

SHIP COMPARISON BETWEEN THE ENTERPRISE AND CONSTITUTION CLASSES OF CRUISERS

Commodore J. Hickinbotham COT, SFC Quadrant 2

CLASS WEAPONS SYSTEMS

Weapon Systems : Constitution

When the U.S.S. Constitution was first launched, she was fitted with Loraxial Ltd's FAC-1 Accelerator cannon, as well as Johanson Energy Co-Op's 4680 TEV Rarium laser system Reference Name¹ (Ref No.) FL-3.

The cannon fired a warhead with the destructive force of 120 megawatts (mw), and a line-of-sight distance of 10,000km with a power cost to arm the unit of 40mw.

The FL-3 was mounted with the cannon at the base of the primary hull, this weapon fired a 'modulator' beam, this weapon had the damage of 20mw, a frequency modulator had the job of keeping the beam in a tight diameter, due to earlier models having a beam that when fired it spread in diameter thus losing power, this laser had the range of 10,000km.

When the other ships of the class were launched, instead of the 4680 the 17.7 QEV laser system was installed. It had the same range of the 4680 but a max damage setting of 40mw.

The next series of refits saw a total replacement of weapon systems, firstly a dual tubed "Awalt" Photon Torpedo system replaced the FAC-1, and to replace the laser technology was the 447/54 single surface mount phaser.

¹ The use of the Ref No. came about when Starfleet put out to contract the building of ship systems to different companies, when the first units came back, most of them with the same specifications, Starfleet grouped them together under one title, so the FP-1 Ref No. could contain six different makes of the same system by different firms, it was up to the Chief Design Engineer of the vessel to use a model which was compatible with the major systems of his ship. The Ref No. could be FWG-1 in two cases, but having two different types of engine, to get the manufacturer of the system check the engineering computer of the vessel.

The Racal Werfit R.M.C. "Awalt" Photon torp system Ref No. FP-1, had twenty Mk-1 torpedos armed with antimatter, these torps were loaded automatically ready to be incased in a magnetic field set to be fired, these first torps had a range of 12,000km and a damage force of 100mw.

The 447/54 Ref No. FH-3, designed by Lockheed Associated Industries. This system was one of the first to be brought onto the market, its range was 20,000km with a damage setting of 50mw., this phaser system stayed with the class until they were upgraded to the Enterprise class.

The torp system had one last upgrade, to the Mk 10 Mod 1 tubes brought out by Sleenia Sistmi S.P.A. Industries. The Ref No. FP-5 had a range of 16,000km at a power to arm cost of 10mw and a damage factor of 160mw, this system also stayed with the class until the Enterprise refit.

Like the weapon systems of the time, they took their power from the excess power from the warp engines, this slowed the recharge time of the phasers and the arming of the torps by a few seconds. The power to arm cost is for a single torp, if more than one is fired the power cost increases.

Weapon systems : Enterprise

The first few ships launched in the class had RIM-9 Ref No. FH-13 phasers at there six primary hull locations, three banks of RSM Ref No. FH-12 at locations at the base of the secondary hull and aft of the secondary hull above the hangar doors and the Mk 10 Mod 1 photorp system.

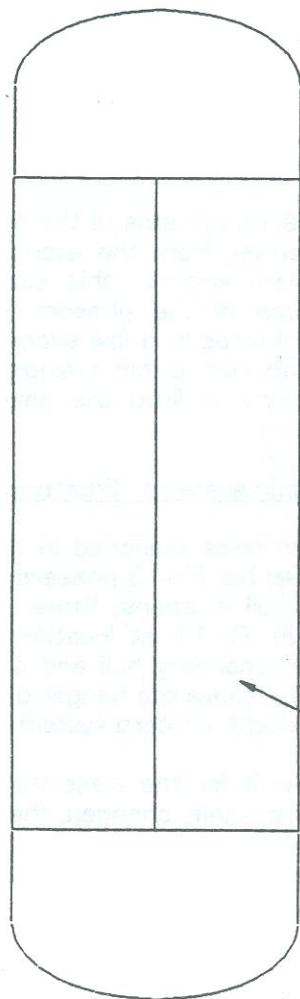
In the first refit for the class the phaser systems were totally changed, the RIM-9s were replaced with RIM-12C Ref No. FH-11 and the RSM system with the RSM-14B Ref No. FH-10.

The RIM-9 phasers had a damage power of 80mw with a range of 180,000km, the

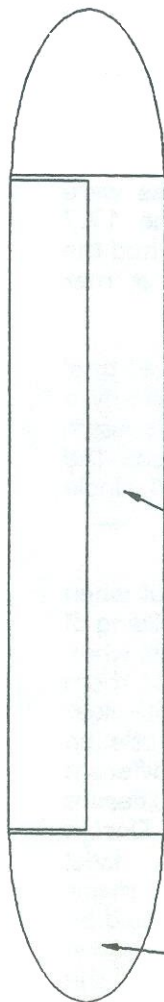
837232

847269

MK-1 'AWALT' FP-1 PHOTORP

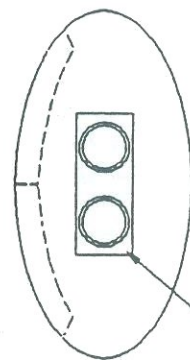


ANTIMATTER PAYLOAD BAY.



