



CIVIL AVIATION AUTHORITY
OF THE PHILIPPINES

ADVISORY CIRCULAR AC 02-019

SKILL TEST STANDARDS: AVIATION MAINTENANCE SPECIALIST (AVIONICS RATING)

SECTION 1 GENERAL

1.1 PURPOSE

This Advisory Circular (AC) provides guidance to individuals, organizations and examiners regarding the determination that an individual's skill level is adequate for the—

- Original issuance of an Aviation Maintenance Specialist License (AMS)/AVIONICS

1.2 STATUS OF THIS ADVISORY CIRCULAR

This is an original issuance of this AC.

1.3 BACKGROUND

- A. ICAO Standards in Annex 1, Personnel Licensing, require that, before issuing an Aviation Maintenance Specialist License, the State must assess the knowledge and skill of the individual to perform such operations.
- B. PCAR Part 2 establishes the specific requirements for AMS testing that parallel the ICAO Standards.
- C. This AC provides amplified standards for an AMS applicant and the person assigned to conduct the skill test for license

1.4 APPLICABILITY

- A. These Skill Test Standards are for use by examiners for determination of an individual's fitness to be issued and continue to hold AMS privileges.
- B. Aviation Maintenance Specialist instructors are expected to use these standards when preparing applicants for their AMS skill tests.
- C. Applicants should be familiar with these skill test standards and refer to them during their training.

- Advisory Circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.
 - Where a regulation contains the words "prescribed by the Authority," the AC may be considered to "prescribe" a viable method of compliance, but status of that "prescription" is always "guidance" (never regulation).
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1.5 RELATED REGULATIONS

The following regulations are directly applicable to the guidance contained in this advisory circular—

- PCAR Part 2, Personnel Licensing
- PCAR Part 5, Airworthiness
- PCAR Part 6, Approved Maintenance Organizations
- PCAR Part 7, Instruments & Equipment
- PCAR Part 8, Operations of Aircraft

1.6 RELATED PUBLICATIONS & REFERENCES

For further information on this topic, individuals, instructors and examiners are invited to consult the following publications—

1) Civil Aviation Authority of the Philippines

- ◆ AC 02-018: STS Aircraft Maintenance Technician.
- ◆ AC 05-002: Application & Process: Special Certificates of Airworthiness.
- ◆ AC 05-003: Disposition of Unsalvageable Parts & Materials
- ◆ AC 05-004: Eligibility & Traceability of Replacement Parts
- ◆ AC 05-005: Handling of Suspected Unapproved Aircraft Parts
- ◆ AC 08-015: Development of Acceptable Minimum Equipment Lists
- ◆ AC 08-016: Acceptable Aircraft Mass & Balance Control
- ◆ AC 08-018: Acceptable Required Flight Preparation Documents

Copies may be obtained from the CAAP Flight Standards Inspectorate Service.

2) United States Federal Aviation Administration (FAA)

- ◆ AC 65-24, Certification of Repairman (General)
- ◆ AC 65-23A, Certification of a Repairman (Experimental Aircraft Builders)
- ◆ AC 65-31, Training, Qualification and Certification of NonDestructive Inspection (NDI) Personnel
- ◆ AC 65-32, Certification of Repairman (Light-Sport Aircraft)

● Copies are normally available through training schools and instructors.
● Contact the Flight Standards Inspectorate Service if unable to find copies.

3) International Civil Aviation Organization (ICAO)

- ◆ Annex 1, Personnel Licensing
- ◆ Annex 8, Airworthiness of Aircraft
- ◆ Document 9051, Airworthiness Technical Manual
- ◆ Document 9760, Airworthiness Manual
- ◆ Document 9824, Human Factors for Aircraft Maintenance Manuals
- ◆ Circular 251, Human Factors in Aircraft Maintenance and Inspection

Copies may be obtained from Document Sales Unit, ICAO, 999 University Street, Montreal, Quebec, Canada H3C 5H7.

4) Recommended Commercial Publications

- ◆ ABS: Aircraft Basic Science, Glencoe-Macmillan/McGraw-Hill Publishing Co.
 - ◆ AEE: Aircraft Electricity and Electronics, Glencoe-Macmillan/McGraw-Hill Publishing Co.
 - ◆ AMR: Aircraft Maintenance and Repair, Glencoe—Macmillan/McGraw-Hill Publishing Co.
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- ◆ AMT-G: Aviation Maintenance Technician Series—General, Aviation Supplies and Academics (ASA), Inc.
- ◆ JSAT: A & P Technician Airframe Textbook—Jeppesen-Sandersen, Inc.
- ◆ JSGT: A & P Technician General Textbook—Jeppesen-Sandersen, Inc.

1.7 DEFINITIONS & ACRONYMS

The following definitions are used in this advisory circular—

- 1) **Examiner.** As used in this document, this word denotes either the CAAP Inspector or CAAP Designated Examiner who conducts the Skill Test.
- 2) **Objective.** Listing of the competency elements relating to a defined Subject Area to define knowledge and tasks that an applicant must be able to demonstrate satisfactorily.
- 3) **Subject Areas.** The groupings of competency elements pertaining to specific knowledge and skills.
- 4) **Testing Categories.** The groupings of knowledge and skill Subject Areas for the purposes of skill tests for AMT ratings.

1.7.1 ACRONYMS & ABBREVIATIONS

The following acronyms and abbreviations are used in this advisory circular—

- 1) **AC** – Alternating Current
- 2) **CAAP** – Civil Aviation Authority of the Philippines
- 3) **CG** – Center of Gravity
- 4) **DC** – Direct Current
- 5) **FSIS** – Flight Standards Inspectorate Service
- 6) **AMS** – Aviation Maintenance Specialist License
- 7) **CAAP** – Civil Aviation Authority of the Philippines
- 8) **MAC** – Mean Aerodynamic Chord
- 9) **PCARs** – Philippine Civil Aviation Regulations
- 10) **PEL** – Personnel Licensing
- 11) **TCDS** – Type Certificate Data Sheet

SECTION 2 INTRODUCTORY INFORMATION

2.1 AVIATION MAINTENANCE SPECIALIST SKILL TEST PREREQUISITES

An applicant for the Aviation Maintenance Specialist Skill Test is required to—

- 1) Be at least 18 years of age;
 - 2) Demonstrate the ability to read, write, speak, and understand the English language by reading and explaining appropriate maintenance publications and by writing defect and repair statements;
 - 3) Comply with the knowledge, experience, and competency requirements prescribed for the license and rating sought; and
 - 4) Pass all of the prescribed tests for the license and rating sought, within a period of 24 months.
 - 5) Be a citizen of the Philippines or a citizen of a foreign country granting similar rights and
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privileges to citizens of the Philippines subject, however, to existing treaty or treaties, and agreements, entered into by the Philippine Government with foreign countries, and subject, further, to security measures adopted by the Philippine Government.

