DSP FOR DUMMIES

My name is RapidRotation, and I am a frequent participant in discussion in the DSP official Discord. I and several others have noticed that the current community tutorials and guides are… lacking, to say the least. Most are out of date, in some cases to the point that their advice no longer applies. This will (hopefully) be a collaborative effort with other experienced individuals in the DSP community, as we try to combine our knowledge into better ways for new players to understand the game.

Understand that this is a growing document. It is incomplete and there is a lot of information planned for the future. As mentioned below, please send any suggestions or requests to my Discord DMs and I will keep tabs on them. If you wish for commenter access to the document, send a request through Google and I will approve it.

~~As of today (08/07/2023) the Dark Fog/combat update has not yet been released; when it does, many of the tips/tricks/what-have-you in here might be invalidated.~~

~~After a long hiatus, I have returned, on 10/23/2023! While I was out we got more news about the Dark Fog, but no other changes have occurred. I will continue writing this as though the combat update is not coming, as it will likely be a *long* time after it launches before I feel confident in giving advice on that aspect of the game.~~

(04/24/2024) With the Rise of the Dark Fog update having been out for some time now, I believe it's time for me to do a proper overhaul on this guide. It's going to take time, but I want to rework it into a proper tool for users, with in-depth information that I intentionally left out previously. If anyone has anything they want to see added/edited/what-have-you, *please* DM me or ask for commenter access, because I want to hear what people have to say!

Shoutouts to:
Mr-Vagabond (mrvagabond) Dude is by far one of the most helpful people in the community. If you have a question, he probably knows it.
Flamehaze (flamehaze) Very experienced individual who helps keep me in check.
wadusher0 (wadusher0) Black magic practitioner and very knowledgeable. Taught me to pizza.
ebb (ebbdev) Likes making art using belt bending, and very helpful when troubleshooting problems.
Selsion (selsion) Developer of DSPOptimizations, an essential performance mod for late game.
starfish (starfi5h_) highly experienced modder who has made incredible contributions to the modding side of DSP.

Nexii (.nexii) Developer of DSP Ratios, an up-and-coming resource and production calculator for the game.
Bayes (bay.es) Loves asking questions, and has pointed out many areas where DSP for Dummies needs expanding.

If you have any questions, suggestions, or comments about this guidebook, please feel free to DM me on Discord @rapidrotation. I can also be found often on the official Discord, but DMs are the best way for me to keep an idea on what suggestions I might need to be working on next.

Helpful Resources

The DSP Wiki, home to a vast repository of game information. I visit this site multiple times a day to double-check information.
Factoriolab, currently the go-to production calculator for Factorio, DSP, Satisfactory, and Captain of Industry.
DSP-Ratios, in development by Nexii as a dedicated production calculator exclusively for DSP.
The DSP Thunderstore, a quick and painless place to install mods for the game. R2modman is a lifesaver!
Dyson Sphere Blueprints, the largest repository of blueprints the community has, with libraries for factory BPs, Dyson Shell BPs, and even cosmetic designs for the mecha.

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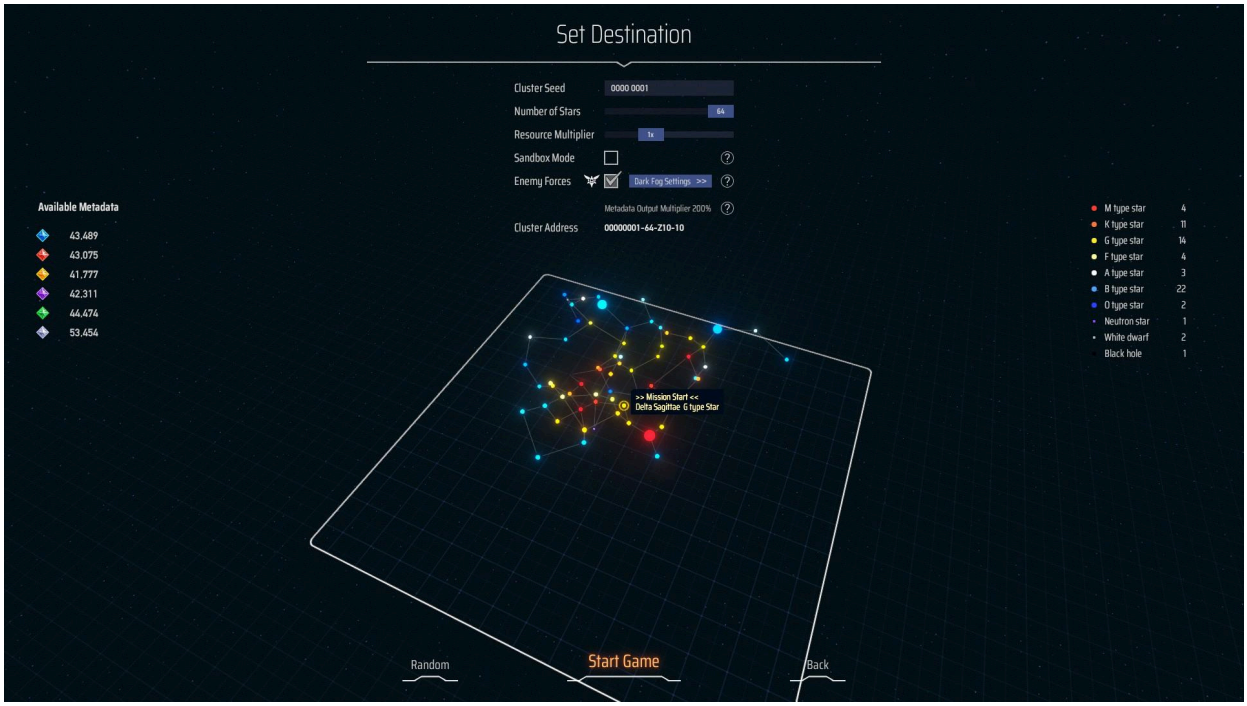
Getting Started

WIP
Immediately on clicking the “New Game” button, you will be presented with a screen like this:



While there is a lot of information on this screen, the vast majority of it isn't immediately relevant to someone just starting out.

The center of the screen is dominated by the map of the cluster. The player always starts in a G-type (Sun-like) system, in the rough center of the cluster. The color of the stars on the map will roughly correspond to the star classes listed on the right side of the screen, with some slight variance for the brightness of each individual star. The lines between stars are unimportant, as they're meant to signify "constellations", and have no impact on gameplay. Finally, each cluster can have between 1 and 3 Giant stars, which have larger dots on the map, and come in Red, White, and Blue varieties. These also follow the same star classes as regular stars, so Red Giants (common) can be M or K, Blue Giants (uncommon) can be B or O, and White Giants (very rare) spawn as A class. Giant stars have fewer planets than regular stars, and can support much larger Dyson Spheres than normally possible for their class.

The **"Available Metadata"** on the left-hand side is primarily for those who have already played through the game to some degree, and have earned Metadata. Metadata will be explained in a future section, but for the time being it is not important.

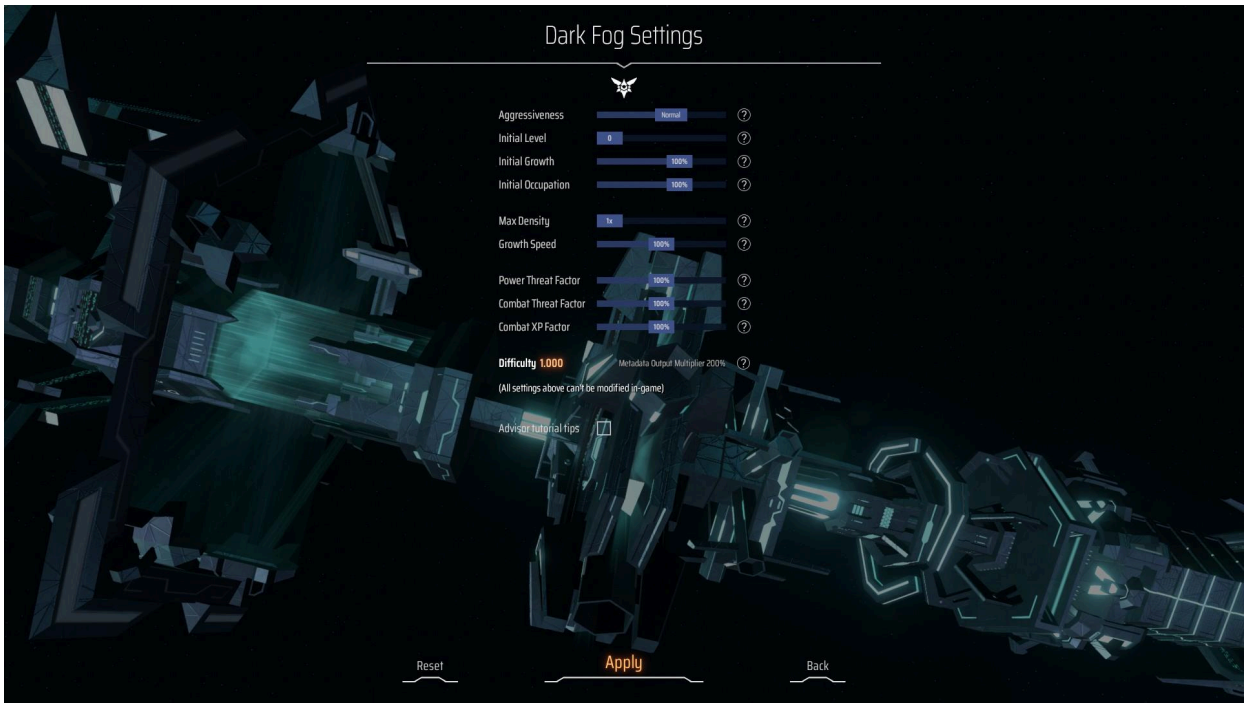
"Cluster Seed" is, as you'd expect, the seed for the game you would be playing. You can input any number from 0 to 9999 9999, and that bring up a seed that you can look at, as shown above. Note that the "Random" button on the lower left is *not* actually random, but instead will increment the current seed by 1. If you're on seed 0000 1000, then pressing "Random" will bring you to seed 0000 1001.

"Number of Stars" is exactly the same. You can pick from a range of 32 to 64 stars, although the default (and recommended number) is 64.

“Resource Multiplier” is the second most important choice to make, after choosing a seed. The default value is 1x, and ranges from Scarce (0.1x) to Infinite, and affects both planetary resources, and Dark Fog drop rates. Going lower than 1x will increase your Metadata Multiplier, and 0.5x will enable an achievement, but there isn’t really much incentive to do so outside of that. Going higher is also not penalized aside from a reduction to your Metadata Multiplier, but again, this is *not* important when you’re starting out. Pick a number you’re comfortable with, but the recommended multiplier to start with is 1x, as this will give you the game experience that was most intended for new players. It will give you lots of resources to beat the game with, while also making sure the player is able to plan around what happens when veins inevitably deplete.
“Sandbox Mode” is exactly what it sounds like. It gives you access to sandbox tools like infinite mecha energy, free buildings, teleporting between planets, and free tech unlocks. This is a great tool for when you want to try out a new factory blueprint, or just to get a feel for certain parts of the game.
“Enemy Forces” is the checkbox to enable or disable the Dark Fog. I will go further in-depth on their settings below, but this will be on by default, and gives an immediate 100% final multiplier to your Metadata Multiplier %.
The **“Metadata Multiplier %”** is what determines how much Metadata you get from a save. Metadata is largely unimportant in DSP, even after the addition of the Dark Fog, but it can help serve as a general indicator of how “hard” your seed settings are.
“Cluster Address” is the final “seed” that you are playing on. While the eight digit seed does not change between one person and the next, the cluster address signifies additional information:

- The first eight numbers are the actual seed that will match “Cluster Seed”.
- The next number signifies how many stars are in your save, from 32 to 64.
- The next section shows the resource multiplier that you have chosen, from A/Z01 (scarce) to A/Z99 (infinite). The A or Z depends on whether or not you have Dark Fog enabled. If you do not, it will read Axx and stop there. If you have Fog enabled, it will instead read Zxx, and will have one last set of numbers.
- The last set of numbers is only for seeds with Dark Fog enabled. This ranges from 00 to 99, and is a quick reading of how high you’ve set your Dark Fog settings to. The default settings will show up as 10.