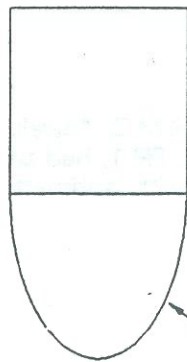
DURANTESS CASING.

GUIDANCE SYSTEM.

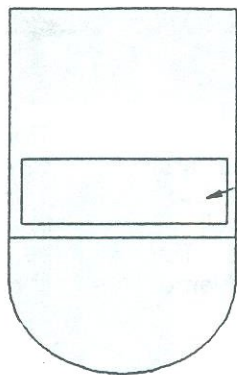


PROPULSION SYSTEM. (2)

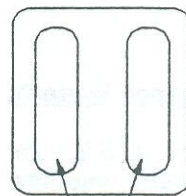
LORAXIAL FAC-1 CANNON SHELL. (MISSILE)



NUCLEAR WARHEAD.

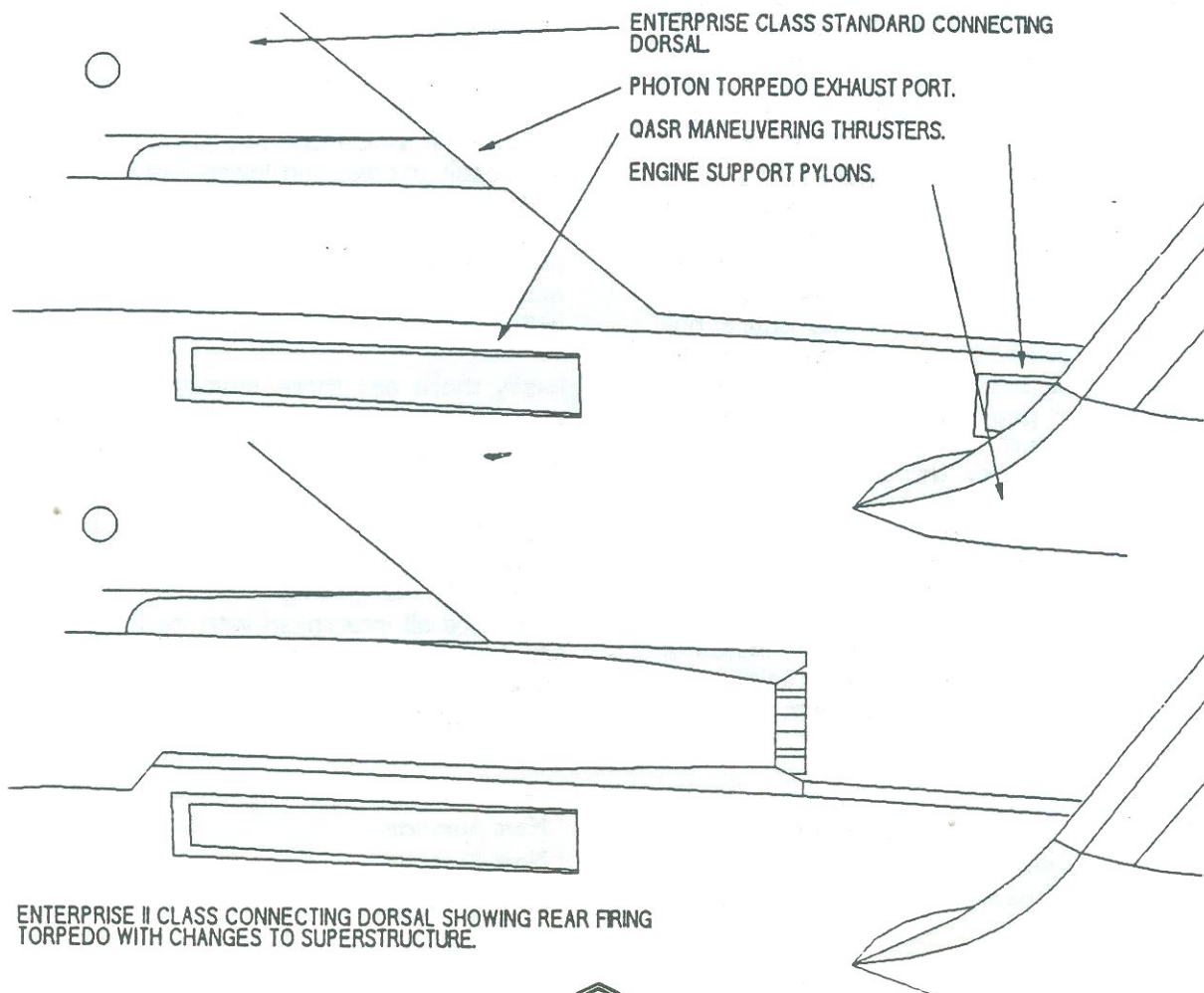
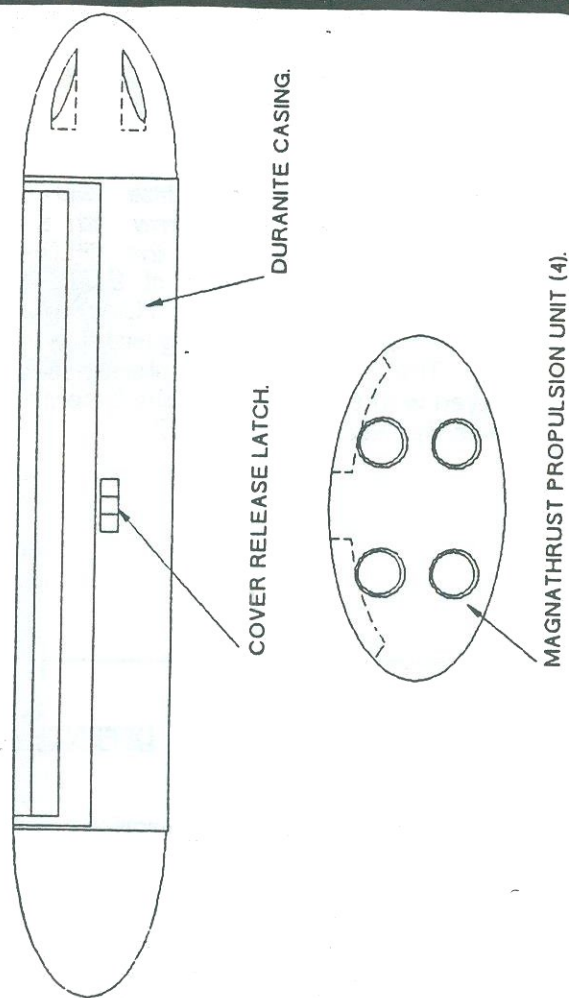
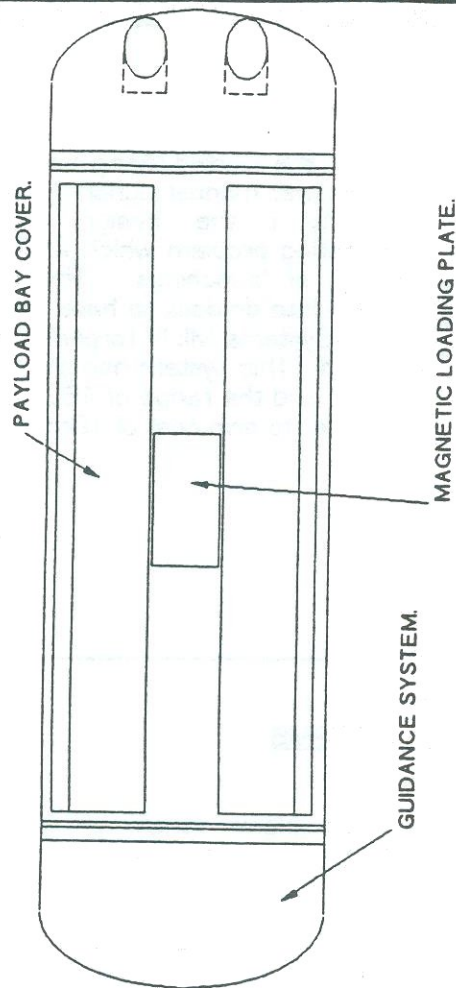


