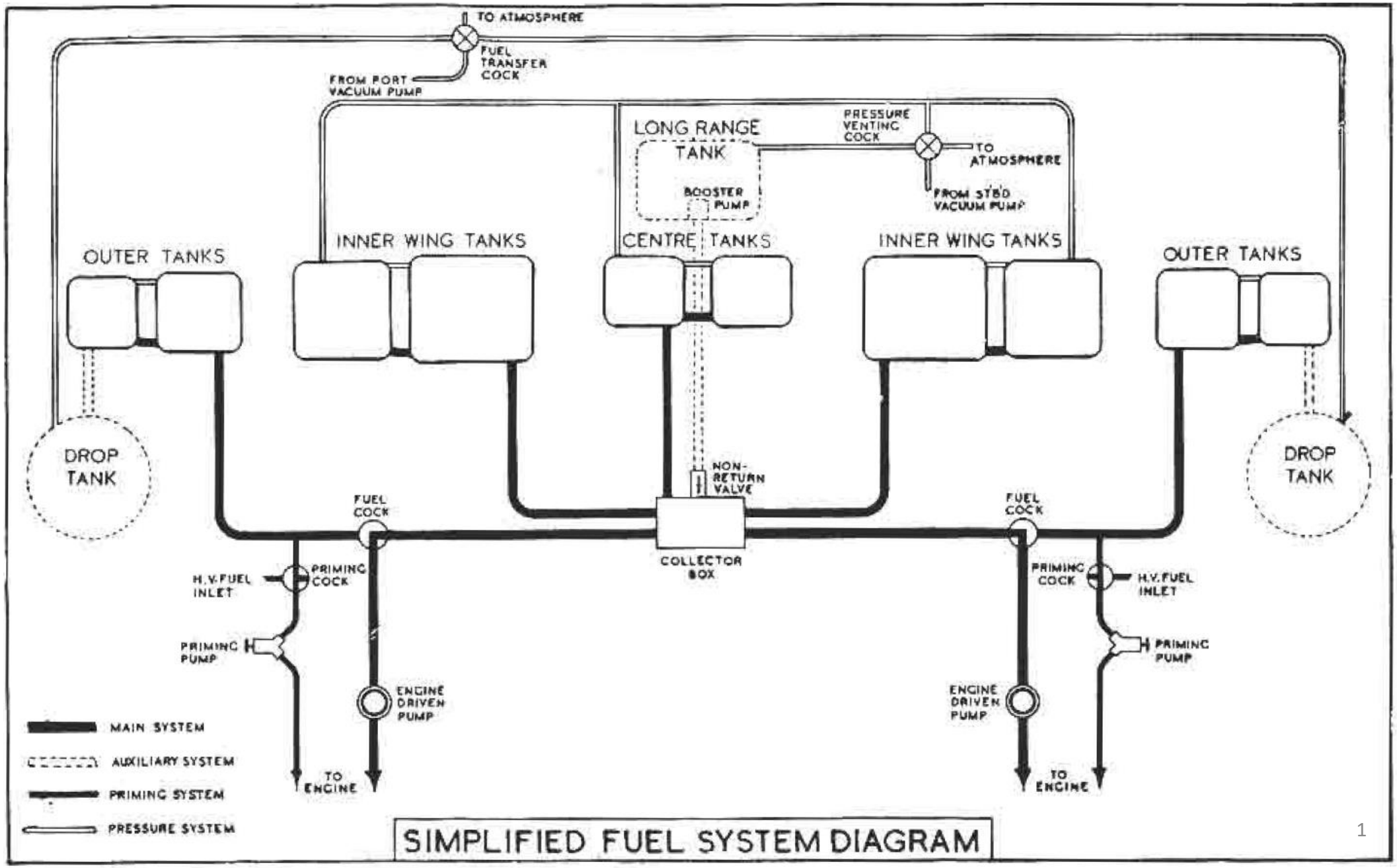
FUEL SYSTEM OVERVIEW

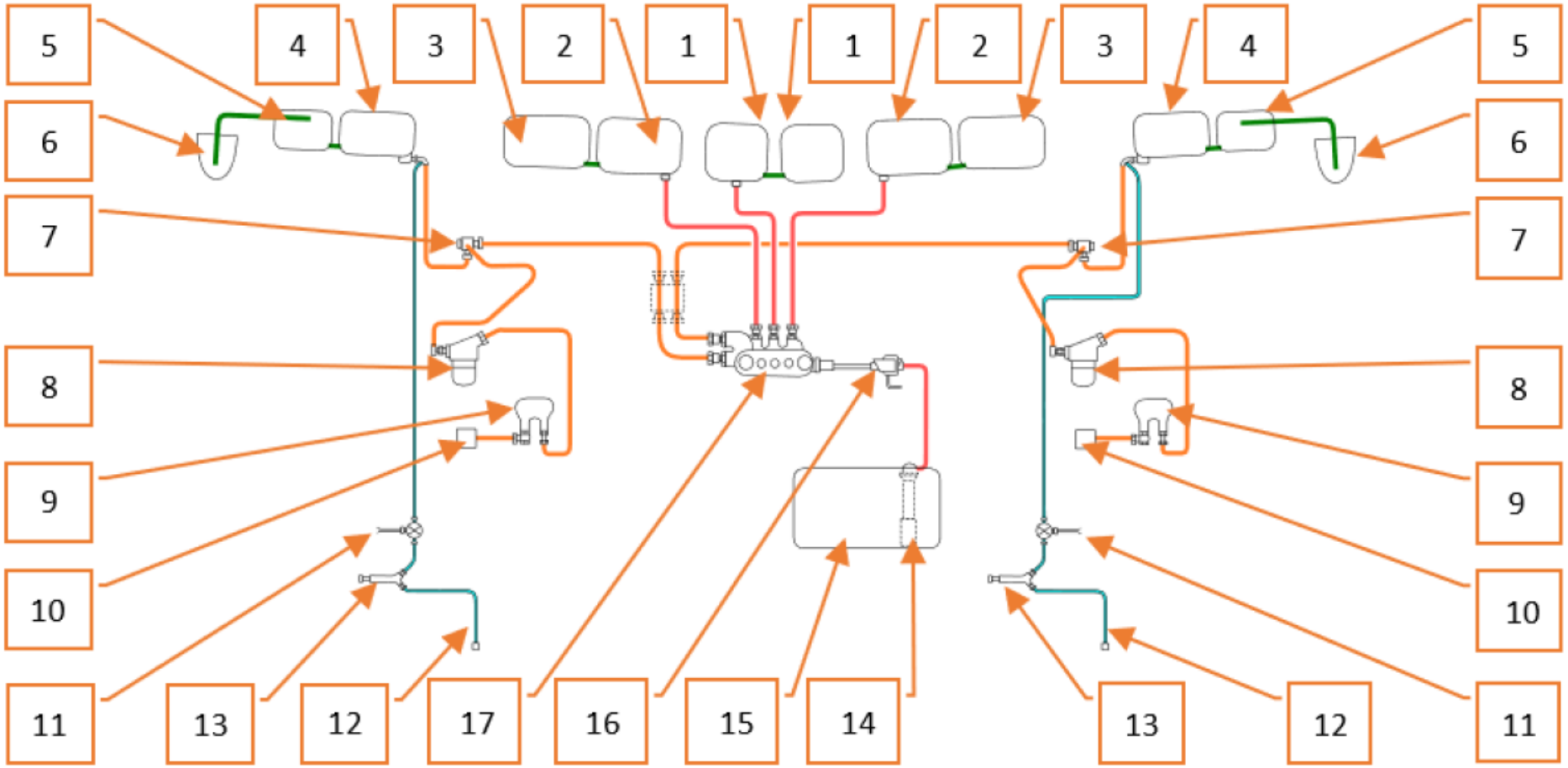


FUEL SYSTEM COMPONENTS

Fuel is contained in five pairs of CIMA protected aluminum alloy tanks, all of which are housed within the wing. The fuel in the external drop tanks is transferred to the outer tanks by air pressure supplied from the port vacuum pump, the control for which is on the left side of the observer adjacent to the main fuel cocks

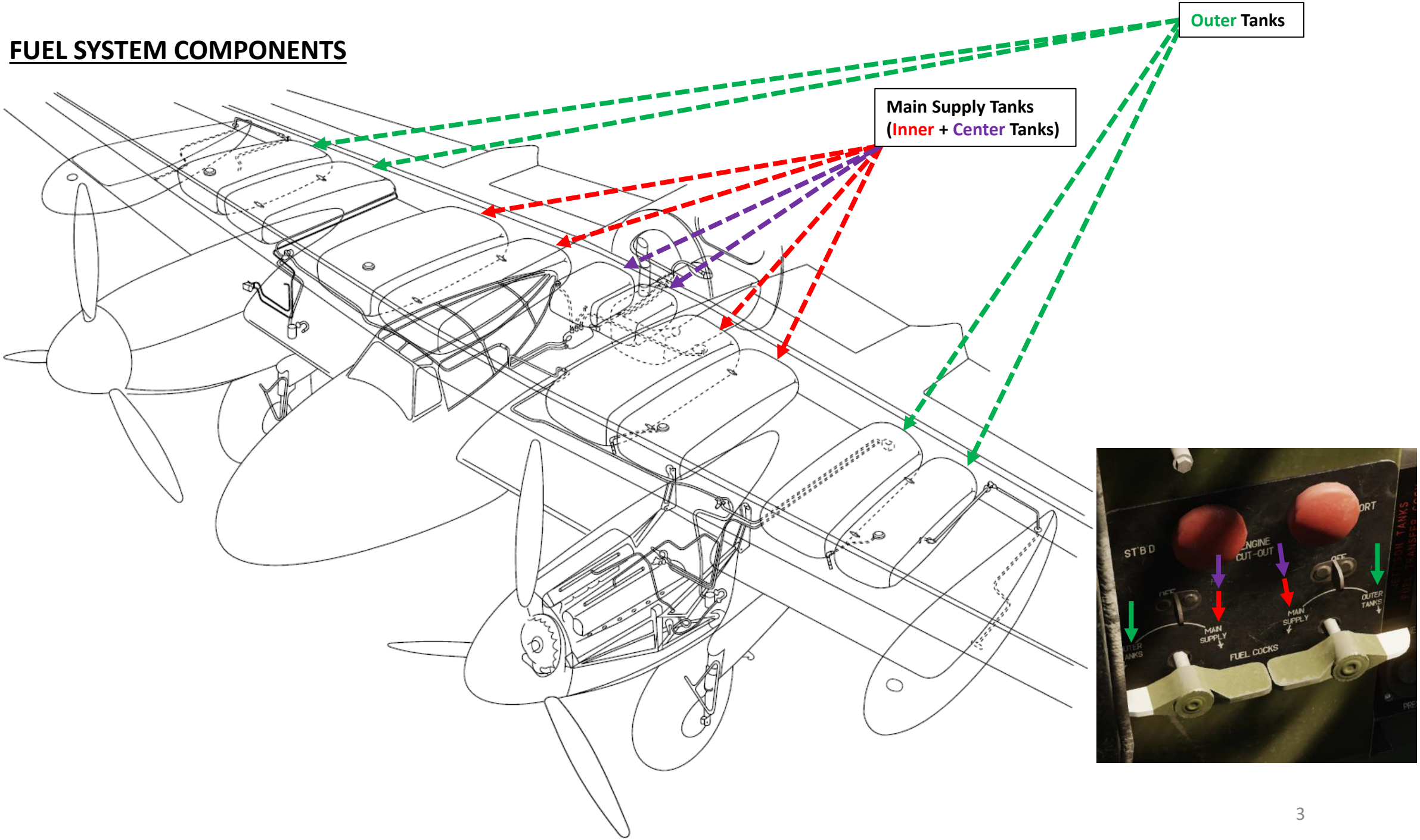
A long-range tank can be carried in the 20 mm cannon bay aft of the machineguns. The contents of this tank are pumped to the fuel gallery by an immersion pump, controlled by a switch in the cockpit. The fuel pump unit, mounted on the left side of the wheel housing, consists of two separate pumps operating in parallel. Each pump can operate independently of the other, and each pump has sufficient capacity to deliver more than the required maximum amount of fuel.