Finally, on the right hand side of the screen, you will see the distribution of star types in the seed, as they follow the main sequence of star types. Under general circumstances, you will a fairly standard distribution of stars (few Ms and Os, a handful of Fs and As, many Ks and Gs, and lots of Bs) as well as two white dwarfs, plus a single neutron star and black hole. The last three will always be static (excepting white dwarfs, which on seeds with few stars will be reduced to one) and will *always* spawn in a seed.



Moving on to the **Dark Fog Settings**, you have all the sliders to determine how strong the AI (should you enable it) will be. Each setting has its own explanation next to it, but I'll add my own anyway, because some people can't read what the game tells them. I will also post some "recommended settings" below, to give an idea of where to start from.

Aggressiveness determines how much the Fog hates you, ranging from "Dummy" to "Rampage". This is the single largest difficulty modifier the Fog has. Lower settings will attack less often, or not at all (Dummy will not even defend itself), while higher settings attack more frequently (Rampage gives you very little downtime between waves).
Initial Level is exactly what it sounds like, the starting level for all Dark Fog in the game. This slider ranges from 0 to 10, out of the Fog's maximum level of 30. Every three levels, the Fog gains more advanced loot drops, so this determines both how strong individual Fog units and buildings are, as well as how good their drops will be.
Initial Growth is how developed each DF space hive will be on starting the game. Note that this is also determined at least somewhat by where in the cluster the hive is; a hive in the starting system will always start out smaller and less developed than a hive on the edge of the cluster.
Initial Occupation determines how many systems in the seed will have DF hives in them on game start. Lower values mean less systems will have Fog in them. Outside of the neutron star and black hole (always have DF in them), the presence of Fog is somewhat random, and it *is* possible to start a save that does not have any DF hive in the starting system, although it's very uncommon without reducing this slider.

Max Density determines the amount of DF hives that can be present in a system, from 1x to 3x. 1x caps out at two per system, while 3x caps out at six. Higher values of this and **Initial Occupation** can cause the starting system to spawn with as many as three hives in it.
Growth Speed is exactly as it sounds. This determines how fast DF hives and planetary bases can grow, and goes from 25% to 300%.
Power Threat Factor is very important! The Dark Fog does not like us using power and energy, and so will gain "threat" over time based on our energy *consumption* (NOT GENERATION!). This largely applies to planetary bases, but essentially this ties in with **Aggressiveness** to determine how often the Fog will attack your factory. Higher values on this slider mean the Fog will send waves more often based on your power usage, while lower values instead mean you are attacked less frequently. This slider ranges from 1% (practically none) to 1000% (lots!)
Combat Threat Factor is the other side of the coin. This determines how much "threat" you will generate by attacking DF units, buildings, etc. While the Fog will of course defend itself from attack, the "threat" meter is what determines when waves of units will be sent at your factory. Attacking one base on a planet will not go unnoticed by other bases on the same planet. Just like with **Power Threat Factor**, higher values mean you generate more threat by attacking the Fog (more waves), while lower values mean you generate less(fewer waves). This slider ranges from 1% (practically none) to 1000% (lots!)
Finally, **Combat XP Factor** determines how much XP the Fog gets from combat. The Dark Fog will (very) slowly gain XP and level up on its own over time, but it also gains XP from fighting the player as well. This slider determines how much XP the fog gains during combat, meaning it will level up and grow faster or slow, depending on the value chosen. This slider ranges from 1% (practically none) to 1000% (lots!)

All the above settings will contribute to the **"Difficulty"** rating. The number itself doesn't directly affect anything other than your Metadata Multiplier, but it's a good indicator for how much challenge the Dark Fog will be.

Recommended DF Settings

- For players brand-new to factory games like DSP/Factorio/Final Factory: Leave your settings on the **Default** values. The default values for the Dark Fog in this game are extremely forgiving, with infrequent attacks and lots of time to get your feet under you. The Fog is slow to gain threat, slow to grow, and slow to level up. It's a good starting point for first-time players to sink their teeth into. Going lower is an option, of course, but doing so will make it difficult to acquire many Fog drops later on.

- For players with some experience in factory games in general, or on their second/third playthrough of DSP: Orient your sliders to around **2.0x-4.0x** Difficulty. This range is well-suited for a “normal” game, where the Dark Fog will be an ever-present threat to work around and combat, without being completely overwhelming. It will take some knowledge of automation and planning to keep your defenses up and running as the Fog grows. A good starting point would be as follows: Normal/3/100%/100%/2x/200%/200%/500%/500%. This keeps the Fog at a comfortable balance at 2.176 Difficulty. Level 3 means they can start dropping more advanced items immediately without being too hard to kill. 200% Power Threat helps to keep from being overwhelmed by frequent attacks, while being able to generate threat easily later on with 500% Combat Threat. Finally, 500% XP Factor makes the Fog level up quickly enough to actually keep up with the player’s growth, instead of falling behind fairly quickly.
- For experienced players seeking a challenge: Aim for at *least* **5x** Difficulty. This is meant for those who want the Fog to be a serious challenge for the entire duration of a regular game, with frequent attacks and rapid growth. For these settings, I’d advise starting around the following: Sharp/6/150%/150%/3x/300%/500%/1000%/1000%. This will give a Difficulty of 5.568, for a real challenge. Sharp means there will be more frequent attacks, and level 6 means they will start off significantly stronger than normal. The DF hives will be more developed, and there will be more systems that have them. 3x density means that in the most established systems, there will be up to *six* hives to deal with, which will be difficult to surmount, while 300% growth means that hives and their planetary bases will also grow rapidly. 500% Power Threat means you will have frequent but not insurmountable attacks, while 1000% Combat Threat means every time you fight the Fog, you will generate far more threat than before, meaning even more waves. 1000% XP Factor also allows the Fog to potentially out-scale the player if they are not prepared for it, meaning there will be a real challenge throughout the entire game.
- Finally, for the masochists out there: Go for **Maximum Sliders!** If you’re crazy enough to do this, set all your sliders to the maximum! This will make the Dark Fog super-aggressive, starting at level 10, with many hives in almost every system of the cluster. Additionally, the hives and their planetary bases will grow very quickly, and the player’s actions will generate threat at all times, meaning you will need very robust defenses to survive. Setting it this high is basically just for bragging rights.

General Progression

The First Minutes

When you're just starting out, you will experience a short cutscene explaining the origin of the Dark Fog, and the threat it poses to the player. This is entirely for in-universe flavor and is not directly relevant to the player aside from as background lore. Upon finishing the cutscene, you will ride into your starting system on a small rocket. Once you land, you will be greeted with a screen like this:

From here you can immediately start the game. On the right hand side, you will see multiple Guidebook prompts open. These will give you the basic control information needed to move the mecha around and to mine resources by hand. The Guidebook is a crucial tool for when you're first starting out, and will fill itself over time with more entries as you unlock new things and explore the game further.

Other important information includes the planetary **Map** (hotkey M) and **Starmap** (hotkey V) on the bottom left corner, the central menu on the bottom of the screen (shows the player's energy bar as well as where they will be able to place buildings from, later) and on the bottom right corner, there is the circular menu which provides various functions to the player, being the **Inventory** (hotkey E), **Replicator** (hotkey F (this is your crafting tool)), the **Mecha Panel** (hotkey C), **Statistics Panel** (hotkey P), the **Detail Display** (hotkey H), and the **Tech Tree** (hotkey T)

You can use the same right mouse button you use to mine, to disassemble the landing rocket. This will give 3 **Hydrogen Fuel Rods** (162MJ of power, or about 133% of your

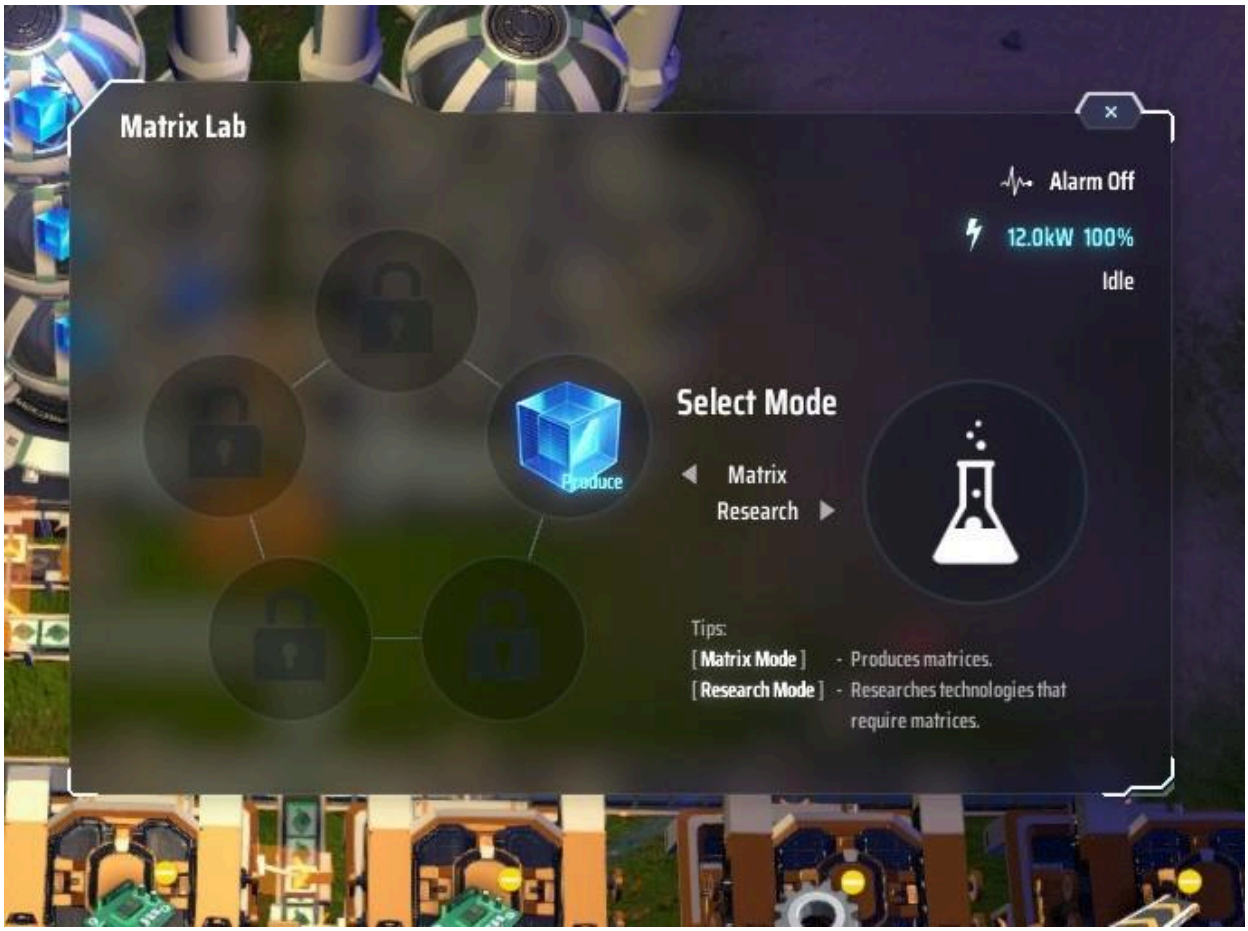
starting energy bar), 10 **Iron Ingots**, 10 **Magnets**, and 10 **Copper Ingots**. This is enough to complete the first technology **Electromagnetism** which unlocks the basic **Mk1 Miner, Tesla Tower,** and **Wind Turbine.** This begins the process of automation, as you can now use your Wind Turbine to power a Miner, to mine Iron/Copper for you. You can also use the Replicator to create more of these machines if you obtain the materials to do so.