FUEL CASING.



ION PROPULSION SYSTEMS
(2).

BELTESHA MARK VI PHOTON TORPEDO.



ENTERPRISE II CLASS CONNECTING DORSAL SHOWING REAR FIRING TORPEDO WITH CHANGES TO SUPERSTRUCTURE.

82693

265328

RSM had the destructive power of 60mw with a max range of 160,000km.

The RIM-12C are the second most powerful phasers to date with the destructive power of 100mw with a max range of 240,000km, the RSM-14B phasers have the range of 200,000km and the damage power of 70mw. These systems are supplied by Augusta Anasado Inc. The RIM and RSM phaser designs stayed with the class until the Enterprise II class was laid down in 2287.

The launch system for the Mk 10 Mod 1 is automatic, loading and firing system. This unit cut the loading/firing time by twenty percent over manual launch systems, but a oversight i the design caused an overheating problem which aborted seven percent of launchings. The class was recalled into drydock to have the Beltesha Missile Systems Mk IV torpedo system Ref No. FP-4. This system had the damage of 200mw and the range of 160,000km and the power to arm cost of 10mw.

DEFENCE AND SHIELD SYSTEMS

Shield systems : Enterprise

The main shield generator in the Enterprise class of vessel is placed on level 16 behind the main Vernier sensor/Navigational deflector unit. It draws power from the energizer and channels standby power up to level 7 to the primary hull's secondary shield units.

The unit consists of a coil of diburnium-osmium alloy² which is mounted in a reinforced titanium/transparent aluminum mount. When the shield unit is activated the coil is scanned at the subatomic level, then it's replicated and projected as energy through the deflector network. This network consists of the entire hull being covered in DiComposite Plates, these are placed over the outer hull plating with a small gap in between the plate and the outer hull to run the plates regenerating energy through. The energy supplied from the shield generator is passed through the plate to its surface giving it limited regenerating properties. When the plate is struck by an energy force the plates can replace the surface that is burnt off by the weapon instantly. The plates however cannot regenerate quick enough if the energy weapon is fired

at point blank range or the energy discharge is on the same area for a long time e.g. the effects of a torpedo weapon.