- 6) *For AMS Specialized Services ratings*, be specially qualified to perform maintenance on aircraft or components thereof, appropriate to the job for which he/she was employed;
- 7) *For AMS Specialized Services ratings*, be employed for a specific job requiring those special qualifications by an approved maintenance organization certificated under Part 6 allowed by its operating certificate and approved specific operating provisions to provide maintenance, preventive maintenance, or modifications to aircraft; and
- 8) *For AMS Specialized Services ratings*, be recommended for certification by his employer, to the satisfaction of the Authority, as able to satisfactorily maintain aircraft or components, appropriate to the job for which he is employed;
- 9) A licensed AMS who applies for an additional rating must meet the requirements of this Part and, within a period of 24 months, pass the tests prescribed by the Authority for the additional rating sought.

2.2 APPLICANT SKILL TEST PREPARATION CHECKLIST

The following guidance is provided to ensure that the applicant arrives at the appointment with all equipment and documents necessary for the administration of the skill test, including—

2.2.1 APPOINTMENT WITH EXAMINER

- A. Contact the CAAP-FSIS to be assigned an examiner for the purpose of the skill test.
- B. Contact the examiner to arrange a suitable location, date and time.
- C. Plan to arrive at the designated location before the actual time of the appointment.

2.2.2 TOOLS & EQUIPMENT

- A. The examiner will must provide the tools, equipment, forms, supplies and technical data necessary to conduct the appropriate skill test.
- B. The applicant may bring personal tools to the skill tests, if permitted by the examiner.

2.2.3 PERSONAL RECORDS

The applicant must provide the following personal records before the skill test can be administered—

- 1) LCD Form 01-10
 - 2) PEL license (if applicable)
 - 3) Completed FSIS Form 542, or Other PEL Rating Application, with Instructor's Signature (If applicable)
 - 4) Aeronautical knowledge test report/Certificate of Official Release.
 - 5) Skill test report and Skill test result;
 - 6) FSIS-Form 555, Notice of Disapproval (if applicable)
 - 7) Graduation certificate and Official Transcript of records from an Approved Training Organization (if applicable)
 - 8) Certificate of Employment
 - 9) Certificate of Training (if applicable)
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2.3 A PRETEST INTERVIEW WILL BE CONDUCTED

2.3.1 CONTENTS OF INTERVIEW

The examiner will accomplish the pretest interview face to face, by telephone/fax, through e-mail, or other methods to—

- 1) Discuss fees, testing procedures, projects, and type of equipment to be used and what the applicant should expect if they pass, fail, or do not complete the test.
- 2) Determine whether the applicant will take the full test, or desires to take an abbreviated test which may result in significant limitations placed on his license.

Refer to Appendix A for the authorized reductions to the full test for an airframe or power-plant rating and the subsequent limitations.
- 3) Advise the applicant when the day's activities terminate, and when testing resumes if more than 1 day is needed.
- 4) Ensure the applicant's eligibility.

All applicants must have met the prescribed experience requirements as stated in PCAR Part 2

 - (a) Review the application for completeness and correctness.
 - (b) The examiner will have the applicant correct any errors.
 - (c) This may require the applicant to return to CAAP where authorization was obtained.
 - (d) Review the applicant's current written test results that are applicable to the rating(s) sought.
 - (e) Advise applicant of retesting after failure provisions and restrictions.

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2.3.2 REASONABLE FEE MAY BE CHARGED

- A. The examiner may charge a reasonable fee to each applicant for—
 - 1) Handling the forms and reports incident to the issuance of an aviation maintenance specialist license, and
 - 2) Use of the examiner's facilities, equipment, and materials, service in administering the oral and practical tests.
- B. The examiner and the applicant should reach a mutual understanding and agreement of the total fee for the examiner's services before beginning the tests.
 - An agreement in writing may be to the advantage of both the examiner and the applicant.

SECTION 3 GUIDELINES FOR SKILL TESTING

- A. The Aircraft Maintenance Specialist (Avionics) Skill Test Standards include the Testing Categories with Subject Areas of knowledge and skill for the original issuance of an aviation maintenance specialist license and/or the addition of a rating.
 - The subject areas include the competency elements in which aviation maintenance specialist applicants must have knowledge and/or demonstrate skill.
- B. Detailed descriptions relating to the subject areas are not included in the Skill Test Standards, because this information can be found in references listed and/or in manufacturer or CAAP-approved or acceptable data related to each subject area.
- C. Each subject area has an objective. The objective lists the important knowledge and skill competency elements that must be utilized by the--
 - 1) Examiner in planning and administering aviation maintenance specialist tests; and
 - 2) Applicant to be prepared to satisfactorily perform.

3.1 USE OF THE SKILL TEST STANDARDS

- A. The CAAP requires that all Skill Tests be conducted in accordance with the appropriate Skill Test Standards. When using these Skill Test Standards contained in this document, the examiner must evaluate the applicant's knowledge and skill in sufficient depth to determine that the objective for each subject area element selected is met.
- B. An applicant is not permitted to know before testing begins which competency elements in each subject area will be included in his/her test (except the core competency elements, which all applicants are required to perform).

Those skill elements identified as "Core Competency Elements" will be required for all applicants.

 - Therefore, an applicant should be well prepared in *all* oral and skill areas included in the Skill Test Standard outlined in this document.

