SPACE STATION THUNDERCHILD
#SS-04202019
MILDA REGION, ALTITUDE 3,900 METERS
&
SPACE STATION FIGHTING KOCK
#SS-12242021
TRIASM REGION, 3,900 METERS
Rev. 02/14/22

POWER SYSTEMS

AJ & 1 Horse Power = 33,000 foot-pounds of work per minute.
Electrical Equivalent 746 SI or 22,545 BTU of heat.

QUICK INFORMATION

Primary Power Harvesting

Station AI & Management Systems: IBM Dual Mirrored Watson 2112

Solar Array, MFJ Redwire, Model: THX1138, 256MW Peak DC, conversion 6.73% loss. Peak AC 238.7712 MW.

Photovoltaic painted surfaces: MFJ: DuPont, Armstrong Photovoltaic Orbital Paint. 134 KW DC Accumulative
Top coat: Bearpaw, Neverwet Orbital, Superhydrophobic coating

Piezoelectric Flooring, MFJ: TRS Technologies - Piezoelectric flooring. Varies with traffic, Dense traffic RMS accumulative DC 850 KW.
Diversified Battery Packs, Installer: All Over Power Inc. Systems integrator of AI managed diversified battery systems and on-demand power storage.
Total accumulative capacitance: 1.372 TF
Total accumulative battery power: 650 MAh

Primary Power Production

BHPP (Black Hole Power Plant),
MFJ Tesla, model Year: 2057,
Line: Core 6.5v72 (TC65).
Internal AI: Asimo-T1K AI system
BH class: Subatomic Black Hole (SBH), Variable Goldilocks zone, Self-evaporating fail-safe
Feeders, Single elements: H, He, N, O, Ne, Ar, Kr
Feeders, Mixed elements: see Operations Manual
Available Power Conversions

- Radiation from accretion of material into current
- Hawking radiation conversion into current
- Magnetic conversion of Ergosphere rotational energy for mechanical power
- Magnetic conversion of magnetosphere into current flow

See Operations Manual for chars of Available Powers for SBH and Feeders
Maximum gross power: 7.575 TW
Sustained internal loads: 1.5 TW continuous +/- 0.065 TW
Net Power: 6.5 TW
Steady performance range 45% to 70.7% max output.
See Owner's manual for charts of power levels to performance and efficiency ratings.

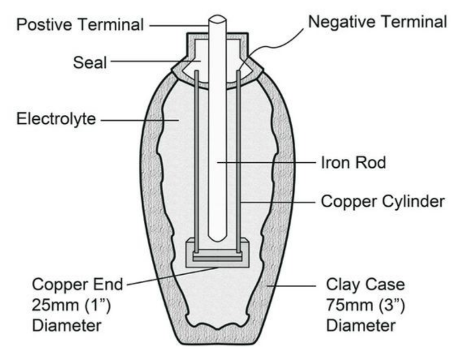
Added Features
Blaupunkt, Industrial Power Division: BP-RC Super Kicker Xr420
Resonance chamber Super Kicker, Max Peak 15 TW sustained 350ns to 850ns, Charge time 650ns, discharge range ELI mode 500fs to 1ps, ICE mode 50ps to 250ns.

Attached one to Front end ignition circuit
Attached one to Docked Ship Service Bus
Attached one to Auxiliary Shield Output

External Dummy Load Space Heater.

A Little Battery History

The Baghdad Battery is one of the oldest examples of a battery. The ancient Egyptians probably used these for early lighting or electroplating. In later history, the wet cell was the earliest commercial battery and used in may telegraph offices of the 19th & 20th century. They could not be recharged when the cell was used up. It required a new electrodes and electrolyte. Early vehicles used semi-sealed wet cells. The lead-acid batter was the first to allow recharging of the cell. Nickel and lithium batteries made smaller batteries for portable devices of the late 20th century. However, these batteries can be dangerous if punctured. The violent reaction to oxygen will cause the battery to catch fire and possibly explode.