The main coil generated deflector shield is in the form of a "bubble," which would surround the whole ship to give all-round protection.

The coil would be scanned and the energy projected through a series of shield emitters of which 51 are placed around the upper, middle, and lower bands of the deflector grid on the primary hull³. Also mounted behind the magnatomic amplification crystal on top of both warp nacelles are 12 emitters, these run down either side of the central spine⁴.

Lastly there are three emitters mounted above the hangar doors, all these emitters when energized provide the ship with the 360° by 360° cover.

The deflector shield consists of eight fields, each one of the shields is made up of 3 layers of overlapping deflector globes⁵ which are all interlinked with its neighbor, when the outer layer of the shield is struck, the other two layers back it up with extra power to regenerate itself, but if the drain is too great e.g. several torpedo hits

² Note οφ ιντερεστ: Ον Σταρδατε 5978.2 Χημειφ Σχιενχε Οφφιχερ Σποχκ φιστ ρεχορδεδ διβυρνιυμ-οσμιυμ, α συβοτανχε χρεατεδ βψ τηε λοστ ραχε οφ Καλανδαν.

³ Note Διαγραμ.

⁴ Note Διαγραμ.

⁵ Note Διαγραμ.

on the same area the shield, it will collapse.

In case of hull separation, the primary hull's shield units would supply the shield units for the hull. This unit will draw its power from either the batteries or surplus converted reactor impulse power. This powers the hull's forcefield network, the same can be said of the main unit in the secondary hull. This draws its power from the main battery room to supply to the forcefield network only, the deflector cannot be raised due to the power cost.

If the shield were up when the transporter was used, its energy would be absorbed by the deflector shield. This is also the case with weapons, beam energy would be absorbed and torpedos would explode inside the shield itself. This is solved by having the area of the beaming through c"closed down" for the duration of the beaming. This is done by having the transporter emitters on the hull surrounded by a a laser projectors, the projector is the same size as the emitter. It would shine a laser generated box onto the shield at the same time as beaming. The box, controlled by computer will close down the shield inside itself allowing the beam to pass through the shield. When the beam is complete the box will disperse closing the hole in the shield. This is the same with Photorp system, around both

tubes are laser emitters which create the same, bnt larger box as the transporter system. The box is energized just before launching of the trop. The phasers have their own tracer control beam which is fired in front of the phaser beam, this opens a hole for the beam in the shield, lasting the duration of the shot. All laser projectors and control tracer beams are tied into the computer fire control system. So whatever the direction the beam ir torp, there will always be a door through which it cabin travel through the shield.

The deflector shield is monitored at reference points around its circumference for signs of power loss and buckling.

The Enterprise was first fitted with the "Lancelot" forcefield network, after the fine tuning was done by Chief Engineer Scott, he powered up the primary hull's forcefield, due to a dud energy projector a very large area of the hull's plates buckled. This sent Cmdr Scott into a walking coma, after a nasty visual communications between himself and the president of Prentice-Schafer Inc., he was last seen by Capt. Decker heading towards his office saying something about a "stiff drink," it was said by an Engineering cadet, that because of this incident Cmdr Scott received most of his grey hair.

Defence Systems : Enterprise

"Lancelot" primary forcefield and shield control system.

System contractor - Prentice-Schafer Inc., Marsport, Mars.

CGCP/SCDS Cloaking generation, penetration, and statis countermeasure system.

System contractor - Hycor, Woburn, Earth.

All figures shown are based on a vessel operating on full power and systems operating at their maximum performance.

Forcefield maximum energy impact load - 2.265×10^{17} joules.
4.25 seconds to full recovery.

Deflector shield max energy impact load 3.215×10^{10} joules full power to 8 shields.
 2.568×10^{11} to any one shield.

Cloaking generator max power - 93*Earth normal gravity.

328769

Cloaking penetrator range - 2.665×10^9 km.

Stasis countermeasure shield max load - 7.320×10^6 luytens.

Cloaking device intermix conduit - Bali 4010 Series Magnetic Flux Antimatter Valve.

System contractor - Bali Industries, Tanami Spacebridge, Australia, Earth.

Defensive grid systems - L550 .19 M Graviton Conduction Tubing.

System contractor - Prentice-Schafer Inc., Marsport, Mars.

Shield systems : Constitution.

The navigational deflector shield matrix is fed through the shield emitter probe which extends from the external sensor dish. The matrix forms a cone of deflector energy set at a programmable distance in front of the ship. The rest of the deflector shielding was projected through the central spine which runs down the top of the secondary hull, this produces the shields to match the heading of the ship. It is possible to stretch the main cone in front of the ship giving a distant object protection. This operation is extremely

dangerous and requires a large amount of power.

The class is not fitted with the main deflectors but like the Enterprise class the entire hull is covered in tritium-alloyed deflector plates. The shield generator is placed in the secondary hull underneath the central spine.

The Dor Ayela system stayed with the class until they were upgraded. Starfleet considered this system to have outstanding power output and shield coverage for the time.

32708

Defence Systems : Constitution

Dor Ayela forcefield and deflector.

System contractor - Dor Ayela Ltd., Andor.

All figures shown are based on a vessel operating on full power and systems operating at their maximum performance.

