



Australian Government

Civil Aviation Safety Authority

Notice of Final Rule Making

**(Including Summary of Responses & Disposition of Comments to
Civil Aviation Order 100.66 – Maintenance Authorities – EASA Equivalents)**

Civil Aviation Order 100.66

Maintenance Authorities – EASA Equivalents

Readers should note that this Notice of Final Rule Making (NFRM) contains the consolidated summary of responses, CASA's comments and disposition of comments to the consultation draft of Civil Aviation Order (CAO) 100.66. The NFRM also provides CASA's final CAO 100.66 and finalises the public consultation process in respect of the CAO.

Only under extreme or unusual circumstances will CASA consider views or arguments opposing the views expressed in this NFRM.

Any member of the public having views or arguments to support an appeal against the decisions documented in this NFRM may ask/request CASA to consider such an appeal.

Issued as part of the process of public consultation
by CASA's Regulatory Development Management Branch

Document NFRM CAO 100.66 – April 2007

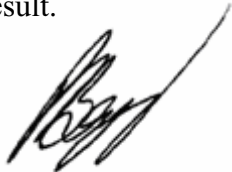
Foreword

As part of the public consultation process for new regulatory initiatives, on 31 October 2006, CASA released for public comment, the Notice of Proposed Rule Making - NPRM 0604MS which described the policy content of the projected Maintenance Regulations Suite and forecast the Civil Aviation Order 100.66.

NPRM 0604MS contained the history behind previous maintenance regulatory change initiatives, a description of the European Aviation Safety Authority (EASA) maintenance regulations, details of the process used by the Joint CASA/industry team to develop Australian policy based on the EASA legislation and the changes to the EASA requirements to suit the Australian environment. CASA made the draft CAO 100.66 available for public comment in December 2006.

CASA received a good level of formal responses to the NPRM and to the draft CAO and used this comment to finalise the CAO. A copy of the Summary of Responses (SoR) to the CAO and CASA's disposition of these comments is attached to this NPRM.

I thank the respondents for their input into the development of this CAO and am confident that the release of the CAO 100.66 will give the Australian aviation industry access to a system which will provide 'EASA-Equivalents' Maintenance Authorities and appropriate training through Recognised Organisations to achieve an authority result.



Peter Boyd
Group General Manager
Planning and Government Office

26 April 2007

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Final Rule Making

1. Background

1.1 NPRM 0604MS – A Proposal to Modernise and Harmonise Rules for the Maintenance of Australian Aircraft and Licensing of Aircraft Maintenance Personnel was released for public comment on 31 October 2006. The comment period closed on 27 November 2006.

1.2 The purpose of this NPRM was to initiate formal public consultation on the development and issue of a revised suite of Maintenance Rules which would align Australian maintenance training, licensing and practices with the European Aviation Safety Agency (EASA) regulations. This initiative is designed to put in place a maintenance system which has the capability of meeting internationally recognised standards and practises.

1.3 The NPRM proposed that an early implementation of EASA based licensing (but not all of the outcomes of the projected maintenance suite) could be implemented by the use of a Civil Aviation Order under the existing Civil Aviation Regulations 1988. This Notice of Final Rule Making addresses the detailed policies and consultative processes involved in CAO 100.66 Maintenance Authorities EASA – Equivalents. The proposed CAO was aimed at providing the Australian aviation industry with the benefits which this system provides as soon as possible, and to do so in a voluntary manner. This is to allow industry organisations and individuals to make relevant decisions depending on specific situations, pending the future release of the complete maintenance suite of rules.

2. Purpose

2.1 The purpose of this Notice of Final Rule Making (NFRM) is to provide a consolidation of all comments received as part of the consultative process, as well as providing CASA's response to each of those comments and a final disposition in respect of each comment. This document does not provide a detailed overview of the expected impact of the CAO. This is because the voluntary nature of the order leaves industry organisations and individuals to assess this impact, including benefits, and make a decision to voluntarily access the Order.

2.2 All comments received from the public consultation on CAO 100.66 have been considered in this document. See **Annex A** to this NFRM for the consolidated summary of responses.

2.3 The final Civil Aviation Order 100.66 Maintenance Authorities EASA – Equivalents, is provided at **Annex B** to this NFRM.

3. Analysis of Comments

3.1 CASA received a total of 25 formal responses to the CAO. The CASA responses to these comments and the final disposition of those comments are contained in **Annex A** to this NFRM.

3.2 A total of 23 respondents consented to the publishing of his/her name as follows:

Mr. Alan Abbott	
Mr. Craig Humann	
Mr. David Hagart	
Mr. Errol Perera	
Mr. Garry Sweetnam	
Mr. Gordon Smith	
Mr. Howard Mason	
Mr. Ian Bailey	
Mr. John Dokon	
Mr. Kevin Evans	
Mr. Kevin Haase	
Mr. Matt Huxtable	
Mr. Michael Morrissey	
Mr. Peter Flanagan	Pacific Avionics
Mr. Peter Marosszeky	
Mr. Phil Hurst	Aerial Agricultural Association of Australia
Richard A. Peri	Aircraft Electronics Association
Mr. Boyd Park	Boston LHF Pty Ltd
Mr. Raymond Hill	Rayley Aviation Training
Ms Lesley Collins	Rayley Aviation Training
Mr. Dan Sheahan	
Mr. John Ireland	
	Aviation Maintenance Repair Overhaul Business Association

3.3 A total of 25 formal written responses were received from industry stakeholders covering many sectors of the aviation industry such as airlines, industry organisations, airline and general aviation maintenance and individuals.

3.4 Responses to the CAO were mixed and in some cases indicated a concern that CASA was instituting a binding system across the whole of the industry via CAO 100.66. This is not accurate. CAO 100.66 is specifically written to allow industry organisations or individuals to adopt the authority system and methods of training covered by it on a voluntary basis.

3.5 Similarly, opinions were expressed that this authority system may not be

appropriate for General Aviation maintenance. It should be noted that the previously released NPRM 0604MS stated at Page 38 that “Note: The joint team is considering the need for a maintenance licence specifically for the general aviation sector not appropriately catered for by the EASA licence ratings. Such a licence (proposed ‘B3’) would be restricted to aeroplanes below 5,700kg and helicopters below 3,175kg MTOW. The scope of this licence is not yet confirmed but is likely to be variable and would be dependant on the training undertaken to support a specific licence result. The team will be further exploring this issue with industry”. CASA has now separately initiated a project to use a joint CASA/industry team to develop the training requirements and licence outcomes needed to provide a maintenance licence specifically aligned with General Aviation and Aerial Work needs.

3.6 A total of 4 respondents indicated that the CAO was ‘not acceptable under any circumstances’. Also, a total of 5 respondents indicated that the CAO was ‘not acceptable but would be acceptable with suggested changes’. A review of these negative comments shows that the majority were based on misconceptions of what the CAO would require or on resistance to change of existing ‘demarcations’ between present licence categories. Amongst these comments also was one which was ‘not acceptable under any circumstances’ but provided no explanation. In some cases the comments ‘not acceptable but would be acceptable with suggested changes’ provided realistic suggestions that have led to changes in the CAO.

3.7 Additional comment was received indicating that the CAO required amendment to change the scope of certain licence types, as identified by specific Air Transport Association ATA iSpec 2200 (ATA) Chapter designators. Much of this comment was valuable and allowed CASA to amend the CAO draft to provide more clarity. Detailed responses to each of these are included in the Summary of Responses contained in Annex A to this NFRM.

3.8 One correspondent stated that the CAO was not in the interest of aviation safety in Australia. The respondents concern was centred on the fact that under the current system a person wishing to become a licensed aircraft maintenance engineer must have gained 2 years experience in a licence specialisation - such as airframes, engines, electrical, instruments and/or radio. While under the EASA like system the mechanical and airframe categories are combined into one, as well as including electrical category and much of the instrument category. CASA acknowledges that there will be some separation between the historically known categories. The B1 authority has the engine and airframe categories combined into one, as well as including the electrical category and limited scope for the replacement of avionics line replaceable units (LRUs), requiring simple tests to prove their serviceability. Experience with the system in Europe and elsewhere has indicated that it is logical to bring together multi disciplines into one individual rather than 2 or more persons, with the view to overcoming some human factor issues, thus providing an improved level of safety.

3.9 Further comments from industry respondents stated that the CAO was not acceptable under any circumstances and then provided no further comment. Another respondent believed that there was no regulatory basis for the CAO. Detailed explanation as to why the CAO is required is provided in the Summary of Responses (Respondent 21) in Annex A to this NFRM.

3.10 A total of 16 respondents indicated that the CAO was ‘acceptable as presented, without any changes’ or ‘acceptable but would be improved with suggested changes’ or provided similar wording. Many of the suggested changes accompanying these comments covered issues of substance and have been incorporated into the CAO.

3.11 As a result of the consultative process and the comments provided detailed changes were undertaken to the draft CAO. These changes included such issues as additional training requirements in Human Factors for the Category A authority holder, the removal of propellers from the training package and the addition of Air Transport Association ATA iSpec 2200 Chapter ATA 44 – Cabin Systems.

4. Conclusion and Impact of Changes

4.1 The final Civil Aviation Order CAO 100.66 was initiated and signed in to law on 9 February 2007 and took effect on 14 February 2007.

4.2 Due to the voluntary nature of this CAO, a decision by an individual or an industry organisation to use the outcomes of the CAO will be dependent upon the individual or organisation seeing benefit in doing so. As a result this NFRM does not address economic impacts of the CAO.

Annex A

Consolidated Summary of Comments / Responses received and CASA's Response and Disposition Actions to Consultation draft Civil Aviation Order (CAO) 100.66 Maintenance Authorities – EASA Equivalents

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Name	Section	Paragraph	Comments
RESPONDENT 1		What is your overall view of the draft CAO?	Choice: Not acceptable under any circumstances
	Select here for any additional general comments regarding this draft CAO		<p>I am concerned that existing airframe engine licensed engineers with avionic maintenance authorities will be given privileges that they do not deserve or can safely carry out due to no meeting the new training requirements. Eg not holding full electrical type course credits or full CASA exam requirements.</p> <p>CASA Response</p> <p><i>There is no safety issue with this outcome as there will be mandatory knowledge training and competency assessment required to gain the additional scope of authority for both a basic category of authority and type ratings.</i></p> <p>Most MA holders do an approved company run course to get some sort of avionic knowledge but not to the extent of which the CASA basics go into. The other is the privileges of there (sic) existing MAs do not allow them to use test equipment or carry out permanent wiring repairs. Eg splicing, terminating, installing diode packs etc.</p> <p>CASA Response</p> <p><i>Refer to additional training comment above.</i></p> <p>When this system is in place people who are grandfathered to the full B1 will be allowed to change connectors on a hydraulic depressurisation solenoid or carry out a permanent fire wire repair where the B2 engineer will not be allowed I think whoever has decided to adopt these rules needs a bite on reality.</p> <p>CASA Response</p> <p><i>Refer to additional training comment above. It is intended under CASR Part 66 at transition that current licence holders will not lose or automatically gain licence scope. Therefore any existing licence holder who is 'grandfathered' to a full B1 licence will have met all of the competency requirements for that licence. A current E I & R LAME will not lose any current licence scope at transition. They will be granted a full B2 and B1 limited to the scope of their residual E, I & R licence scope.</i></p>

Name	Section	Paragraph	Comments
RESPONDENT 2		What is your overall view of the draft CAO?	<p>Choice: Acceptable but would be improved with suggested changes</p> <p>Comments: AAAA's concern is regarding the transition of current LAMEs and MOs to the new system in such a way that all current privileges are maintained.</p> <p>CASA Response</p> <p><i>Agree, current licence privileges will be maintained during transition. MA's will be considered separately on a case by case basis at transition depending on the original basis which they were issued.</i></p> <p>Keeping specialist maintainers available to the industry in rural Australia is critical and during the current drought is even more difficult - the new regs should not add any burden, especially cost, to industry.</p> <p>CASA Response</p> <p><i>Phase 2 of the regulatory development is still considering the specific need for a 'B3' licence to cover this sector of the industry.</i></p> <p>AAAA also seeks a reassurance that there will be no unintended consequences from the definition of 'large aircraft' to be those above 5700 kg (eg the Air Tractor 802.)</p> <p>CASA Response</p> <p><i>Future legislation will give the capability of special consideration for aircraft that fall on either side of the large or small aircraft separation by definition.</i></p>
RESPONDENT 3		What is your overall view of the draft CAO?	<p>Choice: Acceptable as presented, without any changes</p> <p>Comments: No explanation provided</p>
RESPONDENT 4		What is your overall view of the draft CAO?	<p>Choice: Not acceptable under any circumstances</p> <p>Comments: There is not enough detail in the draft to allow an informed decision as to the worth of the proposal. There has been nowhere near enough time for constructive comment.</p>

Name	Section	Paragraph	Comments
			<p>Pacific Avionics is a member of both the AEA and AMROBA. I hope that the comments submitted by Ric Perri of the AEA and Ken Cannane of AMROBA are being given the weight that they deserve considering that they represent the majority of maintenance businesses in this country. I fully endorse their comments and am very concerned that they are both of the opinion that their comments on this are being ignored and that CASA is pushing ahead with regulation changes that are going to be another disaster that will cost aviation businesses more money, when they are already struggling to survive.</p> <p>If you don't want to listen to the comments that are made and act on them accordingly then stop wasting our time by asking for an opinion.</p> <p>CASA Response</p> <p><i>The proposal has been discussed by the CASA SCC and MSC over the last 6 months and in detail over the last 3 months. Representatives of AEA and AMROBA have been involved in these discussions, provided with electronic copies of the draft documents and it is understood that these have been provided to their members for consideration.</i></p>
RESPONDENT 5		What is your overall view of the draft CAO?	Choice: Not acceptable but would be acceptable with suggested changes
	Select here if you have any comments on the CAO's introductory text	Select here for Section 3: Authority categories	<p>C Licence category identified in NPRM Part 66 Para 6.1.1. This is not mentioned in CAO Authority Categories listed in 3.2. Has this category been abandoned or is not being pursued.</p> <p>CASA Response</p> <p><i>Category C will not be introduced under the CAO but is going to be under the proposed CASR Part 66 rules.</i></p>
		Select here for Section 6: Continued validity of an authority	<p>Is age limit to be 21 years for all personnel regardless of what type of maintenance organisation they are employed by.</p> <p>CASA Response</p> <p><i>The CAO must work in the current regulations (CAR1988) so age for grant of an authority will be 21.</i></p>

Name	Section	Paragraph	Comments
			<p>NPRM Para 4.2.19 stated age as 18 years for personnel working in subpart F organisation. Additional requirement for subpart F on public transport aircraft minimum age for certifying staff is 21 (refer Para 4.2.25 bullet point).</p> <p>CASA Response</p> <p><i>The CAO does not introduce the subpart F maintenance organisation. See above comments on age.</i></p>
		<p>Select here for any additional general comments regarding this draft CAO</p>	<p>With regard to personnel who hold licences that are current is there to be a grand father clause for these personnel to grant B1 type licence. These licences are rated and personnel have provided to CASA their experience prior to be granted licence rating.</p> <p>CASA Response</p> <p><i>Application under the CAO is voluntary. An application must meet the full requirements for a specific category of authority but all existing licence privileges will be accepted towards the authority. CAR31 exists in parallel with the CAO.</i></p> <p>CASA have accepted this training prior to issuing rating and now require these personnel to submit same experience again before licence will be issued but this time has to be through Part 147 Training Organisation.</p> <p>CASA Response</p> <p><i>Under the CAO there is no need for a licence holder to take any action unless an additional scope to a licence (MA) is sought. Refer above, only additional privileges will require training/assessment via a proposed CASR Part 147. Transition from CAR31 licences to CASR Part 66 licences will be managed by CASA without the need for the current licence holder to attend a 147 organisation, unless they are seeking additional licence scope. For example if you held a CAR31 Airframe and Engine licence you would be granted a CASR Part 66 B1 licence limited to existing Airframe and Engine scope. Human factors training will be required during the transition period.</i></p> <p>These personnel now certify for maintenance activities on types listed in their licence. Will they be allowed to Release to Service on Aircraft types that they are currently rated on and</p>

Name	Section	Paragraph	Comments
			<p>will this be reflected on MA listed?</p> <p>CASA Response</p> <p><i>Yes. However only full B1 or B2 types will be endorsed on these authorities and they will exist in parallel with CAR 31 licences.</i></p>
RESPONDENT 6		What is your overall view of the draft CAO?	<p>Choice: Not acceptable but would be acceptable with suggested changes</p> <p>Comments: This is not in the interest of aviation safety in Australia. Certainly safety has not been the main consideration</p>
	Select here if you have any comments on Appendix 1	Select here for: Maintenance activities - authority in subcategory A1, A2, A3 or A4	<p>Safety?</p> <p>Under the current system a person wishing to become a licensed aircraft maintenance engineer you must:</p> <ul style="list-style-type: none"> • Have gained four years general aviation experience in maintenance of aircraft, including time in training. • Have gained 2 years experience in your licence specialisation - such as airframes, engines, electrical, instruments and/or radio. This can form part of the four years general experience as outlined above. <p>There are five categories; engines, airframes, electrical, instrument and radio systems with each category further broken down into ratings.</p> <p>Under the new system the mechanical and airframe categories are combined into one, as well as including electrical category and much of the instrument category.</p> <p>CASA Response</p> <p><i>Agree that mechanical and airframe categories are combined into one, as well as including electrical category, however the B1 authority holder is restricted to replacement of avionic line replaceable units (LRUs), requiring simple tests to prove their serviceability. Before an applicant will be granted an authority under this CAO they must have been assessed as competent for the full scope of authority.</i></p> <p>Disregarding the international perspective, in what ways or terms is it safer that electrical</p>

Name	Section	Paragraph	Comments
			<p>and instrument licenses are now no longer specialist licensed fields and can be carried out by any engine/airframe AME?</p> <p>I am not saying engine/airframe LAMEs are not capable of carrying out the extra tasks, but just on a broad safety issue the new licensing regime will now allow persons that have not done a full apprenticeship in that particular field to carry out that work. An analogy would be that of carpenter doing a standard apprenticeship, but with a little more experience in the same period, coming out as a licensed builder, plumber and electrician.</p> <p>CASA Response</p> <p><i>This analogy is inaccurate. Under the CAO no authority will be granted unless the applicant has met the competency requirements for the full scope of authority sought.</i></p> <p>Is CASA now saying either:</p> <p>The mechanical/structures personnel within the four years have plenty of time to learn 2 new categories; and/or that electrical and instrument systems are that simple that they should never have been a separate licence in the first place.</p> <p>In the case of piston powered aircraft, it will be only 3 years!</p> <p>I can see no logical argument that the new licensing system is safer than the existing system. We will have a situation whereby new trainees will have to learn and gain experience on engines/airframes as well as electrics and instrumentation at the same time and in the case of piston aircraft in a shorter period. Would you want to fly an aircraft that has been completely serviced and released by a person with 3 years experience? I have always questioned whether 4 years is enough?</p> <p>CASA Response</p> <p><i>This comment is not agreed with. It can not be considered that the EASA licensing system is unproven in relation to those facets of the industry where it has been successfully adopted. There will be mandatory knowledge training and assessment required to gain the additional scope of authority for both a basic category of authority and type ratings.</i></p>

Name	Section	Paragraph	Comments
			<p>Under the current system, if an aircraft (IFR) was released you would know that the engine/airframe was done by someone who has had at least 4 years experience on those two categories only, and the electrical, instruments and radio was done by another who has at least 4 years experience in those categories only. Also those people would have submitted a schedule of experience to person, whom they do not know, for scrutiny to determine whether in that period they have covered all aspects in enough detail.</p> <p>CASA Response</p> <p><i>The new licensing (MA) system uses formal competency based training including assessment. This system is more structured than the current CASA basic examinations and SOE process.</i></p> <p>There is no way that the new system is safer than the existing system. By no means am I saying that it is not possible or in fact it is not safe, as it is done under FAA and EASA, but the CAO is not an improvement on existing safety measures in Australia. Trainees have more to learn and get experience on, within the same or shorter period. Situations may arise where not only does a person have to do their normal job of engine and/or airframe, they are now responsible for what was carried out by someone specifically trained in that field.</p> <p>CASA Response</p> <p><i>CAR31 permits an individual to gain a licence in all five categories provided they met the requirements for those categories. The situation under CAO 100.66 is no different.</i></p> <p>Consider what an expert in Human Factors would say. I am sure they would not agree that the new CAO is an improvement to safety. Placing extra burdens onto a shorter training schedule?</p> <p>CASA Response</p> <p><i>Overseas experience has indicated that it is logical to bring together multiple categories into appropriate groupings. This provides a safer result by overcoming some human factor issues caused by traditional category demarcations.</i></p>

Name	Section	Paragraph	Comments
	Select here if you have any comments on Appendix 5	Select here for Section 2: Scope	<p>Is it CASAs contention that making the teacher also the examiner and removing that layer of independence safer?</p> <p>There is no way that I can see that the new system is going to reduce the cost to the trainee. If a student fails; is it because of the student or the instructor. What's the first thing a student/organisations going to look at before handing over thousands of dollars; pass rates. I am sure instructors will not want half the class failing.</p> <p>This is an industry which cannot afford a rogue RO; the consequences could be catastrophic. External Auditing can only pick up so much. The CASA examination is not the best, but there is still that independence without any conflicts of interest. CASA does not care if you pass or fail and that's the way it should be. Most State Governments still do their own car driving tests; the training can be conducted elsewhere.</p> <p>The aviation industry in Australia is not big enough to support too many RO's; most individual States in the US have more aircraft than the whole of Australia. I believe there will be a high chance over the next few years that many of the smaller RO's will either disappear or be taken over by the bigger/stronger ones, thus reducing competition and choice.</p> <p>If the new system is competency based why still the `minimum experience levels provision?</p> <p>Is it going to be more cost effect to CASA or to the industry to have RO's? I believe CASA. Removing that layer of independence is that safer? I believe not.</p> <p>CASA Response</p> <p><i>CASA will approve and oversight the organisation providing this training and in particular the assessment processes, to confirm an appropriate safety outcome.</i></p>
	Select here if you have any comments on the CAO's introductory text	Select here for Section 1: Scope and application	<p>Reasoning</p> <p>The Draft CAO Explanatory Statement describes the current regulations as:</p> <ol style="list-style-type: none"> 1. The current regulations for aircraft maintenance and maintenance personnel have, over