3.2 COMPETENCY TERMS

The following terms may be reviewed with the applicant prior to, or during, element assignment--

- 1) "Inspect" means to examine by sight and/or touch (with or without inspection enhancing tools/equipment).
 - 2) "Check" means to verify proper operation.
 - 3) "Troubleshoot" means to analyze and identify malfunctions.
 - 4) "Service" means to perform functions that assure continued operation.
 - 5) "Repair" means to correct a defective condition.
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3.3 PERFORMANCE LEVELS

The following is a detailed description of the meaning of each level—

3.3.1 LEVEL 1

- Know basic facts and principles.
- Be able to find information and follow directions and written instructions.
- Locate methods, procedures, instructions, and reference material.
- Interpretation of information not required.
- No skill demonstration is required.

3.3.2 LEVEL 2

- Know and understand principles, theories, and concepts.
- Be able to find and interpret maintenance data and information, and perform basic operations using the appropriate data, tools, and equipment.
- A high level of skill is not required.

3.3.3 LEVEL 3

- Know, understand, and apply facts, principles, theories, and concepts.
- Understand how they relate to the total operation and maintenance of aircraft.
- Be able to make independent and accurate airworthiness judgments.
- Perform all skill operations to a return-to-service standard using appropriate data, tools, and equipment. Inspections are performed in accordance with acceptable or approved data.
- A fairly high skill level is required.

3.4 SELECTING COMPETENCY ELEMENTS FOR TESTING

A. The knowledge (oral) and skill (practical) competency elements listed in the STS in this document will be used by the examiner to administer the skill test.

Examiners will be working from a plan of action that has been approved by the CAAP to ensure that the testing uses standardized methodology.

B. Applicants should be aware that all knowledge questions and skill element test projects used by the examiner to test the competency elements have been reviewed and approved by the CAAP prior to their use in the testing process.

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C. The examiner will use the following method to select competency elements for testing in each Subject Area of each Testing Category required for the rating sought—

The examiner will not test every element listed in each Task.

- 1) One-third of the competency elements must be Level 1 competency or higher;
- 2) Additionally one-third of the elements must be Level 2 or higher; and
- 3) Finally one-third of the competency elements selected must be Level 3, even though the applicant may not have used some of the skills in past or present jobs.

An applicant must be able to demonstrate satisfactory knowledge and skill in the assigned elements in each Task to the required standard.

If a competency element in a Subject Area is listed as a "Core Competency Element," that element must be included in the test.

3.5 PRESCRIBED LENGTH OF TIME

A. There is no standard length of time prescribed for the knowledge and skill test.

Both the applicant and the examiner should plan the testing times so the applicant completes most of the test once it commences.

B. The testing period will be long enough to make a valid determination in each Subject Area for the rating sought.

C. The examiner will take appropriate time to ensure that all required knowledge element questions and skill element practical projects have been completed for the rating sought.

D. Although it may be necessary to continue a test for more than 1 day, tests must not be allowed to continue for long periods.

Suspending the test to allow the applicant further study is not allowed.

- Progressive testing is defined as testing which continues for more than four sessions in a 4-day period.

3.5.1 TESTING CATEGORIES (AVIONICS RATING)

A. There are 5 testing categories included in these Skill Test Standards—

- 1) Avionics - General
- 2) Avionics – Electrical
- 3) Avionics – Instruments
- 4) Avionics - Autoflight
- 5) Avionics-Radio & Navigation

B. The examiner should begin the test with the intent to complete the testing for the rating sought.

The examiner should not begin a test with the intent of testing the General competency elements only.

3.5.2 CONDUCTING THE ORAL PORTIONS OF THE TEST

A. Oral questioning may be used at any time during the practical test.

- At least four questions will be asked in each Subject Area.
 - These questions should be from more than one element listed under Objective 1 in the STS for that Subject Area.
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- The applicant must be able to answer successfully 70 percent of the oral questions asked in each Subject Area.
 - Each Subject Area must be passed in order to pass a Testing Category.
 - No more than 10 questions will be used by the examiner to evaluate a Subject Area.
- B. An applicant's answers to oral questions must show an understanding of the subject and ability to apply knowledge.
- The applicant's skill of oral expression or ability to memorize details will not be allowed to affect oral test evaluation.
 - The examiner may ask additional exploratory questions to verify the applicant's understanding of the subject area, but this will not be considered as part of the test.
- Applicants shall not be expected to memorize all mathematical formulas that may be required in the performance of various elements in this Skill Test standard.
 - However, where relevant, applicants must be able to locate and apply necessary formulas to obtain correct solutions.
- C. The knowledge questions will be—
- 1) Clear.
 - 2) Grammatically correct.
 - 3) Concise.
 - 4) Pertinent to the skill element when combining knowledge (oral) and skill elements.
 - 5) Have only one correct answer.
- Content should establish the conditions or significant circumstances so the examiner and the applicant will have the same mental picture.
- Long questions can be complex and ambiguous.
- D. The questions will not—
- 1) Be open-ended or multiple-choice questions.
 - 2) Require any further information or clarification.
 - 3) Be manufacturer-specific.
 - 4) Contain double negatives.
 - 5) Have two parts.
 - 6) Contain clues to the answer.
- E. Knowledge questions should be limited only to who, what, when, where, how, or why, not a combination.
- F. Answers to the knowledge questions must be found within CAAP-approved or accepted information sources, including—
- 1) Recommended references
 - 2) Advisory circulars (AC)
 - 3) PCARs.
- G. The examiner is looking evaluate the applicant's basic knowledge. To determine if the oral questions are answered correctly, the examiner must be able to reference information (e.g., manufacturer's data, ACs, PCARs). The examiner must be objective in making the determination.
- The applicant must be able to answer successfully all oral questions without the use of any reference materials.
 - While the answers to the oral questions should be available in the PCARs, manufacturer's maintenance data, or other aviation related data, the use of any reference materials will not be allowed.
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3.6 CONDUCTING THE PRACTICAL PORTIONS OF THE TEST

3.6.1 SUBJECT AREAS

- A. All Subject areas required for the rating sought must be tested; however, the examiner is not required to test every element in each Subject area.
- B. In Subject Areas where a core competency element is identified, the examiner should test the applicant on the core competency element and at least one other skill element selected from the Subject Area.
- C. The applicant must pass each Subject Area to pass a Testing Category.
 - The examiner may combine two or more Subject Areas within a practical project as needed to facilitate testing.
 - However, the examiner must be able to make an objective determination of an applicant's performance in each Subject Area tested.