Baghdad Battery

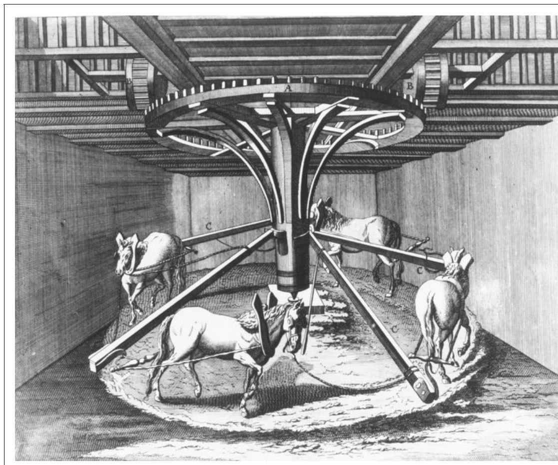
Battery advances in the 20th and 21st centuries included new designs in growing batteries, sodium-sulfur batteries, Solid-state batteries, nickel, manganese and cobalt batteries that can be fully recycled. Nanopower batteries for vehicles allowed a full charge in just 8 minutes and a driving range of 9,200 Miles per charge. Ultra Fast Carbon Batteries made their appearance in the EU on electric motorbikes giving them a range of 300 KM. Graphene-based ultracapacitors alos became prevalent for energy storage in the automotive systems.

By the beginning of the 21st century, many consumer products had batteries that never needed replacing, at least for the life of the product. By the end of the century, many of those devices charged themselves from the ambient electromagnetic pollution (EMP) caused by other devices. The massive amount of electronic technology in use made a vast volume of EMP in the populated areas where it was used. Some people proved sensitive to such noise and communities formed near zones of EM Free areas. Generally around large radio telescopes and deep space listening stations. EM Harvesting devices made use of the EMP and maintained a charge while in such areas. Outside the pollution of the cities and megalopolises, you still had to lay your handie on a charge surface or "plug it in."

The 21th century saw a lot of development in nano and quantum technologies. Superhydrophobic coatings protected any surface from stains, paint , but and just about everything. Nanotube technologies improved medical procedures, made super strong cables for for the space elevator, gave use flexible and wearable computers and devices. Nanotube and 3D printing created a whole new set of electronics for industries which lead to a better integration of the quantum processor. Nanotubes anodes made tradition batters more functional internally which gave you better power and efficiency. Bio-organic and quantum dot batteries began to appear on the market and their development over the decades made them an alternative to chemical based batters.

A Little Power Plant History

A large central power plant is pretty much the staple for power production from the 19th century through the 21st century. Early pants produced DC current. However, DC current has a distance limitation due to the resistance of the wire cable. Power produced could only be used in the very local area. The war of the Currents between Edison and Tesla started the change to AC transmission systems.


Horse Powered Mill

The first commercial-scale generator was created in Belgian in 1871 by Zenobe Gramme. Seven years later in Cragside, England, William, Lord Armstrong build the first hydroelectric power station. mainly for his property. In January of 1882 in London, England, Edison build the Edison Electric Light Station. A 125 Horsepower steam engine drove a DC generator producing 93KW. In September that same year, the Pearl Street Station was completed in New York, U.S.A..

The 1893 Worlds Fair in Chicago was the site of the first AC generator and light system installed by Westinghouse Electric & Manufacturing. That pretty much solidified AC power as the mode of electrical transmission. The next advances were in transformers and power cycles. Early factories used various motors for equipment and there was a wide variety of power needs. The industry established standards for the number pf phases on the transmission lines as well as transformers to step up voltage for long-haul circuits and voltage drops to customers.

In 1906, the invention of the steam turbine allowed great expansion for power generating capacity. Power plants replaced cables, gears and pulley systems with direct connected turbines to the generator. The main producer of commercial electricity comes from the spinning of a coil winding (dynamo) in a magnetic field. A variety of methods are used in the 20th and 21st century to power the generator. These include Steam Turbines, Gas Turbine, Combined cycles plants, reciprocating engines, micro-turbines.