Your immediate goal from here on out is to complete the starting technologies that require no Matrices to research. The order of them is up to you, but I personally advise going for **Automatic Metallurgy** first, followed by **Basic Assembling,** then **Basic Logistics System.** Metallurgy gives you the **Arc Smelter**, which are the first step in any manufacturing process, and lets you save time and mecha energy on initial crafting. Basic Assembling allows you to place **Assembling Machine Mk1** which, combined with smelters, will form the backbone of your factories. More importantly at this moment, these let you craft items without needing the replicator, again saving time and mecha energy. Logistics unlocks **Conveyor Belt Mk1, Sorter Mk1,** and the **Depot.** While these are *absolutely* very important to unlock, the player can easily move resources around by hand for the first couple minutes without any issues.

Blue Science

After the first three techs are completed, you have (almost) everything you need to begin your first real factory! The last remaining step is to unlock **Electromagnetic Matrix,** which unlocks the Matrix of the same name, as well as the **Matrix Lab** to produce it. This the first Science cube of the game, and which serves to broaden the player's horizons significantly. Note that after this, the only remaining researches that require items instead of Science cubes are **Mecha Core 1, Mechanical Frame 1, Inventory Capacity 1, Energy Circuit 1, and Drive Engine 1.** Any further tech research will require cubes, going forward. Electromagnetic Matrices (hereafter referred to as Blue Cubes, or Blue Science), are the most basic of the five "rainbow" sciences in the game. They require **Circuit Boards** and **Magnetic Coils** to make, and are relatively cheap to produce. They require a 2 to 1 ratio of Iron to Copper, and a small production of 1 blue cube per second requires 2 iron ore and 1 copper ore per second. Below is an example of what an early "first" factory to produce and use blue cubes might look like:

Note that it is not enough to simply have Matrix Labs *producing* science cubes, but there must also be Labs to *use* said cubes to perform research. A lab can either be set to **Matrix** (takes in items, produces cubes) or **Research** (takes in cubes, consumes them for “hashes” to perform research). A single lab (or stack of labs, remember you can stack these vertically and they will share resources) can do one of these tasks, but not both at the same time. While you *can* perform research just using cubes in the mecha’s inventory, this is slow and non-automated, so you want to use labs instead.



After you have your starter factory making blue cubes successfully, the game begins to truly open up! Your first goal with your new cubes should be to unlock **Universe Exploration 1,** in the Upgrades section of the Tech Tree. This is a very cheap unlock that allows you to see all the veins on the planet, as well as how much resources they possess. Afterward, you can start on any of the blue cube unlocks that you like, but I would advise starting with **Smelting Purification** to unlock **Energetic Graphite,** a powerful early to mid-game fuel that helps a lot with managing energy, and **Thermal Power,** so you can supplement your Wind Turbine-based power grid with stronger **Thermal Power Plants.** While it's not good to rely on burning Coal for *too* long, these will serve well for a few hours to make expansion easier on your power supply. Additionally, **Steel Smelting,** whilst not *immediately* important, allows you to place your Wind Turbines on the water, meaning you can use that space for power, instead of land you would otherwise be building on.

Returning to the topic of thermal power, it's actually very important to note that burning Coal straight out of the miner is actually *not* the most effective way to do it! Using Energetic Graphite instead of Coal will give a significant overall power boost of around

10% from the initial value. This doesn't seem like much, but it adds up considerably over time. The math is as follows (copied directly from dsp-wiki):

- 2 Coal have an Energy Value of 5400 kJ. Energetic Graphite has an Energy Value of 6750 kJ. 1350 kJ are gained.
- To smelt the coal requires 1 Arc Smelter running for 2 seconds, which costs 720 kJ. There is still a 630 kJ gain.
- To move the products to and from the smelter requires 2 Sorter Mk.I. Running 2 Sorter Mk.1 for 2 seconds requires 72 kJ. There is still a 558 kJ gain.

It is important to mention that Thermal Plants are actually *not* 100% efficient, however; they only gain 80% of the energy from the fuel that they burn. This means that the 558 kJ of free energy from using Energetic Graphite is slightly reduced to just over 446 kJ. This is still free power from nothing, however, and the mecha's fuel chamber actually is 100% efficient and will gain the entire bonus 558 kJ of the Energetic Graphite without issue.

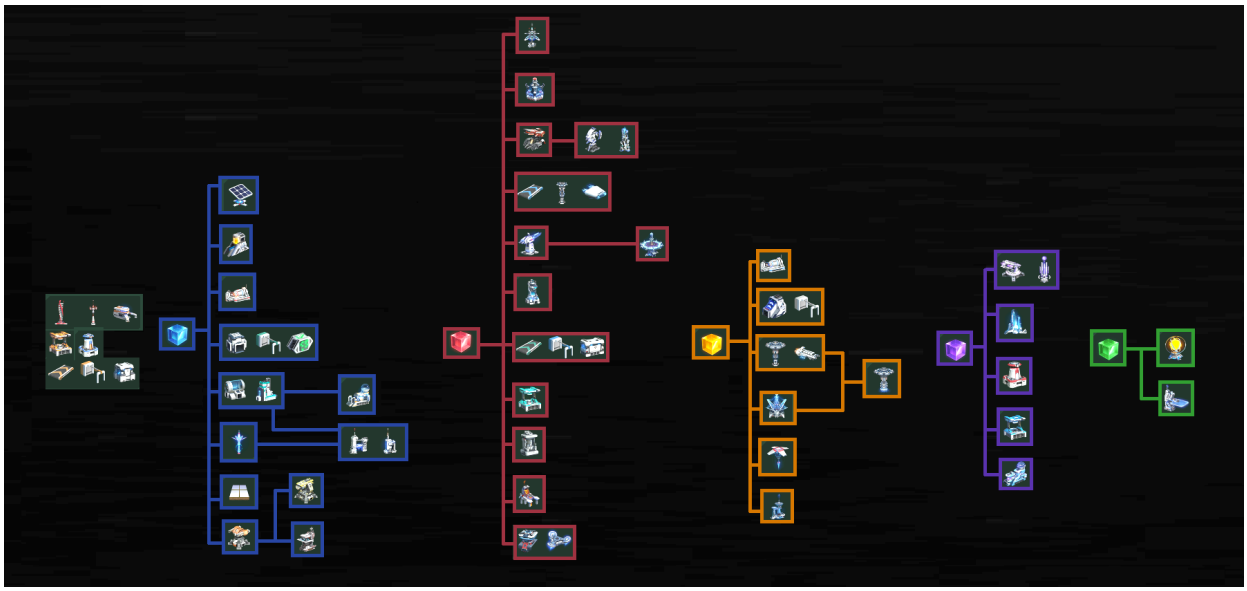
Your First Fog Attack

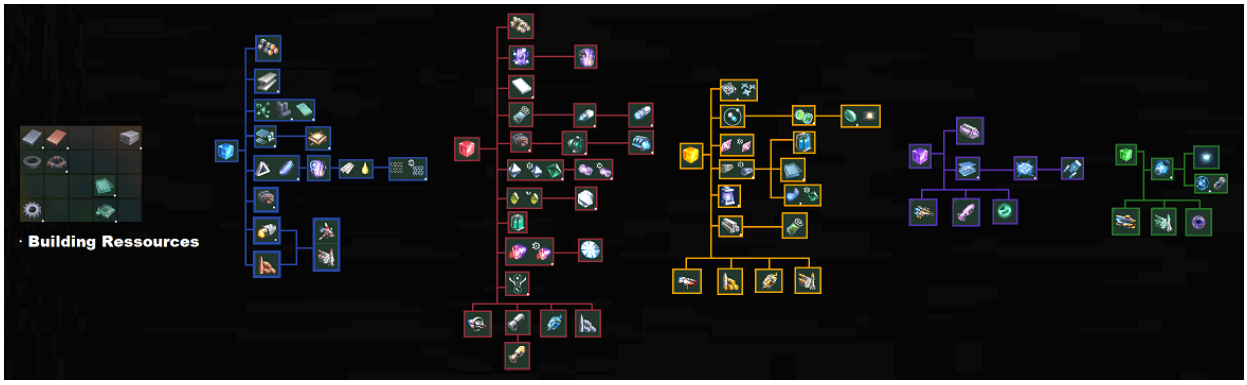
It is generally around this point that the Dark Fog base on the planet will have its **Threat Gauge** (located on the upper left of the screen) filled. It will then assemble a wave of enemies, and send them at the player's factory. Fortunately however, this first wave is always very small, and can be fended off easily by the mecha alone, even on boosted Fog settings. It will consist of a handful of **Raiders**, slow ground units with a short-ranged attack. While they can be dangerous in numbers, the initial wave is almost always a non-threat, able to be dealt with using the mecha's built-in short range laser weaponry.

(For the sake of transparency, the save I am using here for example images is on completely default settings)

("Dank Frog" is from a mod, and will show up as "Dark Fog" in a vanilla game)

This first attack, as explained above in the DF section of **Getting Started,** is triggered by our power consumption, which rapidly increases in the first few minutes as we build our first factory and use it to begin research. Future attacks will continue to occur, steadily growing in numbers and frequency, and the player will likely need to invest in **Gauss Turrets** within the first hour or so. These turrets shoot **Ammo**, and each item of Ammo produced gives a turret 20 shots. They have a range of 44m, and can effectively defend a much larger area around themselves than the mecha's starting laser can.





(credit to Mr-Vagabond for the images above)

Red Science unlocks many different machines and recipes, and is made primarily from Oil and Coal. It unlocks several important items and machines throughout the game, such as Sailguns, RRs, PLS towers, Proliferator Mk2, as well as some of the first upgrades to your existing machines. This is also where one of the first bottlenecks a player experiences typically occurs, thanks to the oil refining process outputting both refined oil and hydrogen. It's generally recommended to store the refined oil, as you will need it for later production…

Note that at this point you *can* create a Dyson Swarm using Solar Sails and EM Rail Ejectors. However, its utility would be severely limited; Silicon is awkward to obtain prior to interstellar logistics, and you need quite a bit of it to build the RRs used to actually get power from the swarm. Additionally, without some levels in Ray Transmission Efficiency the RRs are highly inefficient, and the resources needed to maintain the swarm would be better used on progressing further into the tech tree.

Yellow Science is the first real "gate" to progression. It requires Titanium, which cannot spawn in veins on the starting planet. You can get small quantities from gathering rocks on the ground, but nowhere near enough for usage at scale. Instead, you must journey to other planets in your system to find the two basic resources not on the home planet: Titanium and Silicon. While Titanium is the only one "necessary" for progression at this point, Silicon is required for making Processors, which are used in basically everything going forward. Not only are they needed for both of the upcoming colored sciences, but they're also needed for over half a dozen important buildings, as well as logistics vessels and drones.

This is also the point in the game where you need very large amounts of oil. The Refined Oil you've (hopefully) been saving since Red science is now needed for several important recipes. It is required for mass producing Organic Crystals, which you need

for Yellow science. It is required for Sulfuric Acid, which is needed for graphene (assuming you do not have Fire Ice available) *and* for Titanium Alloy, which is used in multiple critical buildings like ILS and MPCs. All of this combines into a steadily increasing oil dependency, and need for an increasing amount of Chemical Plants. And naturally, all those added buildings means you'll need more power, too…

Everything above, combined with the relative complexity of Titanium Crystals and the need for interplanetary logistics that comes with them, is what makes this part of the game the first real "gate" in the game's progression. However, it also unlocks various core parts of endgame, like ILS, Particle Colliders, fusion power, and Space Warpers (Note that you cannot access warp without Purple science). If you use Proliferation (which you probably should…) this is around the time you would start to do so. This is also when Proliferator Mk3 is unlocked, but unless you have large quantities of Fire Ice in the home system, I would advise against it until you have access to interstellar travel. The coal demand to make Prolif Mk3 from purely basic recipes is immense.