Forcefield maximum energy impact load - 1.255×10^{15} joules.

8.62 seconds to full recovery.

Deflector shield max energy impact load - 2.265×10^{10} joules full power to deflectors. 2.017×10^{11} to any one deflector shield.

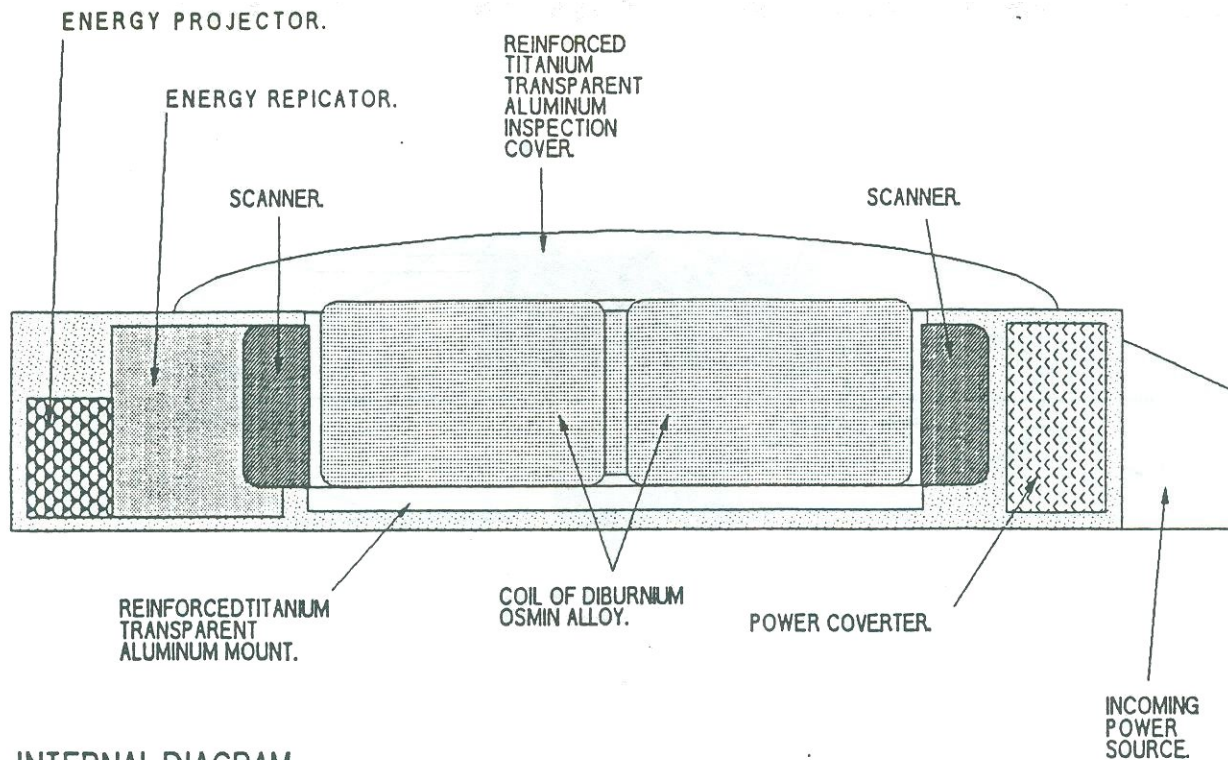
57670

Navigational deflector shield.

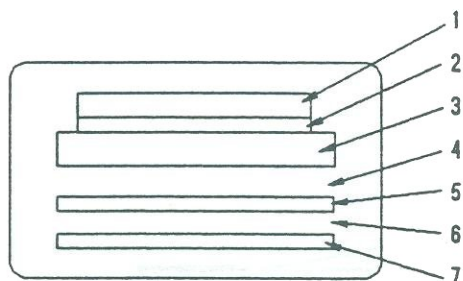
This shield unit has programmed eight deflector shields. The energy for these shields is scanned in the same way as the main deflector shields and is projected, either through the emitters around the

three bands on the primary hull or the emitter mounted around the ship and above the hangar bay doors.

The first shield is projected through the Vernier Navigational deflector mounted on the front of the ship, this generates a



INTERNAL DIAGRAM.
SECTION - A -.



LAYOUT OF A SECTION OF HULL
CONSTRUCTION.

- 1 MOLECULAR REGENERATION PLATE
- 2 CERAMIC-DI ALLOY COMPOSITE.
- 3 POWER SUPPLY GRID.
- 4 OUTER HULL PLATE.
- 5 DEAD SPACE.
- 6 INNER HULL PLATE.
- 7 SERVICES AREA.
- 7 INNER SOUND/VIBRATION PADDING.

