



**PURSUANT** to Section 28 of the Civil Aviation Act 1990


**I, HARRY JAMES DUYNHOVEN**, Minister for Transport Safety,

**HEREBY MAKE** the following ordinary rules.

**SIGNED AT** Wellington

This *16<sup>th</sup>* day of *May* 2006

by **HARRY JAMES DUYNHOVEN**

  
Minister for Transport Safety

**Civil Aviation Rules**

**Part 121, Amendment 13**

**Air Operations – Large Aeroplanes**

*Docket 3/CAR/4*

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## **Rule objective**

The objective of Amendment 13 to Part 121 is to make editorial and minor technical changes as part of a general rule fix up project and to update some of the specifications in Appendix B regarding flight data recorders.

## **Extent of consultation**

A Notice of Proposed Rulemaking, NPRM 05-07, containing the proposed changes to Part 121 was issued for public consultation under Docket 3/CAR/4 on 23 June 2005.

The publication of this NPRM was notified in the *Gazette* on 23 June 2005 and advertised in the daily newspapers in the five main provincial centres on 25 June 2005. The NPRM was published on the CAA web site and mailed to identified stakeholders including representative organisations who were considered likely to have an interest in the proposal.

A period of 37 days was allowed for comment on the proposed rule.

## **New Zealand Transport Strategy**

The development of the NPRM and the proposed rule changes takes into account the objectives of the New Zealand Transport Strategy (NZTS) and the provisions of the Civil Aviation Amendment Act (No 2) 2004.

## **Summary of submissions**

Nine written submissions were received on the NPRM. Three submissions were received on the proposed amendments to Part 121.

Air New Zealand commented on the changes to Flight Data Recorder parameters with their submission supported by the Aviation Industry Association and the Board of Airline Representatives New Zealand Incorporated. The Air New Zealand submission was supportive of the amendments to harmonize New Zealand Flight Data Recorder (FDR) parameters with those of the United States Federal Aviation Administration (FAA). However they were concerned that because the FAA is currently reviewing Flight Data Recorder parameters and has published a NPRM detailing these changes, the New Zealand rules may become different to the FAA regulations.

Following contact with the FAA, who recommend proceeding with the proposed Omnibus changes, and internal CAA discussion, the CAA has proceeded with the changes proposed in the Omnibus NPRM to harmonise with the current FAA regulations.

The Air New Zealand submission also noted that some FDR parameters in the proposed rules did not align fully with the FAA parameters or contained wording errors. The CAA has amended these parameters as required.

Air New Zealand also commented that rule 121.163(b) only refers to runways published in the AIPNZ and recommended that the rule be amended for reduced takeoff minima operations at airports where the ICAO contracting state authorises reduced takeoff minima for the runway to be used. The CAA agreed and rule 121.163(b) has been amended accordingly.

These changes were notified in the Summary of Public Submissions which was published on the CAA web site on 25 October 2005.

During final rule drafting it was recognised that proposed changes to rule 121.55 unintentionally changed the rule requirement and as a result the proposed wording has been amended.

Proposed amendments to rule 121.93 were also removed during final rule drafting as the issue of fuel is being fully reviewed in a separate rule project.

The rule as amended was then referred to Parliament's Regulations Review Committee before being signed by the Minister for Transport Safety.

### **Examination of submissions**

Submissions may be examined by application to the Docket Clerk at the Civil Aviation Authority between 8:30 am and 4:30 pm on weekdays, except statutory holidays.

### **Insertion of Amendments**

The amendments to the rules in this Part are reflected by the revocation of the existing rule and the substitution of the new rule.

### **Effective date of rule**

Amendment 13 to Part 121 comes into force on 22 June 2006.

### **Availability of rules**

Civil Aviation Rules are available from–

CAA web site: <http://www.caa.govt.nz/>

Freephone: 0800 GET RULES (0800 438 785)

## Part 121 Air Operations – Large Aeroplanes

### Subpart A — General

*Rule 121.11 is revoked and the following new rule is substituted:*

#### **121.11 Flight simulator and other training device approval**

(a) A holder of an air operator certificate must ensure that each flight simulator, or training device, that is used in the certificate holder's training programme is specifically approved for—

- (1) use by the certificate holder; and
- (2) the aeroplane type and, if applicable, the particular variant within that type, for which the training or check is being conducted; and
- (3) the particular manoeuvre, procedure, or crew member function involved.

