UNITED KINGDOM CIVIL AIR DISPLAY REVIEW 1996

1 INTRODUCTION

1.1 The Civil Air Display Review Group, comprised of members from the Civil Aviation Authority and Industry (see Appendix 1), was set up partly as a response to the regrettable number of accidents that occurred during 1996 and partly because it had been some time since there had been a detailed review of display procedures.

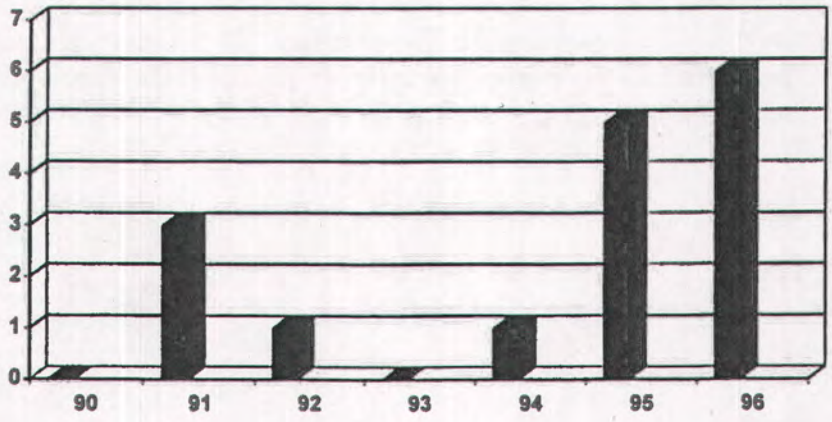
1.2 The Group was tasked with studying the safety record of United Kingdom civil air displays since 1 January 1990, in particular, the regulations and procedures governing the organisation and conduct of displays, the approval of display pilots and the operation of display aircraft with reference to the safety of spectators, display pilots, crews and other third parties.

1.3 The Group were further tasked with identifying and recommending any improvements that could be made to the applicable regulations/CAPs[1] (see Appendix 2) to further enhance air display safety.

2 BACKGROUND

2.1 The Group compiled a list of display related occurrences to include those air display accidents/incidents involving United Kingdom and foreign registered aircraft; those that were display practice related; demonstration flights and those involving airspace infringements that were display related (see Appendix 3). The number of accidents occurring at flying displays/practices showed a significant increase during the 1995 and 1996 display seasons, see below:

Number of accidents occurring at flying displays/practices



[1] Civil Aviation Publication

2.2 During initial debate on the possible reasons for the recent increase in the number of accidents, the Group identified a number of areas worthy of further investigation. It was not possible to debate a number of the 1996 accidents in detail as they were still under investigation by the AAIB[2]. Recommendations resulting from the AAIB investigations would be dealt with by the Authority as and when they were released.

3 AREAS FOR INVESTIGATION

3.1 The Group identified the following areas for detailed investigation/comment:

- Display Authorisation Evaluators
- Display Authorisation
- Formation Flying/Tail Chases
- Exhibition Organiser/Display Co-ordinator
- Aerobatics
- Asymmetric Flight
- Handling Classification
- Low Fly-bys
- Airshow Separation Distances
- Aerodromes located in or near congested areas/motorways
- Air Traffic Control
- Availability of Flight Planning Information
- Airspace Infringements
- Maintenance Procedures
- Safety Monitoring
- Disciplinary Procedures
- Confidential Reporting
- Spinning
- Carriage of passengers on board display aircraft
- Training on Permit-to-Fly aircraft
- Hazardous Material

3.2 Display Authorisation Evaluators

3.2.1 The provisional DAE[3] list for 1997 comprised 10 balloon DAEs and 53 aircraft DAEs. The aircraft DAEs were made up of 16 specialists, 4 European and 33 general DAEs. The 16 specialist DAEs were as follows:

Paragliders	1	Gyroplanes	1	Gliders	3
Helicopters (SE[4])	3	Helicopters (ME[5])	1	Microlights	1
Specific aircraft types (Catalina/B17/Canberra)			3		
Company/Commercial types (BAe146/BN2)			3		

The number of DAEs was considered appropriate for the approximately 250 DAs[6] issued annually.

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[2] Air Accidents Investigation Branch
[3] Display Authorisation Evaluator
[4] Single engine
[5] Multi-engine
[6] Display Authorisation

3.2.2 DAEs should inform new DA applicants that they must obtain an appropriate application form/application number from the Authority before a test could be conducted. It appeared that feedback to the Authority by DAEs on failed DA candidates was negligible and it was concluded that there was a need for more formal feedback to the Authority on those candidates. The existing text in CAP 403[7] quite clearly stated that completed CA 2199s[8] should be submitted by the DAE, to the Authority, irrespective of whether a candidate had passed or failed. During continued debate it became clear that a number of DAEs were unfamiliar with the contents of the latest edition of CAP 403 and it was agreed that each DAE should immediately receive a copy of the latest edition and that complimentary copies should be sent to all DAEs following any future amendment action.

