Appendix C

To

ADDENDUM NUMBER 4 TO THE SYSTEMS GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION - A300-600 GROUND TEST

A300-600 MSN 701 test program to confirm operational characteristics of the rudder system, in answer to NTSB request

I-/ Introduction :

In the frame of the AAL flight 587 accident on November 12, 2001, "iron bird" test session was held on 15, 16 and 17 May 2002 in Toulouse Blagnac (Cf MoM ref 506.0010/2002). A new test session on A/C (MSN 701) is now requested by the systems group in order to document the characteristics of the aircraft's flight control system:

Technical content:

- Measurement of Variable Stop Actuator extension characteristics and associated rudder max deflection depending on Vc
- Measurement of control system characteristics under pedals motions and forces (forces applied pedal on Rudder Travel Limiter Unit stop)
- Measurement of control system characteristics under Yaw Damper input
- Measurement of control system characteristics under Yaw Damper input combined with force and motion applied on pedals
- Measurement of Flight Augmentation Computer control laws characteristics
- Measurement of Autopilot characteristics

Organisation of the Test campaign
For the purpose of efficiency towards the successful completion of the Test program, as well as to guarantee the security of both personnel and equipment, each the NTSB and Airbus designate a test Supervisor who both co-ordinate and direct communication between the two and the conduct of test procedures assigned to each entity.

The Test Supervisor and its assistance team designated for each the NTSB and Airbus are listed in Appendix 3 of this document.

II-/ Test configuration :

Tests will be achieved on A300-600 MSN701, aircraft on wheels, three hydraulics circuits pressurised (no electric pomp use).
Pedals motions and forces shall be applied on Pilot side.
Reminder: Individual pedal force shall not exceed 133 daN (300 lbs) (limit load).
Sum of the pedal forces shall not exceed 200 daN (450 lbs) (limit load).

III-/ Means :

Pedals force measurement:
It shall be derived from the signal delivered by a specific sensor to be installed on the rod downstream of the first bellcrank of the rudder pedal control linkage under the cockpit floor, and measures the force on this rod (Cf Appendix 1).

Pedals position measurement:
It shall be derived from the signal delivered by a specific sensor to be installed on the first bellcrank downstream of the instrumented rod above (installation similar to SB A300-31-6093, Cf Appendix 2).

Rudder control surface position measurement:
It shall be measured from the signal delivered by the A/C sensor 10CT mounted on the rudder rotation axis (sensor originally fitted on A300-600).

Control wheel force measurement:
It shall be derived from the signals delivered by specific sensors to be installed on the vertical rod inside the Captain control column and the first horizontal rods downstream control columns (Captain and First Officer), and measure the force on these rods (Cf Appendix 1).

Control wheel position measurement:
It shall be derived from the signal delivered by a specific sensor to be installed on the first bellcrank downstream of the horizontal rod in the control wheel mechanical linkage. (Cf Appendix 2).

Aileron control surfaces position measurement:
It shall be measured from the signals delivered by the A/C sensors 6CT and 7CT mounted on the ailerons rotation axis (sensors originally fitted on A300-600).

Control column force measurement:
It shall be derived from the signal delivered by a specific sensor to be installed on the first rod downstream of the control column under the cockpit floor, and measures the force on this rod (Cf Appendix 1).

Control column position measurement:
It shall be derived from the signal delivered by a specific sensor to be installed on the second bellcrank in the control column mechanical linkage (installation similar to SB A300-31-6093, Cf Appendix 2).

Pitch control surface position measurement:
It shall be measured from the signal delivered by the A/C sensor 12CT mounted on the right hand pitch control surface rotation axis (sensor originally fitted on A300-600).

Variable Stop Actuator length measurement:
It shall be measured from the signal delivered by a specific sensor to be mounted on the actuator.

Vc simulation tool:
It will permit to inject simulated Vc as an ADC output.

Yaw Damper actuator servoloop kit:
It will permit to inject rudder deflection order to the Yaw Damper actuator.

Yaw Auto Pilot actuator servoloop kit:
It will permit to inject rudder deflection order to the Yaw Auto Pilot actuator.

Yaw rate simulation tool:
It will permit to inject simulated yaw rate to the FAC.

Function generator.

Information to be recorded:
For each test sequence, **all** the following parameters shall be **simultaneously** registered:
Pedals position (parameter N° 271025)
Paired pedals force (parameter N° 271003)
Rudder control surface position (parameter N° 271024)
Control wheel position (parameter N° 271026)
Control wheel force (parameter N° 271008)
Aileron control surfaces position (parameters N° 271020 and 271021)
Control column position (parameter N° 271027)
Control column force (parameter N° 271009)
Pitch control surface position (parameter N° 271022)
VSA length (parameter N° 271040)
Clock (parameter N° 312)

IV-/ Test program :

IV-0: Measurement of Variable Stop Actuator extension characteristics and associated rudder max deflection depending on Vc

IV-0-1: Vc = 160 knots
Push left pedal until it reaches RTL stop.
Inject a positive ramp of 1 kt/sec until Vc reaches 310 knots. Let the left pedal come back but still apply sufficient force to be in permanent contact with RTL stop.
Repeat the same on right pedal.

IV-0-2: Vc=160 knots
Inject a Vc step input to 395 knots until Variable Stop Actuator motion stops.
Push left pedal until it reaches RTL stop.
Return to neutral.
Push right pedal until it reaches RTL stop.

IV-0-3: Vc=300 knots
Cut off electrical power supply to FLC 1 & 2:
Pull C/B 5CY2 (110PP) and 305CY2 (231XP). Then pull C/B 5CY1 (301PP) and 305 CY1 (331XP).

IV-1 : Measurement of control system characteristics under pedals motions and forces (Rudder trim= 0°, Yaw Damper OFF; Auto Pilot OFF)

IV-1-1 Vc = 0 knots
Left and right slow pedal motion up to the pedal mechanical stops (about 20 s from neutral to full deflection)

IV-1-2 Vc = 240 knots
IV-1-2-a: Push left pedal with a speed of 5 deg pedals / second until it reaches RTL stop. Keep on pushing the left pedal in order to increase left pedal force up to 100 daN (225 lbs) as continuously as possible.
Repeat the same on the right hand side.
IV-1-2-b: Idem IV-1-3-a but with a speed of 20 deg pedals / second.

