U.S. Department
of Transportation
Federal Aviation Administration

Advisory Circular

Subject: VISUAL GUIDANCE LIGHTING EQUIPMENT APPROVAL PROGRAM

Date: 03/07/2006 **AC No:** 150/5345-57
Initiated by: Navigation Services **Change:**

1. PURPOSE. This advisory circular (AC) describes the Visual Guidance Lighting Equipment Approval Program (VGLEAP). It provides information on how an organization can get Federal Aviation Administration (FAA), Navigation Services Organization acceptance as a third party verification body and how manufacturers may have their equipment verified and approved under the program. It lists FAA accepted verification bodies and approved products. This AC describes the requirements that are imposed on third party verification bodies and manufacturers who choose to participate in the VGLEAP. This AC describes the criteria that the FAA will use to determine whether a verification body qualifies for participation and the verification procedure for equipment. This AC also addresses the life cycle support items and configuration management requirements for the listed approved equipment. The FAA, Navigation Service, will use this AC to acquire Facilities and Equipment (F&E) funded navigation and landing systems for use in the National Airspace System (NAS). The list of approved equipment in this AC should only be used for F&E procurements.

2. BACKGROUND. The Airport Service Office established a similar equipment approval program on January 1, 1990. The program named a commercial testing laboratory, under the oversight of an Industry Technical Advisory Committee, as the program certification body for equipment to be provided under additional ACs. On May 15, 1995, the FAA, realizing that there were additional commercial laboratories that may want to participate as certification bodies, established and instituted the Airport Lighting Equipment Certification Program. That program allows any commercial laboratory meeting certain criteria to participate as a certification body and provides for FAA oversight and acceptance of certification bodies. The Airport Service program is further described in AC 150/5345-53B.

On November 13, 1992, the FAA issued policy for using non-developmental items (NDI) in FAA acquisitions. The FAA Navigation Services Organization has established the VGLEAP in response to this policy.

3. INTERNET ACCESS. This AC, the latest approved equipment list, the address list of approved visual guidance lighting equipment manufacturers, and the list of third party verification bodies, are available on the Internet at the FAA Regulatory and Guidance Library Web site listed in Appendix 2 of this AC.

