Herb Ray AMROBA Rotary Wing Management Committee Member
LAME # 4669 IoA 1-5XWP1

Inquiry into the Administration of the Civil Aviation Safety Authority (CASA) and related matters

SUBMISSION- Replacement Issued July 2, 2008

Att: The Secretary
Senate Standing Committee on Rural and Regional Affair and Transport
Parliament House
Canberra, ACT, 2500

Terms of Reference

Honorable Members of the Senate Standing Committee,
I refer to the terms of reference:

- To assess the effectiveness of administrative reforms undertaken by CASA management since 2003; and
- To examine the effectiveness of CASA's governance structure; and
- To consider ways to strengthen CASA's relations with industry and ensure CASA meets community expectations of a firm safety regulator.

Overview
The tardy and disappointing reforming of our Civil Aviation legislation is a product of our National Airworthiness Authority (NAA) of neither having the will nor the capability of providing the necessary rules and services to adopt international standards and procedures as is CASA's responsibility pursuant to the Air Navigation Act 1920 Article 37.

Whilst the Civil Aviation Act in section 98, Part VIII gives wide administrative powers, -The Air Navigation Act binds the crown to being compliant with Article 37 of the Convention.
This must be addressed!

- :CHAPTER VI.—INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES.

Article 37.
Adoption of international standards and procedures.
Each contracting State undertakes to collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures, etc

CASA is obligated to provide the necessary services to meet the ICAO/FAA objective that the aircraft is design compliant and 'safe for flight' by auditing the aircraft, not by 'administrative connivance'.

As a result of lowering the qualifications (refer Annexed P26/27) and standards to employ xADF personnel in the CASA's airworthiness administration, management , and airworthiness inspector positions, a class of airworthiness (AW) staff are employed with qualifications and AW judgment, not acceptable for ICAO or FAA service.(refer P12)

The most significant outcome is that the administration is unable to provide those necessary services that require a qualification and experience level to apply globally aligned rules that Type Certificated (TC) aircraft, predominantly of US manufacture, are returned to service (RTS) in a 'design compliant' manner and are 'safe for flight'

The 'Connivance'
The question is for what reason would CASA put to the industry a Notice for a Proposed Rule 'the B3 licence' when it doesn't relate to making a 'rule' at all. (NPRM0808MS attached)
NPRM is an invitation to transfer your licence to a rule that doesn't formally exist.
We estimate the cost ,conservedly, to be over $100, 000 per engineer to obtain the 'task extensions' with the duplicated training required to be able to return an aircraft to service by himself as he does now.
The proposed rule making should be CASR Part 66, with an impact study, risk and costs benefits analysis, everything the CEO told the Deputy PM last year CASA were doing in his 'mission statement'.
Instead here we have an NPRM to pre empitively introduce, by invitation, a previously rejected CASR Part 66 rule change by what can only be described as a 'connivance' – a dishonest presentation of a proposed rule, by applying and developing a yet to be formally established industry viewed Part 66 rule.

The evidence suggests that the proposed B3 licence rules are not only misaligned, but crafted to maximize 'cost recovery' at unprecedented levels for services not required by other States, and as generated, at will, from the 'chair'.

We are swamped with 'ad hoc' rules that require CASA approval attracting 'a user pay' fee.

Frankly, with the proposed B3 licence ADF aligned RTS system courtesy of NPRM0804MS with CASA trying to displace our FAA RTS system, a disaster in itself, we have our problems compounded as the ADF RTS system and its introduction is an attractive vehicle for 'cost recovery'.

We can expect an avalanche of 'user pays' 'approvals to service not only the pre emptive introduction and development of the proposed B3 licence, but also the 31 extension modules the B3 licence will thrive on, plus the expositions the AMO's will require also to cover the 31 extension modules and the aircraft type ratings. (Refer the B3 Licence Flow RTS Compatibility Diagram- attached)
Maybe we have it wrong!

The CEO seems to focus on 'Cost recovery 'in his 'Mission Statement' last year to Mark Vaile the then Deputy Prime Minister.
Quote
We will further develop our cost recovery proposals for your consideration which will take us through to Phase III implementation of cost recovery in July 2008. We will also work with DOTARS to fully review and make recommendations to revamp CASA's long term funding strategy.
Unquote
Is the government more interested in 'cost recovery' than for our industry being able to provide safe, efficient, competetive, aerospace products? or is this the CEO's objective?

Another declaration to the Deputy Prime Minister in the 'Mission Statement' re 'risk and cost benefits analysis. (P29)
Quote
CASA has already put considerable effort into the development of the Office of Airspace Regulation (OAR). We will continue to devote all necessary resources to the establishment and ongoing operation of the Office of Airspace Regulation which will report directly to me. We will be proactive in assessing airspace reform opportunities, and will develop, assess and promote proposals according to international best practice (including the application of risk and cost benefit analysis), and in cooperation with other relevant agencies, including the Department of Defence. Training and the provision of information to enhance airspace safety and efficiency will be part of the airspace reform program.
Unquote
If any CASA officer has set a poor example to his administration and management with regard to abiding with the governments protocol for 'good rule making' it is the 'CEO'.

Without any regard , whatsoever, for applying risk, cost /benefit analysis, or impact analysis, or industry consensus, the CEO arbitrarily directed his staff to apply the EASA standards, in direct conflict with his own memorandums directing his staff to apply the 'good rule making' protocols.

The CEO set the pace, and if anyone is guilty of promoting 'poor rule making', it starts here!

Collaboration with 'Department of Defence' is prominent in his 'statement of intent'

Viewing a 'Balancing Perspective'
This submission is presenting a case that CASA is not providing the services that support the GA airworthiness aerospace industry to manufacture parts, maintain aircraft , and/or return them to service compliant with the 'design standards' as set by the FAA.

CASA is obligated to provide services that harmonize with the FAA standards.

The FAA audit foreign operators entering and transiting the US for being FAA TC 'design compliant' and 'safe for flight'.
They had three categories '

- Green- Carrier could 'transit' the US 'coast to coast'
- Orange- 'transit' with restrictions and conditions; and
- Red, - 'Leave your goods at the gate please!'-no transit

'Harmonization' is 'mandatory' not an 'option' for our VH aerospace industry!

As industry participant in the continual struggle to attain 'harmonization since 1990, and being a member of technical committees etc and seminars etc believe I have been able to,, provide a view, that indicates a 'behavioral pattern' by CASA management that has culminated with NPRM0804MS being the product of 'administrative connivance' by resurrecting the rejected NPRM 0407MS in 2004, a proposal of similar ilk
My submission identifies what I believe is the crux of the problems being:

- An industry 'skill shortage'
- A convenient 'bulk store' of ADF pending retirees
- The lowering of employment standards

- The inability of such staff being able to audit an aircraft for 'design compliance' and
- This is the ICAO and FAA s fundamental objective
- ICAO assist States to establish the administration to achieve this harmonization etc
- Unable to establish the aircraft is 'safe for flight
- The 'Chair' is CASA management's answer to regulating 'safety of flight'
- The 'chair' has the power to 'think deficient' and apply personal customized rules, to alleviate 'alleged' deficiencies'.
- There is an overall practice of introducing unqualified processes really 'ad hoc' rules that generate unnecessary 'user pays' activities-
- we argue constitutes 'self employment'.

I believe the 'submission; will show that CASA administration has exploited the 'skill shortage ' dilemma, and instead of using the ADF staff to support qualified experienced staff to provide the necessary services, the ADF staff have been placed in crucial decision making areas of management where a continual shift has been in force, with military RTS system principles permeating their way into the ICAO/FAA RTS system , a product largely due to the 'rule making' teams being dominated by ex ADF staff.

The apparent reliance on ADF retirees to staff administration, management in Canberra, and AWI field positions, is understandable with the skills shortages we all experience.

However, as noted, these persons are in critical decision making areas where they introduce 'military culture' return to service practices

These practices are for 'centralized' RTS activities based on skilled tradespersons basically 'Specialist task oriented'. The B3 'extension' modules;

GA is by necessity, a 'decentralized RTS\ industry as is the FAA RTS system. Cross trained to encapsulate the 'task' RTS requirements.

Some of the ADF 'specialists' obtain other specialist task qualifications and co ordinate and carry out RTS activities, and the B3 system follows this idiom.

To day when you view the rejected NPRM0407MS from 2004 and now the resurrected precursor from 2004 into the B3 licence thrust with NPRM0804MS, which is more developed than 2004, the ADF system is readily identifiable.

The CEO focuses on 'cost recovery' and there appears to be exploitation of the 'skills shortage
, by creating a 'conduit' with the lowering of employment standards, that exclude the ability of carrying out the ICAO/FAA service to RTS an aircraft in a 'design compliant manner'.

Rather, the 'regulating' of our airworthiness system is a direct product of introducing 'ad hoc' rules and administrative process from the 'chair'.

The 'chair' syndrome starts from the 'rule making' team which has been dominated by x Navy retirees who proposed both the 2004 and 2008 NPRM Maintenance Suites

There is a continued resistance to harmonize of our RTS system; in favor of regulating our airworthiness from the 'chair' without identifiable standards (the FAA has the FSIMS manual 8900.1 P 31).
The FAA AWI's are trained to apply these standards),
This is one of our problems
The 'chair' is seen as generating unnecessary 'user pays' services, basically 'self employment' and a comfortable slot for retirees.

However, the ADF are well trained and skilled person with military RTS aircraft.

They can be a productive element if they have the right objectives, but initially they should not be in 'rule making' areas, until they are able to relate to civilian RTS capabilities and how RTS is achieved in a safe, efficient manner in civil service.

Therefore in this submission we propose the PAP be re instated to 'separate the rule making powers' from CASA, and the present staff be stood down and reemployed as the NZ government did with 'Performance Guarantee Contracts'

This is to break the 'chair culture' and align their objectives with government policy.

The ADF retirees can have their intelligence and skill potential realized with this alignment, rather than regulating by 'administrative connivance' from the 'chair'.

Balance 'cost recovery 'for 'necessary' services; rather than 'cost recovery' for 'necessary and unnecessary' services

I believe that if Belinda Neil can be held accountable by the Parliament and be looking at up to 12-14 years behind bars for with holding information in order to 'pervert the course of natural justice',

- then the CASA administrative and managerial infrastructure , who have been practicing the withholding of information and applying subversive and dishonest practices to install an incompatible RTS system for GA and
- avoid the adoption of FAA/ICAO standards and practices
- May see our submissions provide the evidence that the Senators will see fit to cause 'inquiry' of those people responsible for this questionable behavior', in particular with NPRM0804MS.
- That the 'inquiry' will similarly rule that a case exists for 'perverting the course of natural justice' with regard to the re surjection of NPRM 0407MS rejected in 2004, on the grounds that NPRM 0804MS is of similar ilk, and has been submitted
- as the B3 licence, when the NPRM0804MS is, in reality, only an invitation to transit to the B3 licence from the existing licence and
- Preemptively develop the licence at the industries expense to a hidden B3 licence agenda that does not have any rules formally established and
- Presenting the licence as a 'fait accompli', with CASR Part 66 again by passing all the governments 'good rule making' protocols.
- No impact statement, no cost/benefits. Basically, a misrepresentation,
- It will indeed be a travesty of justice if those responsible for the dismantling of the PAP and the archiving of the FAA standards and procedures package, and crafting an inferior

non harmonizing dysfunctional maintenance suite are not held accountable.

I hope that the wisdom of the Senators with this enquiry can right a long standing wrong, and that accountability is achievable

Our future to be able to contribute to our Nations quality of life in a safe and efficient manner is in the balance.
Thank you
Yours Sincerely
Herb Ray
Herb Ray
Lic. # 4669, IoA 1-5XWP1
AMROBA Rotary Wing Management Committee Member

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Issues

Issues and reference documents relating to and affecting GA's ability to provide 'safe and efficient' aerospace products/ competitively, 'Nationally' and 'Internationally'

FAA- Mission

Our Mission

Our mission is to provide the safest, most efficient aerospace system in the world.

Our Vision

Our vision is to improve the safety and efficiency of aviation, while being responsive to our customers and accountable to the public.

CEO's Mission Statement to the Deputy PM 2007.

In part quote

I am determined to ensure that:

- CASA's highest priority is the fare paying passenger,
- CASA is a firm regulator with safety as its primary objective, and
- CASA makes quality judgements on safety issues, while permitting the orderly operation and growth of Australian aviation.

Etc unquote

CASA's obligations is to provide the necessary services and rules to support the governments harmonization policy as is directed in Article 37 of the 'convention',

The Air Navigation Act 1920 binds the crown to the undertakings of the agreement signed to be a party to the Chicago Convention' and it is CASA's responsibility you provide the necessary services to ensure the VH aerospace industry aircraft are RTS in a Design compliant' manner, 'safe for flight'

Article 37.

Adoption of international standards and procedures

The CAA ACT consolidates Article 37.

Every aircraft manufacturer that produces aircraft wants to sell them on the US market, they all do, and they are produced to the US FAA design standards. Many aircraft hold two TC"s
No aircraft operates in the US unless it holds an FAA Type Certificate (TC).

Every State accepts the US FAA TC'd aircraft without question, and when we harmonize with these standards we have the capability ability of open access to global markets.

Regardless of what type of aerospace product we offer, flights, passengers, aircraft manufacture, parts, aircraft services (firefighting overseas or any global operation), employment overseas,
The US FAA sets the pace with its 'design standards' and the FAA's airworthiness, manufacture , maintenance, return to service system that tailors the work force and its certification and operational processes to operate aircraft must be adopted.
An N registered aircraft is FAA audited aircraft for compliance with the TC'd design standard that is 'safe for flight'
When we return to service our VH aircraft in a design compliant manner, and harmonize with the FAA RTS system, if a structural failure occurs, a design fault, the manufacturer is held accountable by the FAA.
Important for us, liability is covered for passengers, the operator, and CASA who should support the FAA system, are not held accountable for the design standard upkeep.

'Administrative Connivance'
CASA is hard pressed to defend its actions 'with the resurrection of the same principles of the NPRM0407MS rejected in 2004, by proposing NPRM0804MS as:

- A Proposed to Modernize Rules for the Licensing of Maintenance Personnel for Small Aircraft and
- 'This information is included for reference purposes only to put the proposed B3 licence in context with CASR Part 66.

Being in the first instance a more extensive version of the rejected licence replacement proposal, and presented in such a misleading manner by preemptively introducing the B3 licence as a 'fait accompli' under the guise of an 'initiation to transfer your existing licence to a non existent B3 CASR Part 66 licence by using an undeclared in house CASR Part 66, yet to be put up as an NPRM

NPRM0804MS represents a current example of CASA knowingly evading the government's protocol for 'good rule making' and I believe that scrutiny of the NPRM will indicate that

- we have a 'perverting the course of natural justice' by rule makers withholding and or misinforming the committees and the industry, being
- those persons that were responsible for 'recommending' or 'rejecting' the proposed 'rule making'.

For the last 10 years at least, our NAA's administrative and management have established practices to subvert the government's protocol to establish 'good rules'.

Issue- Skills Inability

CASA has a 'self imposed' 'skills' inability to meet their obligations and responsibilities to comply with and uphold the legislation, by adopting ICAO and international standards and procedures.

With a 'skills and experience' shortage everywhere, maybe a convenient 'bulk store' was to tempting, however, the 'conduit' has got out of hand. The 'skills' shortage situation is being exploited.

Issue- Conduit

The continued escalation of ADF retirees into the administration, management and field positions supports the notion that the qualifications and the 'poor' rules patronize ADF inductance into the CASA infrastructure, basically a convenient 'conduit'.

Issue- ICAO objective

The Airworthiness objective of ICAO is to aid a State to have an administration, management and particularly the Airworthiness Inspector, capable of inspecting an aircrafts condition that it is 'safe for flight' by auditing its compliance with normally an FAA Type Certificate Data Sheet (TCDS) 'design standard'.

ICAO's aim is to assist an NAA to create administration and management that harmonizes with global 'safety' standards that are transparent.

Issue- Government Intent

I believe the international 'safety standards' are the intentions of our governments 'Constitutional' undertaking as a 'Party to the Chicago Convention' and this is what article 37 directs CASA to provide! - the necessary rules services to support an 'international 'safety standard'- We have seen probably 10-15 years of fumbling ,

except for the brief sojourn with the PAP at the helm of 'rule making', with the RRP.

Issue- There is a resolution.

A permanent resolution, -
The separation of 'rule making powers' from CASA.

- This should be legislated to be permanent! and
- Reconstitute the 'independent 'Program Advisory Panel' (PAP)!

How many 'inquiries' does it take to meet our Constitutional obligations?-
A bleak future indeed for GA the way things are going!

Issue- Employment standards

The FAA and ICAO have strict employment standards for airworthiness staff.
The FAA states: Quote
(b) Duties of Inspectors. -
The Administrator of the Federal Aviation Administration shall employ inspectors who shall -
(1) inspect aircraft, aircraft engines, propellers, and appliances designed for use in air transportation, during manufacture and when in use by an air carrier in air transportation, to enable the Administrator to decide whether the aircraft, aircraft engines, propellers, or appliances are in safe condition and maintained properly etc
Unquote

Issue- FAA Flight Safety

The FAA audit foreign operators entering and transiting the US for being FAA TC 'design compliant' and 'safe for flight'.
They had three categories '

- Green- Carrier could 'transit' the US 'coast to coast'
- Orange- 'transit' with restrictions and conditions; and
- Red, - 'Leave your goods at the gate please!'-no transit

'Harmonization' is not an 'option'!

