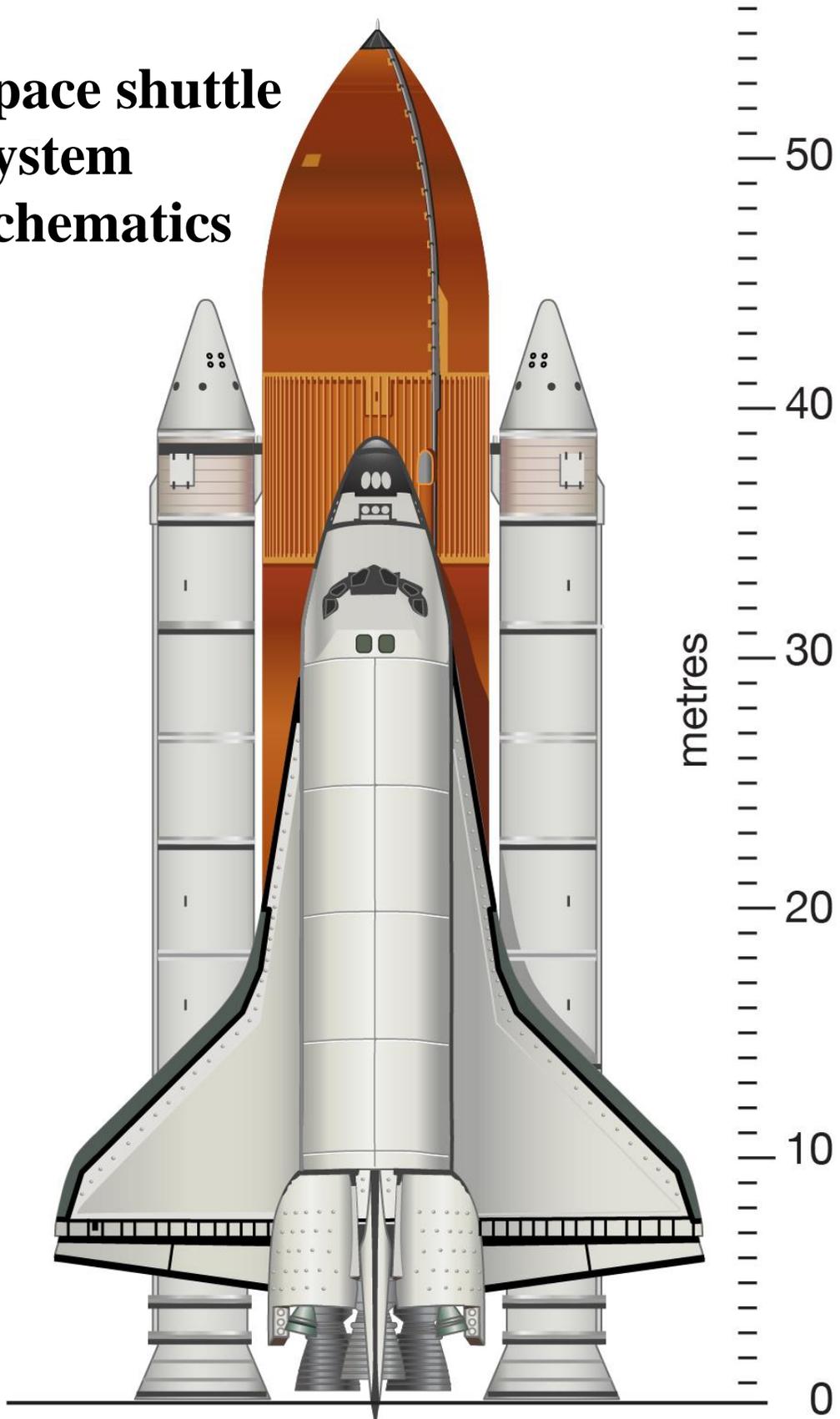


space shuttle system schematics



System Schematic Directory

Orbiter Dimensions and Weight **page 5**

Main Propulsion System **page 6 - 8**

- Space Shuttle Main Engine (SSME) schematic
 - Fuel Preburner Oxidizer Valve
 - Chamber Coolant Valve
 - Main Fuel Cutoff Valve
- Main Propulsion Subsystem diagram
- Main Propulsion Subsystem Fuel and Oxidizer Plumbing diagram
- Main Propulsion Fuel Flow
- Main Propulsion Oxidizer Flow

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- Orbital Maneuvering System Pressurization and Propellant Feed schematic
 - Oxidation Vapor Isolation Valve
 - Oxidation Tank Isolation Valve
 - Oxidizer Cross-feed Valve
 - Oxidizer Relief Valve
 - Fuel Tank Isolation Valve
 - Fuel Cross-feed Valve
 - Fuel Relief Valve
 - Control Valves 1 and 2
 - Helium Pressure Isolation Valves A and B
 - Nitrogen Engine Pressure Isolation Valve
 - Nitrogen Relief Valve
 - Nitrogen Purge Valve 1 and 2
- OMS Nitrogen System
 - Nitrogen Pressure Valve
 - Nitrogen Relief Valve
 - Nitrogen Purge Valves 1 and 2
 - Control Valves 1 and 2
- OMS Bipropellant Valve
 - Control Valve 1 and 2
- OMS Fuel and Oxidizer Cross-feed system
 - OMS Cross-feed Valves
 - RCS Cross-feed Valves

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- Helium Isolation Valves A and B
- Primary Regulator A and B
- Oxidizer Terminal Valve
- Oxidizer Isolation Valve for Legs 1 & 2
- Oxidizer Isolation Valve for Legs 3, 4 & 5

- Oxidizer Isolation Valve for Manifold 1
- Oxidizer Isolation Valve for Manifold 2
- Oxidizer Isolation Valve for Manifold 3
- Oxidizer Isolation Valve for Manifold 4
- Oxidizer Isolation Valve for Manifold 5
- Fuel Terminal Valve
- Fuel Isolation Valve for Legs 1 & 2
- Fuel Isolation Valve for Legs 3, 4 & 5
- Fuel Isolation Valve for Manifold 1
- Fuel Isolation Valve for Manifold 2
- Fuel Isolation Valve for Manifold 3
- Fuel Isolation Valve for Manifold 4
- Fuel Isolation Valve for Manifold 5
- RCS Oxidizer Manifolds 1-5
- RCS Fuel Manifolds 1-5

Reaction Control System Schematic – Aft

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- Primary Regulator A and B
 - Helium Isolation Valves A and B
 - Primary Regulator A and B
 - Oxidizer Terminal Valve
 - Oxidizer Isolation Valve for Legs 1 & 2
 - Oxidizer Isolation Valve for Legs 3 & 4
 - Oxidizer Isolation Valve for Manifold 1
 - Oxidizer Isolation Valve for Manifold 2
 - Oxidizer Isolation Valve for Manifold 3
 - Oxidizer Isolation Valve for Manifold 4
 - Fuel Terminal Valve
 - Fuel Isolation Valve for Legs 1 & 2
 - Fuel Isolation Valve for Legs 3 & 4
 - Fuel Isolation Valve for Manifold 1
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 - Oxidizer Manifolds 1-4
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Electrical Power System Overview

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- Electrical Power System Interfaces

Cryogenic Power Distribution System

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- Power Reactant Storage and Distribution (PRSD) System Schematic for Fuel Cells 1-3

- Cryogenic Oxygen Reaction Valves 1-3
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- AC Power Distribution Diagram
 - DC Main Bus A, B and C
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Major Microwave Landing System (MMLS)

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- MMLS Overview
- MMLS Components

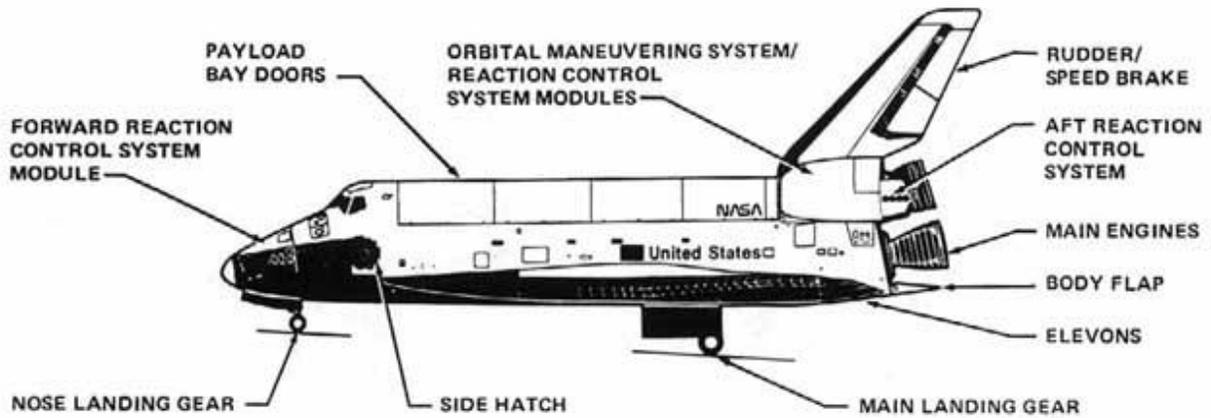
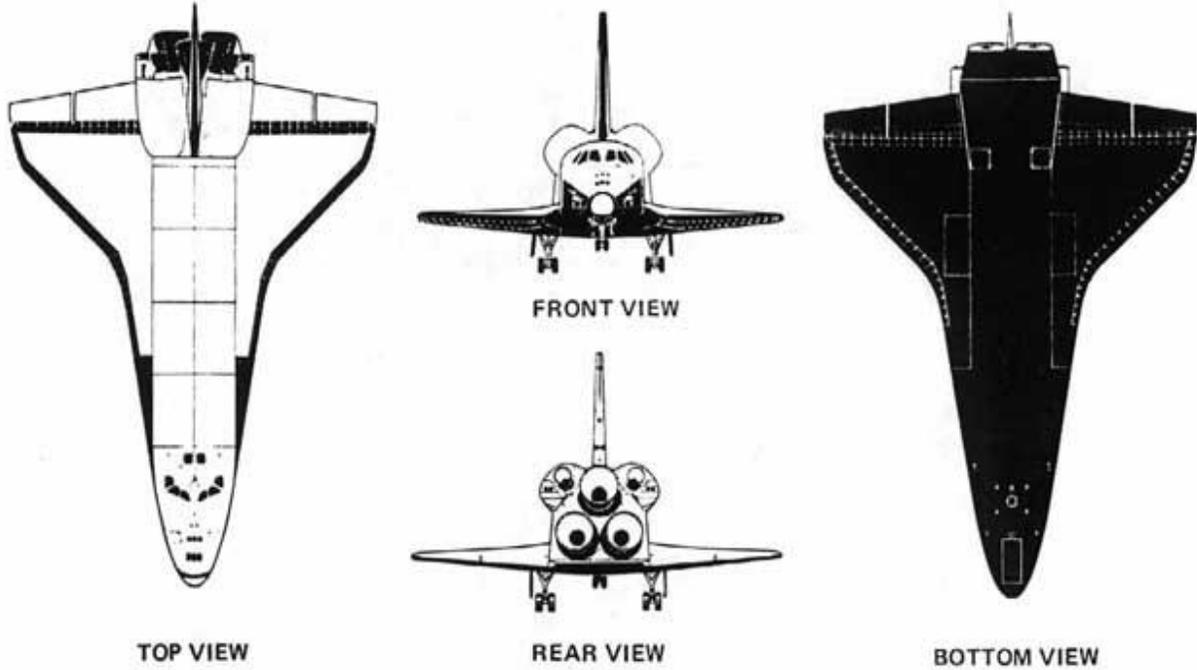
Star Tracker

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Range Safety Subsystem schematic

page 29

Orbiter Dimensions and Weight



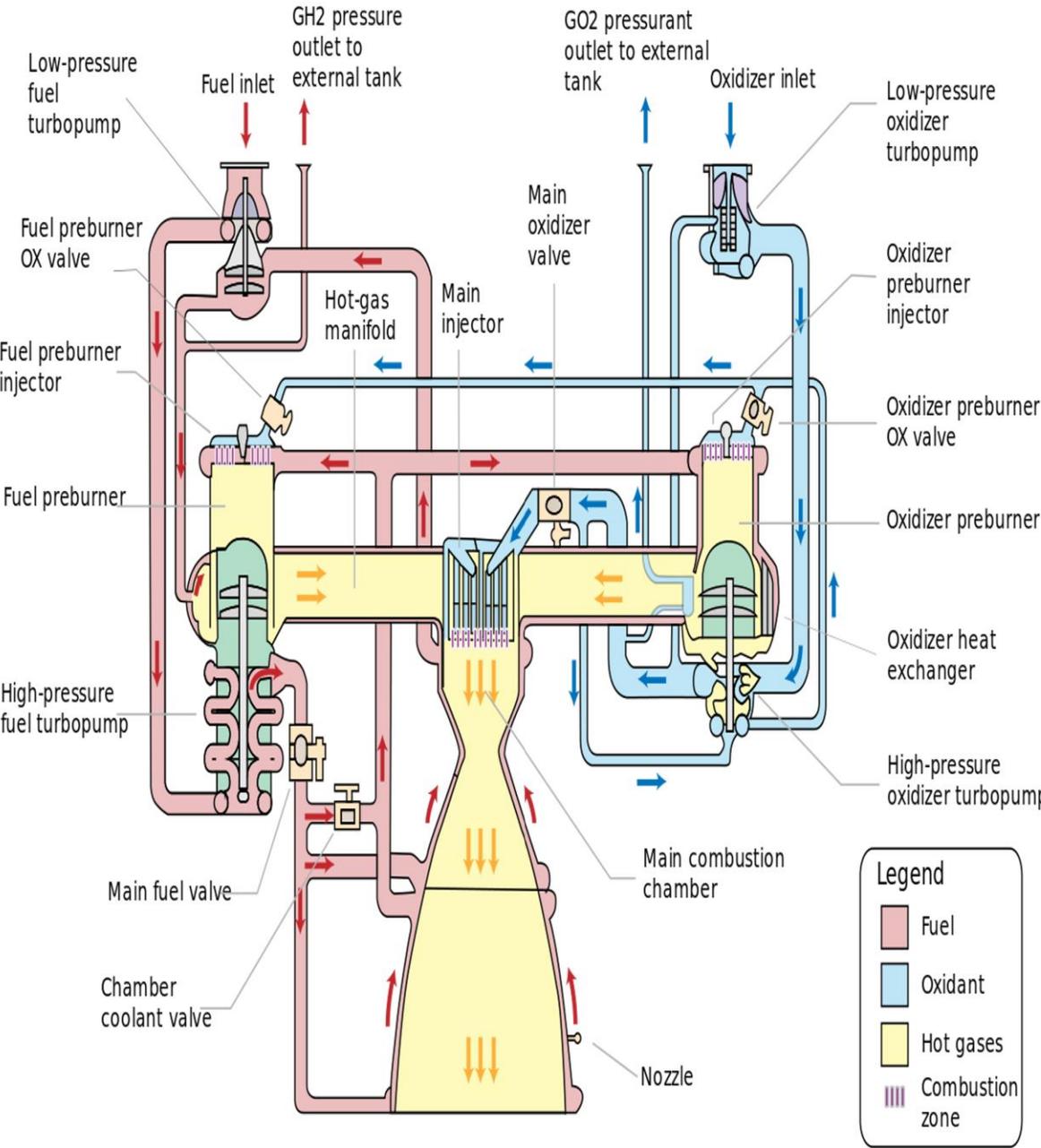
DIMENSIONS AND WEIGHT

| | | |
|-----------------------------|-----------|--------------|
| WING SPAN | 23.79 m | (78.06 FT) |
| LENGTH | 37.24 m | (122.17 FT) |
| HEIGHT | 17.25 m | (56.58 FT) |
| TREAD WIDTH | 6.91 m | (22.67 FT) |
| GROSS TAKEOFF WEIGHT | | VARIABLE |
| GROSS LANDING WEIGHT | | VARIABLE |
| INERT WEIGHT (APPROX) | 74 844 kg | (165 000 LB) |

