

RA 2370 – Test and Evaluation

Rationale

Test and Evaluation (T&E) activity provides evidence that is used to support the Air System Safety Case (ASSC)¹. The Risks to Life (RtL) associated with this activity are two-fold: firstly the process of evidence gathering has the potential to present a greater RtL than that associated with the routine operating environment, and secondly the generation of flawed evidence may negatively impact on the subsequent ASSC. Therefore T&E activity, and the associated evidence-generation, needs to be conducted and supervised by approved organizations and Suitably Qualified and Experienced Person (SQEP).

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Applicability

Applicability of this RA

1. The T&E activities covered by this Regulatory Article are defined as flights, ground taxi, ground runs and / or other on-Air System assessments that generate evidence in support of the ASSC¹.

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Test and Evaluation Governance

2370(1) T&E activity **shall** be subject to governance by SQEP.

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Test and Evaluation Governance

2. Endorsement.

a. Aviation Duty Holders (ADH), **▶ Remotely Piloted Air Systems (RPAS) Duty Holders (RPAS DH), ◀ Accountable Managers (Military Flying) (AM(MF)), or ▶ RPAS Accountable Managers (RPAS AM) ◀** who manage or conduct T&E activity **should** be endorsed by the Military Aviation Authority (MAA)².

b. When not themselves T&E SQEP; ADH, **▶ RPAS DH, ◀ AM(MF), ▶ or RPAS AM ◀** **should** appoint SQEP to oversee T&E activity. In these cases ADH, **▶ RPAS DH, ◀ AM(MF), ▶ or RPAS AM ◀** **should** provide evidence of said individual's SQEP when submitting their application for endorsement by the MAA² and note that accountability remains with the endorsed ADH, **▶ RPAS DH, ◀ AM(MF), ▶ or RPAS AM. ◀**

c. ADH-Facing organizations that manage or conduct T&E activity **should** do so in accordance with (iaw) RA 1020³ and RA 1205⁴.

3. Nomination of Units and organizations. ADH, **▶ RPAS DH, ◀ AM(MF), ▶ or RPAS AM ◀** **should**:

a. Nominate Units and organizations for T&E activity and its associated T&E category iaw the endorsement issued by the MAA.

b. Nominate SQEP⁵ for T&E activity.

4. Approval of T&E activity. ADH, **▶ RPAS DH, ◀ AM(MF), ▶ or RPAS AM ◀** **should**:

a. Detail in orders the manner in which T&E activity is to be approved as follows:

¹ ▶ The means by which the ASSC is satisfied for RPAS operating in the Open Category and Specific S1 sub-category is detailed at RA 1601 - Remotely Piloted Air Systems Open A1 sub-category (Fly 'Over' People), RA 1602 – Remotely Piloted Air Systems Open A2 sub-category (Fly 'Close To' People), RA 1603 – Remotely Piloted Air Systems Open A3 sub-category (Fly 'Far From' People) and RA 1604 – Remotely Piloted Air Systems Specific S1 sub-category.

² The T&E Endorsement application form is available on the MAA's website. ◀

³ Refer to RA 1020 – ▶ Aviation Duty Holder and Aviation Duty Holder-Facing Organizations - Roles and Responsibilities. ◀

⁴ Refer to RA 1205 – Air System Safety Cases.

⁵ ▶ iaw ◀ Annexes ▶ A ◀, B and C.