Issue- Employment standards

What employment standards does CASA have today?
The latest 'job vacancies' on the CASA website require qualifications that are virtually dismissive of any comprehensible global standard.

Quote:

Title Manager Field Office, Southern Region
Classification Senior Manager Band D
Group/Office General Aviation Operations Group
5.1 Qualifications and/or Experience
Mandatory
□ Aviation industry experience.
□ Demonstrated experience managing a multi-disciplined technical team.
Unquote

CASA has a fundamental problem; it doesn't employ the right people to carry out the '**S**afety' in CA'**S**'A.!

ICAO identified this in an audit
Quote: ICAO
CASA should provide all of its airworthiness inspectors recurrent training on different aspects of maintenance, auditing and oversight in an effort to stay abreast with a dynamic industry and to comply with the provisions of Doc 9389, Chapter 4.
Unquote

Of course one cannot be provided with 'recurrency' training, if you have never been 'current' in the first place?

Compare the qualifications and experience prior to the lowering of standards and today is alarming (refer P20)
Issue- Rules from the 'chair'
The rules are construed and maintained to accommodate the lowest level of ability of the staff, great for cranking out 'user pays' invoices, but unable to make qualified experienced airworthiness judgment that withstands legal scrutiny and,

- are unable to apply or regulate to rules that should be adopted to return aircraft to service in a design compliant manner as approved by the FAA/ICAO, auditing the aircraft for 'design compliance and being 'safe for flight', and
- that the CASA administration and management are unable to provide certification services to support and regulate a 'return to service' in a 'design compliant' manner, to FAA standards and procedures.
- In essence, a 'vehicle' must be provided that is within the 'drivers' capabilities to handle,
- The 'Chair' is CASA management's answer to regulating 'safety of flight'
- the 'chair' has the power to 'think deficient' and apply personal customized rules, to alleviate 'alleged' deficiencies'.

- There is an overall practice of introducing unqualified processes really 'ad hoc' rules that generate unnecessary 'user pays' activities- we argue
- constitutes 'self employment'.

9 The handicap

As previously noted, this handicap is a 'self inflicted' malaise, as CASA management has increasingly relied on a readily available and convenient source of staff from the ADF.

Staff today has been known to be employed virtually direct from the ADF. This exacerbates our problems.\

Issue- Refusing to harmonize

Regardless of the excuses offered by CASA, the main reason why CASA refuse to provide the necessary service to adopt the FAA standards and procedures is a lack of will and a determined behavior to neither provide or support the adoption of FAA standards and procedures.

Issue- PAP Harmonize

The Program Advisory Panel (PAP), the independent body that was established with the Regulatory Reform Program (RRP), quickly established with the RRP to harmonize standards and procedures with the FAA administration and management structure as adapted to our needs.

The Part 21 design rules to harmonize with the FAA design standards was quickly established and thankfully promulgated,

To complete the 'harmonization' airworthiness package was the FAA Airworthiness 'return to service' standards and procedures required to upkeep the aircraft compliant with the FAA Type Certificated Data Sheet (TCDS).

Issue- TC

The TCDS contains the design standards and the FAA airworthiness standards and procedures package was virtually up to the NPRM stage, before the PAP was finally dismantled by CASA thanks to a compliant CASA Board.

Issue- Consultant

I am retired, but act as a 'consultant' and recently I have been requested by Consolidated Press Holdings(CPH) to advise on the support of new aircraft and their introduction to service.

- CPH operate a Global Express based in Sydney on the N register, and a Sikorsky S76B IFR helicopter, a Huey, and a Soloy 47, all based at Ellerston near Scone on the VH register.

The more I delved into how we could continue the 'return to service activities under the new B3 licence concept presently NPRM0804 MS, the worse it got-

- It is not possible to even maintain the S76B in continuity during a B3 licence transit change let alone introduce a new type to the fleet

CPH have been advised that in order to continue returning the aircraft to service in a FAA TC'd compliant manner, the aircraft should be placed on the 'N' register, as their Global Express is, and the Base engineer to obtain an FAA A+P licence.

This will allow the new AS350 destined for the CPH ship to be anywhere on the globe , and to be maintained by any rated FAA Repair Station (as the Global Express is).

Issue- ICAO/FAA The intent

This is exactly the intent behind harmonization, for an NAA or a 'Repair Station' to immediately relate to the FAA AW TC's design and maintainance standards and either provide a 'continuing AW service' or accept our aerospace product.

Issue- The outcome –to compete

The VH operator or the manufacturer or the maintainer is in a competitive position in the aerospace market under these conditions, not to under estimate that CASA must support this condition with a competent audit system in force scrutinizing 'design compliance' and that the 'aircraft or product is 'safe for flight'.

Issue- Present RTS

At present the VH operator elects the manufacturers Schedule of Maintenance (SoM) and FAA RTS, and our licence generally covers the ability to comply with the FAA RTS system, however,

- the CASA administration and management cannot support the FAA RTS system, it is not transparent to other NAA's satisfaction, and they cannot readily equate our RTS standards with the FAA RTS system

Issue- ICAO objective
This is the ICAO objective, and the FAA's goal, (refer to the ICAO, FAA, and CASA 'mission statements P19) –to be able to demonstrate that

- your aerospace product is FAA TC design compliant and 'safe for flight', and
- it is CASA's fundamental obligation to provide and support this service.

To do that it needs the right people, the right rules, and a dedicated administration and management structure to support harmonization and meet the challenge.

To date they have just simply 'dropped the bundle'!

Issue- Flags of Convenience- Present RTS
There are an increasing number of VH registered operators who are 'flying 'flags of convenience' and registering in States that harmonize with FAA standards and procedures'.
This is to provide safe and efficient services that uphold the aircraft in a design compliant manner as directed by the ICAO/FAA.

- There must be a message in this to the 'inquiry' as to why an Australian licensed engineer can readily
- obtain a FAA A+P licence against the qualifications and experience his Australian licence demonstrate (at present) and then
- do basically the same FAA design compliant RTS , except he is also being compliant with the FAA RTS certification system, the FAA certification paperwork, which gives the aircraft instant access to any global market without question.

Issue- Liability
The operator, the passenger, and the NAA (CASA), are covered for any liability with regard to the upkeep of the aircraft compliance with the design standard, by courtesy of the FAA.

- That the skilled personnel have the experience and training to apply the FAA approved manufacturers return to service

data and the alerts and modifications etc to improve reliability and safety is essential, (after a FAA or equivalent, approved manufacturers training course) only if

- CASA's obligations and responsibilities are to provide the necessary services and rules to support and maintain the harmonized FAA system

Issue- The Intent of This Submission

This submission uses as an example the recent NPRM0804MS, which is a resurrection of a similar unacceptable proposal to our return to service system rejected in 2004, after much acrimony Public Notices and a 'petition'

Issue- Administrative Connivance

This NPRM exhibits many of the practices and subterfuge used in avoiding the government's 'good rulemaking' protocols, and NPRM0804MS is in essence introducing a Defence RTS system with CASA controlling the 31 'task specialist' extension modules that constitute the B3 licence from the 'chair' with 'ad hoc' rules.

- This standard permeates through out the entire CASA and administrative and management structure, with customized regulatory oversight a product of the 'chair'.

Issue- Introduction of Military RTS

The fact is we have a proposed military RTS controlled system introduced from the B3 licence NPRM0804MS replacing our present largely FAA design compliant RTS system.

As the Minister stated July 4 2008

- Quote This means aviation workers can move more freely between civilian and defence workforces.etc unquote
- (refer P19)-Unquote

Whilst we may have few civilians aviation workers moving to defence aviation, it looks as though, maybe, the defence force aviation is going to be run by contracted civilians, hence the dismantling of the FAA RTS system providing a 'design compliant ' aircraft in favor of a 'Defence RTS system.?
Unfortunately our 'aviation workers' won't be able to take their skills overseas, nor will our aerospace products be welcome overseas either.

Issue- Lack of Respect
We have a demonstrable lack of respect for our industries capability to operate safely and efficiently and be a competitive entity in the global aerospace market and the government directions are shown similar disrespect as we do no uphold the binding undertakings as a 'Party to the Chicago Convention'.

Issue- The Intent of This Submission
That the submissions and those of the industry will hopefully provide evidence that will cause the Senators to inquire into our NAA's administrative and management practices that have exercised a raft of tactics to subvert the governments protocols for 'good rulemaking', no impact statements , RIS, cost/benefits etc is my objective.

That the Senators will hopefully inquire into why so many

- VH operators seek 'flags of Convenience' to operate mainly on the ZK and N registers to provide safe efficient competetive services or operate on our mainland,
- devoid of CASAs inefficient administration and,
- why CASA is trying to establish a purportedly EASA based system when EASA have declared they are embracing the FAA and harmonizing with the FAA and Canadian systems- Really , just any excuse to impose the Defence RTS system.

That the submissions may cause the inquiry to scrutinize behavioral patterns by certain sectors of CASA administration and management

- that can be argued to indicate a patronizing of ADF retirees to the point of 'cronyism'
- that relies on regulating airworthiness to rules that avoid all the governments protocols for 'good rulemaking', and
- rely on staff neither holding globally recognized qualifications, experience (refer P15/16) or civil airworthiness judgment to audit the ICAO and FAA requirements that aircraft on the VH register are 'safe for flight' and are 'design compliant'.

Issue- Administrative Connivance
I believe that certain CASA administration and management levels have knowingly crafted 'poor rules' and a 'self imposed' inability to uphold their obligations and responsibilities to comply with a 'Constitutionally' inspired legislation

Issue- CASA Senior Management - Harmonizing

There are elements in the CASA management in senior positions that are in the throes of trying to establish harmonization. Much appreciated, but a long way to go!!

However, as with the PAP and Leroy Keith and other senior staff members supporting the FAA RRP 'harmonization', who were forced to resign and the dismantling of the PAP, 'rocking the boat' can make one awfully temporary.

Such persons need all the support they can get.

Issue- Belinda Neil Versus CASA

I believe that if Belinda Neil can be held accountable by the Parliament and be looking at up to 12-14 years behind bars for with holding information in order to 'pervert the course of natural justice',

- then the CASA administrative and managerial infrastructure , who have been practicing the withholding of information and applying subversive and dishonest practices to install an incompatible RTS system for GA and
- avoid the adoption of FAA/ICAO standards and practices
- That our submissions will provide the evidence that the Senators will see fit to hold accountable and cause the inquiry of those people responsible for this questionable behavior', in particular with NPRM804MS.
- That the 'inquiry' will similarly rule that a case exists for 'perverting the course of natural justice' with regard to the resurrection of NPRM 0407MS was rejected in 2004, on the grounds that NPRM 0804MS is of similar ilk, and has been submitted
- as the B3 licence, when the NPRM0804MS is, in reality, only an invitation to transit to the B3 licence from the existing licence and
- Pre emptive develop the licence at the industries expense.
- The B3 licence does not have any rules established and
- Presenting the licence as a fait accompli, with part 66 again bypassing all the governments 'good rule making' protocols.
- No impact statement, no cost/benefits. Basically, a misrepresentation,
- It will indeed be a travesty of justice if those responsible for the dismantling of the PAP and the archiving of the FAA standards and procedures package, and crafting an inferior

non harmonizing dysfunctional maintenance suite are not held accountable.

- ADF personnel still serving should gain industry experience taking leave in the fire season.
- We need all the help we can get. They are well trained but need to adapt their skills to be independently productive and efficient
- In this way commercial aerospace industry experience can be achieved,
- A two year stint at least is needed to comprehend, understand, and respect how GA returns aircraft to service in a FAA TC design compliant, safe, and efficient manner.

Basically, learn how to be a 'man for all seasons'.
They can be competent trade's people, but need to develop the experience, confidence, and skills to think for themselves, be independent, rather than having a faceless unskilled system prescriptively think for you, based on 'rank' not 'merit'.

Issue- GA is 'decentralized' maintenance and RTS is based on 'merit',
Unless you are independant and can follow the helicopters in the bush on survey work, you can't maintain them.
If you need a 'specialist' you bring him up on the next 'burner'!

- CASA was and still is trying to transform the GA AW industry into a **'centralized'** Squadron or Qantas fleet activity , based on task oriented (specialist) modular extensions, breaking the approved manufactures 'return to service' data into 31 categories or extensions,
- The present engineer is trained to carry out these tasks on the manufacturer's course so he can competently carry out all the tasks the manufacturer directs in his RTS-FAA approved data. We have an unnecessary level of rules inserted into a competent system here.

The CASA proposal follows the ADF concept of withdrawing all the tasks from the manufacturer's maintenance manual and schedules and creating 31 task oriented specialists, covering the tasks.

Issue- The Cost –The incompatibility –No Impact vision

Retraining an engineer who has been RTS the aircraft for 15 years or so, and applying costly unnecessary expositions for the AMO requiring CASA approval' is not and cannot be justified.
The engineer can only exercise his task module if the AMO has the task on his exposition-and I would say this is only the tip of the 'iceberg'

Totally incompatible with the FAA RTS system and unworkable for GA.

Issue- A Resolution
The grounds for 'Separation of Rule Making Powers'
The Prompt establishment of the FAA design Standards-CASR Part 21 series when the Regulatory Reform Program was initiated in 1996 by the Program Advisory Panel, an independant body that represented a 'separation of powers 'from CASA being in the 'chair', was a product of industry and CASA expertise .
Unfortunately the CASA expertise was extinguished to gather with the PAP after a blinding moment of success.

Until this time CASA management with an XADF dominated rule making team, had dismissed all attempts to adopt international standards and procedures'

Issue -The Cause and Effects

- CASA management lowered the AW staff employment standard possibly to ensure a steady induction of a convenient and reliable supply of pending ADF retirees for the CASA administrative and management structure in Canberra, and AWI's in the field.
- Many AWI cannot support prosecution on an alleged 'unsafe' aircraft or allied activity in court as an 'expert ' or qualified , or experienced witness, and those who 'can' are benchmarked down with those who 'can't'

Issue -No Standards Manual' or training to establish standards

- Incredibly, there is no 'standards' manual as the FAA has, the Flight Standards Information Management System' (FSIMS), that details applied rule determinations, customized variations for specific conditions etc, and acceptable interpretation of the rule.

- With out a 'standards' FSIMS manual as the FAA has the 'Flight Standards Information Management System' (8900.1) (index P28) or the training, and 're currency training' or the ability to provide scrutable airworthiness judgment, CASA resorts to 'regulating' air safety through the 'chair'\

Quote: ICAO
CASA should provide all of its airworthiness inspector's recurrent training on different aspects of maintenance, auditing and oversight in an effort to stay abreast with a dynamic industry and to comply with the provisions of Doc 9389, Chapter 4.

'One cannot be provided with 'recurrence' training, if you have never been current in the first place!
Basically, for the US industry with access to this manual. means- if 'you do this' 'you get that'! - This covers operations and AW.

Issue-Lack of standards
The industry is mired in a cacophony of standards and procedures not prevalent in the FAA system, tarmac to tarmac, airport to airport, state to state.

Issue – The 'Chair'
CASA management has given the 'chair' the power to 'think deficient' and apply personal customized rules, to alleviate 'alleged' deficiencies'.

- As with the Rule Maker team the powers invested in the 'chair' completely ignore and disrespect the government's protocol for 'good rule making'
- The 'chair' introduces industry disputed rules and policies pre emptively, or disallows other practices long established in a successful and safe manner, for unjustified reasons,
- There is an overall practice of introducing unqualified processes really 'ad hoc' rules that generate unnecessary 'user pays' activities-
- We argue this constitutes 'self employment'.
- The CASA OLC is a principle generator of advice to the field that often initiates such policies.
- The Regional Manager may set similar 'think deficient' policies' that the field staff must implement.
- When either your assigned surveyor changes or the Regional Manager changes so do your standards change?

Issue- The Voluntary Invitation to establish EVU's

The OLC was the thrust behind the rules being crafted inviting voluntary participation in 'enforceable voluntary undertakings' (EVU), by creating an 'administrative rule or rules',

- often a 'process' unique to an alleged offender, who faces expensive legal challenge , loss of licence or approvals to work, and forcing an undertaking to comply with an inefficient and unnecessary practice.

Issue – CASA- Clerical 'Safety'

CASA's 'Safety of Flight' in most instances, is by issuing non conformance notices (NCN's) for alleged 'clerical' 'misdemeanor' delinquencies with 'invitations' for enforceable voluntary undertakings as a solution to compel compliance with 'think deficient' rules.

Issue- Employment standards

A recent 'job vacancy for a Regional GA Operations Manager GA the web shows scant reference to 'qualifications' virtually a dismissall of the international AW employment standards :

5.1 Qualifications and/or Experience

Mandatory

- Aviation industry experience.
- Demonstrated experience managing a multi-disciplined technical team.