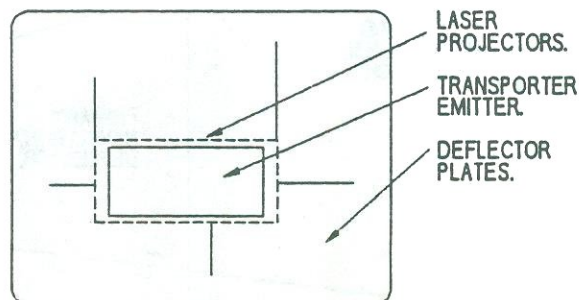
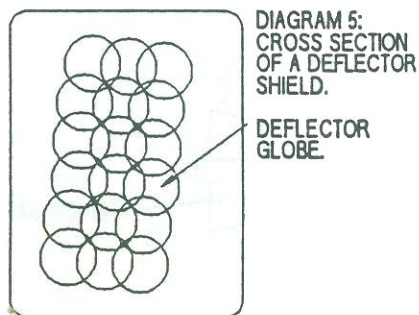
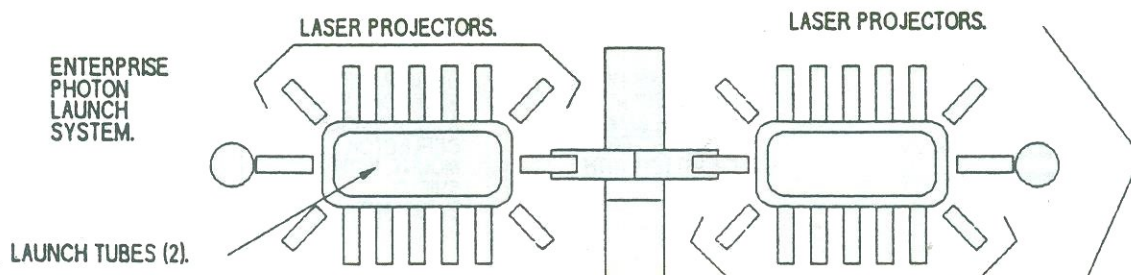


DIAGRAM 6.



87693

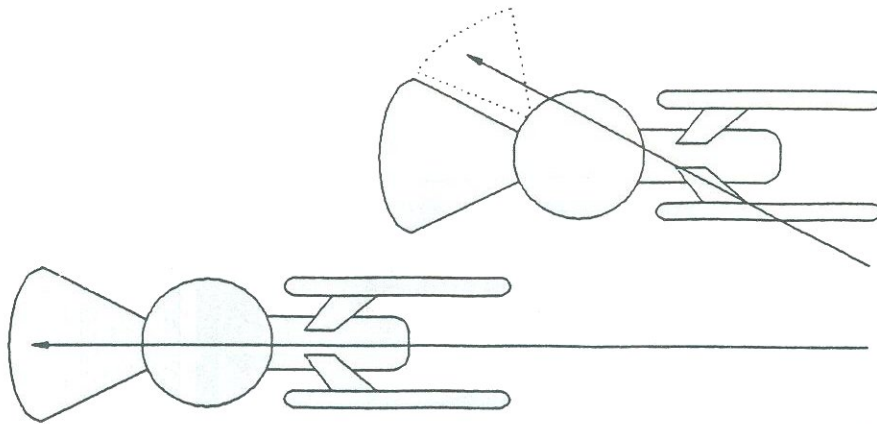
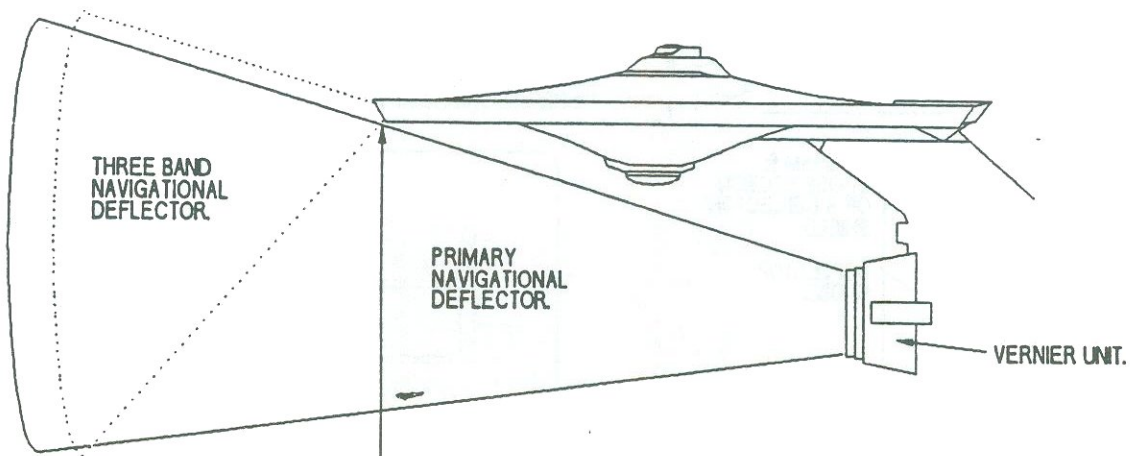
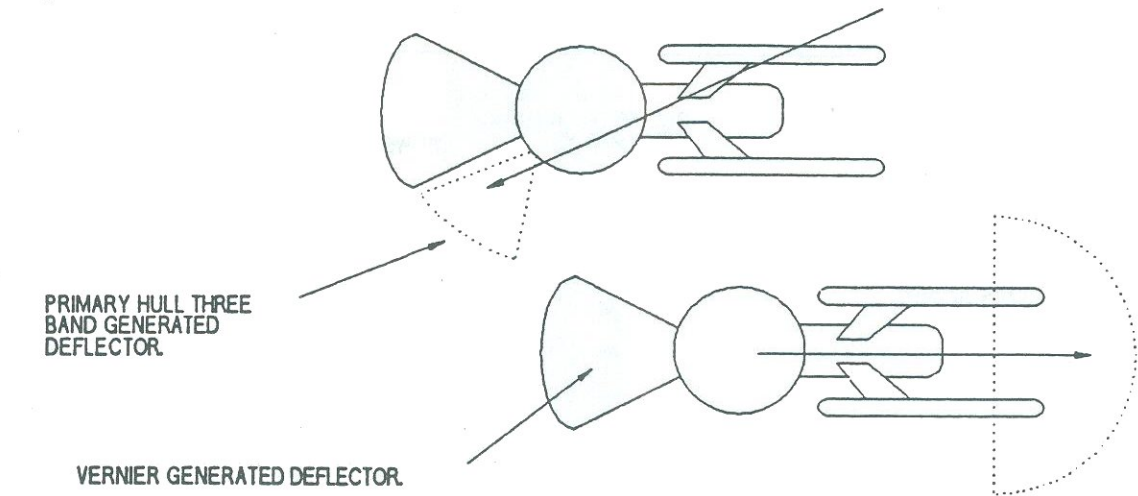


