SAFETY SUPPLEMENT

TECHNICAL MANUAL

AEROSPACE EMERGENCY RESCUE AND MISHAP RESPONSE INFORMATION (EMERGENCY SERVICES)

THIS PUBLICATION SUPPLEMENTS TO 00-105E-9 REVISION 8, DATED 30 SEPTEMBER 2002, LOCATED AT WEB SITE:**http://www.robins.af.mil/logistics/LGEDA/Documents/to00-105e-9.htm**.

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PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE

18 February 2004

1. PURPOSE.

This supplement provides instructions for update of TO 00-105E-9 Revision 8, dated 30 September 2002, affecting Chapter 10 USAF Observation/Reconnaissance Aircraft. This supplement is a new file for the latest information regarding the YAL-1A Airborne Laser aircraft procedures.

2. INSTRUCTIONS.

a. This information, if it applies to your operation, can be downloaded and printed from this web site by the end user. Use the most current Adobe Reader for this function. This software is free and can be downloaded from Adobe.com at their web site. PDF files should be downloaded with the Reader running on your PC to reduce download time.

b. This supplement to Chapter 10 adds information based on newly researched source data information regarding this ABL aircraft. The new file update should be added to Chapter 10 in TO 00-105E-9 Revison 8. The end user should save this file and print the affected pages, if applicable to the user's operation. File a copy of this Safety Supplement with the main Technical Order according to current regulations.

NOTE

The operational user file is the whole or selected printed pages from the web site placed in a binder used for local, transient operations or both. This information should also be included in mobility boxes where applicable. If your unit or a part of your unit is serving elsewhere, they should be informed of this Safety Supplement and how to obtain it. See TO 00-5-2 paragraphs 1-1.4,1-1.4.1, and 1-1.6 for Local Reproduction of TOs and Digital Media guidance.

THE END

AIRBORNE LASER AIRCRAFT PAINT SCHEME

AIRBORNE LASER AIRCRAFT: 747-400F FREIGHTER PLATFORM

NOTE:

The intent of this aircraft file is not to disclose an indepth explanation of the ABL systems and how the systems work together to create the laser. The following developmental drawings on pages YAL-1A.3 thru YAL-1A.32 are to be used for orientation of the aircraft, locating all on-board personnel in case of mishap and identifying hazards and their locations. Pages YAL-1A.33 and YAL-1A.34 are a 747-400 Freighter similiarly listed in Chapter 18 for the Civil Reserve Air Fleet (CRAF) illustrating aircraft entry and systems shutdown.

CREW EGRESS INFORMATION:

* The aft lower lobe cargo door is BLOCKED.
* The maximum number of personnel is limited by egress capability (16 inertial reels) to 16 SOBs.
* There are no plans to reconfigure and replace the slide bustles on door 1L and the upper deck door, and by putting a slide on door 2R.
* The minimum number of SOBs is the ferry flight crew, Pilot and Copilot.
* All personnel must be forward of STA 1000 during taxi, takeoff, and landing. AFT of STA 1000 in flight is only allowed during a declared emergency, and then only for the absolute minimum duration, in Level A hazmat suit with SCBA.
* During taxi, takeoff, and landing, there are a maximum of 8 SOBs allowed on the upper deck, and a maximum of 8 SOBs allowed on the main deck. This is because there are only egress provisions for 8 on each deck (i.e. 8 inertial reels at each of two egress paths on each deck).
* Other than observation ports and windows on the upper deck, there are no windows on this configuration.

MDA LOGO AND LEFT SIDE VIEW INDICATING TARGET RANGER AND NOSE STRUCTURE APPLIANCES

ABL CHEMICAL INVENTORY AND HAZARDS AND TERMS

HAZARD TRACKING # SA 0050

HAZARD TRACKING # SA 0051

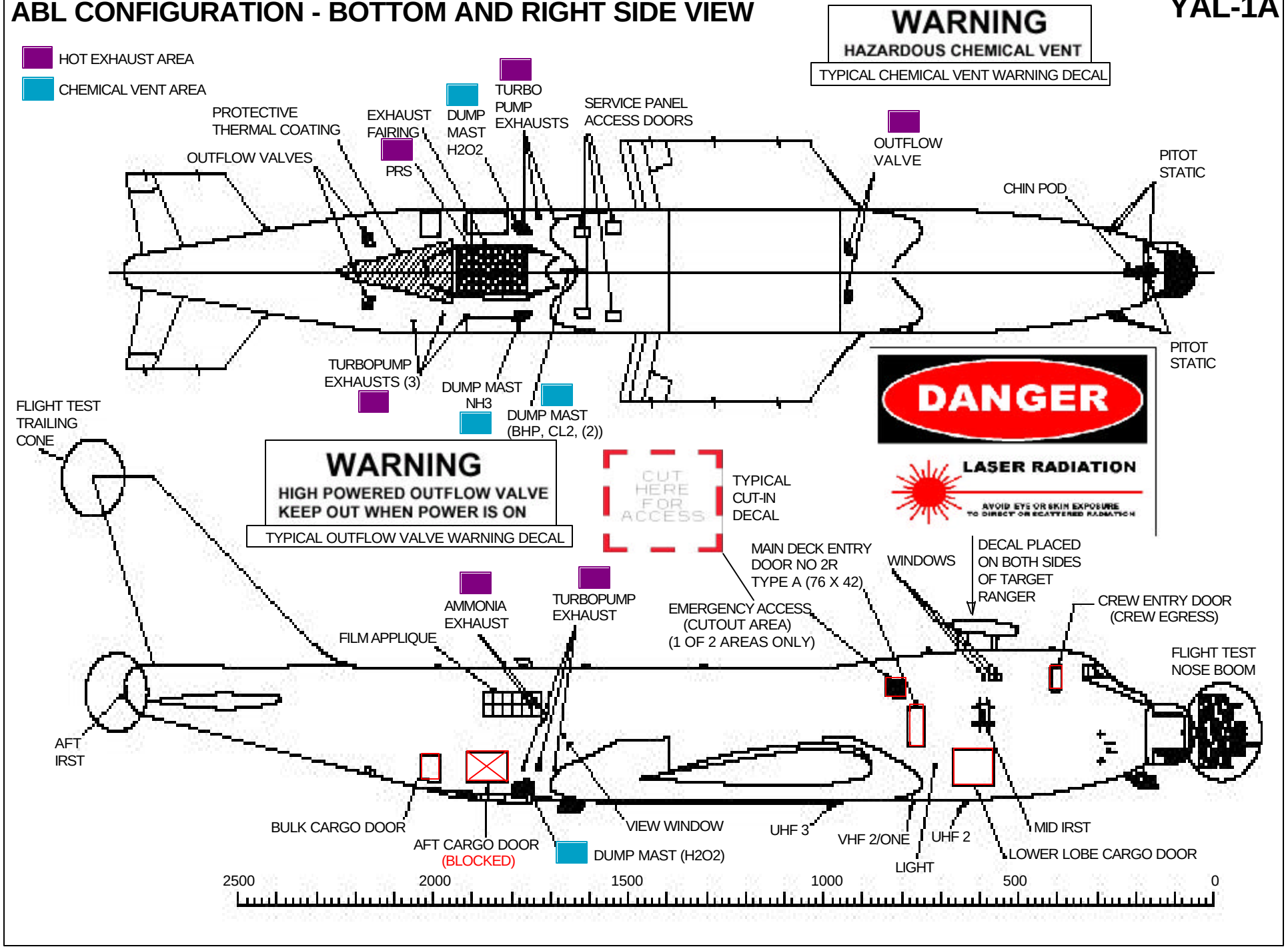
Chemical	On-board Storage (lbs)	FTA/SIL Carts Qty. (gal or lbs)	IMF Storage (gal or lbs)	GPRA Capacity (gal)	Cryogenic	Asphyxiant	Corrosive	Pressure	Fire	Oxidizer	Toxic
Chlorine	950 lbs	1,000 lbs	2000 lbs		X	X	X	X	X	X	X
Ammonia	2,000 lbs	2,000 lbs	4000 lbs		X	X	X	X	X		X
70% H_2O_2	12,000 lbs	12,000 lbs	4,000 gal				X	X	X	X	X
BHP	12,000 lbs	12,000 lbs	12,000 lbs				X	X	X	X	X
Iodine	65 lbs	65 lbs	100 lbs			X	X		X	X	X
GN2	270 lbs	1600				X		X			
GHe	1025 lbs	1900				X		X			
50% H_2O_2			8000 gal					X	X	X	X
LiOH			5000 lbs				X				X
NaOH			10,000 lbs				X				X
KOH			10,000 lbs				X				X
93% H2SO4			220 gal				X				X
30% H_2O_2	12,000 lbs	12,000 lbs	12,000 lbs					X	X	X	X
10% NaOH				3400 gal			X				X
20% NaOH		1700 gal					X				X
25% H2SO4		2900 gal					X				X
20% H3PO4				8500 gal			X				X
LN2			3500 gal		X	X		X			
LCO2			6000 gal		X	X		X			

NOTE:
The column hi-lighted in red is for the chemicals on board the aircraft. The other chemicals not in red are for various ground based facilities and portable transfer carts that interface with the aircraft during laser fueling.

TERMS:
BHP - Basic Hydrogen Peroxide
CL2 - Chloride
FTA - Fluid Transfer Assemblies
GPS - Global Positioning System
H2O2 - Hydrogen Peroxide
He - Helium
I2 - Iodine
IRST - Infrared Sensor and Tracker
MDA - Missile Defence Agency
NH3 - Ammonia
PRS - Pressure Recovery System
UARRSI - Universal Aerial Refueling Receptacle Slipway Installation
WL - Waterline

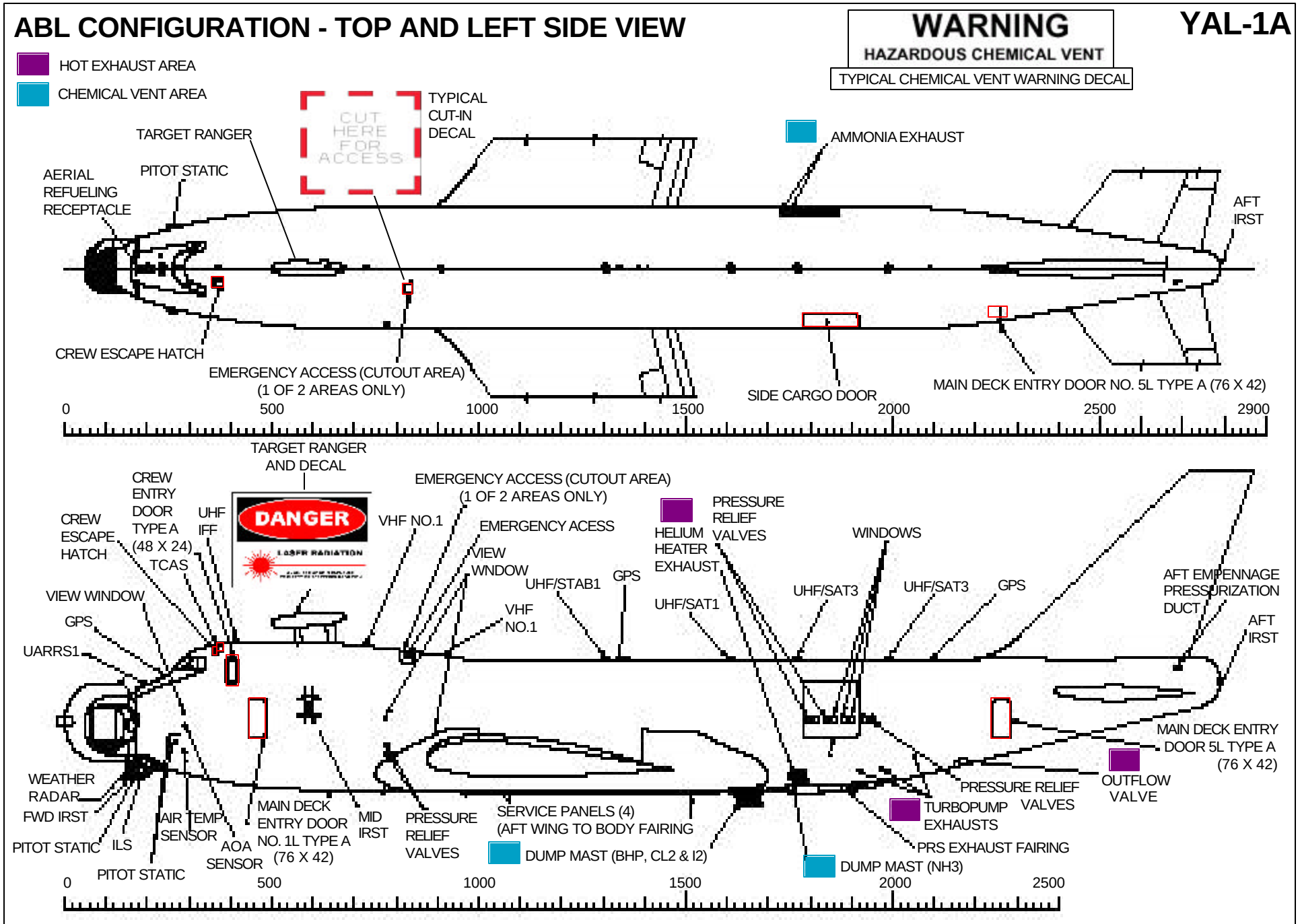
ABL CONFIGURATION - BOTTOM AND RIGHT SIDE VIEW

