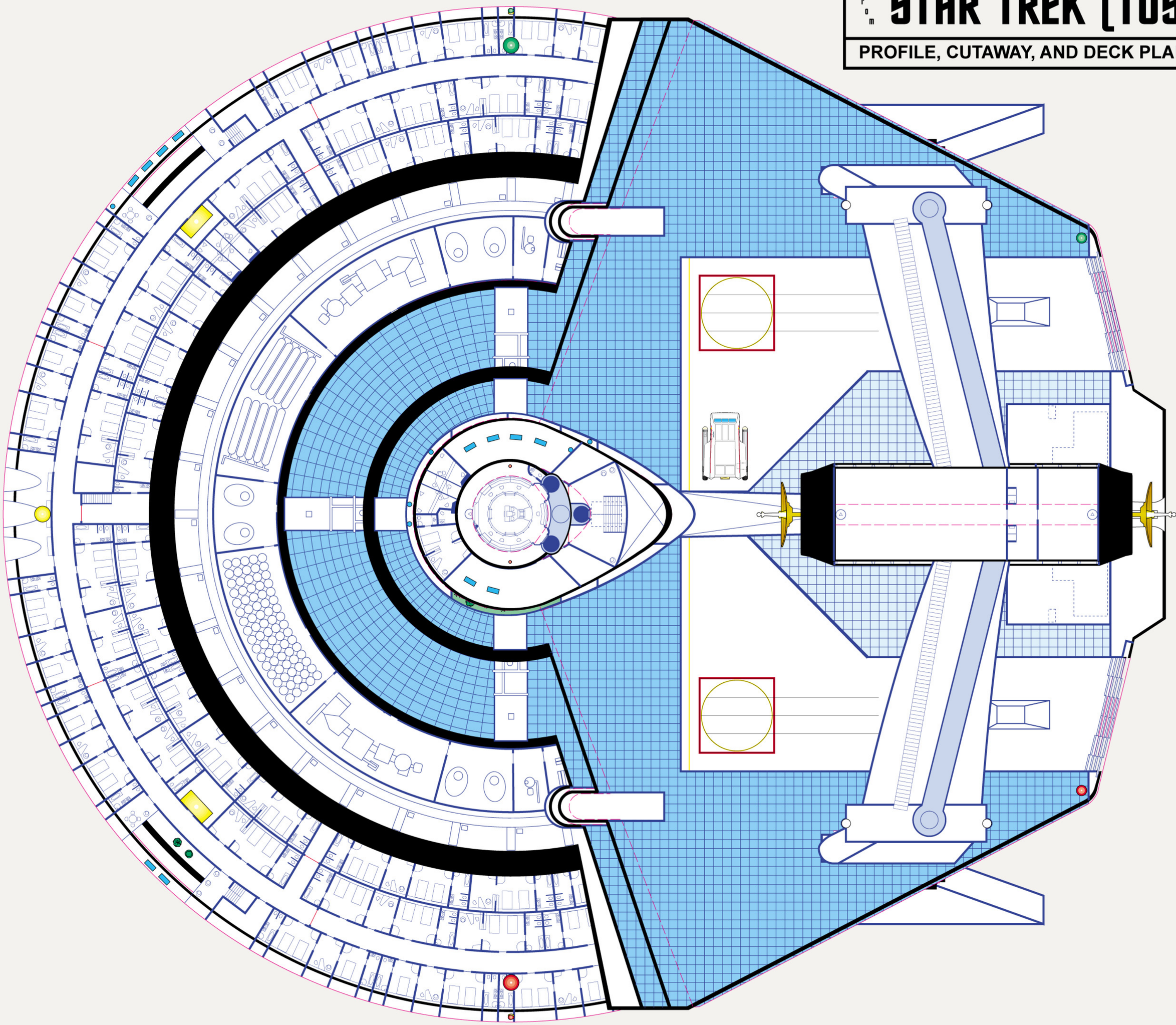
AVENGER HEAVY FRIGATE

From STAR TREK [TOS]

PROFILE, CUTAWAY, AND DECK PLANS



DRAWN BY: Jim Botaitis

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: PORT PROFILE PAGE 1 of 19

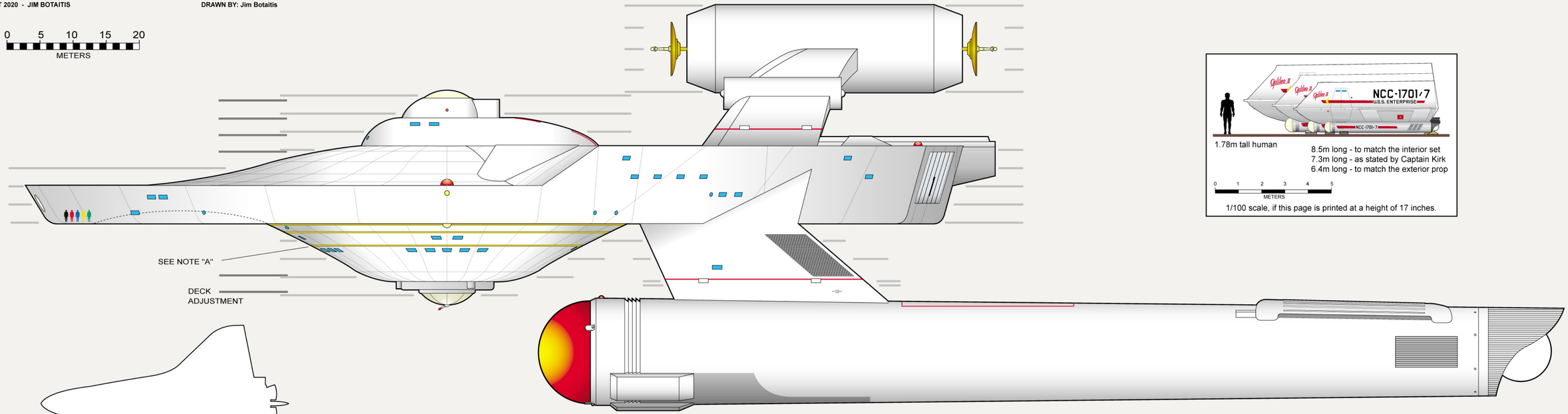
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0 5 10 15 20
METERS

1
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11
12



SPACE SHUTTLE
(Shown here for size reference)

1.78m tall human

8.5m long - to match the interior set
7.3m long - as stated by Captain Kirk
6.4m long - to match the exterior prop

0 1 2 3 4 5
METERS

1/100 scale, if this page is printed at a height of 17 inches.

BACKGROUND HISTORY

This project is an extrapolation of the U.S.S. ENTERPRISE drawings developed in the year 2000. Those drawings were governed by 3 criteria:
(1) The 11-foot-2.08-inch (3.4-meter) studio model,
(2) The Writer's Guide, and
(3) The 79 episodes plus the original pilot.
There are no such criteria to guide these drawings, but the basic design philosophy is to complete this ship in the same style that Franz Joseph (FJ) developed for his Technical Manual and in the same style as his Heavy Cruiser blueprints.

These drawings are an attempt to design a version of the U.S.S. RELIANT from the second movie THE WRATH OF KHAN and make it fit in the original series (TOS). What would such a ship look like? What are the roles of "Heavy Frigates" in the STAR TREK universe?

A "Heavy Frigate" was a type of ship used on Earth. It was a type of warship which had more guns than a "Frigate". It was built with its weapons distributed on several decks. Its creation coincided with the invention of smaller, lighter cannons which could be reloaded quicker and needed a smaller crew for maintenance. These new cannons did not have the range or accuracy but that was offset by the ability to fire more frequently at the enemy.

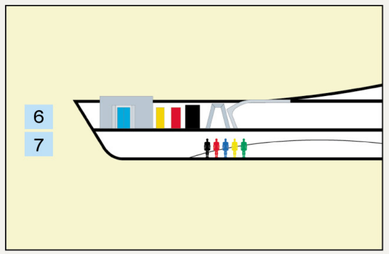
In Starfleet, a "Frigate" is a fast, medium-sized ship intended to protect other vessels. That protection is provided by the ship-mounted phasers and photon torpedoes, but also by the many small craft stored in the hangar bays.
A "Heavy Frigate" has a heavier emphasis on weapons and armor.

The Transport / Tug had an energy surplus. It is this energy surplus which led to the Surya-class and Avenger-class designs. The Surya-class Frigates used that energy surplus for Hangar Bay Operations and (to a lesser extent) for Cargo Operations. The Avenger-class Heavy Frigates used that energy surplus for additional weapons and (to a lesser extent) for Hangar Bay Operations. The Heavy Frigate also maintains many small craft (WORK BEES, or others) stored in compartments located throughout the Hangar Bay.

This design retains the lines as established by David Nielsen from his CLASS I HEAVY FRIGATE drawing, TM:379260-2. Certain details were changed to match the 11-foot (3.3 meter) studio model. Also, some details were changed to maintain continuity with my other drawings.
Special thanks to David for permission to expand on his original design.

CONSTRUCTION NOTES

As with my Heavy Cruiser plans, I started at the edge of the primary hull (see image below), where the height of 2 decks, the thickness of 1 floor, and the thickness of 2 hulls have to fit in this part of the saucer.



In CHARLIE X we saw how thick the walls are and also what is in the walls. The DESILU Studio plans of the set show walls that are 1 foot (0.3 meters) thick and sometimes even thicker. I decided to make all walls, decks, and hulls 1 foot thick, never thinner. In a few places, the walls are even thicker.

This leaves a ceiling height of 8 feet (2.44 meters) for each level.

The one set piece (reminiscent of a ship's rib - often seen in the Briefing Room) does not quite fit. However, all the other details (doors, openings, etc) do fit (see image at left). I consider the trapezoidal openings to be isolation doors ... in case of hull breaches, damage control, intruder alerts, etc.

In my profile drawing (at the top of this page) the light grey horizontal lines show the initial deck locations. They represent a constant 8 foot ceiling throughout the entire ship.

I built them upwards and downwards from my starting point, Deck 6 and 7. However, this makes the Bridge too high, and Deck 11 too low. The dark grey horizontal lines show the adjusted deck locations.

Disconnection equipment is located in each engine pylon. It can only be reached via Jefferies Tubes, which are also used to climb down to the engine inspection stations. It makes sense to keep this area clear of crew and difficult to access except by authorized personnel.

The undercut on the Primary Hull affects Deck 7. However, the concave undercut of the Primary Hull was flattened at the rear so as to strengthen the hull at the point where the warp pylons attach to the Primary Hull. This allowed an expansion of Engineering.

The disconnection equipment in the upper pylons (as well as the Dorsal Pod) can be reached by Jefferies Tubes and turbo-elevators.

GENERAL NOTES

Are the wide steps in Engineering considered to be "stairs"? Are the steps on the Bridge considered to be "stairs"?
Perhaps stairs do not appear in any episodes, but that does not mean they do not exist in Starfleet ships. Therefore:
1. After engine nacelle disconnection and an emergency landing, stairs on Decks 4, 3, and 2 lead up to the hatch, thus allowing the crew to leave the ship quickly.
2. Each of the 2 Recreation Rooms on Deck 7 have balconies on Deck 6. Those balconies have stairs that lead down to their respective Recreation Rooms.
3. The two Cargo Operations areas on Deck 7 have wide stairs as well as cargo lifts.
4. Stairs connect the two levels of the Deflector Equipment at the front of the hull.
5. Stairs connect Impulse Engineering and Warp Engineering.

Aside from these stairs, the rectangular ladders (within rectangular alcoves) and the triangular ladders (within circular alcoves) supplement the turbo-elevator system. If that system fails, or in some other emergency, ladders alone would not be very efficient; it is easier to carry something up stairs than up a ladder.

The rings behind the Deflector Dishes are not habitable. I leave those areas black.
The Warp Engines are also not habitable. I leave this area mostly white. There is an inspection chamber at the bottom of the pylons, accessed by Jefferies Tube.

There are external features that do not need to be marked: hatches for the Phasers, hatches for the Photon Torpedo Launchers, and the Primary Hull / Warp Engine disconnection line, to name a few.
These drawings attempt to make sense of the markings that ARE visible on the studio model of the ENTERPRISE, all of which is then extrapolated onto the Heavy Frigate.

More notes relevant to each deck appear on the following pages.

Contradictions and errors exist within the episodes. I am sure 100% continuity is not possible.

I hope these pages provide you with some pleasure, information, and ideas for contemplation / consideration.

If I missed something, please let me know.

Jim Botaitis
jbot@rogers.com
October 2020

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

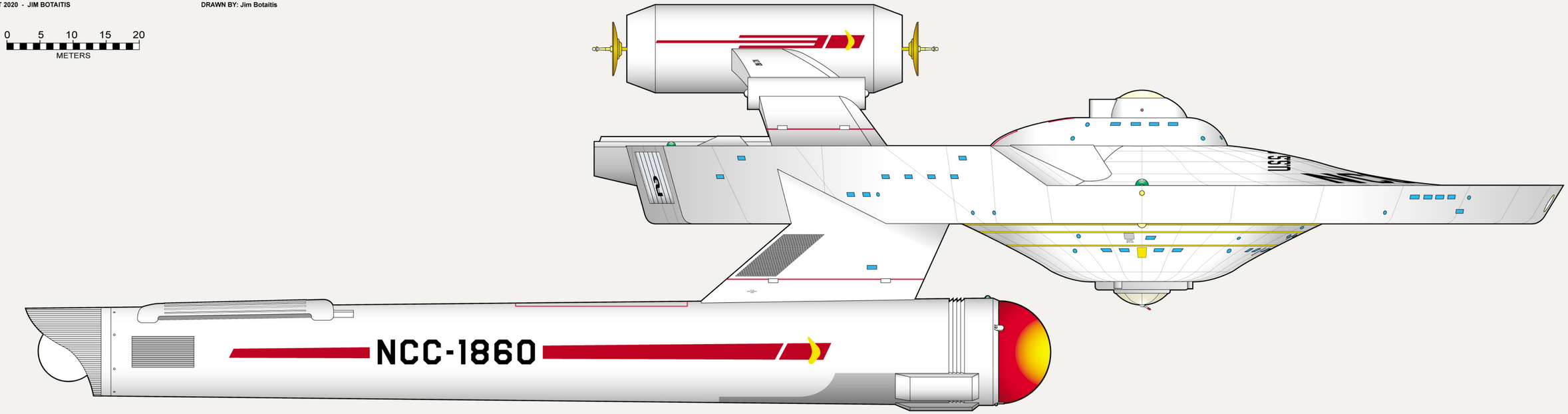
LAYOUT: STARBOARD PROFILE PAGE 2 of 19

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0 5 10 15 20
METERS



STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: TOP

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NOTES

DECK 6 (on Page 13)
The layout of this deck is similar to the FJ design for the Constitution-class ship. I like the tri-radial symmetry. As on Deck 5, the turbo-elevator shafts are separated by 120°. I also added 4 more turbo-elevator storage spaces. This network is not as extensive as the FJ design; walking a few hundred feet or meters should not be an issue. Also, this network does not need to reach outward as much because it does not then drop down to Deck 7.