(b) The certificate holder must ensure that any flight simulator or any training device that is used to accrue flight credits—

- (1) maintains the performance, functional, and other characteristics that are required for approval; and
- (2) is modified to conform with any modification to the aeroplane being simulated that results in changes to performance, functional, or other characteristics required for approval; and
- (3) is given a daily functional pre-flight check before being used and any discrepancy is logged by the appropriate flight crew supervisor or instructor at the end of each training or check flight.

### Subpart B — Flight Operations

*Rule 121.55 is revoked and the following new rule is substituted:*

### **121.55 Common language**

A holder of an air operator certificate must ensure that—

- (1) every crew member can communicate in a common language, with flight crew members being able to communicate in the English language; and
- (2) every operations person is able to understand the language in which the applicable parts of the certificate holder's exposition are written.

## **Subpart C — Operating Limitations and Weather Requirements**

*Rule 121.163 is revoked and the following new rule is substituted:*

### **121.163 Reduced take-off minima**

(a) A holder of an air operator certificate may operate an aircraft at lower take-off minima than that prescribed in rule 91.413(f) provided the certificate holder ensures that the operation is conducted in accordance with the reduced minima take-off procedure specified in the certificate holder's exposition.

(b) The reduced take-off minima procedure must require that—

- (1) the pilot-in-command and the second-in-command are qualified for reduced minima take-offs in accordance with rule 121.515; and
- (2) the runway to be used has centre-line marking or centre-line lighting; and
- (3) the instrument approach and departure procedure published in the AIP for the runway to be used authorises reduced take-off minima; and
- (4) if the aeroplane is a two-engine propeller-driven aeroplane, the aeroplane is equipped with an operative auto-feather or auto-coarse system; and



- (5) the runway visibility is established using RVR; and
- (6) the method for observing and confirming that the required visibility exists for the take-off is acceptable to the Director.

## **Subpart E — Weight and Balance**

*Rule 121.307 is revoked and the following new rule is substituted:*

### **121.307 Load manifest**

A holder of an air operator certificate must ensure that —

- (1) a load manifest is completed before every air operation; and
- (2) the load manifest is certified by the pilot-in-command; and
- (3) the following details are accurately recorded on the load manifest:
  - (i) the name of the pilot-in-command, except where this is recorded by the certificate holder in another document;
  - (ii) the date of the operation;
  - (iii) the aeroplane type and registration mark;
  - (iv) the name or identification of the departure and destination aerodromes;
  - (v) the flight number or estimated time of departure;
  - (vi) the surname and initial of every crew member and passenger, except where these details are recorded by the certificate holder in another document;
  - (vii) the total of, the aeroplane's empty weight, the weight of any removable equipment, the weight of consumables, and the weight of crew members;

- (viii) the total weight of passengers and their carry-on baggage, the total weight of goods, the total weight of checked baggage, and the total weight of usable fuel:
- (ix) the take-off weight of the aeroplane:
- (x) evidence that the centre of gravity of the aeroplane is within the limits specified in the flight manual, except where this is recorded by the certificate holder in another document:
- (xi) the maximum allowable weights for the operation including zero fuel weight, take-off weight, and landing weight:
- (xii) the total of any weight adjustment made under rule 121.303(f).

## Subpart F – Instruments and Equipment

*Rule 121.363 is revoked and the following new rule is substituted:*

### **121.363 Flights over-water**

A holder of an air operator certificate must ensure that each of the certificate holder's aeroplanes operated on an extended over-water operation is equipped with sufficient liferafts with buoyancy and overload capacity to accommodate every occupant of the aeroplane in the event of a loss of one liferaft of the largest rated capacity.

*Rule 121.371 is revoked and the following new rule is substituted:*

### **121.371 Cockpit voice recorder**

A holder of an air operator certificate must ensure that each of the certificate holder's aeroplanes is equipped with a cockpit voice recorder.

