Memorandum

U.S. Department
of Transportation
Volpe National
Transportation
Systems Center

As required by Federal Aviation Administration (FAA) Order 8110.4C: "*Type Certification Process*" (most recently revised as "Change 5", 20 December, 2011), the Volpe Center Acoustics Facility (Volpe), in support of the FAA Office of Environment and Energy (AEE), performs audits of aircraft noise certification applicants' software and methodologies to ensure conformance with the requirements and specifications of the Code of Federal Regulation (CFR) Title 14 part 36 (Part 36). These audits are executed as "validations" of applicants' software, instrumentation and procedures.

In addition to the **primary software & methodology validation**, separate validations are performed for **noise measurement and analysis instrumentation systems**, and for **DGPS (DGNSS) tracking systems**. Applicants should note that validation of particular instrumentation for one applicant does not universally apply – each applicant must submit to validation of their instrumentation system, including evaluation of formalized documentation such as an individualized operator manual or procedures report for setup and operation of the instrumentation by the applicant. This may sometimes result in individual validation reports for instrumentation components and for applicant procedures related to those components.

As a result of recent issues related to unexpected results from applicants using validated and approved DGPS systems and in coordination with FAA's Transport Directorate Noise Certification Specialist (TDNCS), Bruce Conze, Volpe is instituting some changes to the data submittal requirements and procedures for the audit/validation of DGPS tracking systems used in

aircraft noise certification flight-tests. In addition to the existing data requirements, Volpe requests that the following submission requirements be implemented:

1. Coordinate transformation code used to convert GPS coordinates to local, site-specific TXYZ data must now include ID and Version control, and applicants must include a statement in any test plans that they will use the validated code;
2. Formal documentation of the applicant's individual setup and operation protocols for use of the DGPS system in the field, and the applicant must include a statement in any test plans that these procedures will be followed, and specifically include a daily "validity check", as follows:
   a. Prior to each takeoff, the aircraft must be taxied over a known and previously verified survey location in the ramp area;
   b. A check of the on-board system location against the surveyed location.
3. Latitude/Longitude coordinates must be input to 6 significant digits when using Decimal Degrees format (45.123456° N), and to 2 significant digits when using Degrees/Minutes/Decimal Seconds format (45° 12' 34.56" N). Calculations performed on such coordinates must maintain (at minimum) this level of precision throughout all processing until converted to local XYZ data.

Volpe will be re-validating applicants who have previously been validated and approved, as certification projects become available. Applicants should allow additional time for such validation to be completed prior to flight-testing.

Applicants should note that Volpe has established a set of detailed requirements for the data sets to be supplied, which in some cases exceed the reporting requirements for certification. This is necessary in order for Volpe to most accurately duplicate the applicant's procedures and to obtain meaningful results for evaluation.

If you have any comments or questions, please do not hesitate to contact me.

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Attachments:

1. DGPS Validation Submittal Instructions;
2. DGPS Validation Submittal Checklist;

cc:
      M. Marsan, FAA, AEE-100
      S. Liu, FAA, AEE-100
      R. Cointin, FAA, AEE-100
      B. Conze, FAA, AIR-672

D. Read, Volpe, V324
C. Roof, Volpe, V322
C. Lee, Volpe, V324
C. Reherman, Volpe, V320
G. Fleming, Volpe, V320