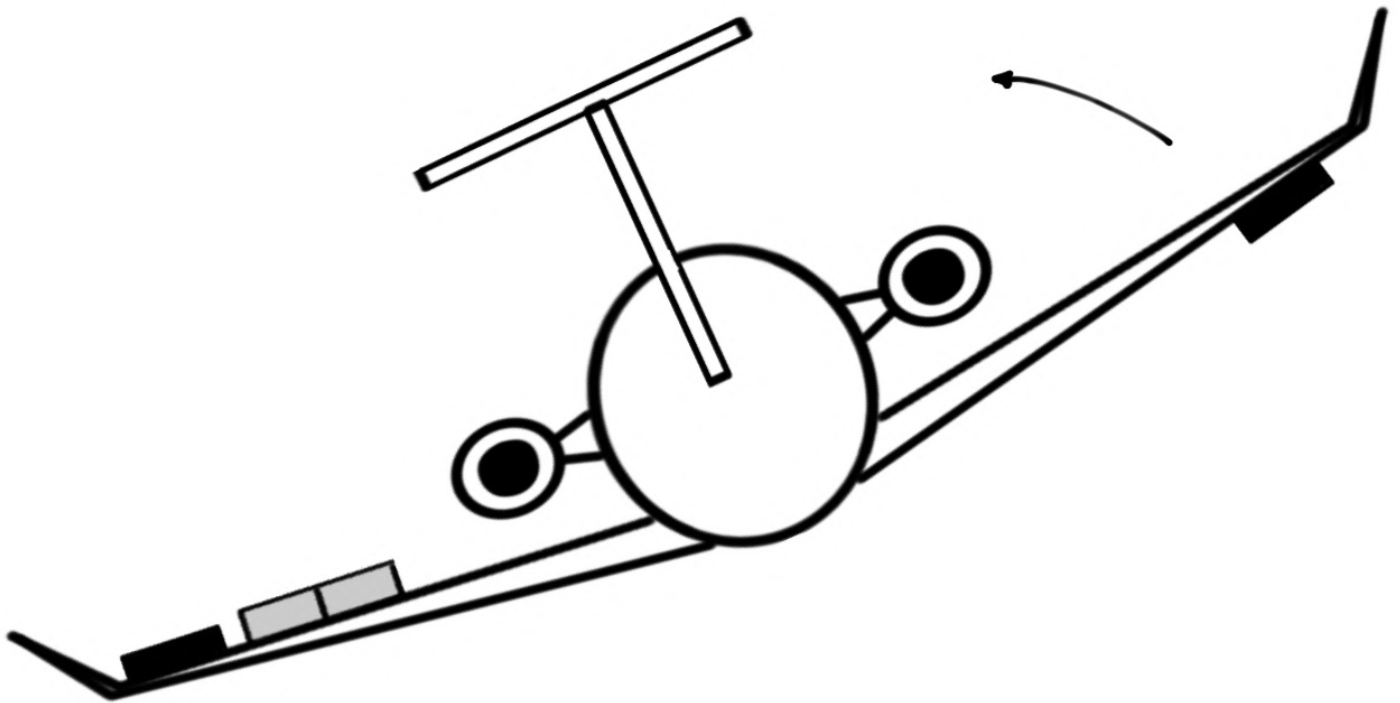


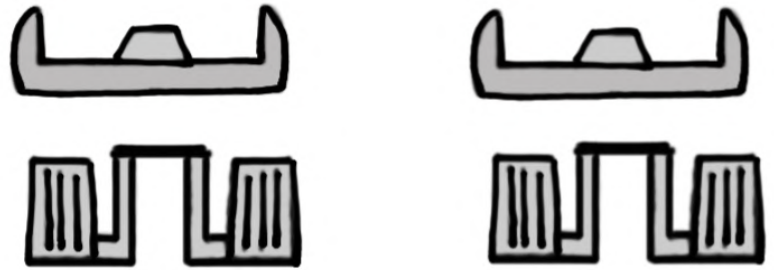
6550 FLIGHT CONTROL SYSTEM



For study purposes only

The G550's Flight controls are **Hydraulically**-powered but retain manual capability should there be a complete loss of **hydraulic fluid**

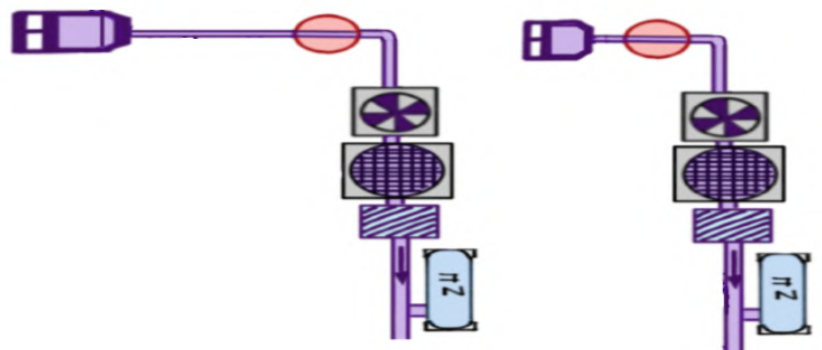
MANUALLY - CONTROLLED



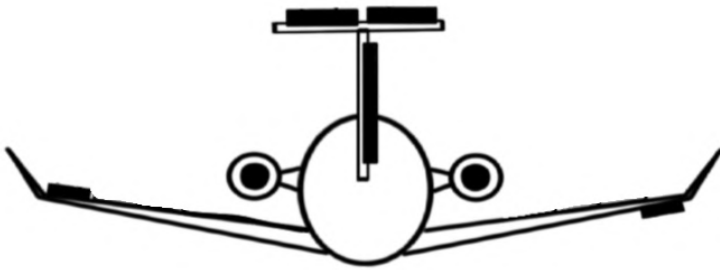
MECHANICALLY - OPERATED

- Pushrods
- CABLES
- BELL CRANKS

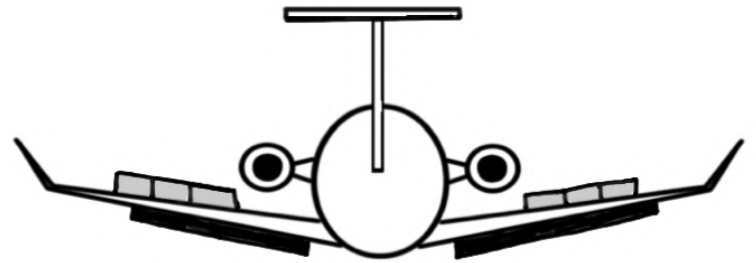
HYDRAULICALLY - BOOSTED
(6 To 1 boost)



