

**WELCOME TO TECHNICAL ORDER 00-105E-9, 1 FEBRUARY 2006, REVISION 11.**

**THIS IS SEGMENT 10 COVERING CHAPTER 7 FROM THE YAL-1A  
TO CHAPTER END.**

**TO NAVIGATE**

CLICK ON THE  
BOOKMARKS AND  
CLICK ON THE (+)  
SYMBOLS, THEN  
CLICK ON SUBJECT  
LINKS TO GO TO  
SPECIFIC VIEWS  
IN THIS SEGMENT.



**CONTINUE**

**NOTICE**

**CONTACT**

**TO GO DIRECTLY TO THE TECHNICAL ORDER,  
CLICK ON THE CONTINUE BUTTON.**

**TO SEE THE SEGMENT INFORMATION CHANGE NOTICE,  
CLICK ON THE NOTICE BUTTON.**



**TO CONTACT THE TECHNICAL CONTENT MANAGER ,  
CLICK ON THE CONTACT BUTTON.**

## TECHNICAL ORDER 00-105E-9 TECHNICAL CONTENT MANAGER



### WRITTEN CORRESPONDENCE:

**HQ AFCESA/CEXF**

**ATTN: Fire and Emergency Services Egress Manager**

**139 Barnes Drive Suite 1**

**Tyndall AFB, Florida 32403-5319**

**E-MAIL: HQAFCESA.CEXF@tyndall.af.mil**

**INTERNET: HQ AFCESA Fire and Emergency Services PUBLIC WEB PAGE:**

**<http://www.afcesa.af.mil/CEX/cexf/index.asp>**

**Safety Supplements: [http://www.afcesa.af.mil/CEX/cexf/\\_firemgt.asp](http://www.afcesa.af.mil/CEX/cexf/_firemgt.asp)**

**PHONE: (850) 283-6150**

**DSN 523-6150**

**FAX: (850) 283-6383**

**DSN 523-6383**

**For technical order improvements, correcting procedures, and other inquiries, please use the above media most convenient.**

## SEGMENT 10 INFORMATION CHANGE NOTICE

This page is provided to notify the user of any informational changes made to Technical Order 00-105E-9 in this Segment and the current Revision. Informational changes will be referenced in the Adobe Reader's Bookmark tool as a designator symbol illustrated as a <[C]> for quick reference to the right of the affected aircraft. The user shall insure the most current information contained in this TO is used for his operation. Retaining out of date rescue information can negatively affect the user's operability and outcome of emergencies. If the user prints out pages his unit requires, the user shall print the affected page(s), remove and destroy the existing page(s), and insert the newly printed page(s) in the binder provided for that purpose. A Master of this TO shall be retained in the unit's library for reference, future printing requirements and inspections.

<u>CHAPTER</u>	<u>AIRCRAFT</u>	<u>PAGE</u>	<u>EXPLANATION OF CHANGE</u>
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None.

## NOTE

Chapter 7 contains emergency rescue and mishap response information for the following aircraft:

USAF	E-3 30/35
USAF	E-4A/B
USAF	E-6B
USAF	EA-6B
USAF	E-8C
USAF	E-9A
USAF	VC-25 (AF-1)
USAF	YAL-1A





# AIRBORNE LASER AIRCRAFT: 747-400F FREIGHTER PLATFORM

YAL-1A

## 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

YAL-1A

	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	
HAZARD TRACKING # SA 0050	Chlorine	950 lbs	1,000 lbs	2000 lbs		X	X	X	X	X	X	X	HAZARD TRACKING # SA 0051
	Ammonia	2,000 lbs	2,000 lbs	4000 lbs		X	X	X	X	X		X	
	70% H <sub>2</sub> O <sub>2</sub>	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 <sub>2</sub> O <sub>2</sub>			8000 gal					X	X	X	X	
	LiOH			5000 lbs				X				X	
	NaOH			10,000 lbs				X				X	
	KOH			10,000 lbs				X				X	
	93% H <sub>2</sub> SO <sub>4</sub>			220 gal				X				X	
	30% H <sub>2</sub> O <sub>2</sub>	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% H <sub>2</sub> SO <sub>4</sub>		2900 gal					X				X	
	20% H <sub>3</sub> PO <sub>4</sub>				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