3.6.2 SKILL (PRACTICAL) ELEMENT PROJECTS

- A. The objective of this portion of the skill testing is to measure an applicant's basic skills in a Competency Elements/Task.
- B. The examiner has designed the projects directly relational to its assigned level and to the accuracy of this measurement.

Several Subject Areas may be evaluated during an assigned practical project.
- C. The following basic guidelines were used to develop the skill projects.
 - 1) The givens (e.g., specific tools, equipment, mock ups, and technical data) that will be required for the project will be provided;
 - 2) The level should be clearly identified, clear and concise with the level; and
 - 3) The standard(s) by which the project will be graded will be presented. The examiner has developed a performance standard for each project which include:
 - (a) What the applicant must do. As an example: (for AMS applicants) Select materials and tools and accomplish a wire splice.
 - (b) How it must be done. As an example: use of proper information (e.g., manufacturer's data, Type Certificate Data Sheet (TCDS)) proper tooling, and observance of all applicable safety precautions.

3.6.3 EVALUATION OF THE PRACTICAL PROJECTS

- A. The examiner must determine if the applicant's project is acceptable.
 - The examiner must personally observe all practical projects performed by the applicant.
 - Be objective in making this determination. The applicant must be able to demonstrate satisfactory proficiency and competency using basic aircraft mechanic skills.
- B. The applicant must demonstrate an approval for return to service standard, where applicable, and demonstrate the ability to locate and apply the required reference materials, where applicable.
- C. For instances where an approval for return to service standard cannot be achieved, the applicant must be able to explain why the return to service standard cannot be met (e.g., when tolerances are outside of a product's limitations).

3.6.4 TOOLS, EQUIPMENT & REFERENCE MATERIALS

- A. The examiner will provide all tools, equipment, and reference materials for the Subject Area elements selected. These materials must include, but are not limited to—
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- PCARs
 - TCDS
 - Airworthiness Directives
 - Advisory circulars
 - Manufacturer's technical and parts manuals, service information, and any other instructions and/or reference materials that are necessary for the objective accomplishment of the assigned Subject Area element(s).
- B. All reference material must be unmarked and in good condition.
- The applicant's use of other reference material, not provided by the examiner, is prohibited.
- C. Applicants may use personal tools and equipment at the discretion of the examiner.
- Use of non-programmable calculators is permitted where appropriate.
- D. Publications other than those listed may be used as references if their content conveys substantially the same information as the referenced publications.
- Document references listed in this document are NOT meant to supersede or otherwise replace manufacturer or other CAAP-approved or acceptable data.
 - They serve as general information and study material sources.
- E. Information contained in manufacturer and/or CAAP approved/acceptable data always takes precedence over advisory or textbook referenced data.

3.7 EVALUATION OF PERFORMANCE

- A. The examiner who conducts the Skill Test is responsible for determining that the applicant meets acceptable standards of knowledge and skill in the STS subject areas for the rating sought.
- Since there is no formal division between the knowledge and skill portions of the Skill Test, this becomes an ongoing process throughout the test.
- B. An applicant is not expected to be competent in all phases of overhaul, maintenance, alteration, and repair, or be highly skillful in performing complex manipulative operations.
- But applicants are expected to have developed basic skills and be able to demonstrate them during the practical test.
- C. The examiners will inform the applicant of the level of performance expected before beginning each project.
- Applicants can find the required performance levels in the STS in this document.

3.7.1 SATISFACTORY PERFORMANCE

- A. The Skill Test is passed if the applicant demonstrates the prescribed proficiency in the assigned elements (core competency and other selected elements) in each subject area to the required standard.
- B. The following standards will be used by the examiner for evaluating applicant performance—
- 1) Approach to the project; proper information and tools; preparation of the equipment; and observation of safety precautions;
 - 2) Cleaning, preparing, and protecting parts; skill in handling tools; thoroughness and cleanliness;
 - 3) The functions of the units or systems of the assigned project; use of current maintenance and/or overhaul procedures;
 - 4) Final inspection for safety and operation;
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- 5) Completion of required forms and records;
- 6) Application of appropriate rules; and
- 7) Attitude toward safety, manufacturer's recommendations, and acceptable to industry practices.

3.7.2 UNSATISFACTORY PERFORMANCE

- A. If the applicant does not meet the standards of any of the elements performed (knowledge, core competency, or other skill elements), the associated subject area is failed, and thus the Skill Test is failed.
- B. Typical areas of unsatisfactory performance and grounds for disqualification include the following—
 - 1) Any action or lack of action by the applicant that requires corrective intervention by the examiner for reasons of safety.
 - 2) Failure to follow acceptable or approved maintenance procedures while performing skill (practical) projects.
 - 3) Exceeding tolerances stated in the maintenance instructions.
 - 4) Failure to recognize improper procedures.
 - 5) The inability to perform to a return to service standard, where applicable.
 - 6) Inadequate knowledge in any of the subject areas.

3.7.3 FAILURE TO PERFORM AT AN ACCEPTABLE LEVEL

3.7.3.1 Testing Category

- A. When it becomes obvious during the test that an applicant cannot perform at an acceptable level and has already failed several Subject Areas in a Testing Category, the examiner may discontinue testing in that category and go on to the next category.
- B. In some cases, however, it may be advantageous to continue to the end of the category so the applicant will know his/her strengths and weaknesses when preparing for retest.

3.7.3.2 Subject Area

- A. If, in the judgment of the examiner, the applicant does not meet the standards of performance of any task performed, the subject area is failed and; therefore, the skill test performance will be unsatisfactory.
- B. When it becomes obvious during the test that an applicant cannot perform at an acceptable level and has failed a Subject Area, the examiner may discontinue testing in that Subject Area and go on to the next Subject Area.

- The test may be continued only with the consent of the applicant.
- The examiner or the applicant may discontinue the testing any time after the failure of a Subject Area.