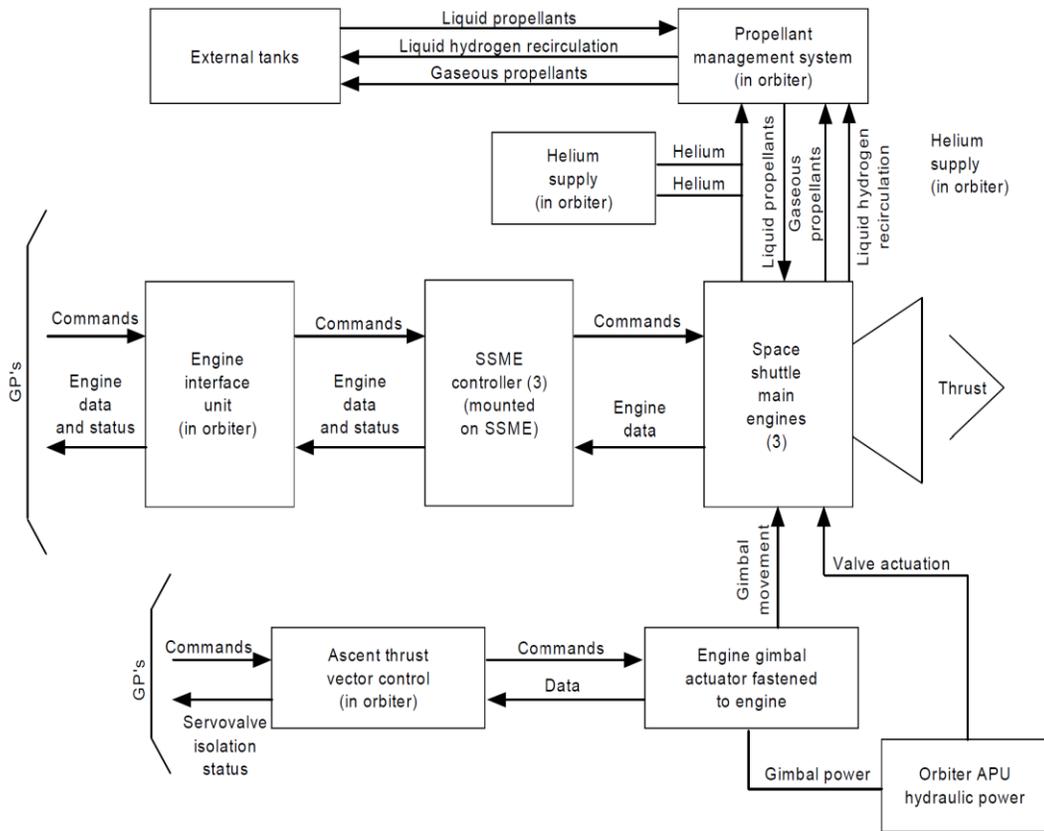
MINIMUM GROUND CLEARANCES

| | | |
|---------------------------|--------|------------|
| BODY FLAP (AFT END) | 3.68 m | (12.07 FT) |
| MAIN GEAR (DOOR) | 0.87 m | (2.85 FT) |
| NOSE GEAR (DOOR) | 0.90 m | (2.95 FT) |
| WINGTIP | 3.63 m | (11.92 FT) |

