ACE MANUAL

International Council of Air Shows, Inc.
Aerobatic Competency Evaluation Program
Effective April 1, 2015
Revision 8

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ICAS SAFETY CREED

ICAS represents our great industry. The founding members set standards that have contributed to an enviable spectator safety record. These standards are dynamic and continuously honed through years of preparation and experience. ICAS membership carries the responsibility of maintaining these safety standards.

As an ICAS member:

- I shall remember first and foremost that spectators place their trust and well-being in my mature judgment and professional actions. I shall continuously strive to be deserving of this trust.

- I shall not knowingly violate or stand idly by if others violate the spirit of the rules and standards set forth by ICAS or regulatory authorities.

- I shall work to create an environment that does not invite or promote unsafe actions and do my best to instill these values in my fellow ICAS members.

- I shall not think in terms of my event or my performance. Any adverse safety circumstances at one event may bring irrevocable consequences to the entire industry. It is our industry and our responsibility.

CHAPTER 1
ACE PROGRAM OVERVIEW

1.1 Introduction

The Aerobatic Competency Evaluation (ACE) Program represents the establishment of a program within the air show industry to qualify civilian air show pilots to fly aerobatics at public events in the United States and Canada.

Flight within the air show environment is unique, and professional standards must be set forth by the industry to maintain public trust. The industry itself is the best source of personnel with the experience necessary to evaluate the competency/safety of performers who wish to operate within the air show environment. Membership in ICAS is encouraged; however, membership in an industry-related organization is not required to participate. The evaluation process is available to any user of the national airspace system.

This manual and its appendices contain the standards and procedures to be used by Aerobatic Competency Evaluators (ACEs) in conducting evaluations. It also establishes the process for making recommendations regarding aerobatic competency/safety to the Federal Aviation Administration (FAA) and/or Transport Canada Aviation (TC).

A valid airmen's certificate/pilot license or pilot permit, and a current and valid medical certificate are required, when operating an aircraft for each person intending to participate in a public exhibition of certain flight maneuvers at aviation events, such as air shows. For Part 103 operations, a valid airman/medical certificate is not required. A student pilot is not authorized to apply for the issuance of aerobatic competency credentials. The ACE Manual and the accompanying Practical Ground Evaluation Standards (Appendix C) and Practical Flight Evaluation Standards (Appendix D) set forth the procedures and standards which an applicant shall meet in order to qualify for a recommendation to the FAA or TC for issuance of aerobatic competency credentials.

By FAA guidance and TC policy, a pilot who wishes to perform aerobatics or other non-aerobatic flight demonstrations at a public aviation event must possess a valid FAA Form 8710-7, or TC Form 26-0307, Statement of Aerobatic Competency (SAC).

All ACEs shall thoroughly familiarize themselves with the contents of this document, read all sections carefully, review them frequently, and have all appropriate documents, including this manual, on hand when conducting an evaluation.

1.2 Program Objectives

The ACE Program represents the industry's acknowledgment of the need for an effective method of safeguarding the public at air shows. The ACE Program standards are a basis by which the competency and safety of air show pilots are evaluated and recommendations made to the FAA and TC for the issuance of the appropriate aerobatic competency/safety credentials.

The main objective of the ACE Manual is to establish the ACE's procedures to assist the FAA and TC with the aerobatic competency evaluation of an applicant. Completion of the evaluation will result in recommending whether the FAA or TC should issue, deny or in some cases rescind a Statement of Aerobatic Competency.

1.3 Program Structure

The ACE Committee is a permanent sub-committee of the Safety and Operations Committee (SOC) established and funded by the International Council of Air Shows' (ICAS) Board of Directors to monitor, administer and direct the day-to-day operation of the ACE Program. This includes discussing and recommending changes to the policies and procedures of the program. The ACE Committee recommends potential members for approval by the ICAS Board of Directors in accordance with the ICAS Bylaws and the endorsement of the SOC.

With concurrence by both the SOC chair and the ICAS Board of Directors, an ACE Committee chair will be designated to lead and represent the ACE Committee. The ICAS Board of Directors shall appoint one Board member to act as ex-officio to the ACE Committee.

1.4 Authority

Unless otherwise specified in this manual, authority for the ACE Manual lies with the ICAS Board of Directors. The ICAS Director of Operations is the liaison between the ACE Committee, the ICAS Board of Directors, the FAA and TC. Its scope shall not exceed the bounds set by regulatory guidance from the FAA or TC (FAA Order 8900.1 or CAR 623). The ACE Committee is tasked with reviewing and addressing any pertinent issues directly with the SOC for governing regulation compliance. ICAS will submit a semi-annual report to outline any recommendation of changes received by ICAS and the status of the recommendations to the FAA and TC.

1.5 Waivers and Exemptions

Unless otherwise specified in this manual, recommendations for waivers, exemptions, deviations and/or exemption approval from the ACE Manual will be submitted by the applicant or his/her ACE and approved or disapproved by the ACE Committee. All waivers and exemptions to ACE Manual provisions and policies shall be ratified by the SOC. (See Chapter 8 of this manual for information on the process used for requesting an exemption.)

1.6 History of ACE Program

The aerobatic competency evaluation program has been in use for several years. In the past, most pilots found it advantageous to simply go to the local FAA district office for an annual evaluation or renewal instead of using an industry evaluator for peer review and recommendation. The FAA found it necessary to appoint inspectors in each office to conduct these evaluations. However, the FAA was not always able to designate an adequately trained inspector who had related experience. Consequently, flight evaluations were sometimes inequitable. Efforts to correct these inadequacies revealed that, because of the relatively low demand for evaluations, it was not cost-effective to attempt a nationwide training program for inspectors in this specific task. Other safeguards built into the air show environment have prevented the public from being placed at undue risk. However, 12 performing pilots suffered fatal accidents within one year. Although the number of accidents was generally no greater than in previous years, and many of the accidents did not take place at air shows, the accidents did appear to be related to aerobatic competency. These accidents served as a catalyst toward more aggressive evaluation of the aerobatic competency of air show pilots.

It is generally agreed that the level of safety of any segment of the industry is critically dependent upon that industry's assuming responsibility for itself and its safety programs. In this instance, the air show industry was very proactive in its steps to alleviate future events that would reflect negatively on general aviation. Within a very short period of time, two industry groups proposed a revamping of the evaluator program to include new techniques and procedures. The most encouraging part of the proposed program was that, for the first time, there would be a well-orchestrated program that would directly affect virtually all active air show pilots in the United States and Canada.

Moreover, the industry provides a database of information on air show pilots and their competency checks. Such a fund of information is unprecedented, and the program far exceeds the FAA's and TC's capabilities for action in light of other priorities. This action will significantly advance air show safety with little cost to the public. The FAA and TC are convinced that industry evaluators are people who are credible and dedicated to fulfilling their duties in conducting peer review, counsel, and making appropriate recommendations to the FAA or TC. Today, a pilot obtains FAA Form 8710-7 or TC Form 26-0307 by successfully completing an aerobatic competency evaluation, in accordance with the provisions of an FAA-accepted or TC-approved industry aerobatic competency evaluation program and conducted by an industry-approved ACE.

CHAPTER 2
ADMINISTRATION

2.1 Records and Information

ICAS will be the primary source of data and information on the ACE Program. ICAS is responsible for answering all inquiries related to the ACE Program, its charter, structure, activities and day-to-day operations. ICAS will maintain its records in an internal database located at the address provided on page 1 of this manual for a period of no less than five (5) years. Upon request from either TC or the FAA, ICAS will make its records available for inspection. ICAS is responsible for maintaining all records pertinent to the program, including, but not limited to, the following:

A. Applicant files, including contact and application information on each applicant and card holder.
B. Pilot and ACE reports and/or grievances.
C. ACE listing.
D. ACE address and contact information.
E. ACE expiration dates.
F. ACE Committee proceedings and meetings.
G. Recommendations on the issuance/suspension/revocation of Statement of Aerobatic Competency to the FAA/TC.
H. Any other data pertinent to the administration of the ACE Program deemed necessary.

2.2 Fees

A. ICAS Fees: The ICAS Board of Directors shall set and may adjust processing fees for SAC applications.

B. ACE Fees: Any ACE may charge a fee for conducting an evaluation. If there is a fee, it must be agreed upon by the applicant before initiating the evaluation. The fee should be reasonable, and determined based on time, expense, and geographically accepted rates.

2.3 Funding

The ICAS Board of Directors is responsible for establishing and providing necessary funds to support the ACE Program. At a minimum, funding will include, but not be limited to, the following:

A. Records maintenance.
B. ACE Committee meetings.
C. Administrative items such as mailing, documents, forms, supplies, etc.
D. ACE insurance policy.

2.4 ACE Manual Changes/Updates

The ACE Committee chair is responsible for maintaining and updating the ACE Program Manual. Proposed amendments will be filed to ICAS through the ICAS Confidential Reporting System (ICARUS) located at www.icarusreports.com.

A. Amendments criteria:

1. Proposals may be submitted to the ACE Committee by anyone.
2. Proposals may be submitted at any time for consideration.
3. Proposals must include a summation, objective of the change, and justification.
4. Proposals must have the written endorsement of at least one current ACE.
5. Proposals from government agencies do not require ACE endorsement.

B. Amendment consideration:

1. Proposed amendments shall be reviewed by the entire ACE Committee

within thirty (30) days.

a. Receipt of proposed amendments will be acknowledged in writing within ten (10) business days of receipt at ICAS headquarters.
b. Within twenty (20) days of a final decision on the proposed amendment, the individual/organization who/that submitted the proposed amendment will be informed in writing about the final disposition of the proposed amendment.

2. The ACE Committee shall consult with the SOC in order to receive concurrence before proceeding with the amendment process.

3. The ACE Committee shall direct ICAS staff to consult with all appropriate government agencies that accept the ACE Manual.

4. Recorded majority vote is required to place any proposal into proposed amendment status.

5. Proposed amendments will be made available for ACE review within ten (10) days of status.

6. Proposed amendments will have a 30-day comment period once posted for review. This comment period may be waived by the SOC for the purpose of immediate action items, administrative issues, and/or other simple, required corrective actions. ICAS staff will be charged with assuring that proposed amendments are communicated to the ICAS membership.

7. Upon the end of the 30-day comment period, the ACE Committee will review and incorporate justified comments into the "proposed amendment" for final consideration. This will include any necessary editing and modification for clarity, format and compliance purposes. It will then be submitted to the SOC for final review.

8. Via the Safety Management System Development Committee and the Safety and Operations Committee, the SOC will submit a final draft of the proposed amendment to the ICAS Board of Directors within sixty (60) days of the initial proposed amendment status for approval or disapproval. If approved, the ICAS staff will then submit the recommended amendment to the FAA/TC for their acceptance and recognition. If disapproved, the party proposing the amendment shall be given written notification and an additional thirty (30) days to reconsider and modify its proposal. It is the responsibility of the ICAS Staff to communicate the acknowledgement of governmental actions to the appropriate committees.

9. Exceptions to these timelines may be approved by the ICAS Board of Directors or the Executive Committee of the Board of Directors.

C. Amendment implementation:

1. Upon concurrence of the ICAS Board of Directors, all other affected committees and acceptance by the FAA/TC, the proposed amendment will be given an implementation date by the ACE Committee.

2. The implementation date will account for adequate distribution through appropriate communications from ICAS and appropriate incorporation of the amendment into the ACE Manual.

3. Once implemented, the amendment is to be considered "effective" in accordance with the implementation date.

2.5 Maintaining the Validity of a Statement of Aerobatic Competency

Upon successful completion of an initial aerobatic competency evaluation, a performer will be issued a SAC card with a validity date of December 31 of the year following the year in which the evaluation was completed.

A. If a performer had an initial evaluation completed June 1, 2012, the performer will be issued a SAC card valid until December 31, 2013.

B. Subsequent renewals accomplished while the card is still valid and initial SACs will expire on December 31 of the following year.

C. If a performer holds a SAC valid until December 31, 2013 and undergoes a re-evaluation in 2013 prior to December 31, 2013, the performer will be issued a SAC valid until December 31, 2014. To maximize the validity time of a SAC, a performer must undergo an evaluation once each calendar year.

D. If a performer who holds a SAC valid until December 31, 2013 does not complete a re-evaluation until January of 2014, the performer will be issued a SAC valid until December 31, 2014.

E. If the performer in example (d.) above undergoes a subsequent evaluation in 2014, the performer will be issued a SAC valid until December 31, 2015.

F. If the performer in example (d.) above elects to postpone his or her re-evaluation until 2015, he or she will be issued a SAC valid until December 31, 2015.

CHAPTER 3
ACE COMMITTEE

3.1 ACE Committee Mission

The ACE Committee is a permanent committee established and funded by the International Council of Air Shows' ICAS Board of Directors to monitor, administer and direct the operation of the ACE Program. The ACE Committee is collectively charged with the oversight, leadership and management of aerobatic competency and the evaluation thereof. The ACE Committee will place air show industry safety above all other considerations. The ACE Committee is responsible for the directing and administering of the ACE Program as outlined in the ACE Manual.

3.2 ACE Committee Chair

With concurrence by both the SOC and ICAS Board of Directors, an ACE Committee chair will be designated to lead and represent the ACE Committee. The ACE Committee chair is responsible for guiding the ACE Committee in fulfilling its charter and responsibilities. He/she shall also assist in the selection of ACE Committee members. The ACE Committee chair should be a current or former member of the ACE Committee and meet all the qualifications listed in Section 3.3A of the ACE Manual.

3.3 ACE Committee Members

The ACE Committee shall be listed on the ICAS website (www.airshows.aero). Committee members are selected volunteers from the air show industry. Each member will make every effort to uphold the ACE Committee Charter and follow the guidance provided by the ACE Committee chair. This committee will have no more than nine (9) and no fewer than five (5) members.

A. Qualifications:

Only one of the qualifications listed below may be waived by the SOC for the purpose of securing an otherwise well-qualified committee member to serve in a particular role based on the needs and priorities of the ACE Committee.

1. Current or previously qualified ACE.
2. Minimum five (5) years of air show performance experience; ten (10) performances per year.
3. Able to attend annual ICAS Convention.
4. Must hold a current Unrestricted SAC card. If the ACE does not renew his/her Unrestricted SAC card, he/she may continue as a member of the ACE Committee for up to two (2) calendar years with the approval of the ACE Committee and the SOC.

B. Disqualifiers:

ACE Committee members may be disqualified if in the past seven (7) years the ACE has:

1. Been convicted of a violation of any local, state or federal law pertaining to drugs or alcohol.
2. Been convicted of any misdemeanor or felony offense.
3. Been imprisoned.
4. Been discharged from the military with anything other than "Honorable."
5. Had an airman certificate (other than medical) rating or authorization (or foreign equivalent) suspended, revoked or paid a civil penalty as a result of a violation of any FAA, TC or other civil aviation authority regulations (foreign or domestic).
6. Been involved in any investigations, charged indictments, or pending actions in any local, state, federal, military or foreign court.

C. Member Experience:

In hopes of maintaining a representative cross-section of the air show industry, the ACE Committee membership should include at least one individual with experience in each of the categories listed below.

1. High performance, high wing-loaded, $\geq$600hp
2. Solo Aerobatics
3. Turbine powered
4. Formation Aerobatics
5. Glider/Sailplanes
6. Canadian

D. Selection and Tenure:

The ACE Committee will recommend members for a three (3) year term. No more than two (2) terms may be served consecutively. Final approval lies with the ICAS Board of Directors. Ideally, each year, approximately one-third of the ACE Committee should be renewed or replaced. Committee members may be removed by a majority vote from the ACE Committee itself and ratified by the SOC or by a majority vote of the ICAS Board of Directors.

3.4 ACE Committee Responsibilities

The ACE Committee's formal responsibilities include, but are not limited to, the following:

A. Recommend members for the ACE Committee.
B. Review initial ACE applications and biennial ACE renewals.
C. Review ACE performances.
D. Review grievances and present findings to the SOC for action.
E. Review exemption requests and make recommendations to the SOC.
F. Investigate allegations of non-compliance of the ACE Manual.

G. Maintain and update ACE Program documents, to include this manual.

3.5 ACE Committee Authority

A. Recommend the removal of ACE Committee members to the SOC.

B. Recommend approval/renewal or revocation of ACE status to the SOC.

C. Submit recommendation of issuance for Statement of Aerobatic Competency to FAA/TC.

D. Submit recommendation of "revoke" or "re-evaluation" for Statement of Aerobatic Competency to FAA/TC.

E. The committee may direct re-evaluation of any ICAS performer, SAC pilot, or ACE for the purpose of ensuring an acceptable level of safety, flying proficiency, and compliance with ACE Manual directives. At the conclusion of a re-evaluation, a written report must be submitted to the ICAS Director of Operations for documentation and validation.

F. Recommend exemption approval and/or disapproval to the SOC.

G. Implement any immediate action items, administrative issues, and/or other simple, required corrective actions to the ACE Manual.

3.6 ACE Committee Incident Procedures

The ACE Committee shall follow the protocol and procedures outlined within the ICAS Safety Incident Procedures, specifically, but not exclusive to, Appendix 1 of the ICAS Safety Incident Procedures. The ICAS Safety Incident Procedures may be obtained at www.airshows.aero

CHAPTER 4
AEROBATIC COMPETENCY EVALUATOR (ACE)

4.1 ACE Standards and Code of Ethics

All ACEs will be held to the highest level of professionalism with respect to integrity, flight discipline, and safety. As a minimum, every ACE will comply with the following:

A. Shall abide by all terms and conditions of the ACE Program.
B. Shall only conduct evaluations within their approved categories.
C. Shall conduct all evaluations in a professional, fair, reasonable, and equitable manner.
D. Shall conduct all evaluations at a predetermined date, time, and location.
E. Shall conduct all evaluations without any, or any perceived, "conflict of interest."
F. Shall conduct all evaluations in accordance with the standards and guidelines set forth in this manual.
G. Shall conduct all evaluations in a manner that reflects great credit upon the air show industry.
H. Shall maintain the respect and confidence of their peers, the FAA, and TC.
I. Shall bring any unsafe act or practice to the attention of the individual/individuals involved, the ICAS Director of Operations, the ACE Committee, and any other appropriate official.

Any violation of the above will be brought to the attention of the ACE Committee, which will, in turn, review the situation. If determined appropriate, an ACE qualification may be revoked.

4.2 ACE Responsibilities

A. Abide by the Standards and Code of Ethics outlined in Section 4.1 of the ACE Manual.

B. Remain familiar with the contents of this manual and all ACE Program documents.
C. Conduct evaluations only in the categories that he/she is approved to evaluate.
D. Conduct evaluations in accordance with the ACE Manual Practical Ground and Flight Evaluation Standards.
E. Take the following actions when observing a "questionable" event:

1. First, discreetly approach the individual and/or individuals involved with the event. If more than one ACE is present, the ACEs should confer to determine which one of the ACEs is in the best position to approach the pilot.

2. Provide a verbal or written account of the event in question to the ICAS Director of Operations, who shall initiate the Safety Incident Response Procedures, to include pertinent time, date, location and description of the event and the response of the performer in question.

3. If an ACE feels that talking to the individual has not resolved the matter, the ACE will address the "questionable" event with the air boss and/or air show director.

F. An ACE shall be considered current if he/she has met and complies with all requirements of this chapter and has three (3) evaluations within the previous twenty-four (24) months.

4.3 ACE Authority

A. Recommend re-evaluation of a current SAC pilot to the ACE Committee.
B. Recommend to the ACE Committee that restrictions be placed on a current SAC pilot.
C. Recommend revocation of ACE status to the ACE Committee.
D. Recommend follow-on actions, with respect to observing a "questionable" event," to the ACE Committee.
E. An ACE may recommend the following:

1. The issuance of a Statement of Aerobatic Competency.
2. A change to a performer's Statement of Aerobatic Competency.
3. These recommendations may include initial issuance, altitude adjustments, deletion or addition of aircraft, and/or type of act.

4.4 ACE Applications and Requirements

Before applying to become an ACE, a pilot should review and be familiar with the entire contents of the ACE Manual. Each applicant should understand and be prepared to abide by the ACE Standards and Code of Ethics provided in this manual. The applicant is also responsible for knowing and complying with the ACE application process outlined in this section.

A. Qualifications:

1. Written recommendation from a current ACE.
2. Written acknowledgement from the FAA (local FSDO) and/or TC.
3. Meet geographical need as determined by the ICAS staff with concurrence of the ACE Committee.
4. Possess Unrestricted SAC card.
5. Performed aerobatic flight at three (3) waivered/authorized air show events for eight (8) out of the last ten (10) years.
6. Minimum one-hundred (100) performances at Unrestricted Level.
7. Minimum twenty-five (25) performances at different waivered/authorized event locations.

B. Exceptions:

1. With the concurrence of the SOC, any of the qualification criteria may be waived by the ACE Committee.

C. Applicants:

1. Provide written letter of intent/desire for ACE selection.
2. Provide documentation for satisfying all qualifications outlined in 4.4A of this manual.
3. Provide synopsis of aviation background (total time, aerobatic time, military time, etc.).
4. Provide any additional information requested by the ACE Committee.

D. Selection:

1. ACE applications may be submitted once each calendar year.
2. ACE applications will be reviewed by the ACE Committee at each meeting.
3. The ACE Committee will approve, disapprove, or request additional information.
4. Upon request, the ACE applicant will provide additional information within thirty (30) days.
5. Upon approval, initial ACE designation will expire at the end of the second calendar year.
6. Upon disapproval, the ACE applicant may re-apply the next calendar year if desired.

