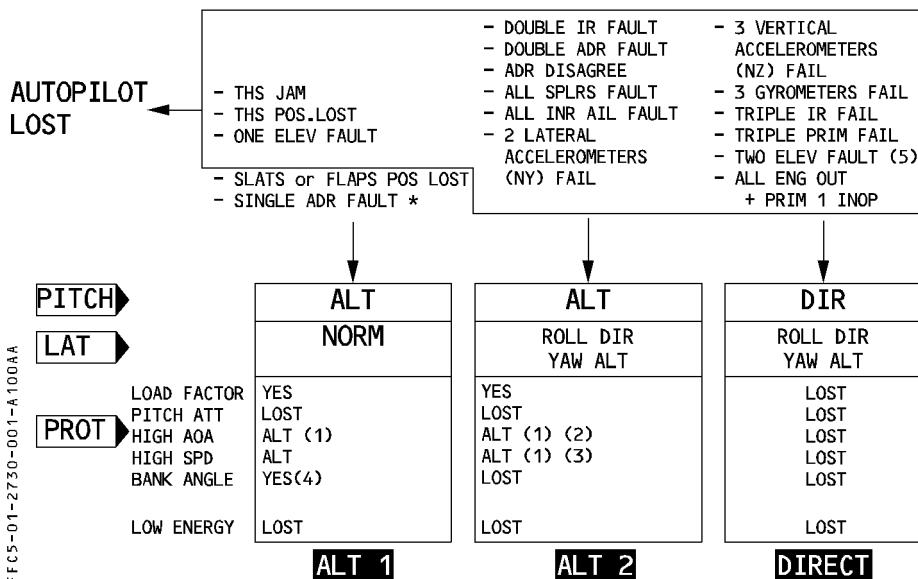


GENERAL

Depending on the type of failures affecting the flight control system, or its peripherals, there are 3 possible reconfiguration levels :

- Alternate law (ALT 1 or ALT 2)
- Direct law, or
- Mechanical.



- *
- Only in case the AOA, of the remaining ADRs, disagrees with the AOA (as computed by the PRIMs).
- (1) Protection is totally lost, in case of VS1g computation failure (loss of weight or slat/flap position).
 - (2) Protection is lost, in case of a dual ADR failure (or ADR DISAGREE).
 - (3) Protection is lost, in case of a triple ADR failure (or ADR DISAGREE).
 - (4) Bank angle limitation remains effective in ALT 1, which uses roll normal. However, since ALT 1 is generally an unprotected law, all protection marks on the PFD are in amber for simplicity.
 - (5) When both elevators have failed, only pitch mechanical backup is available, by using the manual pitch trim (THS). "MAN PITCH TRIM ONLY" is displayed in red on the PFDs.

Note : 1. In case of a dual RA failure, the flare law is introduced when the landing gear is extended and both autopilots are disengaged.

2. A jerk may be felt, in the case of flight control computers reconfiguration (due to hydraulic failure, computer failure, electrical transient...).

	FLIGHT CONTROLS		1.27.30	P 2
	RECONFIGURATION CONTROL LAWS		SEQ 100	REV 16

ALTERNATE LAW

ALT 1

PITCH CONTROL

Ground mode

Identical to normal law ground mode.

Flight mode

Flight law is a load factor demand law, similar to normal law, with limited pitch rate feedback and gains, depending on the speed and configuration.

Flare mode

Flare law is identical to normal flare law.

LATERAL CONTROL

Lateral control is similar to normal law, except that alterations of positive spiral static stability will not occur due to the loss of high AOA and high speed protection.

PROTECTIONS

Low speed stability

At low speed, a nose down demand is introduced in reference to IAS, instead of angle of attack, and alternate law changes to direct law.

It is available, whatever the slats/flaps configuration, and it is active from about 5 knots up to about 10 knots above the stall warning speed, depending on the aircraft's weight and slats/flaps configuration. A gentle progressive nose down signal is introduced, which tends to keep the speed from falling below these values. The pilot can override this demand.

Bank angle compensation is provided.

In addition, an audio stall warning (crickets + "STALL" synthetic voice message) is activated at an appropriate margin from the stall condition.

The PFD speed scale is modified to show a black/red barber pole below the stall warning.

V_{α} prot and V_{α} max are replaced by V_{sw} (stall warning speed).

The α floor protection is inoperative.

High speed stability

Above V_{mo}/M_{mo} , a nose up demand is introduced to avoid an excessive increase in speed.

The pilot can override this demand.