Purple Science is generally less of a roadblock than Yellow, if only because you should have reliable transport between planets at this point. It is rather complicated though, and requires considerable amounts of Silicon. Even worse, if you do not have access to Fire Ice, it will also be very coal-intensive, thanks to the added requirement of Carbon Nanotubes. This tier doesn't unlock much compared to the ones before it, but the new upgrades are very helpful, including finally being able to use Space Warpers. However, the Quantum Chips you unlock at this point are crucial to late game progression, as you need them both for the upcoming Green science, as well as the highest upgraded machines. It is also at this point when you unlock Small Carrier Rockets.

Green Science is the most complicated of the five rainbow sciences, and the slowest to produce. However, it unlocks the ability for players to plan a proper Dyson Sphere, without these you can't really do much with Rockets. It also unlocks probably the single best building in the game, the Advanced Miner, which is a combination miner and (supply-only) planetary logistics tower in one! It also unlocks the advanced recipe for Warpers, which produces eight from a single green science, instead of the single one you get from using Graviton Lenses. It is advised to use this recipe over the basic one as soon as you can, with Proliferator Mk3.

Finally, Green is also the science that allows you to switch your RRs over from producing small amounts of power from a Dyson swarm or shell, to Photon Generation in order to make antimatter. This requires the Dirac Inversion Mechanism technology, and vastly increases the effectiveness of RRs.

Finally, once you have all five colors of science automated, it is time for the final **White Science**! This requires all five other sciences to make, as well as antimatter, making it the item with the highest amount of inputs, at 6. You need four thousand of these to finish the “Mission Complete!” research, which means you have beaten the game! After this point, it’s just a matter of expanding ever outwards, increasing production as you do more research with your white science, and building Dyson Spheres across all the stars you wish. After all, the factory must grow…

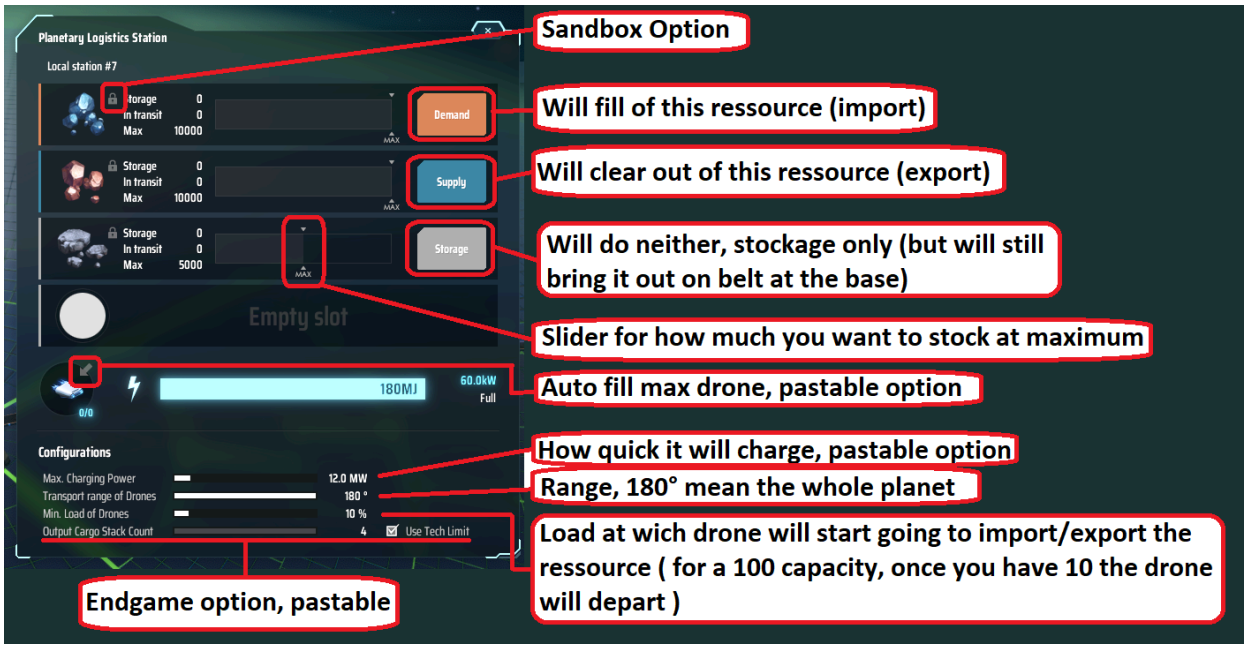
Logistics

WIP

The very first form of logistics you get access to is, of course, **belts** and **sorters**. With these, and machines to produce items, you can automate anything in the game. Belts require no power to run, but sorters require a tiny amount of power, and need to be in range of a power source. The guidebook has a page “Conveyor Belt and Sorter” dedicated solely to these. If I had to give one strict recommendation, it’s to **always** run belts alongside buildings, with sorters to input or output items. Do **not** run a belt to each individual building in a production line; this is referred to as “1-belt-per-building” and is generally regarded as the single worst building habit in the game.

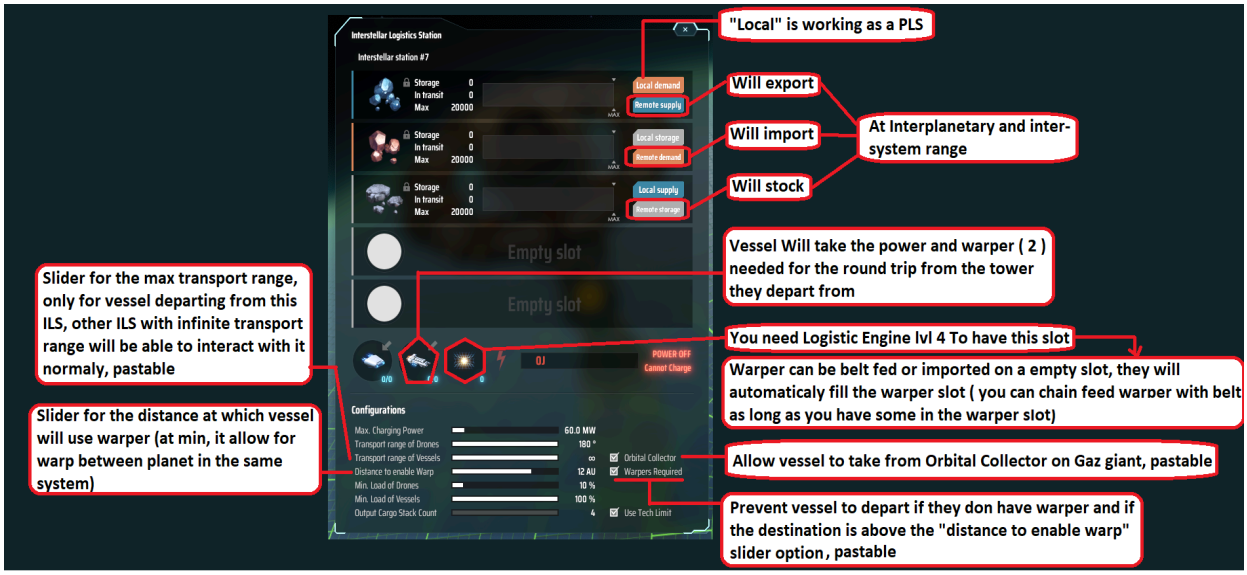
Alongside belts and sorters, there are three additional logistic buildings, **Distributors**, **PLS**, and **ILS**. Distributors and PLS are typically unlocked around the same time; of the two, PLS is far superior, albeit somewhat more expensive. Distributors use **Logistics Bots** docked in buildings attached to storage boxes to move small quantities of a single (1) type of item to/from the player or another Distributor. Initially, their range and speed is very limited, although there are several upgrades the bots benefit from. For more information, check the “Distribution Logistics System Guide” in the in-game Guidebook.

Meanwhile, PLS have twelve slots for belts (either input or output) and can hold four (4) different types of item. These cannot move items directly to the player, but can use **Logistics Drones** to move larger quantities of items between PLS and ILS on a planet. PLS are extremely useful for moving items from one side of a planet to another, and can be placed much closer together than ILS can. This makes them excellent for use in blueprints. A single PLS can hold up to fifty drones.



(Credit to Mr-Vagabond for the image above)

Finally, ILS have the same twelve slots for belts as PLS, but can hold five (5) different items, and upon unlocking **Logistics Engine 4** can also maintain a small stock of warpers separately from the normal item slots. This stock cannot be supplied without using one of the five item slots, except by using belts to connect ILS together. For example, if ILS A has an item slot for warpers, it can then supply them to ILS B and C using belts, without those two ILS needing to use an item slot on warpers.



(Credit to Mr-Vagabond for the image above)

ILS, along with being able to hold up to one hundred drones, primarily use **Logistics Vessels** to move items between planets and star systems. These vessels can move very large quantities of resources around at a time, and are quite fast. However, this process consumes a significant amount of energy; interplanetary travel isn't very energy-intensive, but interstellar uses considerably more power. Do **not** attempt to create a transport line between star systems without access to warpers! Even the closest star systems are typically around 3LY away, and without warpers this can take an hour or more for a one-way trip!

Note that only **one** end of an ILS route needs to have power, warpers, and vessels. You can set a remote ILS without any power, vessels, or warpers, and as long as it can either demand from a supplying ILS with those things, or supply to a demanding ILS, the route will function. This is typically used for early mining outposts so that the player only needs to power mining machines and not the logistics tower.

Proliferation

WIP

Proliferator was added in January of 2022, and it completely changed the way players build factories. Generally considered the most overpowered thing in the game, effective use of proliferation allows the player to potentially double their production speed, or halve the amount of factories needed to produce an item, through the use of **Production Speed**. If that wasn't good enough, it's actually capable of creating items out of thin air with no extra inputs using **Extra Products**. While this does come at a cost of extra power usage for production, the benefits far outweigh the costs (psst, you can proliferate fuels too…)

Proliferation is applied to items on a belt using a Spray Coater, a building that sits on top of a belt, with a lower section for items to move through, and an upper section that intakes Proliferator via belt. It cannot be fed directly with a sorter.

The full list of Proliferator effects can be found here.