IV-1-3 Idem IV-1-3 but with Vc = 250 knots

IV-1-4 Idem IV-1-3 but with Vc = 260 knots

WARNING: For points IV-1-5, IV-1-6, IV-1-7, IV-3-1, IV-4-9, IV-4-10, IV-4-11, IV-4-12 below, pedal force shall be continuously monitored so that it does not exceed 100 daN (225 lbs) (conservative load). The aircraft behaviour in terms of vibration / oscillations shall be monitored and test sequence shall be stopped according to specific structural criteria.
For points IV-1-5, IV-1-6, IV-1-7, operator shall be trained to achieve these test sequences

IV-1-5 Vc=0 knots
Repeat in a continuous manner three times the following sequence:
Push left pedal. When left pedal position is higher than 15° (2/3 of full travel) and before it reaches pedals mechanical stop, push right pedal. When right pedal position is higher than 15° (2/3 of full travel) and before it reaches mechanical stop, return to neutral.
The three cycles shall be completed in about 1.5 min, trying to achieve a sine movement of a 30 sec period (Cf **WARNING** above).

IV-1-6 Vc=0 knots
Same as IV-1-5 but the three cycles shall be completed in about 15 seconds, trying to achieve a sine movement of a 5 sec period (Cf **WARNING** above).

IV-1-7 Vc=0 knots
Same as IV-1-5 but the three cycles shall be completed in about 6 seconds, trying to achieve a sine movement of a 2 sec period (Cf **WARNING** above).

IV-2 : Measurement of control system characteristics under Yaw Damper input without any force applied on pedals

IV-2-0 Vc=0 knot
Search for maximum possible rudder deflection with Yaw Damper actuator servoloop kit tool.

IV-2-1 Vc = 0 knot
Inject a left rudder position order ramp of 15 deg rudder / sec (equivalent to a rudder deflection speed order step input) to the Yaw Damper actuator, with Yaw Damper actuator servoloop kit tool and function generator (max ordered position: 8.5 deg rudder)
Repeat the same with a right ramp.

IV-2-2 Idem IV-2-1 but with a ramp of 39 deg rudder / sec (39 deg rud / sec is the actuator and FAC max speed).

IV-2-3 Idem IV-2-1 but with a ramp of 60 deg rudder / sec (rudder deflection speed should be 39 deg rud / sec only due to actuator max speed).

IV-3 : Measurement of control system characteristics under Yaw Damper input combined with force and motion applied on pedals

IV-3-1 Vc = 0 knot
Inject a left ramp of 0.5 deg rudder / sec to the Yaw Damper actuator until rudder reaches max deflection (max deflection should be 8.5 deg rud due to function generator). During this rudder movement , apply the following cycle to the pedals:

> push left pedal up to mechanical stop, return to neutral, push right pedal up to mechanical stop, return to neutral. This cycle shall be completed in about 3 seconds (Cf **WARNING** above). Continue movement in order to achieve a sine movement of a 3 sec period.

IV-3-2 Vc = 240 knots
Inject a rudder deflection order to the Yaw Damper actuator of 4 deg rudder left.
Push left pedal until it reaches RTLU stop.
Slowly increase pedal force up to 50 daN (112 lbs).
Inject a right ramp of 39 deg rudder / sec to the Yaw Damper until Yaw Damper output reaches 4 deg rudder right. Maintain 50 daN (112 lbs) on the left pedal.

IV-3-3 Vc = 240 knots
Inject a rudder deflection order to the Yaw Damper of 4 deg left.
Push right pedal until it reaches RTLU stop.
Slowly increase pedal force up to 50 daN (112 lbs).
Inject a right ramp of 39 deg rudder / sec to the Yaw Damper until Yaw Damper output reaches 4 deg rudder right. Resist pedal motion up to 100 daN (225 lbs).

IV-4 : Measurement of FAC (Flight Augmentation Computer) control laws characteristics

IV-4-1 Vc = 165 knots
Inject a step input yaw rate of 10 deg yaw /sec to the FAC until rudder reaches maximum deflection.

IV-4-2 Idem IV-4-1 but with Vc = 200 knots

IV-4-3 Idem IV-4-1 but with Vc = 240 knots

IV-4-4 Idem IV-4-1 but with Vc = 260 knots

IV-4-5 Vc = 165 knots
Inject a yaw rate varying from 0 to 10 deg yaw /sec, with an increase rate of 0.1 deg yaw / sec / sec, to the FAC until rudder reaches maximum deflection.

IV-4-6 Idem IV-4-5 but with Vc = 240 knots

IV-4-7 Idem IV-4-5 but with Vc = 240 knots and a yaw rate increase rate of 0.5 deg yaw / sec / sec

IV-4-8 Idem IV-4-5 but with Vc = 240 knots and a yaw rate increase rate of 1 deg yaw / sec / sec

IV-4-9 Vc = 240 knots
Inject a sinusoidal yaw rate varying from 0 to 10 deg yaw /sec, with a period of 10 seconds, to the FAC (Cf **WARNING** above)

IV-4-10 Idem IV-4-9 but with a period of 5 seconds (Cf **WARNING** above)

IV-4-11 Idem IV-4-9 but with a period of 3 seconds (Cf **WARNING** above)

IV-4-12 Idem IV-4-9 but with a period of 2 seconds (Cf **WARNING** above)

IV-5 : Measurement of Autopilot actuator characteristics (Rudder trim= 0°, Yaw Damper OFF; Auto Pilot ON)

IV-5-0 Search for maximum possible rudder deflection with Autopilot actuator servoloop kit.

IV-5-1 Vc = 0 knots
Inject a left rudder position order ramp of 15 deg rudder / sec (equivalent to a rudder deflection speed order step input) to the Yaw Autopilot Actuator, with Yaw Auto Pilot actuator servoloop kit and function generator (max ordered position: 18 deg rudder).
Repeat the same with a right ramp.

IV-5-2 Idem IV-5-1 but with a ramp of 34 deg rudder / sec (34 deg rud / sec is the actuator and FAC max speed).

IV-5-3 Idem IV-5-1 but with a ramp of 60 deg rudder / sec (rudder deflection speed should be 34 deg rud / sec only due to actuator max speed).

Agreed and accepted

AIRBUS

Dominique CHATRENET

Vice President
Flight Control & Hydraulics Systems

Date: 12/09/09

Signature:

NATIONAL TRANSPORTATION SAFETY BOARD

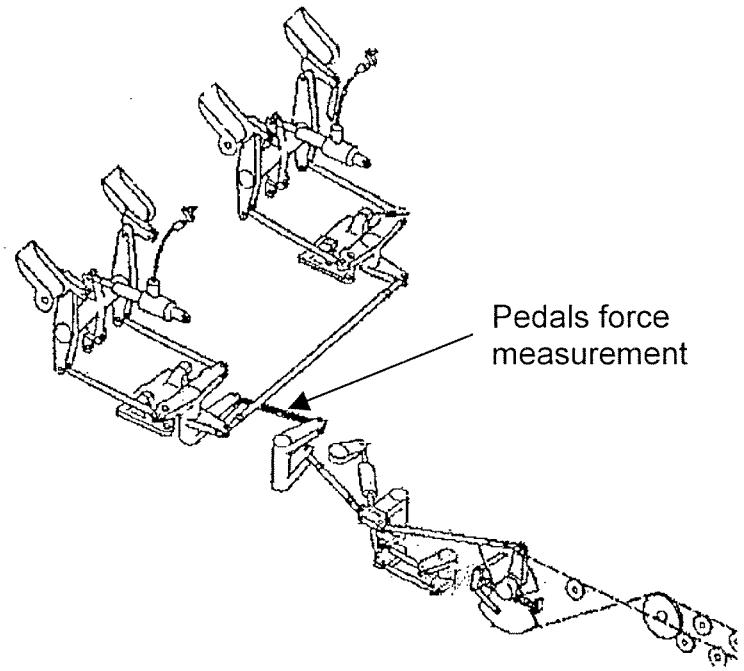
Steven MAGLADRY

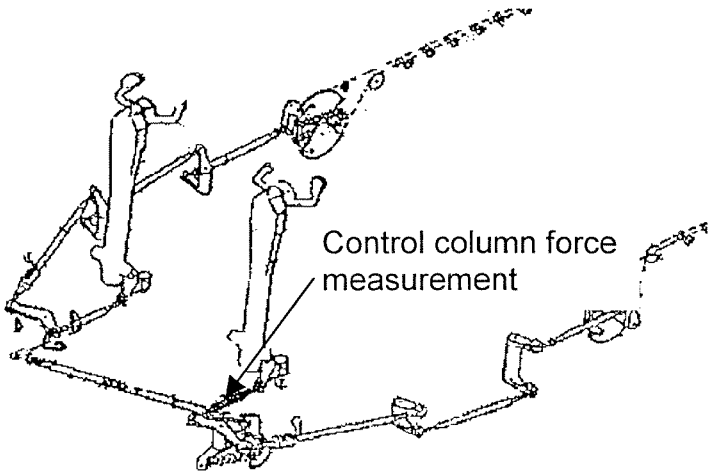
Systems Group Chairman

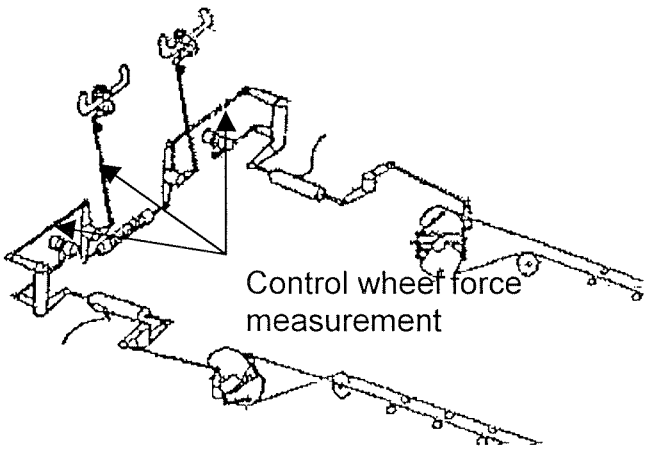
Date: 09/13/02

Signature:

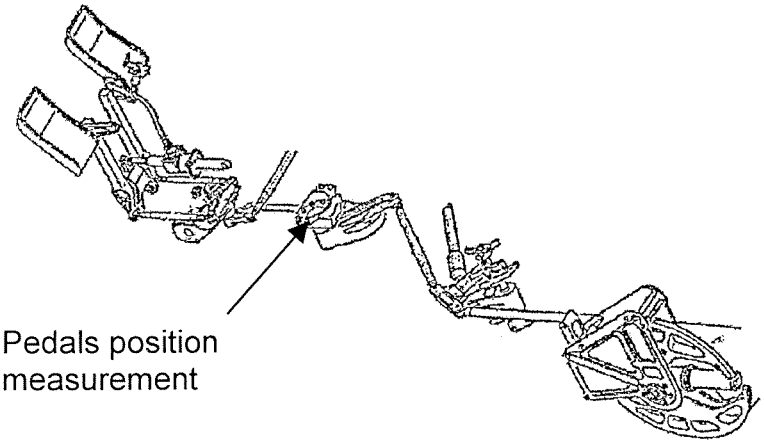
Appendix 1 : Force measurements

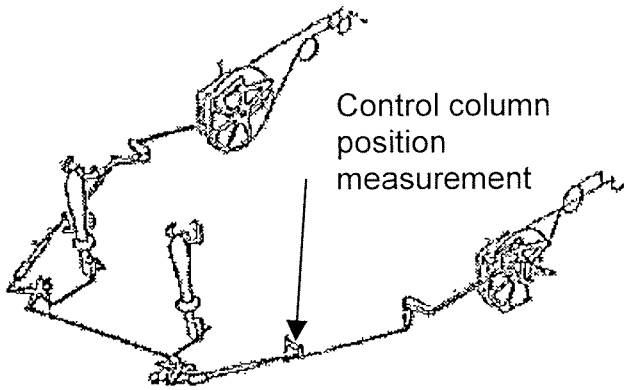


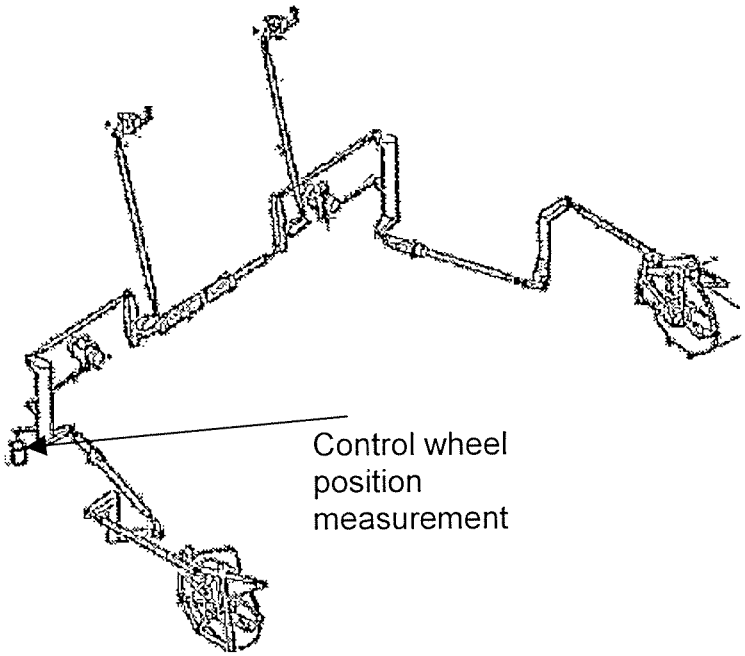




Appendix 2 : Position measurements







Appendix 3 : Test Supervisory

For Airbus:

Ground Test Supervisor –.....Denis OSWALD
Instrumentation & Engineering

With the assistance of:

System Ground Test Follow-up –.....Laurent ANDRIEU
Design Office - (back-up Cecile MAGNE)

Ground Test Maintenance Support - .....Dominique MAZZARINO
& Logistics liaison

Ground Test Support - .....André MAUMUS
Engineering

HUMAN FACTORS Tests Support .....Armand JACOB

For the NTSB

Ground Test Supervisor –.....Scott WARREN

With the assistance of:

System Ground Test Follow-up –.....Steve MAGLADRY

Instrumentation Engineering - .....Marc HEPP

HUMAN FACTORS Tests Support –.....Bart ELIAS

September 11th 2002

IV-0 **MEASUREMENT** OF VSA EXTENSION CHARACTERISTICS AND ASSOCIATED RUDDER MAX DEFLECTION DEPENDING ON Vc

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-0-1 Vc = 160 kts					
A	Set Vc = 160 kts	LACOMBE	Vc	34120611		253 IV01.001
			VSA	271040		
B	Left pedal motion → RTL stop	Pilot	Rud. Ped.	271025		16:29:00
			Rud. Surf	271024		16:32:30
			Rud. Force	271003		
			L Ped. Force	271001		95 lbs
C	Increase Vc 1 kts/s → 310 kts	LACOMBE	Vc	34120611		
D	Left pedal comes back but apply force to maintain contact to RTL stop	Pilot	VSA	271040		
			Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			L Ped. Force	271001		
E	Return to neutral	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
F	Set Vc = 160 kts	LACOMBE	Vc	34120611		
			VSA	271040		253 IV01.002
G	Right pedal motion → RTL stop	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		16:36:00
			Rud. Force	271003		16:39:15
			R Ped. Force	271002		
H	Increase Vc 1 kts/s → 310 kt	LACOMBE	Vc	34120611		
			VSA	271040		
I	Right pedal comes back but apply force to maintain contact to RTL stop	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			R Ped. Force	271002		
			Rud. Ped.	271025		
J	Return to neutral	Pilot	Rud. Surf	271024		

IV-0 MEASUREMENT OF VSA EXTENSION CHARACTERISTICS AND ASSOCIATED RUDDER MAX DEFLECTION **DEPENDING ON Vc**

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-0-2 Vc = 160 kts					
A	Set Vc = 160 kts	LACOMBE	Vc	34120611		253 IV02
			VSA	271040		
B	Vc step 160kts → 395 kts	LACOMBE	Vc	34120611		16:44:15
			VSA	271040		16:47:20
C	Push left pedal to stop	Pilot	L ped force	271001		
			Rud.surf	271024		
D	Push right pedal to stop	Pilot	R ped force	271002		
			Rud.surf	271024		

IV-0 MEASUREMENT OF VSA EXTENSION CHARACTERISTICS AND ASSOCIATED RUDDER MAX DEFLECTION **DEPENDING ON Vc**

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-0-3-1 Vc = 300 kts					253 IV03.001
A	Set Vc = 300 kts	LACOMBE	Vc	34120611		16:07:51
			VSA	271040		16:11:00
B	Cut off electrical power supply to FLC2 5CY2 and 305CY2 J4 J5	Pilot	VSA	271040		nothing
			RTL flt	271042		
C	Cut off electrical power supply to FLC1 5CY1 and 305CY1 J1 J2	Pilot	VSA	271040		retract
			RTL flt	271041		253 IV03.002
D	Reset C/B	Pilot				16:16:00
						16:17:20

IV-0 MEASUREMENT OF VSA EXTENSION CHARACTERISTICS AND ASSOCIATED RUDDER MAX DEFLECTION **DEPENDING ON Vc**

Nota: Post test program NSTB request

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-0-3-2 Vc = 300 kts					253 IV03.003
A	Set Vc = 300 kts	LACOMBE	Vc	34120611		16:19:00
			VSA	271040		16:20:30
B	Cut off electrical general 115 VAC/400 power	Pilot	VSA	271040		retract
			RTL flt	271042		
			RTL flt	271041		
D	Reset C/B	Pilot				

IV-0 MEASUREMENT OF VSA EXTENSION CHARACTERISTICS AND ASSOCIATED RUDDER MAX DEFLECTION **DEPENDING ON Vc**

Nota: Post test program NSTB request

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-0-3-3 Vc = 300 kts					254 IV03.004
A	Set Vc = 300 kts	LACOMBE	Vc	34120611		16:05:30
			VSA	271040		16:06:28
B	Shut down A/C external ground electrical power supply	Ground mechanic	VSA	271040		retract
			RTL flt	271042		
			RTL flt	271041		
C	Reset power	Ground mechanic				

IV-1 **MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS** UNDER PEDALS MOTIONS AND FORCES

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ	RESULTS	COMMENTS/GMT
	IV-1-1 Vc = 0 kts				253 IV11.001
A	Set Vc = 0 kts	LACOMBE	Vc 34120611		16:51:20
B	Left pedal motion → to stop (approx 20 s)	Pilot	Rud. Ped. 271025		16:53:54
			Rud. Surf 271024		253 IV11.002
C	Return to neutral (approx 20 s)	Pilot			16:57:32
D	Right pedal motion → to stop (approx 420s)	Pilot	Rud. Ped. 271025		16:59:45
			Rud. Surf 271024		253 IV11.003
E	Return to neutral (approx 20 s)	Pilot			17:00:21
					17:02:30

IV-1 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS **UNDER PEDALS MOTIONS AND FORCES**

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ	RESULTS	COMMENTS/GMT
	IV-1-2 Vc = 240 kts				
A	Set Vc = 240 kts	LACOMBE	Vc 34120611		253 IV12.001
			VSA 271040		17:06:50
B	Left pedal motion at **5**°/s → to RTL stop (approx 2 s)	Pilot	Rud. Ped. 271025		17:08:20
			Rud. Surf 271024		
	Increase pedal force up to 100daN = 225 lbs		Rud. Force 271003		
			L Ped. Force 271001		Max 100 daN/225 lbs
		Pilot	Rud. Force 271003		
			L Ped. Force 271001		Max 100 daN/225 lbs
C	Return to neutral				
D	Right pedal motion at **5**°/s → to RTL stop (approx 2 s)	Pilot	Vc 34120611		
			VSA 271040		
			Rud. Ped. 271025		
			Rud. Surf 271024		
			Rud. Force 271003		
			R Ped. Force 271002		
	Increase pedal force up to 100daN = 225 lbs		Rud. Force 271003		
			R Ped. Force 271002		
E	Left pedal motion at **20**°/s → to RTL stop (approx 1/2 s)	Pilot	Rud. Ped. 271025		253 IV12.002
			Rud. Surf 271024		17:13:50
			Rud. Force 271003		17:14:55
			L Ped. Force 271001		
	Increase pedal force up to 100daN = 225 lbs		Rud. Force 271003		
			L Ped. Force 271001		
F	Return to neutral				
G	Right pedal motion at **20**°/s → to RTL stop (approx 1/2 s)	Pilot	Rud. Ped. 271025		
			Rud. Surf 271024		
			Rud. Force 271003		
			R Ped. Force 271002		
			Rud. Force 271003		
	Increase pedal force up to 100daN = 225 lbs		R Ped. Force 271002		
H	Return to neutral				