3.7.3.3 Disapproval or Discontinuance

- A. If the test is discontinued, the applicant is entitled to credit for only those areas of operation and their associated tasks satisfactorily performed.
- B. When a Notice of Disapproval is issued, the examiner shall record the—

During the re-test and at the discretion of the examiner, any element in a Subject Area may be re-evaluated, including those previously passed.

- 1) Applicant's unsatisfactory performance in terms of the area of operation and specific task(s) not meeting the standard appropriate to skill test conducted;
- 2) The area(s) of operation/task(s) not tested; and
- 3) Number of skill test failures shall also be recorded.

3.7.3.4 Letter of Discontinuance

A. When a skill test is discontinued for reasons other than unsatisfactory performance (i.e., equipment failure or illness), the examiner at that time shall prepare, sign and issue a Letter of Discontinuance to the applicant.

The Letter of Discontinuance should identify the Elements and the Core Competency tasks of the skill test that were successfully completed.

B. The following documents will be returned to the applicant—

- 1) The license application form; and
- 2) The Aviation Maintenance Specialist knowledge test results

C. The applicant shall be advised that the Letter of Discontinuance shall be presented to the examiner when the skill test is resumed, and made part of the certification file.

3.7.4 INCOMPLETE TEST

A. Should the test not be completed in the allotted time frame, the examiner will forward this incomplete test file to the CAAP office within 7 calendar-days.

B. When practical, schedule a retest for the areas not completed at the time the test is discontinued.

Treat this retest as if the applicant had failed those portions not tested.

3.7.5 RE-TEST IN ALL REQUIRED AREAS

A. Applicants for a re-test in all areas of the oral and/or practical tests in the Testing Category(s) or Area(s) of Operation listed as failed, that was/were not taken, or that has/have expired.

- 1) Applicants who apply for retesting within 60 calendar-days to the same examiner who gave the failed test may, at the option of the examiner, be tested in only the Subject Areas failed on the previous test (provided applicant has successfully passed all other Subject Areas within that Testing Category).

New questions and practical projects may be included in the retest.

- 2) Practical projects will be re-tested at the same level as failed.

SECTION 4 GENERAL SUBJECTS

The applicant must first satisfactorily complete the Subject Areas in this Testing Category for the AMS avionics ratings.

4.1 SUBJECT AREA: BASIC ELECTRICITY

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following—
 - (a) Sources and/or effects of capacitance in a circuit.
 - (b) Uses of capacitance in a circuit.
 - (c) Sources and/or effects of inductance in a circuit.
 - (d) Uses of inductance in a circuit.
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- (e) Operation of basic AC and/or DC electrical circuits.
 - (f) Ohm's law.
 - (g) Kirchhoff's law(s).
 - (h) Procedures used in the measurement of voltage, current, and/or resistance.
 - (i) Determining power used in simple circuits.
 - (j) Troubleshooting, and/or repair or alteration using electrical circuit diagrams.
 - (k) Common types of defects that may occur in an installed battery system.
 - (l) Aircraft battery theory/operation.
 - (m) Servicing aircraft batteries.
 - (n) Digital techniques, computers and associated devices
- 2) Demonstrates the ability to perform both of the following----
- Core Competency Element
- (a) Use measuring equipment to measure in a circuit or circuit components), at least one of the following: voltage, current, resistance, or continuity. (Level 3)
 - (b) Determine the appropriateness of measurements according to instructions/ specifications. (Level 3)
- 3) Demonstrates the ability to perform at least one of the following—
- (a) Read and interpret one or more electrical circuit diagrams. (Level 3)
 - (b) Troubleshoot an electrical circuit. (Level 3)
 - (c) Calculate voltage, current, and resistance using Ohm's Law. (Level 3)
 - (d) Inspect a battery and installed battery system. (Level 2)
 - (e) Accomplish a battery state-of-charge (hydrometer) and/or electrical leak (cell imbalance) test. (Level 2)
 - (f) Accomplish removal and/or installation of a battery in an aircraft. (Level 2)
 - (g) Set-up and connect a charger to one or more batteries for constant current and/or constant voltage charging. (Level 2)

4.2 SUBJECT AREA: AIRCRAFT ELECTRICAL DRAWINGS

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following—
- (a) Characteristics and/or uses of any of the various types of electrical diagrams and/or system schematics.
 - (b) The meaning of any of the lines and symbols commonly used in aircraft electrical diagrams/schematics.
 - (c) Using charts or graphs.
 - (d) Troubleshooting an aircraft system or component(s) using electrical and/or system schematics.
 - (e) Inspection of an aircraft system or component(s) using electrical and/or system schematics.
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- (f) Repair or alteration of an aircraft electrical system or component(s) using drawings/blueprints and/or schematics.
- (h) Terms used in conjunction with aircraft drawings/blueprints and/or system schematics.

- 2) Demonstrates the ability to perform at least one of the following—

● Core Competency Element

- (a) Maintenance and/or inspection using drawings/blueprints and/or system schematics. (Level 3)
- (b) Preventive maintenance using drawings/blueprints and/or schematics. (Level 3)
- (c) Troubleshooting using drawings/blueprints and/or schematics. (Level 3)
- (d) Draw a diagram of an electrical circuit or other system, or portion thereof, and explain the drawing. (Level 3)

4.3 SUBJECT AREA: MATERIALS & PROCESSES

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following:

- (a) Precision measurement and precision measurement tools.
- (b) Identification, selection, installation, and/or use of aircraft electrical/electronic hardware.
- (c) Finding information about material types for specific application(s).
- (d) Identify basic tools.

- 2) Demonstrates the ability to perform at least two of the following:

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- (a) Torque to specification and safety wire components and hardware. (Level 3)
- (b) Soldering and wire crimping. (Level 3)
- (c) Wire stamping and bundling (Level 3)
- (d) Select materials and tools and accomplish a wire splice. (Level 3)
- (e) Select and install one or more wires and pins and/or sockets in a connector. (Level 3)

- 3) Demonstrates the ability to perform at least one of the following—

- (a) Select and install standard aircraft hardware, to include one or more self-locking nuts. (Level 2)
 - (b) Select and install one or more appropriate screws/bolts, nuts, cotter pins, and washers. (Level 3)
 - (c) Inspect electrical hardware for defects, proper installation (Level 3)
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4.4 SUBJECT AREA: MATHEMATICS

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following—

The practical portion of the Mathematics subject area may be tested simultaneously when performing calculation(s) in subject areas Basic Electricity and/or Weight and Balance.