Name	Section	Paragraph	Comments
			<p>time, become complicated and to some extent outdated.</p> <ol style="list-style-type: none"> 2. They are not clear, concise or harmonised with international regulatory best practice and they are not always appropriate for the Australian aviation environment. 3. They increasingly rely on exemptions to be practicable and they can inhibit innovation. 4. They may, in some circumstances, result in additional costs to industry while not necessarily adding safety benefits. <p>Whilst CASA does not go into any further detail on each point, there is no clear statement the current regulations are unsafe or pose any threat to the safety of aircraft in Australia. After all, it has to be remembered that the current regulations with regard to licensing have been in place for quite some time in Australia. The other important consideration is the new system CASA is seeking to implement is not just a `tweak' on the existing system, but a complete rewrite.</p> <p>Complicated and to Some Extent Outdated</p> <p>Has there been that much change to the licensing regulations over the time to make them complicated? Most people I know do not find them complicated. I actually thought it was quite a simple effective system.</p> <p>Outdated? Look at the average age of the aircraft in Australia. Have they become suddenly so new that there requires a new licensing system for the personal maintaining them? They have been maintained under the present system for a long time without problems. If there was a serious problem with the licensing of maintenance personnel, should this have been addressed much earlier?</p> <p>Not Clear, Concise Or Harmonised With International Regulatory Best Practice And They Are Not Always Appropriate For The Australian Aviation Environment.</p> <p>The current system has been developed by CASA over a period of time. How can it suddenly no longer be appropriate for the Australian aviation environment?</p> <p>Why is the European system now suddenly more appropriate for the Australian aviation environment?</p>

Name	Section	Paragraph	Comments
			<p>Why is CASA harmonising with the EASA system and not the FAA system?</p> <p>Already there is talk about introducing another category for General Aviation. Is this part of the EASA system or is this going to be a uniquely Australian qualification?</p> <p>They Increasingly Rely On Exemptions To Be Practicable And They Can Inhibit Innovation.</p> <p>Is it not important to address what exemptions are being relied upon and why? Then address the issue from there rather than introduce a complete new system? Is there any guarantee that these exemptions are not still going to be sort under the EASA system?</p> <p>Inhibit innovation? Isn't that what design engineers do? I am sure the last thing a passenger wants to hear is that an aircraft maintenance engineer has delayed the flight by 10 minutes because she/he wants to do something innovative on the aircraft before it leaves.</p> <p>I thought the idea behind Maintenance Systems is safety, so people do not go off and do whatever they want or think.</p> <p>They may, in some circumstances, result in additional costs to industry while not necessarily adding safety benefits.</p> <p>There is a simple statement that the regulations `may, in some circumstances`“ increase costs without additional safety benefits. There is no further breakdown of which circumstances this may occur or how much it is costing the industry.</p> <p>CASA Response</p> <p><i>A high priority has been placed on international harmonisation during the development of this system so as to provide industry with the advantages that such harmonisation can lead to. In consultation with industry this harmonisation has been seen to be of major benefit to industry.</i></p>
	<p>Select here if you have any general comments</p>	<p>Select here for any additional general comments regarding</p>	<p>I am yet to see an argument that the new system is an improvement on safety; or that the current system is in such a bad way that it needs a complete new system rather than maybe a re-write to clarify some of the existing provisions.</p>

Name	Section	Paragraph	Comments
RESPONDENT 7		this draft CAO	<p>I accept that comments formally closed on 8 January, but I thought it worthwhile nevertheless to formally advise the team of the RAAA position on the draft CAO100.66.</p> <p>Bearing in mind the inability of OLDP to provide drafting support in a timely fashion, and the fact that the new arrangements are optional and of an interim nature, the RAAA supports the draft CAO as written as a reasonable means of getting the intended effect of the proposed new licensing arrangements in place in a timely manner.</p>
RESPONDENT 8			<p>Greater clarification from CASA is sort with regard to certification of defects between Licence Categories.</p> <p>For instance will a B1 LAME be permitted to clear a defect within a B2 system, if a defect is cleared by the resetting of a computer?</p> <p>CASA Response</p> <p><i>Yes provided they hold a full B1 authority under the CAO covering this scope of work.</i></p> <p>Under current rules, this situation may be acceptable as the computer can be considered as an Electrical component within Airframe or Engine Category. If this is not within the scope of the new regulations then please refer below:</p> <p>My understanding of the intent of the new regs is to simplify and address many of the inconsistencies that exist in the current Regs. I therefore find it difficult to understand why a B1 Licensed Engineer, who does not hold credits for core Avionic exams, will be entitled to certify for B1 defects. At the same time, a B1 "single category holder", who holds credits in all Avionic core exams, will not be granted the same privilege within his own group.</p> <p>I understand that before a B2 holder can exercise this privilege, they must complete basic "PCT style" training. That being the case, why then doesn't a single Category B1 LAME qualify for the same privilege within the Avionic group? Additionally, if this approach to certification is to be accepted, why not allow a B1 LAME to certify for B2 defects provided similar qualification training within the B2 category has been received?</p>

Name	Section	Paragraph	Comments
			<p>In keeping with New Generation aircraft (which I have over 7 years experience both on Line and as a PCT instructor), I don't believe the new regs address the current issue of the grey areas that exist between categories. New Gen aircraft constantly present faults that are regularly cleared by the resetting of computers within that system. I believe that the confusion that currently exists in certification between categories could be adequately addressed if the B1 privileges that are proposed for B2 holders are also granted to B1 single category holders, and in addition permit B1 LAMEs to certify for B2 defects provided similar training is provided.</p> <p>In addition will B1 LAMEs be permitted to apply an MEL within the B2 group?</p> <p>I support the principles behind the implementation of the new regulations, however I feel greater clarification is required.</p> <p>CASA Response</p> <p><i>There will be mandatory knowledge training and assessment required to gain the additional scope of authority for both a basic category of authority and type ratings.</i></p> <p><i>Application under the CAO is voluntary. An application must meet the full requirements for a specific category of authority but all existing licence privileges will be accepted towards the authority. Current CAR31 licences can exist in parallel with the CAO.</i></p> <p><i>Transition of all remaining licence holders will not occur until the proposed CASR Part 66 regulation commences. For example if you held a CAR31 Airframe and Engine licence you would be granted a CASR Part 66 B1 licence limited to existing Airframe and Engine scope.</i></p>
<p>RESPONDENT 9</p>		<p>What is your overall view of the draft CAO?</p>	<p>Choice: Not acceptable but would be acceptable with suggested changes</p> <p>Comments: ATA Chapter 21 Air conditioning and ATA Chapter 35 Oxygen have always been Instrument engineers functions, this is not so under this system.</p> <p>ATA Chapter 21 has a large amount of electronic control in large RPT aircraft flying in Australian skies today and should be handled by the avionic engineers(B2)</p>

Name	Section	Paragraph	Comments
			<p>Impact on aircraft operators would be costly, having B1 engineers trained to the level required to understand the operation of the electronics involved in these systems.</p> <p>B1 licence under this system covers ATA Ch 21 which on RPT aircraft contains a large amount of electronics/electronics hardware and is an instrument basic IM at present.</p> <p>B2 licence does not include ATA Ch 21 why?</p> <p>ATA 21 has been an instrument/electrical task on all RPT aircraft that I have been licensed on.</p> <p>Please change ATA Ch21 to be covered by both B1 and B2 licences.</p> <p>CASA Response</p> <p><i>Historically Air-conditioning, Fire systems and Oxygen were systems that were in main catered for by the CAR 31 Instrument Category. With the introduction of the proposed CASR Part 66 regime both the basic and type training syllabi lead to a situation where the resultant privileges are mainly the domain of the B1 category, however instrument and radio (Avionics) and work that fits within the ATA31 descriptors remains a B2 privilege. Now, only the electrical and instrument aspect of the oxygen system is a B2 privilege.</i></p> <p><i>The CAO appendices have been amended to acknowledge the B2 privilege.</i></p>
RESPONDENT 10		What is your overall view of the draft CAO?	<p>Choice: Acceptable but would be improved with suggested changes</p> <p>Comments: No explanation provided</p>
	Select here if you have any comments on Appendix 1	Select here for: Maintenance activities - authority in subcategory A1, A2, A3 or A4	<p>Paragraph 3 (g) - Would it be possible to change this to read. "Simple repair and replacement of passenger or cabin crew seats, seat belts and harnesses"</p> <p>CASA Response</p> <p><i>No, this list is a direct equivalent of the EASA list and it is intended to maintain equivalence for harmonisation purposes.</i></p>

Name	Section	Paragraph	Comments
			<p>With modern cabin seating, there are many simple repairs that can be carried out by an appropriately trained Cat-A certifying person. For example, simple arm rest / foot rest repairs, reclining mechanism repairs.</p> <p>If required, simple repairs to passenger or cabin seats can be defined as repairs in which no structural part of the seats is removed or modified.</p>
	<p>Select here if you have any comments on Appendix 2</p>	<p>Select here for: ATA chapter designators of maintenance - authority in subcategory B1.1, B1.2, B1.3, B1.4</p>	<p>There is no mention of ATA-44 (In-flight Entertainment Equipment)</p> <p>Both Qantas and Rockwell Collins have been issuing publications under ATA-44</p> <p>CASA Response</p> <p><i>ATA Chapter 44 – Cabin Systems has been added to the CAO appendix.</i></p>
	<p>Select here if you have any comments on Appendix 3</p>	<p>Select here for: ATA chapter designators of maintenance - authority in category B2</p>	<p>There is no mention of ATA-44 (In-flight Entertainment Equipment).</p> <p>Both Qantas and Rockwell Collins have been issuing and using publications under this ATA-44 designator.</p> <p>A current practice is that persons with a Group 20 - A/C rating, radio category are certifying for maintenance under this ATA.</p> <p>CASA Response</p> <p><i>ATA Chapter 44 – Cabin Systems has been added to the CAO appendix.</i></p>
	<p>Select here if you have any comments on Appendix 4</p>	<p>Select here for Part 2 - Knowledge module requirements</p>	<p>Would a person wishing to obtain a Cat-A1 for In-flight Entertainment maintenance really benefit from completing modules 11, 15, and 17?</p> <p>CASA Response</p> <p><i>Training is designed to support the scope of the full category of authority, and the knowledge levels in individual modules reflect this. Category 'A' authorities are not going to be issued by CASA for a single item from the task list. Rather they will be issued for the full scope of the authority and the CAR30 or RO will be required to task and type train and authorise the authority holder.</i></p>

Name	Section	Paragraph	Comments
			<p>These are basic airframe and engine modules, which would not be suitable to an avionics orientated person.</p>
	<p>Select here if you have any comments on Appendix 4</p>	<p>Select here for Part 3 - Module 10: Aviation legislation</p>	<p>10.5 Aircraft Certification. This should be a level 1 also for Cat-A certifying staff.</p> <p>Even though Cat-A certifying staff will have a very limited scope in the type of work they will perform, it is important for these people to have and understanding of the whole scope of certification rules.</p> <p>CASA Response</p> <p><i>Disagree; the training is appropriate to the Category A licence and the tasks they may issue a Certification Release to Service (CRS) for.</i></p>
	<p>Select here if you have any comments on Appendix 4</p>	<p>Select here for Part 3 - Module 9: Human factors</p>	<p>There should be no difference in the "Level of knowledge for the categories" when it comes to Human Factor training.</p> <p>The main goal of human factor training is error reduction. To reduce the level of HF training required between A and B1/B2 makes no logic sense given that maintenance errors are across all spectrum of aviation work.</p> <p>CASA Response</p> <p><i>Agree, the syllabus has been amended.</i></p>
	<p>Select here if you have any comments on the CAO's introductory text</p>	<p>Select here for Section 2: Definitions</p>	<p>There is no definition for a "Training Instructor". Unusual given that there is definitions for "examiner", "assessor" etc.</p> <p>CASA Response</p> <p><i>Agree, definition has been added to CAO.</i></p>
	<p>Select here if you have any general comments</p>	<p>Select here for any additional general comments regarding this draft CAO</p>	<p>As an EASA-145 organisation, IASA has found several problems with the existing EASA-145 rules which limit IASA's capabilities when operating in foreign countries. In particular the use of local licence person with a particular endorsement when there is no such local licence endorsement and the inability to use other appropriately trained and qualified</p>

Name	Section	Paragraph	Comments
			<p>persons.</p> <p>CASA Response</p> <p><i>This comment is relevant for consideration during the drafting of CASR Parts 42, 66 and 145.</i></p> <p>Also as has been mentioned to me by my EASA-145 Inspector in France, an EASA Part-66 licence is not valid outside of the European Union (EU). For and EASA Part-66 licence to be valid outside the EU, the person must work for an EASA-145 Maintenance Organisation and have a Company Approval issued by the Maintenance Organisation which then needs to be approved by EASA. The AMO can use the EASA Part-66 licence as the basis of issuing a Company approval, but the Company Approval must be approved by EASA.</p> <p>CASA Response</p> <p><i>This comment is relevant for consideration during the drafting of CASR Parts 42, 66 and 145.</i></p> <p>I am not seeing the above requirement in these CASA regulations and I hope it is not intended to go that way, otherwise there will be a lot of holders of CASA AME licences who are overseas, who will need to be issued with their Company "Company Approvals" and sent to CASA for approval. If possible, can we have future NPRM responses where we can download the response form as a separate document and not rely on the internet connection?</p> <p>CASA Response</p> <p><i>This comment will be passed to the software developer for rectification.</i></p> <p>This is mainly due to some people like myself, who like to think about exactly what to write for each question without having to worry about the 1-hour deadline, or if the user loses the internet connection mid-way, then the user has to start all over again.</p>
RESPONDENT 11		What is your overall view of the draft	Choice: Acceptable but would be improved with suggested changes

Name	Section	Paragraph	Comments
		CAO?	Comments: Please refer to separate detailed submission sent to email address
	Select here if you have any general comments		<p>We wish to thank CASA for the opportunity to respond to the NPRM and discussions that have occurred to date. Our comments are provided throughout extracts of the document using Red Text and Shaded Background. Where no comment is provided, or where we are happy with the CASA proposal, the original CASA text is not shown in our response.</p> <p>In general, we are satisfied with the proposal but require refinement and clarification where shown.</p> <p>Licence vs. Authority</p> <p>There is some conjecture as to using the Maintenance Authority System versus a refined Licence System. In many ways, it would be ideal to go to a new Licence Structure but the scope and flexibility of what is proposed and equivalence to the EASA system is mandatory for the new aircraft types (i.e. A380 and B787). Should it be possible to simply have a B1 Airframe Licence (with new Extensions for Engine and Electrical) to give the equivalent to the EASA B1 that may be desirable. Similarly a B2 Instrument Licence (with Extensions for Radio and other Electrical work) to give the equivalent to the EASA B2 would be acceptable.</p> <p>B2 MA's not aircraft specific?</p> <p>In the explanatory Statement issued by CASA with the NPRM, there is a statement that the B2 MA's are not aircraft specific. We seek urgent clarification on that issue for large complex aircraft as our understanding of the EASA system, is that the B2 is aircraft specific for large complex aircraft. We can well perceive that for GA and under 5700kg type aircraft that a B2 should /could possibly be all encompassing from an avionic perspective.</p> <p>CASA Response</p> <p><i>The authority is not aircraft specific; however a type rating will be required on a B1 or B2 authority for aircraft that require a rating.</i></p> <p>Ideal world for 147</p>

Name	Section	Paragraph	Comments
			<p>Idealistically we still believe that the CAO should be clearly split into two (2) CAO's. One for part 66 and one for part 147. If CASA do not / cannot separate CAO 66 and 147, it is difficult to issue an international equivalent approval for a Training Organisation under 66. The 147 certificate should be recognisable internationally, and be in line with the requirements of a 147. Many other NAA's operators that we handle like to see the LAME training carried out in 147 School.</p> <p>CASA Response</p> <p><i>This comment mixes the CAO with the proposed outcomes of CASR Parts 66 and 147 and is more relevant to the actual regulations.</i></p> <p>Plain English and EASA terminology</p> <p>The language in most cases is in plain English and is a close reflection of what is in the equivalent EASA Regulations. In many cases (but not all) the sub-paragraphing /numbering has made it easier to read than the EASA equivalent. However, there are some areas where legalese has re-emerged (eg Para 11& 12). As decreed by Peter Gibson's Media Release "the new regulations will be clear and concise as per the EASA regs". Complex legalese must be eliminated.</p> <p>CASA Response</p> <p><i>The CAO is constrained in its language by needing to work within the existing regulations.</i></p> <p>Evolution and Category C Licences</p> <p>There is no mention of a Category C licence. If we are harmonising then this is eventually also required.</p> <p>CASA Response</p> <p><i>Agree, the proposed CASR Part 66 will cover this licence.</i></p> <p>Consideration must be given to ensure that the new concept can adapt. As a general comment concerning the Levels shown against each ATA – it would be beneficial to assess the newer aircraft types (eg. B787 and A380) system implications for both category</p>

Name	Section	Paragraph	Comments
			<p>B1 and B2. These newer aircraft have technological improvements some of which are possibly already evident in Australia (eg. Electric pressurisation, electric braking, complex cabin systems including GSM telephone capability, complex composites etc). Training being carried out now will be for the newer fleets. Some flexibility is required to enable logical grouping of activities related to training and human factors considerations.</p> <p>CASA Response</p> <p><i>CASA will amend the CAO with some ATA Chapters identified but must also look at how new technology will influence the knowledge syllabus and training syllabus before adding the ATA Chapter.</i></p> <p><i>The new maintenance suite will be inherently flexible and will meet this requirement.</i></p> <p>Concluding Remarks</p> <p>We are satisfied with the overall direction of the NPRM but some improvements can / must be made as defined below. We are happy to discuss any item with you to assist in the resolution of this new direction</p> <p>Definitions:</p> <p>Airworthiness management requirement means a requirement that when met demonstrates that a person has a knowledge and understanding of the fundamental documentation and administrative processes for the preservation and enhancement of airworthiness.</p> <p>Comment: Assume this means an AQF Module similar to what is currently available. Industry would need to see this.</p> <p>Aeroskills Training Package means the package of that name set out by CASA in an AAC Information Bulletin for this Order.</p> <p>Comment: Believe any reference to an AAC should only be a NOTE in the CAO as the CAO should not refer to lower / subordinate level of advisory documentation.</p>

Name	Section	Paragraph	Comments
			<p>CASA Response</p> <p><i>The CASA legal Group has advised this is legally correct.</i></p> <p>Authority means an authority to carry out maintenance on aircraft issued under paragraph 33B (1) (a) of CAR 1988.</p> <p>Comment: Refer comments at start of our response.</p> <p>Examination means:</p> <p>(a) a process with all of the following elements:</p> <p>(i) a formal assessment of a student under the supervision of an examiner, occurring after teaching in the student’s course has been completed;</p> <p>(ii) a set of questions or exercises to determine what the student knows or has learned from the course;</p> <p>(iii) assessment:</p> <p>(A) of written answers to essay questions; or</p> <p>(B) of answers to questions with multi-choice answers of which only 1 answer can be correct; or</p> <p>(C) of oral answers to written or oral questions; or</p> <p>(D) using 1 or more of these methods;</p> <p>(iv) a fixed duration under examination conditions; or</p> <p>(b) use of RPL where this is an appropriate method of determining what a student knows or has learned.</p> <p>Comment: Agree with significantly improved definition of examination to include RPL and different types of exams. The use of the RPL (or some other means) must be flexible enough to cover large airline staff that does not work on propeller aircraft to be able to demonstrate equivalent skills / knowledge by working on turbine engines. We have no objection to them being taught propeller theory as part of the overall AQF training. However it is impractical for them to do practical training on propellers.</p> <p>Line maintenance means minor or scheduled maintenance carried out on an aircraft:</p> <p>(a) that is in service; and</p> <p>(b) that is:</p>

Name	Section	Paragraph	Comments
			<p>(i) preparing for its first flight in service after a period of being out of service; or (ii) en route and stopped before its next flight; or (iii) preparing for any other flight during a period of service; and (c) to ensure that the aircraft is fit for the flight.</p> <p>Comment: The above definition is still considered complex.</p> <p>CASA Response</p> <p><i>CASA disagrees the definition has been consulted on with other industry representatives and is acceptable.</i></p> <p>As written we understand that this allows an A-MA to still perform and certify for maintenance that they personally perform in Line, Base or Heavy Maintenance as would be permitted by their A-MA.</p> <ul style="list-style-type: none"> • They would also be permitted to sign but not certify for work perform under supervision. • They can only certify the return to service for checks up to but excluding say A-checks. <p>CASA Response</p> <p><i>The respondents comment is incorrect as a Category A authority holder may issue a certificate of release to service for line maintenance in accordance with CAO 100.66 Paras 10.1 and 10.2.</i></p> <p>Supervision, for maintenance, means:</p> <p>(a) being physically present and observing the maintenance being carried out to the extent necessary to ensure that it is being carried out properly; and (b) being immediately available to give advice, or answer questions, about the maintenance.</p> <p>Note being immediately available means being able, without delay, to:</p> <p>(a) react with advice to the maintenance being carried out; or (b) respond to a question from the person carrying it out.</p> <p>Comment: Agree with the ability of a B1 & B2 MA to supervise. The scope and privileges</p>

Name	Section	Paragraph	Comments
			<p>must be identical to a full Licence and not the old concept of an MA. The word “inspecting” is more defined than “observing” and is a truer reflection of what is required. Good principles in EASA AMC M.A.402 require inclusion.</p> <p>CASA Response</p> <p><i>The scope and privileges for supervision are identical of a CAR 31 licence.</i></p> <p>6. Continued validity of an authority</p> <p>Comment: Some special consideration / clarification is required once a licence / authority is granted. Firstly, it can only be used when the person is also authorised by the AMO. As written CASA would have to revalidate every A-MA every five years while the B-MA’s may escape the revalidation process if the individual obtains new type ratings on their licence which automatically revalidates for a further 5 years. As stated previously, we believe significant gains can be made by CASA and Industry to have an approval/Instrument/delegation to the AMO revalidating licences/authorities into the CASA database /system. (We understand this is already practice for some Pilot licences).</p> <p>CASA Response</p> <p><i>Not agreed at this time.</i></p> <p>7. Validity, invalidity and re-validation of an authority</p> <p>Comment: Refer comments on Para 6 above.</p> <p>10 Privileges of holder of an authority</p> <p>10.1- Comment: Suggest simply refer to Large Aircraft per definition.</p> <p>10.1 - Comment: Refer previous comments under re-validation. This could be similar to the current Transit Authority approval but with greater flexibility and lower cost to CASA and Industry.</p> <p>CASA Response</p>