IV-1 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS **UNDER PEDALS MOTIONS AND FORCES**

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ	RESULTS	COMMENTS/GMT
	IV-1-3 Vc = 250 kts				
A	Set Vc = 250 kts	LACOMBE	Vc 34120611		253 IV13.001
			VSA 271040		17:18:50
B	Left pedal motion at **5**°/s → to RTL stop (approx 1.5 s)	Pilot	Rud. Ped. 271025		17:19:50
			Rud. Surf 271024		
			Rud. Force 271003		
			L Ped. Force 271001		Max 100 daN/225 lbs
	Increase pedal force up to 100daN = 225 lbs		Rud. Force 271003		
			L Ped. Force 271001		Max 100 daN/225 lbs
C	Return to neutral				
D	Right pedal motion at **5**°/s → to RTL stop (approx 1.5 s)	Pilot	Vc 34120611		
			VSA 271040		
			Rud. Ped. 271025		
			Rud. Surf 271024		
			Rud. Force 271003		
			R Ped. Force 271002		
	Increase pedal force up to 100daN = 225 lbs		Rud. Force 271003		
			R Ped. Force 271002		
E	Left pedal motion at **20**°/s → to RTL stop (approx 1/3 s)	Pilot	Rud. Ped. 271025		253 IV13.002
			Rud. Surf 271024		17:21:40
			Rud. Force 271003		17:22:20
			L Ped. Force 271001		
	Increase pedal force up to 100daN = 225 lbs		Rud. Force 271003		
			L Ped. Force 271001		
	Return to neutral				
G	Right pedal motion at **20**°/s → to RTL stop (approx 1/3 s)	Pilot	Rud. Ped. 271025		
			Rud. Surf 271024		
			Rud. Force 271003		
			R Ped. Force 271002		
	Increase pedal force up to 100daN = 225 lbs		Rud. Force 271003		
			R Ped. Force 271002		
	Increase pedal force up to 100daN = 225 lbs				

IV-1 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS **UNDER PEDALS MOTIONS AND FORCES**

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ	RESULTS	COMMENTS/GMT
	IV-1-4 Vc = 260 kts				
A	Set Vc = 260 kts	LACOMBE	Vc 34120611		253 IV14.001
			VSA 271040		17:25:00
B	Left pedal motion at **5**°/s → to RTL stop (approx 1 s)	Pilot	Rud. Ped. 271025		17:25:55
			Rud. Surf 271024		
			Rud. Force 271003		
			L Ped. Force 271001		Max 100 daN/225 lbs
	Increase pedal force up to 100daN = 225 lbs		Rud. Force 271003		
			L Ped. Force 271001		Max 100 daN/225 lbs
C	Return to neutral				
D	Right pedal motion at **5**°/s → to RTL stop (approx 1 s)	Pilot	Vc 34120611		
			VSA 271040		
			Rud. Ped. 271025		
			Rud. Surf 271024		
			Rud. Force 271003		
	Increase pedal force up to 100daN = 225 lbs		R Ped. Force 271002		
			Rud. Force 271003		
			R Ped. Force 271002		
E	Return to neutral				
F	Left pedal motion at **20**°/s → to RTL stop (approx 1/4 s)	Pilot	Rud. Ped. 271025		253 IV14.002
			Rud. Surf 271024		17:28:10
	Increase pedal force up to 100daN = 225 lbs		Rud. Force 271003		17:29:05
			L Ped. Force 271001		
			Rud. Force 271003		
			L Ped. Force 271001		
	Return to neutral				
G	Right pedal motion at **20**°/s → to RTL stop (approx ¼ s)	Pilot	Rud. Ped. 271025		
			Rud. Surf 271024		
			Rud. Force 271003		
			R Ped. Force 271002		
	Increase pedal force up to 100daN = 225 lbs		Rud. Force 271003		
			R Ped. Force 271002		
G	Return to neutral				

IV-1 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS **UNDER PEDALS MOTIONS AND FORCES**
Warning: Do not exceed 100 daN = 225 lbs on pedal force

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-1-5 Vc = 0 kts (note delta ped max=21°)					
A	Set Vc = 0 kts	LACOMBE	Vc	34120611		253 IV15
			VSA	271040		17:51:00
B	Push left pedal up to 15° (2/3 of full travel) but don't reach stop	Pilot	Rud. Ped.	271025		17:52:45
			Rud. Surf	271024		
			Rud. Force	271003		
			L Ped. Force	271001		Max 100 daN/225 lbs
C	Push right pedal up to 15° (2/3 of full travel) but don't reach stop	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			R Ped. Force	271002		Max 100 daN/225 lbs
D	Return to neutral. **Cycle achieved in 30s and continue immediately with next point**					
E	Repeat cycle. **Cycle achieved in 30s and continue immediately with next point**	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			L Ped. Force	271001		
			R Ped. Force	271002		
F	Repeat cycle. **Cycle achieved in 30s**	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			L Ped. Force	271001		
			R Ped. Force	271002		

IV-1 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS **UNDER PEDALS MOTIONS AND FORCES**
Warning: Do not exceed 100 daN = 225 lbs on pedal force

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-1-6 Vc = 0 kts					
A	Set Vc = 0 kts	LACOMBE	Vc	34120611		253 IV16
			VSA	271040		17:55:56
B	Push left pedal up to 15° (2/3 of full travel) but don't reach stop	Pilot	Rud. Ped.	271025		17:56:33
			Rud. Surf	271024		
			Rud. Force	271003		
			L Ped. Force	271001		Max 100 daN/225 lbs
C	Push right pedal up to 15° (2/3 of full travel) but don't reach stop	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			R Ped. Force	271002		Max 100 daN/225 lbs
D	Return to neutral. **Cycle achieved in 5s and continue immediately with next point**		Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			L Ped. Force	271001		
			R Ped. Force	271002		
E	Repeat cycle. **Cycle achieved in 5s and continue immediately with next point**	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			L Ped. Force	271001		
			R Ped. Force	271002		
F	Repeat cycle. Repeat cycle. **Cycle achieved in 5s**	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			L Ped. Force	271001		
			R Ped. Force	271002		

IV-1 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS **UNDER PEDALS MOTIONS AND FORCES**
Warning: Do not exceed 100 daN = 225 lbs on pedal force