- (a) Areas of various geometrical shapes.
 - (b) Volumes of various geometrical shapes.
 - (c) Definitions/descriptions of geometrical terms, including but not limited to any of the following: polygon, pi, diameter, radius, and hypotenuse.
 - (d) Ratio problems, including one or more examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
 - (e) Proportion problems, including one or more examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
 - (f) Percentage problems, including one or more examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
 - (g) Algebraic operations, including one or more examples of where or how they may be used in relation to aircraft maintenance.
 - (h) Conditions or areas where metric conversion may be necessary.
- 2) Demonstrates the ability to perform at least one of the following, using appropriate formulas—
 - (a) Calculate the area of a polygon and/or circle. (Level 2)
 - (b) Calculate the volume of a sphere, cube, or cylinder. (Level 2)
 - (c) Algebraic operations involving addition, subtraction, multiplication, and/or division of positive and negative numbers. (Level 2)
 - (d) Locate mathematical formulas used to assist in the maintenance, preventive maintenance, or alteration of aircraft. (Level 1)

4.5 SUBJECT AREA: MAINTENANCE FORMS & RECORDS

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following—
 - (a) Writing descriptions of work performed and approval for return to service after minor repairs or minor alterations.
 - (b) The content, form and disposition of aircraft maintenance records reflecting approval for return to service after a 100-hour inspection.
 - (c) The content, form and disposition of aircraft maintenance records reflecting disapproval for return to service after a 100-hour inspection.
 - (d) The recording content, form and disposition requirements for licensed aviation maintenance specialist (without an Inspection Authorization) who perform major repairs and/or major alterations.
 - (e) The inoperative instruments or equipment provisions of PCAR Part 8.
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- (f) The definition/explanation of any of the terms used in relation to aircraft maintenance, such as overhaul(ed), rebuilt, time in service, maintenance, preventive maintenance, inspection, major alteration, major repair, minor alteration, and minor repair
- 2) Demonstrates the ability to write appropriate entries on CAAP Form 523, Major Repair and Major Alteration, indicating performance of a major repair, and make appropriate corresponding aircraft maintenance record entry. (Level 3)
- 3) Demonstrates the ability to write entries for at least one of the following—
- (a) Performance of minor repair or minor alteration. (Level 3)
 - (b) Performance of preventive maintenance. (Level 3)
 - (c) Compliance with an airworthiness directive. (Level 3)
 - (d) Performance of a 100-hour inspection with approval for return to service, including a list of some allowable inoperative instruments or equipment in accordance with the provision of PCAR Part 8. (Level 3)
 - (e) Performance of a 100-hour inspection with disapproval for return to service because of needed maintenance, or noncompliance with applicable specifications or airworthiness directive(s). (Level 3)
 - (f) CAAP Form 523, Major Repair and Major Alteration, for additional equipment installation or an alteration in accordance with a supplemental type certificate (STC) and make appropriate maintenance record entry. (Level 3)
 - (g) CAAP Form 524, Malfunction or Defect Report. (Level 3)

● Core Competency Element

4.6 SUBJECT AREA: BASIC PHYSICS

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following—
 - (a) Any of the simple machines, how they function, and/or how mechanical advantage is applied in one or more specific examples.
 - (b) Sound resonance, how it can be a hazard to aircraft, and how sound may be used to aid in inspecting aircraft.
 - (c) The relationship between fluid density and specific gravity.
 - (d) The characteristic of specific gravity of fluids and how it may be applied to aircraft maintenance.
 - (e) The general effects of pressure and temperature on gases and liquids and how the qualities of compressibility and/or incompressibility of gases and liquids are generally applied to aircraft systems.
 - (f) Density altitude and the effects of temperature, and/or pressure, and/or humidity on aircraft and/or engine performance.
 - (g) Heat, how it is manifested in matter, and how heat transfer is accomplished through conduction, and/or convection, and/or radiation.
 - (h) Coefficient of linear (thermal) expansion as related to aircraft materials.
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- (i) Aircraft structures and theory of flight/physics of lift.
 - (j) The operation of aerodynamic factors in the flight of airplanes and/or helicopters.
 - (k) The relationship between force, area, and pressure.
 - (l) The five forces or stresses affecting aircraft structures.
 - (m) The two forms of energy and how they apply to aircraft and/or aircraft systems.
- 2) Demonstrates the ability to perform at least one of the following—
- (a) Identify any parts or systems of an aircraft and/or engine where Bernoulli's principle and/or Newtonian law is applied. (Level 1)
 - (b) Identify parts or systems of an aircraft where Boyle's, Charles', and/or Pascal's Laws apply. (Level 2)
 - (c) Calculate force, area, or pressure in a specific application. (Level 2)
 - (d) Identify one or more methods of heat transfer in aircraft systems and where and how heat damage may occur when performing aircraft maintenance. (Level 1)
 - (e) Identify any of the following and describe how they function aerodynamically: stall strips, wing fences, vortex generators, flaps, slats, spoilers, ailerons, stabilators, elevators, rudders, or trim tabs. (Level 1)
 - (f) Determine which of the five forces/stresses are acting on an aircraft or aircraft parts at specific points under given conditions. (Level 1)
 - (g) Design a simple machine (on paper) that uses one or more methods of mechanical advantage. (Level 1)

