



WELLINGTON NEW ZEALAND

PURSUANT to Section 28 of the Civil Aviation Act 1990

I, MAURICE WILLIAMSON, Minister of Transport,

HEREBY MAKE the following ordinary rules.

SIGNED AT Wellington

This *25* day of *March* 1998

by **MAURICE WILLIAMSON**

Minister of Transport

A handwritten signature in black ink, appearing to read 'Maurice Williamson', written over a large, stylized flourish.

Civil Aviation Rules

Part 121, Amendment 3

Air Transport Operations - Large Aeroplanes

Docket 97/CAR/1243

Civil Aviation Rules
Part 121, Amendment 3

Air Transport Operations - Large Aeroplanes

RULE OBJECTIVE, EXTENT OF CONSULTATION AND COMMENCEMENT

The objective of the amendment to Part 121 is to introduce the requirements to equip some existing aircraft types and new aircraft entering the aviation system from 2000 onwards with updated flight data recorders (FDR).

The FDR amendments were developed by the Rules and Standards Group from comments received since the associated rules came into force, consultation with industry representatives, and a petition for rulemaking submitted in accordance with Part 11.

A draft of the proposed FDR amendments to Parts 121 and 135 was developed by the Rules and Standards Group in consultation with members of the CAA and industry most likely to be affected. This culminated in the issue of Notice of Proposed Rulemaking 97-1 under Docket 98/CAR/1243 on 19 February 1997.

The publication of this notice was advertised in the daily newspapers in the five main provincial centres on 22 February 1997. The notice was mailed to industry members most likely to be affected and to other parties, including overseas Aviation Authorities and organisations, who were considered likely to have an interest in the proposal.

A period of 49 days was allowed for comment on the proposed rules. Eight comments were received. The submissions and verbal comments were considered and where appropriate the proposed rules amended to take account of the comments made.

The rules as amended were then referred to and signed by the Minister of Transport.

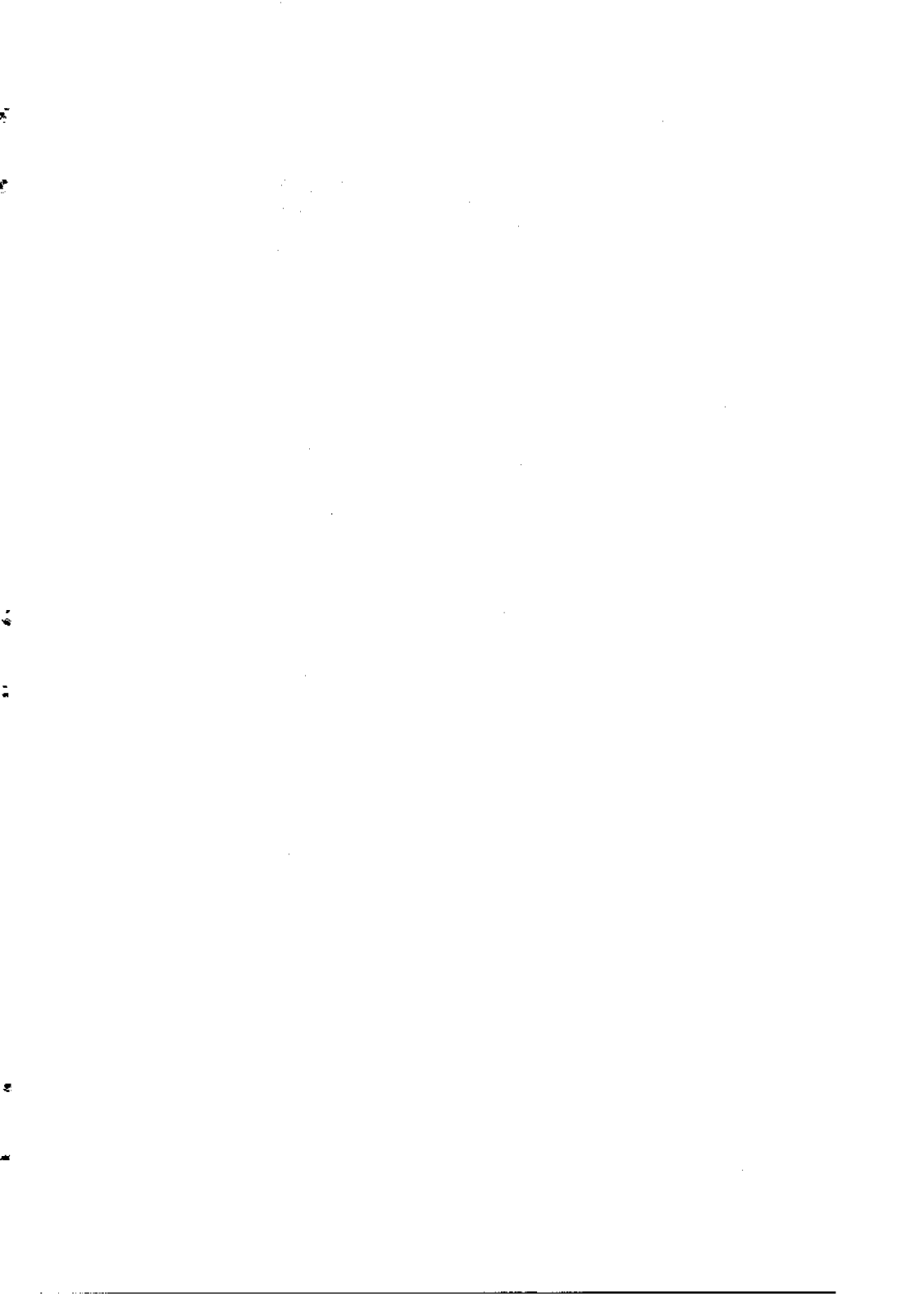
Amendment 3 to Part 121 comes into force on 23 April 1998.