Name	Section	Paragraph	Comments
			<p><i>Not agreed at this time.</i></p> <p>10.3 - Comment: Para (c) above considered superfluous as a B1 includes capability to do A-MA tasks.</p> <p>10.5 - Comment: This must include some scope for Licensed management/ licensed /maintenance watch type of personnel that are still actively involved in maintenance issues and specialisation to retain their licence/MA. Believe EASA does actually address this.</p> <p>CASA Response</p> <p><i>Agreed, Added capability for CASA to access this in accordance with existing requirements.</i></p> <p>11. Privilege of supervising a person performing maintenance</p> <p>Comment: Please don't include reference to Schedule 6 of CAR 1988. This has caused confusion in industry over the years and does introduce some illogical concepts into large organisations systems of certification. Other NAA's have this as part of the 145 orgs responsibilities and the alternate system in the AMO's procedures is all that is required. Para 11& 12 must be significantly simplified and written in plain English.</p> <p>13. Requirements for a category</p> <p>13.1 - Comment: We note that the Appendix 6 provides some scope for alternative re pressurised and non-pressurised aircraft. As noted previously some ability must exist re Propeller and turbine engines re the modules and competencies.</p> <p>13.2 - Comment: Where the MA/Licence holder works for an AMO, the person can then only certify if authorised by the AMO.</p> <p>13.7 - Comment: This must not prohibit a full B1 from performing minor repair / ramp rash / etc. Acknowledge that complex composite /sheet metal repairs may only be done by persons with the appropriate competencies but these may not be B1 or B2 persons.</p>

Name	Section	Paragraph	Comments
			<p>13.9 - Comment: Does this cover the previous issue such as turbine engine vs. propeller issue.</p> <p>13.10 - Comment: Does this mean that this could be the only activity??</p> <p>13.11 - Comment: Suggest simplify and combine para (b) and (c) above.</p> <p>CASA Response</p> <p><i>Not agreed at this time.</i></p> <p>13.12 - Comment: Refer to previous comments. Recognition of relevant military aircraft training is supported.</p> <p>14. Recognition of foreign qualifications for a category or subcategory</p> <p>Comment: As mentioned previously, believe this particular Para must refer to other NAA Licences not Authorities. The word Licence not Authority is used in the ICAO documentation.</p> <p>CASA Response</p> <p><i>The use of the word authority conforms to CASR Part 11 and is generic, including licences.</i></p> <p>17. Endorsement of an additional rating</p> <p>Comment: Add a clause or NOTE to clarify that additional aircraft can be added to an A-MA by the AMO and that it is not a rating in its true sense.</p> <p>Appendix 1 Maintenance activities — authority in subcategory A1, A2, A3 or A4</p> <p>Comment: The weekly criteria is specified in EASA but should be able to cover simple tasks up to A check. The person should still be able to sign for the tasks if he/she performs them at a greater check but they can not do the RTS (refer previous comments).</p>

Name	Section	Paragraph	Comments
			<p>CASA Response</p> <p><i>In consultation with industry CASA has agreed to conform exactly to the EASA task listings for Category A in the CAO.</i></p> <p>2. Minor maintenance,</p> <p>Comment: This is not in the EASA regs. It combines a few different items believed already covered. Possibly ok.</p> <p>3. After appropriate task training for issuing an aircraft certificate of release to service as part of minor scheduled line maintenance or simple defect rectification:</p> <p>(d) replacement of galley equipment (eg. ovens, boilers, trash compactors and beverage makers); and</p> <p>(p) deactivation of subsystems and aircraft components as permitted by the operator's MEL, if the task is determined as being a simple task;</p> <p>Comment: Add / amend (d) and (p) as shown to update with the times. It is not practical or cost beneficial for CASA to have to add these items under (q) in an AAC. Although it is agreed that some of the details should not be in the Reg or CAO itself, placing this in an AAC (or Guidance Material) will prove complex and administratively illogical.</p> <p>CASA Response</p> <p><i>In consultation with industry CASA has agreed to conform exactly to the EASA task listings for Category A in the CAO.</i></p> <p>Appendix 2 Air Transport Association chapter designators of maintenance — authority in subcategory B1.1, B1.2, B1.3, B1.4</p> <p>Comment: The list must be updated in line with current ATA practice and what is probably already in recent aircraft types. Suggest add the following new ATAs as evident in ATA:</p>

Name	Section	Paragraph	Comments
			<ul style="list-style-type: none"> • 42 – Common Core System • 44 – Cabin Systems • 46 – Information Systems. • 47 – Nitrogen Generation • 50 – Cargo and Accessory systems. <p>CASA Response</p> <p><i>CASA will amend the CAO with some ATA Chapters identified but must also look at how new technology will influence the knowledge syllabus and training syllabus before adding the ATA Chapter.</i></p> <p><i>ATA Chapters 44, 46 and 50 have been added to the CAO.</i></p> <p>Please also note the following general remarks:-</p> <ul style="list-style-type: none"> • This list is not reflected in EASA to the same extent. EASA only have a basic list for the B2 in their AMC to 147. We are against becoming too prescriptive over ATA Trade Distinctions in the CAO and believe that the use of ATA designators is no longer necessarily a definitive way to distinguish between avionics and mechanical trades. • For example, some distinction may be made between “Power Plant”, “Mechanical Systems” (non-power plant) and “Structures” trades using ATA. • Agree that some ATA’s can currently still be designated as wholly Avionic, eg 22, 23, 31, 33 etc. • In Modern aircraft, there is more and more use of avionics for control and monitoring in all ATA’s hence simple ATA designations cannot necessarily be used to distinguish between trades. That said, the ATA lists in Appendices 2 and 3 need to be carefully considered. • To permit a B1 mechanical rated engineer to have full authority over ATA’s 24, 33, 45, 76, and 77 goes against common sense. <p>CASA Response</p>

Name	Section	Paragraph	Comments
			<p><i>These ATA Chapters are moderated by the scope of the authority.</i></p> <ul style="list-style-type: none"> • The ATA lists in Appendixes 2 and 3 appear to be missing many important and evolving ATA's: eg 20 (standard practices, particularly wiring), and 42, 44 and 46, all present in new aircraft designs as included below. Believe EASA simply listing what is clearly a B2 ATA may be simpler than the complex lists. More discussion required. <p>Comment: Refer other comments re MA's re specialist activity.</p> <p>Appendix 3 Air Transport Association chapter designators of maintenance — authority in category B2</p> <p>Comment: Similarly add the electrical aspects of following ATAs (as already evident in ATA maintenance):</p> <ul style="list-style-type: none"> • 21 – re electrical air conditioning. • 30 – Ice and Rain re electric de-icers. • 32 – Landing gears re electric brakes. • 42 – Common Core System • 44 – Cabin Systems • 46 – Information Systems. • 47 – Nitrogen Generation • 50 – Cargo and Accessory systems. • 52 – Doors – re cockpit door complexity. <p><i>CASA Response</i></p> <p><i>CASA will amend the CAO with some ATA Chapters identified but must also look at how new technology will influence the basic knowledge syllabus and training syllabus before adding the ATA Chapter.</i></p> <p>Appendix 4 CASA knowledge syllabus</p> <p>Comment: Item 17 re Propellers must be able to be practically covered by turbine engine competency for B1. Refer previous comments.</p>

Name	Section	Paragraph	Comments
			<p>CASA Response</p> <p><i>Will be given further consideration in the drafting of CASR Part 66.</i></p> <p>Appendix 5 Recognised organisations</p> <p>2.2 CASA may only recognise training as maintenance training if it is conducted in accordance with this appendix.</p> <p>Comment: Simplify as shown above.</p> <p>CASA Response</p> <p><i>CAO wording meets legal requirements.</i></p> <p>6..Student numbers</p> <p>Comment: Appreciate it's per EASA but appears possibly restrictive depending upon what is being taught. This should be part of the RTO exposition.</p> <p>CASA Response</p> <p><i>These figures are a maximum and RTO expositions will provide specific figures per activity type.</i></p> <p>Appendix 6 Units of competency required for a category or subcategory of authority</p> <p>Comment: Refer previous comments re MEA307B and MEA315B re theory and practical aspects of propellers and turbine engines.</p> <p>Appendix 7 Type training and assessment standards</p> <p>Comment: As proposed, this is essentially as per EASA Part 66 Appendix III but excludes details for a category "C" licence / MA.</p>

Name	Section	Paragraph	Comments
			<p>CASA Response</p> <p><i>Will be covered in the proposed CASR Part 66.</i></p>
RESPONDENT 12		What is your overall view of the draft CAO?	Choice: Acceptable as presented, without any changes
		Select here for any additional general comments regarding this draft CAO	<p>The CAO in question reads well as a mature document in a post Part 66 environment. Having discussed this issue with a number of other CAR 30 maintenance and training organisations the main area of confusion seems to be in relation to how existing licence holders will be handled; specifically:</p> <p>1. How will current LAME licence holders have their licences changed over to the Part 66 format?</p> <p>CASA Response</p> <p><i>Application under the CAO is voluntary. An application must meet the full requirements for a specific authority but all existing licence privileges will be accepted towards the authority. Current CAR31 licences can exist in parallel with the CAO. Transition of all remaining licence holders will not occur until the proposed CASR Part 66 regulation commences.</i></p> <p>2. Will existing CASA exam credits (eg. FG, FM, IM, GC etc.) remain current?</p> <p>CASA Response</p> <p><i>Yes for a period of four years once the proposed CASR Part 66 has commenced.</i></p> <p>3. Noting question two above; Is the completion of the CASA Schedule of Experience still the route to be followed to turn a CASA Exam credit into a Licence?</p> <p>CASA Response</p> <p><i>Yes to gain a CAR31 licence outcome. However, to gain an authority under the CAO both the CASA basic exam credits and SOE held by any individual can be used as evidence for Recognition of Prior Learning by a Recognised Organisation. Some additional training</i></p>

Name	Section	Paragraph	Comments
			<p><i>and competency assessment may be required to meet the full requirements for the issue of an authority.</i></p> <p>4. Noting the scope of privileges of the EASA B1 licence, how will the privileges be applied to current A/F+Eng LAME's when they transfer to a Part 66 Licence?</p> <p>CASA Response</p> <p><i>There will be mandatory training required to gain the additional scope of licence for both a category of basic licence and type ratings. At transition under CASR Part 66 current licence privileges will be maintained and limitations will be placed on the licence unless additional training is undertaken to meet the differences between the existing licence scope and full licence scope.</i></p> <p>5. B1.3 specific question- Under the current regulations an A/F group 19 holder with multiple group 22 engine ratings has the ability to work on a majority of the twin engine Group 19 helicopters on the register. Under the new regulations that is not the case.</p> <p>Will current Group 19/22 combination licence holders have all the applicable aircraft + engine ratings added to their MA without having to sit Part 147 type training (training that currently does not exist for Group 19 aircraft)?</p> <p>CASA Response</p> <p><i>Once CASR Part 66 commences there will be appropriate transitional mechanisms to accommodate this case. The CAO does not introduce this as authority applications will be for full categories.</i></p> <p><i>Under the new regime a category B1.3 holder would be able to work on what were previously Group 19 helicopters. There are some engines for which a type rating will be required such as the Allison 250-B. A B1.3 holder with such engine type ratings would be able to work on all helicopters not type rated with such engines fitted.</i></p>
RESPONDENT 13		What is your overall view of the draft CAO?	<p>Choice: Acceptable but would be improved with suggested changes</p> <p>Comments: References to the Aeroskills Training Package need to identify the actual version/draft version referred to, (not 'the latest version') Readers need to be informed of</p>

Name	Section	Paragraph	Comments
			<p>which particular Training Package version the proposed rule making is intending to use, particularly whilst the Training Package is in draft form. The Training Package competencies are a key part of this proposal and stakeholders need to be clear on the actual content of any intended accompanying material</p> <p>CASA Response</p> <p><i>Agree, the CAO provides the appropriate references to make it clear to the reader.</i></p>
	Select here if you have any comments on Appendix 4	Select here for Part 3 - Module 14: Propulsion - avionic systems	<p>14.2 "Manifold Pressure" is commonly associated with piston engines. Should it also feature in Gas Turbine indicating systems?</p> <p>CASA Response</p> <p><i>The module is correct and generic for an avionics authority holder in either case.</i></p>
	Select here if you have any comments on Appendix 4	Select here for Part 3 - Module 15: Gas turbine engine	<p>15.21 Is the reference to "baroscope" intended to read "borescope"</p> <p>CASA Response</p> <p><i>Agree, it should read boroscope.</i></p>
	Select here if you have any comments on the CAO's introductory text	Select here for Section 2: Definitions	<p>2.2 Is assessment constrained only to TAA qualified assessors, or are those qualified under the BSZ suite of competencies still permitted to conduct assessments?</p> <p>CASA Response</p> <p><i>The CAO allows for equivalent qualifications to be recognised. The BSZ suite will be explicitly recognised via note with the AAC 9-66</i></p>
RESPONDENT 14			Very Dissatisfied
RESPONDENT 15		What is your overall view of the draft CAO?	<p>Choice: Acceptable as presented, without any changes</p> <p>Comments: No explanation provided</p>
RESPONDENT 16		What is your overall	Choice: Not acceptable under any circumstances

Name	Section	Paragraph	Comments
		view of the draft CAO?	Comments: No explanation provided
RESPONDENT 17		What is your overall view of the draft CAO?	<p>Choice: Acceptable as presented, without any changes</p> <p>Comments: I hold an EASA Licence, Categories A1 and B1.1 - as well as a CASA Licence, and wholly approve of the changes to be made.</p> <p>There needs to be some sort of standardisation of the different legislative systems, practised by different NAAs, worldwide.</p>
	Select here if you have any general comments	Select here for any additional general comments regarding this draft CAO	<p>Once these rules are implemented, what would be the fate of those holding Company Approvals locally-i.e. Qantas? They do also hold CASA Licences.</p> <p>CASA Response</p> <p><i>The CAO does not specifically address the large range of varying company approvals. This will be considered during transition to CASR Part 66.</i></p>
RESPONDENT 18		What is your overall view of the draft CAO?	<p>Choice: Acceptable but would be improved with suggested changes</p> <p>Comments: In appendix 6 where it lists the competency required for licence category, it does not list any competencies that are used in the AQTF Aeroskills avionics pathway 1(210, 212, 214, 216, 217) which is used for General Aviation apprenticeships. If the new licensing regulations are to be used for GA, these competencies need to be added to allow for GA avionics engineers to gain a B2 category.</p>
	Select here if you have any comments on Appendix 6	Select here for: Units of competency required for a category or subcategory of authority	<p>The same competencies from AQTF Aeroskills avionics pathway 1 are not listed. These include 210, 212, 214, 216, and 217. If these competencies are not added, those apprentices doing the avionics pathway 1 will not be able to become licensed in the B2 category once finished. All of these competencies will need to be added so that licensing for GA is not forgotten</p> <p>CASA Response</p> <p><i>The competency units listed in the CAO are those required to meet the full scope of the particular authority. A RO will be able to apply RPL processes to all existing qualifications</i></p>

Name	Section	Paragraph	Comments
			<i>to provide for CAO 100.66 authority outcomes. The competency units you have mentioned if held will just be another form of evidence that can be used for RPL.</i>
RESPONDENT 19		What is your overall view of the draft CAO?	Choice: Acceptable but would be improved with suggested changes Comments: No explanation provided
RESPONDENT 20		What is your overall view of the draft CAO?	Choice: Acceptable but would be improved with suggested changes
	Select here if you have any general comments	Select here for any additional general comments regarding this draft CAO	<p>As a holder of a UK CAA licence plus NZ-CAA licence endorsed under the Trans Tasman Agreement, my concerns are for the future of the AME in Australia, there will come a point when conversion to a type 66 will be a fundamental requirement. The UK-CAA has taken over 5 years to reach, and they will admit a not satisfactory requirement for certifying staff for aircraft/helicopters below 5200kg. Especially for smaller organisations, which are more predominating here?</p> <p>May I suggest that a check list be raised as part of the rule allowing all certifying staff to be able to cross reference where and how they will be able to transfer rights for current licenses.</p> <p>CASA Response</p> <p><i>As it relates to implementation of CASR Part 66 consideration will be given to the need for such a before and after checklist or equivalent.</i></p>
RESPONDENT 21			<p>The Aircraft Electronics Association (AEA) appreciates the opportunity to comment on the proposed Civil Aviation Order on behalf of our AEA – Australia membership.</p> <p>The Association represents more than 1300 aviation businesses worldwide, including repair stations that specialize in maintenance, repair and installation of avionics and electronic systems in general aviation aircraft. AEA membership also includes instrument facilities, manufacturers of avionics equipment, instrument manufacturers, airframe manufacturers, test equipment manufacturers, major distributors, and educational institutions.</p> <p>Thank you for your consideration given to the AEA's Australian membership by allowing</p>

Name	Section	Paragraph	Comments
			<p>them a few extra days to review this extensive proposal and to draft our comments. While we applaud the use of the Maintenance Standards Subcommittee and are privileged to participate on this Subcommittee, we do not believe the use of the MSC for developing regulations relieves CASA of reasonable public comment period.</p> <p>As you state in your “Explanatory Statement” the “SCC” established the Maintenance Standards Subcommittee to assist with the development phase of the maintenance proposals.” CASA must provide the Australian public with a reasonable opportunity to review and comment on critical pieces of regulations. Allowing a mere 19 days, which included the Christmas and New Year Holiday, is not providing the public with a reasonable opportunity to review and comment on this proposal.</p> <p>The Aircraft Electronics Association generally supports the overall concept of updating the Australian aviation regulatory structure with that of more common regulatory structures found throughout Europe, New Zealand, and the United States. However, we cannot endorse this proposal as written.</p> <p>CASA has not adequately justified such a wholesale rewrite of the current proven training and licensing program.</p> <p>CASA Response</p> <p><i>The formal consultation period for the CAO can not be considered in isolation. It is part of a 15 month program which has involved public presentation, targeted documentation and web based information to the public in addition to the formal consultation using notice of proposed rule making and standard CASA committee consultation processes.</i></p> <p>The following are section-by-section comments regarding the proposal.</p> <p>Explanatory Statement Civil Aviation Act 1988 Civil Aviation Order 100.66 Instrument 2007</p> <p>Current regulations for aircraft maintenance and maintenance personnel. They are not clear, concise or harmonised with international regulatory best practice and they are not always appropriate for the Australian aviation environment.</p>

Name	Section	Paragraph	Comments
			<p>AEA does not support this language.</p> <p>In reviewing Annex 1 to the Convention on International Civil Aviation, which Australia is a signatory to AEA agrees that the current Australian system of licensing contains minor deviations to the international standard?</p> <p>However, the proposed CAO 100.66 far exceeds the international standards of ICAO. CASA’s legal mandate is to harmonize with the international standards of ICAO, not with the various international regulatory bodies.</p> <p>EASA</p> <p>As a matter of safety policy, CASA proposes to adopt the regulatory approach to maintenance promulgated by the European Aviation Safety Agency (EASA). This includes the use of EASA licence equivalents in the form of categories of aircraft maintenance authorities, namely categories A, B1 and B2, and aircraft ratings, awarded on the basis of compliance with detailed knowledge and competency training and assessment. It also involves recognition of specifically approved maintenance training organisations operating under detailed, self-prepared, expositions setting out their training objectives, resources and capabilities.</p> <p>AEA does not support this language.</p> <p>CASA Response</p> <p><i>This comment is not understood. The EASA licensing system has been specifically designed to be ICAO Annex 1 compliant, as will be the Australian EASA-like system when implemented. The initial use of an airworthiness authority rather than a licence does not render this system non-compliant with ICAO.</i></p> <p>This is inappropriate use of regulatory power. “As a matter of safety policy” CASA proposes a wholesale change of the proven Aircraft Maintenance Engineer licensing system in favour of an unproven licensing structure. This proposal will have negative impact on aviation technician recruiting; the additional administrative cost to be paid for by the Australian small businesses will be devastating; and, there have been no assurances that this proposed system of licensing is any closer to the international standards of ICAO Annex 1 than the current system is.</p>

Name	Section	Paragraph	Comments
			<p>CASA Response</p> <p><i>This comment is not agreed with. It can not be considered that the EASA licensing system is unproven in relation to those sectors of the industry where it has been successfully adopted. The remainder of the comments made in this paragraph are unsubstantiated and in fact it is anticipated that final adoption of a world recognised system rather than Australia’s present unique system will lead to increased participation rates in the industry.</i></p> <p>Civil Aviation Act 1988, Section 11 Functions to be performed in accordance with international agreements specifically states that: “CASA shall perform its functions in a manner consistent with the obligations of Australia under the Chicago Convention and any other agreement between Australia and any other country or countries relating to the safety of air navigation.”</p> <p>This is a major regulatory change without quantifiable data to support the financial burden to the aviation industry. There also has not been any effort to document the deficiencies which may exist between the current Australian regulatory structure and that of ICAO.</p> <p>CASA Response</p> <p><i>As this program has involved a joint CASA and Industry team there has been substantial discussion on financial burden of change as against the benefits of this change. As the benefits of the CAO are available to industry on a voluntary basis it will be up to industry to make cost/value judgements relevant to their specific business.</i></p> <p>New CASR Parts and new CAO</p> <p>This new regulatory framework for licensing will fall within proposed Part 66 of CASR 1998, and the framework for maintenance training organisations will fall within proposed Part 147 of CASR 1998.</p> <p>These regulatory proposals are in various states of preparation, some under development and many already at the legislative drafting stage. However, because of the time frames involved in finalising all elements of the package, CASA has decided to make a CAO that would immediately implement proposed changes in 2 areas, namely maintenance personnel licensing and maintenance training organisations. This would make new rules in</p>

Name	Section	Paragraph	Comments
			<p>these specific areas available for the aviation industry to take up voluntarily, if they so desired, by way of preparation for the forthcoming changes or to gain the benefits of the new system as soon as possible.</p> <p>AEA does not support this language.</p> <p>CASA Response</p> <p><i>The language used is an accurate statement of fact.</i></p> <p>There is no regulatory basis for this Civil Aviation Order. The Civil Aviation Order is an extension a specific Civil Aviation Regulation. Issuing a CAO prior to having a regulatory basis for that Order is not in keeping with the intent of the Civil Aviation Regulations.</p> <p>CASA Response</p> <p><i>This comment is inaccurate. The CAO will be issued under a power provided by the Civil Aviation Regulations (1988), specifically Regulation 33B. Legal advice shows that the CAO is an entirely appropriate use of this regulatory power.</i></p> <p>Civil Aviation Regulations 1988 PART 2 ADMINISTRATION AND ORGANISATION 5 Civil Aviation Orders</p> <p>(1) Wherever CASA is empowered or required under these Regulations to issue any direction, instruction or notification or to give any permission, approval or authority, CASA may, unless the contrary intention appears in the regulation conferring the power or function or imposing the obligation or duty, issue the direction or notification or give the permission, approval or authority in Civil Aviation Orders or otherwise in writing.</p> <p>(2) Expressions used in Civil Aviation Orders shall, unless the contrary intention appears, have the same meanings as in these Regulations.</p> <p>(3) If a direction, instruction or notification relating to a person is issued in Civil Aviation Orders, the direction, instruction or notification, as the case may be, is taken to have been served on the person on the date on which the making of the Order is notified in the Gazette.</p>