An open invitation for ADF , which of course is happening with ever increasing regularity.

Issue- A Competetive Handicap

CASA's present administrative and management system, with the XADF rule making team'

- will ensure the VH aerospace industry will remain handicapped in its ability to provide safe, efficient return to service of aircraft in a design compliant manner,
- Nor will we have equitable access to the international aerospace market with our products, either operationally or aircraft /component/parts wise.

.Issue- Safety of Flight Audits

The ICAO and FAA objective of auditing the aircraft for design compliance and being 'safe for flight' is seldom carried out.

- This standard permeates through out the entire CASA and administrative and management structure, with customized regulatory oversight a product of the 'chair'.

Issue- The Competent pegged down to the Incompetent!
The CASA qualified ex industry AWI's are handicapped having to try and supervise the new AWI's- however, when the manager imposes, a 'think deficient' policy syndrome from his 'chair', the staff must apply the policy. Very painful.

Enlightenment
The Ministers excitement regarding the collaboration between CASA and the ADF is in contrast to the long standing recognition in GA of this practice, and one must say, that there are signs that support the argument of 'cronyism'

It is suffice to say that the resurrection of the task oriented module certification RTS resurrected from the rejected task modular code NPRM0407MS is to again impose a centralized squadron/ fleet based RTS certification service on GA that is totally incompatible with our RTS function .

Having been involved with this type of requirement before with Airfast many years ago, we were top heavy in tech records and inspectors and we seldom if ever, had a schedule that reflected the current revision status because the schedules were under virtually permanent DOT amendment and approval.

The centralized Squadron/fleet RTS system is readily identifiable with the proposed B3 licence, and as the Minister said in his statement on July 4 2008
Quote

Firstly, it represents for the first time the two regulators of Australia's aviation industry - CASA and Defence - have agreed on standards and requirements for aviation qualifications.

This means aviation workers can move more freely between civilian and defence workforces.etc unquote

The two regulators have been in collaboration for at least 15 years, and now we adopt the Defence system instead of the FAA system, and that's progress? Not likely!

Herb Ray AMROBA Rotary Wing Management Committee Member
LAME # 4669 IoA 1-5XWP1

Issue Summary
The PAP provided FAA harmonized design rules CASR Part 21 in a short period

Australian designed and manufactured aircraft now meet FAA design standards, and obtain a US FAA TCDS and can enter the US market and automatically are accepted by any global operator.

However our delinquent administrative and management RTS rules are a handicap.

The FAA administrative and management rule package was the next on the PAP agenda.
Although archived this is still available and can be NPRM'd at short notice

The Resolution

- The 'Separation of Rule Making Powers' away from CASA, The PAP should be re established permanently.
- The only time CASA gets it right is when 'We not only have to listen', 'We have to act'
- While CASA is in the 'chair' the message is, 'We have to listen, but 'We don't have to act'! As it is today!
- The 'chair' makes 'ad hoc' rules throughout the entire CASA administration.
- CASA administration and management should be stood down and re employed as the Kiwis did with 'performance 'agreements' that
- promise the adoption and crafting of rules in support of the PAP /Government adoption of FAA standards and procedures- the FAA synchronization package, as is obligated by Article 37 of the Air Navigation Act.

- The CASA AW personnel should be trained but not be immediately in a managerial position where experienced AW judgment is needed.
- They are intelligent well trained people for the RTS of an F111, and they can be productive- just misguided! Need alignment!

HDR

Herb Ray AMROBA Rotary Wing Management Committee Member
LAME # 4669 IoA I-5XWPI

Annexe- Document Parking Area.
Air Navigation Act 1920 to

Article 37.
Adoption of international standards and procedures

The Act clearly establishes CASA responsibility is to provide the necessary services to adopt and harmonize our standards and procedures in our case to the FAA.

Chapter I. The Parliament.

Part V - Powers of the Parliament

51. The Parliament shall, subject to this Constitution, have power to make laws for the peace, order, and good government of the Commonwealth with respect to: -

(xxix.) External Affairs 'Party to the Chicago convention' –The power to legislate air space –The Air Navigation Act 1920

Here is a CASA 'job' vacancy, as watered down from 1998 or so tailored for an ADF pensioner, and the qualifications required
Title Manager Field Office, Southern Region
Classification Senior Manager Band D
Group/Office General Aviation Operations Group
5.1 Qualifications and/or Experience
Mandatory
□ Aviation industry experience.
□ Demonstrated experience managing a multi-disciplined technical team.

Here is the standard that CASA altered our qualifications for an AWI to around 2000 (I think!). To include para 3 ADF acceptability

Mandatory Qualifications

Paras 1, 2, and 4 was the standard prior the addition of para 3

1. Have held An Australian Aircraft Maintenance Engineer's Licence for a period of at least 8 years; OR
2. An equivalent overseas Aircraft Maintenance Engineer's Licence (ICAO Annexe 1) for a period of at least 8 years and the successful completion of the "overseas recognition examinations" conducted by the Civil Aviation Safety Authority; OR
3. Australian Defence Forces maintenance or maintenance training qualifications which, in the opinion of the Director of the Civil Aviation Safety Authority are appropriate to the duties of the office; OR
4. Have held an airworthiness inspector's position within a National Regulatory Authority

The standard we need is the FAA employment standard or our old standard back less the ADF para 3 –Unfortunately this has turned into 'cronyism'

The Ministers statement 17 June 2008 confirms this quote:

Firstly, it represents for the first time the two regulators of Australia's aviation industry - CASA and Defence - have agreed on standards and requirements for aviation qualifications.

This means aviation workers can move more freely between civilian and defence workforces.etc unquote

The CASA ADF Pensioners' rule making team, working with the ADF ? What a suiprise? Really-Been happening for years-the ADF has always been in the committees, every one I went they were there!

We reckon theADF pulled rank on the 'pensioners;!

FAA law - Sec. 44713. - Inspection and maintenance

(a) General Equipment Requirements. -
An air carrier shall make, or cause to be made, any inspection, repair, or maintenance of equipment used in air transportation as required by this part or regulations prescribed or orders issued by the Administrator of the Federal Aviation Administration under this part. A person operating, inspecting, repairing, or maintaining the equipment shall comply with those requirements, regulations, and orders.

(b) Duties of Inspectors. -
The Administrator of the Federal Aviation Administration shall employ inspectors who shall -
(1) inspect aircraft, aircraft engines, propellers, and appliances designed for use in air transportation, during manufacture and when in use by an air carrier in air transportation, to enable the Administrator to decide whether the aircraft, aircraft engines, propellers, or appliances are in safe condition and maintained properly; and
(2) advise and cooperate with the air carrier during that inspection and maintenance.
(c) Unsafe Aircraft, Engines, Propellers, and Appliances. -
When an inspector decides that an aircraft, aircraft engine, propeller, or

appliance is not in condition for safe operation, the inspector shall notify the air carrier in the form and way prescribed by the Administrator of the Federal Aviation Administration. For 5 days after the carrier is notified, the aircraft, engine, propeller, or appliance may not be used in air transportation or in a way that endangers air transportation unless the Administrator or the inspector decides the aircraft, engine, propeller, or appliance is in condition for safe operation.

ICAO--Mission Statement

presentations

presentations

To provide advice and assistance to Contracting States in the development and implementation of projects across the full spectrum of air transport aimed at improving the security, efficiency, regularity and operational safety of national and international civil aviation with a view to achieving standardization, as specified in ICAO's Standards and Recommended Practices (SARPs).

Vision

FAA- Mission

Our Mission

Our mission is to provide the safest, most efficient aerospace system in the world.

Our Vision

Our vision is to improve the safety and efficiency of aviation, while being responsive to our customers and accountable to the public.

Our Values

Safety is our passion. We're world leaders in aerospace safety.
Quality is our trademark. We serve our country, our customers, and each other.
Integrity is our character. We do the right thing, even if no one is looking.
People are our strength. We treat each other as we want to be treated.

CASA Mission ??

Passenger policy The new policy setting out CASA's overarching priorities states that the authority has been established primarily to look after the interests of the travelling public.

Australian Government
Civil Aviation Safety Authority

OFFICE OF THE CHIEF EXECUTIVE OFFICER

Trim Ref:
File Ref:

14 May 2007

The Hon Mark Vaile MP
Deputy Prime Minister
Minister for Transport and Regional Services
Parliament House
CANBERRA ACT 2600

Dear Deputy Prime Minister

Statement of Intent

Thank you for your Statement of Expectations provided to me on 12 March 2007. The following indicates how I intend to meet the expectations contained in the Statement including the high level performance measures I propose.

I am determined to ensure that:

- CASA's highest priority is the fare paying passenger,
- CASA is a firm regulator with safety as its primary objective, and
- CASA makes quality judgements on safety issues, while permitting the orderly operation and growth of Australian aviation.

To achieve this objective I intend to promote and develop a world class aviation regulator in which staff:

- act with integrity and impartiality at all times,
- provide a consistent message to industry, and
- exercise consistency, timeliness and transparency in decision making.

GPO Box 2005 Canberra ACT 2601 Telephone: (02) 6217 1001 Facsimile: (02) 6217 1444

Governance and Relationships

I will maintain strong and cooperative relationships with you, your office, and the Parliament. In ensuring CASA works closely with your office, the Department of Transport and Regional Services (DOTARS) and other government agencies, we will improve our ability to provide independent, coordinated and timely advice on safety issues.

CASA, working closely with DOTARS, will also provide timely and accurate advice to Parliament on operations and in response to requests for input to Ministerial representations and on Parliamentary Questions.

Performance Measure: *Achievement of agreed timelines and delivery of accurate and relevant advice to the Minister's office.*

CASA will maintain strong and cooperative working relationships with portfolio agencies to maximise coordinated development and delivery of cross-boundary initiatives. We will work closely and cooperatively with the Department of Transport and Regional Services (in particular to support implementation of the Alcohol and Other Drugs initiative, and to assist with airport issues such as Master Plans, Major Development Plans and airspace protection at airports), and with the Office of Transport Security.

I will also ensure that we continue to contribute actively and appropriately to the government's wider aviation agenda.

I am also committed to building on progress already made through the Aviation Policy Group in cross boundary issues, and I will continue to seek a strong and cooperative relationship with the Australian Transport Safety Bureau.

Performance Measure: *Achievement of agreed timelines.*
Delivery of accurate and relevant information and advice to support a cooperative and coordinated relationship with portfolio agencies.

I will work with the Secretary of DOTARS to establish a framework for the Monthly Reports and a schedule for the bi-monthly meetings.

My Monthly Reports will include information on operational priorities, performance (including progress against performance indicators), key challenges, progress of regulatory reform, (including significant new regulations), and the status of the Office of Airspace Regulation (including its work program and implementation of the Australian Airspace Policy Statement).

I will participate actively in our bi-monthly meetings. My reports to these meetings will include updates on the formal monthly reports, contemporary operational issues and key challenges and updates on CASA's progress in implementing the Long-Term Funding Strategy.

Key issues and strategies will continue to be reported in a timely and professional manner, and will be in accordance with the DOTARS Procedural Manual (when issued).

Performance Measure: *Timely submission of a Monthly Report which meets ministerial expectations.*
Participation by the CEO in bi-monthly meetings.

Finance and Reporting

I will continue to drive CASA's service delivery, regulatory functions and industry surveillance operations to pursue efficiencies and improved processes, with a particular emphasis on better and more cost effective service delivery which reflects international best practice. We will also pursue the devolution of functions to industry where appropriate.

We will further develop our cost recovery proposals for your consideration which will take us through to Phase III implementation of cost recovery in July 2008. We will also work with DOTARS to fully review and make recommendations to revamp CASA's long term funding strategy.

Progress will be benchmarked, with appropriate reporting of the key performance indicators critical to CASA's success. We undertake to maintain our focus on core business during the change process and while new functions are being integrated.

Performance measure: *Achievement of 90% of targets in Corporate Plan.*
Achievement of published service delivery targets.

Office of Airspace Regulation

CASA has already put considerable effort into the development of the Office of Airspace Regulation (OAR). We will continue to devote all necessary resources to the establishment and ongoing operation of the Office of Airspace Regulation which will report directly to me. We will be proactive in assessing airspace reform opportunities, and will develop, assess and promote proposals according to international best practice (including the application of risk and cost benefit analysis), and in cooperation with other relevant agencies, including the Department of Defence. Training and the provision of information to enhance airspace safety and efficiency will be part of the airspace reform program.

Performance Measure: *Formal establishment of OAR by 1 July 2007.*
Formal agreement to OAR work plan by 1 September 2007.

Operational Priorities

We will continue the policy of giving highest priority to the safety of passenger carrying operations. To do so we will improve our oversight of the aviation industry, seeking to identify and promote the safety benefits in all we do.

Performance measures: *Public confidence in aviation safety, by annual survey.*

Regulatory Reform

We will develop a detailed program of regulatory reform in consultation with the Aviation Regulation Review Taskforce (ARRT). A draft program, prepared by CASA was submitted to you at the end of April 2007, ahead of the first meeting of the ARRT. We will also consult with the Department on policy issues prior to industry consultation on significant regulatory matters.

Performance Measure: *Achievement of target dates contained in the regulatory reform program agreed with the ARRT.*

International

CASA will continue to support safety objectives through participation in and support for international safety forums, particularly the International Civil Aviation Organization, as well as working for the development of international bilateral safety agreements and consultations. We will continue to support the Memorandum of Understanding with the Department and Airservices Australia in respect to ICAO.

We will also participate actively in the recently announced initiative to support improvements in Indonesia's aviation safety.

Performance Measure: *Active contribution to the maintenance of Australia's standing as an ICAO Member State of Chief Importance.*
Outcome of ICAO Australian audit consistent with 'New CASA' goals.
Targeted assistance to Indonesian aviation authorities.

Industry and Community Engagement

CASA is committed to engaging cooperatively with the aviation industry and other stakeholders, and in particular with General Aviation. We will assist the General Aviation Action Agenda wherever possible and actively promote the self administration of areas of aviation where there is potential to improve safety performance. We will also strive to ensure that the Regulatory Reform Program does not unnecessarily undermine the sector's viability and capacity for growth.

We will maintain effective consultation with industry on the Long Term Funding Strategy to ensure that it is applied fairly and with a proper regard for industry's role and capacity.

CASA will maintain and seek to enhance the operations of the Aviation Safety Forum and Standards Consultative Committee as important contributors to the industry consultative process.

Performance Measure: *Annual survey of key industry representatives to benchmark CASA's standing in the industry.*
Personal engagement by the CEO with key industry groups, organisations and individuals and through quarterly industry briefings.

The air transport sector of the aviation industry has entered a new phase. Continued expansion of current operations, the arrival of new carriers and new aircraft types, and the extension of regional services all define a period of innovation and change. With change comes the potential for increased risks for aviation operations and the attendant challenges for the safety regulator. The 'New CASA' reforms achieved to date together with the budgetary support provided by the Government have positioned CASA to meet these challenges.

The addition of new responsibilities adds significantly to our ability to contribute to Australian aviation safety and we look forward to the challenges inherent in their implementation. With our continued emphasis on the safety of the fare paying passenger, our drive towards consistency, transparency, efficiency and effectiveness and our focus on accountability and regulatory reform I am confident that we can achieve an enhanced safety regime during these challenging times.

Yours sincerely

Bruce Byron AM
Chief Executive Officer

FSIMS

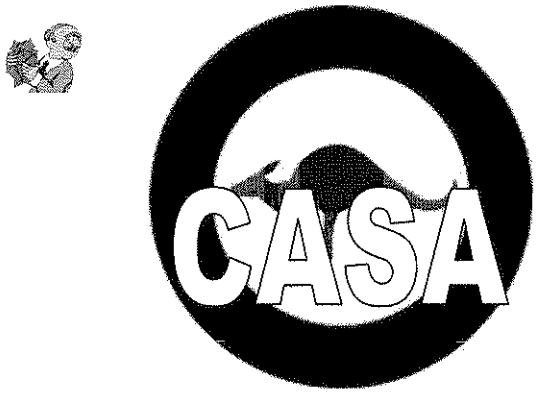
Flight Standards Information Management System

8900.1 Contents

June 28, 2008

Herb Ray AMROBA Rotary Wing Management Committee Member
LAME # 4669 IoA 1-5XWPI

Unfortunatly this is how many people in the industry relate to CASA



Per Ardua Ad Astra

'By Adversity to the Stars'- For the GA VH aerospace industry- Believe it!

Annex A

A Guide to Licence Requirements, Categories, Subcategories and Ratings

The tables in this Annex contain information about other proposed CASR Part 66 licence categories, namely Categories A, B1 and B2. This information is included for reference purposes only to put the proposed B3 licence in context with CASR Part 66.

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Contents

1. Definitions

1.1 The following definitions will apply:

1.2 ***large aircraft*** means:

(a) an aeroplane that has a maximum take-off weight (***MTOW***) of more than 5 700 kg; or

(b) a helicopter that is multi-engined.

1.3 ***Small aircraft*** means any aircraft that falls outside the criteria for large aircraft.