*Rule 121.373 is revoked and the following new rule is substituted:*

**121.373 Flight data recorder**

A holder of an air operator certificate must ensure that each of the certificate holder's aeroplanes is equipped with a flight data recorder.

**Subpart G — Maintenance**

*Rule 121.403 is revoked and the following new rule is substituted:*

**121.403 Responsibility for airworthiness**

(a) A holder of an air operator certificate is responsible for the airworthiness of the certificate holder's aeroplanes, including airframes, aircraft engines, propellers, appliances, emergency equipment, and parts.

(b) The certificate holder must have a maintenance programme for each aeroplane, aircraft engine, propeller, appliance, emergency equipment item, and part.

(c) The maintenance programme required by paragraph (b) must contain standards at least equivalent to Part 91, Subpart G and the manufacturer's maintenance programme.

(d) The certificate holder must ensure that maintenance performed on the certificate holder's aeroplanes is performed—

- (1) in accordance with the maintenance programme required by paragraph (b); and
- (2) by a maintenance organisation certificated in accordance with Part 145; or
- (3) for maintenance performed in another State under a technical arrangement with the State, by a maintenance organisation that is appropriately certificated and authorised by the State.

*Rule 121.611 is revoked and the following new rule is substituted:*

**121.611 Flight attendant crew member competency requirement**

A holder of an air operator certificate must not use a flight attendant, and a person must not serve as a flight attendant unless, within the

immediately preceding 12 months, the certificate holder has determined by appropriate introduction and recurrent assessment, and flight check as may be appropriate, that the person has adequate knowledge and is competent in the following areas as appropriate to assigned duties and responsibilities—

- (1) authority of the pilot-in-command; and
- (2) passenger handling, including procedures to be followed in handling persons whose conduct might jeopardise safety; and
- (3) crew member assignments, functions, and responsibilities during emergencies, including evacuation of persons who may need assistance; and
- (4) briefing of passengers; and
- (5) use of cabin equipment and controls; and
- (6) location and operation of items of emergency equipment; and
- (7) location and operation of oxygen equipment; and
- (8) location and operation of every normal and emergency exit, including evacuation chutes and escape ropes; and
- (9) seating of a person who may need assistance; and
- (10) first aid; and
- (11) for a senior flight attendant and his or her deputy, ability to supervise a flight attendant carrying out his or her duties.

## **Subpart K – Fatigue of Flight Crew**

*Rule 121.803 is revoked and the following new rule is substituted:*

### **121.803 Operator responsibilities**

- (a) The operator of an aeroplane must not cause or permit an air operation to be performed with an aeroplane unless—

- (1) a scheme has been established for the regulation of flight and duty times for every person flying as a flight crew member in the aeroplane; and
- (2) the scheme addresses the following factors where appropriate to the operator's type of operation:
  - (i) rest periods before flight:
  - (ii) acclimatisation:
  - (iii) time zones:
  - (iv) night operations:
  - (v) maximum number of sectors:
  - (vi) single pilot operations:
  - (vii) two pilot operations:
  - (viii) two pilots plus additional flight crew members:
  - (ix) flight crew members' qualifications:
  - (x) mixed duties:
  - (xi) dead-head transportation:
  - (xii) reserve or standby period:
  - (xiii) flight duty period:
  - (xiv) in-flight relief:
  - (xv) type of operation:
  - (xvi) cumulative duty time:
  - (xvii) cumulative flight time:
  - (xviii) discretionary increase in flight time limitation or flight duty limitation or both:

- (xix) circadian rhythm;
  - (xx) days off;
  - (xxi) record-keeping; and
- (3) the scheme is acceptable to the Director.
- (b) The operator of an aeroplane performing an air operation must not cause or permit a person to fly in the aeroplane as a flight crew member if the operator knows or has reason to believe that the person is suffering from, or, having regard to the circumstances of the flight to be undertaken, is likely to suffer from, such fatigue while they are so flying as may endanger the safety of the aeroplane or its occupants.
- (c) The operator of an aeroplane performing an air operation must—
- (1) keep an accurate record of the flight time and duty time of each flight crew member flying in the aeroplane; and
  - (2) retain the flight time and duty time record required by paragraph (c)(1) for a period of 12 months from the date on which it was made.