Name	Section	Paragraph	Comments
			<p>All categories For all MA holders, there is a recency requirement. To exercise the relevant privileges of their authority, they must, in the previous 2 years, have had at least 6 months' experience in inspecting or maintaining aircraft structures, powerplant, mechanical, electrical or avionic systems, or, during that 2 year period, have first become qualified for the issue of the authority.</p> <p>AEA does not support this language.</p> <p>This rule increases the current standards and limits currency to “experience in inspecting or maintaining aircraft structures, powerplant, mechanical, electrical or avionic systems.” A senior technician with supervisory responsibility, the accountable manager, or director of maintenance may not actually “inspect or maintain” an aircraft but is still fully qualified to keep their respective license.</p> <p>CASA Response</p> <p><i>This comment is difficult to interpret however; it is assumed that it relates to the differences in recency between the existing CAO100.90 and the draft CAO100.66. As such this comment is valid and CAO100.66 will be amended to provide a common result.</i></p> <p>Civil Aviation Order 100.66 Instrument 2007 Schedule 1 Civil Aviation Order 100.66 Maintenance authorities — EASA equivalents 1 Scope and application 1.1 This Order is intended to provide an equivalent of the EASA categories of aircraft maintenance licence A, B1 and B2 as a transitional arrangement pending introduction of these categories of licence into the Civil Aviation Safety Regulations 1998.</p> <p>AEA does not support this language.</p> <p>The stated purpose of this Order is “to provide an equivalent of the EASA categories.” As stated earlier, CASA’s legal obligation is to provide a regulatory structure that is compliant with ICAO, not an unproven regulatory structure such as EASA Part 147.</p>

Name	Section	Paragraph	Comments
			<p>CASA Response</p> <p><i>This respondent's comment previously answered.</i></p> <p>10 Privileges of holder of an authority</p> <p>10.5 The holder of an authority may issue a certificate of release to service only:</p> <p>(a) subject to subsection 11, in accordance with the requirements of regulation 42ZE of CAR 1988 that apply to the holder; and</p> <p>(b) for an aircraft/engine combination or an engine referred to in the definition of rating — if the holder's authority is endorsed with a rating for the aircraft/engine combination or engine; and</p> <p>(c) if, in the previous 2 years, the holder has:</p> <p>(i) had at least 6 months' experience in inspecting or maintaining aircraft structures, or powerplant, or mechanical, electrical or avionic systems; or</p> <p>(ii) qualified for the issue of the authority; and</p> <p>(d) if the holder is not suffering from a disability that is likely to affect the exercise of the privileges of the authority.</p> <p>AEA does not support this language.</p> <p>Based on the proposed language, CASA personnel are no longer qualified to hold a current AME license since they are not actually inspecting or maintaining aircraft as required in 10.5 (c).</p> <p>CASA Response</p> <p><i>This respondent's comment previously answered.</i></p> <p>14 Recognition of foreign qualifications for a category or subcategory</p>

Name	Section	Paragraph	Comments
			<p>AEA concurs with this language.</p> <p>The Association commends CASA for making reference to the legal obligations of Australia to the international standards of ICAO rather than the broad acceptance of the unproven regulatory system of EASA.</p> <p>15 Requirements for a rating</p> <p>15.1 This subsection sets out the requirements for the endorsement of a rating on a subcategory B1.1, B1.2, B1.3, B1.4 authority or on a B2 authority.</p> <p>AEA does not support this language.</p> <p>ICAO recognizes “task ratings” which are similar to the current CAR 30 ratings for avionics and instruments. The change from task ratings to aircraft type rating prohibits a fully qualified avionics facility from performing maintenance and repairs to transient and new aircraft.</p> <p>CASA Response</p> <p><i>This comment is incorrect. CAR30 which provides for organisational approvals is not relevant to this CAO100.66 in relation to type ratings.</i></p> <p>This broad brush approach is not in the best interest of the travelling public of the Commonwealth, or the small businesses that provide safe and affordable transportation.</p>
<p>RESPONDENT 22</p>			<p>I have only done a brief review of the CAO, and the following comments are provided with a view to making the CAO more understandable to industry people:</p> <p>The CAO could do to have some notes explaining what is meant by various subsections.</p> <p>Sub-section 10.2(b)(i): I think this should read " a maintenance organisation that has been appointed as an Authorised Person for the purposes of 42ZC(7) of CAR 1998..." since that is the regulation that will allow the maintenance organisation to authorise (the person being assessed) to carry out maintenance tasks under 42ZC(3)(d). (Or else provide a note explaining what is meant!)</p>

Name	Section	Paragraph	Comments
			<p>Sub-section 10.5 is somewhat misleading as it implies that CAR 42ZE is applicable to all holders of an authority. 42ZE is aimed at employers or the self-employed who carry out maintenance. It is their responsibility to ensure that they (or their employees) certify per an approved System of Certification. The majority of authority holders will be employees, so compliance with 42ZE is not their responsibility.</p> <p>42ZE stands in its own right to anyone "carrying out" maintenance, including self-employed authority holders. What I think should be in CAO 100.66 is simply a statement to the effect that for the purposes of the CASA System of Certification in Schedule 6 - the holder of an authority who supervises work performed by another person is the one who shall certify.</p> <p>The current text of the CAO has made getting around the Schedule 6 "person who performed the maintenance" very complicated - when in fact it should be a relatively simple matter to formalise that the supervisor certifies for the work he/she has supervised.</p> <p>CASA Response</p> <p><i>The CAO has been amended to allow it to operate with in the requirements of the existing regulations such as 42ZE.</i></p> <p>Subsection 11.2: What if the holder IS the Certificate of Approval holder, rather than an employee of same?</p> <p>CASA Response</p> <p><i>This is also the current situation under the regulations. If this circumstance pertains CASA treats both the licence holder and the certificate of approval holder as individuals.</i></p> <p>Subsection 11.3: CAR 42ZE does not apply to employees. See previous comment.</p> <p>CASA Response</p> <p><i>Agree, the CAO has been amended.</i></p> <p>Subsection 11.4: See previous comment regarding Schedule 6.</p>

Name	Section	Paragraph	Comments
RESPONDENT 23			<p>George Bernard Shaw once stated “we learn from experience that men never learn anything from experience”. This latest proposal demonstrates that CASA has learnt nothing from past experience in proposing regulatory change nor the long term effects, consequences and outcomes. Once again it is being proposed to introduce a unique Australian regulatory standard that will not support Australia’s international acceptance & recognition instead of a harmonised system.</p> <p>After 14 years of being promised regulatory change that will benefit the aviation MRO industry and enable MRO businesses and personnel to once again be recognised and compete in the global aviation market, CASA now propose to introduce a non ICAO aircraft maintenance engineer (AME) licensing system. Instead of moving towards a harmonised AME licensing system, CASA is proposing to further isolate the Australian aviation MRO personnel qualifications (maintenance authority not an AME licence) that do not align with ICAO or any other recognised aviation system?</p> <p>Q1. How many more times will the Authority introduce non-harmonised regulatory systems as an interim that remain for decades and confuses other NAAs?</p> <p>If this is really an adoption of the EASA AME licensing system then the proposal should, and must, be a step towards international recognition of the AME licensing system used in Australia NOT a step further away from international recognition.</p> <p>CASA Response</p> <p><i>The introduction of the proposed CASR Part 66 and the remainder of the maintenance regulations suite will provide Australia with a fully harmonised AME Licensing system. CASA has previously stated that CAO100.66 will allow early introduction of an EASA-like system, however, there is no intention to progress international mutual recognition until the maintenance suite of regulations commences.</i></p> <p>Q2. Why then is this AME licensing proposal being done under the uniquely Australian system to issue a non ICAO compatible document (CAR 33B – Maintenance Authority) instead of an ICAO compatible document in the form of a CAR31 AME licence category and ratings.</p> <p>There is no rationale in the Explanatory Statement why CAR 31, Aircraft Maintenance</p>

Name	Section	Paragraph	Comments
			<p>Engineer Licences, was not used to implement this proposal or why CASA opted for utilising the non ICAO recognised CAR 33B, Maintenance Authority, process that had been ear marked for deletion from the regulatory framework for over a decade.</p> <p>CASA Response</p> <p><i>This comment is not factually correct. The early implementation of an EASA-like licensing system via the CAO will be ICAO compliant. For information, ICAO uses interchangeably the word 'licence' and the phrase 'certificate of competency'. As such both a CAR 31 licence and an airworthiness authority granted under the CAO 100.66 are ICAO compliant. The key is that both will be issued or rendered valid based on being equal to or above minimum standards established by ICAO.</i></p> <p>This proposal could have and should have been proposed under CAR 31 as an aircraft maintenance engineers licence based on the EASA AME licence categories and ratings. The EASA AME licence category & ratings can fit under this legislation.</p> <p>AMROBA is not against adopting the EASA AME licence category or ratings. It is just variation of the Canadian AME licensing system that was changed a few years ago to align with the USA A&P and avionic specialist especially the FAA proposal a few years ago for a “transport” A&P category & ratings.</p> <p>CASA Response</p> <p><i>Consideration was given to the use of both CAR31 and CAR33 to initiate early implementation. However, legal advice indicated that constraints within CAR31 may have made its use problematic where as the use of CAR33 is entirely appropriate. Therefore this comment is not agreed.</i></p> <p>Q3. Is CASA contributing to an industrial situation within Australia or is it implementing an interim system that will lead to empowering organisations and no AME licensing by CASA? i.e. Company licensing.</p> <p>CASA Response</p>

Name	Section	Paragraph	Comments
			<p><i>No. The projected licensing system that the proposed CASR Part 66 will introduce continues a CASA issued licensing regime.</i></p> <p>EASA</p> <p>The EASA AME category and rating licensing system meets ICAO Annex 1, Chapter 4 standards and practices. Their Category “A” AME licence is no more than an Australian multi category, limited AME licence that can be packaged and issued under CAR 31. The same applies to the EASA B & C categories. Whether it is the EASA ICAO compliant AME licensing system, the Canadian ICAO compliant AME or American A&P mechanic & avionic specialist licensing system, they are all still a proper ICAO compliant and internationally recognised maintenance personnel licensing system.</p> <p>There is no reason why the EASA AME licensing system cannot be implemented under CAR 31 as an Australian AME licensing system – it simply mean that their would be an AME licensing packages, repackaged to implement what is proposed in this proposed CAO, that replace or operates in parallel with the current system.</p> <p>CASA Response</p> <p><i>Refer previous comments in relation to CAR31.</i></p> <p>If a proper study and research had been carried out of the Australian AME licensing system one would find that licence “extensions” had/has been used in the past for current licences to give similar coverage as what is now proposed.</p> <p>Summary</p> <p>As previously stated, AMROBA is not opposed to the introduction of the proposed changes but we are against the use of “maintenance authorities” as an interim way of introducing such changes. Past “interim” changes still haunt this industry. Once such a system is introduced it will take a decade or more to get rid of it and the international damage that would have been done in that period would harm the capability and creditability of the Australian MRO industry to compete in the global aviation market.</p> <p>CASA Response</p> <p><i>It is envisaged that CASR Part 66 will be drafted by later in 2007. Once the CASR Part 66</i></p>

Name	Section	Paragraph	Comments
			<p><i>consultation and drafting process is finished and the regulation commences, CAO100.66 will be repealed. Those that have elected to utilise it, given the voluntary nature of the CAO, will be automatically transferred to the equivalent CASR Part 66 licence outcome when this occurs.</i></p> <p>CASA MUST START TO THINK GLOBAL WHEN PROPOSING CHANGES.</p> <p>CASA has been through the confusion a decade ago trying to explain what Maintenance Authorities are used for in Australia and came to the conclusion that the MA had to be removed from the Australian system if international recognition was to be achieved.</p>
<p>RESPONDENT 24</p>			<p>Please clarify latest dates for comment on your website.</p> <p>One paragraph states 8th January 2007</p> <p>Immediately followed by a further paragraph asking for comments by 8th December 2007. We assume the latter to be a typographical error!</p> <p><i>CASA Response:</i></p> <p><i>Correction made.</i></p> <p>Furthermore - this would appear to be the most inconvenient time of year for businesses to be requested to give full attention to the study and comment on these documents.</p> <p>Do we infer from this that it is CASA's intention to push this legislation through by "stealth" without giving fair time for the due process of comment from the affected parties? The time-frame seems a little unrealistic under the circumstances!</p>

Name	Section	Paragraph	Comments
RESPONDENT 25			<p>My background with aviation is 38 years of maintenance, military and civilian, hands-on for most of it. I started as an Aircraft Electrician and migrated to a full Avionics Technician 32 years ago. I have also had several years in trade training and managerial positions. I have worked under several regulatory systems.</p> <p>My comments are based on observations with current Australian GA, Charter and Flying School type operations maintainers, particularly the avionics trade in mind.</p> <p>My main concerns revolve around the migration of avionics work to the mechanical trades. In particular, electrical systems and some instrument systems have been devolved and will now be the responsibility of essentially partially trained personnel.</p> <p>The other issue with this migration is the work loss in several traditional avionics trade areas. Examples being Air Conditioning (don't see any reference to combustion heaters which are prevalent in smaller aircraft), Ice and Rain Protection, Vacuum systems etc – the full list is below. Each of these systems are primarily electrical and instrumentation with a mechanical interface.</p> <p>This new CAO wipes years of expertise and experience out of the market and does not provide for the transition. My observation of the mechanical trades in general aviation with the current level of training, equipment and experience does not instil great confidence in them to deliver a safe outcome to all electrical and instrument defects.</p> <p>CASA Response</p> <p><i>There will be mandatory knowledge training and assessment required to gain the additional scope of authority for both a basic category of authority and type ratings.</i></p> <p><i>Application under the CAO is voluntary. An application must meet the full requirements for a specific category of authority but all existing licence privileges will be accepted towards the authority. Current CAR31 licences can exist in parallel with the CAO.</i></p> <p><i>Transition of all remaining licence holders will not occur until the proposed CASR Part 66 regulation commences. For example if you held a CAR31 Airframe and Engine licence you would be granted a CASR Part 66 B1 licence limited to existing Airframe and Engine scope.</i></p>

Name	Section	Paragraph	Comments
			<p>A number of operations are already expecting their mechanical engineers to be able to do more in-house avionics work instead of using specialists with the expectation that the transition to the new authorisations will take no more than an exam and a declaration of work experience at the most – some even hoping (expecting) that the exam will not be necessary to ease the transition. Should this occur, it can only result in the loss of avionics engineers from the industry as profitability drops - and this when the trade is already at dangerously low manning levels.</p> <p>I would like the following to be considered:</p> <p>License Validity – would like to see that extended to 10 years.</p> <p>CASA Response</p> <p><i>It is unlikely that authorities granted under the CAO will prevail longer than 2 years before being replaced by an equivalent licence under the proposed CASR Part 66.</i></p> <p>B1 licenses, Appendix 2</p> <p>The following categories under Appendix 2 should be given some limitations because these systems are electromechanical and are not exclusively mechanical.</p> <p>ATA chapters</p> <p>21 - Air Conditioning and pressurisation. Exclude electronic controls and instrumentation. 24 - Electrical power. Limit to LRU's. There are three phase high voltage systems or sophisticated starter/generator systems on most modern turboprop and larger aircraft which require in-depth knowledge to test and fault find. 26 - Fire protection excludes detection, warning and other electrical systems. 27 - Flight control. Exclude electronic controls and indication. 28 - Fuel (control and indication). 29 - Hydraulic power (control and indication). 30 - Ice and rain protection. Limit to mechanical aspects only. The mechanical trades cannot touch the pitot or static systems anyway. Prop de-ice systems are generally purely electrical as are a number of engine intake and leading edge anti-ice or de-ice systems. The hot air systems and chemical based systems are invariably electronically controlled through timing systems.</p>

Name	Section	Paragraph	Comments
			<p>32 - Landing gear. Exclude electrical control and indication. 33 - Lights. Simple component changes only. 35 - Oxygen systems – exclude instrumentation 36 - Pneumatics – exclude electronic controls. 37 - Vacuum systems – pumps and mechanical devices only. A large proportion of vacuum systems are for gyro instrumentation. 38 - Water and waste – exclude electrical systems. 45 - Central Maintenance system. Line replacement only. 49 - APU – exclude electronic controls and instrumentation systems. 60 - Props – exclude computerised controls and electronic synchro phasing/synchronizing. 73 - Engine Fuel and Control – limit to non computerised and simple electrical systems 74 - Ignition – limit to engine interfacing. The overhaul and maintenance of High Energy Ignition Units, magnetos and other spark producing equipment is the providence of electrical trades. 76 - Engine controls – limit to non-computerised and non-servo driven systems 77 - Engine indicating – limit to engine interface unit installation. 78 - Exhaust – mechanical systems – exclude indicating and interfaces with engine control systems. 79 - Oil – mechanical aspects only 80 - Engine Starting.</p> <p>CASA Response</p> <p><i>The new training regime (basic knowledge and type training) provides for electrical and avionics coverage for the B1 holder appropriate to the privileges of the authority.</i></p> <p>Add the following categories in Appendix 3 and adjust the training requirements appendices.</p> <p>21 - Air conditioning and pressurisation (heaters, air conditioners and pressurisation systems all have a significant electrical and instrument component) 28 - Fuel control and indicating (control systems for pumps, valves and instrumentation are electrically based) 29 - Hydraulic power (as for fuel) 30 - Ice and rain protection (most are purely electrical control and indication systems. Refer my comments for Appendix 2 ATA chapter 30) 32 - Landing gear (again, most systems have electrical control and indication systems.)</p>

Name	Section	Paragraph	Comments
			<p>35 - Oxygen systems (indication) 36 - Pneumatic systems (electrical control and indication) 37 - Vacuum systems (Most vacuum systems are hooked to instrument gyro systems and there are elements here that should be covered by the avionics trade.) 49 - APU (electrical controls, starting and indication) 52 - Doors (electrical indication systems) 60 - Prop (electrical control – synchronisation/synchro phasing are almost entirely electrical/electronic/computerised. De-icing/anti-icing systems are generally electronically controlled electrical elements and the only mechanical aspects is the attachment of the element to the blade. Pitch control in smaller aircraft has very little avionics content but the newer more sophisticated twins have an electronic content that is traditionally avionics.) 73 - Engine fuel and control – Does EEC stands for electronic engine control (not defined in the CAO)? If so does this cover all non-mechanical control systems. If not, then what. 79 - Oil (instrument systems)</p> <p>CASA Response</p> <p><i>Disagree, the Appendix is derived from the privileges of the authority and it's supporting training.</i></p> <p>Training and Experience Appendices:</p> <p>There are omissions and inconsistencies throughout. I realise that there is still a lot of work to be done but unless this facet is addressed, the next generation of apprentices and engineers upgrading licenses will have face a very confusing future. The following are examples.</p> <p>MEA211B Replace the word “advanced” with “basic”. The implication that a B2 engineer cannot inspect, test or troubleshoot an advanced electrical system is an insult to the avionics world as there is no equivalent in the avionics listings nor is there any clue as to what defines an advanced system.</p> <p>MEA219B add non-electrical.</p> <p>MEA209B as above.</p> <p>MEA203B “the installation of an advanced electrical system”. As for MEA211B and my</p>

Name	Section	Paragraph	Comments
			<p>general comments.</p> <p>MEA246 Electrical component fabrication or repair is NOT a mechanical engineers function nor is training mandated to the levels required.</p> <p>MEA310 Add avionics content to vacuum systems.etc, etc, etc</p> <p>Installation définition.</p> <p>Throughout the CAO there is constant reference to the installation of components. The term installation is not defined. There are two main possibilities relevant to aircraft maintenance. The first being the “replacement” of a component with an identical or in-lieu item and I am assuming that this is the definition being applied. The second is the installation of a completely new (additional) system to an aircraft, i.e. a “new autopilot system is installed in accordance with.....” If this second definition is interchangeable with the first definition I can see nothing but disaster as a result.</p> <p>CASA Response</p> <p><i>CASA disagrees, all installations must be carried out in accordance with maintenance data.</i></p> <p>General comments.</p> <p>Firstly – thank you very much for the Christmas present. I had planned for a decent break, instead CASA goes on holiday and dumps a significant ill thought out draft CAO on us for comment that will be closed before most get back to work.</p> <p>When this draft is combined with the limited consultation with the industry earlier in 2006, the inference is that this whole process has an agenda that has nothing to do with aircraft safety. Where the push comes from is unclear but the only winners from it will be the major operators who can restructure their maintenance with less licensed staff and the political hierarchy who can claim some action just before elections.</p> <p>The whole 100.66 has been written with only one client in mind – large aircraft organisations with all the controls and checks in place to take advantage of this CAO.</p>

Name	Section	Paragraph	Comments
			<p>Maintenance organisations for smaller organisations, older aircraft operators, GA aircraft operators and private owners will struggle. I did note that the concern regarding GA maintenance in previous discussion papers has effectively been sidelined with this draft.</p> <p>Secondly, if this CAO is meant to be easily read, perhaps you should start again. I do appreciate the minimisation of legalese but there are too many cross-references (not allowed in modern expositions), too many abbreviations (also not allowed) and not enough detail in the appendices. Take a look at the NZ regulations for guidance.</p> <p>I sincerely hope that this draft does not go any further in its present form.</p>

Annex B

Civil Aviation Order (CAO) 100.66 – Maintenance Authorities – EASA Equivalents

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Australian Government
Civil Aviation Safety Authority

Civil Aviation Order 100.66

made under regulation 33B and subregulations 42ZC (6) and 308 (1) of the *Civil Aviation Regulations 1988*.

This document was prepared on 21 February 2007 following the making of *Civil Aviation Order 100.66 Instrument 2007*.

Prepared by the Legislative Drafting Branch, Legal Services Group, Civil Aviation Safety Authority, Canberra.

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1 Scope and application

- 1.1 This Order is intended to provide an equivalent of the EASA categories of aircraft maintenance licence A, B1 and B2 as a transitional arrangement pending introduction of these categories of licence into the *Civil Aviation Safety Regulations 1998*.
- 1.2 Civil Aviation Orders 100.23 and 100.24 do not apply to a person who makes an application under this Order.
- 1.3 Paragraph 1.2 only applies in respect of an application made under this Order.

2 Definitions

- 2.1 In this Order:

AAC means an Airworthiness Advisory Circular.

accountable manager means the person appointed under clause 7 of Appendix 5.

aircraft/engine combination means a particular type of engine in a particular type of aircraft.

airworthiness management requirement means a requirement that when met demonstrates that a person has a knowledge and understanding of the fundamental documentation and administrative processes for the preservation and enhancement of airworthiness.

AQTF means the Australian Quality Training Framework.