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- (1) The scope of involvement of the ADH, ► RPAS DH, ◀ AM(MF), ► or RPAS AM ◀ in the approval process.
- (2) The composition and competency of the Approval Board, which is to be SQEP for the activity being conducted, include minimum T&E qualifications iaw Annexes B ► and C ◀ and include representatives from the following areas as appropriate: Design Organization, T&E, Continuing Airworthiness, Type Airworthiness and flight operations.
- (3) The categorization of T&E activity.
 - b. Detail in orders the process for allocating T&E activity to specific Units or organizations.
5. **T&E Approval Board.** The Approval Board **should**:
 - a. Approve T&E activity on behalf of the ADH, ► RPAS DH, ◀ AM(MF), ► or RPAS AM. ◀
 - b. Examine each trial before planning commences and endorse the proposed T&E categorization.
 - c. Ensure that those designing, planning, supervising and conducting T&E activity are SQEP.
 - d. Ensure that the trial design is capable of generating the appropriate level and fidelity of evidence.
 - e. ► Ensure that, for RPAS T&E, the trial design remains within the scope of the MAA RPAS Letter of Categorization (LEC). ◀
6. **Combined Test Teams (CTT).** CTT **should** operate under the governance of a single clearly identifiable ADH, ► RPAS DH, ◀ AM(MF), ► or RPAS AM ◀ and within the boundaries of a governance arrangement agreed by all relevant participants / stakeholders (eg T&E Organizations, Design Organization, ► Delivery ◀ Team).
7. ► **Open Category and Specific S1 sub-category RPAS T&E.** All T&E on RPAS operating in the Open Category and Specific S1 sub-category **should** be conducted under the authority of a RPAS DH / RPAS AM and supported by appropriate persons⁶. The RPAS DH / RPAS AM **should** ensure that the RPAS has been appropriately evaluated by SQEP for basic Airworthiness requirements⁷, that it is "Safe to Operate" in the Defence Air Environment (DAE) and can be registered iaw RA 1161⁸. ◀

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8. **ADH-Facing organizations.** To ensure that evidence generated in support of the ASSC is reliable, ADH-Facing organizations that manage or conduct T&E activity may wish to consider adopting the processes described in this Regulation.
9. **RPAS categorization** ►⁹◀. RPAS T&E activity may warrant a different RPAS ► categorization ◀ to the eventual, envisaged or in-use RPAS categorization. The scope of any T&E activity will be considered during the ► RPAS ◀ categorization process. ► Where the proposed T&E activity is outside the scope of an extant MAA RPAS LEC, a new RPAS Categorization Submission and corresponding LEC will be required. ◀

⁶ ► This explicitly includes the requirement for a RPAS DH / RPAS AM for T&E activities on Sub 250 g RPAS operating in the Open Category. Refer to RA 1601, RA 1602, RA 1603 and RA 1604 for the responsibilities of the RPAS DH / RPAS AM and supporting appropriate persons.

⁷ For Open Category and Specific S1 sub-category RPAS this would normally be achieved through endorsement of the manufacturer by the Defence Equipment and Support (DE&S) Unmanned Air System Team (UAST) Type Airworthiness Authority (TAA); refer to RA 1601, RA 1602, RA 1603 and RA 1604. This RA 2370 derogation allows the RPAS DH / RPAS AM to ensure the basic Airworthiness of an RPAS in the early stages of experimentation and development via another route, appropriate to the context of the Air System and T&E activity to be undertaken.

⁸ Refer to RA 1161 – Military Registration of Air Systems Operating within the Defence Air Environment.

⁹ Refer to RA 1600 – Remotely Piloted Air Systems. ◀

**Regulation
2370(2)**

Test and Evaluation Personnel

2370(2) T&E activity **shall** only be designed, planned, supervised and conducted by SQEP.

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10. ADH, ►RPAS DH, ◀ AM(MF), ►or RPAS AM ◀ **should** detail in orders the T&E competencies required of those designing, supervising and conducting T&E across the T&E categories. These T&E competencies **should** meet or exceed the minimum qualification requirements⁵ and include appropriate experience in the following:

- a. Test programme management, risk management and T&E governance.
- b. The planning, conduct and reporting of T&E activity.
- c. The intended functionality of the Air System and / or the system under test.
- d. The application of relevant test techniques.

11. ADH, ►RPAS DH, ◀ AM(MF), ►or RPAS AM ◀ **should** record evidence of T&E competencies (including training, qualifications, and experience) and T&E currency.

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12. Nil.

**Regulation
2370(3)**

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2370(3) ADH, ►RPAS DH, ◀ AM(MF), ►or RPAS AM ◀ **shall** issue orders detailing the governance, categorization, planning, conduct and reporting of T&E activity.

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13. **T&E categorization.** ADH, ►RPAS DH, ◀ AM(MF), ►or RPAS AM ◀ **should** categorize T&E activity as follows:

- a. **Cat 1.** Experimental / Developmental T&E.
- b. **Cat 2.** Flight Safety-critical T&E.
- c. **Cat 3.** Production T&E.
- d. **Cat 4.** Non-Flight Safety-critical T&E.
- e. **Cat 5.** Operational T&E.

