

## Concepts

### ship

A ship represents any artificial construction in space that the party has influence over. These can be transport ships, mining vessels, military ships or even space stations. Ships consist of a *ship class* that set the basic stats, like payload capacity and can be customized with *modules* to customize it for a certain role. In addition to their modules any ship can carry as much of any resource as the *transfer* allows.

### planet

A planet refers to any natural satellite at which ships can park. A planet may be a source of *resource* and can contain *resource* and *module*.

### ship\_class

A ship class determines the base *stat* for a ship as well as the maximum cargo capacity,  $\Delta v$  and *specific impulse*. Ship classes can be build in a *shipyard* if it is fitted appropriately\* (cf *shipyard*) and then fitted with modules afterwards.

### module

A ship module is an entity that can be fitted to a ship. To fit a module onto a ship is instant for the purpose of this simulation. The modules can be anything from production facilities to military equipment to *shipyard* parts. Some, like *heatshield* or *droptank water* provide a special benefit, while others provide an increase to certain stats. Most modules have a *weight* associated with them, so certain *transfer* are limited in the types of modules they can bring. Modules can be build in a *shipyard* if it is fitted appropriately\* (cf *shipyard*).

### stat

A stat (short for statistical measurement of ability) is a measure of capability of a *ship* to do a certain task. The stats modeled in this simulation are *health*, *attack* and *defense* for *ordnance kinetic* and *boarding* attacks, *initiative* and *power*

### $\Delta v$

A measure of capability of the ship to perform certain *transfer*. Decreases with increasing payload.

### specific\_impulse

A measure of engine efficiency. Determines how much  $\Delta v$  decreases with increasing payload.

### weight

The prime measurement of quantity of a *resource* or size of a *module*. Weight is measured in 'counts', where 1 count corresponds to roughly 10 metric tons. The count is often omitted in user interface. Physically knowledgeable readers should know that weight is simply used as an alias for mass in the cosmonautics jargon. A tradition that is carried over from shipping and aviation.

### ordnance

A type of attack that represents attacks by mostly missile/torpedos that deal damage by their carried ordnance. These can be chemical explosives or tactical nuclear weapons. Ordnance weapons tend to be slow-moving, but powerful. Ordnance defense can be provided by armor or point-defense systems.

## **kinetic**

A type of attack that represents attacks by hyper-velocity cannons, like rail- or coilguns. Kinetic weapons tend to provide quick, hard to avoid damage and get more powerful the higher the relative velocities of the ships. Kinetic defense can only be provided by special armor.

## **boarding**

TBD

## **health**

A family of *stat* measuring the ammount of damage that the ship can take. Split up by attack type.

## **attack**

A family of *stat* measuring the ammount of damage that the ship can deal. Split up by attack type.

## **defense**

A family of *stat* measuring the ammount of damage that the ship can negate. Split up by attack type.

## **initiative**

A *stat* measuring a combination of accuracy and evasiveness of a ship in combat. A ship with higher initiative gets to deal damage before a ship with low one. In the simulation, initiative directly relates to the number of attacks a ship can make before a ship with 0 initiative.

## **power**

A *stat* measuring the surplus power a reactor can provide. This mostly refers to the surge power that military ships can bring in combat to power modules like railguns, coilguns power-intensive ACS. Power can be increased with modules like *reactor*

## **resource**

A resource represents a certain collection of goods needed to build a modules of ship. Resources are stored and produced on a planet-by-planet level. Resources can be transported between planets by any *ship* in a *transfer*. A special resource is *water*, which is used as fuel every *transfer*

## **allegiance**

TBD

## **shipyard**

A shipyard is a collection of modules that can be used to build modules and ships. There are 4 shipyard modules: *manufacture offices*, *large storage*, *workshop*, *wetdock*. Each collection of *large storage* & *workshop* can build modules. Each collection of *workshop* & *wetdock* can repair ships. Each collection of all 4 can build ships.

## **transfer**

A transfer of a single *ship* between *planet*. A transfer is defined by the departure and arrival times. By default the times are set to give the transfer with the least  $\Delta v$ , thus able to carry the most payload. The arrival time can be rushed or the departure time delayed in cost for more  $\Delta v$ . Depending on how much  $\Delta v$  the transfer costs, how much *weight* the ship carries and if the engine is hydrogen consuming, the ship will use a certain ammount of *water* as fuel. More exotic *ship class* may use different materials a fuel. The fuel will be lost from the departing *planet*. If the planet cannot provide enough fuel, the trnsfer cannot take place.

## **independance**

'Independance' is a property of a *planet* that indicates its level of autonomy. If independance exceeds 100, you loose control over the place. The planet will gain autonomy and become either friendly or hostile depending on their *opinion*. Independance can be lowered by the placement military ships in orbit

## **opinion**

'Independance' is a property of a *planet* that indicates its relationship to the to the player. It can be raised by large stockpiles / industry on the planet and lowered by military presence and certain buildings

## Resources

**water**

Stay hydrated! :)

**food**

...

**steel**

...

**electronics**

...

**hydrogen**

...

**oxygen**

...

**co2**

...

**carbon**

...

**iron\_ore**

...

**aluminium\_ore**

It's called 'Bauxite' actually

**aluminium**

...

**rock**

...

**biomass**

...

**waste**

...