A Ki-gass priming pump is fitted at each engine nacelle and is accessible through a hinged flap on the right-hand side. The Ki-gass pumps draw fuel from the outer wing tanks via a three-way cock next to the pump, alternatively, high volatility fuel can be pumped from a separate container.

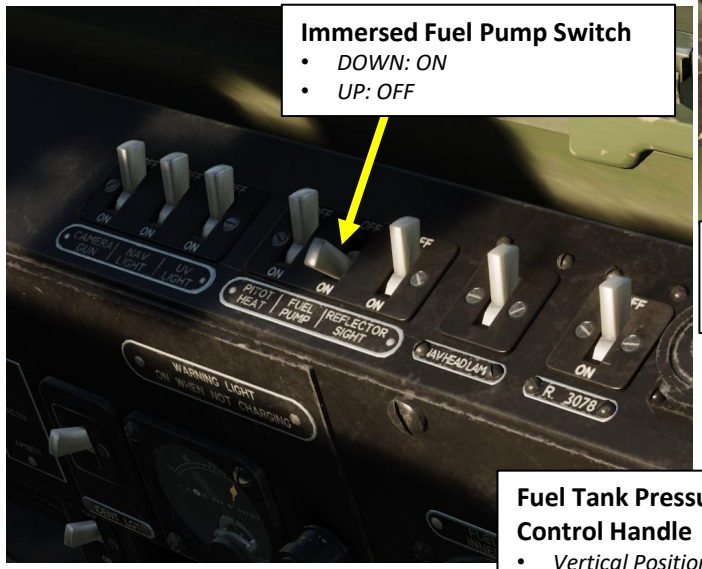


1. 25 Gallons Fuel Tank
2. 78 Gallons Fuel Tank
3. 65 Gallons Fuel Tank
4. 34 Gallons Fuel Tank
5. 24 Gallons Fuel Tank
6. External Drop Tank
7. 4-way Switch
8. Fuel Filter
9. Fuel Pump
10. Carburetor
11. External Fuel Supply
12. Connection to the Supercharger
13. Ki-gass Pump
14. Immersed Fuel Pump
15. 63 Gallons Long-Range Fuel Tank
16. Non-Return Valve
17. Fuel Collector Box

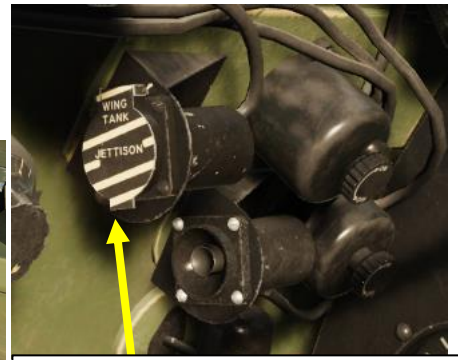
FUEL SYSTEM COMPONENTS



FUEL SYSTEM COMPONENTS



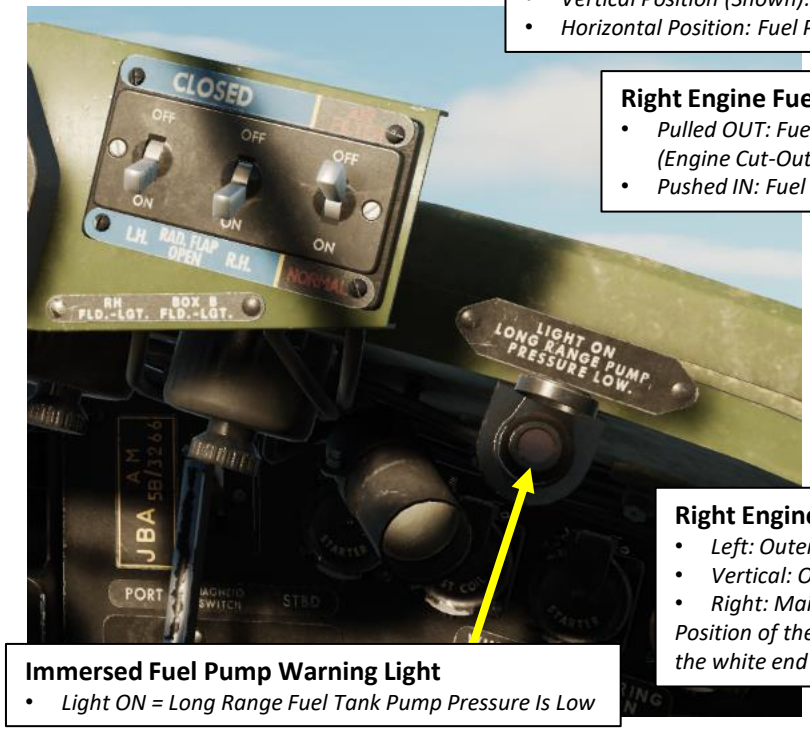
Immersed Fuel Pump Switch
- *DOWN: ON*
- *UP: OFF*