List of Rules

Part 121 Amendments

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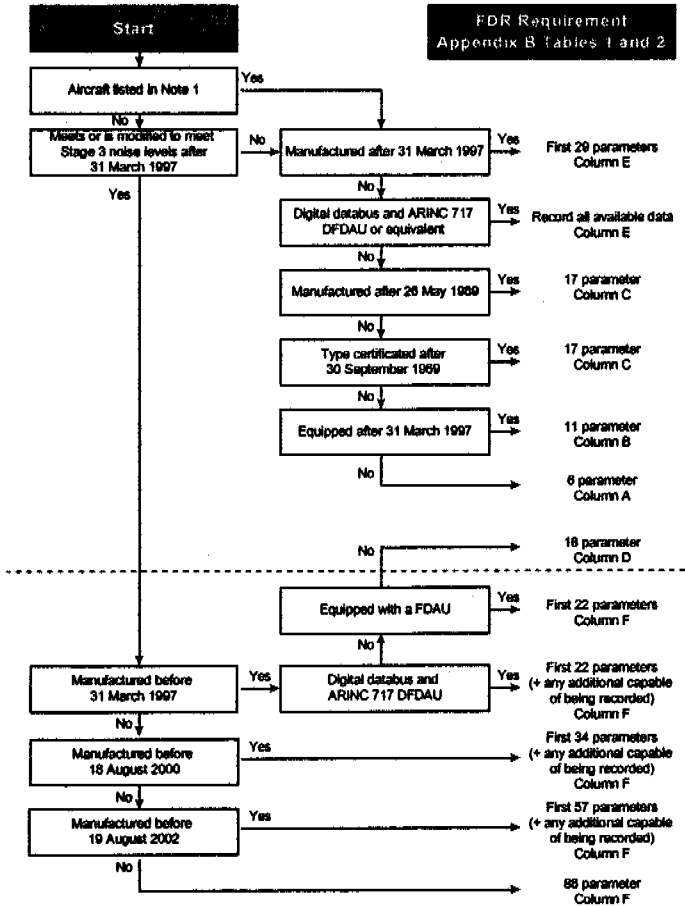


Part 121 Amendments

Appendix B, B.6 Flight data recorders is amended by revoking paragraph (4) and inserting the following new paragraph (4):

- “ (4) record the parameters as detailed in—
- (i) Figure 1; and
 - (ii) as applicable, Table 1 and Table 2—
of Appendix B.”

Appendix B is amended by revoking Figure 1 and inserting the following new Figure 1 and note.