Over half of this deck is devoted to Crew Quarters. Most of the remaining space is filled by the Hangar Bays.

The windows around the edge of the Primary Hull governed the location of the two Recreation Rooms / Lounges. They have balconies (on Deck 6) which overlook the main level (on Deck 7). Stairs lead down from the balconies to each Lounge. There are also stairs at the bow, behind the Deflector Equipment.

Small Lounges are located at the two aft window locations. The nearby stairs lead down to the Cargo Operations Centers. This will be discussed below.

In the center are 3 relaxation areas. The one at the front is a Lounge. The other two are Messrooms, serviced by food dispensers which are directly connected to the Food Preparation area on Deck 8.

Aft of the two Messrooms is a corridor leading to the Hangar Bay foyer. Airlock doors lead to the Hangar Bays. Aft of the Foyer is Warp Engineering, Deuterium Tanks, and Environmental Engineering. At the rear is the Work Bee Maintenance Area.

The Emergency Manual Monitor is immediately to port of the Warp Engineering Highbay, but it can only be reached by a ladder from below, on Deck 7.

Environmental Lockers (EL) or storage spaces are distributed all around the deck, mostly concentrated near the 2 large rectangular escape hatches in the ceiling (shown here in orange).

Work bees (and/or other small craft) are in storage compartments accessed from the Hangar Bays.

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

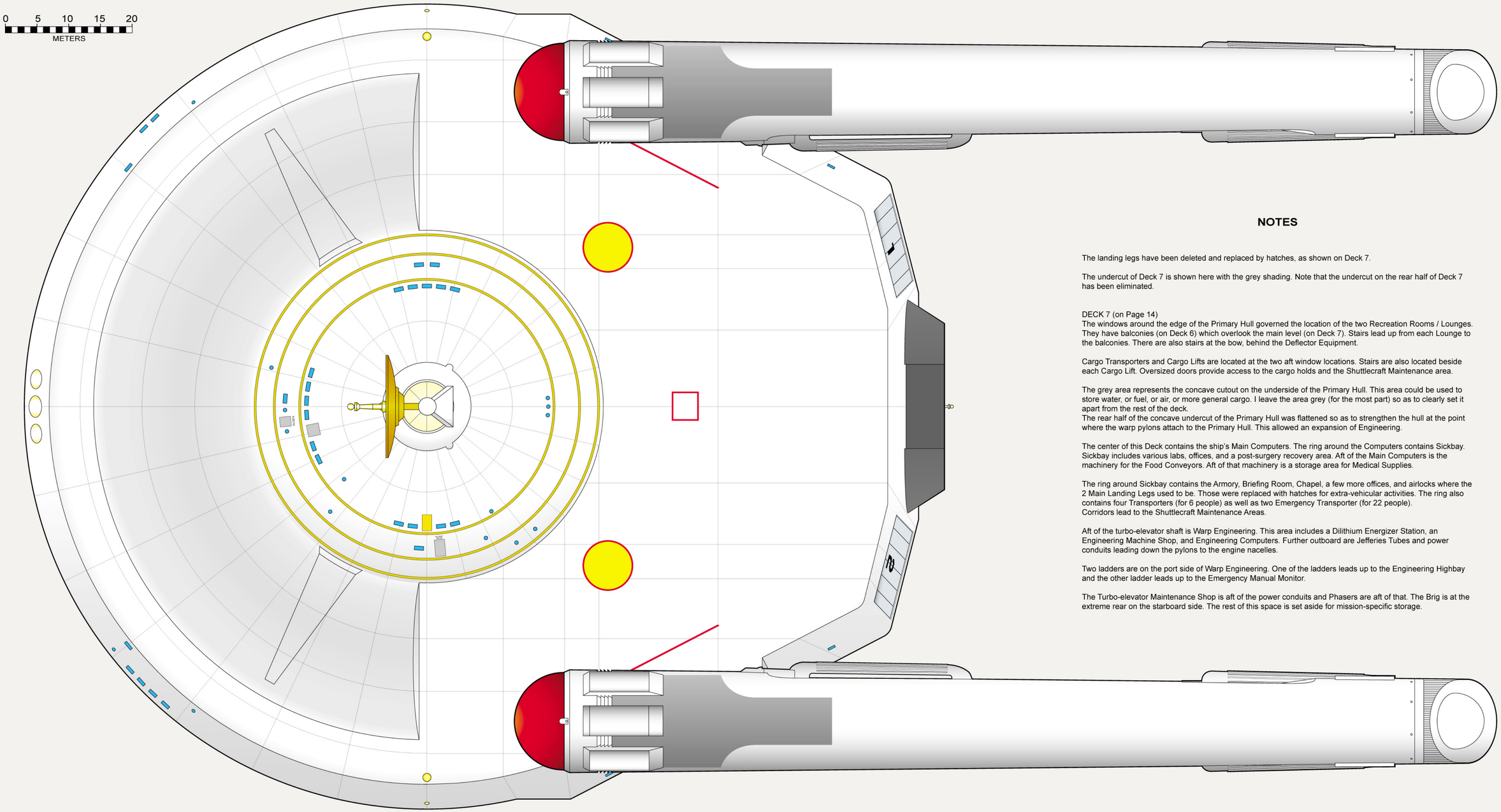
LAYOUT: BOTTOM **PAGE 4 of 19**

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0 5 10 15 20
METERS



NOTES

The landing legs have been deleted and replaced by hatches, as shown on Deck 7.

The undercut of Deck 7 is shown here with the grey shading. Note that the undercut on the rear half of Deck 7 has been eliminated.

DECK 7 (on Page 14)
The windows around the edge of the Primary Hull governed the location of the two Recreation Rooms / Lounges. They have balconies (on Deck 6) which overlook the main level (on Deck 7). Stairs lead up from each Lounge to the balconies. There are also stairs at the bow, behind the Deflector Equipment.

Cargo Transporters and Cargo Lifts are located at the two aft window locations. Stairs are also located beside each Cargo Lift. Oversized doors provide access to the cargo holds and the Shuttlecraft Maintenance area.

The grey area represents the concave cutout on the underside of the Primary Hull. This area could be used to store water, or fuel, or air, or more general cargo. I leave the area grey (for the most part) so as to clearly set it apart from the rest of the deck.
The rear half of the concave undercut of the Primary Hull was flattened so as to strengthen the hull at the point where the warp pylons attach to the Primary Hull. This allowed an expansion of Engineering.

The center of this Deck contains the ship's Main Computers. The ring around the Computers contains Sickbay. Sickbay includes various labs, offices, and a post-surgery recovery area. Aft of the Main Computers is the machinery for the Food Conveyors. Aft of that machinery is a storage area for Medical Supplies.

The ring around Sickbay contains the Armory, Briefing Room, Chapel, a few more offices, and airlocks where the 2 Main Landing Legs used to be. Those were replaced with hatches for extra-vehicular activities. The ring also contains four Transporters (for 6 people) as well as two Emergency Transporter (for 22 people).
Corridors lead to the Shuttlecraft Maintenance Areas.

Aft of the turbo-elevator shaft is Warp Engineering. This area includes a Dilithium Energizer Station, an Engineering Machine Shop, and Engineering Computers. Further outboard are Jefferies Tubes and power conduits leading down the pylons to the engine nacelles.

Two ladders are on the port side of Warp Engineering. One of the ladders leads up to the Engineering Highbay and the other ladder leads up to the Emergency Manual Monitor.

The Turbo-elevator Maintenance Shop is aft of the power conduits and Phasers are aft of that. The Brig is at the extreme rear on the starboard side. The rest of this space is set aside for mission-specific storage.

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

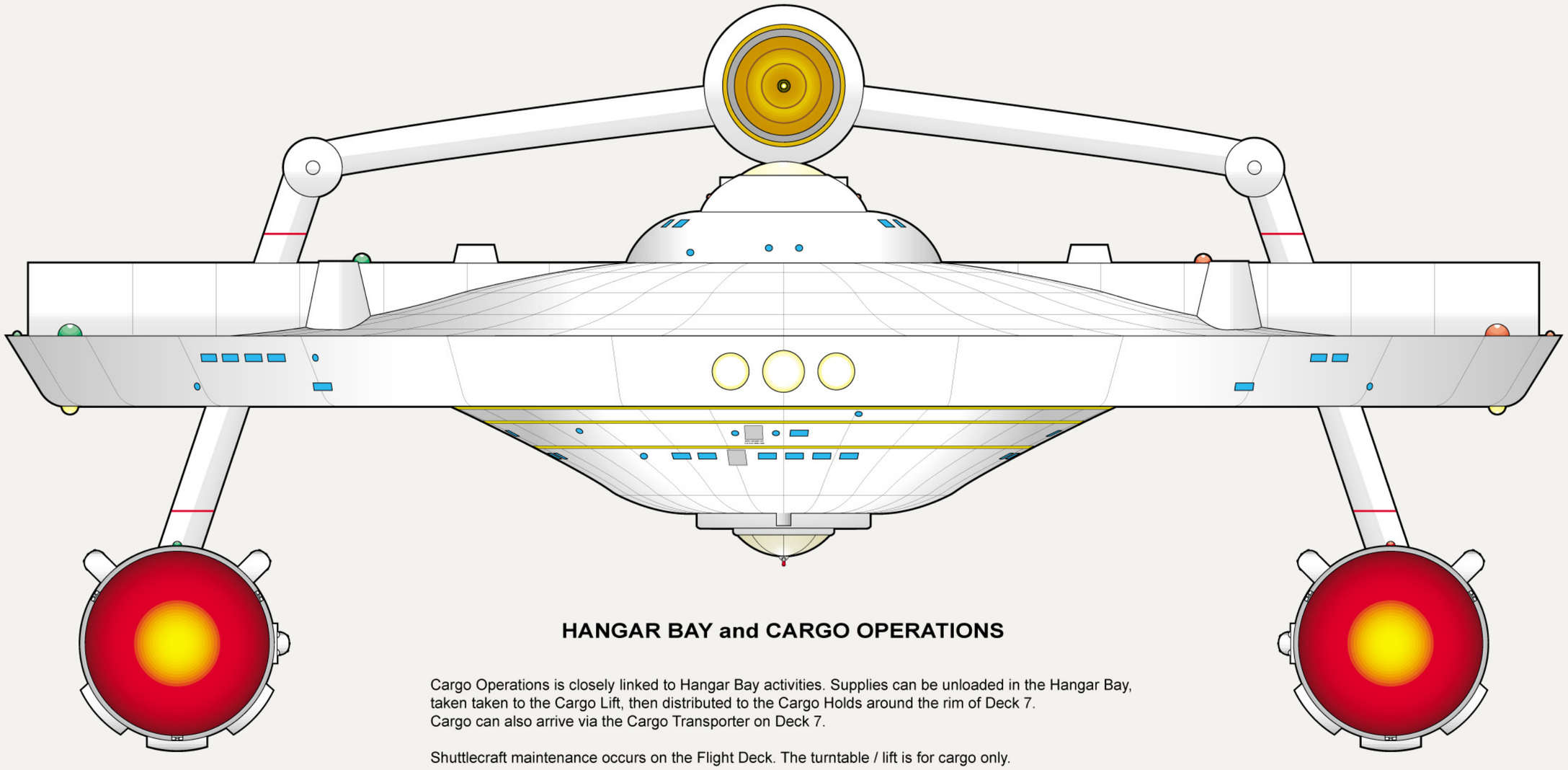
LAYOUT: FRONT and REAR PAGE 5 of 19

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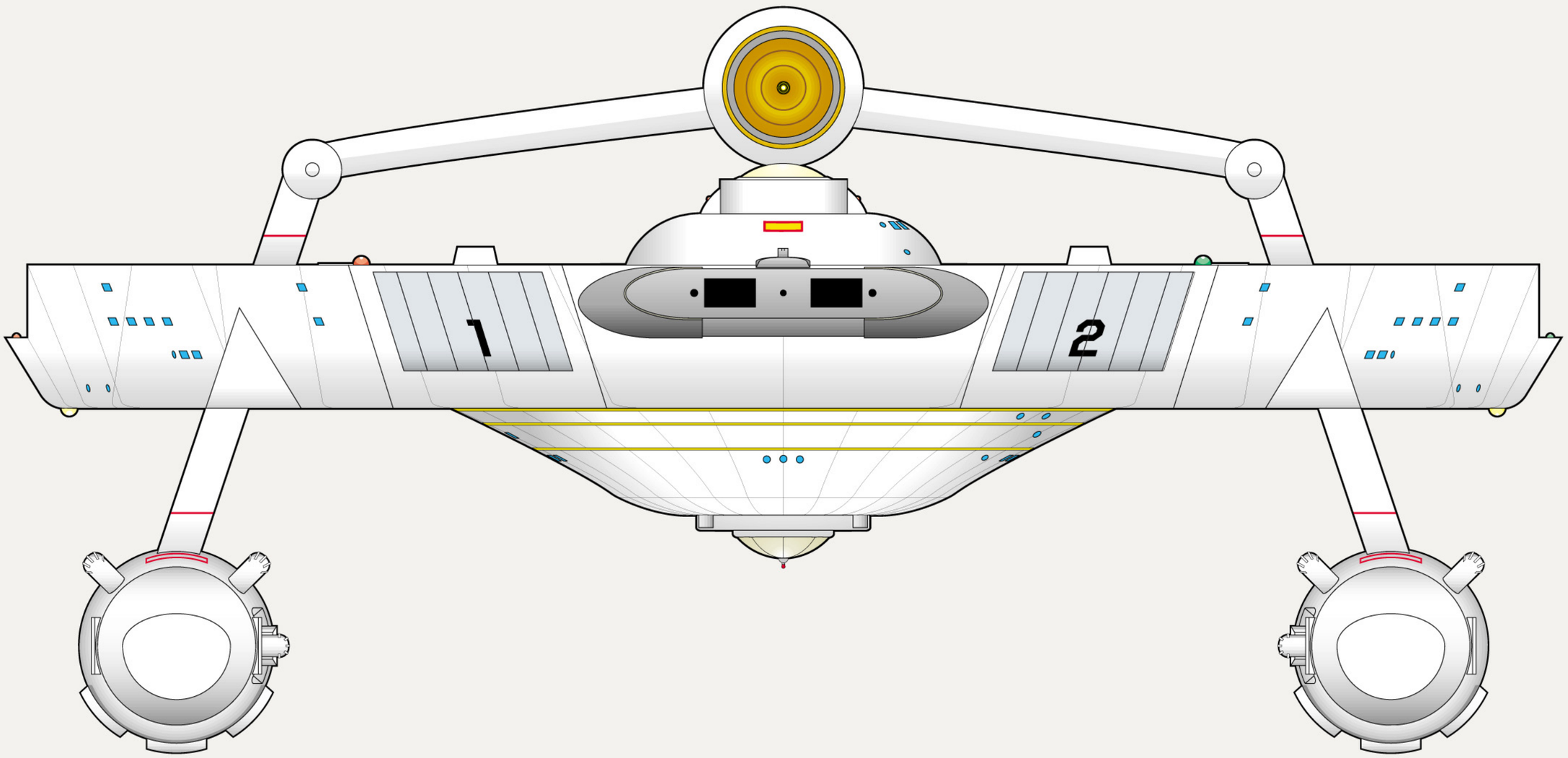
0 5 10 15 20
METERS



HANGAR BAY and CARGO OPERATIONS

Cargo Operations is closely linked to Hangar Bay activities. Supplies can be unloaded in the Hangar Bay, taken taken to the Cargo Lift, then distributed to the Cargo Holds around the rim of Deck 7.
Cargo can also arrive via the Cargo Transporter on Deck 7.