1.4 ***pilot maintenance*** in relation to the tasks that may be carried out by the holder of a pilot maintenance sub-category, means the maintenance mentioned in items 1 to 22, inclusive, of Schedule 8 of CAR 1988 or the proposed Appendix VIII of Part 42

2. Privileges of a Licence/Authority- Certify maintenance

Note re privileges

- *This NPRM describes the privileges and limitations attached to a B3 licence.*
- *Many of these privileges are also available to other Part 66 licence categories and also to non-licensed persons.*
- *Certifications for Release to Service of aircraft may only be made by a Part 66 licence holder in accordance with CASR Part 42 or Part 145, or a pilot. Pilot CRS privileges will be listed in an appendix to Part 42*
- *Maintenance certifications of aircraft may be made by any person authorised to do so in accordance with an Approved Maintenance Organisation (AMO) Exposition or as permitted under Part 42.*
- *Certifications for Release to Service of components may be made by any person in accordance with an approved Exposition.*
- *Certifications for maintenance of components are subject to the AMO training and assessing the persons as competent in accordance with an approved procedure.*

2.1 The holder of a licence in an aircraft sub-category of B3 (B3.1 – B3.4) may issue a certificate of release to service for a non-type-rated aircraft that corresponds to the sub-category following completion of maintenance on aircraft structure, powerplant, and mechanical, avionic and electrical systems, including maintenance for which he or she holds the extension required to complete the maintenance (relevant extension).

2.2 The holder of a licence in an engine sub-category of B3 (B3.5 or B3.6) may issue a certificate of release to service for an engine that corresponds to the sub-category following completion of maintenance on powerplant, including maintenance for which he or she holds:

(a) the relevant extension; and

(b) if the maintenance is to an engine for which an engine rating applies — the engine rating (the ***relevant rating***).

2.3 The holder of a licence in the avionic and electrical systems sub-category of B3 (B3.7) may issue a certificate of release to service for a non-type rated aircraft following completion of maintenance on aircraft avionic and electrical systems, including maintenance for which he or she holds the relevant extension.

2.4 The holder of a licence in the pilot maintenance sub-category of B3 (B3.8) may issue a certificate of release to service for a non-type rated aircraft — following completion of pilot maintenance only.

2.5 The holder of a licence in a sub category of B3 may issue a certificate of release to service only following completion of maintenance that falls within the scope of:

(a) the relevant aircraft systems mentioned for category B3 in Table 1 of this annexe, subject to any condition or limitation mentioned for category B3; and

(b) the relevant extension mentioned for category B3 in Table 1; and

(c) the relevant engine rating.

2.6 The holder of a pilot maintenance sub-category of B3 (B3.8) may issue a certificate of release to service only following completion of maintenance that falls within the scope of items 1 to 22, inclusive, in Schedule 8 of CAR 1988.

2.7 A B3 licence holder is authorised to start and run a helicopter engine in connection with carrying out helicopter maintenance or helicopter maintenance training, only if the person:

(a) Has both of the following subcategories:

(A) B3.3 (basic helicopter); and

(B) B3.5 (piston engine) or B3.6 (gas turbine engine) as appropriate for the helicopter; or

(b) both of the following subcategories:

(A) B3.4 (advanced helicopter); and

(B) B3.6 (gas turbine engine); and

2.8 The holder may issue a certificate of release to service for the helicopter.

3. Privileges of a licence/ authority — carry out maintenance

3.1 The holder of a B3 may physically carry out any maintenance in respect of which he or she may issue the certificate of release to service (CRS)

4. Licence pre-requisites

4.1 An applicant for a B3 category licence must demonstrate by examination, knowledge:

(i) of each subject module, or item or sub-item of a module, that is marked for the sub-category in accordance with Table 3; and

(ii) to the level of knowledge for the module or its items or sub-items as indicated in Table 4 the sub-category; and

(iii) that is sufficient to attain a pass mark of 75%.

4.2 An applicant for a sub-category of category B3 (except for pilot maintenance (B3.8)) must:

(i) have accumulated at least 3 years of practical maintenance experience on operating aircraft relevant to the sub-category for which the authority is sought; and

(ii) hold each unit of competency listed and coded in Table 4 that is marked X or indicated as its alternative for category B3; and

(iii) hold each unit of competency listed and coded in Table 4 that is indicated for the specific sub-category of B3 applied for; and

(iv) before holding a unit of competency mentioned in sub-paragraph(ii) or (iii) — hold the qualifications or units of competency that are prerequisites for the unit; and

(v) if an extension for the sub-category is required to permit completion of maintenance not otherwise covered by the sub-category — hold each unit of competency listed and coded for the extension in Table 4; and

(vi) before holding a unit of competency mentioned in sub-paragraph(v) — hold the qualifications or units of competency that are prerequisites for the unit; and

(vii) hold a Certificate IV in Aeroskills (B3).

4.3 An applicant for the sub-category of category B3 that is for pilot maintenance (B3.8) must:

(i) have accumulated at least 2 years of practical maintenance experience on operating aircraft relevant to the sub-category for which the authority is sought; and

(ii) hold each unit of competency listed and coded in Table 4 that is marked X or indicated as its alternative for the sub-category; and

(iii) hold each unit of competency listed and coded in Table 4 that is specifically indicated for sub-category B3.8; and

(iv) before holding a unit of competency mentioned in sub-paragraph(iii), hold the qualifications or units of competency that are prerequisites for the unit.

4.4 An applicant for an extension must:

(i) hold the sub-category of category B3 that is relevant to the extension; and

(ii) hold each unit of competency listed and coded in Table 4 that is indicated for the extension; and

(iii) before holding a unit of competency mentioned in subparagraph (b), hold the qualifications or units of competency that are prerequisites for the unit.

5. B3 Subcategories and extensions

5.1 There are eight sub-categories of the B3 licence as follows:

B3.1 = Aeroplanes, fixed landing gear

B3.2 = Aeroplanes, retractable landing gear

B3.3 = Basic helicopter

B3.4 = Advanced Helicopter

B3.5 = Piston Engines
B3.6 = Gas Turbine Engines
B3.7 = Electrics and Avionics
B3.8 = Pilot Maintenance

5.2 The B3 licence will be further expandable by means of thirty one extensions as follows:

(a) Pneumatic Systems
(b) Air Cycle Air Conditioning
(c) Vapour Cycle Air Conditioning
(d) Piston Engine Pressurisation
(e) Gas Turbine Pressurisation
(f) Structural Repairs & Modifications
(g) Wood Structures
(h) Fabric Inspect & Test
(i) Fabric repair & Replace
(j) Composite Structures
(k) Hydraulic Systems
(l) Retractable Undercarriage
(m) Oxygen Systems
(n) Turbocharging Systems
(o) Constant Speed Propellers
(p) Multi-Engine DC Electrical Systems
(q) FADEC
(r) Diesel Aircraft Engines
(s) 2-Stroke Aircraft Engines
(t) Advanced Electrical Systems
(u) Weighing of aircraft
(v) Electric powered Instrument Systems
(w) Aeroplane Autopilots
(x) Helicopter Autopilots
(y) Instrument Landing System (ILS)
(z) Advanced Instrument Systems
(aa) Advanced Radio Systems
(bb) Inertial Navigation Systems (INS)
(cc) Radar
(dd) Global navigation Systems (GNS)
(ee) Flight Management Systems (FMS)

TABLE 1 – Sub-category and extension interdependencies

Aircraft and engines

Extension Designator	Extension	Relevant sub-category of category B3
(a)	Pneumatic Systems	B3.1, B3.2, B3.3 and B3.4 *Note* These are the aircraft subcategories
(b)	Air Cycle Air-conditioning	B3.1, B3.2, B3.3 and B3.4
(c)	Vapour Cycle Air-conditioning	B3.1, B3.2, B3.3 and B3.4
(d)	Piston Powered Aircraft - Pressurisation Systems	B3.1, B3.2, B3.3 and B3.4
(e)	Gas Turbine Powered Aircraft - Pressurisation Systems	B3.1, B3.2, B3.3 and B3.4
(f)	Major Structural Repairs and Modifications	B3.1, B3.2, B3.3 and B3.4
(g)	Wooden Structures	B3.1, B3.2, B3.3 and B3.4
(h)	Fabric – Inspecting/Testing	B3.1, B3.2, B3.3 and B3.4
(i)	Fabric – Replacing/Repairing	B3.1, B3.2, B3.3 and B3.4
(j)	Composites	B3.1, B3.2, B3.3 and B3.4
(k)	Hydraulic Systems	B3.1, B3.2, B3.3 and B3.4
(l)	Retractable Undercarriage Systems	B3.1, B3.2, B3.3 and B3.4
(m)	Oxygen Systems	B3.1, B3.2, B3.3 and B3.4
(n)	Super/Turbo charging	B3.5 *Note* This is piston engine sub-category
(o)	Constant Speed Propellers	B3.5, B3.6 *Note* These are the engine subcategories
(p)	Multi-Engine DC Electrical Systems	B3.1, B3.2, B3.5, B3.6 *Note* These are the aeroplane and engine subcategories
(q)	FADEC	B3.5, B3.6
(r)	Diesel Engines	B3.5
(s)	2-Stroke Engines	B3.5
(t)	Advanced Electrical Systems	B3.1, B3.2, B3.3, B3.4, B3.5, B3.6
(u)	Weighing of aircraft	B3.1, B3.2, B3.3, B3.4, B3.5, B3.6
(v)	Electric Powered Instrument Systems	B3.1, B3.2, B3.3, B3.4, B3.5, B3.6

Avionics and electrical systems

Extension Designator	Extension	Relevant sub-category of category B3
(w)	Aeroplane Autopilots	B3.7 Note This is the avionics and electrical systems sub-category
(x)	Helicopter Autopilots	B3.7
(y)	Instrument Landing Systems (ILS)	B3.7
(z)	Advanced Instrument Systems	B3.7
(t)	Advanced Electrical Systems	B3.7
(aa)	Advanced Radio Systems	B3.7
(bb)	Inertial Navigation Systems (INS)	B3.7
(cc)	Radar	B3.7
(dd)	Global Navigation Systems (GNS)	B3.7
(ee)	Flight Management Systems	B3.7
(m)	Oxygen systems	B3.7
(q)	FADEC	B3.7
(u)	Weighing of aircraft	B3.7

TABLE 2 – Aircraft systems, designations and conditions and qualifications for an authority in category B1, B2 and B3

Aircraft system (and ATA chapter reference)	Designation of system	Conditions or limitations
Pressurisation, Air-conditioning & Equipment Cooling Systems (ATA 21)	Mechanical	**For category B2:** limited to electrical test and electrical defect rectification only.
		For category B3: limited to: air-conditioning systems — only if extension (b) or (c) is held for the relevant aircraft and engine; or pressurisation systems — only if extension (d) or (e) is held for the relevant aircraft and engine.
Autopilot (ATA 22)	Avionic	**For category B3:** aeroplane autopilots — only if extension (w) is held; and helicopter autopilots — only if extension (x) is held; and for auto throttle and automatic landing systems – no privileges may be exercised.
Communications (ATA 23) including ELT and underwater locating beacon (ATA25-60)	Avionic	**For category B3:** for communications systems —only if sub-category B3.7 is held; for UHF, SATCOM, Intercom and CVR Systems — only if extension (aa) is held.
Electrical Power Supply Systems Generator Constant Speed Drive/IDG (ATA 24)	Electrical	**For category B3:** for multi-generator aircraft DC electrical systems — only if extension (p) is held; for AC generation and distribution systems — only if extension (t) is held; for Generator Constant Speed Drive/IDG — no privileges may be exercised.
Equipment, Furnishings and Emergency Equipment (ATA 25)	Mechanical	**For category B3:** for cabin entertainment, galleys and air stairs — no privileges may be exercised; for electronic emergency equipment —only if sub-category B3.7 is held; for seats and harnesses, cabin layout, equipment layout, cabin furnishing installation and cargo handling and retention equipment —only if 1 or more of subcategories B3.1, B3.2, B3.3 , B3.4 B3.5 or B3.6 is/are held; for seat belts — only if 1 or more of subcategories B3.1, B3.2, B3.3, B3.4, B3.5, B3.6 or B3.7 is/are held; for lifting systems and emergency flotation systems — only if sub-category B3.3 or B3.4 is held.

Aircraft system (and ATA chapter reference)	Designation of system	Conditions or limitations
Fire, Smoke, Overheat Detecting and Extinguishing Systems (ATA 26)	Mechanical	**For category B2:** limited to electrical test and electrical defect rectifications only.
		For category B3: for electrical components — only if sub-category B3.7 is held; for testing of fire and smoke detection, warning and extinguishing systems — only if subcategories B3.2, B3.4 or B3.6, or extensions (e) or (t), are held; for inspection and testing of portable fire extinguishers —only if any of subcategories B3.1 to B3.6 is held
Flight Control Systems (ATA 27)	Mechanical	**For category B3:** for servomechanisms — only if sub-category B3.7 is held; for Active Load control, pneumatic operation, lift dump, yaw damping, rudder gust locking or artificial feel —no privileges may be exercised; for aeroplane flight controls —only if sub-category B3.1 or B3.2 is held; for helicopter flight controls —only if sub-category B3.3 or B3.4 is held; for hydraulically assisted flight controls —only if extension (k) is held.
Flight Control Systems – system operation – fly by wire (ATA 27)	Avionic	**For category B3:** no privileges may be exercised.
Fuel Systems (ATA 28)	Mechanical	**For category B2:** fuel systems —instrumentation aspects only.
		For category B3: for instrumentation — only if extension (v) is held; for fuel dumping and longitudinal fuel balancing — no privileges may be exercised.
Hydraulic Power Systems, including ram air turbine (***RAT***) (ATA 29)	Mechanical	**For category B3:** except for RAT — only if extension (k) is held; for RAT — no privileges may be exercised.
Ice and Rain Protection Systems (ATA 30)	Mechanical	**For category B2:** limited to electrical test and electrical defect rectifications only.
		For category B3: for Ice and Rain Protection Systems —only if extension (e) is held; for Ice & Rain Protection Systems boots — only if extension (a) is held.

Aircraft system (and ATA chapter reference)	Designation of system	Conditions or limitations
Indicating & Recording Systems (ATA 31)	Avionic	**For category B3:** only if sub-category B3.7 is held; for instrument warning systems including master warning systems and centralised warning panels —only if extension (t) is held; for RMI, EIS, vibration measurement and display, altitude reporting and alerting systems; air data computers, Remote Magnetic Instruments, GPWS, FDR, EFIS, stall warning systems and angle of attack indicating systems; and digital techniques —only if extension (z) is held.
Landing Gear (ATA 32)	Mechanical	**For category B3:** for aeroplanes — only if sub-category B3.1 and extensions (k) and (l) are held, or if sub-category 3.2 is held; for helicopters — only if sub-category B3.3 and extensions (k) and (l) are held, or if sub-category 3.4 is held.
Wheels and Brakes (ATA 32–40)	Mechanical	**For category B3:** for aeroplanes — only if sub-category B3.1 or B3.2 is held for the relevant aircraft; for helicopters — only if sub-category B3.4 is held.
Lighting (Operation) (ATA 33)	Electrical	**For category B3:** only if sub-category B3.1, B3.2, B3.3, B3.4 or B3.7 is held for the relevant aircraft.
Navigation Systems: General Radio Interface ACARS, SELCAL, INS/IRS Compass Flight Management System Doppler Systems (ATA 34)	Avionic	**For category B3:** only if sub-category B3.7 is held for all circumstances; for flight director —only if extensions (w) or (x) are held for the relevant aircraft; for ILS systems — only if extension (y) is held; for SELCAL systems — only if extension (aa) is held; for INS/IRS — only if extension (bb) is held; for weather radar — only if extension (cc) is held; for GNS — only if extension (dd) is held; for FMS — only if extension (ee) is held; for VLF, RNAV, and MLS — no privileges may be exercised.
Oxygen System (ATA 35)	Mechanical	**For category B3:** only if extension (m) is held.
Pneumatic System (ATA 36)	Mechanical	**For category B3:** for piston engine pneumatic system — only if extension (a) is held; for gas turbine pneumatic system — only if extension (e) is held.
Vacuum (ATA 37)	Mechanical	**For category B3:** only if extension (a) is held.