Note 1: General Dynamics Convair 580, 600, 640, deHavilland Aircraft Company Ltd. DHC-7, Fairchild Industries FH 227, Fokker F-27 (except Mark 50), F-28 Mark 1000 and Mark 4000, Gulfstream Aerospace G-159, Lockheed Aircraft Corporation Electra 10-A, 10-B, 10-E, L-188, Maryland Air Industries, Inc. F27, Mitsubishi Heavy Industries, Ltd. YS-11, Short Bros. Limited SD3-30, SD3-60.

Appendix B is amended by revoking Table 1 and inserting the following new Table 1 and Table 2.

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
1	Time	Time	Time	Time	Time	Time or Relative time counts
2	Altitude	Altitude	Altitude	Altitude	Altitude	Pressure Altitude
3	Airspeed	Airspeed	Airspeed	Airspeed	Airspeed	Indicated airspeed or Calibrated airspeed
4	Vertical acceleration	Vertical acceleration	Vertical acceleration	Heading	Heading	Heading (primary flight crew reference)
5	Heading	Heading	Heading	Vertical acceleration	Vertical acceleration	Normal acceleration (vertical)
6	Time of radio transmission to/from ATC	Time of radio transmission to/from ATC	Time of radio transmission to/from ATC	Pitch attitude	Pitch attitude	Pitch attitude
7		Pitch attitude	Pitch attitude	Roll attitude	Roll attitude	Roll attitude

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
8		Roll attitude	Roll attitude	Radio transmitter keying	Radio transmitter keying	Manual radio transmitter keying or CVR/DFDR synchronisation reference
9		Longitudinal acceleration	Longitudinal acceleration	Thrust/power on each engine	Thrust/power on each engine	Thrust/power on each engine (primary flight crew reference)
10		Control column OR pitch control surface position	Pitch trim position	Trailing edge flap OR cockpit control selection	Trailing edge flap OR cockpit control selection	Autopilot engagement
11		Thrust of each engine	Control column OR pitch control surface position	Leading edge flap OR cockpit control selection	Leading edge flap OR cockpit control selection	Longitudinal acceleration

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
12			Control wheel OR lateral control surface position	Thrust reverser position	Thrust reverser position	Pitch control(s) position (non fly-by-wire systems)
			Rudder pedal OR yaw control surface position	Ground spoiler position/speed brake selection	Ground spoiler position/speed brake selection	Pitch control(s) position (fly-by-wire systems)
13						Lateral control(s) position (non fly-by-wire systems)
						Lateral control(s) position (fly-by-wire systems)
14			Thrust of each engine	Marker beacon passage	Marker beacon passage	Yaw control(s) position (non fly-by-wire systems)
						Yaw control(s) position (fly-by-wire systems)
15			Position of each thrust reverser	Autopilot engagement	Autopilot engagement	Pitch control surface(s) position

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters * if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
16			Trailing edge flap OR cockpit flap control position	Longitudinal acceleration	Longitudinal acceleration	Lateral control surface(s) position
17			Leading edge flap OR cockpit flap control position	Pilot input and/or surface position - primary controls Lateral acceleration	Pilot input and/or surface position - primary controls Lateral acceleration	Yaw control surface(s) position
18				Lateral acceleration	Lateral acceleration	Lateral acceleration
19					Pitch trim position	Pitch trim surface position
20					Glide slope deviation	Trailing edge flap or cockpit control position
21					Localiser deviation	Leading edge flap or cockpit control position
22					AFCs mode and engagement status	Each thrust reverser position or equivalent for propeller aeroplane

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters * if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
23					Radio altitude	Ground spoiler position or speed brake position
24					Master warning	Outside air temperature or total air temperature
25					Main gear squat switch status	Autopilot/ autoflight/AFCs mode and engagement status
26 *					Angle of attack	Radio altitude
27					Outside air temperature OR total air temperature	Localiser deviation or MLS azimuth

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
28					Hydraulics, each system, low pressure	Glideslope deviation or MLS elevation
29					Groundspeed	Marker beacon passage
30					Drift angle	Master warning
31					Wind speed and direction	Airground sensor (primary aeroplane sensor, nose or main gear)
32*					Latitude and longitude	Angle of attack (if measure directly)
33					Brake pressure/pedal position	Hydraulic pressure low, each system