Shuttlecraft maintenance occurs on the Flight Deck. The turntable / lift is for cargo only.



STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: PORT CUTAWAY PAGE 6 of 19

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NOTES

A SEE PAGE 1

These 3 pale gold-coloured recessed rings are part of the Tractor Beam system. See Page 16 for more information.

B

The height of the bump behind the Bridge has been increased to allow a turbo-elevator to fit. See Page 7 for more information.

C

This is the "Emergency Crew Escape" hatch, to be used after the Primary Hull has made an emergency (hard) landing. The main Landing Legs were removed, so all landings are "hard".

D

One Phaser on each side fires forward and one on each side fires aft. See Page 6 for more information.

E

The Tactical and Warfare Countermeasures Equipment is located in this pod, together with the Main Sensors and Deflector Equipment. Many combinations of sensors and weapons are possible. Some layouts will be shown and discussed on Page 19.

F

The details in the engine and these pylons are shown on Page 7.

G

The undercut on the bottom of the Primary Hull affects Deck 7. However, the connection to the warp engine pylons required reinforcement, so Starfleet Engineers flattened the rear half of the deck. This is shown on Page 14 and discussed on Page 4.

H

The Shuttlecraft used here measure 28 feet (8.5 meters) in length, as suggested by the size of the interior set. The studio prop was 21 feet (6.4 meters) which was about 3/4 of the intended size. In one episode of STAR TREK, Captain Kirk mentioned the Shuttlecraft is 24 feet (7.3 meters) long.

Special thanks to Dana E. Lubich for permission to display the Cargo Shuttle design which Dana developed 30 years ago.

I SEE PAGE 7

There is a "Separation Plane" for the engines and another one for the upper pylons. They operate independently of each other.

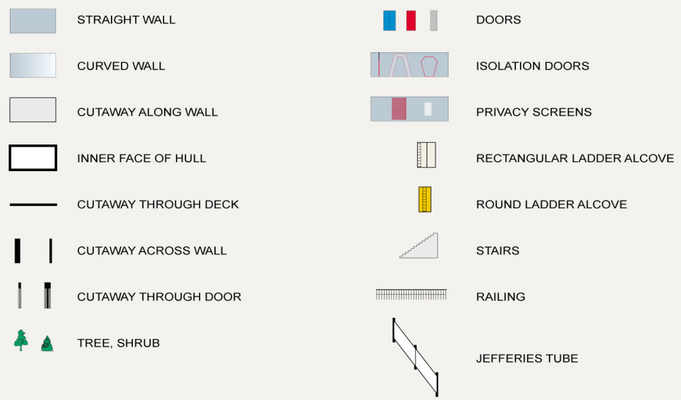
J SEE PAGE 7

The Matter-Antimatter Reaction Chamber is heavily shielded and recessed within the Warp Engine nacelle.

K SEE PAGE 7

Antimatter is created / stored in the engine nacelles. In an emergency, the red-outlined panels swing open and the antimatter is ejected up and to the rear.

CUTAWAY SYMBOLS



STAR TREK - AVENGER-CLASS HEAVY FRIGATE

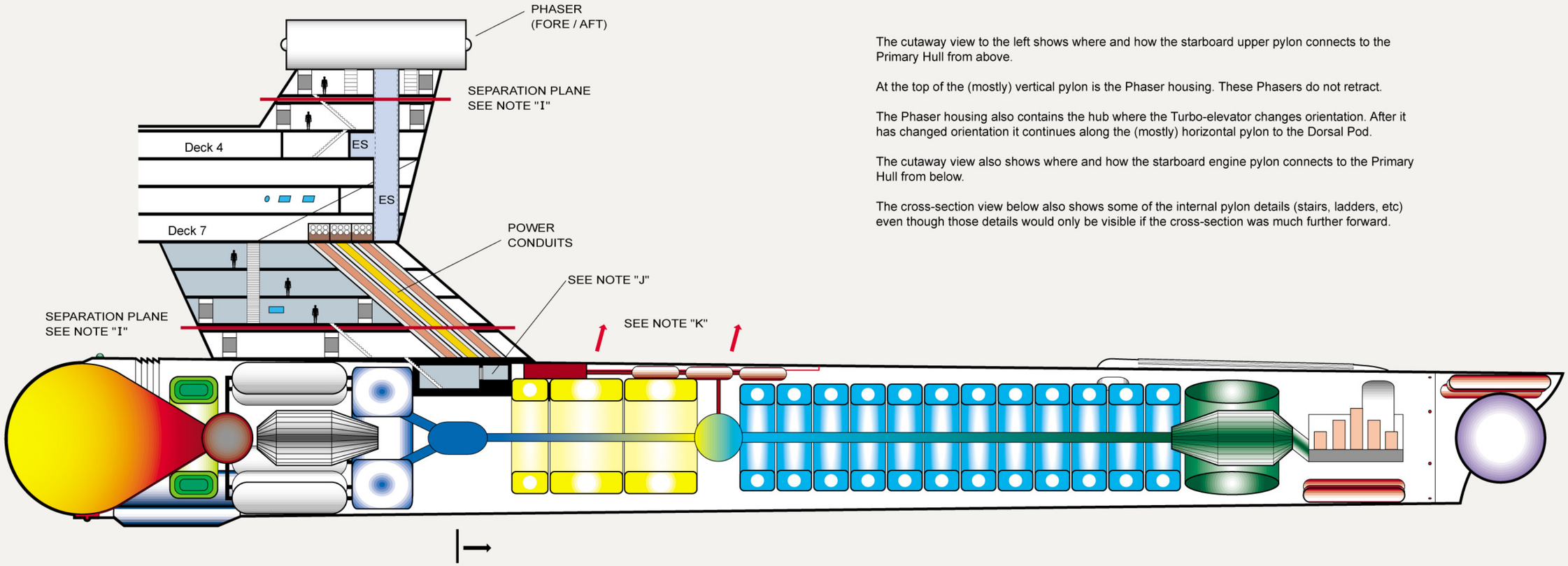
LAYOUT: STARBOARD ENGINE

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NOTES

The cutaway view to the left shows where and how the starboard upper pylon connects to the Primary Hull from above.

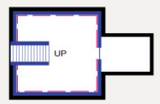
At the top of the (mostly) vertical pylon is the Phaser housing. These Phasers do not retract.

The Phaser housing also contains the hub where the Turbo-elevator changes orientation. After it has changed orientation it continues along the (mostly) horizontal pylon to the Dorsal Pod.

The cutaway view also shows where and how the starboard engine pylon connects to the Primary Hull from below.

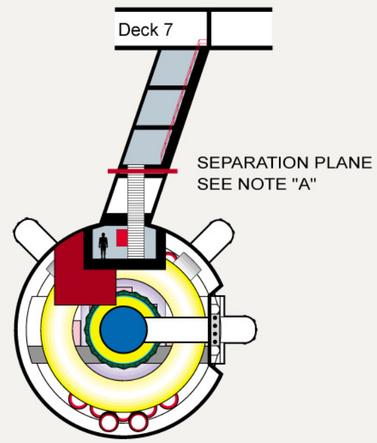
The cross-section view below also shows some of the internal pylon details (stairs, ladders, etc) even though those details would only be visible if the cross-section was much further forward.

STARBOARD ENGINE INSPECTION STATION
(Cross-section, Looking Aft)

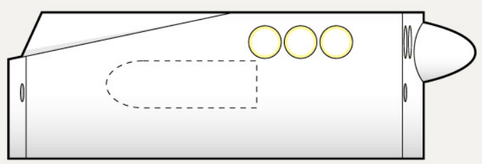


MATTER-ANTIMATTER
REACTION CHAMBER

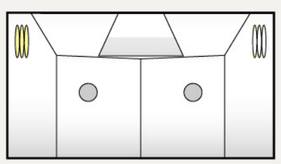
STARBOARD ENGINE INSPECTION STATION
(Plan View)



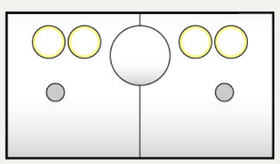
STARBOARD ENGINE INSPECTION STATION
(Cross-section, Looking Aft)



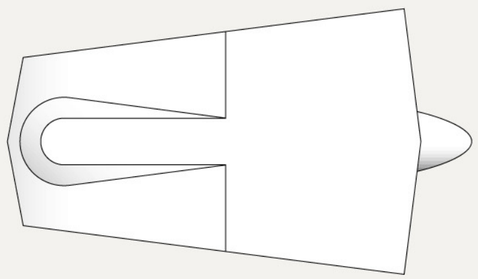
PORT SIDE



FRONT

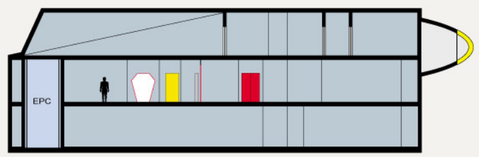


REAR



TOP

CUTAWAY



WEAPONS POD

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: DECK 1 (BRIDGE)

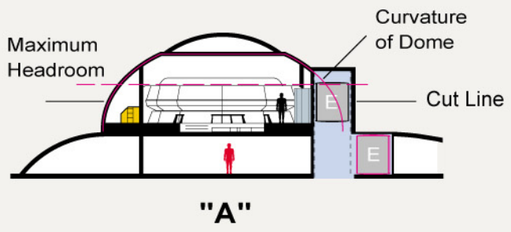
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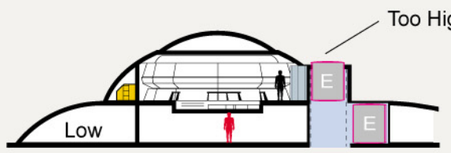


ORIGINAL BRIDGE



"A"

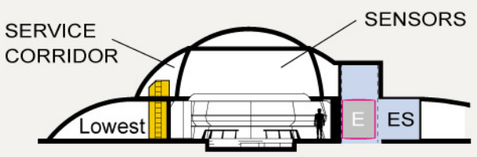
REVISED BRIDGE (3 possibilities)



"C"



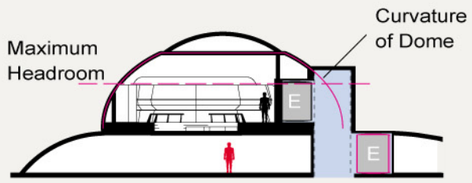
"D"

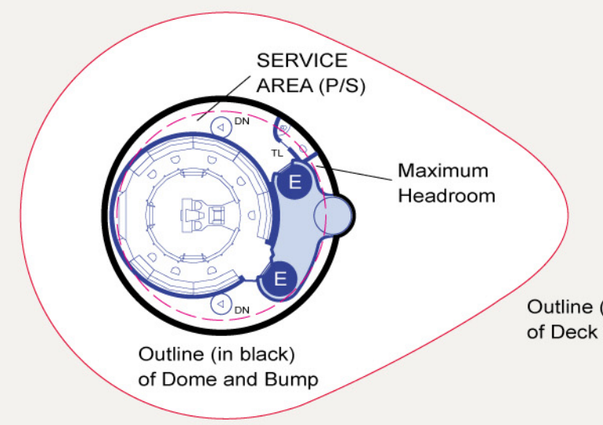


"E"

NOTES

ORIGINAL BRIDGE
The Bridge of the U.S.S. ENTERPRISE was intended to be under the dome on the studio model, as per the special effect in the first scene of THE CAGE. The original dome was taller. The bump aft of the dome

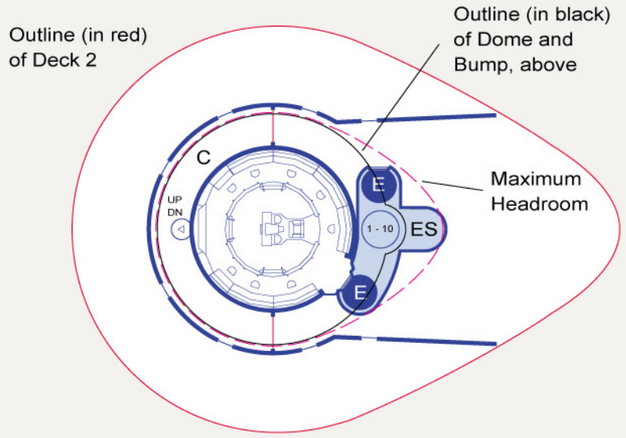




DECK 1: ORIGINAL BRIDGE ("B")

ORIGINAL BRIDGE (continued)
was also taller. A turbo-elevator car easily fits inside the bump even if the recessed floor of the Bridge is above the ceiling of Deck 2 (see "A"). However, the curvature of the dome does not allow a lateral turbo-elevator tube to fit behind the Bridge; the car has to remain inside the bump. Therefore, the Bridge has to be rotated 36° counter-clockwise.