14. **T&E documentation.** ADH, ►RPAS DH, ◀ AM(MF), ►or RPAS AM ◀ **should** detail in orders the processes for determining:

- a. T&E objectives.
- b. Hazard identification and risk management processes specific to T&E.
- c. Test plans, flight test cards, post-flight reports and trial reports.
- d. Ground, simulator and air trials specific training.
- e. Specific currency requirements for the T&E activity.
- f. Additional / specific safety and survival training requirements.
- g. Any T&E specific procedures for engineering and flight line personnel.
- h. SQEP to approve, supervise, plan and conduct T&E activity.
- i. SQEP to author and release trials reports.

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15. **Determination of T&E objectives.** When formulating test plans containing the T&E objectives, ADH, ►RPAS DH, ◀ AM(MF), ►or RPAS AM ◀ may refer to the Integrated Test and Evaluation Acceptance Plan.

16. **Categorizing T&E activity.** Advice for Contractor Flying Approved Organization Scheme (CFAOS) and MOD units and organizations is available from ►the ◀ Air ►and Space ◀ Warfare Centre (►ASWC ◀) or the Maritime Warfare Centre.

17. **T&E categories.** The following provides guidance for determining the category of T&E Activity:

- a. **Cat 1. Experimental / Developmental T&E.** T&E that expands the flight envelope, extends the flight limitations or develops the handling techniques of an Air System. This entails operations outside, or to the limits of, existing temporary or proposed airworthiness and flight limitations of the Air System. It may include, but is not exclusive to, assessment of:
 - (1) Initial flight or significantly modified Air Systems.
 - (2) Changes in flight characteristics or flight envelope definition or expansion.
 - (3) Novel or unusual design, features or techniques.
 - (4) Changes to handling qualities of an Air System that might include changes to visual references, flight instruments and symbology, flying controls, flying control systems, Air System performance, external stores and weapons carriage / release / jettison and underslung loads.
- b. **Cat 2. Flight Safety-critical T&E.** T&E that is conducted on a production standard Air System that provides evidence for an airworthiness clearance of Flight Safety-critical systems. This will entail operating to the limits of existing, temporary or proposed airworthiness and flight limitations of the Air System. It may include, but is not exclusive to, assessment of:
 - (1) Communications systems.
 - (2) Navigation systems.
 - (3) Sensors that affect Flight Safety.
 - (4) Weapon integration.
 - (5) Collision avoidance systems.
 - (6) Secondary role systems.
- c. **Cat 3. Production T&E.** This may be referred to as post-manufacture test flying or post-factory flight test. This activity assures the production standard of a newly built Air System and / or associated systems that have been newly installed; this activity is not Maintenance test flying. ►Production T&E may not be required for all RPAS, particularly those of smaller physical attributes and / or complexity. ◀
- d. **Cat 4. Non-Flight Safety-critical T&E.** Assessment of new systems or software whose operation ►is not considered Flight Safety-critical ◀, but which requires T&E activity for clearance. Flying conducted by an Air System to facilitate the testing of a system with which it would not normally be fitted in order to assess that system in the airborne environment. It may include, but is not exclusive to, assessment of:
 - (1) New cabin installations.
 - (2) Passenger radio systems.
 - (3) Mission system software.
 - (4) Aircrew Equipment Assemblies.

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e. **Cat 5. Operational T&E.** T&E aimed at determining the performance or effectiveness of an Air System's non-Flight Safety-critical systems / software and developing or ensuring the validity of tactics, techniques and procedures of the Air System and associated doctrine, ►where they affect the ASSC.◄ It is normally carried out within the limits of existing or temporary Airworthiness limitations of the Air System. It may include, but is not exclusive to, assessment or development of the following:

- (1) Tactics, Techniques and Procedures. ►◄
- (2) Weapon effectiveness.
- (3) The operational employment of mission systems.

18. **Trials supervisors.** Trial supervisors are responsible to the endorsed ADH, ►RPAS DH,◄ AM(MF), ►or RPAS AM◄ for ensuring that T&E Activity is carried out safely iaw the direction of the T&E Approvals Board. They are not required to be flying supervisors or authorisers.