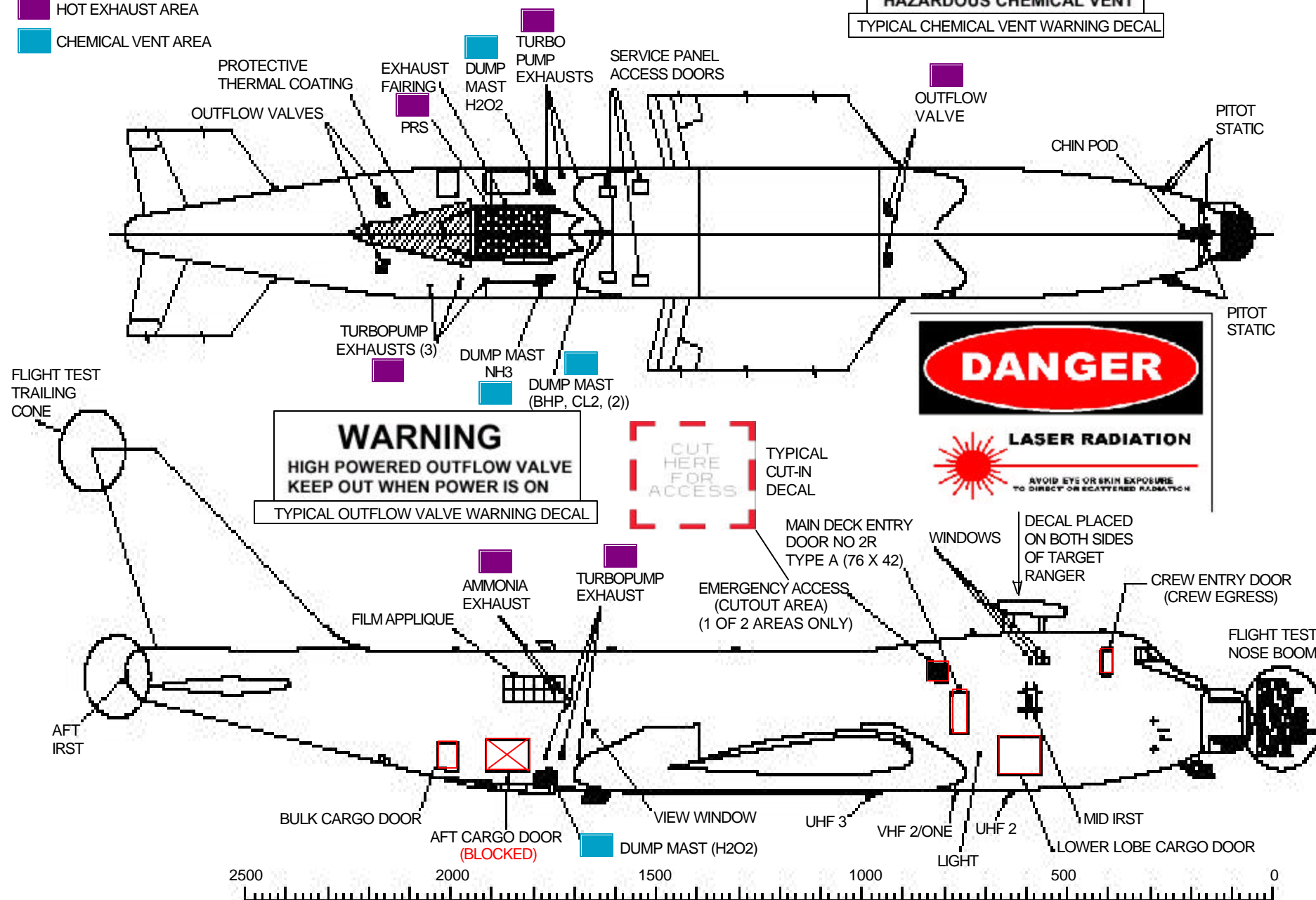
 HOT EXHAUST AREA

 CHEMICAL VENT AREA

## WARNING

HAZARDOUS CHEMICAL VENT

TYPICAL CHEMICAL VENT WARNING DECAL





### ABL CONFIGURATION - TOP AND LEFT SIDE VIEW

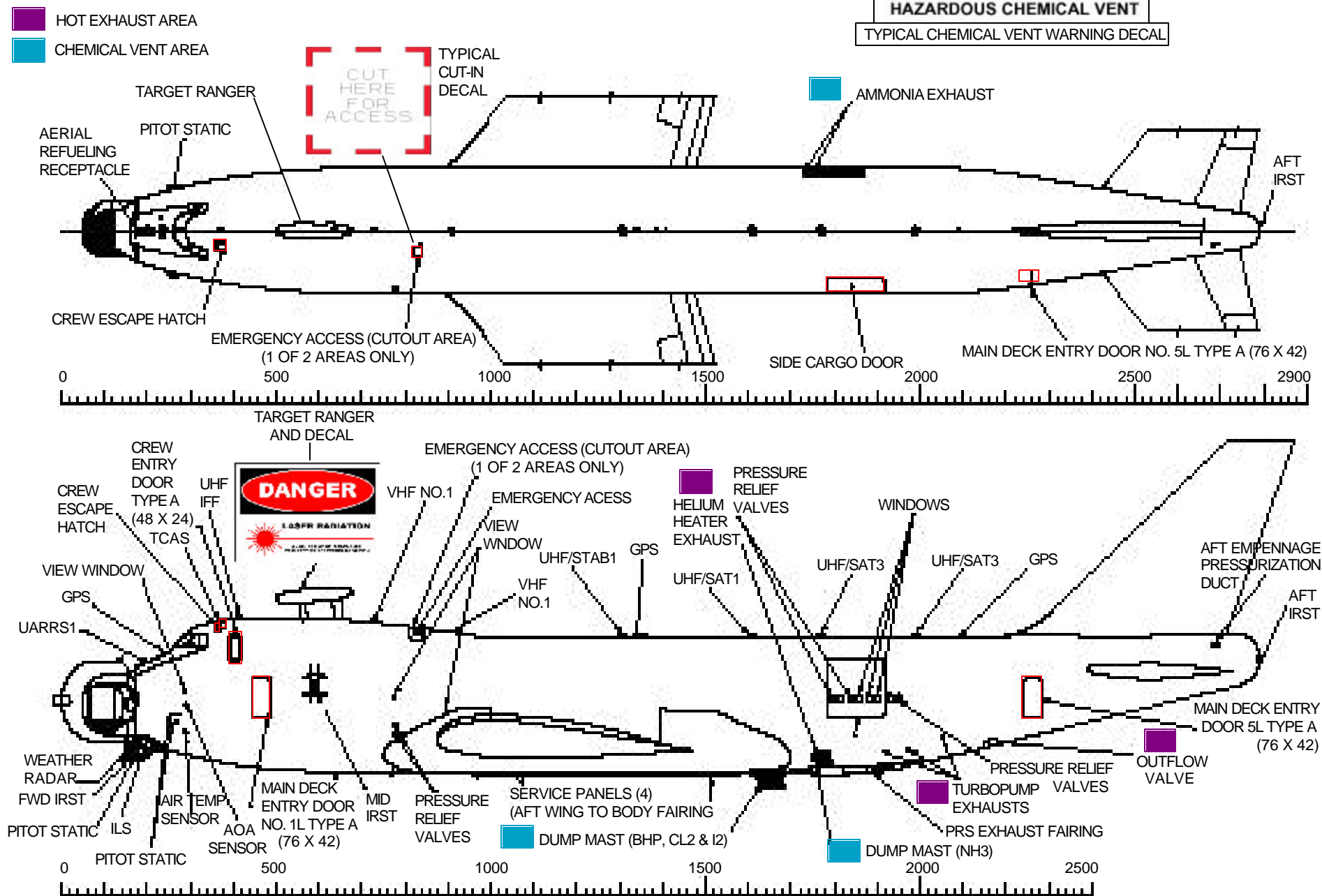
## WARNING

HAZARDOUS CHEMICAL VENT

TYPICAL CHEMICAL VENT WARNING DECAL

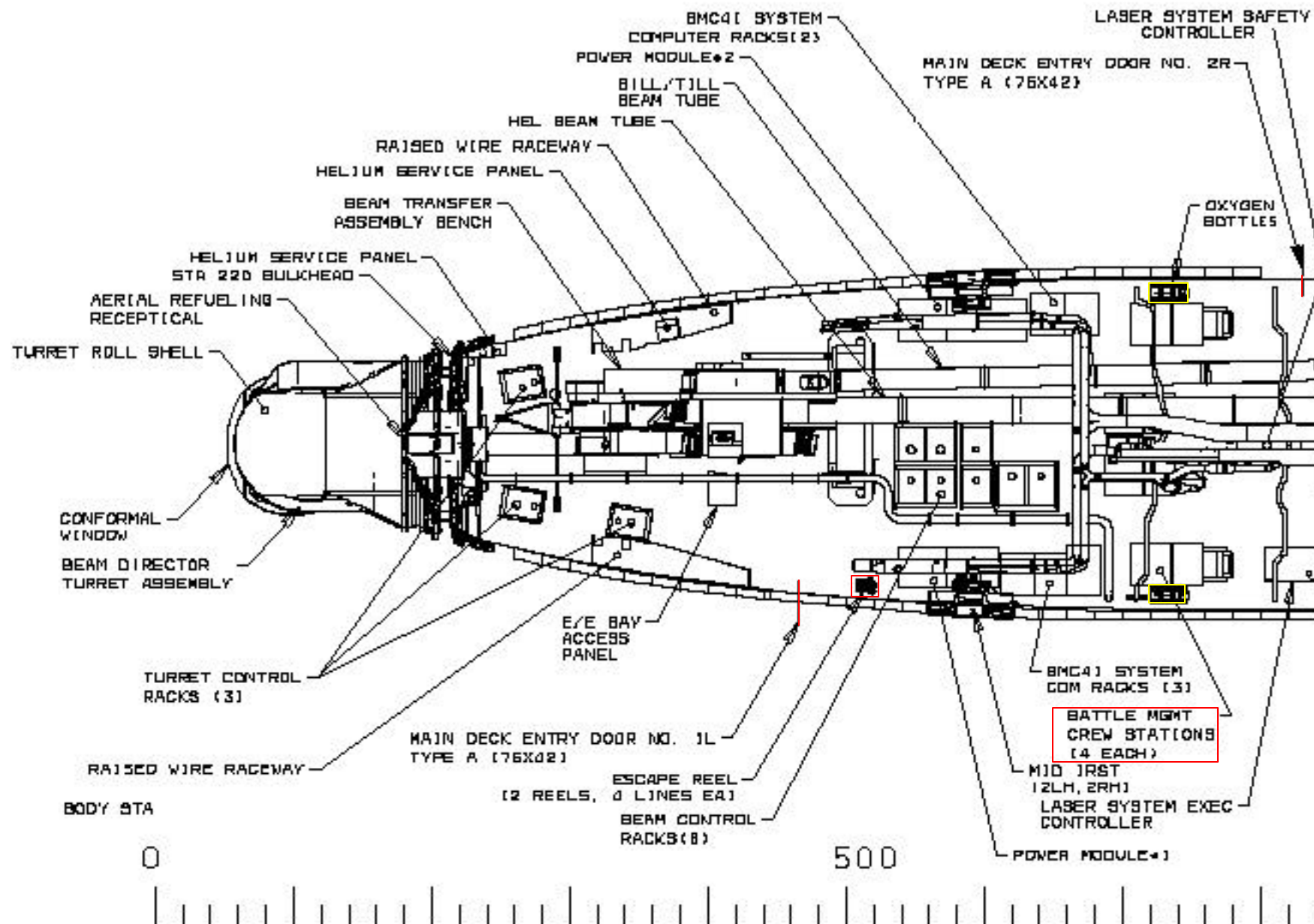
## YAL-1A

**T.O. 00-105E-9**



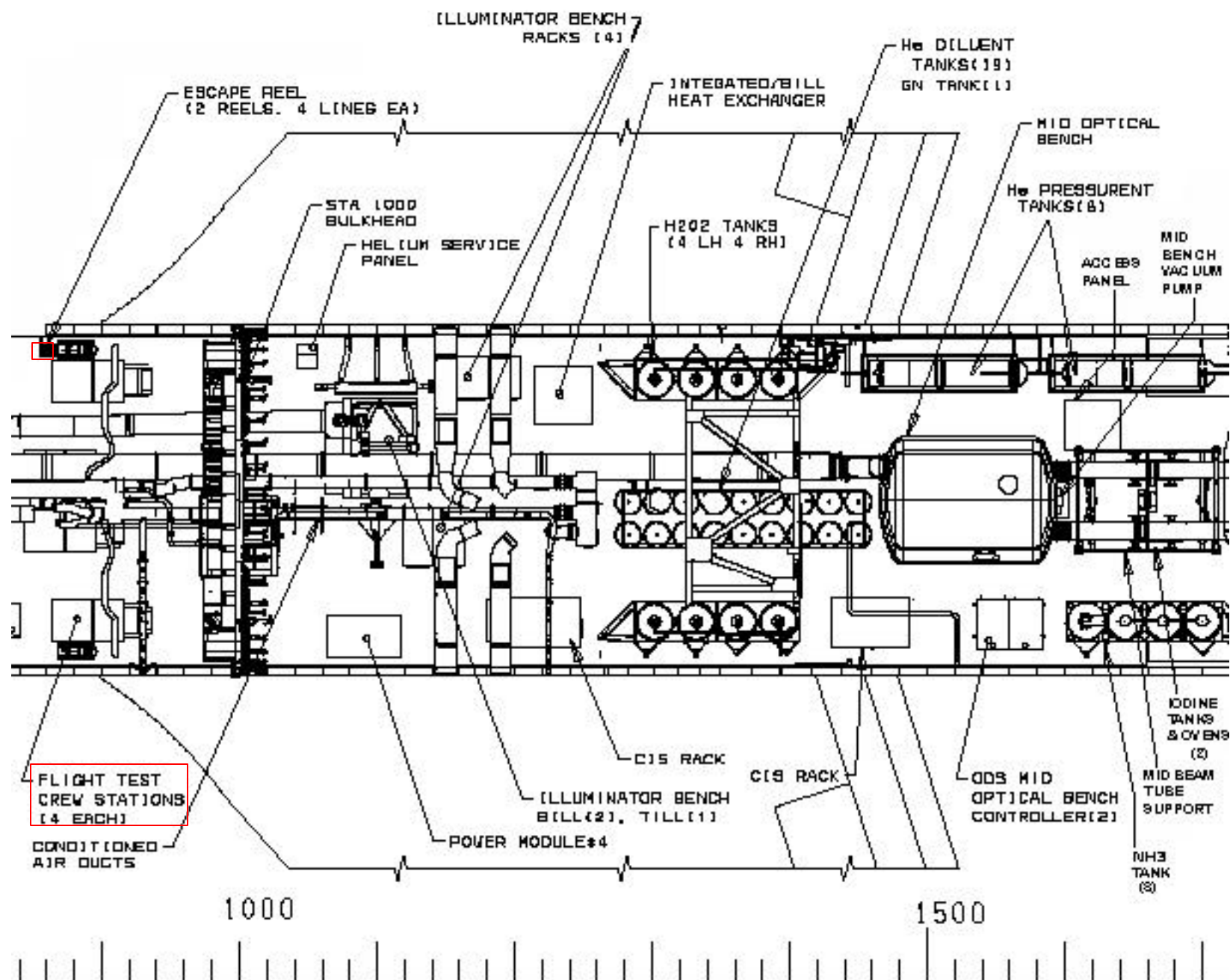
# ABL CONFIGURATION - FORWARD TOP VIEW

YAL-1A



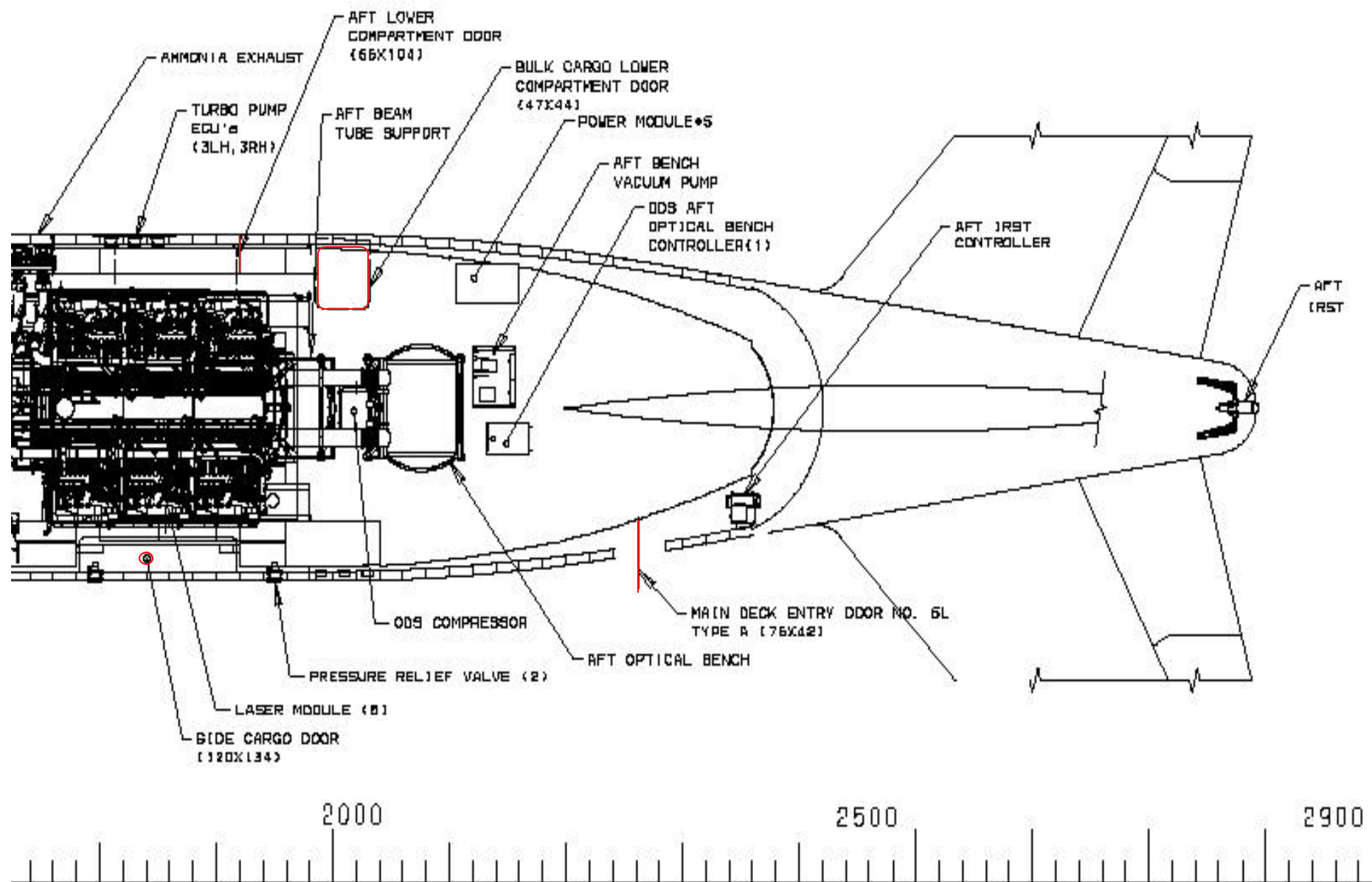
# ABL CONFIGURATION - MID TOP VIEW

YAL-1A



# ABL CONFIGURATION - AFT TOP VIEW

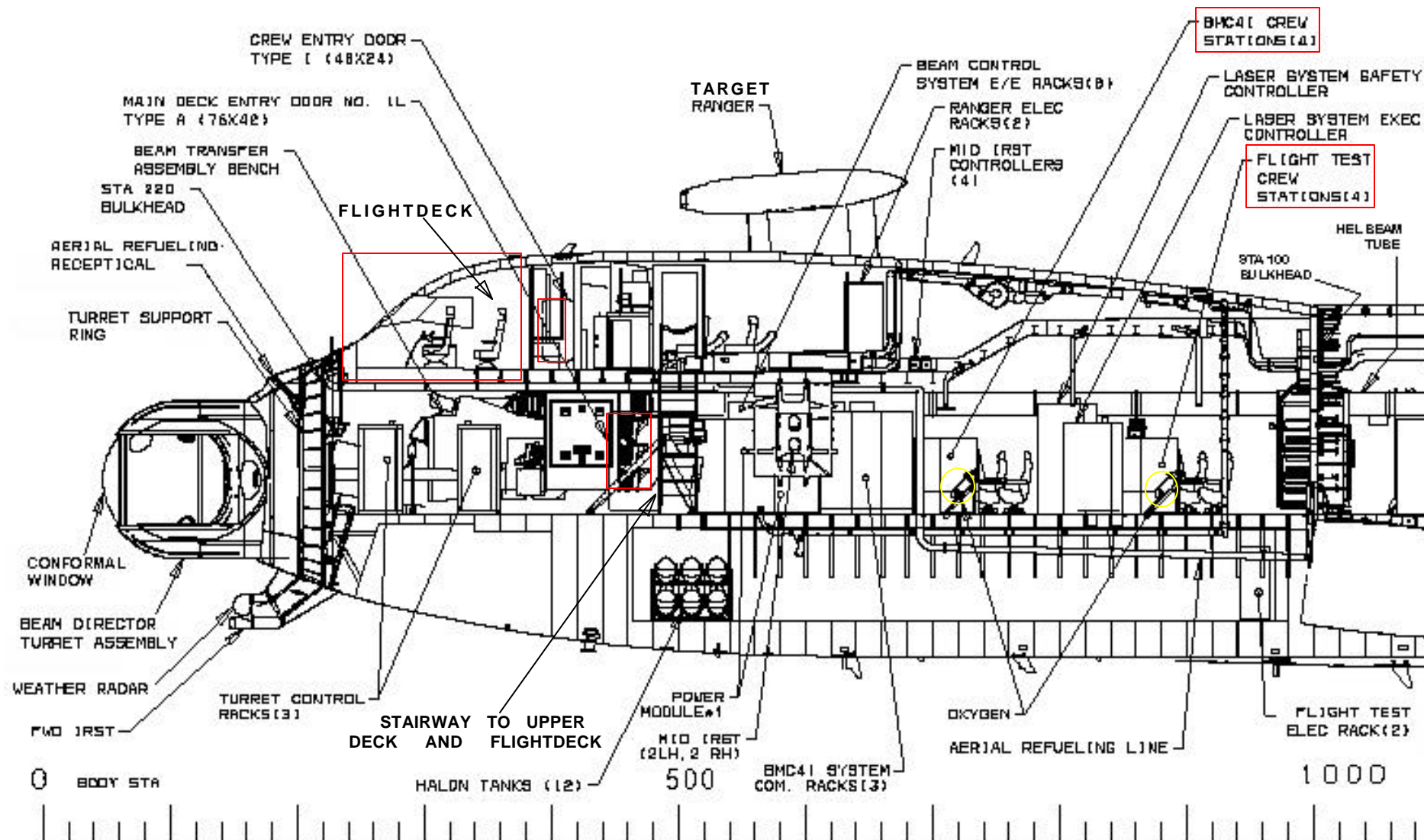
YAL-1A





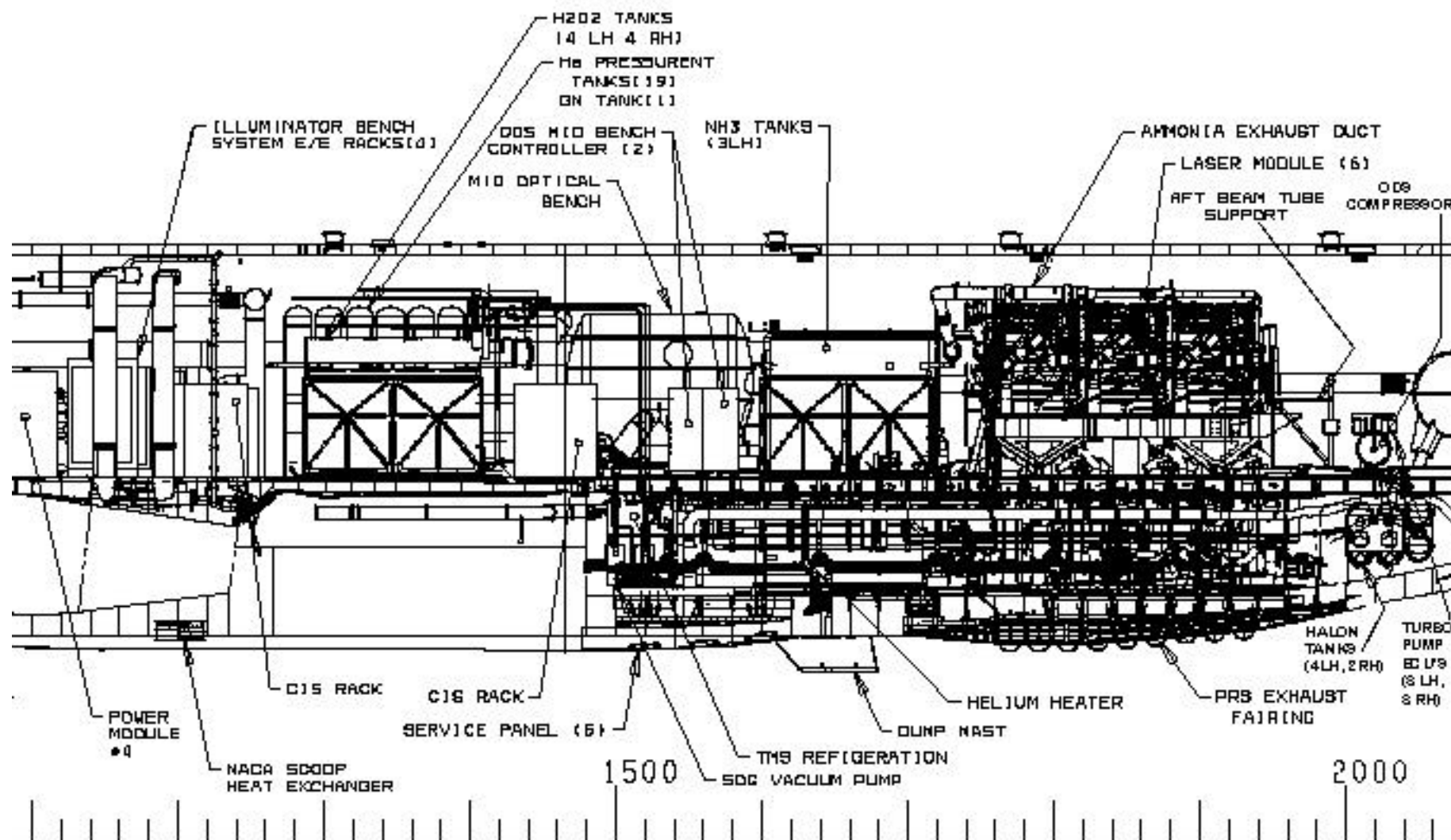
# ABL CONFIGURATION - FORWARD LEFT SIDE VIEW