Horse in Gerbil Wheel Generator.

Power plants organized by duty or load are Base load power plants, Peaking power plants and Load following power plants. Base load provide power for predictable demands over time. A steady load. Some Base Loads may run at full capacity to do this and other may run at a economical percentage. Peaking Power provide power for demands at peak times. Generally predictable and for one or a few hours as needed. Morning wake up time when the day starts, peak loads at lunch time, AC load demand at the end of the work day and you get home. Load Following operate on the same load demands as Peaking Power, but can better follow the variations in daily and weekly loads more economically.

Power plants up to the end of the 21st century, had a multi-stage conversion process to actually get elections on the cable. Traditionally, you had a large superstructure that used fire to convert water into steam, generally steam is recycled in three times between the boiler and turbine, each being a different temperature of steam driving a specific set of blades in the turbine. Maximum use of the steam before the cooling towers or lake. We can drop a lot of this and just go to a gas turbine connected to the generator. The generator puts out a large voltage (15,000 V) and in multiple phases. The voltage is stepped up at the local substation for transmission on high power lines.

Even the fusion reactors produced heat that's used to drive a fluid. The next generation of power plants were more like batteries, but the Everlasting Gobstopper type. Direct power generators include the quantum reactors known as black hole power plant (BHPP). BHPP do not require anti-mater in containment fields, which might collapse and take out the station and a good part of the local cosmic neighborhood (Klingon moon Praxis). Anti-mater Power Plants (AMPP) and BBHP both have a mass-to-energy conversion efficiency close to 1. However, the energy-to-energy efficiency of an AMPP is 10^{-4} and a BHPP is greater than 1.

Amount of power

The coulomb (C) is a unit of electric charge. defined as the quantity of electricity transported in one second by a current of one ampere and is approximately equivalent to 6.24×10^{18} electrons. That's 6.25 billion billion electrons. The elementary charge of one electron is $1.602176634 \times 10^{-19}$ C. One Volt over a one ohm resistance will push one ampere and product one watt of hear. One Watt is equivalent to 3.41 BTUs. A one farad capacitor will store one coulomb of electrons with a charge of one volt.

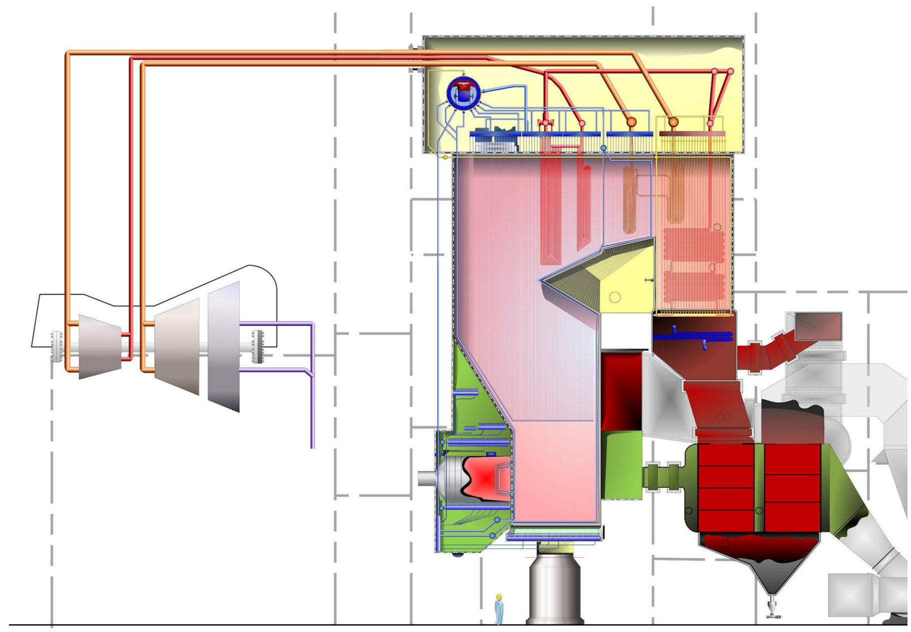
The U.S. Navy's Gerald R. Ford Class Ships are aircraft carriers with crews of nearly 5,000 people. These ships have two A1B reactor plants. It is estimated that the total thermal power output of the A1B will be around 700 MW and provides output to both propulsion and electrical systems. This generate 125 megawatts (168,000 hp) of electricity, plus 350,000 shaft horsepower (260 MW).