Aircraft system (and ATA chapter reference)	Designation of system	Conditions or limitations
Waste Water (ATA 38)	Mechanical	**For category B3:** no privileges may be exercised.
Cabin intercom data and network systems (ATA 42)	Avionic	**For category B3:** only if extension (aa) is held for all circumstances; for software management —only if sub-category B3.7 is held
Cabin Systems (ATA 44)	Avionic	**For category B3:** no privileges may be exercised.
Central Maintenance System (ATA 45)	Avionic	**For category B3:** no privileges may be exercised.
Information System ATIMS Network server (ATA 46)	Avionic	**For category B3:** no privileges may be exercised.
APU (ATA 49)	Mechanical	**For category B3:** no privileges may be exercised.
Cargo and Accessory Compartments (ATA 50)	Mechanical	**For category B3:** for general maintenance and repair only, and excluding major repairs and modifications; for major repairs and modifications — only if extension (f) is held.
Structures - General (ATA 51)	Structure	The holder of an authority in category B1, B3.1, B3.2, B3.3 and B3.4 has privileges in metal and composite structures limited to the following: • the inspection of aircraft structures, • metal scab, patch, flush, splice, lap and formed section repair • composite external patches, scarf or stepped repairs • metal-to-metal and metal-to-composite bonding. • repair and modification of aircraft composite structures and components — but only if the holder has obtained the relevant optional units of competency mentioned in paragraph 13.9 marked Y in Appendix 6 of this Order, or for B3.1, B3.2, B3.3 or B3.4 holds extension (j). • repair and modification of wooden structures — but only if the holder has obtained the relevant optional units of competency mentioned in paragraph 13.10 marked Z in Appendix 6 of this Order; or, for B3.1, B3.2, B3.3 or B3.4: holds extension (g).

Aircraft system (and ATA chapter reference)	Designation of system	Conditions or limitations
		• repair or replacement of fabric surfaces —but only if the holder has obtained the relevant optional units of competency mentioned in paragraph 13.10 marked as Z in Appendix 6 of this Order, or, for B3.1, B3.2, B3.3 or B3.4 holds extension (h) (limited to inspection and testing) or holds extension (i) (for repair and replacement). • For **category** B3: – for major repair and modification of aircraft metal structures and components — only if extension (f) is held; – for weighing of aircraft — only if extension (u) is held
Doors (ATA 52)	Structure	**For category B3:** for general maintenance and repair only, and excluding major repairs and modifications; for major repairs and modifications — only if extension (f) is held.
Fuselage (ATA 53)	Structure	**For category B3:** for general maintenance and repair only, and excluding major repairs and modifications; for major repairs and modifications — only if extension (f) is held.
Nacelles and Pylons (ATA 54)	Structure	**For category B3:** for general maintenance and repair only, and excluding major repairs and modifications; for major repairs and modifications — only if extension (f) is held.
Stabilisers (ATA 55)	Mechanical	**For category B3:** for general maintenance and repair only, and excluding major repairs and modifications; for major repairs and modifications — only if extension (f) is held.
Windows (ATA 56)	Structure	**For category B3:** for general maintenance and repair only, and excluding major repairs and modifications; for major repairs and modifications — only if extension (f) is held.
Wings (ATA 57)	Structure	**For category B3:** for general maintenance and repair only, and excluding major repairs and modifications; for major repairs and modifications — only if extension (f) is held.

Aircraft system (and ATA chapter reference)	Designation of system	Conditions or limitations
Propeller – Rotor (ATA 60)	Mechanical	**For category B3:** no privileges may be exercised.
Propeller – Propulsion (ATA 61)	Mechanical	**For category B1:** only if the holder has obtained the relevant optional units of competency mentioned in paragraph 13.8 of this Order. Note These optional units of competency are marked P in Appendix 6.
		For category B3: for constant speed propellers — only if extension (o) is held. **For sub-category B3.5:** limited to fixed pitch propellers only.
Rotor (ATA 62)	Mechanical	**For category B3:** only if sub-category B3.3 or B3.4 is held for the relevant helicopter.
Rotor Drives (ATA 63)	Mechanical	**For category B3:** only if sub-category B3.3 or B3.4 is held for the relevant helicopter.
Tail Rotor (ATA 64)	Mechanical	**For category B3:** Only if sub-category B3.3 or B3.4 is held for the relevant helicopter.
Tail Rotor Drive (ATA 65)	Mechanical	**For category B3:** only if sub-category B3.3 or B3.4 is held for the relevant helicopter.
Folding Blades & Pylon (ATA 66)	Mechanical	**For category B3:** only if sub-category B3.3 or B3.4 is held for relevant helicopter.
Rotor Flight Control (ATA 67)	Mechanical	**For category B3:** only if sub-category B3.3 or B3.4 is held for the relevant helicopter.
Power Plant (ATA 71)	Powerplant	**For category B3:** for piston powered aircraft — only if sub-category B3.5 is held; for diesel aircraft engines — only if extension (r) is held; for 2-stroke aircraft engines — only if extension (s) is held.
Engine Turbine/Turbo Prop and Fans (ATA 72)	Powerplant	**For category B3:** for gas turbine powered aircraft — only if sub-category B3.6 is held; for turbofan — no privileges may be exercised.

Aircraft system (and ATA chapter reference)	Designation of system	Conditions or limitations
Engine Fuel and Control - Carburation/ Injection System (ATA 73)	Powerplant	**For category B3:** for piston or turbine powered aircraft — only if sub-category B3.5 or B3.6 is held; for turbocharging systems — only if extension (n) is held.
FADEC (ATA 73A)	Avionic	**For category B3:** limited to: B3.7 — provided extension (q) is also held; and B3.5 and B3.6 — provided extension (q) is also held and maintenance is confined to LRU changes and interface adjustments.
Ignition System (ATA 74)	Mechanical	**For category B3:** limited to: B3.5 or B3.6 for the relevant powerplant and only if extension (t) is also held.
Air Systems & Control (ATA 75)	Mechanical	**For category B3:** for Piston Engine Pneumatic System — only if extension (a) is held; for Gas Turbine Pneumatic System — only if extension (e) is held.
Engine Control System (ATA 76)	Powerplant	**For category B3:** for piston powered aircraft — only if B3.5 is held; for gas turbine powered aircraft — only if sub-category B3.6 is held.
Engine Indicating System (ATA 77)	Mechanical	**For category B3:** only if B3.7 is held; or only if B3.1, B3.2, B3.3, B3.4, B3.5 or B3.6 is held, but then limited to avionic LRU.
Exhaust - Thrust Reverser (ATA 78)	Mechanical	**For category B3:** no privileges may be exercised.
Lubrication System (ATA 79)	Mechanical	**For category B3:** for piston powered aircraft — only if B3.5 is held; for gas turbine powered aircraft — only if B3.6 is held.
Starting System (ATA 80)	Mechanical	**For category B3:** for piston powered aircraft — only if B3.5 is held; for gas turbine powered aircraft — only if B3.6 is held.
Supercharging System (ATA 81)	Mechanical	**For category B3:** only if extension (n) is held.
Power Augmentation (ATA 82)	Mechanical	**For category B3:** for piston powered aircraft — only if B3.5 is held; for gas turbine powered aircraft — only if B3.6 is held. for afterburner — no privileges may be exercised.
Accessory Drives (ATA 83)	Mechanical	**For category B3:** for piston powered aircraft — only if B3.5 is held; for gas turbine powered aircraft — only if B3.6 is held.

TABLE 3 — Knowledge module requirements

Qualifications on basic subjects for each category or sub-category of authority must be in accordance with the following table. Applicable subjects are indicated by an X.

		A or B1 Aeroplane with:		A or B1 helicopter with:		B2	B3 with:				
		Turbine engine(s)	Piston engine(s)	Turbine engine(s)	Piston engine(s)	Avionics	Fixed wing	Rotary Wing	Piston Engines	Turbine Engines	Elect & Avionic
1	Mathematics	X	X	X	X	X	X	X	X	X	X
2	Physics	X	X	X	X	X	X	X	X	X	X
3	Electrical fundamentals	X	X	X	X	X	X	X	X	X	X
4	Electronic fundamentals	X	X	X	X	X	X	X	X	X	X
5	Digital techniques electronic instrument systems	X	X	X	X	X	X	X	X	X	X
6	Materials and hardware	X	X	X	X	X	X	X	X	X	X
7	Maintenance practices	X	X	X	X	X	X	X	X	X	X
8	Basic aerodynamics	X	X	X	X	X	X	X	X	X	X
9	Human factors	X	X	X	X	X	X	X	X	X	X
10	Aviation legislation	X	X	X	X	X	X	X	X	X	X
11	Aeroplane aerodynamics, structures and systems	X	X				X				
12	Helicopter aerodynamics, structures and systems			X	X			X			
13	Aircraft structures and systems										X
14	Propulsion – avionic systems					X					X
15	Gas turbine engine	X		X						X	
16	Piston engine		X		X				X		
17	Propeller	X	X						X	X	

Part 3 — Details of modules and levels of knowledge

Module 1: Mathematics

	Level of knowledge for the category or extension			
	A	B1	B2	B3
1.1 Arithmetic	1	2	2	2
Arithmetical terms and signs, methods of multiplication and division, fractions and decimals, factors and multiples, weights, measures and conversion factors, ratio and proportion, averages and percentages, areas and volumes, squares, cubes, square and cube roots.				
1.2 Algebra				
(a) Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions;	1	2	2	2
(b) Linear equations and their solutions; Indices and powers, negative and fractional indices; Binary and other applicable numbering systems; Simultaneous equations and second degree equations with one unknown; Logarithms.	—	1	1	1
1.3 Geometry				
(a) Simple geometrical constructions;	—	1	1	1
(b) Graphical representation; nature and uses of graphs, graphs of equations and functions;	2	2	2	2
(c) Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.	—	2	2	2

Module 2: Physics

	Level of knowledge for the category or extension			
	A	B1	B2	B3
2.1 Matter	1	1	1	1
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds; States: solid, liquid and gaseous; Changes between states.				
2.2 Mechanics				
2.2.1 Statics	1	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
Forces, moments and couples, representation as vectors; Centre of gravity; Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).				
2.2.2 Kinetics	1	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity); Rotational movement: uniform circular motion (centrifugal and centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio, mechanical advantage and efficiency.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
2.2.3 Dynamics				
(a) Mass; Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency;	1	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
(b) Momentum, conservation of momentum; Impulse; Gyroscopic principles; Friction: nature and effects, coefficient of friction (rolling resistance).	1	2	2	2
2.2.4 Fluid dynamics				
(a) Specific gravity and density;	2	2	2	2
(b) Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids; Static, dynamic and total pressure: Bernoulli's Theorem, venturi.	1	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
2.3 Thermodynamics				
(a) Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; heat definition.	2	2	2	2
(b) Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Latent heats of fusion and evaporation, thermal energy, heat of combustion.	1	2	2	2
2.4 Optics (light)	—	2	2	2

	Level of knowledge for the category or extension			
	A	B1	B2	B3
Nature of light, speed of light; Laws of reflection and refraction: reflection at plane surfaces, reflection by spherical mirrors, refraction, lenses; Fiberoptics.				
2.5 Wave motion and sound	—	2	2	2
Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect.				

Module 3: Electrical fundamentals

	Level of knowledge for the category or extension			
	A	B1	B2	B3
3.1 Electron theory	1	1	1	1
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.				
3.2 Static electricity and conduction	1	2	2	2
Static electricity and distribution of electrostatic charges; Electrostatic laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and vacuum.				
3.3 Electrical terminology	1	2	2	2
The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.				
3.4 Generation of electricity	1	1	1	1
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.				
3.5 DC sources of electricity	1	2	2	2
Construction and basic chemical action of: primary cells, Secondary cells, lead acid cells, nickel cadmium cells, other Alkaline cells; Cells connected in series and parallel; Internal resistance and its effect on a battery; Construction, materials and operation of thermocouples; Operation of photo-cells.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
3.6 DC circuits	—	2	2	2
Ohms Law, Kirchoff's Voltage and Current Laws; Calculations using the above laws to find resistance, voltage and current; Significance of the internal resistance of a supply.				
3.7 Resistance and resistor				
(a) Resistance and affecting factors; Specific resistance; Resistor colour code, values and tolerances, preferred values, wattage ratings; Resistors in series and parallel; Calculation of total resistance using series parallel and series parallel combinations; Operation and use of potentiometers and rheostats; Operation of Wheatstone Bridge.	—	2	2	2
(b) Positive and negative temperature coefficient conductance; Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; Construction of potentiometers and rheostats; Construction of Wheatstone Bridge.	—	1	1	1
3.8 Power	—	2	2	2
Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.				
3.9 Capacitance and capacitor	—	2	2	2
Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, construction and function; Capacitor colour coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
3.10 Magnetism				
(a) Theory of magnetism; Properties of a magnet; Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.	—	2	2	2
(b) Magneto-motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, reluctance, saturation point, eddy currents; coercive force; Precautions for care and storage of magnets.	—	2	2	2
3.11 Inductance and inductor	—	2	2	2
Faraday's Law; Action of inducing a voltage in a conductor moving in a magnetic field; Induction principles; Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns; Mutual induction; The effect the rate of change of primary current and mutual inductance has on induced voltage; Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other; Lenz's Law and polarity determining rules; Back emf, self induction; Saturation point; Principal uses of inductors.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
3.12 DC motor and generator theory	—	2	2	2
Basic motor and generator theory; Construction and purpose of components in DC generator; Operation of, and factors affecting output and direction of, current flow in DC generators; Operation of, and factors affecting output power, torque, speed and direction of rotation of DC motors; Series wound, shunt wound and compound motors; Starter generator construction.				
3.13 AC theory	1	2	2	For extensions t, v and z: 2
Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of these values, in relation to voltage, current and power; Triangular and square waves; Single and 3 phase principles.				
3.14 Resistive (R), Capacitive (C) and Inductive (L) Circuits	—	2	2	For extensions t, v and z: 2
Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel; Power dissipation in L, C and R circuits; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.				
3.15 Transformers	—	2	2	For extensions t, v and z: 2
Transformer construction principles and operation; Transformer losses and methods for overcoming them; Transformer action under load and no-load conditions; Power transfer, efficiency, polarity markings; Calculation of line and phase voltages and currents; Calculation of power in a 3 phase system; Primary and secondary current, voltage, turns ratio, power, efficiency; Autotransformers.				
3.16 Filters	—	1	1	For extensions t, v and z: 1
Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
3.17 AC generators	—	2	2	For extensions t and z: 2
Rotation of loop in a magnetic field and waveform produced; Operation and construction of revolving armature and revolving field type AC generators; Single phase, 2 phase and 3 phase alternators; Three phase star and delta connections advantages and uses; Permanent magnet generators.				
3.18 AC motors	—	2	2	For extensions t and z: 2
Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and polyphase; Methods of speed control and direction of rotation; Methods of producing a rotating field: capacitor, inductor, shaded or split pole.				

Module 4: Electronic fundamentals

	Level of knowledge for the category or extension			
	A	B1	B2	B3
4.1 Semiconductors				
4.1.1 Diodes				
(a)	—	2	2	2
Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.				
(b)	—	—	2	For sub-category 7: 2
Materials, electron configuration, electrical properties; P and N type materials: effects of impurities on conduction, majority and minority characters; PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions;				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation; Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers; Detailed operation and characteristics of the following devices: silicon controlled rectifier (thyristor), light emitting diode, Shottky diode, photoconductive diode, varactor diode, varistor, rectifier diodes, Zener diode.				
4.1.2 Transistors				
(a)	—	1	2	For subcategories 1-6 and 8: 1 For sub-category 7: 2
Transistor symbols; Component description and orientation; Transistor characteristics and properties.				
(b)	—	—	2	For sub-category 7: 2
Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations; Testing of transistors; Basic appreciation of other transistor types and their uses; Application of transistors: classes of amplifier (A, B, C); Simple circuits including: bias, decoupling, feedback and stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.				
4.1.3 Integrated circuits				
(a)	—	1	—	For subcategories 1-6: 1
Description and operation of logic circuits and linear circuits and operational amplifiers.				
(b)	—	—	2	For sub-category 7: 2
Description and operation of logic circuits and linear circuits; Introduction to operation and function of an operational amplifier used as: integrator, differentiator, voltage follower, comparator; Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct;				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
Advantages and disadvantages of positive and negative feedback.				
4.2 Printed circuit boards	—	1	2	For subcategories 1-6 and 8: 1
Description and use of printed circuit boards.				For sub-category 7: 2
4.3 Servomechanisms				
(a)	—	1	—	—
Understanding of the following terms: open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of the following synchro system components and features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters.				
(b)	—	—	2	For extensions w, x and z: 2
Understanding of the following terms: open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, dead band; Construction operation and use of the following synchro system components: resolvers, differential, control and torque, E and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters; Servo mechanism defects, reversal of synchro leads, hunting.				

