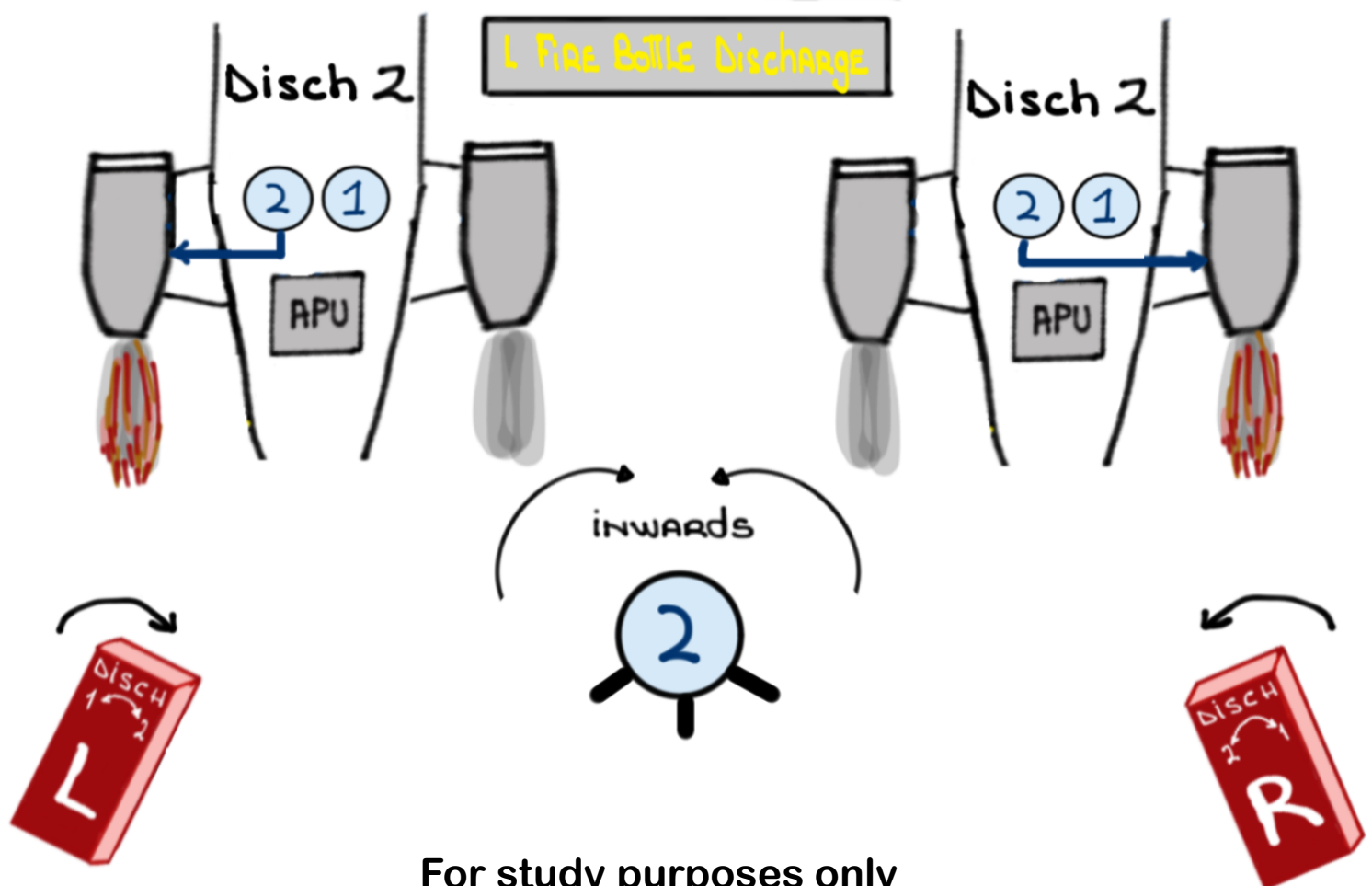


# G650 FIRE PROTECTION SYSTEM



For study purposes only

# THE FIRE PROTECTION SYSTEM IS ABOUT:

## ① DETECTION:

- FIRE DETECTION SYSTEM:

- ENGINE NACELLE - TEMPERATURE SENSITIVE WIRES
- APU COMPARTMENT - HELIUM-FILLED TUBES

- SMOKE DETECTION SYSTEM:

SMOKE DETECTORS (OPTICAL SENSORS)

- BAGGAGE COMPARTMENT
- FORWARD AND AFT LAVATORIES

- OVERHEAT DETECTION SYSTEM:

- TEN (10) AREAS MONITORED BY THERMAL SWITCHES

- AREAS MONITORED AND TRIP POINTS:

\* BLEED AIR RELATED AREAS (5) (250°F)

\* ELECTRONIC EQUIPMENT AREAS (5) (150°F)

## ② NOTIFICATION:

### CREW NOTIFICATION

- FIRE:

L ENGINE FIRE

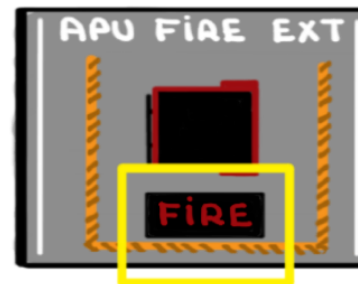
R ENGINE FIRE

AFT LAVATORY FLAME

FORWARD LAVATORY FLAME

GALLEY FLAME

W W  
APU FIRE



- SMOKE:

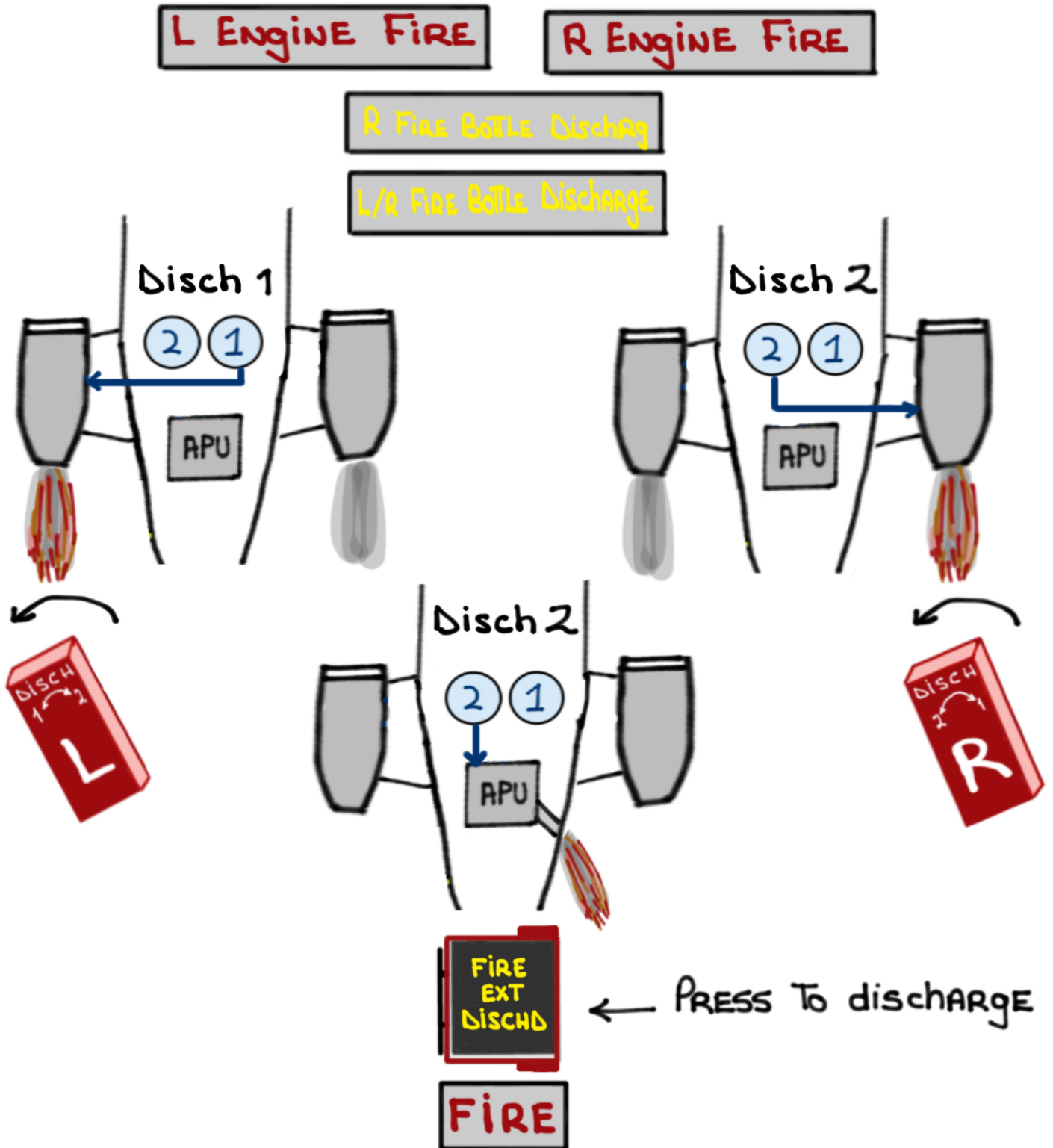
W GALLEY SMOKE AFT LAVATORY SMOKE W  
AFT BAGGAGE SMOKE FORWARD LAVATORY SMOKE

- OVERHEAT CONDITION:

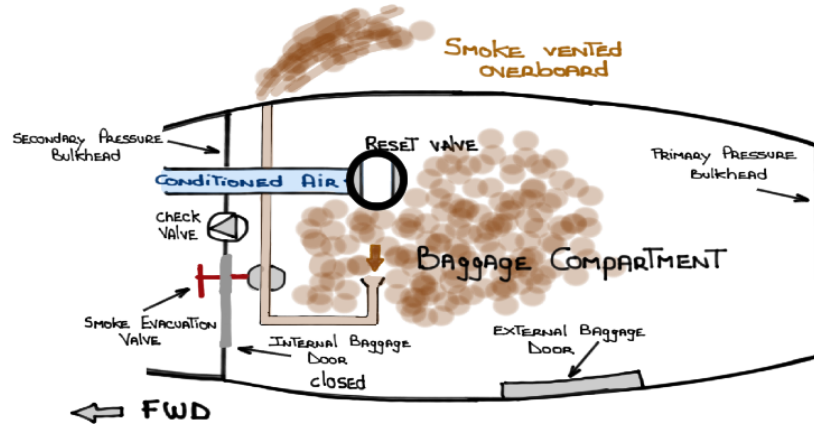
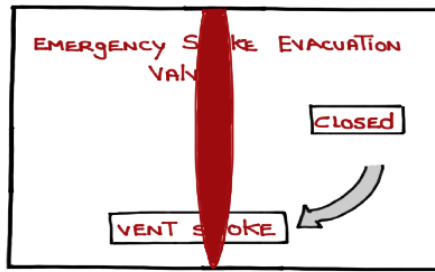
W RED OVERHEAT CAS - 250°F BLEED AIR RELATED W  
C AMBER OVERHEAT CAS - 150°F ELECTRICAL RELATED C

### ③ FIRE fighting:

- ENGINE AND APU fire BOTTLES:



# ④ SMOKE EVACUATION:

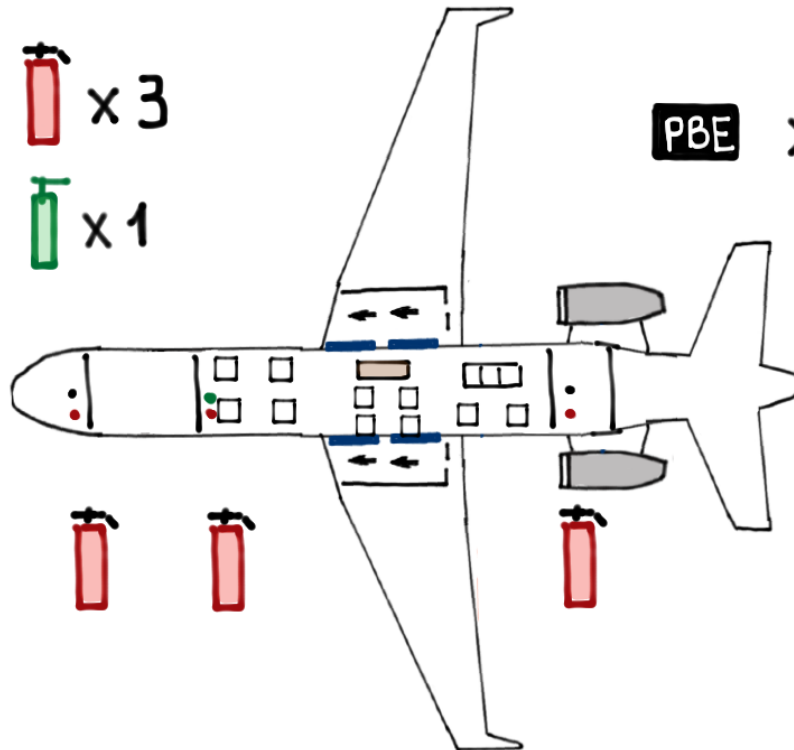


# ⑤ PORTABLE FIRE BOTTLES AND PBEs:

HALON  x 3

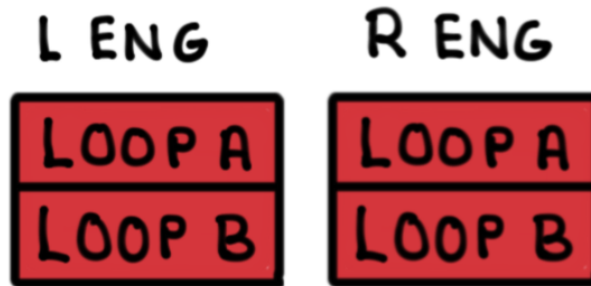
WATER  x 1

**PBE** x 2



# ENGINE FIRE DETECTION SYSTEM

- DUAL loop fire detection system
- Each engine has two (2) fire loops - A and B

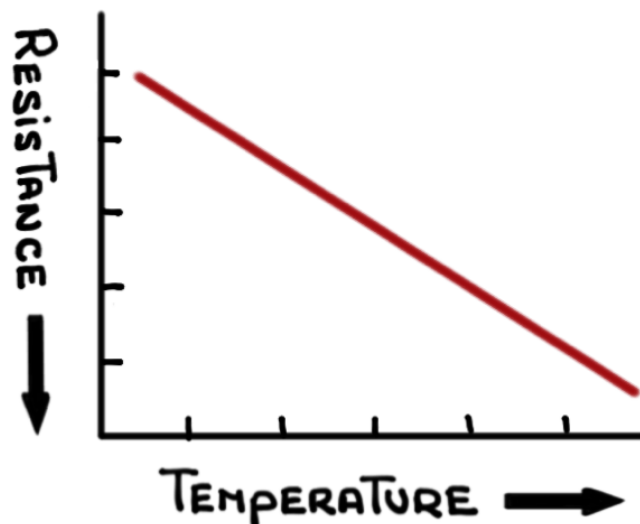


- A loop is a TEMPERATURE - SENSITIVE WIRE
- IT CAN BE ROUTED - looped - THROUGHOUT THE ENGINE NACELLE
- Each loop SENDS RAW DATA TO THE FIRE DETECTION CONTROL UNIT (FDCU)
- The FIRE DETECTION CONTROL UNIT (FDCU) DETERMINES WHETHER A loop is faulty, failed OR SENSING AN ACTUAL FIRE
- A faulty/failed loop CAN BE DESELECTED. THE SYSTEM CAN THEN OPERATE AS A SINGLE loop system
- REQUIRES L  
ESS  
DC R  
ESS  
DC TO OPERATE

- COMPRISED OF A SERIES OF DETECTOR SEGMENTS/ELEMENTS
- TEMPERATURE SENSITIVE WIRES ARE ROUTED THROUGHOUT THE ENGINE NACELLE