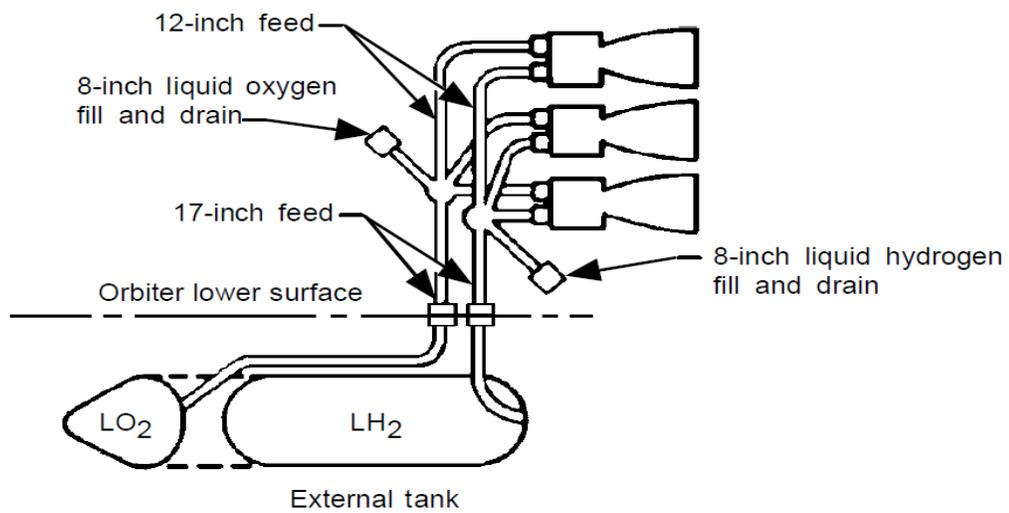
Main Propulsion System



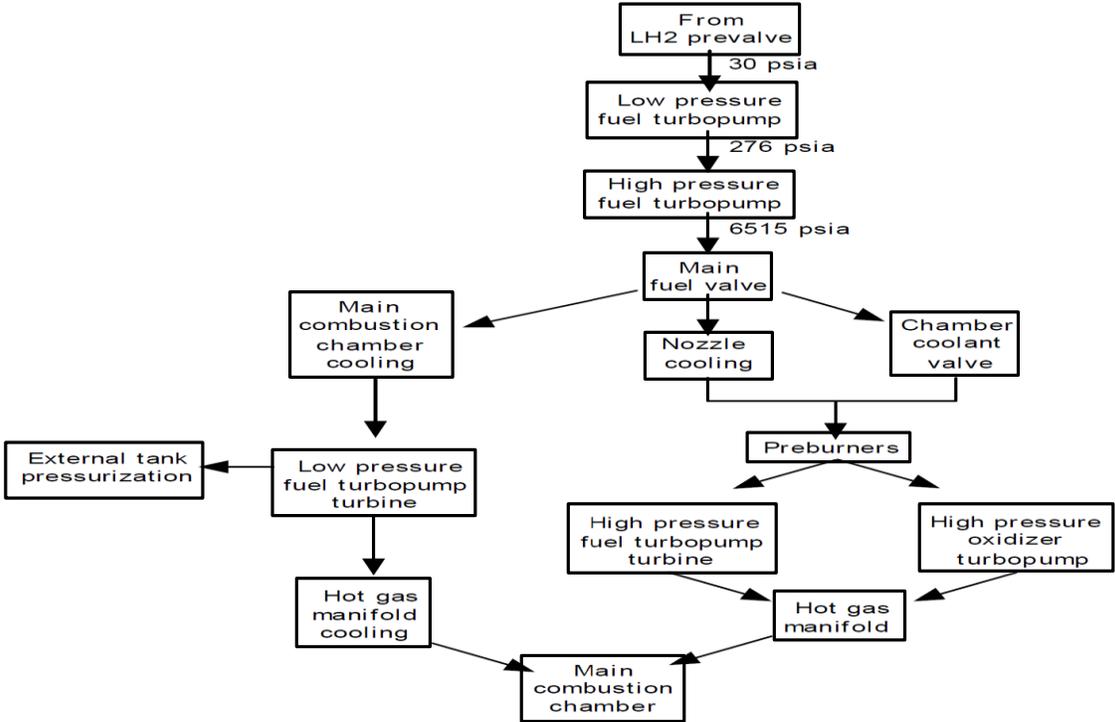
SSME Schematic



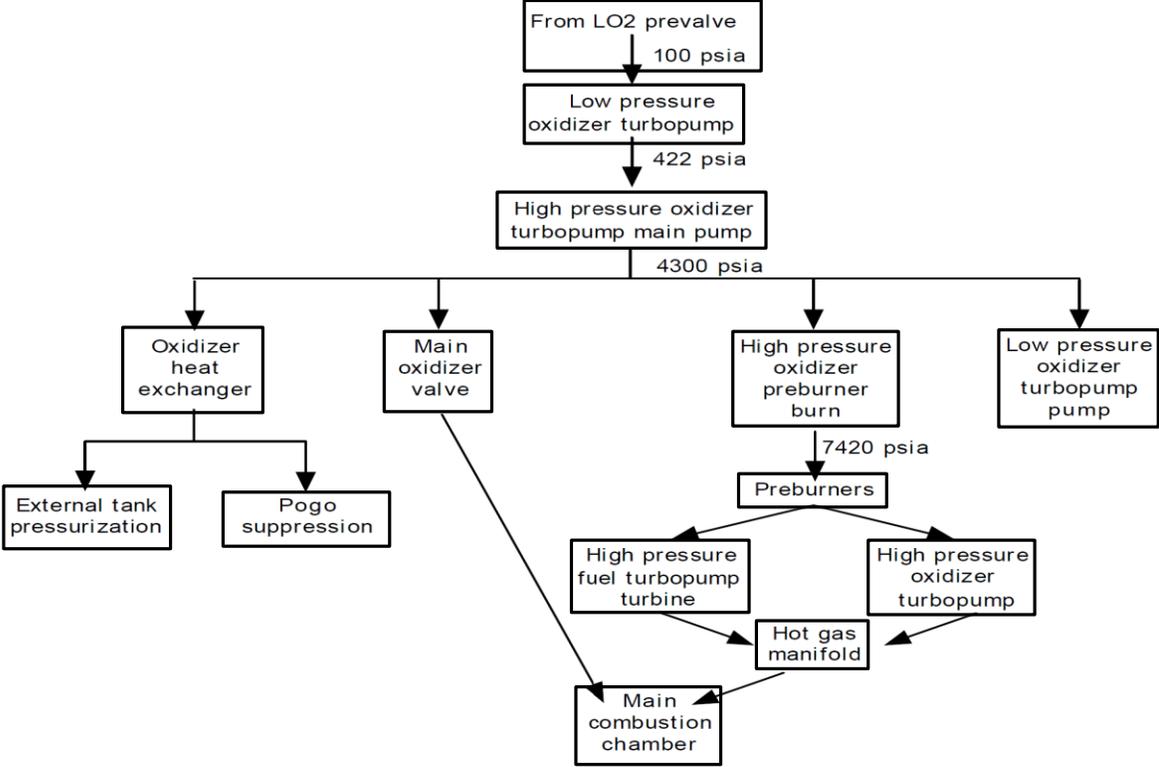
Main Propulsion System Subsystem



Main Propulsion Subsystem Fuel and Propellant Plumbing diagram

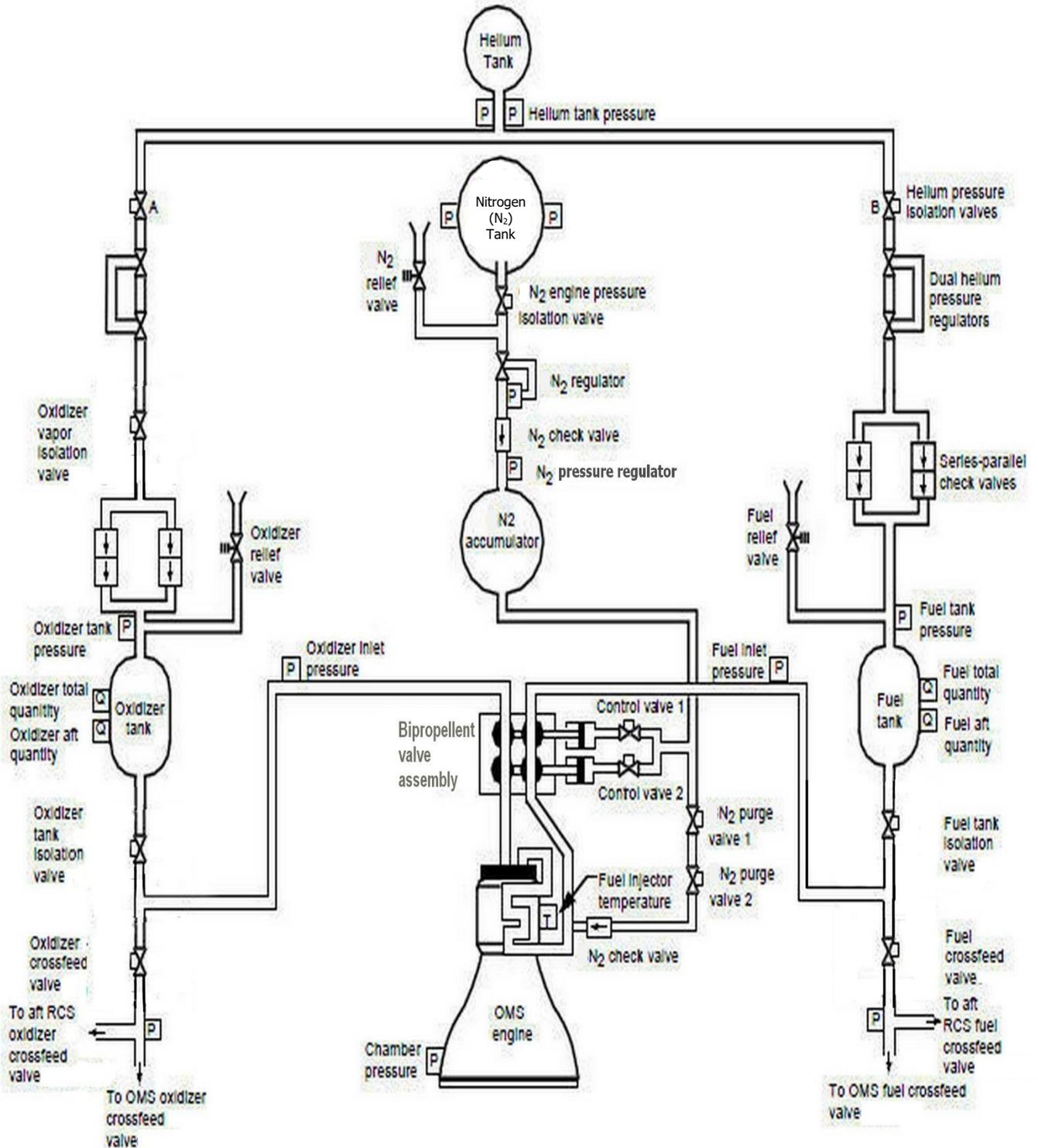


Main Engine Fuel Flow

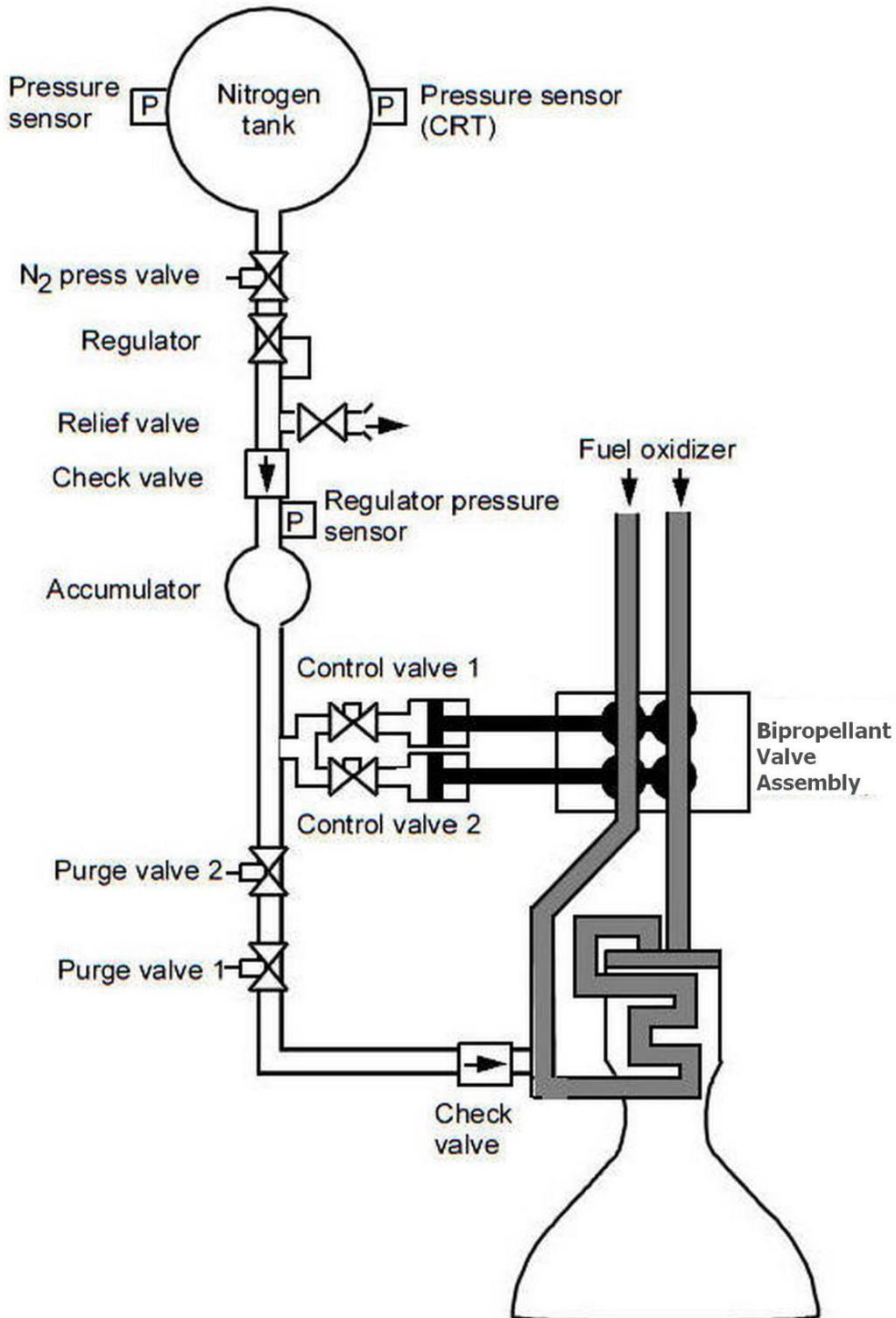


Main Engine Oxidizer Flow

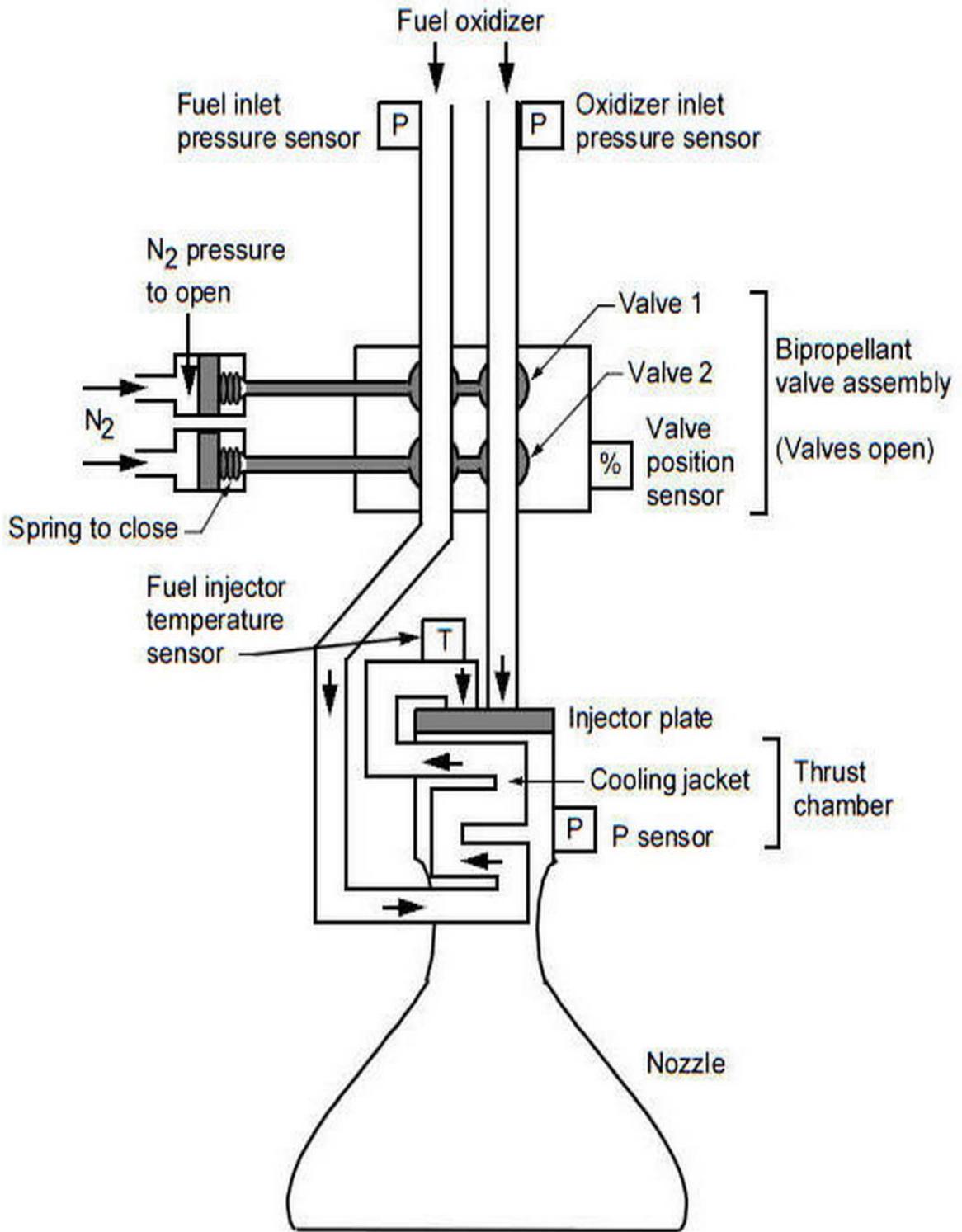
Orbital Maneuvering System



Orbital Maneuvering System Pressurization and Propellant Feed System for One Engine (other Engine Identical)