4.7 SUBJECT AREA: MAINTENANCE PUBLICATIONS

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following—
- (a) How a technician makes use of Type Certificate Data Sheets (TCDSs) and/or Aircraft Specifications in conducting maintenance or inspections.
 - (b) Aircraft maintenance manuals and associated publications including any of the following types of publications and how they are used: service bulletin, maintenance manual, overhaul manual, structural repair manual, or instructions for continued airworthiness.
 - (c) The requirements of PCAR Part 5 in the performance of maintenance.
 - (d) Airworthiness Directives (AD), including purpose and/or AD categories and/or ADs issued to other than aircraft.
 - (e) In what form individuals may receive CAAP published AD summaries and/or how they may be obtained.
 - (f) The AD identification numbering system.
 - (g) CAAP Advisory Circulars (ACs) including any of the following: significance of the AC numbering system, one or more examples of ACs issued to provide information in designated subject areas, one or more examples of ACs issued to show a method acceptable to the CAAP complying with the PCARs.
 - (h) The intent or function of the Aviation Maintenance Alerts.
 - (i) The Air Transport Association (ATA) Specification 100.
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- 2) Demonstrates the ability to perform both of the following—
- (a) Read, comprehend, and apply information contained in a manufacturer's maintenance manual or illustrated parts manual. (Level 3)
- 3) Demonstrates the ability to read, comprehend, and apply the information contained in at least one of the following—
- (a) Service bulletin. (Level 2)
- (b) Overhaul manual. (Level 2)
- (c) Instructions for continued airworthiness. (Level 3)
- (d) At least one maintenance related section, or appendix, or portion(s) thereof, of the PCARs. (Level 2)
- (e) An AD. (Level 3)
- (f) Aircraft Specifications or TCDS to specific maintenance or inspection operations, or portions thereof. (Level 3)

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4.8 AIRCRAFT MAINTENANCE SPECIALIST PRIVILEGES & LIMITATIONS

Objective. To determine that the applicant—

- 1) Exhibits knowledge of privileges and limitations and exercise thereof, including at least two of the following—
- (a) Required evidence of eligibility experience satisfactory to the Administrator.
- (b) Length of experience required for eligibility.
- (c) Practical experience required for eligibility.
- (d) The privileges in relation to 100-hour and annual inspections.
- (e) Change of address reporting requirements.
- (f) Minimum age requirements.
- (g) Recent experience requirements to exercise privileges of a certificate.
- (h) Who is authorized to perform maintenance/inspection, preventive maintenance, rebuilding, or alteration and/or approve for return to service afterwards.
- (i) Causes for revocation or suspension.
- (j) Criteria for determining major and minor repair or alteration.
- 2) When given a copy of PCAR Part 2, demonstrates the ability to understand AMS privileges and limitations by finding and interpreting/explaining essential information contained in at least two of the following—
- (a) Offenses involving alcohol or drugs. (Level 2)
- (b) Written tests: Cheating or other unauthorized conduct. (Level 2)
- (c) Applications, certificates, logbooks, reports, and records: Falsification, reproduction, or alteration. (Level 2)
- (d) Refusal to submit to a drug or alcohol test. (Level 2)
- (e) General privileges and limitations. (Level 2)
- (f) Recent experience requirements. (Level 2)
- (g) Display of certificate (Level 2)

SECTION 5 AVIONICS – ELECTRICAL

5.1 SUBJECT AREA: AIRCRAFT ELECTRICAL SYSTEM & MAINTENANCE PRACTICES

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following:
 - (a) Factors to consider when selecting wire size for an aircraft circuit.
 - (b) Routing and/or installation of electric wire or wire bundles.
 - (c) Wire splicing.
 - (d) Use of derating factors in switch selection.
 - (e) Requirements for circuit protection devices.
 - (f) Voltage regulator: purpose and operating characteristics.
 - (g) Lighting and/or lighting system components.
 - (h) Electric motor operation and/or motor components.
 - (i) Constant speed drive (CSD) and/or integrated drive generator (IDG) systems and/or system components.
 - (j) Airframe electrical system components.
 - (k) Wiring defects and/or inspection.

 - 2) Demonstrates the ability to troubleshoot an electrical system or portion thereof, using appropriate tools and/or test equipment. (Level 3) ● Core Competency Element

 - 3) Demonstrates the ability to perform at least one of the following—
 - (a) Select a circuit switch or circuit protection device for a specific aircraft and application. (Level 2)
 - (b) Install a circuit switch or circuit protection device. (Level 3)
 - (c) Select materials and tools and accomplish a wire splice. (Level 3)
 - (d) Adjust one or more voltage regulators. (Level 3)
 - (e) Select and install one or more wires and pins and/or sockets in a connector. (Level 3)
 - (f) Select materials and fabricate a bonding wire. (Level 3)
 - (g) Install a bonding wire and accomplish a resistance check. (Level 3)
 - (h) Check the operation of one or more airframe electrical system circuits and/or system components. (Level 3)
 - (i) Inspect and check a landing light. (Level 3)
 - (j) Inspect and check anti-collision and position lights. (Level 3)
 - (k) Inspect generator brushes and determine serviceability. (Level 3)
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5.2 SUBJECT AREA: ENGINE ELECTRICAL SYSTEM & MAINTENANCE PRACTICES

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following—
 - (a) Generator rating and performance data location.
 - (b) Operation of a turbine engine starter-generator.
 - (c) The procedure for locating the correct electrical cable/wire size needed to fabricate a replacement cable/wire.
 - (d) Installation practices for wires running close to exhaust stacks or heating ducts.
 - (e) Operation of engine electrical system components.
 - (f) Types of and/or components of D.C. motors.
 - (g) Inspection and/or replacement of starter-generator brushes.
- 2) Demonstrates the ability to perform at least one of the following—
 - (a) Flash a generator field. (Level 3)
 - (b) Install an engine driven generator or alternator. (Level 3)
 - (c) Use of an engine electrical wiring schematic. (Level 3)
 - (d) Accomplish the installation of a tach generator. (Level 3)
 - (e) Fabricate an electrical system cable. (Level 3)
 - (f) Repair a damaged engine electrical system wire. (Level 3)
 - (g) Replace and check a current limiter. (Level 3)
 - (h) Check/service/adjust one or more engine electrical system components. (Level 3)
 - (i) Troubleshoot an engine electrical system component. (Level 3)

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SECTION 6 AVIONICS - INSTRUMENTS