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters , if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
34*					Additional engine parameters: EPR, N1, N2	Groundspeed
35					Exhaust Gas Temperature	GPWS
36					Throttle lever position	Landing gear position or landing gear cockpit control selection
37*					Fuel flow	Drift angle
38*					TCAS - TA	Wind speed and direction
39*					TCAS - RA	Latitude and longitude
40*					TCAS - Sensitivity level	Stick shaker and pusher activation
41*					Ground Proximity Warning System	Windshear detection

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
42					Landing gear or gear selector position	Throttle/power lever position
43					DME 1 and 2 distance	Additional engine parameters
44					Nav 1 and 2 frequency selection	TCAS
45						DME 1 and 2 distances
46						Nav 1 and 2 selected frequency
47*						Selected barometric setting
48*						Selected altitude
49*						Selected speed
50*						Selected Mach

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
51*						Selected vertical speed
52*						Selected heading
53*						Selected flight path
54*						Selected decision height
55						EFIS display format
56						Multi-function/engine alerts display format
57*						Thrust command
58*						Thrust target
59*						Fuel quantity in CG trim tank

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
60						Primary navigation system reference
61*						Ice detection
62*						Engine warning each engine - vibration
63*						Engine warning each engine - over temp
64*						Engine warning each engine - oil pressure low
65*						Engine warning each engine - over speed
66						Yaw trim surface position

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
67						Roll trim surface position
68						Brake pressure - left and right
69						Brake pedal application - left and right
70*						Yaw and side-slip angle
71*						Engine bleed valve position
72*						De-icing or anti-icing system selection
73*						Computed centre of gravity
74						AC electrical bus status

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 88 Parameter
75						DC electrical bus status
76*						APU bleed valve position
77						Hydraulic pressure each system
78						Loss of cabin pressure
79						Computer failure - critical flight and engine control systems
80*						HUD
81*						Para-visual display
82						Cockpit trim control input position - pitch

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter

Parameters * if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 18 Parameter	(E) 44 Parameter	(F) 38 Parameter
83						Cockpit trim control input position - roll
84						Cockpit trim control input position - yaw
85						Trailing edge flap and cockpit flap control position
86						Leading edge flap and cockpit flap control position
87						Ground spoiler position and speed brake selection
88						All cockpit flight control input forces - control wheel, control column, rudder pedal

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Time or Relative time counts	24 hours 0 to 4095	±0.125% per hour	4	1s	UTC time preferred when available. Counter increments each 4 seconds of system operation
Pressure Altitude	-1000' to maximum certificated altitude -1000' to maximum certificated altitude +5000'	±100' to ±700' (refer TSO C124a, C51a)	1	5' to 35'	Data should be obtained from the air data computer when practicable
Indicated airspeed or Calibrated airspeed	50 KIAS or minimum value to Max V _{so} and V _{so} to 1.2V _{so}	±5% and ±3%	1	1kt	Data should be obtained from the air data computer when practicable
Heading (primary flight crew reference)	0 - 360° 0 - 360° and discrete 'true' or 'mag'	±2°	1	0.5°	When true or magnetic heading can be selected as the primary heading reference, a discrete indicating selection must be recorded
Normal acceleration (vertical)	-3g to +6g	±1% maximum range excluding datum error of ±5%	0.125	0.01g	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Pitch attitude	±75°	±2°	1 or 0.5 for aeroplanes manufactured after 2002	0.5°	A sampling rate of 0.25 is recommended
Roll attitude	±180°	±2°	1 or 0.5 for aeroplanes manufactured after 2002	0.5°	A sampling rate of 0.5 is recommended
Manual radio transmitter keying or CVR/DFDR synchronisation reference	Discrete - 'on' or 'off'		1		Preferably each crew member but one discrete acceptable for all transmission provided the CVR/DFDR system complies with TSO C124a CVR synchronisation requirements
Thrust/power on each engine (primary flight crew reference)	Full range forward	±2%	1 per engine	0.2% of full range	Sufficient parameters (e.g. EPR, N ₁ or Torque, N _p) as appropriate to the particular engine be recorded to determine power in forward and reverse thrust, including potential overspeed conditions
Autopilot engagement	Discrete - 'on' or 'off'		1		

