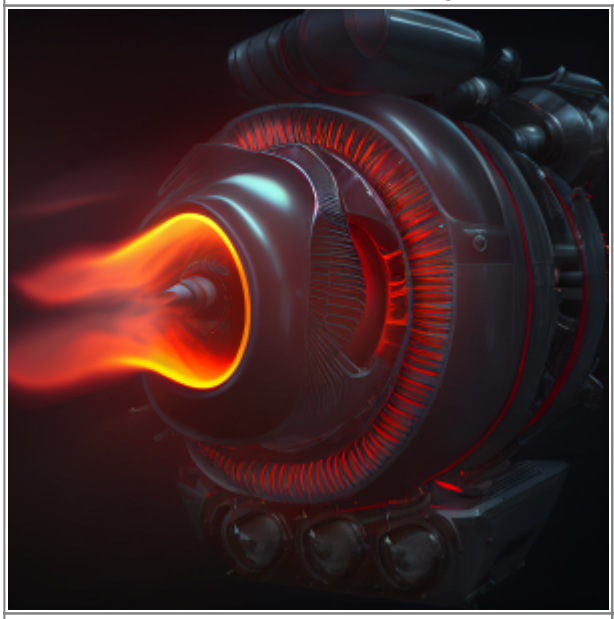
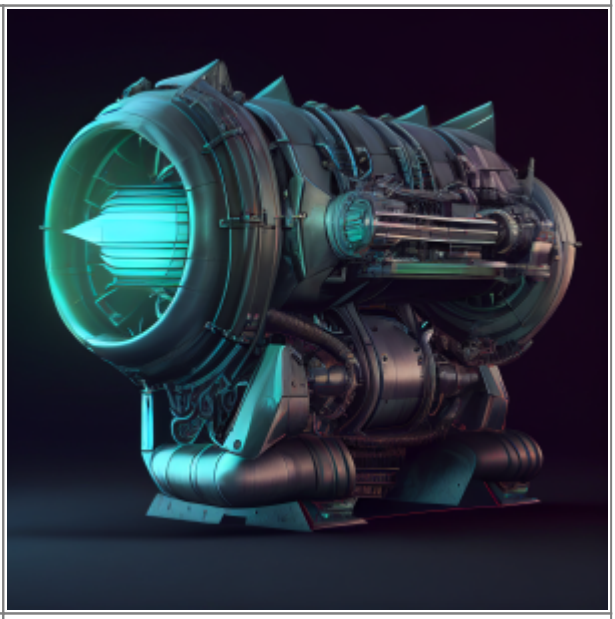
Hoshi III Series Multi-stage Turbo Plasma Drives

A Multi-Stage Turbo Plasma Drive System developed by the Yugumo Corporation in late YE 44 for limited release, and put into full production in YE 45.

Multi-Stage Turbo Plasma Drive Internals	
	
Turbo Plasma Operation	**Turbo Aether Plasma Operation**

The Hoshi III Series Multi-Stage Turbo Plasma Drive is the continuation of the Hoshi II Series Turbo Plasma Drives, with the upgraded modes of operation of the Multi-Stage Aether Drive. Its purpose is not only to diversify the modes of operation of earlier engine technology, but to allow it to support components commonly installed nearby. It also has applications in planetary and aquatic craft, due to its various modes of operation.

About The Hoshi III Series of Multi-Stage Turbo Plasma Drives

The previous Hoshi II Series Turbo Plasma Drives were based on the Geshrinari Modular Aether Plasma Drive as an improvement on the original in YE 42. In YE 44, Yugumo Fleetworks decided to include improvements from the Multi-Stage Aether Drive invented by Kage Yaichiro.

The Multi-Stage Turbo Plasma Drive is a streamlined unit that uses the plasma source of the engine to also function as a power, matter, and antimatter source on demand while also expanding the areas in which an equipped vessel can operate with assorted STL types. This unit can power the ship's Plasma Projection System, and can also convey plasma drawn from the source as well as mass from the intake of the engine to a fabrication chamber. Additionally, it provides diverse set of propulsion options for various mediums. For example, the Jet Mode allows for an option which is attractive to atmospheric fighters and

the Magnetic Drive is useful for aquatic craft or use in a non-combusting atmosphere.