The high speed protection symbol ($V_{MO} + 4$) disappears.

In addition, the overspeed warning ($V_{MO} + 4$ or $MMO + 0.006$) remains available.

	FLIGHT CONTROLS RECONFIGURATION CONTROL LAWS		1.27.30	P 3
			SEQ 105	REV 16

Pitch attitude protection

Lost.

ALT 2

PITCH CONTROL

Identical to ALT 1 law.

LATERAL CONTROL

Roll direct law

Provides a direct stick-to-surface position relationship.

The gains are automatically set according to the slats/flaps configuration.

The maximum roll rate is approximately 20° to 25°/second, depending on the speed and configuration.

Spoilers 2 and 3 are inhibited, except in case of some additional failures affecting the lateral control.

Yaw alternate law

The dutch roll damping function is available, and damper authority is limited to $\pm 4^\circ$ rudder (CONF 0) and $\pm 15^\circ$ (other configuration).

Turn coordination is also provided, except in CONF 0.

PROTECTIONS

Identical to protections in ALT 1, except that :

- There is no bank angle protection in ALT 2 law.
- In case of failure of 2 ADRs, there is no low speed stability.
- In case of failure of the 3 ADRs, there is no high speed stability.

DIRECT LAW

Pitch direct law is a direct stick to elevator relationship (elevator deflection is proportional to stick deflection).

In all configurations, the maximum elevator deflection varies as a function of CG and aircraft speed.

It is a compromise between the adequate controllability at forward CG, and the not-so-sensitive controllability at aft CG.

As there is no automatic trim, the pilot has to use manual trim.

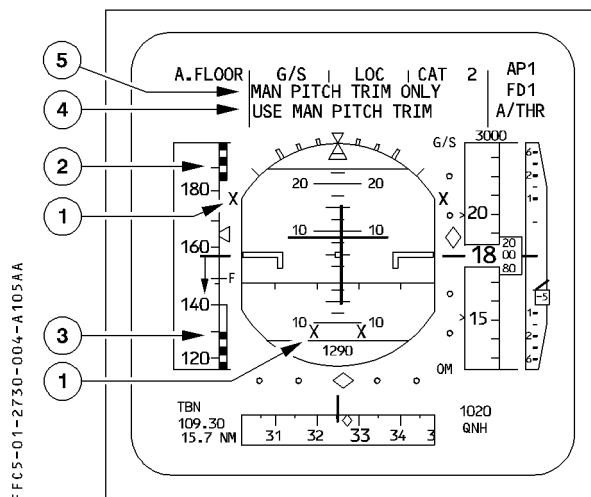
The «USE MAN PITCH TRIM» amber message is displayed on the PFD.

All protections are inoperative.

The α floor function is inoperative.

As per alternate law, overspeed and stall warnings are available.

RECONFIGURATION CONTROL LAWS – PFD DISPLAY



- ① Bank angle and pitch limitation replaced by an amber X.
- ② The overspeed protection symbol (=) disappears.
- ③ V_{α} prot and V_{α} max are replaced by V_{sw} .
- ④ USE MAN PITCH TRIM (amber) is displayed in direct law, or in flare law without RA.
- ⑤ MAN PITCH TRIM ONLY (red) is displayed if a L + R elevator fault is detected.

	FLIGHT CONTROLS		1.27.30	P 5
	RECONFIGURATION CONTROL LAWS		SEQ 100	REV 15

ABNORMAL ATTITUDE LAWS

Abnormal attitude law in pitch and roll is provided if the aircraft is in flight, and in any of the following conditions :

- Pitch attitude > 50° nose up or 30° nose down ;
- Bank angle > 125 ° ;
- Angle of attack > 30° or < – 10° ;
- Speed > 440 knots or < 60 knots ;
- Mach > 0.96 or < 0.1.

The law in pitch is the alternate law without protection (except load factor protection) and without auto trim. In roll, it is a full authority direct law with yaw alternate.

After recovery, the flight controls laws are :

- | | | |
|----------|---|------------------------------------|
| In pitch | : | Alternate law. |
| In roll | : | Direct law with yaw alternate law. |

BACKUP

To control the aircraft during a temporary complete loss of electrical power.

PITCH

Pitch mechanical control is achieved through the THS, using manual trim control.

«MAN PITCH TRIM ONLY» is displayed in red on the PFDs.

LATERAL

The Backup Control Module (BCM) computer provides yaw damping and direct rudder command with pedals. This computer includes its own electrical generator, supplied by the B or Y hydraulic system.