A forward-facing Bridge CAN fit (see "B") but it has to be shifted toward the front. It is the only way a turbo-elevator car can fit under the curvature of the dome. This shift allows a lateral turbo-elevator tube and even a spare turbo-elevator car to fit behind the Bridge.



DECK 1: REVISED BRIDGE ("E")

REVISED BRIDGE (Low)
When the shape of the Bridge on the model was modified, material was removed from the bottom of the dome and the bump. The lower curvature of the dome's ceiling means the Bridge cannot be shifted forward. Placing it back in the middle means there is no space for a lateral turbo-elevator tube behind the Bridge, so the Bridge has to be rotated 36° to ensure the turbo-elevator car remains inside the bump. However, the material that was removed reduced the height of the bump too much. A turbo-elevator car no longer fit even if the recessed floor of the Bridge is dropped below the ceiling of Deck 2 (see "C").

REVISED BRIDGE (Lower)
If the main floor of the Bridge is also dropped below the ceiling of Deck 2, the turbo-elevator car does finally fit inside the bump. But, this makes the ceiling for most of Deck 2 too low. The Bridge is still rotated 36° but now the turbo-elevator car waiting inside the bump (to serve the Bridge) is too low, obstructing the shaft and preventing service to Deck 2 (see "D").

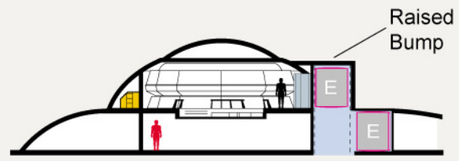
REVISED BRIDGE (Lowest)
If the Bridge is lowered all the way to Deck 2 a lateral turbo-elevator tube and even a spare turbo-elevator car fits (see "E"). But what of the dome? It could contain sensors and a service corridor . . . and now the Bridge is not as vulnerable, so all this might be a good thing.

In at least one episode, a character left the Bridge and a moment later a turbo-elevator car was available for another character to leave. Spare turbo-elevator cars must be stored somewhere close, very close.

The Bridge shown in "E" is used only in the U.S.S. ENTERPRISE Heavy Cruiser plans.

ALTERNATE BRIDGE CONFIGURATIONS
A simpler, more practical solution is to raise the bump slightly (see "F"). This is a good start. Extending the bump to the port side, or to both sides, is even better. Now a lateral turbo-elevator tube fits behind the Bridge.

The "Auxiliary Door" is optional, added here to satisfy what we see in the Animated Series. Think of it as being hidden behind the display panel to port of the main viewing screen.



MODIFIED BUMP ("F")

Such changes allow for smoother turbo-elevator operations, turbo-elevator storage spaces closer to the Bridge, and other (better, more logical) Bridge configurations. To the right are three such designs.
One of these is used in each of my starship blueprint sets.

v1.
A storage space for spare turbo-elevators exists to starboard. The bump is much bigger but is symmetrical.

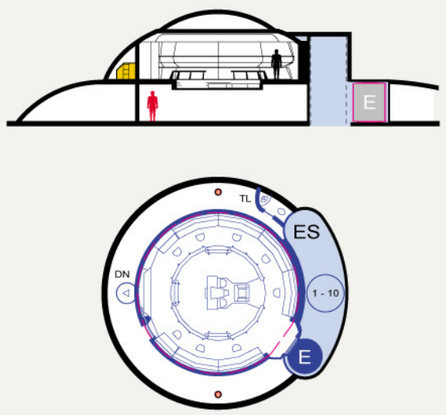
v2.
This second design minimizes the change to the size and shape of the bump but it is now asymmetrical.

v3.
The turbo-elevator storage space has been replaced by a second access

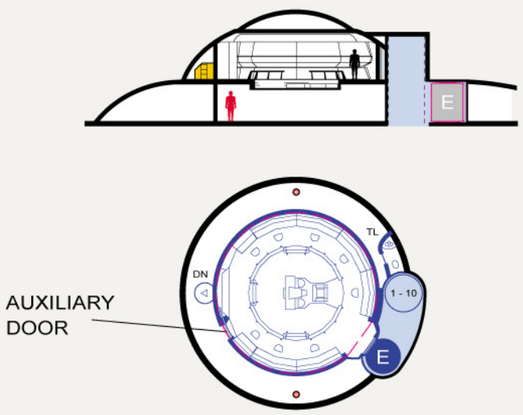
v3. (continued)
point for the Bridge. The stations have been re-arranged around the Bridge, but overall, one station has to be deleted.

In all these Bridge designs, access to the Service Corridor is via removable panels, or the auxiliary door, or the ladder.

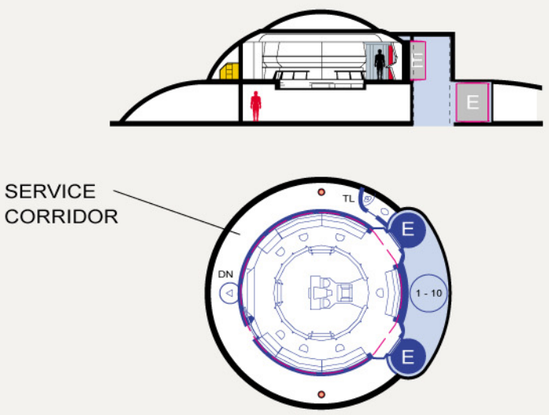
In all these alternate versions, the Bridge faces forward ... as it was always meant to be (in my humble opinion).



DECK 1: BRIDGE (v1)



DECK 1: BRIDGE (v2)



DECK 1: BRIDGE (v3)

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

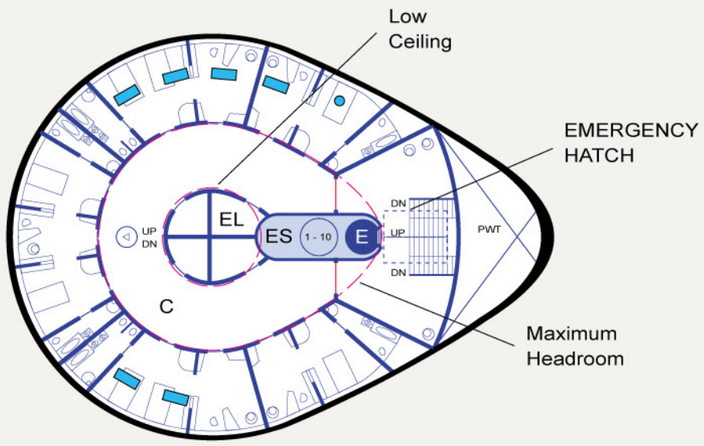
LAYOUT: DECK 2

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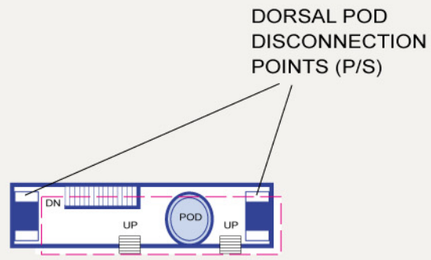
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DECK 2: V.I.P. QUARTERS





NOTES

DECK 2
Even after adjusting the spacing of the top 4 decks, the recess in the center of the Bridge still affects the ceiling of Deck 2. The ceiling in the center of Deck 2 is so low that it can only be used for storage. That area is labeled Environmental Lockers (EL) and contains full spacesuits, partial suits, air-testing kits, etc ... useful if exiting via the top hatch.

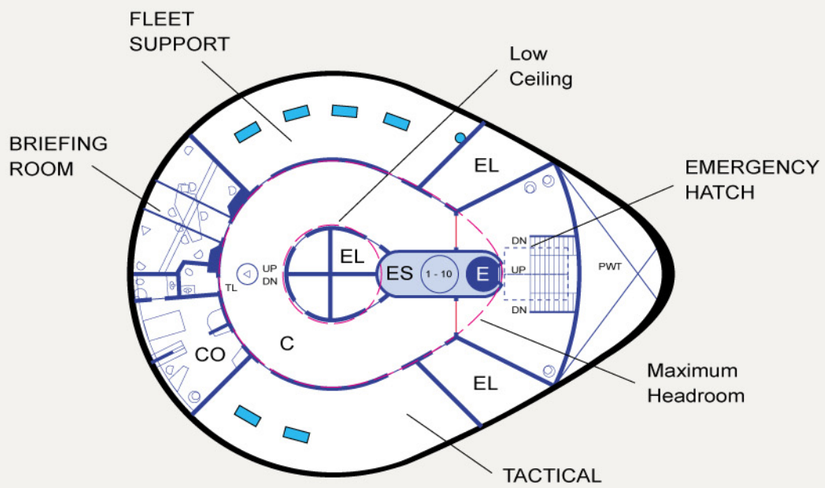
In at least one episode, a character left the Bridge and a second later a turbo-elevator was available for another character to leave the Bridge. Spare turbo-elevators must be stored somewhere nearby, so one such storage spot is on Deck 2.

For missions of a military nature, this deck could contain a Briefing Room, the Captain's Ready Room, and other stations to help support whatever military duties are assigned.

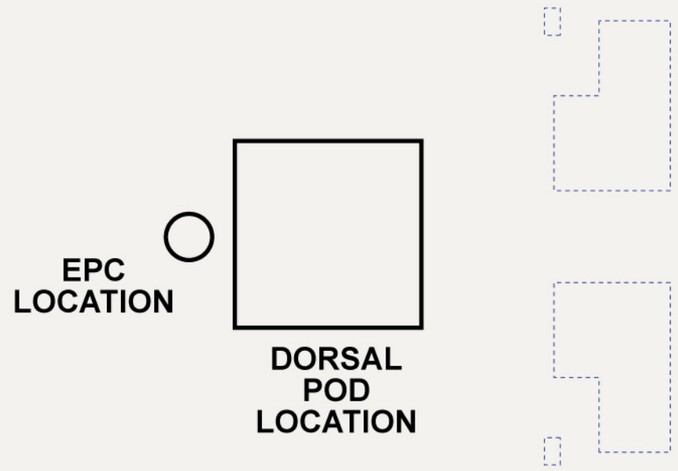
For exploration missions, this deck could be reconfigured with Science Labs, as needed.

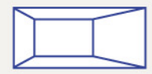
Above and below are two other possible, alternate configurations.

Stairs allow many people to exit the ship quickly. I can't imagine people trying to exit a ship (especially in an emergency situation) by using ladders. We never saw stairs but that does not mean stairs do not exist. The location of the hatch for these stairs coincides with an external marking on the studio model of the U.S.S ENTERPRISE.

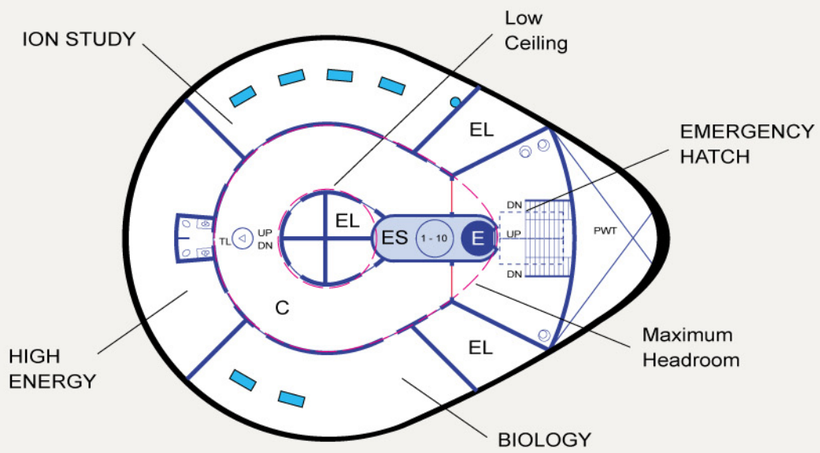


DECK 2: BRIEFING ROOM / READY ROOM

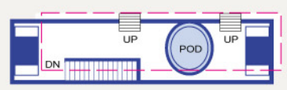




LANDING
TRACTOR
BEAM
(P/S)



DECK 2: SCIENCE LABORATORIES



DECK 2: DORSAL PYLON

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: DECK 3

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0 5 10 15 20
METERS

NOTES

DECK 3

NOTE: Only the teardrop shape is full height. The extensions to the sides and the rear are actually very thin.