4.5 ACE Renewal

Every ACE is required to have his/her ACE designation reviewed and renewed every two (2) years. The initial ACE designation will expire on December 31st of the second calendar year. All subsequent designations will expire every other year. The ACE Committee is responsible for conducting the review for renewal and recommending to the SOC renewal or decline prior to November 1st of the appropriate year.

A. The ACE Committee will use the following criteria when recommending re-designation of ACEs:

1. ACE written request for re-designation.
2. Conduct at least three (3) evaluations for every twenty-four (24) month period.
3. Quality and thoroughness of evaluation reports submitted by the ACE.
4. Safety record of performers to whom the ACE granted recommendations.
5. Any grievances concerning the ACE.
6. Geographic need as determined by the ACE Committee.
7. Attendance at the ACE meeting and the Performer Safety Meeting during the annual ICAS Convention at least once every two (2) years.

B. An ACE who is only attending the ACE Meeting and the Performer Safety Meeting may submit a written request to the ACE Committee for an exemption of the 'full' ICAS Convention fee.

C. Individuals will be notified by the end of the calendar year if they are not selected for ACE status, and that notification will terminate their evaluation privileges.

4.6 ACE Revocation

The ACE Committee may recommend revocation of an individual's ACE evaluator status. Any ACE may also recommend an ACE revocation in writing to the ACE Committee. The ACE Committee is responsible for conducting a review for revocation.

A. The ACE Committee will use the following criteria when considering ACE revocation:

1. ACE self-initiated request for revocation.
2. Lack of required accomplished evaluations for every 2-year period.

3. Poor quality and/or thoroughness of evaluation reports submitted by the ACE.
4. Safety record of performers to whom the ACE granted recommendations.
5. Any grievances concerning the ACE.
6. Lack of completed continuation training as required by the SOC.
7. Lack of attendance at the ACE Meeting and the Performer Safety Meeting.
8. Failure to abide by the ACE Standards and Code of Ethics in the ACE Manual.

B. Once initiated, the ACE Committee has thirty (30) days to complete the review.

1. The ACE will be notified of the review.
2. The ACE may submit a written statement.
3. The ACE will not conduct any ACE responsibilities or activities during the review.
4. A two-thirds majority vote by the full ACE Committee is required to recommend the revocation of an ACE's status.

C. At the conclusion of the review, the ACE Committee will provide a written statement to the SOC and to the ACE in question outlining the status of the ACE.

4.7 ACE Observations

A. At the request of the National Aviation Events Specialist (NAES) or TC liaison, a request for observation of an evaluation will be coordinated through ICAS on a case by case basis.

CHAPTER 5
QUALIFICATION, PROFICIENCY, CURRENCY AND REINSTATEMENT

5.1 General

In order to exercise the privileges of a Statement of Aerobatic Competency, a pilot must be qualified, proficient and current in the aircraft and endorsements being flown. The aircraft category, level and endorsements in which a performer is qualified and proficient may be found on the performer's SAC card authorization.

5.2 Qualification

A. Upon successful completion of an evaluation in an aircraft, a pilot is considered qualified to fly that aircraft for a period of thirty-six (36) months. A performer maintains this qualification by completing a valid renewal evaluation in the aircraft being flown or an aircraft of the same category.

1. A renewal or addition of aircraft will further the qualification period for thirty-six (36) calendar months from the date of renewal or addition of aircraft.

2. A renewal for performers who are not currently qualified for the aircraft may not take place in airspace waivered for an air show. In this case, renewals must be performed in an aerobatic practice area or in airspace authorized as a practice waiver.

3. Aircraft in which a pilot has been qualified will not be removed from their authorization if the pilot is no longer qualified.

4. It is recommended that pilots with multiple aircraft in one category rotate the aircraft type evaluated to maximize familiarity with the category of aircraft in which the pilot is qualified.

B. Upon successful completion of an evaluation at a specific level, a pilot is considered qualified to fly at that level for a period of thirty-six (36) months. A performer maintains this qualification by completing a valid renewal evaluation at that level.

    1. A renewal or change in level will further the qualification period for thirty-six (36) calendar months from the date of renewal or change in level.

    2. A renewal for performers who are not currently qualified for the level may not take place in airspace waivered for an air show. In this case, renewals must be performed in an aerobatic practice area or in airspace authorized as a practice waiver.

C. Upon successful completion of an evaluation for an endorsement, a pilot is considered qualified to execute that endorsement.

    1. A renewal for performers who are not currently qualified for the endorsement may not take place in airspace waivered for an air show. In this case, renewals must be performed in an aerobatic practice area or in airspace authorized as a practice waiver.

5.3 Proficiency

A pilot is considered proficient if the pilot has a current and valid SAC card for the aircraft category, level and endorsements being flown in accordance with Chapter 2.5 of this manual.

5.4 Currency

A pilot is considered current in the specific aircraft, level and endorsements that will be flown at an air show if the pilot has flown either a practice performance or an air show performance in the same aircraft, level and same endorsements within the previous forty-five (45) days.

5.5 Reinstatement

When a pilot is no longer qualified in an aircraft category, level or endorsement, the pilot will be required to complete a reinstatement evaluation. A reinstatement evaluation must be conducted at an aerobatic practice area outside of the air show environment. A reinstatement evaluation accomplishes the requirements of both proficiency and qualification for the aircraft category, level and endorsement(s) evaluated.

CHAPTER 6
APPLICANT PROCEDURES

6.1 Preparation

The applicant should be familiar with the entire ACE Manual, including: Practical Ground Evaluation Standards, Practical Flight Evaluation Standards, endorsements and currency requirements, prior to the actual evaluation. The applicant is responsible for the following items:

A. Identifying a qualified ACE.
B. Identifying and securing appropriate authorized/waivered airspace.
C. Identifying proposed date and location of evaluation.
D. Providing pilot credentials and other relevant paperwork and documentation.
E. Providing aircraft credentials.

6.2 Initial Applicant

An applicant applying for an initial SAC card shall provide:

A. The name and contact information of the applicant's trainer or mentor.
B. A description of the applicant's practical experience as an aerobatic pilot (which may include competition experience, aerobatic instruction, relative military experience, etc.).
C. A description of the applicant's preparation for the evaluation for which he/she is applying.

6.3 Identify ACE

The applicant may select any ACE from the list provided by ICAS as an acceptable ACE to perform the required evaluation. Upon request, applicants may obtain the name, address, and point of contact information for the nearest ACEs from a list provided by ICAS (703-779-8510). This list will also be available on the ICAS website (www.airshows.aero). The selected ACE will be approved to evaluate both the type of endorsement and type of aircraft the applicant will be flying.

6.4 Evaluation Application

After identifying and contacting a qualified ACE, the applicant and ACE should agree upon the proposed date and location of the evaluation. Upon doing so, the applicant will notify ICAS of the following:

A. Name and contact information of the person(s) who mentored the applicant during the applicant's preparation for the evaluation.
B. A description of the applicant's relative aerobatic experience.
C. How the applicant has prepared for the evaluation.
D. Acknowledgement of understanding and agreement with all applicable guidelines outlined within the ACE Manual.

6.5 Evaluation Airspace

Both the applicant and the ACE will ensure that the following airspace criteria are met:

A. Evaluation is conducted in the appropriate authorized/waivered airspace.
B. Authorized/waivered airspace includes appropriate altitudes for evaluation.
C. Accessible location and unrestricted view from the ground for ACE evaluation.
D. Safe and suitable for type of act and type of aircraft flown for the evaluation.

6.6 Evaluation Requirements

A. Upon request, the applicant will provide the ACE with the following:

1. Pilot credentials

a. Pilot certificate with appropriate ratings;
b. Current medical;
c. Previous Statement of Aerobatic Competency, if any;
d. Current flight review (14 CFR 61.56 for U.S. pilots);
e. Applicant's performance sequence/profile;
f. Proof of satisfying endorsement requirements outlined in Appendix E.

2. Aircraft credentials

a. Registration;
b. Airworthiness certificate;
c. Supplement type certificates and field approvals (if appropriate);
d. Evidence of aircraft capabilities for conducting proposed maneuvers

(if applicable);

e. Operating limitations (if appropriate).

3. Airspace credentials

a. Appropriate airspace/waiver for date, time and location.

4. Planned "sequence of events" for the evaluation and subsequent air show performances.

B. In advance of the face-to-face meeting with the ACE, the applicant will already have completed and submitted Part 1 of the SAC application on the ICAS website. Completion and submission of Part 1 must be finished before the rest of the evaluation may take place.

C. Upon completion of Part 1 and having previously arranged a mutually convenient time and location that accommodates all the requirements in paragraph 6.6 of this document, the applicant and ACE will meet in person to complete the ground evaluation, flight evaluation and evaluation de-brief portions of the application/evaluation process.

D. Applicant should ensure that the ACE completes and submits the application to ICAS (directions for which may be found at https://www.airshows.aero/ViewDoc/2257).

E. Applicant must submit the SAC processing fee before the application may be processed. Payment process is explained on the ICAS website and must be completed as part of the automated SAC application submission process.

F. The application must be submitted to the ACE electronically prior to the flight evaluation. Applications submitted to the ACE more than 72 hours after the evaluation will not be accepted.

G. The applicant must be recommended for his/her initial evaluation and first surface level evaluation by an ACE other than the evaluating ACE or an approved aerobatic expert for evaluations of Solo Aerobatics, Formation Aerobatics and/or Comedy. A list of approved aerobatics experts will be available on the ICAS website.

(Note: The ACE Committee shall approve by a majority vote any applicant for designation as an aerobatics expert.)

CHAPTER 7
EVALUATOR PROCEDURES

7.1 Evaluator Qualifications

On initial contact from an applicant regarding the availability of conducting an evaluation, the ACE will first and foremost confirm that he/she is current and qualified, as per the definitions in Chapter 4 of this manual, to administer the evaluation with respect to background, endorsement type, aircraft type, and specific expertise. If not, the ACE should decline, notify ICAS staff, and possibly recommend a more appropriate ACE. The ACE should also take special note if the evaluation is for an Initial Application and review Chapter 6.2 of the ACE Manual.

A. More specifically, an ACE must meet the following conditions in order to conduct an evaluation:

1. Current and qualified ACE as per the definitions in Chapter 4 of this manual.
2. ICAS recognized competence and expertise for endorsement type and aircraft type.
3. Ensure that no conflict of interest, or any perception thereof, exists.

a. Confirm that the applicant is not a family member, team member, employee, aerobatic student, or an individual being mentored by, and/or who may have a financial involvement with, the ACE who has been asked to conduct the evaluation. Although ACEs are authorized to make these determinations themselves, ICAS urges evaluators to err on the side of not conducting the evaluation if there may be even an appearance of a conflict of interest. If an ACE believes that he/she requires some independent assessment on this issue, he/she is urged to contact ICAS headquarters. The headquarters staff will be directed to also err on the side of avoiding even the perception of a possible conflict of interest when making these determinations.

(Note: A pilot receiving more than three (3) hours of instruction from an ACE for the requested evaluation is considered to be a student of that ACE.)

4. The ACE shall ensure that he/she is not the ACE of record for greater than three (3) consecutive renewal evaluations.

B. An approved exemption to Section 4.1 E of the ACE Manual is in place for permanent air display locations (i.e. Silverwood, Bealeton, and Rhinebeck Aerodrome). At such facilities, an ACE is on hand to evaluate those who fly in the daily or weekly shows. The competency cards being recommended to these individuals will be limited to the facility only since, in most cases, their qualifying flights are in aircraft owned by the facility; the evaluation is by a facility official; and/or the qualifying flights for renewal all occur at the same location.

1. Unrestricted cards may be obtained if a flight evaluation is conducted by an ACE other than the ACE located at the permanent air display facility.

7.2 Required Materials

The ACE shall have the following materials in his/her possession when conducting an evaluation:

A. Aerobatic Competency Evaluation Program application.
B. Copy of Practical Ground Evaluation Standards.
C. Copy of Practical Flight Evaluation Standards.
D. Copy of ACE Manual.
E. Copy of applicant's historical file.

These items may be obtained by the applicant or the ACE through the ICAS office (703-779-8510).

7.3 Requirements for Completing an Evaluation

A. Qualified ACE.
B. Qualified applicant.
C. Qualified aircraft.
D. Evaluation conducted within authorized/waivered airspace.
E. Ground Evaluation Standards administered as per the ACE Manual (Appendix C).
F. Flight Evaluation Standards administered as per the ACE Manual (Appendix D).
G. Ground and Flight evaluations must be accomplished within thirty (30) days of each other.
H. Completed SAC application submitted to ICAS headquarters not more than fifteen (15) days after the completion of the evaluation.

7.4 ACE Recommendations

ICAS staff will submit an annual report by November 1 of each year to the FAA and TC with ACE metrics including number of applicants passed, number of applicants declined and number of applicants denied through pre-

screening by each ACE. ACEs must report to the ICAS office the number of applicants declined and number of applicants denied through pre-screening by October 1 of each year. After accomplishing or attempting to accomplish a scheduled evaluation, the ACE is responsible for submitting an evaluation status. All evaluations must be assigned one of the following:

A. Evaluation Complete: all requirements satisfied.

1. The ACE will provide a list of any restrictions if applicable.
2. The ACE will complete and submit all required supporting documentation.

B. Evaluation Incomplete: all requirements not satisfied and follow-on actions required.

1. The ACE will provide a brief narrative of incomplete items.
2. The ACE will provide a recommended sequence of events to complete evaluation.

C. Re-evaluation Required: applicant did not satisfy or display baseline ability or knowledge necessary for maintaining a Statement of Aerobatic Competency at the evaluated level.

1. The ACE will provide a brief narrative of non-satisfactory items.
2. The ACE will provide a suggested course of action to possibly include a training program, mentor opportunities, recommended maneuvers, etc.

7.5 Requirements for completing SAC application

A. The ACE will ensure that the applicant has completed Part 1 of the application.

B. The ACE will complete the evaluation information portion of the application:

1. Date of the ground evaluation.
2. Time it took for ground evaluation.
3. Whether or not the applicant's performance on the ground evaluation was satisfactory.
4. Date of the practical flight evaluation.
5. Time it took for flight evaluation.
6. Whether or not the applicant's performance on the flight evaluation was satisfactory.
7. Whether or not the applicant was changing altitude, adding an aircraft or adding an endorsement type.
8. Whether or not the applicant was requesting a renewal without change.
9. Airport at which the flight evaluation was conducted.
10. Aircraft type flown by the applicant for the practical flight evaluation.
11. Endorsement type evaluated by the ACE during the practical flight evaluation.
12. Altitude level at which the evaluation was conducted.
13. Number of performances evaluated.
14. Comply with Appendix E for minimum requirements.

C. The ACE will complete the altitude portion of the application:

1. Include clear direction to ICAS and the FAA/TC of notations, provisions, and/or restrictions.
2. Recommended altitude level: Level 4, Level 3, Level 2, Level 1/Unrestricted.
3. Specify altitude level for each aircraft type and each endorsement type, if appropriate.

D. The ACE will complete the aircraft type portion of the application:

1. Recommended aircraft and applicable variants.
2. Unless otherwise restricted by the ACE, a recommendation for a 'Pitts Special' where appropriate is a recommendation for that aircraft and all its variants.
3. A recommendation for a new type of aircraft and variants may be considered by the ACE Committee.
4. The notations in this section will include not just the aircraft in which the applicant performed his/her evaluation, but all aircraft listed on the applicant's previous authorization.

E. The ACE will complete the endorsement type portion of the application:

1. Recommended endorsement type (listed in Appendix E).
2. The notations in this section will include not just the endorsement type in which the applicant performed his/her evaluation, but all endorsement types listed on the applicant's previous authorization. Endorsements that have not been evaluated within the qualification period listed in Appendix E shall require reinstatement in accordance with Chapter 5.5.

F. The ACE will complete the final portion of the application:

1. ACE name
2. ACE electronic signature
3. Date of evaluation (enter last day of events if evaluation required more than one day).

(Note: The application will not be processed without the above final portions being completed.)

G. The ACE will submit the application to ICAS within fifteen (15) calendar days of the evaluation.

1. Although recommended, it is not required that the ground evaluation be conducted prior to the flight evaluation for renewals without change.
2. Whether or not the applicant is recommended for a Statement of Aerobatic Competency, the ACE will submit the completed application to ICAS.
3. Copies of all documents as required by Section 6.2 or 7.5 shall be reviewed and verified by the ACE.

H. After reviewing the application for accuracy and to ensure that it is completed properly, ICAS shall forward copies of the application recommending issuance of a SAC card to the appropriate FAA Flight Standards District Office (FSDO) or TC headquarters for issuance of the Statement of Aerobatic Competency (FAA Form 8710-7 or TC Form 26-0307). ICAS will also forward a copy of the completed application to the ACE for his/her files.

CHAPTER 8
EVALUATION PROCEDURES

8.1 Initial Qualifications

All initial evaluations must include both the ground and flight portions of an evaluation in accordance with the provisions outlined in Appendix C and Appendix D. In addition:

A. An initial applicant who has not previously held a Statement of Aerobatic Competency from the FAA or TC will be initially issued a Level 4 (800 feet) Statement of Aerobatic Competency.

B. An initial applicant who has other experience that makes him/her believe they might qualify for a Statement of Aerobatic Competency other than Level 4, may petition the ACE Committee for an exemption to 8.1A of this section.

C. All initial applicants are required to comply with FAA Order 8900.1 Flight Standards Information Management System and/or TC Special Flight Operations Standards and Procedures when applying for a formation aerobatic card.

8.2 Renewal of Qualifications

An existing SAC card holder desiring *no changes* in status (aircraft type, endorsement type, altitude, etc…) must still complete an annual ground evaluation and flight evaluation. Although there is no requirement during an annual renewal for the ground and flight evaluation to be conducted on the same day or in any particular order, the applicant must be in compliance with the following procedures:

A. Conduct ground evaluation in accordance with the Practical Ground Evaluation Standards as outlined in Appendix C.

B. Conduct flight evaluation in accordance with the Practical Flight Evaluation Standards as outlined in Appendix D. In addition:

1. The evaluation must be preplanned.

2. The evaluation must be flown in the presence of the selected ACE as an evaluation flight.

3. No portion of the evaluation may be based on the "recollection" of a previous flight.

C. Annual renewals with 'no changes' may be accomplished within the following provisions:

1. The evaluation must be flown in the air show environment or in a duly authorized practice box.

2. At a minimum, the applicant will perform either his/her entire standard air show flight sequence or fly each one of the maneuvers specified in the Practical Flight Evaluation Standards or a combination of both to ensure all required components are met.

3. At the discretion of the ACE, the applicant may be required to perform particular maneuvers from the Practical Flight Evaluation Standards.

8.3 Renewal of Qualifications with Change

A. Altitude Change: An existing SAC card holder desiring a change in status for altitude must complete and provide written documentation that the following prerequisites have been accomplished within 24 months of the required subsequent ground and flight evaluation:

1. For a pilot to change his/her SAC altitude restriction from Level 4 to Level 3, he/she must perform an aerobatic sequence at no fewer than eight (8) public air shows (for purposes of this segment of the Statement of Aerobatic Competency requirements, a practice or rehearsal show that includes spectators may be counted toward the minimum eight (8) required

performances) at no fewer than five (5) different air show sites at 800 feet in the same category of aircraft for which a change of status is requested.

2. For a pilot to change his/her SAC altitude restriction from Level 3 to Level 2, he/she must perform an aerobatic sequence at no fewer than twelve (12) public air shows (for purposes of this segment of the Statement of Aerobatic Competency requirements, a practice or rehearsal show that includes spectators may be counted toward the minimum twelve (12) required performances) at no fewer than six (6) different air show sites at 500 feet in the same category of aircraft for which a change of status is requested.

3. For a pilot to change his/her SAC altitude restriction from Level 2 to Level 1, he/she must perform an aerobatic sequence at no fewer than sixteen (16) public air shows (for purposes of this segment of the SAC requirements, a practice or rehearsal show that includes spectators may be counted toward the minimum sixteen (16) required performances) at no fewer than eight (8) different air show sites at 250 feet in the same category of aircraft for which a change of status is requested. The pilot must be evaluated by two qualified ACEs concurrently. The first four (4) air show sites flown at Level 1 will be restricted to a maneuvers package submitted by the pilot and approved by the two evaluating ACEs.

(*Note: Prior to accomplishing an evaluation with a change in status for altitude, the selected ACE is required to review the documentation of the qualifying events. Copies of logbooks, contracts, newspaper articles, programs, event waivers or similar documentation are acceptable support evidence of participation.)*

B. Aircraft Type and/or Endorsement Type Change: An existing SAC card holder desiring a change in status for aircraft type and/or endorsement type must complete the required ground and flight evaluation for that particular aircraft type and/or endorsement type.

C. General changes. In addition to the above, the following restrictions apply to all qualifications:

1. Multiple performances in a single day in the same aircraft may not be used to meet the performer sequence requirements to move from one altitude restriction to a lower altitude restriction.

2. Air show performances used to qualify for one *change in status* may not be used again for a subsequent change. For example, a performance at air show X on June 30, 2012 may be used to move from Level 3 to Level 2, but that same performance may not be used to move from Level 2 to Level 1.

3. Flight evaluations use to qualify for a *change in status* may not be conducted at a public air show. For example, an evaluation from Level 2 to Level 1 may not take place at a public air show.

4. An additional flight evaluation may be required of a pilot who substantively changes his/her performance sequence.

8.4 Reinstatement of Qualifications

A. In the event an ACE is asked to evaluate an applicant who had a previous but expired SAC in a specific aircraft category, level or endorsement, he/she may be reinstated to the aircraft category, level and endorsements evaluated. This reinstatement of qualifications applies to all aircraft of the same category previously qualified as well as endorsements and level, if the card has expired within the last twelve (12) months. If the pilot's level qualification has been expired for more than twelve (12) months, the ACE must move the applicant up at least one altitude level (for example, from Level 1 to Level 2). No renewing pilot will be moved higher than Level 3.