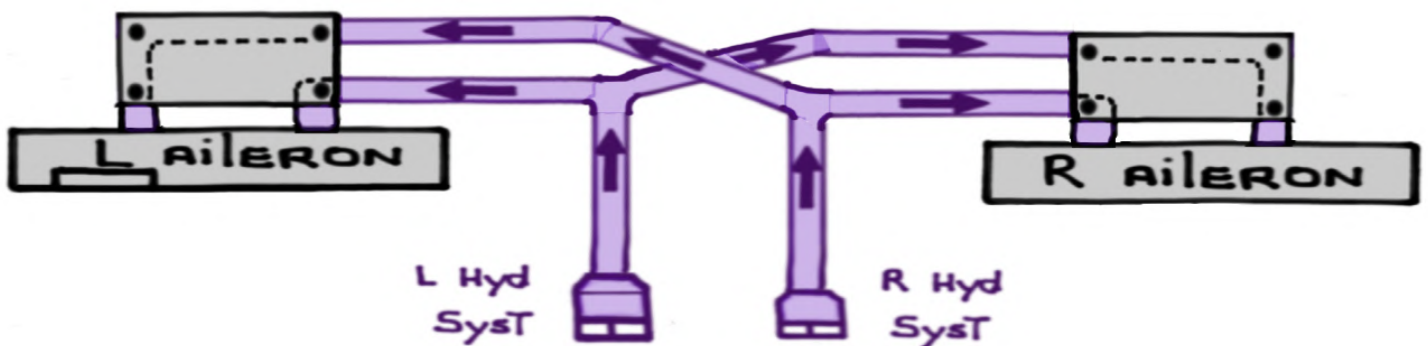
PRIMARY
FCS



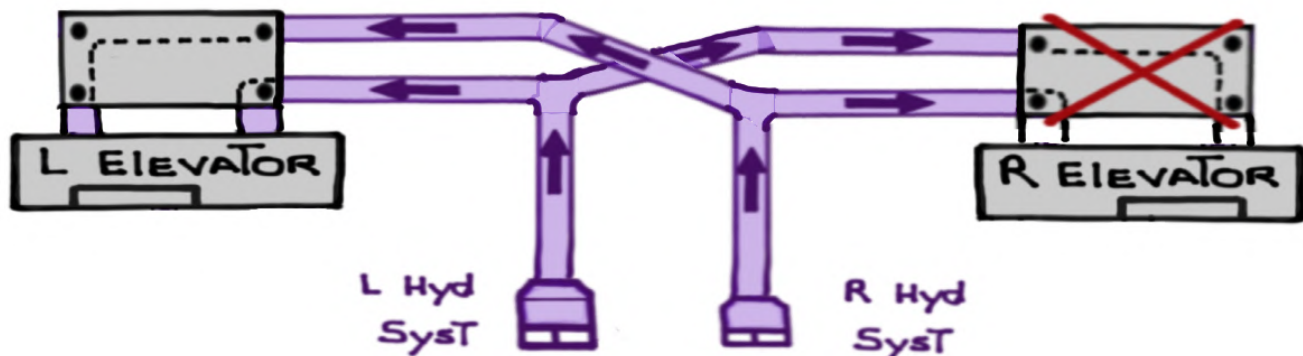
SECONDARY
FCS



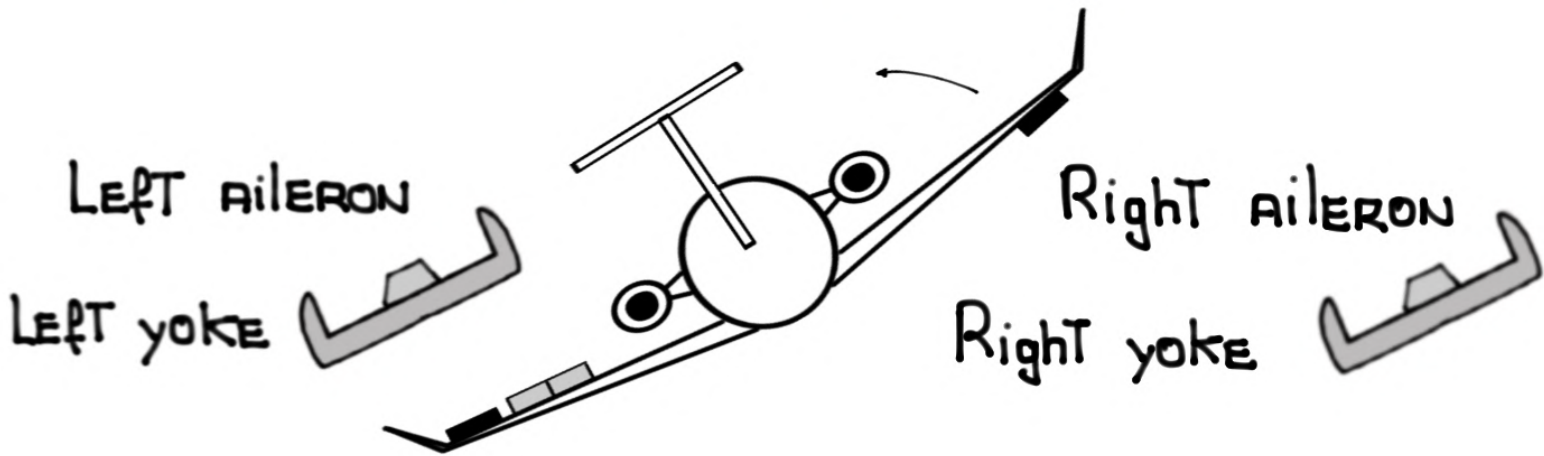
- A HARD OVER PREVENTION SYSTEM (HOPS) COMPARES PRESSURE SENSED INTO THE SERVOS AGAINST PRESSURE SENSED OUT OF THE SERVOS



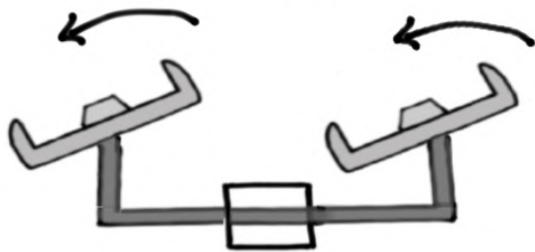
If THERE IS A DIFFERENCE THE HOPS SHUTS OFF HYDRAULIC FLUID FROM THE AFFECTED SYSTEM (S)



Roll Flight Controls - Ailerons

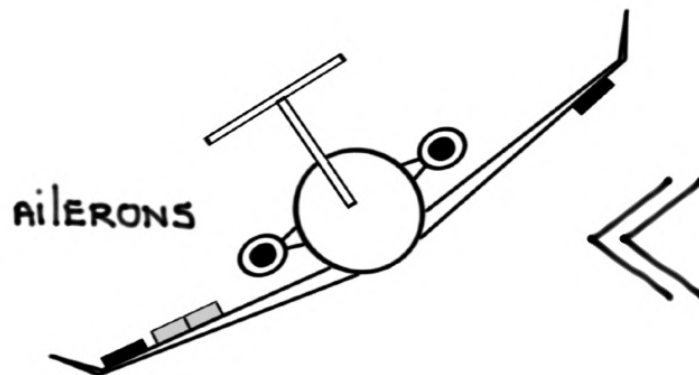
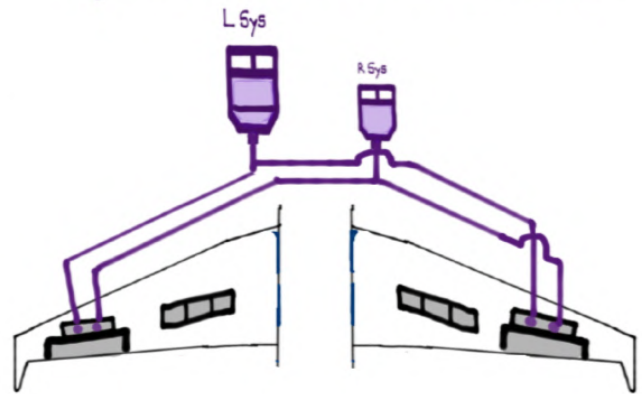


- CONTROL YOKE MOVEMENT RESULTS IN ACTIVATION of:

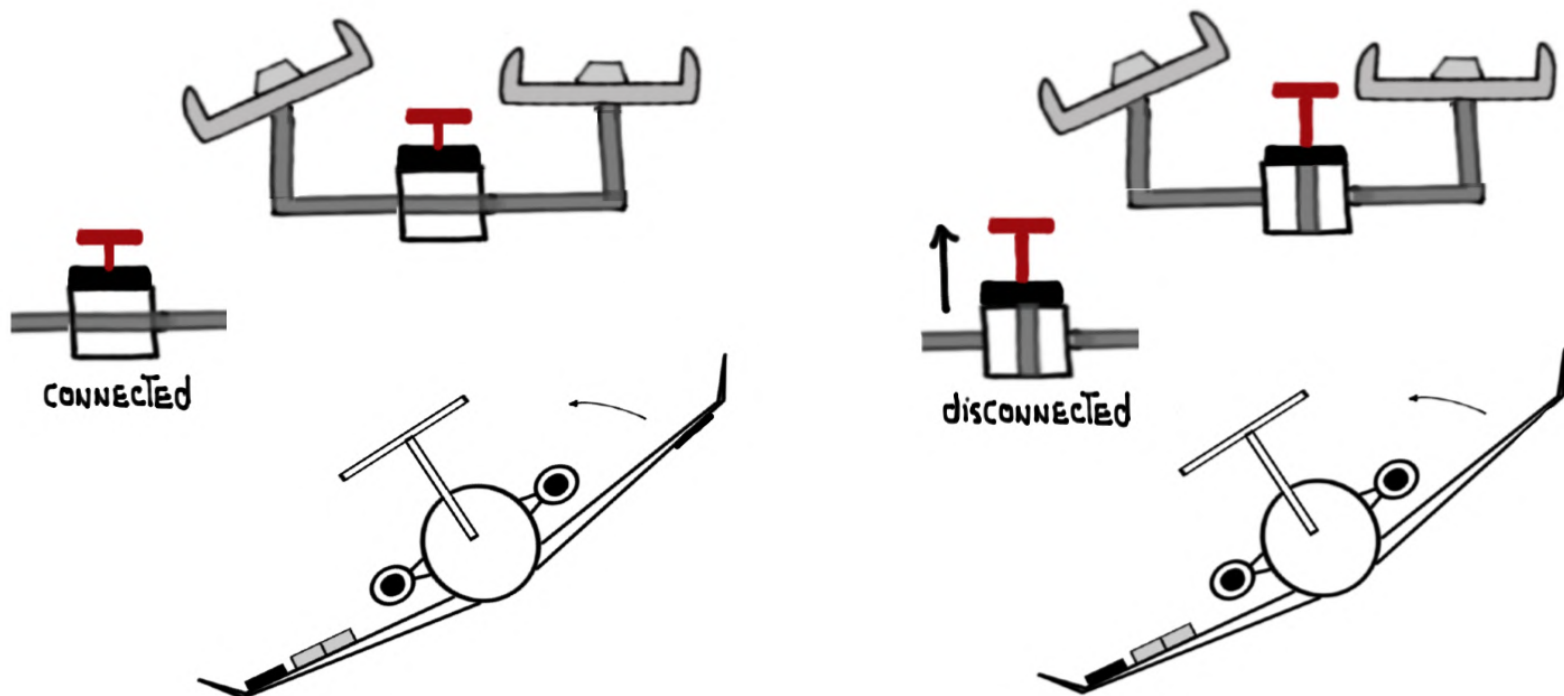


- Pushrods
- Cables
- Bell cranks

Hydraulic Boost Actuators



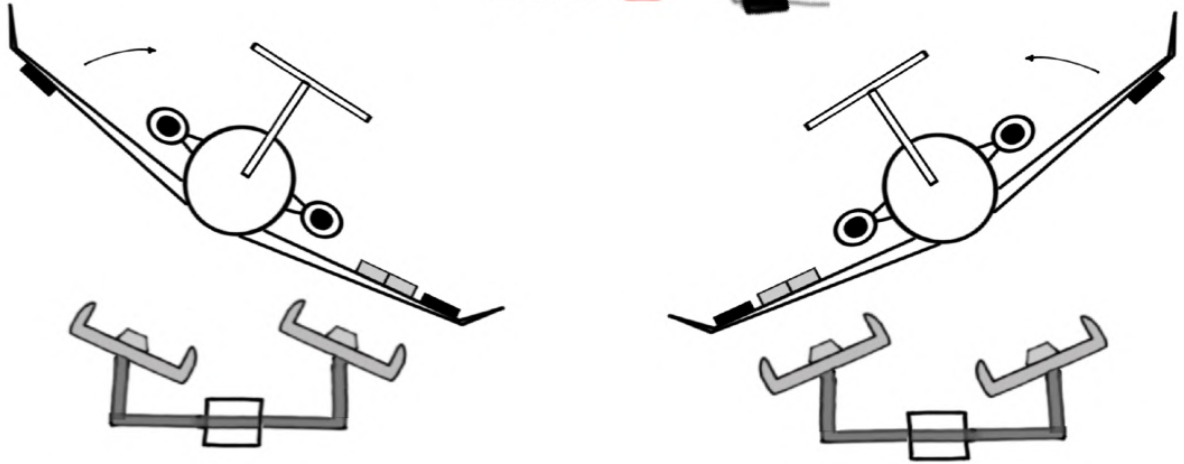
- The LEFT AND Right ailerons ARE MECHANICALLY CONNECTED BUT CAN BE SPLIT IN THE EVENT OF A JAM