Aeroskills Training Package means the package of that name set out by CASA in an AAC Information Bulletin for this Order.

assessment has the meaning given by paragraph 2.2.

assessor is a practical/competency assessor and has the meaning given by paragraph 2.3.

ATA means the Air Transport Association.

authority means an authority to carry out maintenance on aircraft issued under paragraph 33B (1) (a) of CAR 1988.

avionic system means an instrument or radio system.

being immediately available means being able, without delay, to:

- (a) react with advice to the maintenance being carried out; or
- (b) respond to a question from the person carrying it out.

CAO means Civil Aviation Order.

CAR 1988 means the *Civil Aviation Regulations 1988*.

CAR 30 organisation means a person who holds a certificate of approval under regulation 30 of CAR 1988 covering aircraft maintenance within the privileges of an authority.

CASR 1998 means *Civil Aviation Safety Regulations 1998*.

certificate of release to service has the same meaning as certification of completion of maintenance issued under regulation 42ZE or 42ZN of CAR 1988.

complex aircraft means an aircraft that CASA considers is a complex aircraft and lists in an AAC after taking into account aviation complexity factors including certificated maximum passenger seating capacity, multi-crew requirements, design philosophy and technology.

course plan means the detailed course teaching and assessment plan, including durations, for each training course to be delivered by a recognised organisation.

EASA means the European Aviation Safety Agency.

employee includes a person who performs duties under a contract for services.

Note An employee is employed under a contract of service. An independent contractor is retained under a contract for services.

examination means:

- (a) a process with all of the following elements:
 - (i) a formal assessment of a student under the supervision of an examiner, occurring after teaching in the student's course has been completed;
 - (ii) a set of questions or exercises to determine what the student knows or has learned from the course;
 - (iii) assessment:
 - (A) of written answers to essay questions; or
 - (B) of answers to questions with multi-choice answers of which only 1 answer can be correct; or
 - (C) of oral answers to written or oral questions; or
 - (D) using 1 or more of these methods;
 - (iv) a fixed duration under examination conditions; or
- (b) use of RPL where this is an appropriate method of determining what a student knows or has learned.

examiner, or knowledge examiner, means an employee of a recognised organisation who is appointed by the recognised organisation to do 1 or more of the following for the recognised organisation:

- (a) prepare examination questions;
- (b) conduct examinations;
- (c) mark examination answers;
- (d) approve examination results.

exposition means the document mentioned in clause 14 of Appendix 5.

FAR means Federal Aviation Regulations of the United States of America.

hold a unit of competency means to hold such a unit in accordance with the Aeroskills Training Package, including by RPL.

Note The AQTF Aeroskills Training Package (the **Package**) may require prerequisites to be held before a unit of competency may be held in accordance with the Package.

in service for the definition of line maintenance means that the aircraft is in service and not in base maintenance.

instructor, or training instructor, means an employee of a recognised organisation who gives some, or all, of the maintenance training a person requires to achieve the knowledge, obtain the competency or complete the training mentioned in Appendix 4, 6 or 7.

key personnel means each person nominated under paragraph 7.2 of Appendix 5.

large aircraft means:

- (a) an aeroplane that:
 - (i) has a maximum take-off weight of more than 5 700 kg; or
 - (ii) has been type-certified under:
 - (A) SFAR 41 and FAR 23; or
 - (B) FAR 23 (commuter) class; or
 - (C) an equivalent type-certification basis; or
- (b) a helicopter that:
 - (i) has a maximum take-off weight of more than 3 175 kg; or
 - (ii) is multi-engined.

line maintenance means minor or scheduled maintenance carried out on an aircraft:

- (a) that is in service; and
- (b) that is:
 - (i) preparing for its first flight in service after a period of being out of service; or
 - (ii) en route and stopped before its next flight; or
 - (iii) preparing for any other flight during a period of service; and
- (c) to ensure that the aircraft is fit for the flight.

maintenance training means a structured course of training:

- (a) in the maintenance of aircraft or aeronautical products; and
- (b) conducted in accordance with this Order; and
- (c) which a person requires to become qualified under this Order.

prerequisite, for a unit of competency, means each prerequisite unit of competency, or other qualifications, required under the Aeroskills Training Package before a unit of competency may be held in accordance with the Package.

quality management system, for a recognised organisation, means a management system that:

- (a) deals with policies, resources and procedures to achieve the required training standards for the organisation; and

(b) is mentioned in the exposition.

rating means an endorsement on an authority that permits its holder to carry out maintenance on an aircraft/engine combination that is, or on an engine fitted to:

- (a) a large aircraft; or
- (b) a complex aircraft; or
- (c) another aircraft that CASA considers to be a rating required aircraft and lists in an AAC for this subparagraph.

Note 1 For guidance only, see AAC 9-66 which lists large and complex aircraft.

Note 2 Under subparagraph (c), CASA may consider an aircraft/engine combination or an engine to be a rating required aircraft if CASA considers that type training for such a rating would enhance safety. CASA may consider issues such as complexity, new technology, ATSB recommendations or other safety issues.

recognised organisation means a maintenance training organisation approved by CASA and operating in accordance with Appendix 5.

RPL means recognition of prior learning.

Note Under provisions of this Order, passing examinations, holding units of competency and holding prerequisite qualifications or prerequisite units of competency, may be by means of RPL.

SFAR means Special Federal Aviation Regulations of the United States of America.

student means a person who enrolls with a recognised organisation for a course to qualify for an authority or a rating.

supervision, for maintenance, means:

- (a) being physically present and observing the maintenance being carried out to the extent necessary to ensure that it is being carried out properly; and
- (b) being immediately available to give advice, or answer questions, about the maintenance.

Note **being immediately available** is defined above.

type rating has the same meaning as rating.

undertaking means the undertaking mentioned in paragraph 2.2 (c) of Appendix 5.

unit of competency means an Aeroskills Training Package unit of competency.

- 2.2 For this Order, an assessment of whether a person can properly perform a maintenance task is done by collecting, checking and evaluating evidence of the person's ability to perform the task to a predetermined standard, including by means of RPL, knowledge examinations, practical tests and consideration of experience acquired or competency demonstrated.

- 2.3 For this Order, a *practical/competency assessor* is an employee of a recognised organisation who:
- (a) has the following competencies from the Training Package for Assessment and Workplace Training of the Commonwealth Department of Education, Science and Training or demonstrated equivalent competencies:
 - (i) TAAASS401A plan and organise assessment;
 - (ii) TAAASS402A assess competence;
 - (iii) TAAASS404A participate in assessment validation; and
 - (b) has relevant vocational competencies, or equivalent competencies, at least to the level that is being assessed; and
 - (c) is appointed by a recognised organisation to conduct assessments.
- 2.4 For paragraph 2.3, two or more people when assessing together constitute an assessor if:
- (a) 1 person has the competencies mentioned in subparagraph 2.3 (a); and
 - (b) 1 or more other persons have the competencies mentioned in subparagraph 2.3 (b).

3 Authority categories

- 3.1 An authority may be issued for 1 or more of the following categories or 1 or more of the subcategories that comprise the category:
- (a) category A, comprising subcategory A1, A2, A3 and A4;
 - (b) category B1, comprising subcategory B1.1, B1.2, B1.3 and B1.4;
 - (c) category B2.
- 3.2 An authority for 1 of the following subcategories is limited to the aircraft specified for the subcategory:
- (a) A1 and B1.1 — turbine engined aeroplanes;
 - (b) A2 and B1.2 — piston engined aeroplanes;
 - (c) A3 and B1.3 — turbine engined helicopters;
 - (d) A4 and B1.4 — piston engined helicopters.

4 Application for an authority or rating

An application for an authority or a rating must:

- (a) be in writing; and
- (b) set out details of the applicant's training, attainments, qualifications and experience to the extent relevant to the authority or rating and required by this Order; and

- (c) be accompanied by a copy of any document that shows that the applicant has completed the training, holds the qualifications and has the experience mentioned in paragraph (b).

5 Eligibility for an authority or rating

An applicant for an authority must:

- (a) be at least 21; and
- (b) be able to read, write and communicate in English to a level which enables him or her to carry out safely the duties required to be carried out by the holder of the authority; and
- (c) if the applicant has not previously met an airworthiness management requirement considered by CASA as required for eligibility and listed in an AAC — meet such a requirement; and

Note Airworthiness management requirements are basic aviation knowledge requirements, for example, successful completion of the Airworthiness Administration examination.

- (d) not suffer from a disability that is likely to affect the exercise of the privileges of the authority; and
- (e) meet the requirements of subsection 13 or 15 of this Order that are relevant for the authority or rating.

6 Continued validity of an authority

Subject to subsection 7, an authority:

- (a) ceases to be valid 5 years after its last issue, amendment or endorsement by CASA; and
- (b) is not in effect while it is invalid under subsection 7.

7 Validity, invalidity and re-validation of an authority

- 7.1 An authority becomes invalid unless on, or within 1 month before, each fifth anniversary of the day on which the authority was last issued, amended or endorsed, its holder verifies the information about the authority in CASA's records.

Note Verification may be done in the way indicated by CASA in an AAC.

- 7.2 If a person's authority has become invalid under paragraph 7.1, the person is taken not to be the holder of the authority during the period that it is invalid.
- 7.3 To revalidate an authority that has become invalid under paragraph 7.1, the holder must respond to CASA about the authority, in the way indicated by CASA, to verify the information in CASA's records.
- 7.4 A revalidated authority is in effect only from the date of its revalidation by CASA.

8 Surrender, suspension or revocation of an authority

- 8.1 An authority stops having effect if it is suspended or revoked by CASA.
- 8.2 If the authority is revoked, the holder must return the authority to CASA within 14 days.

8.3 CASA may revoke or suspend an authority:

- (a) if CASA is satisfied that revocation or suspension is in the interests of the safety of air navigation; or

Note For example, if CASA considers that the holder is not competent to hold the authority.

- (b) if the holder breaches a condition of his or her authority; or
- (c) at the written request of the holder.

Note A maintenance authority is a civil aviation authorisation under the *Civil Aviation Act 1988* (the *Act*) and, therefore, suspension and revocation are enforceable under the serious and imminent risks to air safety provisions in Division 3A of Part III of the Act which provides for suspension or cancellation of civil aviation authorisations.

9 Condition of an authority

An authority is issued subject to the condition that the holder must:

- (a) comply with the requirements of this Order for holding the authority and exercising its privileges; and
- (b) comply with the requirements of this Order for the endorsement of a rating, if any, on the authority; and
- (c) if he or she is suffering from a disability that is likely to affect the exercise of the privileges of the authority — tell CASA in writing not later than 14 days after first learning of the disability.

10 Privileges of holder of an authority

10.1 Despite subparagraph 10.5 (b), the holder of an authority in subcategory A1, A2, A3 or A4 may issue a certificate of release to service:

- (a) only for:
 - (i) a class A aircraft; or
 - (ii) if a class B aircraft is maintained by a CAR 30 organisation, and the aircraft and the organisation are considered by CASA to be appropriate for category A privileges — that class B aircraft; and

Note These class B aircraft and organisations will be listed together for this subparagraph by CASA in an AAC.

- (b) following completion of maintenance mentioned in Appendix 1 that corresponds to the authority; and
- (c) within the limits of the tasks:
 - (i) for which the holder has been trained; and
 - (ii) that are endorsed on an authorisation given to the holder by CASA, or an authorised person, under subregulation 42ZC (6) or (7) of CAR 1988; and
- (d) for work that the holder has personally performed in an organisation approved under regulation 30 of CAR 1988 for the maintenance of aircraft.

10.2 For sub-subparagraph 10.1 (c) (i), the task training must include:

- (a) theoretical knowledge and practical training appropriate to the task; and

- (b) assessment carried out by:
 - (i) a maintenance organisation that is authorised for subregulation 42ZC (3) (d) or 42ZC (4) (e) of CAR 1988 as the case requires; or
 - (ii) a recognised organisation.
- 10.3 The holder of an authority in subcategory B1.1, B1.2, B1.3 or B1.4 may issue a certificate of release to service after any, or all, of the following:
 - (a) completion of maintenance on aircraft structure, powerplant, and mechanical and electrical systems, including such aircraft structure, powerplant, and mechanical and electrical systems maintenance that falls within the scope of the ATA chapter designators mentioned in Appendix 2 that are relevant to the authority;
 - (b) in spite of subparagraph (a), completion of the replacement of an avionic line replaceable unit whose correct functioning and serviceability have been demonstrated by use of:
 - (i) an operational check; or
 - (ii) built-in test equipment; or
 - (iii) the aircraft's central maintenance system;
 - (c) completion of any work in a subcategory of category A that applies to the holder.
- 10.4 The holder of an authority in category B2 may issue a certificate of release to service following completion of maintenance on avionic or electrical systems, including such avionic or electrical systems maintenance that falls within the scope of the ATA chapter designators mentioned in Appendix 3.
- 10.5 The holder of an authority may issue a certificate of release to service only:
 - (a) subject to subsection 11, in accordance with whichever of the following applies to the holder:
 - (i) the requirements of regulation 42ZE of CAR 1988;
 - (ii) the requirements of the CASA system, or another CASA approved system, of certification of completion of maintenance mentioned in subregulation 42ZE (1) of CAR 1988; and
 - (b) for an aircraft/engine combination or an engine to which a rating applies — if the holder's authority is endorsed with a rating for the aircraft/engine combination or engine; and
 - (c) if, in the previous 2 years, the holder has:
 - (i) had at least 6 months' experience in inspecting or maintaining aircraft structures, or powerplant, or mechanical, electrical or avionic systems; or
 - (ii) qualified for the issue of the authority; or
 - (iii) been engaged in work that CASA considers is comparable with the duties and privileges of the authority and lists in an AAC for this subparagraph; and

Note For guidance only, see AAC 9-66 which lists duties and privileges comparable with an authority.

- (d) if the holder is not suffering from a disability that is likely to affect the exercise of the privileges of the authority.

11 Privilege of supervising a person performing maintenance

- 11.1 The holder of an authority in category B1 or B2 (the *holder*) may, in accordance with this subsection, supervise a person (the *person under supervision*) who physically does any maintenance for which the holder may issue a certificate of release to service.

Note Under paragraph 2.1 of this Order, a certificate of release to service has the same meaning as a certification of completion of maintenance issued under regulation 42ZE or 42ZN of CAR 1988.

- 11.2 The holder, and the person under supervision, must be employed by, or working under an arrangement with, the same person who holds a certificate of approval under regulation 30 of CAR 1988 covering aircraft maintenance within the privileges of the authority of the holder.
- 11.3 For this subsection, for an Australian aircraft, a holder who supervises a person in accordance with paragraph 11.1 and 11.2 is, for that person and that aircraft only, exempt from the requirement to comply with paragraph 42ZE (1) (b) of CAR 1988 to the extent mentioned in paragraph 11.4.
- 11.4 The exemption in paragraph 11.3 only operates to the extent that compliance with paragraph 42ZE (1) (b) of CAR 1988 requires compliance with paragraph 1.3 of Schedule 6 of CAR 1988 under which only the person who physically does the maintenance may certify for its completion.

12 Authorisation of a person under supervision

For paragraphs 42ZC (3) (d) and 42ZC (4) (e) of CAR 1988, and subsection 11 of this Order, a person under supervision is authorised to perform maintenance in accordance with subsection 11.

13 Requirements for a category

- 13.1 This subsection applies to a person who applies for:
 - (a) an authority in a category or subcategory; or
 - (b) the addition of a category or subcategory to the person's authority.
- 13.2 CASA must issue the authority or the addition if the person meets the requirements of this subsection.
- 13.3 The person must demonstrate by examination, knowledge:
 - (a) of each subject module that is marked for the category or subcategory in accordance with Part 2 of Appendix 4; and
 - (b) to the level of knowledge for the module and its items as indicated in Part 3 of Appendix 4 for the category or subcategory; and
 - (c) that is sufficient to attain a pass mark of 75%.
- 13.4 For subparagraph 13.3 (b), a level of knowledge required for a module or its parts is set out in Part 1 of Appendix 4.

- 13.5 The knowledge examination mentioned in paragraph 13.3 must be conducted by a recognised organisation.
- 13.6 An applicant for an authority must:
- (a) for a subcategory of category A:
 - (i) have accumulated at least 2 years of practical maintenance experience on operating aircraft relevant to the category or subcategory for which the authority is sought; and
 - (ii) hold each unit of competency listed and coded in Appendix 6 that is marked X for the subcategory; and
 - (iii) before holding a unit of competency mentioned in sub-subparagraph (ii), hold the qualifications or units of competency that are prerequisites for the unit; or
 - (b) for subcategories B1.2 and B1.4:
 - (i) have accumulated at least 3 years of practical maintenance experience on operating aircraft relevant to the category or subcategory for which the authority is sought; and
 - (ii) hold each unit of competency listed and coded in Appendix 6 that is marked X or indicated as its alternative for the subcategory; and
 - (iii) before holding a unit of competency mentioned in sub-subparagraph (ii), hold the qualifications or units of competency that are prerequisites for the unit; or
 - (c) for category B2 and subcategories B1.1 and B1.3:
 - (i) have accumulated at least 4 years of practical maintenance experience on operating aircraft relevant to the category or subcategory for which the authority is sought; and
 - (ii) hold each unit of competency listed and coded in Appendix 6 that is marked X or indicated as its alternative for the category or subcategory; and
 - (iii) before holding a unit of competency mentioned in sub-subparagraph (ii), hold the qualifications or units of competency that are prerequisites for the unit.
- 13.7 In spite of subsection 13.3:
- (a) an applicant for a subcategory B1.1 authority is not required to demonstrate by examination, knowledge of:
 - (i) propellers in accordance with item 17 in Part 2 of Appendix 4 unless the authority is to include propellers; or
 - (ii) high speed flight in a piston aircraft in accordance with subitem 11.1.2 of subject module 11 in Part 3 of Appendix 4; and
 - (b) an applicant for a subcategory B1.1, B1.2, B1.3 or B1.4 authority is not required to demonstrate by examination, knowledge of aircraft materials — composite and non-metallic in accordance with subitem 6.3.1, 6.3.2 or 6.3.3

of subject module 6 in Part 3 of Appendix 4 unless the authority is to include the particular materials mentioned in the subitem.

- 13.8 In addition to the units of competency that are required under this subsection for a subcategory B1.1 authority, an applicant for such an authority that includes propellers must hold each relevant optional unit of competency listed and coded in Appendix 6 that is marked P for the subcategory.
- 13.9 In addition to the units of competency that are required under this subsection for a subcategory B1.1, B1.2, B1.3 or B1.4 authority, an applicant for such an authority that includes repair and modification of aircraft composite material, structures and components must hold each relevant optional unit of competency listed and coded in Appendix 6 that is marked Y for the subcategory.
- 13.10 In addition to the units of competency that are required under this subsection for a subcategory B1.1 or B1.2 authority, an applicant for such an authority that includes wooden structures or fabric surfaces must hold each relevant optional unit of competency listed and coded in Appendix 6 that is marked Z for the subcategory.
- 13.11 For this subsection, a person may be taken to hold the prerequisite qualifications or units of competency required under paragraph 13.6 by means of RPL.
- 13.12 At least 1 year of the practical maintenance experience required by this subsection for an initial authority must be:
- (a) maintenance experience on aircraft relevant to the category or subcategory for which the initial authority is sought; and
 - (b) accumulated immediately before making the application for the authority.
- 13.13 A person who holds an authority, and who applies to add a category or subcategory to it, must be certified by a recognised organisation as satisfying the following requirements for the category or subcategory to be added:
- (a) meet the knowledge and examination requirements mentioned in paragraph 13.3 of this Order;
 - (b) hold the units of competency required by paragraph 13.6 of this Order;
 - (c) meet the practical maintenance experience requirements mentioned in paragraph 13.6 of this Order.
- 13.14 Practical aircraft maintenance experience gained outside a civil aircraft maintenance environment may be taken to be the practical experience required by this subsection if a recognised organisation certifies to CASA that:
- (a) the experience is equivalent to the practical experience required by this subsection; and
 - (b) the applicant has sufficient additional experience of civil aircraft maintenance to ensure understanding of the civil aircraft maintenance environment.

14 Recognition of foreign qualifications for a category or subcategory

- 14.1 An applicant for a category or subcategory of an authority is taken to comply with subsection 13 for the category or subcategory if:
- (a) he or she holds a current authorisation, of a kind to which section 4.2 of Annex 1 to the Chicago Convention applies, that was issued by a State authority that CASA considers maintains appropriate standards for the issue of authorities of that kind; and
- Note CASA will list eligible State authorities in an AAC.
- (b) the authority is endorsed with a category or subcategory that corresponds to the category or subcategory applied for; and
 - (c) within the 2 years immediately before the application, the person exercised for at least 6 months privileges under the authorisation equivalent to those of a holder of the category or subcategory applied for; and
 - (d) a recognised organisation certifies to CASA that the applicant meets the requirements of subsection 13.
- 14.2 A person described in subparagraph 14.1 (a) of this subsection who holds, or has held, a foreign company authorisation is taken to comply with subsection 13 for the category or subcategory if:
- (a) CASA is satisfied that, within the 2 years immediately before the application, the person exercised for at least 6 months privileges under the authorisations equivalent to those of a holder of the category or subcategory; and
 - (b) if the person no longer holds the foreign company authorisation, CASA is satisfied that it was not cancelled or revoked for any reason involving fault by the person; and
 - (c) a recognised organisation certifies to CASA that the applicant meets the requirements of subsection 13.

15 Requirements for a rating

- 15.1 This subsection sets out the requirements for the endorsement of a rating on a subcategory B1.1, B1.2, B1.3, B1.4 authority or on a B2 authority.
- 15.2 The holder of the authority must satisfactorily complete the category or subcategory type training and assessment for the rating that is:
- (a) approved by CASA; and
 - (b) conducted by a recognised organisation.
- 15.3 For paragraph 15.2, the assessment must consist of:
- (a) for category B1 — a mechanical assessment; and
 - (b) for category B2 — an avionics assessment.
- 15.4 For paragraph 15.3, the assessment for the rating must:
- (a) be in accordance with Part 4 of Appendix 7; and

- (b) for the aircraft type — be in the theoretical elements mentioned in Part 2 of Appendix 7 that are indicated for the category or subcategory by the numerical level of the type training; and
 - (c) assess the applicant in each theoretical element to the numerical level of the type training indicated for the element; and
 - (d) for the aircraft type — be in the practical elements mentioned in Part 3 of Appendix 7 that are:
 - (i) based on representative theoretical elements mentioned in Part 2 of Appendix 7; and
 - (ii) appropriate for the category or subcategory and the rating; and
 - (e) assess the applicant in each practical element to the numerical level of the theoretical element mentioned in Part 2 of Appendix 7 on which the practical element is based.
- 15.5 For paragraph 15.4, the numerical level of type training required is set out in Part 1 of Appendix 7.
- 15.6 For paragraph 15.2, the approved type training for a rating must:
- (a) for the aircraft type — include the theoretical elements mentioned in Part 2 of Appendix 7 that are indicated for the category or subcategory by the numerical level of the type training; and
 - (b) include the practical elements mentioned in Part 3 of Appendix 7 that are appropriate for the category or subcategory and the rating; and
 - (c) correspond with the privileges mentioned in subsection 10 for the authority on which the rating is to be endorsed.