Steve Zaidman
Vice President, Technical Operations Services

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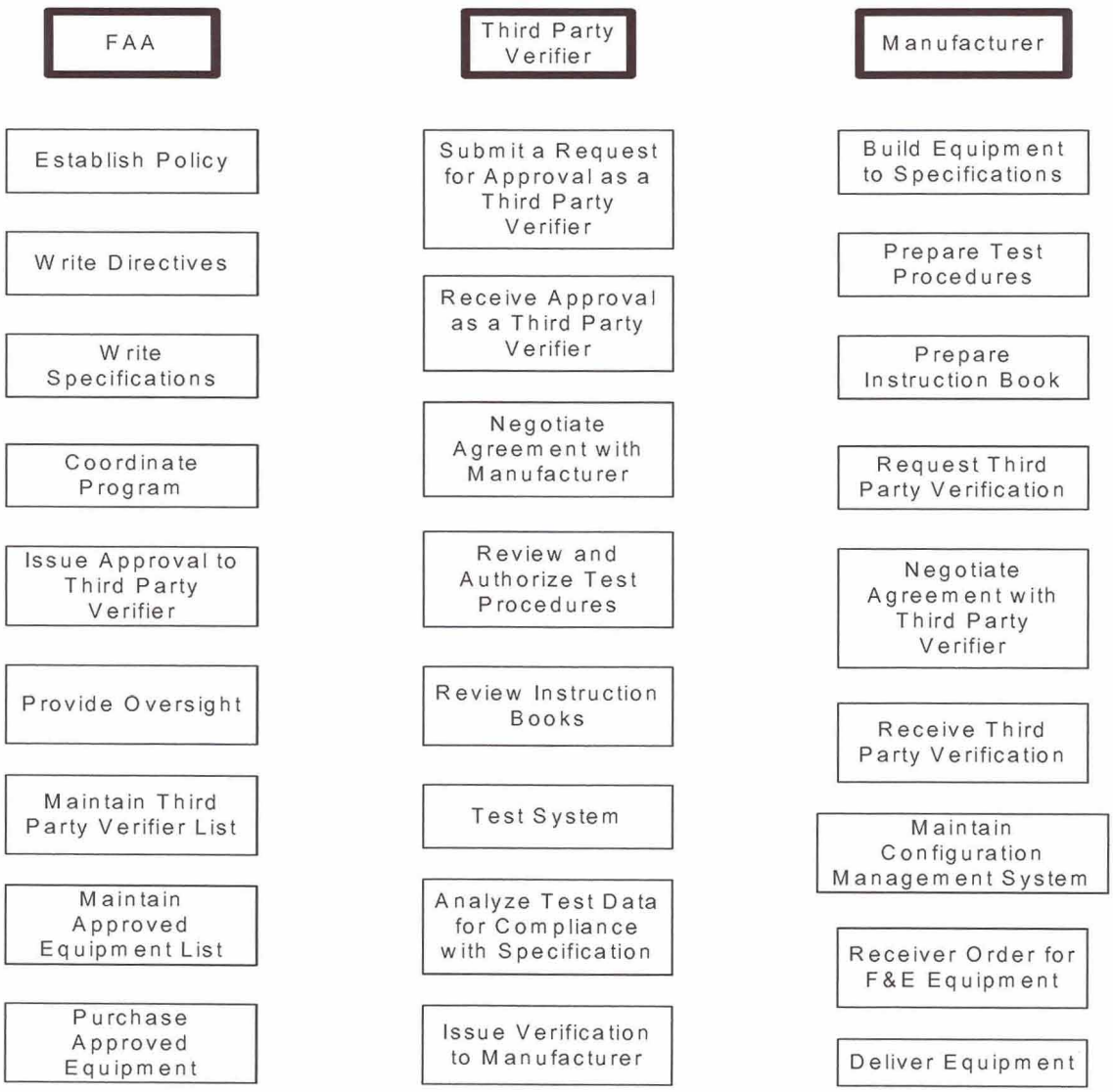
VISUAL GUIDANCE LIGHTING EQUIPMENT APPROVAL PROGAM

1. GENERAL. The FAA has established the Visual Guidance Lighting Equipment Approval Program (VGLEAP). FAA approved third party verification bodies will implement this program. The FAA will use this program to acquire equipment under the FAA's F&E program. The purpose of the program is to assist the FAA in discharging its duty to ensure timely availability of visual guidance lighting equipment that meets the applicable FAA standards for safety, performance, quality, and standardization. Manufacturers are subject to quality audits and twice yearly quality assurance inspections by the third party verification body. Manufacturers submitting products for verification and approval must have a representative in North America to provide aftermarket services for the equipment.

Figure 1. Simplified Responsibilities Chart



2. APPROVAL PROGRAM.

a. Procedures. Manufacturers of lighting and visual aid equipment that want to participate in the VGLEAP may select any third party verification body from the list in Appendix 1, Third Party Verification Bodies. The manufacturer will negotiate a licensing agreement (paragraph 3) that describes the relationship between the manufacturer and the third party verification body and specifies their respective responsibilities. A procedural guide (paragraph 4) supplements the license agreement and describes the operational aspects of the program. The third party verification body will evaluate the manufacturer's equipment using the procedures contained in this AC. The third party verification body will issue the manufacturer a Certificate of Verification for each type of equipment that meets the applicable FAA standards. The third party verification body must submit a copy of each Certificate of Verification to the FAA. On a monthly basis, the FAA will add newly approved equipment to the list of Approved Visual Guidance Lighting Equipment. The FAA will update this list in the form of an addendum file to this AC on the FAA Navigation Services Internet home page. Hard copies of this file may also be obtained directly from Navigation Services.

b. Costs. The program is funded entirely by fees paid by participating manufacturers. The fee schedule may be obtained from the third party verification bodies listed in Appendix 1. The third party verification body determines the fee amounts and collects the fees.

3. LICENSING AGREEMENT. The licensing agreement describes the relationship between the manufacturer and the third party verification body, and specifies their respective responsibilities. The licensing agreement will also include a schedule of fees for the manufacturer's participation in the program. These fees include a yearly administrative service fee and fees for quality control reviews and the witnessing of tests.