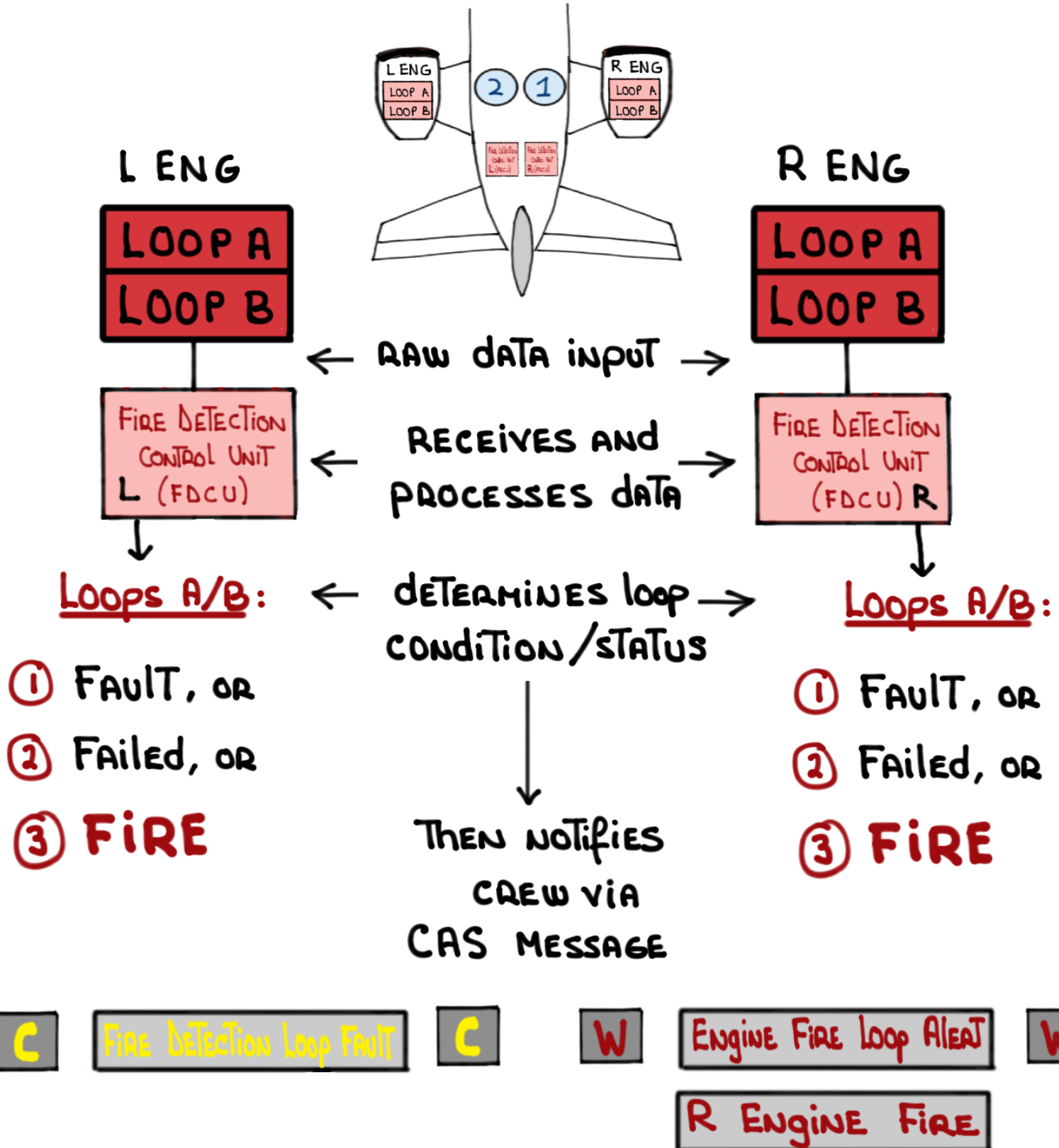
- THE STAINLESS STEEL SHEATH COVERS THE TEMPERATURE SENSITIVE SEMI CONDUCTING GLASS AND COAXIAL CENTER WIRE
- AS TEMPERATURE INCREASES THE RESISTANCE AROUND THE CENTER WIRE DECREASES



- The Two (2)



FIRE DETECTION CONTROL UNIT (FDCU)

ARE THE BRAINS OF THE SYSTEM








# ENGINE FIRE EXTINGUISHING SYSTEM

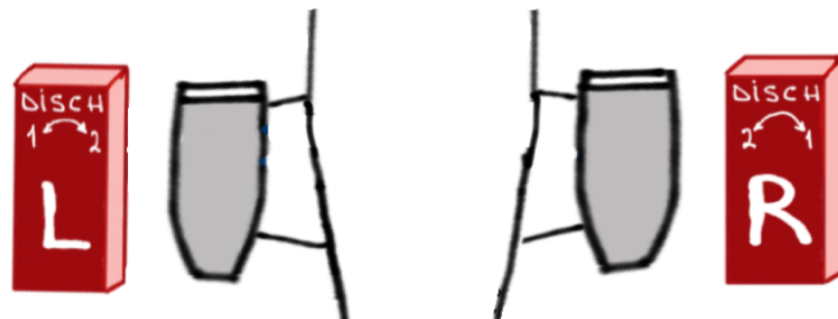
- Available any time the   BUSES ARE POWERED
- The system has two (2) identical single-shot fire extinguishing bottles

L BOTTLE = Disch (2)

R BOTTLE = Disch (1)

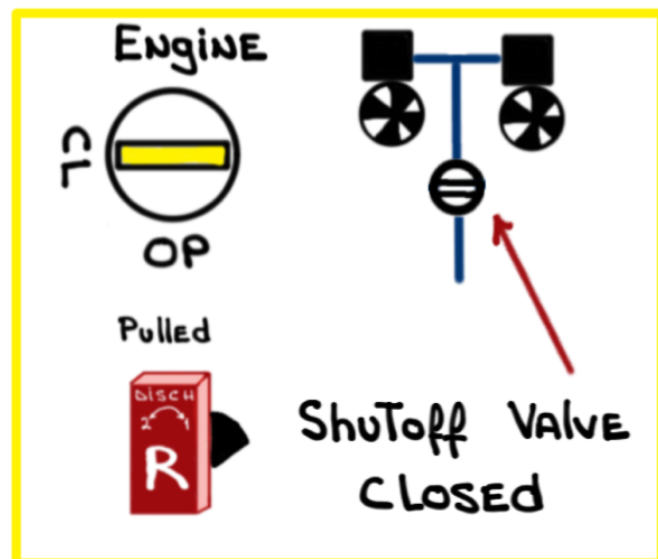
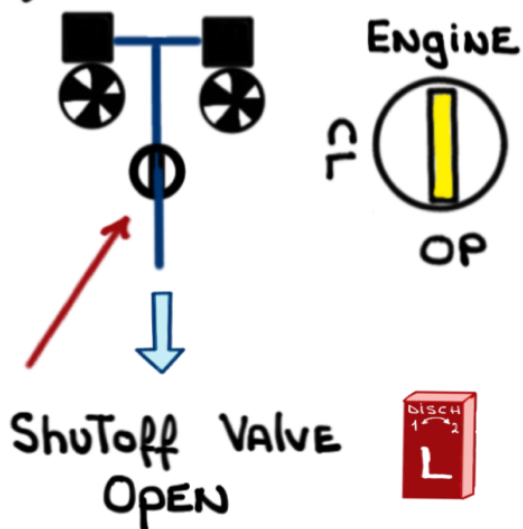
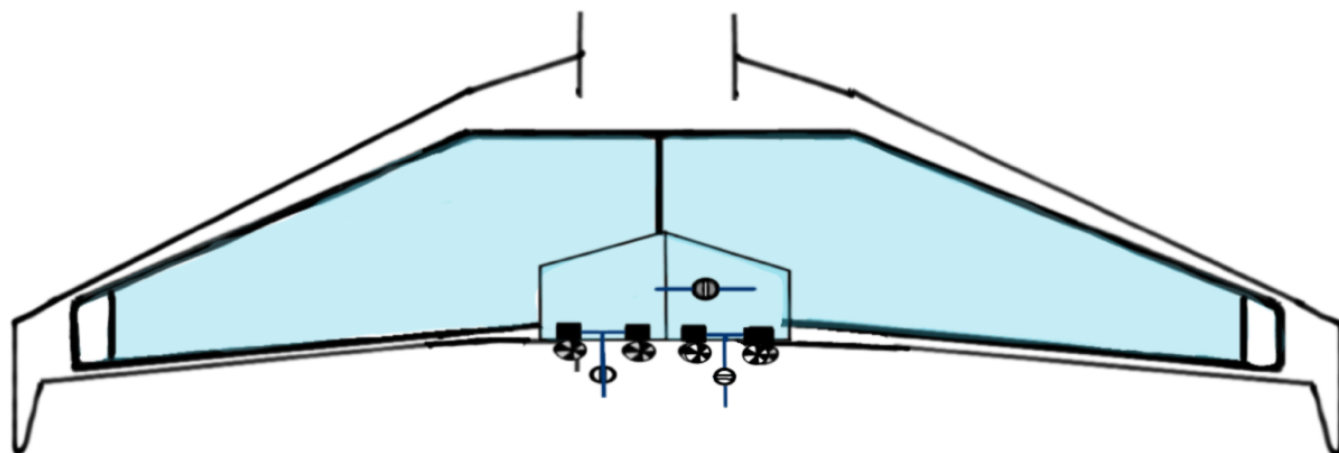
- The bottles are located in the tail compartment
- Each bottle contains  extinguishing agent under high pressure (non-toxic and non-corrosive)
- In the event of overpressure the extinguishing agent is vented into the tail compartment
- The bottles can be discharged into the engine nacelle by the crew via the **FIRE HANDLES**
- Upon a discharge a  CAS MESSAGE is displayed  