YAL-1A

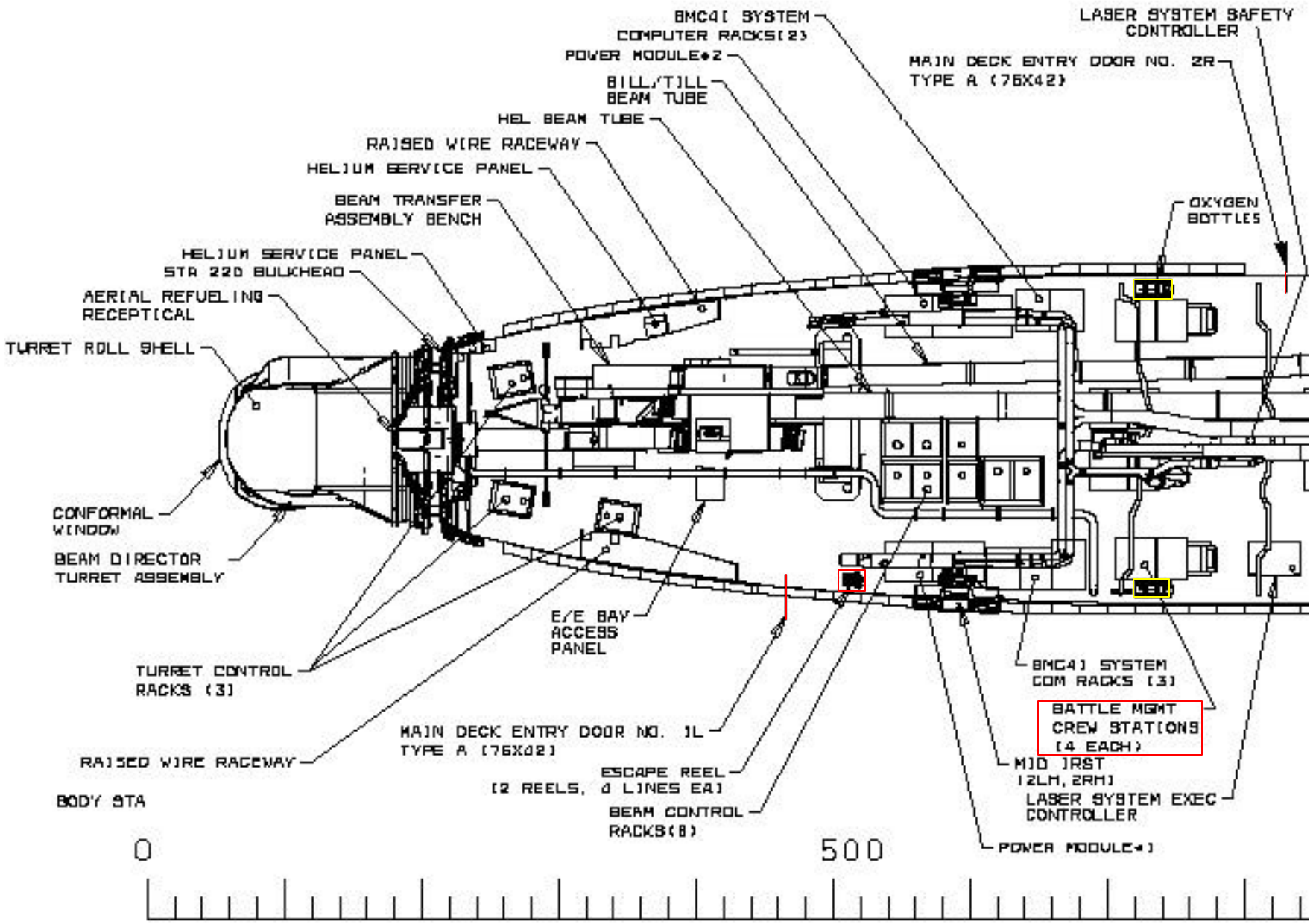


ABL CONFIGURATION - TOP AND LEFT SIDE VIEW

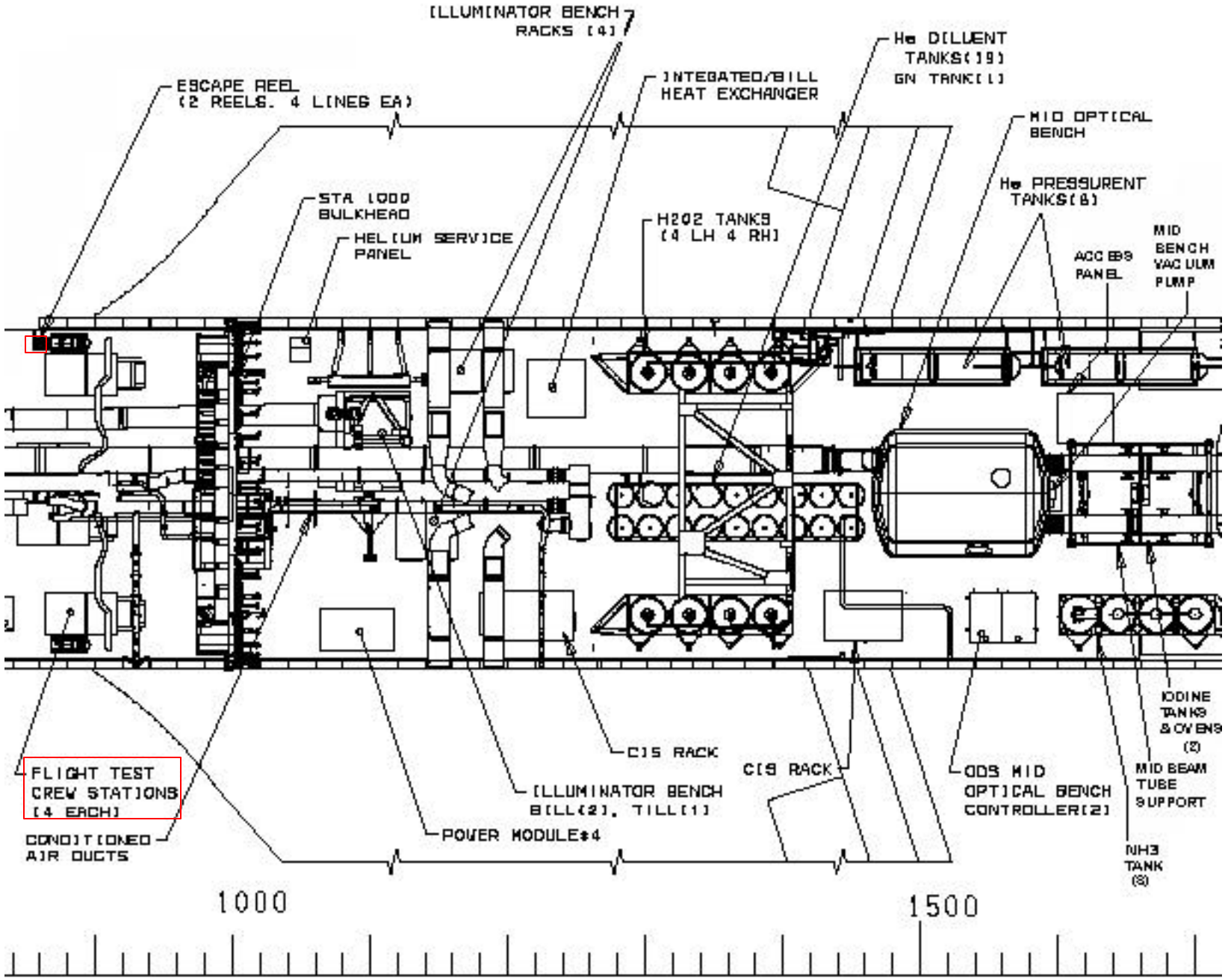
YAL-1A



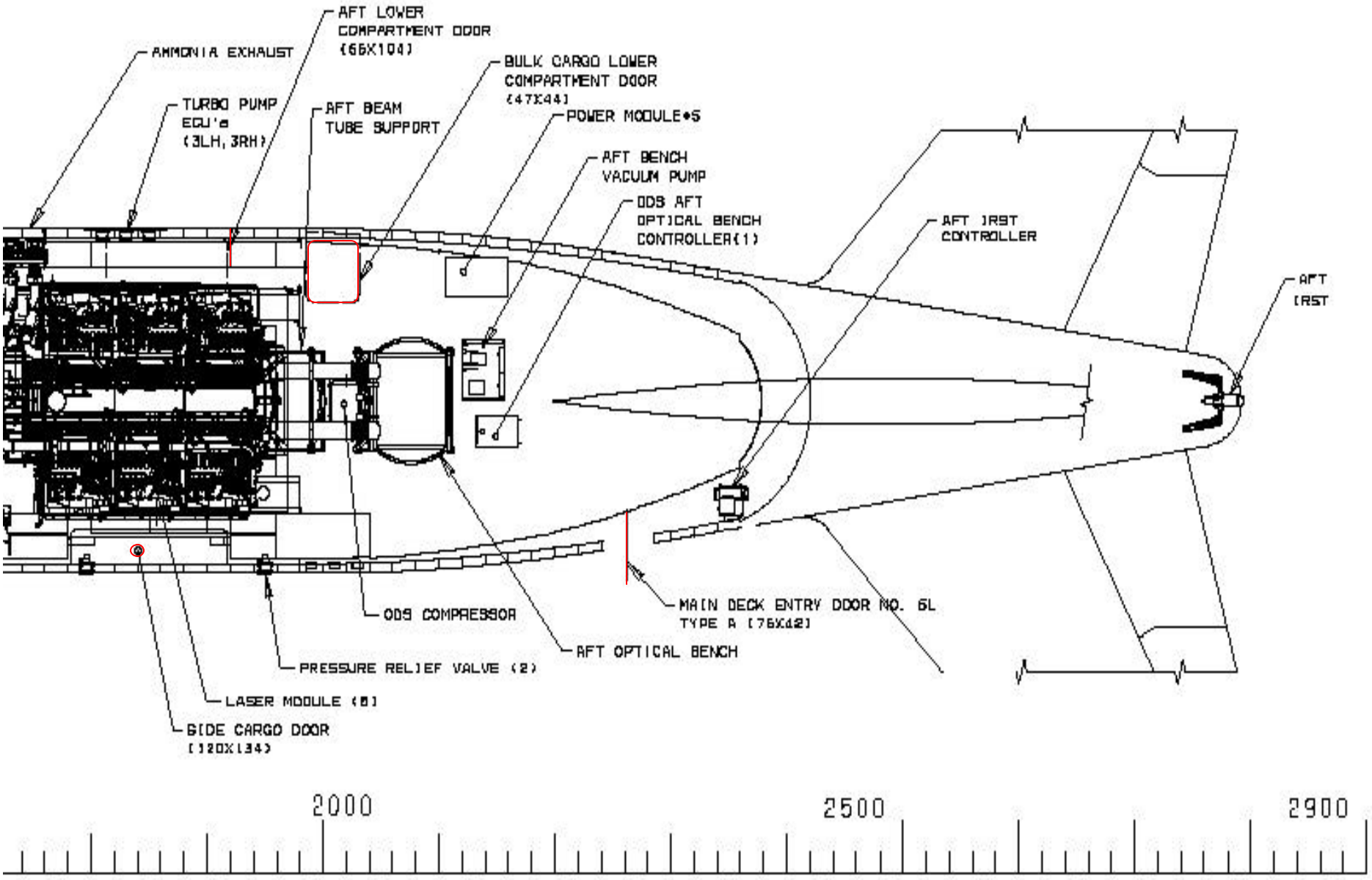
ABL CONFIGURATION - FORWARD TOP VIEW



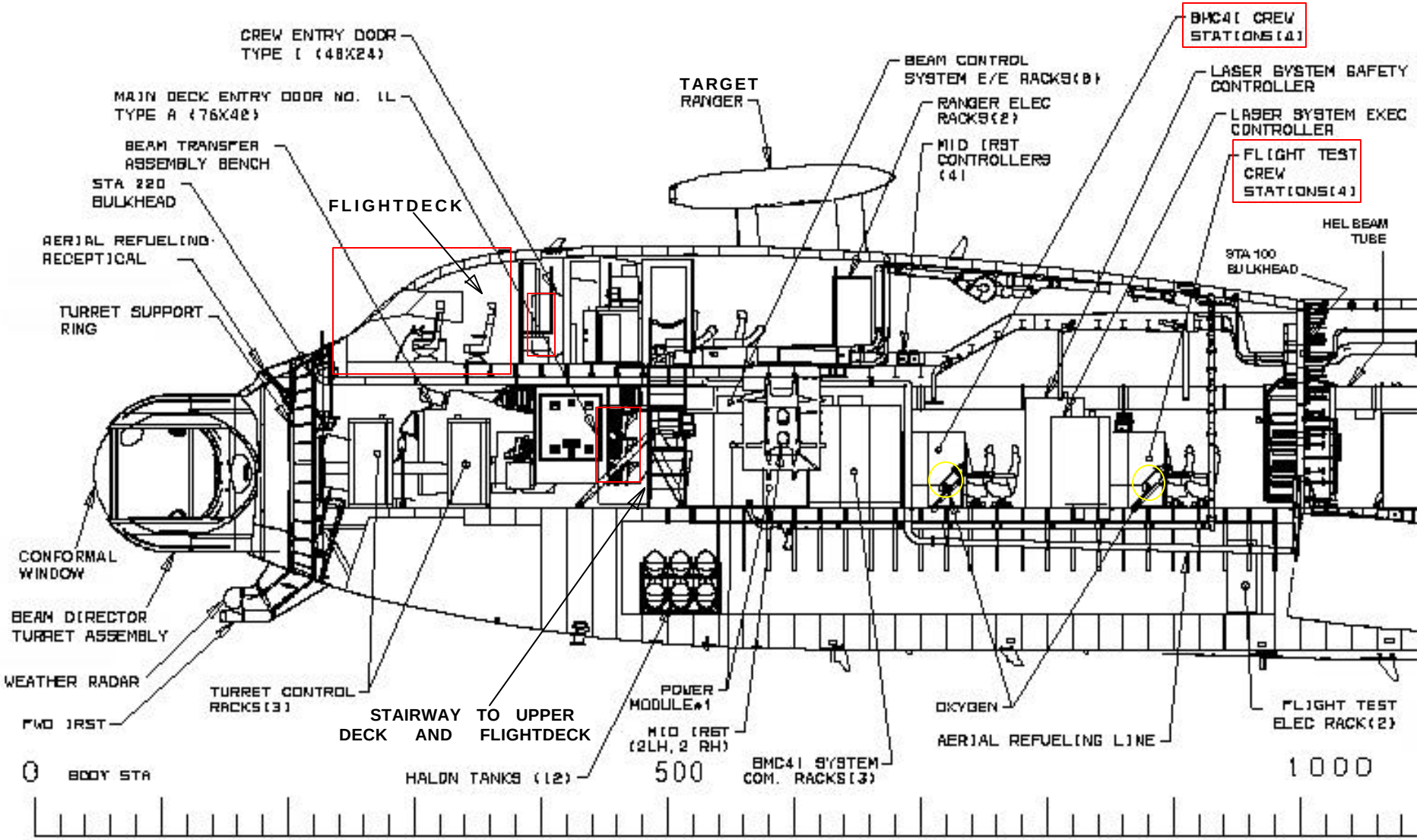
ABL CONFIGURATION - MID TOP VIEW



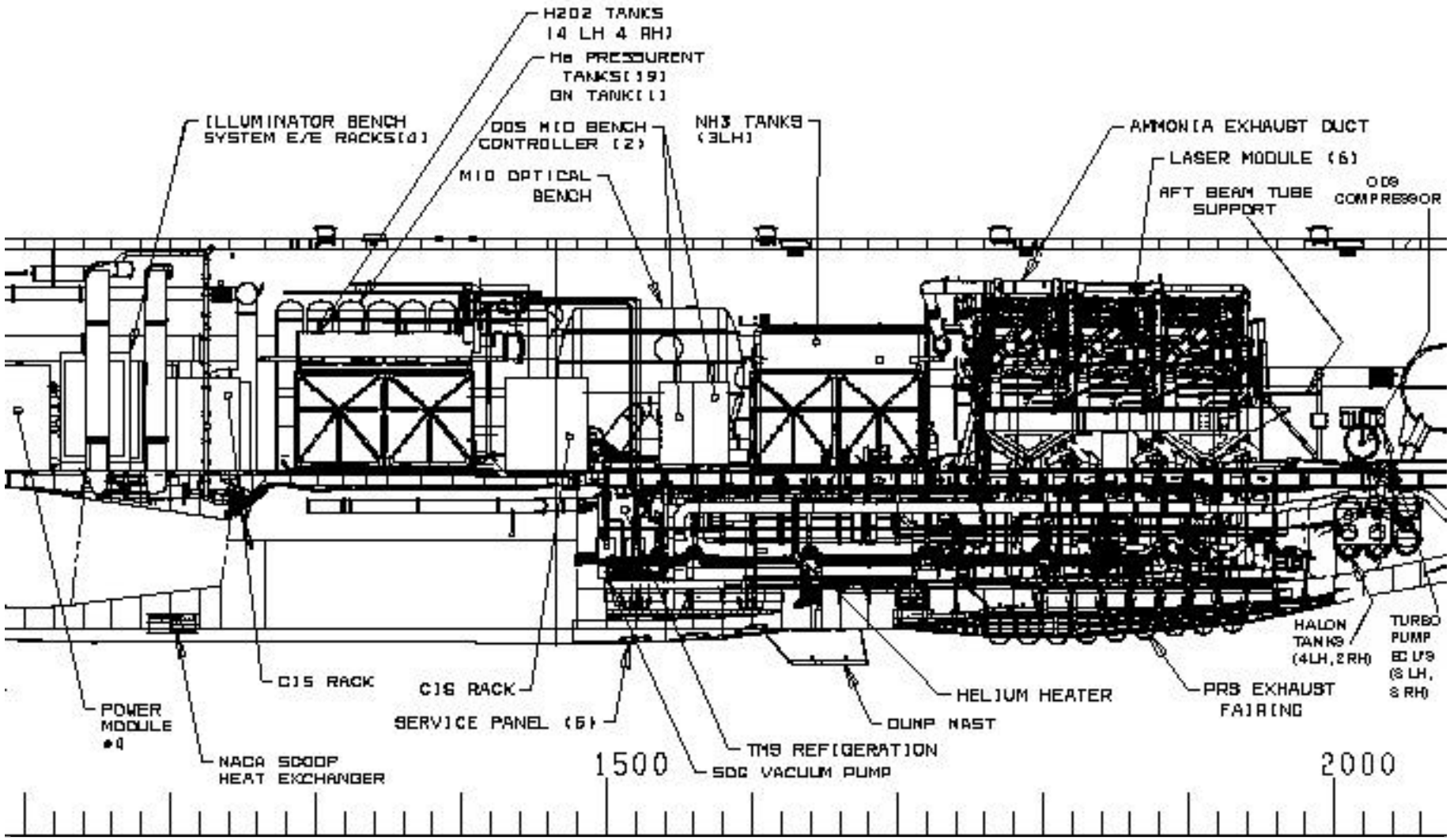
ABL CONFIGURATION - AFT TOP VIEW



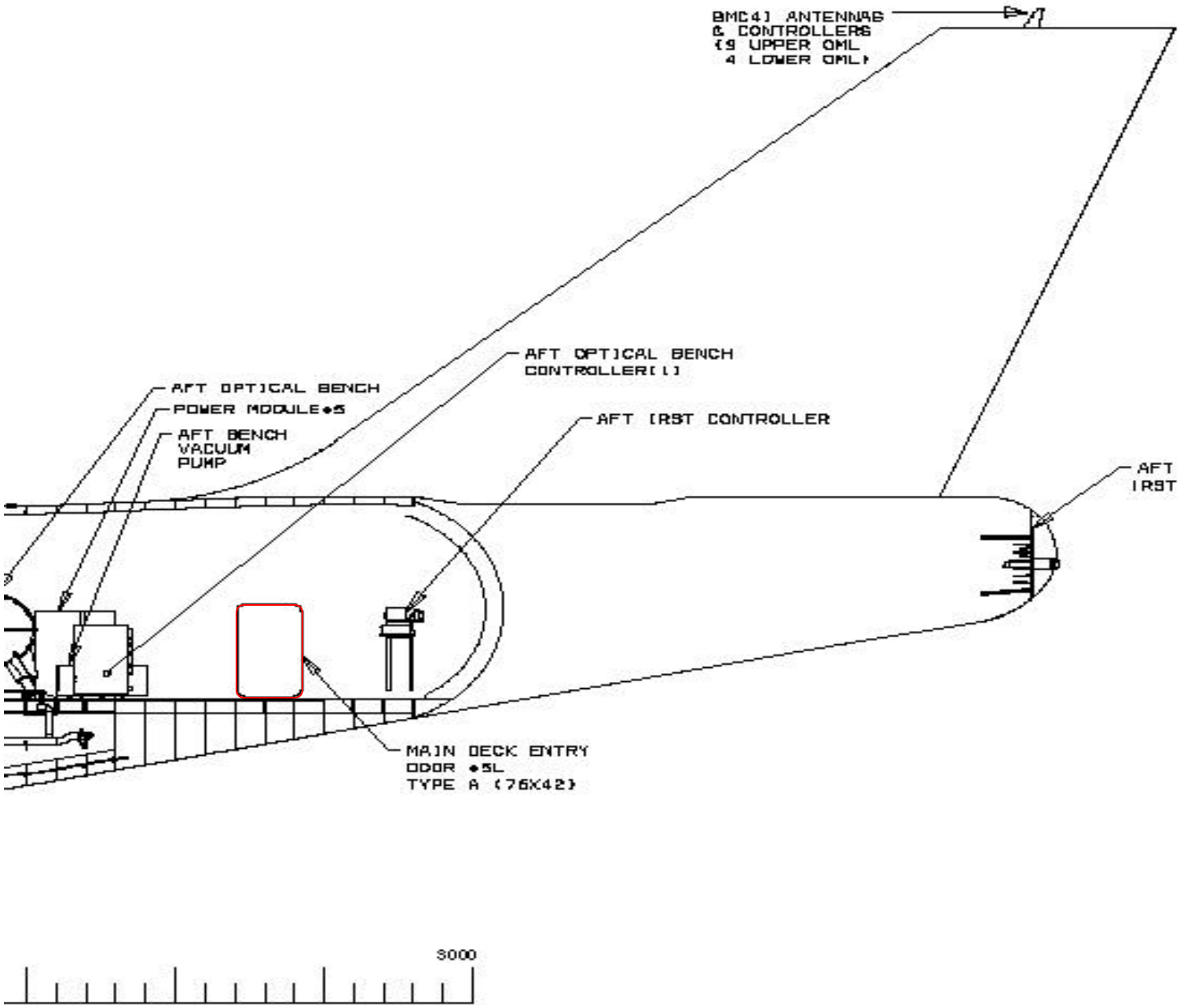
ABL CONFIGURATION - FORWARD LEFT SIDE VIEW