Module 5: Digital techniques electronic instrument systems

	Level of knowledge for the category or extension			
	A	B1	B2	B3
5.1 Electronic instrument systems	1	2	3	For sub-category 7: 3
Typical systems arrangements and cockpit layout of electronic instrument systems.				
5.2 Numbering systems	—	1	2	For sub-category 7: 2
Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.				
5.3 Data conversion	—	1	2	For sub-category 7: 2
Analogue data, digital data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.				
5.4 Data buses	—	2	2	For sub-category 7: 2
Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications.				
5.5 Logic circuits				
(a) Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams.	—	2	2	For sub-category 7: 2
(b) Interpretation of logic diagrams.	—	—	2	For sub-category 7: 2

	Level of knowledge for the category or extension			
	A	B1	B2	B3
5.6 Basic computer structure				
(a) Computer terminology (including bit, byte, software, hard ware, CPU, IC and various memory devices such as RAM, ROM,PROM); Computer technology (as applied in aircraft systems).	1	2	—	—
(b) Computer related terminology; Operation, layout and interface of the major components in a microcomputer including their associated bus systems; Information contained in single and multi address instruction words; Memory associated terms; Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems.	—	—	2	For sub-category 7: 2
5.7 Microprocessors	—	—	2	For sub-category 7: 2
Functions performed and overall operation of a microprocessor; Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.				
5.8 Integrated circuits	—	—	2	For sub-category 7: 2
Operation and use of encoders and decoders; Function of encoder types; Uses of medium, large and very large scale integration.				
5.9 Multiplexing	—	—	2	For sub-category 7: 2
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
5.10 Fibre optics	—	1	2	For subcategories 1-6 and 8: 1 For sub-category 7: 2
Advantages and disadvantages of fibre optic data transmission over electrical wire propagation; Fibre optic data bus; Fibre optic related terms, terminations; Couplers, control terminals, remote terminals; Application of fibre optics in aircraft systems.				
5.11 Electronic displays	—	2	2	2
Principles of operation of common types of displays used in modern aircraft, including cathode ray tubes, light emitting diodes and liquid crystal display.				
5.12 Electrostatic sensitive devices	1	2	2	For subcategories 1-6 and 7: 2
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.				
5.13 Software management control	—	2	2	For sub-category 7: 2
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programs.				
5.14 Electromagnetic environment	—	2	2	2
Influence of the following phenomena on maintenance practices for electronic system: EMC-electromagnetic compatibility; EMI-electromagnetic interference; HIRF-high intensity radiated field; Lightning and lightning protection.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
5.15 Typical electronic and digital aircraft systems	—			
General arrangement of typical electronic and digital aircraft systems and associated BITE (built-in test equipment) testing such as:				
ARINC Communication and Addressing and Reporting System (ACARS);		2	2	For extension aa: 2
ECAM-electronic centralised aircraft monitoring;		2	2	For sub-category 7: 2
EFIS-electronic flight instrument system;		2	2	For sub-category 7: 2
EICAS-engine indication and crew alerting system;		2	2	For sub-category 7: 2
FBW-flyby wire;		2	2	—
FMS-flight management system;		2	2	For extension ee: 2
GPS-global positioning system;		2	2	For extension dd: 2
IRS-inertial reference system;		2	2	For extension bb: 2
TCAS-traffic alert collision avoidance system;		2	2	For sub-category 7: 2
TAWS-Terrain awareness system		—	—	For extension z: 2

Module 6: Materials and hardware

	Level of knowledge for the category or extension			
	A	B1	B2	B3
6.1 Aircraft materials ferrous				
(a) Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels;	1	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
(b) Testing of ferrous materials for hardness, tensile strength, Fatigue strength and impact resistance.	—	1	1	1
6.2 Aircraft materials — non-ferrous				
(a) Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials;	1	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
(b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.	—	1	1	For subcategories 1-7: 1
6.3 Aircraft materials — composite and non-metallic				
6.3.1 Composite and non-metallic other than wood and fabric				
(a) Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.	1	2	2	2
(b) The detection of defects and deterioration in composite and non-metallic material; Repair of composite and non-metallic material.	1	2	—	For subcategories 1-6 and 8: 2

	Level of knowledge for the category or extension			
	A	B1	B2	B3
6.3.2 Wooden structures	1	2	—	For extension (g):2
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; Preservation and maintenance of wooden structure; Types of defects in wood material and wooden structures; The detection of defects in wooden structure; Repair of wooden structure.				
6.3.3 Fabric covering	1	2	—	For extensions h and i: 2
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; Repair of fabric covering.				
6.4 Corrosion				
(a)	1	1	1	1
Chemical fundamentals; Formation by galvanic action process, microbiological, stress;				
(b) Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.	2	3	2	For subcategories 1-6 and 8: 3 For sub-category 7: 2
6.5 Fasteners				
6.5.1 Screw threads	2	2	2	2
Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; Measuring screw threads;				
6.5.2 Bolts, studs and screws	2	2	2	2

	Level of knowledge for the category or extension			
	A	B1	B2	B3
Bolt types: specification, identification and marking of aircraft bolts, international standards; Nuts: self-locking, anchor, standard types; Machine screws: aircraft specifications; Studs: types and uses, insertion and removal; Self tapping screws, dowels.				
6.5.3 Locking devices	2	2	2	2
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.				
6.5.4 Aircraft rivets	1	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
Types of solid and blind rivets: specifications and identification, heat treatment.				
6.6 Pipes and unions				
(a)	2	2	2	2
Identification of, and types of, rigid and flexible pipes and their connectors used in aircraft.				
(b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.	2	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
6.7 Springs	1	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
Types of springs, materials, characteristics and applications.				
6.8 Bearings	1	2	2	2
Purpose of bearings, loads, material, construction; Types of bearings and their application.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
6.9 Transmissions	1	2	2	2
Gear types and their application; Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns; Belts and pulleys, chains and sprockets.				
6.10 Control cables	1	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
Types of cables; End fittings, turn buckles and compensation devices; Pulleys and cable system components; Bowden cables; Aircraft flexible control systems.				
6.11 Electrical cables and connectors	1	2	2	2
Cable types, construction and characteristics; High tension and co-axial cables; Crimping; Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes.				

Module 7: Maintenance practices

	Level of knowledge for the category or extension			
	A	B1	B2	B3
7.1 Safety precautions — aircraft and workshop	3	3	3	3
Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals; Instruction in the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on extinguishing agents.				
7.2 Workshop practices	3	3	3	3
Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
7.3 Tools	3	3	3	3
Common hand tool types; Common power tool types; Operation and use of precision measuring tools; Lubrication equipment and methods; Operation, function and use of electrical general test equipment.				
7.4 Avionic general test equipment	—	2	3	For subcategories 1-6 and 8: 2 For sub-category 7: 3
Operation, function and use of avionic general test equipment.				
7.5 Engineering drawings, diagrams and standards	1	2	2	2
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised presentations; Specification 100 of the Air Transport Association (ATA) of America; Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL; Wiring diagrams and schematic diagrams.				
7.6 Fits and clearances	1	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
Drill sizes for bolt holes, classes of fits; Common system of fits and clearances; Schedule of fits and clearances for aircraft and engines; Limits for bow, twist and wear; Standard methods for checking shafts, bearings and other parts.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
7.7 Electrical cables and connectors	1	2	2	2
Continuity, insulation and bonding techniques and testing; Use of crimp tools: hand and hydraulic operated; Testing of crimp joints; Connector pin removal and insertion; Co-axial cables: testing and installation precautions; Wiring protection techniques: cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding.				
7.8 Riveting	1	2	—	For subcategories 1-6 and 8: 2
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.				
7.9 Pipes and hoses	1	2	—	For subcategories 1-6 and 8: 2 For sub-category 7: 1
Bending and belling and flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.				
7.10 Springs	1	2	—	For subcategories 1-8: 2
Inspection and testing of springs.				
7.11 Bearings	1	2	—	For subcategories 1-8: 2
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
7.12 Transmissions	1	2	—	For subcategories 1-8: 2
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.				
7.13 Control cables	1	2	—	2
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; Aircraft flexible control systems.				
7.14 Material handling				
7.14.1 Sheet Metal	—	2	—	For subcategories 1-6 and 8: 2
Marking out, and calculation of, bend allowance; Sheet metal working including bending and forming; Inspection of sheet metal work.				
7.14.2 Composite and non-metallic	—	2	—	For subcategories 1-6 and 8: 2
Bonding practices; Environmental conditions; Inspection methods.				
7.15 Welding, brazing, soldering and bonding				
(a) Soldering methods, inspection of soldered joints;	—	2	2	2
(b) Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.	—	2	—	For subcategories 1-6 and 8: 2
7.16 Aircraft weight and balance				
(a) Centre of gravity and balance limits calculation: use of relevant documents;	—	2	2	For extensions f and u: 2

	Level of knowledge for the category or extension			
	A	B1	B2	B3
(b) Preparation of aircraft for weighing; Aircraft weighing.	—	2	—	For extension u: 2
7.17 Aircraft handling and storage	2	2	2	2
Aircraft taxiing and towing and associated safety precautions; Aircraft jacking, chocking, securing and associated safety precautions; Aircraft storage methods; Refuelling and defuelling procedures; De-icing and anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.				
7.18 Disassembly, inspection, repair and assembly techniques				
(a) Types of defects and visual inspection techniques; Corrosion removal, assessment and re protection;	2	3	2	For subcategories 1-6 and 8: 3 For sub-category 7: 2
(b) General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programs;	—	2	—	For subcategories 1-6 and 8: 2
(c) Non destructive inspection techniques including: penetrant, radiographic, eddy current, ultrasonic and boroscope methods.	—	2	1	For subcategories 1-6 and 8: 2 For sub-category 7: 1
(d) Disassembly and re-assembly techniques;	2	2	2	2
(e) Trouble shooting techniques.	—	2	2	2

	Level of knowledge for the category or extension			
	A	B1	B2	B3
7.19 Abnormal events				
(a) Inspections following lightning strikes and HIRF penetration.	2	2	2	2
(b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2	2	—	For subcategories 1-6 and 8: 2
7.20 Maintenance procedures	1	2	2	2
Maintenance planning; Modification procedures; Stores procedures; Certification and release procedures; Interface with aircraft operation; Maintenance inspection, quality control and quality assurance; Additional maintenance procedures; Control of life limited components.				

Module 8: Basic aerodynamics

	Level of knowledge for the category or extension			
	A	B1	B2	B3
8.1 Physics of the atmosphere	1	2	2	2
International Standard Atmosphere (ISA), application aerodynamics.				
8.2 Aerodynamics	1	2	2	2
Air flow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, up wash and downwash, vortices, stagnation; The terms: camber, chord, mean aerodynamic chord, profile (parasite) drag, induced drag, centre of pressure, angle of attack, wash in and washout, fineness ratio, wing shape and aspect ratio; Thrust, weight, aerodynamic resultant; Generation of lift and drag: angle of attack, lift coefficient, drag coefficient, polar curve, stall; Aerofoil contamination including ice, snow, frost.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
8.3 Theory of flight	1	2	2	2
Relationship between lift, weight, thrust and drag; Glide ratio; Steady state flights, performance; Theory of the turn; Influence of load factor: stall, flight envelope and structural limitations; Lift augmentation.				
8.4 Flight stability and dynamics	1	2	2	2
Longitudinal, lateral and directional stability (active and passive).				

Module 9: Human factors

	Level of knowledge for the category or extension			
	A	B1	B2	B3
9.1 General	2	2	2	2
The need to take human factors into account; Incidents attributable to human factors and human error; "Murphy's" law.				
9.2 Human performance and limitations	2	2	2	2
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.				
9.3 Social psychology	1	1	1	1
Responsibility: individual and group; Motivation and de-motivation; Peer pressure; "Culture" issues; Team working; Management, supervision and leadership.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
9.4 Factors affecting performance	2	2	2	2
Fitness and health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.				
9.5 Physical environment	1	1	1	1
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.				
9.6 Tasks	1	1	1	1
Physical work; Repetitive tasks; Visual inspection; Complex systems.				
9.7 Communication	2	2	2	2
Within and between teams; Work logging and recording; Keeping up-to-date, currency; Dissemination of information.				
9.8 Human error	2	2	2	2
Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e. accidents); Avoiding and managing errors.				
9.9 Hazards in the workplace	2	2	2	2
Recognising and avoiding hazards; Dealing with emergencies.				

Module 10: Aviation legislation

	Level of knowledge for the category or extension			
	A	B1	B2	B3
10.1 Regulatory framework	1	1	1	1
Role of International Civil Aviation Organization; Role of CASA; Relationship between CAO 100.66, CASR 1998 and CAR 1988; Relationship with other aviation authorities.				
10.2 CAO 100.66 certifying staff maintenance	2	2	2	2
Detailed understanding of CAO 100.66.				
10.3 Reserved				
10.4 Commercial air transportation	1	1	1	1
Air Operators Certificates; Operators responsibilities; Documents to be carried; Aircraft placarding (markings).				
10.5 Aircraft certification				
(a) General Certification rules; Type certification; Supplemental type certification; Part 21 – Design and production organisation approvals.	—	1	1	1
(b) Documents Certificate of Airworthiness; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station Licence and Approval.	—	2	2	2
10.6 Reserved				
	A	B1	B2	B3

	Level of knowledge for the category or extension			
	A	B1	B2	B3
10.7 Applicable national and international requirements				
(a) Management programs, maintenance checks and inspections; Master Minimum Equipment Lists, Minimum Equipments List, Dispatch Deviation Lists; Airworthiness Directives; Service bulletins, manufacturers' service information; Modification and repairs; Maintenance documentation: maintenance manuals, structural repair manuals, illustrated parts catalogue, etc;	1	2	2	2
(b) Continuing airworthiness; Test flights; ETOPS, maintenance and despatch requirements; All weather operation: category 2 and 3 operations and minimum equipment requirements.	—	1	1	1

Module 11: Aeroplane aerodynamics, structures and systems

	Level of knowledge for the category or extension			
	A1 A2	B1.1 B1.2	B2	B3
11.1 Theory of flight				
11.1.1 Aeroplane aerodynamics and flight controls	1	2	—	For subcategories 1 and 2: 2
Operation and effect of: roll control: ailerons and spoilers; pitch control: elevators, stabilators, variable incidence stabilisers and canards; yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, sawtooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.				
11.1.2 High speed flight	1	2	—	N/A
Speed of sound, subsonic flight, transonic flight, supersonic flight; Mach number, critical Mach number, compressibility buffet, shockwave, aerodynamic cheating, area rule; Factors affecting airflow in engine intakes of high speed aircraft; Effects of sweepback on critical Mach number.				
11.2 Airframe structures — general concepts				
(a) Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision; Aircraft bonding.	2	2	—	For subcategories 1 and 2: 2

	Level of knowledge for the category or extension			
	A1 A2	B1.1 B1.2	B2	B3
(b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.	1	2	—	For subcategories 1 and 2: 2
11.3 Airframe structures — aeroplanes				
11.3.1 Fuselage (ATA52/53/56)	1	2	—	For subcategories 1 and 2: 2
Construction and pressurisation sealing; Wing, stabiliser, pylon and under carriage attachments; Seat installation and cargo loading system; Doors and emergency exits: construction, mechanisms, operation and safety devices; Windows and windscreen construction and mechanisms.				
11.3.2 Wings (ATA57)	1	2	—	For subcategories 1 and 2: 2
Construction; Fuel storage; Landing gear, pylon, control surface and highlift and drag attachments.				
11.3.3 Stabilisers (ATA55)	1	2	—	For subcategories 1 and 2: 2
Construction; Control surface attachment.				

	Level of knowledge for the category or extension			
	A1 A2	B1.1 B1.2	B2	B3
11.3.4 Flight control surface (ATA55/57)	1	2	—	For subcategories 1 and 2: 2
Construction and attachment; Balancing — mass and aerodynamic.				
11.3.5 Nacelles and pylons (ATA54)	1	2	—	For subcategories 1, 2, 5 and 6: 2
Construction; Firewalls; Engine mounts.				
11.4 Air-conditioning and cabin pressurisation (ATA21)				
11.4.1 Air supply	1	2	—	For extensions b, d, and e: 2
Sources of air supply including engine bleed, APU and ground cart.				
11.4.2 Air-conditioning	1	3	—	For extensions b and c: 3
Air-conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.				
11.4.3 Pressurisation	1	3	—	For extensions d and e: 3
Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.				
11.4.4 Safety and warning devices	1	3	—	For extensions b, c, d and e: 3
Protection and warning devices.				