4. PROCEDURAL GUIDE. The Procedural Guide describes the operational aspects of the third party verification body's program, and, as a minimum, must address the elements listed below. (See Appendix 3 for the Procedural Guide Outline.)

a. Scope. The verifier will describe the general procedures for the VGLEAP. This section must discuss how the verifier will implement the equipment verification/approval procedures contained in this AC.

b. Quality Control Program. The verifier will describe the procedures for assuring the manufacturer's compliance with the provisions of ISO 9000 (paragraph 17).

c. Equipment Requirements. The verifier will describe the evaluation criteria for the equipment requirements.

d. Equipment Qualification Tests. The verifier will describe the procedures, with associated completion time frames, for the equipment qualification tests. The third party verification body may witness tests conducted by a manufacturer at the manufacturer's laboratory or witness tests conducted at an independent laboratory. All laboratories in which equipment is tested will be subject to inspection and audit to ensure conformance with ISO/IEC Guide 25.

e. Production Tests. The verifier will describe the procedures for ensuring that routine production tests, as required by FAA

specifications, have been conducted. During the semiannual inspections (paragraph 4f), the third party verification body may request to witness some of the production testing.

f. Semiannual Inspections. The verifier will describe the procedures for conducting semiannual inspections at the manufacturing site of the participant to determine that the manufactured equipment is the same as the sample subjected to the qualification tests. The inspections may be scheduled or unannounced, at the option of the third party verification body. Samples of all verified equipment produced in a given year must be inspected at least once during these visits. The inspection will include configuration management of drawings, test procedures, and test fixtures. If equipment is not being produced during the semiannual visit, the third party verification body will review the production records and test data for that equipment. If production test records are not available, the verification must be suspended. Nonconformance to specifications found during these inspections will result in suspension of verification unless corrections are made within 72 hours. The third party verification body must notify the FAA within 24 hours of any suspension or withdrawal of equipment's Certification of Verification.

g. Appeals Procedure. The verifier will describe the procedures for conducting an appeals program. Under this procedure, a manufacturer who is affected by an adverse determination by the third party verification body with respect to its verified equipment or its participation in the program may appeal the determination to the third party verification body.

h. Challenge Procedure. The verifier will describe the procedures for conducting a challenge program. Under this program, if a manufacturer believes another manufacturer's equipment does not meet FAA specification requirements, it may challenge that manufacturer's verification by submitting to the third party verification body a written statement of reasons for the challenge. The statement will specify the section(s) of the particular FAA specification being challenged. The third party verification body must follow the challenge procedures developed. The challenged manufacturer's equipment will remain on the Approved Visual Guidance Lighting Equipment list while the challenge is underway.

i. Latent Defects. The verifier will describe the procedures for correcting latent defects found in the manufacturer's verified equipment.

j. Forms. The verifier will describe the use and function of forms to be utilized in administering the program. The "Certificate of Verification" must follow the sample shown in Appendix 4.

5. EQUIPMENT COVERED BY THE APPROVAL PROGRAM. The equipment covered by the approval program is included in the FAA specifications listed in paragraph 24 of this AC. The FAA may periodically change the equipment covered by the program to reflect changes in the FAA's requirements.

6. SUBMITTAL OF EQUIPMENT VERIFICATION REQUESTS. Requests for verification must be submitted in writing to a third party verification body listed in Appendix 1 of this AC. This request must include the following:

a. A list of the types, classes, styles, and sizes of equipment, along with the manufacturer's catalog numbers. A list of

equipment options must also be included when the individual FAA equipment specifications require it.

b. Engineering assembly and schematic drawings of the equipment to permit determination of adherence to specification design requirements.

c. A copy of the proposed test procedures and test data sheets, and a statement as to whether the manufacturer proposes to conduct the tests at its own facility, or the name and location of an independent testing laboratory where the tests are to be conducted. Since the third party verification body reserves the right to witness any or all tests, the manufacturer must not commence the tests until after consulting with the third party verification body. The third party verification body must conduct initial inspections and audits of any new laboratories used for testing. The third party verification body may elect to witness or waive the option to witness the tests. The manufacturer must give the third party verification body at least two weeks notice prior to starting tests.