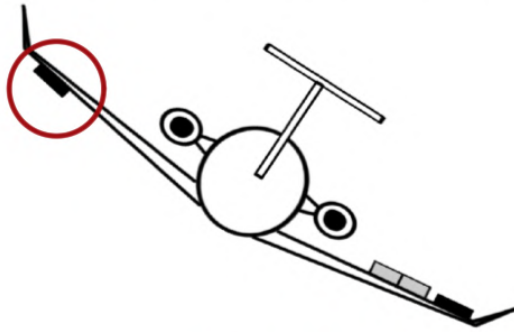
JAMMED ailerons:

- 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°

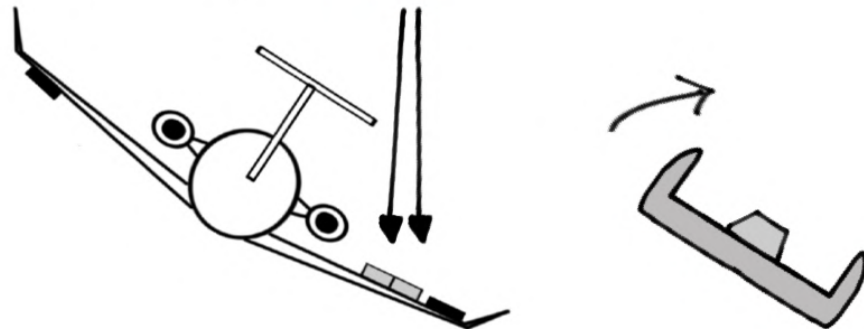


Down 15°

* TRIM TAB is HEATED ($175^\circ\text{F} \pm 20^\circ\text{F}$)



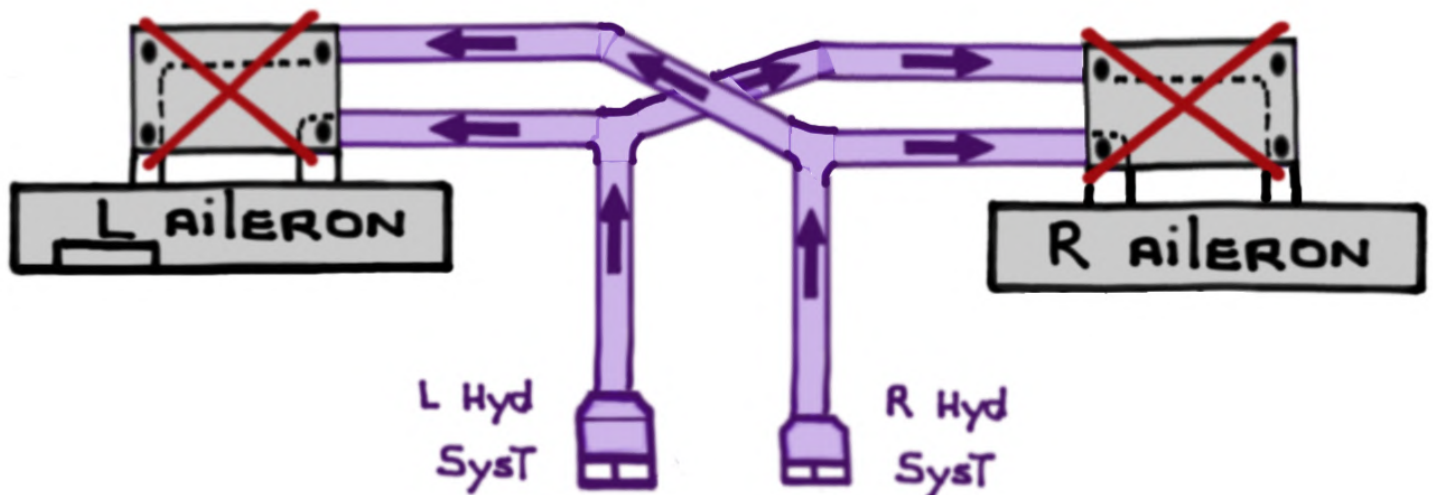
- Roll AUGMENTATION: MID AND OUTBOARD PANELS AUGMENT THE UP AILERON up to 47°



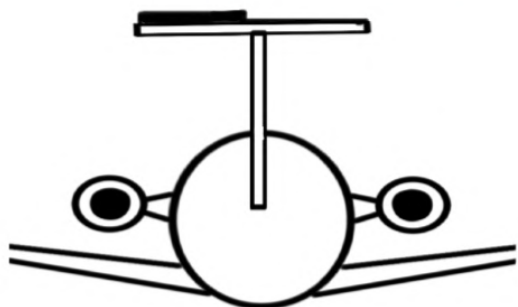
- HOPS activation =

L-R Aileron Hydraulics OFF

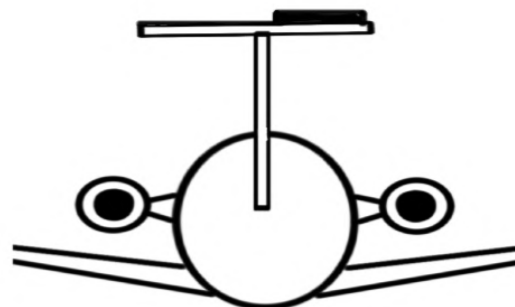
- If ONE aileron is jammed both ailerons are affected
- No hydraulic pressure = MANUAL REVERSION
- FORCE TO MOVE ailerons is MUCH GREATER



Pitch FLIGHT CONTROLS - ELEVATORS



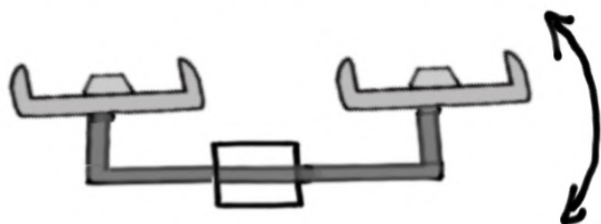
LEFT ELEVATOR



RIGHT ELEVATOR

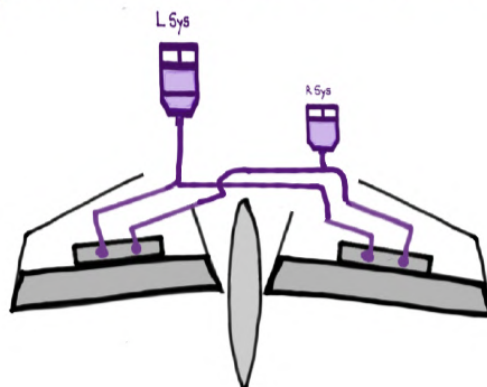


- CONTROL YOKE MOVEMENT RESULTS IN ACTIVATION OF:

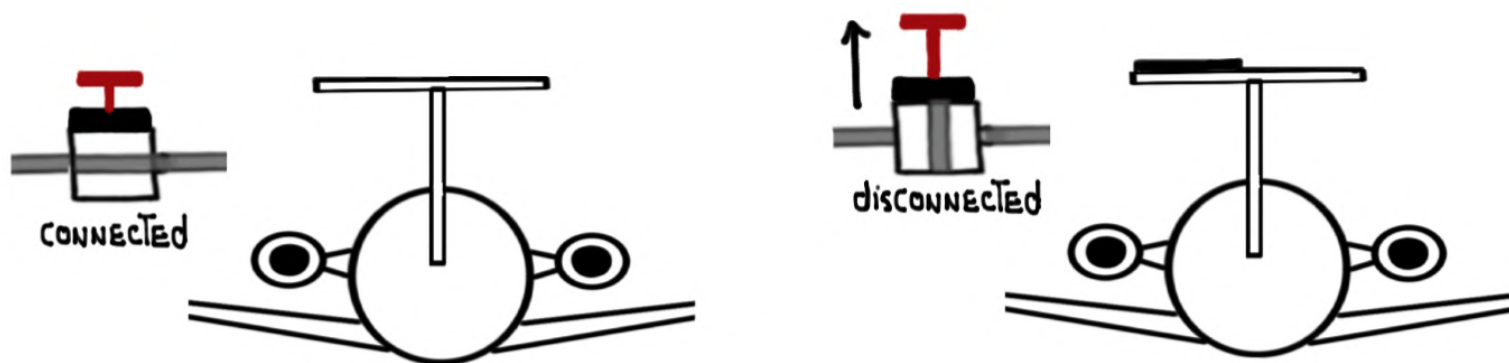


- PUSHRODS
- CABLES
- BELL CRANKS

HYDRAULIC BOOST ACTUATORS



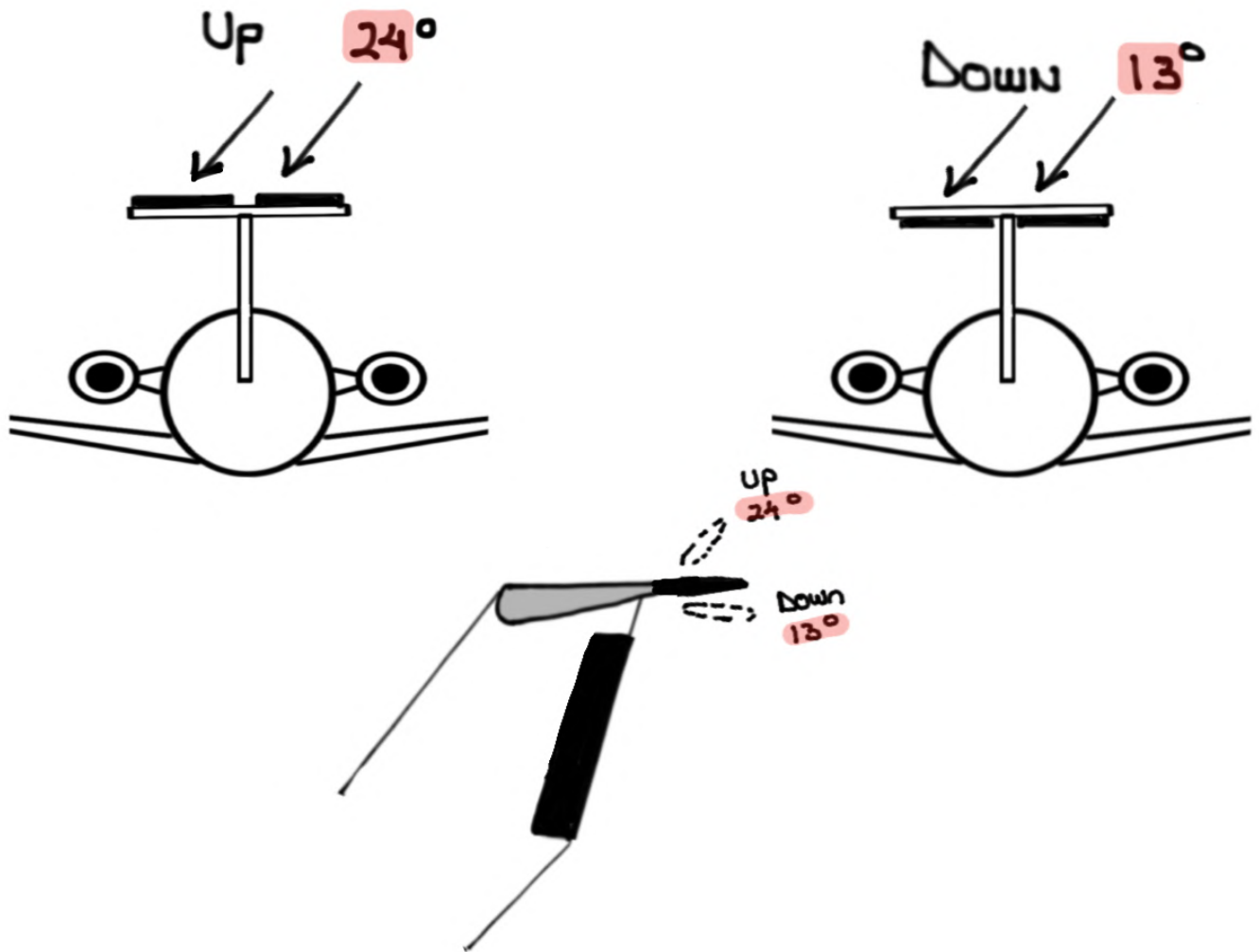
- THE LEFT AND RIGHT ELEVATORS ARE MECHANICALLY CONNECTED BUT CAN BE SPLIT IN THE EVENT OF A JAM



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 *

ELECTRICALLY 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 ($175^{\circ}\text{F} \pm 20^{\circ}\text{F}$)



- ELEVATOR TRIM TABS deflection:

ELECTRICALLY:

Up 21°

Down 7°

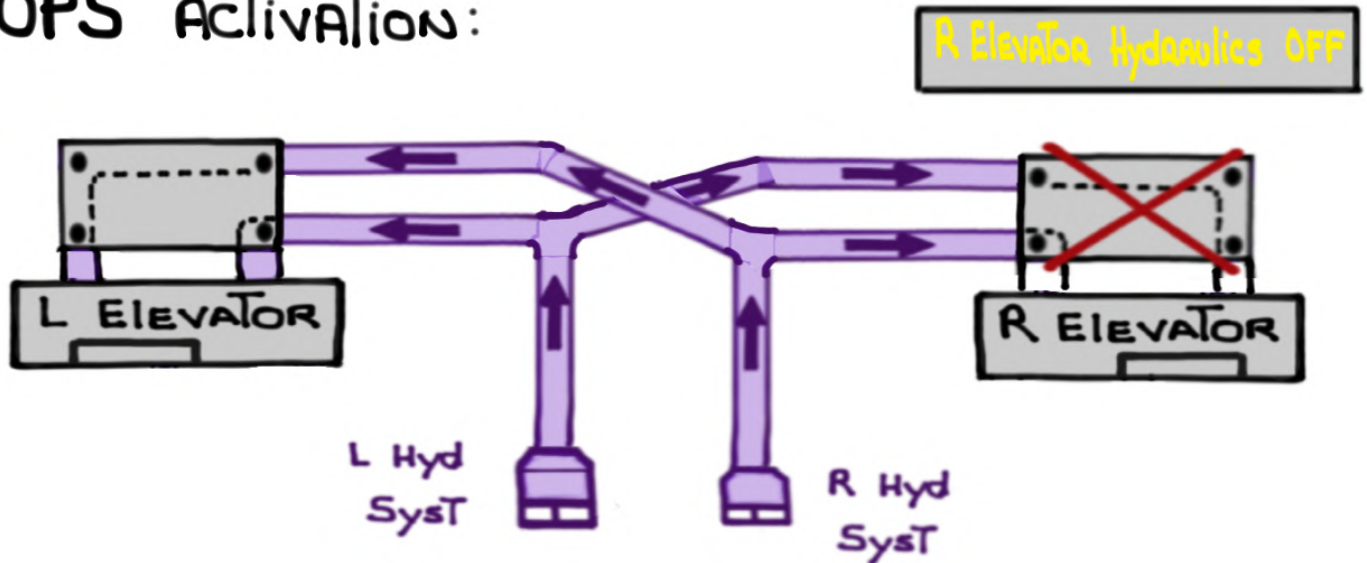
MECHANICALLY:

Up 22°

Down 8°



- HOPS ACTIVATION:



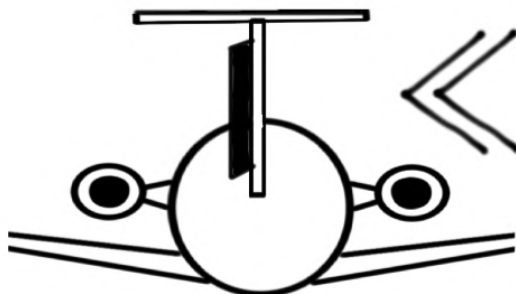
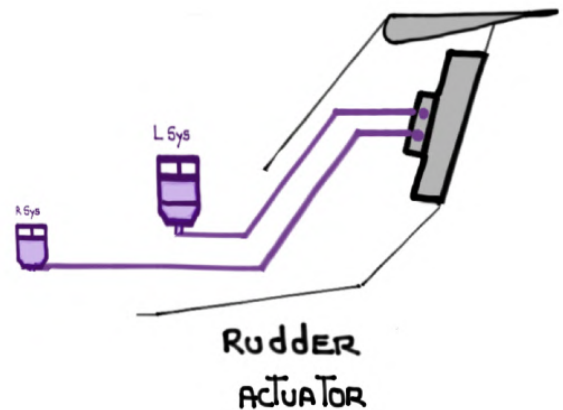
- Left and Right Hydraulic pressure to affected actuator is shut off
- Flight is continued with remaining actuator
- If both actuators are affected:
 - ① No hydraulic pressure = manual reversion
 - ② Force to move elevators is much greater

Yaw Flight Controls - Rudder

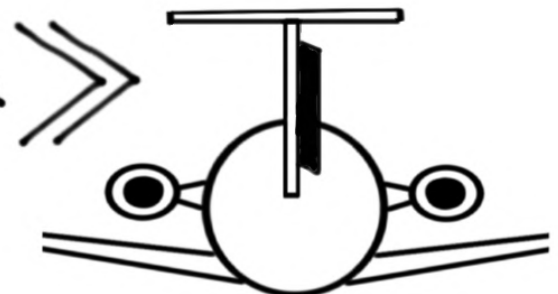
- Single rudder operated by the pilots' pedals and yaw damper system
- Rudder pedal movement actuates a series of cables and bell cranks that in turn actuate a dual tandem hydraulic boost actuator dedicated to moving the rudder
- Rudder pedal movement results in activation of:



- Pushrods
- Cables
- Bell cranks



Rudder



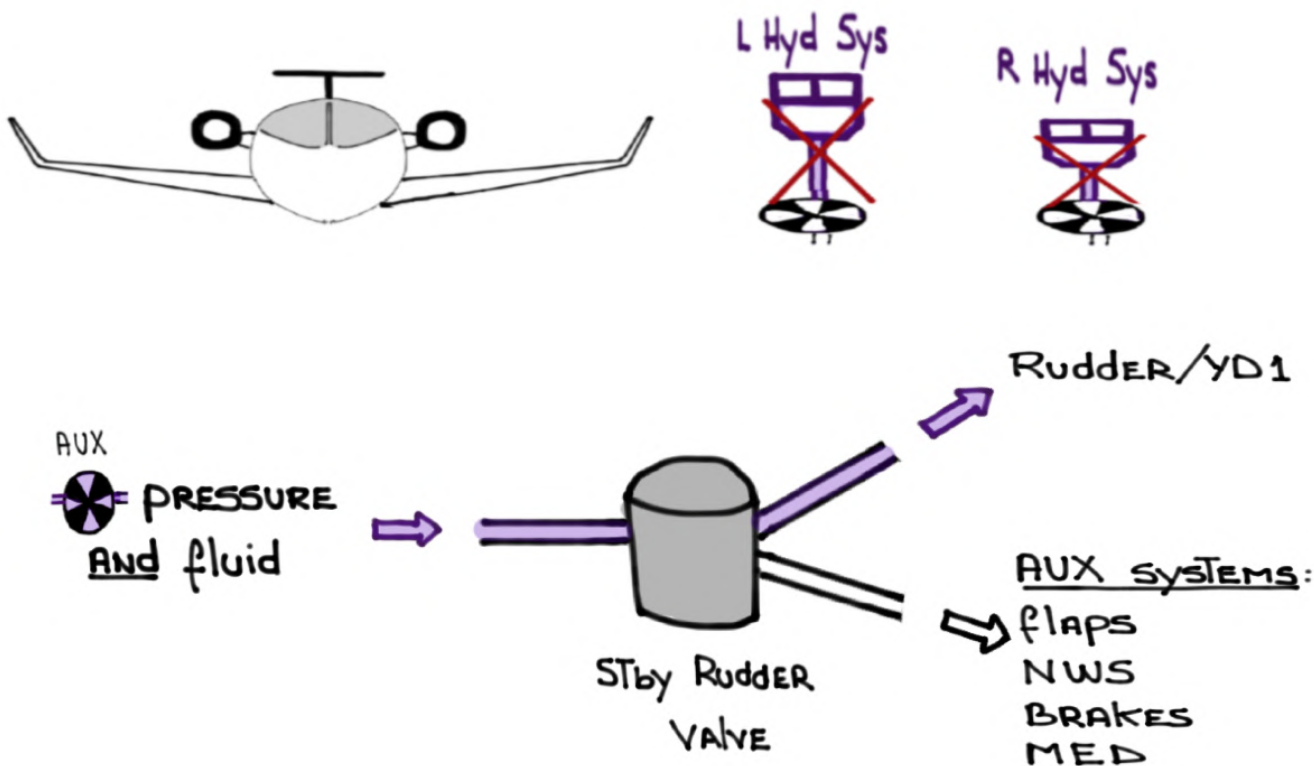
- A **Rudder Limit** CAS MESSAGE INDICATES MAXIMUM RUDDER HYDRAULIC ASSIST CONDITION
- Rudder Trim is accomplished by moving the entire rudder surface via a rudder trim control wheel on the center pedestal (**7.5°** L/R)
- The Yaw damper system damps Dutch Roll tendencies associated with the G550's swept-back wing design