YAL-1A



## ABL CONFIGURATION - MID LEFT SIDE VIEW

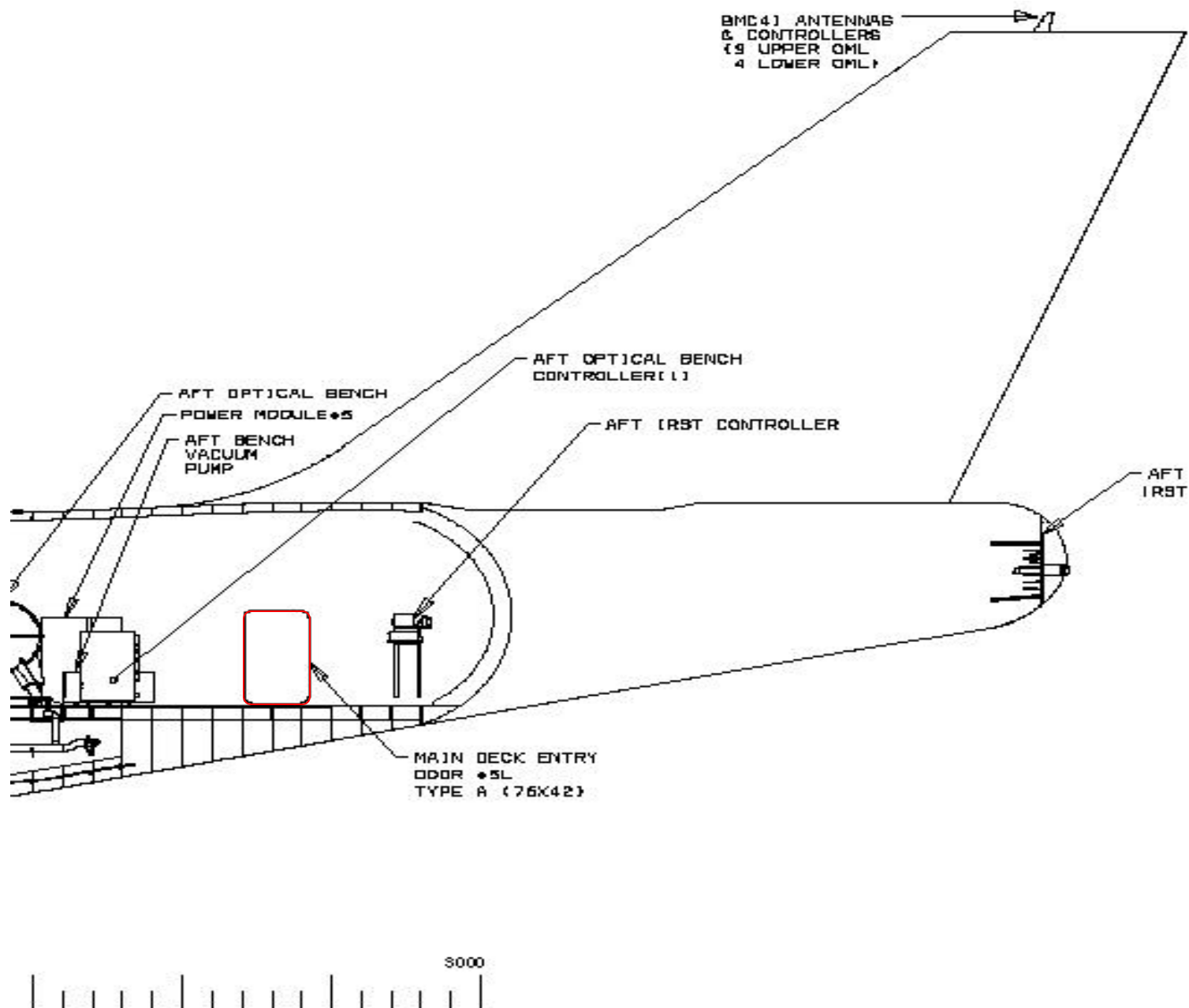
YAL-1A



# ABL CONFIGURATION - AFT LEFT SIDE VIEW

YAL-1A

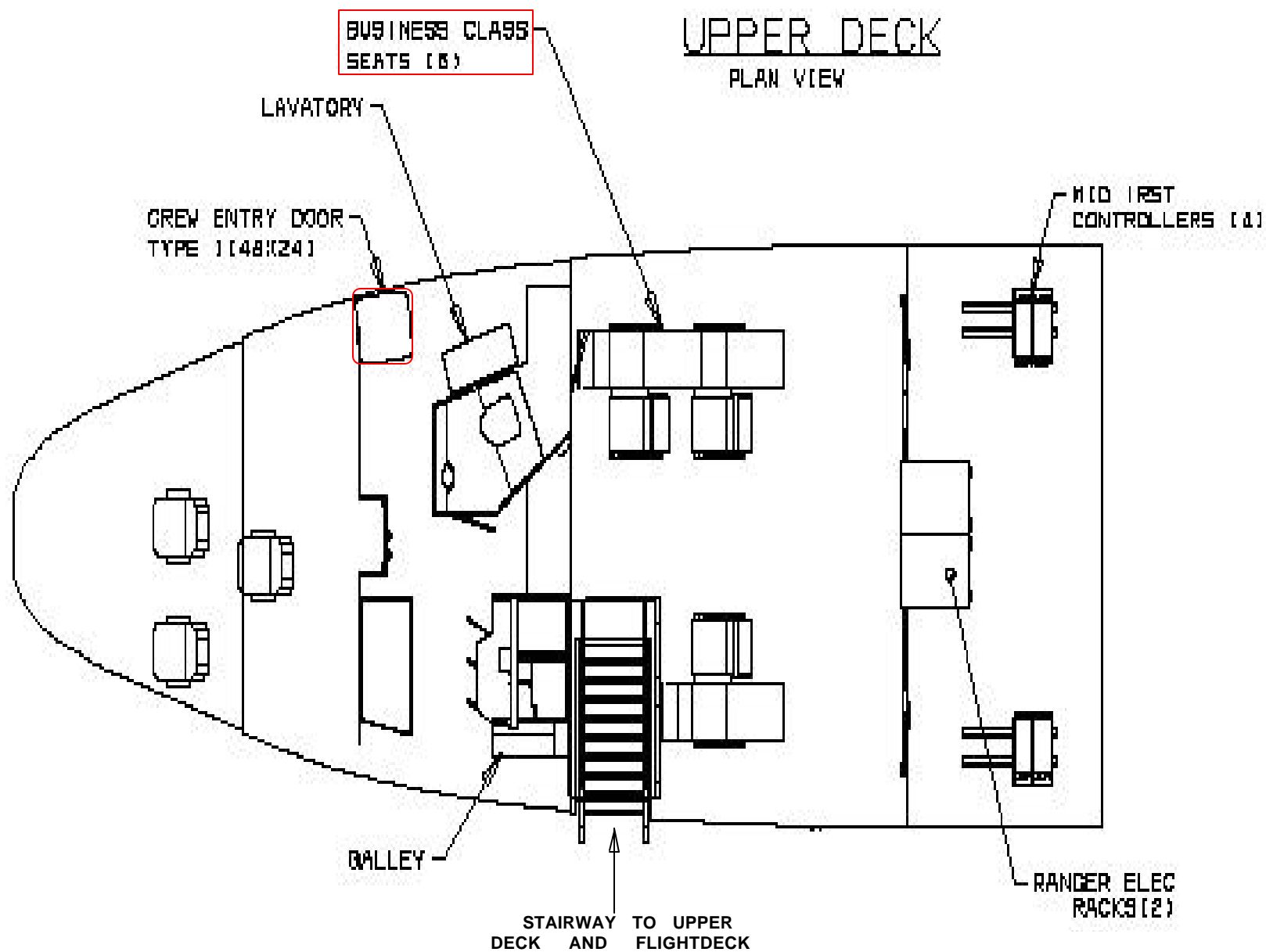
T.O. 00-105E-9



YAL-1A11

## ABL CONFIGURATION - UPPER DECK

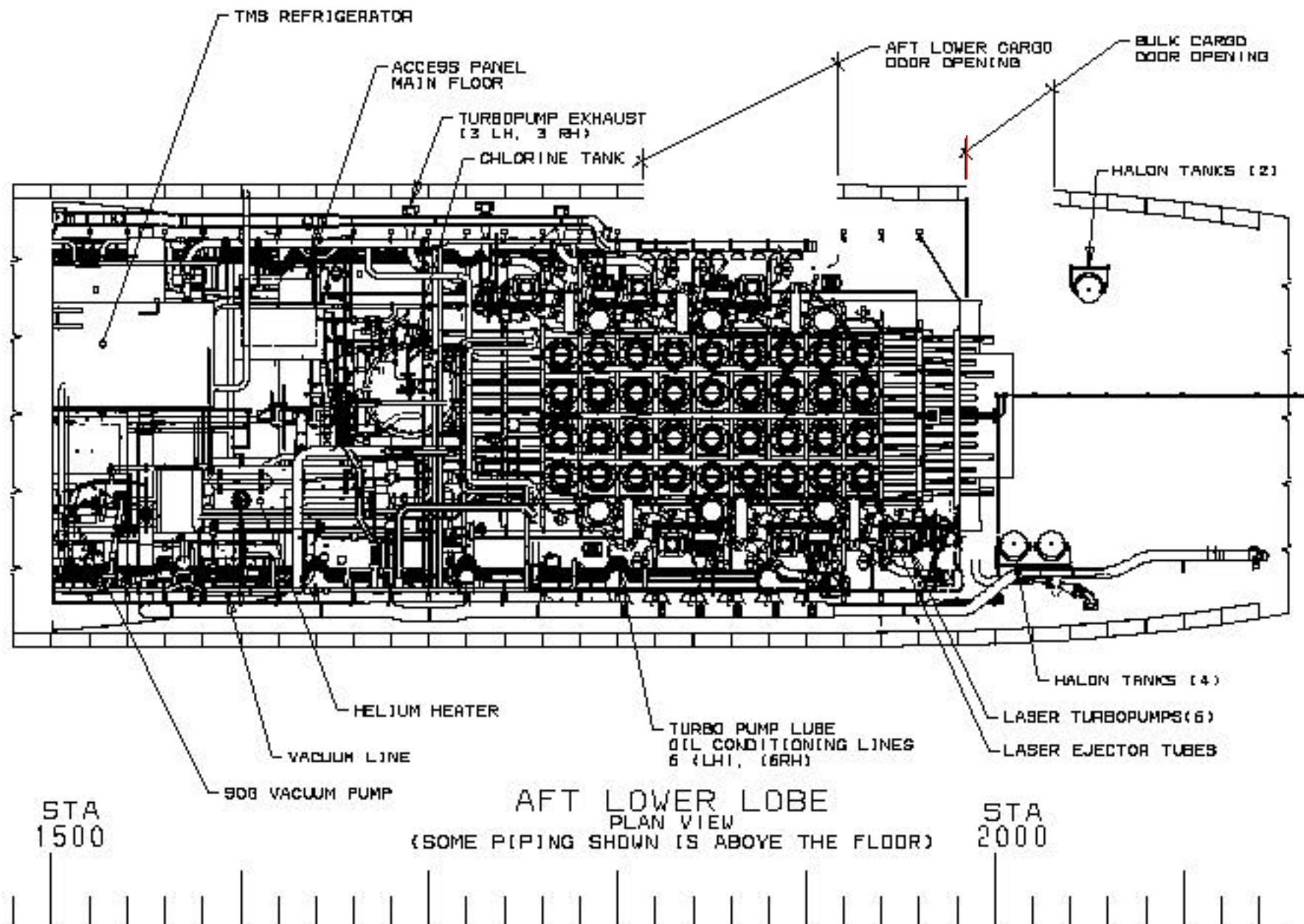
YAL-1A





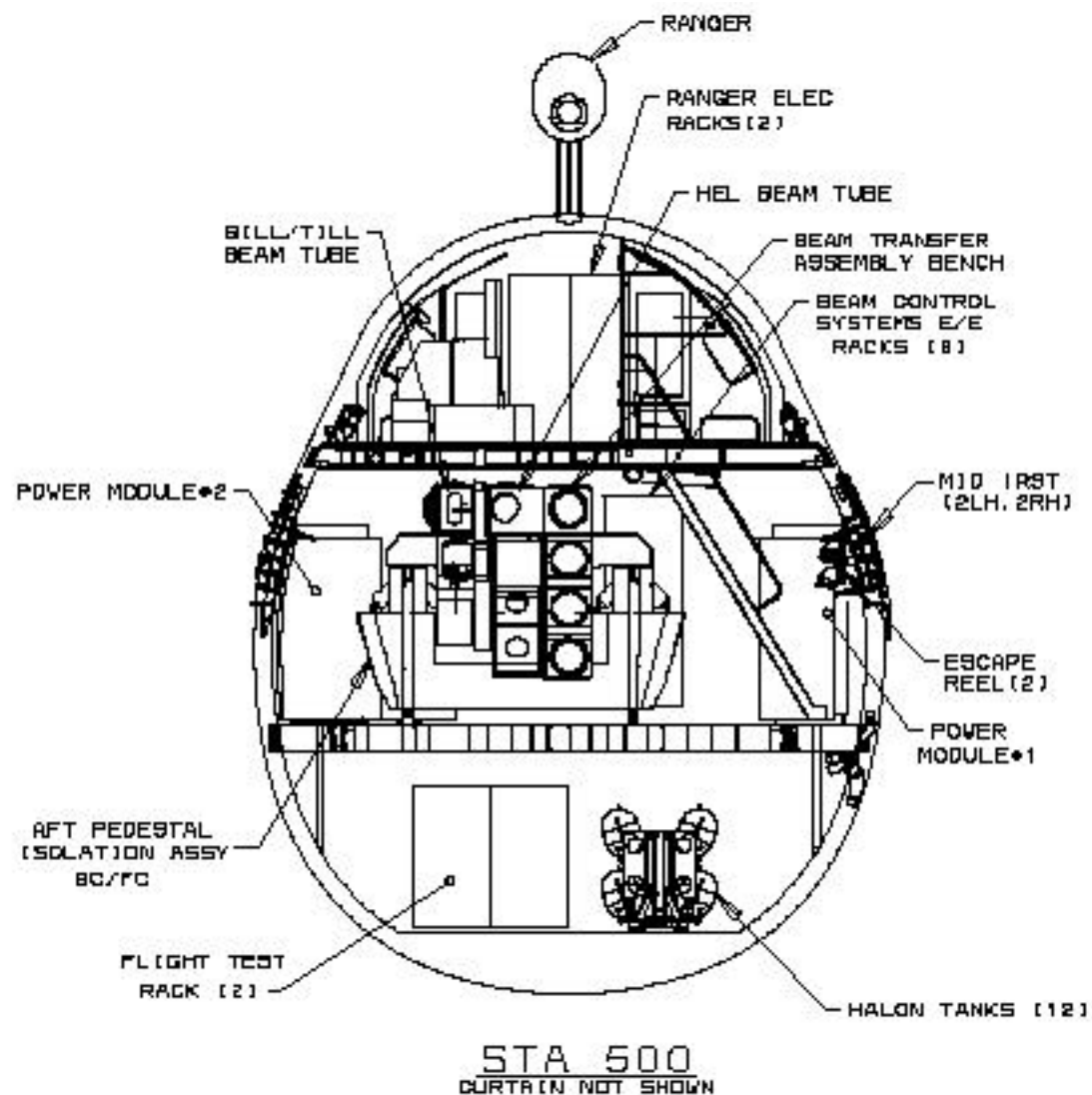
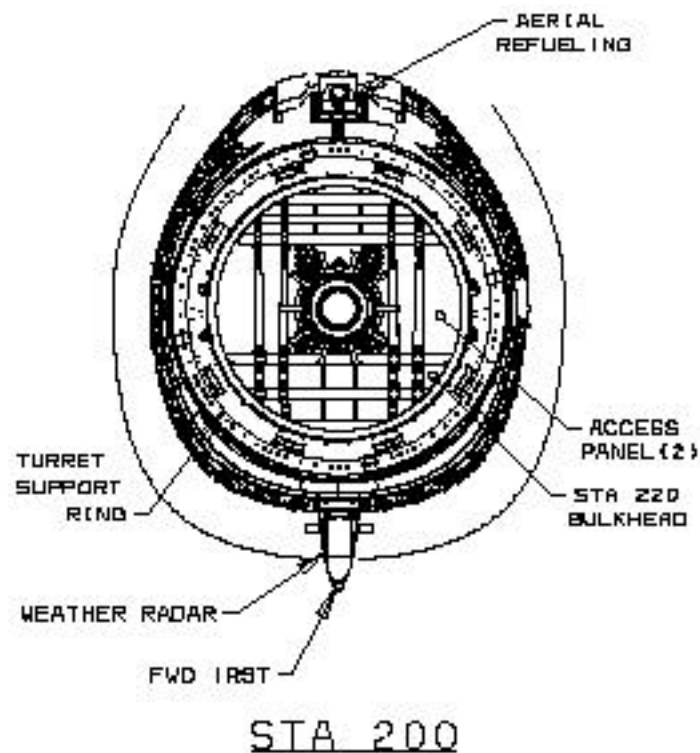
# ABL CONFIGURATION - LOWER LOBE

YAL-1A



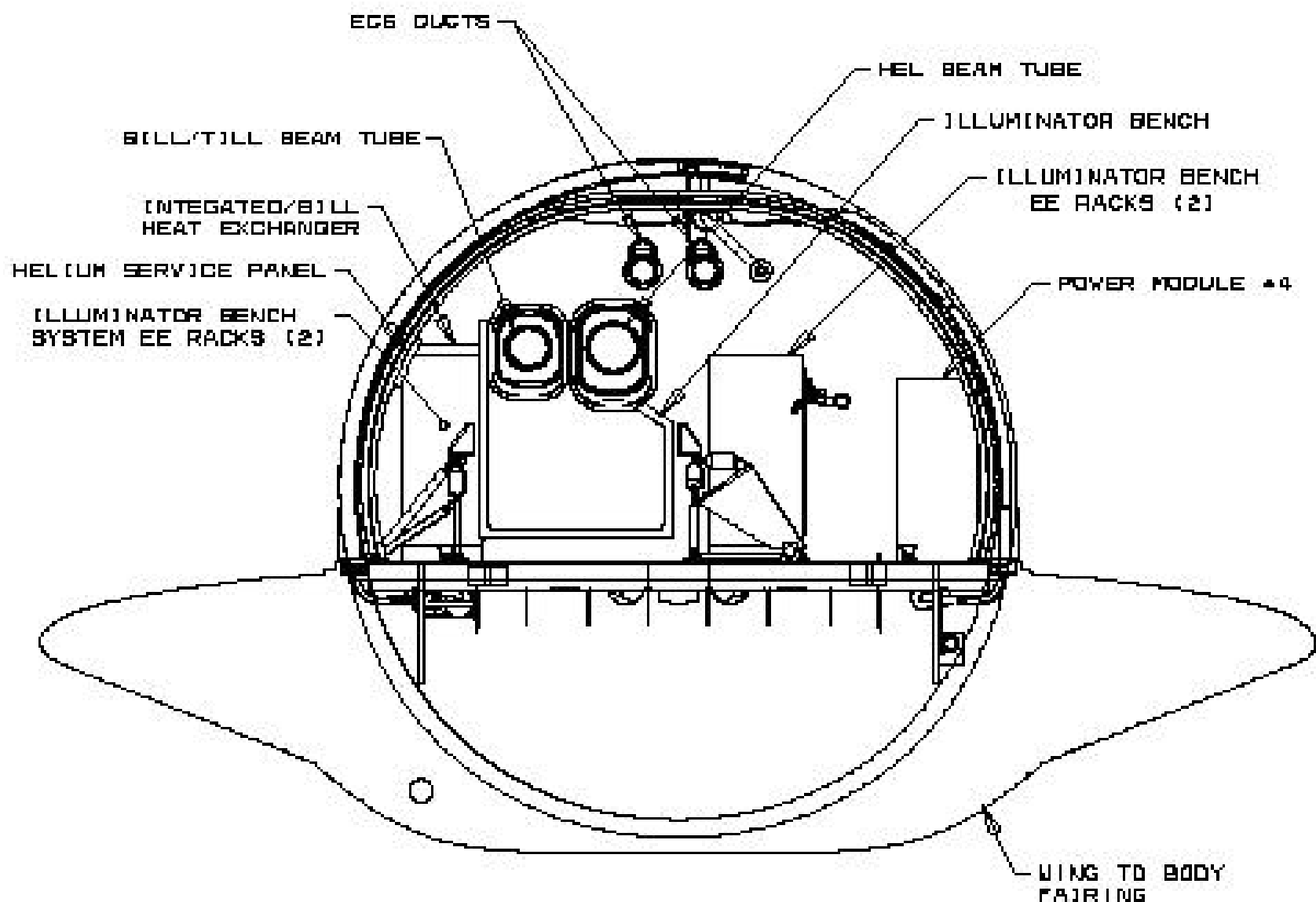
# ABL CONFIGURATION - STATIONS 200 AND 500