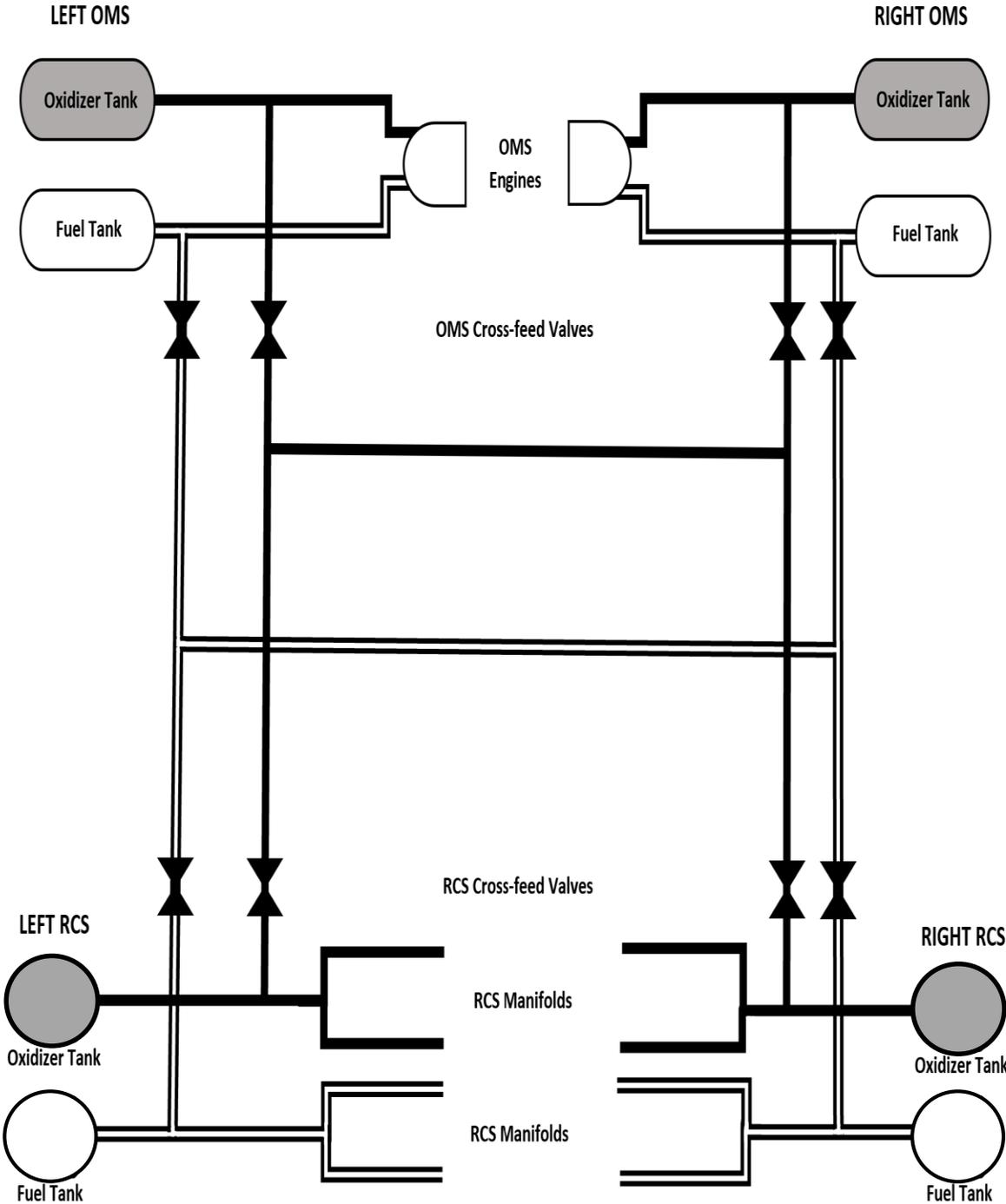


OMS Nitrogen System



OMS Bipropellant Valve

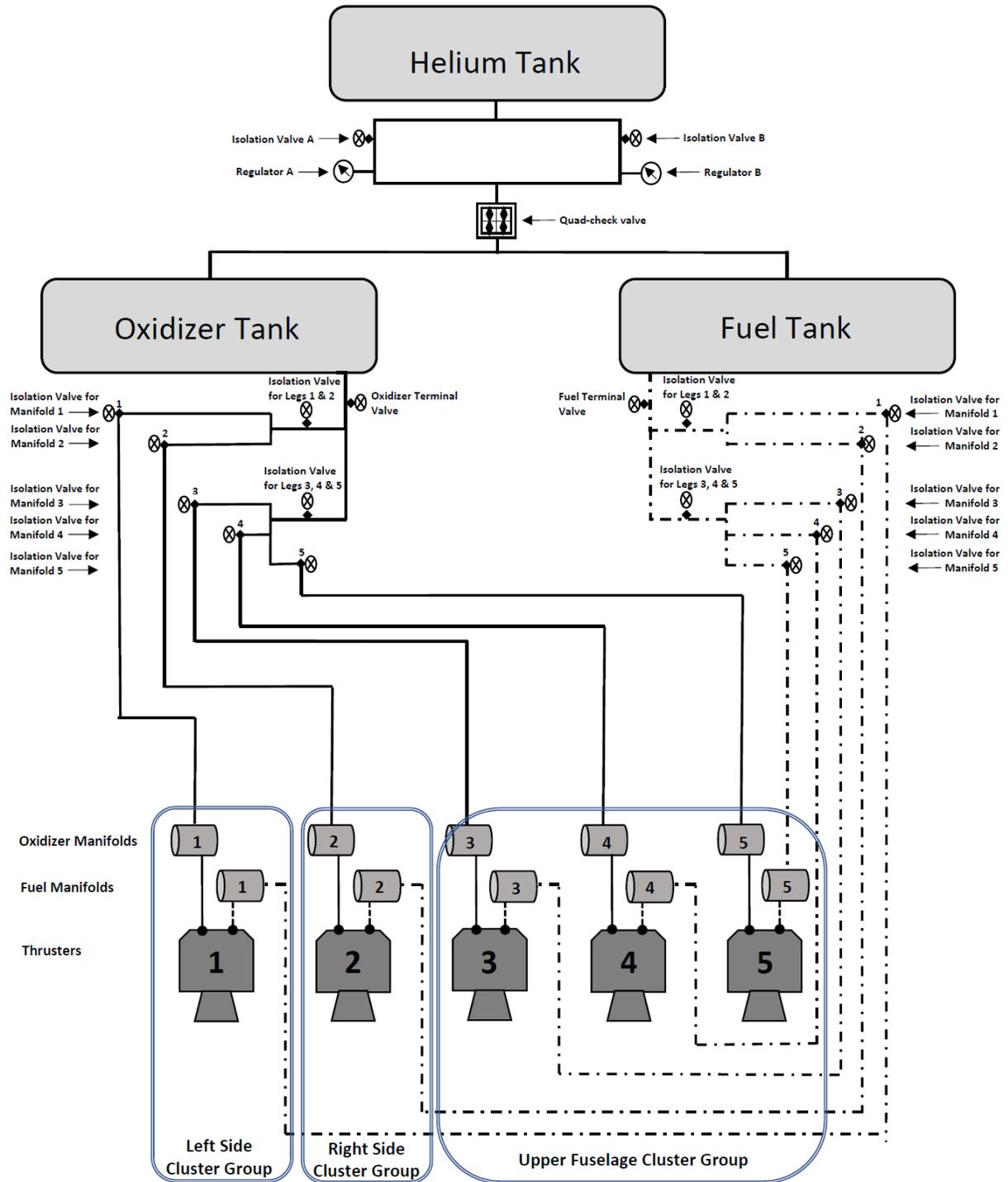
(Detail from OMS Nitrogen System diagram)



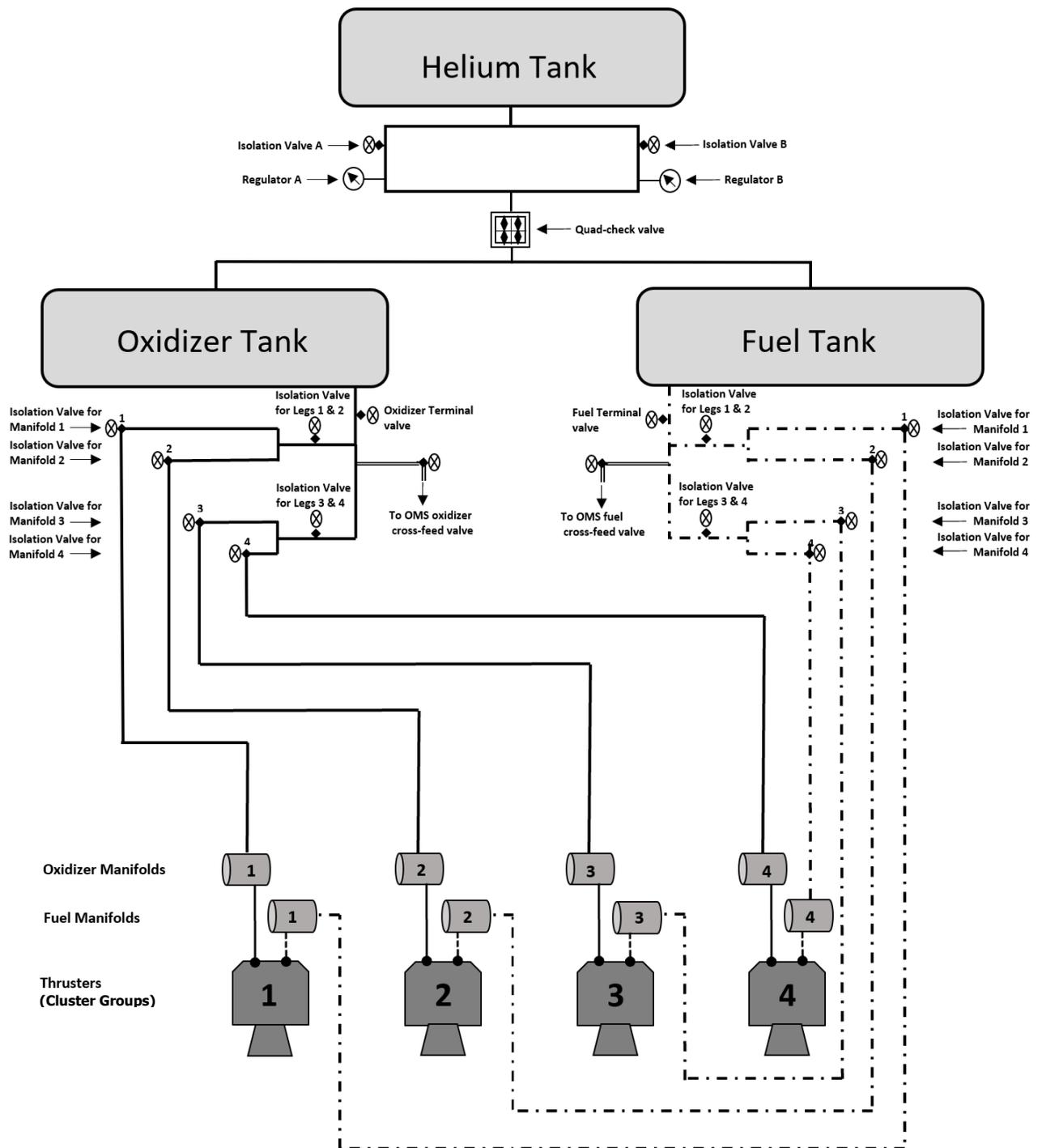
OMS and RCS Cross-feed Valves

Note: OMS and RCS Tank Isolation and Manifold Isolation Valves not shown

Reaction Control System Schematic – Forward

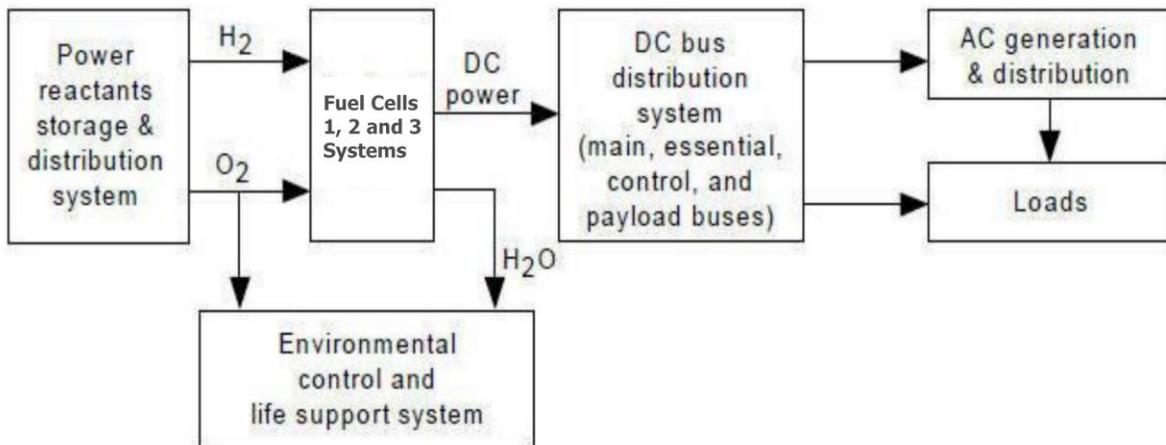


Reaction Control System Schematic – Aft

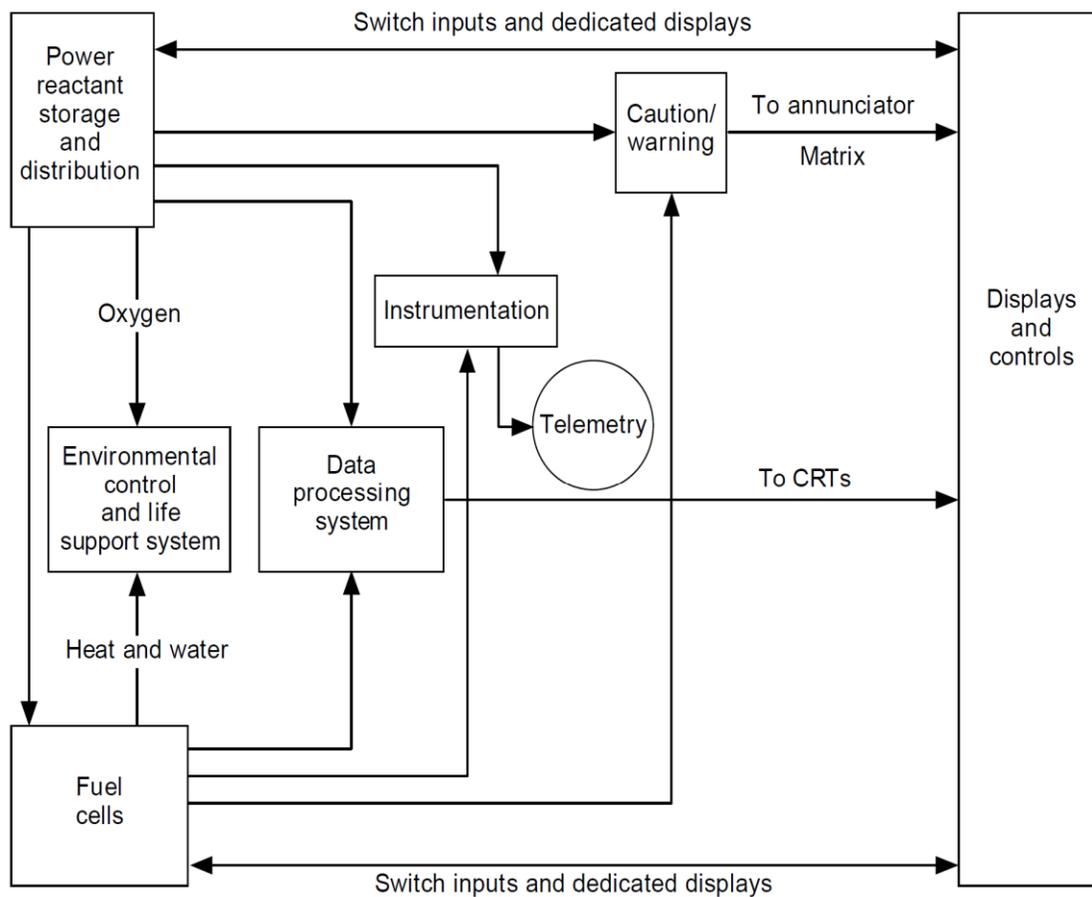


Left side **RCS – Aft** system diagram depicted.
 Right side **RCS – Aft** system components are identical.