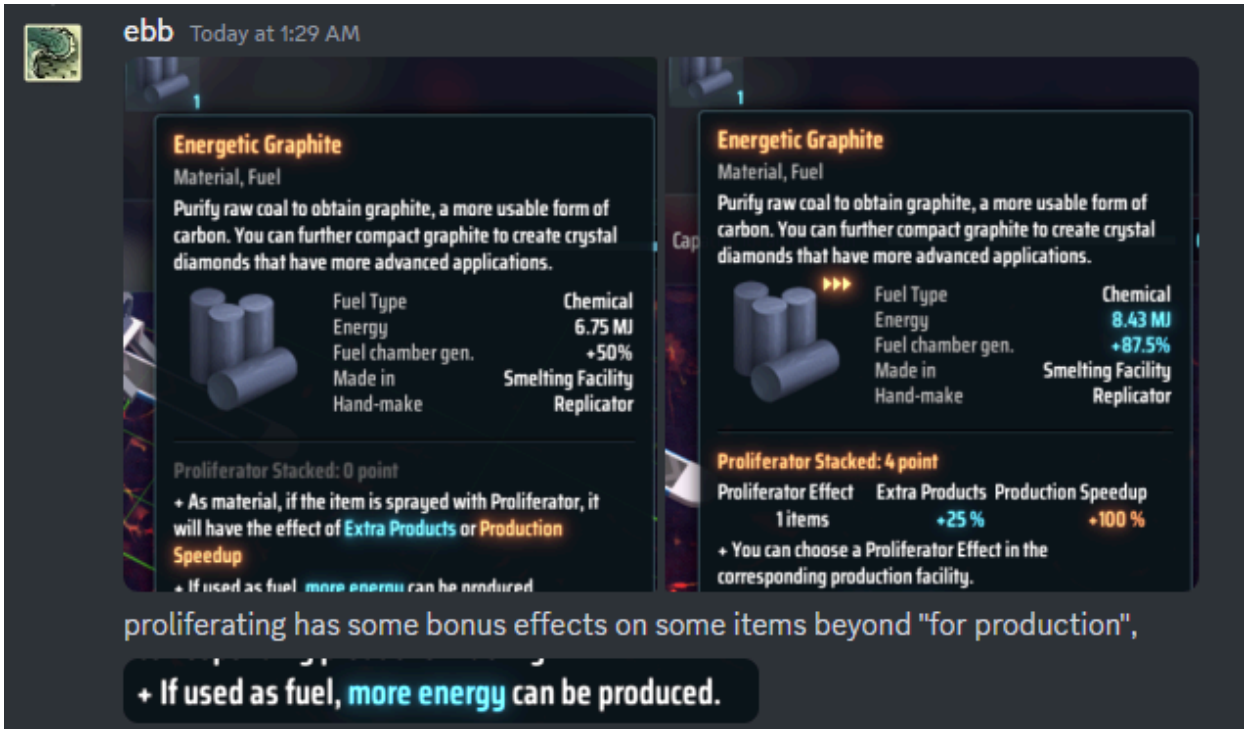
Proliferator Mk1 is the very first kind you get, and honestly… it's not that noteworthy. 12.5% **Extra Products** means 1 free item for every 8 produced, or a 25% bonus **Production Speedup** for a little extra production speed. Outside of being used as an ingredient to create Proliferator Mk2, it doesn't see much use. It has a total of only 12 sprays per unit.

Proliferator Mk2 is generally where players first step into large-scale proliferating. It isn't much more expensive than Mk1, and provides either a 20% **Extra Products** bonus, or a 50% **Production Speedup** bonus. This is a much stronger bonus than Mk1, and

means either 1 free item for every 5 produced, or producing at 1.5x speed. Either of these is highly useful, but generally **Extra Products** is chosen for early game proliferation. It has a respectable 24 sprays per unit.
Proliferator Mk3 is the best of the best. It can be a little intimidating to mass produce compared to Mk2, but it's absolutely worth it to do so (provided you have access to advanced recipes for either graphene or nanotubes). It provides a 25% **Extra Products** bonus, or a 100% **Production Speedup** bonus. That's either 1 free item for every 4 produced, or *doubling* the production speed of the building. Both options are very powerful, although **Extra Products** is generally used more at first, with **Production Speed** becoming more used over time. Notably, it has a whopping **60** sprays per unit of proliferator!

The amount of sprays per unit of proliferator is important to take note of, because it dramatically increases the value of the spray as you go up in tier. Since Mk1 only has 12 sprays and low modifiers (12.5/25), its usefulness is limited. However, turning it into Mk2 not only gives much better modifiers (20/50) but also doubles the spray count to 24. You get double the sprays as well as making them much stronger. Mk3 continues this trend, but instead of doubling the sprays, you actually get 2.5x, with 60 instead of 24. Factoring in the costs of making each spray, this means that Mk3 prolif gains 12 free sprays for the cost of a single nanotube.

Below is an example of what Proliferator Mk3 can do to a fuel item.



(Credit to ebb for the image above)

Every item sprayed with Proliferator gets either 1, 2, or 4 Proliferator points. This primarily corresponds to the level of proliferator used (Mk1, Mk2, or Mk3) but there are some instances where you might get an odd 3-point item. This *usually* occurs either as a result of an item not being sprayed properly (the result of either inadequate power or lack of Proliferator, usually the former) and causing one or more items in a stack to not be adequately proliferated. This can be seen easily with an ILS or storage box when your base is either underpowered or lacking enough Proliferator spray. While annoying, it's something fairly easy to correct, and won't severely impact production.

Building and Blueprints

WIP

Now, when it comes to blueprinting, note that creating a new blueprint is something that you do well before entering the blueprint screen! You have to actually build whatever it is you want to blueprint before you can actually save it using the blueprint screen. It is also important to note that without Mass Construction 5 you have a limit on how many machines that can be included in a single blueprint; this includes belts and sorters.

Dyson Spheres (And Designing Them)

WIP

General Dyson Basics

The eponymous Dyson Sphere can be considered the "end goal" of the game, and is likely the reason you bought DSP in the first place. However, it's an arduous task to create even a small sphere, and the process itself isn't always the most intuitive.

The first stage a player typically reaches in the process of creating a Dyson Sphere is actually a Dyson Swarm. These can be created as early as red science, although their utility at that point in the game is dubious. Dyson swarms are made up of one or more orbits around a star, filled with Solar Sails. These are launched from EM Rail Ejectors (sailguns) and each one in orbit will produce 36kW of power. However, by themselves sails have a limited lifespan before decaying (1.5 hours with no research, 2.5 hours with all levels of Solar Sail Life) and so a Swarm's size and power generation is limited by how many sails you can keep in orbit at once. Each star can have up to 20 orbits for sails, and each orbit can maintain an unlimited amount of them.

Once you have progressed further toward the end of the tech tree, you gain access to Vertical Launching Silos (VLS), which allow the player to launch Rockets to form the nodes and structure of a Dyson Sphere (referred to as shells ingame). These are **permanent** structures around a star that do not expire, and are the basis of endgame

power generation. Each Structure Point created by a rocket produces 96kW of power, and enclosed sections of nodes and structure can also hold shells containing Cell Points, which are created by absorbing solar sails into the shell. This “freezes” the lifespan of the sails, and they will no longer expire once placed in a shell. Each Cell Point produces only 15kW of power, but their permanence makes them far better in the long run. Each star can have up to 10 Dyson Shells, and they will not interfere with each other’s output.

The power generated by a Swarm or Sphere is collected using Ray Receivers, which work somewhat similarly to Solar Panels. They have a line-of-sight check that looks for swarm orbits or dyson shells, and if they can see one, they will be able to receive power from it, either in the form of direct energy or Critical Photons. Direct energy can output up to 15MW of power from the RR to the local grid, whereas photons are used to create antimatter, needed for endgame AM rods and white science.

Once the player has launched at least one Solar Sail, if they are the only person on their seed, a star will be lit in the Milky Way to represent their cluster. Each star in the Milky Way is “owned” by the player with the highest power on that seed, so if you are on a seed already being played by someone else, you would need to have a higher Dyson power output than them to “own” the star. As more power is generated in a cluster, the star will gradually become brighter, turning first from a dim red to yellow, before shifting to purple and eventually a bright blue. The requirement for a purple star is honestly massive (think around 50TW) and blue is even higher still, so the majority of players have red or yellow stars in the Milky Way.

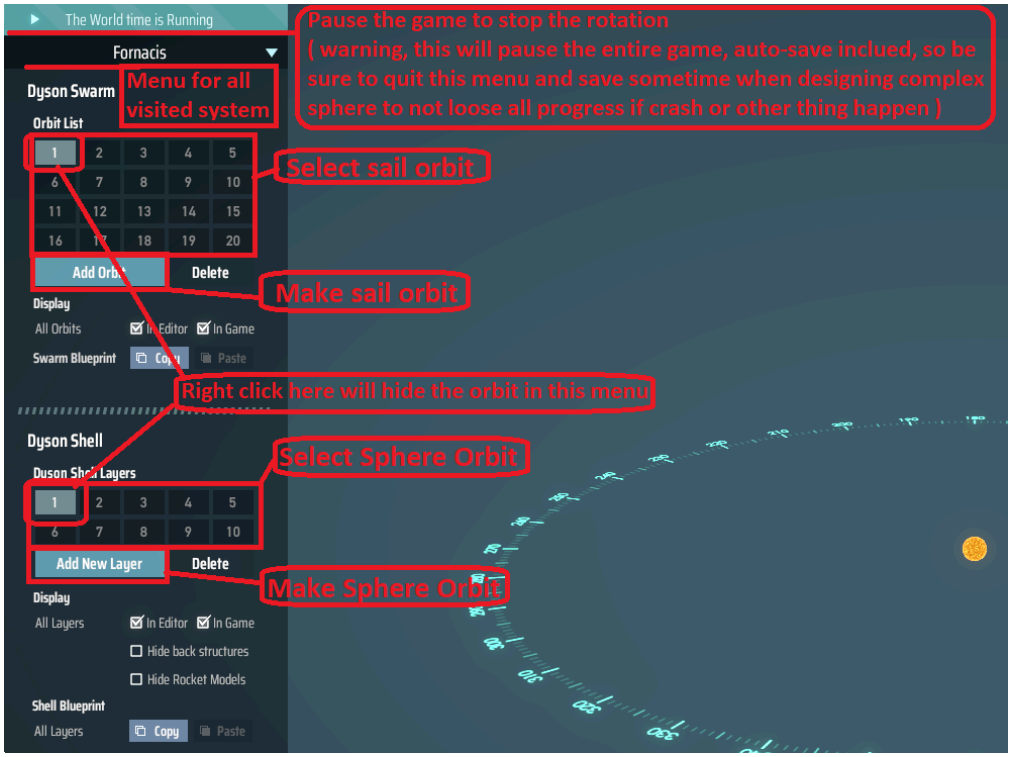
As of 10/23/2023 I myself still only have a yellow star on the Milky Way, sitting at 2.66TW.

Building a Dyson Sphere

This is what you’re all *actually* here for, I believe. Dyson Spheres are the primary draw of the game, and they do not disappoint! That being said, they’re also somewhat of a pain in the ass to make. However, one of the primary community pillars @Mr-Vagabond has gone above and beyond to create a *full guide* on how to plan and build a sphere! For those in the Discord, it can be found in the #help-forum channel, but I will be doing my best to paraphrase it here.

You’ll be getting started by pressing the Dyson screen hotkey **(Y)** or clicking the DSP icon on the bottom left of the screen, close to the planet map. This will take you out of Icarus’s view, but things will keep running in the background. On the left side of the

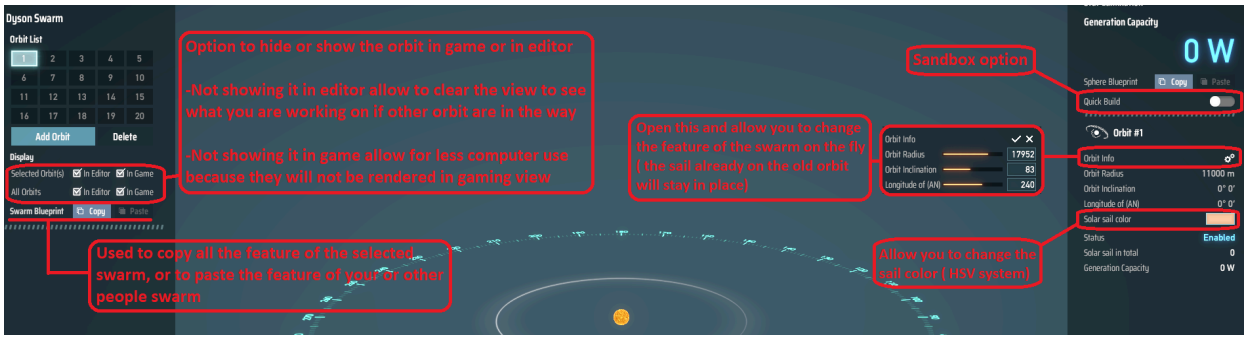
screen there's a multitude of buttons, which can be intimidating, but Mr-Vagabond has gone through the trouble of making a nice infographic showing what each one does:



(credit to Mr-Vagabond for the image above)

These are all the basic options for the Dyson screen. If you like building and checking in on your spheres, you'll be using these buttons a lot. The only ones missing information are the "Display" options, which allow you to show and hide orbits and Dyson Shells in the editor and in game. While it might seem silly to hide your Dyson Sphere in a game that's all about building them, unfortunately it is often necessary. Even with mods like DSPOpt, rendering spheres is a *highly* graphics-intensive process, and it significantly impacts performance as the shells grow larger. However, Swarms often do not have this issue.