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy ±1.5% maximum range excluding datum error of ±5%	Seconds per sampling interval	Resolution	Remarks
Longitudinal acceleration	±1g		0.25	0.01g	
Pitch control(s) position (non fly-by-wire systems)	Full range	±2°	1 or 0.5 for aeroplanes manufactured after 2002	0.2% of full range	For aeroplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately once per second to produce the sampling interval of 0.5 or 0.25, as applicable
Pitch control(s) position (fly-by-wire systems)	Full range	±2°	1 or 0.5 for aeroplanes manufactured after 2002	0.2% of full range	
Lateral control(s) position (non fly-by-wire systems)	Full range	±2°	1 or 0.5 for aeroplanes manufactured after 2002	0.2% of full range	For aeroplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Lateral control(s) position (fly-by-wire systems)	Full range	±2°	1 or 0.5 or 0.25 for aeroplanes manufactured after 2002	0.2% of full range	Inputs may be sampled alternately once per second to produce the sampling interval of 0.5 or 0.25, as applicable
Yaw control(s) position (non fly-by-wire systems)	Full range	±2°	1 or 0.5	0.2% of full range	For aeroplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately once per second to produce the sampling interval of 0.5
Yaw control(s) position (fly-by-wire systems)	Full range	±2°	1 or 0.5	0.2% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Pitch control surface(s) position	Full range	±2°	0.5 or 0.25 for aeroplanes manufactured after 2002	0.2% of full range	For aeroplanes fitted with multiple or split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5 or 0.25
Lateral control surface(s) position	Full range	±2°	0.5 or 0.25 for aeroplanes manufactured after 2002	0.2% of full range	A suitable combination of surface position sensors is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5 or 0.25

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Yaw control surface(s) position	Full range	±2°	0.5	0.2% of full range	A suitable combination of surface position sensors is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5
Lateral acceleration	±1g	±1.5% maximum range excluding datum error of ±5%	0.25	0.01g	Twin engine aircraft only
Pitch trim surface position	Full range	±3%	1	0.3% of full range	
Trailing edge flap or cockpit control position	Full range or discrete each position	±3° or pilot's indicator	2	0.5% of full range	Flap position and cockpit control may each be sampled alternately at 4 second intervals, to give a data point every 2 seconds

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters		Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Leading edge flap or cockpit control position	Full range or discrete each position	±3° or pilot's indicator	2	0.5% of full range	Left and right sides, or flap position and cockpit control may each be sampled at 4 second intervals, so as to give a data point each 2 seconds	
Each thrust reverser position or equivalent for propeller aeroplanes	Discrete - 'stowed', 'in transit', 'reverse'		1 per engine		Turbo-jet - 2 discretises enable the 3 states to be determined Turbo-prop - 1 discrete	
Ground spoiler position or speed brake position	Full range or discrete each position	±2°	1 or 0.5 for aeroplanes manufactured after 2002	0.2% of full range		
Outside air temperature or total air temperature	-50°C to +80°C	±2° C	2	0.3° C		
Autopilot/autothrottle/AF CS mode and engagement status	Discretises - suitable combination		1		Discretises should show which systems are engaged and which primary modes are controlling the flight path and speed of the aircraft	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Radio altitude	-20' to +2 500'	±2' or ±3% whichever is the greater below 500' and ±5% above 500'	1	1' ±5% above 500'	For autoland/category 3 operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second.
Localiser deviation or MLS azimuth	±400 microamps or available sensor range as installed ±62°	As installed - ±3% recommended	1	0.3+ of full range	For autoland/category 3 operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second. It is not necessary to record ILS and MLS at the same time, only the approach aid in use need be recorded
Glide slope deviation or MLS elevation	±400 microamps or available sensor range as installed -0.9° to +30°	As installed - ±3% recommended	1	0.3% of full range	For autoland/category 3 operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second. It is not necessary to record ILS and MLS at the same time, only the approach aid in use need be recorded