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-1-7 Vc = 0 kts					
A	Set Vc = 0 kts	LACOMBE	Vc	34120611		253 IV17
			VSA	271040		17:58:45
B	Push left pedal up to 15° (2/3 of full travel) but don't reach stop	Pilot	Rud. Ped.	271025		17:59:28
			Rud. Surf	271024		
			Rud. Force	271003		
			L Ped. Force	271001		Max 100 daN/225 lbs
C	Push right pedal up to 15° (2/3 of full travel) but don't reach stop	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			R Ped. Force	271002		Max 100 daN/225 lbs
D	Return to neutral. **Cycle achieved in 2s and continue immediately with next point**	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			L Ped. Force	271001		
			R Ped. Force	271002		
E	Repeat cycle. **Cycle achieved in 2s and continue immediately with next point**	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			L Ped. Force	271001		
			R Ped. Force	271002		
F	Repeat cycle. **Cycle achieved in 2s**	Pilot				

IV-2 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS **UNDER YAW DAMPER INPUT WITHOUT ANY FORCE APPLIED ON PEDALS**

ALL TRIMS = 0°		YAW DAMPER = **OFF**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-2-0 Vc = 0 kts Manual increase					
A	Set Vc = 0 kts	LACOMBE	Vc	34120611		254 IV20.001
			VSA	271040		08:46:50
B	Set FAC/FCC configuration B	BAUDET				08:48:00
C	Set Yaw Damper **KIT** ON	BAUDET				
D	Set a **left** rudder deflection in the YDA servo-loop until rudder stops at max deflection	BAUDET	Fct gen	271045		
			YD current	271046		
			Rud pos	271024		
E	Set a **right** rudder deflection in the YDA servo-loop until rudder stops at max deflection	BAUDET	Fct gen	271045		254 IV20.002
			YD current	271046		08:50:00
			Rud pos	271024		08:51:00

IV-2 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS **UNDER YAW DAMPER INPUT WITHOUT ANY FORCE APPLIED ON PEDALS**

ALL TRIMS = 0°		YAW DAMPER = **OFF**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-2-1 Vc = 0 kts ramp 15°/s					
A	Set Vc = 0 kts	LACOMBE	Vc	34120611		254 IV21
			VSA	271040		08:56:20
B	Set FAC/FCC configuration B	BAUDET				08:56:40
C	Set a 15°/s **left** rudder deflection in the YDA servo-loop until rudder stops at a 8.5° deflection	BAUDET	Fct gen	271045		
			YD current	271046		
			Rud pos	271024		
D	Set a 15°/s **right** rudder deflection in the YDA servo-loop until rudder stops at a 8.5° deflection	BAUDET	Fct gen	271045		
			YD current	271046		
			Rud pos	271024		

IV-2 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS **UNDER YAW DAMPER INPUT WITHOUT ANY FORCE APPLIED ON PEDALS**

ALL TRIMS = 0°		YAW DAMPER = **OFF**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-2-2 Vc = 0 kts ramp 39°/s					
A	Set Vc = 0 kts	LACOMBE	Vc	34120611		254 IV22
			VSA	271040		09:03:00
B	Set FAC/FCC configuration B	BAUDET				09:03:15
C	Set a 39°/s **left** rudder deflection in the YDA servo-loop until rudder stops at a 8.5° deflection	BAUDET	Fct gen	271045		
			YD current	271046		
			Rud pos	271024		
D	Set a 39°/s **right** rudder deflection in the YDA servo-loop until rudder stops at a 8.5° deflection	BAUDET	Fct gen	271045		
			YD current	271046		
			Rud pos	271024		

IV-2 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS **UNDER YAW DAMPER INPUT WITHOUT ANY FORCE APPLIED ON PEDALS**

ALL TRIMS = 0°		YAW DAMPER = **OFF**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-2-3-1 Vc = 0 kts ramp 60°/s					
A	Set Vc = 0 kts	LACOMBE	Vc	34120611		254 IV23.001
			VSA	271040		09:09:20
B	Set FAC/FCC configuration B	BAUDET				09:09:40
C	Set a 60°/s **left** rudder deflection in the YDA servo-loop until rudder stops at a 8.5° deflection	BAUDET	Fct gen	271045		
			YD current	271046		
			Rud pos	271024		
D	Set a 60°/s **right** rudder deflection in the YDA servo-loop until rudder stops at a 8.5° deflection	BAUDET	Fct gen	271045		
			YD current	271046		
			Rud pos	271024		

IV-2 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS **UNDER YAW DAMPER INPUT WITHOUT ANY FORCE APPLIED ON PEDALS**

Nota: Post test program NSTB request

ALL TRIMS = 0°		YAW DAMPER = **OFF**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-2-3-2 Vc = 0 kts step					254 IV23.002
A	Set Vc = 0 kts	LACOMBE	Vc	34120611		
			VSA	271040		
B	Set FAC/FCC configuration B	BAUDET				09:27:10
C	Set a step **left** rudder deflection in the YDA servo-loop until rudder stops at a 8.5° deflection	BAUDET	Fct gen	271045		09:27:30
			YD current	271046		
			Rud pos	271024		
D	Set a step **right** rudder deflection in the YDA servo-loop until rudder stops at a 8.5° deflection	BAUDET	Fct gen	271045		
			YD current	271046		
			Rud pos	271024		

IV-3 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS UNDER YAW DAMPER INPUT COMBINED WITH FORCE APPLIED ON PEDALS

ALL TRIMS = 0°		YAW DAMPER = **OFF**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-3-1 Vc = 0 kts ramp 0.5°/s					
A	Set Vc = 0 kts	LACOMBE	Vc	34120611		254 IV31
			VSA	271040		
B	Set FAC/FCC configuration B	BAUDET				
C	Set a 0.5°/s **left** rudder deflection in the YDA servo-loop until rudder stops at max deflection. Continue with next step before rudder stop	BAUDET	Fct gen	271045		09:39:10
			YD current	271046		09:39:40
			Rud. Surf	271024		
D	During the rudder motion Push left pedal → mech stop → neutral→ right→ mech stop→neutral Cycle performed in **3 s repeated 4 times**	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		
			Rud. Force	271003		
			R Ped. Force	271002		