6.1 SUBJECT AREA: AIRCRAFT INSTRUMENTS

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following—
 - (a) Magnetic compass operation.
 - (b) Magnetic compass swinging procedures.
 - (c) Gyroscopic instrument(s) purpose and operation.
 - (d) Vacuum/pressure and/or electrically operated instrument system operation.
 - (e) Pitot and/or static instruments and function.
 - (f) Pitot and/or static instrument system operation.
 - (g) PCAR Parts 5 and/or 8 requirements for static system checks.
 - (h) Aircraft instrument range markings.
- 2) Demonstrates the ability to perform at least two of the following—
 - (a) Remove and install an aircraft instrument. (Level 3)
 - (b) Accomplish a magnetic compass swing. (Level 3)

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- (c) Determine range/limit markings for one or more instruments. (Level 3)
- (d) Remove, inspect, and install one or more vacuum or pressure system filters. (Level 3)
- (e) Determine the proper setting of a vacuum and/or pressure system for a particular aircraft. (Level 3)
- (f) Inspect and/or troubleshoot portions of a vacuum and/or pressure and/or electrically operated instrument power system. (Level 3)
- (g) Inspect portions of a pitot-static system. (Level 3)
- (h) Find barometric pressure using an altimeter. (Level 3)

6.2 SUBJECT AREA : ENGINE INSTRUMENTS

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following—
 - (a) Troubleshoot a fuel flow and/or low fuel pressure indicating system.
 - (b) The operation of a fuel flow indicating system and where it is connected to the engine.
 - (c) The operation of a temperature indicating system.
 - (d) The operation of a pressure indicating system.
 - (e) The operation of an RPM indicating system.
 - (f) Required checks to verify proper operation of a temperature indicating system.
 - (g) Required checks to verify proper operation of a pressure indicating system.
 - (h) Required checks to verify proper operation of an RPM indicating system.
 - (i) The operation of a manifold pressure gage and where it actually connects to an engine.
- 2) Demonstrates the ability to perform inspection of engine electrical and/or mechanical instrument systems to include at least one of the following (Level 3)—
 - (a) Temperature.
 - (b) Pressure.
 - (c) RPM.
 - (d) Rate of flow.
- 3) Demonstrates the ability to perform at least one of the following—
 - (a) Verify proper operation and marking of an indicating system. (Level 3)
 - (b) Replace a temperature sending unit. (Level 3)
 - (c) Troubleshoot an oil pressure indicating system (Level 3)
 - (d) Locate and inspect fuel flow components on an engine. (Level 2)
 - (e) Replace an exhaust gas temperature (EGT) indication probe. (Level 3)

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SECTION 7 AVIONICS - AUTOFLIGHT

7.1 SUBJECT AREA: AUTOFLIGHT THEORY/MAINTENANCE

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least two of the following—
 - (a) Operation of a Basic Autoflight System.
 - (b) Operation and purpose of a Yaw Damper.
 - (c) Basic Autopilot modes (Alt hold, Heading, Pitch control, etc.)
 - (d) Basic operation of an Auto throttle system.
- 2) Demonstrates the ability to perform at least two of the following—
 - (a) Remove and install an Autoflight system component. (Level 3)
 - (b) Accomplish Autoflight System test (Level 3)
 - (c) Perform Autopilot Component self test (BITE Chk) (Level 3)
 - (d) Perform Yaw Damper test. (Level 3)
 - (e) Perform Authrottle test (Level 3)
 - (f) Inspect and/or troubleshoot an Autopilot system. (Level 3)
 - (g) Inspect portions an Autoflight system. (Level 3)

SECTION 8.0 - RADIO COMMUNICATION & NAVIGATION SYSTEM

8.1 SUBJECT AREA: RADIO COMMUNICATION

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least four of the following—
 - (a) PCAR Part 7 emergency locator transmitter (ELT) maintenance requirements.
 - (b) PCAR Part 7 ELT record keeping requirements.
 - (c) Checking/inspecting coaxial cable.
 - (d) Coaxial cable installation and/or routing requirements.
 - (e) VHF Communication System
 - (f) HF Communication System.
 - (g) Satellite Communication System
 - (f) Proper installation of a communication radio in an existing radio rack.
 - (g) Static Discharger function and operation
- 2) Demonstrates the ability to perform at least two of the following—
 - (a) Identify and inspect communication cable and connectors. (Level 3)
 - (b) Inspect an ELT and/or ELT installation. (Level 3)
 - (c) Determine ELT battery serviceability/status. (Level 3)
 - (d) Inspect one or more antenna installations. (Level 3)
 - (e) Inspect a coaxial cable installation. (Level 3)
 - (f) Inspect a communication radio installation. (Level 3)

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- (g) Inspect a shock mount base. (Level 3)
- (h) Locate & identify various antennas installed on a particular aircraft. (Level 3)
- (i) Inspect one or more static dischargers for security, resistance. (Level 3)
- (j) Inspect, remove and install communication transceivers. (level 3)

8.2 SUBJECT AREA: NAVIGATION

Objective. To determine that the applicant—

- 1) Exhibits knowledge of at least four of the following—
 - (a) VOR Navigation
 - (b) DME/TACAN System
 - (c) ADF System
 - (d) Instrument Landing System (ILS)
 - (e) Proper installation of a navigation radio in an existing radio rack.
 - (f) Means of identification of commonly used navigation antennas.
 - (g) Inertial Navigation
 - (h) GPS Navigation.

- 2) Demonstrates the ability to perform at least two of the following—

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 - (a) Identify and inspect navigation equipment cable and connectors. (Level 3)
 - (b) Inspect one or more radio navigation antenna installations. (Level 3)
 - (c) Inspect a coaxial cable installation. (Level 3)
 - (d) Inspect a navigation radio installation. (Level 3)
 - (e) Inspect a shock mount base. (Level 3)
 - (f) Locate & identify various antennas installed on a particular aircraft. (Level 3)
 - (g) Inspect one or more static dischargers for security, resistance. (Level 3)
 - (h) Inspect, remove and install radio navigation receivers. (Level 3)
 - (i) Inspect, remove and install Inertial Navigation equipment. (Level 2)

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End of Advisory Circular

WILLIAM K. HOTCHKISS III
Director General

Date of Issue _____