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters		Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Marker beacon passage	Discrete - 'on' or 'off'			1		A single discrete is acceptable for all markers
Master warning	Discrete			1		Record the master warning and record each 'red' warning that cannot be determined from other parameters or from the cockpit voice recorder
Airground sensor (primary aeroplane sensor, nose or main gear)	Discrete - 'air' or 'ground'			1 (0.25 recommended)		
Angle of attack (if measure directly)	As installed		As installed	2 0.5 for aeroplanes manufactured after 2002	0.3% of full range	If left and right sensors are available, each may be recorded at 4 second intervals so as to give a data point each 0.5 second
Hydraulic pressure low, each system	Discrete - 'low' or 'normal' or available sensor range		±5%	2	0.5% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Groundspeed	As installed	Most accurate system installed	1	0.2% of full range	
GPWS	Discrete - 'warning' or 'off'		1		A suitable combination of discretises unless recorder capacity is limited in which case a single discrete for all modes is acceptable
Landing gear position or landing gear cockpit control selection	Discrete		4		A suitable combination of discretises should be recorded
Drift angle	As installed	As installed	4	0.1°	
Wind speed and direction	As installed	As installed	4	1kt and 1°	
Latitude and longitude	As installed	As installed	4	0.002°	Provided by the Primary Navigation System Reference. Where capacity permits latitude/longitude resolution should be 0.0002°

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Stick shaker and pusher activation	Discrete - 'on' or 'off'		1		A suitable combination of discretises to determine activation
Windshear detection	Discrete - 'warning' or 'off'		1		
Throttle/power lever position	As installed Full range	As installed $\pm 2\%$	1 per lever	2% of full range	For aeroplanes with non-mechanically linked cockpit engine controls
Additional engine parameters	As installed	As installed	Each engine each second	2% of full range	EPR, N ₁ , N ₂ , EGT Where capacity permits, the preferred priority is - indicated vibration level, N ₂ , EGT, Fuel Flow, Fuel Cut-off lever position, and N ₃ , unless the engine manufacturer recommends otherwise

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
TCAS	Discretes	As installed	1		A suitable combination of discretes should be recorded to determine the status of - Combined Control, Vertical Control, Up Advisory, and Down Advisory. (refer ARINC Characteristic 735 - Attachment 6E, TCAS VERTICAL RA DATA OUTPUT WORD)
DME 1 and 2 distances	0 - 200nm	As installed	4	1nm	1 mile
Nav 1 and 2 selected frequency	Full range	As installed	4		Sufficient to determine selected frequency
Selected barometric setting	Full range	±5%	1 per 64 seconds	0.2% of full range	
Selected altitude	Full range	±5%	1	100'	
Selected speed	Full range	±5%	1	1kt	
Selected Mach	Full range	±5%	1	0.01	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Selected vertical speed	Full range	±5%	1	100ft/min	
Selected heading	Full range	±5%	1	1°	
Selected flight path	Full range	±5%	1	1°	
Selected decision height	Full range	±5%	64	1'	
EFIS display format	Discretes		4		Discretes should show the display system status (off, normal, fail, composite, sector, plan, navigation aids, weather radar, range, copy)
Multi-function/engine alerts display format	Discretes		4		Discretes should show the display system status (off, normal, fail) and the identity of display pages for emergency procedures need not be recorded
Thrust command	Full range	±2%	2	2% of full range	
Thrust target	Full range	±2%	4	2% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters		Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Fuel quantity in CG trim tank		Full range	±5%	1 per 64 seconds	1% of full range	
Primary navigation system reference		Discretes - 'GPS', 'INS', 'VOR/DME', 'MLS', 'Loran C', 'Omega', 'Localiser Glideslope'		4		A suitable combination of discretes to determine the Primary Navigation System reference
Ice detection		Discrete - 'ice' or 'no ice'		4		
Engine warning each engine - vibration		Discrete		1		
Engine warning each engine - over temp		Discrete		1		
Engine warning each engine - oil pressure low		Discrete		1		
Engine warning each engine - over speed		Discrete		1		
Yaw trim surface position		Full range	±3%	2	0.3% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Roll trim surface position	Full range	±3%	2	0.3% of full range	
Brake pressure - left and right	As installed	As installed ±5%	1		To determine braking effort applied by pilots or by autobrakes
Brake pedal application - left and right	Discrete or analogue - 'applied' or 'off'	As installed ±5%	1		To determine braking applied by pilots
Yaw and side-slip angle	Full range	±5%	1	0.5°	
Engine bleed valve position	Discrete - 'open' or 'closed'		4		
De-icing or anti-icing system selection	Discrete - 'on' or 'off'		4		
Computed centre of gravity	Full range	±5%	1 per 64 seconds	1% of full range	
AC electrical bus status	Discrete - 'power' or 'off'		4		Each bus
DC electrical bus status	Discrete - 'power' or 'off'		4		Each bus