YAL-1A



## ABL CONFIGURATION - STATION 1000

YAL-1A



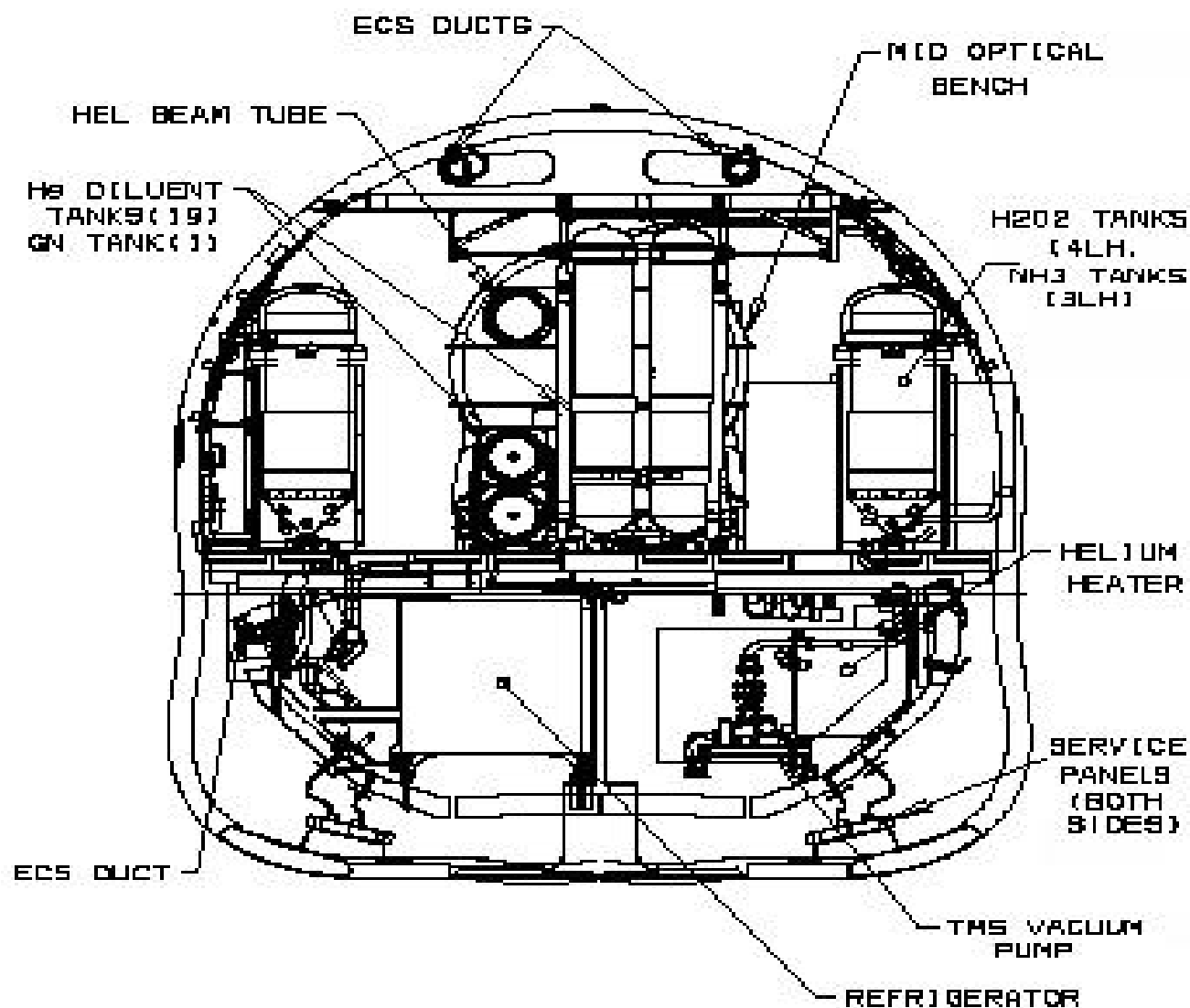
STA 1000

BULKHEAD & AIRLOCK NOT SHOWN

YAL-1A.16 ABL CONFIGURATION - UPPER DECK 1300  
AND LOWER LOBE 1480

YAL-1A

T.O. 00-105E-9

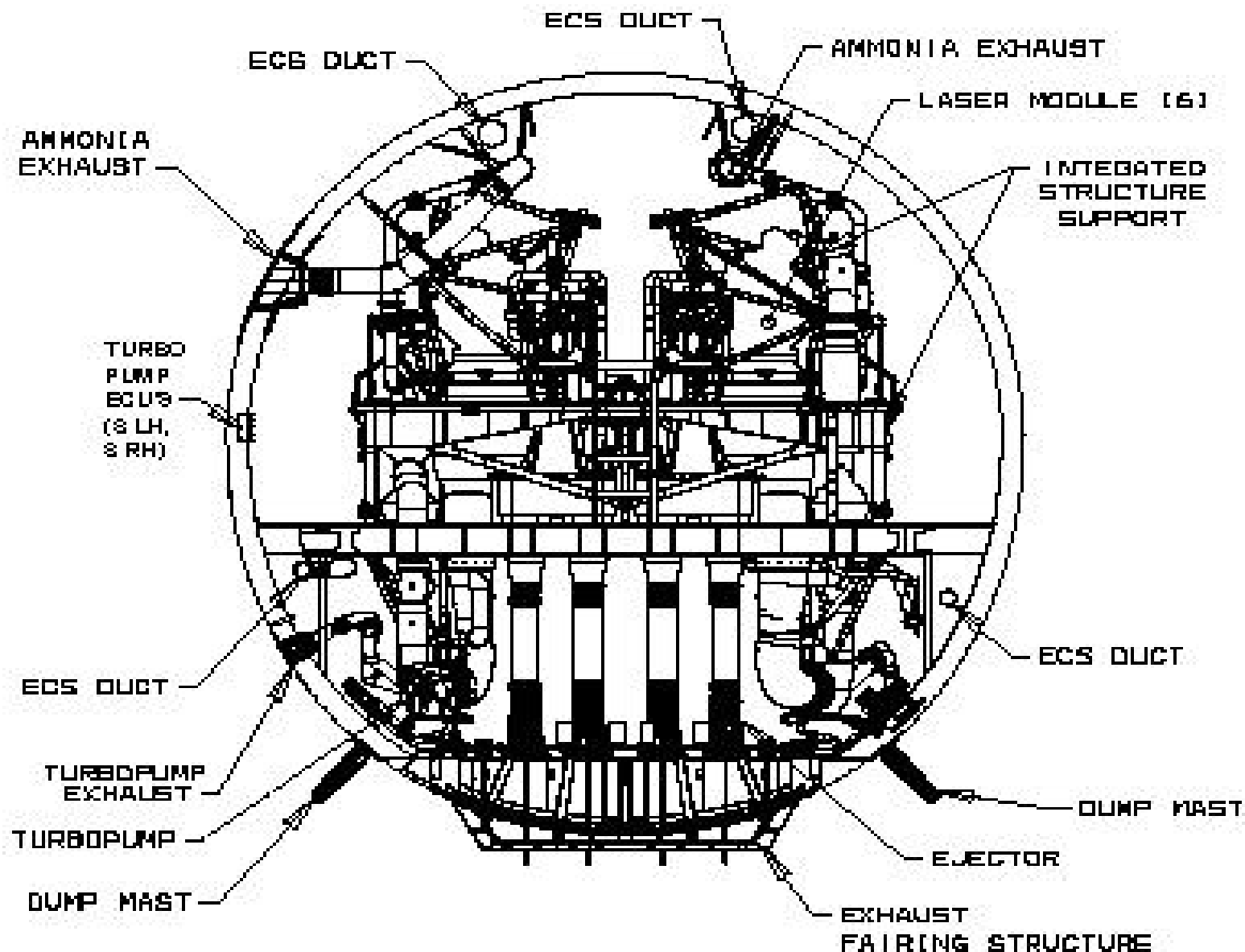


UPPER DECK 1300/LOWER LOBE 1480



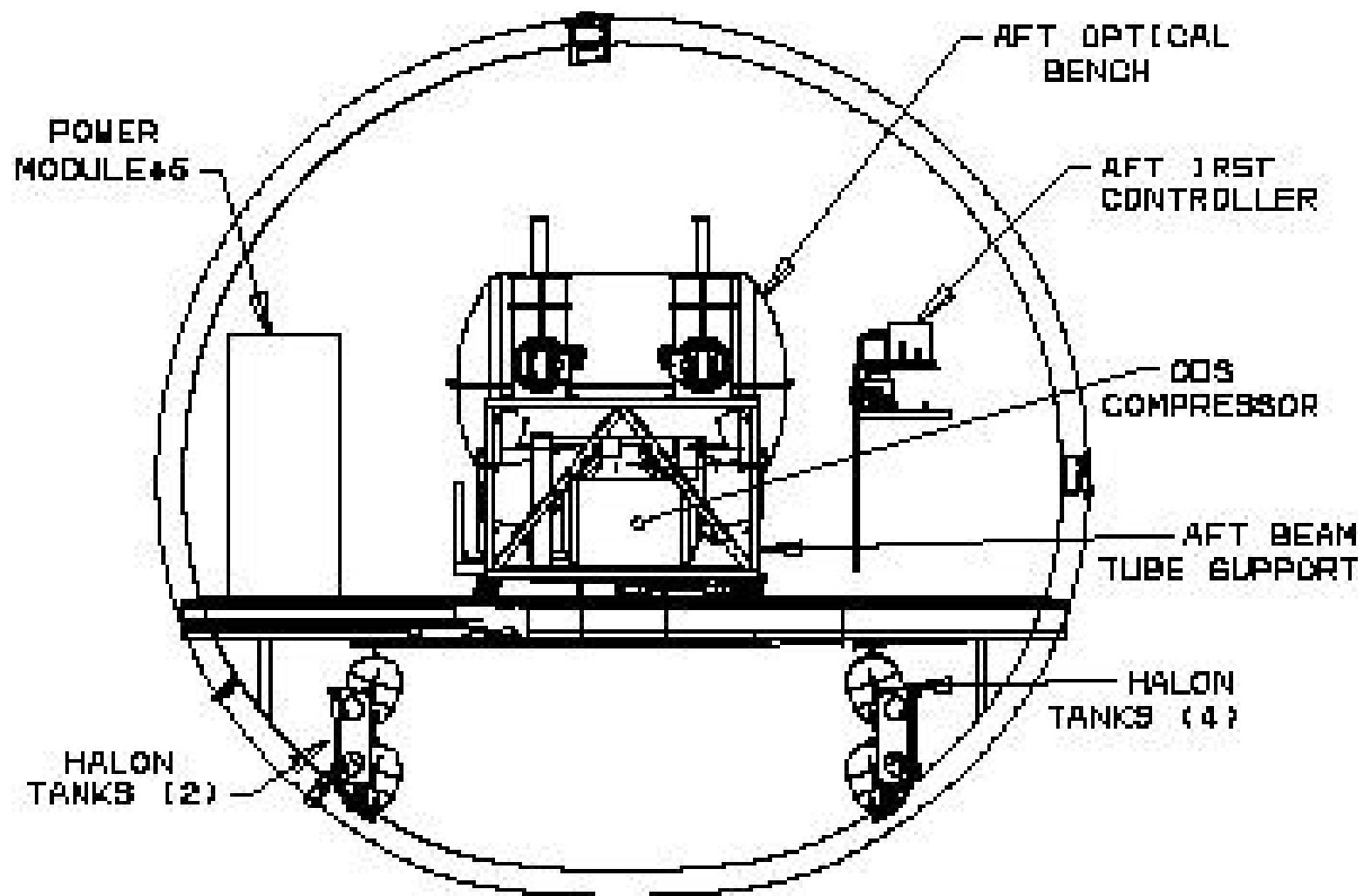
## ABL CONFIGURATION - STATION 1740

YAL-1A

STA 1740

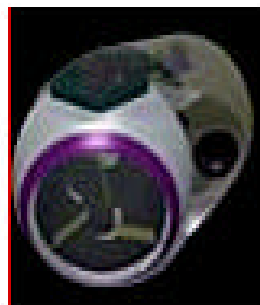
## ABL CONFIGURATION - STATION 1900

YAL-1A

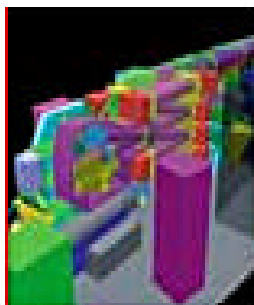
STA 1900

# ABL KEY FEATURES

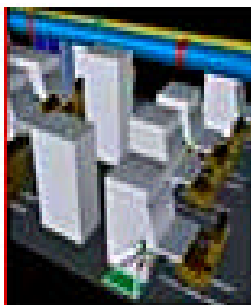
YAL-1A



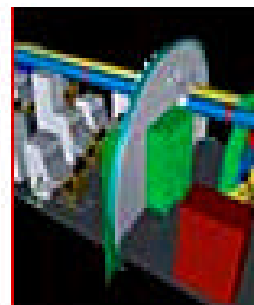
Nose-Mounted Turret



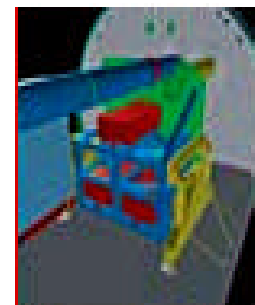
Beam Control System



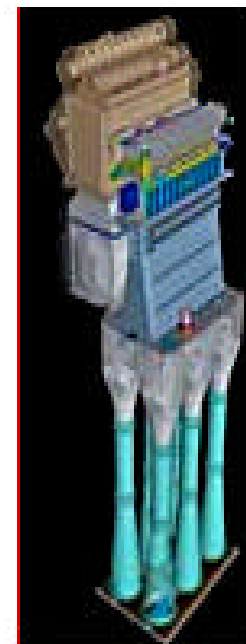
Battle Management



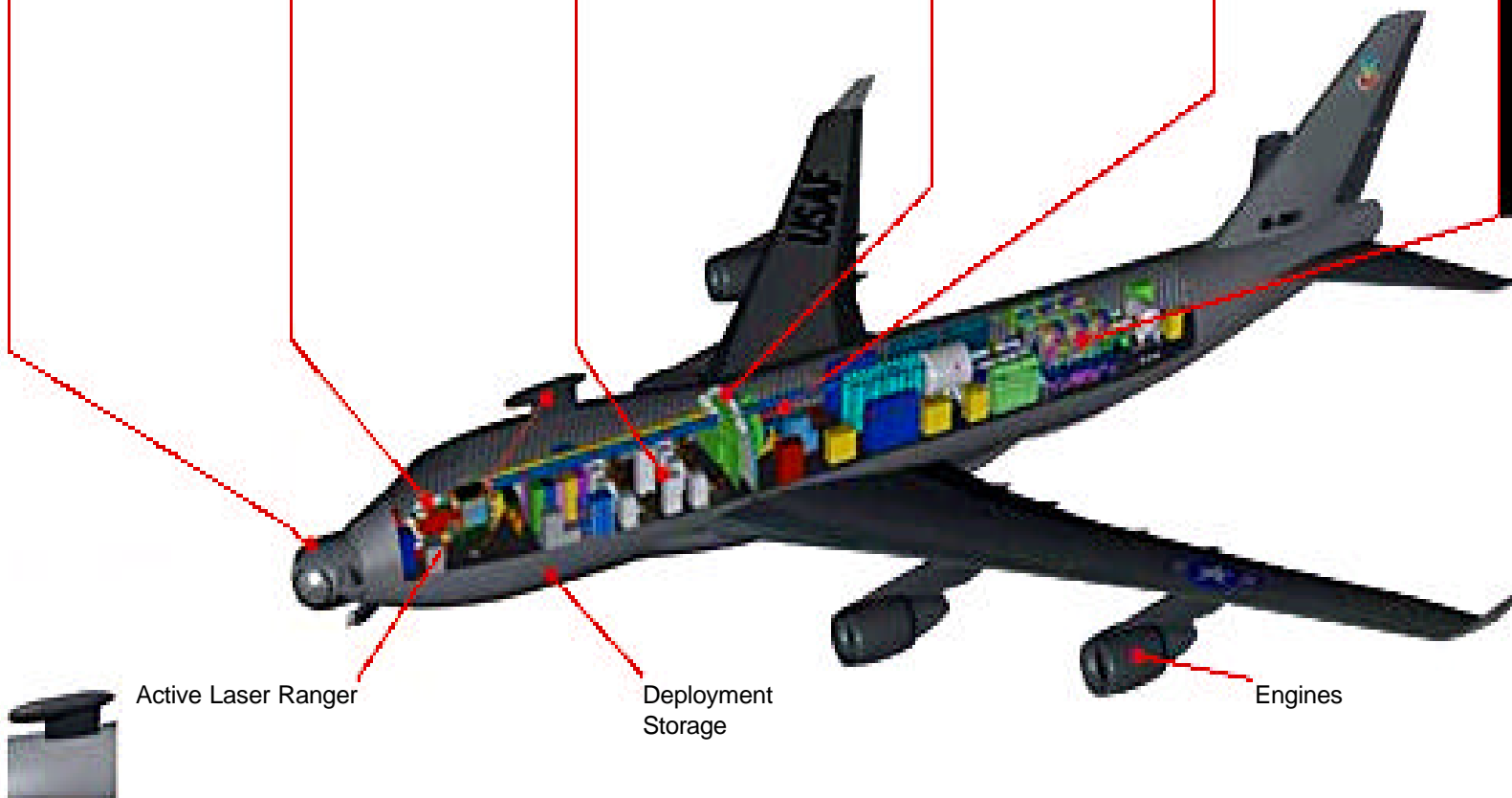