Electrical Power Systems Overview

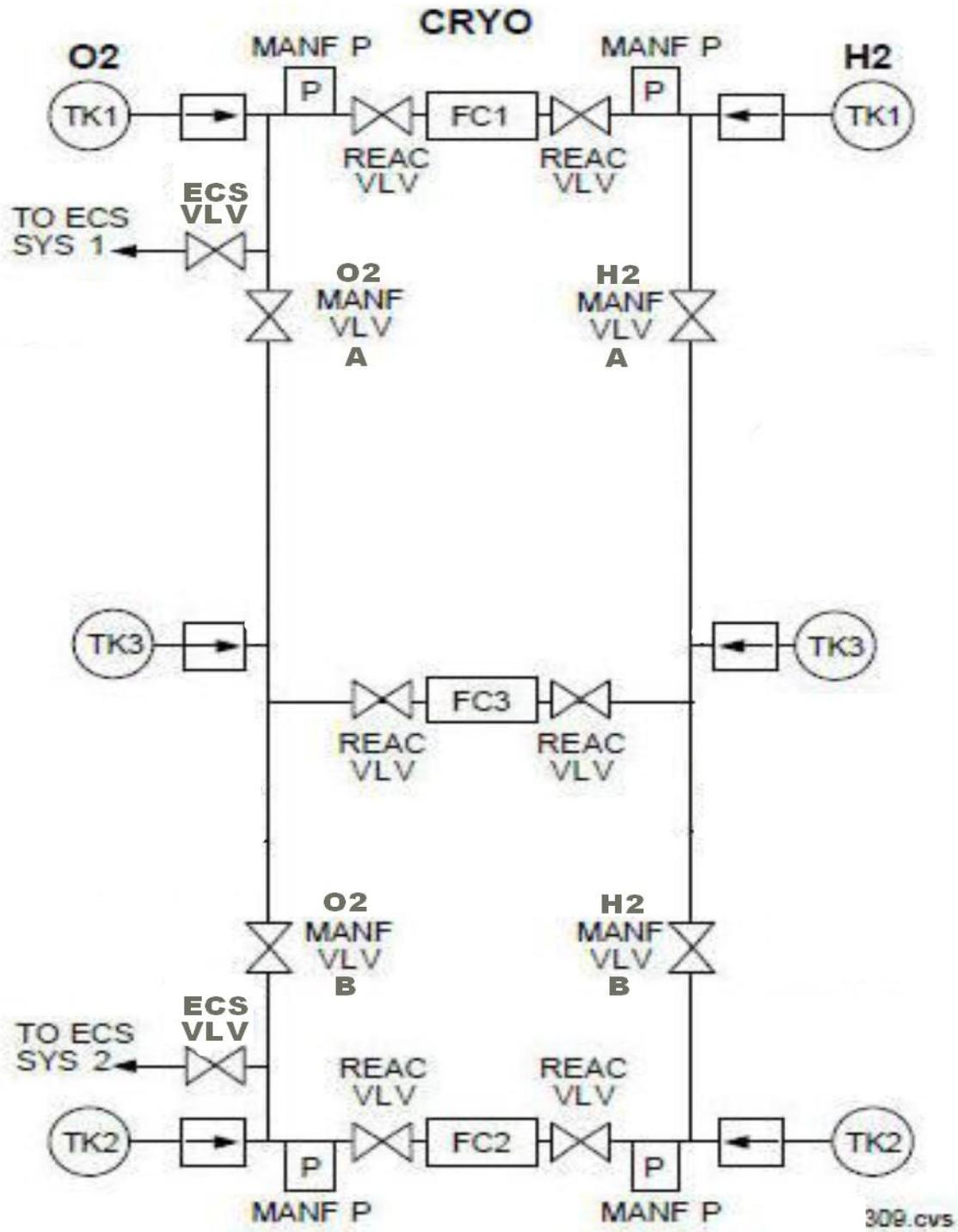


The Electrical Power System

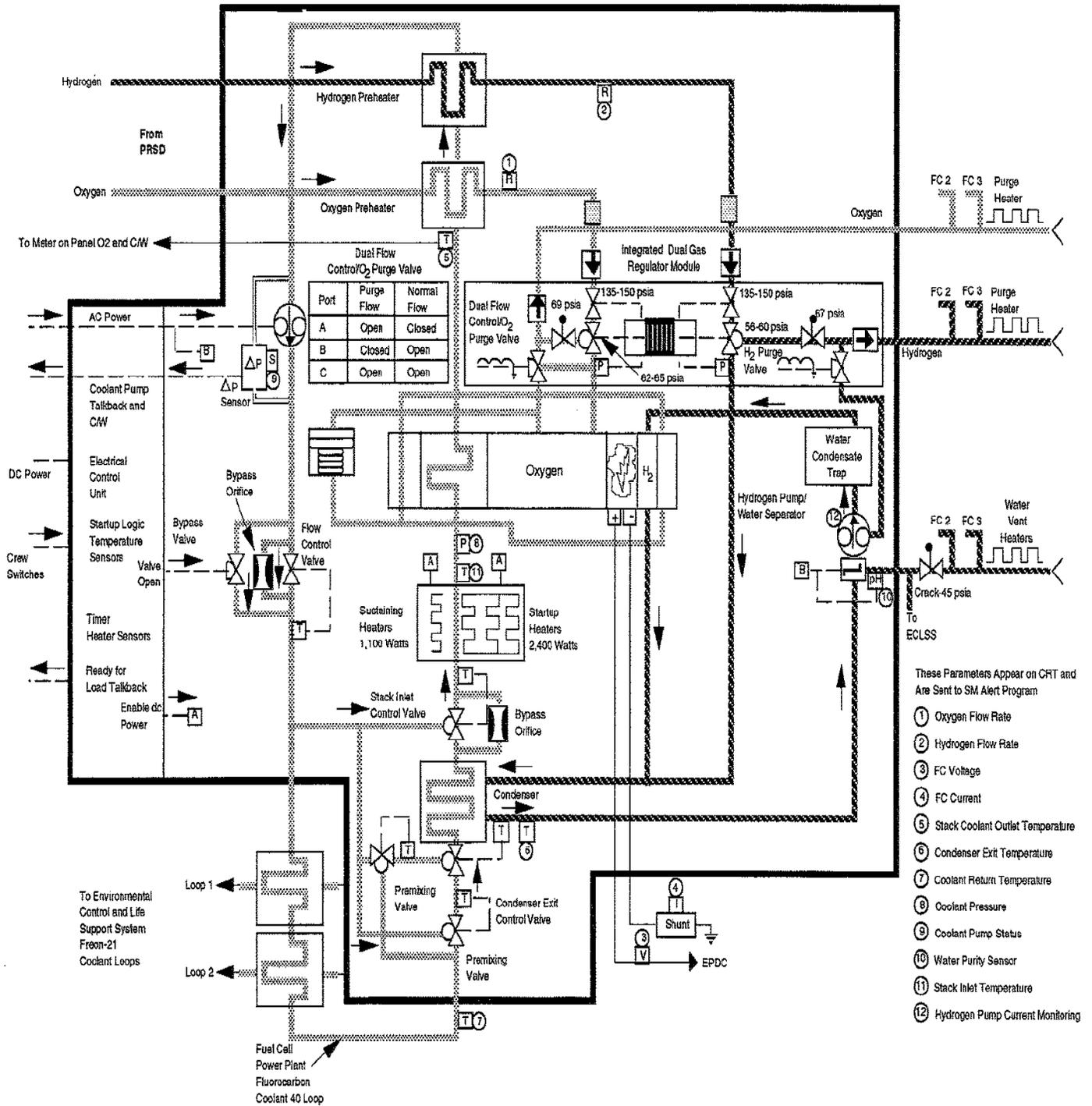


Electrical Power System Interfaces

Cryogenic Power Distribution System Schematic

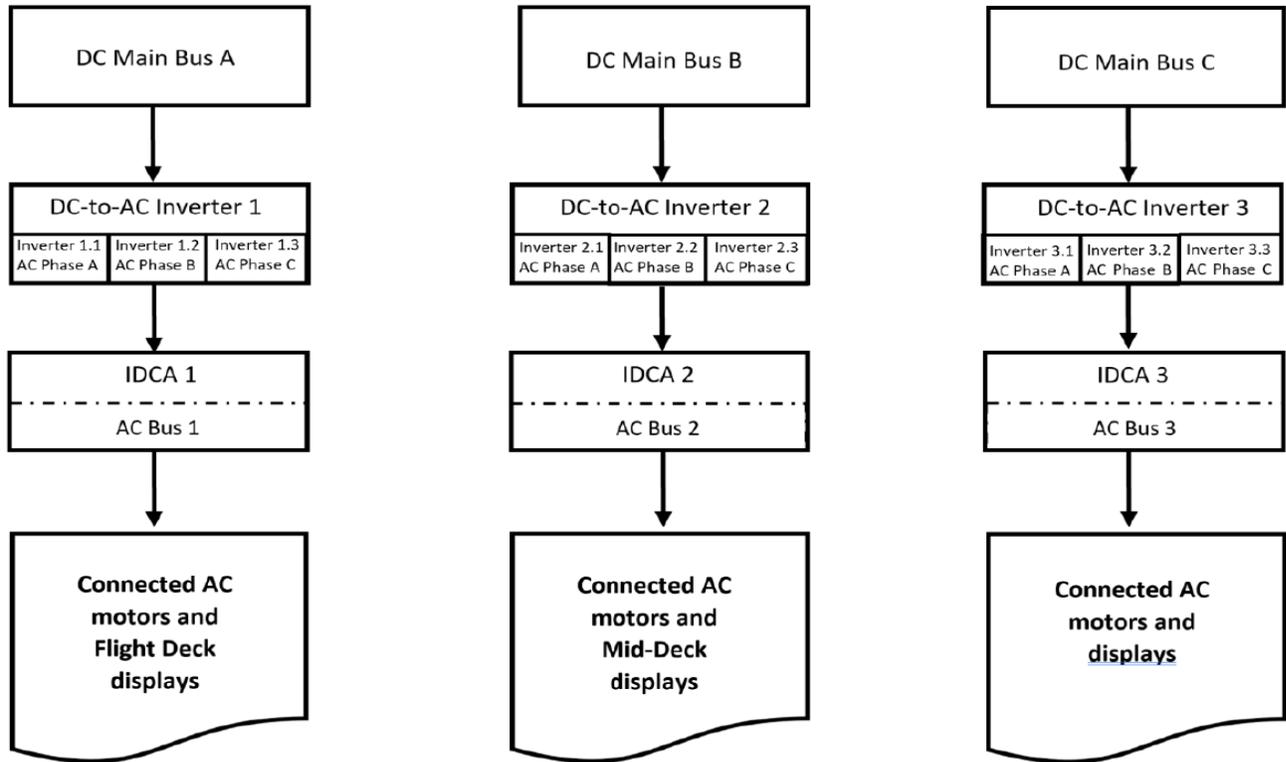


PRSD System



Fuel Cell - Typical

Electrical Power Distribution Schematics



AC Bus 1

Primary Avionics (backup - AC Bus 2)
 Fwd L/R Vent doors (backup - AC Bus 2)
 Star Tracker Y/Z doors (backup - AC Bus 3)
 L/R Air Data doors (backup - AC Bus 2)
 Fwd RCS Manifold Valves (backup - AC Bus 3)
 Fwd RCS Tank Isol Valves (backup - AC Bus 2)

AC Bus 2

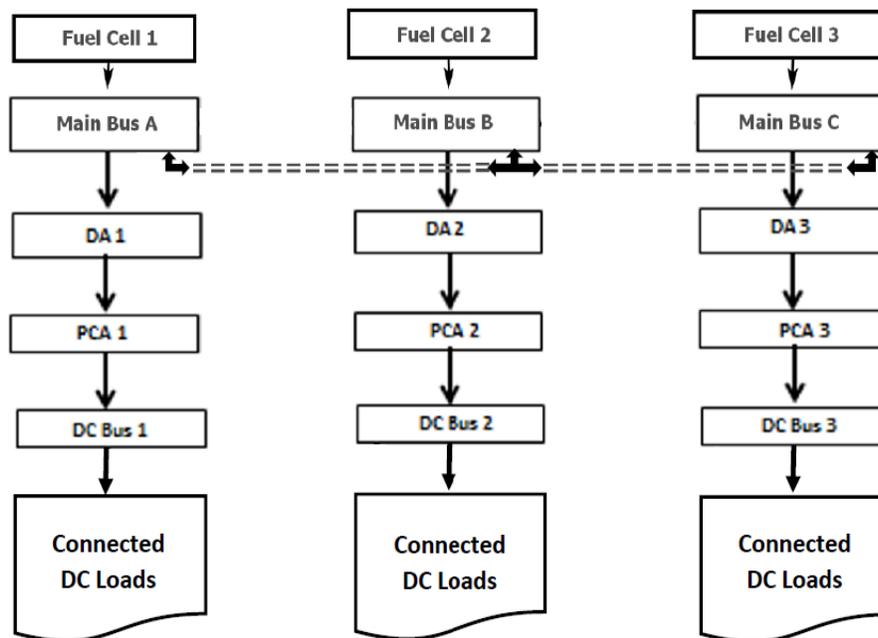
Mid L/R Vent doors (backup - AC Bus 3)
 Payload Bay doors (backup - AC Bus 1)
 Payload Bay door latches (backup - AC Bus 3)
 Payload Bay Retention latches (backup - AC Bus 1)
 Radiator Deployment Actuators (backup - AC Bus 3)
 Payload Bay doors (backup - AC Bus 3)

AC Bus 3

Secondary Avionics (backup - AC Bus 2)
 Aft Vent doors (backup - AC Bus 1)
 Aft OMS/RCS Manifold valves (backup - AC Bus 2)
 Aft OMS/RCS Tank Isol valves (backup - AC Bus 2)
 Aft OMS/RCS Cross-feed valves (backup - AC Bus 1)

IDCA – Inverter Distribution and Control Assembly

AC Direct Power Distribution Diagram



DC Bus 1

Flight Deck Power Panels (backup – DC Bus 2)
 Primary Control (backup – DC Bus 3)
 Fwd Remote Power Relays (RPR) Master (backup – DC Bus 3)
 RPR - Fwd L/R Vent doors (backup - DC Bus 2)
 RPR - Star Tracker Y/Z doors (backup - DC Bus 3)
 RPR - L/R Air Data doors (backup - DC Bus 2)
 RPR - Fwd RCS Manifold Valves (backup - DC Bus 3)
 RPR - Fwd RCS Tank Isol Valves (backup – DC Bus 2)

DC Bus 2

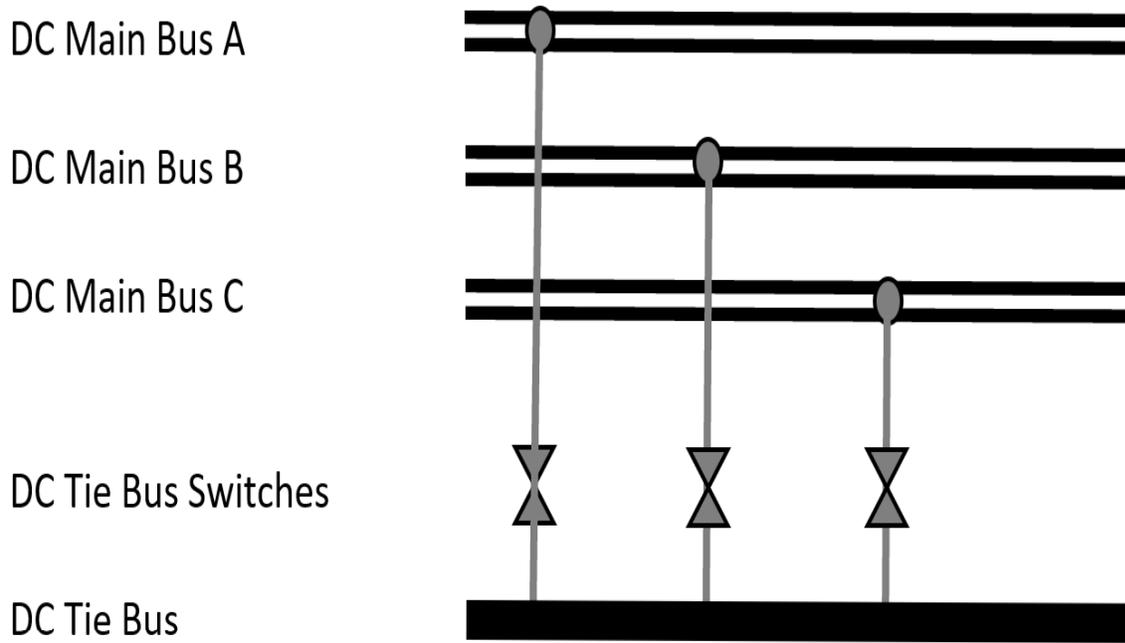
Mid-Deck Power Panels (backup – DC Bus 1)
 Secondary Controls (backup – DC Bus 1)
 Mid Remote Power Relays (RPR) Master (backup – DC Bus 1)
 RPR - Mid L/R Vent doors (backup - DC Bus 3)
 RPR - Payload Bay doors (backup - DC Bus 1)
 RPR - Payload Bay door latches (backup - DC Bus 3)
 RPR - Payload Bay Retention latches (backup - DC Bus 1)
 RPR - Radiator Deployment Actuators (backup - DC Bus 3)
 RPR - Payload Bay doors (backup - DC Bus 3)