B. In the event that an applicant has had his/her SAC card suspended or revoked by the FAA/TC, or had other enforcement actions that impacted that pilot's flying status, it will be the duty of the applicant to inform ICAS staff of these developments as part of the application and/or renewal status. Under these circumstances, the ACE Committee may, at its discretion, opt to designate a particular ACE to conduct the subsequent evaluation. In the event that an ACE is asked to evaluate an applicant who has had his/her SAC card suspended or revoked by the FAA/TC, the ACE must evaluate the applicant in the category of aircraft, level and endorsement flown by the applicant that gave cause of suspension/revocation. In all cases, the ACE Committee will ensure that the designated ACE is not the ACE who had previously evaluated the applicant. Should circumstances dictate, the ACE Committee may require reevaluation of other aircraft categories, levels or endorsements held by the applicant.

C. Failure by the pilot to notify ICAS of a SAC card suspension or revocation or any other FAA/TC enforcement action may be cause for ICAS to recommend to the FAA/TC that the pilot's SAC card be suspended or revoked. This may be considered a falsification of application and should be communicated to and coordinated with the FAA/TC.

D. When the FAA IIC, TC or ICAS requests/recommends a reevaluation of the performer's competency to continue holding their current authorizations, an ACE other than the one who conducted the evaluation for the current SAC card will be assigned the task.

CHAPTER 9
EXEMPTIONS

9.1 Exemption Application

Anyone may request an exemption from specific provisions of the ACE Manual provided that an equivalent level of safety is obtained through alternate means. Applicants requesting an exemption should allow for approximately ninety (90) days processing. Exemption requests will be directly submitted to ICAS for distribution to the ACE Committee within the following guidelines:

A. Typed format (i.e. faxes, word processing documents, e-mails).

B. Includes a summation, objective, and justification of the request for exemption.

C. Includes an explanation of the unique situation requiring the request for exemption.

D. Attached endorsement of at least one ACE.

E. Requests from government agencies do not require ACE endorsement.

F. Explanation of how exemption request ensures an equivalent level of safety.

9.2 Exemption Consideration

A. ACE Committee actions:

1. Review all duly proposed exemptions within fifteen (15) days.
2. Recorded majority vote required to place into "Proposed Exemption" status.
3. Forward decision to the SOC for concurrence.

B. Denied exemptions - SOC actions:

1. Upon receipt of a denied exemption from the ACE Committee, one may petition the SOC for additional review.
2. The SOC shall consider all petitions within thirty (30) days.

3. A recorded majority vote of the SOC will conclude the review.

9.3 Conditions and Terms of Granted Exemptions

The ACE Committee will provide and establish the conditions and terms allowed within the granted exemption. At a minimum, these conditions and terms will specify the individual, the exemption, possible restrictions, the effective date, the expiration date, the renewal process, and any other associated requirements.

9.4 Notifications of Granted Exemptions

A. The ACE Committee will notify each applicant in writing of the terms and conditions for a granted exemption.

B. The ICAS Director of Operations will notify the FAA/TC via e-mail of the terms and conditions for a proposed granted exemption and receive concurrence or nonconcurrence within fifteen (15) days.

C. ICAS will maintain a copy of the granted exemption in the individual's historical file and release copies as appropriate for publication in ICAS documents. ICAS will email a copy of the granted exemption to the FAA/TC.

D. Should the applicant be denied exemption, he/she shall receive a written explanation of the ruling from the ACE Committee stating the reason for denial and, if applicable, any changes necessary to process the requested exemption.

CHAPTER 10
OBSERVATIONS, GRIEVANCES, and VIOLATIONS PROCEDURES

10.1 ACE Observation Procedures

An ACE should submit a written report (typed format) at any time to the ACE Committee detailing a personal observation/grievance of a "questionable" and/or "unsafe" event or incident by a holder of a Statement of Aerobatic Competency or potential applicant. In the same manner, the FAA/TC may also request (typed format) that the ICAS Director of Operations conduct an inquiry. The original report will be retained by ICAS, and the performer may request a copy. The Director of Operations will initiate ICAS Safety Incident Procedures as outlined in Chapter 3.6. When required, ICAS will recommend to the FAA/TC:

A. Revocation of SAC qualification to be completed prior to further aerobatic displays at an aviation event.

B. Re-evaluation of aerobatic competency qualifications.

C. Suspension of aerobatic competency qualifications.

D. Implementation of restrictions (i.e. altitude, maneuvers, type aircraft, type act, etc.).

E. Other actions which may be appropriate to ensure proper safety compliance.

10.2 Performer Observation Procedures

A performer may submit a verbal or written report (typed format) at any time to the ICAS Director of Operations detailing a personal observation/grievance of a "questionable" and/or "inappropriate" event or incident by an ACE. A copy will be sent to the ACE and the original report will be retained by ICAS. Upon review, the ICAS Director of

Operations will initiate the ICAS Safety Incident Procedures. When required, the results of the Safety Incident Procedures shall be communicated to the FAA/TC.

10.3 Notification and Appeal Process

A. All ACE observations and performer grievances will be maintained on file at ICAS for a minimum of two (2) years. The pilot or ACE who is the object of an observation or grievance will be notified by the chair of the ACE Committee within five (5) working days of the original complaint being filed with the ACE Committee. This written notification will include a copy of the Observation and/or Grievance, and is the first step of the notification and appeal process. Upon official notification, the following actions/steps will be taken as required:

B. The Pilot or ACE has fifteen (15) days to respond, after which the ACE Committee may schedule a meeting to determine what action, if any, should be taken. Concerns of the ACE Committee shall be presented to the Pilot or ACE, who shall in turn have a reasonable opportunity to respond, after which the ACE Committee may, by at least a two-thirds majority vote, take or recommend appropriate action to remedy the situation.

C. If the Pilot or ACE has an objection to any member of the ACE Committee participating in the process, the reasons for the objection shall be submitted at the same time as the response to the notice of complaint by the ACE Committee chair. The members of the ACE Committee shall decide by a majority vote if any member of the committee should not participate in the proceedings. The ACE Committee retains the right but not the obligation to appoint an alternate member for the purpose of considering the actions before the committee, if one of its members is asked to step down for the matter. All committees may invite outside participation in a deliberation for the purpose of gaining expertise.

D. The ACE Committee may consider any information provided from any source. The ACE Committee shall determine to what degree such material will be considered. This material shall be available to all parties.

E. In the event that the concerned Pilot or ACE desires an appeal in person to the Appeals Subcommittee at a time other than the convention, he/she must first agree to pay all expenses for the meeting and deposit funds with ICAS to pay the estimated costs of the appeal. These funds will be used to pay for the appeal process regardless of the outcome of the appeal. The appeal hearing will be scheduled at a time and place agreed upon by all parties.

F. The decision of the Appeals Subcommittee may be appealed to the SOC. The decision of the Appeals Subcommittee shall be overturned only with overwhelming evidence provided by the applicant. Under extreme circumstances the decision of the SOC may be appealed to the ICAS Board of Directors.

G. In cases where the ACE Committee believes a clear and present danger to life exists, action may be taken immediately. In this situation, the Pilot or ACE shall be notified promptly of the ACE Committee's decision and action to be taken. Any appeal shall first be made to the ACE Committee. ICAS staff must be notified in all instances in which the ACE Committee believes a clear and present danger to life exists.

10.4 Non-Compliance Process

Allegations of non-compliance of the specific provisions and overall intent of the ACE Manual will be investigated by the ICAS Director of Operations and a summation of the investigation shall be presented to the SOC. With a recorded majority vote of the full SOC, penalties may be assessed based on the severity of the violation. Such penalties may include, but are not limited to, the following:

A. Formal recommendation to the FAA/TC that the individual's SAC card be suspended

or revoked.

B. Formal recommendation to the ICAS Board of Directors that the individual's membership in ICAS be revoked or suspended.

C. Formal documentation maintained in the individual's ICAS historical records of the violation and the actions taken by the ACE Committee, ICAS Board of Directors, and/or the FAA/TC.

10.5 Falsifications Process

Evidence of falsification by either an applicant/applicants or an evaluating ACE shall be cause for immediate formal recommendation to the FAA/TC that the individual's SAC card be revoked. Falsification incidences will be investigated by the ICAS Director of Operations and treated as possible Violations per Section 10.4.

Appendix A
Terms/Definitions

1. All Variants: The summation of aircraft so close in flight characteristics that they warrant inclusion on any qualification given in any one of the aircraft of the group listed in Figure 5.

2. Applicant: A pilot seeking a SAC card evaluation.

3. Category: A generic classification of aircraft with similar performance capabilities.

   - Category A: Sport Aerobatics
   - Category B: Jet Warbird Aerobatics
   - Category C: Piston Warbird Aerobatics
   - Category D: Sailplane Aerobatics
   - Category E: Helo Aerobatics

4. Civil twilight: Civil twilight in the evening is the time between sunset and when the center of the sun is less than 6 degrees below the horizon.

5. Dog fighting: Two or more aircraft operating simultaneously in the box in reference to each other for the simulation of air combat maneuvering. Not formation in nature.

6. Endorsement: An additional qualification which an applicant may be authorized to perform in an aircraft at a specific level. Permissible endorsements are listed in Appendix E.

7. Fly-by: A non-aerobatic pass or a series of non-aerobatic passes performed by one or more aircraft at an aviation event while the waiver is in effect.

8. Formation flying: When an aircraft is flown solely with reference to another aircraft and within 500 feet of the referenced aircraft. Air racing and simulated dog fighting are not considered formation flying.

9. Practice Session: Flying a dedicated event with a planned series of maneuvers… no more than three (3) practice sessions may be accomplished in one flight. The series of maneuvers may be or may include part of a performer's actual sequence. Actual performances may qualify as a practice session for currency purposes.

10. Initial applicant: A pilot who has never held a SAC card or had their SAC card revoked.

11. Level: Minimum altitude AGL authorized to start and complete aerobatic maneuvers.

    - Level 4: 800 feet
    - Level 3: 500 feet
    - Level 2: 250 feet
    - Level 1: Unrestricted

12. Night Performance: Night performance means a performance between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac, converted to local time.

13. Performance Class – Sport Aerobatics/Rotorcraft: As used in Appendix D of the ACE Manual, a generic classification of sport aerobatic or rotorcraft aircraft with similar aerobatic characteristics and capabilities for the purpose of establishing Practical Test Standards.

    - Performance Class A – Sport Aerobatics: Aircraft capable of inverted flight maneuvering advanced maneuvers (e.g. torque rolls and inverted flat spins) and gyroscopic maneuvers. Typical aircraft include: Extra, Edge, Pitts, MX-2, Yak 55 and Sukhoi.

    - Performance Class B – Sport Aerobatics: Aircraft capable of basic aerobatics and inverted flight maneuvering but are not typically capable of the advanced maneuvers in performance Class One aircraft, including gyroscopic maneuvers. Typical aircraft include: Modified Stearman, Chipmunk, Decathlon, and Great Lakes.

    - Performance Class C – Sport Aerobatics: Aircraft capable of basic aerobatics, but are usually considered incapable of sustained inverted maneuvering and the advanced maneuvers of Performance Class One aircraft, including gyroscopic maneuvers. Typical aircraft include: stock Stearman, Citabria, Cub.

14. Spot Evaluation: An evaluation initiated by the ACE Committee to ensure compliance with the Standards and Code of Ethics established within the ACE Manual.

15. Squirrel Cage: Two or more aircraft operating in the aerobatic box coordinating with each other. Not formation in nature.

Appendix B
Acronyms

ACE	Aerobatic Competency Evaluator
AGL	Above ground level
CT	Continuation training
FAA	Federal Aviation Administration
ICAS	International Council of Air Shows, Inc.
MSL	Mean sea level
PSOC	Performer Safety and Operations Committee

SAC	Statement of Aerobatic Competency
SOC	Safety and Operations Committee
TC	Transport Canada

Appendix C
Practical Ground Evaluation Standards

During the Ground Evaluation phase, the ACE must keep in mind that this portion of the evaluation presents an opportunity to review all of the areas of knowledge unique to air show flying. For some pilots, this session may be the only formal review of air show aerodynamics, density altitude effects, physiology, energy, and other specific issues that impact air show professionals that the pilot may have during the year. The ACE must allow sufficient time and attach sufficient importance to this phase so that each applicant will remember the concepts and principles discussed.

I. Air Show Safety Concepts

This first part of the ground checklist concentrates on aerodynamics, density altitude, and physiology. The applicant should have a working knowledge of the relationship of turn and pull-out radius to true airspeed and radial "G." The applicant must know the indicated airspeed for his/her aircraft at which the tightest turn and highest pull out can be made. The applicant must understand the relationship between kinetic energy and potential energy in air show flying. The applicant must know how to determine if a particular maneuver is energy gaining or energy losing under various conditions of density altitude.

The applicant must understand the effect of density altitude upon true airspeed in relation to indicated airspeed, on the performance of aircraft engines, and on the ability to gain and/or maintain energy. The relationship between pull-out distances (altitude) and true airspeed should be discussed.

The main point in discussing physiology with each applicant is to impress upon him/her the need to take a good personal physiological inventory before each and every flight. The inclusion of this step in every pre-flight and the use of this personal physiological inventory in planning the flight is critical to safe flying. The ACE should also review the effects of stress, hydration, fatigue, and other human factors.

II. Review of Applicant's Proposed Performance Sequence

The goal in reviewing the entire sequence is to review the sequence design in relationship to the aircraft's capabilities, preservation of energy, adaptability to changes in density altitude and weather, demand on the pilot both physically and mentally, and the flow of the program.

The ACE should proceed through the applicant's written sequence and pause at each maneuver to examine it; then discuss it by covering the topics above. The applicant must know the minimum energy state (airspeed and altitude) for various density altitudes that he/she must have as entry parameters for every maneuver in the sequence. The ACE must cover this item for every maneuver in the sequence.

The applicant for a Level 3 or Level 4 waiver will be required to adhere to the maneuver sequence flown during the flight evaluation -- as recorded in the information sent to the ICAS office -- with the completed flight evaluation, in subsequent air show performances. However, variances in the sequence that increase the safety of the performance by compensating for factors such as density altitude, wind and terrain considerations shall be allowed, providing that no new maneuvers that have not been demonstrated are included in such modifications. Maneuvers may be deleted from the sequence.

III. Special Considerations

The ACE should refer to the appropriate checklist item if the applicant is flying a specialty act. A thorough discussion of each item is required. In certain situations, the ACE may have related, though not personal, experience in a specialty or new act. This is a good chance to ask the applicant to explain the unique facets and safety requirements of his/her specialty or plans for a new air show act. The ACE may also find it helpful to contact

another ACE who specializes in a related field such as comedy, transfers or wing walking. In these situations, the chair of the ACE Committee will be advised before recommendations are forwarded to the FAA or TC.

IV. Emergency Procedures

An important issue for the ACE to bear in mind when reviewing emergencies is the decreasing number of options the pilot has in any given emergency as the total energy level (airspeed and altitude) of the aircraft decreases. Special care should be taken by the ACE to include specialty act circumstances into the discussion of each emergency. Examples include such emergencies as engine failure during a formation maneuver or during a wing walk act. Once again, the idea here is to take the time to think about these possible emergencies so that the pilot can recall his/her plan when and if those circumstances arise.

V. Practical Ground Standards Evaluation Checklist

A. Review of applicant's experience

1. [ ] Certificate check (license, medical, Flight Review, and LOA)
2. [ ] Air show documentation
3. [ ] Total flying time and time in type
4. [ ] Aerobatic time

    a. [ ] total
    b. [ ] in type

B. The applicant will exhibit appropriate knowledge of the following: personal motivation, philosophy, and reasons for obtaining an aerobatic competency card.

C. [ ] Understanding of past history of air show accidents and common causes.

D. [ ] Aerodynamics as it relates to the applicant's sequence (turn performance and energy management).

1. [ ] Relationship between true airspeed and; lift, drag, turn rate, and turn radius
2. [ ] Relationship between indicated and true airspeed
3. [ ] Technique for minimum altitude vertical recovery
4. [ ] Limitations of pilot's aircraft (V_N or V_G diagram)
5. [ ] Understanding of control of induced drag and how it can be controlled from the cockpit
6. [ ] Capabilities of pilot's specific aircraft

    a. [ ] wing loading
    b. [ ] power to weight
    c. [ ] G limits
    d. [ ] V_{ne}, V_{so}
    e. [ ] special modifications
    f. [ ] structural integrity, fatigue
    g. [ ] use of pyro

7. [ ] Review of applicant's specific sequence

    a. [ ] logic of sequence/energy management
    b. [ ] energy losing maneuvers

c. [ ] special adjustments for high density altitude
d. [ ] blown maneuver or sequence interruption

8. [ ] Out of control flight (planned or unplanned)

9. [ ] Night time considerations

E. [ ] Operation at high density altitude

1. [ ] Use of density altitude chart
2. [ ] Increased true airspeed and pull-out performance (turn radius increases with square of TAS)
3. [ ] Engine performance degradation
4. [ ] Relationship between indicated and true airspeed
5. [ ] Ability to maintain energy
6. [ ] Sequence modifications necessary to maintain energy

F. [ ] Physiological effects/human factors in the air show environment

1. [ ] Temperature effects (high and low)
2. [ ] Hydration
3. [ ] Stress
4. [ ] G tolerance

a. [ ] insidious characteristics of loss of G tolerance
b. [ ] affected greatly by physical condition

5. [ ] Density altitude effects on the body

G. [ ] Weather considerations

1. [ ] Wind velocity and direction
2. [ ] Ceiling and visibility
3. [ ] Rain on laminar wings (gliders, Long EZ, etc.)
4. [ ] Prepared and practiced low show

H. [ ] Air show responsibilities

1. [ ] Responsibilities at air show briefing
2. [ ] Federal Aviation Regulations and policy/Canadian Aviation Regulations and standards that apply to aerobatics and air shows, IIC responsibilities, air boss duties and assignments, air show standard operation procedures, air show safety briefing requirements, pertinent paperwork reviewed by the FAA and TC, and the air show ground plan.
3. [ ] Required certification for air shows
4. [ ] Showline vs. crowd line

a. [ ] artificial showlines
b. [ ] water shows
c. [ ] obstacles

5. [ ] Ground operations (start & taxi)

I. [ ] Emergencies

1. [ ] Structural failure and aircraft control
2. [ ] Engine failure
3. [ ] Fire
4. [ ] Communications failure
5. [ ] Disorientation
6. [ ] Bail out and parachute considerations

VI. Special Act Considerations

(Must be reviewed for notation on competency card)

A. [ ] Formation team acts

1. [ ] Sequence design

a. [ ] optimizing aircraft capability
b. [ ] adjustments for weather (low show, density altitude, etc.)
c. [ ] dissimilar aircraft
d. [ ] timing for opposing maneuvers

2. [ ] Preflight briefing
3. [ ] Lead pilot techniques and responsibilities

a. [ ] power requirements for wingmen

4. [ ] Wingmen responsibilities
5. [ ] Basic formation signals
6. [ ] Use of radio

a. [ ] to initiate maneuvers
b. [ ] deconfliction
c. [ ] acknowledgements

7. [ ] Emergency procedures

a. [ ] broken formation; blown maneuver procedures and “outs”
b. [ ] radio calls for emergencies
c. [ ] aborted take-off
d. [ ] “lost sight” procedure
e. [ ] radio, engine, and other equipment failures; team procedure

8. [ ] Postflight briefing

B. [ ] Wing walking act

1. [ ] Walking or riding at take-off, take-off aborts
2. [ ] Safety restraints
3. [ ] Temperature, wind and rain
4. [ ] Aircraft CG changes
5. [ ] Drag considerations and energy
6. [ ] Emergency procedures

C. [ ] Comedy act

1. [ ] Low altitude control

2. [ ] Ground effect and energy
3. [ ] Special effects: plan ahead for safety
4. [ ] Emergency procedures

D. [ ] Dog fight act

1. [ ] Aircraft dissimilarities
2. [ ] Energy conservation
3. [ ] Special effects: plan ahead for safety
4. [ ] Emergency procedures
5. [ ] Risks of "unplanned" sequence

E. [ ] Night pyrotechnic show

1. [ ] Altitude restrictions, recommended distances from crowd line and orientation of maneuvers
2. [ ] Pyro safety considerations
3. [ ] Aircraft lighting
4. [ ] Emergency procedures
5. [ ] Night blindness
6. [ ] Pyro ashes
7. [ ] Pyro loading/unloading areas
8. [ ] Awareness of federal/state/local licensing requirements and safety requirements
9. [ ] Shipping and storing of pyro

F. [ ] Ribbon cuts

1. [ ] Low altitude control
2. [ ] Ground effect and energy management
3. [ ] Emergency procedures
4. [ ] Briefing and safety of pole holders
5. [ ] Weather considerations

G. [ ] Circle the Jumpers

1. [ ] Briefing
2. [ ] Knowledge of FAA/TC requirements concerning Circling the Jumpers
3. [ ] Knock it off procedures

Appendix D
Practical Flight Evaluation Standards

A. General

1. If an applicant believes that he/she may have difficulty executing one or more of the flight maneuvers mandated, it is strongly recommended that the applicant postpone or cancel the evaluation until he/she has complete mastery of the required maneuvers.

2. The final decision on whether or not an applicant is capable of performing any particular maneuver is the applicant's.