DIAGRAM SHOWING BOTH THE PRIMARY NAVIGATIONAL DEFLECTOR, AND THE THREE BAND GENERATED SCREEN, THE THREE BAND SCREEN CAN GIVE 360 COVER.

THE DIRECTION THE SHIP IS TRAVELLING.

PRIMARY HULL THREE BAND GENERATED DEFLECTOR.

VERNIER GENERATED DEFLECTOR.



THREE BAND NAVIGATIONAL DEFLECTOR.

PRIMARY NAVIGATIONAL DEFLECTOR.

VERNIER UNIT.

265848

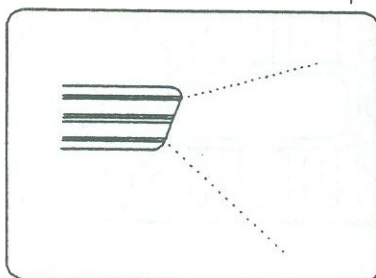
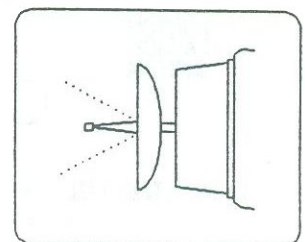
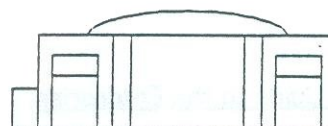
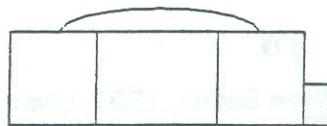
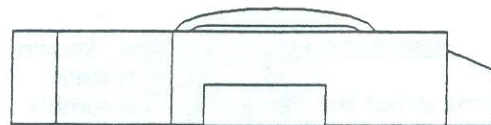
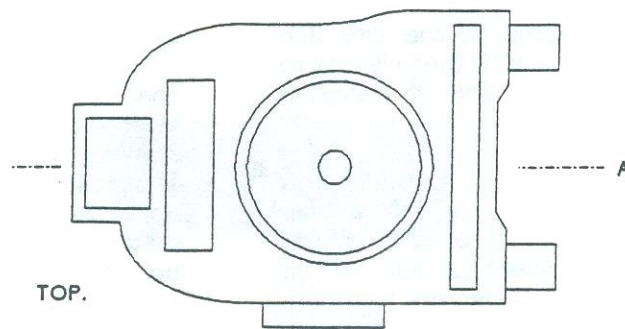


DIAGRAM OF THE PRIMARY HULL THREE BAND DEFLECTOR EMITTER WITH

DIAGRAM OF THE EXTENDED DOR AYELA SENSOR/ DEFLECTOR MOUNT, WITH SHIELD EMISSIONS.

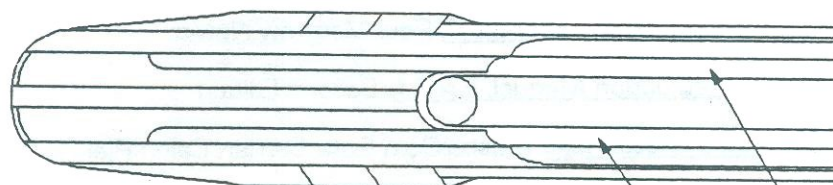


PRENTICE-SCHAFFER "LANCELOT" SHIELD GENERATOR.

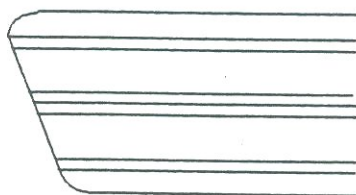


FRONT.

