G650 Fire Protection System
The fire protection system is about:

1. **Detection**: Presence of fire and/or smoke
2. **Notification**: Alert the crew via CAS message
3. **Firefighting**:

   - **Engine & APU fire bottles**:

   ![Diagram of fire protection system with engine and APU fire bottles with shot 1 and shot 2 indications]
- **Smoke Evacuation**:

![Diagram of smoke evacuation system]

- **Portable Fire Bottles**:

  - 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

\[
\begin{array}{c|c}
L\ ENG & R\ ENG \\
\hline
\text{LOOP A} & \text{LOOP A} \\
\text{LOOP B} & \text{LOOP B} \\
\end{array}
\]

- 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 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 and R ESS DC to operate
- The two (2) FDCUs are the brains of the system.

L ENG
- LOOP A
- LOOP B

FIRE DETECTION CONTROL UNIT (FDCU) L

Loops A/B:
1. Fault,
2. Failed, or
3. Fire

Then notifies crew via CAS message:
- Fire detection loop fault

R ENG
- LOOP A
- LOOP B

FIRE DETECTION CONTROL UNIT (FDCU) R

Loops A/B:
1. Fault,
2. Failed, or
3. Fire

- Engine fire loop alert
- Engine fire
Engine Fire Extinguishing System

- Available any time the L ESS DC and R ESS DC buses are powered

- The system has two (2) identical single-shot fire extinguishing bottles
  
  L bottle = Shot 2 
  R bottle = Shot 1

- The bottles are located in the tail compartment

- Each bottle contains HALON 1301 extinguishing agent under high pressure

- 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 discharge a Fire Bottle Discharge CAS is displayed
- Each engine has its own **Fire Handle** powered by its respective ESS DC bus

- Pulling a **Fire Handle**:
  1. Shuts off fuel (at the tank)
  2. Shuts off hydraulic fluid
  3. Trips the IDG

- **Fire Handles**, when rotated, can discharge one or both bottles/shots
- Rotating the **Fire Handle** outwards discharges shot 1

- Rotating the **Fire Handle** inwards discharges shot 2

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**L bottle**

- ENG
- APU
- R ENG

**R bottle**

- ENG
- R ENG
ENGINE FIRE TEST

1. It 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." ✓
   "Bad test, bad engine." ⚠

4. When pressed the following lights illuminate:
   (Similarly for left engine)
   - Two (2) overhead lights
   - Two (2) CAS messages
   - Two (2) master warning lights
   - Fire handle
   - Fuel control switch
   - Loop A
   - Loop B
   - Engine fire loop alert
   - R engine fire
   - W W
   - R
   - Run off

- R ENG
Engine Fire Fault Test

1. It tests the fire detection fault system, not the loops.

2. When the switchlight is pressed in and held the following lights illuminate:
   - Five (5) overhead lights
   - One (1) CAS message
   - Two (2) master caution lights
   - Fire detection loop fault
   - Loop A
   - Loop B
   - Fault
   - Fault
   - Test
   - Fault
   - Fault
   - R ENG
   - Loop B
   - Loop A
   - Off

3. A faulty loop can be deselected.
APU Fire Extinguishing System

- APU is enclosed in a fireproof Titanium case
- APU Fire Extinguishing System is powered by the L'ESS DC bus (down to Main Batteries)

![Diagram of APU Fire Extinguishing System]

Press to discharge
In the event of an engine fire the Right bottle/shot (1) is used first. This saves the other bottle for the APU.

APU FIRE TEST=

Two (2) Overhead lights

Two (2) CAS messages

Two (2) Master warning lights

Two (2) Master caution lights

Exterior aural warning “Fire Bell” (ground) only

After the APU FIRE TEST ensure the following CAS message is not displayed:

L Fire Bottle Discharge
In the event of an APU FIRE, the ECU will auto shutdown the APU. The QRH will direct the crew to:

1. Select APU switchlight to OFF

2. Press the APU switchlight to fire the bottle and discharge extinguishing agent into the APU.

* L Fire bottle no longer available to engines

L Fire bottle discharge

Uses L Fire bottle

Shot 2

2 1

APU
An emergency smoke evacuation valve allows for smoke in the baggage compartment to be vented overboard. The valve inlet, located in the ceiling, extracts smoke by depressurizing the baggage compartment. This deprives it of oxygen.
Smoke in the cabin can also be vented overboard by partially opening the internal baggage door.
SMOKE EVACUATION

With the emergency smoke evacuation valve closed, the vent valve can be reset and the baggage compartment repressurized.
Questions, comments or errors?

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Thank you!