G550 Flight Control System
The G550’s Flight controls are **hydraulically-powered** but retain manual capability should there be a complete loss of **hydraulic fluid**

**Manually-controlled**

**Mechanically-operated**
- Pushrods
- Cables
- Bell cranks

**Hydraulically-boosted**
(6 to 1 boost)
A HARD OVER PREVENTION SYSTEM (HOPS) compares pressure sensed into the servos against pressure sensed out of the servos.

If there is a difference the HOPS shuts off hydraulic fluid from the affected system(s).
Roll Flight Controls - Ailerons

- Control yoke movement results in activation of:

  - Pushrods
  - Cables
  - Bell cranks

Hydraulic Boost Actuators

Ailerons
- The left and right ailerons are mechanically connected but can be split in the event of a jam.

**Jammed ailerons:**

- Use rudder to level the wings
- Manually disconnect the ailerons
- Fly aircraft with operating aileron
- Minimum speed on approach is 125 knots to ensure adequate air flow over the flight controls
- **Aileron Deflection:**
  - Up 11°
  - Down 11°

- **Trim Tab** (Left aileron only):
  - Up 15°
  - Down 15°

*Trim Tab is heated (175°F ± 20°F)*

- **Roll Augmentation:** Mid and outboard panels augment the up aileron up to 47°
- HOPS activation =

- If one aileron is jammed both ailerons are affected
- No hydraulic pressure = manual reversion
- Force to move ailerons is much greater
Pitch Flight Controls - Elevators

Left Elevator
Left Yoke

Right Elevator
Right Yoke

Control yoke movement results in activation of:

- Pushrods
- Cables
- Bell cranks

Hydraulic Boost Actuators
The left and right elevators are mechanically connected but can be split in the event of a jam.

**Jammed Elevators:**
- Manually disconnect the elevators
- Fly aircraft with operating elevator
- Minimum speed on approach is **125 knots** to ensure adequate air flow over the flight controls
- Elevator deflection:

- Elevator Trim Tabs *
Electricaly controlled by switches on the control columns or manually controlled by control wheels located on each side of the center pedestal

* Trim tabs are heated (175°F ± 20°F)
- **Elevator Trim Tabs deflection:**

  **Electrically:**
  - Up: 21°
  - Down: 7°

  **Mechanically:**
  - Up: 22°
  - Down: 8°

- **HOPS Activation:**

  ![HOPS Activation Diagram]

  - **Left and Right Hydraulic pressure to affected actuator is shut off**
  - **Flight is continued with remaining actuator**
  - **If both actuators are affected**:
    1. **No hydraulic pressure = Manual reversion**
    2. **Force to move elevators is much greater**
- Single rudder operated by the pilots' pedals and yaw damper system

- Rudder pedal movement actuates a series of cables and bell cranks that in turn actuate a dual tandem hydraulic boost actuator dedicated to moving the rudder.

- Rudder pedal movement results in activation of:
  - Pushrods
  - Cables
  - Bell cranks
- A **Rudder Limit** CAS message indicates maximum rudder hydraulic assist condition

- Rudder Trim is accomplished by moving the entire rudder surface via a rudder trim control wheel on the center pedestal (7.5° L/R)

- The yaw damper system damps **Dutch Roll** tendencies associated with the G550’s swept-back wing design

- Two (2) channels: Two (2) computers:

  ![Diagram](image)

  **Fail Operational:** If a YD and/or FGC fails, the remaining YD and/or FGC would automatically take over the duties of the failed YD and/or FGC
Standby Rudder Control Valve: Provides AUX system fluid and pressure to rudder actuator and yaw damper #1 in the event that L and R hydraulic systems fail in flight.
- HOPS Activation:

Affected Hydraulic System is Shutoff
Automatic Overload Limiting System:
Prevents excessive overload on vertical stabilizer during high speeds by:

1. Limiting rudder travel, and

Low speed = High deflection        High speed = Low deflection

2. Limiting hydraulic pressure

- If there is a loss of one hydraulic system the pressure from the remaining system is ramped up to 3,000 psi and a Single Rudder CAS message is displayed

- Rudder deflection:

  Up to 22° depending on speed

  L/R
Hydraulic Boost Actuators

Ailerons

Elevators

Hydraulic Boost Actuator

Rudder

Flight Spoilers/Speed Brakes
**Hard Over Prevention System (HOPS)**

**Ailerons:** both actuators

![Diagram of aileron system]

**Elevators:** affected actuator only

![Diagram of elevator system]

**Rudder:** affected hydraulic system(s)

![Diagram of rudder system]
- **Aileron deflection:**
  
  Up 11°  
  Down 11°

- **Trim Tab deflection:**
  
  Up 15°  
  Down 15°

- **Elevator deflection:**
  
  Up 24°  
  Down 13°

- **Rudder deflection:**
  
  Up to 22° depending on speed
  
  L/R
- Fowler type, single surface flaps

- Horizontal stabilizer moves in conjunction with flap movement in order to minimize pitch changes as the flaps extend/retract and the center of lift moves.

Flaps 0: \(-1.5^\circ\)
Flaps 10: \(-2.7^\circ\)
Flaps 20: \(-3.6^\circ\)
Flaps 39: \(-4.6^\circ\)

- Flap/stab control unit is located in the AEER.

- Horizontal stabilizer is driven by two (2) AC motors powered by the L Standby AC and R Standby AC buses.
- Flap/stab indications on PFD (HSI) disappear thirty (30) seconds after the Flaps have reached the UP (zero) position.

- Flaps:

  - Electrically-controlled
  - Hydraulically-powered
  - Mechanically-actuated
- **Horizontal Stabilizer:**

  Electr**ically-controlled**

  and actuated
Flaps

Maximum Extension/Extended Speed

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<thead>
<tr>
<th>VFE</th>
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<tr>
<td>250 KCAS</td>
<td>220 KCAS</td>
<td>170 KCAS</td>
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Maximum G-loads

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<thead>
<tr>
<th>-1 To +2.5 g</th>
<th>0 To +2 g</th>
<th>0 To +2 g</th>
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<tr>
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<td>0 To +1.5 g (\textgreater MLW)</td>
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Maximum Operating Altitude

| \leq 25,000\textdegree | \leq 25,000\textdegree | \leq 20,000\textdegree |
Spoilers

Electrically-controlled via speed brake handle

Hydraulically-powered by:

L hyd Sys  R hyd Sys

Six (6) Spoiler panels = Two (2) Hydraulic actuators per wing
**Spoilers**

Do not extend spoilers inflight with gear down or flaps 39°

Do not arm ground spoilers for touch and go landings
Spoilers

1. Roll Augmentation: Mid and Outboard Panels
   up to 47°

2. Speed Brakes (in-flight)
   up to 30°

3. Ground Spoilers (on ground)
   55° ± 4°
Questions, comments or errors?

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Thank you!