

RA 5219 - Instrumentation and Flight Data Recorder Requirements for Flight Trials of Air Systems

Rationale

Instrumentation is often required for flight trials of new types of Air System, and of Air Systems incorporating major changes to Type Design to facilitate the gathering of trial data. Importantly, the recording of flight trial data can also be used for post-event analysis in case of an unexpected Incident or Accident. However, the conduct of flight trials may pose an additional Airworthiness Risk hence the installation of a crashworthy Flight Data Recorder (FDR) and other Instrumentation may be required.

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Definitions

Definitions Relevant to this RA

1. **Instrumentation.** Refers to all items which are fitted temporarily to an Air System specifically for carrying out flight trials which will be subsequently removed.

Regulation 5219(1)

Instrumentation and Flight Data Recorder Requirements

- 5219(1) The Type Airworthiness Authority (TAA)¹ **shall** agree the need for installation of Instrumentation and a crashworthy FDR for the purposes of the flight trial programme², in consultation with the Design Organization (DO) and / or selected Test and Evaluation (T&E) Organization.

Acceptable Means of Compliance 5219(1)

Instrumentation and Flight Data Recorder Requirements

2. The Instrumentation and FDR requirements, including the parameters and sampling rates to be measured, **should** be considered and the actions taken formally recorded by the TAA for;
 - a. Trials of major changes to Type Design³.
 - b. Trials which seek to extend the approved flight limitations, or which entail an increased Hazard.
 - c. Trials of any special equipment installation which might affect the Safety of the Products, Parts or Appliances including Airborne Equipment and Air Launched Weapons.
3. The following requirements **should** be considered:
 - a. Instrumentation required in each Air System allocated for flight trials⁴.
 - b. Provision for automatic monitoring and recording, including telemetry.
 - c. Provision of a crashworthy FDR which meets the requirements of Defence Standard (Def Stan) 00-970 Part 13 UK 13.4.3.1 and 13.4.3.2⁵.
 - d. Provision for navigational or Safety aids necessary for the safe and satisfactory conduct of the flight trials.

¹ Where the Air System is not UK MOD owned, Type Airworthiness (TAw) management regulatory responsibility by either the TAA or Type Airworthiness Manager (TAM) needs to be agreed within the Sponsor's approved model. However due to the non-delegable responsibilities detailed in RA 1162 – Air Safety Governance Arrangements for Civilian Operated (Development) and (In-Service) Air Systems only the TAM for developmental activity conducted under Special Case Flying is applicable to this RA. Where this is the case, then TAM may be read in place of TAA as appropriate throughout this RA.

² Refer to RA 2370 – Test and Evaluation.

³ Refer to RA 5820 – Changes in Type Design (MRP Part 21 Subpart D).

⁴ Refer to RA 5301 – Air System Configuration Management.

⁵ Refer to Def Stan 00-970 Certification Specifications for Service Aircraft - Part 13.

**Acceptable
Means of
Compliance
5219(1)**

4. The DO / selected T&E organization **should** submit all relevant information on the Instrumentation and FDR to the TAA.
5. All installations **should** conform to the Type Certification Basis applicable to the Air System concerned, or by agreement with the MAA, to the requirements of alternative Certification Specifications for Airworthiness.
6. The DO / selected T&E organization **should** demonstrate to the satisfaction of the TAA, with appropriate trials and Safety arguments, that the installation, when completed, is safe and effective.

**Guidance
Material
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Instrumentation and Flight Data Recorder Requirements

7. The TAA may assist the DO / selected T&E organization by obtaining and / or modifying Instrumentation and equipment when by so doing there are advantages to the flight trials programme.
8. On removing the temporary fit Instrumentation, the Air System will be returned to its original configuration. Any changes that remain have to be correctly documented and managed.

**Regulation
5219(2)**

Identification of Instrumentation

- 5219(2) When Instrumentation is installed in a Military Registered Air System it **shall** be marked in order that its experimental nature is readily identified.

**Acceptable
Means of
Compliance
5219(2)**

Identification of Instrumentation

9. All items of Instrumentation equipment (mountings, fixed and the visible surfaces of removable items) **should** be marked to ensure they are uniquely identifiable as such.

**Guidance
Material
5219(2)**

Identification of Instrumentation

10. Def-Stan 61-12⁶ part 33 requires that all cables be identified on the outside surface and details the coding system to be used.
11. Mil Hdbk 516⁷ refers to the use of Mil Std 27733⁸ for test equipment which details that all test equipment including cabling be orange (BS 381 colour 592 or equivalent) or marked with orange.
12. The requirements of this regulation do not apply to equipment which is under test.

⁶ Refer to Def-Stan 61-12 – Wires Cords, and Cables Electrical Metric Units.

⁷ Refer to Mil Hdbk 516 – Airworthiness Certification Criteria.

⁸ Refer to Mil Std 27733 – Modification and Marking Requirements for Test Equipment in Aerospace Vehicles and Related Support Equipment.