	Level of knowledge for the category or extension			
	A1 A2	B1.1 B1.2	B2	B3
11.5 Instruments and avionic systems				
11.5.1 Instrument systems (ATA31)	1	2	—	
a) Pitot static: altimeter, airspeed indicator, vertical speed indicator;				For subcategories 1, 2, 5 and 6: 2
b) Gyroscopic: artificial horizon, attitude director, direction indicator, turn and slip indicator, turn coordinator;				For subcategories 1, 2, 5 and 6: 2
c) Horizontal situation indicator;				For subcategories 1, 2, 5 and 6: 2
d) Direct reading compasses;				—
e) Remote reading compasses;				For subcategories 1, 2, 5 and 6: 2
f) Angle of attack indication, stall warning systems;				For subcategories 1, 2, 5 and 6: 2
g) Other aircraft system indication.				
11.5.2 Avionic systems	1	1	—	
Fundamentals of system layouts and operation of:				
Auto flight (ATA22);				—
Communications (ATA23);				For subcategories 1 and 2: 1
Navigation systems (ATA34).				For subcategories 1and 2: 1
11.6 Electrical power (ATA24)	1	3	—	
Batteries installation and operation;				For subcategories 1 and 2: 3
DC power generation;				For subcategories 1and 2: 3
AC power generation;				—
Voltage regulation;				For subcategories 1and 2: 3

	Level of knowledge for the category or extension			
	A1 A2	B1.1 B1.2	B2	B3
Power distribution single generator				For subcategories 1and 2: 3
Power distribution multi generator				For extension p: 3
Circuit protection;				For subcategories 1 and 2: 3
Inverters, transformers, rectifiers;				For extension v: 3
External and ground power.				For subcategories 1and 2: 3
Emergency power generation				For subcategories 1 and 2: 3
11.7 Equipment and furnishings (ATA25)				
(a) Emergency equipment requirements; Seats, harnesses and belts.	2	2	—	For subcategories 1, 2, 5 and 6: 2
(b)	1	1	—	
Cabin layout;				For subcategories 1, 2, 5 and 6: 1
Equipment layout;				For subcategories 1, 2, 5 and 6: 1
Cabin furnishing installation;				For subcategories 1, 2, 5 and 6: 1
Cargo handling and retention equipment;				For subcategories 1, 2, 5 and 6: 1
Cabin entertainment equipment;				—
Galley installation;				—
Airstairs.				—
11.8 Fire protection (ATA26)				
(a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.	1	3	—	For subcategories 2 and 6 and extensions e and t: 3

	Level of knowledge for the category or extension			
	A1 A2	B1.1 B1.2	B2	B3
(b) Portable fire extinguisher.	1	3	—	For subcategories 1-6: 3
11.9 Flight controls (ATA27)	1	3	—	
Primary controls: aileron, elevator, rudder, spoiler;				For subcategories 1 and 2: 3
Trim control;				For subcategories 1 and 2: 3
Active load control;				—
High lift devices;				For subcategories 1 and 2: 3
Lift dump,				—
Speed brakes;				For subcategories 1 and 2: 3
System operation, fly-by-wire and pneumatic controls				—
System operation: Manual and electrical,				For subcategories 1 and 2: 3
System operation: Hydraulic				For subcategories 2, 4 and extension k: 3
Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks systems;				—
Balancing and rigging;				For subcategories 1 and 2: 3
Stall protection and warning system.				For subcategories 1 and 2: 3
11.10 Fuel systems (ATA28)	1	3	—	
System layout;				For subcategories 1 and 2: 3
Fuel tanks;				For subcategories 1 and 2: 3
Supply systems;				For subcategories 1 and 2: 3
Dumping,				—

	Level of knowledge for the category or extension			
	A1 A2	B1.1 B1.2	B2	B3
Venting and draining;				For subcategories 1 and 2: 3
Cross-feed and transfer;				For subcategories 1 and 2: 3
Indications and warnings;				For subcategories 1 and 2: 3
Refuelling and defuelling;				For subcategories 1 and 2: 3
Longitudinal balance fuel systems.				—
11.11 Hydraulic power (ATA29)	1	3	—	For sub-category 2 and extension k: 3
System layout; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Pressure control; Power distribution; Indication and warning systems; Interface with other systems.				
11.12 Ice and rain protection (ATA30)	1	3	—	For extensions a, e and t: 3
Ice formation, classification and detection; Anti-icing systems: electrical, hot air and chemical; De-icing systems: electrical, hot air, pneumatic and chemical; Rain repellent; Probe and drain heating; Wiper systems.				
11.13 Landing gear (ATA32)	2	3	—	
Construction, shock absorbing;				For subcategories 1 and 2: 3
Extension and retraction systems: normal and emergency;				For sub-category 2: 3
Indications and warning;				For sub-category 2: 3

	Level of knowledge for the category or extension			
	A1 A2	B1.1 B1.2	B2	B3
Wheels, brakes,				For subcategories 1 and 2: 3
Antiskid and auto braking;				—
Tyres;				For subcategories 1 and 2: 3
Steering.				For subcategories 1 and 2: 3
11.14 Lights (ATA33)	2	3	—	For subcategories 1 and 2: 3
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; emergency.				
11.15 Oxygen (ATA35)	1	3	—	For extension m: 3
System layout: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.				
11.16 Pneumatic and vacuum (ATA36)	1	3	—	For extensions a, d, e and t: 3
System layout; Sources: engine and APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.				
11.17 Water and waste (ATA38)	2	3	—	—
Water system layout, supply, distribution, servicing and draining; Toilet system layout, flushing and servicing; Corrosion aspects.				
11.18 On board maintenance systems (ATA45)	1	2	—	For extension r: 2
Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).				

Module 12: Helicopter aerodynamics, structures and systems

	Level of knowledge for the category or extension			
	A3 A4	B1.3 B1.4	B2	B3
12.1 Theory of flight — rotary wing aerodynamics	1	2	—	For subcategories 3 and 4: 2
Terminology; Effects of gyroscopic precession; Torque reaction and directional control; Dissymmetry of lift, Blade tip stall; Translating tendency and its correction; Coriolis effect and compensation; Vortex ring state, power settling, over pitching; Auto-rotation; Ground effect.				
12.2 Flight control systems	2	3	—	
Cyclic control;				For subcategories 3 and 4: 3
Collective control;				For subcategories 3 and 4: 3
Swashplate;				For subcategories 3 and 4: 3
Yaw control: Anti-torque control, tail rotor, bleed air;				For subcategories 3 and 4: 3
Main rotor head: design and operation features;				For subcategories 3 and 4: 3
Blade dampers: function and construction;				For subcategories 3 and 4: 3
Rotor blades: main and tail rotor blade construction and attachment;				For subcategories 3 and 4: 3
Trim control, fixed and adjustable stabilisers;				For subcategories 3 and 4: 3
System operation: manual, hydraulic and electrical;				For subcategories 3 and 4: 3
System operation: Fly-by-wire;				—
Artificial feel;				—
Balancing and rigging.				For subcategories 3 and 4: 3

	Level of knowledge for the category or extension			
	A3 A4	B1.3 B1.4	B2	B3
12.3 Blade tracking and vibration analysis	1	3	—	For subcategories 3 and 4: 3
Rotor alignment; Main and tail rotor tracking; Static and dynamic balancing; Vibration types, vibration reduction methods; Ground resonance.				
12.4 Transmissions	1	3	—	For subcategories 3 and 4: 3
Gearboxes, main and tail rotors; Clutches, freewheel units and rotor brake.				
12.5 Airframe structures				
(a) Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision.	2	2	—	For subcategories 3 and 4: 2
(b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning and anti-corrosive protection; Pylon, stabiliser and undercarriage attachments; Seat installation; Doors: construction, mechanisms, operation and safety devices; Windows and windscreen construction; Fuel storage;	1	2	—	For subcategories 3 and 4: 2

	Level of knowledge for the category or extension			
	A3 A4	B1.3 B1.4	B2	B3
Firewalls; Engine mounts; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.				
12.6 Air-conditioning (ATA21)				
12.6.1 Air supply	1	2	—	For extensions b, c, d and e: 2
Sources of air supply including engine bleed and ground cart.				
12.6.2 Air-conditioning	1	3	—	For extensions b, c, d and e: 3
Air-conditioning systems; Distribution systems; Flow and temperature control systems; Protection and warning devices.				
12.7 Instruments and avionic systems				
12.7.1 Instrument systems (ATA31)	1	2	—	
Pitot static: altimeter, air speed indicator, vertical speed indicator;				For subcategories 3 and 4: 2
Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;				For subcategories 3 and 4: 2
Compasses, direct reading,				For subcategories 3 and 4: 2
Compasses, remote reading;				—
Vibration indicating systems — HUMS;				For subcategories 3 and 4: 2
Other aircraft system indication.				For subcategories 3 and 4: 2
12.7.2 Avionic systems	1	1	—	
Fundamentals of system layouts and operation of: Auto flight (ATA22);				—

	Level of knowledge for the category or extension			
	A3 A4	B1.3 B1.4	B2	B3
Communications (ATA23);				For subcategories 3 and 4: 1
Navigation Systems (ATA34).				For subcategories 3 and 4: 1
12.8 Electrical power (ATA24)	1	3	—	
Batteries installation and operation; DC power generation, AC power generation; Emergency power generation; Voltage regulation, circuit protection;				For subcategories 3 and 4: 3 For subcategories 3 and 4: 3 — For subcategories 3 and 4: 3 For subcategories 3 and 4: 3
Power distribution;				For subcategories 3 and 4: 3
Inverters, transformers, rectifiers;				For extension v: 3
External and ground power.				For subcategories 3 and 4: 3
12.9 Equipment and furnishings (ATA25)				
(a) Emergency equipment requirements; Seats, harnesses and belts; Lifting systems.	2	2	—	For subcategories 3 and 4: 2
(b) Emergency flotation systems; Cabin layout, cargo retention; Equipment layout; Cabin furnishing installation.	1	1	—	For subcategories 3 and 4: 1
12.10 Fire protection (ATA26)	1	3	—	—
Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.				

	Level of knowledge for the category or extension			
	A3 A4	B1.3 B1.4	B2	B3
12.11 Fuel systems (ATA28)	1	3	—	
System layout; Fuel tanks; Supply systems; Dumping, Venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.				For subcat 4: 3 For subcat 4: 3 For subcat 4: 3 — For subcat 4: 3 For subcat 4: 3 For subcat 4: 3 For subcat 4: 3
12.12 Hydraulic power (ATA29)	1	3	—	For sub-category 4: 3
System layout; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Pressure control; Power distribution; Indication and warning systems; Interface with other systems.				
12.13 Ice and rain protection (ATA30)	1	3	—	
Ice formation, classification and detection; Anti-icing and de-icing systems: electrical, hot air and chemical; Rain repellent and removal; Probe and drain heating.				For extensions a and t: 3 — For extensions a and t:3 For extensions a and t:3
12.14 Landing gear (ATA32)	2	3	—	
Construction, shock absorbing;				For subcategories 3 and 4: 3
Extension and retraction systems: normal and emergency;				For sub-category 3: 3
Indications and warning;				For subcategories

	Level of knowledge for the category or extension			
	A3 A4	B1.3 B1.4	B2	B3
				3 and 4: 3
Wheels, tyres, brakes;				For sub-category 3 : 3
Steering;				For subcategories 3 and 4: 3
Skids, floats.				For subcategories 3 and 4: 3
12.15 Lights (ATA33)	2	3	—	For subcategories 3 and 4: 3
External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; emergency.				
12.16 Pneumatic and vacuum (ATA36)	1	3	—	For extension a:3
System layout; Sources: engine, compressors, reservoirs, ground supply; Pressure control; Distribution; Indication sand warnings; Interfaces with other systems.				
12.17 On board maintenance systems (ATA45)	1	2	—	N/A
Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).				

Module 13: Aircraft aerodynamics, structures and systems

	Level of knowledge for the category or extension			
	A	B1	B2	B3
13.1 Theory of flight				
(a) Aeroplane aerodynamics and flight controls Operation and effect of: • roll control: ailerons and spoilers; • pitch control: elevators, stabilators, variable incidence stabilisers and canards; • yaw control, rudder limiters; Control using elevons, ruddervators; Highlift devices: slots, slats, flaps; Drag inducing devices: spoilers, lift dumpers, speed brakes; Operation and effect of trim tabs, servo tabs, control surface bias.	—	—	1	For extension w:1
(b) High speed flight Speed of sound, subsonic flight, transonic flight, supersonic flight, Mach number, critical Mach number.	—	—	1	N/A
(c) Rotary wing aerodynamics Terminology; Operation and effect of cyclic, collective and anti-torque controls.	—	—	1	For extension x:1
13.2 Structures — general concepts				
(a) Fundamentals of structural systems.	—	—	1	For sub-category 7: 1
(b) Zonal and station identification systems; electrical bonding; Lightning strike protection provision.	—	—	2	For sub-category 7: 2
13.3 Autoflight (ATA22)	—	—	3	
Fundamentals of automatic flight control including working principles and current terminology;				For extensions w and x :3
Command signal processing;				For extensions w and x :3

	Level of knowledge for the category or extension			
	A	B1	B2	B3
Modes of operation: roll, pitch and yaw channels;				For extensions w and x :3
Yaw dampers;				For extensions w and x :3
Stability augmentation system in helicopters;				For extensions w and x :3
Automatic trim control;				For extensions w and x :3
Auto pilot navigation aids interface;				For extensions w and x :3
Auto throttle systems;				—
Automatic landing systems: principles and categories, modes of operation, approach, glide slope, land, go-around, system monitors and failure conditions.				—
13.4 Communication and navigation (ATA23/34)	—	—	3	
Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter.				For sub-category 7: 3
Working principles of following systems:				
Very high frequency (VHF) communication;				For sub-category 7: 3
High frequency (HF) communication;				For sub-category 7: 3
Audio;				For sub-category 7: 3
Emergency locator transmitters;				For sub-category 7: 3
Cockpit voice recorder;				For extension aa: 3
Very high frequency omni directional range (VOR);				For sub-category 7: 3
Automatic direction finding (ADF);				For sub-category 7: 3
Instrument landing system (ILS);				For extension y: 3
Microwave landing system (MLS);				—
Flight director systems;				For extensions w and x :3

	Level of knowledge for the category or extension			
	A	B1	B2	B3
Distance measuring equipment (DME);				For sub-category 7: 3
Doppler navigation;				For sub-category 7: 3
Area navigation, RNAV systems;				—
Flight management systems;				For extension ee: 3
Global positioning system (GPS), Global navigation satellite systems (GNSS);				For extension dd: 3
Inertial navigation system;				For extension bb: 3
Air traffic control transponder, secondary surveillance radar;				For sub-category 7: 3
Traffic alert and collision avoidance system (TCAS);				For sub-category 7: 3
Weather avoidance radar;				For extension cc: 3
Radio altimeter;				For sub-category 7: 3
ARINC communication and reporting.				For sub-category 7: 3
13.5 Electrical power (ATA24)	—	—	3	
Batteries installation and operation;				For sub-category 7: 3
DC power generation;				For sub-category 7: 3
AC power generation;				For extension t: 3
Emergency power generation;				For extension t: 3
Voltage regulation; power distribution; circuit protection;				For sub-category 7: 3
Inverters, transformers, rectifiers; External and Ground power.				For extension t: 3
13.6 Equipment and furnishings (ATA25)	—	—	3	
Electronic emergency equipment requirements;				For sub-category 7: 3
Cabin entertainment equipment.				—

	Level of knowledge for the category or extension			
	A	B1	B2	B3
Seats, harnesses and belts				For sub-category 7: 3
13.7 Flight controls (ATA27)				
(a)	—	—	1	
Primary controls: aileron, elevator, rudder, spoiler;				For extensions, w and x: 1
Trim control;				For extensions, w and x: 1
Active load control;				—
High lift devices;				For extensions, w and x: 1
Lift dump, speed brakes;				For extensions, w and x: 1
System operation: manual, hydraulic, pneumatic;				For extensions, w and x: 1
Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks;				—
Stall protection systems;				For extensions, w and x: 1
(b) System operation: Electrical,	—	—	3	For sub-category 7: 3
Fly by wire.				—
13.8 Instrument systems (ATA31)	—	—	3	
Classification;				For sub-category 7: 3
Atmosphere;				For sub-category 7: 3
Terminology;				For sub-category 7: 3
Pressure measuring devices and systems;				For sub-category 7: 3
Pitot static systems;				For sub-category 7: 3
Altimeters;				For sub-category 7: 3
Vertical speed indicators;				For sub-category 7: 3

	Level of knowledge for the category or extension			
	A	B1	B2	B3
Airspeed indicators;				For sub-category 7: 3
Machmeters;				For extension z: 3
Altitude reporting and alerting systems;				For extension z: 3
Air data computers;				For extension z: 3
Instrument pneumatic systems;				For sub-category 7: 3
Direct reading pressure and temperature gauges;				For sub-category 7: 3
Temperature indicating systems;				For sub-category 7: 3
Fuel quantity indicating systems;				For sub-category 7: 3
Gyroscopic principles;				For sub-category 7: 3
Artificial horizons;				For sub-category 7: 3
Slip indicators;				For sub-category 7: 3
Directional gyros;				For sub-category 7: 3
Ground proximity warning systems;				For extension z: 3
Compass systems;				For sub-category 7: 3
Flight data recording systems;				For extension z: 3
Electronic flight instrument systems;				For extension z: 3
Instrument warning systems including master warning systems and centralised warning panels;				For sub-category 7: 3
Stall warning systems and angle of attack indicating systems;				For extension t: 3
Vibration measurement and indication.				For extension z: 3
13.9 Lights (ATA33)	—	—	3	For sub-category 7: 3
External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
13.10 Onboard maintenance systems (ATA45)	—	—	3	—
Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).				

Module 14: Propulsion — avionic systems

	Level of knowledge for the category or extension			
14.1 Turbine engines	A	B1	B2	B3
(a) Constructional arrangement and operation of turbojet, turbofan, turbo shaft and turbo propeller engines;	—	—	1	For extension q: 1
(b) Electronic Engine control and fuel metering systems (FADEC).	—	—	2	For extension q: 2
14.2 Engine indicating systems	—	—	2	For sub-category 7: 2
Exhaust gas temperature and Inter stage turbine temperature systems; Engine speed; Engine thrust indication: engine pressure ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure, temperature and flow; Manifold pressure; Engine torque; Propeller speed.				