Separation Bulkhead



Illuminator Lasers



High Energy Laser



Active Laser Ranger

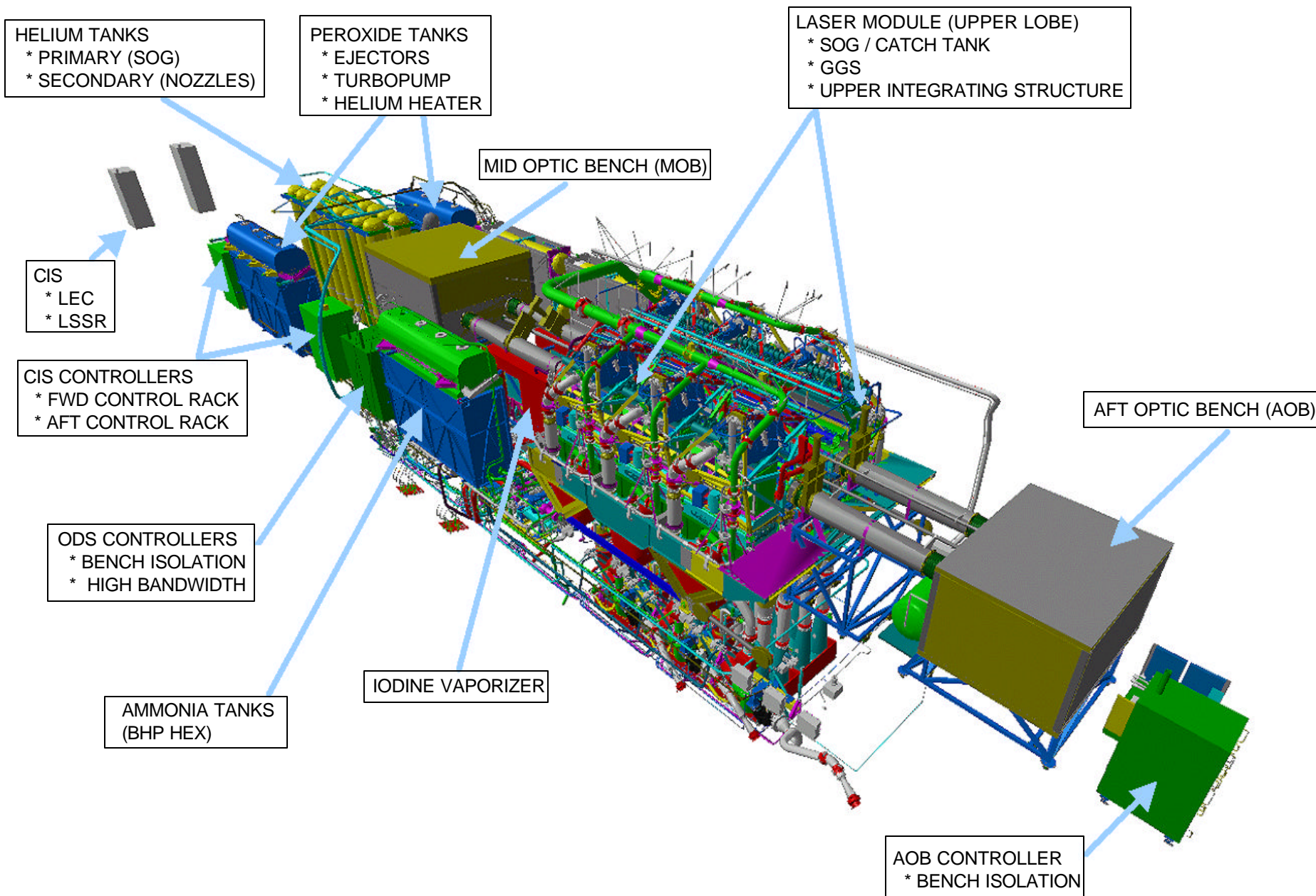
Deployment Storage

Engines

# LASER SYSTEM OVERVIEW OF HAZARDS

FOR SA 0050

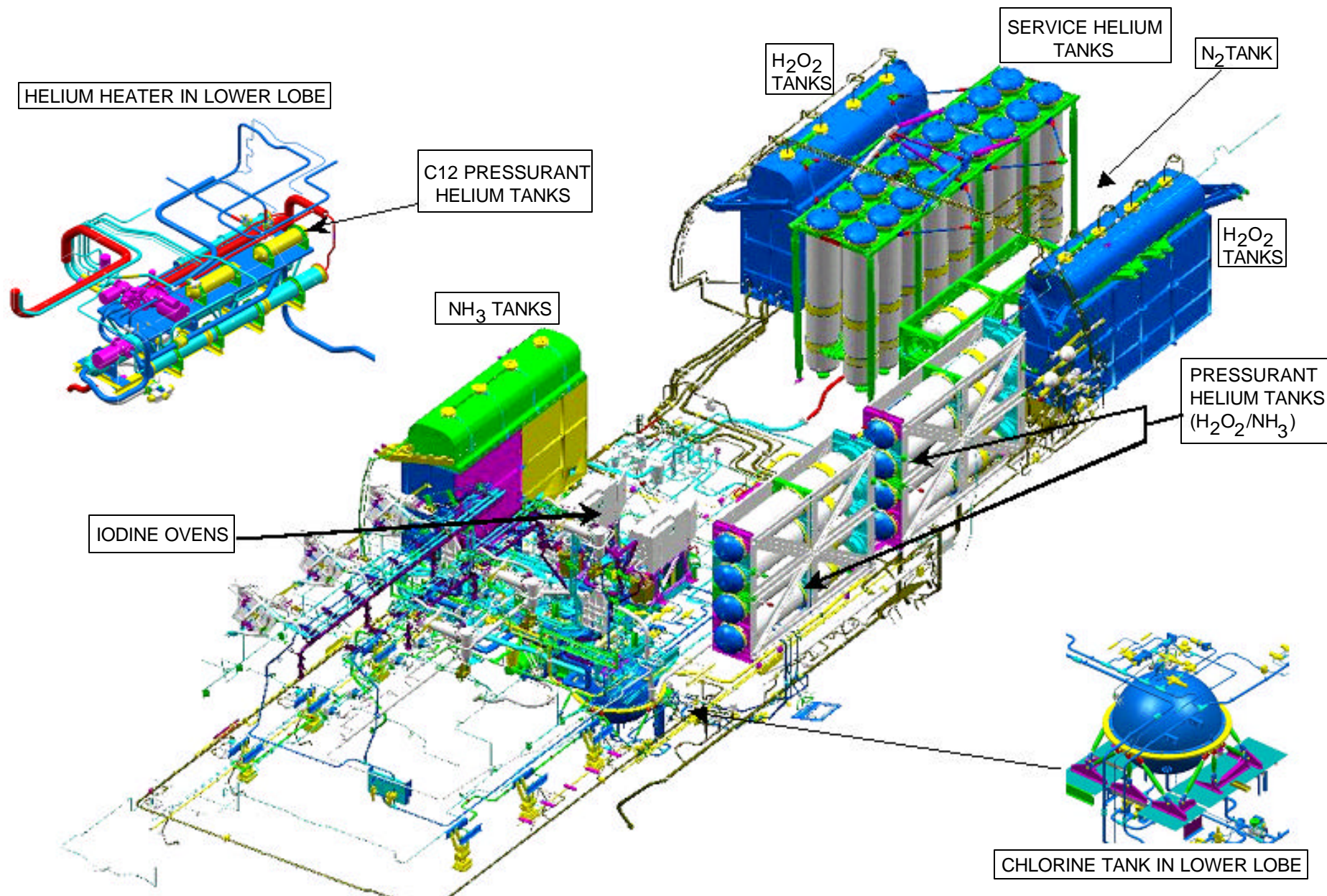
YAL-1A





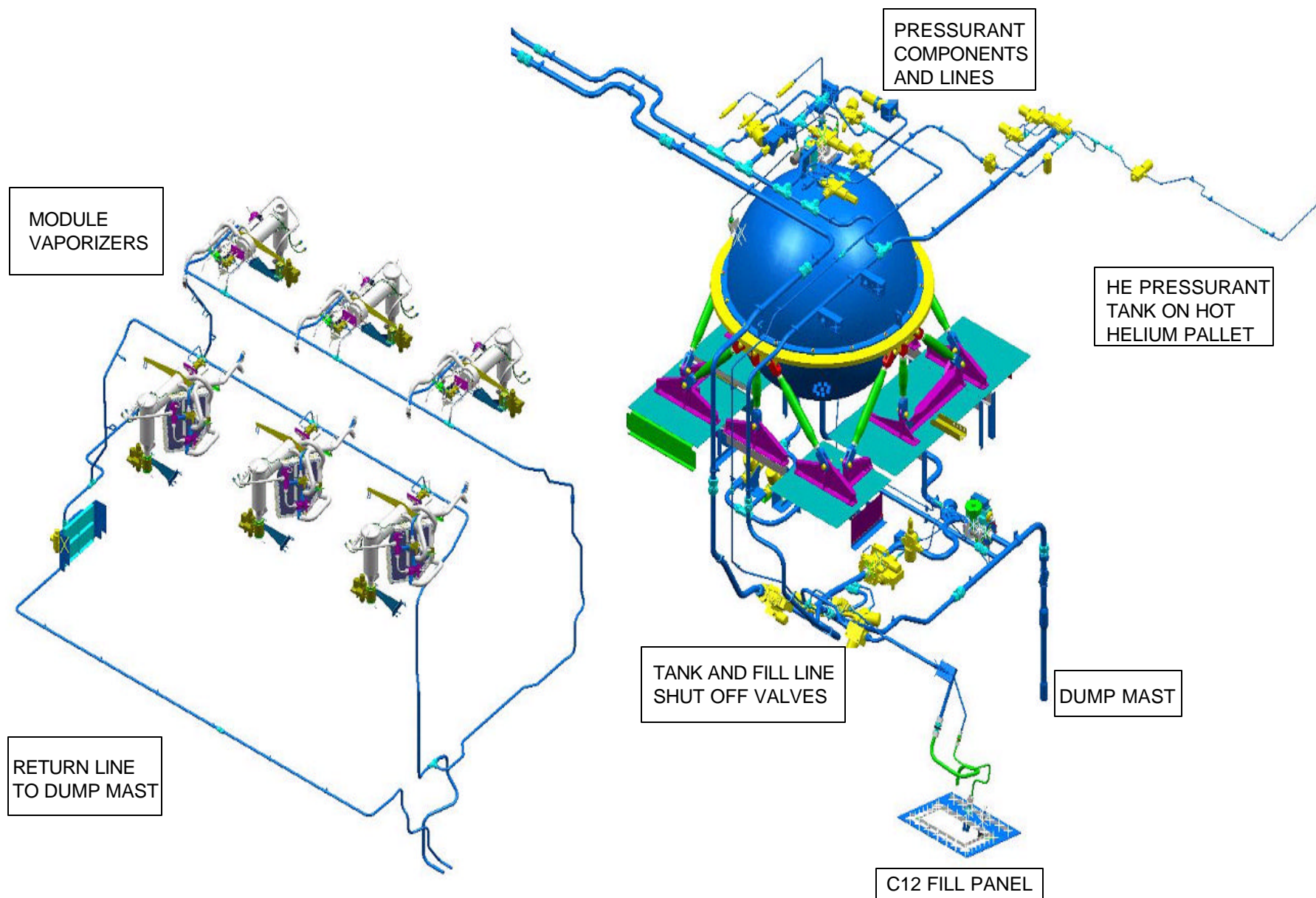
# FLUID SUPPLY SYSTEM HAZARDS

YAL-1A



# CHLORINE SYSTEM OVERVIEW OF HAZARDS

YAL-1A



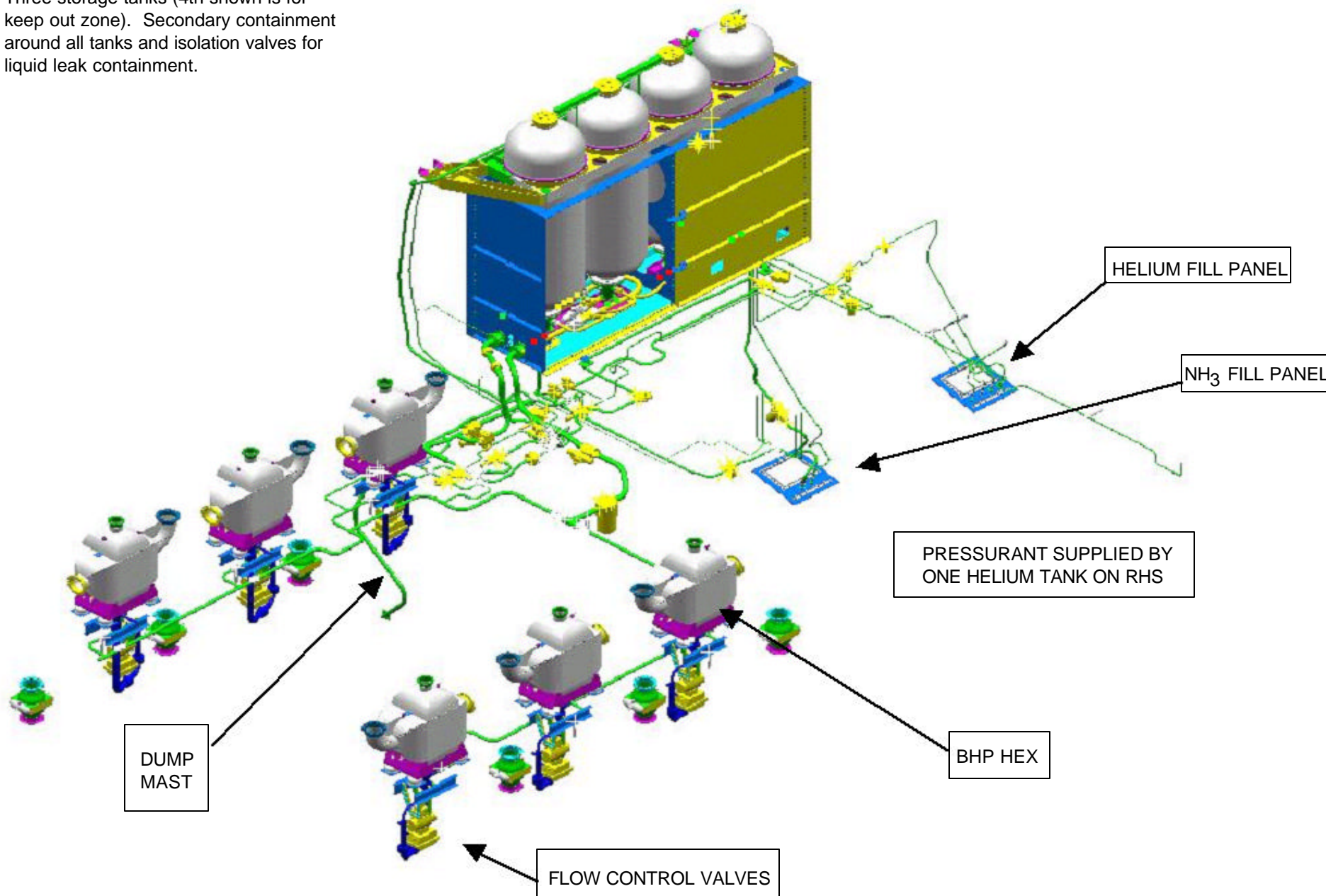


# AMMONIA SYSTEM OVERVIEW OF HAZARDS

YAL-1A

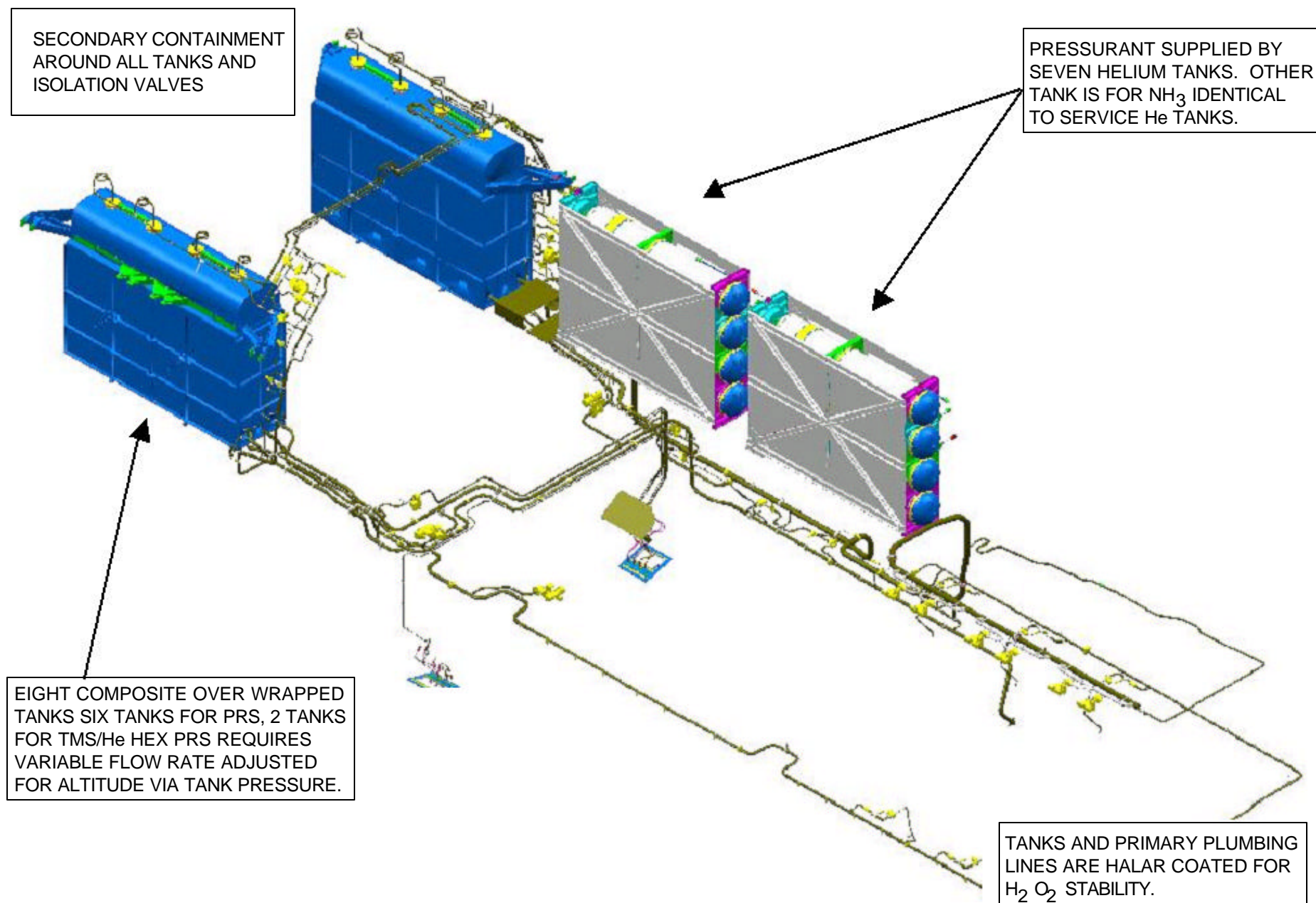
**NOTE:**

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

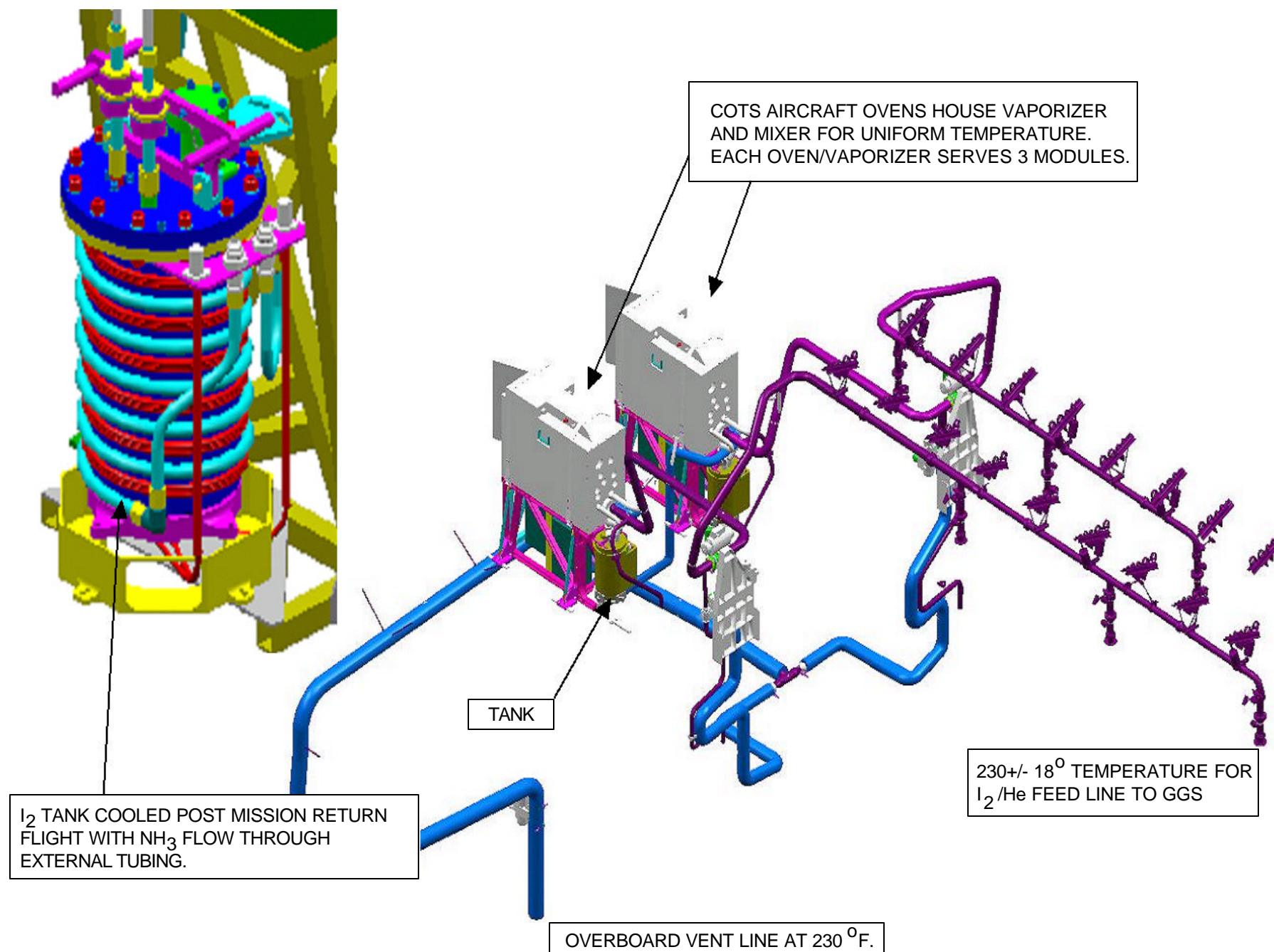


# HYDROGEN PEROXIDE 70% SYSTEM OVERVIEW OF HAZARDS

YAL-1A



## IODINE SYSTEM OVERVIEW OF HAZARDS





# HELIUM SYSTEM OVERVIEW OF HAZARDS

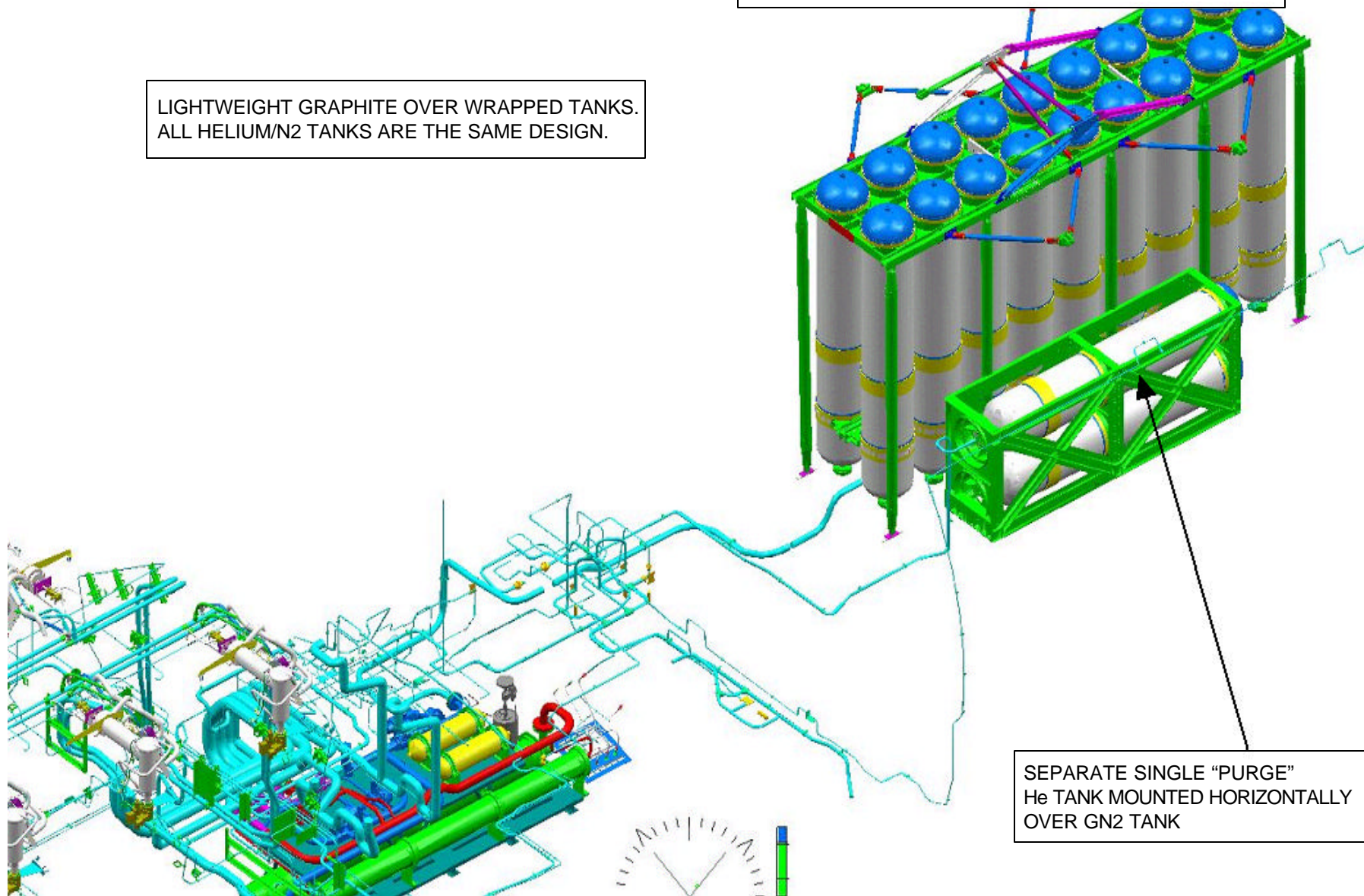
YAL-1A