***Rule 121.805 is revoked and the following new rule is substituted:***

### **121.805 Flight Crew responsibilities**

- (a) A person must not act as a flight crew member of an aircraft performing an air operation if the person knows or suspects that he or she is suffering from, or, having regard to the circumstances of the flight to be undertaken, is likely to suffer from, such fatigue as may endanger the safety of the aircraft or its occupants.
- (b) A flight crew member must not perform other hire or reward flight duties while employed, engaged, or contracted by an air operator when such flying in addition to that in an air operation exceeds the flight and duty time limitations prescribed in the scheme required by rule 121.803(a)(1) relating to the flight crew member.
- (c) A person must not act as a flight crew member of an aircraft performing an air operation unless the person has ensured that the

limitations prescribed in the scheme required by rule 121.803(a)(1) relating to the person are not exceeded.

(d) A person must not act as a flight crew member of an aircraft performing an air operation if, at the beginning of the flight, the aggregate of the person's previous and planned flight times on air operations—

- (1) during the period of 28 consecutive days expiring at the end of the day on which the flight begins — exceeds 100 hours; or
- (2) during the period of 365 consecutive days expiring at the end of the day on which the flight begins — exceeds 1000 hours.

## Subpart L — Manuals, Logs, and Records

*Rule 121.855 is revoked and the following new rule is substituted:*

### **121.855 Documents to be carried**

(a) A holder of an air operator certificate must ensure that the following documents are carried on each air operation:

- (1) details of the operational flight plan:
- (2) NOTAM and aeronautical information service briefing documentation appropriate to the operation:
- (3) meteorological information appropriate to the operation:
- (4) the load manifest:
- (5) notification of dangerous goods:
- (6) copies of the relevant flight guide charts and plates:
- (7) for a regular air transport service, a route guide covering each route flown and alternate aerodromes that may be used.

(b) The holder of an air operator certificate must ensure that separate copies of the documents referred to in paragraph (a)(6) are available for each pilot performing flight crew duties on the flight.

## Appendix B – Instruments and Equipment Airworthiness Design Standards

*Table 2 is revoked and the following new table is substituted:*

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Time or Relative time counts	24 hours  0 to 4095	$\pm 0.125\%$ per hour	4	1s	UTC time preferred when available. Counter increments each four seconds of system operation
Pressure Altitude	-1000' to maximum certificated altitude  -1000' to maximum certificated altitude +5000'	$\pm 100'$ to $\pm 700'$ (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 $1.2V_D$	$\pm 5\%$ and $\pm 3\%$	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'	$\pm 2^\circ$	1	0.5°	When true or magnetic heading can be selected as the primary heading reference, a



**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
					discrete indicating selection must be recorded
Normal acceleration (vertical)	-3g to +6g	±1% maximum range excluding datum error of ±5%	0.125	0.004g	
Pitch attitude	±75°	±2°	1 or 0.25 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

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Thrust/power on each engine (primary flight crew reference)	Full range forward	±2%	1 per engine	0.3% 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		
Longitudinal acceleration	±1g	±1.5% maximum range excluding datum error of ±5%	0.25	0.004 g	

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Pitch control(s) position (non fly-by-wire systems) <sup>1</sup>	Full range	±2°	1  0.5 or 0.25 for aeroplanes manufactured after 2002	0.5% 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  0.5 or 0.25 for aeroplanes manufactured after 2002	0.275% of full range	

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Lateral control(s) position (non fly-by-wire systems) <sup>1</sup>	Full range	±2°	1  0.5 or 0.25 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
Lateral control(s) position (fly-by-wire systems)	Full range	±2°	1  0.5 or 0.25 for aeroplanes manufactured after 2002	0.22% of full range	

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Yaw control(s) position (non fly-by-wire systems) <sup>1</sup>	Full range	±2°	1 0.5	0.3% 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 0.5	0.2% of full range	

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Pitch control surface(s) position <sup>1</sup>	Full range	±2°	1  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 <sup>1</sup>	Full range	±2°	1  0.5 or 0.25 for aeroplanes manufactured after 2002	0.3% of full range	For aeroplanes fitted with multiple or split surfaces, 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.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Yaw control surface(s) position <sup>1</sup>	Full range	±2°	1 0.5	0.2% of full range	For aeroplanes fitted with multiple or split surfaces, 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	0.004g	Twin engine aircraft only
Pitch trim surface position	Full range	±3%	1	0.6% of full range	