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
APU bleed valve position	Discrete - 'open' or 'closed'		4		
Hydraulic pressure each system	Full range	±5%	2	100psi	
Loss of cabin pressure	Discrete - 'loss' or 'normal'		1		
Computer failure - critical flight and engine control systems	Discrete - 'fail' or 'normal'		4		
HUD	Discrete - 'on' or 'off'		4		
Para-visual display	Discrete - 'on' or 'off'		1		
Cockpit trim control input position - pitch	Full range	±5%	1	0.2% of full range	
Cockpit trim control input position - roll	Full range	±5%	1	0.2% of full range	
Cockpit trim control input	Full range	±5%	1	0.2% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications

Parameters		Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
position - yaw						
Trailing edge flap and cockpit flap control position	Full range or discrete each position	±5%	2	0.5% of full range	Trailing edge flaps and cockpit flap control position may each be sampled alternately at 4 second intervals to provide a sample each 0.5 second	
Leading edge flap and cockpit flap control position	Full range or discrete each position	±5%	1	0.5% of full range		
Ground spoiler position and speed brake selection	Full range or discrete each position	±5%	0.5	0.2% of full range		
All cockpit flight control input forces - control wheel, control column, rudder pedal	Full range - wheel, column, pedals	±5% - ±70lbs, ±85lbs, ±165lbs respectively	1	0.2% of full range	For fly-by-wire flight control systems, where flight control surface position is a function of the displacement of the control input device only, it is not necessary to record this parameter	

CONSULTATION DETAILS

(This statement does not form part of the rules contained in Part 121. It provides details of the consultation undertaken in making the rules.)

Background to the Rules

The Civil Aviation Rules are structured in a manner similar to the Federal Aviation Regulations (FAR) of the FAA, and aim to achieve maximum harmonisation whilst allowing for national variations. Close co-operation is also being maintained with the Civil Aviation Safety Authority of Australia to ensure maximum harmonisation with their regulatory code. New legislation is being generated where necessary for the areas not presently covered.

New Zealand's revised legislation is published as Civil Aviation Rules (CAR) which is divided into Parts. Each Part contains a series of individual rules which relate to a particular aviation activity.

Accompanying most Parts will be at least one associated Advisory Circular (AC) which will expand, in an informative way, specific requirements of the Part and acceptable means of compliance. For instance an AC may contain examples of acceptable practices or procedures which would meet the requirements of a particular rule.

The objective of the new rules system is to strike a balance of responsibility between the State authority and those who provide services and exercise privileges in the civil aviation system. This balance must enable the State authority to set standards for, and monitor performance of, aviation participants whilst providing the maximum flexibility for the participants to develop their own means of compliance.

Section 12 of the Civil Aviation Act 1990 requires participants in the aviation system to carry out their activities safely and in accordance with the relevant prescribed safety standards and practices. Section 28 of the Act allows the Minister to make ordinary rules.

Notice of Proposed Rule Making

To provide public notice of, and opportunity for comment on the proposed new rules, the Authority issued Notice of Proposed Rule Making 97-1 under Docket 97/CAR/1243 on 19 February 1997. This

Notice proposed the introduction of upgraded flight data recorder requirements to provide a regulatory environment harmonised with foreign authorities for operations by New Zealand registered aircraft.

Supplementary Information

All comments made on the Notice of Proposed Rule Making are available in the rules docket for examination by interested persons. A report summarising each substantive contact with the Civil Aviation Authority contact person concerning this rule making has been filed in the docket.