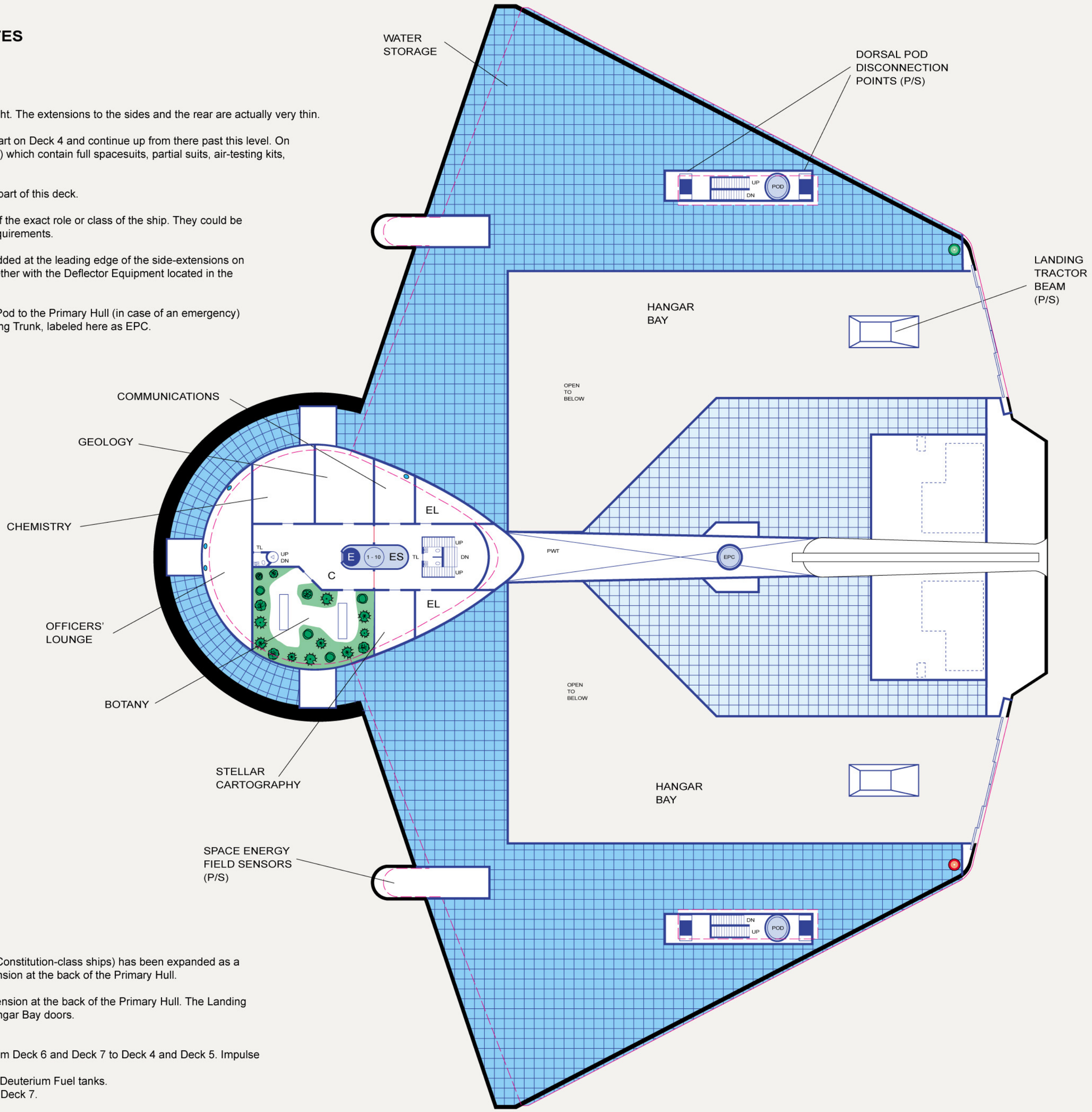
Stairs for the emergency exit on Deck 2 start on Deck 4 and continue up from there past this level. On either side are storage spaces (labeled EL) which contain full spacesuits, partial suits, air-testing kits, etc ... useful if exiting via the top hatch.

An Officers' Lounge occupies the forward part of this deck.

Some Science Labs will exist regardless of the exact role or class of the ship. They could be reconfigured depending on the mission requirements.

Space Energy Field Sensors have been added at the leading edge of the side-extensions on the Primary Hull. These sensors work together with the Deflector Equipment located in the bow of Deck 6 and Deck 7.

The equipment for connecting the Dorsal Pod to the Primary Hull (in case of an emergency) is located in the middle of the Piping / Wiring Trunk, labeled here as EPC.



DECK 3 (continued)
Water storage all around (as is typical on Constitution-class ships) has been expanded as a top layer of protection for most of the extension at the back of the Primary Hull.

The Hangar Bay occupies most of the extension at the back of the Primary Hull. The Landing Tractor Beam is located just inside the Hangar Bay doors.

The Impulse Engines have been raised from Deck 6 and Deck 7 to Deck 4 and Deck 5. Impulse Engineering has also been raised.
The Engineering section is surrounded by Deuterium Fuel tanks.
Warp Engineering remains on Deck 6 and Deck 7.

DECK 3: SCIENCES / LOUNGE

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: DECK 4

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0 5 10 15 20
METERS

NOTES

DECK 4
The Hangar Bays extend from Deck 3 down to Deck 6. The Shuttlecraft Maintenance areas are located on Deck 7.

Flight Control is at the front of each Hangar Bay and Ladders lead down to the Hangar Deck. On the other side is Hangar Bay Operations.

The Standard Gases located here store air while the Hangar Bay doors are open to vacuum.

Stairs for mass exodus via the hatch on Deck 2 start on this deck. Storage spaces (EL) are located nearby. These contain full spacesuits, partial suits, air-testing kits, etc ... useful if exiting via the top hatch.

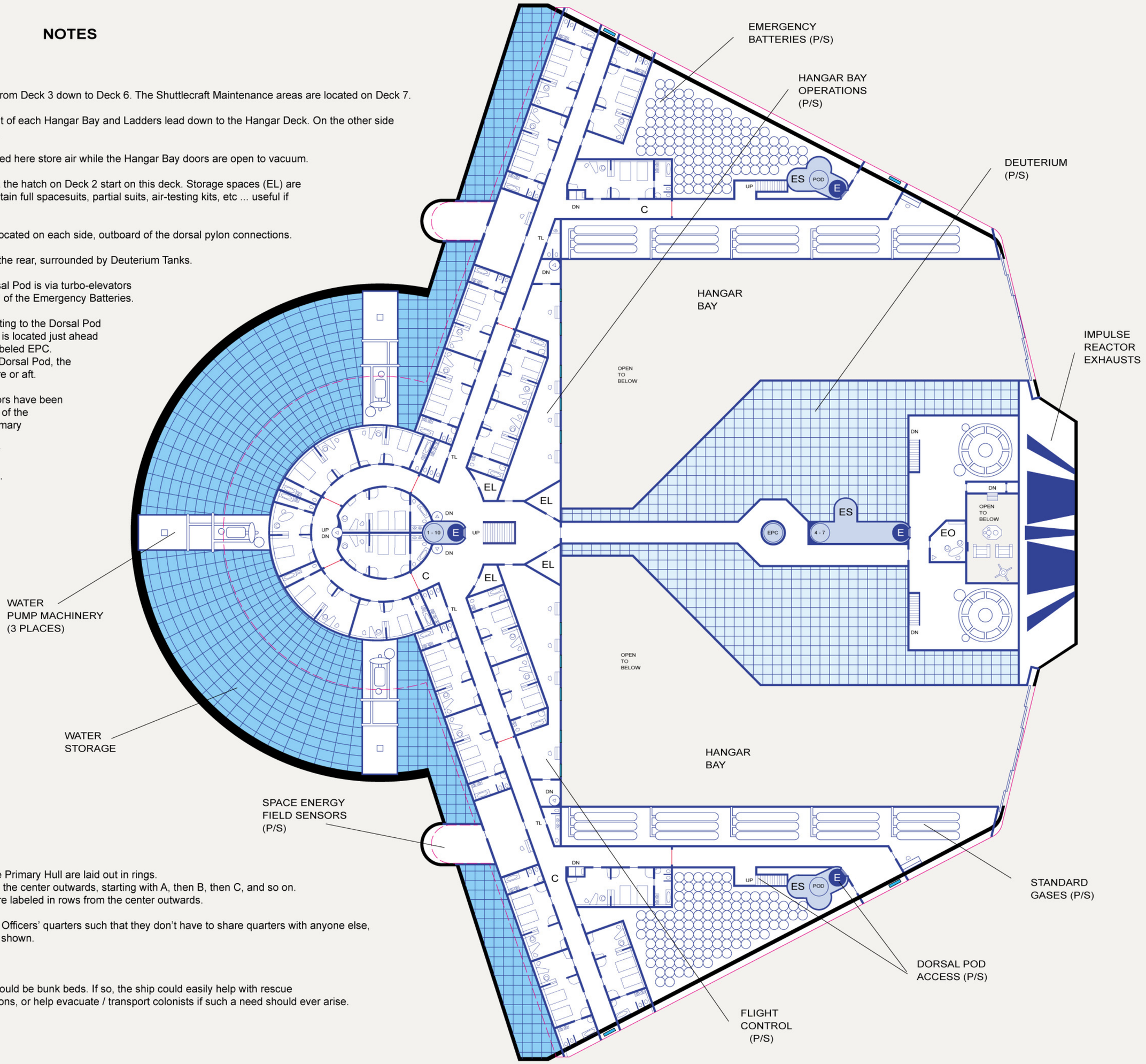
Emergency Batteries are located on each side, outboard of the dorsal pylon connections.

Impulse Engineering is at the rear, surrounded by Deuterium Tanks.

Normal access to the Dorsal Pod is via turbo-elevators and stairs, located inboard of the Emergency Batteries.

The equipment for connecting to the Dorsal Pod (in case of an emergency) is located just ahead of Impulse Engineering, labeled EPC.
Once evacuated from the Dorsal Pod, the crew can then continue fore or aft.

Space Energy Field Sensors have been added at the leading edge of the side-extensions on the Primary Hull. These sensors work together with the Deflector Equipment located in the bow of Deck 6 and Deck 7.



DECK 4 (continued)
Most of the Quarters in the Primary Hull are laid out in rings.
The rings are labeled from the center outwards, starting with A, then B, then C, and so on.
The rest of the Quarters are labeled in rows from the center outwards.

There are sufficient Junior Officers' quarters such that they don't have to share quarters with anyone else, even if there are two beds shown.

Many of the beds shown could be bunk beds. If so, the ship could easily help with rescue missions, diplomatic missions, or help evacuate / transport colonists if such a need should ever arise.

DECK 4: JUNIOR OFFICERS' QUARTERS

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: DECK 5 **PAGE 12 of 19**

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0 5 10 15 20
METERS

NOTES

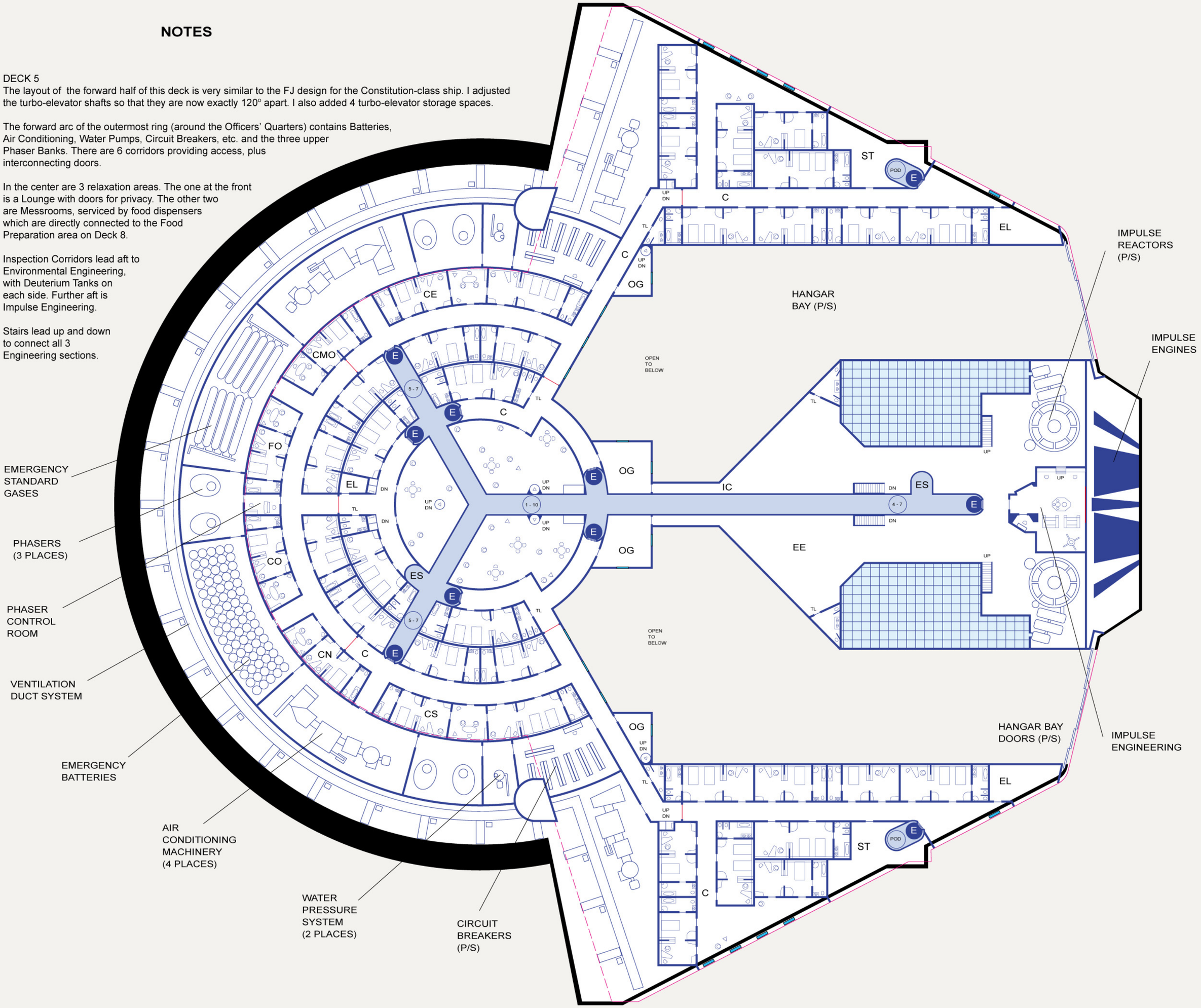
DECK 5
The layout of the forward half of this deck is very similar to the FJ design for the Constitution-class ship. I adjusted the turbo-elevator shafts so that they are now exactly 120° apart. I also added 4 turbo-elevator storage spaces.

The forward arc of the outermost ring (around the Officers' Quarters) contains Batteries, Air Conditioning, Water Pumps, Circuit Breakers, etc. and the three upper Phaser Banks. There are 6 corridors providing access, plus interconnecting doors.

In the center are 3 relaxation areas. The one at the front is a Lounge with doors for privacy. The other two are Messrooms, serviced by food dispensers which are directly connected to the Food Preparation area on Deck 8.

Inspection Corridors lead aft to Environmental Engineering, with Deuterium Tanks on each side. Further aft is Impulse Engineering.

Stairs lead up and down to connect all 3 Engineering sections.