- Each ENGINE has its own **FIRE HANDLE**

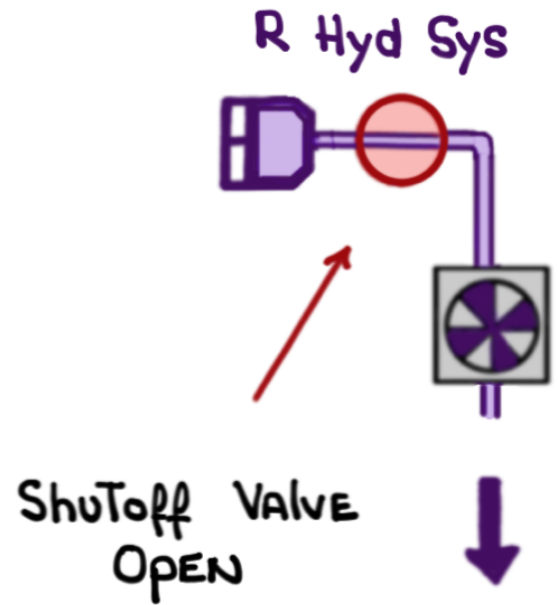
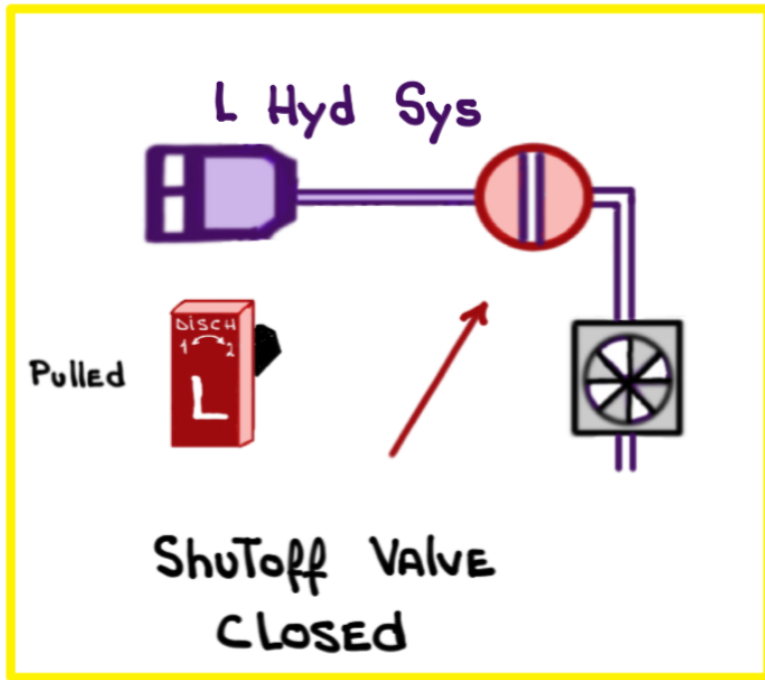


- Pulling a **FIRE HANDLE**

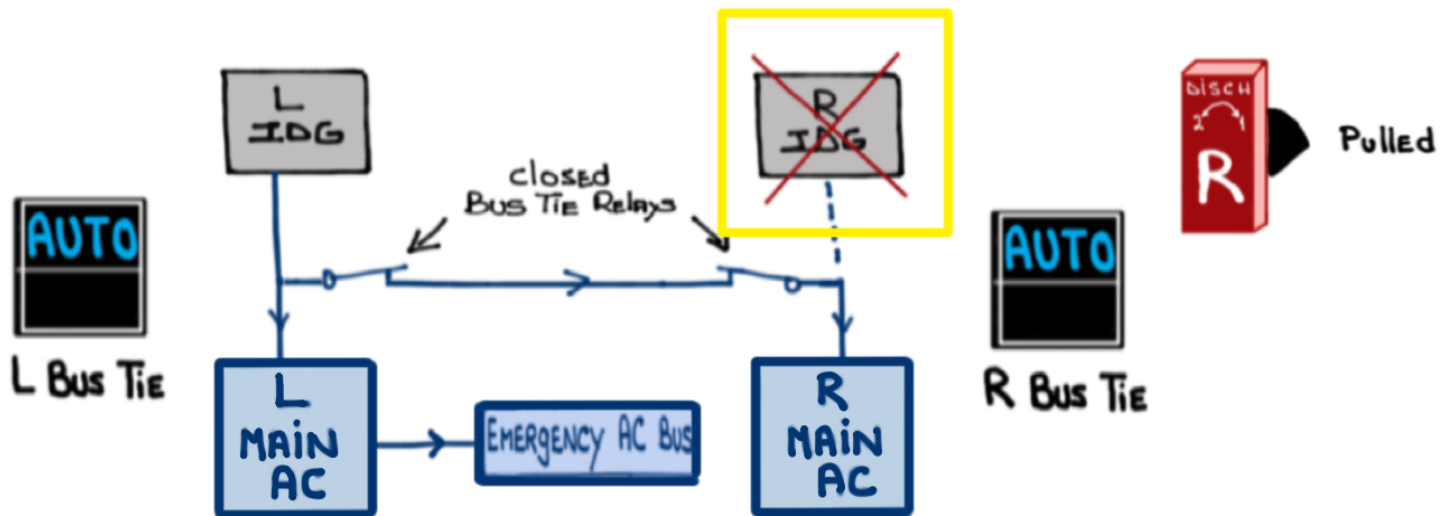
① Shuts off FUEL AT THE TANK



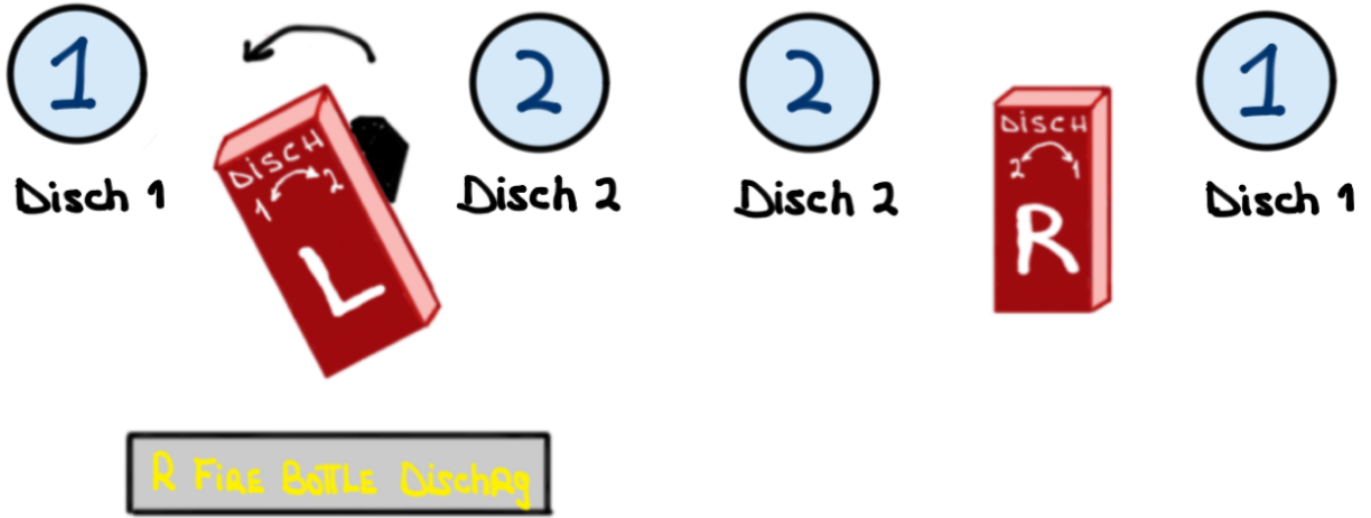
## ② Shuts off Hydraulic fluid DOWNSTREAM FROM RESERVOIR