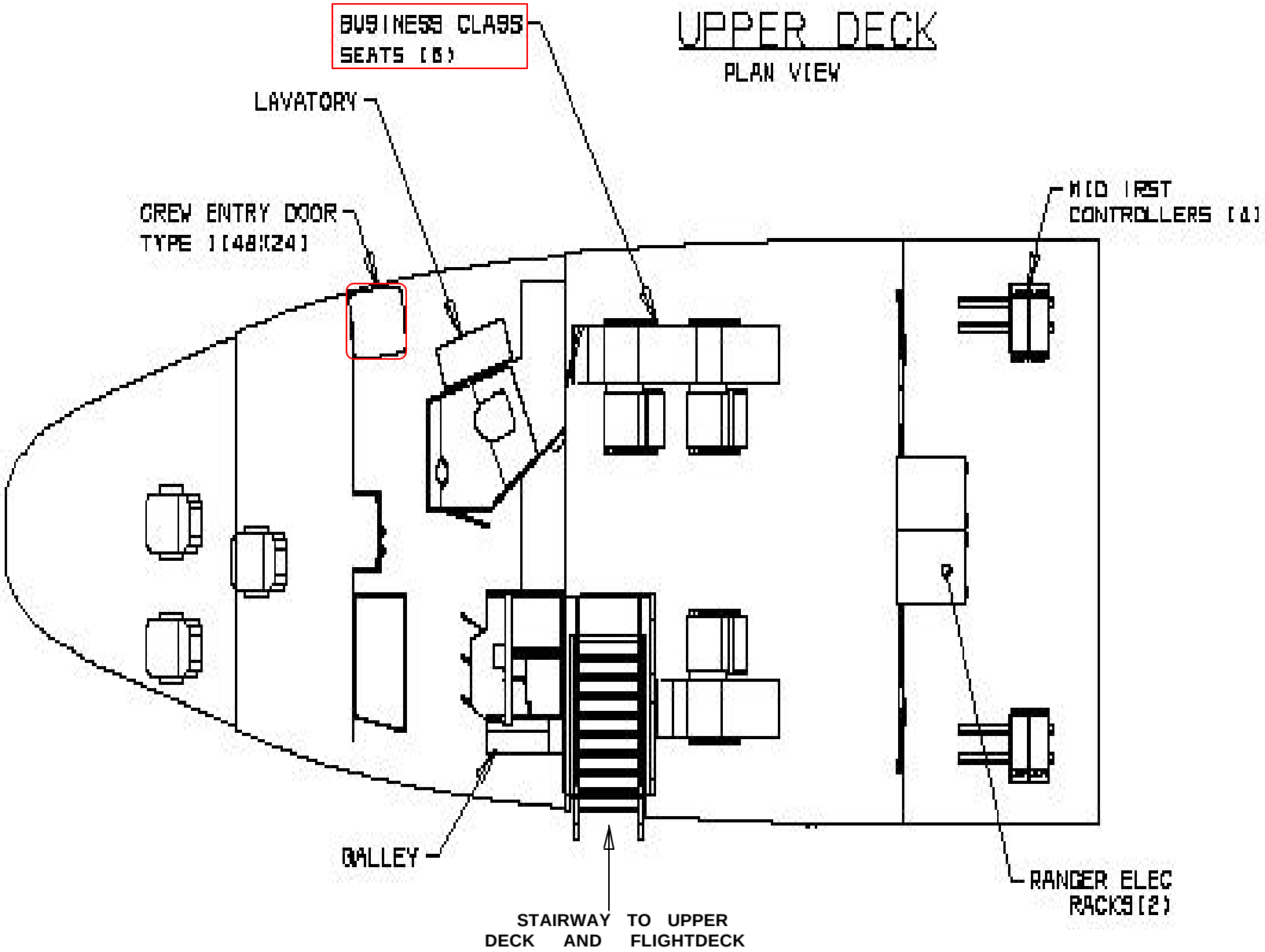
ABL CONFIGURATION - MID LEFT SIDE VIEW



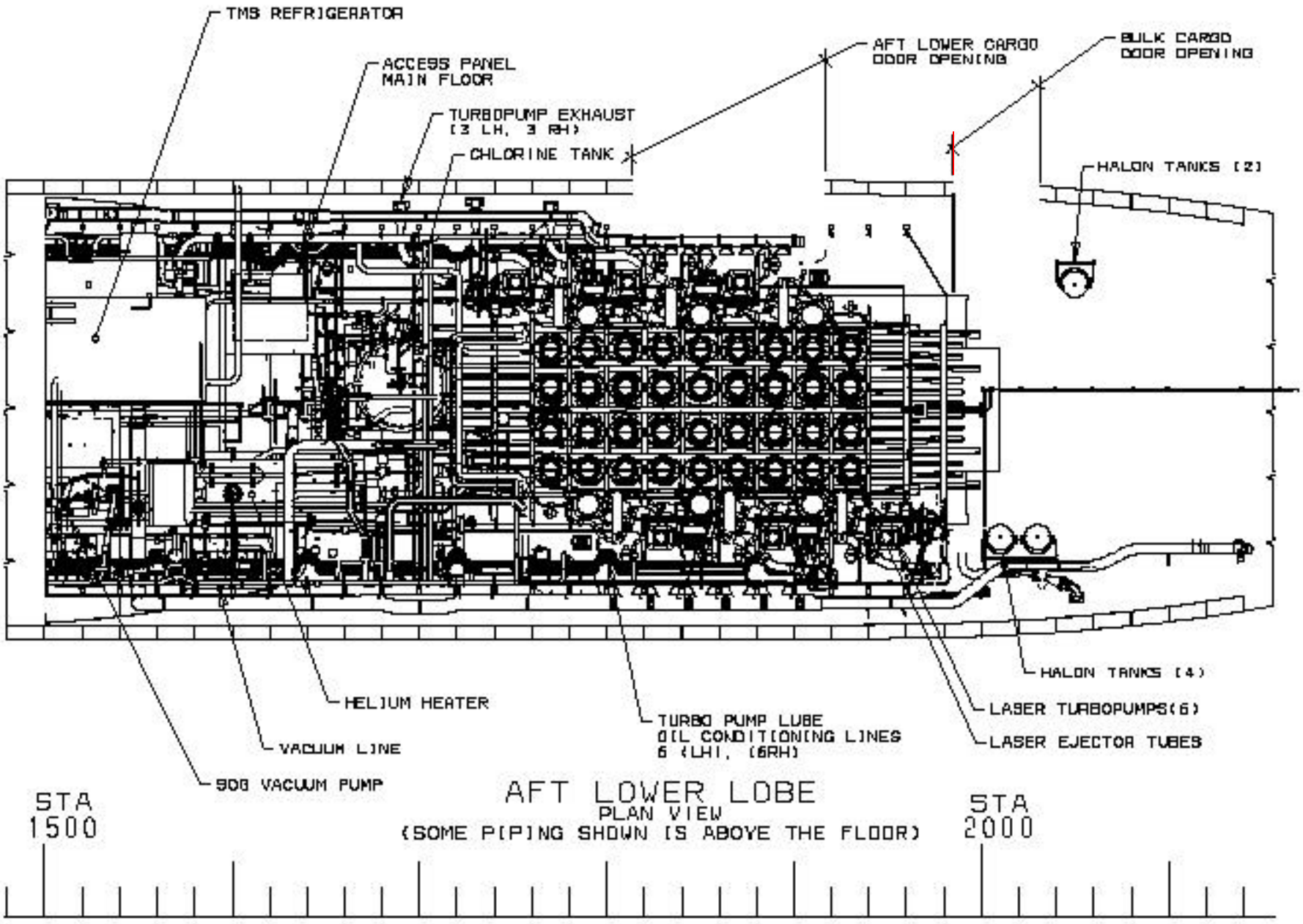
ABL CONFIGURATION - AFT LEFT SIDE VIEW



ABL CONFIGURATION - UPPER DECK

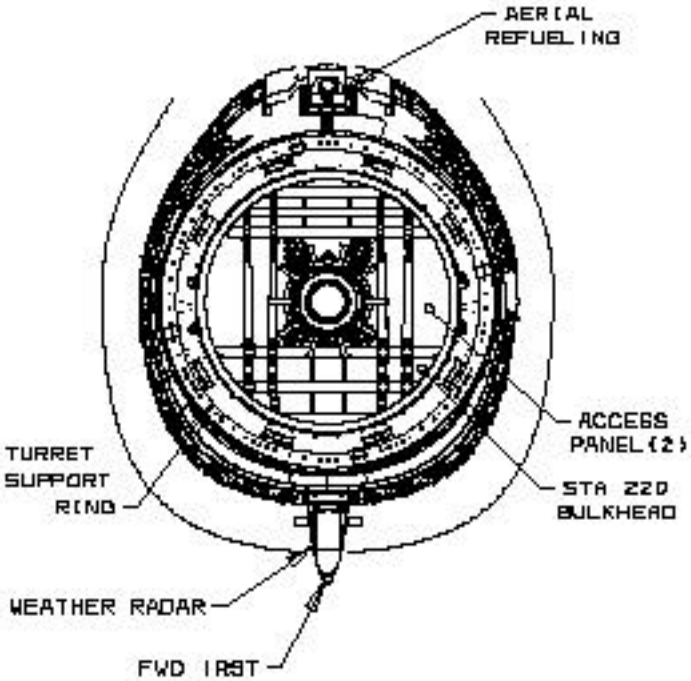


ABL CONFIGURATION - LOWER LOBE

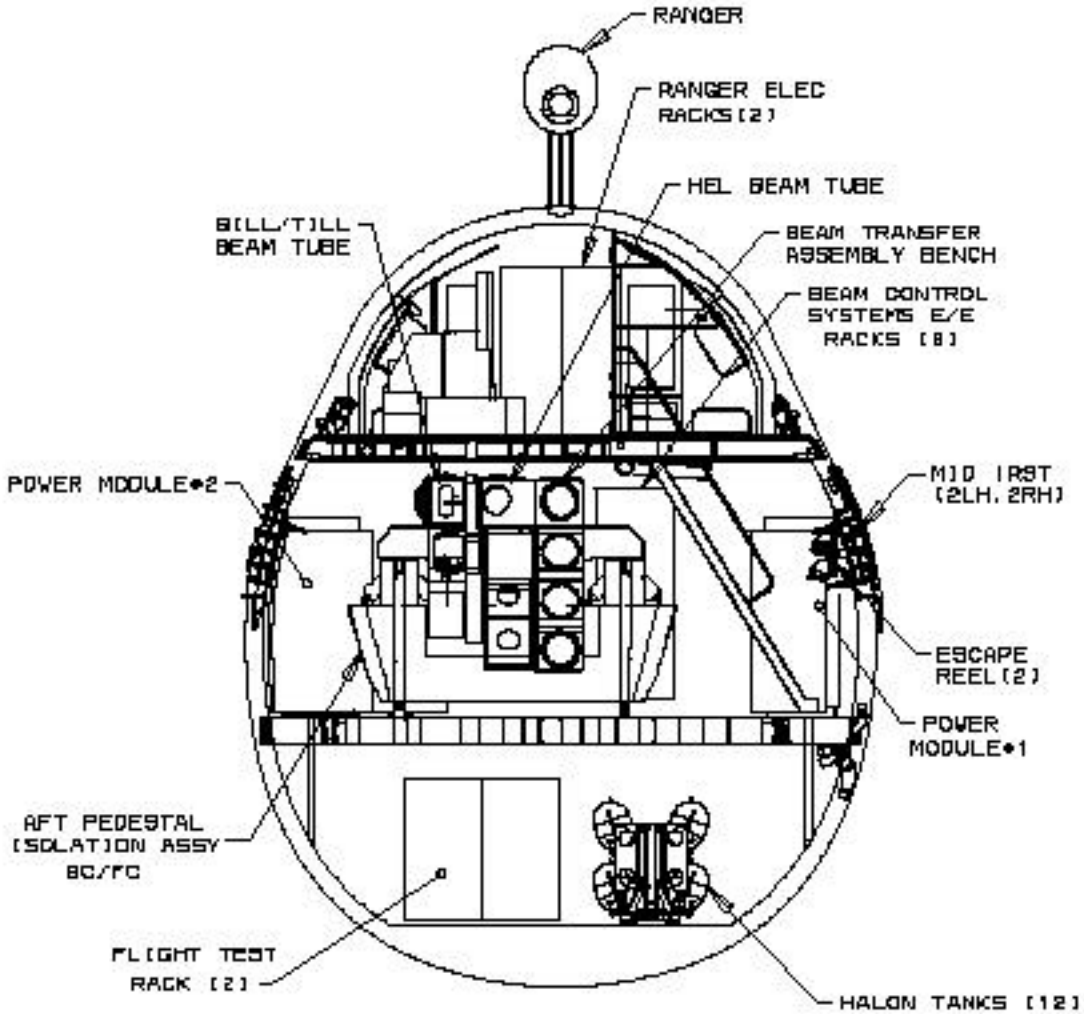


AFT LOWER LOBE
PLAN VIEW
(SOME PIPING SHOWN IS ABOVE THE FLOOR)