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



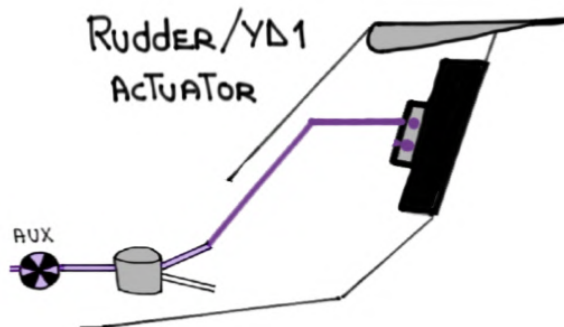
FAIL OPERATIONAL: If a YD AND/OR FGC fails the remaining YD AND/OR FGC would automatically take over the duties of the failed YD AND/OR FGC

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



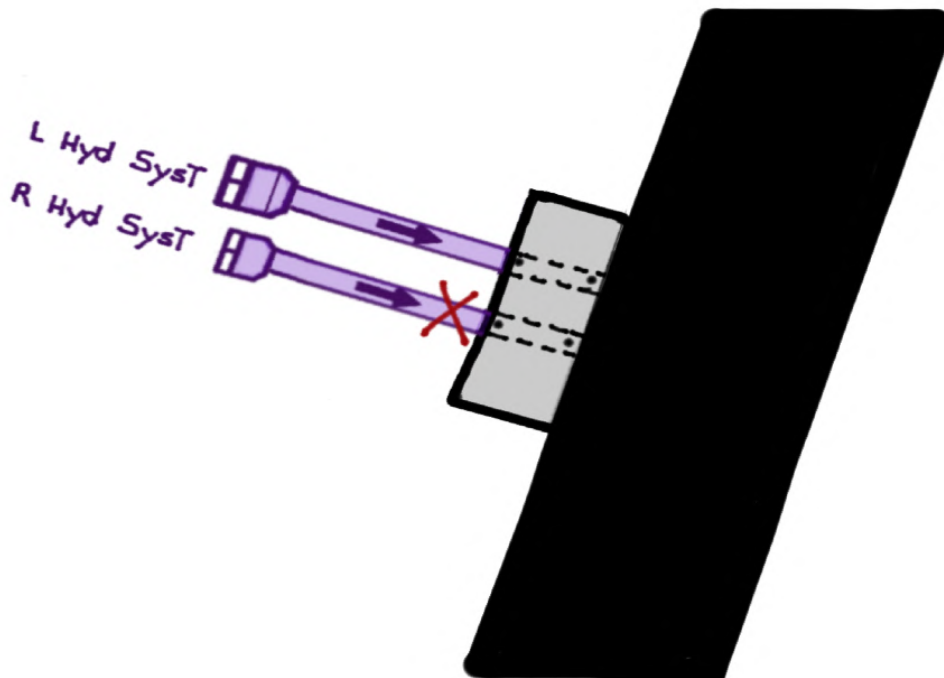
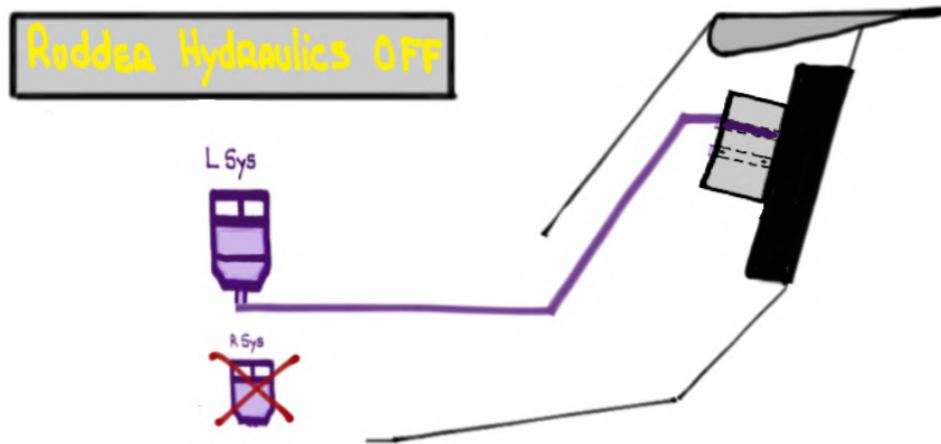
NOSEWHEEL
WOW
AIR

+ STBY RUD
ON =



- HOPS Activation:

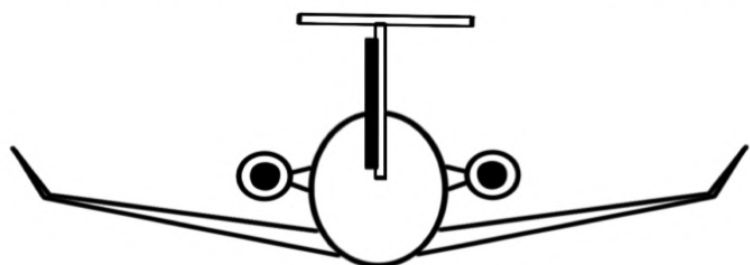
Affected Hydraulic System is shutdown



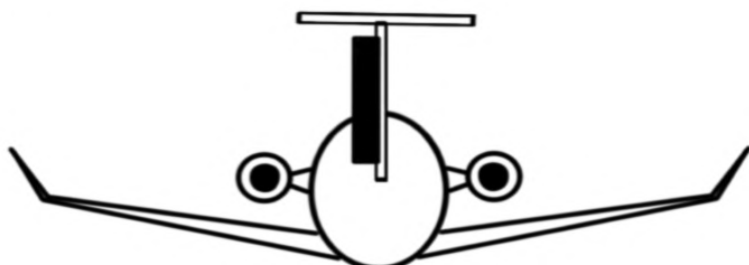
- Automatic Overload Limiting System:

PREVENTS EXCESSIVE OVERLOAD ON VERTICAL STABILIZER DURING high speeds by:

① Limiting rudder travel, and



High speed



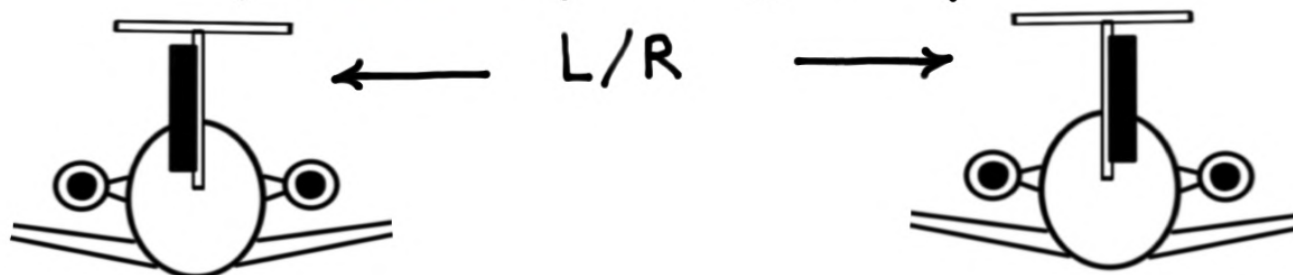
Low speed

② Limiting Hydraulic pressure

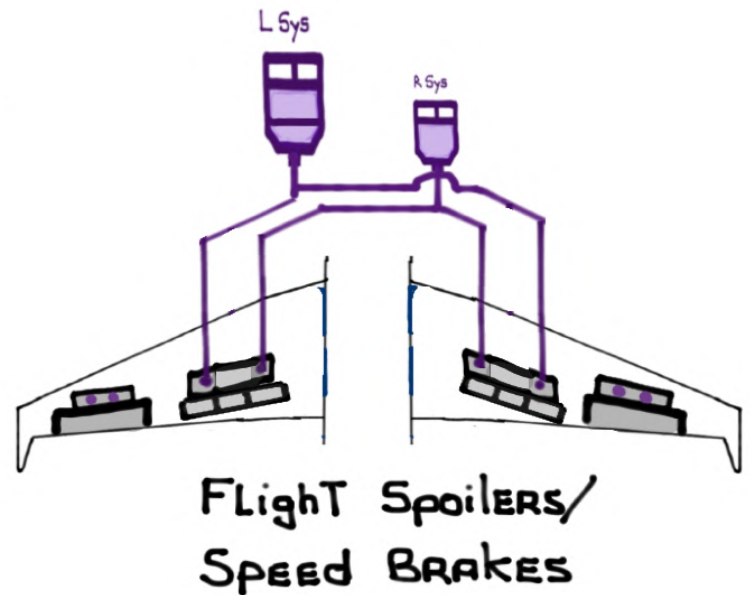
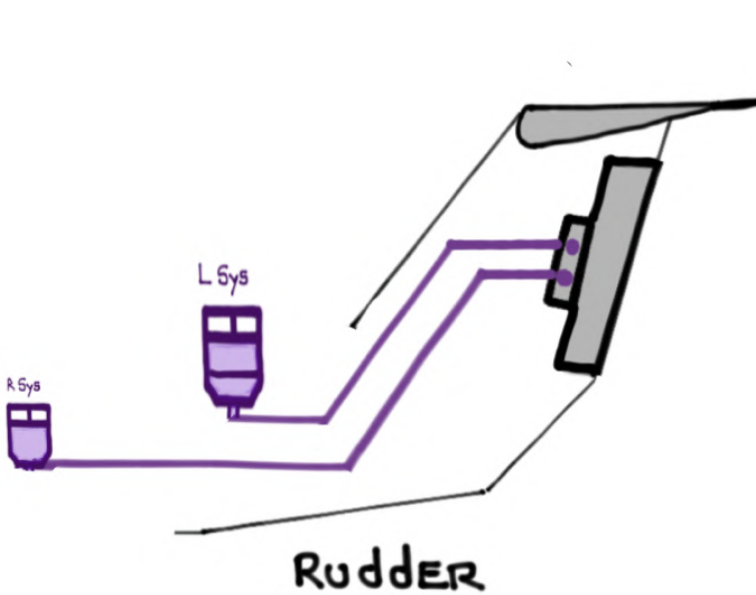
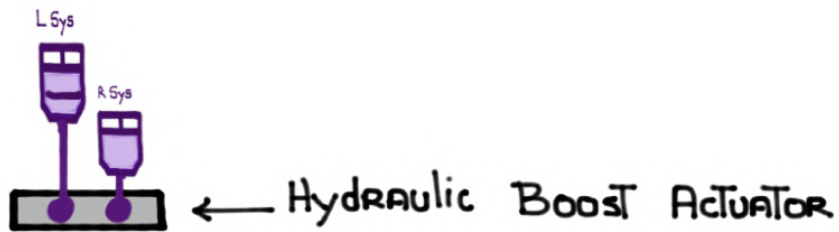
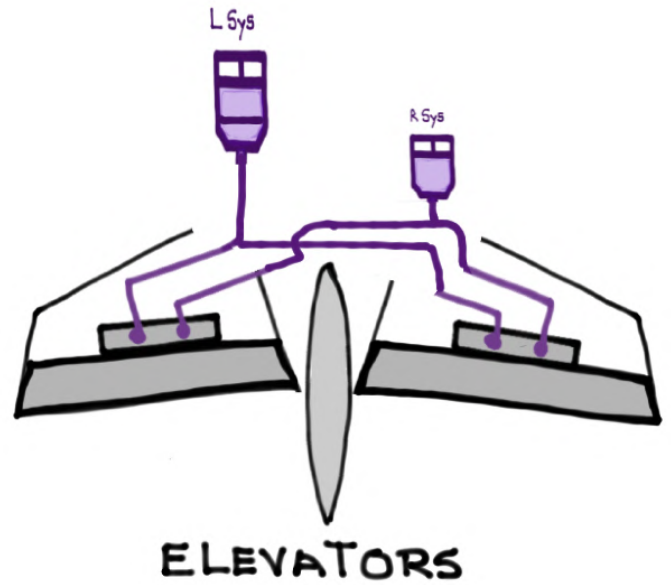
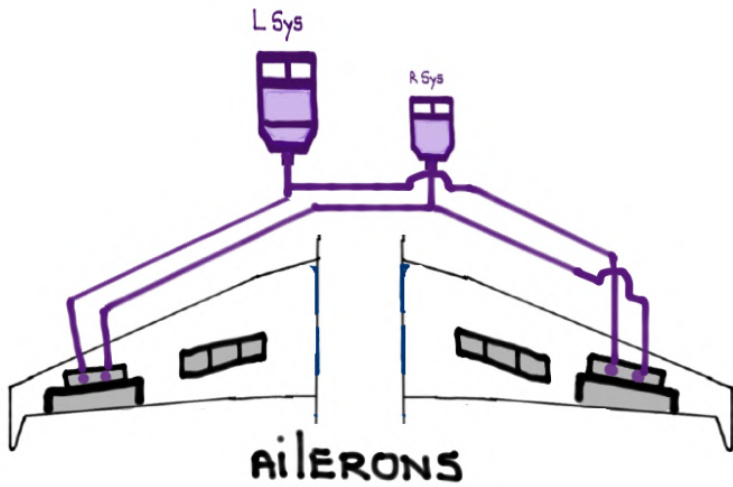
- If there is a loss of one hydraulic system the pressure from the remaining system is ramped up to **3,000** Psi and a **Single Rudder** CAS message is displayed

- Rudder deflection:

Up to **22°** depending on speed

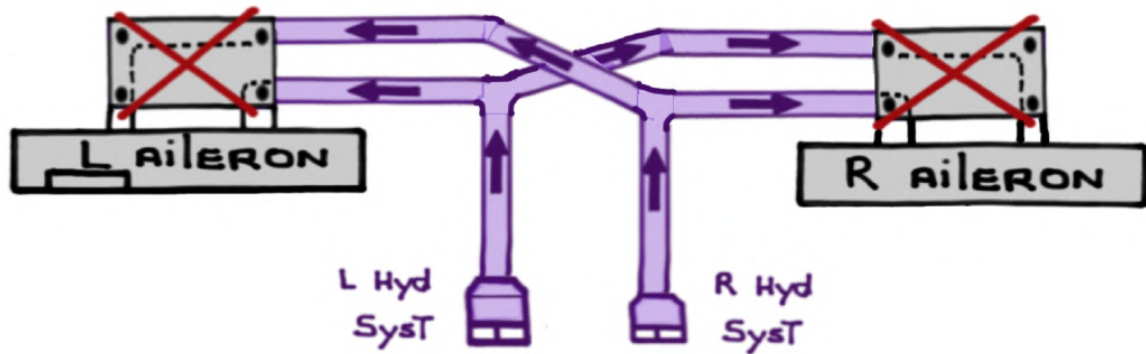


Hydraulic Boost Actuators

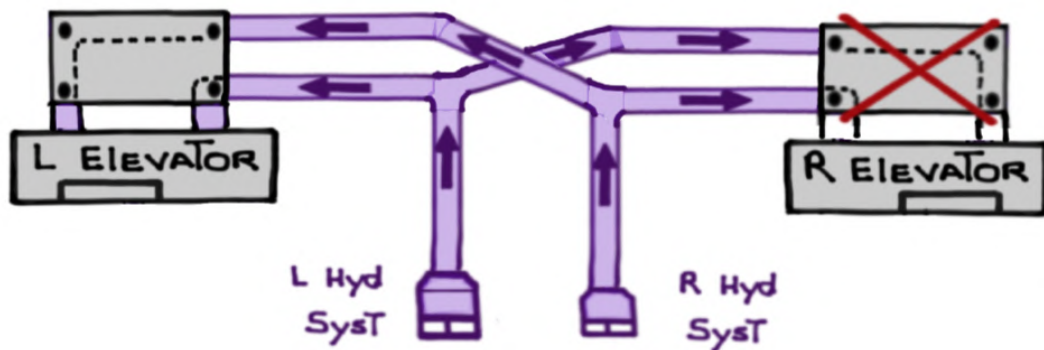


HARD OVER PREVENTION SYSTEM (HOPS)

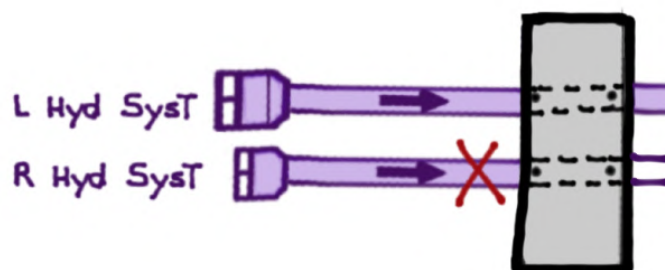
AILERONS: both ACTUATORS



ELEVATORS: AFFECTED ACTUATOR ONLY

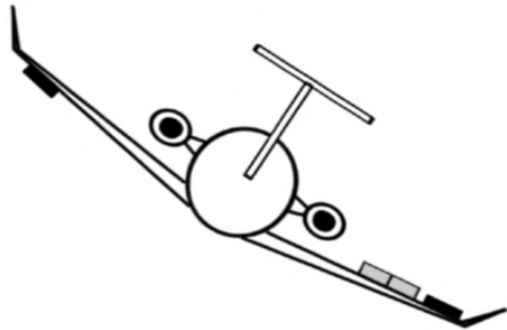


RUDDER: AFFECTED HYDRAULIC SYSTEM (S)



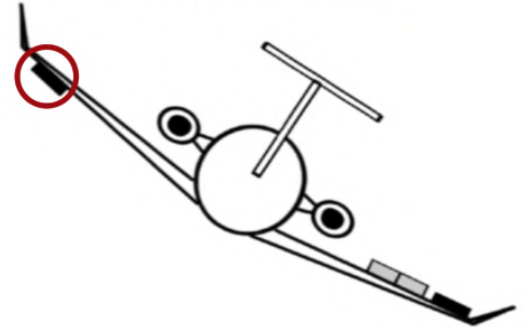
- AILERON deflection:

Up 11°
Down 11°



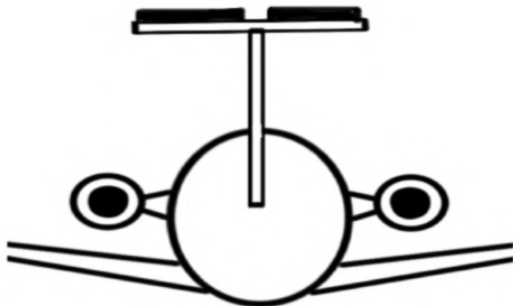
- TRIM TAB deflection:

Up 15°
Down 15°

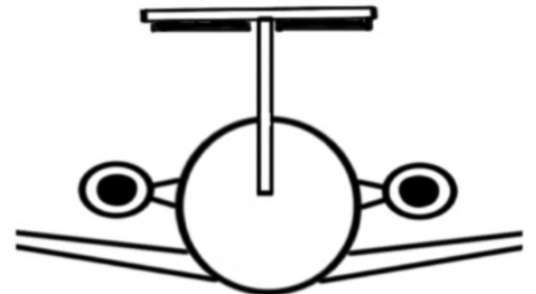


- ELEVATOR deflection:

Up 24°

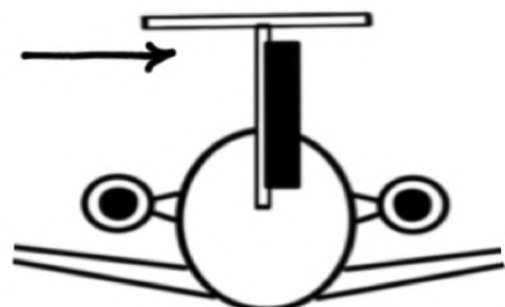
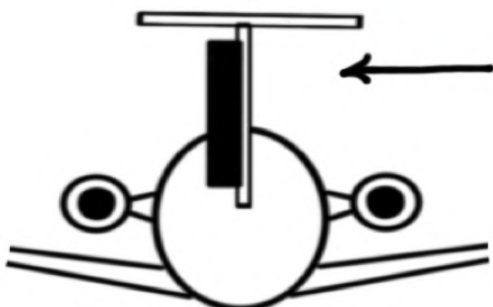


Down 13°



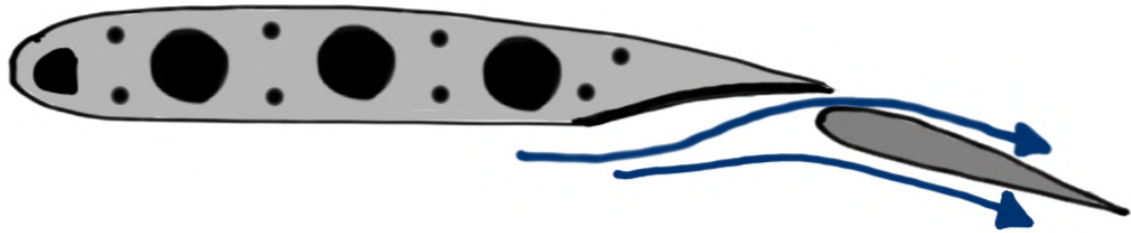
- RUDDER deflection:

Up To 22° depending on speed



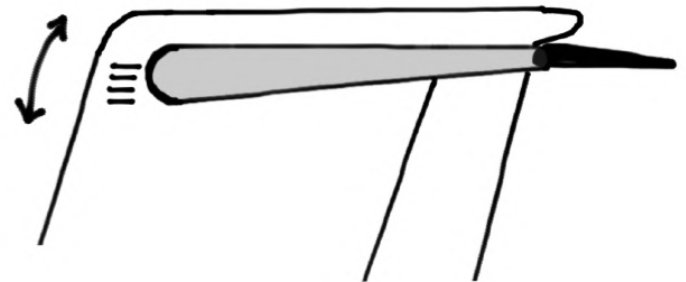
FLAPS/STAB

- 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°
Flaps 10:	-2.7°
Flaps 20:	-3.6°
Flaps 39:	-4.6°



- Flap/STAB CONTROL UNIT IS LOCATED IN THE **AEER**
- HORIZONTAL STABILIZER IS DRIVEN BY TWO (2) AC MOTORS POWERED BY THE

L
STANDBY
AC

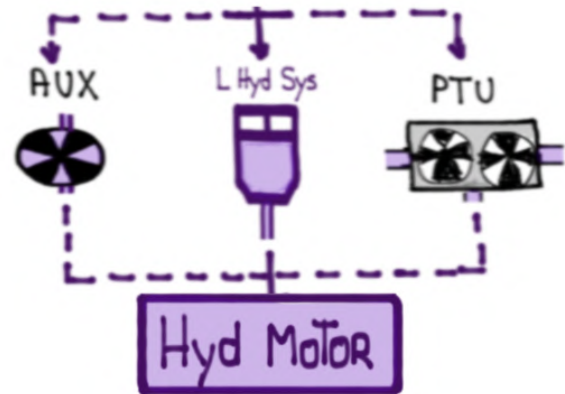
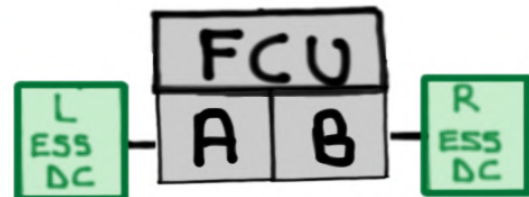
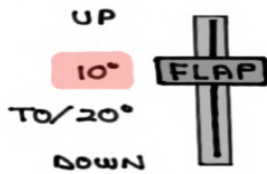
R
STANDBY
AC

buses

- Flap/stab indications on PFD (HSI) disappear thirty (30) seconds after the flaps have reached the UP (zero) position

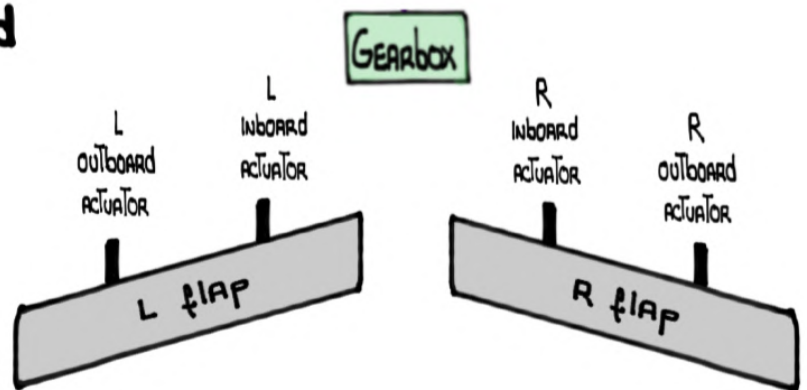
- Flaps:

ELECTRICALLY - CONTROLLED



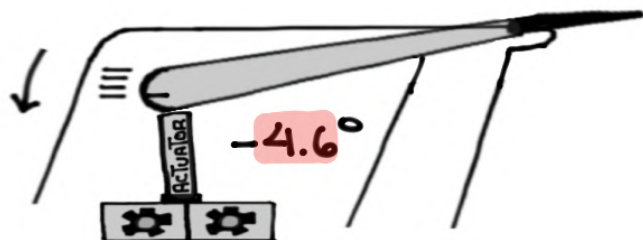
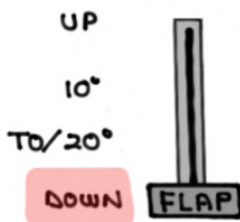
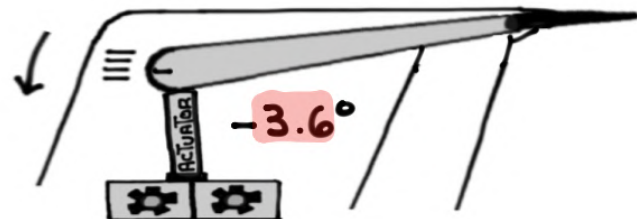
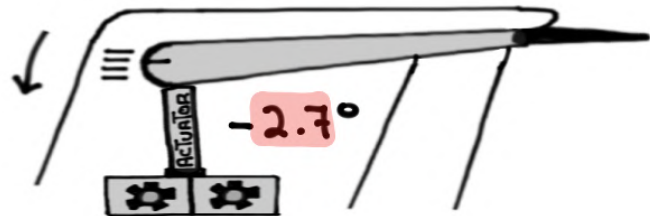
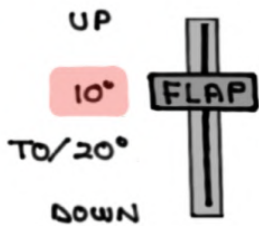
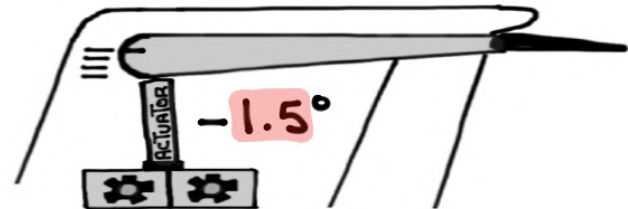
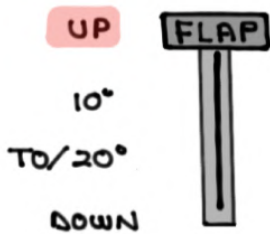
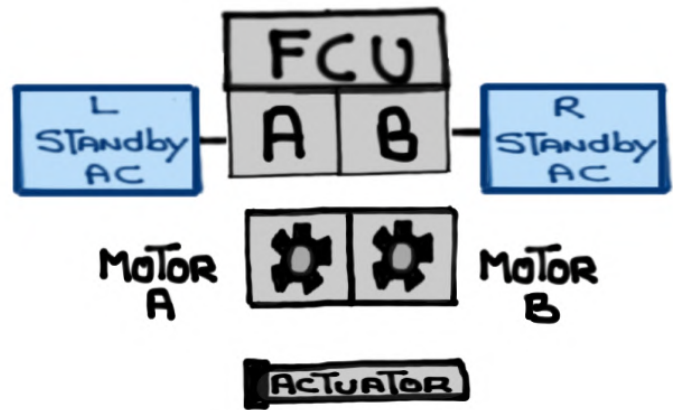
HYDRAULICALLY - POWERED

MECHANICALLY - ACTUATED



- HORIZONTAL STABILIZER:

ELECTRICALLY-CONTROLLED
AND ACTUATED

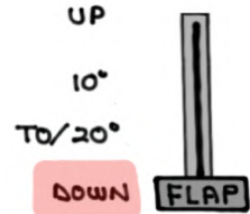
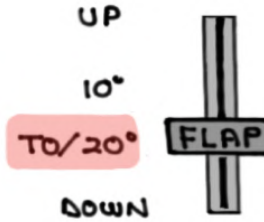
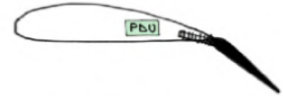
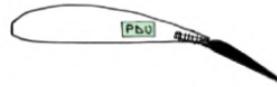
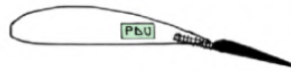
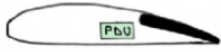