External Wing Fuel Tank Jettison Button
Flip safety cover, then press button to jettison external wing fuel tanks

Low Fuel Pressure Warning Light (Left Engine)

Low Fuel Pressure Warning Light (Right Engine)



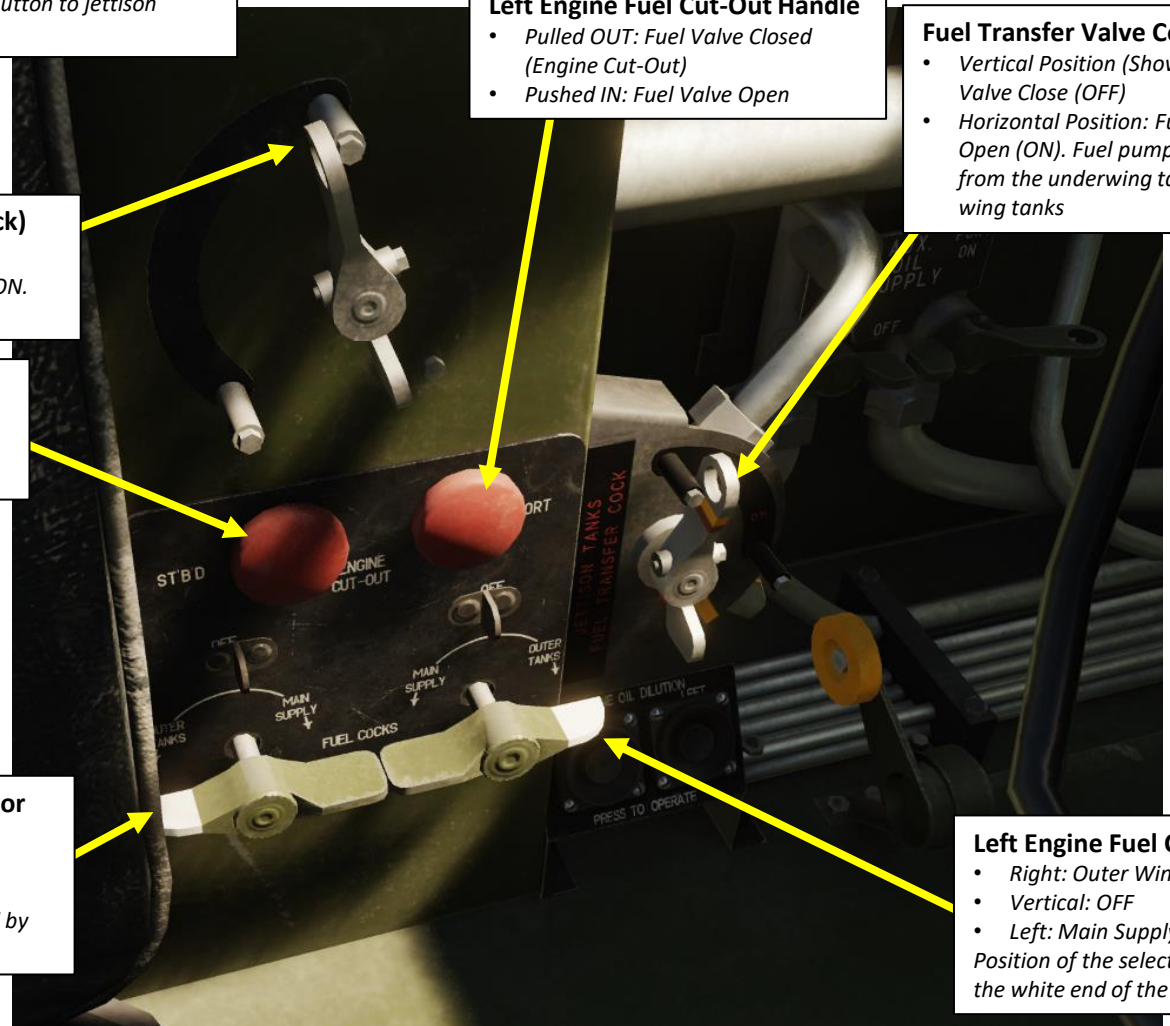
Fuel Tank Pressurization (Fuel Venting Cock) Control Handle
- *Vertical Position (Shown): Fuel Pressurization ON.*
- *Horizontal Position: Fuel Pressurization OFF.*

Right Engine Fuel Cut-Out Handle
- *Pulled OUT: Fuel Valve Closed (Engine Cut-Out)*
- *Pushed IN: Fuel Valve Open*

Immersed Fuel Pump Warning Light
- *Light ON = Long Range Fuel Tank Pump Pressure Is Low*

Right Engine Fuel Cock Selector
- *Left: Outer Wing Tanks*
- *Vertical: OFF*
- *Right: Main Supply*

Position of the selector is indicated by the white end of the handle.



Left Engine Fuel Cut-Out Handle
- *Pulled OUT: Fuel Valve Closed (Engine Cut-Out)*
- *Pushed IN: Fuel Valve Open*

Fuel Transfer Valve Control Handle
- *Vertical Position (Shown): Fuel Transfer Valve Close (OFF)*
- *Horizontal Position: Fuel Transfer Valve Open (ON). Fuel pumps transfer fuel from the underwing tanks to the outer wing tanks*

Left Engine Fuel Cock Selector
- *Right: Outer Wing Tanks*
- *Vertical: OFF*
- *Left: Main Supply*

Position of the selector is indicated by the white end of the handle.