## ③ Trips The IDG

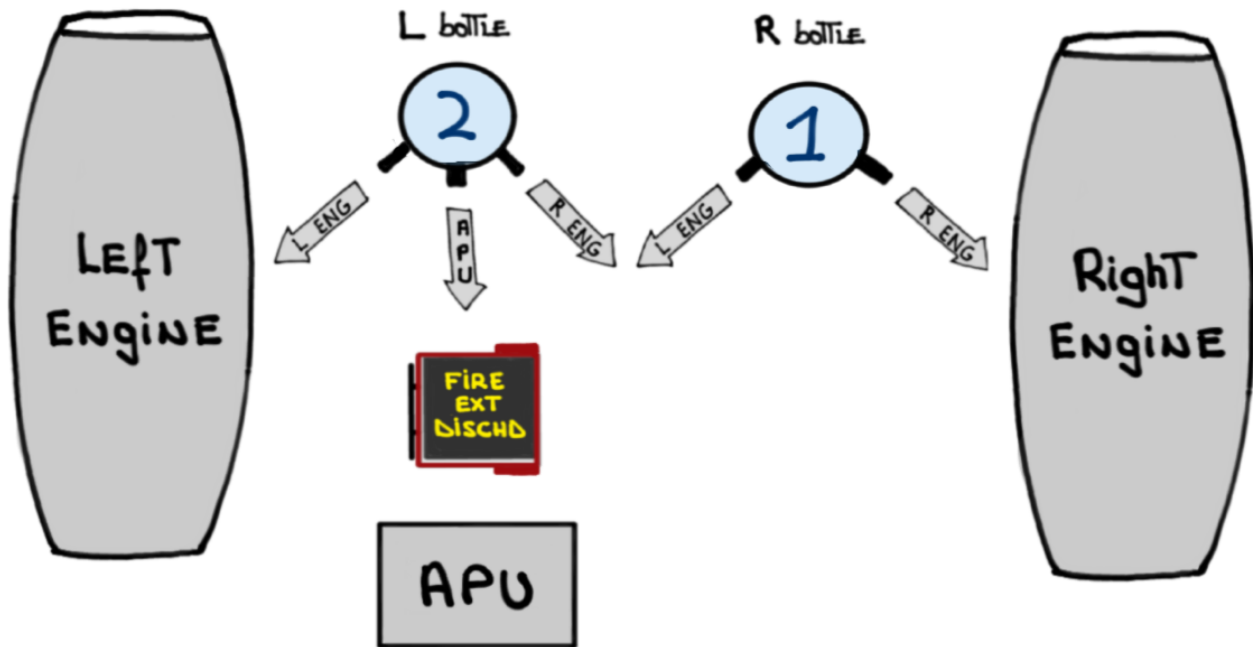


- **FIRE HANDLES**, when ROTATED, CAN DISCHARGE ONE OR BOTH BOTTLES/SHOTS



- L bottle — EITHER ENGINE  
                  APU

R bottle — EITHER ENGINE

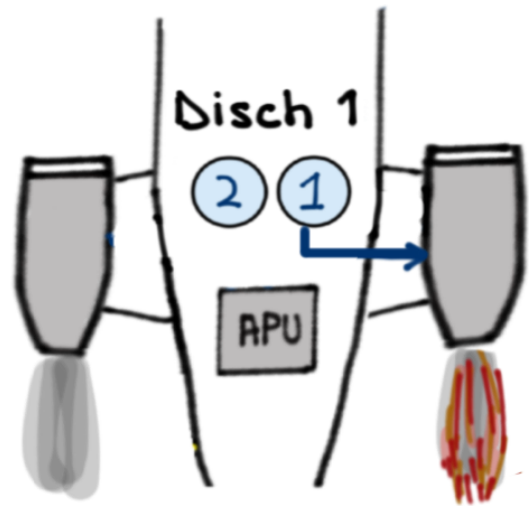
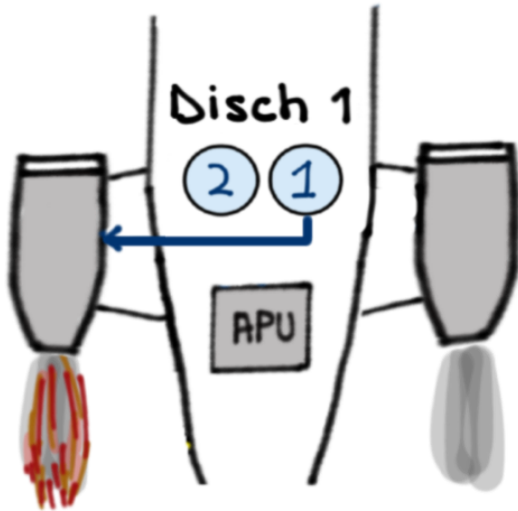


- ROTATING THE **FIRE HANDLE** OUTWARDS discharges  
shot ①

L ENGINE FIRE

R ENGINE FIRE

R FIRE BOTTLE Disch



OUTWARDS

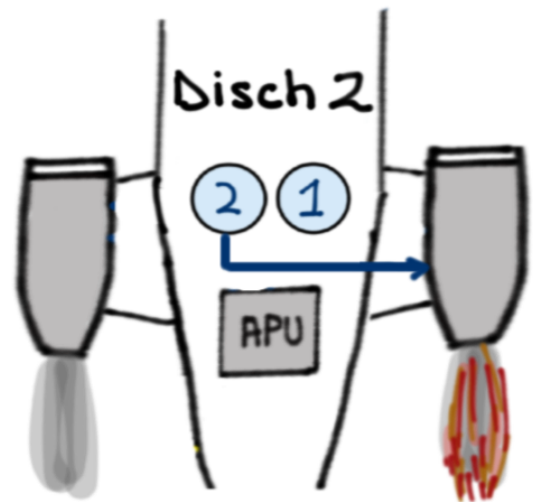
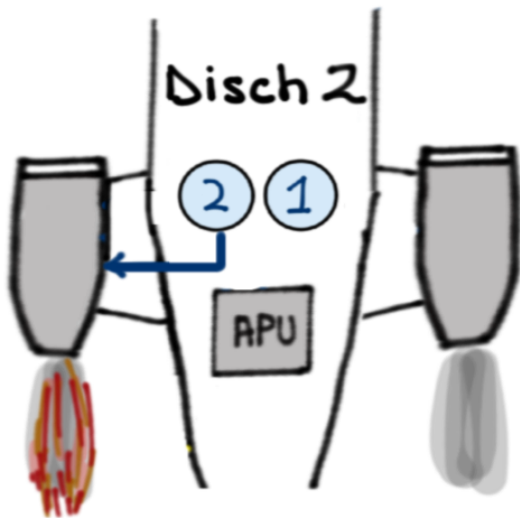


- ROTATING THE **FIRE HANDLE** INWARDS discharges  
shot (2)

L ENGINE FIRE

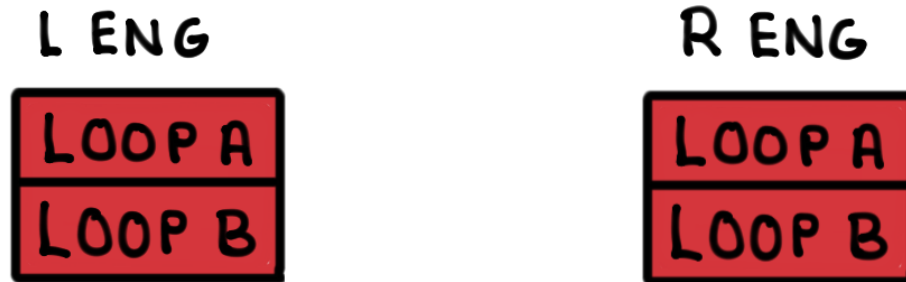
R ENGINE FIRE

L FIRE BOTTLE DISCHARGE



# ENGINE FIRE TEST

① TESTS THE FIRE DETECTION SYSTEM FOR EACH ENGINE



② If a loop does NOT illuminate it is because there is:

- AN OPEN LOOP, OR
- NO CONTINUITY, OR
- A DEFECTIVE FIRE DETECTION CIRCUIT

③ "GOOD TEST, GOOD ENGINE" **NO FIRE**

"BAD TEST, BAD ENGINE" **FIRE**

④ When PRESSED IN The following lights illuminate:

Two (2) OVERHEAD lights

R ENG



Two (2) CAS MESSAGES



Two (2) MASTER WARNING lights



FIRE HANDLE



FUEL CONTROL switch



(SIMILARLY FOR LEFT ENGINE)



# ENGINE FIRE FAULT TEST

① IT TESTS THE FIRE DETECTION FAULT SYSTEM, NOT THE LOOPS

② WHEN THE <sup>FAULT TEST</sup> **TEST** SWITCHLIGHT IS PRESSED IN AND HELD THE FOLLOWING LIGHTS ILLUMINATE:

FIVE (5) OVERHEAD LIGHTS

Loop A	Loop B	FAULT TEST	Loop A	Loop B
FAULT	FAULT	TEST	FAULT	FAULT

ONE (1) CAS MESSAGE

FIRE DETECTION LOOP FAULT

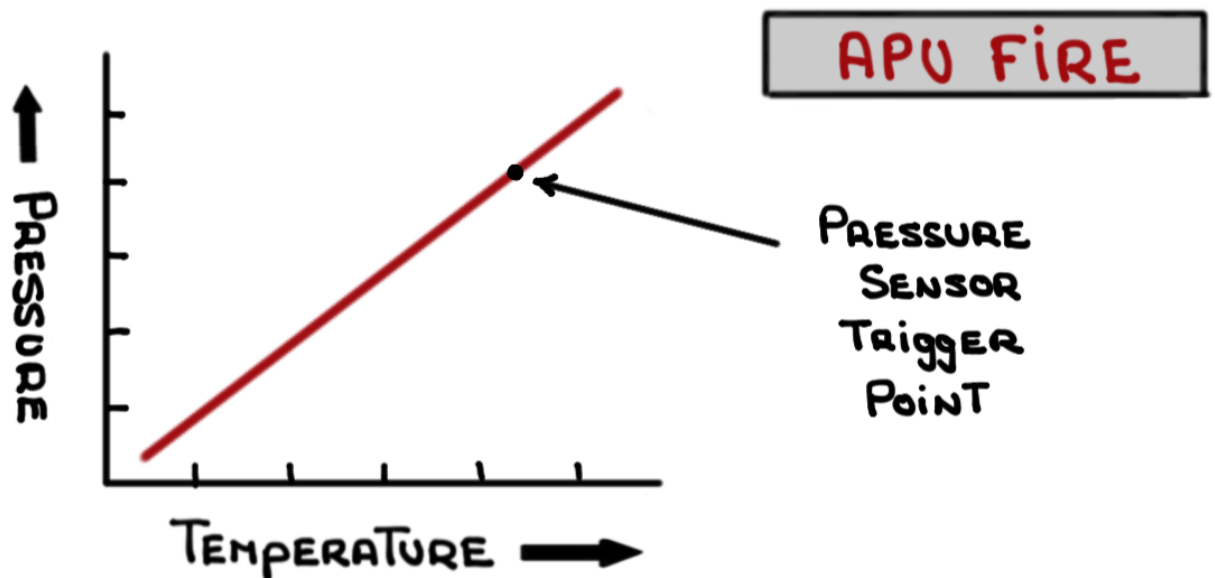
TWO (2) MASTER CAUTION LIGHTS

C	C
---	---

③ A FAULTY LOOP <sup>R ENG</sup> **LOOP B** CAN BE Deselected <sup>Loop A</sup> **OFF**

# APU FIRE DETECTION SYSTEM

- The APU is ENCLOSED in a TITANIUM CASE CAPABLE of SUSTAINING A FIRE FOR FIFTEEN (15) MINUTES. BEYOND THIS PERIOD DAMAGE TO OTHER SYSTEMS WILL OCCUR
- The APU OVERHEAT/FIRE DETECTION SYSTEM CONSISTS OF A HERMETICALLY SEALED HELIUM-FILLED TUBE SECURED TO THE TOP OF THE APU ENCLOSURE
- AS THE TEMPERATURE INSIDE THE ENCLOSURE INCREASES THE GAS IN THE TUBE EXPANDS AND THE PRESSURE INCREASES



# APU FIRE EXTINGUISHING SYSTEM

- The APU FIRE EXTINGUISHING SYSTEM is POWERED by THE bus (down TO MAIN BATTERIES)

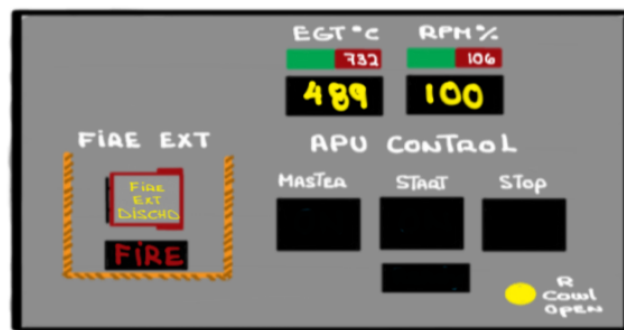
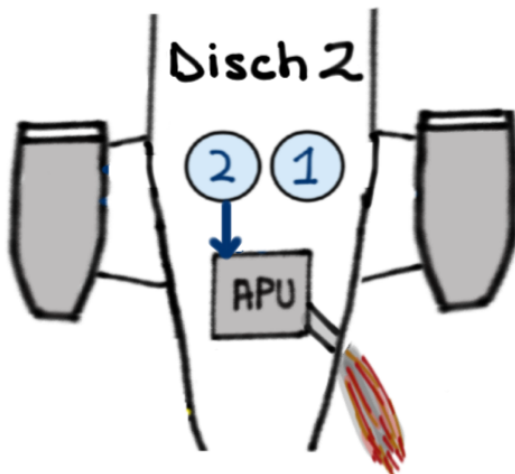


- In THE EVENT of a **FIRE** THE ELECTRONIC CONTROL UNIT (ECU) AUTOMATICALLY SHUTS DOWN THE APU

- FIRE EXTINGUISHING discharge switch (GUARDED) is located ON THE APU CONTROL PANEL



APU FIRE



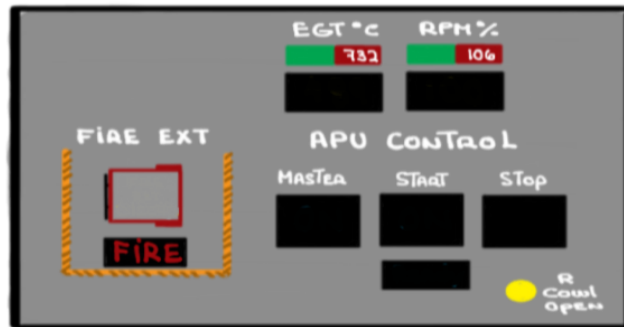
- Discharges LEFT fire bottle HALON INTO APU COMPARTMENT. Only ONE shot is AVAILABLE