Flap 0

Flap 10

Flap 20

Flap 39



MAXIMUM EXTENSION/EXTENDED SPEED

VFE
250 KCAS

VFE
220 KCAS

VFE
170 KCAS

MAXIMUM G-loads

-1 To +2.5g

0 To +2g

0 To +2g

0 To +2g

0 To +1.5g
(> MLW)

MAXIMUM OPERATING ALTITUDE

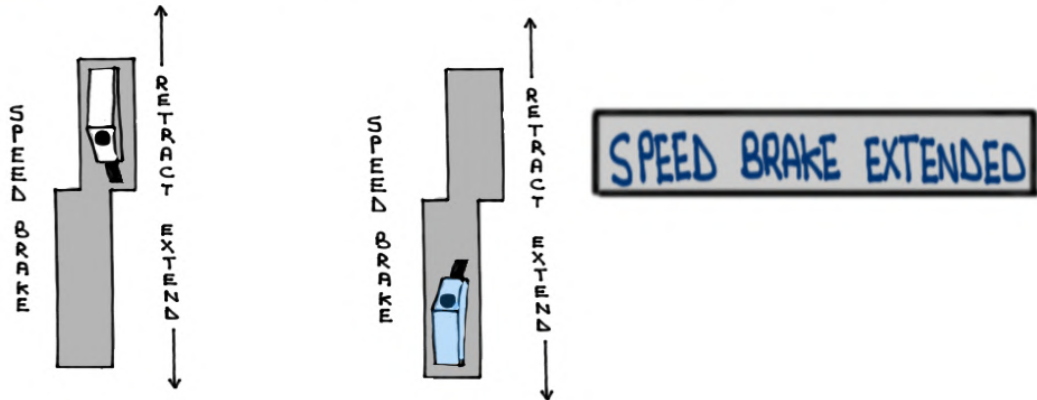
≤ 25,000'

≤ 25,000'

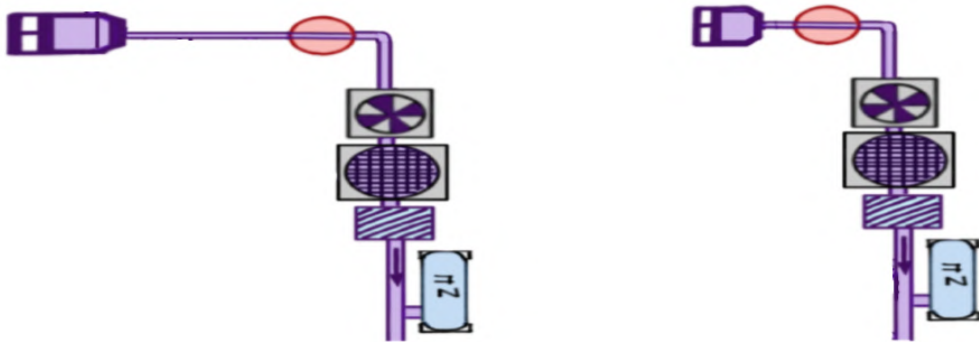
≤ 20,000'

Spoilers

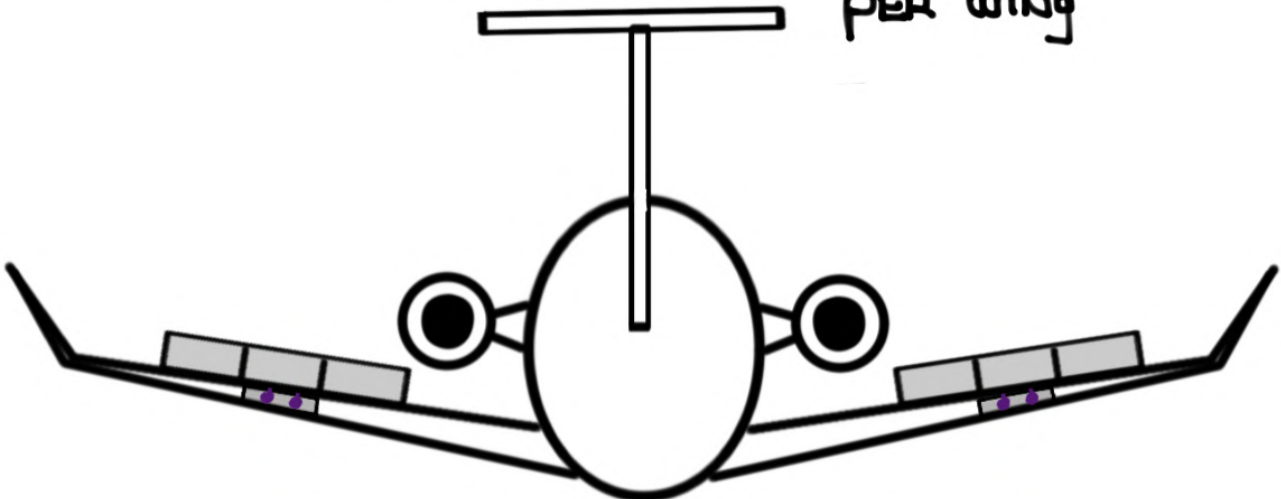
- **ELECTRICALLY** - CONTROLLED VIA SPEED BRAKE HANDLE:



- **HYDRAULICALLY** - POWERED by:

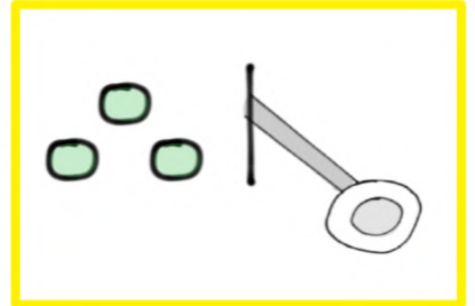
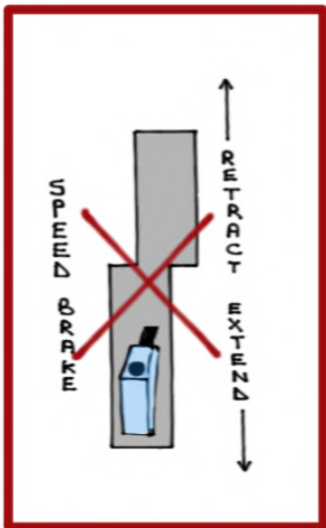


Six (6) Spoiler panels = Two (2) Hydraulic actuators PER wing

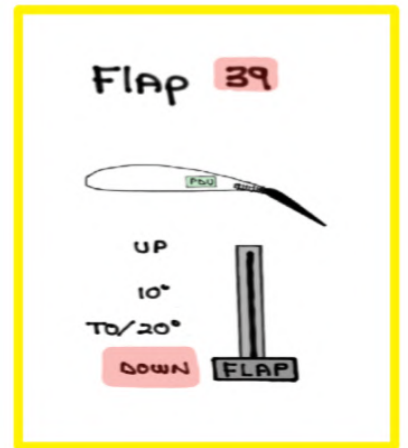


Spoilers

Do NOT EXTEND SPOILERS in flight with GEAR DOWN OR flaps 39°



Prohibited

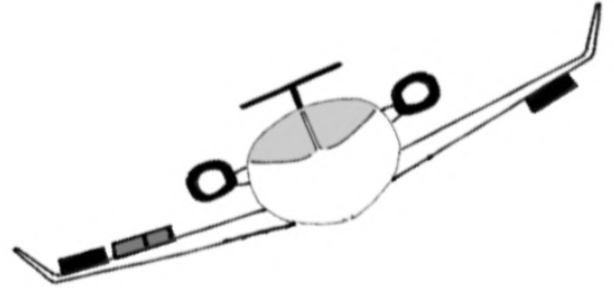
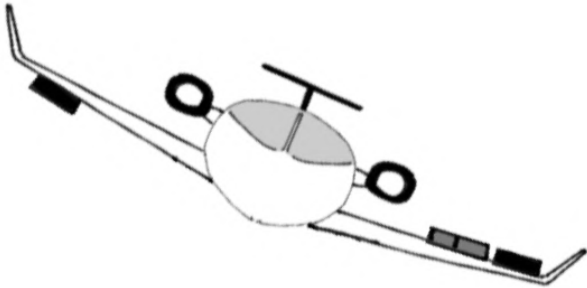


Do NOT ARM ground spoilers for Touch AND go Landings

Spoilers

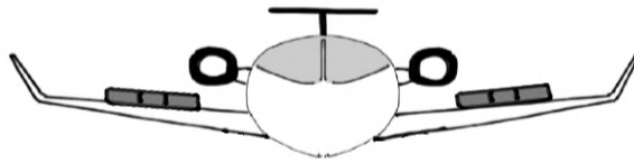
① Roll AUGMENTATION: MID AND OUTBOARD PANELS

up To 47°

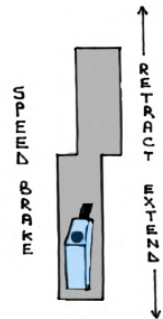


② SPEED BRAKES (in-flight)

up To 30°

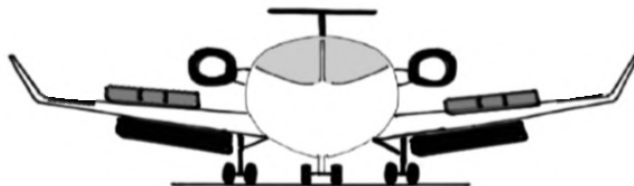


SPEED BRAKE EXTENDED



③ GROUND SPOILERS (ON GROUND)

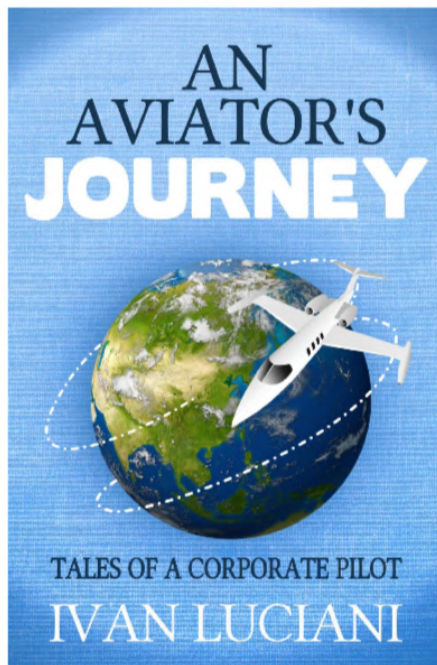
$55^\circ \pm 4^\circ$



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



Thank you!