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Trailing edge flap or cockpit control position	Full range or discrete each position	$\pm 3^\circ$ or pilot's indicator	2	0.5% of full range	Flap position and cockpit control may each be sampled alternately at four second intervals, to give a data point every two seconds
Leading edge flap or cockpit control position	Full range or discrete each position	$\pm 3^\circ$ 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 four second intervals, so as to give a data point each two seconds
Each thrust reverser position or equivalent for propeller aeroplane	Discrete - 'stowed', 'in transit', 'reverse'		1 per engine		Turbo-jet - two discrettes enable the three states to be determined Turbo-prop - one discrete
Ground spoiler position or speed brake position	Full range or discrete each position	$\pm 2^\circ$	1 or 0.5 for aeroplanes manufactured after 2002	0.5% of full range	



**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Outside air temperature or total air temperature	-50°C to +90°C	±2° C	2	0.3° C	
Autopilot/autothrottle/AFCS mode and engagement status	Discretes - suitable combination		1		Discretes should show which systems are engaged and which primary modes are controlling the flight path and speed of the aircraft
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 III operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second.

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Localiser deviation, MLS azimuth, or GPS latitude deviation.	±400 microamps or available sensor range as installed  ±62°	As installed - ±3% recommended	1	0.3% of full range	For autoland/ category III 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
Glideslope deviation, MLS elevation, or GPS vertical deviation.	±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 III 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
Marker beacon passage	Discrete - 'on' or 'off'		1		A single discrete is acceptable for all markers
Master warning	Discrete		1		Record the master warning

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
					and record each 'red' warning that cannot be determined from other parameters or from the cockpit voice recorder
Air/ground 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 or 0.5 for aeroplanes manufactured after 2002	0.3% of full range	If left and right sensors are available, each may be recorded at four 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	
Groundspeed	As installed	Most accurate system installed	1	0.2% of full range	

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
GPWS	Discrete - 'warning' or 'off'		1		A suitable combination of discretes 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 discretes 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°
Stick shaker and pusher activation	Discrete - 'on' or 'off'		1		A suitable combination of discretes to determine activation
Windshear	Discrete -		1		

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
detection	'warning' or 'off'				
Throttle/power lever position	As installed Full range	As installed ±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 <sub>1</sub> , N <sub>2</sub> , EGT  Where capacity permits, the preferred priority is - indicated vibration level, N <sub>2</sub> , EGT, Fuel Flow, Fuel Cut-off lever position, and N <sub>3</sub> , unless the engine manufacturer recommends otherwise

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

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	
Selected vertical speed	Full range	±5%	1	100ft/min	

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
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	
Fuel quantity in CG trim tank	Full range	±5%	1 per 64 seconds	1% of full range	
Primary navigation system	Discretes - 'GPS', 'INS', 'VOR/DME',		4		A suitable combination of discretes to

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
reference	'MLS', 'Loran C', 'Omega', 'Localiser Glideslope'				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	
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 -	Discrete or analogue -	As installed	1		To determine braking applied



**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
left and right	'applied' or 'off'	±5%			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
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	Discrete - 'fail' or 'normal'		4		

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
systems					
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	Where mechanical means for control inputs are not available, cockpit display trim positions should be recorded.
Cockpit trim control input position - roll	Full range	±5%	1	0.7% of full range	Where mechanical means for control inputs are not available, cockpit display trim positions should be recorded.
Cockpit trim control input position - yaw	Full range	±5%	1	0.3% of full range	Where mechanical means for control inputs are not available, cockpit display trim positions should be recorded.
Trailing edge flap and cockpit flap control	Full range or discrete each	±5%	2	0.5% of full range	Trailing edge flaps and cockpit flap control

**Table 2. Part 121 - Flight Data Recorder Parameter Specifications.**

*This table refers to the FDR requirements of 121.373.*

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
position	position				position may each be sampled alternately at four 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	0.3% of full range	
All cockpit flight control input forces - control wheel, control column, rudder pedal	Full range – control wheel- ±70lbs, control column ±85lbs, rudder pedals, ±165lbs.	±5%	1	0.3% 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

Notes:

1. For aeroplanes that can demonstrate the capability of deriving either the control input or control movement (one from the other) for all modes of operation and flight regimes only the surface position OR the control position need be sensed. For aeroplanes with non-mechanical control systems (fly-by-wire) both surface and control position must be recorded.