- Discharge GENERATES **L Fire Bottle Discharge** CAS MESSAGE

# APU FIRE TEST

- PROPER TEST - Eight (8) indications

APU



APU FIRE



APU FIRE DETECTOR FAIL



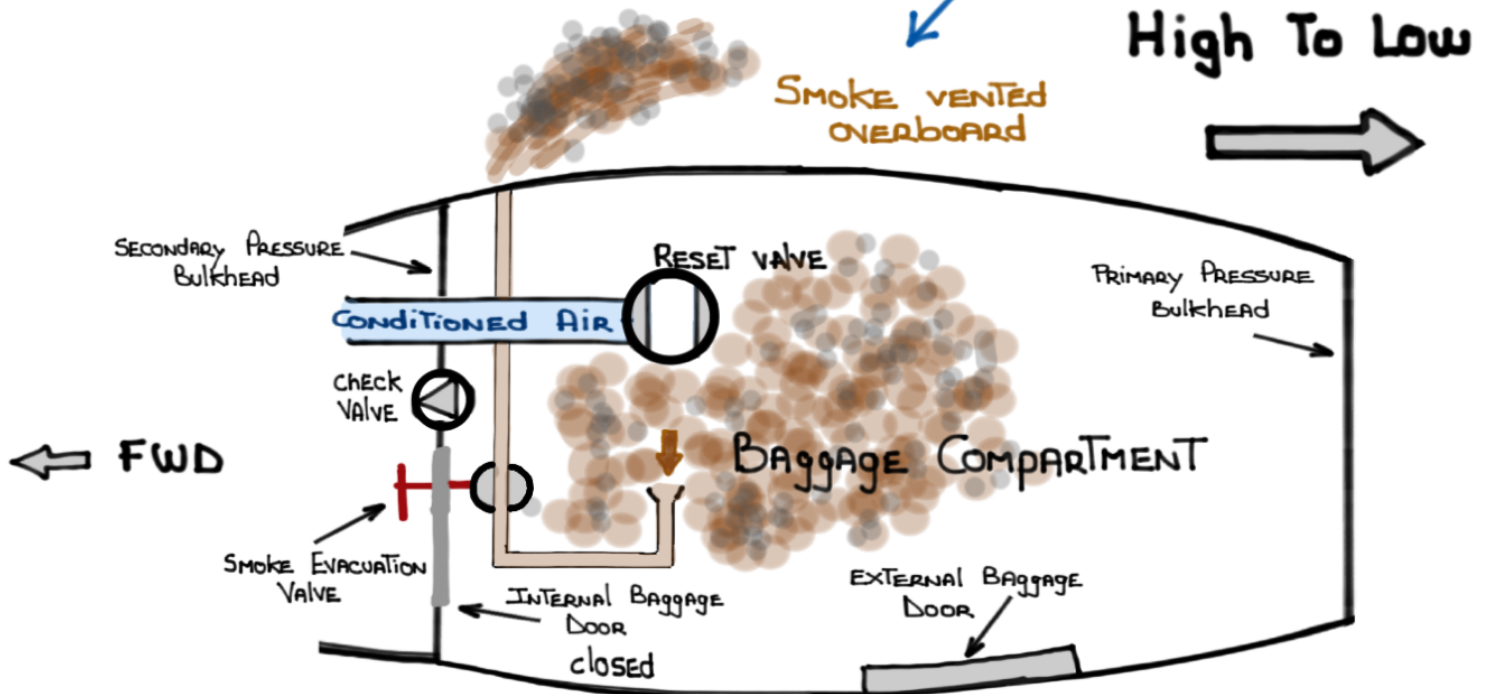
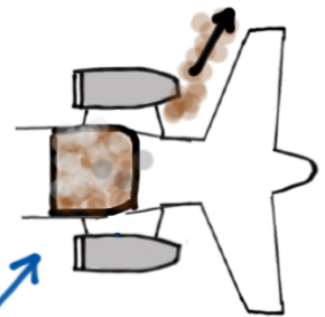
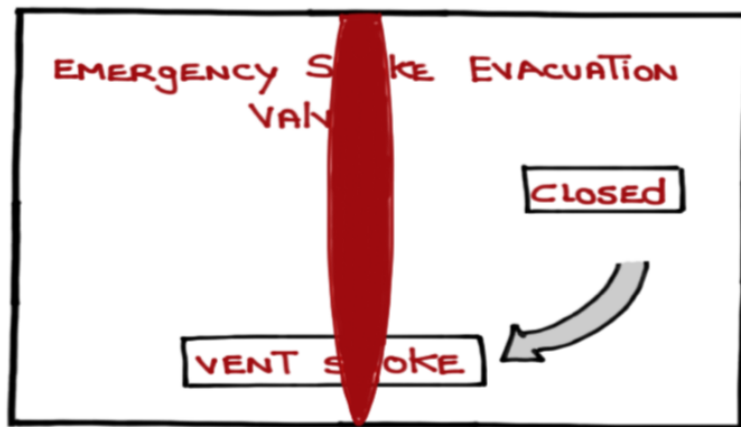
If on the ground a Fire Bell (located in the nose wheel well) will sound

# SMOKE EVACUATION

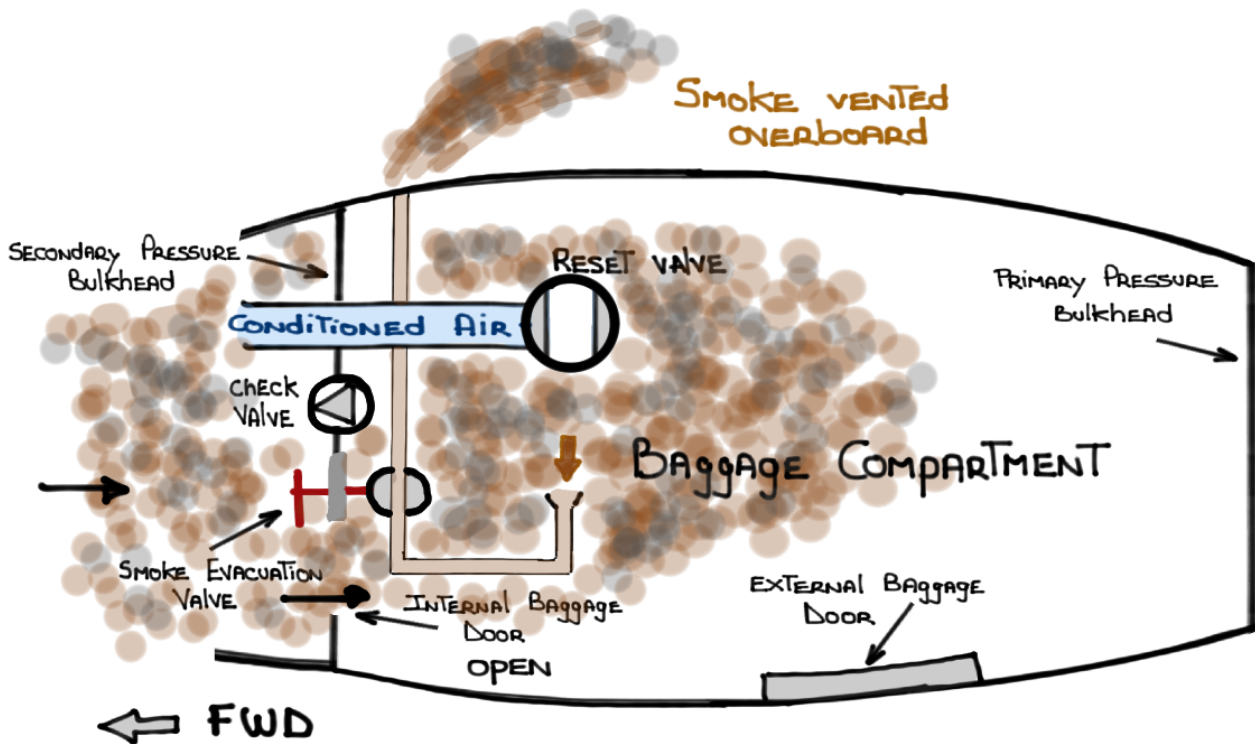
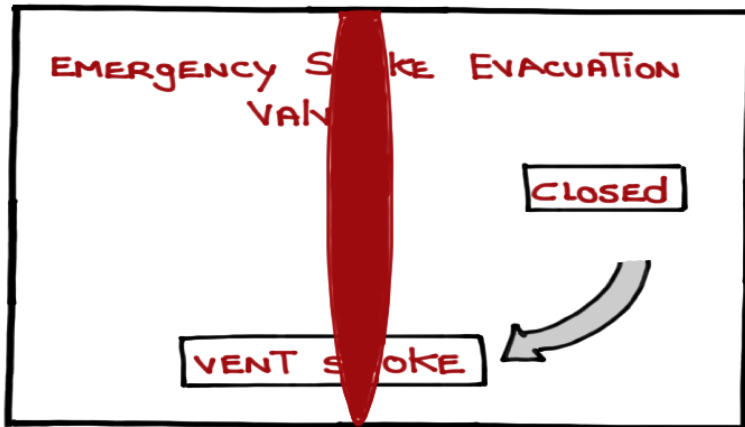
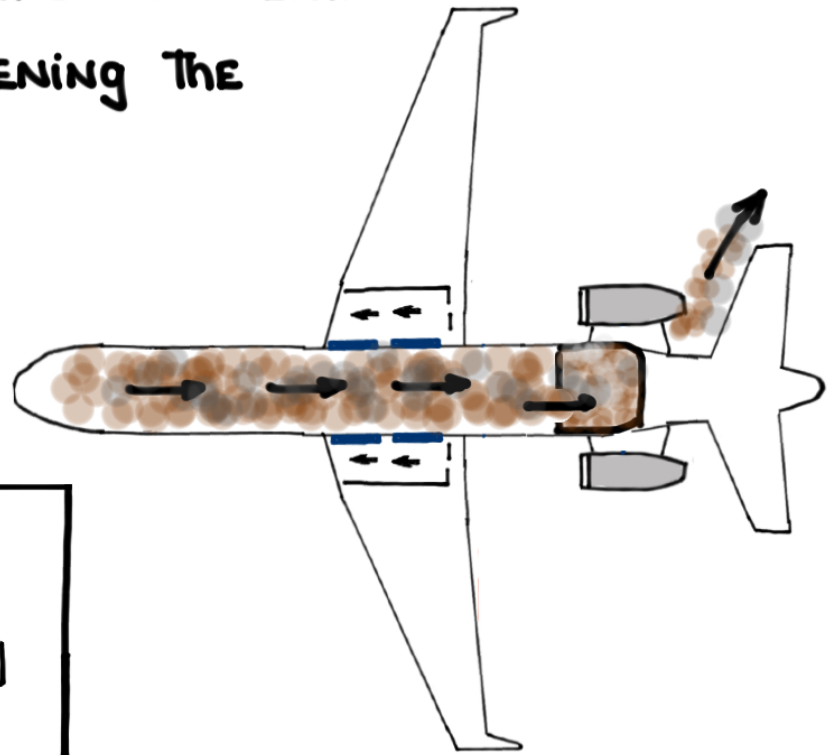
AN EMERGENCY SMOKE EVACUATION VALVE ALLOWS FOR SMOKE IN THE BAGGAGE COMPARTMENT TO BE VENTED OVERBOARD. THE VALVE INLET IS LOCATED IN THE CEILING AND EXTRACTS SMOKE BY DEPRESSURIZING THE BAGGAGE COMPARTMENT.