Now, the first part of the process of creating a Dyson Sphere is actually with a Dyson Swarm. As stated above, these are unlocked early in the game, and are created by firing Solar Sails into an orbit, which last for a set amount of time before they disappear. Each star begins with a small flat orbit already set up for you. If you want to create more, you can click "Add Orbit" to do so, which gives you the option to change the orbit's size (within a range of values set by the star parameters) as well as its angle of inclination and longitude. You can also edit orbits after they are created:



(credit to Mr-Vagabond for the images above)

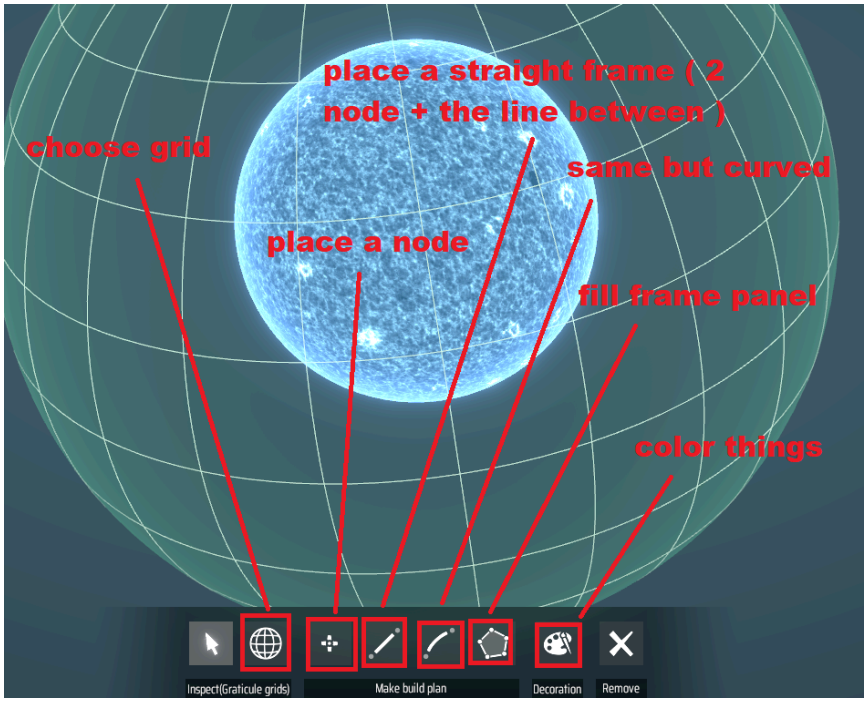
Editing an orbit will not affect any existing sails, but all newly-launched ones will follow the new parameters.

Now, Dyson Shell orbits are created in the same way, with the same three parameters. An important note for creating Dyson Shells is that they **cannot** be built within 1km of each other, and any nearby planets will have their own exclusion zones as well. You can also edit the inclination and longitude of shells much the same as Swarm orbits (the shell will gradually move over time to its new longitude and inclination), but you **cannot** edit the radius after creating the shell. Keep this in mind.

(credit to Mr-Vagabond for the image above)

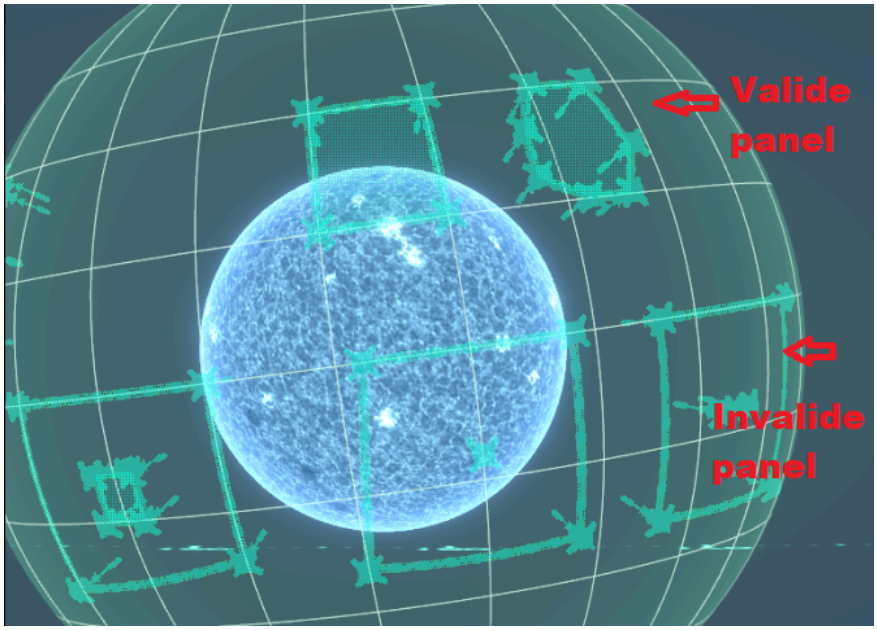
Now, the true meat and potatoes! Once you have a shell size and orbit picked out, you can click on it in “Dyson Shell Layers” to bring up the sphere design menu. Here you can choose what grid you’d like to build on (stick to square at first, it’s less finicky), as well as place nodes, frames, and create panels from closed sections of frames and nodes. The option to build frames also comes with the added bonus of placing and connecting nodes automatically, so you can save some time and clicking.

If you’re the artsy type, you can also color parts of the shell as well. There are also aesthetic options for different patterns on the frames and panels.



(credit to Mr-Vagabond for the image above)

Outside of a few restrictions, you're generally free to place nodes and frames wherever you like on the sphere; while they cannot be too close together, they do not need to form a complete shape to be part of the shell, and frames can connect nodes from quite a distance away. Panels must be created from a closed shape built from 3 or more nodes connected by frames, and there must not be any "free" nodes within the shape. Simply click the panel button and click the shape to "fill" it as a panel. There is a size limit to these as well, although it is fairly generous. Building large panels is generally ill-advised, for reasons I will explain further below. Below are a few examples of valid and invalid panels:



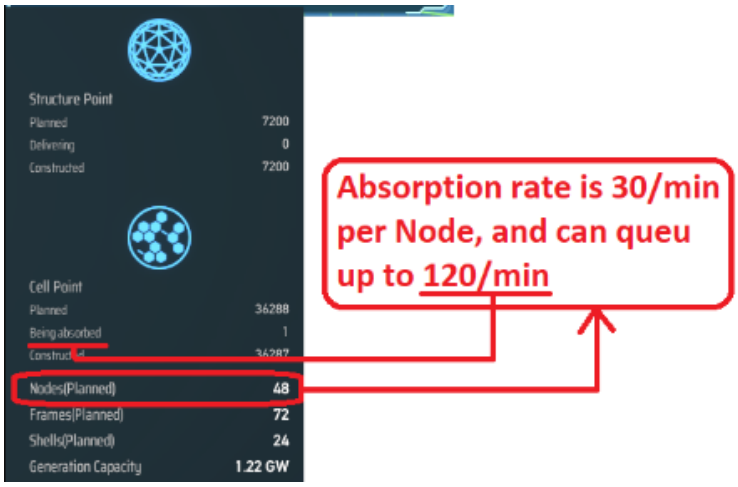
(credit to Mr-Vagabond for the image above)

It's somewhat hard to see due to the star being there, but the two top shapes are of an acceptable size and have no "free" nodes within, while the bottom shapes seem to be of an acceptable size, but there are "free" nodes within. To specify what I mean by "free", it means that the nodes inside the shape are not connected to the nodes that make up the outside of the shape. For instance, the middle invalid panel above can be made valid by connecting the center node to two nodes on the outside, which would create two valid panels out of the shape.

Now, unfortunately, there is **no way at this time to mirror, duplicate, or otherwise reduce clicking** when working in the Sphere design menu. What this means is that you will have to manually click and place *each individual node, frame, and panel* while designing. Creating a full sphere is an exercise in patience, and denser shells with more nodes and frames tend to get exponentially worse due to the amount of connections needed. No, I don't know why this is. No, I don't like it *at all.* No, there is nothing wrong with finding blueprints on here and saving yourself the hassle.

Once you have designed a shell you're happy with (or yoinked one from online) you can begin the process of building it. Before I get into that process, there's one final piece of advice: You are able edit a shell after starting (or finishing) construction on it. If there's any unused space in the design, you can make additions without losing anything; **however**, deleting any part of the shell will permanently destroy the structure points used to build that section! Cell points will revert to Solar Sails and have their lifespan resume, but all structure points are permanently lost. These aren't cheap, so keep it in mind!

The process of building a Dyson Sphere has two parts to it, dependent on Solar Sails and Small Carrier Rockets. As mentioned in the Basics above, Small Carrier Rockets, upon being launched, will create a single structure point on the shell, and Solar Sails can be absorbed into panels to create cell points, with one point per sail. Unlike rockets, which are simply launched automatically before they pick a node to fly to and start building, sails are launched into orbits, before nodes will then start to absorb them. Each node can absorb 30 sails per minute, and sails will *always* take four minutes to travel to a node, meaning there can be up to 120 sails being absorbed by a node at any given time.



(credit to Mr-Vagabond for the image above)

This is part of why it isn't advised to create overly large panels. Even a small panel around a small star can have thousands of cell points within it (the example above is a *very* small shell), with shells around larger stars being exponentially larger. B and O-type stars can have massive shells ranging from 50 to 74KM in diameter; shells like these can have tens of millions of cell points, and large panels can have hundreds of thousands of cell points within them. Blue Giants can have shells potentially over 200KM in diameter, with hundreds of millions of cell points! A single large panel in one of those would have several million cell points, and take *weeks* to fill.

Instead, it is much better to build "denser" shells, meaning there's more nodes and frames, with many smaller panels rather than large ones. While this does make the sphere more expensive (and require more clicking to design) it comes with two major benefits:

- Firstly, denser spheres take *less* time to build. Due to each node being limited to only creating 30 cell points per minute, it becomes far more effective to build spheres with many nodes and small frames, as cell points will always be the

longest part of any sphere construction. This also reduces potential waste for Solar Sails, as they can typically be launched far faster than they are absorbed.

- Secondly, denser spheres are *far* more effective at generating power. Not only do the added structure points (96kW) mean you get more energy, but through some sort of voodoo magic, making the frame denser somehow creates more cell points as well, meaning you can fit more pieces onto the same amount of space! A lower-density sphere is “cheaper”, sure, but it also gives far less power than one with more nodes and frames. And on the note of cost…
- Remember that cost really is a small concern when it comes to Dyson spheres. They are **permanent** structures once created, meaning that the longer one exists, the more “efficient” your investment becomes. Unless you’re designing a shell to look pretty, it really is just *better* to build it more densely. No matter what, it’s still going to take a lot of resources, so go big or go home!

