state. Lower the throttle a little (Control to the left), follow the direction and keep an eye on the apoapsis (marked with Ap on the map) until 70 km is reached. When the throttle (left control) is reached and turned off or press the X. This requires a speed of 1500-2000 m/s relative to the orbit (or 1325-1825 m/s relative to the surface (see: (see: correct trajectory, but less is sufficient in a more pronounced path. Remember: the path too shallow wastes the fuel to drag, the too steep for gravity (note: differentiating to the understict is a little more dangerous for the steepest). Don't forget: the good trajectory is clean and continuous. Fuel economy from the right cast turn and gravity can reach several hundred m/s. The other benefit of precise gravity rotation induces less rocket body stress - so lower stability improvement (SAS, RCS, winglets at the bottom of the rocket) and booster struts is needed for the rocket, making the rocket cheaper, and results in better weight ratio and improving efficiency. The higher horizontal speed of a correctly shallow path also makes circularization easier, as there is much lower extra speed here that had to be added during the procedure. That's why the twist of gravity is worth learning well. Enter orbit and re-enter orbit, remember when I told you how to open the map? That's going to be useful here. The map also shows the orbital details, so what you have to do is burn almost directly with your launcher stage. This can take a while, and I encourage you not to use physical warp as with most rockets if you're burning like using physical warp will almost always make you wildly deflect off course or explode in the air. Once the apoapsis (marked with Ap on the map) is above about 70 km, press X or hold the control to the left to turn off the throttle. In the navball the marker indicating its direction should be right on the border between blue and brown. Turn SAS back on and warp the time (slowly) until your rocket is about 10 seconds away to reach the apoapsis and then starts to burn. The most efficient method if you feed your rockets with small doses keeping the apoapsis front of your rocket with a few (2-5) seconds. The appropriate time to reactivate the engines depends on the acceleration of the rocket and the trajectory. The shallower path needs less extra speed, the better acceleration gives you more freedom. This Kerbal X with near-empty tanks will accelerate pretty well. On the map its orbit should become wider and wider, and once it is wide enough its periapses will come out of the ground, see its shadow and run in space. Once your apoapsis and periapsis (marked with Pe on the map) are above 70km, you can rest and watch your work. You can open your navball on the map by clicking the small arrow at the top of the hidden navigation ball to control the ship, and see its resources on the clicking on the drum. Pressing F2 hides/displays the entire GUI. Orbit and re-entry Back to Kerbin (This image is outdated. You should make sure you have a heat shield before re-entering.) So you can start thinking Big, I have a piece of garbage in orbit of my To re-enter Kerbin, you need to burn retrograde. That sounds elegant, but if you have enough fuel just turn your rocket until you see the green circle with a cross in the middle: . Aim straight at him and burn. There is no need to point to the landing site, even the ground, because atmospheric drag modifies the trajectory. It is enough to lower the periapsis from a low circular orbit to 35-40 km. This altitude ensures effective aerodynamic braking, but prevents ship damage. The landing site position can be operated over braking time. In the case of a circular orbit 70 kms high, the landing site is approximately below that 35-40 km high periapsis. Re-entry heating Starting with KSP 1.0, you have to worry about re-entry heating. As your rocket (only the capsule and parachute in this case) re-enters, it generates heat because it is pushing the air molecules out of the way at a very high speed. Rub your hands and you'll see what I mean. Pressure change contributes mainly to the re-entry effect... So obviously, unless you're trying to roast your little members of the green crew, you need to make sure your ship has proper thermal armor. To find a heat shield, click the Thermal tab and choose a heat shield that fits your ship. | The parachute can be semi-deployed at an altitude of 22 km - in this state it functions as drogue chute - and fully deploy 1,000 m above the ground by default, and if you made your top stage light enough that will almost completely stop you before hitting the ground. It is worth opening the parachute long before the full deployment altitude, because the semi-deployed duct still effectively slows down. If your return unit is too fast and too heavy, the full deployment parachute will suddenly rip off and your kerbals will fall to the ground, exploding on impact. Therefore, allow the cab to slow down below 350 m/s before opening the parachute safely. This will indicate by the color of its icon turning gren red which means it is now safe to open the parachute. If the parachute has already opened and the capsule slowly descends, wait until it reaches the surface. If the capsule landed on the ground or splashed downwards, move the mouse over the altimeter in the upper center of the screen and click the green recover VESSEL button to retrieve the pod. Congratulations, you've successfully completed your first space mission! If you can do the above simple mission (launch-reach orbit-return) with confidence with a default Kerbal-X (or your own self-made rocket), it's time to The editor and the basics of rocket construction or go to the tutorials page where you can find many secrets of shipbuilding, mission planning and maneuvering. Notes Notes

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