LIGHTWEIGHT GRAPHITE OVER WRAPPED TANKS.  
ALL HELIUM/N<sub>2</sub> TANKS ARE THE SAME DESIGN.

EIGHTEEN "SERVICE" HELIUM TANKS FOR LASER FLOW

SEPARATE SINGLE "PURGE"  
He TANK MOUNTED HORIZONTALLY  
OVER GN<sub>2</sub> TANK

HELIUM HEATER PALLET IN AFT LOWER LOBE  
HEATS HELIUM FOR Cl<sub>2</sub> AND I<sub>2</sub> VAPORIZATION.

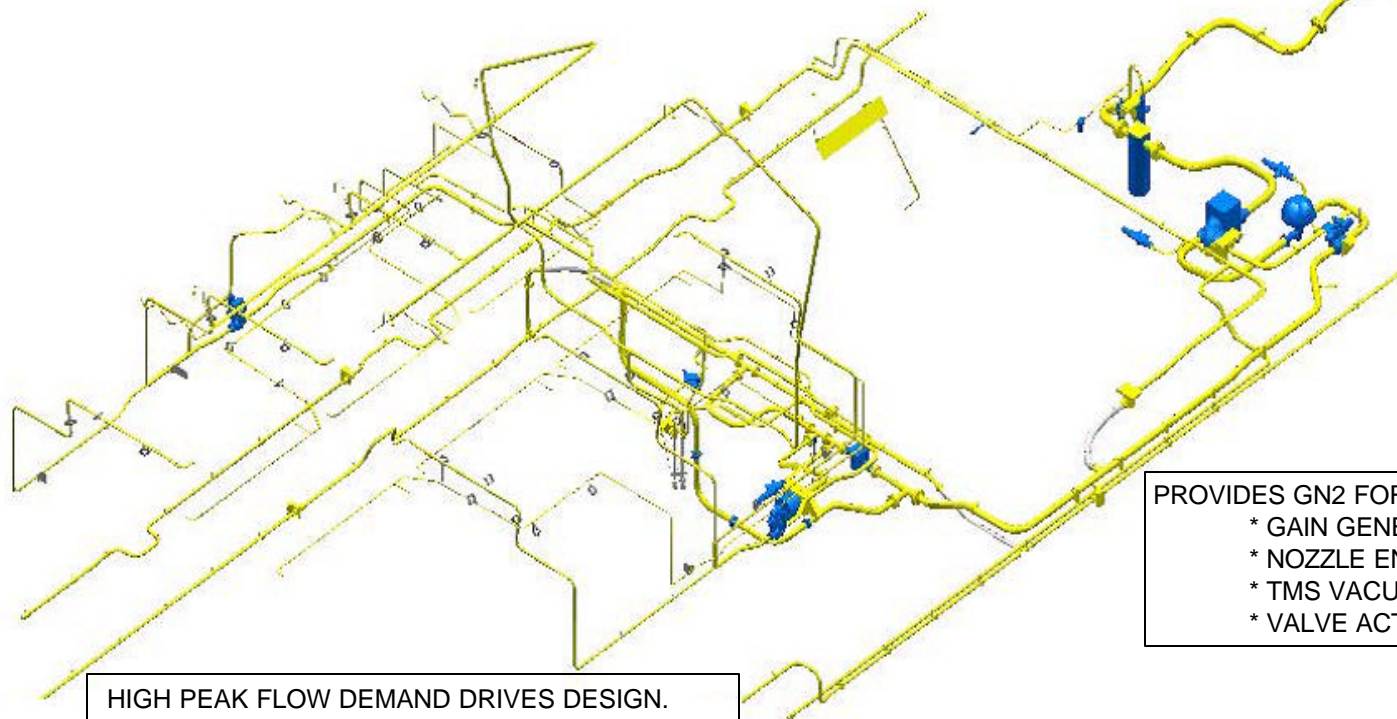
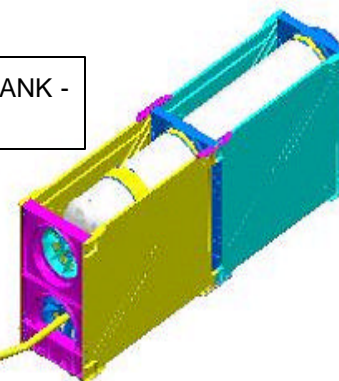


# NITROGEN SYSTEM OVERVIEW OF HAZARDS

YAL-1A

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

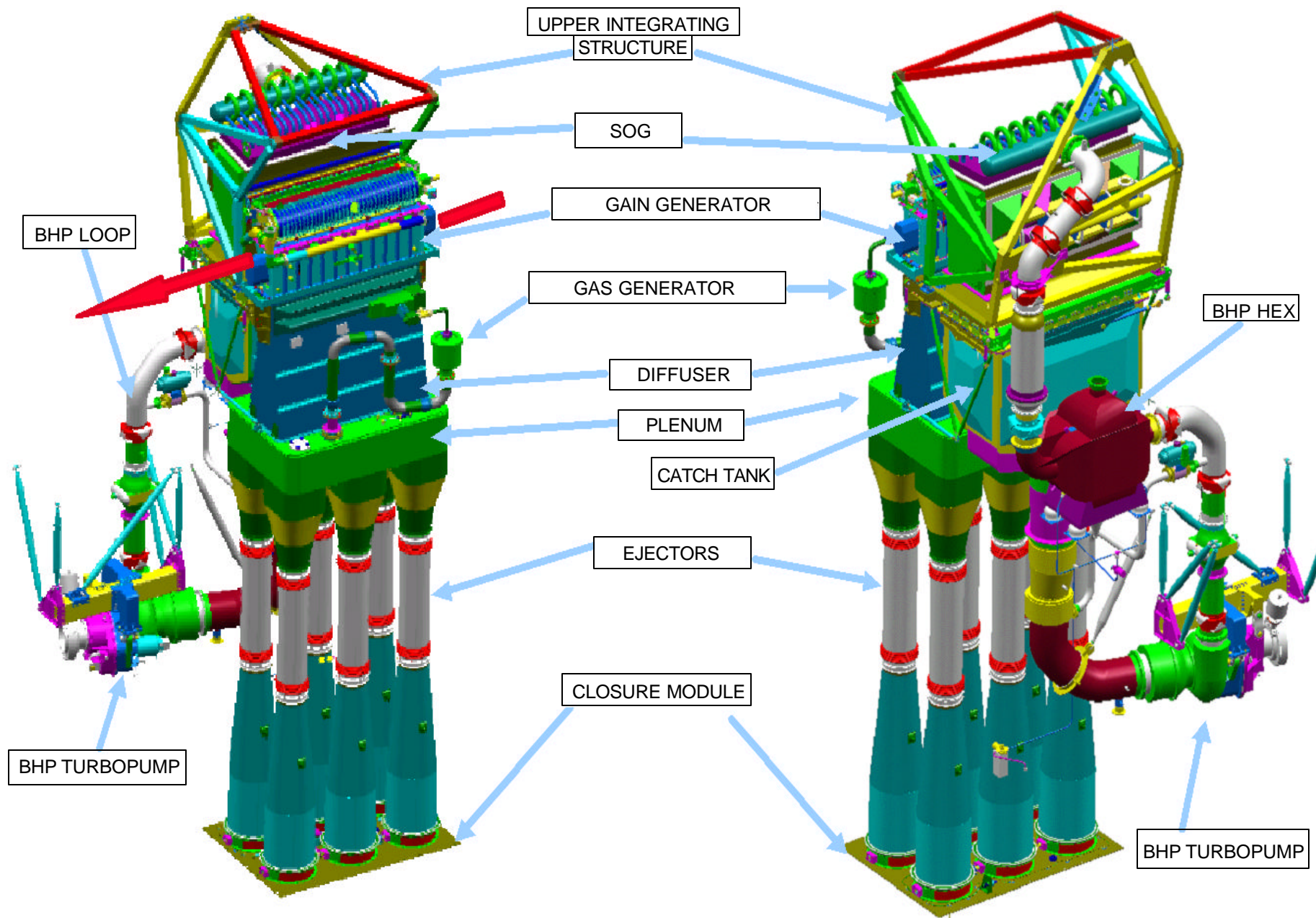
- \* GAIN GENERATOR ISOLATION PURGE
- \* NOZZLE ENERGIZERS
- \* TMS VACUUM PUMP SHAFT PURGE
- \* VALVE ACTUATION (125 AND 250 PSIA)

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



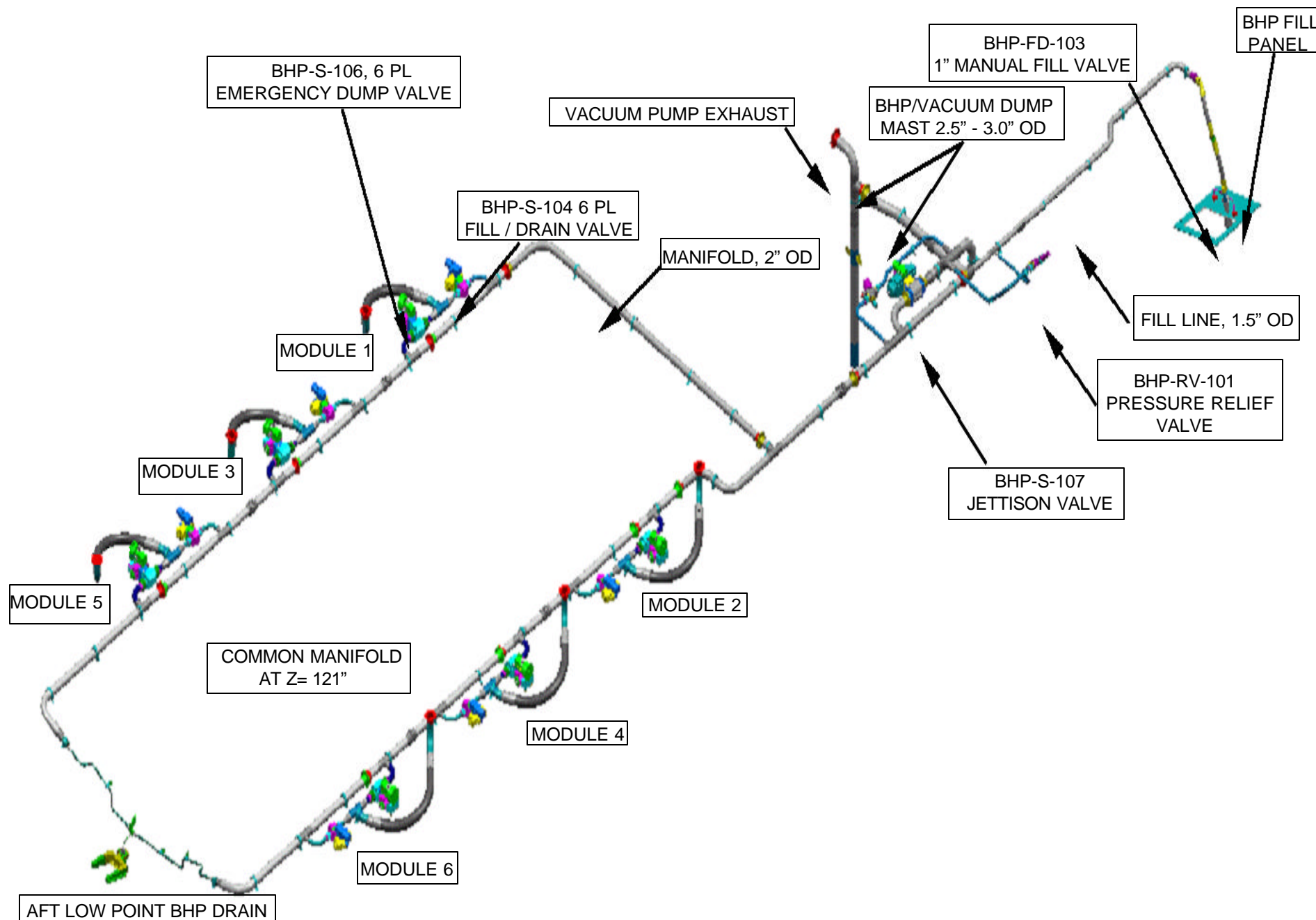
# BASIC HYDROGEN PEROXIDE (BHP) OVERVIEW OF HAZARDS