d. A statement that the manufacturer agrees to provide the following minimum warranty for the equipment:
"The equipment has been manufactured and will perform in accordance with applicable FAA specifications. Any defect in design, materials, (excluding lamps), or workmanship which may occur during proper and normal use during a period of 1 year from date of installation or a maximum of 2 years from date of shipment will be corrected by repair or replacement by the manufacturer's factory."

e. A statement that the manufacturer agrees to provide and maintain a quality control program in accordance with ISO 9000 or Department of Defense quality standards. The manufacturer must provide a copy of the proposed quality control program.

f. A copy of the proposed instruction book conforming to specification FAA-D-2494b, for the equipment and a copy of each product's Listed Products Description Sheet.

g. A plan for a configuration management program in accordance with FAA-STD-021a.

7. REVIEW PROCEDURE FOR VERIFICATION REQUESTS. After receipt by the third party verification body of the request for verification, the manufacturer will be notified as to whether the proposed test procedures, test data sheets, and other documentation are acceptable. A mutually acceptable schedule for conducting tests should be agreed upon at that time. The manufacturer will be notified, in writing, after the last submittal of the required documentation or results of the equipment verification testing. If the equipment meets the requirements, the manufacturer will be issued a Certificate of Verification. The review procedure and associated time frames must be described by the third party verification body in the procedural guide.

8. TESTS.
a. Quality Assurance Tests. The equipment must successfully pass all quality assurance tests described in the applicable FAA specification. The manufacturer will bear all associated costs. The testing may be witnessed by the third party verification body at the manufacturer's laboratory or at an independent laboratory. Where the third party verification body waives the option to witness tests, the manufacturer must submit a certified copy of all test reports to the third party verification body.

b. Reverification. Each piece of equipment must be reverified every four years.

c. Equipment Requirements. The equipment must meet the requirements described in the applicable FAA specification. The third party verification body may require additional testing of equipment or system components to demonstrate compliance to requirements in areas where the specification quality assurance testing does not address a specific requirement.

d. Production Tests. In addition to quality assurance tests and equipment requirements, each FAA equipment specification requires some tests to be conducted on production units. The manufacturer must retain records of the production tests for four years, unless otherwise specified in the equipment specification, and permit the third party verification body, upon request, to witness these tests or inspect previous records.

9. SUSPENSION AND WITHDRAWAL OF VERIFICATION. The Certificate of Verification may be suspended or revoked if:

a. The manufacturer fails to provide the required documents.

b. The manufacturer fails to honor the warranty (paragraph 6d).

c. The manufacturer is found not in conformance with the quality control requirements or other program requirements (paragraph 6e).

d. The manufacturer does not maintain acceptable configuration management (paragraph 6g).

e. The equipment does not comply with the requirements for reverification (paragraph 8b).

f. The manufacturer fails to perform the required production tests (paragraph 8d).

g. The equipment has an unsatisfactory failure rate (paragraph 10).

h. Changes are made in the equipment without written authorization from the third party verification body (paragraph 11).

i. The equipment specification is canceled or is revised and the manufacturer fails to requalify (paragraph 12).

Once verification has been suspended, the manufacturer will be given a period of time to correct the problem, as specified by the documents of the suspension. While the equipment is suspended, it will remain on the approved list with notation that it has been suspended until a solution has been accepted by the third party verification body. If, after that period of time, the cause of the suspension has not been corrected, the verification will be withdrawn. After verification has been withdrawn, the equipment will be removed from the approved equipment list and the manufacturer will have to resubmit the product for the full verification process.

10. REMOVAL FROM APPROVED EQUIPMENT LIST. Since reliable equipment is of prime importance to the safety of airport operations, equipment that proves unreliable in use (as determined by the FAA) may be removed from the approved listing. The determination of unreliability will be based on judgment and experience with equipment of a like nature. Where any such equipment is deemed to have an unsatisfactory failure rate or is

deficient in workmanship or materials, the manufacturer will be notified in writing by the FAA as to the basis for this determination. The manufacturer shall then notify the FAA in writing within 15 working days as to its plan of action for correcting the problem. If the manufacturer does not resolve the problem within a reasonable time (the time frame will, of necessity, be based on safety considerations and/or the nature of the problem), the manufacturer and third party verification body will be notified and the equipment will be removed from the approved listing. The FAA reserves the right to require the equipment to be subjected to any or all qualification tests when the equipment has been deemed unreliable.