General Tips & Tricks

WIP

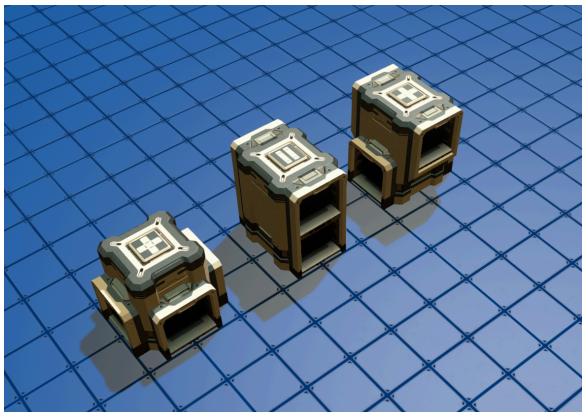
- **Proliferate EVERYTHING!!!** Except buildings. Don’t bother with those. Refer to the Proliferation section above for more specific details, but the juice is the most powerful tool in the game, bar none. It’s an essential item for any and all production lines, whether that be the basic iron and copper for blue cubes, or the hyper-complex graviton lenses and quantum chips needed in green cubes.
- A proliferator tip so important it gets its own bullet point: **Proliferate your Proliferator!** It is essentially free to do this; each unit of Mk3 gives 60 sprays, and can be proliferated to give 75 sprays. If you run proliferator through the bottom of the spray coater, then the top, before using it or distributing it, you’ll be creating free proliferator from nothing! Since each unit of proliferated proliferator can spray 75 times, it will give approximately 23.35% more proliferator in this way. Below is an image showing the beltwork needed:

- **Veins Utilization** (often abbreviated VU) is probably the **single** most important repeatable research in the game for a long-term save. It provides two bonuses: an exponentially scaling reduction to ore consumed per resource, and a linear scaling bonus to mining speed. With enough levels in this, ore veins and oil seeps become effectively infinite! All the math and more information can be seen here. Importantly, *all* extraction buildings benefit from this, meaning Water Pumps, Oil Extractors, and Orbital Collectors will also benefit from it.
- **Many important recipes** in the game have advanced variations that use rare minerals. Only one of these is possible in the home system (Fire Ice can spawn there) but once you have access to warp, the possibilities open up massively. The two biggest ones are using Opticals for Casimir Crystals, and mining Organic Crystals directly instead of needing to make them yourself. Sulfuric Acid can also be pumped from the oceans of one planet type, vastly reducing the oil dependency the player experiences after the early game.
- **Early on**, many matrices require similar items to be produced. A good example of this is with red and yellow science, which both require significant amounts of oil to be produced (before rare resources), or purple and green which both need large amounts of silicon. Make sure to properly expand your production of core resources like these accordingly.
- **Spiniform Stalagmite Crystals** are excellent for supplying nanotubes once the player has access to warp travel. However, shipping these is highly inefficient, as it takes 6 spini to create 2 nanotubes in a chemical plant. Instead of shipping the spini by itself, process it into nanotubes on the planet where you mine it! Doing this will reduce the burden on your logistics vessels by 66%, as well as reducing the space taken up on your factory planets by the bulky Chemical Plants.

- **Use your Logistics slots!** Starting at Inventory Capacity (3) they can hold more than a full stack of items per slot. This is excellent for holding items like belts, fuel rods, warpers, and other things.
- **Upgrade your buildings ASAP!** While it's true they need more power, and can be more expensive to create, they reduce the amount of machines needed for a production line considerably. In the endgame, game performance can start to struggle as the factory gets larger and larger, one of the best ways to combat this is by reducing the amount of machines needed for production. (Protip: Mk3 Assemblers have exactly double the production speed of Mk1s. Keep this in mind when you're making ratios)
- **Build a Mall!** Malls are absolute lifesavers at any point in the game. These are self-contained factories that only produce buildings. Trying to craft all your buildings in the replicator seems like a perfectly reasonable idea at first, but as the factory grows larger you'll see why it's not such a good idea. Malls don't need to be super large, either; outside of what is needed to create components like magnetic coils and processors, you generally don't need more than one assembler producing a building. I speak from experience here, having played a save for over 160 hours and more than 1TW of Dyson Sphere output before I built a proper mall: automate your building production, *please*! A good starting point is all the "basic" stuff: belts, assemblers, sorters, smelters, chemical plants, labs and power buildings. Later on, you'll want to add things like sailguns, ray receivers, refineries, logistics towers, drones and vessels,etc.
- **When placing** down buildings, pay close attention to the right edge of the screen. There's often hotkeys listed here that are very useful for building, such as their spacing, rotation, etc. This also applies to almost any action that is done in the build/delete screen.
- **Shift-clicking** a building will copy it, its recipe, and all attached sorters. Sorters will not be copied if there is not a belt for them to connect to. This is an excellent way to reduce the clicking needed while making production lines! If your sorter placement needs changed, then you can press Backspace to clear the sorters, but keep the recipe.
- **Even in the same tropic** area (equator zone, for instance), due to planets having a square grid imposed on a sphere, there is compression as one approaches the poles. While this is obvious when the grid changes when moving north or south, compression occurs even before then. This can interfere with pasting blueprints, so keep it in mind. Most notably, this often causes collision issues for spray coaters and chemical plants.
- **Make your own Blueprints!** While it might be tempting to go to a DSP blueprint website and borrow somebody else's production lines, it takes away a lot of the actual engagement in the game. If you aren't taking the time to create your own

factories, are you really enjoying the game to its fullest? Even if you make a BP once and copy it after the fact, it's still something that you personally put together and can be proud of!

- In the same vein, **Test your Blueprints!** Blueprinting is hard! Even with a calculator telling you the exact ratios needed, and building in sandbox mode so you aren't limited by your own inventory, it takes a *lot* of clicking to put BPs together. Inevitably, something is going to be broken or otherwise messed up; it's just the way it is. When I made a massive 14.6K facility BP producing rockets, I had to test and retest it for over *three hours* before I worked out all the kinks and mistakes I made.
- **Feed Graviton Lenses** to your Ray Receivers! This is the best way to get lots of power from your Dyson Sphere; a Mk3 proliferated lens will quadruple the energy draw and yield of the RR, as well as giving it a much better line of sight to the Sphere. Note that on a planet without atmosphere (0% wind power ratio) this will only boost the power draw/output, not the line of sight. Each lens lasts for ten minutes as well, so it really doesn't take much to feed them.
- **Splitters** have three different variants you can use: the regular 4-way splitter, a two-story splitter with all front/back entrances, and a two-story splitter with the top entrances facing outwards perpendicularly. They can also have storage boxes placed on top, and can either input or output items. For outputting items, it will do so at the top speed of the belt used.



(Credit to Mr-Vagabond for the image above)

FAQs

WIP

Q: "Can I die?"

A: Yes. Currently, the only way to die is to be killed by the Dark Fog, however this may change in the future.

Q: “How do I delete items?”
A: Hold the item in question on your cursor, and press Delete. This will drop the item on the ground, where you will then have a prompt above the toolbar to either delete or pick up “litter” on the ground. Yes, it is clunky, but I’d rather avoid accidentally deleting a stack of quantum chips, thanks.

Q: “What happens if I delete a building with items in it while my inventory is full?”
A: Any items that cannot fit into the inventory when a building is deleted will be dropped on the ground as “litter”. This can also include the buildings themselves; keep this in mind when deleting large sections of factory.

Q: “What is VU?”
A: Go back up to Tips & Tricks :azusastare:

Q: “I have too much Hydrogen/Refined Oil, what do I do?”
A: Balancing hydro and oil is a common problem for many first time players. If you have too much of one or the other on hand, *store it!* Whether it’s in storage tanks or in logistics towers, just make sure you keep it around. DO NOT burn it for power or trash it. Refined oil is critical to midgame production lines (Structure and Information matrices especially) when you don’t have access to warpers, and hydrogen is needed in huge quantities at the endgame, for deuterium and casimir crystals. Wasting excess in the mid game (think Yellow/Purple science) just makes things harder for you later on. If you’re already in the late/endgame and are making deuterium/casimirs, and still have too much hydrogen, the solution is to make more deuterium/casimirs. Generally, refined oil becomes less of a problem the further you move into the game.

Q: “How do Energy Exchangers work?”
A: For a brief explanation, they use Accumulators (the building) and can be set to either Charge or Discharge. Charge uses 45MW of power from a power grid to fill the Accumulator with energy, while Discharge takes the energy from the Accumulator to output to a power grid. This is most often used to transport energy between planets before late game options become viable. Note that a Discharging EE will **always** be considered the “primary” power source to a grid; this means that it will always output at the same rate, regardless of demand (unless the demand itself is less than 45MW). More information about these can be found here.

Q: “What is DSPOptimizations?”
A: DSPOpt is a performance mod for the game that can significantly boost performance in the late game. It primarily affects Dyson Shells and Swarms, but there is also a tweak

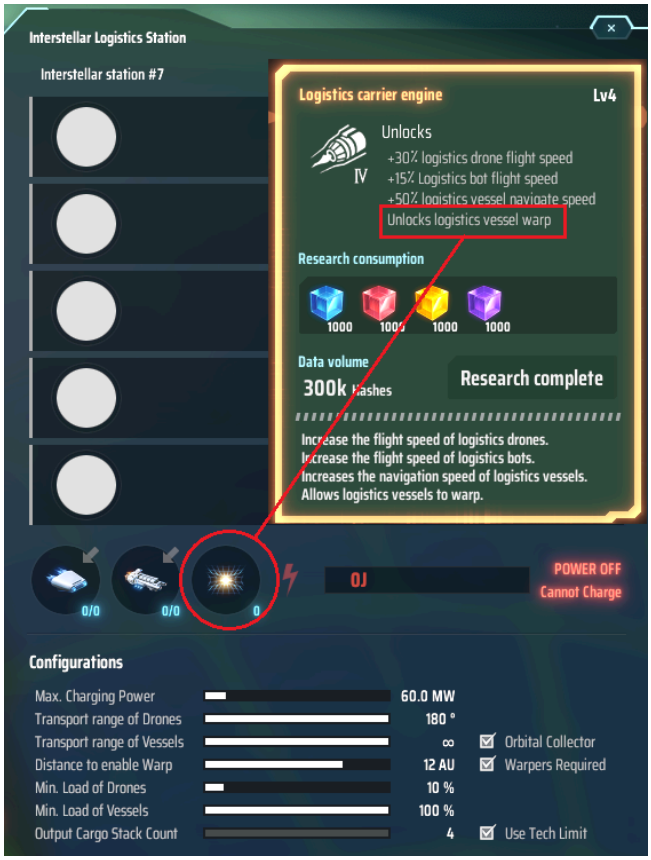
to Logistic Station belt logic to make them impact performance less. More info about the mod can be found here. A guide to installing mods can be found here.

Q: "Will using mods disable my achievements, or my Milky Way contribution?"
A: Well, yes, but also no. There is a way for the game to check for abnormalities not possible within the game mechanics, like with using a cheat mod or something that would affect item generation. If an abnormality is detected then the save game will be flagged, and achievements/Milky Way contribution will be locked. However, mods that do not cause abnormalities will not flag the save, and the player can still get achievements/Milky Way contribution like normal. An example of a "safe" mod is DSPOptimizations. An example of a "flagged" mod is PlanetMiner. Note that when I say a mod is "flagged" that does **NOT** necessarily mean it is illegal or otherwise dangerous! It only means that it will disable achievements and your contribution to the Milky Way.

Q: "Why can't I start planning to build a Dyson sphere? What is a 'Stress System Upgrade'?"
A: If you're asking this, you likely missed the research directly after Vertical Launching Silo. This research, Dyson Sphere Stress System, is a *requirement* in order to create more than a narrow band of structure nodes around the star's "equator". There are six levels of the technology, and each one unlocks 15° of build area on either side of the equator, until you can build a full sphere.

Q: "I've run out of X in my starting system, what do I do?"
A: Well, depending on where you are in the game, you have one or two options. If you have access to warpers (1 per Graviton Lens, or 8 per Gravity Matrix), or can do so with the remaining resources available to you, you can build a remote supply ILS in a neighboring system and start on interstellar shipping by getting resources from other planets. If you do *not* have the ability to access warpers, and the resource is something required to beat the game, unfortunately your only options are either to restart (either from an earlier save, or a new seed) or to fly out of the system slowly. 2 km/s is usually enough to reach the nearest star in an hour or less, and neighboring systems will usually have larger amounts of resources than the home star. If you have Universe Exploration 3, you also can see which system would be your best bet to start anew.