IV-3 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS UNDER YAW DAMPER INPUT COMBINED WITH FORCE APPLIED ON PEDALS

ALL TRIMS = 0°		YAW DAMPER = **OFF**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-3-2 Vc = 240 kts ramp 39°/s					
A	Set Vc = 240 kts	LACOMBE	Vc	34120611		254 IV32.001
			VSA	271040		09:57:45 (Bad data)
B	Set FAC/FCC configuration B	BAUDET				09:58:30
C	Set a 39°/s **left** rudder deflection in the YDA servo-loop until rudder reaches **4° left (approx 1 s)**	BAUDET	Fct gen	271045		
			YD current	271046		254 IV32.002
			Rud. Surf	271024		09:59:30
D	Push left pedal → RTLU stop	Pilot	Rud. Ped.	271025		10:00:20
			Rud. Surf	271024		**11° left?**
			Rud. Force	271003		
			L Ped. Force	271001		
E	Increase left pedal force up to 50 daN= 112 lbs	Pilot	L Ped. Force	271001		**Max 50 daN= 112lbs**
			Rud. Force	271003		
F	Set a 39°/s **right** rudder deflection in the YDA servo-loop until YDA output reaches **4° rudder right**	BAUDET	Fct gen	271045		
			YD current	271046		
			Rud. Surf	271024		**7° left?**
			Rud. Force	271003		
			Yaw position	271030		

IV-3 MEASUREMENT OF CONTROL SYSTEM CHARACTERISTICS UNDER YAW DAMPER INPUT COMBINED WITH FORCE APPLIED ON PEDALS

ALL TRIMS = 0°		YAW DAMPER = **OFF**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-3-3 Vc = 240 kts ramp 39°/s					
A	Set Vc = 240 kts	LACOMBE	Vc	34120611		254 IV33.001
			VSA	271040		10:03:00
B	Set FAC/FCC configuration B	BAUDET				10:03:45
C	Set a 15°/s **left** rudder deflection in the YDA servo-loop until rudder reaches **4° left (approx 1 s)**	BAUDET	Fct gen	271045		254 IV33.002
			YD current	271046		10:07:30
			Rud. Surf	271024		10:08:02
C	Push **right** pedal → RTLU stop	Pilot	Rud. Ped.	271025		
			Rud. Surf	271024		**11° right?**
			Rud. Force	271003		
			R Ped. Force	271002		
D	Increase right pedal force up to 50 daN= 112 lbs	Pilot	R Ped. Force	271002		**Max 50 daN= 112lbs**
			Rud. Force	271003		
E	Set a 39°/s **right** rudder deflection in the YDA servo-loop until YDA output reaches **4° rudder right**	BAUDET	Fct gen	271045		
			YD current	271046		
			Rud. Surf	271024		**11° right?**
			Yaw position	271030		
F	Resist (Increase?)pedal motion force up to 100 daN= 225 lbs	Pilot	R Ped. Force	271002		**Max 100 daN= 225lbs**
			Rud. Force	271003		
			Rud. Surf	271024		
			Yaw position	271030		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **ON**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ	RESULTS	COMMENTS/GMT
	IV-4-1 Vc = 165 kts rate 10°/s				
A	Set Vc = 165 kts	LACOMBE	Vc 34120611		254 IV41
			VSA 271040		10:54:30
B	Set FAC/FCC configuration A	LACOMBE			10:55:20
C	Set a 10°/s yaw rate to the FAC until rudder max deflection	LACOMBE	YD current 271046		
			Rud. Surf 271024		
			Yaw cd 271029		
			Yaw pos 271030		
			Yaw rate input 22F330		
			Yaw rate $22^{E}330$		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **ON**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-4-2 Vc = 200 kts rate 10°/s					
A	Set Vc = 200 kts	LACOMBE	Vc	34120611		254 IV42
			VSA	271040		10:59:30
B	Set FAC/FCC configuration A	LACOMBE				11:00:25
S	Set a 10°/s yaw rate to the FAC until rudder max deflection	LACOMBE	YD current	271046		
			Rud. Surf	271024		
			Yaw cd	271029		
			Yaw pos	271030		
			Yaw rate input	22F330		
			Yaw rate	$22^{E}330$		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **OFF**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-4-3 Vc = 240 kts rate 10°/s					
A	Set Vc = 240 kts	LACOMBE	Vc	34120611		254 IV43
			VSA	271040		11:03:00
B	Set FAC/FCC configuration A	LACOMBE				11:03:50
C	Set a 10°/s yaw rate to the FAC until rudder max deflection	LACOMBE	YD current	271046		
			Rud. Surf	271024		
			Yaw cd	271029		
			Yaw pos	271030		
			Yaw rate input	22F330		
			Yaw rate	$22^{E}330$		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **ON**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-4-4 Vc = 260 kts rate 10°/s					
A	Set Vc = 260 kts	LACOMBE	Vc	34120611		254 IV44
			VSA	271040		11:05:40
B	Set FAC/FCC configuration A	LACOMBE				11:06:23
C	Set a 10°/s yaw rate to the FAC until rudder max deflection	LACOMBE	YD current	271046		
			Rud. Surf	271024		
			Yaw cd	271029		
			Yaw pos	271030		
			Yaw rate input	22F330		
			Yaw rate	$22^{E}330$		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **ON**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-4-5 Vc = 165 kts rate 10°/s + ramp 0.1°/s/s					
A	Set Vc = 165 kts	LACOMBE	Vc	34120611		254 IV45
			VSA	271040		11:08:30
B	Set FAC/FCC configuration A	LACOMBE				11:09:48
C	Set a 10°/s yaw rate with a slope of 0.1°/s/s to the FAC until rudder max deflection	LACOMBE	YD current	271046		
			Rud. Surf	271024		
			Yaw cd	271029		
			Yaw pos	271030		
			Yaw rate input	22F330		
			Yaw rate	$22^{E}330$		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **ON**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-4-6 Vc = 240 kts rate 10°/s + ramp 0.1°/s/s					
A	Set Vc = 240 kts	LACOMBE	Vc	34120611		254 IV46.001
			VSA	271040		11:14:50 (Bad data)
B	Set FAC/FCC configuration A	LACOMBE				11:15:13
C	Set a 10°/s yaw rate with a slope of 0.1°/s/s to the FAC until rudder max deflection	LACOMBE	YD current	271046		
			Rud. Surf	271024		254 IV46.002
			Yaw cd	271029		11:15:40
			Yaw pos	271030		11:16:55
			Yaw rate input	22F330		
			Yaw rate	$22^{E}330$		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **ON**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-4-7 Vc = 240 kts rate 10°/s + ramp 0.5°/s/s					
A	Set Vc = 240 kts	LACOMBE	Vc	34120611		254 IV47.001
			VSA	271040		11:19:10
B	Set FAC/FCC configuration A	LACOMBE				11:19:44
C	Set a 10°/s yaw rate with a pitch of 0.5°/s/s to the FAC until rudder max deflection	BAUDET	YD current	271046		
			Rud. Surf	271024		254 IV47.002
			Yaw cd	271029		11:55:10
			Yaw pos	271030		11:56:00
			Yaw rate input	22F330		
			Yaw rate	$22^{E}330$		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **ON**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-4-8 Vc = 240 kts rate 10°/s + ramp 1°/s/s					
A	Set Vc = 240 kts	LACOMBE	Vc	34120611		254 IV48
			VSA	271040		12:01:45
B	Set FAC/FCC configuration A	LACOMBE				12:02:30
C	Set a 10°/s yaw rate with a pitch of 1°/s/s to the FAC until rudder max deflection	LACOMBE	YD current	271046		
			Rud. Surf	271024		
			Yaw cd	271029		
			Yaw pos	271030		
			Yaw rate input	22F330		
			Yaw rate	$22^{E}330$		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **ON**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-4-9 Vc = 240 kts rate 10°/s + sinusoid on 10s					
A	Set Vc = 240 kts	LACOMBE	Vc	34120611		254 IV49
			VSA	271040		12:10:10
B	Set FAC/FCC configuration A	LACOMBE				12:11:00
C	Set a sinusoidal yaw rate from 0 to 10°/s on a 10s period to the FAC until rudder max deflection	LACOMBE	YD current	271046		
			Rud. Surf	271024		
			Yaw cd	271029		
			Yaw pos	271030		
			Yaw rate input	22F330		
			Yaw rate	$22^{E}330$		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **ON**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-4-10 Vc = 240 kts rate 10°/s + sinusoid on 5s					
A	Set Vc = 240 kts	LACOMBE	Vc	34120611		254 IV410
			VSA	271040		12:12:40
B	Set FAC/FCC configuration A	LACOMBE				12:13:13
C	Set a sinusoidal yaw rate from 0 to 10°/s on a 5s period to the FAC until rudder max deflection	LACOMBE	YD current	271046		
			Rud. Surf	271024		
			Yaw cd	271029		
			Yaw pos	271030		
			Yaw rate input	22F330		
			Yaw rate	$22^{E}330$		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **ON**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-4-11 Vc = 240 kts rate 10°/s + sinusoid on 3s					
A	Set Vc = 240 kts	LACOMBE	Vc	34120611		254 IV411.001
			VSA	271040	Yaw Damper disengaged after 2 cycles	12:15:20
B	Set FAC/FCC configuration A	LACOMBE				12:15:51
C	Set a sinusoidal yaw rate from 0 to 10°/s on a 3s period to the FAC until rudder max deflection	LACOMBE	YD current	271046		
			Rud. Surf	271024		254 IV411.002
			Yaw cd	271029		12:25:00
			Yaw pos	271030	Yaw Damper disengaged after 2 cycles	12:25:23 (.001 repeated)
			Yaw rate input	22F330		
			Yaw rate	$22^{E}330$		