DECK 5: SENIOR OFFICERS' QUARTERS

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: DECK 6 **PAGE 13 of 19**

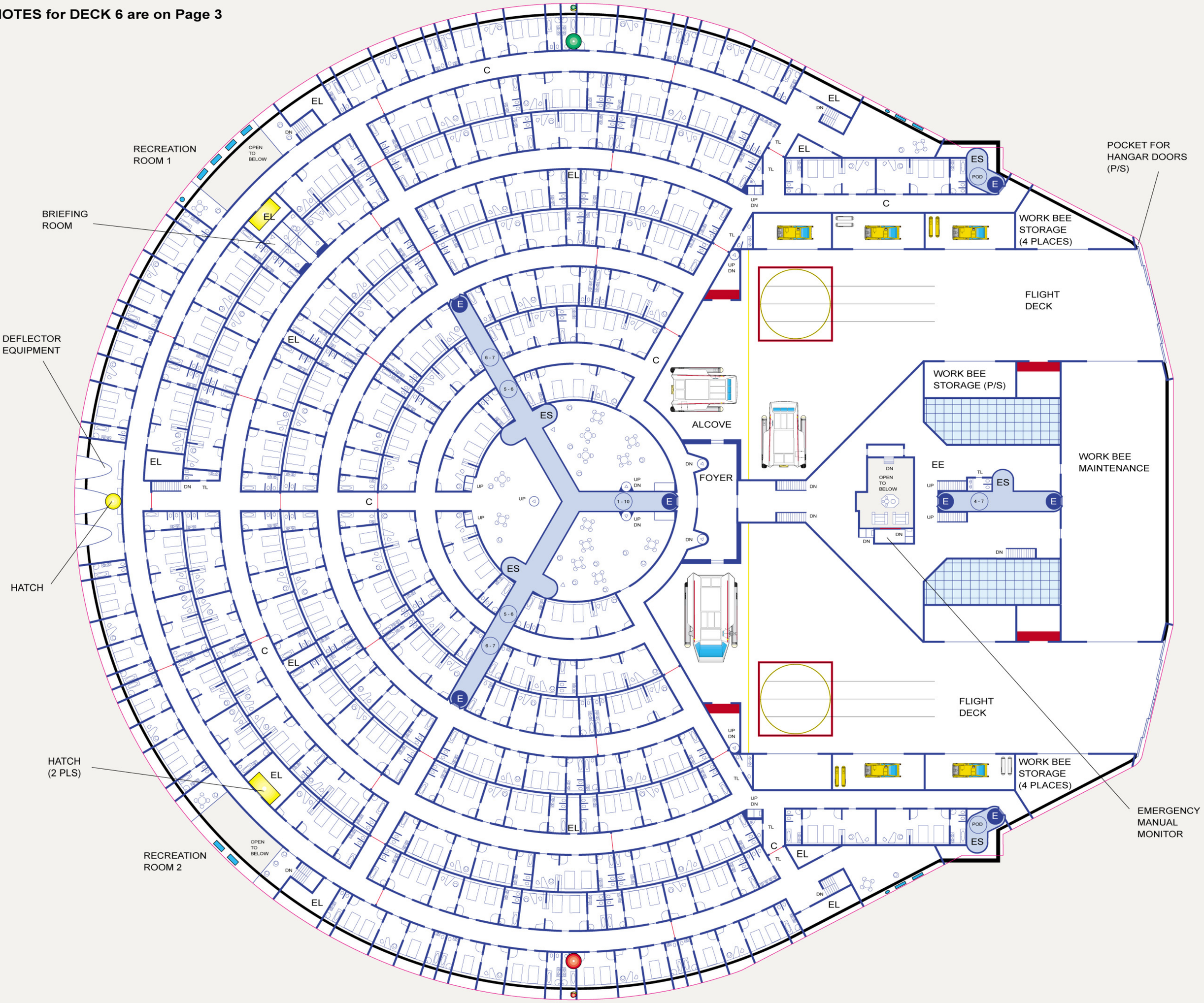
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0 5 10 15 20
METERS

NOTES for DECK 6 are on Page 3



DECK 6: CREW'S QUARTERS / ENGINEERING / HANGAR DECK

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: DECK 7 **PAGE 14 of 19**

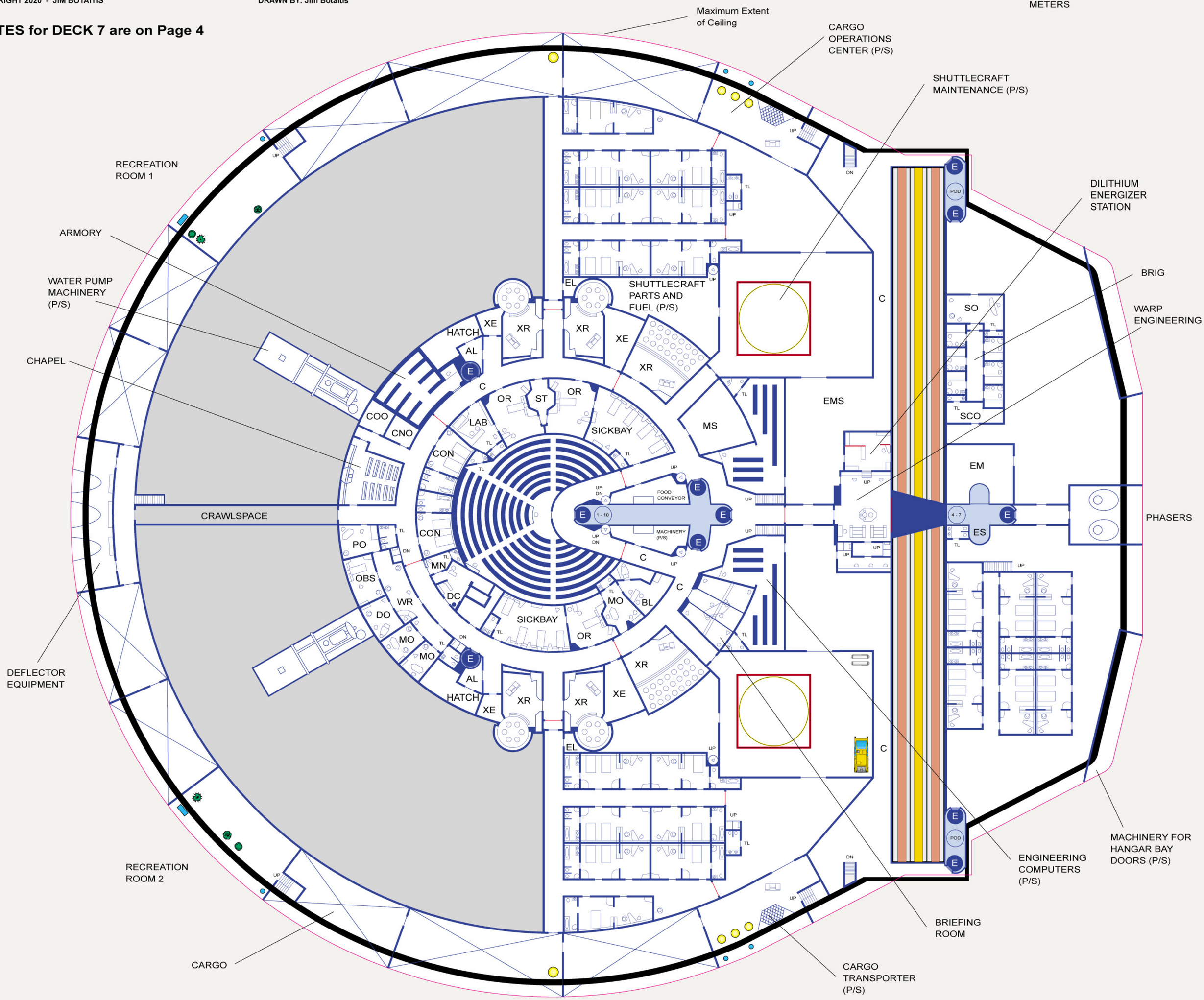
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0 5 10 15 20
METERS

NOTES for DECK 7 are on Page 4



DECK 7: SICKBAY / ENGINEERING

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: DECK 8 **PAGE 15 of 19**

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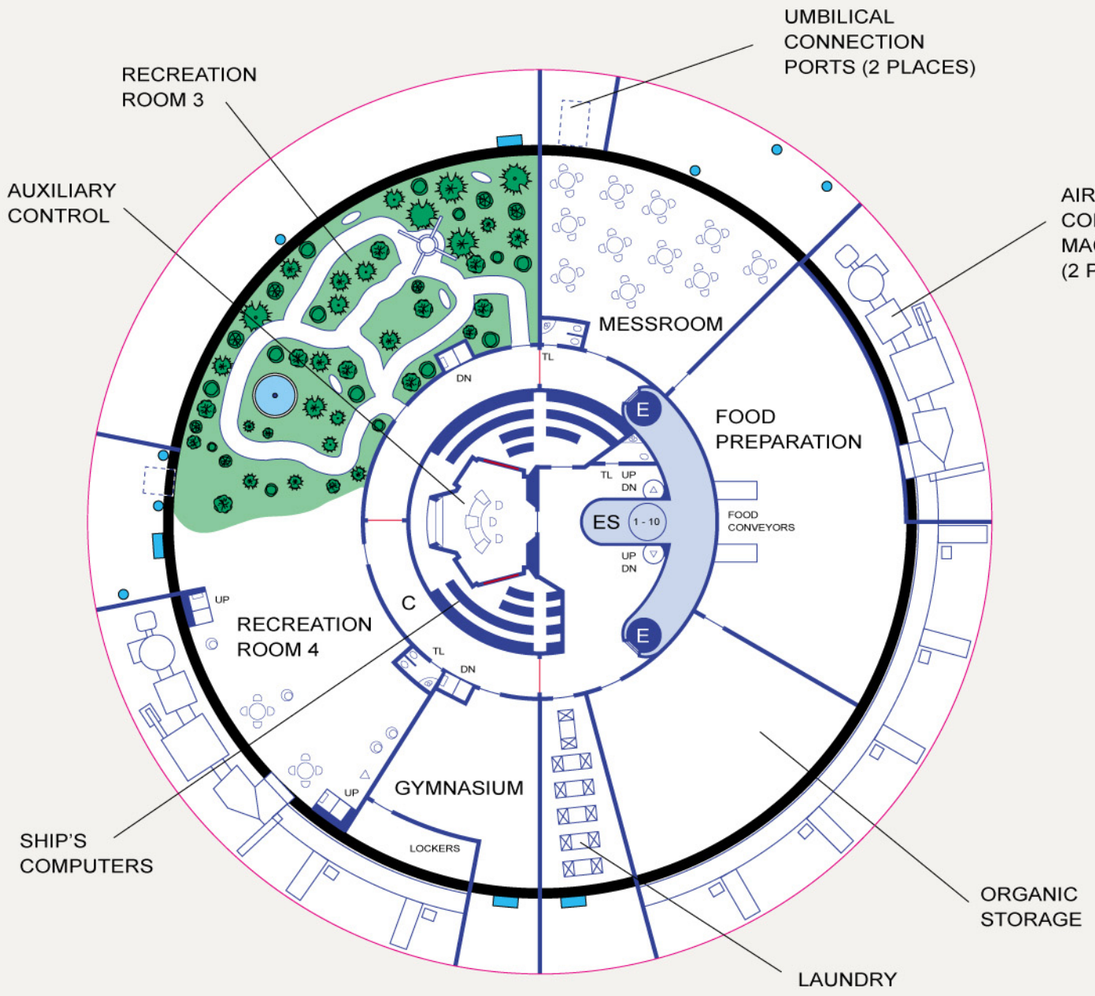
NOTES

DECK 8
Most of this deck is unchanged from the configuration of the Constitution-class ship. Laundry, Food Preparation, Main Recreation and Entertainment areas are here.

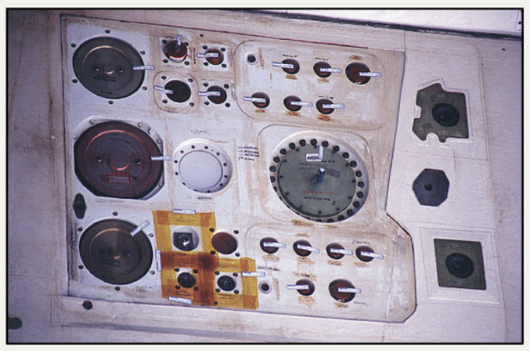
The Auxiliary Control is surrounded by the ship's Main Computers which continue here from the center of Deck 7.

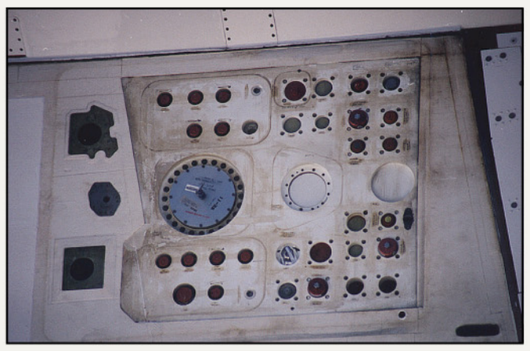
The Food Preparation area has two "conveyors" which distribute food upwards into the Messrooms located on Deck 6 and Deck 5.

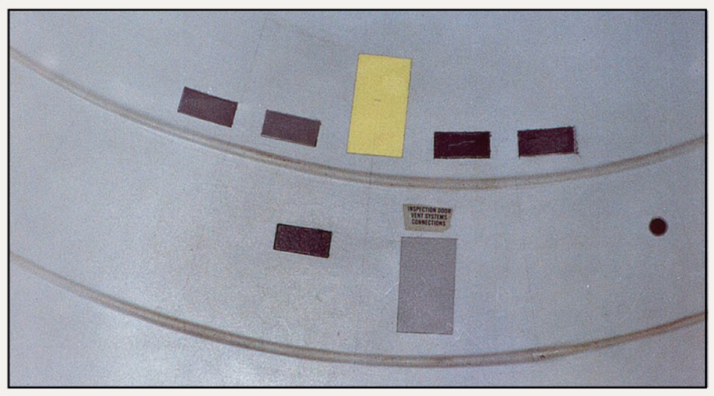
DECK 8 (continued)
There are four hatches or ports on the studio model. Two of them are on Deck 8. The other two are on Deck 9. Images of these hatches are below, right. Their distribution on the studio model is asymmetric, as are the windows around them. The hull is at such an extreme angle that even the longest hatch results in an opening only 4 feet (1.2 meters) tall. A crew member in a spacesuit can not fit through any of these hatches. Instead, these 2 hatches probably have a function similar to the Umbilical Connection Panels as on the Space Shuttle (below, left).