3. Certain maneuvers may not be appropriate for certain aircraft. The ACE and the applicant will jointly decide if specific maneuvers should be adjusted or eliminated from the evaluation process if the applicant is flying a plane that cannot or should not be used to fly those maneuvers. For example, it is understood that only planes with inverted fuel and oil systems will fly the two 180-degree inverted turns. Under no circumstances should an aircraft be used to perform maneuvers not approved for that aircraft.

4. The maneuvers specified in the Practical Flight Evaluation Standards for air show pilots may change as ICAS gains experience with the Standards and adjusts them over time. The most up to date schedule of maneuvers will always be available from ICAS headquarters.

5. At a minimum, the maneuvers explained in this document are to be successfully demonstrated prior to the applicant demonstrating his/her air show sequence. They are to be performed at a safe altitude, may be flown separately or in a sequence, and may be completed in the same flight, or in a separate flight from the air show sequence, at the discretion of the applicant and evaluator. These maneuvers are used to demonstrate the applicant's ability to perform basic aerobatic maneuvers safely before demonstrating his/her ability to perform a sequence of maneuvers at low altitude in a designated area.

6. Reverse Half Cuban-Eights and Split S-type maneuvers can be dangerous maneuvers. Though any maneuver specified in these standards can also be dangerous, ICAS and the ACE Committee recommend particular caution and, if necessary, a bit more altitude than normal when a new pilot or a pilot unknown to the ACE is performing these particular maneuvers.

7. In order to provide the ACE with a basis for evaluating a maneuver from the ground, ICAS has given altitude and heading guidelines to assist the ACE in the evaluation process. The altitude and heading guidelines are provided for reference only. These values are accepted by the International Aerobatic Club (IAC) as the minimum deviation visible by a judge evaluating from the ground. Please use these values as a guide only. ICAS expects the ACE to use his/her best judgment in evaluating a performance. If there is any question as to the safety of any maneuver or sequence presented by an applicant, the pilot should fail the evaluation.

8. The ACE should select the category and performance class that covers the maneuvers the aircraft is capable of and then, if necessary, disregard any maneuvers deemed unsafe or beyond the capabilities of the aircraft. The ACE may ask to see any maneuver that might not be listed if it is deemed necessary for conducting a thorough evaluation and the maneuver is considered to be safe and appropriate.

9. To be eligible for a waiver with a formation team, each member of that team must also obtain or possess a solo authorization in the aircraft and at the level sought for the format.

Sport Aerobatics

Sport aircraft are to be evaluated in one of the following three classes. The evaluation should be conducted in the class that *best* covers the maneuvers the aircraft is capable of and then exclude any maneuvers inappropriate for the aircraft. The ACE may add a maneuver to any category if deemed necessary for conducting a thorough evaluation if the maneuver is considered to be safe and appropriate for the aircraft.

Performance Class A Aircraft

- Level 4 (800 feet AGL minimum)
- Level 3 (500 feet AGL minimum)
- Level 2 (250 feet AGL minimum)
- Level 1 (Unrestricted)

Aircraft in this performance class are capable of inverted flight maneuvering, advance maneuvers (e.g. torque rolls and inverted flat spins) and gyroscopic maneuvers.

Typical aircraft: ***Extra, Edge, Pitts, MX-2, Yak-55***

If the ACE is familiar with the applicant, the ACE may, at his/her discretion, elect to omit selected maneuvers from Section IA when conducting a Level 2, Level 1/surface evaluation.

IA. Area of Operation: Flight Evaluation Maneuvers (Level 3 and Level 4)

A. Task: Inverted Flight

To determine that the applicant can half-roll from upright to inverted flight, fly the distance of the demonstration area, and half-roll back to upright flight while maintaining control and full situational awareness.

1. Exhibit knowledge of the elements of inverted flight.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level attitude at the demonstration altitude before the roll to inverted, making necessary wind corrections to maintain a constant flight path.
4. Roll to inverted smoothly and in a controlled fashion. Stopping at wings level +/- 10 degrees.
5. Maintain flight path +/- 10 degrees while inverted.
6. Maintain altitude **+/- 100 feet**.
7. Roll back to upright flight in a smooth and controlled fashion, maintaining flight path +/- 10 degrees.
8. Stop roll upright, wings level +/- 10 degrees at the same altitude as at the start of the maneuver.

B. Task: Two Inverted 180-degree Turns

To determine that the applicant can complete two 180-degree inverted turns while maintaining control and full situational awareness.

1. Exhibit knowledge of the elements of inverted turns.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level inverted flight path.
4. Roll smoothly and in a controlled fashion to the intended bank angle +/- 5 degrees to no less than 45 degrees.
5. Execute a single 180-degree turn and, when completed, initiate and execute a second 180-degree turn in the opposite direction.
6. Maintain constant altitude +100/-0 feet and consistent bank angle +/- 10 degrees throughout the entire maneuver.
7. When the second 180-degree turn is completed, roll out on the initial flight path heading +/- 20 degrees.
8. Be able to safely and promptly abort the figure if needed or as instructed by the ACE.

C. Task: Three-turn Upright Spin

To determine that the applicant can complete three (3) full rotations in a fully developed upright spin while maintaining control and full situational awareness. This maneuver is to be performed at a safe altitude and is not required to be performed at the evaluation altitude.

1. Exhibit knowledge of the elements of upright spins in demonstration aircraft type, including, but not limited to, normal, flat, accelerated, power on and power off.
2. Consider wind conditions, obstructions and emergency procedures.
3. Enter the demonstration area on a constant heading.
4. While holding the established heading, fully stall aircraft and establish a spin in a predetermined direction.

5. Hold the aircraft in the spin for three full rotations.
6. Stop the rotation of the spin in a prompt and timely manner on the same heading as entered +/- 30 degrees in roll axis.
7. Recover aircraft from vertical flight (initial recovery attitude) back to a straight and level flight on the same heading as entered +/- 10 degrees.
8. Be able to safely and promptly abort the figure if needed or as instructed by the ACE.

D. Task: Inverted Stall/Spin Recognition and Recovery

To determine that the applicant exhibits knowledge of the elements related to inverted slow flight and inverted stall/spin recognition and recovery.

1. Exhibit knowledge of flight situations where unintentional inverted stalls/spins may occur.
2. Exhibit knowledge of the technique used to recognize and recover from unintentional inverted stall/spins.
3. Exhibit knowledge of the recommended inverted stall/spin recovery procedure for the airplane being used for the evaluation.

E. Task: Three Consecutive Slow Rolls

To determine that the applicant can complete three (3) consecutive rolls while maintaining heading, altitude and full situational awareness.

1. Exhibit knowledge of the elements of multiple rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level attitude with a flight path parallel to the demonstration area.
4. Roll smoothly and in a controlled fashion to the left or right.
5. Maintain a constant rate of roll throughout all three (3) rolls.
6. Maintain heading during all three (3) rolls +/- 10 degrees.
7. Maintain altitude +/- 100 feet during all three (3) rolls.
8. Finish rolls in a wings level attitude +/- 10 degrees.
9. Finish rolls on same heading as entry +/- 10 degrees.
10. Be able to abort the figure at any time if needed or as instructed by the ACE.

F. Task: Four-Point Roll

To determine that the applicant possesses advanced rolling abilities and inverted orientation while maintaining the showline and baseline altitude.

1. Exhibit knowledge of point rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.
4. Roll smoothly and in a controlled fashion to each point.
5. Stop each segment of the roll +/- 10 degrees.
6. Maintain heading during the maneuver +/- 10 degrees.
7. Complete the maneuver at an altitude at or above the baseline altitude.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or as instructed by the ACE.

G. Task: Inside Loop

To determine that the applicant can complete a full inside loop.

1. Exhibit knowledge of the elements of the inside loop.

2. Consider wind conditions, obstructions and emergency procedures.
3. Initiate the inside loop from an established flight path parallel to the demonstration area.
4. Maintain roll and pitch control during loop.
5. Maintain speed control over the top of the loop.
6. Exit the loop on the same flight path as entry +/- 10 degrees.
7. Exit the loop at an altitude at or above the baseline altitude.
8. Be able to safely abort the loop at any time if needed or asked to by ACE.

H. Task: Hammerhead Turn

To determine that the applicant can demonstrate a Hammerhead Turn with reference to the ground, while maintaining directional control and altitude awareness.

1. Exhibit knowledge of the elements of Hammerhead turns, to include vertical up and down flight, pivot points, altitude loss and ground closure rates.
2. Consider wind conditions (upwind or downwind pivot), obstructions and emergency procedures.
3. Establish a straight and level flight path at the demonstration altitude parallel to the demonstration area.
4. Pull smoothly in a controlled fashion to a vertical up flight attitude.
5. Pivot/turn at the correct speed in a controlled manner to produce a turn radius that is no greater than one and one-half times the wing span of the demonstration aircraft. The pitch and roll of the aircraft should not change more than 20 degrees in any direction during the pivot/turn in a zero wind condition.
6. Establish vertical down flight attitude. Length of line should not be a factor as long as level upright flight is established at or above the initial starting altitude.
7. Return to initial start altitude **+/- 100 feet** and on the reciprocal heading as first entered +/- 10 degrees.
8. Be able to abort the figure at any time if needed or as instructed by the ACE.

I. Task: Reverse Half Cuban-Eight

To determine that the applicant can complete a Reverse Half Cuban-Eight by: establishing an upline of approximately 45 degrees, half-roll to inverted, transition to approximately five-eighths of a loop returning to upright and level flight in the opposite direction from the entry.

1. Exhibit knowledge of the elements of the Reverse Half Cuban-Eight. Specifically, altitude and pitch awareness during the inverted portion of this figure.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area.
4. Pull to a flight path of approximately 45 degrees or whatever attitude is needed to gain required altitude to complete this maneuver.
5. Roll to the inverted flight attitude while maintaining the original flight path.
6. Transition smoothly to a downward inside approximately five-eighths of a loop.
7. Return to upright level flight in the opposite direction of the entry +/-10 degrees and **+/- 100 feet** altitude from entry altitude.
8. Be able to abort this figure at any time if needed or as instructed by the ACE.

J. Task: Half Cuban-Eight

To determine that the applicant can complete a Half Cuban-Eight: fly approximately five-eighths of a loop to an inverted downline of approximately 45 degrees. Half-roll the aircraft to upright. Recover in straight and level upright flight parallel to the demonstration area, while maintaining full situational awareness in reference to the ground.

1. Exhibit knowledge of the elements of the Half Cuban-Eight.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area.

4. Fly approximately five-eighths of a loop in a smooth and controlled fashion to an inverted downline of approximately 45 degrees.
5. Half-roll to upright flight on a downline.
6. Return to upright level flight at the same or greater altitude in the opposite direction from entry +/- 10 degrees.
7. Be able to abort this figure at any time needed or as instructed by the ACE.

K. Task: Snap Roll

To determine that the applicant can complete one full inside snap roll maintaining heading and altitude while maintaining full situational awareness to the ground.

1. Exhibit knowledge of the elements of positive "G" snap rolls. Discussion should include aircraft limitation, maximum maneuver speed vs. maximum snap roll speeds and their differences.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area.
4. Execute one full revolution, positive snap roll.
5. Stop the roll upright and in level flight on same heading +/- 10 degrees and altitude +100/-0 feet.
6. Be able to abort the figure at any time needed or as instructed by the ACE.

IB. Area of Operation: Flight Evaluation Maneuvers (Level 1 and 2)

A. Task: Inverted Spin. Minimum of One Turn

To determine that the applicant can recognize, enter and recover from an inverted spin. This maneuver is to be performed at a safe altitude and is not required to be performed at the evaluation altitude.

1. Exhibit knowledge of the elements of inverted spins in the demonstration aircraft, including but not limited to, normal, flat, accelerated, power on and power off.
2. Consider wind conditions, obstructions and emergency procedures.
3. While holding the established heading, fully stall the aircraft, establish an inverted spin in a predetermined direction.
4. Hold the aircraft in the spin for at least one full rotation.
5. Stop the rotation in a prompt and timely manner.
6. Recover the aircraft from vertical flight (initial recovery attitude) back to straight and level flight in a direction that is not divergent with the ACE or the demonstration line.
7. Be able to safely and promptly abort the figure if needed or as instructed by the ACE.

B. Task: Vertical Roll, Up and Down (Hammerhead or Humpty)

To determine that the applicant can demonstrate a Hammerhead Turn or Humpty Bump with a full vertical roll up and a full vertical roll down (left or right) with reference to the ground, while maintaining directional control and altitude awareness.

1. Exhibit knowledge of the elements of the vertical roll, both up and down to include pivot and pull points, altitude loss and ground closure rates.
1. Consider wind conditions (upwind or downwind pivot, pull, and rolls into or downwind) obstructions and emergency procedures.
2. Establish a straight and level flight path at the demonstration altitude parallel to the demonstration area.
3. Start at an altitude that will allow the figure to be flown and recovered by an altitude no lower than the level being applied for.
4. Pull smoothly in a controlled fashion to a vertical up line, once established, one full vertical roll (360 degrees, +/- 10 degrees) will be added.

5. Pivot/turn or pull at the correct airspeed in a controlled manner to reverse direction of flight to the vertical down attitude. Once established, one full vertical roll (360 degrees, +/- 10 degrees) will be added.
6. Return to upright and level flight no lower than the waiver level being applied for and heading +/- 10 degrees from the demonstration area.
7. Be able to abort this figure at any time or as instructed by the ACE.

C. Task: Inside Snap Rolls on a Descending Line

To determine that the applicant can complete a multiple snap roll on a descending line of no less than 45 degrees. At least two full rotations should be demonstrated, with a recovery on the same axis as entered.

1. Exhibit knowledge of multiple snap rolls, to include over and under snap rolls, deep snaps, accelerated snaps, "tumbled" snaps and recovery in an unusual attitude. Also, displacement of aircraft during snap rolls and snapping towards the crowd line. The discussion should also include aircraft limitation, maximum maneuver speed vs. maximum snap roll speeds and how they differ.
2. Consider wind conditions (snapping into or downwind obstructions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area. Enter a 45-degree or steeper descending line. A Half Cuban-Eight works well for this.
4. Execute one series of multiple snap rolls (minimum of two).
5. Snaps should be "clean" and well defined. Rotation should be stopped accurately and without hesitation. Wings should return to level +/-20 degrees. The snaps must be completed in the upright position.
6. Be able to abort the figure at any time needed or as instructed by the ACE.

D. Task: Torque Roll

To determine that the applicant can complete a torque roll while maintaining full situational awareness to the ground.

1. Exhibit knowledge of elements of tail slides and torque rolls.
2. Consider the wind conditions, possible drift of this maneuver, any obstructions and emergency procedures. Attention should be given to the possible altitude gain vs. the possible altitude loss.
3. Establish a straight and level flight path parallel to the demonstration area. Pull to a vertical flight attitude. At this point it is up to the pilot and the ACE weather to perform a vertical roll into a torque or to let the engine torque produce the roll of the aircraft.
4. Once forward airspeed has stopped and the aircraft is rolling from the torque of the engine and the aircraft is in a tail slide, the pilot must recover to the vertical down attitude and resume normal flight parallel to the demonstration area.
5. Be able to safely abort the torque roll at any time if needed or asked to by the ACE.

E. Task: Gyroscopic Maneuvers

To determine that the applicant can safely perform maneuvers that are driven by the gyroscopic effect of the aircraft engine, propeller and maximum control surface deflection. The pilot applicant may choose three different "tumbles" of his/her choice and demonstrate them for the ACE. The applicant must explain in detail the tumbles he/she will fly and the direction of entry and exit of each maneuver before the evaluation.

1. Exhibit knowledge of the elements of gyroscopic figures. Special attention should be paid to altitude awareness during the maneuver and ground closure rates. Also, at what point the aircraft falls from gyroscopic effect and transitions to spin or no motion (hanging and falling).
2. Consider the wind conditions, obstructions and emergency procedures.
3. Establish the required flight path needed to perform the given "tumble" at the required safe altitude.
4. Execute the "tumble" and recover the aircraft to a normal upright attitude in a reasonable amount of time. At no time may the recovery allow the aircraft to fly towards the ACE or demonstration area.

5. Be able to abort the maneuver at any time needed or as instructed by the ACE.

II. Area of Operation: Crosswind Correction

A. Task: Crosswind Correction

To determine that the applicant can compensate for crosswind conditions by maneuvering the aircraft in a fashion that will keep the aircraft from moving downwind. Many techniques will work for this purpose, leaving quite a bit of subjectivity and judgment on the ACE's evaluation. Therefore, the sole task is to verify that the pilot has the control and situational awareness needed to keep the aircraft from passing inside a given "deadline."

The following maneuver is designed to demonstrate the pilot's ability to "move" the aircraft from left to right or vice versa. The amount of sideways movement will vary depending on the size of the loop, time in the loop, and the pilot's ability to input corrections for wind drift.

Exhibit knowledge of the elements of crosswind correcting. Specifically, being able to keep the aircraft over the same path along the demonstration area correcting for crosswind, and also be able to move aircraft to the upwind direction at will.

1. Consider wind conditions, obstructions and emergency procedures.

2. Perform one inside loop over a pre-determined ground point, while flying the aircraft directly toward the ACE at the demonstration altitude.

3. The applicant should be able to "move" the aircraft "up-wind" to the left or right by no less than 100 feet. (The use of runway lights normally spaced 200 feet is a good reference for the ACE to use.)

4. Refer to Task F: Inside Loop in Section I. If sufficient crosswind exists, the applicant may perform the loop in a direction that would expose his/her aircraft to a 90-degree crosswind. If this method is used, the applicant will be expected to keep his/her aircraft over the pre-determined ground point during the entire loop. The ACE may want to refer to the enclosed Crosswind Component Charts for wind vs. distance drift.

III. Area of Operation: Full Aerobatic Sequence

A. Task: Aerobatic Sequence Demonstration

To determine that the applicant can complete a full aerobatic demonstration. During the flight the pilot shall be able to complete the following:

1. Maintain a safe altitude at all times as appropriate for the level for which the applicant is applying.

2. Maintain directional control of his/her aircraft at all times during the aerobatic demonstration, to include take off and landings.

3. Maintain an energy level that is appropriate for the given sequence and maneuvers being demonstrated.

4. Compensate for winds during the sequence so as to remain over the primary demonstration area, remaining no less than 500 feet in front of the ACE, and keeping the sequence balanced and centered.

    a. Be able to abort or interrupt the sequence at any time if needed or asked to by the ACE. After interruption, being able to return to the aerobatic area and continue with the remainder of the sequence without the flow and safety being compromised.

b. All maneuvers shall be performed to the same standard as set in the proceeding "tasks."

Performance Class B Aircraft

- Level 4 (800 feet AGL minimum)
- Level 3 (500 feet AGL minimum)
- Level 2 (250 feet AGL minimum)
- Level 1 (Unrestricted)

Aircraft in this class are capable of basic aerobatics and inverted flight maneuvering and are not typically capable of the advanced maneuvers of **A Class**, Section IB including gyroscopic maneuvers.

*(Note: Any of the tasks listed below with the notation ** indicates that if the aircraft being used for the evaluation cannot perform a specific maneuver due to limited inverted fuel or oil supply, or is placarded against flying these maneuvers, may modify or not perform the maneuver if agreed to by the evaluating ACE.)*

Typical aircraft: ***Modified Stearman/Chipmunk, Decathlon, Great Lakes***

I. Area of Operation: Flight Evaluation Maneuvers

A. Task: Slow Roll (left)

To determine that the applicant can roll the aircraft without losing altitude and maintain a constant heading while executing a 360 degree slow roll.

1. Exhibit knowledge of slow rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.
4. Roll smoothly and in a controlled fashion to the left.
5. Maintain a constant rate of roll throughout the roll.
6. Maintain heading during the roll +/- 10 degrees.
7. Complete the roll at **+/-** 100 feet and altitude above the baseline altitude.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or as instructed by the ACE.

B. Task: Slow Roll (right)

To determine that the applicant can roll the aircraft equally well in both directions.

1. Exhibit knowledge of slow rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.
4. Roll smoothly and in a controlled fashion to the right.
5. Maintain a constant rate of roll throughout the roll.
6. Maintain heading during the roll +/- 10 degrees.
7. Complete the roll at **+/- 100 feet** altitude and above the baseline altitude.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or as instructed by the ACE.

C. Task: Inverted Flight **

To determine that the applicant can half-roll from upright to inverted flight, fly distance of the demonstration area, and half-roll back to upright flight while maintaining control and full situational awareness.

1. Exhibit knowledge of the elements of inverted flight.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level attitude at the demonstration altitude before the roll to inverted, making necessary wind corrections to maintain a constant flight path **+/- 100 feet** altitude.
4. Roll to inverted smoothly and in a controlled fashion. Stopping at wings level +/- 10 degrees.
5. Maintain flight path +/- 10 degrees while inverted.
6. Maintain **+/- 100 feet** altitude.
7. Roll back to upright flight in a smooth and controlled fashion, maintaining flight path +/- 10 degrees. Stop roll upright, wings level +/- 10 degrees at same altitude as at start of maneuver.

D. Task: Two Inverted 180-degree Turns **

To determine that the applicant can complete two 180-degree inverted turn while maintaining control and full situational awareness.

1. Exhibit knowledge of the elements of inverted turns.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level inverted flight path.
4. Roll smoothly and in a controlled fashion to the intended bank angle +/- 5 degrees to no less than 45 degrees.
5. Execute a single 180-degree turn and, when completed, initiate and execute a second 180-degree turn in the opposite direction.
6. Maintain constant altitude +100/-0 feet and consistent bank angle +/- 10 degrees throughout the entire maneuver.
7. When the second 180-degree turn is completed, roll out on initial flight path heading +/- 20 degrees.
8. Be able to safely and promptly abort the figure if needed or instructed to by ACE.