## 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.)

### Comments arising from the NPRM

The rule amendment was developed under docket 3/CAR/4 and published as NPRM 05-07. The consultation details relating to docket 3/CAR/4 are detailed in each affected rule.

Nine written submissions were received on the NPRM and three commented on the proposed amendments to Part 121.

**The Board of Airline Representatives New Zealand Inc (BARNZ)** submitted they had no issues with the NPRM. They noted their support for the Air NZ submission on flight data recorder parameters and the periods for investigating and reporting incidents.

**The Aviation Industry Association (AIA)** submitted that they support the concept of an Omnibus Rule. The AIA note that an Omnibus Rule should not address matters of substance but aim to propose administrative rule changes or remove the requirement for an exemption.

The AIA submit that the proposed changes to the Flight Data Recorder Parameter Specifications (FDR) in relation to Petition 3/PET/7 meet the scope for the Omnibus. The AIA is concerned that the remainder of the FDR changes are based on Federal Aviation Administration rules on FDR changes but the FAA FDR rules are in transition. The AIA believe it is inadvisable to propose changes to New Zealand rules without discussion with New Zealand registered operators and the FAA rules are not in their final state.

**CAA comment:** *Refer to the CAA response to Air New Zealand below.*

**Air New Zealand** submitted that the CAA should review the amendments to the Part 121 Flight Data Recorder parameters in Appendix B, Table 2. Air NZ is supportive of the intent to align the CAA rules with those of the FAA. NPRM 05-07 proposes to amend the CAA rules on Flight Data Recorder parameters with the current Federal Aviation Regulations (FARs) of the United States. However Air NZ note the FAA currently has a Notice of Proposed Rule Making proposing amendments to the current Federal Aviation Regulations on

Flight Data Recorders. Air NZ also note that the FAA amendments proposed in NPRM FAA-2005-20245 have drawn a great deal of comment especially from Boeing, and if the FARs are amended in accordance with the FAA NPRM then the NZCAA rules will again not harmonise with the FARs.

Air NZ recommends all Flight Data Recorder parameters listed in FAA-2005-20245 are reviewed by the CAA against the Omnibus NPRM 05-07 proposed amendments for differences.

Air NZ supports proceeding with the amendments to the Flight Data Recorder Parameters 12b and 13b but recommend all other parameters changes be put on hold until FAA changes are finalised. The Air NZ concern is that changes made now may have to be amended if the FAA proposed amendments are finalised.

**CAA comment:** *The CAA is aware of the proposed FAA Flight Data Recorder amendments and has been in contact with the FAA in regard to the FAA NPRM. The CAA has reviewed all the proposed FAA amendments against current and proposed New Zealand rule changes. The CAA is mindful of the FAA NPRM and the proposed amendments but the FAA amendments are in the process of consultation not a final rule.*

*As AIR NZ has noted much comment has been made on the proposed parameter amendments. This comment includes a Boeing submission that states the FAA proposed Flight Data Recorder changes not proceed, and the proposed FAA amendments be reissued for comment with appropriate background. The CAA agrees with the Boeing submission as there is no supporting data from the FAA on the changes especially in terms of a safety case.*

*Following contact with the FAA, who recommend proceeding with the proposed Omnibus changes, and internal CAA discussion the CAA has decided to proceed with the changes proposed in the Omnibus NPRM to harmonise with the current FAA regulations.*

*If the FAA makes legislative amendments in regard to Flight Data Recorders that return the parameters to the current CAANZ requirements, the CAA will address those changes in a future rule project.*

**The Air NZ submission** relates specifically to the following Part 121 Flight Data Recorder parameters:

**FAA Parameter 15.** Pitch control surface position. Resolution is 0.3% for existing FAA rule, 0.2% in the existing CAANZ rule. FAA-2005-20245 proposes to change this to 0.2%, but Boeing comments contest this change without due consultation.