IV-4 MEASUREMENT OF **FAC (Flight Augmentation Computer) CONTROL LAWS**

ALL TRIMS = 0°		YAW DAMPER = **ON**		AUTO PILOT = OFF		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-4-12 Vc = 240 kts rate 10°/s + sinusoid on 2s					
A	Set Vc = 240 kts	LACOMBE	Vc	34120611		254 IV412
			VSA	271040		12:22:25
B	Set FAC/FCC configuration A	LACOMBE				12:22:52
C	Set a sinusoidal yaw rate from 0 to 10°/s on a 2s period to the FAC until rudder max deflection	LACOMBE	YD current	271046		
			Rud. Surf	271024		
			Yaw cd	271029		
			Yaw pos	271030		
			Yaw rate input	22F330		
			Yaw rate	$22^{E}330$		

IV-4 MEASUREMENT OF **AUTOPILOT ACTUATOR characteristic**

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = **ON**		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ	RESULTS	COMMENTS/GMT
	IV-5-0 Vc = 0 kts Manual increase				
A	Set Vc = 0 kts	LACOMBE	Vc 34120611		254 IV50.001
			VSA 271040		12:57:15
B	Set FAC/FCC configuration D	LACOMBE			12:58:00
C	Set AP ON and YD OFF	Pilot			
D	Set a left rudder rate to the APYA up to rudder max deflection	BAUDET	Fct gen 271045		
			APYA current 271047		
			Rud. Surf 271024		
			APYA pos 271031		
E	Set a **right** rudder rate to the APYA up to rudder max deflection	BAUDET	Fct gen 271045		254 IV50.002
			APYA current 271047		13:00:25
			Rud. Surf 271024		13:01:10
			APYA pos 271031		

IV-4 MEASUREMENT OF **AUTOPILOT ACTUATOR characteristic**

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = **ON**		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ	RESULTS	COMMENTS/GMT
	IV-5-1 Vc = 0 kts rate 15°/s				
A	Set Vc = 0 kts	LACOMBE	Vc 34120611		254 IV51
			VSA 271040		13:11:00
B	Set FAC/FCC configuration D	LACOMBE			13:11:45
C	Set AP ON and YD OFF	Pilot			
D	Set a 15°/s left rudder rate to the APYA for an 18° rudder max deflection	BAUDET	Fct gen 271045		
			APYA current 271047		
			Rud. Surf 271024		
			APYA pos 271031		
E	Set a 15°/s **right** rudder rate to the APYA for an 18° rudder max deflection	BAUDET	Fct gen 271045		
			APYA current 271047		
			Rud. Surf 271024		
			APYA pos 271031		

IV-4 MEASUREMENT OF **AUTOPILOT ACTUATOR characteristic**

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = **ON**		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-5-2 Vc = 0 kts rate 34 °/s					
A	Set Vc = 0 kts	LACOMBE	Vc	34120611		254 IV52
			VSA	271040		13:13:25
B	Set FAC/FCC configuration D	LACOMBE				13:14:00
C	Set a 34°/s left rudder rate to the APYA for an 18° rudder max deflection	BAUDET	Fct gen	271045		
			APYA current	271047		
			Rud. Surf	271024		
			APYA pos	271031		
D	Set a 34°/s **right** rudder rate to the APYA for an 18° rudder max deflection	BAUDET	Fct gen	271045		
			APYA current	271047		
			Rud. Surf	271024		
			APYA pos	271031		

IV-4 MEASUREMENT OF **AUTOPILOT ACTUATOR characteristic**

ALL TRIMS = 0°		YAW DAMPER = OFF		AUTO PILOT = **ON**		SLATS/FLAPS = retracted	

	ACTIONS	ACTORS	READ		RESULTS	COMMENTS/GMT
	IV-5-3 Vc = 0 kts rate 60 °/s					
A	Set Vc = 0 kts	LACOMBE	Vc	34120611		254 IV53
			VSA	271040		13:17:15
B	Set FAC/FCC configuration D	LACOMBE				13:17:35
C	Set a 60°/s left rudder rate to the APYA for an 18° rudder max deflection	BAUDET	Fct gen	271045		
			APYA current	271047		
			Rud. Surf	271024		
			APYA pos	271031		
D	Set a 60°/s **right** rudder rate to the APYA for an 18° rudder max deflection	BAUDET	Fct gen	271045		
			APYA current	271047		
			Rud. Surf	271024		
			APYA pos	271031		