



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Institute of Standards and Technology**  
Gaithersburg, Maryland 20899-

March 2, 2004

Ms. Diana Frohn  
Manager, General Aviation and Repair Station Branch  
Federal Aviation Administration  
AFS-340, Room 827  
800 Independence Avenue, S.W.  
Washington, DC 20591

Dear Ms. Frohn:

As a follow-up to your discussions with Dave Alderman, Chief, Standards Coordination and Conformity Group, National Institute of Standards and Technology, I am writing to you to provide information and thoughts regarding implementation of the Federal Aviation Administration (FAA) requirement referenced in Chapter 4-12(c), Calibration of Measuring and Test Equipment, of FAA *Advisory Circular AC 145-9*, which states that “The calibration must be traceable to a standard acceptable to the FAA, which includes those recommended by the manufacturer and the National Institute of Standards and Technology (NIST) or other national authority.”

**Background:** As the national measurement institute (NMI) for the United States, NIST provides customers with the tools they need (a) to assist them in establishing traceability of their measurement results, and (b) to assess the claims of traceability made by others. This is achieved directly through the provision of NIST measurement-related products and services – such as calibration services, through collaboration with relevant organizations, through development and dissemination of technical information on traceability, and through coordinated outreach programs. NIST is a signatory, with other national measurement institutes representing 57 countries, to the Comité International des Poids et Mesures (CIPM) Mutual Recognition Arrangement (MRA). This arrangement provides for the mutual recognition of national measurement standards and of calibration and measurement certificates issued by NMIs. Recognition is based on (a) the results of a set of key comparisons carried out using specified procedures which lead to a quantitative measure of the degree of equivalence of national measurement standards; (b) the operation by each NMI of a suitable way of assuring quality in the provision of calibration and measurement services; and (c) successful participation by each NMI in appropriate supplementary comparisons.

**NIST**

**Recommendations:** To assist you in providing additional guidance to FAA Repair Station personnel, particularly those operating in foreign countries, NIST recommends that, where relevant and necessary, the FAA accept:

- (a) Calibration certificates issued by an NMI that is a signatory to the CIPM MRA, provided that:
  - the uncertainties stated on the calibration certificate are appropriate for the instrument and its application at the point of use, as determined by the FAA, and
  - the NMI's competence to conduct calibrations and measurements for the measurand in question has been substantiated under the MRA through the means for recognition specified above; and
  
- (b) Calibration certificates issued by a laboratory that has demonstrated its competence through accreditation by an accrediting body that is a signatory to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement, provided that:
  - the laboratory's scope of accreditation includes the measurement capabilities required by the FAA, and
  - the NMI to which the laboratory has established traceability of its measurement results meets the requirements stated in (a) above.

NIST is aware that there are instances in which traceability to another NMI, either directly or through an accredited laboratory, as noted above, will not meet current FAA requirements. For example, the FAA requirement relating to approved air carrier strobe light maintenance programs states that intensity measurements on flashing strobe anti-collision lights must be calibrated to a standard traceable to NIST. NIST maintains a flashing light primary standard for intensity measurements to meet this requirement.<sup>1</sup> There may be other instances in which FAA airworthiness or related requirements specify traceability to a standard which is maintained only by NIST. In these instances, traceability to a standard maintained by another NMI would not meet FAA requirements.

NIST would be pleased to assist the FAA in determining whether specific NMI or laboratory calibration and measurement capabilities meet FAA traceability and uncertainty requirements. We consider this an important part of our broader commitment to provide the FAA with the metrology and measurement services necessary to sustain aircraft safety and airworthiness. To this end, NIST would welcome closer collaboration

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<sup>1</sup> This FAA requirement is contained in Flight Standards Information Bulletin for Airworthiness (FSAW) 98-01 and was established in response to a 1996 National Transportation Safety Board recommendation. With FAA support, NIST developed a flashing light primary standard for intensity measurements to meet this requirement. No other NMI maintains such a standard. Traceability for this measurement cannot be established via the steady-light candela.

with the FAA on acceptable traceability paths and to identify and understand next-generation measurement and standards needs.

If you have any questions regarding NIST's position on traceability to acceptable standards, please feel free to contact Dr. Robert Watters, Senior Scientist and Acting Chief, NIST Measurement Services Division at [robert.watters@nist.gov](mailto:robert.watters@nist.gov) or by telephone at 301-975-4122.

Sincerely,



Richard F. Kayser  
Director, Technology Services  
Chair, NIST Measurement Services Advisory Group

cc: David E. Cann, Manager, Aircraft Maintenance Division,  
Flight Standards Service, FAA  
Belinda L. Collins, Deputy Director, Technology Services  
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