Hoshi III Series Turbo Plasma Drive	
Designer	Yugumo Corporation, Kage Yaichiro
Nomenclature	See Nomenclature Catalog
Manufacturer	Yugumo Corporation
Fielded by	Yugumo Corporation
Production	Mass Production
Price	5000-7000 KS/Tier

Developed as an upgrade and expansion to the Hoshi II Series Turbo Plasma Drives by incorporating the featuers of the Multi-Stage Aether Drive, the Multi-Stage Turbo Plasma Drive was designed to be a versatile, thrust vectoring engine system suitable for high performance general purpose, exploration, and combat vessels.

The system allows a vessel to operate optimally in various environments, as well as to avoid sensor clutter in the move away from gravimetric and CFS-based slower-than-light travel. It is also possible to use the engine as a real-time source of positrons and antineutrons as well as plasma for the ship's weapons systems. This introduced the concept of having the engine act not just as an engine, but a supplemental positron-electron/antineutron-neutron/energy source for surrounding systems such as a Integrated CFS Array as well as a matter/plasma source for a Standard Star Army Fabrication Area or Universal Hemosynthetic Fabrication System Type 43.

Multi-Stage Turbo Aether Plasma Drives

The Yugumo Corporation produces a restricted version of the drive for ships they build for the Star Army of Yamatai only.

Hoshi III Series Multi-Stage Turbo Aether Plasma Drive	
Designer	Yugumo Corporation, Kage Yaichiro
Nomenclature	Yu-P4501
Manufacturer	Yugumo Corporation
Fielded by	Star Army of Yamatai Only
Production	Mass Production
Price	7000-9000 KS/Tier

Having the contract for the re-establishment of the First Expeditionary Fleet, and their cooperative agreement with Ketsurui Fleet Yards, the Yugumo Corporation also began to produce Multi-Stage Turbo Aether Plasma Drive for the vessels they produce for the Star Army of Yamatai only. This allows the Turbo Plasma modes to operate as a Turbo Aether Plasma Drive.

Modes, Practices, and Ranges of Engine Operation

Like its predecessor the Multi-Stage Aether Drive, the Multi-Stage Turbo Plasma Drive transtions into different modes of operation to better suit the environment in which it is used. Propeller and Jet are for use in atmosphere, Magnetic is for use in water or non-combustible atmosphere, and Turbo Plasma is used for space.

Mode of Propulsion	Standard Altitude Range[1)]	Functional Altitude Range	Operational Speed Range	Special Details
Propeller	0 ~ 12.5 km	0 ~ 24 km	Mach 0.7	Used in subsonic flight or non-magnetic liquid, useful in volatile or noncombustible atmospheres
Jet	0 ~ 33 km	0 ~ 40 km[2)]	Mach 5+[3)]	Primary method of lower atmospheric propulsion
Magnetic	N/A	N/A	Variable by pressure	Used for underwater propulsion or in thick, magnetic alien atmospheres
Low Turbo Plasma	33 ~ 100,000 km	10 ~ 65,000 km	0 ~ 14,990 kms / 0.05c	Low thrust mode with diffuse exhaust within atmosphere/magnetosphere
Turbo Plasma	100,000 km onward	65,000 km onward	Vessel's full STL Range[4)]	Standard Operation

It is standard practice above a Yamatai or Nepleslia-like planet to transition between Jet and Turbo Plasma Modes, the two modes most often employed, at roughly 33 kilometers of altitude for this purpose. Turbo Plasma Mode is used at a reduced capacity below 0.05c (just under 14,990 kilometers per second), with its thrust vectoring systems diffusing the exhaust into a cloud rather than a cohesive beam, until reaching a distance of 100,000 kilometers. The computer is capable of managing the entire process from liftoff to space and from space to landing in under a minute, simplifying the procedure for crew.