E. Task: Inverted Stall/Spin Recognition and Recovery

To determine that the applicant exhibits knowledge of the elements related to inverted slow flight and inverted stall/spin recognition and recovery.

1. Exhibit knowledge of flight situations where unintentional inverted stalls/spins may occur.
2. Exhibit knowledge of the technique used to recognize and recover from unintentional inverted stall/spins.
3. Exhibit knowledge of the recommended inverted stall/spin recovery procedure for the airplane being used for the evaluation.

F. Task: Three Consecutive Slow Rolls

To determine that the applicant can complete three (3) consecutive rolls while maintaining heading, altitude and full situational awareness.

1. Exhibit knowledge of the elements of multiple rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level attitude with a flight path parallel to the demonstration area.
4. Roll smoothly and in a controlled fashion to the left or right.
5. Maintain a constant rate of roll throughout all three (3) rolls.
6. Maintain heading during all three (3) rolls +/- 10 degrees.
7. Maintain **+/- 100 feet** altitude during all three (3) rolls.
8. Finish rolls in a wings level attitude +/- 10 degrees.

9. Finish rolls on same heading as entry +/- 10 degrees.
10. Be able to abort the figure at any time if needed or as instructed by the ACE.

G. Task: Four-Point Roll

To determine that the applicant possesses advanced rolling abilities and inverted orientation while maintaining the showline and baseline altitude.

1. Exhibit knowledge of point rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.
4. Roll smoothly and in a controlled fashion to each point.
5. Stop each segment of the roll +/- 10 degrees.
6. Maintain heading during the maneuver +/- 10 degrees.
7. Complete the maneuver **+/- 100 feet altitude** and above the baseline altitude.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or as instructed by the ACE.

H. Task: Half Cuban-Eight

To determine that the applicant can complete a Half Cuban-Eight: fly approximately five-eighths of a loop to an inverted down line of approximately 45 degrees. Half-roll the aircraft to upright. Recover in straight and level upright flight parallel to the demonstration area, while maintaining full situational awareness in reference to the ground.

1. Exhibit knowledge of the elements of the Half Cuban-Eight.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area.
4. Fly approximately five-eighths of a loop in a smooth and controlled fashion to an inverted down line of approximately 45 degrees.
5. Half-roll to upright flight on a down line.
6. Return to upright level flight at same or greater altitude in the opposite direction from entry +/- 10 degrees.
7. Be able to abort this figure at any time needed or as instructed by the ACE.

I. Task: Reverse Half Cuban-Eight

To determine that the applicant can complete a reverse Half Cuban-Eight by: establishing an up line of approximately 45 degrees, half-roll to inverted, transition to approximately five-eighths of a loop down returning to upright and level flight in the opposite direction from the entry.

1. Exhibit knowledge of the elements of the Reverse Half Cuban-Eight. Specifically, altitude and pitch awareness during the inverted portion of this figure.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area.
4. Pull to a flight path of approximately 45 degrees or whatever attitude is needed to gain required altitude to complete this maneuver.
5. Roll to the inverted flight attitude while maintaining the original flight path.
6. Transition smoothly to a downward inside approximately five-eighths of a loop.
7. Return to upright level flight in the opposite direction of the entry +/-10 degrees and +100/-0 feet altitude from entry altitude.
8. Be able to abort this figure at any time if needed or as instructed by the ACE.

J. Task: Inside Loop

To demonstrate that the applicant has the ability to utilize the vertical while maintaining the showline correcting for wind drift and reestablish level flight upon completion of the maneuver at the baseline altitude.

1. Exhibit knowledge of the elements of the inside loop.
2. Consider wind conditions, obstructions and emergency procedures.
3. From an established flight path, parallel to the demonstration area initiate the inside loop.
4. Maintain roll and pitch control during the loop.
5. Maintain speed control over the top of the loop.
6. Exit the loop on the same flight path as entry +/-10 degrees.
7. Exit the loop at an altitude at or above the baseline altitude.
8. Be able to safely abort the loop at any time if needed or asked to by ACE.

K. Task: Three-turn Upright Spin **

To determine that the applicant can complete three (3) full rotations in a fully developed upright spin while maintaining control and full situational awareness.

1. Exhibit knowledge of the elements of upright spins in demonstration aircraft type. Including, but not limited to normal, flat, accelerated, power on and power off.
2. Consider wind conditions, obstructions and emergency procedures.
3. Enter the demonstration area on a constant heading.
4. While holding the established heading, fully stall aircraft and establish a spin in a predetermined direction.
5. Hold the aircraft in the spin for three full rotations.
6. Stop the rotation of the spin in a prompt and timely manner on the same heading as entered +/- 30 degrees in roll axis.
7. Recover aircraft from vertical flight (initial recovery attitude) back to a straight and level flight on the same heading as entered +/- 10 degrees.
8. Be able to safely and promptly abort the figure if needed or as instructed by the ACE.

L. Task: Hammerhead

To determine that the applicant can demonstrate a Hammerhead while maintaining directional control and altitude awareness.

1. Exhibit knowledge of the elements of hammerheads, to include vertical flight up and down, pivot points, altitude loss and ground closure rates.
2. Consider wind conditions (upwind or downwind pivot) obstructions and emergency procedures.
3. Establish a straight and level flight path at demonstration altitude parallel to demonstration area.
4. Pull smoothly in a controlled fashion to a vertical up flight attitude.
5. Pivot/turn at the correct speed in a controlled manner to produce a turn radius that is no greater than one and one-half times the wing span of the demonstration aircraft. The pitch and roll of the aircraft should not change more than 20 degrees in any direction during the pivot/turn in a zero wind condition.
6. Establish vertical down flight attitude. Length of line should not be a factor as long as level upright flight is established at or above the initial starting altitude.
7. Return to initial start altitude or above on the reciprocal heading as first entered +/- 10 degrees.
8. Be able to abort the figure at any time if needed or as instructed by the ACE.

II. Area of Operation: Crosswind Correction

A. Task: Crosswind Correction

To determine that the applicant can compensate for crosswind conditions by maneuvering the aircraft in a fashion that will keep the aircraft from moving downwind. Many techniques will work for this purpose leaving quite a bit of subjectivity and judgment on the ACE's evaluation. Therefore, the sole task is to verify that the pilot has the control and situational awareness needed to keep the aircraft from passing inside a given "dead line."

The following maneuver is designed to demonstrate the pilot's ability to "move" the aircraft from left to right or vice versa. The amount of sideways movement will vary depending on the size of the loop, time in the loop, and the pilot's ability to input corrections for wind drift.

1. Exhibit knowledge of the elements of crosswind correcting. Specifically, being able to keep the aircraft over the same path along the demonstration area correcting for crosswind, and also being able to move aircraft to the upwind direction at will.
2. Consider wind conditions, obstructions and emergency procedures.
3. While flying the aircraft directly towards the ACE at the demonstration altitude perform one inside loop over a pre-determined ground point.
4. The applicant should be able to "move" the aircraft "up-wind" to the left or right by no less than 100 feet. (The use of runway lights normally spaced 200 feet is a good reference for the ACE to use.)
5. Refer to Task G: Inside Loop in Section I.
6. If sufficient crosswind exists, the applicant may perform the loop in a direction that would expose his/her aircraft to a 90-degree crosswind. If this method is used, the applicant will be expected to keep his/her aircraft over the pre-determined ground point during the entire loop. The ACE may want to refer to the enclosed Crosswind Component Charts for wind vs. distance drift.

III. Area of Operation: Full Aerobatic Sequence

A. Task: Aerobatic Sequence Demonstration

To determine that the applicant can complete a full aerobatic demonstration. During the flight the pilot shall be able to complete the following:

1. Maintain a safe altitude at all times as appropriate for the level being applied for.
2. Maintain directional control of his/her aircraft at all times during the aerobatic demonstration. This is to include take-off and landings.
3. Maintain an energy level that is appropriate for the given sequence and maneuvers being demonstrated.
4. Compensate for winds during the sequence so as to remain over the primary demonstration area, remaining no less than 500 feet in front of the ACE, and keeping the sequence balanced and centered.
5. Be able to abort or interrupt the sequence at any time if needed or asked to by the ACE. After interruption, being able to return to the aerobatic area and continue with the remainder of the sequence without the flow and safety being compromised.

Performance Class C Aircraft

- Level 4 (800 feet AGL minimum)
- Level 3 (500 feet AGL minimum)
- Level 2 (250 feet AGL minimum)
- Level 1 (Unrestricted)

Aircraft in this class are capable of basic aerobatics but are usually considered *incapable* of sustained inverted maneuvering and the advanced maneuvers of **A Class**, Section IB including gyroscopic maneuvers.

*(Note: Any of the tasks listed below with the notation ** indicates that if the aircraft being used for the evaluation cannot perform a specific maneuver due to limited inverted fuel or oil supply, or is placarded against flying these maneuvers, may modify or not perform the maneuver if agreed to by the evaluating ACE.)*

Typical aircraft: ***Stock Stearman, Citabria, Cub***

I. Area of Operation: Flight Evaluation Maneuvers

A. Task: Half-Rolls

To determine that the applicant can execute a half-roll from upright to inverted, pause, and then roll back upright in the opposite direction of the original roll. Requires applicant to exhibit orientation and recognition of inverted flight and demonstrate ability to roll in the opposite direction to reestablish upright position. This maneuver may be accomplished in a parabolic arc at the discretion of the pilot.

1. Exhibit knowledge of the elements of rolling maneuvers.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish necessary wind corrections to maintain a constant flight path before rolling to the inverted.
4. Roll to inverted smoothly and in a controlled fashion, stopping at wings level +/- 10 degrees.
5. Maintains flight path +/- 10 degrees while inverted.
6. Roll back to upright flight in a smooth and controlled fashion, maintaining flight path +/- 10 degrees.
7. Stop roll upright, wings level +/- 10 degrees and at an altitude at or above the baseline altitude.
8. Be able to abort the maneuver at any time needed or as instructed by the ACE.

B. Task: Aileron Roll (left)

To determine that the applicant can roll the aircraft without losing altitude and maintain a constant heading while executing a 360 degree aileron roll.

1. Exhibit knowledge of aileron rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.
4. Roll smoothly and in a controlled fashion to the left.
5. Maintain a constant rate of roll throughout the roll.
6. Maintain heading during the roll +/- 10 degrees.
7. Complete the roll at an altitude at or above the baseline altitude.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or as instructed by the ACE.

C. Task: Aileron Roll (right)

To determine that the applicant can roll the aircraft equally well in both directions.

1. Exhibit knowledge of aileron rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.
4. Roll smoothly and in a controlled fashion to the right.
5. Maintain a constant rate of roll throughout the roll.
6. Maintain heading during the roll +/- 10 degrees.
7. Complete the roll at an altitude at or above the baseline altitude.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or as instructed by the ACE.

D. Task: Four-Point Aileron Roll

To determine that the applicant possesses advanced rolling abilities and inverted orientation while maintaining the showline and baseline altitude.

1. Exhibit knowledge of point rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.
4. Roll smoothly and in a controlled fashion to each point.
5. Stop each segment of the roll +/- 10 degrees.
6. Maintain heading during the maneuver +/- 10 degrees.
7. Complete the maneuver at an altitude at or above the baseline altitude.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or as instructed by the ACE.

E. Task: Half Cuban-Eight

To determine that the applicant can complete a Half Cuban-Eight: fly approximately five-eighths of a loop to an inverted down line of approximately 45 degrees. Half-roll the aircraft to upright. Recover in straight and level upright flight parallel to the demonstration area, while maintaining full situational awareness in reference to the ground.

1. Exhibit knowledge of the elements of the Half Cuban-Eight.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area.
4. Fly approximately five-eighths of a loop in a smooth and controlled fashion to an inverted down line of approximately 45 degrees.
5. Half-roll to upright flight on a down line.
6. Return to upright level flight at same or greater altitude in the opposite direction from entry +/- 10 degrees.
7. Be able to abort this figure at any time needed or as instructed by the ACE.

F. Task: Reverse Half Cuban-Eight

To determine that the applicant can complete a Reverse Half Cuban-Eight by: establishing an up line of approximately 45 degrees, half-roll to inverted, transition to approximately five-eighths of a loop down returning to upright and level flight in the opposite direction from the entry.

1. Exhibit knowledge of the elements of the Reverse Half Cuban-Eight. Specifically, altitude and pitch awareness during the inverted portion of this figure.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area.
4. Pull to a flight path of approximately 45 degrees or whatever attitude is needed to gain required altitude to complete this maneuver.
5. Roll to the inverted flight attitude while maintaining the original flight path.
6. Transition smoothly to a downward inside approximately five-eighths of a loop.
7. Return to upright level flight in the opposite direction of the entry +/-10 degrees and +100/-0 feet altitude from entry altitude.
8. Be able to abort this figure at any time if needed or as instructed by the ACE.

G. Task: Inside Loop

To demonstrate that the applicant has the ability to utilize the vertical while maintaining the showline, correcting for wind drift and reestablishing level flight upon completion of the maneuver at the baseline altitude.

1. Exhibit knowledge of the elements of the inside loop.

2. Consider wind conditions, obstructions and emergency procedures.
3. From an established flight path, parallel to the demonstration area initiate the inside loop.
4. Maintain roll and pitch control during loop.
5. Maintain speed control over the top of the loop.
6. Exit the loop on the same flight path as entry +/-10 degrees.
7. Exit the loop at an altitude at or above the baseline altitude.
8. Be able to safely abort the loop at any time if needed or asked to by ACE.

H. Task: Three-turn Upright Spin **

To determine that the applicant can complete three (3) full rotations in a fully developed upright spin while maintaining control and full situational awareness.

1. Exhibit knowledge of the elements of upright spins in demonstration aircraft type, including, but not limited to normal, flat, accelerated, power on and power off.
2. Consider wind conditions, obstructions and emergency procedures.
3. Enter the demonstration area on a constant heading.
4. Fully stall the aircraft and establish a spin in a predetermined direction, while holding the established heading.
5. Hold the aircraft in the spin for three full rotations.
6. Stop the rotation of the spin in a prompt and timely manner on the same heading as entered +/- 30 degrees in roll axis.
7. Recover aircraft from vertical flight (initial recovery attitude) back to a straight and level flight on the same heading as entered +/- 10 degrees.
8. Be able to safely and promptly abort the figure if needed or as instructed by the ACE.

I. Task: Hammerhead

To determine that the applicant can demonstrate a Hammerhead while maintaining directional control and altitude awareness.

1. Exhibit knowledge of the elements of hammerheads, to include vertical flight up and down, pivot points, altitude loss and ground closure rates.
2. Consider wind conditions (upwind or downwind pivot) obstructions and emergency procedures.
3. Establish a straight and level flight path at demonstration altitude parallel to demonstration area.
4. Pull smoothly in a controlled fashion to a vertical up flight attitude.
5. Pivot/turn at the correct speed in a controlled manner to produce a turn radius that is no greater than one and one-half times the wing span of the demonstration aircraft. The pitch and roll of the aircraft should not change more than 20 degrees. In any direction during the pivot/turn in a zero wind condition.
6. Establish vertical down flight attitude. Length of line should not be a factor as long as level upright flight is established at or above the initial starting altitude.
7. Return to initial start altitude or above on the reciprocal heading as first entered +/- 10 degrees.
8. Be able to abort the figure at any time if needed or as instructed by the ACE.

II. Area of Operation: Crosswind Correction

A. Task: Crosswind Correction

To determine that the applicant can compensate for crosswind conditions by maneuvering the aircraft in a fashion that will keep the aircraft from moving downwind. Many techniques will work for this purpose leaving quite a bit of subjectivity and judgment on the ACE's evaluation. Therefore, the sole task is to verify that the pilot has the control and situational awareness needed to keep the aircraft from passing inside a given "dead line."

The following maneuver is designed to demonstrate the pilot's ability to "move" the aircraft from left to right or vice versa. The amount of sideways movement will vary depending on the size of the loop, time in the loop, and the pilot's ability to input corrections for wind drift.

1. Exhibit knowledge of the elements of crosswind correcting. Specifically, being able to keep the aircraft over the same path along the demonstration area correcting for crosswind, and also being able to move aircraft to the upwind direction at will.
2. Consider wind conditions, obstructions and emergency procedures.
3. While flying the aircraft directly towards the ACE at the demonstration altitude perform one inside loop over a pre-determined ground point.
4. The applicant should be able to "move" the aircraft upwind to the left or right by no less than 100 feet. (The use of runway lights normally spaced 200 feet is a good reference for the ACE to use.)
5. Refer to Task G: Inside Loop in Section I.

If sufficient crosswind exists, the applicant may perform the loop in a direction that would expose his/her aircraft to a 90-degree crosswind. If this method is used, the applicant will be expected to keep his/her aircraft over the pre-determined ground point during the entire loop. The ACE may want to refer to the enclosed Crosswind Component Charts for wind vs. distance drift.

Area of Operation: Full Aerobatic Sequence

B. Task: Aerobatic Sequence Demonstration

To determine that the applicant can complete a full aerobatic demonstration. During the flight the pilot shall be able to complete the following:

1. Maintain a safe altitude at all times as appropriate for the level for which the applicant is applying.
2. Maintain directional control of his/her aircraft at all times during the aerobatic demonstration -- to include take off and landings.
3. Maintain an energy level that is appropriate for the given sequence and maneuvers being demonstrated.
4. Compensate for winds during the sequence so as to remain over the primary demonstration area, remaining no less than 500 feet in front of the ACE, and keeping the sequence balanced and centered.
5. Be able to abort or interrupt the sequence at any time if needed or asked to by the ACE. After interruption, being able to return to the aerobatic area and continue with the remainder of the sequence without the flow and safety being compromised.

Warbird Aerobatics

Jet Warbird Aerobatics and Piston Powered Warbird Aerobatics

Level 4 (800 feet AGL minimum)
Level 3 (500 feet AGL minimum)
Level 2 (250 feet AGL minimum)
Level 1 (Unrestricted)

(Aircraft in this category include, but are not limited to, military and ex-military aircraft with reciprocating and turbine engines that have 600 horsepower or more and retractable gear.)

I. Area of Operation: Flight Evaluation Maneuvers

A. Task: Flat Pass

To determine that the applicant can define and track the appropriate showline (1,000 feet or 1,500 feet, depending on the aircraft), and establish a reference to the appropriate baseline altitude.

1. Show knowledge of showline orientation and baseline altitude minimums.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area and correct for wind conditions if required.
4. Fly a smooth and level pass at the baseline altitude +/- 50 feet.

B. Task: 180-degree Repositioning Turn

To determine that the applicant can execute a 180-degree repositioning turn.

1. Show knowledge of the dynamics of repositioning turns.
2. Demonstrate the flight path and judgment required to reposition the aircraft from a maneuvering pass and realign on the reciprocal showline for the next pass.
3. Direct the flight path so as not to direct energy toward the crowd line.
4. Be able to abort the maneuver at any time needed or as instructed by the ACE.

C. Task: Half Rolls

To determine that the applicant can execute a half roll from upright to inverted, pause, and then roll back upright in the opposite direction of the original roll. Requires applicant to exhibit orientation and recognition of inverted flight, hold inverted flight, and demonstrate the ability to roll in the opposite direction to reestablish flight in the upright position. This maneuver may be accomplished at a level altitude or a parabolic arc depending on the inverted flight limitations of the aircraft being utilized.

1. Exhibit knowledge of the elements of rolling maneuvers.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish necessary wind corrections to maintain a constant flight path before rolling to the inverted.
4. Roll to inverted smoothly and in a controlled fashion, stopping at wings level +/- 10 degrees.
5. Maintains flight path +/- 10 degrees while inverted.
6. Roll back to upright flight in a smooth and controlled fashion, maintaining flight path +/- 10 degrees.
7. Stop roll upright, wings level +/- 10 degrees and at an altitude at or above the baseline altitude.
8. Be able to abort the maneuver at any time needed or as instructed by the ACE.

D. Task: Aileron Roll (left)

To determine that the applicant can roll the aircraft without losing altitude and maintain a constant heading while executing a 360-degree aileron roll.

1. Exhibit knowledge of aileron rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.
4. Roll smoothly and in a controlled fashion to the left.
5. Maintain a constant rate of roll throughout the roll.
6. Maintain heading during the roll +/- 10 degrees.
7. Complete the roll at an altitude at or above the baseline altitude.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or instructed by ACE.

E. Task: Aileron Roll (right)

1. To determine that the applicant can roll the aircraft equally well in both directions.
2. Exhibit knowledge of aileron rolls.
3. Consider wind conditions, obstructions and emergency procedures.
4. Establish a straight flight path parallel with the demonstration area.

5. Roll smoothly and in a controlled fashion to the right.
6. Maintain a constant rate of roll throughout the roll.
7. Maintain heading during the roll +/- 10 degrees.
8. Complete the roll at an altitude at or above the baseline altitude.
9. Finish roll in a wings level attitude +/- 10 degrees.
10. Finish roll on same heading as entry +/-10 degrees.
11. Be able to abort this figure at any time if needed or instructed by ACE.

(Note: An aerobatic competency card with the notation,"Rolls Only" may be issued to any applicant who satisfactorily demonstrates these first five maneuvers: the flat pass, the 180 degree repositioning turn, the half roll to inverted and half roll back upright, the left aileron roll and the right aileron roll.)

F. Task: Point Roll (four- or eight-point)

To determine that the applicant possesses advanced rolling abilities and inverted orientation while maintaining the showline and baseline altitude.

1. Exhibit knowledge of point rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.
4. Roll smoothly and in a controlled fashion to each point.
5. Stop each segment of the roll +/- 10 degrees.
6. Maintain heading during the maneuver +/- 10 degrees.
7. Complete the maneuver at an altitude at or above the baseline altitude.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or instructed by ACE.