FUEL INDICATORS

Fuel Contents Gauges (Inner Wing Fuel Tanks) (Imperial Gallons)
Portside/Left Tanks – Starboard/Right Tanks
- *Beige Divisions: Fuel Quantity during flight*
- *Red Divisions: Fuel Quantity on ground (tail down)*

Fuel Contents Gauges (Outer Wing Fuel Tanks) (Imperial Gallons)
Portside/Left Tanks – Starboard/Right Tanks
- *Beige Divisions: Fuel Quantity during flight*
- *Red Divisions: Fuel Quantity on ground (tail down)*

Fuel Contents Gauge (Center Fuel Tanks) (Imperial Gallons)
- *Beige Divisions: Fuel Quantity during flight*
- *Red Divisions: Fuel Quantity on ground (tail down)*

Fuel Contents Gauge (Long-Range Tank, if fitted) (Imperial Gallons)
- *Beige Divisions: Fuel Quantity during flight*
- *Red Divisions: Fuel Quantity on ground (tail down)*

FUEL TANKS

The center tanks and the inner wing tanks supply both engines through a fuel collector box when the fuel cock selectors are set to MAIN SUPPLY.

Fuel Capacity (Internal Tanks)

- *Total Inner Wing Fuel Tanks Capacity: 286 Imperial Gal*
- *Total Outer Wing Fuel Tanks Capacity: 116 Imperial Gal*
- *Total Center Fuel Tank Capacity: 50 Imperial Gal*

Total Capacity (Internal): 452 Imperial Gal

Fuel Contents Gauges (Outer Wing Fuel Tanks) (Imperial Gallons)

Fuel Contents Gauge (Center Fuel Tanks) (Imperial Gallons)

Fuel Contents Gauges (Inner Wing Fuel Tanks) (Imperial Gallons)

Fuel Contents Gauge (Long-Range Tank if fitted) (Imperial Gallons)