Module 15: Gas turbine engine

	Level of knowledge for the category or extension			
	A	B1	B2	B3
15.1 Fundamentals	1	2	—	For sub-category 6: 2
Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relationship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turbo shaft, turboprop.				
15.2 Engine performance	—	2	—	For sub-category 6: 2
Gross thrust, net thrust, choked nobble thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; Engine efficiencies; By-pass ratio and engine pressure ratio; Pressure, temperature and velocity of the gas flow; Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.				
15.3 Inlet	2	2	—	For sub-category 6: 2
Compressor inlet ducts; Effects of various inlet configurations; Ice protection.				
15.4 Compressors	1	2	—	For sub-category 6: 2
Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation; Causes and effects of compressor stall and surge; Methods of airflow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.				
15.5 Combustion section	1	2	—	For sub-category 6: 2
Constructional features and principles of operation.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
15.6 Turbine section	2	2	—	For sub-category 6: 2
Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep.				
15.7 Exhaust	1	2	—	For sub-category 6: 2
Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction;				For sub-category 6: 2
Thrust reversers.	1	2	—	—
15.8 Bearings and seals	—	2	—	For sub-category 6: 2
Constructional features and principles of operation.				
15.9 Lubricants and fuels	1	2	—	For sub-category 6: 2
Properties and specifications; Fuel additives; Safety precautions.				
15.10 Lubrication systems	1	2	—	For sub-category 6: 2
System operation and layout and components.				
15.11 Fuel systems	1	2	—	For sub-category 6: 2
Operation of engine control and fuel metering systems; Including electronic engine control (FADEC); Systems layout and components.				
15.12 Air systems	1	2	—	For sub-category 6: 2
Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
15.13 Starting and ignition systems				For sub-category 6: 2
Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	1	2	—	
15.14 Engine indication systems				
Exhaust gas temperature and interstage turbine temperature; Engine thrust indication: engine pressure ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure and flow; Engine speed; Vibration measurement and indication; Torque; Power.	1	2	—	For sub-category 6: 2
15.15 Power augmentation systems	—	1	—	For sub-category 6: 2
Operation and applications; Water injection, water methanol;				
Afterburner systems.	—	1	—	—
15.16 Turbo-prop engines	1	2	—	For sub-category 6: 2
Gas coupled and free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Over speed safety devices.				
15.17 Turbo-shaft engines	1	2	—	For sub-category 6: 2
Arrangements, drive systems, reduction gearing, couplings, control systems.				
15.18 Auxiliary power units (APUs)	1	2	—	—
Purpose, operation, protective systems.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
15.19 Powerplant installation	1	2	—	For sub-category 6: 2
Configuration of fire walls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.				
15.20 Fire protection systems	1	2	—	For extension t: 2
Operation of detection and extinguishing systems.				
15.21 Engine monitoring and ground operation	1	3	—	For sub-category 6: 3
Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Trend (including oil analysis, vibration and baroscope) monitoring; Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; Compressor washing and cleaning; Foreign object damage.				
15.22 Engine storage and preservation	—	2	—	For sub-category 6: 2
Preservation and depreservation for the engine and accessories and systems.				

Module 16: Piston engine

	Level of knowledge for the category or extension			
	A	B1	B2	B3
16.1 Fundamentals	1	2	—	For sub-category 5: 2
Mechanical, thermal and volumetric efficiencies; Operating principles: 2 stroke, 4 stroke, otto and diesel; Piston displacement and compression ratio; Engine configuration and firing order.				
16.2 Engine performance	1	2	—	For sub-category 5: 2
Power calculation and measurement; Factors affecting engine power; Mixtures and leaning, pre-ignition.				
16.3 Engine construction	1	2	—	For sub-category 5: 2
Crankcase, crankshaft, camshafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds; Valve mechanisms; Propeller reduction gearboxes.				
16.4 Engine fuel systems				
16.4.1 Carburettors	1	2		For sub-category 5: 2
Types, construction and principles of operation; Icing and heating.				
16.4.2 Fuel injection systems	1	2	—	For sub-category 5: 2
Types, construction and principles of operation.				
16.4.3 Electronic engine control	1	2	—	For extensions q and r: 2
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems layout and components.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
16.5 Starting and ignition systems	1	2	—	For sub-category 5: 2
Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, sparkplugs; Low and high-tension systems.				
16.6 Induction, exhaust and cooling systems	1	2	—	For sub-category 5: 2
Construction and operation of induction systems, including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.				
16.7 Supercharging and turbo charging	1	2	—	For extension n: 2
Principles and purpose of supercharging and its effects on engine parameters; Construction and operation of supercharging and turbo charging systems; System terminology; Control systems; System protection.				
16.8 Lubricants and fuels	1	2	—	For sub-category 5: 2
Properties and specifications; Fuel additives; Safety precautions.				
16.9 Lubrication systems	1	2	—	For sub-category 5: 2
System operation and layout and components.				
16.10 Engine indication systems	1	2	—	For sub-category 5: 2
Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust gas temperature; Fuel pressure and flow; Manifold pressure.				

	Level of knowledge for the category or extension			
	A	B1	B2	B3
16.11 Power plant installation	1	2	—	For sub-category 5: 2
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.				
16.12 Engine monitoring and ground operation	1	3	—	For sub-category 5: 3
Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances and data specified by engine manufacturer.				
16.13 Engine storage and preservation	—	2	—	For sub-category 5: 2
Preservation and depreservation for the engine and accessories and systems.				

Module 17: Propeller

	Level of knowledge for the category or extension			
	A	B1	B2	B3
17.1 Fundamentals	1	2	—	For subcategories 5 and 6: 2
Blade element theory; High and low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; Vibration and resonance.				
17.2 Propeller construction	1	2	—	
Construction methods and materials used in wooden, composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch,				For subcategories 5 and 6: 2
controllable pitch, constant speeding propeller;				For extension o: 2
Propeller and spinner installation.				For subcategories 5 and 6: 2
17.3 Propeller pitch control	1	2	—	For extension o: 2
Speed control and pitch change methods, mechanical and electrical and electronic; Feathering and reverse pitch; Overspeed protection.				
17.4 Propeller synchronising	—	2	—	For extension t: 2
Synchronising and synchrophasing equipment.				
17.5 Propeller ice protection	1	2	—	
Fluid Electrical de-icing equipment.				— For extensions t and o: 2

	Level of knowledge for the category or extension			
	A	B1	B2	B3
17.6 Propeller maintenance	1	3	—	For sub-category 5: 3 For extension o: 3
Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment and repair schemes; Propeller engine running.				
17.7 Propeller storage and preservation	1	2	—	For subcategories 5 and 6: 2
Propeller preservation and depreservation.				

TABLE 4 – Units of competency required for a category or sub-category of an authority, or an extension

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA101B	Interpret occupational health and safety practices in aviation maintenance	X	X	X	X	X	X	X	X	X	X
MEA103B	Plan and organise aviation maintenance work activities	X	X	X	X	X	X	X	X	X	X
MEA105B	Apply quality standard applicable to aviation maintenance processes	X	X	X	X	X	X	X	X	X	X
MEA107B	Interpret and use aviation maintenance industry manuals and specifications	X	X	X	X	X	X	X	X	X	X
MEA108B	Complete aviation maintenance industry documentation	X	X	X	X	X	X	X	X	X	X
MEA109B	Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance	X	X	X	X	X	X	X	X	X	X

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA111B	Perform administrative processes to prepare for certification of civil aircraft maintenance					X	X	X	X	X	X
MEA112B	Plan and implement aircraft maintenance activities					X	X	X	X	X	X
MEA113B	Supervise maintenance activities and manage human resources in the workplace					X	X	X	X	X	X
MEA116A	Apply occupational health and safety procedures at supervisor level in aviation maintenance					X	X	X	X	X	X
MEA117A	Apply self in the aviation maintenance environment	X	X	X	X						
MEA118A	Conduct self in the aviation maintenance environment					X	X	X	X	X	X

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA119A	Perform administrative processes to prepare for certification of civil aircraft A level line maintenance	X	X	X	X						
MEA142A	Manage self in the aviation maintenance environment					X	X	X	X	X	
MEA144A	Perform administrative processes to prepare for certification of civil aircraft pilot maintenance										For B3.8
MEA201B	Remove and install miscellaneous aircraft electrical hardware and components					X	X	X	X	X	X
MEA202C	Remove & Install basic aircraft electrical system components										For B3.2, B3.4, B3.7, and B3.8. For extensions (l) and (p)

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA203C	Remove and install advanced aircraft electrical systems and components					X	X	X	X	X	For extension (t)
MEA204C	Remove and install basic aircraft instrument system components										For B3.7
MEA205C	Remove and install advanced aircraft instrument systems and components									X	For extension (z)
MEA206C	Remove and install aircraft basic radio communication and navigation systems and components									X	For B3.7
MEA207C	Remove and install aircraft electronic systems and components									X	For B3.7 For extension (q)
MEA208C	Remove and install pressurisation control systems and components					X	X				For extension (e)

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA209C	Remove and install oxygen systems and components					X	X				For extension (m)
MEA210C	Inspect, test and troubleshoot basic aircraft electrical systems and components										For B3.2, B3.4, B3.7 For extensions (l) and (p)
MEA211C	Inspect, test and troubleshoot advanced aircraft electrical systems and components					X	X	X	X		For extension (t)
MEA212C	Inspect, test and troubleshoot basic aircraft instrument systems and components										For B3.7

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA213C	Inspect, test and troubleshoot advanced aircraft instrument systems and components										For extension (z)
MEA214C	Inspect, test and troubleshoot aircraft basic communication and radio navigation systems and components										For B3.7
MEA215C	Advanced Radio Systems										For extension (aa)
MEA216C	Inspect, test and troubleshoot instrument landing systems and components										For extension (y)
MEA217C	Inspect, test and troubleshoot fixed wing autopilot systems and components										For extension (w)

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA218C	Inspect, test and troubleshoot rotary wing autopilot systems and components										For extension (x)
MEA219C	Inspect, test and troubleshoot aircraft pressurisation control systems and components					X	X				For extension (e)
MEA220C	Inspect, test and troubleshoot aircraft primary radar systems and components										For extension (cc)
MEA221C	Inspect, test and troubleshoot aircraft secondary radar systems and components										For B3.7

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA222C	Inspect, test and troubleshoot aircraft oxygen systems and components					X	X				For extension (m)
MEA223B	Inspect aircraft electrical systems and components									X	
MEA224B	Inspect aircraft instrument systems and components									X	
MEA225B	Inspect fixed wing aircraft automatic flight control systems and components									X	
MEA226B	Inspect aircraft electronic systems and components									X	
MEA227B	Test and troubleshoot aircraft electrical systems and components									X	

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA228B	Test and troubleshoot aircraft instrument systems and components									X	
MEA229B	Test and trouble-shoot aircraft radio frequency navigation and communications systems and components									X	
MEA230B	Test and troubleshoot fixed wing aircraft automatic flight control systems and components									X or MEA 231B	
MEA231B	Test and troubleshoot rotary wing aircraft automatic flight control systems and components									X or MEA 230B	
MEA232B	Test and troubleshoot aircraft pulse systems and components									X	

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA233C	Inspect test and troubleshoot inertial navigation and reference systems and components *(INS)*										For extension (bb)
MEA234C	Inspect test and troubleshoot aircraft global navigation systems and components *(GNS)*										For extension (dd)
MEA235B	Perform advanced troubleshooting in aircraft avionic maintenance									X	
MEA240B	Use electrical test equipment to perform basic electrical tests	X	X	X	X						
MEA241B	Perform aircraft weight and balance calculations as a result of modifications									X	

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA246C	Fabricate and/or repair aircraft electrical hardware or parts					X	X	X	X	X	X
MEA260C	Use electrical test equipment					X	X	X	X	X	X
MEA264B	Remove and install aircraft electrical/avionic components during line maintenance	X	X	X	X						
MEA265A	Remove and install general aircraft electrical hardware	X	X	X	X						
MEA274A	Maintain basic light aircraft electrical systems and components										For B3.1, B3.3
MEA275A	Maintain basic light aircraft instrument systems and components										For B3.1, B3.2, B3.3, B3.4

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA276A	Maintain basic light aircraft communication and radio navigation systems and components										For B3.1, B3.2, B3.3, B3.4
MEA277A	Maintain twin engine aircraft electrical systems and components										For B3.7 For extension (p)
MEA278A	Inspect test & troubleshoot instrument display systems and components										For B3.7
MEA279A	Inspect test & troubleshoot full authority digital engine control systems										For extension (q)

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA280A	Inspect test and troubleshoot aircraft flight management systems and components *(FMS)*										For extension (ee)
MEA281A	Maintain light aircraft AC powered instrument system and components										For extension (v)
MEA301C	Perform aircraft flight servicing					X	X	X	X	X	X
MEA302C	Remove and install aircraft hydro-mechanical and landing gear systems and components					X	X	X	X		For B3.2, B3.4, B3.7 For extensions (k) and (l)

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA303C	Remove and install aircraft pneumatic systems and components					X	X	X	X		For extension (e)
MEA304C	Remove and install non-pressurised aircraft structural and non-structural components							X or MEA 317C	X or MEA 317C		For B3.1, B3.2, B3.3, B3.4
MEA305C	Remove and install aircraft fixed wing flight control systems and components					X	X				For B3.2
MEA306C	Remove and install engines and engine systems and components					X	X	X	X		For B3.6 For extension (n)
MEA307C	Remove and install propeller systems and components					P	X				For extension (o)

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA308C	Remove and install rotary wing rotor and flight control systems and components							X	X		For B3.4
MEA309C	Inspect, test and troubleshoot aircraft hydro-mechanical and landing gear systems and components						X	X	X		For B3.2, B3.4 For extensions (k) and (l)
MEA310C	Inspect, test and troubleshoot aircraft pneumatic systems and components						X	X	X		For extension (e)
MEA311C	Inspect & repair/modify aircraft structures										For extension (f)
MEA312C	Inspect, test and troubleshoot aircraft fixed wing flight control systems and components						X				For B3.2

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA313C	Inspect, test and troubleshoot piston engine systems and components						X		X		For extension (n)
MEA314C	Inspect, test and troubleshoot gas turbine engine systems and components										For B3.6
MEA315C	Inspect, test and troubleshoot propeller systems and components					P	X				For extension (o)
MEA316C	Inspect, test and troubleshoot rotary wing rotor and control systems and components							X	X		For B3.4
MEA317C	Remove and install pressurised aircraft structural and non-structural components					X	X				For extensions (d) and (e)

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA318B	Inspect aircraft hydro-mechanical, mechanical, gaseous and landing gear systems and components					X					
MEA319B	Inspect gas turbine engine systems and components					X		X			
MEA320B	Test and troubleshoot aircraft hydro-mechanical, mechanical, gaseous and landing gear systems and components					X					
MEA321B	Test and troubleshoot aircraft fixed wing flight control systems and components					X					
MEA322B	Test and troubleshoot gas turbine engine systems and components					X		X			

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA323B	Perform advanced troubleshooting in aircraft mechanical maintenance					X	X	X	X		
MEA324C	Perform structural repair and modification assessment and evaluation					X	X	X	X		X
MEA325C	Weigh aircraft and perform aircraft weight and balance calculations as a result of modifications					X	X	X	X		For extension (u)
MEA328C	Maintain and/or repair aircraft mechanical components or parts					X	X	X	X		For B3.2, B3.3, B3.4, B3.7, B3.8
MEA339B	Inspect, repair and maintain aircraft structures					X	X	X	X		X or, MEA 311C
MEA343A	Remove and install avionic systems and components					X	X	X	X		

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA344A	Remove and install aircraft hydro-mechanical components during line maintenance	X	X	X	X						
MEA345A	Perform scheduled line maintenance activities on gas turbine engine fixed wing aircraft	X									
MEA346A	Perform scheduled line maintenance activities on gas turbine engine rotary wing aircraft			X							
MEA347A	Perform scheduled line maintenance activities on piston engine fixed wing aircraft		X								
MEA348A	Perform scheduled line maintenance activities on piston engine rotary wing aircraft				X						

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA351A	Maintain airframe systems of basic light fixed wing aircraft										B3.1
MEA352A	Maintain basic rotary wing aircraft systems										For B3.3
MEA353A	Maintain basic light aircraft engines & propellers										For B3.5
MEA354A	Maintain light aircraft pneumatic systems										For extension (a)
MEA355A	Maintain light aircraft air cycle air conditioning systems										For extension (b)
MEA356A	Maintain light piston engine aircraft pressurisation systems										For extension (d)
MEA357A	Inspect test & repair fabric surfaces										For extension (h)
MEA358A	Recover aircraft fabric surfaces										For extension (i)
MEA359A	Inspect & repair aircraft wooden structures										For extension (g)

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B3 (including optional units for specific subcategories, and for extensions, as indicated)
MEA360A	Maintain aircraft diesel engines										For extension (r)
MEA361A	Maintain aircraft two stroke petrol engines										For extension (s)
MEA362A	Maintain aircraft vapour cycle air conditioning systems										For extension (c)
MEA 405C	Repair/modify aircraft composite material, structure/components					Y	Y	Y	Y		For extension (j)
MEA408B	Inspect and repair aircraft wooden structures					Z	Z				
MEA409B	Inspect, test, repair and re-cover aircraft fabric surfaces					Z	Z				
MEA418A	Basic repair of aircraft internal fittings during line maintenance	X	X	X	X						