G. Task: Half Cuban Eight

To determine that the applicant can complete a Half Cuban Eight: Fly approximately five-eighths of a loop to an inverted downline of approximately 45 degrees. Half roll the aircraft to upright. Recover in upright flight parallel to the demonstration area, while maintaining full situational awareness in reference to the ground.

1. Exhibit the knowledge of the elements of the Half Cuban Eight.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area.
4. Fly approximately five-eighths of a loop in a smooth and controlled fashion to an inverted downline of
5. approximately 45 degrees.
6. Half roll to upright flight on a downline.
7. Return to upright level flight at same or greater altitude in the opposite direction from entry +/- 10 degrees.
8. Be able to abort this figure at any time needed or instructed by the ACE.

H. Task: Inside Loop

To demonstrate that the applicant has the ability to utilize the vertical while maintaining the showline correcting for wind drift and reestablish level flight upon completion of the maneuver at the baseline altitude.

1. Exhibit the knowledge of the elements of the inside loop.
2. Consider wind conditions, obstructions and emergency procedures.
3. From an established flight path, parallel to the demonstration area initiate the inside loop.
4. Maintain roll and pitch control during loop.
5. Maintain speed control over the top of the loop.
6. Exit the loop on the same flight path as entry +/-10 degrees.

7. Exit the loop at an altitude at or above the baseline altitude.
8. Be able to safely abort the loop at any time if needed or asked to by ACE.

II. Area of Operation: Crosswind Correction

A. Task: Crosswind Correction

To determine that the applicant can compensate for crosswind conditions by maneuvering the aircraft in a fashion that will keep the aircraft from moving downwind. Many techniques will work for this purpose leaving quite a bit of subjectivity and judgment on the ACE's evaluation. Therefore, the sole task is to verify that the pilot has the control and situational awareness needed to keep the aircraft from passing inside a given "dead line."

The following maneuver is designed to demonstrate the pilot's ability to "move" the aircraft from left to right or vice versa. The amount of sideways movement will vary depending on the size of the loop, time in the loop, and the pilot's ability to input corrections for wind drift.

1. Exhibit knowledge of the elements of crosswind correcting. Specifically, being able to keep the aircraft over the same path along the demonstration area correcting for crosswind, and also being able to move aircraft to the upwind direction at will.

2. Consider wind conditions, obstructions and emergency procedures.

3. While flying the aircraft directly towards the ACE at the demonstration altitude perform one inside loop over a pre-determined ground point.

4. The applicant should be able to "move" the aircraft "up-wind" to the left or right by no less than 100 feet. (The use of runway lights normally spaced 200 feet is a good reference for the ACE to use.)

5. Refer to Task H: Inside Loop in Section I.

If sufficient crosswind exists, the applicant may perform the loop in a direction that would expose his/her aircraft to a 90-degree crosswind. If this method is used, the applicant will be expected to keep his/her aircraft over the pre-determined ground point during the entire loop. The ACE may want to refer to the enclosed Crosswind Component Charts for wind vs. distance drift.

III. Area of Operation: Full Aerobatic Sequence

A. Task: Aerobatic Sequence Demonstration

To determine that the applicant can complete a full aerobatic demonstration. During the flight the pilot shall be able to complete the following:

1. Maintain a safe altitude at all times as appropriate for the level being applied for.
2. Maintain directional control of his/her aircraft at all times during the aerobatic demonstration. This is to include take off and landings.
3. Maintain an energy level that is appropriate for the given sequence and maneuvers being demonstrated.
4. Compensate for winds during the sequence so as to remain over the primary demonstration area, remaining no less than 1,000 feet in front of the ACE, and keeping the sequence balanced and centered.
5. Be able to abort or interrupt the sequence at any time if needed or asked to by the ACE. After interruption, being able to return to the aerobatic area and continue with the remainder of the sequence without the flow and safety being compromised.
6. All maneuvers shall be performed to the same standards as set forth in the proceeding "tasks."

Glider/Sailplane

Level 4 (800 feet AGL minimum)
Level 3 (500 feet AGL minimum)

I. Area of Operation: Flight Evaluation Maneuvers

It is understood that sailplane aerobatics differs somewhat from power aerobatics. Maneuver difficulty is not necessarily the only criterion: fluidity and grace are accentuated. Energy management is of prime importance. Flight demonstration of asterisked maneuvers is optional for aircraft with limited aerobatic envelopes.

A. Task: 180-degree Repositioning Turn

To determine that the applicant can execute a 180 degree repositioning turn.

1. Show knowledge of the dynamics of repositioning turns.
2. Demonstrate the flight path and judgment required to reposition the aircraft from a maneuvering pass and realign on the reciprocal heading for the next pass.
3. Direct the flight path so as not to direct energy toward the crowd line.
4. Be able to abort the maneuver at any time needed or as instructed by the ACE.

B. Task: Half rolls

To determine that the applicant can execute a half roll from upright to inverted, pause, and then roll back upright in the opposite direction of the original roll. Requires applicant to exhibit orientation and recognition of inverted flight, hold inverted flight, and demonstrate the ability to roll in the opposite direction to reestablish flight in the upright position.

1. Exhibit knowledge of the elements of rolling maneuvers.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish necessary wind corrections to maintain a constant flight path before rolling to the inverted.
4. Roll to inverted smoothly and in a controlled fashion, stopping at wings level +/- 10 degrees.
5. Maintain flight path +/- 10 degrees while inverted.
6. Maintain consistent sink rate/glide path.
7. Roll back to upright flight in a smooth and controlled fashion, maintaining flight path +/- 10 degrees.
8. Stop roll upright, wings level +/- 10 degrees and at an altitude at or above the baseline altitude.
9. Be able to abort the maneuver at any time needed or as instructed by the ACE.

C. Task: Two Inverted 180-degree turns **

To determine that the applicant can complete two 180-degree inverted turns while maintaining full situational awareness.

1. Exhibit knowledge of the elements of inverted turns.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a constant pitch attitude with a consistent rate of descent and hold throughout maneuver.
4. Roll smoothly and in a controlled fashion to the intended bank angle +/- 5 degrees to no less than 45 degrees.
5. Execute a single 180-degree turn and, when completed, initiate and execute a second 180-degree turn in the opposite direction.
6. Maintain a constant pitch attitude with a consistent rate of descent throughout the entire maneuver.
7. When the second 180-degree turn is completed, roll out on initial flight path heading +/- 20 degrees.
8. Be able to safely and promptly abort the figure if needed or instructed to by ACE.

D. Task: Slow Roll (left)

To determine that the applicant can roll the aircraft without losing altitude and maintain a constant while executing a 360-degree slow roll.

1. Exhibit knowledge of slow rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.
4. Roll smoothly and in a controlled fashion to the left.
5. Maintain a constant rate of roll throughout the roll.
6. Maintain heading during the roll +/- 10 degrees.
7. Execute the maneuver with a consistent sink rate throughout.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or instructed by ACE.

E. Task: Slow Roll (right)

To determine that the applicant can roll the aircraft equally well in both directions.

1. Exhibit knowledge of slow rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.
4. Roll smoothly and in a controlled fashion to the right.
5. Maintain a constant rate of roll throughout the roll.
6. Maintain heading during the roll +/- 10 degrees.
7. Execute the maneuver with a consistent sink rate throughout.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or instructed by ACE.

F. Task: Inside Loop

To demonstrate that the applicant has the ability to utilize the vertical while maintaining the showline correcting for wind drift and reestablish level flight upon completion of the maneuver at the baseline altitude.

1. Exhibit the knowledge of the elements of the inside loop.
2. Consider wind conditions, obstructions and emergency procedures.
3. From an established flight path, parallel to the demonstration area initiate the inside loop.
4. Maintain roll and pitch control during loop.
5. Maintain speed control over the top of the loop.
6. Exit the loop on the same flight path as entry +/-10 degrees.
7. Exit the loop at an altitude at or above the baseline altitude.
8. Execute the maneuver with a consistent sink rate throughout.
9. Be able to safely abort the loop at any time if needed or asked to by ACE.

G. Task: Point Roll (four- or eight-point)

To determine that the applicant possesses advanced rolling abilities and inverted orientation while maintaining the showline and baseline altitude.

1. Exhibit knowledge of point rolls.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight flight path parallel with the demonstration area.

4. Roll smoothly and in a controlled fashion to each point.
5. Stop each segment of the roll +/- 10 degrees.
6. Maintain heading during the maneuver +/- 10 degrees.
7. Execute the maneuver with a consistent sink rate throughout.
8. Finish roll in a wings level attitude +/- 10 degrees.
9. Finish roll on same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed or instructed by ACE.

H. Task: Half Cuban-Eight

To determine that the applicant has the ability to fly the aircraft in the vertical plane while correcting for wind drift as it relates to the showline, establish a downline and roll the aircraft to the upright not exceeding the baseline altitude.

1. Exhibit the knowledge of the elements of the Half-Cuban Eight.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area.
4. Fly five-eighths of a loop in a smooth and controlled fashion to an inverted 30-45 degree down line and half-roll to the upright.
5. Return to upright level flight at same or greater altitude in the opposite direction from entry +/- 10 degrees.
6. Execute the maneuver with a consistent sink rate throughout.
7. Be able to abort this figure at any time needed or instructed by the ACE.

II. Area of Operation: Crosswind Correction

A. Task: Crosswind Correction

To determine that the applicant can compensate for crosswind conditions by maneuvering the aircraft in a fashion that will keep the aircraft from moving downwind. Many techniques will work for this purpose leaving quite a bit of subjectivity and judgment on the ACE's evaluation. Therefore, the sole task is to verify that the pilot has the control and situational awareness needed to keep the aircraft from passing inside a given "dead line."

The following maneuver is designed to demonstrate the pilot's ability to "move" the aircraft from left to right or vice versa. The amount of sideways movement will vary depending on the size of the loop, time in the loop, and the pilot's ability to input corrections for wind drift.

1. Exhibit knowledge of the elements of crosswind correcting. Specifically, being able to keep the aircraft over the same path along the demonstration area correcting for crosswind, and also being able to move aircraft to the upwind direction at will.
2. Consider wind conditions, obstructions and emergency procedures.
3. While flying the aircraft directly towards the ACE at the demonstration altitude perform one inside loop over a pre-determined ground point.
4. The applicant should be able to "move" the aircraft "up-wind" to the left or right by no less than 100 feet. (The use of runway lights normally spaced 200 feet is a good reference for the ACE to use.)
5. Refer to Task F: Inside Loop in Section I.

If sufficient crosswind exists, the applicant may perform the loop in a direction that would expose his/her aircraft to a 90 degree crosswind. If this method is used, the applicant will be expected to keep his/her aircraft over the pre-determined ground point during the entire loop. The ACE may want to refer to the enclosed Crosswind Component Charts for wind vs. distance drift.

III. Area of Operation: Full aerobatic sequence.

A. Task: Aerobatic sequence demonstration

To determine that the applicant can complete a full aerobatic demonstration. During the flight, the pilot shall be able to complete the following:

1. Maintain a safe altitude at all times as appropriate for the level being applied for.
2. Maintain directional control of his/her aircraft at all times during the aerobatic demonstration. This is to include take off and landings.
3. Maintain an energy level that is appropriate for the given sequence and maneuvers being demonstrated.
4. Compensate for winds during the sequence so as to remain over the primary demonstration area, remaining no less than 500 feet in front of the ACE, and keeping the sequence balanced and centered.
5. Be able to abort the sequence at any time if needed or asked to by the ACE. After interruption, being able to return to aerobatic area and continue with the remainder of the sequence without the flow and safety being compromised.
6. All maneuvers shall be performed to the same standard as set in the proceeding "tasks."

*(Note: Any of the Tasks listed above with the notation ** indicates that if the aircraft being used for the ACE evaluation cannot perform these maneuvers due to being placarded against these maneuvers. The ACE examiner may modify them accordingly.)*

Level 2 (250 feet AGL minimum)
Level 1 (Unrestricted)

The following Flight Evaluation Maneuvers are in addition to or -- in some cases -- modified versions of the maneuvers from Glider/Sailplane Level 3 and 4 PTS. If the ACE has no experience with the applicant or has reason to believe that the applicant has not yet performed the Level 3 and Level 4 mandated maneuvers for a duly qualified ACE, the ACE may, at his or her discretion, require the applicant to perform some of all of the Level 3 and 4 maneuvers before the applicant demonstrates the Level 2/Level 1 mandated maneuvers. It will be expected that the applicant will perform the tasks at the appropriate altitude for the level being applied for.

I. Area of operation: Flight Evaluation Maneuvers

It is understood that sailplane aerobatics differs somewhat from power aerobatics. Maneuver difficulty is not necessarily the only criterion: fluidity and grace are accentuated. Energy management is of prime importance. Flight demonstration of asterisked maneuvers is optional for aircraft with limited aerobatic envelopes.

A. Task: One-Turn Upright Spin **

To determine that the applicant can complete full rotation in a fully developed upright spin while maintaining control and full situational awareness.

1. Exhibit knowledge of the elements of upright spins in demonstration aircraft type.
2. Consider wind conditions, and emergency procedures.
3. Enter the demonstration area on a constant heading.
4. While holding the established heading, fully stall aircraft and establish a spin in a predetermined direction.
5. Hold the aircraft in the spin for one full rotation.
6. Stop the rotation of the spin in a prompt and timely manner on the same heading as entered +/- 30 degrees in roll axis.
7. Recover aircraft from vertical flight (initial recovery attitude) back to a straight and level flight on the same heading as entered +/- 10 degrees.
8. Be able to safely and promptly abort the figure if needed or instructed by the ACE.

B. Task: Knowledge of Inverted Stall/Spin Recognition and Recovery **

To determine that the applicant exhibits *aeronautical knowledge only* of the elements related to inverted slow flight and inverted stall/spin recognition and recovery.

1. Exhibit knowledge of flight situations where unintentional inverted stalls/spins may occur.
2. Exhibit knowledge of the technique used to recognize and recover from unintentional inverted stall/spins.
3. Exhibit knowledge of the recommended inverted stall/spin recovery procedure for the airplane being used for the evaluation.

* *This is **NOT** a demonstration maneuver. For ground evaluation only*

C. Task: Hammerhead Turn **

To determine that the applicant can demonstrate a Hammerhead Turn with reference to the ground, while maintaining directional control and altitude awareness.

1. Exhibit the knowledge of the elements of hammerhead turns, to include vertical flight up and down, pivot points, altitude loss and ground closure rates.
2. Consider wind conditions (upwind or downwind pivot), obstructions and emergency procedures.
3. Establish a straight and level flight path at demonstration altitude parallel to demonstration area.
4. Pull smoothly in a controlled fashion to a vertical up flight attitude.
5. Pivot/turn at the correct speed in a controlled manner to produce a turn radius that is no greater than one and one-half times the wingspan of the demonstration aircraft. The pitch and roll of the aircraft should not change more than 20 degrees in any direction during the pivot/turn in a zero wind condition.
6. Establish vertical down flight attitude.
7. Return to initial horizontal attitude on the same heading as first entered +/- 10 degrees.
8. Be able to abort the figure at any time if needed or instructed by ACE.

D. Task: Reverse Half Cuban-Eight **

To determine that the applicant can complete a Reverse Half Cuban-Eight by establishing a 45 degree (30 degree for two- seater a/c or similar longer winged aircraft) flight attitude up, half roll to inverted, transition to five-eighths of a loop down returning to upright and level flight in the opposite direction from the entry +/- 10 degrees.

1. Exhibit the knowledge of the elements of the Reverse Half Cuban-Eight. Specifically, altitude and pitch awareness during the inverted portion of this figure.
2. Consider wind conditions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area +/- 10 degrees.
4. Pull to 45 or 30 degree flight path, roll to the inverted flight attitude while maintaining the original flight path.
5. Transition smoothly to a downward inside five-eighths loop.
6. Return to upright level flight in opposite direction of the entry +/-10 degrees.
7. Execute the maneuver with a consistent sink rate throughout.
8. Be able to abort this figure at any time if needed or as instructed by the ACE.

II. Area of Operation: Crosswind Correction

A. Task: Crosswind correction

To determine that the applicant can compensate for crosswind conditions by maneuvering the aircraft in a fashion that will keep the aircraft from moving downwind. Many techniques will work for this purpose leaving quite a bit of subjectivity and judgment on the ACE's evaluation. Therefore, the sole task is to verify that the pilot has the control and situational awareness needed to keep the aircraft from passing inside a given "dead line."

The following maneuver is designed to demonstrate the pilot's ability to "move" the aircraft from left to right or vice versa. The amount of sideways movement will vary depending on the size of the loop, time in the loop, and the pilot's ability to input corrections for wind drift.

1. Exhibit knowledge of the elements of crosswind correcting. Specifically, being able to keep the aircraft over the same path along the demonstration area correcting for crosswind, and also being able to move aircraft to the upwind direction at will.
2. Consider wind conditions, obstructions and emergency procedures.
3. While flying the aircraft directly towards the ACE at the demonstration altitude perform one inside loop over a pre-determined ground point.
4. The applicant should be able to "move" the aircraft "up-wind" to the left or right by no less than 100 feet. (The use of runway lights normally spaced 200 feet is a good reference for the ACE to use.)
5. If sufficient crosswind exists, the applicant may perform the loop in a direction that would expose his/her aircraft to a 90 degree crosswind. If this method is used, the applicant will be expected to keep his/her aircraft over the pre-determined ground point during the entire loop. The ACE may want to refer to the enclosed Crosswind Component.
6. Charts for wind vs. distance drift.

III. Area of Operation: Full Aerobatic Sequence

A. Task: Aerobatic Sequence Demonstration

To determine that the applicant can complete a full aerobatic demonstration. During the flight, the pilot shall be able to complete the following:

1. Maintain a safe altitude at all times as appropriate for the level being applied for.
2. Maintain directional control of his/her aircraft at all times during the aerobatic demonstration. This is to include take off and landings.
3. Maintain an energy level that is appropriate for the given sequence and maneuvers being demonstrated.
4. Compensate for winds during the sequence so as to remain over the primary demonstration area, remaining no less than 500 feet in front of the ACE, and keeping the sequence balanced and centered.

Be able to abort or interrupt the sequence at any time if needed or asked to by the ACE. After interruption, being able to return to the aerobatic area and continue with the remainder of the sequence without the flow and safety being compromised. All maneuvers shall be performed to the same standard as set in the proceeding "tasks."

*(Note: Any of the Tasks listed above with the notation ** indicates that the aircraft being used for the ACE evaluation cannot perform these maneuvers due to being placarded against these maneuvers. ACE examiner may modify them accordingly.)*

Level 1 (Unrestricted)

The following Flight Evaluation Maneuvers are in addition to or -- in some cases -- modified versions of the maneuvers from Glider/Sailplane Level 4, 3 and 2 Practical Evaluation Standards. If the ACE has no experience with the applicant or has reason to believe that the applicant has not yet performed the Level 4, 3 or 2 mandated maneuvers for a duly qualified ACE, the ACE may, at his or her discretion, require the applicant to perform some or all of these maneuvers before the applicant demonstrates the Level 1 mandated maneuvers. It will be expected that the applicant will perform the tasks at the appropriate altitude for the level being applied for.

I. Area of operation: Flight Evaluation Maneuvers

It is understood that sailplane aerobatics differs somewhat from power aerobatics. Maneuver difficulty is not necessarily the only criterion: fluidity and grace are accentuated. Energy management is of prime importance. Flight demonstration of asterisked maneuvers is optional for aircraft with limited aerobatic envelopes.

A. Task: High-speed Downwind Pass, 180-degree repositioning turn to final approach/ landing

To determine that the applicant can complete a high-speed downwind pass, initiating a 180 repositioning turn to final approach/landing.

1. Exhibit the knowledge of the elements of high-speed flight, specifically pitch sensitivity, the effects of ground effect and wind gradient.
2. Consider wind conditions, thermal conditions, obstructions and emergency procedures.
3. Establish a straight and level flight path at an established high rate of speed, parallel to demonstration area.
4. Pitch and bank aircraft, establishing an abbreviated landing pattern whose distance from the landing point is appropriate for the speed/energy retention properties of the aircraft.
5. Establish smooth and controlled energy degradation utilizing spoilers or speed brakes, upon final approach.
6. Touchdown of aircraft within 100 feet of mark predetermined by ACE.
7. Execute the maneuver with a consistent sink rate throughout.
8. Be able to abort this figure at any time if needed or as instructed by the ACE.

II. Area of Operation: Crosswind Correction

A. Task: Crosswind correction

To determine that the applicant can compensate for crosswind conditions by maneuvering the aircraft in a fashion that will keep the aircraft from moving downwind. Many techniques will work for this purpose leaving quite a bit of subjectivity and judgment on the ACE's evaluation. Therefore, the sole task is to verify that the pilot has the control and situational awareness needed to keep the aircraft from passing inside a given "deadline."

The following maneuver is designed to demonstrate the pilot's ability to "move" the aircraft from left to right or vice versa. The amount of sideways movement will vary depending on the size of the loop, time in the loop, and the pilot's ability to input corrections for wind drift.

1. Exhibit knowledge of elements of crosswind correcting. Specifically, being able to keep the aircraft over same path along demonstration area correcting for crosswind, and also being able to move aircraft to the upwind direction at will.
2. Consider wind conditions, obstructions and emergency procedures.
3. While flying the aircraft directly towards the ACE at the demonstration altitude perform one inside loop over a pre-determined ground point.
4. The applicant should be able to "move" the aircraft "upwind" to the left or right by no less than 100 feet. (The use of runway lights normally spaced 200 feet is a good reference for the ACE to use.)