Outer Wing Fuel Tank *(24 gal)*

Outer Wing Fuel Tank *(34 gal)*

Inner Wing Fuel Tank *(65 gal)*

Inner Wing Fuel Tank *(78 gal)*

Center Fuel Tank *(25 gal)*

Center Fuel Tank *(25 gal)*

Inner Wing Fuel Tank *(78 gal)*

Inner Wing Fuel Tank *(65 gal)*

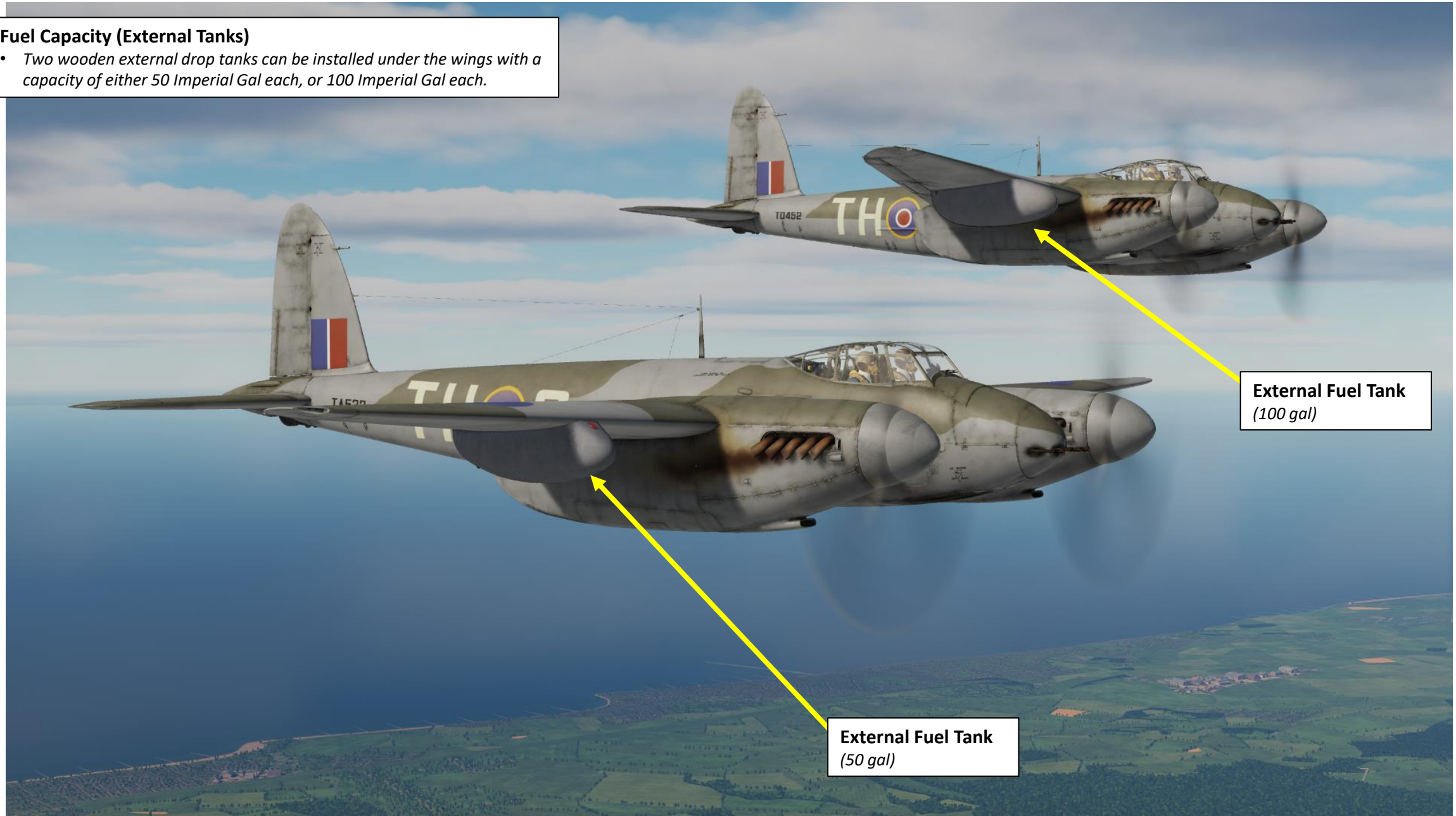
Outer Wing Fuel Tank *(34 gal)*

Outer Wing Fuel Tank *(24 gal)*

FUEL TANKS

Fuel Capacity (External Tanks)

- *Two wooden external drop tanks can be installed under the wings with a capacity of either 50 Imperial Gal each, or 100 Imperial Gal each.*



FUEL TANKS

Fuel Capacity (Long-Range Fuselage Tank)

- *A long-range tank with a capacity of 63 Imperial Gal can be installed in the 20 mm cannon bay aft of the machineguns .*
- ***Note: The long-range tank is not simulated in DCS yet.***

Extra long-range fuel tanks in the bomb bay of De Havilland Mosquito TJ138, at the Royal Air Force Museum of London

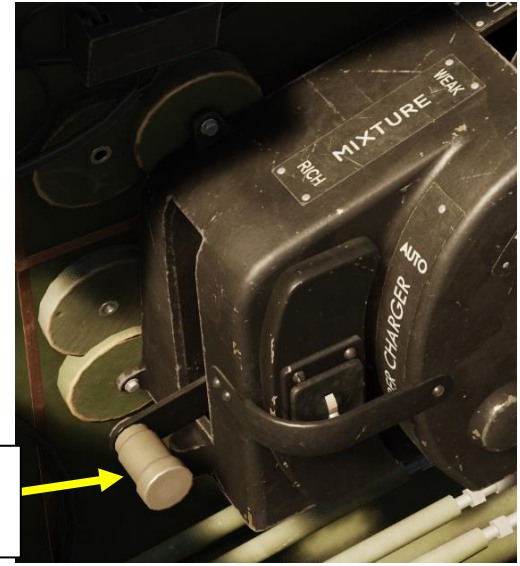
- *Photograph by Les Chatfield*

Source: https://www.flickr.com/photos/elsie/4607704928

FUEL MANAGEMENT BASICS

The Mosquito FB Mk VI variant available in DCS uses 100-octane fuel, which is supplied internally by four outer wing tanks, four inner wing tanks, and two center tanks. Fuel management is mainly done by the Navigator since he is close to the fuel gauges and has an easier access to the fuel cock selectors than the pilot. Here are some general rules to follow:

1. Engine Fuel Cut-Out Handles should be IN at all times when engines are running. Pulling them closes the fuel valves and shuts down the engines.
2. Fuel Crossfeed between left and right engines is not possible; the fuel tanks on the right side can only supply the right engine, and vice-versa.
3. The Fuel Mixture Control Lever is only accessible from the pilot seat and can be used to lean out the mixture, reducing fuel consumption during cruise flight. When taking off, landing, climbing or dogfighting, it is better to leave the mixture to rich to maximize available power.
4. The Fuel Cock Selectors control which fuel tanks the engines feed from:
    a) Select Outer Tanks during Engine Start.
    b) Select Main Tanks (Inner + Center) during Engine Warm-Up.
    c) Select the Fullest Tanks (Main or Outer) during taxi, takeoff and landing.
    d) Select Outer Tanks when flying at medium altitudes (between 1000 and 15000 ft). The reason for this is that the Outer Tanks are the ones you want to empty first since their capacity is small, the outer tank fuel gauges becomes increasingly inaccurate as the fuel level decreases, and you do not want your engines to cut-out when flying 50 ft over the ground due to an erroneous fuel reading. The Outer Tanks are also not recommended to be used at high altitude (above 15000 ft) since these tanks are not pressurized without external drop tanks, which may cause engine cut-out due to fuel vaporization.
    e) Select Main Tanks (Inner + Center) when flying at either low (below 1000 ft) or high altitudes (above 15000 ft).
    f) Use of External Drop Tanks or the Long-Range Fuselage Tank is explained later in this section.
    g) Fuel tanks should be consumed in this order of priority:
        I. External Drop Tanks (provided the outer tanks have been partially emptied first)
        II. Outer Tanks
        III. Long-Range Fuselage Tank (If Installed)
        IV. Main Supply (Inner + Center Tanks)



Fuel Mixture Control Lever
- *DOWN: Rich Mixture.*
- *UP: Weak Mixture*

Left Engine Fuel Cut-Out Handle
- *Pulled OUT: Fuel Valve Closed (Engine Cut-Out)*
- *Pushed IN: Fuel Valve Open*

Right Engine Fuel Cut-Out Handle
- *Pulled OUT: Fuel Valve Closed (Engine Cut-Out)*
- *Pushed IN: Fuel Valve Open*

Left Engine Fuel Cock Selector
- *Right: Outer Wing Tanks*
- *Vertical: OFF*
- *Left: Main Supply*

Position of the selector is indicated by the white end of the handle.

Right Engine Fuel Cock Selector
- *Left: Outer Wing Tanks*
- *Vertical: OFF*
- *Right: Main Supply*

Position of the selector is indicated by the white end of the handle.