3.2.3 The need for standardisation of DAEs was debated at some length, however, the Group concluded that the annual DAE symposium was a satisfactory means of addressing the standardisation issue.

3.2.4 The CAP 403 Appendix G guidelines addressing Display Competency Demonstrations were considered adequate, however, the Group considered that a briefing/checklist sheet for use by DAEs would be a useful addition.

3.2.5 The Group considered that there was a need for DAEs to be more vigilant during the display season and to take a more pro-active role in ensuring that individual DA display standards were maintained. Any perceived fall off in display standards should in the first instance be discussed with the individual concerned and corrective actions proposed. Secondly, the DAE should report the incident to the Authority where appropriate.

3.3 **Display Authorisation**

3.3.1 There was general consensus that the initial issue of a DA should be subject to tight control so as to dispel any suggestion of gratuitous approval and that the required demonstration display should be conducted using actual display heights as required by CAP 403.

3.3.2 It was thought that DA renewals were too easily achieved and that the existing practice of renewing DAs at the end of the season unwise when coupled with the 90 day recency requirement. It was also noted that some DAs had been renewed without the DAE witnessing a pre-notified display: CAP 403 text will be clarified to state that any observation of a display must be pre-notified. Certain organisations ran pre-season practice sessions for display pilots and it was considered that all DA holders should undertake some form of pre-season practice. It was concluded that CAP 403 Appendix G should be amended to contain the following:

- Recency requirement that three full display sequences have been flown or practised within 90 days of the display flight, with at least one display sequence flown or practised on the type or category of aircraft to be displayed;
- Recommendation that all DA holders conduct pre-season training.

[7] Flying Displays and Special Events: A Guide to Safety and Administrative Arrangements
[8] Display Pilot Authorisation Application

3.4 Formation Flying/Tail Chasing

3.4.1 A small number of very large formations had taken place during 1996 and it was thought that a significant number of the participants had been relatively inexperienced in formation flying. There was general agreement that there was a need to tighten the controls over participation in and leading of formations. The existing procedures were not considered to be adequate for those occasional large formations and it was thought that there was a need for formation approvals to be graded covering formation participation and section/formation leader. A similar philosophy should be adopted for Tail Chases with participation in a Tail Chase conditional on holding a formation approval. A minority of members considered that similar/dissimilar type formations should also be a factor considered in the approval. This view was not supported by the majority of members as it was considered an unnecessary complication. It was also agreed that any DAE granting a formation approval should have a minimum qualification of formation leader.

3.4.2 The Group agreed that the existing formation approval system should be revised so as to contain four levels of competence, namely:

- Close Formation member in up to four aircraft formations;
- Close Formation member in unlimited formations;
- Close Formation leader in up to four aircraft formations;
- Close Formation leader in unlimited formations.

3.4.3 The Group also agreed that participation in a Tail Chase should require an approval and that such an approval should be dependant on the applicant holding a basic Close Formation approval and limited to a section of four aircraft.

3.4.4 Once new proposals had been agreed existing formation approvals should be revoked and reissued in accordance with the new procedures. Any existing DA containing a formation approval would automatically qualify for the basic formation approval, ie participation as member of a four aircraft formation, however, higher level approvals would be dependant on experience.

3.5 Exhibition Organiser/Display Co-ordinator

3.5.1 The task of acting as an Exhibition Organiser/Display Co-ordinator was considered to be a fairly onerous task as far as large flying displays were concerned. The Group recommended that such persons should not actively fly during large displays (a large flying display was deemed to be one comprising 7 or more display items).

3.5.2 The FCC[9] was considered to be an important element of the larger display and it was thought that rather than mandate a FCC, suitable guidance material should be prepared for CAP 403 highlighting the perceived benefits. Furthermore, it was considered that any FCC should have at least one member with a current DA. There was also a need for the establishment of communication links between FCCs and the Authority such that the Authority could form an assessment of the success of FCCs in fulfilling their control function.

[9] Flying Control Committee

3.5.3 It was considered unwise that FCC members should participate in displays with the exception that where a specialist member was required to supervise a small number of display items, that particular member could be allowed to participate.

3.5.4 The Group identified a need for more guidance material for display organisers and it was noted that the Royal Air Force issued a booklet on this topic, ie 'RAF Flying Display Notes'. The Group agreed that a similar document would be useful for the civil air display community and the Authority offered to prepare such a document with the assistance of Group members.

3.6 **Aerobatics**

3.6.1 The recent spate of accidents involving so called 'heritage' aircraft had prompted a debate as to whether such aircraft should be restricted beyond the restrictions already applied by the Authority (eg Permit-to-Fly, Pilot's Notes etc). There was no accepted definition of the term 'heritage' although it was commonly interpreted as meaning an aged or rare example of an aircraft type. It was noted that an aircraft requiring an aerobatic approval had to be cleared for flight to +6g and -3g. Organisations operating so called 'heritage' aircraft, with an aerobatic approval, generally required such aircraft to be flown sympathetically, ie +g only and well within cleared limitations: there was no support for imposing any additional restrictions on 'heritage' aircraft.