If sufficient crosswind exists, the applicant may perform the loop in a direction that would expose his/her aircraft to a 90-degree crosswind. If this method is used, the applicant will be expected to keep his/her aircraft over the pre-determined ground point during the entire loop. The ACE may want to refer to the enclosed Crosswind Component Charts for wind vs. distance drift.

III. Area of Operation: Full Aerobatic Sequence

A. Task: Aerobatic sequence demonstration

To determine that the applicant can complete a full aerobatic demonstration. During the flight, the pilot shall be able to complete the following:

1. Maintain a safe altitude at all times as appropriate for the level being applied for.
2. Maintain directional control of his/her aircraft at all times during the aerobatic demonstration. This is to include take off and landings.
3. Maintain an energy level that is appropriate for the given sequence and maneuvers being demonstrated.
4. Compensate for winds during the sequence so as to remain over the primary demonstration area, remaining no less than 500 feet in front of the ACE, and keeping the sequence balanced and centered.
5. Be able to abort or interrupt the sequence at any time if needed or asked to by the ACE. After interruption, being able to return to the aerobatic area and continue with the remainder of the sequence without the flow and safety being compromised.
6. All maneuvers shall be performed to the same standard as set in the proceeding "tasks."

*(Note: Any of the Tasks listed above with the notation ** indicates that if the aircraft being used for the ACE evaluation cannot perform these maneuvers due to being placarded against these maneuvers. The ACE examiner may modify them accordingly.)*

Formation Aerobatic Teams

All altitudes

I. Area of Operation: Flight Evaluation Maneuvers

A. Task: Flat pass in formation

1. To determine if the applicant for lead pilot can lead the formation and set up a flat pass, parallel to the demonstration area. To determine if the applicant for wing pilot can maintain station.
2. Exhibit knowledge of the basics of formation flight as lead pilot and/or wing pilot.
3. Consider wind conditions, obstructions and emergency procedures.
4. Establish a straight and level flight path parallel to the showline.
5. Wing pilots must maintain station within one wingspan outside of normal position.
6. Applicant must demonstrate in each position -- lead or wing -- for which he/she has applied.
7. Applicants must be able to make formation changes, i.e. from left to right wing or from fingertip to diamond formation.
8. Positioning turns should be made smoothly and the rollout should be on a heading and track to parallel the showline.

B. Task: Wingovers (left and right)

To determine if the applicant for lead pilot can smoothly set up and fly left and right wingovers (90 degrees of bank), and if wing pilots can maintain station during constantly changing energy situations.

1. Exhibit knowledge of energy requirements (airspeed and altitude) for wingovers to the left and right.
2. Consider wind conditions, obstructions and emergency procedures.
3. Fly symmetrical wingovers to the left and right with 90 degrees of bank +/- 10 degrees.
4. Wing pilot(s) must be able to maintain station within one wingspan (wide) of normal position.
5. Be able to safely abort the maneuver if needed or if instructed to by the ACE.
6. Applicants must demonstrate this maneuver for each position, wing or lead.

(Note: These maneuvers may be performed as part of an air show sequence demonstration.)

C. Task: Loop *or* Barrel Roll

To determine if lead and wing pilots can perform a loop or barrel roll, maintaining situational awareness and formation integrity. (Either loop or roll, at the discretion of applicants, and either is a minimum for issuance of a SAC card with "Formation" endorsement.)

1. Exhibit knowledge of formation looping maneuvers: energy/altitude requirements for lead and wing positions and anticipation of power changes.
2. Consider wind conditions and drift factors, obstructions and safety procedures, to include emergency abort and wing pilot's "outs."
3. Fly a formation loop or barrel roll along the showline, maintaining roll, pitch, and speed control throughout the maneuver.
4. Wing pilots must be able to maintain station within one wingspan of entry position.
5. Applicants must demonstrate this maneuver for each position (wing or lead).
6. Be able to safely abort the maneuver at any time if needed or if asked to by the ACE.

(Note: These maneuver(s) may be performed as part of an air show sequence demonstration.)

D. Task: Break and Rejoin

To determine if applicants can separate and regroup their formation in an efficient manner.

1. Exhibit knowledge of intercepts and closure rates in turning form-ups.
2. Make a "180 degree break maneuver" and reform the formation in minimum time, preferably in turning flight.
3. Wing pilot(s) should return to within one wingspan of their original positions.
4. Applicants must demonstrate these procedures for each position.

(Note: This task may be accomplished as part of an air show sequence demonstration.)

E. Task: Aerobatic Sequence Demonstration [for established teams]

To determine if the applicants can complete a full air show sequence. For established teams, this demonstration may be in lieu of the above maneuvers if the team is recertifying by performing the Air Evaluation during an air show demonstration in waivered air show airspace. If the evaluation is for an original issuance for any member of the team, this demonstration must be performed in waivered, practice airspace.

1. Exhibit knowledge of energy requirements and sequence design.
2. Maintain a safe altitude at all times as appropriate to the level sought.
3. Compensate for winds and atmospheric conditions on order to maintain safe energy levels and to keep the routine balanced and centered within the demonstration area.
4. Except when recertifying at an air show, applicant must demonstrate as a flight lead in order to be endorsed as "Formation – Lead."
5. Be able to abort the sequence at any time as needed for safety or if requested by the ACE, without endangering the pilots or spectators. [Note: The ACE should not ask the applicants to abort their sequence during an actual air show performance.]
6. All maneuvers shall be performed to the same standards as set in the preceding tasks.

Rotorcraft Agility/Aerobatic PES

Low Performance Class Rotorcraft Agility/Aerobatics

Level 4 (800 feet AGL minimum)
Level 3 (500 feet AGL minimum)
Level 2 (250 feet AGL minimum)
Level 1 (Unlimited)

Rotorcraft in this class are incapable of sustained inverted flight or sustained negative "G" maneuvering, but are demonstrated performing non-standard maneuvers using abrupt or high rates of control input at or near control, engine or transmission limits that negatively affect calculated component life. Rotorcraft in this category may include, but are not limited to, R-22, R-44, and S300 and American Autogryo. Rotorcraft may be certificated in Standard, Restricted, or Special Airworthiness (e.g. exhibition) categories.

I. Area of Operation: Flight Evaluation Maneuvers

A. Task: High Speed, Constant Heading, Hovering Flight

To determine that the applicant understands the elements of, and can demonstrate the ability to hover the helicopter within attitude, altitude and heading limits while performing hover and high speed (greater than 17 knots) constant heading forward, left sideward, right sideward and rearward flight; within display and helicopter limitations as appropriate to the intended display.

1. Exhibits knowledge of helicopter limitations related to controllability during stationary, sideward and rearward flight hovering in ground effect and hovering out of ground effect flight (e.g. critical azimuth limitations, certification basis for controllability).
2. Exhibits knowledge of aerodynamics during sideward and rearward flight such as main rotor vortices interference, weathercock stability, and tail rotor vortex ring-state during hovering flight above 17 knots (20 mph).
3. Exhibits knowledge of emergency procedures applicable to high speed sideward and rearward flight (e.g. engine failure, tail rotor failure).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.

5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to maintain a straight flight path parallel with the show line in forward, rearward, left sideward or right sideward hovering flight.
7. Demonstrates the ability to smoothly, and in a controlled fashion, accelerate from a stationary in-ground effect or out-of-ground effect hover to desired hovering speed, maintain desired hovering speed, and decelerate from desired hovering speed to a stationary in-ground effect or out-of-ground effect hover.
8. Demonstrate the ability to maintain desired heading +/- 10 degrees and desired altitude +/- 10 feet.
9. Demonstrate the ability to abort any translating hovering maneuver and decelerate to a stationary HIGE or HOGE hover as instructed by the evaluating ACE.

B. Task: High Rate Pedal Turns in Stationary or Translating Hovering Flight

To determine that the applicant understands the elements of, and can demonstrate the ability to hover the helicopter within attitude, altitude and heading limits while executing hover and high speed (greater than 17 knots) left and right high rate pedal turns in forward, left sideward, right sideward and rearward flight as appropriate for the intended display and helicopter limitations as appropriate to the intended display. These are maneuvers performed at attitudes and/or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to controllability during high rate pedal turns in stationary, forward, sideward and rearward flight hovering in ground effect (HIGE)and hovering out of ground effect (HOGE) flight (e.g. critical azimuth limitations, certification basis for controllability).
2. Exhibits knowledge of aerodynamics while performing high rate pedal turn during hovering, forward, sideward and rearward flight (e.g. main rotor vortices interference, weathercock stability, and tail rotor vortex ring-state).
3. Exhibits knowledge of emergency procedures applicable to HIGE and HOGE stationary and high speed forward, sideward and rearward flight while performing high rate pedal turns (e.g. engine failure, tail rotor failure).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to maintain a straight flight path, parallel with the show line in forward, rearward, left sideward or right sideward while performing high rate pedal turns in stationary and translating HIGE and HOGE flight.
7. Demonstrates the ability to smoothly, and in a controlled fashion, accelerate from a stationary in-ground effect or out-of-ground effect hover to desired hovering speed, maintain desired hovering speed, and decelerate from desired hovering speed to a stationary in-HIGE and HOGE hover while performing high rate pedal turns.
8. Demonstrate the ability to maintain desired heading rate of turn and desired altitude +/- 10 feet.
9. Demonstrate the ability to abort any translating, left or right high rate of turn hovering maneuver and decelerate to a stationary HIGE or HOGE hover as instructed by the evaluating ACE.

C. Task: Constant Heading Unusual Attitude/High Rate Vertical Climbs and Descents

To determine that the applicant understands the elements of, and can demonstrate the ability to perform constant heading, vertical climbs and descents at vertical speeds greater than 300 feet/minute, and as appropriate to intended display and helicopter limitations. These are maneuvers performed at attitudes and/or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to constant heading, vertical climbs and descents at vertical velocities greater than 300 feet/minute (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics during constant heading, vertical climbs and descents at vertical speeds greater than 300 feet/minute such as settling with power (main rotor vortex ring state, autorotative state).
3. Exhibits knowledge of emergency procedures applicable to constant heading, vertical climbs and descents at vertical velocities greater than 300 feet/minute (e.g. engine failure, tail rotor failure, settling with power, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to maintain a constant heading, during vertical climbs and descents at vertical velocities greater than 300 feet/minute.
7. Demonstrates the ability to smoothly, and in a controlled fashion, perform constant heading, vertical climbs and descents at vertical speeds greater than 300 feet/minute.
8. Demonstrate the ability to maintain desired heading rate of rotation, climb or descent and desired altitude +/- 10 feet.
9. Demonstrate the ability to change rate climb or descent as instructed by the evaluating ACE.

D. Task: Changing Heading High Rate Pedal Turn Vertical Climb and Descent

To determine that the applicant understands the elements of, and can demonstrate the ability to perform high rate changes of heading in vertical climb and descent at vertical speeds greater than 300 feet/minute as appropriate for intended display and helicopter limitations. These are maneuvers performed at attitudes and/or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to high rate change of heading in vertical climb and descent at vertical velocities greater than 300 feet/minute (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics during high rate changes of heading in vertical climb and descent at vertical velocities greater than 300 feet/minute (main rotor vortex ring state).
3. Exhibits knowledge of emergency procedures applicable to high rate change of heading in vertical climb and descent at vertical velocities greater than 300 feet/minute (e.g. engine failure, tail rotor failure, settling with power, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to maintain a high rate change of heading in vertical climb and descent at vertical velocities greater than 300 feet/minute.
7. Demonstrates the ability to smoothly, and in a controlled fashion, perform high rate changes of heading in vertical climb and descent at vertical velocities greater than 300 feet/minute.
8. Demonstrate the ability to maintain desired rate-of-turn, and desired climb or descent rater.
9. Demonstrate the ability to change rate climb or descent as instructed by the evaluating ACE.

E. Task: Aggressive Take-Off from IGE/OGE Hover

To determine that the applicant understands the elements of, and can demonstrate the ability to perform an aggressive take-off from an IGE or OGE hover as appropriate for intended display and helicopter limitations. These are maneuvers performed at attitudes and/or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to an aggressive take-off from an IGE or OGE hover (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics during an aggressive take-off from an IGE or OGE hover.
3. Exhibits knowledge of emergency procedures applicable to an aggressive take-off from an IGE or OGE hover (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform an aggressive take-off from an IGE or OGE hove appropriate to the display approval requested so that the outcome of the maneuver is never seriously in doubt.

F. Task: Aggressive Deceleration and Landing to IGE/OGE Hover

To determine that the applicant understands the elements of, and can demonstrate the ability to perform an aggressive deceleration and landing to an IGE or OGE hover as appropriate for intended display and helicopter limitations. These are maneuvers performed at attitudes and/or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to an aggressive deceleration and landing to an IGE or OGE hover (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics during an aggressive take-off from an aggressive deceleration and landing to an IGE or OGE hover (e.g. settling with power, aircraft limitations).
3. Exhibits knowledge of emergency procedures applicable to an aggressive take-off from an IGE or OGE hover (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform an aggressive deceleration and landing to an IGE or OGE hover appropriate to the display approval requested so that the outcome of the maneuver is never seriously in doubt.

G. Task: Aggressive Pitch-Up and Pitch-Down Maneuvers (>45^0, helicopter limitations)

To determine that the applicant understands the elements of, and can demonstrate the ability to perform aggressive pitch-up and pitch-down maneuvers as appropriate for intended display and helicopter limitations. These are maneuver performed at angles or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to an aggressive pitch-up or pitch down maneuver (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics of aggressive pitch-up and pitch-down maneuvers (e.g. settling with power, aircraft limitations).
3. Exhibits knowledge of emergency procedures applicable aggressive pitch-up or pitch-down maneuvers (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform an aggressive pitch-up or pitch-down maneuver appropriate to the display approval requested so the outcome of the maneuver is never seriously in doubt.

H. Task: Aggressive Roll Maneuvers (>45^{o} or helicopter limitations)

To determine that the applicant understands the elements of, and can demonstrate the ability to perform aggressive left and right roll maneuvers as appropriate for intended display and helicopter limitations. These are maneuver performed at angles or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to an aggressive left and right roll maneuver (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics of aggressive left and right roll maneuver (e.g. settling with power, aircraft limitations).
3. Exhibits knowledge of emergency procedures applicable aggressive left or right roll maneuvers (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform an aggressive left and right roll maneuver appropriate to the display approval requested so the outcome of the maneuver is never seriously in doubt.

I. Task: Aggressive Roll-Reversal Maneuvers

To determine that the applicant understands the elements of, and can demonstrate the ability to perform aggressive left-to-right or right-to-left roll reversal maneuvers as appropriate for intended display and helicopter limitations. These are maneuver performed at angles or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to aggressive left-to-right or right-to-left roll-reversal maneuvers (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics of aggressive left and right roll maneuver (e.g. settling with power, aircraft limitations).
3. Exhibits knowledge of emergency procedures applicable to aggressive left-to-right or right-to-left roll-reversal maneuvers (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform an aggressive left-to-right or right-to-left roll-reversal maneuvers appropriate to the display approval requested so the outcome of the maneuver is never seriously in doubt.

J. Task: High Rate Maneuvers Simultaneously Changing Any Combination of Pitch, Roll, or Yaw

To determine that the applicant understands the elements of, and can demonstrate the ability to perform high rate maneuvers simultaneously changing any combination of pitch, roll, or yawl as appropriate for intended display and helicopter limitations. These are maneuver performed at angles or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics of related to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw (e.g. settling with power, aircraft limitations).

3. Exhibits knowledge of emergency procedures applicable to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform related to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw appropriate to the display approval requested so the outcome of the maneuver is never seriously in doubt.
7. Demonstrates knowledge of control limitations and display related emergency procedures.
8. Understands these maneuvers may require reduction in critical component lives.

K. Task: External Loads/Platforms/Pyro/Laser-Light Show

To determine that the applicant understands the elements of, and can demonstrate the ability to perform the requested air show routine or maneuver as appropriate for intended display and helicopter limitations. These are maneuver performed with equipment or in application not normally used in standard certificated operations..

High Performance Class Rotorcraft Aerobatics

Level 4 (800 feet AGL minimum)
Level 3 (500 feet AGL minimum)
Level 2 (250 feet AGL minimum)
Level 1 (Unlimited)

Rotorcraft in this class are incapable of sustained inverted flight or sustained negative "G" maneuvering, but can perform maneuvers defined as aerobatic. These rotorcraft include, but are not limited to, MBB-105, MD500 series, AH-6i and must be certificated in Standard, Restricted, or authorized Special Airworthiness (e.g. exhibition) categories without restriction or limitation as appropriate for the maneuvers intended. These maneuvers may require reduction in component life.

I. Area of Operation: Flight Evaluation Maneuvers

A. Task: High Speed, Constant Heading, Hovering Flight

To determine that the applicant understands the elements of, and can demonstrate the ability to hover the helicopter within attitude, altitude and heading limits while performing hover and high speed (greater than 17 knots) constant heading forward, left sideward, right sideward and rearward flight within display and helicopter limitations as appropriate to the intended display.

1. Exhibits knowledge of helicopter limitations related to controllability during stationary, sideward and rearward flight hovering in ground effect and hovering out of ground effect flight (e.g. critical azimuth limitations, certification basis for controllability).
2. Exhibits knowledge of aerodynamics during sideward and rearward flight such as main rotor vortices interference, weathercock stability, and tail rotor vortex ring-state during hovering flight above 17 knots (20 mph).
3. Exhibits knowledge of emergency procedures applicable to high speed sideward and rearward flight (e.g. engine failure, tail rotor failure).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to maintain a straight flight path parallel with the show line in forward, rearward, left sideward or right sideward hovering flight.
7. Demonstrates the ability to smoothly, and in a controlled fashion, accelerate from a stationary in-ground effect or out-of-ground effect hover to desired hovering speed, maintain desired hovering speed, and decelerate from desired hovering speed to a stationary in-ground effect or out-of-ground effect hover.
8. Demonstrate the ability to maintain desired heading +/- 10 degrees and desired altitude +/- 10 feet.
9. Demonstrate the ability to abort any translating hovering maneuver and decelerate to a stationary HIGE or HOGE hover as instructed by the evaluating ACE.

B. Task: High Rate Pedal Turns in Stationary or Translating Hovering Flight

To determine that the applicant understands the elements of, and can demonstrate the ability to hover the helicopter within attitude, altitude and heading limits while executing hover and high speed (greater than 17 knots) left and right high rate pedal turns in forward, left sideward, right sideward and rearward flight as appropriate for the intended display and helicopter limitations as appropriate to the intended display. These are maneuvers performed at attitudes and/or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to controllability during high rate pedal turns in stationary, forward, sideward and rearward flight hovering in ground effect (HIGE)and hovering out of ground effect (HOGE) flight (e.g. critical azimuth limitations, certification basis for controllability).
2. Exhibits knowledge of aerodynamics while performing high rate pedal turn during hovering, forward, sideward and rearward flight (e.g. main rotor vortices interference, weathercock stability, and tail rotor vortex ring-state).
3. Exhibits knowledge of emergency procedures applicable to HIGE and HOGE stationary and high speed forward, sideward and rearward flight while performing high rate pedal turns (e.g. engine failure, tail rotor failure).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to maintain a straight flight path, parallel with the show line in forward, rearward, left sideward or right sideward while performing high rate pedal turns in stationary and translating HIGE and HOGE flight.
7. Demonstrates the ability to smoothly, and in a controlled fashion, accelerate from a stationary in-ground effect or out-of-ground effect hover to desired hovering speed, maintain desired hovering speed, and decelerate from desired hovering speed to a stationary in-HIGE and HOGE hover while performing high rate pedal turns.
8. Demonstrate the ability to maintain desired heading rate of turn and desired altitude +/- 10 feet.
9. Demonstrate the ability to abort any translating, left or right high rate of turn hovering maneuver and decelerate to a stationary HIGE or HOGE hover as instructed by the evaluating ACE.

C. Task: Constant Heading Unusual Attitude/High Rate Vertical Climbs and Descents

To determine that the applicant understands the elements of, and can demonstrate the ability to perform constant heading, vertical climbs and descents at vertical speeds greater than 300 feet/minute, and as appropriate to intended display and helicopter limitations. These are maneuvers performed at attitudes and/or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to constant heading, vertical climbs and descents at vertical velocities greater than 300 feet/minute (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics during constant heading, vertical climbs and descents at vertical speeds greater than 300 feet/minute such as settling with power (main rotor vortex ring state, autorotative state).
3. Exhibits knowledge of emergency procedures applicable to constant heading, vertical climbs and descents at vertical velocities greater than 300 feet/minute (e.g. engine failure, tail rotor failure, settling with power, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to maintain a constant heading, during vertical climbs and descents at vertical velocities greater than 300 feet/minute.
7. Demonstrates the ability to smoothly, and in a controlled fashion, perform constant heading, vertical climbs and descents at vertical speeds greater than 300 feet/minute.
8. Demonstrate the ability to maintain desired heading rate of rotation, climb or descent and desired altitude +/- 10 feet.
9. Demonstrate the ability to change rate climb or descent as instructed by the evaluating ACE.

D. Task: Changing Heading High Rate Pedal Turn Vertical Climb and Descent

To determine that the applicant understands the elements of, and can demonstrate the ability to perform high rate changes of heading in vertical climb and descent at vertical speeds greater than 300 feet/minute as appropriate for intended display and helicopter limitations. These are maneuvers performed at attitudes and/or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to high rate change of heading in vertical climb and descent at vertical velocities greater than 300 feet/minute (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics during high rate changes of heading in vertical climb and descent at vertical velocities greater than 300 feet/minute (main rotor vortex ring state).
3. Exhibits knowledge of emergency procedures applicable to high rate change of heading in vertical climb and descent at vertical velocities greater than 300 feet/minute (e.g. engine failure, tail rotor failure, settling with power, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to maintain a high rate change of heading in vertical climb and descent at vertical velocities greater than 300 feet/minute.
7. Demonstrates the ability to smoothly, and in a controlled fashion, perform high rate changes of heading in vertical climb and descent at vertical velocities greater than 300 feet/minute.
8. Demonstrate the ability to maintain desired rate-of-turn, and desired climb or descent rater.
9. Demonstrate the ability to change rate climb or descent as instructed by the evaluating ACE.