Q: "Why can't my logistics vessels warp to other systems?"
A: Typically, this is asked when the player in question has already unlocked warp and warpers. 99% of the time, they have not yet unlocked Logistics Engine 4. This is a *requirement* to get vessels to warp to other stars, even if there is otherwise no issue.



(Credit to Mr-Vagabond for the image above)

Q: “Why are my logistics stations filling up with drones from my inventory?”
A: You likely activated the automatic fill for the drone slot by accident. doesThere is an arrow on the upper right corner of the icon; it is greyed out by default. If it is turned on, the arrow will be white and the tower will automatically fill to its storage cap with drones; 50 for a PLS and 100 for an ILS. Click the arrow again to deactivate this.

Common Acronyms and Terms (seriously, wtf is a PLS?)

PLS: Planetary Logistics Station. These are logistics towers that allow you to move items from one side of a planet to another without needing belts. Extremely useful, logistics stations form the backbone of any advanced factory.

ILS: Interplanetary Logistics Station. The PLS’s big brother. Allows for interplanetary (and later, interstellar) travel. Alongside their smaller sibling, these are a necessity to expand past early Structure Matrix research.

RR: Ray Receiver. Large building used to gain power from Dyson Spheres/Swarms. Works on line-of-sight, and can later be fed Graviton Lenses to improve its LoS check to the top of a planet's atmosphere, giving it more uptime.
EE: Energy Exchanger. Uses Accumulators to move power around planets/stars. These are primarily only used to charge Accumulators to make Orbital Collectors, as fuel rods generally are much more effective to ship around than empty/full accumulators.
OC: Orbital Collector. These are essentially 1-way ILSes that are placed around the equator of a gas or ice giant. Up to 40 can be placed on a single giant, and they cannot hold Logistics Vessels or Drones.
BG: Blue Giant. The largest and brightest stars in DSP, for making the biggest Dyson Spheres.
PITS: Planet Inside The Sphere. Exactly what it sounds like, these planets are perfect for gathering huge amounts of photons in the endgame, due to having their entire surface area able to receive Dyson power at all times..
VU: Veins Utilization. Very important repeatable research, this is what allows (non-Infinite) endgame saves to truly exist. It increases both the mining speed of all extraction machines, *and* reduces the consumption rate for Miners and Oil Extractors. Without VU it would not be feasible to produce tens of millions of science and rockets on normal settings.
MPC/Collider: Miniature Particle Collider. Large building that's primarily used for a couple specific advanced recipes.
UPS: Updates Per Second. This is the tick speed, that being the speed at which the game runs. It runs at 60 UPS by default. It is a separate value from FPS, and can be seen at all times using Shift+F12. Unless specifically set otherwise by the player, UPS will *always* take priority over FPS, to lessen performance drops.
BP: Blueprint. Self explanatory. You copy a factory and paste it somewhere else.
Jello: Community name for the six science cubes.
AM Rod: Antimatter Fuel Rods. Previously the best power source in the game, it is now second place to its upgraded cousin.
DSPOpt: DSPOptimizations. Extremely useful performance mod, everyone uses it.

Mall: Community term across various factory sims to describe a factory that produces buildings. Extremely important for comfortable growth throughout the game.
Pizza: Endgame term for blueprints that divide a planet into “slices”, in order to be pasted multiple times and cover an entire planet in factories. Slices can typically range from as small as 1/40 of a hemisphere to as large as a quarter.
ILS Stacking: Logistics Station Integrated Logistics, an upgrade that allows PLS, ILS, and Mk2 Miners to output stacked items on a belt. Can be researched three times for 2, 3, and 4 high stacked outputs. Incredibly useful in endgame blueprints.
Suns: Artificial Star. Uses AM/Strange rods for fuel, and is the best power building in the game.
Juice/Spray: Proliferator. Absolutely, brokenly amazing part of the game. Use it and abuse it. Go to the Proliferation section for details.
Pink Cans: Community name for Particle Containers. Highly annoying to make, you need these for certain buildings as well as for Gravity Matrices.
Qchips: Shorthand for Quantum Chips. Needed for various endgame items, primarily Gravity Matrices.
Direct Insertion: Using a sorter to move an item from one building to another, without using belts. This saves space, but prevents you from using proliferation.
From Raw: A blueprint or production line designed to produce an item (typically a final product like Solar Sails or Rockets) entirely from raw materials, instead of importing components. Generally very reliable to use, so long as you have enough resource extraction and logistics.
Spini: Shorthand for Spiniform Stalagmite Crystal. Rare resource used to make Nanotubes in a single step. The recipe is a 3:1 input/output, so it is not good to ship these around the cluster.
Uni/UN: Unipolar Magnets. Extremely rare resource, only found on the neutron star and black hole of the seed. These are used to make plane smelters, as well as for the advanced recipe for Particle Containers. Use sparingly, until you’ve reached VU70 and beyond.

Opticals/OGC: Shorthand for Optical Grating Crystals. Rare resource that can be used to remove steps from the process to make Casimir Crystals (and by extension Quantum Chips) and Photon Combiners (and by extension, Solar Sails)
Fidget Spinners: Community name for Logistics Bots. The smaller cousin to Drones.
Sailgun: Community name for EM Rail Ejectors. These shoot the many, many solar sails you need for Dyson shells and/or swarms. They also cannot be placed too close to eachother or other tall structures.
VLS/Silo: Shorthand for Vertical Launch Silos, the huge buildings needed to launch rockets in order to construct a Dyson Sphere.
Spaghetti: Used to refer to a mess of belts, generally in a friendly manner. A well-organized factory with many belts is good spaghetti.
Sushi: Technique where multiple items are placed on one belt to reduce the total amount of belts and sorters needed for a recipe. Usually uses some form of self-regulation to prevent belts from clogging.

Endgame Advice

This section will be primarily focused on advice and tips for the post-game content of DSP, i.e. continuing the factory's growth after you finish "Mission Complete!". To compare to Factorio, it's like when you've launched the rocket and are now working to do even more production, launch more rockets, and so on. If you're in this section, I assume you have a good working knowledge of the game, and are now looking to further optimize your production and gameplay.

- I said it before in the Tips & Tricks section, but **UPGRADE YOUR MACHINES!** This is imperative for a good endgame experience! By this point your factory likely has tens or even hundreds of thousands of machines. Whether they be belts, sorters, assemblers, smelters, this all adds up to create a significant load on the CPU. This in turn begins to affect the UPS (Updates Per Second, the game's tick speed) which lags the game. Using less machines for the same amount of production, means you'll experience less lag.
- In the same vein as above, **USE PROLIFERATOR!** Proliferator is brokenly good, and combined with using all upgraded machines can reduce the amount needed for production down to a quarter of the unupgraded, unproliferated amount. While there are some specifics as to which items are better to use with Production

Speedup compared to Extra Products, it's a huge net gain either way. Use it, and abuse it!

- Start creating **"from raw"** blueprints for items like Solar Sails and the various science cubes. One of the best ways to avoid aches and pains while expanding is to have pastable blueprints to create these items using entirely raw inputs, making all the different components on-site, and exporting the finished product only. Making blueprints in this way means you won't have to worry about whether or not you produce enough components like Processors or Turbines, because all these factories ever need is the raw inputs for items.
- Use **Advanced Recipes/Veins** wherever you can. Not only do many of these reduce the demand for coal (diamonds, graphene, nanotubes) and oil (sulfuric acid, organic crystals), they also greatly reduce the amount of machines needed in the factory. In some cases, you're looking at reducing the amount of machines needed to produce an item like Structure Matrices by almost 64%!
- Avoid **Pilers** and **Splitters** as much as possible. These two buildings are poorly optimized compared to the rest of the game, and using them at scale can cause abnormal amounts of lag. Fortunately, both have serviceable alternatives. Pilers can be avoided by using more belts in a blueprint (verticality is very convenient for belts) and with the Integrated Logistics upgrade for PLS and ILS. The latter allows logistics towers to output stacked cargo, while the former takes a little more work, but will be a performance savings in the end. Splitters are easier to avoid as most things that would need one can either be done with a Sorter, or by extending the belt instead of splitting it. There aren't many occasions where splitting/branching a belt is necessary, so it's a good habit to avoid using splitters wherever possible.
- Push your VU levels **constantly**! Veins Utilization is a core repeatable research for the endgame, not only does it make your ore veins last longer, it also increases the mining speed by 10% per level. At VU70 (the recommended level for utilizing Unipolar Magnets for pink cans on a 1x resource save) this is 700% increase, or 8x the original mining speed. This effect applies before multipliers from an Advanced Miner, meaning a single one can easily reach 10k+ ore per minute at high VU levels. As endgame sphere construction can be extremely resource intensive, it is highly recommended to continue pushing VU well past level 100. To follow in the same vein…
- **DO NOT USE UNIPOLAR MAGNETS FOR PARTICLE CONTAINERS UNTIL YOU ARE AT OR ABOVE VU70!!** The unipolar/pink can recipe is one of the biggest space and UPS savers in the game, alongside pumping Sulfuric Acid from oceans, and using Optical Grating Crystals for Casimirs. However, unipolars are the rarest resource in the game, often having less than five million in a seed. To make matters worse, the recipe calls for *ten* unipolars for every pink can you

make, meaning you effectively have *ten times less* than what you actually see. VU70 and beyond is the rough point when you consume 1/10 of the ore that you actually mine, meaning your veins last 10x longer at full mining rate. Note that this does **not** mean you can just stop leveling VU and expect your unipolar deposits to last; they still deplete at a noticeable rate, but it is at this point where your science production can reasonably outpace the depletion, giving effectively infinite unipolars.

Tips for improving performance in the endgame:

1.) Don't use any splitters. Use inserters to split belts, and side-merging to join belts (the straight section of belt will have priority, and the perpendicular section on the side will wait until there are gaps in the straight belt)

2.) Don't use stackers. Upgrade ILS belt stack size tech instead. If you must stack the output belts from your production lines then consider using an existing ILS instead of adding stackers.

3.) Prefer satellite substations over lots of tesla towers. The game (stupidly) performs distance checks between power facilities during every update. Fewer power facilities will quadratically lower the UPS cost of these checks.

4.) Use mini-suns for power exclusively. They have the lowest UPS cost of any power-generating facilities (even factoring in UPS costs for fuel rod production). In particular: Avoid solar panels. You need a ton of them to provide meaningful power and they have an added cost of sun visibility checks during every update.

5.) Don't leave spheres unbuilt. Just having the planned layers sitting around eats into the UPS, even if you you've hidden rendering and haven't started building them yet.

6.) Don't use fractionators. Upgrade your VU and logistics vessel transport speed and get all of your deuterium from gas giants.

7.) Prefer "from-raw" builds to modular builds. This will reduce the number of logistics vessel trips required to produce products and raise UPS.

8.) Prefer Mk.II inserters to Mk.III inserters where possible. The stacking logic cost of the Mk.III inserters eats a bit more UPS. I don't personally follow this one, but others have reported ~2% performance improvements from this.

9.) Don't have idle machines (particularly inserters). Idle machines, counter-intuitively, consume more UPS than active ones, presumably because they're coded to poll for work instead of using a signal/subscriber system. This means you want to ratio your designs close to perfectly and don't build more than you plan to use.

10.) Prefer shorter belts. Use advanced belt techniques (diagonal belts, crossed belts, bent belts, half-height belts, tele-sorters, etc.) wherever possible.

All of the above performance tips are pulled directly from Aorus Corsair's messages on the topic from 2022. All of these tactics still apply and are essential to keeping lag down at endgame.