11. MODIFICATIONS TO EQUIPMENT. Once equipment has been verified, the manufacturer may not make any changes to the equipment without submitting the changes to the third party verification body for reverification. Requests for design or component changes must be submitted in writing to the third party verification body and must be accompanied by supporting documentation and, if applicable, copies of the revised instruction book pages that reflect the proposed change. The third party verification body will review the modification. If the change is acceptable and is required, the third party verification body will issue a revised Certificate of Verification. Substitution of stock electrical items such as resistors, capacitors, transistors, etc., which are identical in form, fit, and function, and which are equal or better in quality and rating, is permissible. Such substitution may require reverification. The manufacturer must supply the third party verification body a list of the substituted items for filing with the inspection records. This requirement does not apply to lamps. The verifier will maintain CM on the Hardware and Software Configuration Items version numbers of the verified equipment. As a minimum, for SWCIs the CM will include version number and checksum for each EPROM. The manufacturer will provide an equipment change notice to the verifier for Class I and II changes. If this process is not followed, the manufacturer's equipment will be removed from the approved list.

12. REVISION OF SPECIFICATIONS. The FAA may, at times, revise the specification for particular equipment to reflect changing needs of aviation or of new technology. In such a case, the revised FAA equipment specification will contain an effective date, six months after which the prior approval automatically expires unless the manufacturer has been requalified to the revised specification. Manufacturers will be informed by letter and supplied a copy of the revised specification within five days of its issuance. The procedure for requalification is the same as for the original qualification (paragraph 6) with the following exceptions (not applicable to any equipment not tested under this program or a prior grand-fathered manufacturer):

a. The manufacturer does not have to resubmit the quality control plan unless it has changed.

b. Depending on the nature of the equipment modification, it may not be necessary to perform all qualification tests. Exemption from certain tests may be granted by the third party verification body when requested and justified by the manufacturer that the test is not applicable to the modified design.

13. EXEMPTION FROM SPECIFICATION REQUIREMENTS. No exemptions from the specifications,

except as previously stated (paragraph 11), will be granted. However, it is recognized that FAA equipment specifications may not cover all specific design and operational applications and that equipment may be submitted for verification that does not meet all FAA specification requirements. If the proposed design is considered by the FAA to have merit, then the applicable equipment specification will be revised by the FAA to reflect the proposed design and submitted for comment through the normal coordination process with the aviation community. If no valid adverse comments are received by the FAA on the proposed revision, the proposed design may be given an interim verification before final approval and publication of the revised specification. In such cases, other manufacturers of similar equipment will be notified of the verification and of the forthcoming specification revision.

14. PUBLICATION OF APPROVED EQUIPMENT. A listing of equipment that has been verified by third party verification bodies and approved by the FAA will be published on the FAA Regulatory and Guidance Library Web site for the Navigation Services Organization on a monthly basis as an addendum file to this AC. The list can also be obtained from:

Federal Aviation Administration
Navigation Services Organization
800 Independence Ave., SW
Washington, DC 20591.

15. INTERNET ACCESS. This AC and the latest approved equipment list are available on the Internet on the FAA Navigation Services Organization home page (www.faa.gov/and/and700/and740).

THIRD PARTY VERIFICATION BODIES.

16. ACCEPTANCE CRITERIA. Any entity may become an FAA accepted third party verification body if it demonstrates conformance with the American National Standards Institute (ANSI) Z34.1, Third Party Certification Programs, for Products, Processes, and Services, and:

a. has been in operation as a third party testing facility for a minimum of three years,

b. has a permanent assigned staff, knowledgeable in photometric testing and other disciplines related to testing and quality control,

c. is under the supervision of a professional test director (Bachelor of Science Degree in related field; i.e., engineering, physics, physical science, etc.) with a minimum of four years experience in interpreting testing standards/specifications, test methods, evaluating test reports and quality assurance programs, and

d. all laboratory facilities conform to ISO/IEC Guide 25.