16 Endorsement of a rating

If the holder of an authority applies in writing for a rating, CASA must endorse the rating on the holder's authority if:

- (a) he or she:
 - (i) holds an authority in the category B1 or B2 appropriate to the rating sought; and
 - (ii) within the 5 years immediately before he or she applied for the rating, successfully completed the theoretical elements of the aircraft type training and assessment for the rating mentioned in subsection 15; and
 - (iii) within the 2 years immediately before he or she applied for the rating, successfully completed the practical elements of the aircraft type training and assessment for the rating mentioned in subsection 15; or
- (b) he or she:
 - (i) holds a current authorisation of a kind to which section 4.2 of Annex 1 to the Chicago Convention applies, that was issued by a State authority mentioned in subparagraph 14.1 (a) of this Order; and
 - (ii) holds a rating endorsed on the authority that corresponds to the rating sought; and

- (iii) within the 2 years immediately before the application to CASA, exercised for at least 6 months privileges under the rating equivalent to those exercised by the holder of an authority endorsed with the rating; or
- (c) he or she:
 - (i) holds a current authorisation, of a kind mentioned in sub-subparagraph (b) (i); and
 - (ii) holds or has held a foreign company authorisation corresponding to the rating sought; and
 - (iii) within the 2 years immediately before the application to CASA, exercised for at least 6 months privileges under the authorisations equivalent to those exercised by the holder of an authority endorsed with the rating; and
 - (iv) if the foreign company authorisation is no longer held — did not have it cancelled or revoked for any reason involving fault by the person.

17 Endorsement of an additional rating

If the holder of an authority applies in writing for an additional rating, CASA must endorse the rating on the holder's authority if he or she:

- (a) holds a B1 or B2 authority appropriate to the rating sought; and
- (b) within the 2 years immediately before the application to CASA, exercised for at least 6 months privileges under the rating or ratings that he or she already holds; and
- (c) either:
 - (i) successfully completes the aircraft type training and assessment for the additional rating mentioned in subsection 15 of this Order; or
 - (ii) meets the requirements of subparagraph 16 (b) or 16 (c) for the additional rating.

Appendix 1

Maintenance activities — authority in subcategory A1, A2, A3 or A4

- 1 Minor scheduled line maintenance, including a scheduled inspection or check, up to and including a weekly check:
 - (a) specified in the operator's approved aircraft maintenance program; or
 - (b) if not specified in the operator's approved aircraft maintenance program — that CASA considers is equivalent to a weekly check and lists in an AAC.
- 2 Minor maintenance, including a pre-flight, transit or overnight check, ground handling, APU running, minimum equipment list (*MEL*) implementation as allowed by paragraph 3 (p) and replenishment.
- 3 After appropriate task training for issuing an aircraft certificate of release to service as part of minor scheduled line maintenance or simple defect rectification:
 - (a) replacement of wheel assemblies; and
 - (b) replacement of wheel brake units; and
 - (c) replacement of emergency equipment; and
 - (d) replacement of ovens, boilers and beverage makers; and
 - (e) replacement of internal and external lights, filaments and flash tubes; and
 - (f) replacement of windscreen wiper blades; and
 - (g) replacement of passenger or cabin crew seats, seat belts and harnesses; and
 - (h) closing of cowlings and refitment of quick access inspection panels; and
 - (i) replacement of toilet system components, other than gate valves; and
 - (j) simple repair and replacement of internal compartment doors and placards, other than doors forming part of a pressure structure; and
 - (k) simple repair and replacement of overhead storage compartment doors and cabin furnishing items; and
 - (l) replacement of static wicks; and
 - (m) replacement of aircraft main and APU batteries; and
 - (n) replacement of in-flight entertainment system components, other than public address; and
 - (o) routine lubrication and replenishment of system fluids and gases; and
 - (p) deactivation of subsystems and aircraft components as permitted by the operator's MEL, if the task is one that CASA considers is a simple task and is listed in an AAC; and
 - (q) replacement of any other component for an aircraft type if the task is one that CASA considers is a simple task and is listed in an AAC.

Appendix 2

Air Transport Association chapter designators of maintenance — authority in subcategory B1.1, B1.2, B1.3, B1.4

- 07 Lifting and shoring
- 08 Levelling and weighing
- 09 Towing and taxiing
- 10 Parking, mooring, storage and return to service
- 21 Air-conditioning and cabin pressurisation
- 24 Electrical power
- 25 Equipment — furnishing
- 26 Fire protection
- 27 Flight controls
- 28 Fuel
- 29 Hydraulic power
- 30 Ice and rain protection
- 32 Landing gear
- 33 Lights
- 35 Oxygen
- 36 Pneumatics
- 37 Vacuum
- 38 Water and waste
- 45 Central maintenance system
- 49 Airborne auxiliary power
- 50 Cargo and accessory systems
- 51 Structures — general, but excluding:
 - (a) wooden structures and fabric surfaces unless:
 - (i) for wooden structures — the holder has obtained the relevant optional units of competency mentioned in paragraph 13.10 of this Order; or
 - (ii) for fabric surfaces — the holder has obtained the relevant optional units of competency mentioned in paragraph 13.10 of this Order; and

Note These optional units of competency are marked Z in Appendix 6.
 - (b) repair and modification of aircraft composite material, structures and components unless the holder has obtained the relevant optional units of competency mentioned in paragraph 13.9 of this Order.

Note These optional units of competency are marked Y in Appendix 6.
- 52 Doors

- 53 Fuselage
 - 54 Nacelles and pylons
 - 55 Stabilisers
 - 56 Windows
 - 57 Wings
 - 60 Propeller — rotor
 - 61 Propeller — propulsion, but 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.
- 62 Rotor
 - 63 Rotor drive
 - 64 Tail rotor
 - 65 Tail rotor drive
 - 66 Folding blades and pylon
 - 67 Rotors flight control
 - 71 Power plant
 - 72 Engine
 - 73 Engine fuel and control
 - 74 Ignition
 - 75 Air
 - 76 Engine controls
 - 77 Engine indicating
 - 78 Exhaust
 - 79 Oil
 - 80 Starting

Note 1 This list is derived from Air Transport Association chapter designations.

Note 2 Avionics privileges within ATA chapters are limited in accordance with subparagraph 10.3 (b) of this Order.

Appendix 3

Air Transport Association chapter designators of maintenance — authority in category B2

- 21 Air-conditioning and cabin pressurisation
- 22 Auto flight
- 23 Communication
- 24 Electrical power
- 25 Equipment — furnishing (electronic emergency equipment and cabin entertainment equipment)
- 26 Fire protection
- 27 Flight controls
- 28 Fuel
- 29 Hydraulic power
- 30 Ice and rain protection
- 31 Indicating recording systems
- 32 Landing gear
- 33 Lights
- 34 Navigation
- 36 Pneumatics
- 37 Vacuum
- 38 Water and waste
- 44 Cabin systems
- 45 Central maintenance system
- 49 Airborne auxiliary power
- 60 Propeller — rotor
- 61 Propeller — propulsion
- 73 Engine fuel and control
- 74 Ignition
- 76 Engine controls
- 77 Engine indicating
- 79 Oil
- 80 Starting

Note 1 This list is derived from Air Transport Association chapter designations.

Note 2 Privileges within ATA chapters are limited to electrical and avionics aspects only in accordance with paragraph 10.4 of this Order.

Appendix 4

CASA knowledge syllabus

Part 1 — Levels of knowledge

Levels of knowledge

The level of knowledge for a module, or part of a module, for a category A, B1 or B2 authority is indicated in Part 3 of this Appendix by the allocation of a numerical indicator (1, 2 or 3) against the module or part. A level of knowledge has the meaning given to it below.

Level 1

A familiarisation with the principal elements of the subject such that the following objectives are met.

Objectives

- 1 The applicant must be familiar with the basic elements of the subject.
- 2 The applicant must be able to give a simple description of the whole subject, using common words and examples.
- 3 The applicant must be able to use typical terms.

Level 2

A general knowledge of the theoretical and practical aspects of the subject and an ability to apply that knowledge, such that the following objectives are met.

Objectives

- 1 The applicant must be able to understand the theoretical fundamentals of the subject.
- 2 The applicant must be able to give a general description of the subject using, as appropriate, typical examples.
- 3 The applicant must be able to use mathematical formulae in conjunction with physical laws describing the subject.
- 4 The applicant must be able to read and understand sketches, drawings and schematics describing the subject.
- 5 The applicant must be able to apply his or her knowledge in a practical manner using detailed procedures.

Level 3

A detailed knowledge of the theoretical and practical aspects of the subject, and a capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner, such that the following objectives are met.

Objectives

- 1 The applicant must know the theory of the subject and interrelationships with other subjects.

- 2 The applicant must be able to give a detailed description of the subject using theoretical fundamentals and specific examples.
- 3 The applicant must understand and be able to use mathematical formulae related to the subject.
- 4 The applicant must be able to read, understand and prepare sketches, simple drawings and schematics describing the subject.
- 5 The applicant must be able to apply his or her knowledge in a practical manner using manufacturer's instructions.
- 6 The applicant must be able to interpret results from various sources and measurements and apply corrective action where appropriate.

Part 2 — Knowledge module requirements

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

Subject modules	A or B1 aeroplane with:		A or B1 helicopter with:		B2
	Turbine engine(s)	Piston engine(s)	Turbine engine(s)	Piston engine(s)	Avionics
1 Mathematics	X	X	X	X	X
2 Physics	X	X	X	X	X
3 Electrical fundamentals	X	X	X	X	X
4 Electronic fundamentals	X	X	X	X	X
5 Digital techniques electronic instrument systems	X	X	X	X	X
6 Materials and hardware	X	X	X	X	X
7 Maintenance practices	X	X	X	X	X
8 Basic aerodynamics	X	X	X	X	X
9 Human factors	X	X	X	X	X
10 Aviation legislation	X	X	X	X	X
11 Aeroplane aerodynamics, structures and systems	X	X			

Subject modules	A or B1 aeroplane with:		A or B1 helicopter with:		B2
	Turbine engine(s)	Piston engine(s)	Turbine engine(s)	Piston engine(s)	Avionics
12 Helicopter aerodynamics, structures and systems			X	X	
13 Aircraft structures and systems					X
14 Propulsion – avionic systems					X
15 Gas turbine engine	X		X		
16 Piston engine		X		X	
17 Propeller	X	X			

Part 3 — Details of modules and levels of knowledge

Module 1 Mathematics

	Level of knowledge for the category		
	A	B1	B2
1.1 Arithmetic	1	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
(b) Linear equations and their solutions; Indices and powers, negative and fractional indices; Binary and other applicable numbering systems;	—	1	1

	Level of knowledge for the category		
	A	B1	B2
Simultaneous equations and second degree equations with one unknown; Logarithms.			
1.3 Geometry			
(a) Simple geometrical constructions;	—	1	1
(b) Graphical representation; nature and uses of graphs, graphs of equations and functions;	2	2	2
(c) Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.	—	2	2

Module 2 Physics

	Level of knowledge for the category		
	A	B1	B2
2.1 Matter	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			
<i>2.2.1 Statics</i>	1	2	1
Forces, moments and couples, representation as vectors; Centre of gravity; Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion;			

	Level of knowledge for the category		
	A	B1	B2
Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).			
<i>2.2.2 Kinetics</i>	1	2	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.			
<i>2.2.3 Dynamics</i>			
(a) Mass; Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency;	1	2	1
(b) Momentum, conservation of momentum; Impulse; Gyroscopic principles; Friction: nature and effects, coefficient of friction (rolling resistance).	1	2	2
<i>2.2.4 Fluid dynamics</i>			
(a) Specific gravity and density;	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

	Level of knowledge for the category		
	A	B1	B2
2.3 Thermodynamics			
(a) Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; heat definition.	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
2.4 Optics (light)	—	2	2
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
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		
	A	B1	B2
3.1 Electron theory	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
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
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
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
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.			
3.6 DC circuits	—	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.			

	Level of knowledge for the category		
	A	B1	B2
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
(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
3.8 Power	—	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
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;			

	Level of knowledge for the category		
	A	B1	B2
Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.			
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
(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
3.11 Inductance and inductor	—	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;			

	Level of knowledge for the category		
	A	B1	B2
Lenz's Law and polarity determining rules; Back emf, self induction; Saturation point; Principal uses of inductors.			
3.12 DC motor and generator theory	—	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 C theory	1	2	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
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
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;			

	Level of knowledge for the category		
	A	B1	B2
<p>Calculation of line and phase voltages and currents;</p> <p>Calculation of power in a 3 phase system;</p> <p>Primary and secondary current, voltage, turns ratio, power, efficiency;</p> <p>Autotransformers.</p>			
3.16 Filters	—	1	1
<p>Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.</p>			
3.17 AC generators	—	2	2
<p>Rotation of loop in a magnetic field and waveform produced;</p> <p>Operation and construction of revolving armature and revolving field type AC generators;</p> <p>Single phase, 2 phase and 3 phase alternators;</p> <p>Three phase star and delta connections advantages and uses;</p> <p>Permanent magnet generators.</p>			
3.18 AC motors	—	2	2
<p>Construction, principles of operation and characteristics of:</p> <p>AC synchronous and induction motors both single and polyphase;</p> <p>Methods of speed control and direction of rotation;</p> <p>Methods of producing a rotating field: capacitor, inductor, shaded or split pole.</p>			

Module 4 Electronic fundamentals

	Level of knowledge for the category		
	A	B1	B2
4.1 Semiconductors			
<i>4.1.1 Diodes</i>			
(a) 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.	—	2	2
(b) 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; 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, Schottky diode, photoconductive diode, varactor diode, varistor, rectifier diodes, Zener diode.	—	—	2
<i>4.1.2 Transistors</i>			
(a) Transistor symbols; Component description and orientation; Transistor characteristics and properties.	—	1	2

	Level of knowledge for the category		
	A	B1	B2
(b) 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.	—	—	2
4.1.3 Integrated circuits			
(a) Description and operation of logic circuits and linear circuits and operational amplifiers.	—	1	—
(b) 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; Advantages and disadvantages of positive and negative feedback.	—	—	2
4.2 Printed circuit boards	—	1	2
Description and use of printed circuit boards.			
4.3 Servomechanisms			
(a) 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,	—	1	—

	Level of knowledge for the category		
	A	B1	B2
control and torque, transformers, inductance and capacitance transmitters.			
(b) 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.	—	—	2

Module 5 Digital techniques electronic instrument systems

	Level of knowledge for the category		
	A	B1	B2
5.1 Electronic instrument systems	1	2	3
Typical systems arrangements and cockpit layout of electronic instrument systems.			
5.2 Numbering systems	—	1	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
Analogue data, digital data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.			

	Level of knowledge for the category		
	A	B1	B2
5.4 Data buses	—	2	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
(b) Interpretation of logic diagrams.	—	—	2
5.6 Basic computer structure			
(a) Computer terminology (including bit, byte, software, hardware, 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
5.7 Microprocessors	—	—	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.			

	Level of knowledge for the category		
	A	B1	B2
5.8 Integrated circuits			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
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.			
5.10 Fibre optics	—	1	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
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
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
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programs.			

	Level of knowledge for the category		
	A	B1	B2
5.14 Electromagnetic environment	—	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.			
5.15 Typical electronic and digital aircraft systems	—	2	2
General arrangement of typical electronic and digital aircraft systems and associated BITE (built-in test equipment) testing such as: ACARS-ARINC communication and addressing and reporting system; ECAM-electronic centralised aircraft monitoring; EFIS-electronic flight instrument system; EICAS-engine indication and crew alerting system; FBW-flyby wire; FMS-flight management system; GPS-global positioning system; IRS-inertial reference system; TCAS-traffic alert collision avoidance system.			

Module 6 Materials and hardware

	Level of knowledge for the category		
	A	B1	B2
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
(b) Testing of ferrous materials for hardness, tensile strength, Fatigue strength and impact resistance.	—	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
(b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.	—	1	1
6.3 Aircraft materials — composite and non-metallic			
<i>6.3.1 Composite and non-metallic other than wood and fabric</i>			
(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
(b) The detection of defects and deterioration in composite and non-metallic material; Repair of composite and non-metallic material.	1	2	—

	Level of knowledge for the category		
	A	B1	B2
<i>6.3.2 Wooden structures</i>	1	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.			
<i>6.3.3 Fabric covering</i>	1	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) Chemical fundamentals; Formation by galvanic action process, microbiological, stress;	1	1	1
(b) Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.	2	3	2
6.5 Fasteners			
<i>6.5.1 Screw threads</i>	2	2	2
Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; Measuring screw threads;			

	Level of knowledge for the category		
	A	B1	B2
<i>6.5.2 Bolts, studs and screws</i>	2	2	2
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.			
<i>6.5.3 Locking devices</i>	2	2	2
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.			
<i>6.5.4 Aircraft rivets</i>	1	2	1
Types of solid and blind rivets: specifications and identification, heat treatment.			
6.6 Pipes and unions			
(a) Identification of, and types of, rigid and flexible pipes and their connectors used in aircraft.	2	2	2
(b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.	2	2	1
6.7 Springs	1	2	1
Types of springs, materials, characteristics and applications.			
6.8 Bearings	1	2	2
Purpose of bearings, loads, material, construction; Types of bearings and their application.			
6.9 Transmissions	1	2	2
Gear types and their application; Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns;			

	Level of knowledge for the category		
	A	B1	B2
Belts and pulleys, chains and sprockets.			
6.10 Control cables	1	2	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
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		
	A	B1	B2
7.1 Safety precautions — aircraft and workshop	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
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		
	A	B1	B2
7.3 Tools	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
Operation, function and use of avionic general test equipment.			
7.5 Engineering drawings, diagrams and standards	1	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
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.			
7.7 Electrical cables and connectors	1	2	2
Continuity, insulation and bonding techniques and testing; Use of crimp tools: hand and hydraulic operated;			

	Level of knowledge for the category		
	A	B1	B2
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	—
Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.			
7.9 Pipes and hoses	1	2	—
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	—
Inspection and testing of springs.			
7.11 Bearings	1	2	—
Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.			
7.12 Transmissions	1	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	—
Swaging of end fittings; Inspection and testing of control cables;			

	Level of knowledge for the category		
	A	B1	B2
Bowden cables; Aircraft flexible control systems.			
7.14 Material handling			
<i>7.14.1 Sheet Metal</i>	—	2	—
Marking out, and calculation of, bend allowance; Sheet metal working including bending and forming; Inspection of sheet metal work.			
<i>7.14.2 Composite and non-metallic</i>	—	2	—
Bonding practices; Environmental conditions; Inspection methods.			
7.15 Welding, brazing, soldering and bonding			
(a) Soldering methods, inspection of soldered joints;	—	2	2
(b) Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.	—	2	—
7.16 Aircraft weight and balance			
(a) Centre of gravity and balance limits calculation: use of relevant documents;	—	2	2
(b) Preparation of aircraft for weighing; Aircraft weighing.	—	2	—
7.17 Aircraft handling and storage	2	2	2
Aircraft taxiing and towing and associated safety precautions; Aircraft jacking, chocking, securing and associated safety precautions;			

	Level of knowledge for the category		
	A	B1	B2
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
(b) General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programs;	—	2	—
(c) Non destructive inspection techniques including: penetrant, radiographic, eddy current, ultrasonic and boroscope methods.	—	2	1
(d) Disassembly and re-assembly techniques;	2	2	2
(e) Trouble shooting techniques.	—	2	2
7.19 Abnormal events			
(a) Inspections following lightning strikes and HIRF penetration.	2	2	2
(b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2	2	—
7.20 Maintenance procedures	1	2	2
Maintenance planning;			

	Level of knowledge for the category		
	A	B1	B2
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		
	A	B1	B2
8.1 Physics of the atmosphere	1	2	2
International Standard Atmosphere (ISA), application aerodynamics.			
8.2 Aerodynamics	1	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.			
8.3 Theory of flight	1	2	2
Relationship between lift, weight, thrust and drag; Glide ratio;			

	Level of knowledge for the category		
	A	B1	B2
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
Longitudinal, lateral and directional stability (active and passive).			

Module 9 Human factors

	Level of knowledge for the category		
	A	B1	B2
9.1 General	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
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.			
9.3 Social psychology	1	1	1
Responsibility: individual and group; Motivation and de-motivation; Peer pressure;			

	Level of knowledge for the category		
	A	B1	B2
“Culture” issues; Team working; Management, supervision and leadership.			
9.4 Factors affecting performance	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
Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.			
9.6 Tasks	1	1	1
Physical work; Repetitive tasks; Visual inspection; Complex systems.			
9.7 Communication	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
Error models and theories; Types of error in maintenance tasks;			

	Level of knowledge for the category		
	A	B1	B2
Implications of errors (i.e. accidents); Avoiding and managing errors.			
9.9 Hazards in the workplace	2	2	2
Recognising and avoiding hazards; Dealing with emergencies.			

Module 10 Aviation legislation

	Level of knowledge for the category		
	A	B1	B2
10.1 Regulatory framework	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
Detailed understanding of CAO 100.66.			
10.3 Reserved			
10.4 Commercial air transportation	1	1	1
Air Operators Certificates; Operators responsibilities; Documents to be carried; Aircraft placarding (markings).			

	Level of knowledge for the category		
	A	B1	B2
10.5 Aircraft certification			
(a) <i>General</i> Certification rules; Type certification; Supplemental type certification; Part 21 – Design and production organisation approvals.	—	1	1
(b) <i>Documents</i> Certificate of Airworthiness; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station Licence and Approval.	—	2	2
10.6 Reserved			
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
(b) Continuing airworthiness; Test flights; ETOPS, maintenance and despatch requirements; All weather operation: category 2 and 3 operations and	—	1	1

	Level of knowledge for the category		
	A	B1	B2
minimum equipment requirements.			