E. Task: Aggressive Take-Off from IGE/OGE Hover

To determine that the applicant understands the elements of, and can demonstrate the ability to perform an aggressive take-off from an IGE or OGE hover as appropriate for intended display and helicopter limitations. These are maneuvers performed at attitudes and/or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to an aggressive take-off from an IGE or OGE hover (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics during an aggressive take-off from an IGE or OGE hover.
3. Exhibits knowledge of emergency procedures applicable to an aggressive take-off from an IGE or OGE hover (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform an aggressive take-off from an IGE or OGE hove appropriate to the display approval requested so that the outcome of the maneuver is never seriously in doubt.

F. Task: Aggressive Deceleration and Landing to IGE/OGE Hover

To determine that the applicant understands the elements of, and can demonstrate the ability to perform an aggressive deceleration and landing to an IGE or OGE hover as appropriate for intended display and helicopter limitations. These are maneuvers performed at attitudes and/or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to an aggressive deceleration and landing to an IGE or OGE hover (e.g. power and rotor limitations, notes, cautions and warnings).

2. Exhibits knowledge of aerodynamics during an aggressive take-off from an aggressive deceleration and landing to an IGE or OGE hover (e.g. settling with power, aircraft limitations).
3. Exhibits knowledge of emergency procedures applicable to an aggressive take-off from an IGE or OGE hover (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform an aggressive deceleration and landing to an IGE or OGE hover appropriate to the display approval requested so that the outcome of the maneuver is never seriously in doubt.

G. Task: Aggressive Pitch-Up and Pitch-Down Maneuvers (>45^0, helicopter limitations)

To determine that the applicant understands the elements of, and can demonstrate the ability to perform aggressive pitch-up and pitch-down maneuvers as appropriate for intended display and helicopter limitations. These are maneuver performed at angles or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to an aggressive pitch-up or pitch down maneuver (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics of aggressive pitch-up and pitch-down maneuvers (e.g. settling with power, aircraft limitations).
3. Exhibits knowledge of emergency procedures applicable aggressive pitch-up or pitch-down maneuvers (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform an aggressive pitch-up or pitch-down maneuver appropriate to the display approval requested so the outcome of the maneuver is never seriously in doubt.

H. Task: Aggressive Roll Maneuvers (>45^o or helicopter limitations)

To determine that the applicant understands the elements of, and can demonstrate the ability to perform aggressive left and right roll maneuvers as appropriate for intended display and helicopter limitations. These are maneuver performed at angles or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to an aggressive left and right roll maneuver (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics of aggressive left and right roll maneuver (e.g. settling with power, aircraft limitations).
3. Exhibits knowledge of emergency procedures applicable aggressive left or right roll maneuvers (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform an aggressive left and right roll maneuver appropriate to the display approval requested so the outcome of the maneuver is never seriously in doubt.

I. Task: Aggressive Roll-Reversal Maneuvers

To determine that the applicant understands the elements of, and can demonstrate the ability to perform aggressive left-to-right or right-to-left roll reversal maneuvers as appropriate for intended display and helicopter limitations. These are maneuver performed at angles or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to aggressive left-to-right or right-to-left roll reversal maneuvers (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics of aggressive left and right roll maneuver (e.g. settling with power, aircraft limitations).
3. Exhibits knowledge of emergency procedures applicable to aggressive left-to-right or right-to-left roll reversal maneuvers (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform an aggressive left-to-right or right-to-left roll reversal maneuvers appropriate to the display approval requested so the outcome of the maneuver is never seriously in doubt.

J. Task: High Rate Maneuvers Simultaneously Changing Any Combination of Pitch, Roll, or Yaw.

To determine that the applicant understands the elements of, and can demonstrate the ability to perform high rate maneuvers simultaneously changing any combination of pitch, roll, or yawl as appropriate for intended display and helicopter limitations. These are maneuver performed at angles or rates not necessary for normal flight.

1. Exhibits knowledge of helicopter limitations related to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics of related to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw (e.g. settling with power, aircraft limitations).
3. Exhibits knowledge of emergency procedures applicable to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform related to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw appropriate to the display approval requested so the outcome of the maneuver is never seriously in doubt.
7. Demonstrates knowledge of control limitations and display related emergency procedures.
8. Understands these maneuvers may require reduction in critical component lives.

K. Task: External Loads/Platforms/Pyro/Laser-Light Show

To determine that the applicant understands the elements of, and can demonstrate the ability to perform the requested air show routine or maneuver as appropriate for intended display and helicopter limitations. These are maneuvers performed with equipment or in application not normally used in standard certificated operations.

L. Task: Roll and series Rolls if applicable (direction appropriate to helicopter type)

To determine that the applicant can roll the aircraft without losing altitude and maintain a constant heading while executing a 360 degree slow roll.

1. Exhibit knowledge of the elements of slow rolls.
2. Consider wind conditions, obstructions and emergency procedures when performing slow rolls.

3. Maintain a straight flight path parallel with the demonstration area while performing rolls.
4. Roll smoothly and in a controlled fashion to the left and/or right.
5. Maintain a constant roll rate through-out the roll.
6. Maintain heading during the roll +/- 10 degrees.
7. Complete the roll maneuver at or above the baseline altitude.
8. Finish the roll maneuver in a wings level attitude +/- 10 degrees.
9. Finish the roll maneuver on the same heading as entry +/-10 degrees.
10. Be able to abort this figure at any time if needed and/or instructed by ACE.

M. Task: Half Cuban-Eight

To determine that the applicant can complete a Half Cuban-Eight maneuver: Fly approximately five-eighths of a loop to an inverted downline of approximately 45 degrees. Half roll the aircraft to upright. Recover in straight and level upright flight parallel to the demonstration area, while maintaining full situational awareness in reference to the ground.

1. Exhibit knowledge of the elements of the Half Cuban-Eight maneuver.
2. Consider wind conditions, obstructions and emergency procedures.
3. Establish a straight and level flight path parallel to the demonstration area.
4. Fly approximately five-eighths of a loop in a smooth and controlled fashion to an inverted down-line of approximately 45 degrees.
5. Half roll to upright flight on a down-line.
6. Return to upright level flight at same or greater altitude in the opposite direction from entry +/- 10 degrees.
7. Be able to abort this figure at any time needed or instructed by the ACE.

N. Task: Reverse Half Cuban-Eight

To determine the applicant can complete a Reverse Half Cuban-Eight by: establishing an up-line of approximately 45 degrees, half roll to inverted, transition to approximately five-eighths of a loop down returning to upright and level flight in the opposite direction from the entry.

1. Exhibit knowledge of the elements of the Reverse Half Cuban-Eight.
2. Demonstrate altitude and pitch awareness during the inverted portion of this figure.
3. Consider wind conditions, obstructions and emergency procedures.
4. Establish a straight and level flight path parallel to the demonstration area.
5. Pull to a flight path of approximately 45 degrees or whatever attitude is needed to gain required altitude to complete this maneuver.
6. Roll to the inverted flight attitude while maintaining the original flight path.
7. Transition smoothly to a downward inside approximately five-eighths of a loop.
8. Return to upright level flight in the opposite direction of the entry +/-10 degrees and +100/-0 feet altitude from entry altitude.
9. Be able to abort this figure at any time needed or as instructed by the ACE.

O. Task: Inside Loop and Series Loops if appropriate to the demonstration.

To determine the applicant has the ability to complete an inside loop while utilizing the vertical while maintaining the show line and correcting for wind and drift. Can demonstrate the ability to reestablish level flight upon completion of the maneuver at the baseline altitude.

1. Exhibit the knowledge of the elements of the inside loop.
2. Consider wind conditions, obstructions and emergency procedures.
3. From an established flight path, parallel to the demonstration area initiate the inside loop.
4. Maintain roll and pitch control during loop.

5. Maintain speed control over the top of the loop.
6. Exit the loop on the same flight path as entry +/-10 degrees.
7. Exit the loop at an altitude at or above the baseline altitude.
8. Be able to safely abort the loop at any time if needed or asked to by ACE.

P. Task: Hammerhead

Determine that the applicant can demonstrate a Hammerhead while maintaining directional control and altitude awareness.

1. Exhibit the knowledge of the elements of hammerheads, to include vertical flight up and down, pivot points, altitude loss and ground closure rates.
2. Consider wind conditions (upwind or downwind pivot) obstructions and emergency procedures.
3. Establish a straight and level flight path at demonstration altitude parallel to demonstration area.
4. Pull smoothly in a controlled fashion to a vertical up flight attitude.
5. Pivot/turn at the correct speed in a controlled manner to produce a turn radius that is no greater than one and one-half times the wing span of the demonstration aircraft. The pitch and roll of the aircraft should not change more than 20 degrees in any direction during the pivot/turn in a zero wind condition.
6. Establish vertical down flight attitude. Length of line should not be a factor as long as level upright flight is established at or above the initial starting altitude.
7. Return to initial start altitude or above on the reciprocal heading as first entered +/- 10 degrees.
8. Be able to abort the figure at any time if needed or instructed by ACE.

Q. Task: Crosswind Correction

To determine that the applicant can compensate for crosswind conditions by maneuvering the aircraft in a fashion that will keep the aircraft from moving downwind. Many techniques will work for this purpose leaving quite a bit of subjectivity and judgment on the ACE's evaluation. Therefore, the sole task is to verify that the pilot has the control and situational awareness needed to keep the aircraft from passing inside a given "dead line."

The following maneuver is designed to demonstrate the pilot's ability to "move" the aircraft from left to right or vice versa. The amount of sideways movement will vary depending on the size of the loop, time in the loop, and the pilot's ability to input corrections for wind drift.

1. Exhibit knowledge of the elements of crosswind correcting. Specifically, being able to keep the aircraft over the same path along the demonstration area correcting for crosswind, and also being able to move aircraft to the upwind direction at will.
2. Consider wind conditions, obstructions and emergency procedures.
3. While flying the aircraft directly towards the ACE at the demonstration altitude perform one inside loop over a pre-determined ground point.
4. The applicant should be able to "move" the aircraft "up-wind" to the left or right by no less than 100 feet. (The use of runway lights normally spaced 200 feet is a good reference for the ACE to use.)
5. Refer to Inside Loop in Section O.

If sufficient crosswind exists, the applicant may perform the loop in a direction that would expose his/her aircraft to a 90-degree crosswind. If this method is used, the applicant will be expected to keep his/her aircraft over the pre-determined ground point during the entire loop. The ACE may want to refer to the enclosed Crosswind Component Charts for wind vs. distance drift.

R. Task: Performance Rotorcraft Unique or Show Specific Maneuvers

To determine that the applicant understands the elements of, and can demonstrate the ability to safely perform unique or show specific maneuvers as appropriate for intended display and helicopter limitations. Examples of

rotorcraft unique or show specific maneuvers include, but are not limited to, back-flip from a hover, roll to inverted from a hover, Chucklavoc, vertical climbing or descending rolls, descent in vortex ring state, etc.

1. Exhibits knowledge of helicopter limitations related to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw (e.g. power and rotor limitations, notes, cautions and warnings).
2. Exhibits knowledge of aerodynamics of related to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw (e.g. settling with power, aircraft limitations).
3. Exhibits knowledge of emergency procedures applicable to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw (e.g. engine failure, tail rotor failure, power limitation, negative G).
4. Exhibits knowledge of the applicable Height-Velocity Diagram and the assumption of risk when operating in the avoid area of the H/V curve.
5. Exhibits knowledge of the performance effects of density altitude, high humidity, and high or low temperature.
6. Demonstrates the ability to safely perform related to high rate maneuvers simultaneously changing any combination of pitch, roll, or yaw appropriate to the display approval requested so the outcome of the maneuver is never seriously in doubt.
7. Demonstrates knowledge of control limitations and display related emergency procedures.

S. Task: Full Aerobatic Sequence

1. To determine that the applicant can complete a full aerobatic demonstration. During the flight the pilot shall be able to complete the following:
2. Maintain a safe altitude at all times as appropriate for the level being applied for.
3. Maintain directional control of his/her aircraft at all times during the aerobatic demonstration. This is to include take off and landings.
4. Maintain an energy level that is appropriate for the given sequence and maneuvers being demonstrated.
5. Compensate for winds during the sequence so as to remain over the primary demonstration area and keeping the sequence balanced and centered.
6. Be able to abort or interrupt the sequence at any time if needed or asked to by the ACE. After interruption, being able to return to the aerobatic area and continue with the remainder of the sequence without the flow and safety being compromised.

Appendix E
Statement of Aerobatic Competency Endorsements and Requirements

The following are accepted Statement of Aerobatic Competency Endorsements with associated minimum requirements

(Note: Not all endorsements are applicable to all aircraft categories. Any dispute of application of an endorsement to a particular category shall be settled by the ACE Committee):

A. Rolls Only
   1. 5 practice sessions for Initial Endorsement
   2. Level as required
   3. Completed evaluation
   4. Qualification period of 36 months in category evaluated

B. Solo Aerobatics
   1. 30 documented practice sessions for Initial Endorsement
   2. Level as required
   3. Completed evaluation
   4. Qualification period of 36 months in category evaluated

C. Formation Aerobatics
   1. 30 documented practice sessions with the same team members for Initial Endorsement
   2. Level as required
   3. Completed evaluation
   4. Have met the minimum requirements per Volume 3 Chapter 6 Section 1 of 8900.1
   5. Qualification period of 36 months in category evaluated

D. Night Shows
   1. 15 documented practices for Initial Endorsement
   2. Level 2, Level 1/Surface
   3. Completed evaluation
   4. Qualification period of 36 months in category evaluated

E. Pyro
   1. Completed Evaluation
   2. Qualification period of 36 months in category evaluated

F. Wing Walking
   1. 15 documented practices for Initial Endorsement
   2. Level 2, Level 1/Surface
   3. Completed evaluation
   4. Qualification period of 36 months in category evaluated

G. Inverted Ribbon Cut
   1. 15 documented practices for Initial Endorsement
   2. Level 1/Surface
   3. Completed evaluation
   4. Qualification period of 36 months in category evaluated

H. Dog Fight
   1. Completed evaluation
   2. Qualification period of 36 months in category evaluated

I. Comedy
   1. 15 documented practices
   2. Level 1/Surface
   3. Completed Evaluation
   4. Qualification period of 36 months in category evaluated

J. Car to Plane Transfer
   1. 30 documented practices for Initial Endorsement
   2. Level 2, Level 1/Surface
   3. Completed evaluation
   4. Qualification period of 36 months in category evaluated

K. Aerial Transfer
   1. 30 documented practices for Initial Endorsement
   2. Level 2, Level 1/Surface
   3. Completed evaluation
   4. Qualification period of 36 months in category evaluated

L. Car Top Landing
   1. 15 documented practices for Initial Endorsement
   2. Level 1/Surface

3. Completed evaluation
4. Qualification period of 36 months in category evaluated

M. Circle the Jumpers
1. 5 practice sessions for Initial Endorsement
2. Level as required
3. Completed evaluation
4. Qualification period of 36 months in category evaluated

Appendix F
Figures
Note: Figures 1, 2, 3 4 and 6 will be replaced with the new documents upon approval and prior to implementation.

Figure 1
Front of FAA SAC card

Figure 2
Back of FAA SAC card

Figure 3
Front of Transport Canada SAC card

Figure 4
Back of Transport Canada SAC card

Figure 5
Aircraft/Category Reference

Sport Aerobatics	Sport Aerobatics
Acro Sport	MX-2/MXS/MXR
Advantage	Nieuport 11/17
Aermacchi/SIAI Marchetti SF 260	One Design DR-107
Aeronca 7AC	Panzl S-330/331
ASU Challenger II	Patriot 300
ASU Challenger III	Piper Aerostar
ASW-15 Schleicher Glider	Piper J-3 Cub/Super Cub - All variants
Atlantis	Piper PA-34 Seneca
Baby Great Lakes	Pitts Special - All variants
Beech Bonanza	Quicksilver - All variants
Beechcraft Model 18	Raven - All variants
Beechcraft T-34 Mentor	Rebel Edge
Beechcraft T-6 Texan II	Rihn DR-109
Bellanca Viking/Super Viking	Rocket powered velocity
BF9-2	RV series
Boeing Stearman - All variants	Sbach
Bucker BU-131	Senior Aerosport PJ-260
Bucker BU-133	Showcat
CAP 10, 10B, 10C	Skybolt S/D
CAP 230/231/231EX/232	SNS-7 Hiperbipe
Cassutt	SPAD - All variants
Cessna 305A Bird Dog	Sportavia RF4D
Cessna 337 Skymaster	SR-300
Cessna/Columbia 400	Stampe SV-4C
Christen Eagle - All variants	Starduster Too SA300/Stolp SA-750 Acroduster
Citabria - All variants	Starjammer
Culp Special	Staudacher S-300
Decathalon - All variants	Staudacher S-600
DeHavilland DHC-1 Chipmunk/Super Chipmunk	Stephens Acro
Demon - 1	Stewart S-51D
Excalibur	Sukhoi SU-26/29/31
Extra 230 - All variants	Taylorcraft - Modified
Extra 300 - All variants	Taylorcraft - Unmodified
Fleet Finch Model 16	Technoavia SP-95
Fokker D-VII	Travel Air 2000
Fokker DR-1	Travelair Mystery Ship
Giles G-200/202	Tucano - All variants
Giles G-750	Turbo Shark
Glasair - All variants	Twin Commander
Globe Swift - All variants	Ultimate - All variants
Great Lakes	Ultra X
Grumman Ag-Cat/Showcat	Velox Revolution 1
Hammond 1	Vultee BT-13/15 Valiant
Harmon Rocket	Waco - All variants
Interavia E3	Wittman Tailwind
Interstate Cadet	Yakovlev Yak 18
Javelin	Yakovlev Yak 50
Lancair/Columbia 350/400	Yakovlev Yak 52 - All variants
Laser 200/230	Yakovlev Yak 54
LoPresti Fury	Yakovlev Yak 55
MAC-145	Zivko Edge 540
Meyer 360	Zlin 526F
Meyer Brian E Super Ace	Zlin Z 142
Meyers Lil Toot	Zlin Z 50
Midget Mustang	Zlin Z 526L
Monocoupe	

Jet Warbird Aerobatics	Piston Powered Warbird Aerobatics
Aero L-29 Delfin	Bell P-39 Airacobra
Aero Vodochody L-39 Albatros	Bell P-63 Kingcobra
BAE FA2 Sea Harrier	Chance-Vought F-4U Corsair
BD5J Microjet	Commonwealth CA-13 Boomerang
Boeing F/A-18 Hornet - All variants	Curtiss P-36 Hawk
British Aircraft Corporation 167 Strikemaster	Curtiss P-40 Warhawk
British Aircraft Corporation Jet Provost	Douglas A-1 Skyraider - All variants
Canadair Tutor - All variants	Douglas SBD Dauntless
Dassault Mirage F1	Grumman F4F/General Motors FM-2 Wildcat
DeHavilland Vampire/Venom	Grumman F6F Hellcat
Dornier Alpha Jet	Grumman F7F Tigercat
Eclipse Concept Jet	Grumman F8F Bearcat
Fairchild-Republic A-10 Thunderbolt	Grumman OV-1D
Fouga CM-170 Magister	Hawker Hurricane - All variants
Grumman EA-6B Prowler	Hawker Sea Fury
Grumman F-14 Tomcat - All variants	IAR 823
Hawker Hunter	Lockheed C-130 Hercules - All variants
Hispano HA-200 Saeta	Lockheed P-38 Lightning
Jet Wing	Messerschmitt BF 109
Learjet - All variants	Milec M-26 Airwolf
Lockheed F-104 Starfighter	Mitsubishi A6M Zero
Lockheed Martin F-16 Fighting Falcon - All variants	Nanchang CJ-6/Yakovlev Yak 18
Lockheed Martin F-22 Raptor	North American P-51 Mustang
McDonnell Douglas A-4 Skyhawk	North American T-28 Trojan
McDonnell Douglas F-15 Eagle - All variants	North American T-6 Texan/SNJ/Harvard
McDonnell Douglas F-4/FG1 Phantom	Polikarpov I-16
Mikoyan-Gurevich MiG-15	Republic P-47 Thunderbolt
Mikoyan-Gurevich MiG-17	Ryan PT-20/21/22 Recruit
Mikoyan-Gurevich MiG-21	Sindlinger Hurricane
Morane-Saulnier MS-760	Supermarine Spitfire
North American F-86 Sabre/FJ-4 Fury	T-51 Titan
North American RI-T2	Yakovlev Yak 11
North American Sabre Liner NA-265	Yakovlev YAK 3/9
Port Orange	
PZL/WSK TS-11 Iskra	
Rocket Racer Prototype	
T-33 - All Variants	
TT-1 Pinto Jet	

Sailplane Aerobatics	Helo Aerobatics
Ali Sport Silent	Agusta 119
ASK 21	Agusta AW139
Grob Systems Sailplane	Enstrom F-28
Pilatus B-4 Glider	Hughes 269 - All variants
Salto	MBB Bo 105
SGS - All Variants	Schweitzer 300C
SOKO G2A Galeb	
Swift S-1	

Figure 6
Statement of Aerobatic Competency Application