AFT BAGGAGE SMOKE

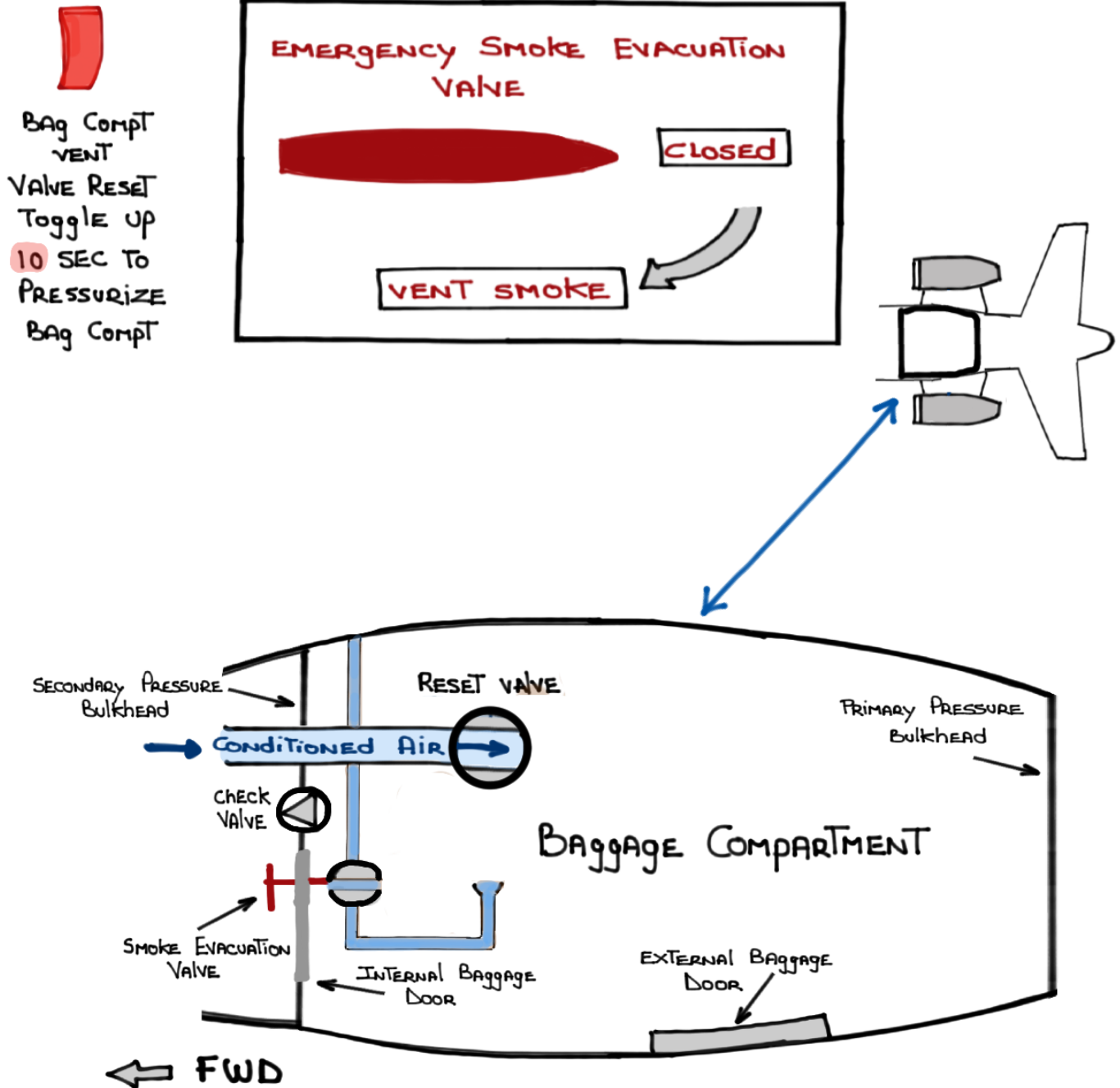
AFT BAGGAGE FLAME



SMOKE IN THE CABIN CAN ALSO BE VENTED OVERBOARD BY PARTIALLY OPENING THE INTERNAL BAGGAGE DOOR



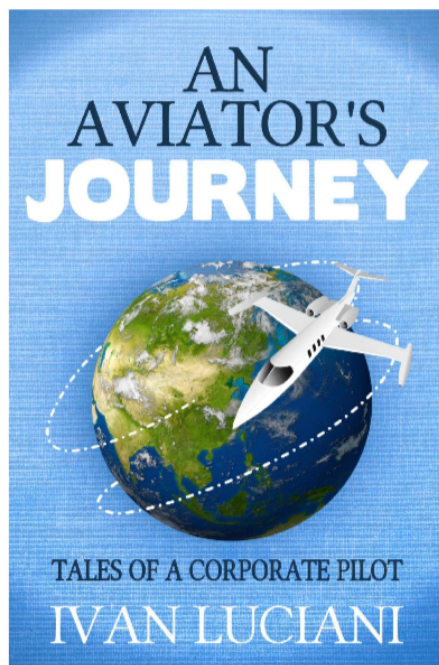
With The EMERGENCY SMOKE EVACUATION VALVE CLOSED  
THE VENT VALVE CAN BE RESET AND THE BAGGAGE  
COMPARTMENT REPRESSURIZED



**REMINDER:** these system notes are intended for study purposes only. Always refer to official Gulfstream manuals and other approved references when operating your aircraft.

NOTE: these system notes are updated from time to time and what is posted on Code450.com will always be the most recent version.

Questions, comments or errors...please do send me an email:  
[ivan@code7700.com](mailto:ivan@code7700.com)



Thank you!