► This Annex has been substantially re-written; for clarity no change marks are presented - please read Annex in entirety ◀

ANNEX A T&E QUALIFICATIONS

1. The T&E qualifications used in Annexes B and C are defined below:

Qualification	Description
Class A Test Pilot (TP)	Long Course Test Pilot graduate of Empire Test Pilot School (ETPS), United States Navy Test Pilot School (USNTPS), United States Air Force Test Pilot School (USAF TPS), L'Ecole du Personnel Navigant d'Essais et de Reception (EPNER) or an equivalent course that is approved and assured by ASWC on behalf of the Air T&E ADH or AM(MF).
Class B TP	Short Course Test Pilot graduate of ETPS or EPNER or an equivalent course that is approved and assured by ASWC on behalf of the Air T&E ADH or AM(MF).
Class A Flight Test Engineer (FTE)	Long Course Flight Test Engineer graduate of ETPS, USNTPS, USAF TPS, EPNER or an equivalent course that is approved and assured by ASWC on behalf of the Air T&E ADH or AM(MF).
Class B FTE	Short Course Flight Test Engineer graduate of ETPS or EPNER or an equivalent course that is approved and assured by ASWC on behalf of the Air T&E ADH or AM(MF).
Qualified AeroSystems (QAS)	Graduate of the ASWC AeroSystems Course or an equivalent course that is approved and assured by ASWC on behalf of the Air T&E ADH, RPAS DH, AM(MF) or RPAS AM.
Evaluator Aircrew (EA)	Aircrew who have successfully completed a dedicated training course that includes the competencies listed at paragraph 10 and who are deemed SQEP and are authorised to participate in T&E by the ADH, RPAS DH, AM(MF) or RPAS AM.
Production Pilot	Aircrew approved as SQEP, competent and endorsed by the ADH, RPAS DH, AM(MF) or RPAS AM to conduct Production T&E.

2. **Hierarchy.** For the purposes of Annexes B and C, when determining SQEP minima the qualification hierarchy is (in descending order): Class A TP / FTE, Class B TP / FTE, QAS, EA and Production Pilot.

ANNEX B

T&E CATEGORIES AND MINIMUM QUALIFICATION REQUIREMENTS FOR MANNED AIR SYSTEMS

T&E Category	T&E Activity Description	Minimum DDH ▶, AM(MF)◀ or CFAOS Post Holder Qualification	T&E Approval Board Qualification (Minimum one per Approval Board)	Trial Supervisor Qualification	Aircrew Qualification (Minimum one per Air System Crew)
CAT 1	Experimental / Developmental T&E	Class A ▶TP◀ / ▶Class A FTE◀	Class A TP / ▶Class A◀ FTE	Class A TP / ▶Class A◀ FTE	Class A TP
CAT 2	Flight Safety-critical T&E	Class B TP / ▶Class B◀ FTE	Class B TP / ▶Class B◀ FTE	Class B TP / ▶Class B◀ FTE	If pilot workload or HMI assessment required: Class B TP. For all else: ▶EA◀
CAT 3	Production T&E	N/A	N/A	N/A	Production Pilot
CAT 4	Non-Flight Safety-critical T&E	Nil	Class B TP / ▶Class B◀ FTE	EA	EA
CAT 5	Operational T&E	Nil	▶QAS◀	EA	EA



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ANNEX C

T&E CATEGORIES AND MINIMUM QUALIFICATION REQUIREMENTS FOR RPAS

Table 1. RPAS operating in the Certified Category.

T&E Category	T&E Activity Description	Minimum DDH, AM(MF) or CFAOS Post Holder Qualification	T&E Approval Board Qualification (Minimum one per Approval Board)	Trial Supervisor Qualification	Aircrew Qualification (Minimum one per Air System Crew)
CAT 1	Experimental / Developmental T&E	Class A TP / Class A FTE	Class A TP / Class A FTE	Class A TP / Class A FTE	Class A TP
CAT 2	Flight Safety-critical T&E	Class B TP / Class B FTE	Class B TP / Class B FTE	Class B TP / Class B FTE ¹	If aircrew workload or HMI assessment required: Class B TP ¹ . For all else: EA
CAT 3	Production T&E	N/A	N/A	N/A	Production Pilot
CAT 4	Non-Flight Safety-critical T&E	Nil	Class B TP / Class B FTE	EA	EA
CAT 5	Operational T&E	Nil	QAS	EA	EA

Note:

1. Where appropriate for the nature of the T&E activity being conducted, the T&E Approval Board may approve lesser qualification requirements for the Trials Supervisor (but not below QAS) and Aircrew (but not below EA) on Cat 2 trials. The argument for using this clause **should** be articulated within the ASSC and the T&E Approval Board **should** notify the MAA with a summary of the decision at least 14 days prior to the T&E activity commencing. Contact: DSA-MAA-OpAssure-TEST-DepHd@mod.gov.uk, copied to DSA-MAA-OA-ACC@mod.gov.uk.