YAL-1A



# BHP FILL AND DRAIN PLUMBING

YAL-1A

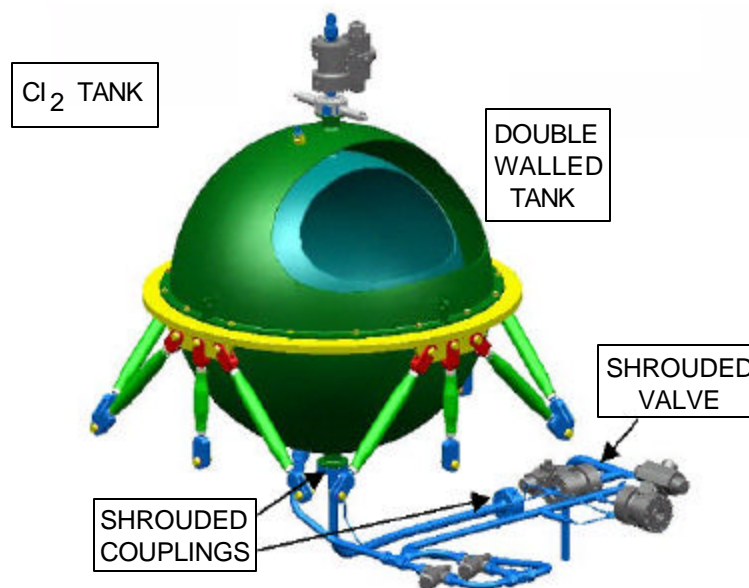


## SECONDARY CONTAINMENT FOR CRITICAL TANKS

- \* SECONDARY CONTAINMENT EQUIPPED WITH LEAK DETECTORS FOR CIS AND BACKUP DISPLAYS

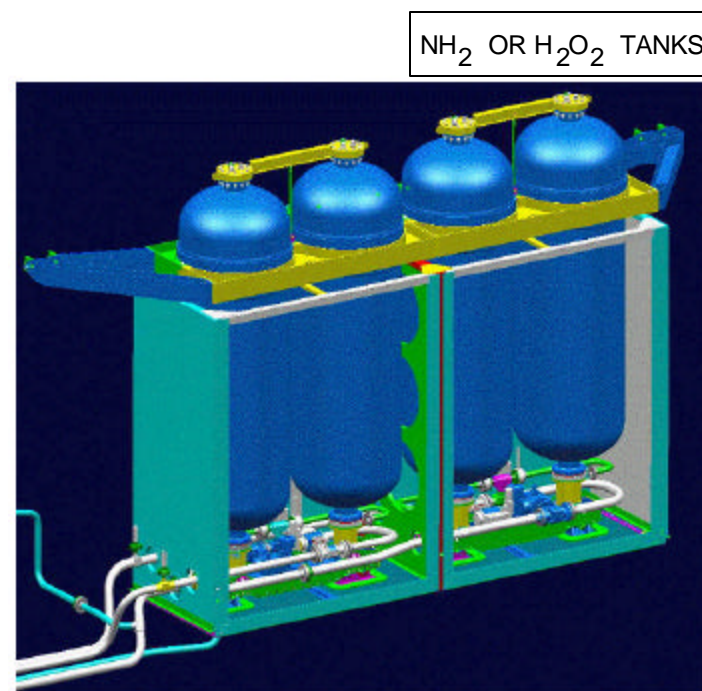
- \*  $\text{Cl}_2$  HAS PRESSURE TRANSDUCERS

- \*  $\text{NH}_3$  &  $\text{H}_2\text{O}_2$  VAPOR DETECTORS AND LIQUID LEVEL SENSORS



- \* SECONDARY CONTAINMENT FOR TANKS AND PRIMARY SHUT OFF AND JETTISON VALVES ON  $\text{Cl}_2$ ,  $\text{NH}_3$  AND  $\text{H}_2\text{O}_2$  TANKS

- \* CAPABLE OF BEING DRAINED OVERBOARD THROUGH DUMP MAST VIA CIS OR BACKUP PANEL





# VENTING OF LARGE HELIUM TANK FARMS

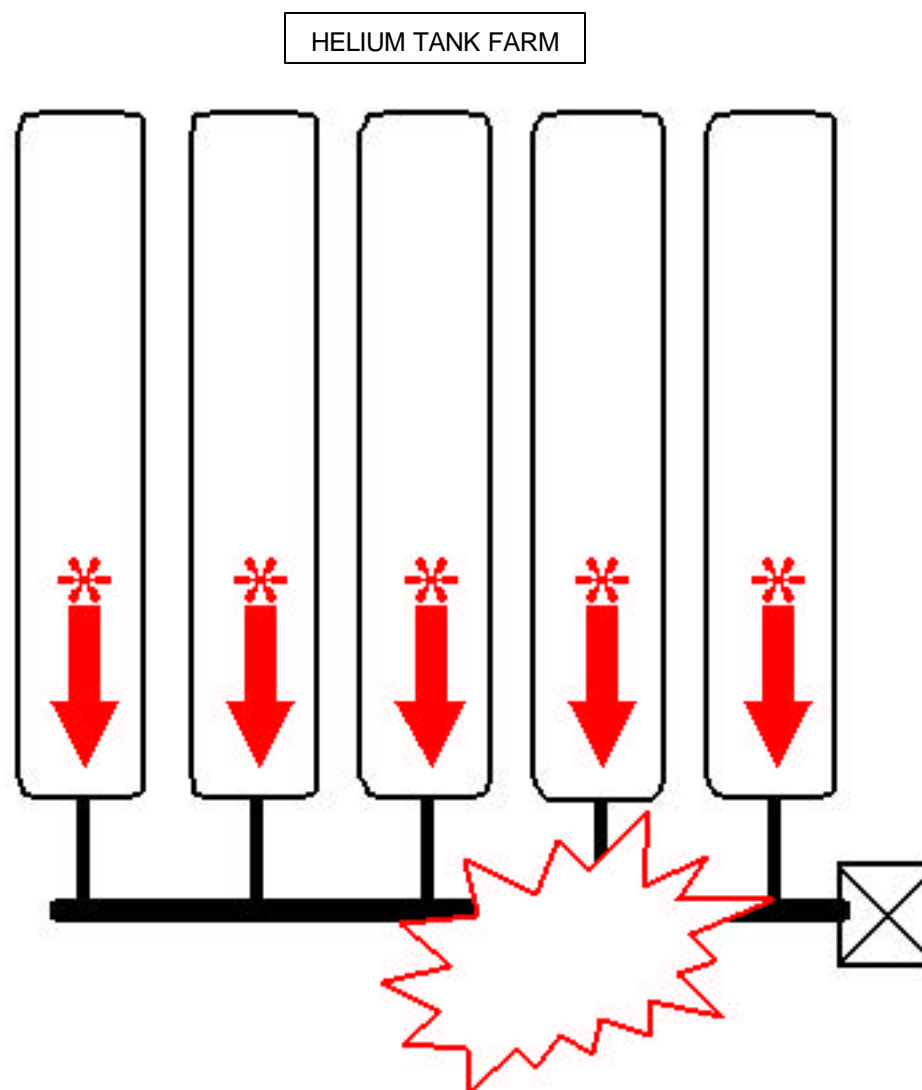
YAL-1A

## 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<sub>2</sub> O<sub>2</sub> 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!

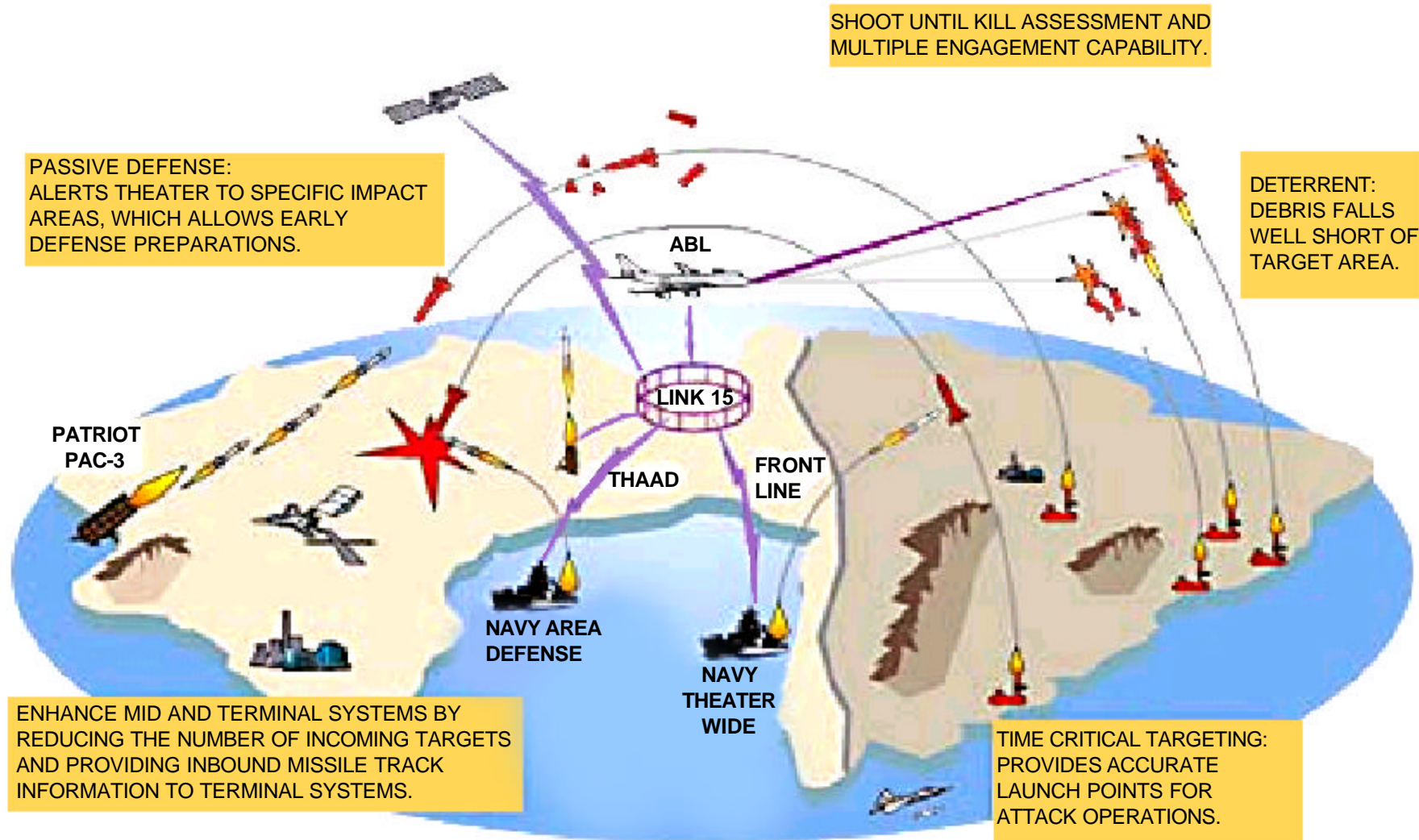


# ABL SYSTEM DESCRIPTION

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.

YAL-1A

T.O. 00-105E-9

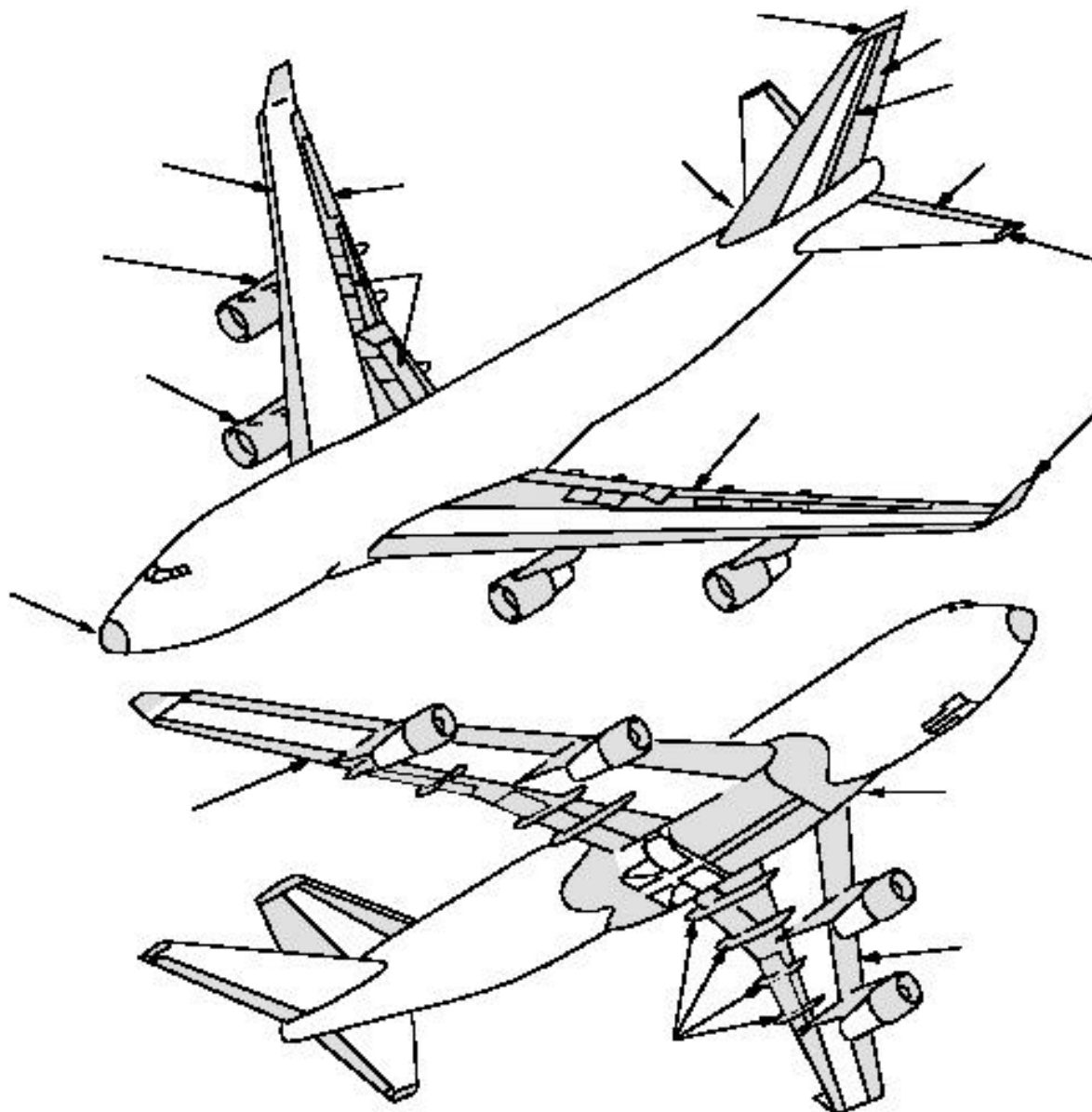


# AIRFRAME MATERIALS

## 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

YAL-1A

## 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:

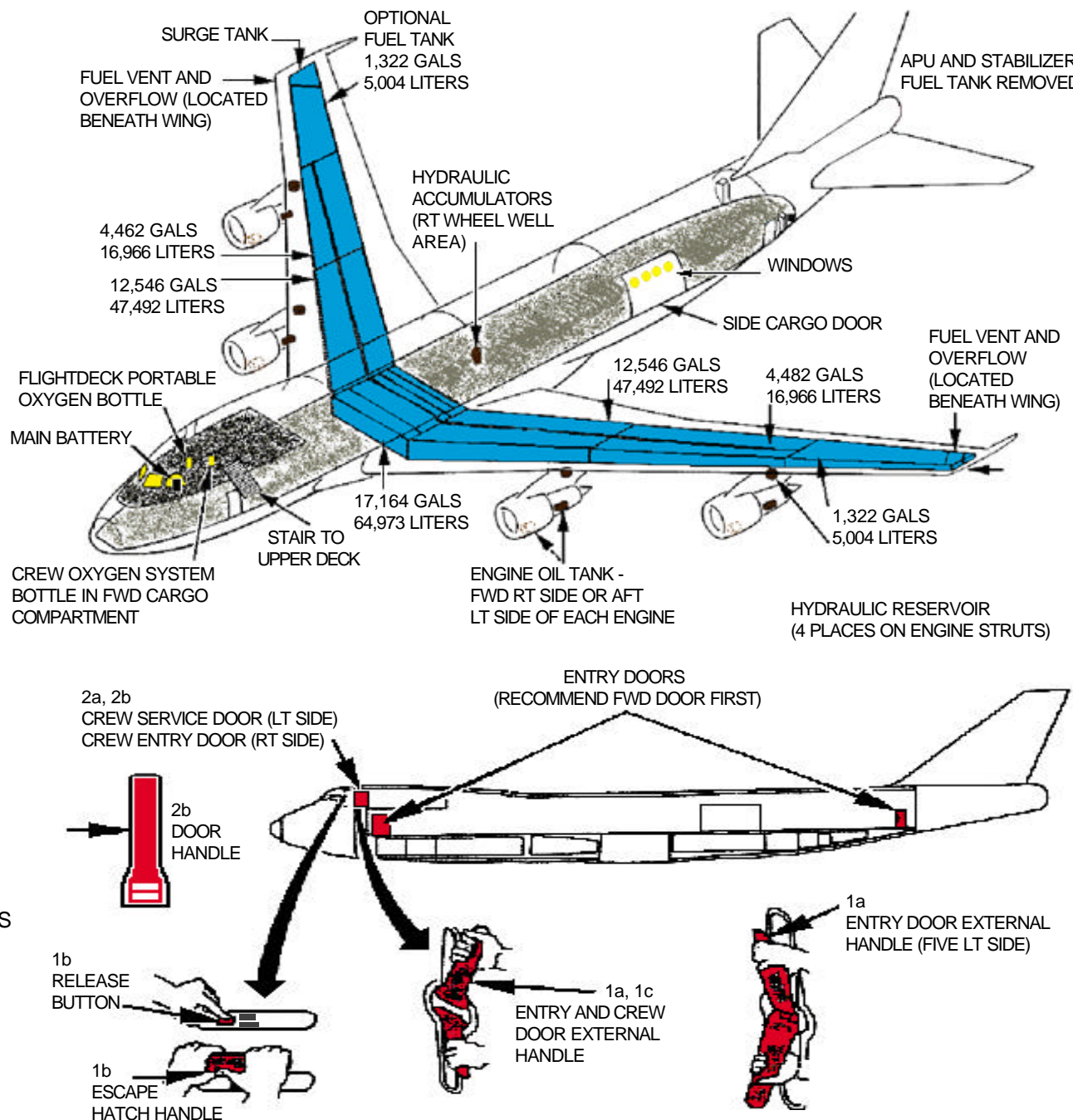
- Opening a door from the outside disengages the emergency evacuation system and the escape chute will not deploy.
- All emergency escape chutes are deployed from inside the aircraft only.