ABL CONFIGURATION - STATIONS 200 AND 500

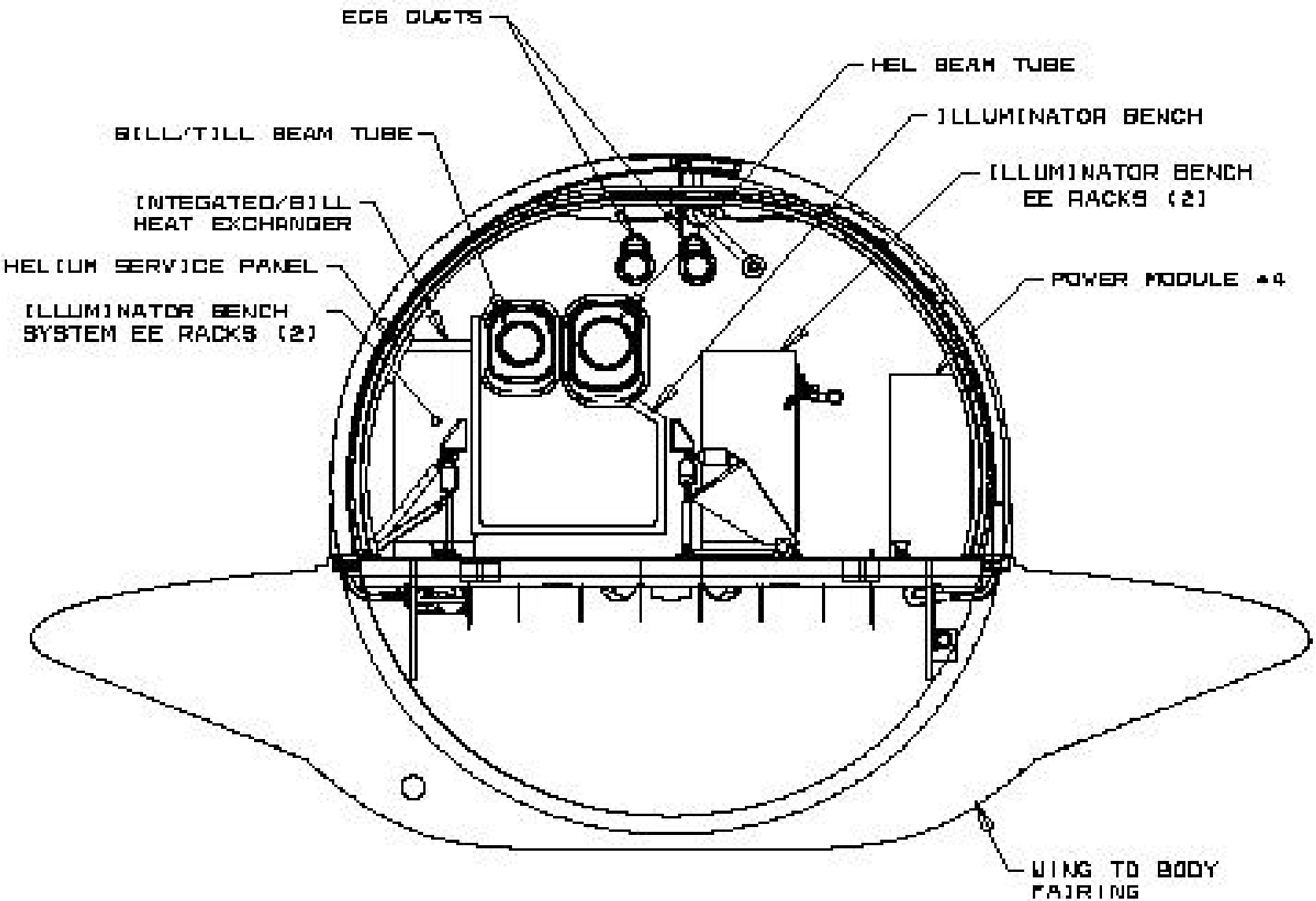


STA 200



STA 500
CURTAIN NOT SHOWN

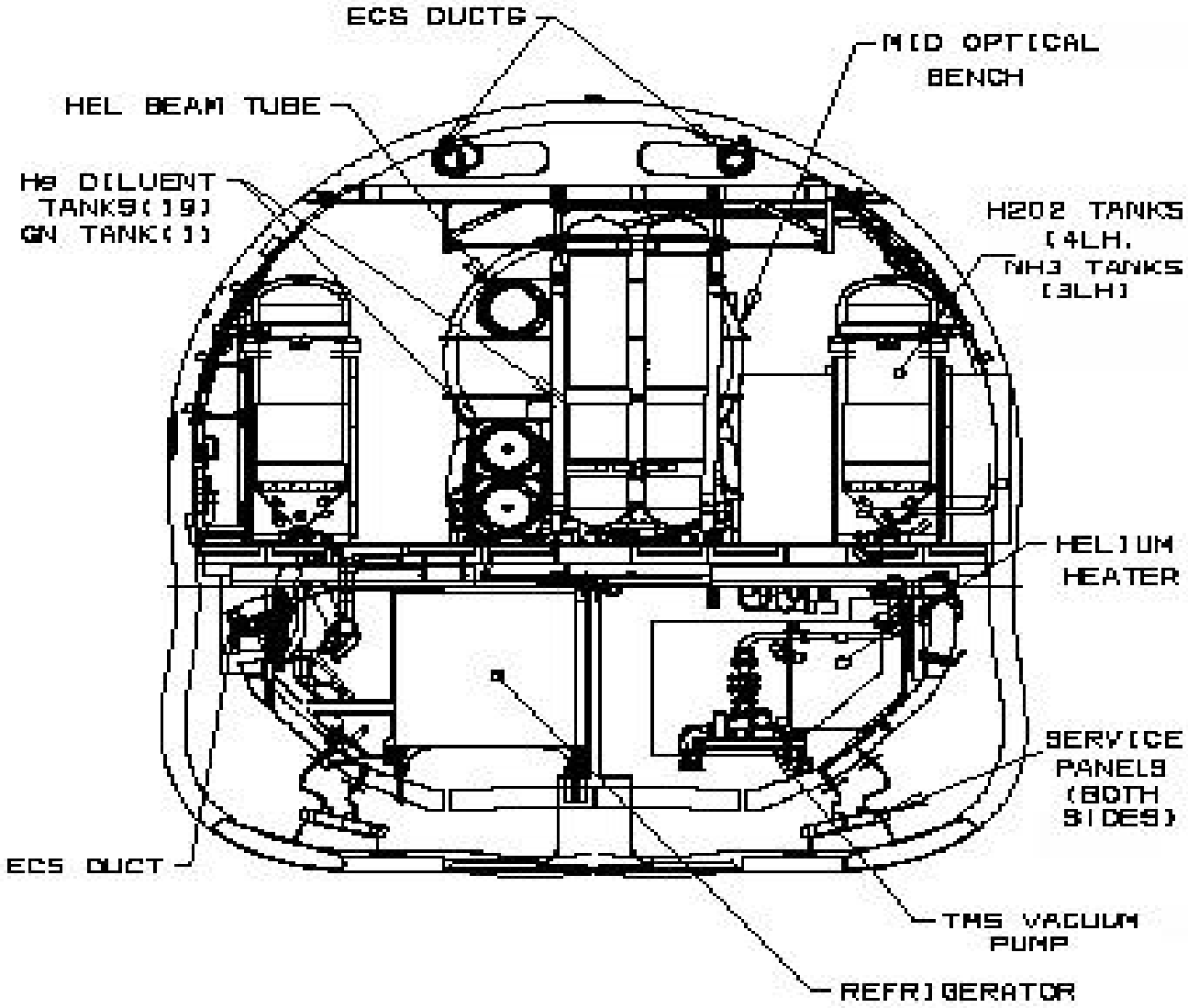
ABL CONFIGURATION - STATION 1000



STA 1000

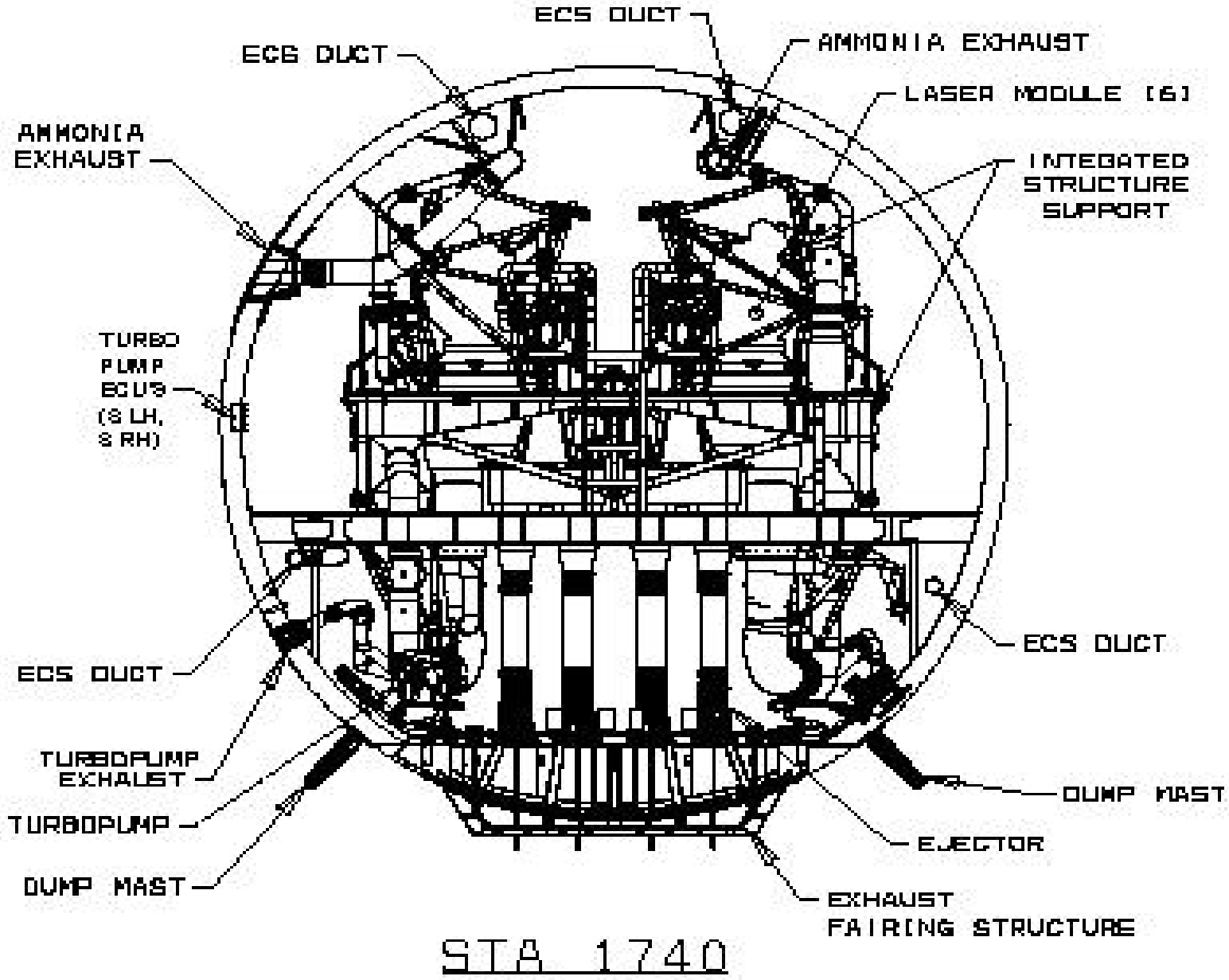
BULKHEAD & AIRLOCK NOT SHOWN

ABL CONFIGURATION - UPPER DECK 1300 AND LOWER LOBE 1480

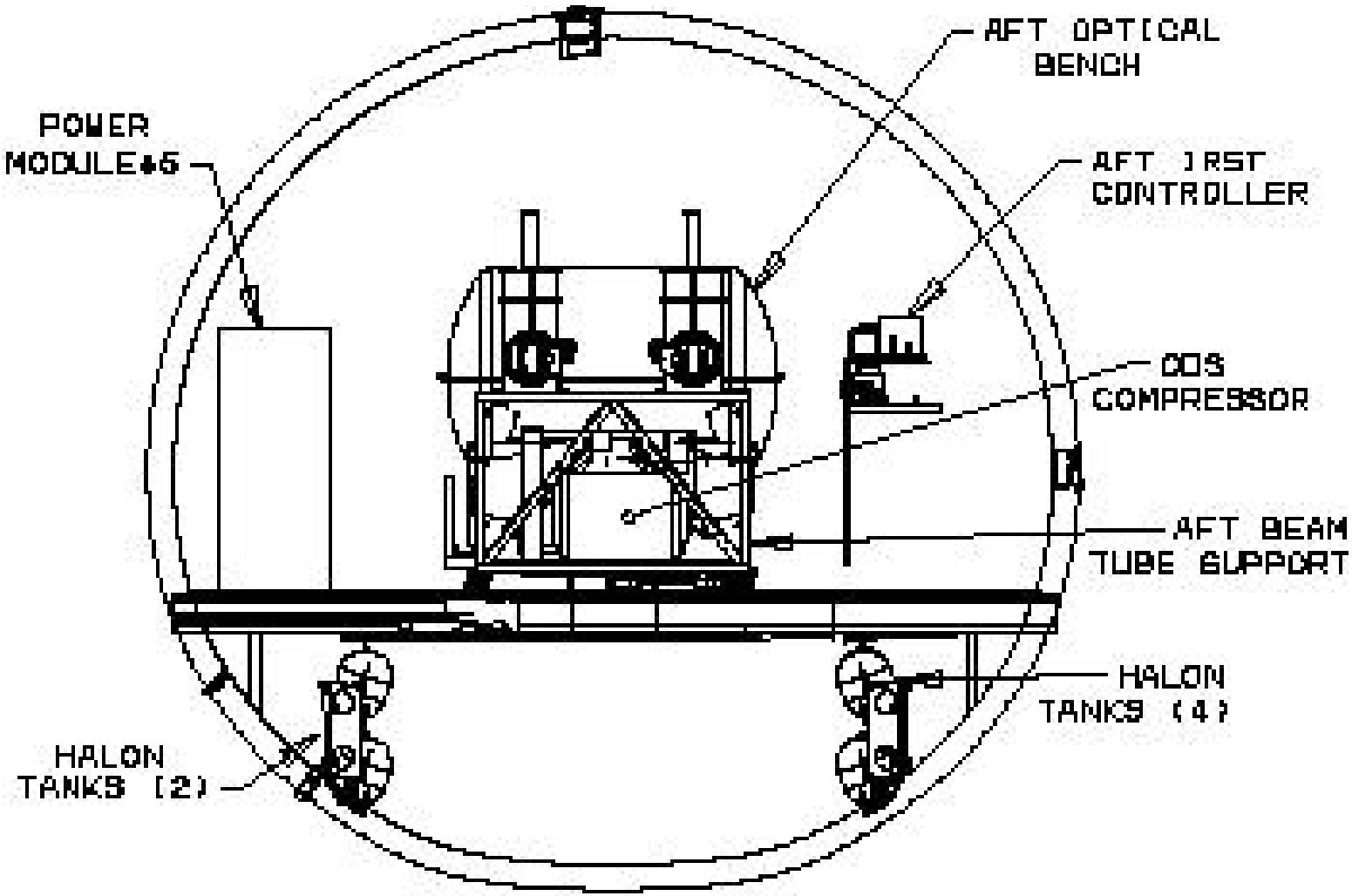


UPPER DECK 1300/LOWER LOBE 1480

ABL CONFIGURATION - STATION 1740

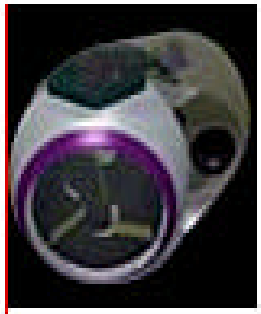


ABL CONFIGURATION - STATION 1900

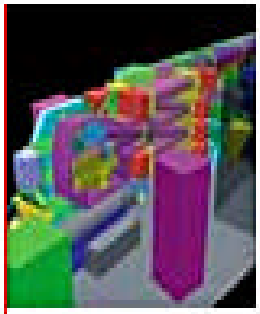


STA 1900

ABL KEY FEATURES

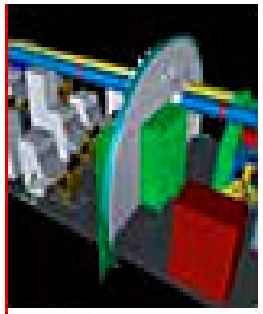


Nose-Mounted Turret

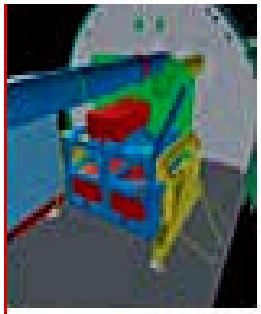


Beam Control System

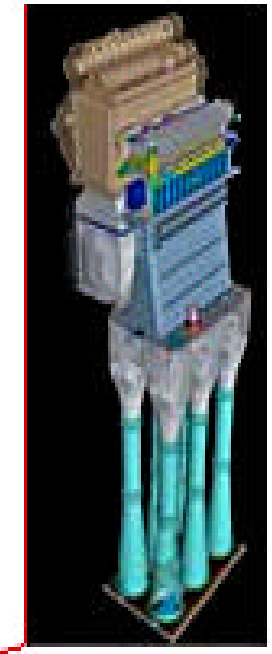
Battle Management



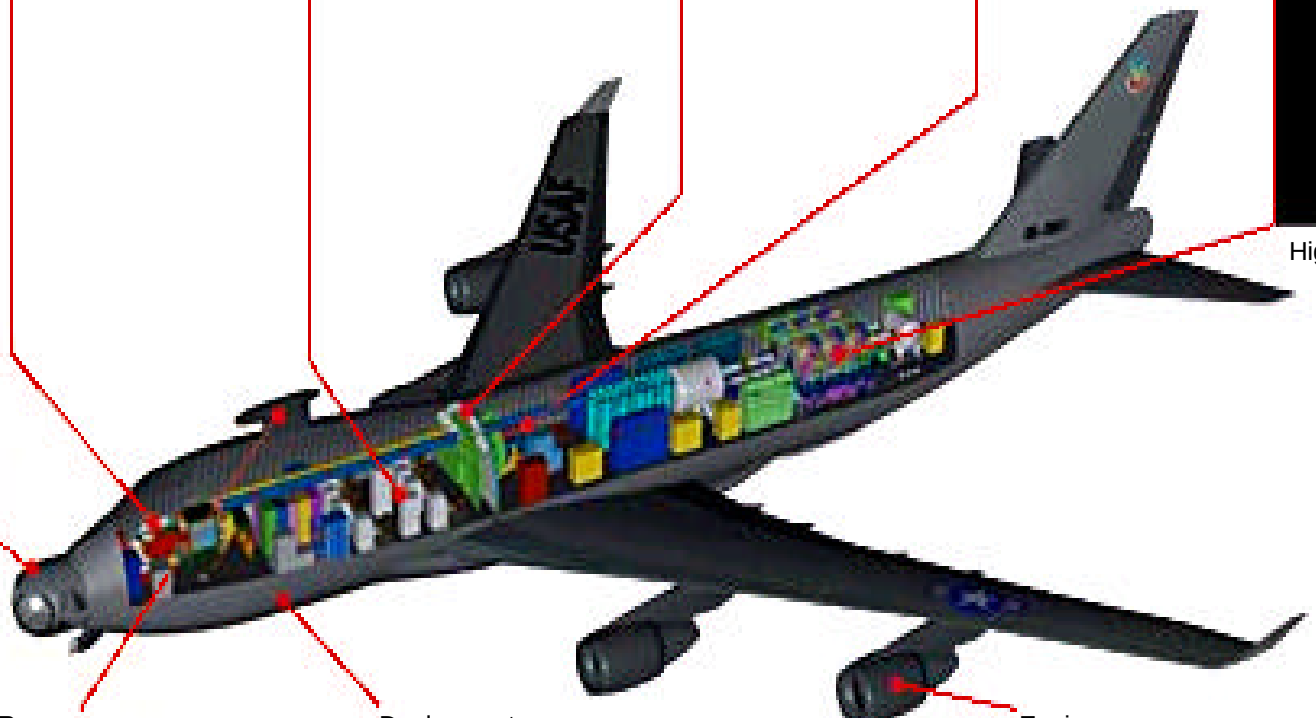
Separation Bulkhead



Illuminator Lasers



High Energy Laser



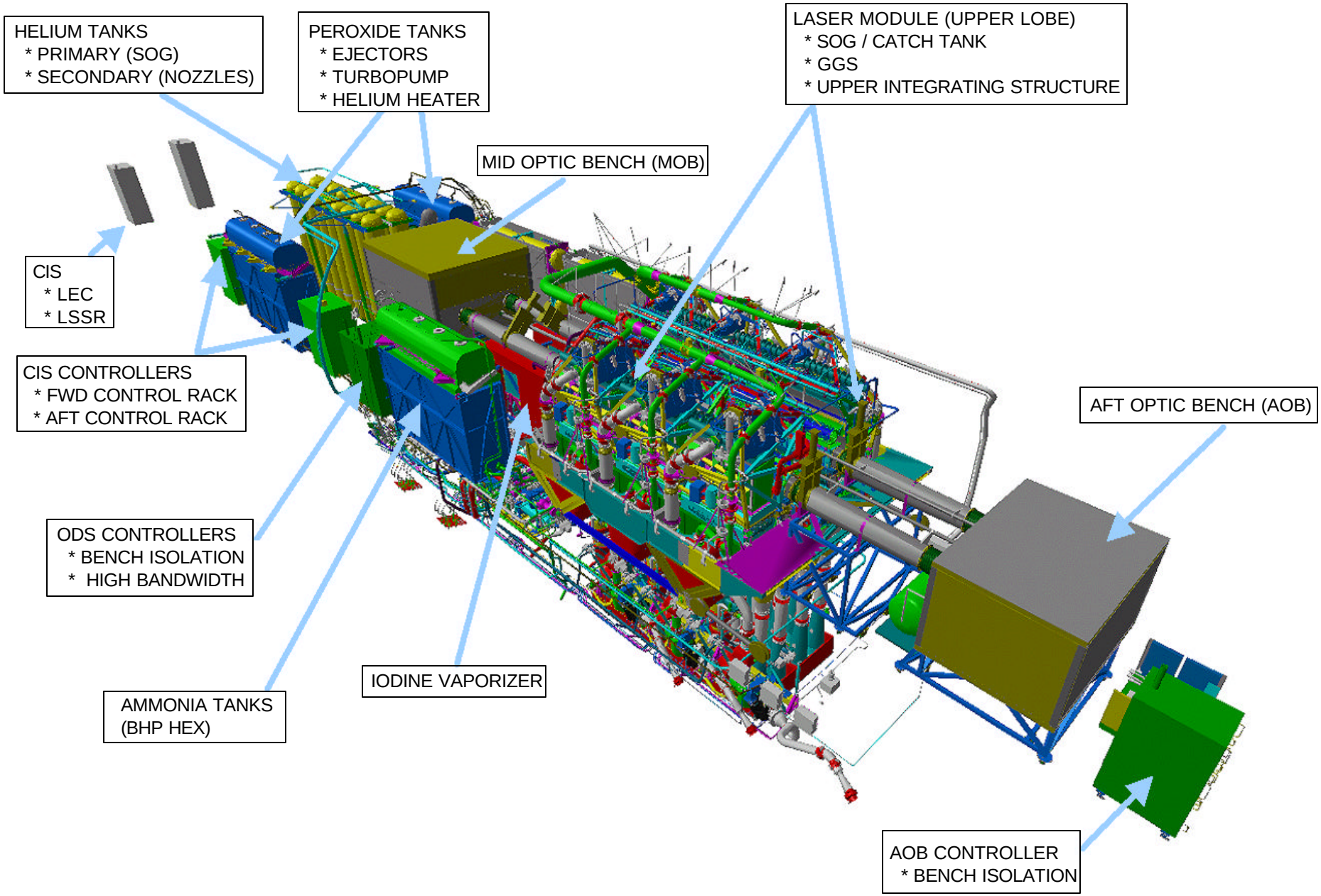
Active Laser Ranger

Deployment
Storage