Thrust Vectoring

All modes of operation can take advantage of force field and magnetic thrust vectoring at the exhaust for improved pitch, yaw, and roll. It is also possible in some variants to reverse the intake and exhaust for the ability to reverse or brake the vessel. For VTOL capability, both ends of the engine are switched to exhaust and a sub-intake is opened in the middle of the engine for more balanced control of the vessel on take off. It should be noted that this mode of operation is notably inferior to the Integrated CFS Array's emergency thrust vectoring capability through its Discharge Redirection function, but does not cost barrier strength to employ. The two are also not mutually exclusive.

Propeller Mode

Perhaps the most simplistic mode of operation, Propeller Mode is the ability of the intake of the engine to use forcefields to direct air through the engine for thrust. While less efficient than the Jet Mode and having a sub-sonic top speed, it is capable of moving through gas or liquid without heating the medium

and uses reduced power. In some volatile atmospheres or non-combustible ones, this is a suitable mode to fall back on. It is not intended for combat operations.

Jet Mode

When in Jet Mode, the plasma system's ability to generate heat and microwaves is used to heat the medium being traveled through and make it expand without the need for fuel. Rather than using a conventional intake fan and exhaust, rotating and specially shaped forcefields near the intake of the engine are utilized. This not only allows the intake to be micromanaged by the computer for optimum efficiency and acceleration; but also allows the engine to operate as various types of jet geometries and gradually transition from turbofan, through ramjet, and on to scramjet if needed in a specific application.

It should be noted that the structural integrity of the vessel the engine is installed in, the materials used for ship construction, and heat tolerances must all be taken into consideration when rating top speed. Because of this, vessel speed specifications will vary. Almost none can achieve the theoretical limit of Mach 15 for this system without being specially designed for this speed and lacking maneuverability. Most craft that are not as aerodynamic are limited to Mach 1.7, while more aerodynamic vessels can achieve approximately Mach 5. The CFS' barrier capability can help mitigate structural concerns and achieve high speeds, however, especially if a Sorakagami AeSOP, Umikagami SSSS, or Integrated CFS Array's Streamlined Mode is being employed to minimize drag. As such, units that have this capability may have both of these different top speeds in Jet Mode; with and without the CFS' support. If the CFS collapses at these speeds, however, it could be problematic for the vessel at best. Extreme high speed should only be used if the CFS' strength is strong, and exceeding Mach 5 is possible but carries risks.

Magnetic Mode

The Magnetic Mode operates on the practice of using magnetic force to draw matter into the intakes of the engine and accelerate it out the rear. It can be used as a traditional Magnetohydrodynamic Drive, but it is also capable of being used in other mediums such as atmospheres which are non-combustible and have some magnetic properties. As such, it replaces the Jet Mode in such scenarios.

It also has the benefit of not generating large amounts of heat and running off of a ship's fusion reactors if necessary, making a ship which uses this mode better able to conceal itself in the oceans of a planet if its CFS stealth is unavailable or impractical. It can even allow a ship to be explicitly designed for ocean operation. It should be noted that it is possible to shunt water to other parts of the vessel from the engines in this mode; be it for cooling or for electrolysis to obtain oxygen(for breathing) and hydrogen(for nuclear fuel).

As with use in Jet Mode, structural considerations should be employed with determining top speed, especially in regards to intended depth and pressure. The CFS can again assist with such matters, with the same considerations as in Jet Mode.

Turbo Plasma Mode

Turbo Plasma Mode is where the Hoshi III operates as a Turbo Plasma Drive. It boasts the same performance and capabilities, making it a plausible option for high performance craft. This is typically a fast engine, but the speed varies based on the specific model.

Components

Rather than being a conventional engine, the design has multiple systems that work together to make the unit capable of performing various functions. They are geared to interact with other systems, and several parts have more than one purpose.