DC Bus 3

Flight Deck Power Panels (backup – DC Bus 2)
 Mid-Deck Power Panels (backup – DC Bus 1)
 Aft Remote Power Relays (RPR) Master (backup – DC Bus 2)
 RPR - Aft Vent doors (backup - DC Bus 1)
 RPR - Aft OMS/RCS Manifold valves (backup - DC Bus 2)
 RPR - Aft OMS/RCS Tank Isol valves (backup - DC Bus 2)
 RPR - Aft OMS/RCS Cross-feed valves (backup - DC Bus 1)

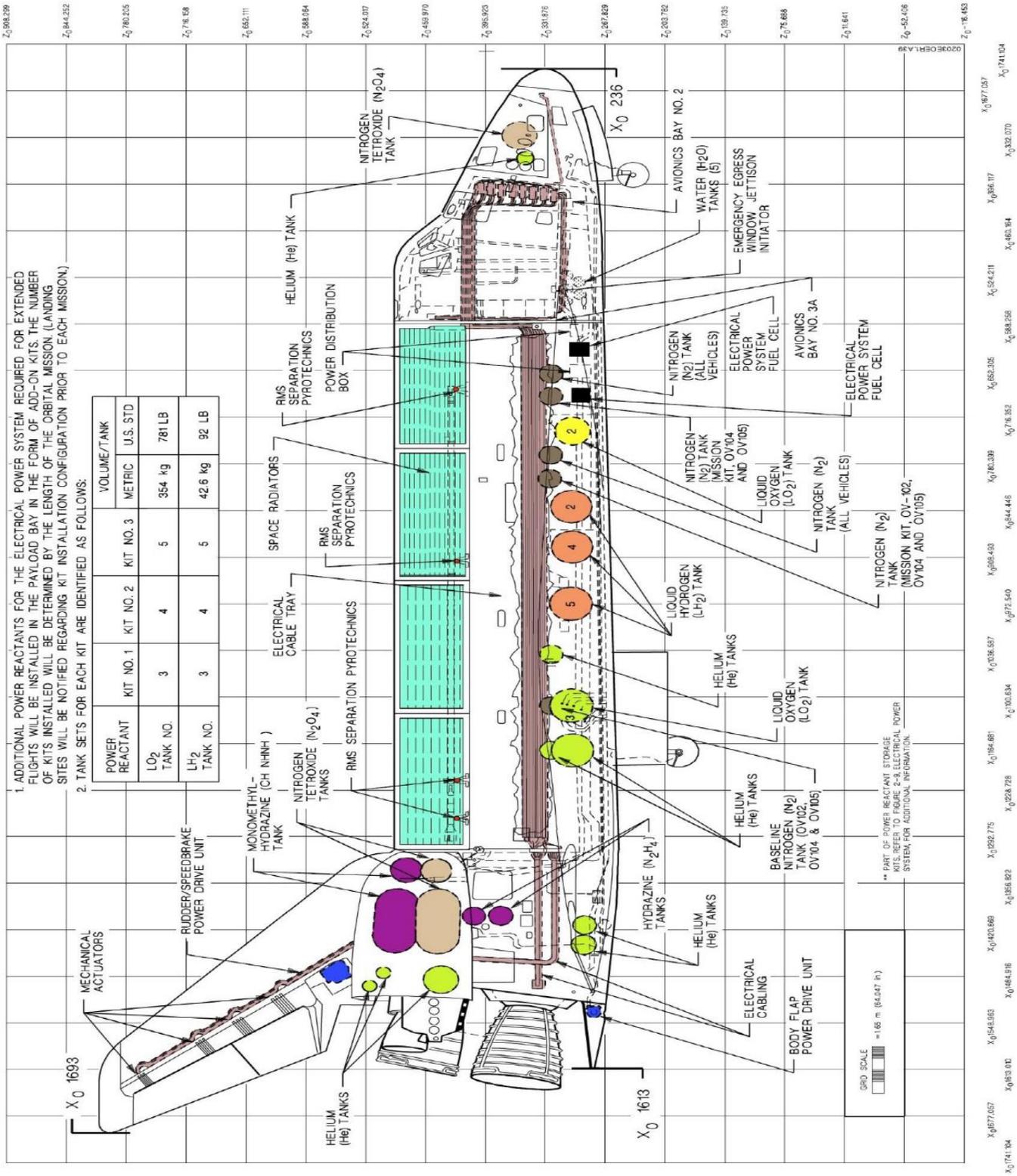
DA – Distribution Assembly
 PCA – Power Control Assembly
 ===== - Main Bus Tie Bus -
 (Detail on next page)

DC Direct Power Main Distribution Diagram



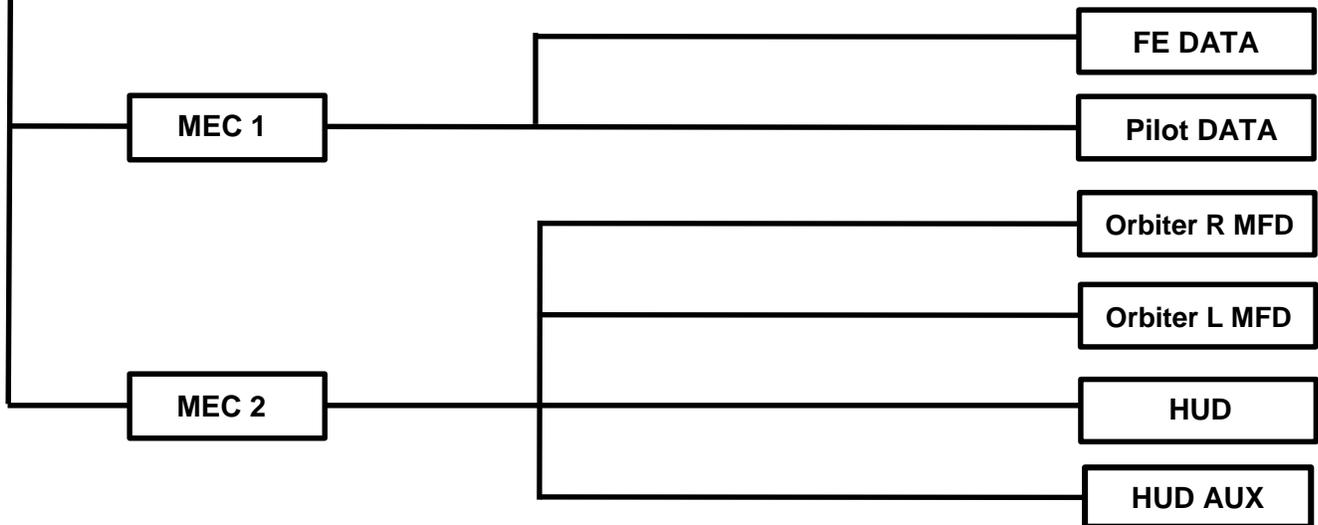
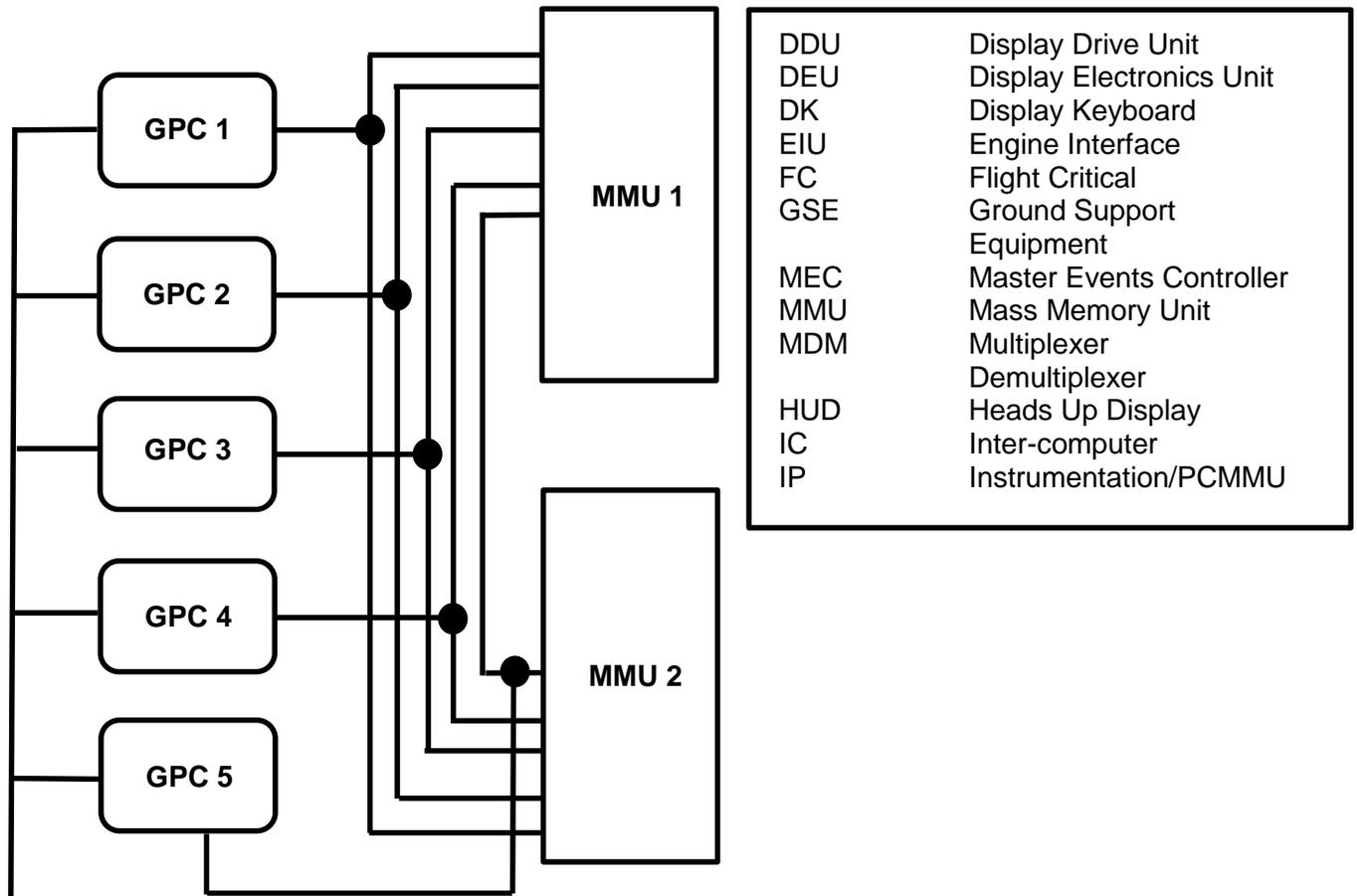
DC Main Bus Tie Bus diagram

The DC Main Bus Tie Bus is a secondary electrical bus that is normally not energized. It provides a method to connect (or 'tie') the three independent main DC buses – A, B and C – if necessary.