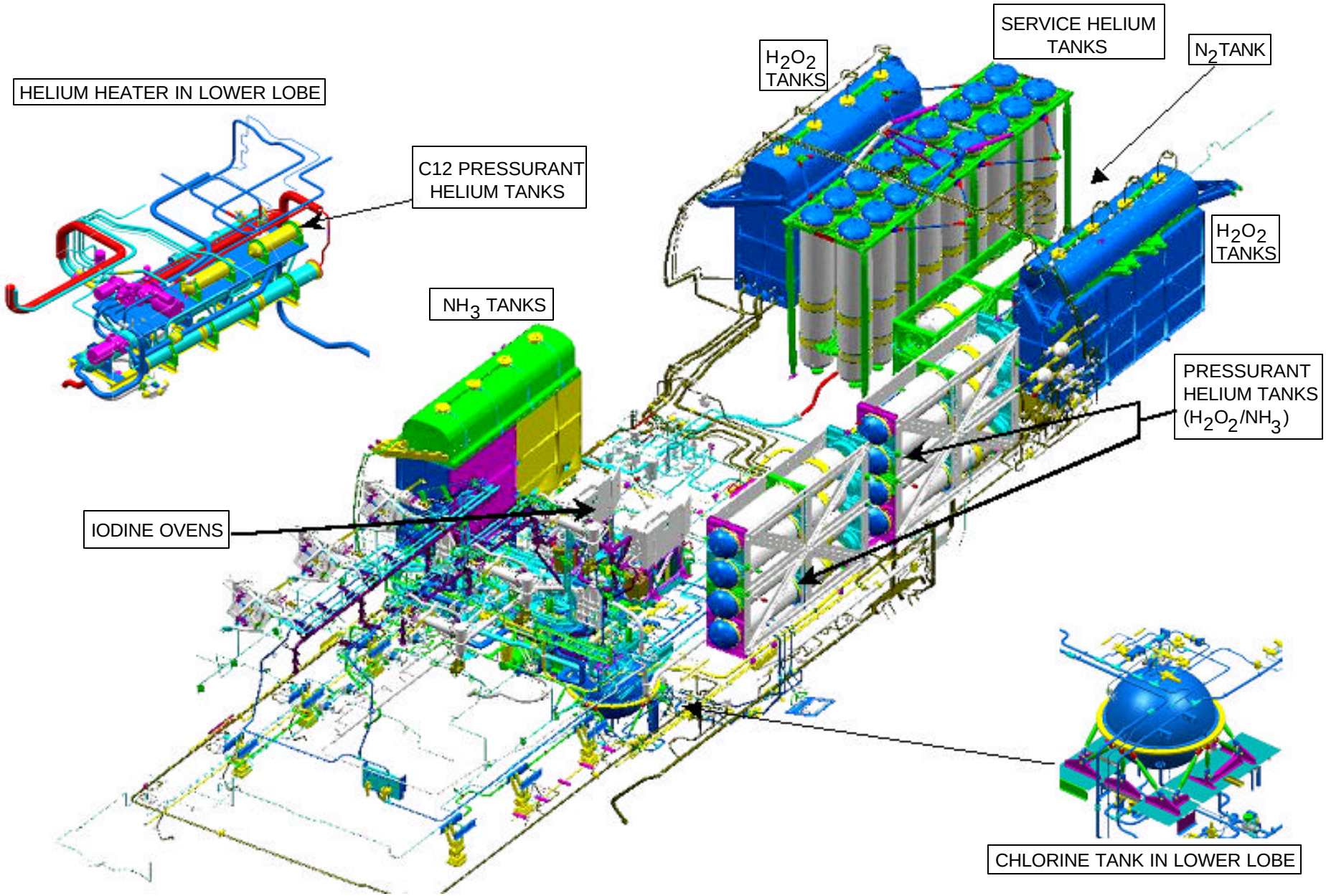
Engines

LASER SYSTEM OVERVIEW OF HAZARDS

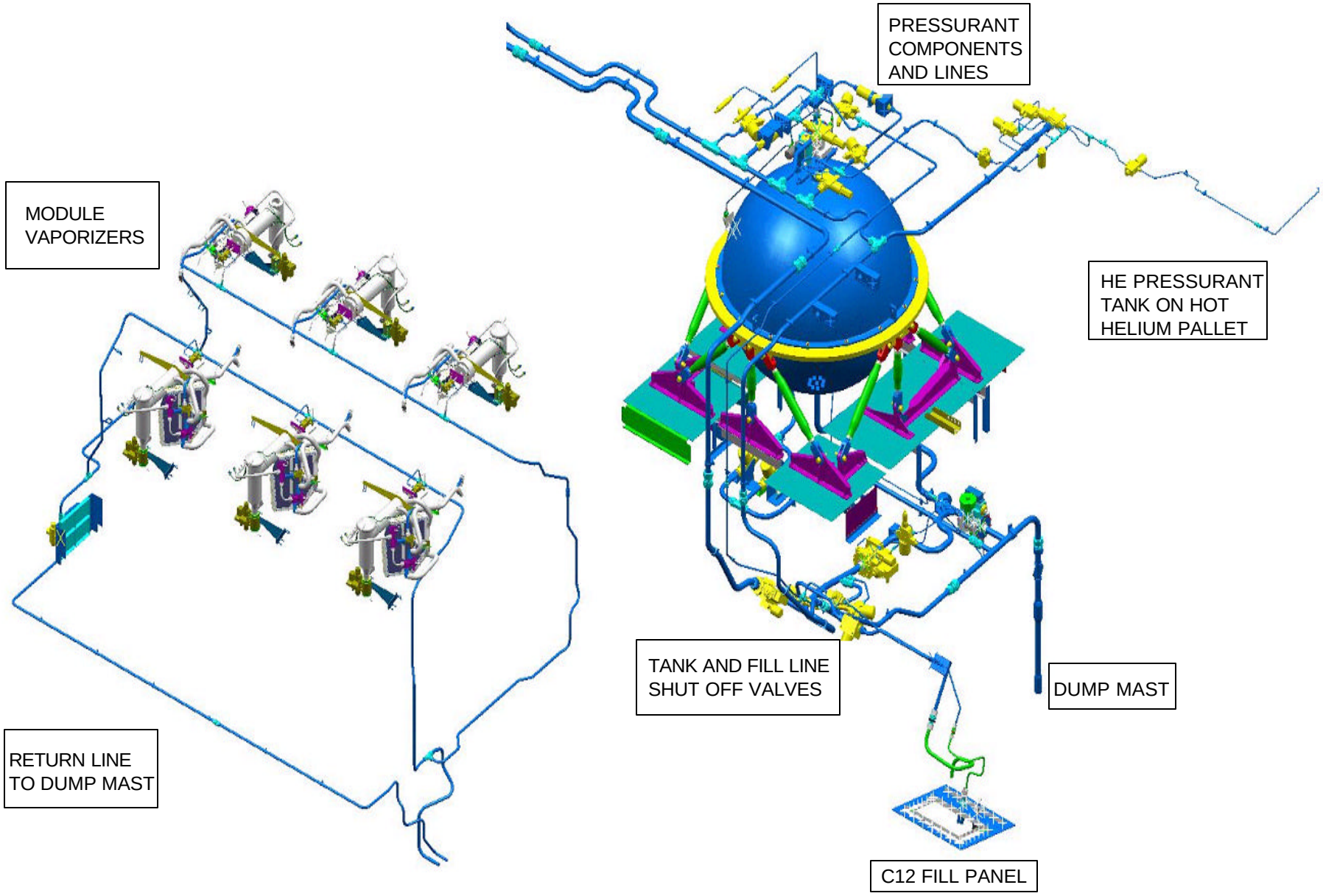
FOR SA 0050



FLUID SUPPLY SYSTEM HAZARDS



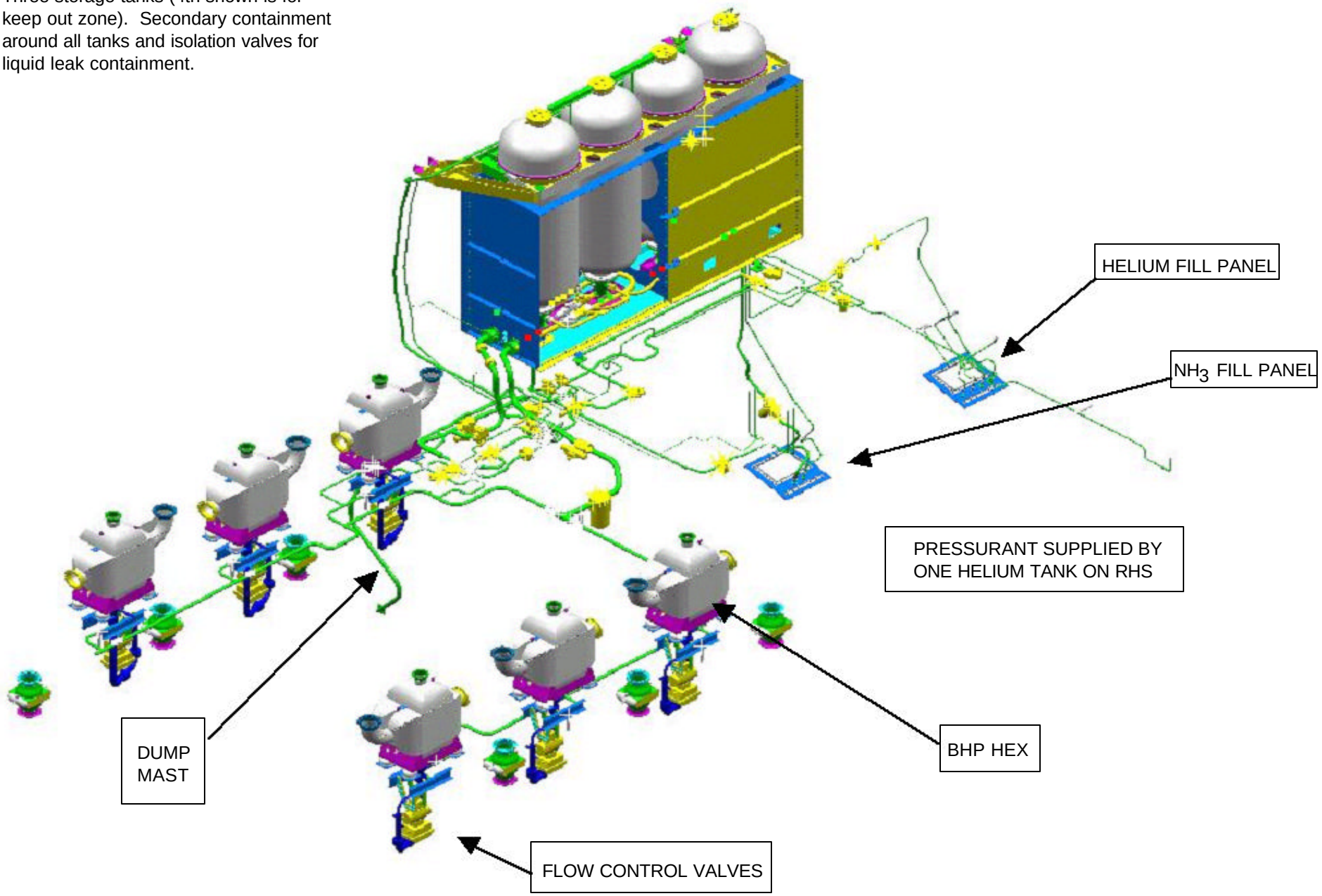
CHLORINE SYSTEM OVERVIEW OF HAZARDS



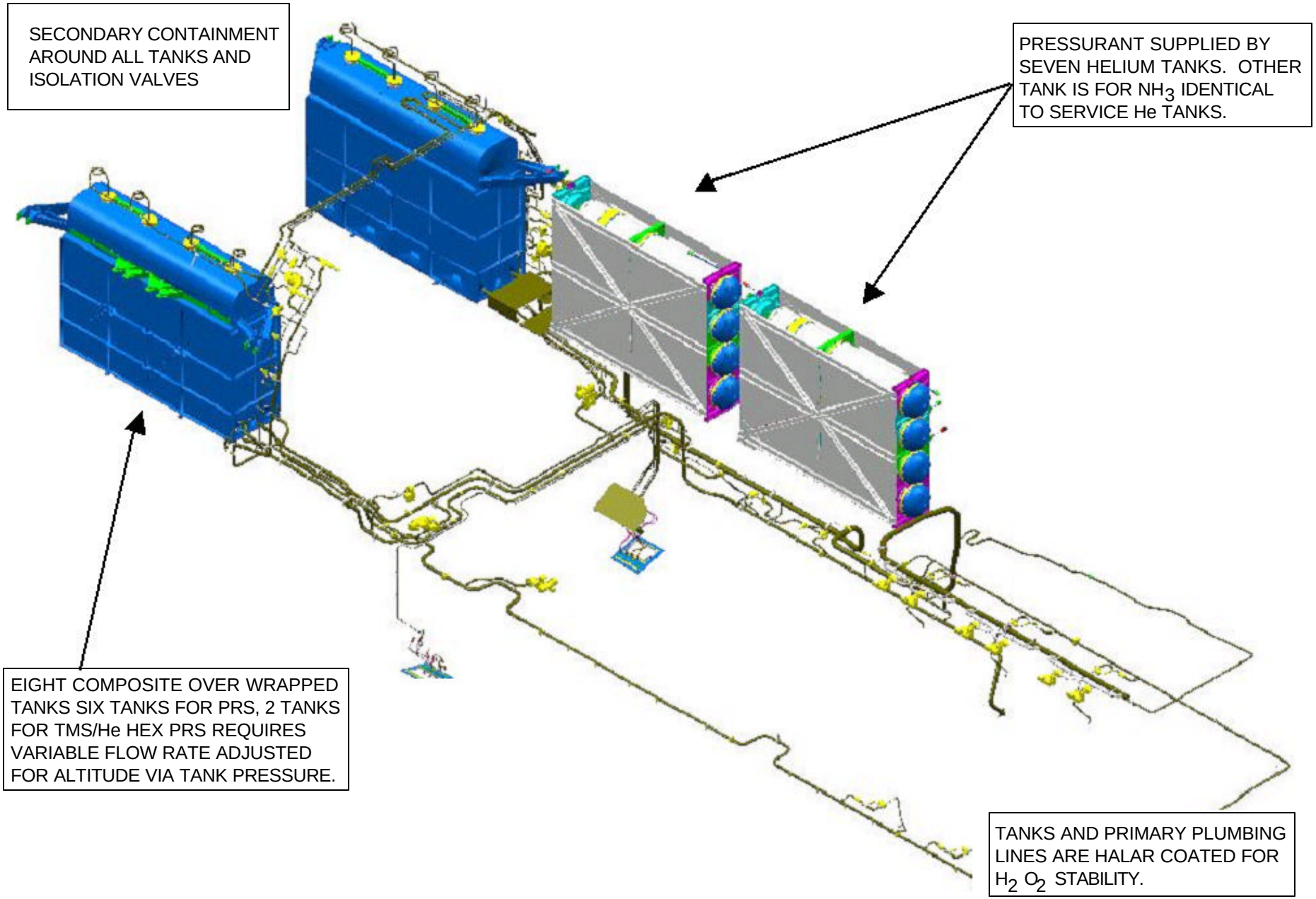
AMMONIA SYSTEM OVERVIEW OF HAZARDS

NOTE:

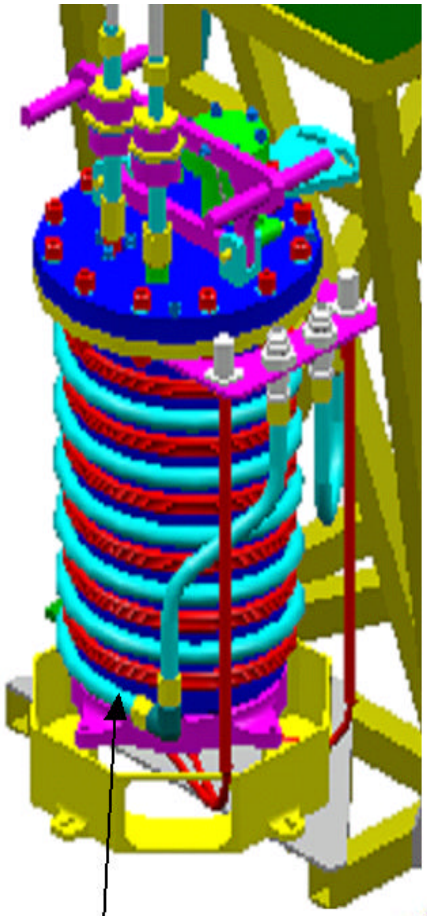
Three storage tanks (4th shown is for keep out zone). Secondary containment around all tanks and isolation valves for liquid leak containment.

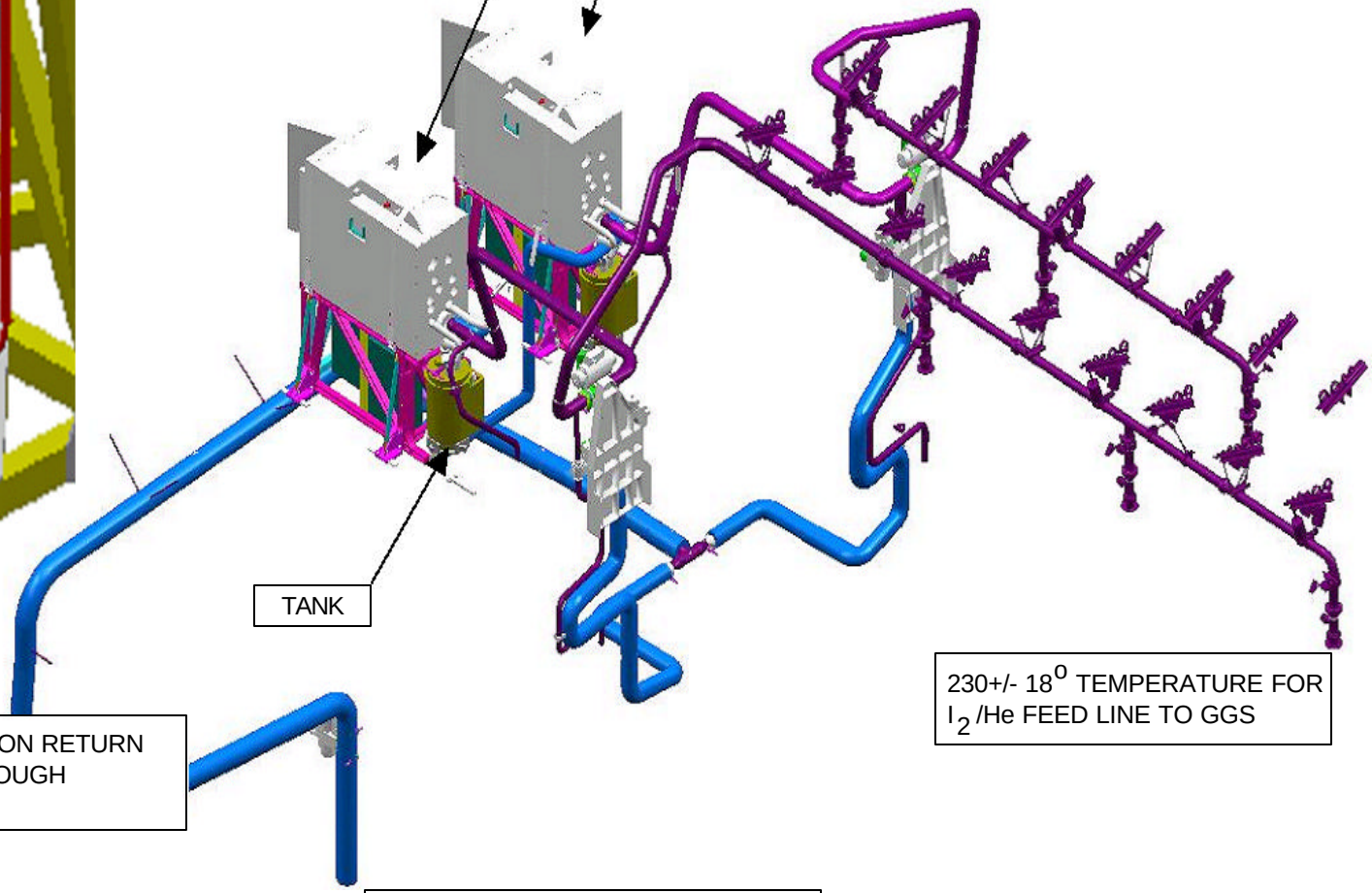


HYDROGEN PEROXIDE 70% SYSTEM OVERVIEW OF HAZARDS



IODINE SYSTEM OVERVIEW OF HAZARDS





COTS AIRCRAFT OVENS HOUSE VAPORIZER AND MIXER FOR UNIFORM TEMPERATURE. EACH OVEN/VAPORIZER SERVES 3 MODULES.

TANK

I_2 TANK COOLED POST MISSION RETURN FLIGHT WITH NH_3 FLOW THROUGH EXTERNAL TUBING.

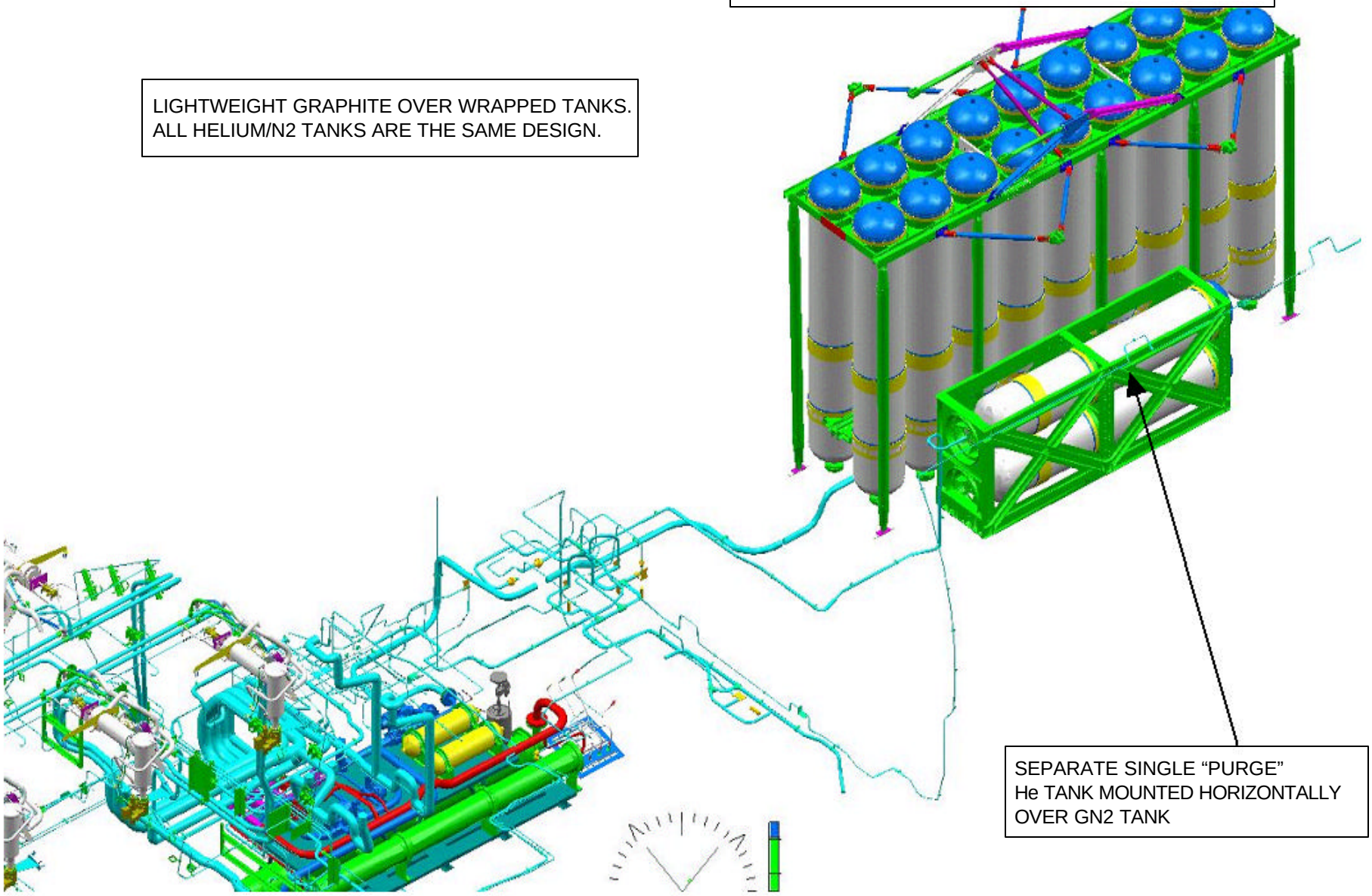
230+/- 18° TEMPERATURE FOR I_2 /He FEED LINE TO GGS

OVERBOARD VENT LINE AT 230 ^{o}F.