Availability of the Document

Any person may view a copy of these amendments at Aviation House, 1 Market Grove, Lower Hutt or on the CAA Internet page at <http://www.caa.govt.nz>. Printed copies may be obtained from Publishing Solutions Ltd, PO Box 983, Wellington 6015, Telephone 0800 800 359.

Summary of Comments on Docket Number 97/CAR/1243 NPRM

1. General comments on the NPRM

From the 9 submissions received, four general points were raised.

1.1 Two commenters noted that the upgraded requirements would place a burden on operators, with one commenter suggesting that the money would be better spent on training.

CAA response: The CAA agrees that emphasis should be placed on training. The CAA also agrees that the proposals will cost some operators to purchase and install the recorders. The benefits of flight data recorders (FDR) are difficult to quantify due to the reactive nature of their use. The CAA notes that the information gained from the FDR post-accident provides an excellent tool to tailor the training to meet the possible needs.

1.2 One commenter suggested that the New Zealand final rule be held until the final Federal Aviation Administration rule was in place.

CAA response: The CAA agrees and has held the final rule until the FAA rule was in place.

1.3 One commenter recognised the need for an identified date of introduction but noted that the rule would prevent existing operators augmenting their existing fleet of older aircraft. The commenter suggested that the rule apply only to introduction of first of type and that existing fleets be permitted to be added to without meeting the requirements of the rule. The commenter questioned the requirements specifically in relation to the deHavilland DHC-6 aircraft.

CAA response: The CAA accepts the comment but notes that the effect of these rules, and other rules such as noise certification requirements, are intended to initiate a fleet renewal process and the continued existence of old aircraft types would to some degree negate this. The CAA notes the commenter's concern relating to the DHC-6 and has removed the requirement for this aircraft to be fitted with the recorder, in line with the FAA requirements.

1.4 One commenter raised the legal issues of the use of the information recorded by the FDR.

CAA response: The CAA notes that the use of the FDR information is an ongoing project by the Government and is outside the scope of this rule. The CAA will introduce the final requirements of the study separately.

2. Specific comments on the NPRM

Specific comments received from the 9 submissions are discussed as follows:

2.1 One commenter suggested that the parameters 12, 13, and 14 should only be recorded if an information source was available. One commenter suggested that parameters 12a, 13a and 14a were not appropriate to their type of aircraft.

CAA response: The CAA agrees and has produced the final table to reflect the choice of parameter depending on the information source available.

2.2 One commenter noted that parameter 22 was unavailable on their aircraft.

CAA response: The CAA notes the comment. As the flow chart and listing has changed to reflect the vast majority of comments the CAA requests that operators re-check the requirements of the final rule. Although it is anticipated to be uncommon, if an operator cannot meet certain requirements for a particular aircraft that operator may have grounds to petition for an exemption and establish alternative means of providing an equivalent level of safety.

2.3 One commenter suggested that certain aircraft types were exempt from the requirements of the FAA. The commenter also suggested that their aircraft types would meet the FAA requirements but not the New Zealand CAA requirements.

CAA response: The CAA agrees and has amended the rule to accurately reflect the FAA requirements.

2.4 One commenter noted that some of their digital flight data acquisition units (DFDAU) did not record flight control input positions. The commenter suggested that the requirements should provide for the recording of either parameters 12, 13, and 14 or parameters 15, 16, or 17.

CAA response: The CAA notes that, as the FAA requirements only permit the recording of such alternative parameters for aircraft with less than 20 passenger seats, no change has been made to the rule.

Transitional arrangements

The existing rules requiring the installation of the flight data recorder equipment do not come into force until they are applied by notice in the Gazette, such application being no sooner than a period of 2 years from the date that Part 121 or Part 135 came into force.

The existing transitional arrangements are appropriate for these amendments.

Regulatory activities

No additional regulatory activities are necessary for these amendments.

Conclusion

The CAA concludes from this consultation that the aviation industry participants favour the direction of the amended rules. The rules also meet New Zealand's international obligations under the applicable ICAO Annex. The comments and all the background material used in developing the rules are held on the docket file and are available for public scrutiny. Persons wishing to view the docket file should call at Aviation House, 1 Market Grove, Lower Hutt and ask for docket file 97/CAR/1243.