FUEL MANAGEMENT
FUEL TANK PRESSURIZATION

In order to prevent fuel boiling at high altitudes in warm weather conditions, the fuel system is equipped with a fuel tank pressurizer system. An aneroid valve feeds air, pressurized by a vacuum pump, into the fuel tanks. Pressurizing, however, impairs the self-sealing of the tanks, which can be problematic in case of a fuel leak.

To pressurize the permanent tanks of the **MAIN SUPPLY** (Inner and Center Fuel Tanks), set the **Fuel Tank Pressurization (Fuel Venting Cock) Control Handle to the Vertical Position (ON)**. Pressurizing is automatically regulated; the aneroid valve controls pressure from the starboard vacuum pump and progressively increases admitted air flow as increases. The valve stays shut at low altitudes.

The **Outer Tanks**, on the other hand, are only pressurized when the two following conditions are met:

- The Fuel Tank Pressurization (Fuel Venting Cock) Control Handle is
- Transfer of fuel is taking place from the wing drop tanks (Fuel Selector to Outer Tanks + Fuel Transfer Valve Control Handle OPEN).

Otherwise, when external drop tanks are not used, the Outer Tanks are NOT pressurized… even with the Fuel Venting Cock ON. In that case, vaporization within the outer tanks may cause engine cut-out at high altitudes, particularly in tropical climates.

In summary, I would recommend that you set the Fuel Tank Pressurization (Fuel Venting Cock) Control Handle ON (Vertical) unless you have an emergency (like a fuel leak) that requires you to turn it off.

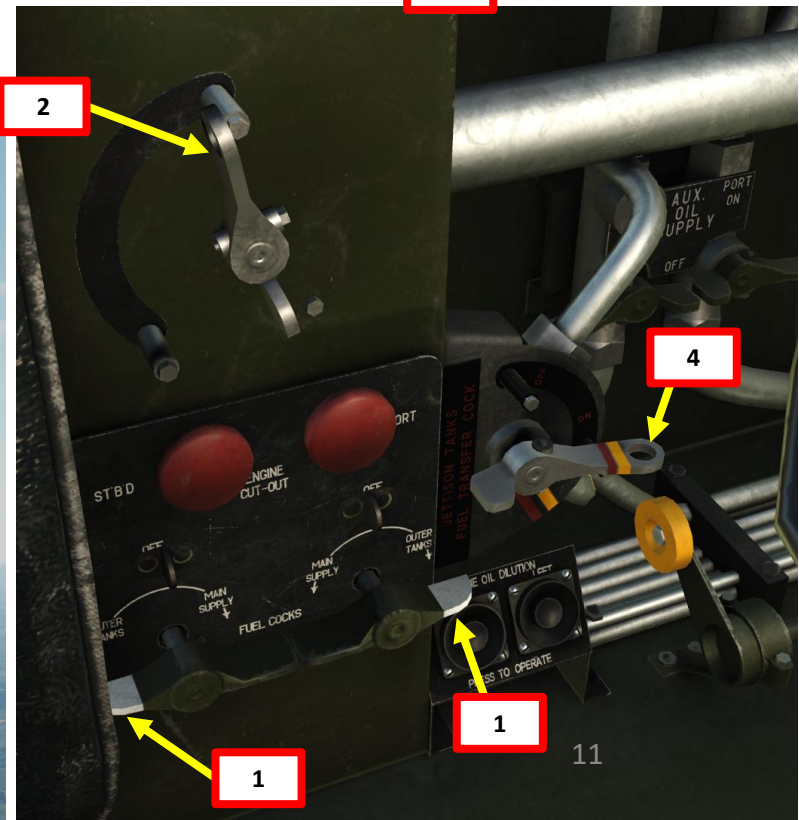
Fuel Tank Pressurization (Fuel Venting Cock) Control Handle

- *Vertical Position (Shown): Fuel Pressurization ON.*
- *Horizontal Position: Fuel Pressurization OFF.*

FUEL MANAGEMENT
EXTERNAL FUEL TANKS OPERATION

Interesting article on the restauration of a Mosquito's Wooden Drop Tank
https://www.vam.ac.uk/blog/caring-for-our-collections/challenges-of-treating-a-mosquito-drop-tank

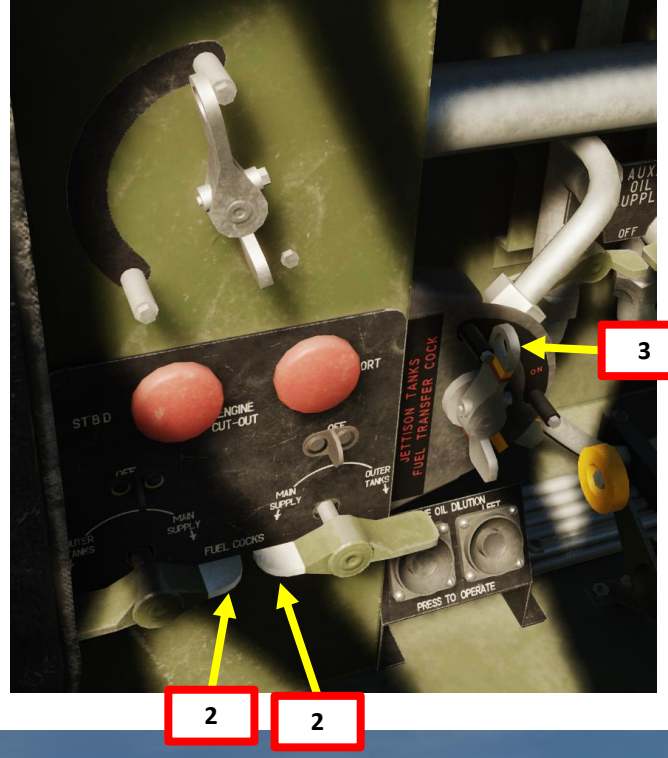
1. Set Fuel Cock Selectors – OUTER TANKS.
2. Set Fuel Tank Pressurization (Fuel Venting Cock) Control Handle to the Vertical Position (ON).
    - *Note: Since the external drop tanks are not transferring fuel yet to the outer tanks, keep in mind that the outer tanks are not pressurized yet.*
3. Consume fuel from the outer tanks until fuel quantity in the outer tanks reaches 5 gal or less (nearly empty).
    - *Note: Failing to empty the outer tanks first will result in the fuel of the external tanks being vented to the atmosphere once the transfer valve opens up.*
4. Set the Fuel Transfer Valve Control Handle to the Horizontal Position (ON/OPEN). This will pressurize the outer tanks and transfer fuel from the external drop tanks to the outer tanks. The air pressure is supplied by the port vacuum pump, which is controlled by the transfer cock.
5. There is no fuel quantity indication for the external drop tanks.
6. The external drop tanks are empty once the Outer Tank Fuel Quantity starts decreasing again. In that case, it is time to switch to the Inner Tanks and jettison the drop tanks.