Module 11 Aeroplane aerodynamics, structures and systems

	Level of knowledge for the category		
	A	B1	B2
11.1 Theory of flight	1	2	—
<i>11.1.1 Aeroplane aerodynamics and flight controls</i>			
<p>Operation and effect of:</p> <p>roll control: ailerons and spoilers;</p> <p>pitch control: elevators, stabilators, variable incidence stabilisers and canards;</p> <p>yaw control, rudder limiters;</p> <p>Control using elevons, ruddervators;</p> <p>High lift devices, slots, slats, flaps, flaperons;</p> <p>Drag inducing devices, spoilers, lift dumpers, speed brakes;</p> <p>Effects of wing fences, sawtooth leading edges;</p> <p>Boundary layer control using, vortex generators, stall wedges or leading edge devices;</p> <p>Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.</p>			
<i>11.1.2 High speed flight</i>	1	2	—
<p>Speed of sound, subsonic flight, transonic flight, supersonic flight;</p> <p>Mach number, critical Mach number, compressibility buffet, shockwave, aerodynamic cheating, area rule;</p> <p>Factors affecting airflow in engine intakes of high speed aircraft;</p> <p>Effects of sweepback on critical Mach number.</p>			

	Level of knowledge for the category		
	A	B1	B2
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	—
(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	—
11.3 Airframe structures — aeroplanes			
<i>11.3.1 Fuselage (ATA52/53/56)</i>	1	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.			

	Level of knowledge for the category		
	A	B1	B2
<i>11.3.2 Wings (ATA57)</i>	1	2	—
Construction; Fuel storage; Landing gear, pylon, control surface and highlift and drag attachments.			
<i>11.3.3 Stabilisers (ATA55)</i>	1	2	—
Construction; Control surface attachment.			
<i>11.3.4 Flight control surface (ATA55/57)</i>	1	2	—
Construction and attachment; Balancing — mass and aerodynamic.			
<i>11.3.5 Nacelles and pylons (ATA54)</i>	1	2	—
Construction; Firewalls; Engine mounts.			
11.4 Air-conditioning and cabin pressurisation (ATA21)			
<i>11.4.1 Air supply</i>	1	2	—
Sources of air supply including engine bleed, APU and ground cart.			
<i>11.4.2 Air-conditioning</i>	1	3	—
Air-conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.			
<i>11.4.3 Pressurisation</i>	1	3	—
Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.			

	Level of knowledge for the category		
	A	B1	B2
<i>11.4.4 Safety and warning devices</i>	1	3	—
Protection and warning devices.			
11.5 Instruments and avionic systems			
<i>11.5.1 Instrument systems (ATA31)</i>	1	2	—
Pitot static: altimeter, airspeed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Angle of attack indication, stall warning systems; Other aircraft system indication.			
<i>11.5.2 Avionic systems</i>	1	1	—
Fundamentals of system layouts and operation of: Auto flight (ATA22); Communications (ATA23); Navigation systems (ATA34).			
11.6 Electrical power (ATA24)	1	3	—
Batteries installation and operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection; External and ground power.			

	Level of knowledge for the category		
	A	B1	B2
11.7 Equipment and furnishings (ATA25)			
(a) Emergency equipment requirements; Seats, harnesses and belts.	2	2	—
(b) Cabin layout; Equipment layout; Cabin furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.	1	1	—
11.8 Fire protection (ATA26)			
(a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.	1	3	—
(b) Portable fire extinguisher.	1	3	—
11.9 Flight controls (ATA27)	1	3	—
Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic, electrical, fly-by-wire; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks systems; Balancing and rigging;			

	Level of knowledge for the category		
	A	B1	B2
Stall protection and warning system.			
11.10 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; Longitudinal balance fuel systems.			
11.11 Hydraulic power (ATA29)	1	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	—
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; Extension and retraction systems: normal and emergency;			

	Level of knowledge for the category		
	A	B1	B2
Indications and warning; Wheels, brakes, antiskid and auto braking; Tyres; Steering.			
11.14 Lights (ATA33)	2	3	—
External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; emergency.			
11.15 Oxygen (ATA35)	1	3	—
System layout: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings.			
11.16 Pneumatic and vacuum (ATA36)	1	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	—
Central maintenance computers; Data loading system; Electronic library system;			

	Level of knowledge for the category		
	A	B1	B2
Printing; Structure monitoring (damage tolerance monitoring).			

Module 12 Helicopter aerodynamics, structures and systems

	Level of knowledge for the category		
	A3 A4	B1.3 B1.4	B2
12.1 Theory of flight — rotary wing aerodynamics	1	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; Collective control; Swashplate; Yaw control: Anti-torque control, tail rotor, bleed air; Main rotor head: design and operation features; Blade dampers: function and construction; Rotor blades: main and tail rotor blade construction and attachment; Trim control, fixed and adjustable stabilisers; System operation: manual, hydraulic, electrical and			

	Level of knowledge for the category		
	A3 A4	B1.3 B1.4	B2
fly-by-wire; Artificial feel; Balancing and rigging.			
12.3 Blade tracking and vibration analysis	1	3	—
Rotor alignment; Main and tail rotor tracking; Static and dynamic balancing; Vibration types, vibration reduction methods; Ground resonance.			
12.4 Transmissions	1	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	—
(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;	1	2	—

	Level of knowledge for the category		
	A3 A4	B1.3 B1.4	B2
<p>Doors: construction, mechanisms, operation and safety devices;</p> <p>Windows and windscreen construction;</p> <p>Fuel storage;</p> <p>Firewalls;</p> <p>Engine mounts;</p> <p>Structure assembly techniques: riveting, bolting, bonding;</p> <p>Methods of surface protection, such as chromating, anodising, painting;</p> <p>Surface cleaning;</p> <p>Airframe symmetry: methods of alignment and symmetry checks.</p>			
12.6 Air-conditioning (ATA21)			
<i>12.6.1 Air supply</i>	1	2	—
Sources of air supply including engine bleed and ground cart.			
<i>12.6.2 Air-conditioning</i>			
<p>Air-conditioning systems;</p> <p>Distribution systems;</p> <p>Flow and temperature control systems;</p> <p>Protection and warning devices.</p>	1	3	—
12.7 Instruments and avionic systems			
<i>12.7.1 Instrument systems (ATA31)</i>	1	2	—
<p>Pitot static: altimeter, air speed indicator, vertical speed indicator;</p> <p>Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;</p> <p>Compasses: direct reading, remote reading;</p> <p>Vibration indicating systems — HUMS;</p> <p>Other aircraft system indication.</p>			

	Level of knowledge for the category		
	A3 A4	B1.3 B1.4	B2
<i>12.7.2 Avionic systems</i>	1	1	—
Fundamentals of system layouts and operation of: Auto flight (ATA22); Communications (ATA23); Navigation Systems (ATA34).			
12.8 Electrical power (ATA24)	1	3	—
Batteries installation and operation; DC power generation, AC power generation; Emergency power generation; Voltage regulation, circuit protection; Power distribution; Inverters, transformers, rectifiers; External and ground power.			
12.9 Equipment and furnishings (ATA25)			
(a) Emergency equipment requirements; Seats, harnesses and belts; Lifting systems.	2	2	—
(b) Emergency flotation systems; Cabin layout, cargo retention; Equipment layout; Cabin furnishing installation.	1	1	—
12.10 Fire protection (ATA26)	1	3	—
Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.			
12.11 Fuel systems (ATA28)	1	3	—
System layout;			

	Level of knowledge for the category		
	A3 A4	B1.3 B1.4	B2
Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.			
12.12 Hydraulic power (ATA29)	1	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.			
12.14 Landing gear (ATA32)	2	3	—
Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, tyres, brakes; Steering; Skids, floats.			

	Level of knowledge for the category		
	A3 A4	B1.3 B1.4	B2
12.15 Lights (ATA33)	2	3	—
External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; emergency.			
12.16 Pneumatic and vacuum (ATA36)	1	3	—
System layout; Sources: engine, compressors, reservoirs, ground supply; Pressure control; Distribution; Indication and warnings; Interfaces with other systems.			
12.17 On board maintenance systems (ATA45)	1	2	—
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		
	A	B1	B2
13.1 Theory of flight			
(a) <i>Aeroplane aerodynamics and flight controls</i> Operation and effect of: <ul style="list-style-type: none"> • roll control: ailerons and spoilers; • pitch control: elevators, stabilators, variable incidence stabilisers and canards; 	—	—	1

	Level of knowledge for the category		
	A	B1	B2
<ul style="list-style-type: none"> • 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. 			
<p>(b) <i>High speed flight</i></p> <p>Speed of sound, subsonic flight, transonic flight, supersonic flight, Mach number, critical Mach number.</p>	—	—	1
<p>(c) <i>Rotary wing aerodynamics</i></p> <p>Terminology;</p> <p>Operation and effect of cyclic, collective and anti-torque controls.</p>	—	—	1
13.2 Structures — general concepts			
<p>(a)</p> <p>Fundamentals of structural systems.</p>	—	—	1
<p>(b)</p> <p>Zonal and station identification systems; electrical bonding;</p> <p>Lightning strike protection provision.</p>	—	—	2
13.3 Autoflight (ATA22)	—	—	3
<p>Fundamentals of automatic flight control including working principles and current terminology;</p> <p>Command signal processing;</p> <p>Modes of operation: roll, pitch and yaw channels;</p> <p>Yaw dampers;</p> <p>Stability augmentation system in helicopters;</p> <p>Automatic trim control;</p> <p>Auto pilot navigation aids interface;</p>			

	Level of knowledge for the category		
	A	B1	B2
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.			
Working principles of following systems: <ul style="list-style-type: none"> • Very high frequency (VHF) communication; • High frequency (HF) communication; • Audio; • Emergency locator transmitters; • Cockpit voice recorder; • Very high frequency omni directional range (VOR); • Automatic direction finding (ADF); • Instrument landing system (ILS); • Microwave landing system (MLS); • Flight director systems; • Distance measuring equipment (DME); • Very low frequency and hyperbolic navigation (VLF); • Doppler navigation; • Area navigation, RNAV systems; • Flight management systems; • Global positioning system (GPS), Global navigation satellite systems (GNSS); • Inertial navigation system; • Air traffic control transponder, secondary surveillance radar; • Traffic alert and collision avoidance system (TCAS); • Weather avoidance radar; • Radio altimeter; • ARINC communication and reporting. 			

	Level of knowledge for the category		
	A	B1	B2
13.5 Electrical power (ATA24)	—	—	3
Batteries installation and operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; power distribution; Inverters, transformers, rectifiers; circuit protection; External and Ground power.			
13.6 Equipment and furnishings (ATA25)	—	—	3
Electronic emergency equipment requirements; Cabin entertainment equipment.			
13.7 Flight controls (ATA27)			
(a) Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks; Stall protection systems;	—	—	1
(b) System operation: electrical, fly by wire.	—	—	2
13.8 Instrument systems (ATA31)	—	—	2
Classification; Atmosphere; Terminology; Pressure measuring devices and systems; Pitot static systems;			

	Level of knowledge for the category		
	A	B1	B2
Altimeters; Vertical speed indicators; Airspeed indicators; Machmeters; Altitude reporting and alerting systems; Air data computers; Instrument pneumatic systems; Direct reading pressure and temperature gauges; Temperature indicating systems; Fuel quantity indicating systems; Gyroscopic principles; Artificial horizons; Slip indicators; Directional gyros; Ground proximity warning systems; Compass systems; Flight data recording systems; Electronic flight instrument systems; Instrument warning systems including master warning systems and centralised warning panels; Stall warning systems and angle of attack indicating systems; Vibration measurement and indication.			
13.9 Lights (ATA33)	—	—	3
External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.			
13.10 Onboard maintenance systems (ATA45)	—	—	3
Central maintenance computers; Data loading system; Electronic library system;			

	Level of knowledge for the category		
	A	B1	B2
Printing; Structure monitoring (damage tolerance monitoring).			

Module 14 Propulsion — avionic systems

	Level of knowledge for the category		
	A	B1	B2
14.1 Turbine engines			
(a) Constructional arrangement and operation of turbojet, turbofan, turbo shaft and turbo propeller engines;	—	—	1
(b) Electronic Engine control and fuel metering systems (FADEC).	—	—	2
14.2 Engine indicating systems	—	—	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		
	A	B1	B2
15.1 Fundamentals	1	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	—
Gross thrust, net thrust, choked nozzle 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	—
Compressor inlet ducts; Effects of various inlet configurations; Ice protection.			
15.4 Compressors	1	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.			

	Level of knowledge for the category		
	A	B1	B2
15.5 Combustion section	1	2	—
Constructional features and principles of operation.			
15.6 Turbine section	2	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	—
Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.			
15.8 Bearings and seals	—	2	—
Constructional features and principles of operation.			
15.9 Lubricants and fuels	1	2	—
Properties and specifications; Fuel additives; Safety precautions.			
15.10 Lubrication systems	1	2	—
System operation and layout and components.			
15.11 Fuel systems	1	2	—
Operation of engine control and fuel metering systems; Including electronic engine control (FADEC); Systems layout and components.			
15.12 Air systems	1	2	—
Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air			

	Level of knowledge for the category		
	A	B1	B2
services.			
15.13 Starting and ignition systems			
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	—
15.15 Power augmentation systems	—	1	—
Operation and applications; Water injection, water methanol; Afterburner systems.			
15.16 Turbo-prop engines	1	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	—
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		
	A	B1	B2
15.19 Powerplant installation	1	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	—
Operation of detection and extinguishing systems.			
15.21 Engine monitoring and ground operation	1	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	—
Preservation and depreservation for the engine and accessories and systems.			

Module 16 Piston engine

	Level of knowledge for the category		
	A	B1	B2
16.1 Fundamentals	1	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.			

	Level of knowledge for the category		
	A	B1	B2
16.2 Engine performance	1	2	—
Power calculation and measurement; Factors affecting engine power; Mixtures and leaning, pre-ignition.			
16.3 Engine construction	1	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			
<i>16.4.1 Carburettors</i>	1	2	
Types, construction and principles of operation; Icing and heating.			
<i>16.4.2 Fuel injection systems</i>	1	2	—
Types, construction and principles of operation.			
<i>16.4.3 Electronic engine control</i>	1	2	—
Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems layout and components.			
16.5 Starting and ignition systems	1	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	—
Construction and operation of induction systems, including alternate air systems;			

	Level of knowledge for the category		
	A	B1	B2
Exhaust systems, engine cooling systems — air and liquid.			
16.7 Supercharging and turbo charging	1	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	—
Properties and specifications; Fuel additives; Safety precautions.			
16.9 Lubrication systems	1	2	—
System operation and layout and components.			
16.10 Engine indication systems	1	2	—
Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust gas temperature; Fuel pressure and flow; Manifold pressure.			
16.11 Power plant installation	1	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	—
Procedures for starting and ground run-up; Interpretation of engine power output and parameters;			

	Level of knowledge for the category		
	A	B1	B2
Inspection of engine and components: criteria, tolerances and data specified by engine manufacturer.			
16.13 Engine storage and preservation	—	2	—
Preservation and depreservation for the engine and accessories and systems.			

Module 17 Propeller

	Level of knowledge for the category		
	A	B1	B2
17.1 Fundamentals	1	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, controllable pitch, constant speed propeller; Propeller and spinner installation.			
17.3 Propeller pitch control	1	2	—
Speed control and pitch change methods, mechanical and electrical and electronic; Feathering and reverse pitch;			

	Level of knowledge for the category		
	A	B1	B2
Overspeed protection.			
17.4 Propeller synchronising	—	2	—
Synchronising and synchrophasing equipment.			
17.5 Propeller ice protection	1	2	—
Fluid and electrical de-icing equipment.			
17.6 Propeller maintenance	1	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	—
Propeller preservation and depreservation.			

Appendix 5

Recognised organisations

1 Definitions

Definitions for this Appendix are set out in subsection 2 of this Order.

2 Scope

- 2.1 This Appendix deals with the circumstances in which the training and assessment conducted by a person will be recognised by CASA as satisfying the requirements of maintenance training.
- 2.2 CASA may only recognise training as maintenance training if it is conducted by a person who:
 - (a) is approved by CASA under this Appendix; and
 - (b) has an accountable manager approved by CASA; and
 - (c) gives an undertaking to operate, and operates, in accordance with this Appendix.

3 Application for approval

- 3.1 A person must apply in writing on the approved form for approval as a recognised organisation.
- 3.2 The application must:
 - (a) be made by the person who is, or proposes to be, the applicant's accountable manager for the purposes of the approval; and
 - (b) include:
 - (i) the applicant's name and address; and
 - (ii) if the applicant is a corporation, its ACN and the address of its registered office; and
 - (iii) the applicant's undertaking to comply with the requirements of this Appendix if approved as a recognised organisation; and
 - (c) be accompanied by a copy of:
 - (i) the applicant's exposition; and
 - (ii) as part of the exposition — the course plan for each training course that is proposed to be covered by the approval.

Note 1 The course plan must be specifically approved as part of the exposition.

Note 2 For information or documents already given to CASA, see subregulation 11.125 (2) of CASR 1998.

4 Conduct of training and assessments

A recognised organisation must conduct training and assessments:

- (a) in accordance with its exposition; and

- (b) in conformity with the relevant knowledge training, type training and assessment standards in Appendixes 4, 6 and 7 of this Order; and
- (c) for task training — in conformity with the requirements for task training and assessment mentioned in paragraph 10.2 of this Order.

5 Facility requirements

- 5.1 A recognised organisation must provide facilities that meet the criteria mentioned in this clause.
- 5.2 The facilities must provide for adequate weather protection and enable all planned training and assessment to occur.
- 5.3 Accommodation for the instruction of theory and the conduct of knowledge examinations must be fully enclosed and separate from other facilities.
- 5.4 The accommodation must be designed so that no student can read the paperwork or computer screen of another student from his or her position during an assessment.
- 5.5 The accommodation environment must enable students to concentrate on their studies or assessment without undue distraction or discomfort.
- 5.6 For a course:
 - (a) the organisation must provide a basic training workshop or maintenance facility separate from training classrooms for practical instruction appropriate to the planned training course; or
 - (b) if the organisation is unable to provide these facilities — the organisation must:
 - (i) arrange with another entity to provide the workshops or maintenance facilities; and
 - (ii) enter a written agreement with the entity specifying the conditions of access and use, including the right of CASA to have access to the facilities.
- 5.7 Office accommodation for instructors, knowledge examiners and assessors must be such as to enable each of them to prepare for his or her duties without undue distraction or discomfort.
- 5.8 There must be secure storage facilities for assessment papers and training records to ensure that documents remain in good condition for the retention period mentioned in clause 11 of this Appendix.
- 5.9 Storage facilities and office accommodation may be combined if there is adequate security.
- 5.10 There must be a library containing all technical material appropriate to the scope and level of training undertaken.

6 Student numbers

A recognised organisation must ensure that, during any training course, there are no more than:

- (a) for knowledge training — 28 students; or

- (b) for practical training — 15 students for each supervisor or assessor; or
- (c) for a session of practical consolidation training — the number mentioned in the course plan for the session.

7 Personnel requirements

- 7.1 A recognised organisation must appoint an accountable manager who has corporate authority for ensuring that all training commitments can be financed and carried out to the standard required by this Appendix.
- 7.2 The applicant must appoint 1 or more persons (*key personnel*) whose duties are to ensure that the organisation complies with this Appendix.
- 7.3 The accountable manager may be the key person, or 1 of the key personnel, mentioned in subclause 7.2.
- 7.4 Each of the key personnel who is not the accountable manager must be responsible to the accountable manager for the performance of his or her duties.
- 7.5 A recognised organisation must:
 - (a) employ sufficient staff to plan and perform knowledge and practical training and to conduct knowledge examinations and practical assessments in accordance with the approval; or
 - (b) if it uses another organisation to provide practical training and assessments — nominate the other organisation's staff to carry out practical training and assessments.
- 7.6 The applicant's exposition must set out the minimum qualifications and experience standards it requires for a training instructor, knowledge examiner, assessor, accountable manager and key personnel.
- 7.7 A recognised organisation must ensure that, at least every 24 months, each instructor, knowledge examiner and assessor undergoes professional development relevant to current technology, practical skills, human factors and the latest training techniques appropriate to the role of the person.
- 7.8 A recognised organisation must ensure that a person may only carry out the role of a training instructor, knowledge examiner or assessor if the person meets the standards mentioned in subclause 7.6 for the role.
- 7.9 A recognised organisation must ensure that each employee has ready access to the part of the exposition that relates to his or her duties.

8 Records of instructors, examiners and assessors

- 8.1 A recognised organisation must maintain a record of all instructors, knowledge examiners and assessors, including their experience and qualifications, training history and any subsequent training undertaken.
- 8.2 The organisation must prepare a statement of duties and responsibilities for each training instructor, knowledge examiner and assessor.
- 8.3 A record mentioned in subclause 8.1 must be kept by the recognised organisation for at least 5 years after the person for whom it is made ceases to be employed by the organisation.

9 Instructional equipment

- 9.1 A recognised organisation must ensure that each classroom used by the organisation has appropriate presentation equipment of a standard that allows students to easily read presentation text, drawings, diagrams and figures from any position in the classroom.
- 9.2 Each classroom used by a recognised organisation may have representative synthetic training devices if the organisation chooses to use them.
- 9.3 For subclause 5.6 of this Appendix, each of the organisation's basic training workshops or maintenance facilities must have:
- (a) the tools and equipment necessary for the training being given; and
 - (b) a selection of aircraft, engines, aircraft parts and avionic equipment appropriate to the training being given.
- 9.4 For a type or task training course, the organisation must have access to:
- (a) an example of the relevant aircraft/engine combination or engine type; or
 - (b) a synthetic training device that provides training at least equivalent to the training under paragraph 9.4 (a) for the type or task.
- 9.5 If a synthetic training device is used for subclause 9.4, its use must be described in the course plan.

10 Maintenance training material

A recognised organisation must provide each of its students with:

- (a) maintenance training course material that covers:
 - (i) the basic knowledge syllabus mentioned in this Order for the category or subcategory of authority that the students seeks; and
 - (ii) the type course content required by this Order for the aircraft type for which the student seeks a type rating; and
- (b) access to examples of maintenance documentation and technical information in its library.

11 Student records

- 11.1 A recognised organisation must keep all student training and assessment records for at least 5 years after the last entry was made for the student to whom it applies.
- 11.2 For the period during which it must keep a student's course record, the organisation must supply to the student on request a document that summarises:
- (a) his or her student course record; and
 - (b) any permanent record kept by the organisation about any qualification granted to, or course completed by, the student.
- 11.3 The organisation must have a system, or other arrangement for the retention of any record or report made, kept or maintained for the purposes of this Appendix for at least 5 years after the organisation ceases to be a recognised organisation.

12 Quality management system

A recognised organisation must establish a quality management system that includes:

- (a) procedures to ensure compliance with this Appendix; and
- (b) an independent audit function to monitor the following:
 - (i) training standards;
 - (ii) the integrity of knowledge examinations and practical assessments;
 - (iii) compliance with, and adequacy of, the procedures mentioned in paragraph (a); and
- (c) a remedial, corrective and preventative action scheme, including a feedback system of audit findings to each person mentioned in subclauses 7.1 and 7.2, to ensure that any necessary corrective action is taken; and
- (d) a system for regular review of the quality management system:
 - (i) to ensure its continuing suitability, adequacy and effectiveness; and
 - (ii) to identify and assess the need for improvement in, or changes to, the quality management system.

