

PART 1.6
RECOMMENDATIONS

PART 1.6 – RECOMMENDATIONS

1. **Deconfliction.** Measures should be identified and implemented to deconflict flights from all EFT/UAS/AEF units based on unit activity¹, tasking, ATS availability, local flying area and period of operations². A range of sensible and flexible procedures to at least reduce the risk, especially from 'in-house' threats, should be implemented. Specific to MOD St Athan, the following measures should be considered:
 - a. Review the MOD St Athan VFR departure and arrival procedures and consider the advantage of monitoring the Cardiff Approach frequency whilst in the Local Flying Area to enhance Situational Awareness and, if practicable, receive an ATS.
 - b. Make increased use of the radio to enhance Mental Air Picture on the location and intention of unit traffic.
 - c. Increase UWAS AEF sortie duration to make more airspace accessible.
2. **Collision Warning System.** The Panel concluded that a collision warning system would make the single greatest contribution towards preventing collisions, providing a far greater degree of protection than visual lookout alone can afford, especially between uncoordinated, third-party aircraft. Consideration should be given to fitting a suitable system to the RAF Tutor aircraft as a priority.
3. **NOTAM.** AEF flying should be the subject of a NOTAM designed to warn the General Aviation community of the high activity levels and encourage them to avoid the most heavily used areas or at least establish radio contact with the local unit.
4. **Tutor FoV.** Improvements to the Tutor FoV should be pursued:
 - a. The Tutor canopy frame and handle should be modified to introduce a less intrusive design.
 - b. A 'go-forward' facility should be introduced to the Tutor aircraft seat harness to permit a greater range of in-cockpit movement.
5. **Tutor conspicuity.** A review of the previous Tutor conspicuity options and future alternative colour schemes to enhance Tutor visual conspicuity be undertaken to determine what measures are technically possible and practicable.
6. **Future aircraft cockpit design.** The hazard presented by obstructions to the pilot's FoV should receive greater recognition when designing or procuring future RAF aircraft. Despite the advantages of Commercial Off-The-Shelf Solutions (COTS), the potential to resolve deficiencies within extant cockpit configurations should be explored.

¹ Limitations associated with deconfliction measures may prove unworkable for some activities but should not be discounted for other activities where the limitation may be acceptable.

² For example, weekend measures may not be suitable for weekdays and vice versa.

7. **RAF lookout training.** A full review of RAF lookout training should be conducted, to ensure that comprehensive theory and consistent practical training is provided.

a. Training should include greater awareness of all of the fundamental limitations of the human visual system, including exposure to the decreased probability of detecting targets with only one eye and the tendency for lookout scans to neglect the edge of the available Field of View.

b. Where techniques exist to overcome the limitations of the human visual system, training should include practical exposure to them.

c. **Cockpit obscuration mapping.** RAF aircraft, especially those that predominantly operate under VFR, should have a cockpit obscuration map or a formal assessment of obscuration conducted, to establish the extent of cockpit obscuration. For most aircraft this only appears to happen after an accident.

i. Cockpit obscuration data should be used to determine definitively how lookout scans need to be adjusted to clear blind spots fully and methodically.

ii. The effect of eye-dominance upon the limitations imposed by obscuration, specifically any potential for limitations to be imperceptible, should be investigated.

d. **EFT lookout.** The lookout technique taught to UAS/AEF and EFT staff and students should be subject to review with the aim of establishing the most effective scan pattern to reduce the probability of mid-air collision. The conclusions should be widely disseminated to ensure that all RAF pilots are apprised of the findings, especially when transferring to training appointments.

e. **Reliance upon See and Avoid.** Lookout training should emphasise the importance of minimising reliance upon visual lookout as a means to maintain aircraft separation. When alternate options are available and practical then they should be exploited.

8. **Vision Correction.** Contact lenses correct vision more effectively than Corrective Flying Spectacles and do not place limitations upon the corrected FoV. The policy for provision of contact lenses for aircrew, especially those that routinely operate predominantly under VFR, should be reviewed.

9. **Survival Training.** RAF Tutor egress training should be reviewed.

a. Egress training for all Tutor pilots should reinforce the motor actions required to jettison the Tutor canopy and exit the cockpit.

b. The location and design of the Tutor parachute handle should be reviewed to ensure that the handle can be easily located. It should also provide tactile recognition to enable it to be securely grasped and operated in freefall conditions.

c. Parachute training for all Tutor pilots should reinforce the motor actions required to locate and operate the parachute handle.

d. Egress training for Tutor AEF cadets should reinforce the motor actions required to abandon a Tutor and thereafter locate and operate the parachute handle.

e. The Tutor Safety Brief Video should be reviewed to ensure that it provides comprehensive and current information.

f. Consideration should be given to gaining assurance that cadets are physically capable of completing an abandon aircraft drill.

10. **Tutor flight data capture.** Measures should be implemented to enhance the investigation of accidents and incidents involving RAF Tutor aircraft.

a. RAF Tutor aircraft should be fitted with an ADR facility.

b. RAF Tutor aircraft should be fitted with a CVR facility.

c. A review should be conducted of the functional use and location of the Tutor DGPS ground station facility at all UAS/AEF/EFT units, to include a feasibility study of incorporating a ground station data recording facility.

11. **Orders and Instructions.** TGO(E) and VTAE fitting instructions relating to the fitting of LSJs and EB 85/2 parachutes should be aligned and the definitive information promulgated to all users.

12. **Work Instructions.** The procedures for cadet briefing and handling by VT SE personnel should be incorporated in TORs, Job profiles or Work Instructions.

13. **ELT.** The ELT and associated systems fitted to the Tutor should be reviewed to ensure that it is fit for purpose and will activate and thereafter continue to provide a full emergency distress signal in the event of a catastrophic event.

14. **HF advice to SIP.** The requirement for and provision of aviation HF advice should be reviewed to ensure that more robust arrangements are in place to ensure that SIPs have assured access to this valuable resource. Better administrative support (to derive more efficient use of specialist skills) and access to an additional aviation psychologist (establishing resilience) should be considered.

15. **AAIB Liaison.** Consideration should be given to establishing a formal programme of routine liaison with the AAIB, especially at more senior levels, in order to facilitate cooperation over future investigations.