HELIUM SYSTEM OVERVIEW OF HAZARDS

EIGHTEEN “SERVICE” HELIUM TANKS FOR LASER FLOW

LIGHTWEIGHT GRAPHITE OVER WRAPPED TANKS.
ALL HELIUM/N2 TANKS ARE THE SAME DESIGN.



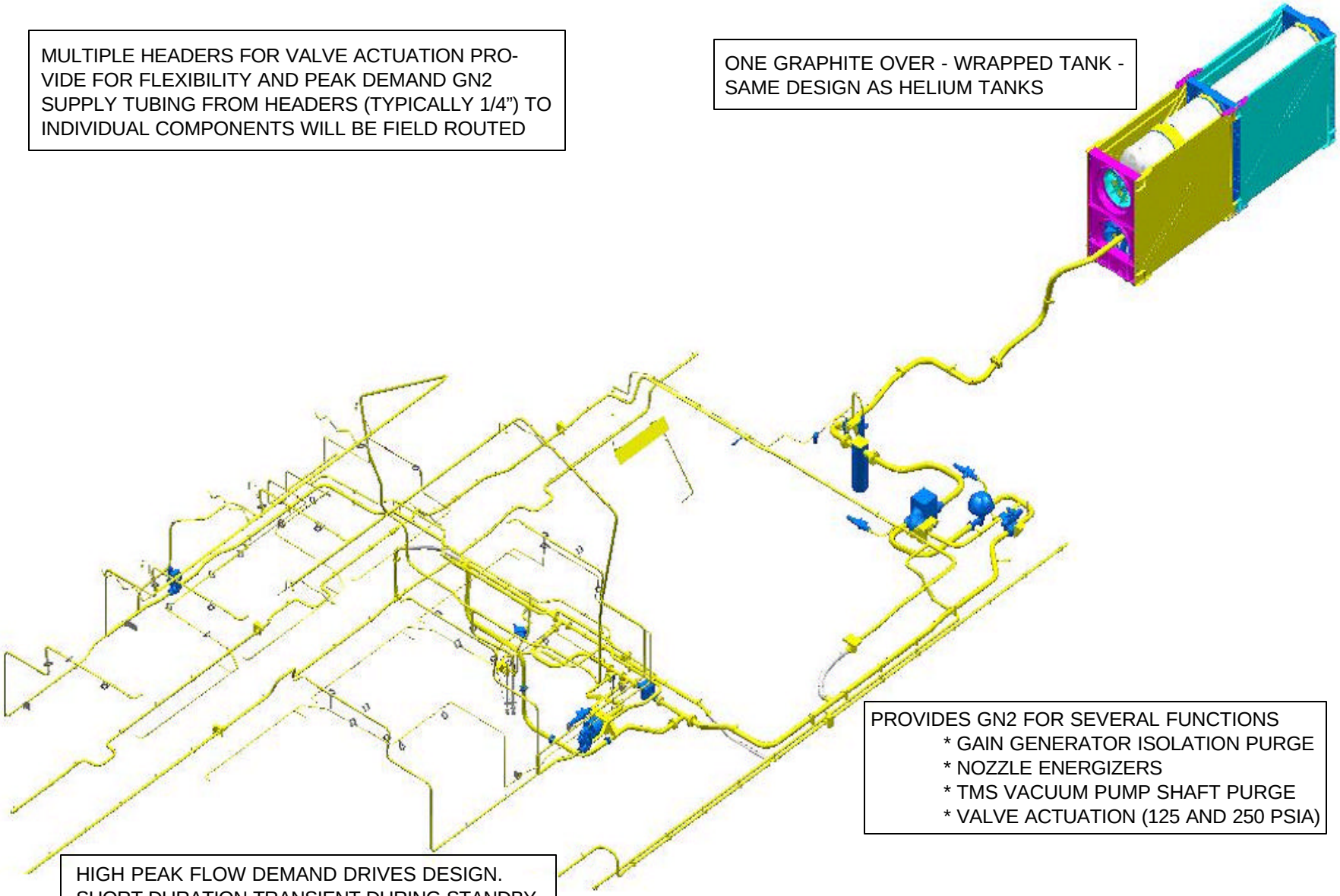
SEPARATE SINGLE “PURGE”
He TANK MOUNTED HORIZONTALLY
OVER GN2 TANK

HELIUM HEATER PALLET IN AFT LOWER LOBE
HEATS HELIUM FOR CI_2 AND I_2 VAPORIZATION.

NITROGEN SYSTEM OVERVIEW OF HAZARDS

MULTIPLE HEADERS FOR VALVE ACTUATION PROVIDE FOR FLEXIBILITY AND PEAK DEMAND GN2 SUPPLY TUBING FROM HEADERS (TYPICALLY 1/4") TO INDIVIDUAL COMPONENTS WILL BE FIELD ROUTED

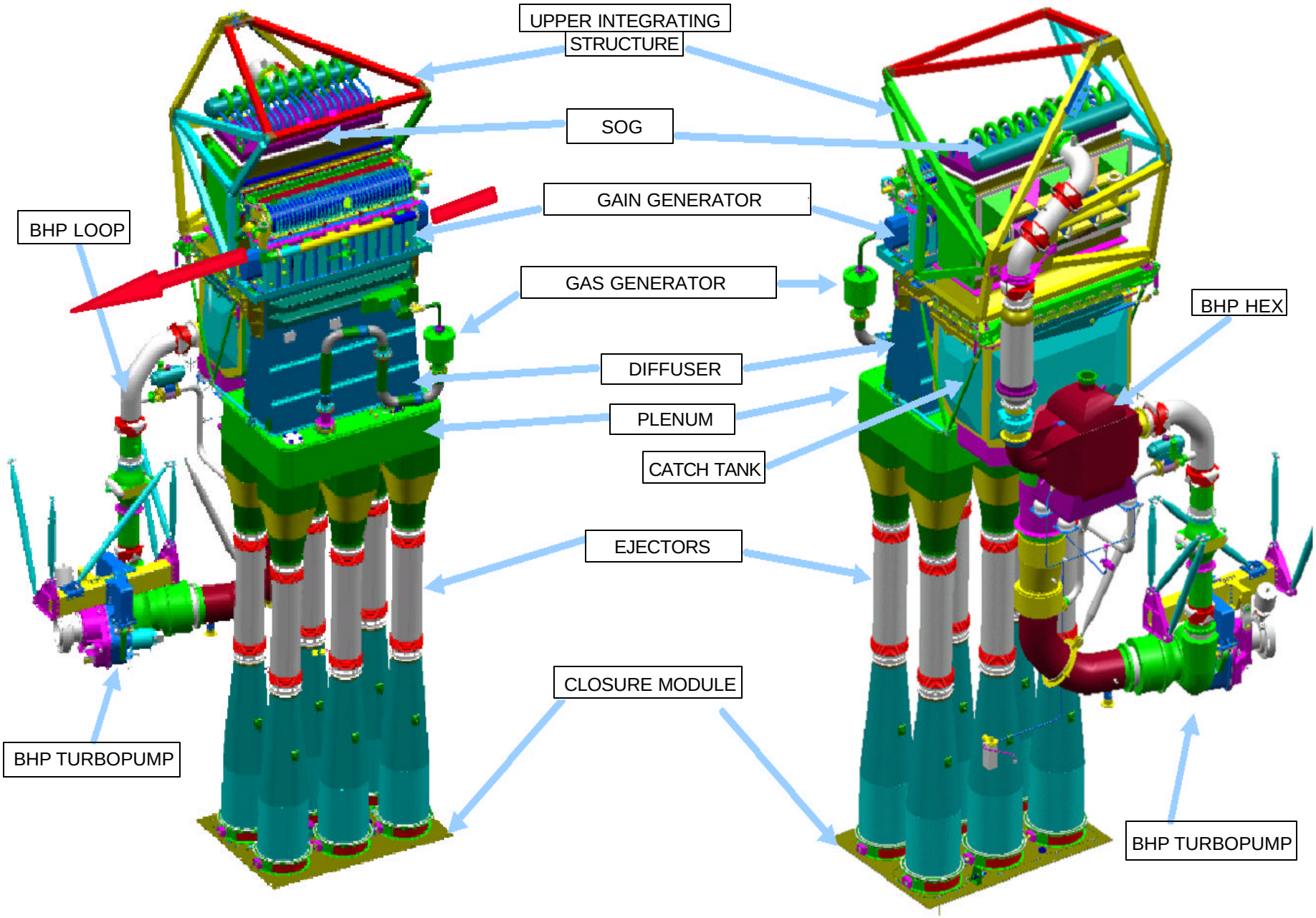
ONE GRAPHITE OVER - WRAPPED TANK - SAME DESIGN AS HELIUM TANKS



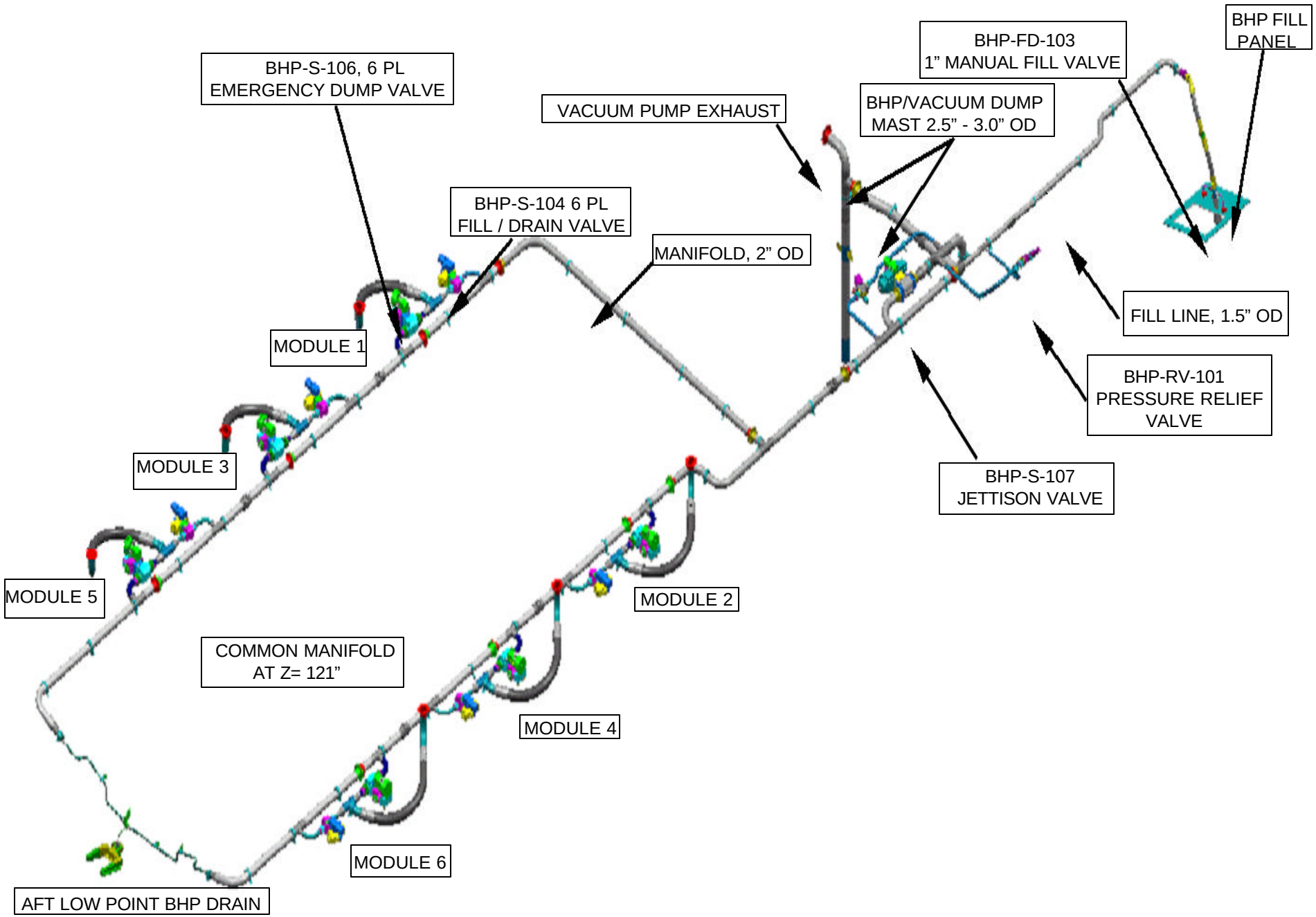
PROVIDES GN2 FOR SEVERAL FUNCTIONS
* GAIN GENERATOR ISOLATION PURGE
* NOZZLE ENERGIZERS
* TMS VACUUM PUMP SHAFT PURGE
* VALVE ACTUATION (125 AND 250 PSIA)

HIGH PEAK FLOW DEMAND DRIVES DESIGN. SHORT DURATION TRANSIENT DURING STANDBY TO READY = 7.5 LB/SEC

BASIC HYDROGEN PEROXIDE (BHP) OVERVIEW OF HAZARDS

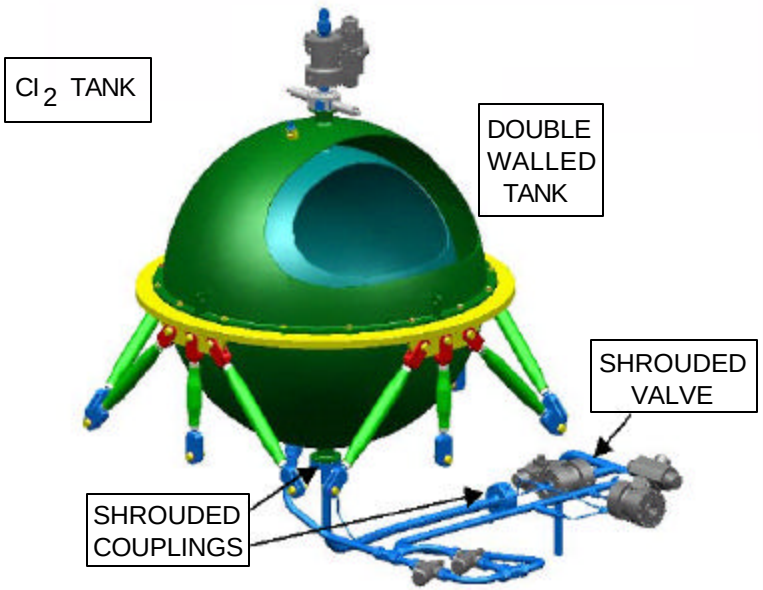


BHP FILL AND DRAIN PLUMBING

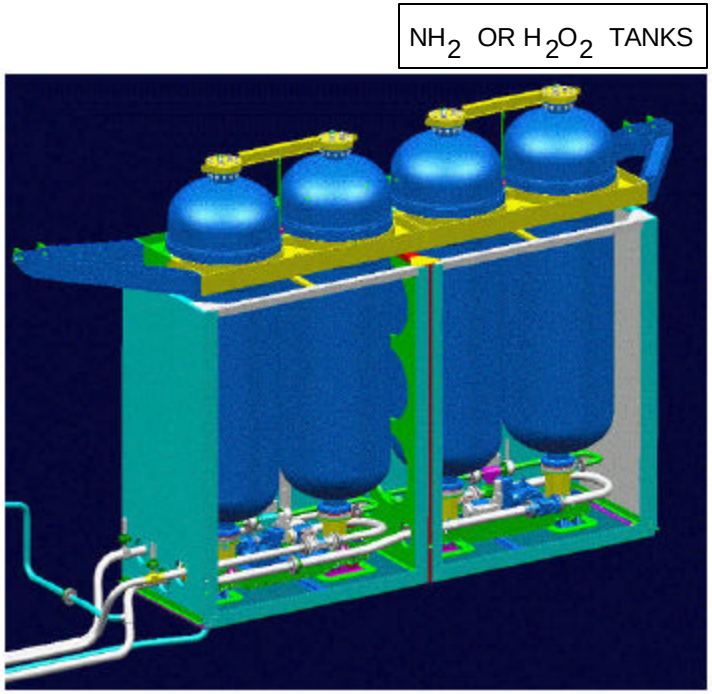


SECONDARY CONTAIMENT FOR CRITICAL TANKS

* SECONDARY CONTAINMENT EQUIPPED WITH LEAK DETECTORS FOR CIS AND BACKUP DISPLAYS
    * Cl_2 HAS PRESSURE TRANSDUCERS
    * NH_2 & H_2O_2 VAPOR DETECTORS AND LIQUID LEVEL SENSORS



* SECONDARY CONTAINMENT FOR TANKS AND PRIMARY SHUT OFF AND JETTISON VALVES ON C12, NH_3 AND H_2O_2 TANKS
* CAPABLE OF BEING DRAINED OVERBOARD THROUGH DUMP MAST VIA CIS OR BACKUP PANEL