Power stations are measured in multiples of watts, megawatts, gigawatts and terawatts. Gas turbine plants generate up to 140 megawatts. Combined-cycle gas turbine plants can reach 700 megawatts. Large wind farms can produce up to 781.5 MW, like the Roscoe Wind Farm. Large photovoltaic plants can produce 850 megawatts. Solar thermal power stations can reach 485 MW. Large coal-fired, nuclear and hydroelectric station can hit gigawatts. Koeberg Nuclear at 1.86 gigawatts, Ratcliffe-on -Soar at 2 gigawatts, Aswan Dam at 2.1 gigawatt and the Three Gorges Dam at 22.5 gigawatts.

The Base Load Power consumption for the normal operations of a small space station can be in the gigawatts and larger ones can go into the petawatts. That's normal operations for life support, gravity plates, hanger and portal shields, radiation shields for windows (lots of windows) shields for normal ambient radiation and the projectile deflection shields for the spherical station footprint. Equipment loads include all the ships computers, processors, sensors and any research gear the station is designed to have.

Power Sources

Everything needs power and most of it is electrical. Horsepower has been a gauge for the amount of power for some time. The power sources that provide our energy comes from a variety of sources. The modern power grid receives electrical energy from diverse sources. Power is bought and sold as a commodity between different power providers and consumers.


Cyclone Boiler, Mixed Coal-Fired, Steam Turbine, Power Plant.

Energy harvesting is the process of collecting energy from the environment Energies include wind, thermal and solar. Energy can be harvested from water waves, geothermal and hydro-power. Generated energy can come from large Fossil fuel power plants and nuclear power plants. Energy can also come from local generator stations, chemical batteries, capacitors and super capacitors.

Vehicles keep stored energy in one or more batteries for starting power. Some may run only on battery power or a combination of gas and batteries. Large generating stations start the fire with a smaller gas ignition about the size of a semi truck and trailer or larger. That in turn ignites the large fire chamber for converting water into steam to drive the turbines that turn the generators.

Satellites and space station rely on solar cells, batteries and various nuclear systems. Larger space fairing ships may have various power generators and capturing systems.

New technology advances in solar energy pushes solar cell efficiency from 15% towards 80% or more. Solar paint can turn the entire surface of the painted area into a massive solar cell. Three paint systems are Solar paint Hydrogen, Quantum dot solar cells, aka photovoltaic paint and Perovskite solar paint. Solar paint in 2022 was around 8% to 10% efficiency. However, when you consider that the entire surface of a building or ship can be made into a massive solar cell, 10% of the overall surface area can net you a lot of KW.

Piezoelectric tiles convert foot steps into electricity. This technology is so efficient that it is the sole power source for some of Japan's subway terminals. Tiles that produce 25W per square foot per hour for 10-hours of traffic use at 70% would produce 1,500 KWs. In additional, the output from these tiles can be used to measure traffic flow and density. Bionic Tiles are a ceramic product capable of cleaning the air by breaking down harmful pollutants. It's biomimetic structure is modeled after the leaves of trees. Ecom4 tiles store hear when local temperature are above 22 degree Celsius and release the hear when temperatures fall below that.

Primary Harvesting

The station uses high efficiency solar collectors and solar paints for the Primary Harvesting devices. Our panels are a Redwire THX1138 product. Redwire has been partnered with NASA for decades and the SS1138 model established it's reputation as prime mission critical equipment in the 2029. The outer light facing of the collectors have adjustable holographic wide spectrum focusing lenses. Holographic lenses on solar cells first took place in the 20th century. A thin film with holograms were used to focus the most light into the cell from many angles. The cells use nano- photovoltaic technology to get the highest use of the photons it receives.