13 Cheating or misconduct in assessments

13.1 A recognised organisation must:

- (a) secure all assessment questions; and
- (b) have systems and procedures under which its assessors and examiners ensure the security of all assessment questions.

13.2 If a student is found during an assessment to be cheating, or in possession of material about the assessment subject other than the assessment papers and associated authorised documentation, the organisation must:

- (a) disqualify the student from taking, or continuing with, the assessment; and
- (b) as soon as practicable, but within 72 hours of the incident, notify CASA in writing about the incident; and
- (c) provide any additional information requested by CASA about the incident.

13.3 If an assessor or examiner is found during any assessment to be providing question answers to any student being assessed, the organisation must:

- (a) disqualify the assessor or examiner from acting, or continuing to act, as an assessor or examiner; and
- (b) declare the assessment void; and
- (c) as soon as practicable but within 72 hours of the incident, notify CASA in writing about the incident; and
- (d) provide any additional information requested by CASA about the incident.

- 13.4 If a student, assessor or examiner is found after any assessment to have engaged in conduct that would have been within paragraph 13.2 or 13.3 if it had occurred during the assessment, the organisation must:
- (a) if the finding concerns misconduct by an assessor or examiner:
 - (i) disqualify the assessor or examiner from acting as an assessor or examiner; and
 - (ii) declare the assessment void; and
 - (b) if the finding concerns cheating by a student — disqualify the student from taking, or continuing with, further assessments; and
 - (c) as soon as practicable but within 72 hours of the finding, notify CASA in writing about the incident; and
 - (d) provide any additional information requested by CASA about the incident.

14 Exposition of a recognised organisation

- 14.1 A recognised organisation must have an exposition, approved by CASA, that describes the organisation and its procedures and contains the following information:
- (a) a statement signed by the accountable manager that the exposition and any associated manuals demonstrate that the organisation will comply with this Appendix;
 - (b) the names and organisational titles of the persons mentioned in subclauses 7.1 and 7.2, and the selection criteria used for their appointment;
 - (c) the duties and responsibilities of the persons mentioned in paragraph (b) including matters on which they may deal directly with CASA on behalf of the organisation;
 - (d) a chart showing chains of responsibility for the persons mentioned in paragraph (b);
 - (e) the organisation's quality management system;
 - (f) details of the system for recording selection criteria for, and information about, the training instructors, assessors and examiners;
 - (g) a description of the training and examination facilities at each location mentioned in clause 5;
 - (h) a list of the maintenance training courses that the organisation proposes to deliver, their course plans and student-instructor ratios;
 - (i) the durations of assessments and examinations and the periods of time over which training is to be conducted;
 - (j) the organisation's exposition amendment procedure, including the procedure for introducing new courses, modifying existing courses and amending course plans;
 - (k) the organisation's control procedure, if any, mentioned in paragraph 15.2 (b) of this Appendix;
 - (l) the organisation's procedure for producing material for clause 10;

- (m) the organisation's procedure for producing reliable and verifiable certifications for paragraph 13.14 and subparagraphs 14.1 (d) and 14.2 (c) of this Order;
 - (n) if the organisation does not own a facility that it proposes to use for maintenance training — a statement explaining in detail the arrangements under which it occupies or uses the facility;
 - (o) if an applicant does not own the equipment or data that it proposes to use for maintenance training — a statement explaining in detail the arrangements under which it uses the equipment or data.
- 14.2 An exposition need not set out the procedures mentioned in paragraph 14.1 (e) to the extent that they are set out in another manual kept and used by the organisation under a law of the Commonwealth, a State or a Territory if the organisation:
- (a) gives CASA a document that shows where, in the other manual, the procedures are located; or
 - (b) adequately cross-refers to those procedures in its exposition.

Example for subclause 14.2

An equal employment opportunity management plan that is required under State legislation to be kept for the organisation's maintenance training personnel.

- 14.3 A recognised organisation may only amend its exposition if the amendment is:
- (a) approved by CASA; or
 - (b) for a minor amendment that does not alter the sense intended by the exposition or a part of it — made in accordance with the procedure set out in the exposition.

15 Maintenance training privileges of a recognised organisation

- 15.1 A recognised organisation may carry out the following maintenance training in accordance with its exposition:
- (a) if the organisation is also a registered training organisation under the AQTF — training for the knowledge syllabus mentioned in Appendix 4 of this Order;
 - (b) training for aircraft types, engine types or tasks in accordance with this Order.
- 15.2 A recognised organisation may conduct training, knowledge examinations and practical assessments at:
- (a) each location for which CASA has given approval; or
 - (b) other locations in accordance with a control procedure mentioned in the organisation's exposition.

16 Qualifications

- 16.1 A recognised organisation must give a student a notification of training outcomes in accordance with the approved form:
- (a) at the end of the course for which the student enrolled; and

- (b) whether or not the student completed or passed the course.
- 16.2 A recognised organisation must also issue a formal statement to each student after his or her successful completion of a course of training mentioned in paragraphs 15.1 (a) and 15.1 (b).

Note The notification will be used by CASA in deciding whether to issue an authority. The formal statement is the recognised organisation's certificate or record for the student.

17 Changes to the recognised organisation

- 17.1 A recognised organisation must notify CASA of any proposed change to the organisation that, had it been in place before CASA approved the organisation, would reasonably have affected CASA's consideration of the application for the approval.
- 17.2 If the organisation does not tell CASA about a change mentioned in subclause 17.1, CASA may suspend or revoke the organisation's approval with effect from the date of the change.
- 17.3 If CASA considers that a change mentioned in subclause 17.1 may affect the organisation's continued compliance with this Appendix, it may place conditions on the organisation's approval that may or may not permit the change.
- 17.4 Approval of an applicant as a recognised organisation is subject to the condition that the organisation must comply with any conditions placed on its approval under this clause.

18 Directions by CASA

Approval of an applicant as a recognised organisation is subject to the condition that the organisation must comply with any direction given to it by CASA about the following:

- (a) its exposition, or assessments or examination material;
- (b) the way in which it conducts maintenance training;
- (c) any of the criteria that the organisation uses to decide whether students who have undertaken maintenance training are competent.

19 Surrender, suspension or revocation of approval

- 19.1 Approval of an organisation as a recognised organisation stops having effect if:
- (a) it is suspended or revoked by CASA; or
 - (b) the organisation tells CASA in writing that the organisation wants to surrender the approval.
- 19.2 If the approval is revoked or surrendered, the organisation must return the approval certificate to CASA within 14 days.
- 19.3 CASA may revoke or suspend an approval if:
- (a) the organisation fails to comply with its undertaking; or
 - (b) the organisation does not comply with this Appendix, including any conditions or directions mentioned in clause 17 or 18 of this Appendix; or

- (c) CASA is refused access to the organisation to assess its continued compliance with this Appendix.

Appendix 6

Units of competency required for a category or subcategory of authority

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2
MEA101B	Interpret occupational health and safety practices in aviation maintenance	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
MEA105B	Apply quality standard applicable to aviation maintenance processes	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
MEA108B	Complete aviation maintenance industry documentation	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
MEA111B	Perform administrative processes to prepare for certification of civil aircraft maintenance					X	X	X	X	X

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Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2
MEA112B	Plan and implement aircraft maintenance activities					X	X	X	X	X
MEA113B	Supervise maintenance activities and manage human resources in the workplace					X	X	X	X	X
MEA116A	Apply occupational health and safety procedures at supervisor level in aviation maintenance					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
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
MEA201B	Remove and install miscellaneous aircraft electrical hardware and components					X	X	X	X	X

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Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2
MEA203B	Remove and install advanced aircraft electrical systems and components					X	X	X	X	X
MEA205B	Remove and install advanced aircraft instrument systems and components									X
MEA206B	Remove and install aircraft basic radio communication and navigation systems and components									X
MEA207B	Remove and install aircraft electronic systems and components									X
MEA208B	Remove and install pressurisation control systems and components					X	X			
MEA209B	Remove and install oxygen systems and components					X	X			
MEA211B	Inspect, test and troubleshoot advanced aircraft electrical systems and components					X	X	X	X	
MEA219B	Inspect, test and troubleshoot aircraft pressurisation control systems and components					X	X			
MEA222B	Inspect, test and troubleshoot aircraft oxygen systems and components					X	X			

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Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2
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
MEA228B	Test and troubleshoot aircraft instrument systems and components									X
MEA229B	Test and troubleshoot 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

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Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2
MEA232B	Test and troubleshoot aircraft pulse systems and components									X
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
MEA246B	Fabricate and/or repair aircraft electrical hardware or parts					X	X	X	X	X
MEA260B	Use electrical test equipment					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					
MEA301B	Perform aircraft flight servicing					X	X	X	X	X
MEA302B	Remove and install aircraft hydro-mechanical and landing gear systems and components					X	X	X	X	
MEA303B	Remove and install aircraft pneumatic					X	X	X	X	

Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2
	systems and components									
MEA304B	Remove and install non-pressurised aircraft structural and non-structural components							X or MEA 317B	X or MEA 317B	
MEA305B	Remove and install aircraft fixed wing flight control systems and components					X	X			
MEA306B	Remove and install engines and engine systems and components					X	X	X	X	
MEA307B	Remove and install propeller systems and components					P	X			
MEA308B	Remove and install rotary wing rotor and flight control systems and components							X	X	
MEA309B	Inspect, test and troubleshoot aircraft hydro-mechanical and landing gear systems and components						X	X	X	
MEA310B	Inspect, test and troubleshoot aircraft pneumatic systems and components						X	X	X	
MEA312B	Inspect, test and troubleshoot aircraft fixed wing flight control systems and components						X			

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Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2
MEA313B	Inspect, test and troubleshoot piston engine systems and components						X		X	
MEA315B	Inspect, test and troubleshoot propeller systems and components					P	X			
MEA316B	Inspect, test and troubleshoot rotary wing rotor and control systems and components							X	X	
MEA317B	Remove and install pressurised aircraft structural and non-structural components					X	X			
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				

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Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2
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		
MEA323B	Perform advanced troubleshooting in aircraft mechanical maintenance					X	X	X	X	
MEA324B	Perform structural repair and modification assessment and evaluation					X	X	X	X	
MEA325B	Weigh aircraft and perform aircraft weight and balance calculations as a result of modifications					X	X	X	X	
MEA328B	Maintain and/or repair aircraft mechanical components or parts					X	X	X	X	
MEA339A	Inspect, repair and maintain aircraft structures					X	X	X	X	
MEA343A	Remove and install avionics systems and components					X	X	X	X	
MEA344A	Remove and install aircraft hydro-mechanical components during line maintenance	X	X	X	X					

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Competency Units Required	Title	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2
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					
MEA 405B	Repair and modification of aircraft composite material, structures and components					Y	Y	Y	Y	
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					

Appendix 7

Type training and assessment standards

Part 1

Type training levels

The 3 levels set out below describe the objectives that a particular level of training is to achieve.

Level 1 General familiarisation

A brief overview of the airframe, systems and powerplants as outlined in the Systems Description section of the aircraft maintenance manual.

Course objectives: on completion of the course, the student will be able to do the following:

- 1 identify safety precautions related to the airframe, its systems and powerplant;
- 2 identify maintenance practices important to the airframe, its systems and powerplant;
- 3 define the general layout of the aircraft's major systems;
- 4 define the general layout and characteristics of the powerplant;
- 5 identify special tooling and test equipment used with the aircraft.

Level 2 Ramp and transit

Basic system overview of controls, indicators, principal components including their location and purpose, servicing and minor troubleshooting.

Course objectives: in addition to the information contained in the Level 1 General Familiarisation course, at the completion of this Level 2 Ramp and Transit training, the student will be able to do the following:

- 1 recall the safety precautions to be observed when working on or near the aircraft, powerplant and systems;
- 2 demonstrate knowledge of the main ramp and transit (through-flight) activities of the following:
 - (a) doors, windows and hatches;
 - (b) electrical power supplies;
 - (c) fuel;
 - (d) auxiliary power unit;
 - (e) powerplant;
 - (f) fire protection;
 - (g) environmental control systems;
 - (h) hydraulic power;

- (i) landing gear;
 - (j) flight controls;
 - (k) water and waste;
 - (l) oxygen;
 - (m) flight and service interphone;
 - (n) avionics;
 - (o) cabin equipment and furnishings;
- 3 describe systems and aircraft handling, particularly access, power availability and sources;
 - 4 identify the locations of the principal components;
 - 5 explain the normal functioning of each major system, including terminology and nomenclature;
 - 6 perform the procedures for ramp and transit servicing associated with the aircraft for the following systems: fuel, powerplants, hydraulics, landing gear, water and waste, and oxygen;
 - 7 demonstrate proficiency in use of crew reports and on-board reporting systems (minor troubleshooting) and determine aircraft airworthiness in accordance with the MEL/CDL;
 - 8 identify and use appropriate documentation;
 - 9 locate the procedures for replacement of components for ramp and transit activities identified that are in item 2 above.

Level 3 Line and base maintenance training

Detailed description, operation, component location, removal and installation and built-in test equipment (BITE) and troubleshooting procedures to maintenance manual level.

Course objectives: in addition to the information contained in Level 1 and Level 2 training, at the completion of Level 3 line and base maintenance training, the student will be able to do the following:

- (a) perform system, engine, component and functional checks as specified in the maintenance manual;
- (b) correlate information for the purpose of making decisions in respect of fault diagnosis and rectification to maintenance manual level;
- (c) describe procedures for replacement of components unique to aircraft type.

Part 2

Type training theoretical elements

The elements in the syllabus below that are specific to the aircraft type must be covered. Additional elements arising from technological changes must also be covered.

In the table, the numbers 1, 2 and 3 indicate the theoretical elements to be covered for the category or subcategory and the training level required for the element.

Introductory training must include the following:

- 1 general aircraft features including dimensions, weights, MTOW etc;
- 2 time limits and maintenance checks;
- 3 levelling and weighing;
- 4 towing and taxiing;
- 5 parking and mooring;
- 6 servicing;
- 7 standard practices-only type particular;
- 8 for B2 modules — safety items and mechanical interface;
- 9 for B1 module — safety items and avionics interface.

Theoretical elements	Aeroplane turbine	Aeroplane piston	Helicopter turbine	Helicopter piston	Avionics
	B1.1	B1.2	B1.3	B1.4	B2
Blade tracking and vibration analysis	—	—	3	3	—
Transmissions	—	—	3	3	
Airframe structure	—	—	3	3	1
Main rotor	—	—	3	3	—
Tail rotor and rotor drive	—	—	3	3	—
Rotor flight control	—	—	3	3	—
Airframe structure	3	3	—	—	1
Fuselage doors	3	3	—	—	—
Fuselage	3	3	—	—	—
Fuselage windows	3	3	—	—	—
Wings	3	3	—	—	—
Stabilisers	3	3	—	—	—
Flight control surfaces	3	3	—	—	—
Nacelles and pylons	3	3	—	—	—
Zonal and station identification	1	1	1	1	1

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Theoretical elements	Aeroplane turbine	Aeroplane piston	Helicopter turbine	Helicopter piston	Avionics
	B1.1	B1.2	B1.3	B1.4	B2
systems					
Air supply	3	3	3	3	3
Air-conditioning	3	3	3	3	3
Pressurisation	3	—	—	—	3
Safety and warning devices	3	—	—	—	3
Instrument systems	3	3	3	3	3
Avionics systems	2	2	2	2	3
Electrical power	3	3	3	3	3
Equipment and furnishings	3	3	3	3	—
Electronic emergency equipment requirements and cabin entertainment equipment	—	—	—	—	3
Fire protection	3	3	3	3	3
Flight controls	3	3	3	3	3
Systems operation: electrical and fly-by-wire	3	—	—	—	3
Fuel systems	3	3	3	3	3
Hydraulic power	3	3	3	3	3
Ice and rain protection	3	3	3	3	3
Landing gear	3	3	3	3	3
Lights	3	3	3	3	3
Oxygen	3	3	—	—	1
Pneumatic and vacuum	3	3	3	3	3
Water and waste	3	3	—	—	3
On-board maintenance systems	3	3	—	—	3

Turbine engines					
Theoretical elements	Aeroplane turbine	Aeroplane piston	Helicopter turbine	Helicopter piston	Avionics
	B1.1	B1.2	B1.3	B1.4	B2
Constructional arrangement and operation	—	—	—	—	1
Engine performance	3	—	3	—	1
Inlet	3	—	3	—	—
Compressors	3	—	3	—	—
Combustion section	3	—	3	—	—
Turbine section	3	—	3	—	—
Exhaust	3	—	3	—	—
Bearings and seals	3	—	3	—	—
Lubricants and fuels	3	—	3	—	—
Lubrication systems	3	—	3	—	—
Fuel systems	3	—	3	—	3
Engine controls	3	—	3	—	3
FADEC	2	—	2	—	3
Air systems	3	—	3	—	—
Starting and ignition systems	3	—	3	—	—
Engine indicating systems	3	—	3	—	3
Power augmentation systems	3	—	—	—	—
Turbo-prop engines	3	—	—	—	—
Turbo-shaft engines	3	—	—	—	—
Auxiliary power units (APUs)	3	—	—	—	3
Powerplant installation	3	—	3	—	—
Fire protection systems	3	—	3	—	3

Turbine engines					
Theoretical elements	Aeroplane turbine	Aeroplane piston	Helicopter turbine	Helicopter piston	Avionics
	B1.1	B1.2	B1.3	B1.4	B2
Engine monitoring and ground Operation	3	—	3	—	—
Engine Storage and Preservation	3	—	3	—	—

Piston engines					
Theoretical elements	Aeroplanes turbine	Aeroplanes piston	Helicopters turbine	Helicopters piston	Avionics
	B1.1	B1.2	B1.3	B1.4	B2
Engine performance	—	3	—	3	1
Engine construction	—	3	—	3	1
Engine fuel systems	—	3	—	3	1
Carburettors	—	3	—	3	—
Fuel injection systems	—	3	—	3	—
Engine controls	—	3	—	3	3
FADEC	—	2	—	2	3
Starting and ignition systems	—	3	—	3	3
Induction, exhaust and cooling systems	—	3	—	3	—
Supercharging and turbocharging	—	3	—	3	—
Lubricants and fuels	—	3	—	3	—
Lubrication systems	—	3	—	3	—
Engine indication systems	—	3	—	3	3

Piston engines					
Theoretical elements	Aeroplanes turbine	Aeroplanes piston	Helicopters turbine	Helicopters piston	Avionics
	B1.1	B1.2	B1.3	B1.4	B2
Powerplant installation	—	3	—	3	—
Engine monitoring and ground operation	—	3	—	3	—
Engine storage and preservation	—	3	—	3	—
Propeller — general	3	3	—	—	1
Propeller construction	3	3	—	—	—
Propeller pitch control	3	3	—	—	—
Propeller synchronising	3	3	—	—	—
Propeller electronic control	2	2	—	—	3
Propeller ice protection	3	3	—	—	—
Propeller maintenance	3	3	—	—	—

Part 3

Practical elements

The practical element of the type training may be conducted simultaneously with the conduct of the theoretical element or provided separately as a stand-alone element.

Options for the practical element include structured on-the-job-training (**OJT**) performed according to a type-specific program. Such OJT would include training in maintenance of the aircraft, rigging, adjustments, replacement of line replaceable units, trouble shooting, rectification of minor defects and testing of systems covering each element of the course e.g. practical consolidation training (**PCT**).

Other options for the practical element training include targeted experience to be recorded within a Schedule of Experience or competency-based assessment of a Schedule of Practical Tasks.

Irrespective of how the practical training element is conducted, it must consist of the performance of representative maintenance tasks drawn from the type training and

examination syllabus, at the indicated level, and their assessment in order to meet the following objectives:

- (a) ensure safe performance of maintenance, inspections and routine work according to the maintenance manual and other relevant instructions and tasks as appropriate for the type of aircraft, for example troubleshooting, repairs, adjustments, replacements, rigging and functional checks such as engine run, etc, if required;
- (b) correctly use all technical literature and documentation for the aircraft;
- (c) correctly use specialist and special tooling and test equipment, perform removal and replacement of components and modules unique to type, including any on-wing maintenance activity.

Part 4

A Theory element — examination standard

Where aircraft type training is required, the examination must be written and comply with the following:

- 1 Format of the examination is usually of the multiple-choice type, however, a recognised organisation may propose a written paper. If multi-choice is adopted, each multiple-choice question must have 3 alternative answers of which only 1 can be the correct answer. The time for answering is based upon a nominal average of 120 seconds per level 3 question and 75 seconds per level 1 or 2 question.
- 2 The examination is usually of the closed book type with no reference material permitted. An exception will be made for the case of examining a B1 or B2 candidate's ability to interpret technical documents.
- 3 The number of questions must be at least 1 question per hour of instruction subject to a minimum of 2 questions per syllabus subject.
- 4 No examination may exceed 180 minutes in duration.
- 5 The examination pass mark is 75 %.
- 6 Penalty marking may not be used to determine whether a candidate has passed.

Note **Penalty marking** means deducting marks for an incorrect answer.

B Practical element — assessment standard

For assessment of practical elements of type training, the assessment may be oral, written or practical assessment based, or a combination of all of these. Conduct of the assessment method must be in accordance with the recognised organisation's exposition.

Practical assessment must determine a person's competence to perform a task based on a sample of subjects drawn from the type training and examination syllabus, at the indicated level.

A written report must be made by the assessor to explain why the candidate has passed or failed.

The assessment must ensure that the following objectives are met:

- 1 accurately and confidently discuss the aircraft and its systems;
- 2 ensure safe performance of maintenance, inspections and routine work according to the maintenance manual and other relevant instructions and tasks as appropriate for the type of aircraft, for example, troubleshooting, repairs, adjustments, replacements, rigging and functional checks such as engine run, etc, if required;
- 3 correctly use all technical literature and documentation for the aircraft;
- 4 correctly use specialist and special tooling and test equipment, perform removal and replacement of components and modules unique to type, including any on-wing maintenance activity.

Note to Civil Aviation Order 100.66

The Civil Aviation Order (in force under the *Civil Aviation Regulations 1988*) as shown in this document comprises Civil Aviation Order 100.66 made as indicated in the Table below.

Table of Orders

Year and number	Date of registration on FRLI	Date of commencement	Application, saving or transitional provisions
CAO 100.66 Instrument 2007	13 February 2007	14 February 2007	

Notice of Final Rule Making

(Including Summary of Responses & Disposition of Comments to
Civil Aviation Order 100.66 – Maintenance Authorities – EASA Equivalents)

Civil Aviation Order 100.66

Maintenance Authorities – EASA Equivalents

Document NFRM CAO 100.66

Copies of this Notice of Final Rule Making CAO 100.66 can be
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