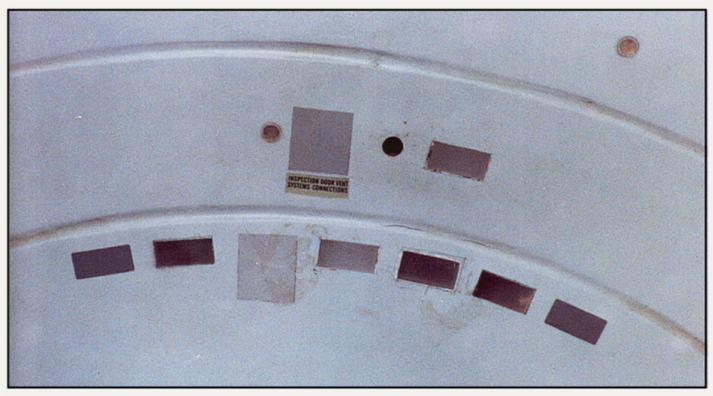


DECK 8: ENTERTAINMENT / RECREATION FACILITIES









STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: DECKS 9 and 10 PAGE 16 of 19

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NOTES

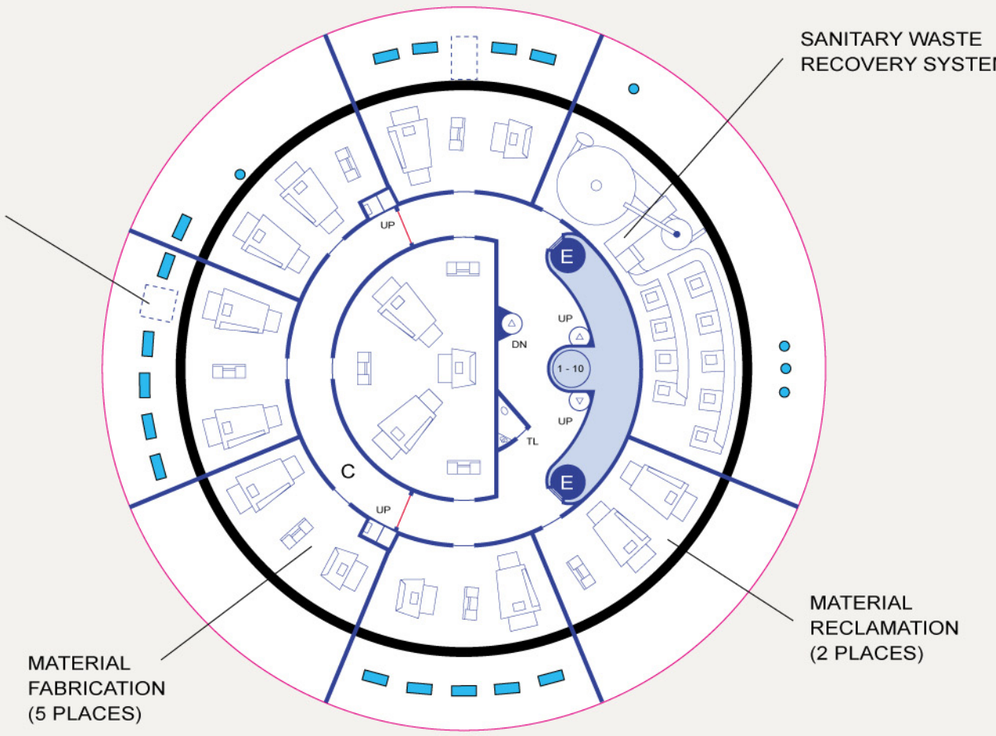
DECK 9
Most of this deck is unchanged from the original configuration of the Constitution-class ship. Material Reclamation and Fabrication is probably not a 100% efficient process. Therefore, these 2 hatches could allow for transfer of rare elements required in various manufacturing processes.

DECK 10
TMoST mentions Photon Torpedoes but not their location. Photon Torpedoes were shown in various episodes of STAR TREK to emanate from the underside of the Primary Hull, approximately the same place as the Phasers. Since TMoST states Phaser Banks are on Deck 11, the logical spot for Photon Torpedoes and their launch system is on Deck 10.

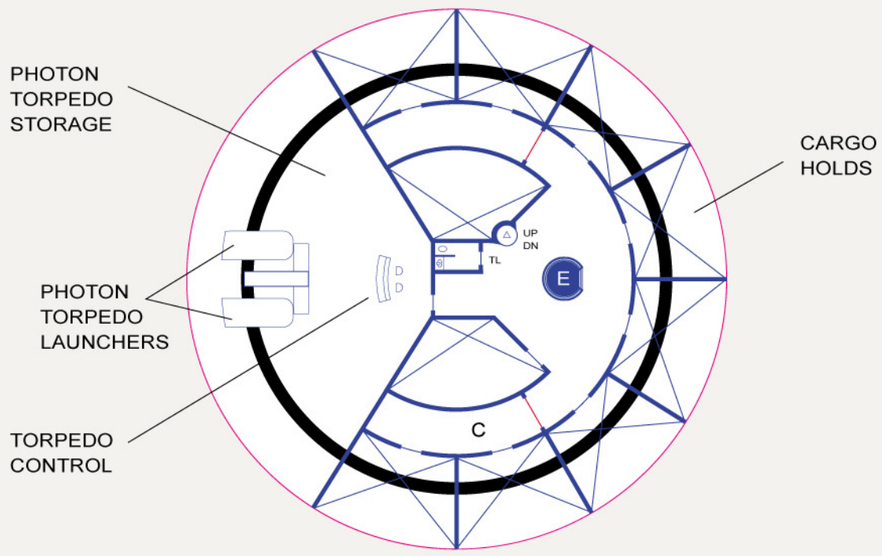
The rest of the deck is filled with Cargo Holds.

SHIP DATA

LENGTH:	231 m
WIDTH:	127 m
HEIGHT:	62 m
TRANSPORTERS	
6-person:	4
22-person:	2
cargo:	2
SHUTTLECRAFT:	10
WORKBEES:	8
PHASERS	
banks of 2:	7
TORPEDO TUBES:	2



DECK 9: FABRICATION FACILITIES



DECK 10: PHOTON TORPEDO LAUNCHERS / CARGO

SHIP'S COMPLEMENT

OFFICERS	50
ENLISTED	270
TOTAL	320

ACCOMMODATIONS

DECK 4 -	Ring A -	4
	Ring B -	5
	Row A -	24
	Row B -	4
DECK 5 -	Ring A -	8
	Ring B -	8
	Ring C -	10
	Row A -	16
	Row B -	8
	Row C -	2
DECK 6 -	Ring A -	8
	Ring B -	12
	Ring C -	20
	Ring D -	28
	Ring E -	32
	Ring F -	44
	Ring G -	36
	Ring H -	36
DECK 7 -	Row A -	12
	Row B -	8
	Row C -	12
TOTAL:		327

STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: DECKS 11 and 12 PAGE 17 of 19

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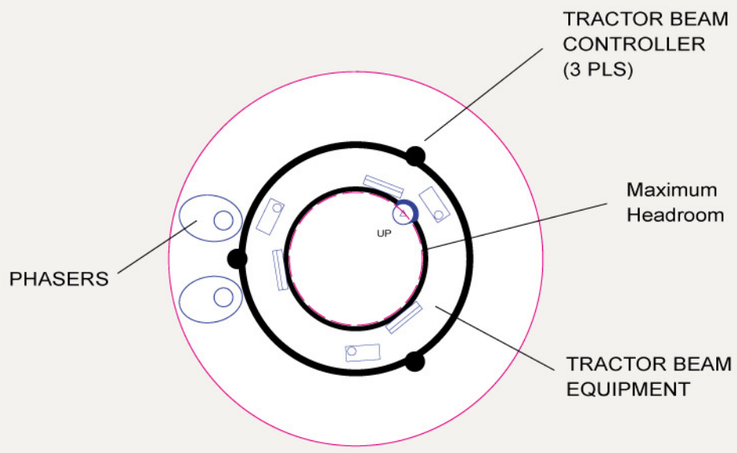


NOTES

DECK 11
Phasers are located on this deck.

The equipment around the perimeter is for the Tractor Beam. The 3 Tractor Beam Controllers direct the Emitter so that the beam can locate and lock onto the object being towed.

The 3 pale gold-coloured recessed rings on the underside of the Primary Hull absorb and re-direct any back-scatter created by the Tractor Beam.



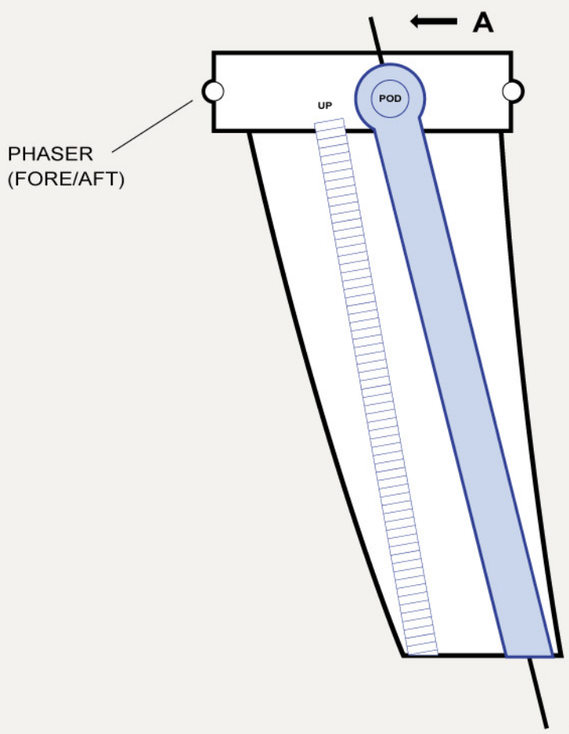
DECK 11: PHASERS / TRACTOR BEAM

DECK 12
The Lower Sensor Dome is located here.
The Tractor Beam Emitter is at the bottom of the Lower Sensor Dome.



DECK 12: SENSORS / TRACTOR BEAM

STARBOARD PHASER AND PYLON TO DORSAL POD (Plan View)

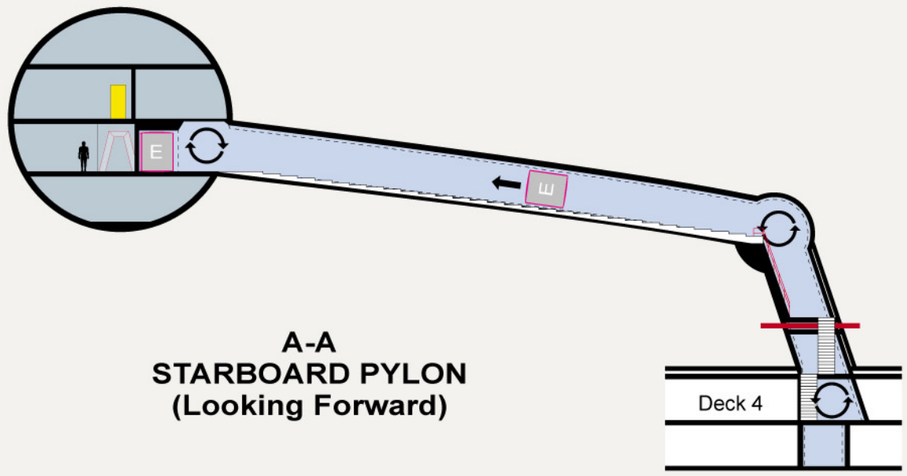


VIEW A-A (SEE AT RIGHT)

PYLON
The pylon contains the disconnection equipment for the separation plane. There are some monitoring stations but it is otherwise unoccupied.

View A-A (below) shows that the turbo-elevator can fit in the pylon. There is space set aside at each end, as well as in the phaser housing, for the rotation.

This view also shows some of the internal pylon details (stairs, ladders, etc) even though those details would only be visible if the cross-section was much further forward.



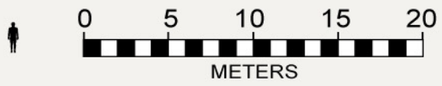
A-A
STARBOARD PYLON
(Looking Forward)

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GENERAL NOTES

When Matt Jefferies designed the U.S.S. ENTERPRISE, he wanted a smooth hull. He reasoned that if anything needed to be accessed, it would be done so from inside the ship. But if red rectangles and yellow circles exist on the hull, they must be there for emergency situations, quick identification, or some aspect of ship's operations.

Matt Jefferies understood that incredible energies would be required to propel a ship faster than light. If this is accomplished with antimatter, why store it in the habitable section of the ship? He and Gene Roddenberry both loved airplanes; they understood and agreed on the importance of isolating dangerous components, yet still making them accessible if required. Yes, Dilithium Crystals are stored in or near Engineering and help modify / channel the energy, but why does the antimatter need to be stored in or near Engineering?

The idea of a Bussard Ramjet was developed in 1960. This label was applied to the U.S.S. ENTERPRISE engines retroactively, after the series ended. A Bussard Ramjet compresses matter for fusion. The grey area on the engine nacelle could indicate where that matter is stored. But on the U.S.S. ENTERPRISE the matter is then mixed with antimatter. Therefore, the red rectangle on the engine nacelle could indicate where the antimatter is stored.

The red rectangle on the engine nacelle could be an access hatch, or an "Emergency Jettison" hatch. Dialogue in various episodes of STAR TREK corroborates the idea of disengaging, discarding, or jettisoning the warp engine nacelles. Dialogue also mentions ejecting the antimatter pod.

The idea of a "Warp Core" came along much later, when the ENTERPRISE was refit for the movies. Will Decker told Kirk, "This is an almost totally new ENTERPRISE." The idea of "ejecting a Warp Core" was introduced in STAR TREK THE NEXT GENERATION. These drawings make no attempt to "retcon" such concepts.

The huge pipes / conduits (visible through the grille behind Engineering) was a set built with forced perspective to suggest immense size and power. The angle on the conduits suggests they continue up the pylons of the U.S.S. ENTERPRISE.