## 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

YAL-1A

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

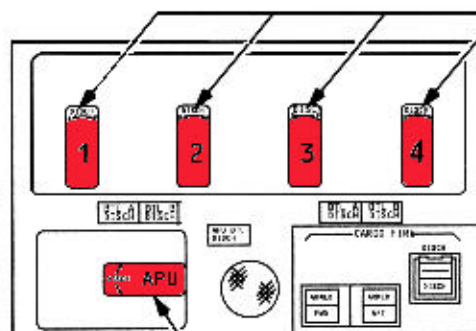
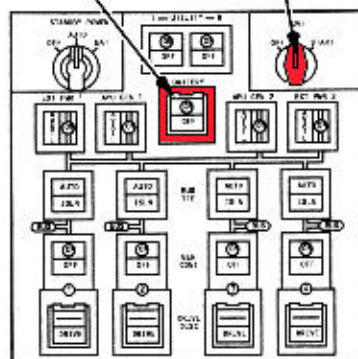
## NOTE:

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

ENGINE FIRE T- HANDLES - PULL  
(IF NOT ILLUMINATED, MAY REQUIRE  
PUSHING AND HOLDING THE BUTTON  
UNDER THE SWITCH TO RELEASE.)

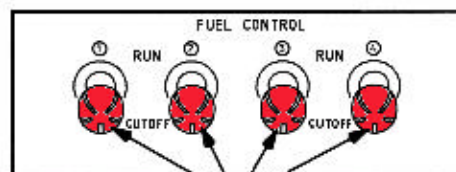
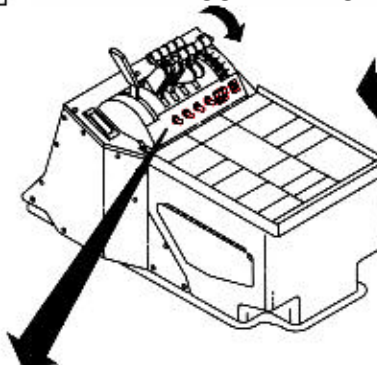
APU SELECTOR -  
ROTATE OFF

BATTERY SWITCH - PRESS  
NOTE: ON SYMBOL  
IS REMOVED

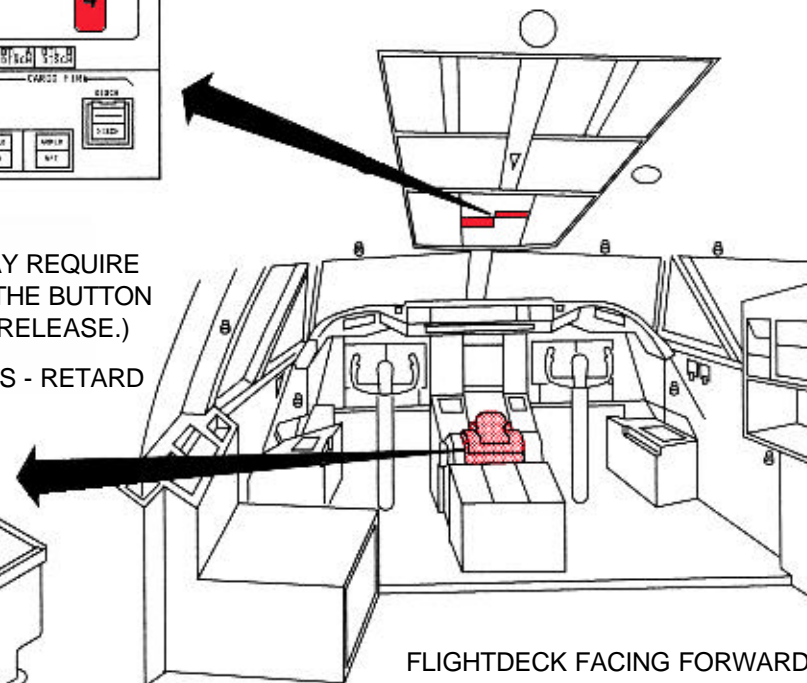


APU SWITCH - PULL  
(IF NOT ILLUMINATED, MAY REQUIRE  
PUSHING AND HOLDING THE BUTTON  
UNDER THE SWITCH TO RELEASE.)

THRUST LEVERS - RETARD



FUEL CONTROL SWITCHES - OFF



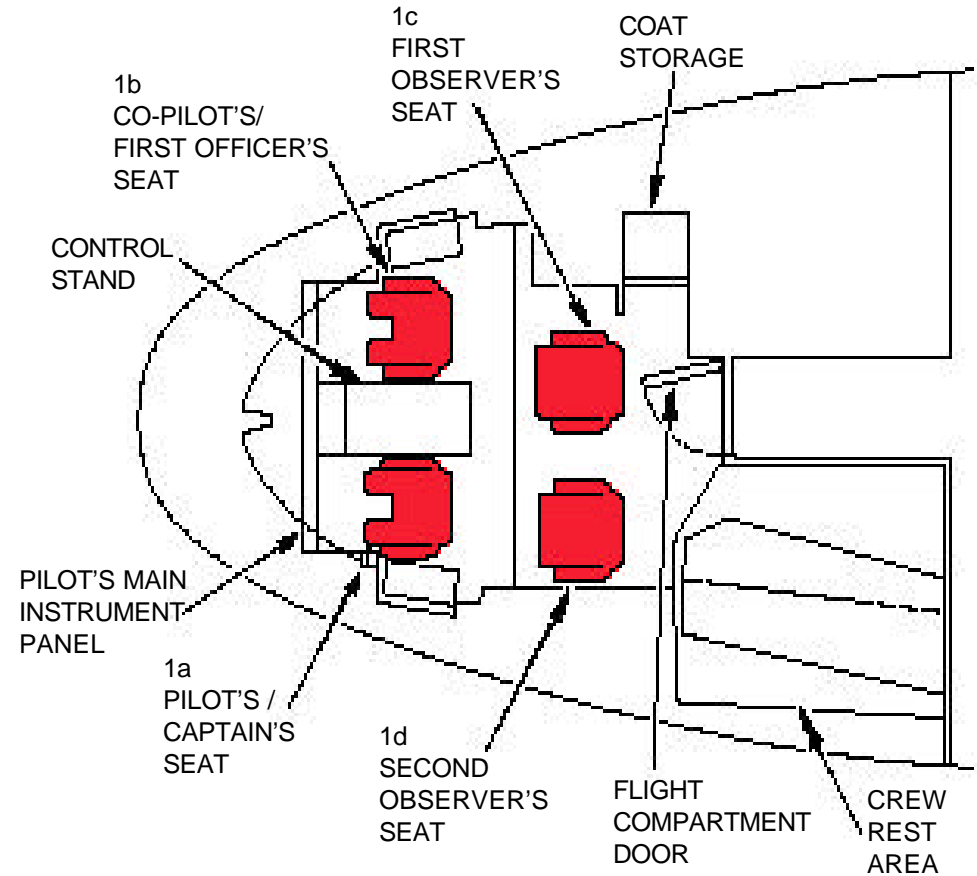
FLIGHTDECK FACING FORWARD



# 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

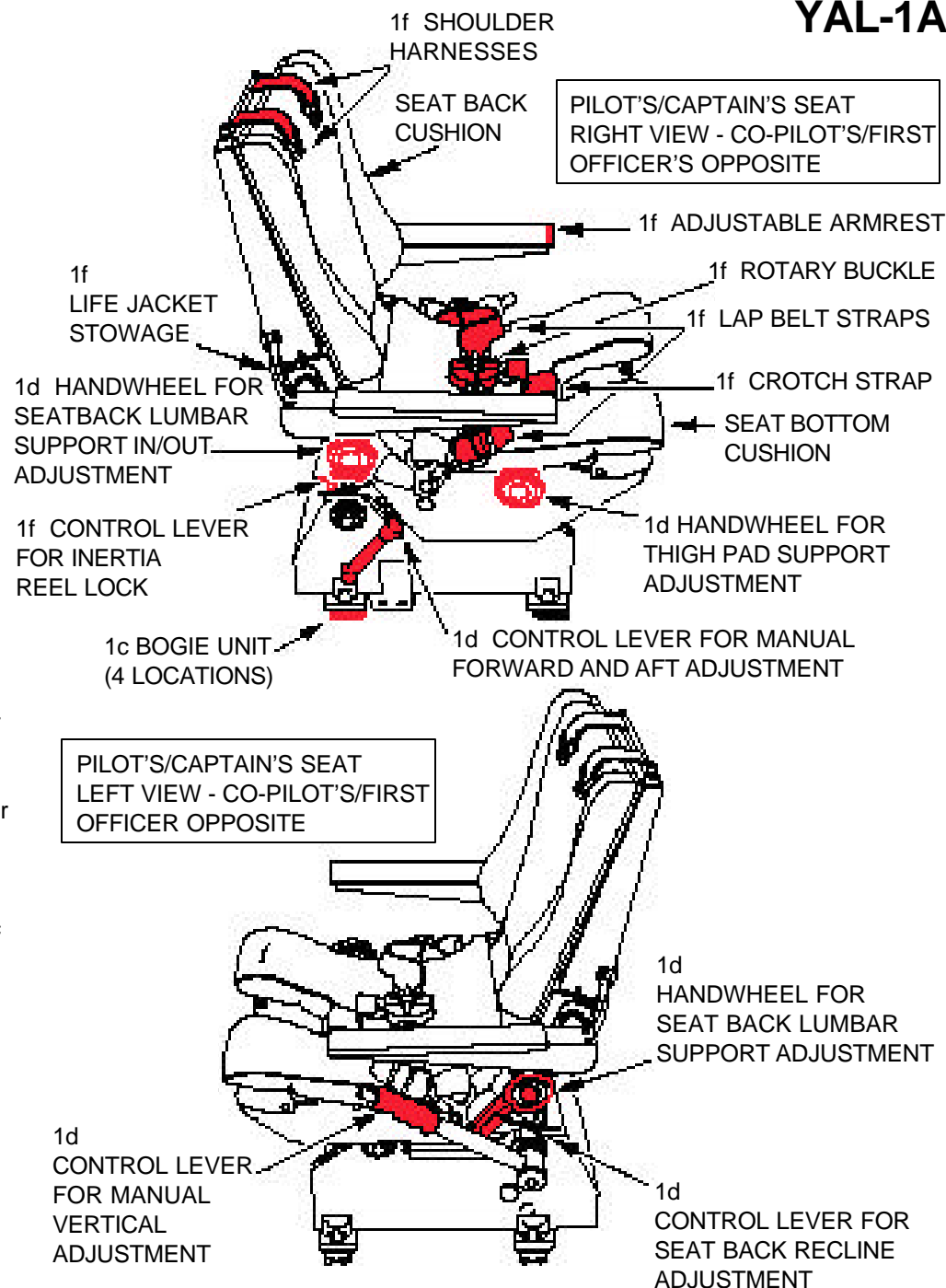
#### NOTE:

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.

YAL-1A

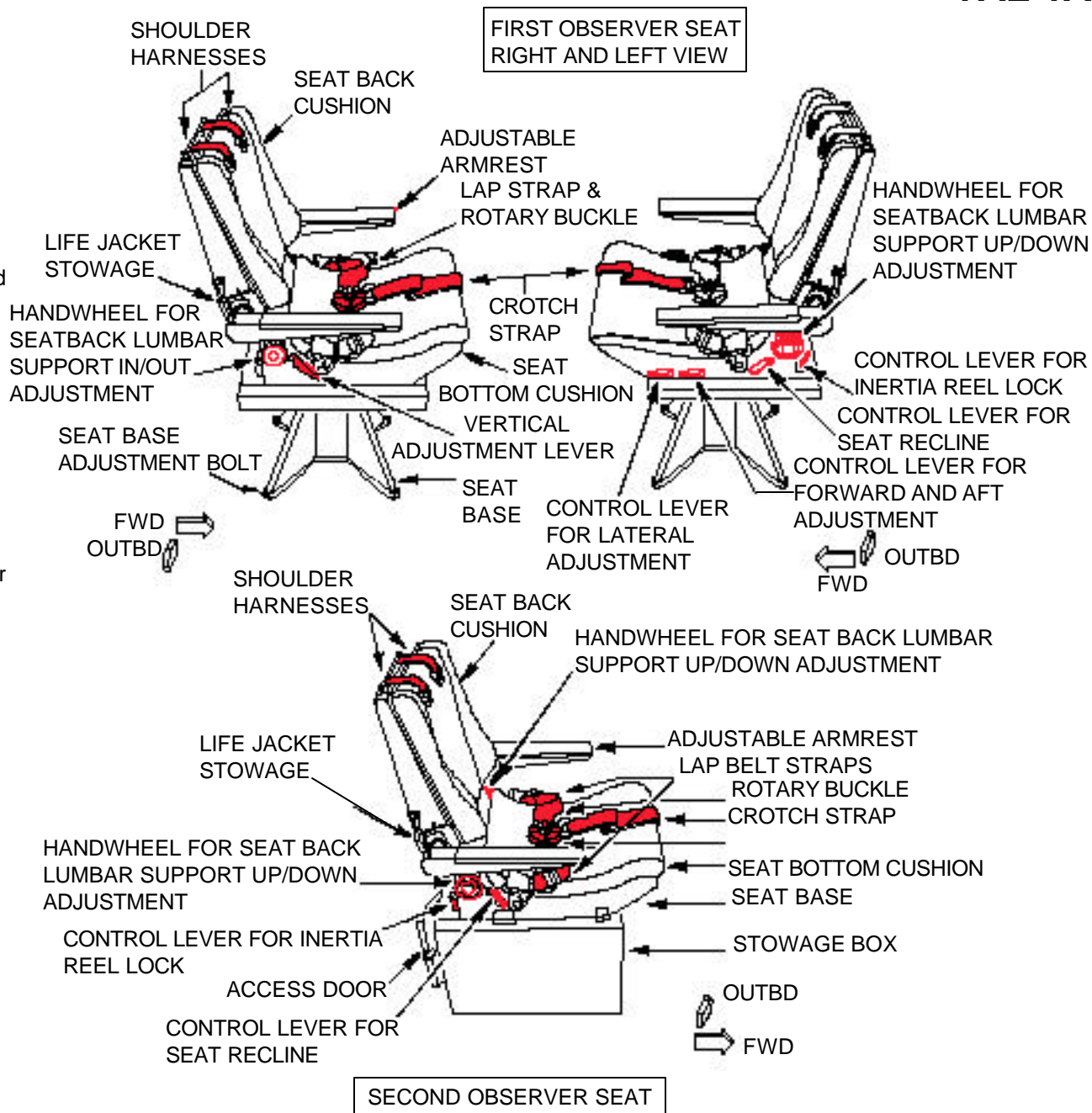
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# AIRCREW AND PASSENGER EXTRACTION-Continued

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

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

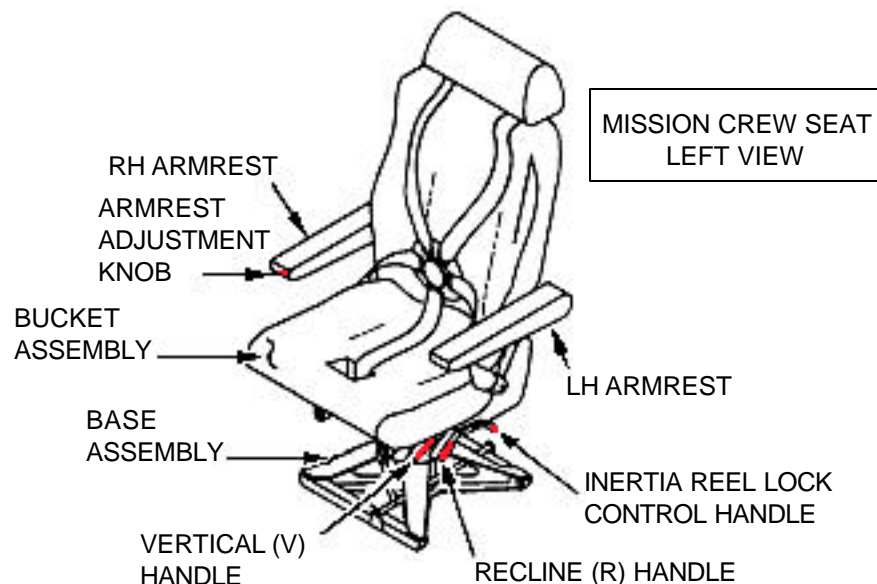
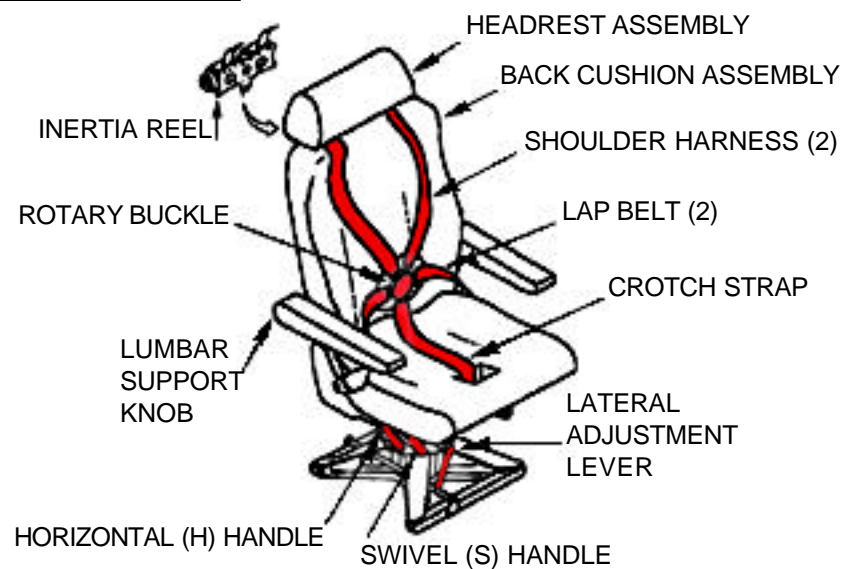


# AIRCREW AND PASSENGER EXTRACTION- Continued

YAL-1A

## 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.

MISSION CREW SEAT  
RIGHT VIEW

## 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