The Solar Pod has two double winged solar panels, one on top and one below.

A majority of the external paint job with all the colors are also active solar power systems. The areas are broken up for better management and use of the surface skin areas. There's a lot of the internal paint and non-paint surfaces that harvest solar or other ambient energies. On it's skin, the station is really a big energy sponge for a wide variety of RF.

In addition to the solar harvesting, we collect kinetic and mechanical to electrical energies. The floor tiles throughout the station are piezoelectric tiles with built in energy storage and management. The tiles collect energy from pedestrian and object traffic, store it locally until storage is full, then it transfers it to the next level of power collection and management.

All power harvesting energies are maintained locally and transferred to the next level when storage capacity is reached or a need is requested from the stations systems. When you lay your communications tablet or handie down on a charging surface, it receives power from the closest stored source.

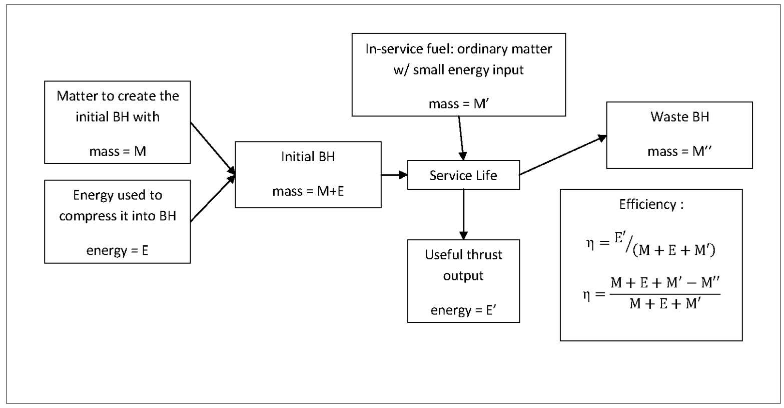
At times, the deflector shields will need extra power for the odd large debris that we encounter. Much like the capacitors in an automotive stereo system are there to supply extra power for sub-woofer, the station has tons of capacitors and super-capacitors throughout the station storing charges for any situation. Anything outside the total available stored energies gets handled by the Black Hold Power Plant.

The storage level above capacitors are the local and station battery packs. Not wanting to risk fire, explosion or dangerous chemicals or metals, our battery system is composed of a mix of sodium batteries, ultra fast carbon batteries, bio-organic batteries, and quantum dot batteries. This provides battery diversity and a more overall stability of the battery system.

Active Power Production

The level above battery packs contains the active power production. Older space stations have power production similar to a 21st century large aircraft carrier. This includes multiple nuclear reactors with an enclosed water/steam system and external cooling vents mounted on the shaded side of the station. The steam driven turbines connect to generators that provide the base load power. These systems generally ran at 50% to 70% of their total output. This allowed headroom for additional gear and research equipment. The next step up replaces the nuclear reactor with a Fusion Reactor. Most station just contained to add more nuclear or fusion reactors to the station as needs grew.

Modern stations use either a Mater-Anti-Matter Mixer (MAMM) or a Black Hole Power Plant. Anti-matter requires multiple redundant power and backups for containment. This requires lots of batteries for reliable power and/or a set of older proven tech to maintain containment. Failure is not an option, unless you're several hundred AUs away. Starting the main MAMM is instantaneous. Once the starter reactor has the system ready to inject, the matter and anti-matter streams start and off it goes.