17. DUTIES OF THIRD PARTY VERIFICATION BODY. In addition to administering the qualification program and issuing Certificates of Verification, a third party verification body must assure that the manufacturer provides and maintains a quality control system in accordance with ISO 9000. To ensure adherence, the third party verification body must perform an initial quality audit. It must also assure that testing laboratories which perform qualification testing conform to the requirements of the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) Guide 25, General Requirements for the

Competence of Calibration and Testing Laboratories. Semiannual inspections of manufacturers must also be conducted (paragraph 4f).

18. APPLICATION. In order to be listed as a Third Party Verification Body, the testing facility must agree to undergo an assessment to determine if it qualifies. The FAA will provide application information upon request. Requests should be submitted to:

Federal Aviation Administration
Navigation Services Organization
800 Independence Ave., SW
Washington, DC 20591.

The following information must be submitted with the application:

a. A summary of the entity's background as a third party testing facility,

b. Resumes of permanent staff members who will be assigned to the verification program,

c. A draft copy of procedural guide and licensing agreement for the VGLEAP. A schedule of fees does NOT have to be included in the licensing agreement, and

d. Scope of verification activities for which it is seeking FAA approval, if it is less than the total program.

If the FAA determines that the third party testing facility conforms to all criteria, a "Letter of Acceptance" will be issued to that body and they will be listed in Appendix 1, Third Party Verification Bodies.

19. INSPECTION OF FACILITIES. Each participating third party verification body must agree to make facilities and program records available to the FAA or its representatives both initially and at all reasonable times thereafter for inspection. The FAA reserves the right to accompany the third party verification body to a manufacturer's facility or testing laboratory to witness qualification tests, quality control audits, site production tests, or inspections. The FAA also reserves the right to have staff or designated representatives visit the third party verification body to review its program.

20. DURATION OF LETTER OF ACCEPTANCE. A FAA Letter of Acceptance is valid for a period of 2 years. However, a third party verification body that wishes to continue in the program may reapply by resubmitting the information called for above (paragraph 18), plus a statement covering any problems experienced that may relate to safety and reliability of products verified. However, should a third party verification body make any changes in the program prior to that time, they must notify the FAA and obtain FAA approval before implementing the changes. Any questions concerning this program or the operation of any of the accepted third party verification bodies should be sent to:

Federal Aviation Administration
Navigation Services Organization
800 Independence Ave., SW
Washington, DC 20591.

21. WITHDRAWAL OF LETTER OF ACCEPTANCE. In the event the third party verification body ceases to meet the criteria of this AC, the FAA reserves the right to withdraw the Letter of Acceptance.

22. THIRD PARTY VERIFICATION BODY CHALLENGE PROCEDURE. If

the FAA receives information that a third party verification body believes another third party verification body is not performing in accordance with the minimum criteria of this AC, the FAA will notify the challenged party and investigate the charges. If the challenge is upheld, and the third party verification body is not performing in accordance with the criteria set forth in this AC, the third party verification body will be notified of the deficiencies. If, at the end of 30 days, the third party verification body still does not meet the minimum criteria of this AC, the FAA reserves the right to withdraw the Letter of Acceptance.

LIFE CYCLE SUPPORT

23. LIFE CYCLE SUPPORT. When the FAA procures visual guidance lighting equipment under this F&E program, the life-cycle support requirements will be included in the solicitation's statement-of-work. The solicitation will include the spare parts and spare parts peculiar for the equipment as contract line items.

EQUIPMENT SPECIFICATIONS

24. EQUIPMENT SPECIFICATIONS. This chapter provides a list of the FAA equipment specifications covered under the approval program. These specifications are available on the Internet at the FAA Navigation Services Organization home page. They can also be obtained from FAA at:

Federal Aviation Administration
Navigation Services Organization
800 Independence Ave., SW
Washington, DC 20591.