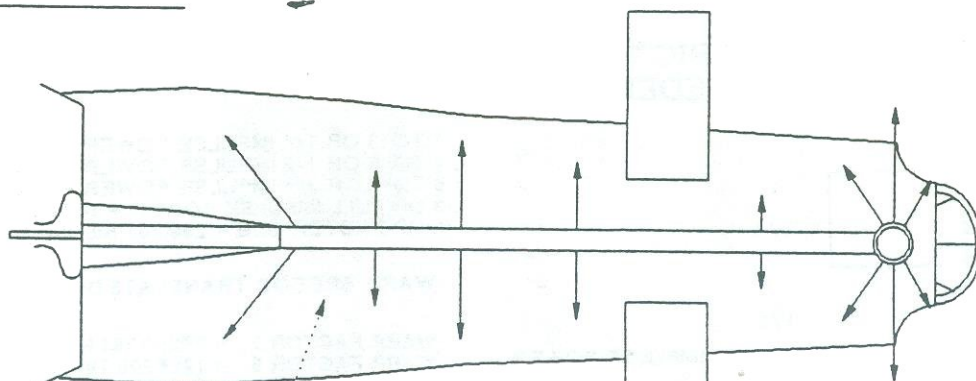
REAR.



SIX DEFLECTOR EMITTERS
ARE POSITIONED EITHER
SIDE.
DIAGRAM 4.



FORCEFIELD DEFLECTOR GRD.
DIAGRAM 3.



DIRECTION OF SHIELD EMISSIONS.
DEFLECTOR EMISSION SPINE ON THE CONSTITUTION CLASS.

DEFLECTOR EMISSIONS
ALSO TRANSMIT FROM THE
OUTER EDGE OF THE
NAVIGATIONAL BEACON.

893265

71657

cones of shielding in front of the ship. The second cone generated through the three bands around the primary hull, this cone is activated to correspond to the direction the ship is travelling. Lastly there is one to cover the rear of the ship if travelling backwards.

The navigational deflectors are tied into the navigation computer so that shields can match the direction of the course change. If in the event of full evasive action, the ship's main deflectors would be raised, so if you heard the command "deflectors to full" this is referring to the main deflectors and not the navigational ones.

Cloaking and countermeasure system.

Cloaking in Starfleet terms is not the same as in Klingon and Romulan terms to hide a vessel inside an energy field, a cloaking generator in a Starfleet vessel sends

signals which are emitted around the ship to try to scramble the enemy vessel's sensors and invisible to its locating and weapon tracking sensors.

The countermeasure system tries to reverse the effects of both types of enemy cloaking systems. In the case of "energy field cloaking," the generator emits a signal which tries to get the enemies computer control to lower the field allowing a visual lock-on. With the electronic cloaking it tries to counteract the enemy signals, with an all-round shield that reflects incoming sensor scans.

The electronic cloak is only effective against uncloaked enemy vessels, Starfleet is known to have the most effective system. It's not a 100% sure thing to scramble the systems of an enemy. Therefore commanders like to "outthink" their enemy and use good sound tactics when engaging an enemy vessel.

Bibliography

Mr. Scott's Guide to the Enterprise, Titan Books, First Edition, 1987, Shane Johnson

Star Trek SpaceFlight Chronology 1980-2188, Pocket Books, Stan Goldstein & Fred Goldstein

StarFleet Assembly Manual 4, Paul Matthew Newitt

Ship Construction Manual, F.A.S.A. Second Edition

Ships of the StarFleet, MasterCom Data Center, Calon Riel

StarFleet Technical Manual, Franz Joseph, Ballantine Books, First Edition 1975, 20TH Anniversary Edition, 1986

Acknowledgement

FLCapt John Morrison SFC, COT, Chief of Technology, StarFleet Command
His help with this project was greatly appreciated.

NEW FEDERATION METRIC SUBLIGHT SPEED INDICATORS AGANIST FEDERATION IMPERIAL

. 1	<input type="checkbox"/>	
. 2	<input type="checkbox"/>	1/4
. 3	<input type="checkbox"/>	
. 4	<input type="checkbox"/>	
. 5	<input type="checkbox"/>	1/2
. 6	<input type="checkbox"/>	
. 7	<input type="checkbox"/>	3/4
. 8	<input type="checkbox"/>	
. 9	<input type="checkbox"/>	FULL

IMPULSE POWER.

. 1 TO .3 OR 1/4 IMPULSE POWER = 49.963 KILOMETERS PER SECOND.
. 4 TO .5 OR 1/2 IMPULSE POWER = 74.945 KILOMETERS PER SECOND.
. 6 TO .8 OR 3/4 IMPULSE POWER = 99.927 KILOMETERS PER SECOND.
. 9 OR FULL IMPULSE POWER = 149.890 KILOMETERS PER SECOND.
WARP FACTOR ONE = 299.781 KILOMETERS PER SECOND.

WARP SPEEDS TRANSLATED INTO KILOMETERS PER

WARP FACTOR 2 = $8 \times 299.781 \text{ KPS}$ = 2,398.248 KPS.
WARP FACTOR 5 = $125 \times 299.781 \text{ KPS}$ = 37,472.625 KPS.
WARP FACTOR 8 = $515 \times 299.781 \text{ KPS}$ = 153,487.872 KPS.
WARP FACTOR 13 = $2197 \times 299.781 \text{ KPS}$ = 658,816.587 KPS.

THE SPEEDS SHOWN HERE ARE PRE-TRANSWARP, OTHER FACTORS HAVE TO BE TAKEN INTO ACCOUNT WHEN WORKING OUT TRANSWARP SPEEDS.