Intake/Exhaust

The intake and exhaust on either end of the Multi-Stage Turbo Plasma Drive are largely the same in function and can switch roles as needed for reversing the vessel, slowing or braking the vessel, or rotating the vessel in place even without the use of supplemental thrusters. The appearance of the components more often used as intakes can very widely, however, as they are not expected to produce the same amount of sustained thrust. Some are even armored with shutters when not in use or have a high variance in geometry depending on application. They are used normally to draw in matter when used as an intake, and can use forcefields and magnetic fields to shape and direct the intake. This can actively suck in matter both for actual engine use as well as for matter collection for other systems.

As an exhaust, the same forcefields and magnetic fields are used to thrust vector the output of the engine to adjust the orientation of the vessel more freely than previous offerings. Electrons can also be drawn from the plasma exhaust for extra power without compromising speed if desired.

Sub Intake

The sub-intake is simply an intake which is used to inject matter into the Engine for use exclusively for its VTOL capability. It allows all Intake/Exhaust to go into Exhaust mode, meaning that most vessels will have four vents from two engines for attitude and stability control. It is also not as elaborate nor as large as the normal Intake/Exhaust, as it is not expected to provide the same amount of thrust for acceleration. This intake is small, normally sealed, and covered in armor.

Engine/Generator

The actual engine has a number of propulsion modes: it has the ability to heat a gas or liquid medium like an actual jet, it can move through water or other such materials with magnetic fields, and it can also act as a normal Turbo Plasma Drive. The Generator is actually a separate component that feeds into the Engine tube directly for Turbo Plasma Mode, but provides electrical power in all four modes of operation

and supplemental heat and microwaves in Jet mode. The actual electron output of the generator exceeds the needs of the engine in all modes of operation, allowing the vessel to power adjacent equipment and assist in powering nearby equipment like a CFS or Integrated CFS.

Electrons for power aren't the only supplemental component drawn from these engines though. As it is capable of producing both of plasma and anti-plasma, it can thus just as easily draw positrons and antineutrons from the stream and readily use them as needed for positron or antineutron weaponry. This allows the equipped vessel to bypass the dangerous need to store antimatter on board. Matter can also be collected both from the intake and from plasma for other systems.

Nomenclature Catalog

Catalog of Standard Product Nomenclature System.

Starchaser III-Class Ferry	Yu-Y2-P4501
Misha-Class Explorer	Yu-Y1-P4501
Seiza-Class Cargo Hauler (1B)	Yu-L3-P4501
Asuga-Class Tug	Yu-L1-P4501
Shuryoku-Class Super Freighter	Yu-L2-P4501
Yūgure-class Merchant Destroyer	Yu-D1-P4501
Tanya-Class Expeditionary Heavy Cruiser	Yu-C1-P4501
Yoru no Tenshi 'Tenshi II' Light Mechanized Power Armor	Yu-M1-P4501
Taka-Class Shuttle	Yu-T1-P4501
Mōkin-Class Patrol Craft	Yu-V1-P4501
Amatsubame-Class Runabout	Yu-T2-P4501
Mozu-Class Starfighter	Yu-V2-P4501

OOC Notes

Yuuki created this article on 2022/11/13 18:10.

- Art generated using Midjourney by Andrew
- Existing Technology see Multi-Stage Aether Drive by Toshiro, Hoshi II Series Turbo Plasma Drives by Andrew, Geshrinari Turbo Plasma Drive by Nashoba. and Turbo Aether Plasma Drive by Wes.
- This was approved by Wes on 2022/11/18.[5)]

Products & Items Database	
Product Categories	subsystems
Product Name	Hoshi III Series Multi-stage Turbo Plasma Drives
Nomenclature	Type 45
Manufacturer	Yugumo Corporation
Year Released	YE 45

Products & Items Database	
Price (KS)	7 ,000.00 KS

1)

This presumes a Yamatai or Nepleslia-like planet

2)

Upper limit in practical use on vessels, 75 km is theoretical top altitude for specialized systems

3)

Upper limit on most aerodynamic craft or vessels using the Sorakagami's AeSOP or Integrated CFS Array's Streamlined Mode, Mach 15 is limit for specialized craft

4)

Dependent on specific vessel's standard top speed

5)

https://stararmy.com/roleplay-forum/threads/hoshi-iii-turbo-plasma-drives.69594/#post-431569