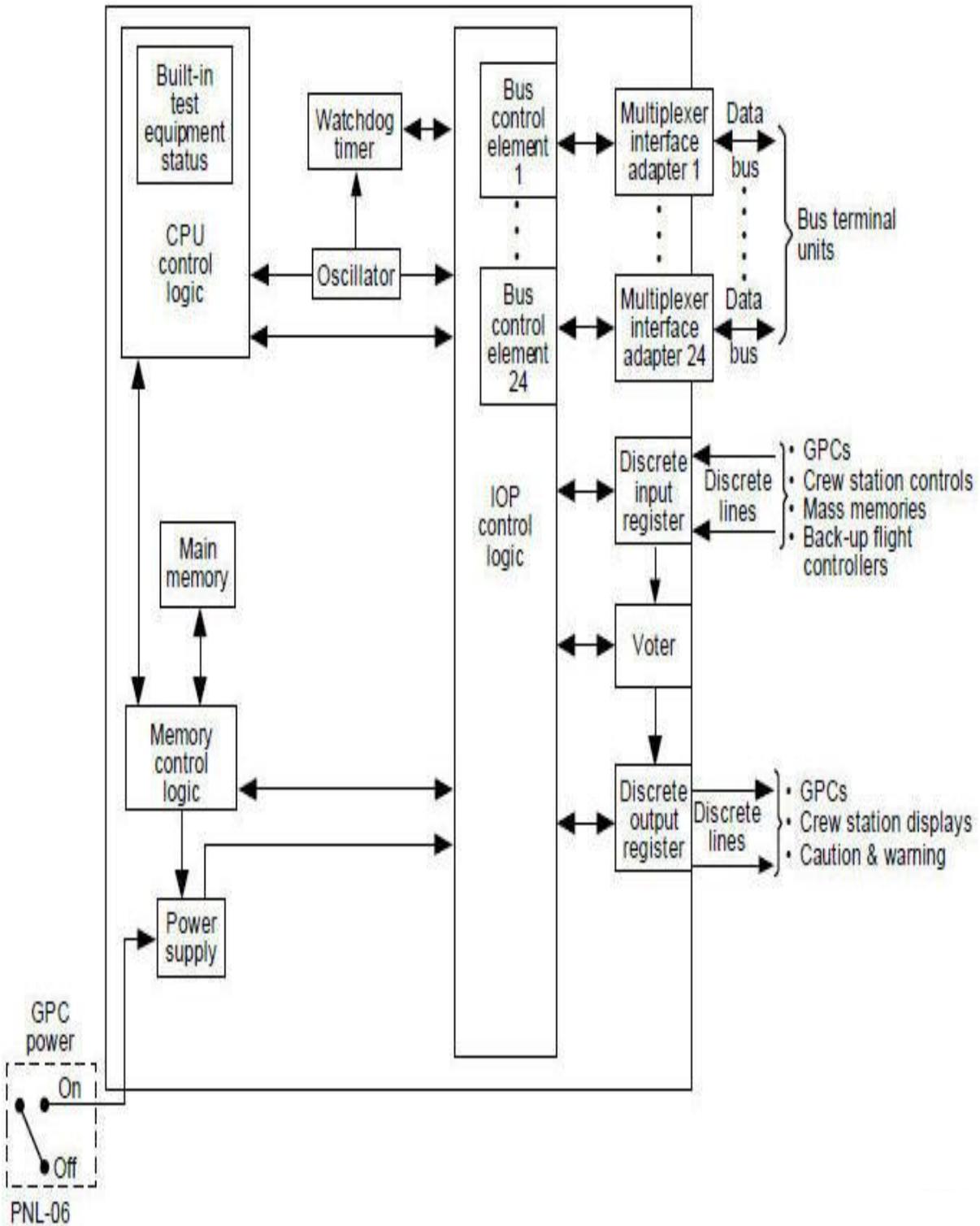


Reactant Tank Locations

General Purpose Computers

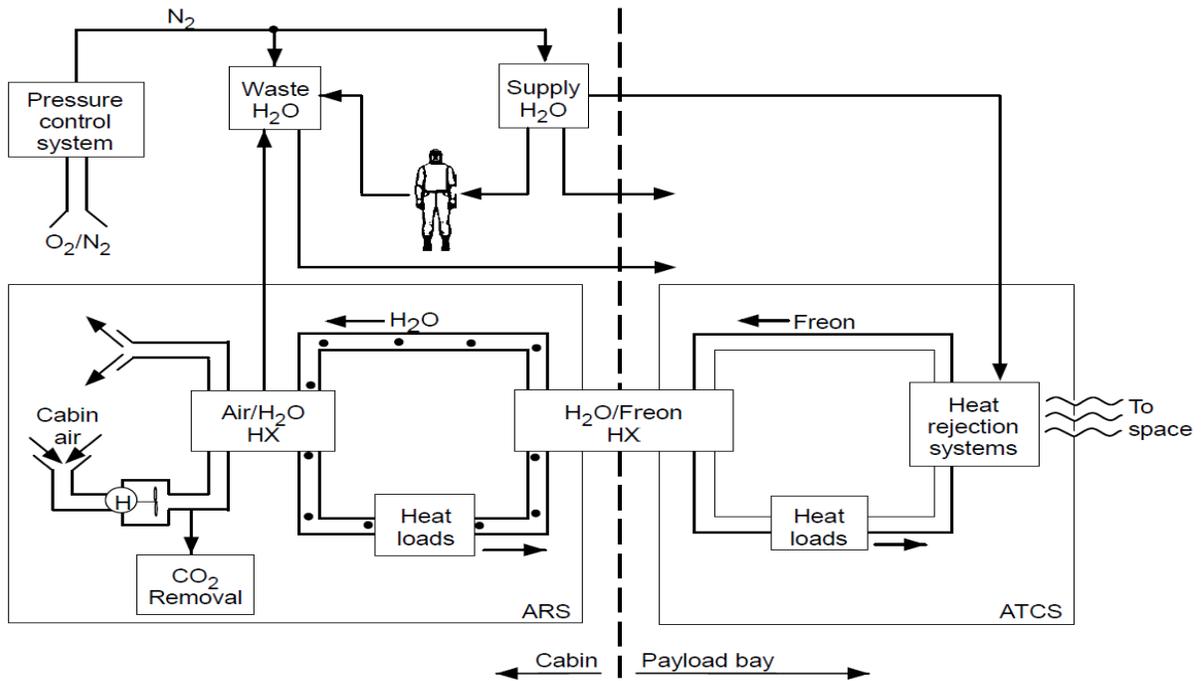


GPC Data Bus Network

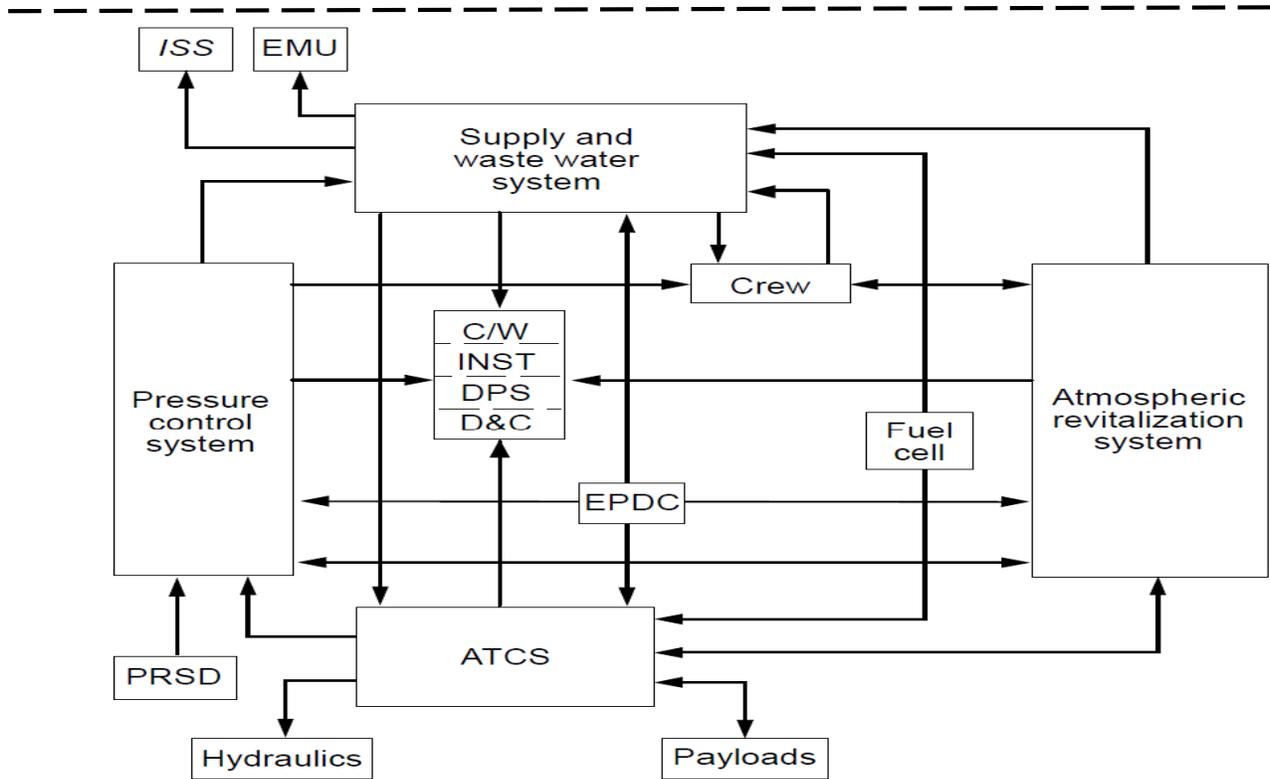


General Purpose Computer Functional Block Diagram

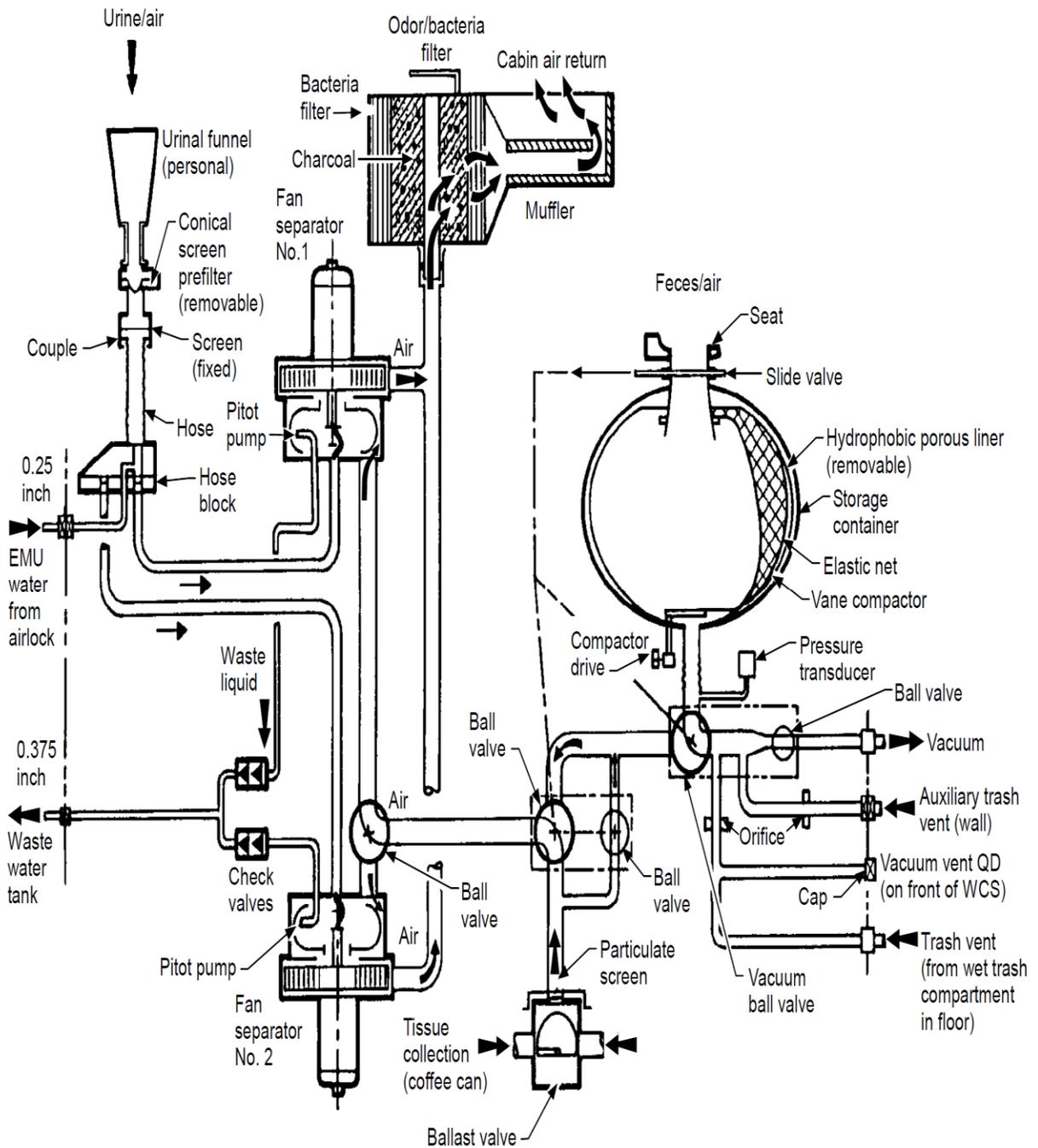
Environmental Control and Life Support Systems