Table 2. RPAS operating in the Specific S2 sub-category.

T&E Category	T&E Activity Description	Minimum DDH, AM(MF) or CFAOS Post Holder Qualification	T&E Approval Board Qualification (Minimum one per Approval Board)	Trial Supervisor Qualification	Aircrew Qualification (Minimum one per Air System Crew)
CAT 1	Experimental / Developmental T&E	Nil	Class B TP / Class B FTE	Class B TP / Class B FTE ¹	Class B TP ¹
CAT 2	Flight Safety-critical T&E	Nil	Class B TP / Class B FTE	Class B TP / Class B FTE ¹	If aircrew workload or HMI assessment required: Class B TP ¹ . For all else: EA
CAT 3	Production T&E	N/A	N/A	N/A	Production Pilot
CAT 4	Non-Flight Safety-critical T&E	Nil	Class B TP / Class B FTE	EA	EA
CAT 5	Operational T&E	Nil	QAS	EA	EA

Note:

1. Where appropriate for the nature of the T&E activity being conducted, the T&E Approval Board may approve lesser qualification requirements for the Trials Supervisor (but not below QAS) and Aircrew (but not below EA) on Cat 1 and Cat 2 trials. The argument for using this clause **should** be articulated within the ASSC and the T&E Approval Board **should** notify the MAA with a summary of the decision at least 14 days prior to the T&E activity commencing. Contact: DSA-MAA-OpAssure-TEST-DepHd@mod.gov.uk, copied to DSA-MAA-OA-ACC@mod.gov.uk.

Table 3. RPAS operating in the Specific S1 sub-category.

T&E Category	T&E Activity Description	Minimum RPAS DH / RPAS AM or CFAOS(BR) Post Holder Qualification	T&E Approval Board Qualification (Minimum one per Approval Board)	Trial Supervisor Qualification	Remote Pilot (RP) Qualification (Minimum one per Air System Crew)
CAT 1	Experimental / Developmental T&E	Nil	QAS	QAS	EA
CAT 2	Flight Safety-critical T&E	Nil	QAS	QAS	EA
CAT 3	Production T&E	N/A	N/A	N/A	Production Pilot
CAT 4	None-Flight Safety-critical T&E	Nil	QAS	EA	EA ¹
CAT 5	Operational T&E	Nil	QAS	EA	EA ¹

Note:

- For Cat 4 and Cat 5 T&E, the minimum T&E qualification may be held by another individual, other than the RP, who is directly supporting the RP in the operation of the RPAS. The T&E qualified individual **should** be empowered to influence the conduct of the T&E activity, whilst recognising the authority of the RP, akin to a crew member on a manned Air System or a multi-crew RPAS.

Table 4. RPAS operating in the Open Category.

T&E Category	T&E Activity Description	Minimum RPAS DH / RPAS AM or CFAOS(BR) Post Holder Qualification	T&E Approval Board Qualification (Minimum one per Approval Board)	Trial Supervisor Qualification	RP Qualification (Minimum one per Air System Crew)
CAT 1	Experimental / Developmental T&E	Nil	QAS	EA	EA
CAT 2	Flight Safety-critical T&E	Nil	QAS	EA	EA
CAT 3	Production T&E	N/A	N/A	N/A	Production Pilot
CAT 4	Non-Flight Safety-critical T&E	Nil	QAS	EA	EA ¹
CAT 5	Operational T&E	Nil	QAS	EA	EA ¹

Note:

- For Cat 4 and Cat 5 T&E, the minimum T&E qualification may be held by another individual, other than the RP, who is directly supporting the RP in the operation of the RPAS. The T&E qualified individual **should** be empowered to influence the conduct of the T&E activity, whilst recognising the authority of the RP, akin to a crew member on a manned Air System or a multi-crew RPAS.

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