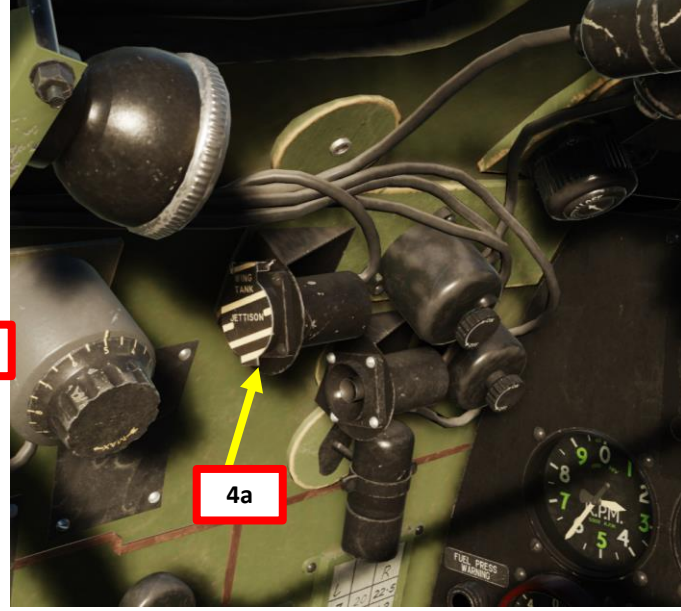


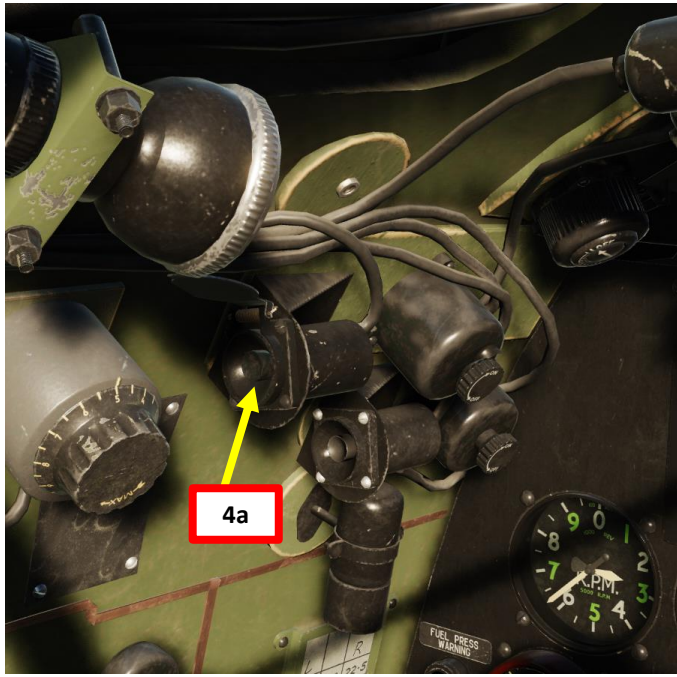
FUEL MANAGEMENT
EXTERNAL FUEL TANK JETTISON

1. There is no fuel quantity indication for the external drop tanks. The external drop tanks are empty once the Outer Tank Fuel Quantity starts decreasing again.
2. Set Fuel Cock Selectors – MAIN SUPPLY
3. Set the Fuel Transfer Valve Control Handle to the Vertical Position (OFF/CLOSED).
4. Flip the safety cover of the External Wing Fuel Tank Jettison Button, then press the button to jettison drop tanks.

Note: Drop tanks should only be jettisoned in level flight without yaw, at speeds between 200 and 300 mph.







FUEL MANAGEMENT
LONG-RANGE FUEL TANK OPERATION

1. Confirm that the Long-Range Fuel Tank is installed on the aircraft by checking the Long-Range Tank Fuel Contents Gauge. The long-range tank has a capacity of 63 Imperial Gal and can be installed in the 20 mm cannon bay aft of the machineguns.
2. Set Fuel Cock Selectors – MAIN SUPPLY
3. Set Immersed Fuel Pump Switch – ON (DOWN)
4. When the Immersed Fuel Pump Warning Light illuminates, the Long-Range Tank is almost empty. Set the Immersed Fuel Pump Switch OFF (UP).
5. The engines will then take fuel from the inner and center fuel tanks (MAIN SUPPLY).

Note: the Long-Range Tank is not available in DCS yet.