Environmental Control and Life Support System Overview

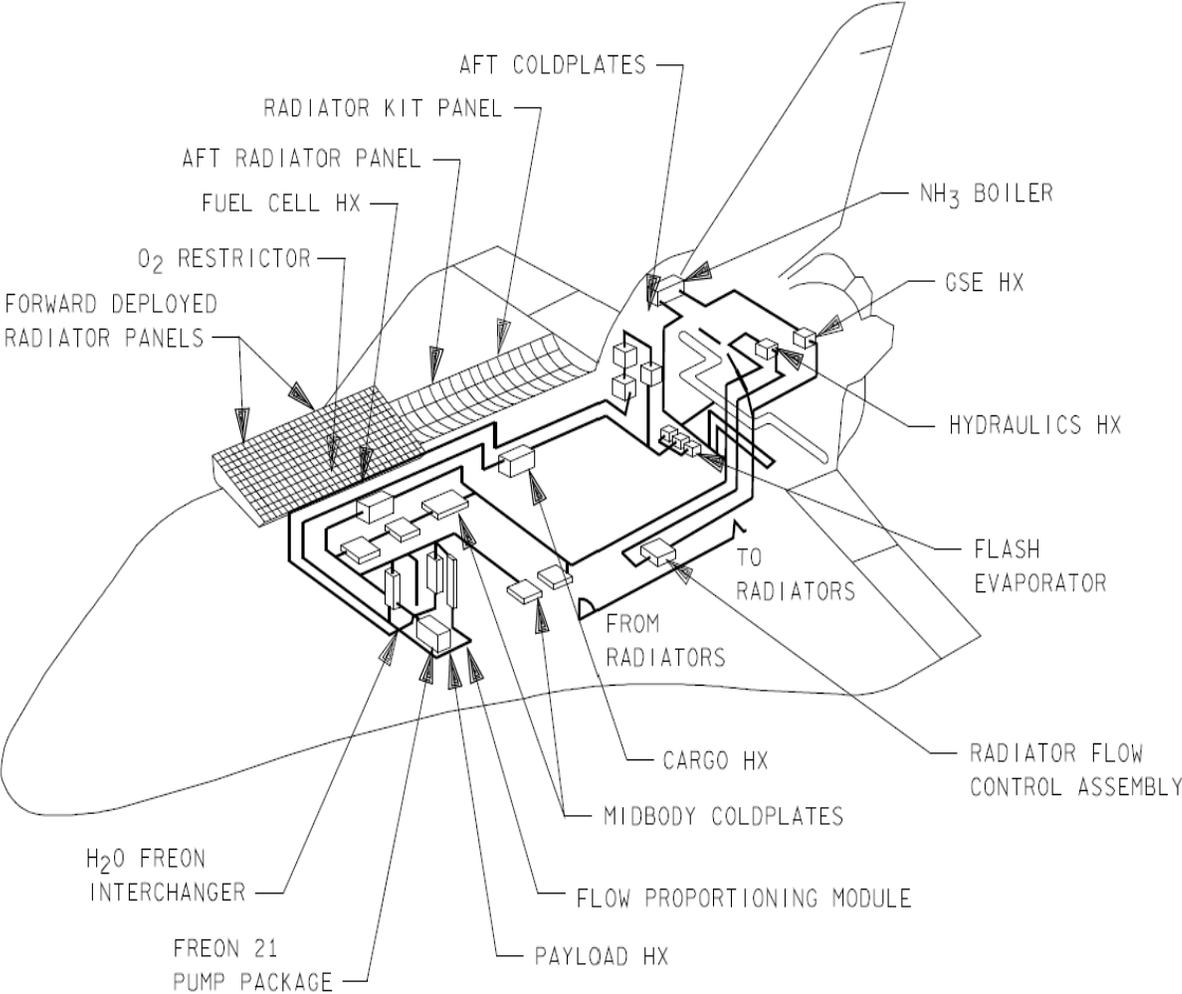


Environmental Control and Life Support System Interfaces

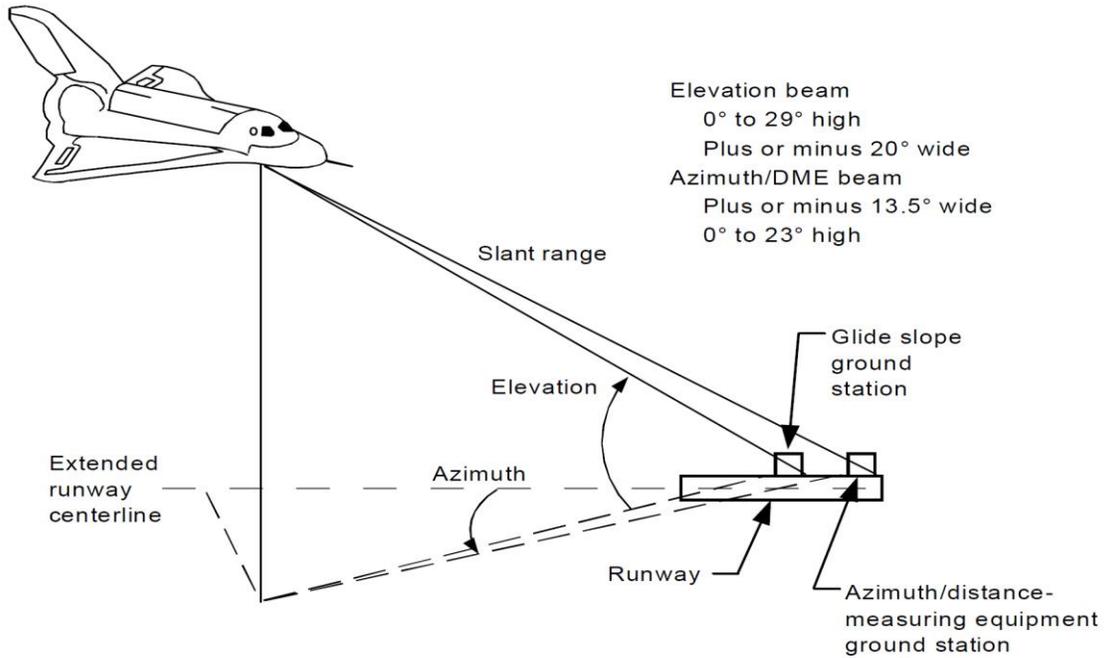


Waste Management System

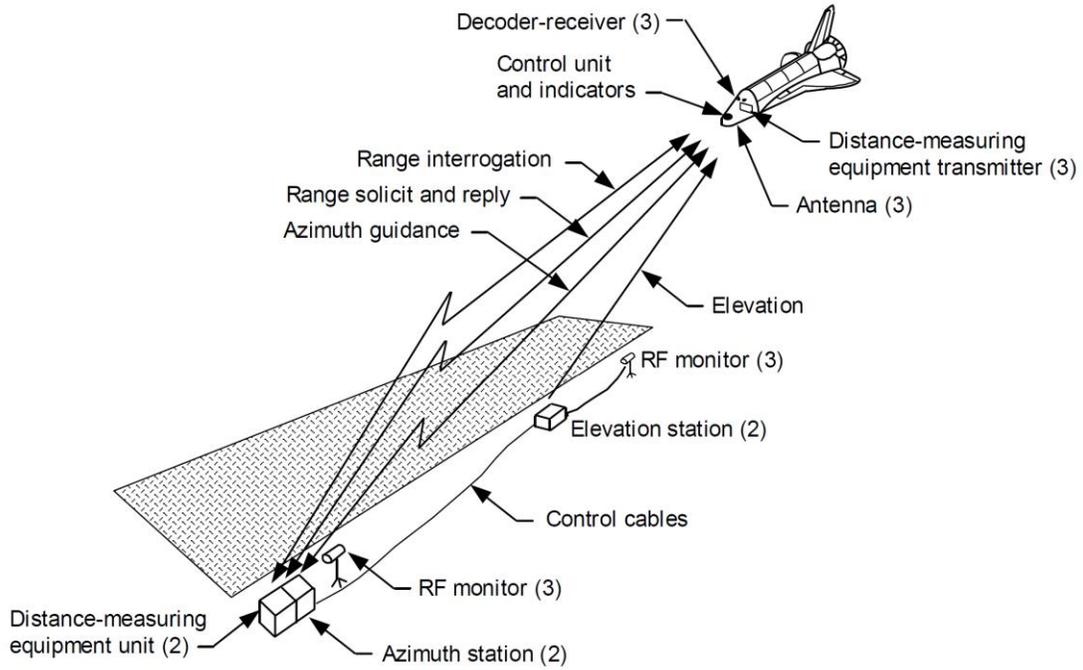
Active Thermal Control System Component Locations



Major Microwave Landing System

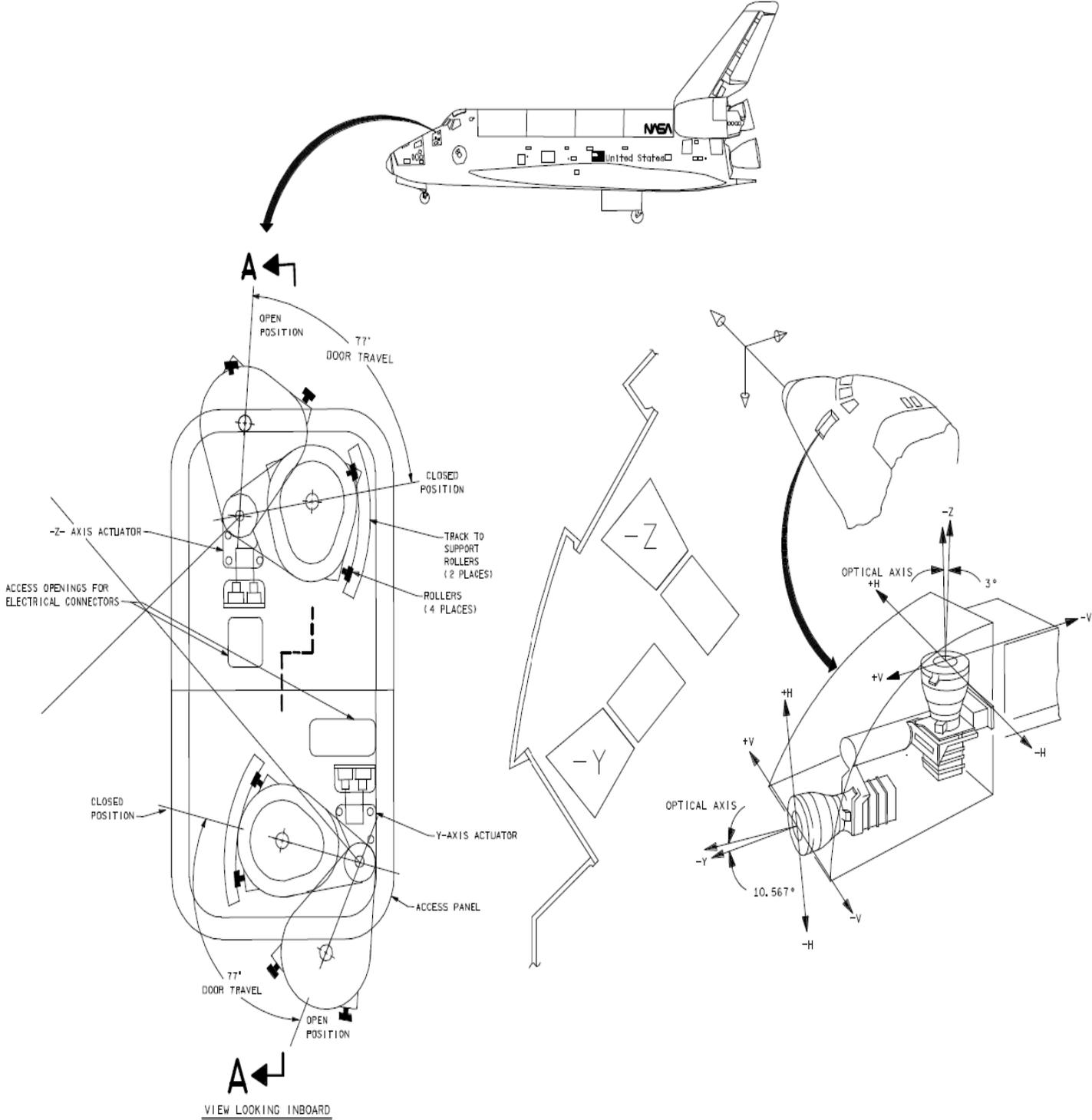


Major Microwave Landing System Overview

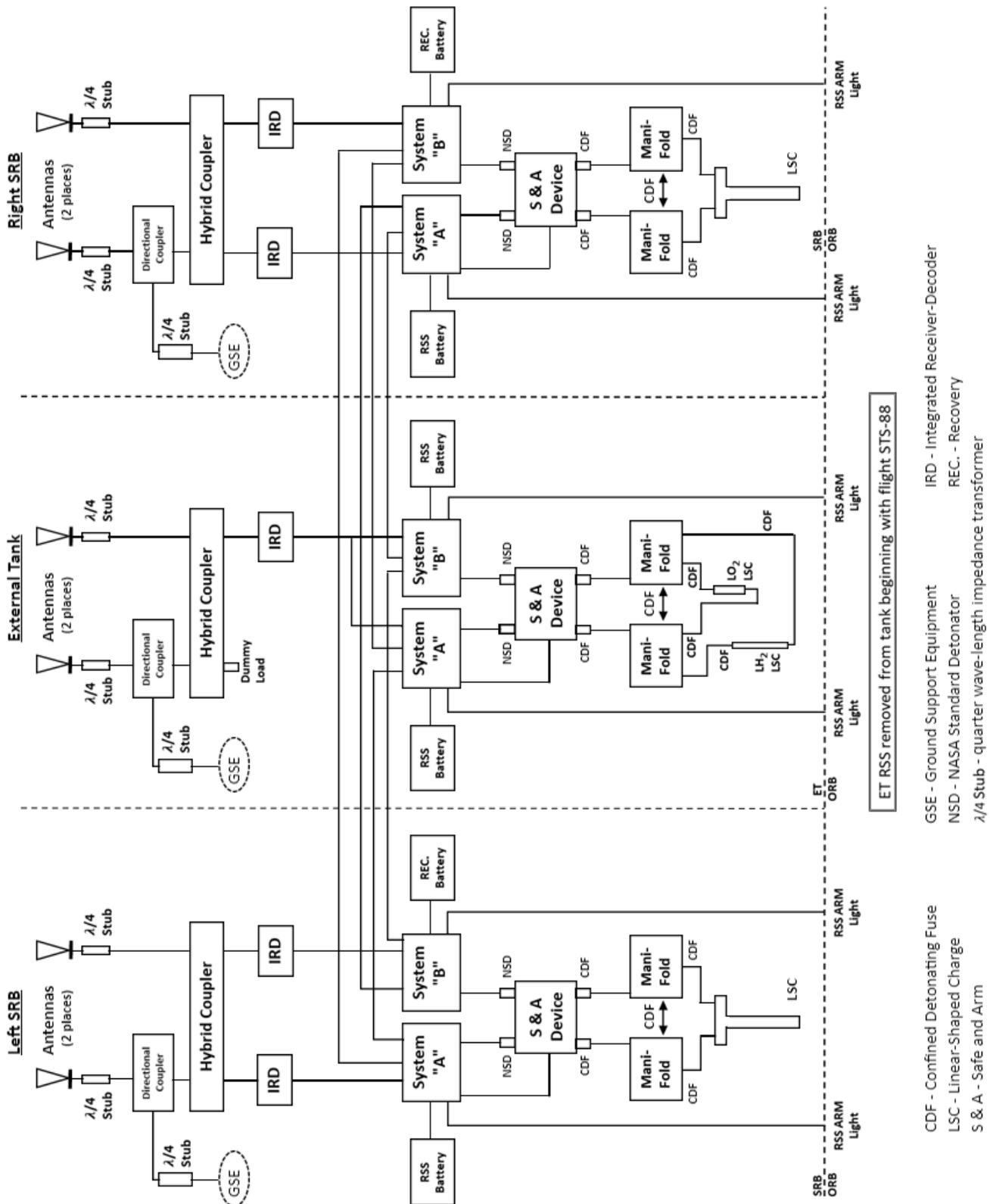


Major Microwave Landing System Components and Radio Frequency Links

Star Tracker



Range Safety Subsystem Schematic



CDF - Confined Detonating Fuse
 LSC - Linear-Shaped Charge
 S & A - Safe and Arm
 GSE - Ground Support Equipment
 NSD - NASA Standard Detonator
 $\lambda/4$ Stub - quarter wave-length impedance transformer
 IRD - Integrated Receiver-Decoder
 REC. - Recovery

ET RSS removed from tank beginning with flight STS-88