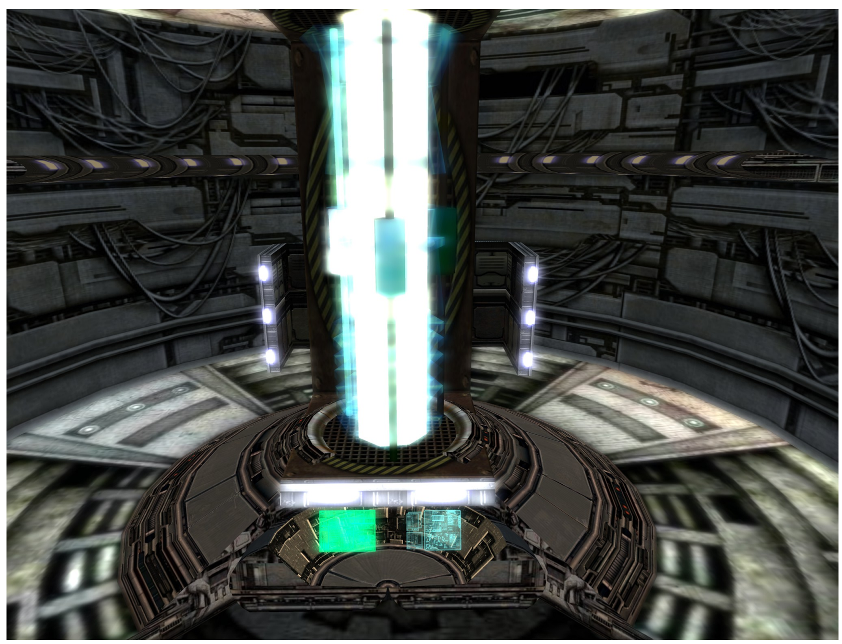


A BHPP also requires a kick start from a starter system or a Reliable Reactor. This is generally a set of batteries and super capacitors that provide the compression wave for the Black Hold Target Matter. The development of Element Frequency Targeting, the amount of power to compress the Initial Black Hold Matter was greatly reduced and made BHPP a more appealing option.

Once the BHPP is running with it's Subatomic Black Hole (SBH) in it's prescribed Goldilocks zone, a steady element stream maintained at precise intervals. Energies received from the BHPP include the following.

- Radiation from accretion of material into current
- Hawking radiation conversion into current
- Magnetic conversion of Ergosphere rotational energy for mechanical power
- Magnetic conversion of magnetosphere into current flow

Our BHPP is a 2057 Tesla Core 6.5v72 (TC65) with added features. Our TC65 can run a single element BH or a multi-element BH. It has double dual redundancy for all systems and the Asimo-T1K AI system. One of the features is the system to station interface. It allows the station's AI and all the AI's it manages to directly communicate with the BHPP's AI. Since the AI can push it's own buttons, we didn't get the external droid.


The main reactor in SSTC.

The TC65's are considered the "Westinghouse" of BHPPs. They are eloquently simple in design and rugged. You can find the original ones still running after decades of use, much like great-great-great-grandma's old Westinghouse refrigerator we have keeping the moonshine cold. They have great resale value.

Most BHPP run well below 100% efficiency. To meet the stations Base Load, our BHPP runs at 47.5% efficiency. The extra head room provides for lots of ships on recharge, maximum shielding, all the coffee makers going and more. The BHPP is rated at 6.5 Tera-Watts sustained. An ultra-high burst capacitor know as a Kicking Resonance Chamber is attached to the front feeder to give it a 2X kick for 500 nsec every 1 .msec.

For your FYI, 6.5 Tera-Watts is equal to 87,166,435,823,673.328125 horsepower. That's a lot of ponies!

OTHER DOCUMENTS

[A Physics and Lab Supplement
http://sl.thunderchild.net/doc-ed/Lab_&_Physics_Supplement.pdf](http://sl.thunderchild.net/doc-ed/Lab_&_Physics_Supplement.pdf)

[All Space Stations Primary Documents
Linkhttp://sl.thunderchild.net/doc/SS-ALL-DocPrimeLinks.pdf](http://sl.thunderchild.net/doc/SS-ALL-DocPrimeLinks.pdf)

[TCGWS Primary Documents Links
http://sl.thunderchild.net/doc/TCGWS-DocPrimeLinks.pdf](http://sl.thunderchild.net/doc/TCGWS-DocPrimeLinks.pdf)

STAFF

General Administrator: AJ Leibengeist

Station Manager: Iris Herouin

Superintendent: bearofboogie

1969 Corvette with 435 horsepower (without nitrous)