**polymers**

...

## Ship modules

### Heatshield

Allows more efficient maneuvers around Titan and low Saturn orbit

### Hydrogen Drop-tank

This expandable tank allows a ship to hold 10 extra counts of hydrogen. Ejected during flight

### Water extractor

Extracts water from icy moons

### Primitive rock extractor

This low-tech rock extractor has been designed specifically to bootstrap a metal industry on small rocky moons and asteroids. It requires no advanced components.

### Rock extractor

A more advanced, more efficient rock excavator, worthy of a self-sufficient industrial power

### Ore Extractor

Extracts aluminium and iron ore from rock. Fundamental part in metallurgy

### Carbon Filter

Extracts carbon from the atmosphere. Performs suboptimally outside of an atmosphere

### Electrolyser

Splits water into hydrogen and oxygen by applying a voltage.

### Fuel cell

Recombines hydrogen and oxygen into water. This reaction releases energy

### Steel Smelter

The steel smelting industry is vital for any major construction project.

### Aluminium Smelter

Aluminium alloys are indispensable for high-strength, low-weight products, like ships.

### Habitat

A collection of residential, commercial and service buildings that can accommodate around 1500 people in total.

### Carbon Splitter

Splits carbon dioxide into oxygen and carbon

### Waste Treatment

Part of the life support system, cleaning and repurposing water from habitats

### Farms

A combination of aquaponics and densely packed bean, fungus and fruit plantages.

### Polymers Factory

Polymers are one of the most versatile and useful materials in human history. They are required in lots of advanced products

### Semiconductor Laboratory

TBD (warrants a large description)

### Small shipyard offices

Administrative and design offices. Needed in order to build ships

### **Shipyards storage facility**

Warehouses for storing parts and material. Needed for larger, more complex production pipelines, like that of ships

### **Workshop**

Construction Workshops. Needed in order to build most ships and modules or repair ships

### **Wet Dock**

Dock, where ships can be build and repaired. 'Wet' docks keep ships exposed to the vacuum.

### **Dry Dock**

Dock, where ships can be build and repaired. 'Dry' docks pressurize the entire area around the ship. Construction in dry-docks is much more efficient, but the large volume of atmosphere leaks air at a significant rate.

### **Clean room**

Clean rooms are required to manufacture special high-tech components, like electronics, optics or medicine.

### **Railgun**

High-velocity kinetic weapon that needs extra energy to fire.

### **Missiles**

Tactical non-nuclear missiles. Basic ordnance used in combat

### **Light armor**

A lighter, thinner armor, granting basic protection to ships.

### **Armor**

A full suite of heavy armor for military ships

### **Point-defence cannons**

High-volume machine cannons provide a good defense against missiles, torpedoes and drones.

### **High-fi Attitude Control System**

A high-accuracy attitude control system ensuring precise targeting is crucial to strike before anybody else does.

### **Sailed Reactor**

While most ship classes have a power regeneration system that can support the most basic ship functions, some modules require a dedicated, 'sailed' reactor.

### **Geothermal power plant**

On tidally active worlds, it can be useful to harvest the power of tides directly

### **Invasion Equipment**

small arms, APCs, supplies, even tanks ... Everything to arm local forces with lethal equipment.

### **Aircraft**

Very effective fighting force uniquely suited for atmospheric planetary bodies (Titan)

### **Embassy**

TODO

### **Water Drop-tank**

This expandable tank allows a ship to hold 10 extra counts of water. Ejected during flight

**Tactical Sail**

TODO

**Ballistics lab**

TODO

**Ship Sail**

TODO

**Bio lab**

TODO

**Industrial Sail**

TODO

**Nuclear Enrichment Facility**

TODO

**Industrial Reactor**

TODO

**Precision Workshp**

TODO

**Heatpump**

TODO

**Industrial Heatpump**

TODO

**Small shuttles**

Small shuttles suited for establishing a ground connection with small, airless bodies

**Spaceplanes**

TODO

**Launch vehicles**

TODO

**Launch loop**

A large structure that exists seperatly to the station, connected to the ground

**Barracks**

TODO

**Windtunnel**

TODO

## Ship classes

### C1K-998++

A larger variant that carries tripple the fuel and triple the engines of a traditional C1K-998.

Capacity	$\Delta v$	$I_{sp}$
300	6	4.5

### C1K-998

Despite beeing nowadays classified as a light freightship, the C1K was the largest cargo ship at the time of its construction. With simple Hydrolox combustion engines, this design was ideal to haul large ammount of cargo with cislunar space. After loosing popularity around the 2060s, some modified version made it to the outer planets and found some popularity due to their large maintenance ecosystem and their independance of nuclear fuel.

Capacity	$\Delta v$	$I_{sp}$
100	6	4.5

### Station 10M

General Cosmonautics space station bus is a structural, thermal and power framework that can hold 10 metric kilotonns of cargo. It is often used for medium sized habitats, shipyards and logistics points. The station has just enough propulsion to maintain orbit and attitude and cannot be used to transport equipment between points

Capacity	$\Delta v$	$I_{sp}$
1000	0	1

### Express

TBD

Capacity	$\Delta v$	$I_{sp}$
100	12	10

### Cruiser

TBD

Capacity	$\Delta v$	$I_{sp}$
40	12	10