FAA-E-982j PAR-56 Lampholder
FAA-E-2159e REIL
FAA-E-2325e MALSR
FAA-E-2408b PAR-56, 20A, Quartz Halogen Lamp
FAA-E-2491b Approach Light, Semi-flush Steady Burning
FAA-E-2628b Sequenced Flashing Lighting System, Elevated and Semiflush with Dimming and Monitoring
FAA-E-2651 ODALS
FAA-E-2663 Interface unit, MALSR Remote Control
FAA-E-2689a, Ch. 6 ALSF-2/SSALR
FAA-E-2702 LIR structures
FAA-E-2723 Amendment 1 RRCS
FAA-E-2756b PAPI
FAA-E-2891 MALSR, Semiflush threshold light fixture
FAA-E-2952 ALSF-2, Semiflush light fixture
FAA-P-2965 PAR-56, Flashtube Lamp
FAA-E-2968 MALSR, Semiflush light fixture
FAA-P-2969 Red and green filters
Drawing C-6046 Frangible coupling, Type 1 and Type 1A, Details

APPENDIX 1. THIRD PARTY VERIFICATION BODIES.
(as of issue date)

The following third party testing facilities have met the requirements described in this Advisory Circular and have been accepted as Third Party Verification Bodies under the Visual Guidance Lighting Equipment Approval Program.

APPENDIX 2. ADDRESS LIST OF APPROVED VISUAL GUIDANCE LIGHTING EQUIPMENT MANUFACTURERS.

This appendix is a list of the manufacturers with one or more pieces of approved equipment at the time of release of a change to this Advisory Circular. An addendum to this appendix, listing all current approved equipment manufacturers' addresses, is updated monthly. Listing of a manufacturer in this appendix does not indicate that all of that manufacturer's products are approved; the addendum must be reviewed to assure approval of individual products. The addendum is available on the Internet at the FAA Regulatory and Guidance Library Web site (www.airweb.faa.gov\rgl). The addendum can also be obtained from the FAA at:

Federal Aviation Administration
Navigation Services Organization
800 Independence Ave., SW
Washington, DC 20591.

APPENDIX 3. PROCEDURAL GUIDE OUTLINE.

1. SCOPE. (§ 4a)
a. Basis of Program
b. Verifier's Role
c. Manufacturer's Role
d. FAA Role

2. LICENSE AGREEMENTS. (§ 3)

3. EQUIPMENT QUALIFICATION TEST PROCEDURES. (§ 4d)
(Use the specification Section 4 as a guide.)

4. SEMIANNUAL INSPECTIONS. (§ 4f)
a. Timing of Inspections
b. Production Records
c. Inspection Review Report
d. Configuration Management Program Compliance
e. Corrective Action
f. FAA Notification

5. QUALITY CONTROL. (§ 4b)
a. Audit Visits
b. Rating System

6. PRODUCTION TESTING. (§ 4e)
(Use the specification Section 4 as a guide.)

7. APPEALS PROCEDURE. (§ 4g)

8. CHALLENGE PROCEDURE. (§ 4h)
a. Written Challenge
b. Documentation
c. Costs
d. Sample Product
e. Testing
f. Corrective Action
g. Payment

9. LATENT DEFECTS. (§ 4i)

10. USE AND FUNCTION OF FORMS. (§ 4j)

11. FORMS

APPENDIX 4. SAMPLE VERIFICATION.

Program Administrator
(Name and address of Third Party Verifier)
_____
_____

DATE:_____
(This is the date of the last issued verification based on complete test data.)

Visual Guidance Lighting Equipment Approval Program
Certification of Verification

Name and Address of Manufacturer
_____
_____
_____

The equipment listed below is hereby verified in accordance with the procedures contained in Federal Aviation Administration (FAA) Advisory Circular 150/5345-*XX*, Visual Guidance Lighting Equipment Approval Program (VGLEAP). The Approval is based on successful completion of test and conformance with requirements of the specifications listed in Advisory Circular 150/5345-*XX* and the reporting to the Program Administrator the results of such test accompanied by related documents.

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ITEM NUMBER – ITEM NAME

		(FAA-E-2159)				Mfgr's		
Type	Rating	Class	Style	Size	Watts	Amps	Lamps No.	Cat No.

(NOTE: Use headings appropriate for the equipment tested.)

1. This equipment requires continuing validation in accordance with the requirements of Advisory Circular 150/5345-*XX*.

2. Product tested and report issued by:

   (A.) Report No.:_____
   (B.) Date of Report:_____
   (C.) FAA Specification NO.:_____

VERIFIED:
BY: Verifier Signature_____
Verifier's Typed Name_____
Date Signed_____