*CAA comment: The CAA has not proposed an amendment to the parameter in the current Part 121 rule.*

**FAA Parameter 12a & 12b.** Pitch control position. Resolution is 0.2% for existing CAANZ rule, changing to 0.5% in NPRM 05-07, but changing from 0.5% back to 0.2% with FAA-2005-20245, with Boeing comments contesting this change without due consultation.

*CAA comment: The CAA in NPRM 05-07 is proposing an amendment to Pitch Control position (Non fly by wire) which is FAA Parameter 12a and has not proposed an amendment to the parameter Pitch Control position (Fly by wire) which is FAA Parameter 12b. The CAA amendment to Pitch Control position (Non fly by wire) decreases the resolution requirement from 0.2% to 0.5% therefore relaxing the resolution requirement. An operator whose Flight Data Recorder is set at a resolution greater than that stated in the rules is exceeding the minimum standard required by the rule.*

**FAA Parameter 12b.** Pitch control position (fly-by-wire). FAA-2005-20245 has a series of notes at the bottom of Part 121 Appendix M that modify the requirements for Airbus aircraft. For the A320 Note 3 changes the resolution to 0.275% instead of 0.2%. This difference should be added to the CAANZ rule to allow the A320 to remain in compliance.

*CAA comment: The CAA agrees and the final rule for the Part 121 Pitch control position (fly-by-wire) parameter is amended to 0.275%.*

**FAA Parameter 13b.** Lateral control position (fly-by-wire). FAA-2005-20245 has a series of notes at the bottom of Part 121 Appendix M that modify the requirements for Airbus aircraft. For the A320 Note 4 changes the resolution to 0.22% instead of 0.2%. This difference should

be added to the CAANZ rule to allow the A320 to remain in compliance.

**CAA comment:** *The CAA agrees and the final rule for the Part 121 Lateral control position (fly-by-wire) parameter is amended to 0.22%.*

**FAA Parameters 27 & 28.** Localiser and Glideslope deviation. The FAA rules include an allowance for GPS deviation which is absent from the CAANZ rule.

**CAA comment:** *The CAA agrees. The final rule is amended to include under both the Localiser, and the Glideslope deviation parameters an allowance for GPS deviation under Part 121, and Part 125.*

**FAA Parameter 88.** All cockpit control input forces. There is a paragraph misalignment with the sensor input accuracy. The numbers +/-70lbs, +/-85lbs, +/- 165lbs relate to the Range column and not to the Sensor Input Accuracy column – refer to FAA-2005-20245 for the correct alignment.

**CAA comment:** *The CAA agrees and the final rule for All cockpit control input forces under Part 121, and Part 125 is amended to put this information under the correct column.*

**FAA Parameter 88.** All cockpit control input forces. Resolution is 0.2% existing CAANZ rule, changing to 0.3% NPRM 05-07, but changing back to 0.2% FAA-2005-20245, with Boeing comments contesting this change without due consultation.

**CAA comment:** *The CAA proposed amendment decreases the resolution requirement from 0.2% to 0.3% therefore relaxing the resolution requirement. An operator whose Flight Data Recorder is set at a resolution greater than that stated in the rules is exceeding the minimum standard required by the rule.*

**Rule 121.163(b)** Air NZ notes the revision to this rule only refers to runways published in the AIPNZ. Air NZ states there are significant benefits to Air New Zealand being able to conduct reduced takeoff minima procedure at overseas airport.

Air NZ recommends that the rule be amended for reduced takeoff minima operations at airports where the ICAO contracting state authorises reduced takeoff minima for the runway to be used.

***CAA comment:*** *The CAA agrees and in order to ensure that such procedures are approved by the state concerned this rule is amended by replacing AIPNZ with AIP.*

The comments and all background material used in developing the rules are held on the docket. The docket is available for public inspection at Aviation House, 10 Hutt Road. Persons wishing to view the docket should contact the Docket Clerk on Phone 64-4-560-9603 and ask for docket 3/CAR/4.