VENTING OF LARGE HELIUM TANK FARMS

HELIUM TANK FARM

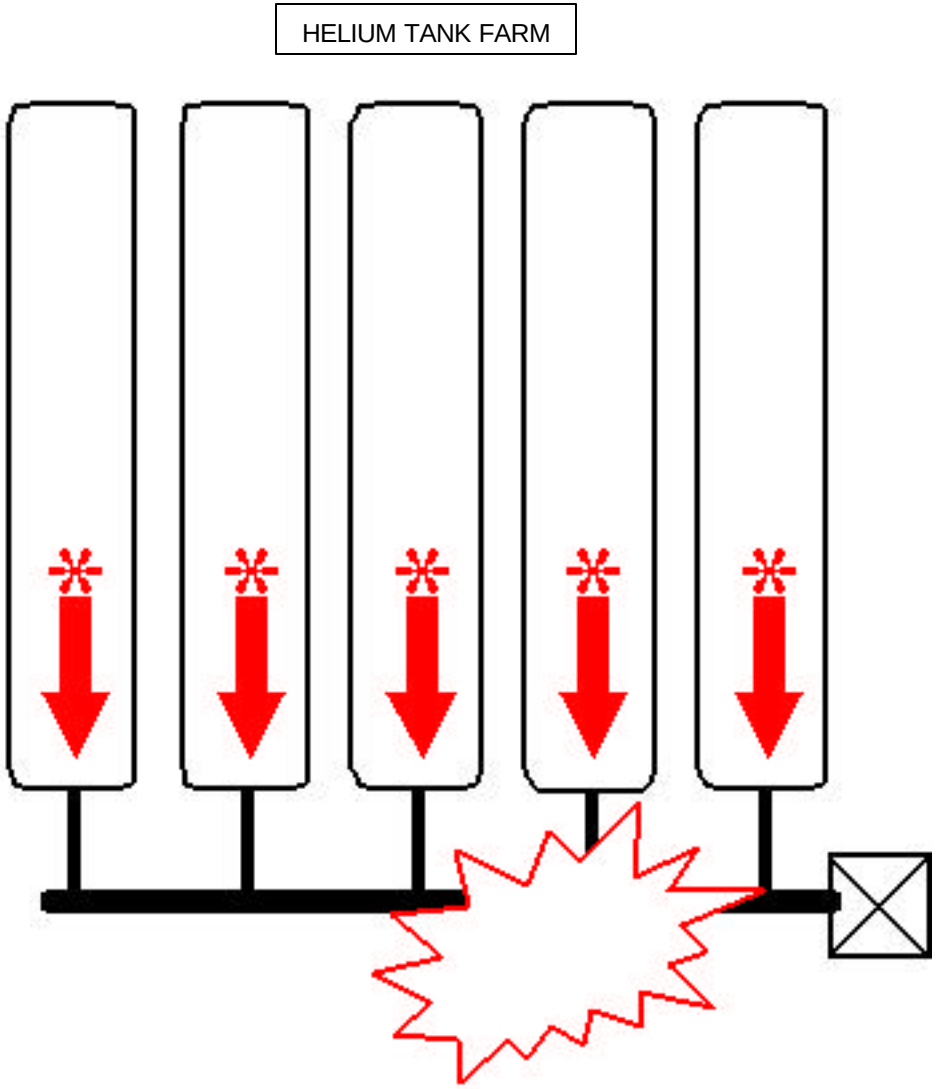
* POTENTIAL OVERPRESSURE OF AIRCRAFT FUSELAGE FROM HELIUM TANK FARMS
    * MANIFOLD CRACKS/BREAKS
    * ALL TANKS BLOW DOWN THROUGH RUPTURED LINE

* 18 TANK HELIUM FARM AND 7 TANK H_2O_2 PRESSURANT He TANKS

* EACH TANK HAS ORIFICE AT OUTLET TO LIMIT TOTAL FLOW RATE FROM TANKS TO PREVENT

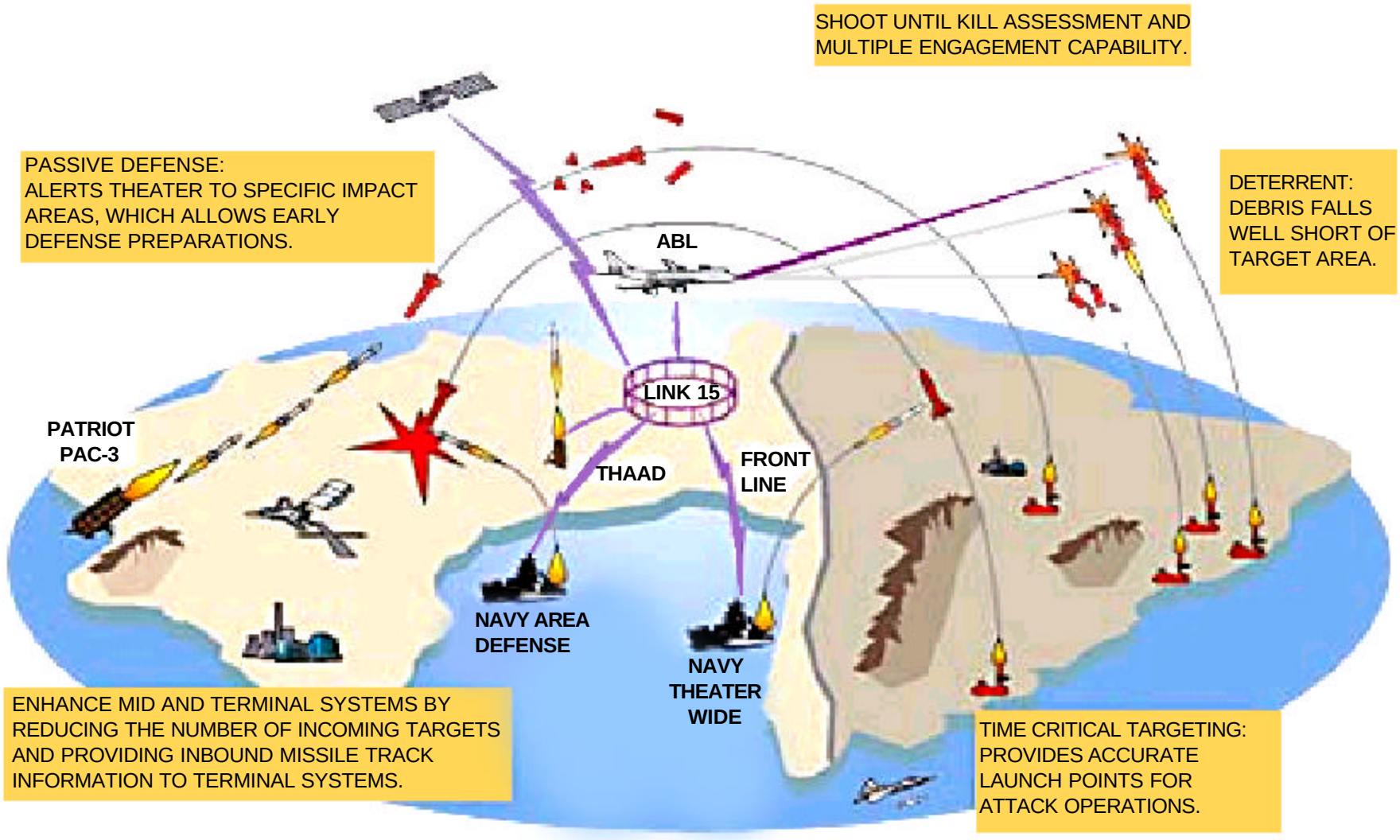
WARNING - EXTREMELY DANGEROUS

The Composite Overwrapped Pressure Vessels (COPVs) are the single most hazardous items on the aircraft. They are nominally at 4600 psig. If more than one ruptures, the aircraft fuselage will break! Handle With Care!



ABL SYSTEM DESCRIPTION

To defend against the ballistic missile threat, the U.S. Air Force, Missile Defense Agency (MDA) and Team ABL — comprising Boeing, TRW and Lockheed Martin — are developing a high-energy chemical oxygen iodine laser (COIL) carried aboard a modified Boeing 747-400F Freighter that is capable of shooting down ballistic missiles while hundreds of miles from the missile launch sites.

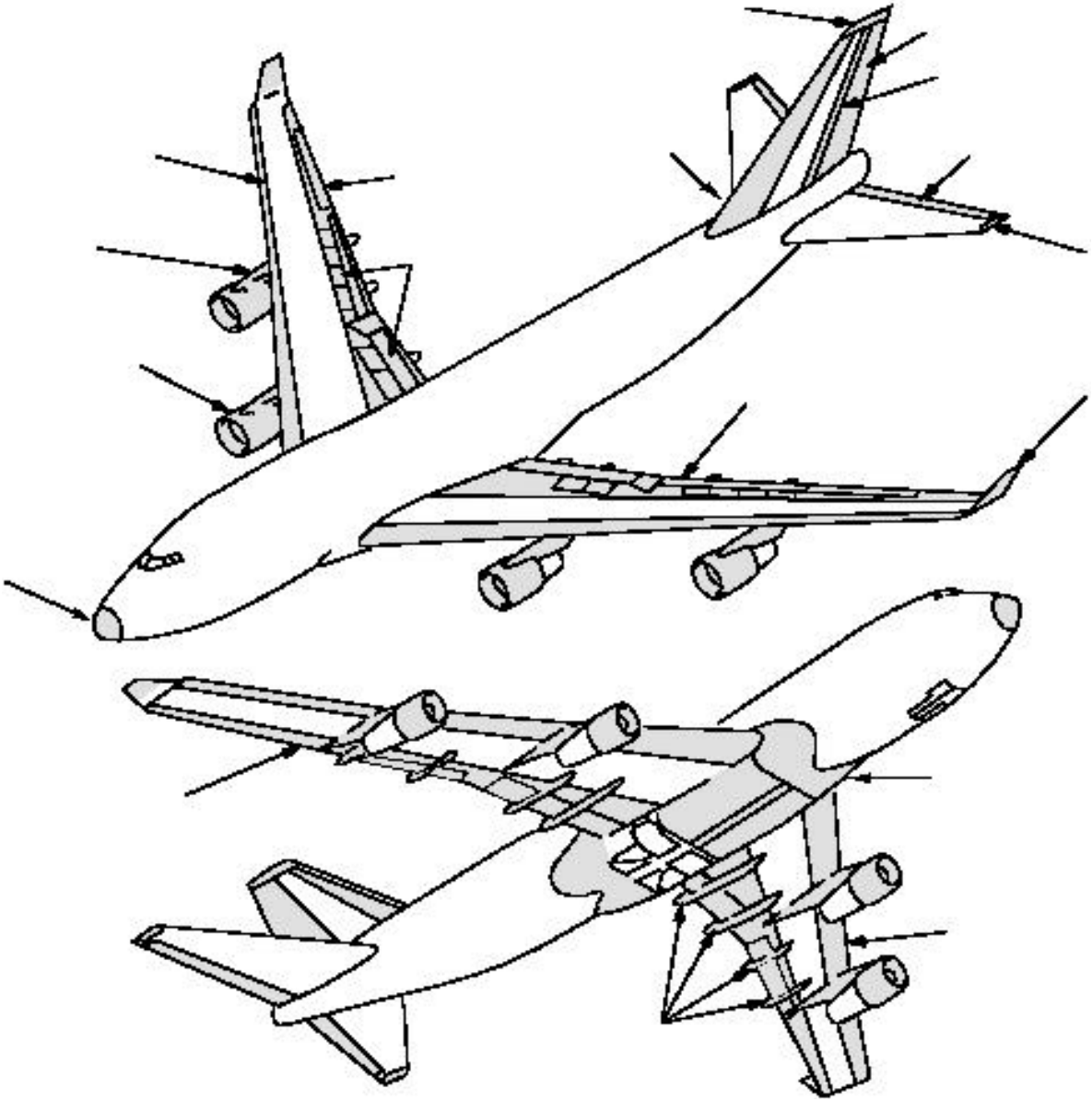


AIRFRAME MATERIALS

1. AIRFRAME MATERIALS

NOTE:

The 747-400 airframe consists of advanced composite materials. These materials are illustrated by the provided graphic.



YAL-1A

SPECIAL TOOLS/EQUIPMENT
Power Rescue Saw
35 Foot Ladder Fire Drill II

AIRCRAFT ENTRY -400 FREIGHTER, GENERIC CONFIGURATION ONLY FOR THE YAL-1A

1. NORMAL/EMERGENCY ENTRY

a. Pull entry door handles from recess position and rotate 180 degrees clockwise for entry doors located on left side and counterclockwise for entry doors on right side.

NOTE:
All entry doors open outward.

b. Press release button on crew escape hatch, located top forward center of crew compartment, and rotate escape hatch handle 180 degrees clockwise. Push escape hatch inward.

c. Pull handle, located on crew door, and rotate 180 degrees counterclockwise. Push door inward until slide tracks are engaged, then slide door aft.

NOTE:
- Opening a door from the outside disengages the emergency evacuation system and the escape chute will not deploy.
- All emergency escape chutes are deployed from inside the aircraft only.

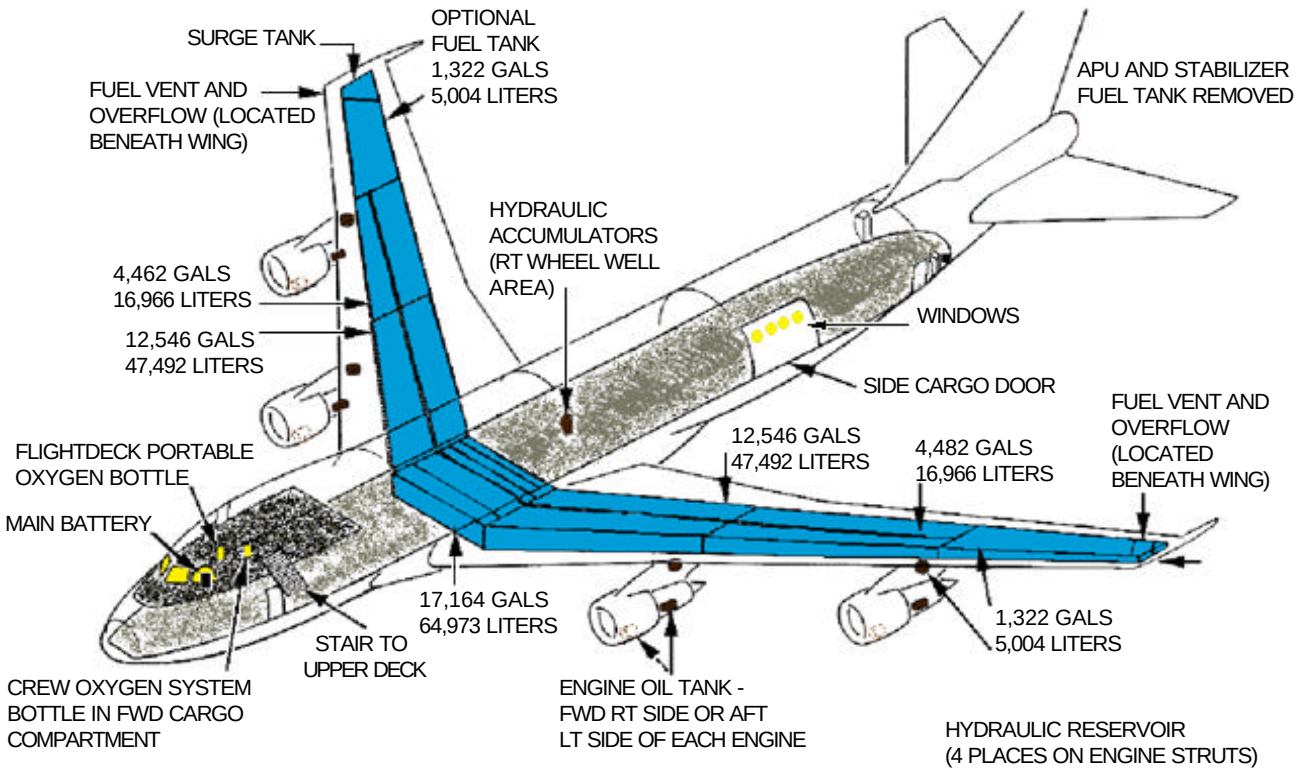
2. UPPER DECK CREW SERVICE/ENTRY DOORS

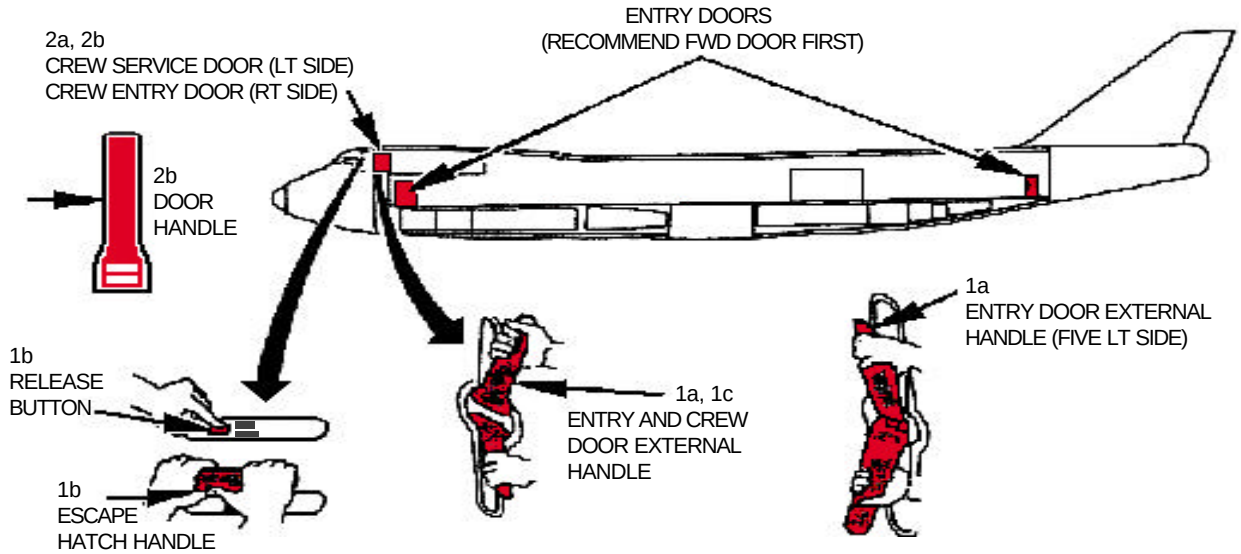
a. To unlock door, push access panel.

b. Lift door handle.

3. CUT-IN

a. Cut areas along window lines as last resort.

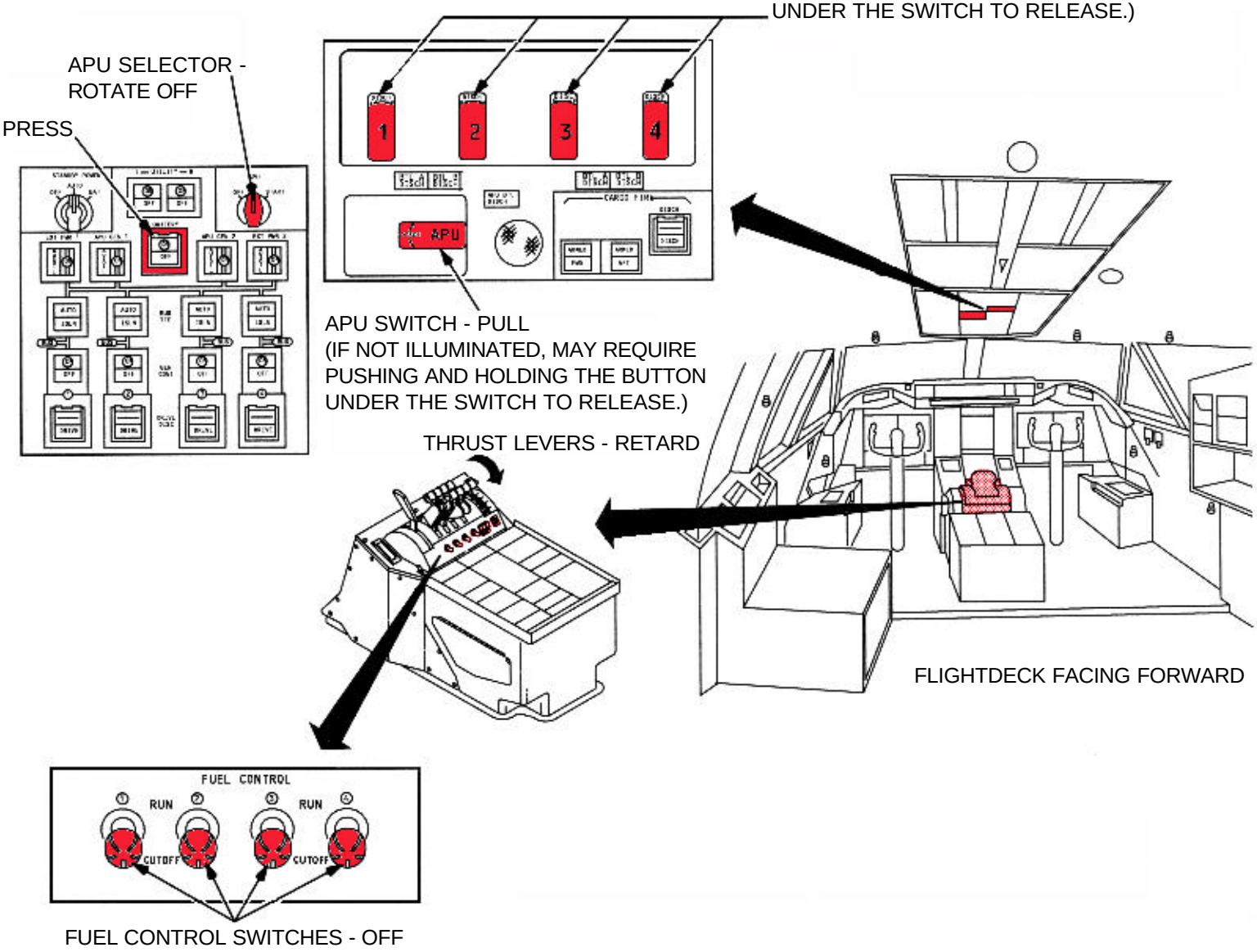




FLIGHTDECK CONTROL SWITCH LOCATIONS

THRUST LEVERS, ENGINE FIRE T-HANDLES, APU SWITCHES, FUEL CONTROL SWITCHES AND BATTERY SWITCH

NOTE:
The battery switch should be actuated last when shutting down systems.