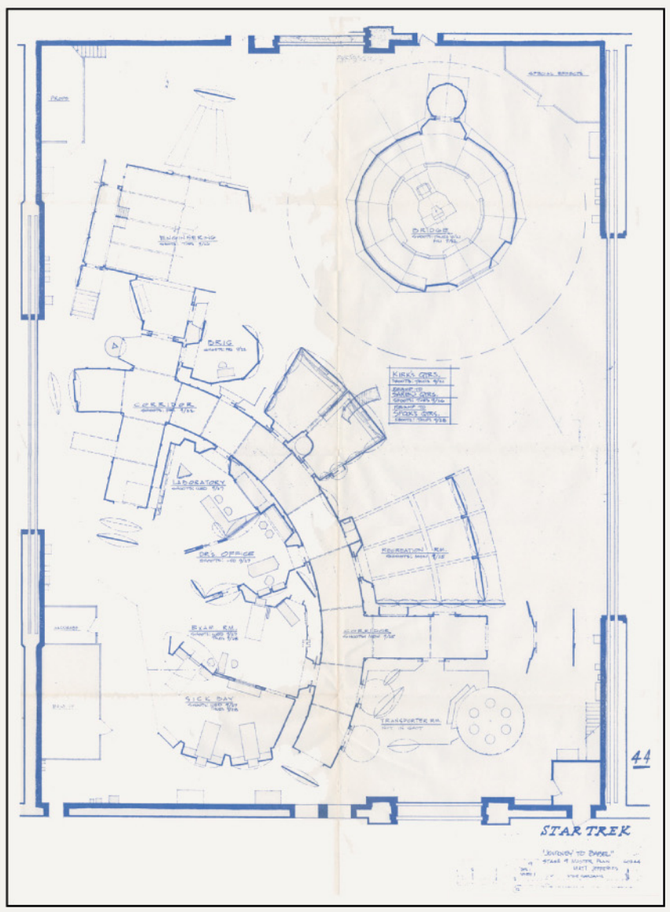
Regarding the antimatter:
CASE 1. Collect matter in the engine nacelle, send the matter to Engineering, mix it (in the habitable section of the ship) with antimatter (stored in the habitable section of the ship!), pass the energy through the Dilithium Crystals, then send the energy up to the engine nacelles to create the warp field.
CASE 2. Collect matter in the engine nacelles, mix it (in the engine nacelles) with antimatter (stored in the engine nacelles), send the energy to Engineering, pass the energy through the Dilithium Crystals, then send the energy up to the engine nacelles to create the warp field.

In both cases, energy is being transmitted. There is no need to move the fuel too (as in Case 1).
Case 1 is unnecessarily complicated.
Case 2 is simpler, and as a bonus, the antimatter is kept away from the habitable section of the ship.

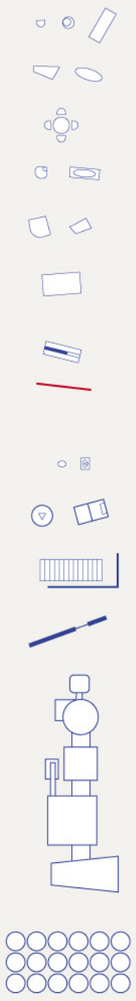
ABBREVIATIONS

AL	-	AIRLOCK
BL	-	BIO LAB
C	-	CORRIDOR
CE	-	CHIEF ENGINEER
CMO	-	CHIEF MEDICAL OFFICER
CN	-	CHIEF NURSE
CNO	-	CHIEF NAVIGATOR'S OFFICE
CO	-	COMMANDING OFFICER
COO	-	COMMUNICATIONS OFFICER'S OFFICE
CON	-	CONVALESCENT WARD
CS	-	CHIEF OF SECURITY
DC	-	DECOMPRESSION CHAMBER
DN	-	DOWN
DO	-	DENTIST'S OFFICE
E	-	TURBO-ELEVATOR CAR
EE	-	ENVIRONMENTAL ENGINEERING
EL	-	ENVIRONMENTAL SUIT LOCKER
EM	-	TURBO-ELEVATOR MAINTENANCE
EMS	-	ENGINEERING MACHINE SHOPS
EO	-	CHIEF ENGINEER'S OFFICE
EPC	-	EMERGENCY POD CONNECTION
ES	-	ELEVATOR STANDBY / STORAGE
EW	-	ELECTRONIC WARFARE
FO	-	FIRST OFFICER
IC	-	INSPECTION CORRIDOR
LAB	-	LABORATORY
LL	-	LANDING LEG
LLM	-	LANDING LEG MACHINERY
MN	-	DUTY NURSE
MO	-	DOCTOR'S OFFICE
MS	-	MEDICAL SUPPLIES
OBS	-	OBSTETRICS
OG	-	OBSERVATION GALLEY
OR	-	OPERATING ROOM
P	-	PORT (LEFT)
PLS	-	PLACES
PO	-	PSYCHIATRIST'S OFFICE
PWT	-	PIPING / WIRING TRUNK
S	-	STARBOARD (RIGHT)
SO	-	SECURITY OFFICE
SCO	-	SECURITY CHIEF'S OFFICE
ST	-	STORAGE
TL	-	TOILET
WR	-	WAITING ROOM
XE	-	TRANSPORTER EQUIPMENT
XR	-	TRANSPORTER ROOM

THE DESILU STAGE AT THE SAME SCALE



PLAN SYMBOLS



CHAIRS

TABLES

DINING TABLE

SHOWER, TUB

DRESSERS

BED

ROOM PARTITIONS
- White circular grille
- Red hexagonal grille

TOILET, SINK

LADDERS

STAIRS, RAILING

WALL and DOOR

AIR CONDITIONING EQUIPMENT

BATTERIES



MEDICAL DIAGNOSTIC BED

CONTROL CONSOLES

ISOLATION DOOR

CIRCUIT BREAKERS

COMPUTERS

WATER PRESSURE SYSTEM

LAUNDRY UNIT

WATER PUMP MACHINERY

HULL THICKNESS AT FLOOR LEVEL (Varies depending on hull curvature)



TREE, SHRUB

FOUNTAIN

SANITARY WASTE RECOVERY SYSTEM

MATERIAL FABRICATION / RECLAMATION MACHINERY

STANDARD GASES

INNER FACE OF HULL
(Used to show the undercut on Deck 7)

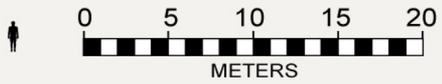
STAR TREK - AVENGER-CLASS HEAVY FRIGATE

LAYOUT: DORSAL POD

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DRAWN BY: Jim Botaitis

If printed 17 inches tall (from black-outlined edge to black-outlined edge) the scale of these drawings is 1/350.



NOTES

TACTICAL & WARFARE ELECTRONIC COUNTERMEASURES EQUIPMENT (EW) Pod

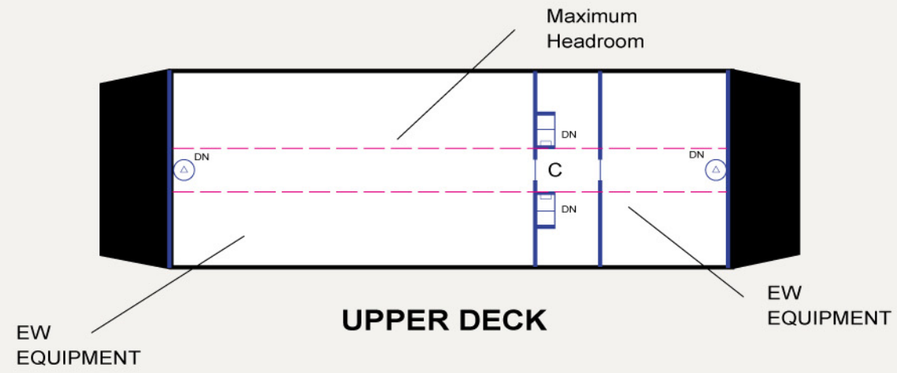
Offering much more than just stealthy intelligence-gathering methods, this pod can also disrupt the capabilities of others to assess their surroundings and to communicate their findings.

The Upper Deck contains most of the information processing and analysis equipment.

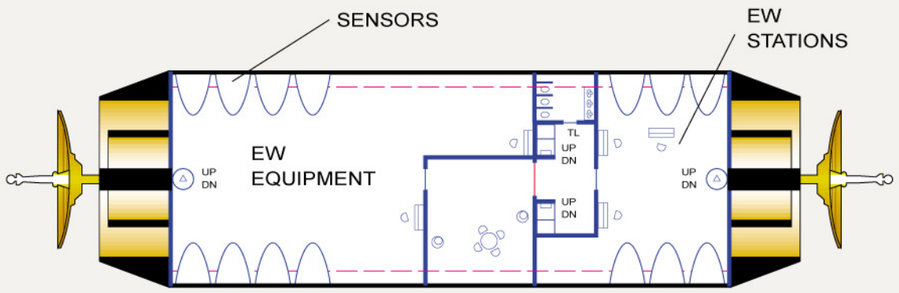
The Middle Deck contains most of the sensors and work stations. In the center are the main ladders, restrooms, a Lounge, and corridors.

The Lower Deck contains more sensors, equipment and work stations, plus personnel lockers, the main access ladders and corridor, as well as the pylon connection points. The pylons provide the main access from and to the rest of the ship via turbo-elevators and stairs. The stairs are very long and shallow.
In emergencies, a vertical tube-connection is established to the Hangar Bay. That connection is at the front of this deck, shown here as EPC.

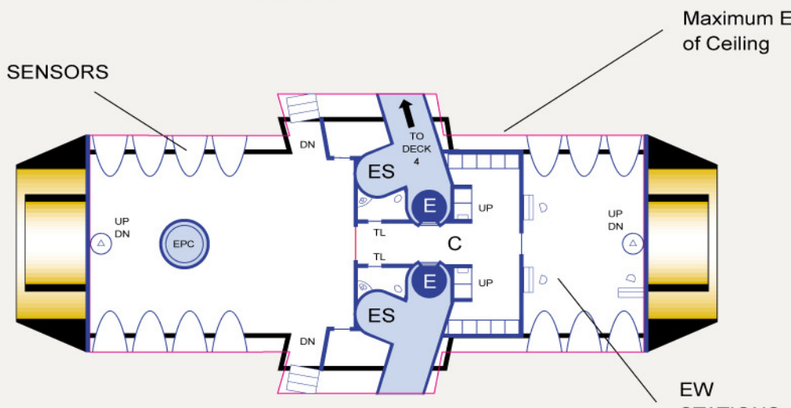
The Bottom Deck contains batteries and an inspection corridor accessed by ladders at each end. The EPC continues down through this deck.



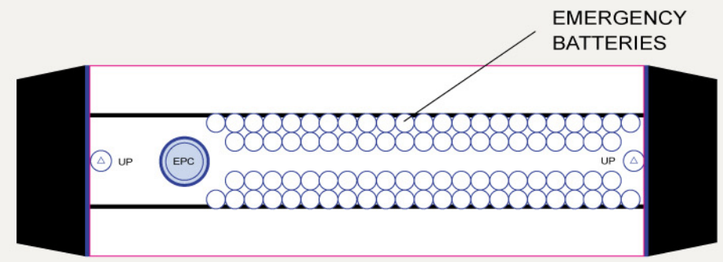
UPPER DECK



MIDDLE DECK



LOWER DECK



BOTTOM DECK

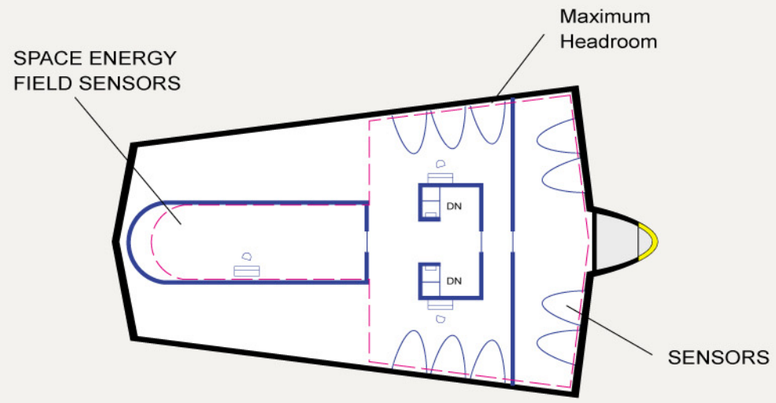
WEAPONS Pod

Photon Torpedoes, Photon Torpedoes, and even more Photon Torpedoes. Plus sensors to guide them.

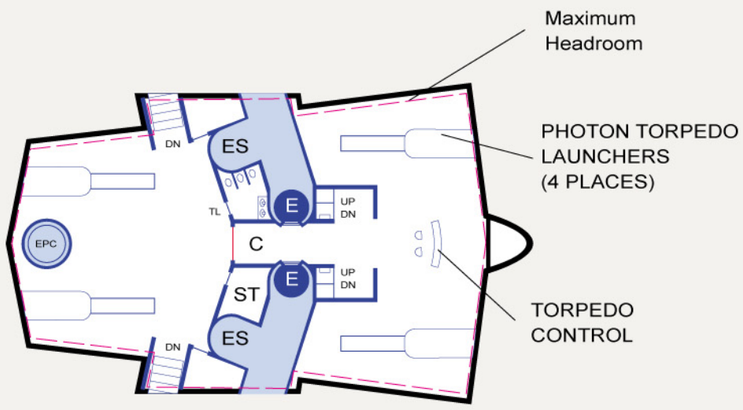
The Top Deck contains most of the information processing, analysis, and guidance equipment for the torpedoes. Note that the Space Energy Field Sensor protrudes almost a full level above this deck.

The Middle Deck contains the work stations. In the center are the restrooms, main access ladders and corridor, as well as the pylon connection points. The pylons provide the main access from and to the rest of the ship via turbo-elevators and stairs. The stairs are very long and shallow.
In emergencies, a vertical tube-connection is established to the Hangar Bay. That connection is at the front of this deck, shown here as EPC.

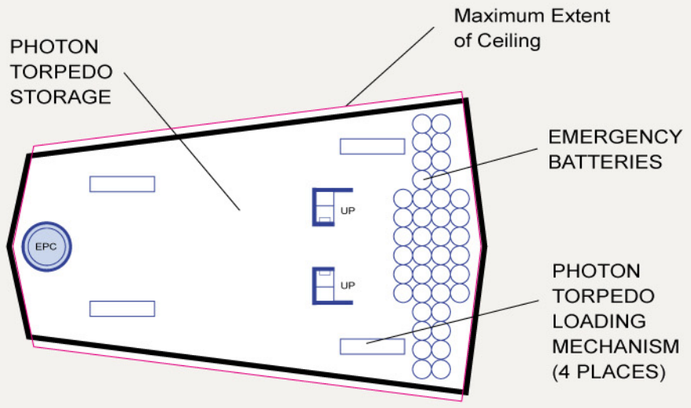
The Bottom Deck contains batteries, Photon Torpedoes, and the torpedo loading equipment. The EPC continues down through this deck.



TOP DECK



MIDDLE DECK



BOTTOM DECK

Many other pods are available. Custom configurations are also possible.
For more information, contact STARFLEET Headquarters, San Francisco, Earth.