AIRCREW AND PASSENGER EXTRACTION

1. FLIGHTDECK ARRANGEMENT

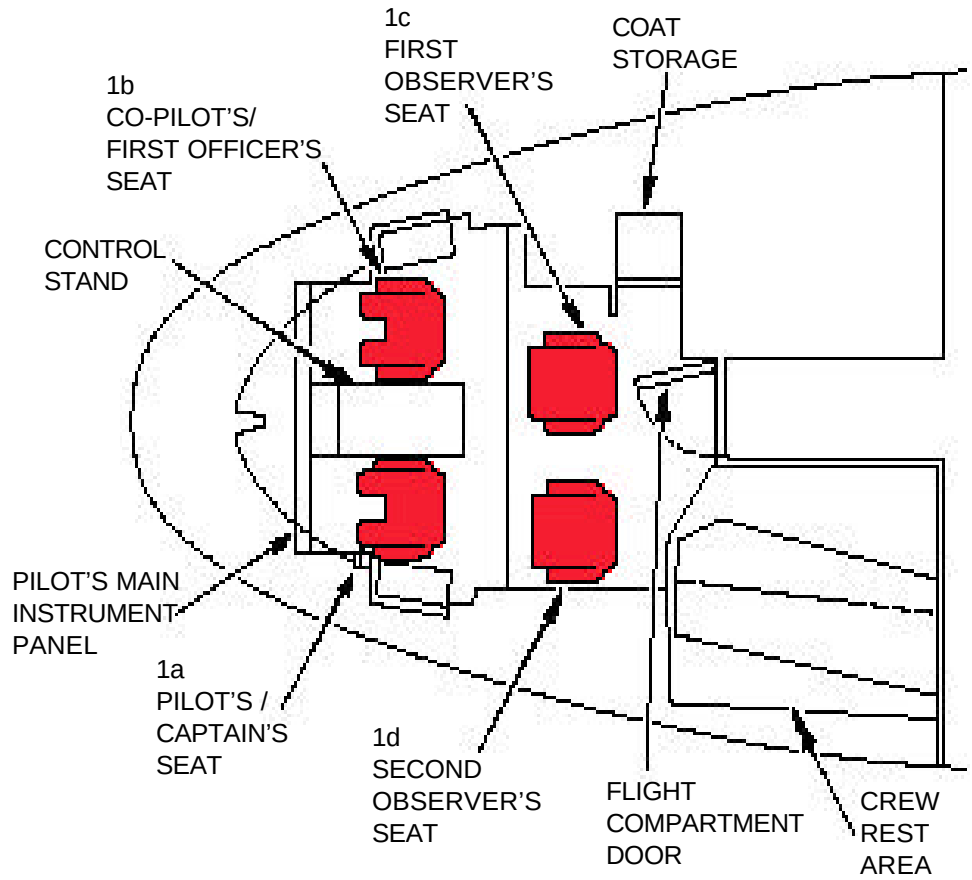
a. A pilot's/captain's station is located at forward left side of the flightdeck compartment.

b. A co-pilot's/first officer's station is located at forward right side of the flightdeck compartment.

c. A first observer's station is located just aft of the co-pilot's/ first officer's station.

d. A second observer's station is located just aft of the pilot's/captain's station.

e. The flightdeck compartment also may have a crew rest area just aft of the pilot's/second observer's station on the left side of the compartment.



AIRCREW AND PASSENGER EXTRACTION - Continued

2. SEAT ADJUSTMENTS - PILOT/CAPTAIN & CO-PILOT/FIRST OFFICER

NOTE:
All seats are provided with seat belts and manually actuated control handles for mechanically operated seat adjustments.

a. The pilot's/captain's and co-pilot's/first officer's seats are also provided with toggle switches for electrically powered operation of the horizontal and vertical seat adjustments.

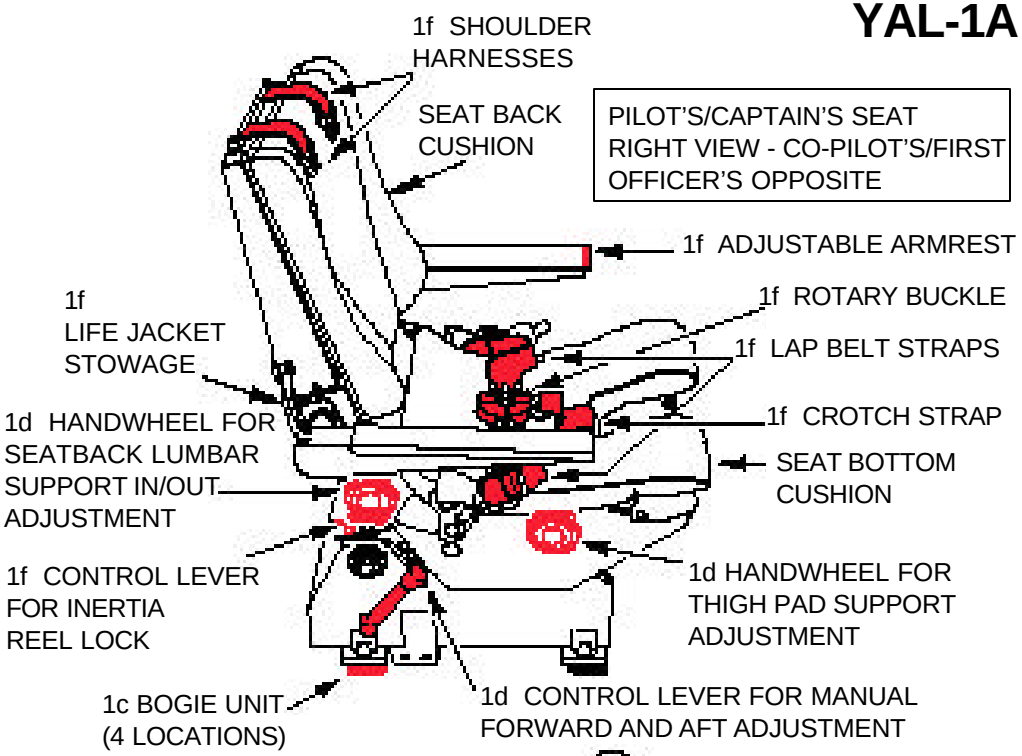
b. Both the captain's and first officer's seats are mounted on seat tracks to permit forward and aft seat travel. The aft ends of the seat tracks are curved outboard so that during the last few inches of aft travel the seats move outboard to provide easement of pilot ingress and egress.

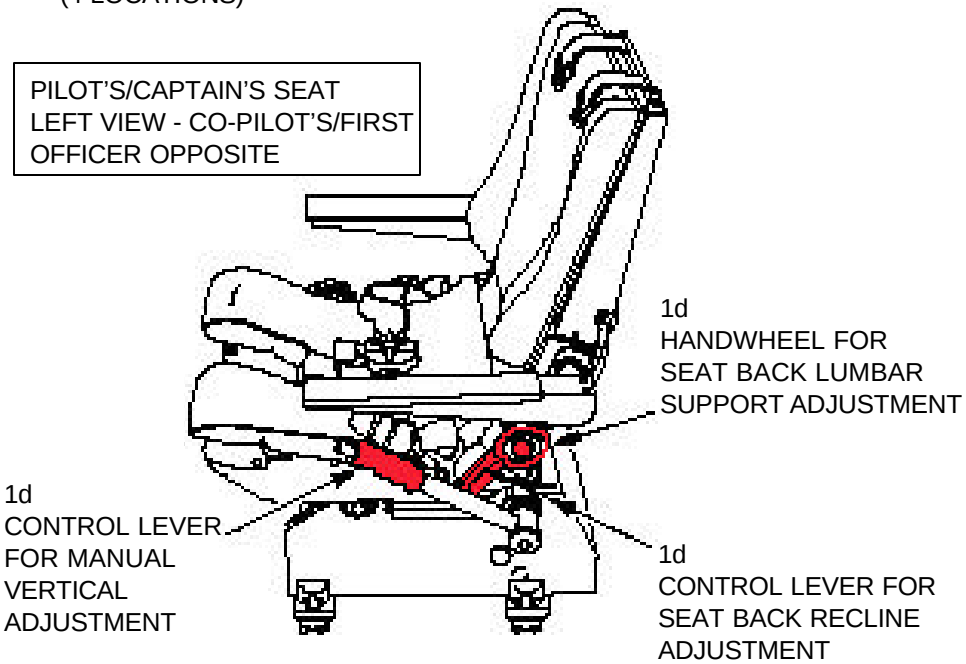
c. Each seat is fitted with four bogie roller swivel assemblies which retain the seat base to the seat tracks and also prevent lateral movement of the seat. The roller swivels located within each bogie assembly assist in the freedom of movement of the seat during fore and aft seat travel.

d. Each seat contains manually operated controls for horizontal and vertical adjustments, thigh support pad adjustment, seat back recline and lumbar support adjustments.

e. In addition, each seat contains two power adjustment control switches for electrically powered operation of the horizontal and vertical seat adjustments.

f. Both seats are also provided with adjustable arm rests, manual/automatic inertia reel shoulder harness, lap straps with rotary buckle and crotch strap, and lifejacket stowage.





AIRCREW AND PASSENGER EXTRACTION- Continued

3. SEAT ADJUSTMENTS - FIRST & SECOND OBSERVER'S SEATS

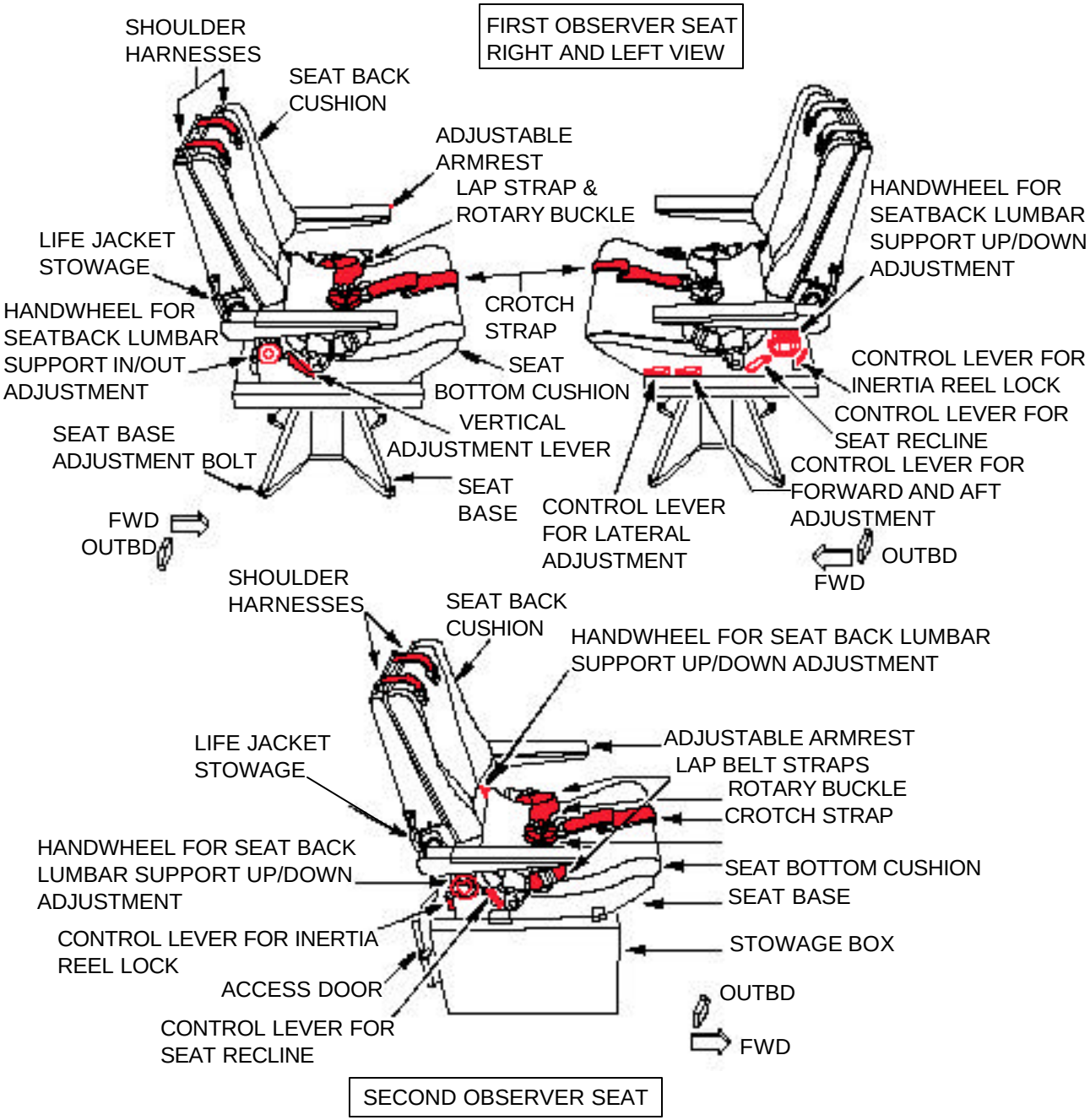
a. The first observer seat is mounted on the flight compartment floor on the right side of the compartment and is capable of horizontal, lateral and vertical adjustments.

b. The first observer seat contains manually operated controls for horizontal, lateral and vertical adjustments, seat back recline adjustment and lumbar support adjustments.

c. The second observer seat is mounted on top of a book stowage compartment on the left side of the compartment and is not capable of horizontal, lateral or vertical adjustments.

d. The second observer seat contains manually operated controls for seat back recline and lumbar support adjustments only.

e. Both seats are also provided with adjustable armrests, manual/automatic inertia reel shoulder harness, lap straps with rotary buckle and crotch strap, and lifejacket stowage.

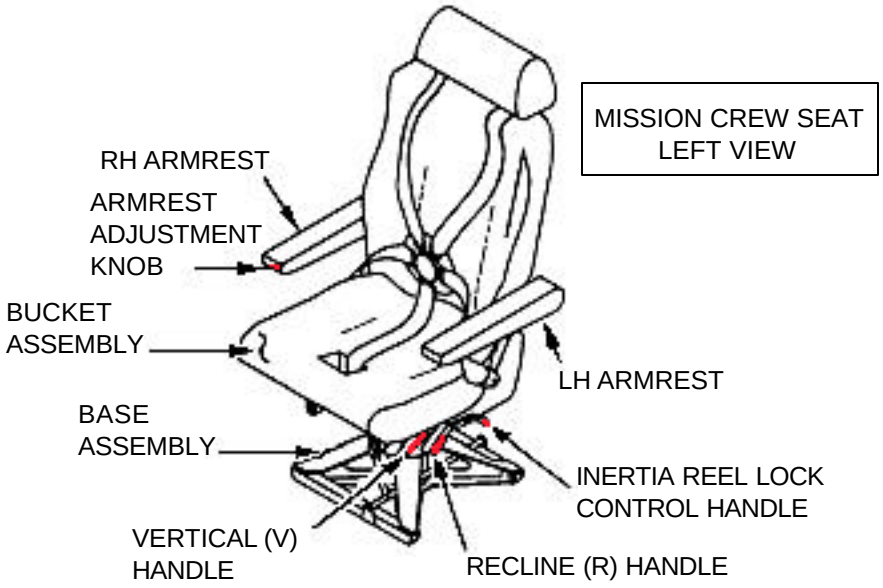


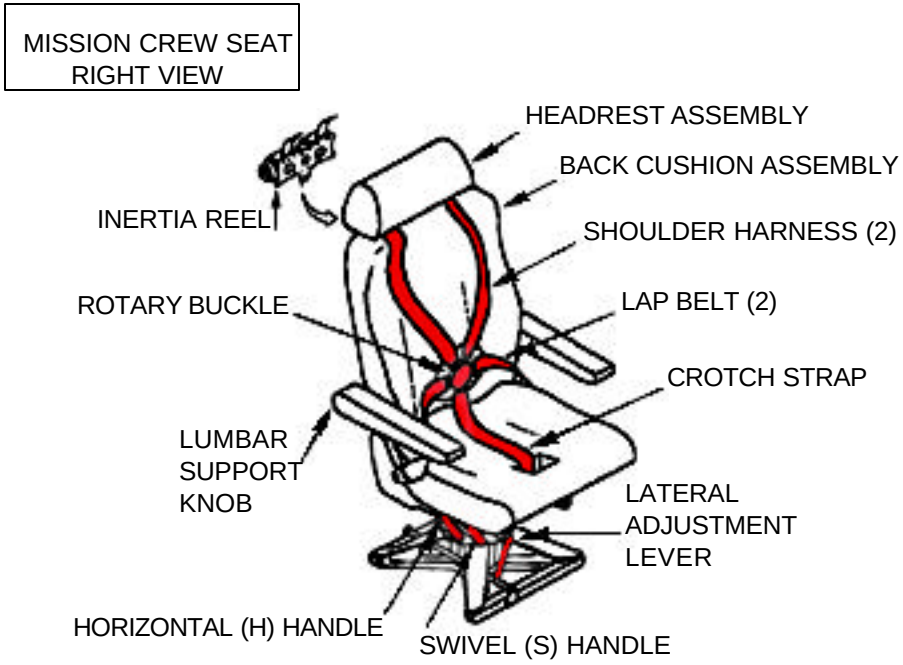
AIRCREW AND PASSENGER EXTRACTION- Continued

4. SEAT ADJUSTMENTS - MISSION CREW SEATS

a. The mission crew seats are located on main deck aft of stairwell. These seats have adjustments for vertical, horizontal, recline, lateral, swivel and lumbar.

b. These seats are also provided with adjustable armrests, manual/automatic inertia reel shoulder harness, lap straps with rotary buckle and crotch strap.





AIRCREW AND PASSENGER EXTRACTION- Continued

5. PASSENGER SEATS

a. The passenger seats are located on the upper deck aft of flightdeck. These seats are business class type seats. They have adjustments for horizontal and recline with a leg rest. This adjustment is located mid way on the left armrest.

b. These seats are equipped with standard airline seat safety belts with the adjustable buckle. Pull up on buckle to release belt.

5a
PAX SEAT WITH
FOOT REST

5a
PAX SEAT WITH
FOOT REST
CONTROLS

5b
PAX SEAT WITH
SAFETY BELT AND
ADJUSTABLE BUCKLE