3.6.2 The existing ANO[10] definition of an aerobatic manoeuvre is one which includes 'loops, spins, rolls, bunts, stall turns, inverted flying and any other similar manoeuvres'. There was considerable debate as to whether the ANO definition should be aligned with that of the FAA[11] to include turns using bank angles in excess of 60° and pitch angles in excess of 30°. The final consensus was that the ANO definition should not be changed but that CAP 403 should be amended to include additional guidance similar to that recently developed for CAP 632[12] as follows:

'Owners, operators, pilots and evaluators are encouraged to take into consideration the age, the rarity value and the need for continued preservation of the aircraft when imposing additional limitations. In general terms, these additional limitations placed on the aircraft should display a level of sympathetic appreciation of these factors whilst allowing the aircraft to be safely flown and, where appropriate, displayed.'

The point was made that restricting aircraft with an aerobatic clearance to a 'flat' show could prove more fatigue inducing, for both the aircraft and the pilot, than conventional full aerobatic displays and there was considered to be no justification for prohibiting aerobatic manoeuvres in an aircraft appropriately certificated.

3.6.3 Pilot's whose DA included an aerobatic approval were cleared to perform aerobatic manoeuvres to a specified base height. The DA might also include a fly-by height lower than the aerobatic manoeuvre base height. It was noted that it had become common practice for pilots to use their fly-by height in the middle of an aerobatic sequence, provided they had completed the aerobatic manoeuvre by the specified base

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[10] Air Navigation (No 2) Order 1995
[11] Federal Aviation Administration
[12] Arrangements for the Operation of Ex-Military Aircraft on the UK Register with a 'Permit-to-Fly'

height. There was some concern that such interpretation could lead to subsequent aerobatic manoeuvres being commenced from the wrong datum. It was noted that the IAT[13] Flying Regulations contained advice on vertical separation which addressed combining the aerobatic display height with the fly-by height as follows:

'All aerobatic manoeuvres, including inverted flypasts and manoeuvres which involve pulling through the vertical are to be executed above the approved aerobatic display height. Descent below the approved aerobatic display height to the fly-by height is permitted once certain of capturing the aerobatic display height. For the purpose of this paragraph, slow speed, high angle of attack flypasts are to be regarded as aerobatic manoeuvres.'

The Group agreed that the above text should be incorporated in CAP 403.

3.7 Asymmetric Flight

3.7.1 As far as multi-engine aircraft were concerned it was generally agreed that asymmetric flight should be prohibited during flying displays. There was also lengthy debate as to whether there should be a restriction imposed to prevent flight at speeds below V_{MCA}[14] during a display sequence along the lines of the recently imposed Direction Generale de l'Aviation Civile (France) restriction. The point was made that multi-engined aircraft were normally displayed at weights significantly below their certificated take-off weights and rarely required the use of higher power settings. It was agreed not to impose a ban on flight at speeds below V_{MCA} during a display and it was accepted that additional guidance in CAP 403 would be appropriate. Again the IAT Flying Regulations contained some useful text ie:

'A multi-engine aircraft should not be flown at a speed below that at which it is possible to safely climb away, without change of configuration, should any engine fail to respond to an acceleration demand.'

Comment was also made that on modern aircraft, in the event of an engine failure after take-off, the pilot is taught to apply full power to all remaining engines. This modern technique was not suited to many older generation aircraft with well known asymmetric handling problems where, in certain circumstances, a power reduction was necessary to achieve safe flight.

3.8 Handling Classification

3.8.1 It was noted that there were some historic and ex-military aircraft, with a Maximum Take-off Mass of <5700kg, with perceived difficult characteristics in terms of handling qualities, systems or performance, which could be operated under a 'class' rating. It was considered that any aircraft having perceived difficult characteristics should attract a separate type rating. The recent amendment to CAP 632 (applicable mass reduced to 2730kg), had partly resolved the problem, however, implementation of JAR-FCL[15] will further resolve this issue.

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[13] International Air Tattoo
[14] Minimum Control Speed, take-off climb
[15] Joint Aviation Requirements-Flight Crew Licensing

3.9 Low Fly-bys

3.9.1 The current minimum height permitted for a low fly-by was stated as being 30ft and there was general agreement that this was a sensible minimum height. The Group concluded that the additional guidance proposed in para 3.6.3 above also adequately addressed the low fly-by of aircraft with gear and/or flap lowered.

3.10 Airshow Separation Distances

3.10.1 The Group reviewed the July 1993 report of the Cranfield Aviation Safety Centre titled 'Airshow Separation Distances'. The report generally supported the contents of CAP 403 and recommended that additional paragraphs be inserted in CAP 403 alerting pilots and Display Organisers to the following:

- A high 'g' turn towards the crowd should be classed as an aerobatic manoeuvre;
- The effects of a strong on-crowd wind must be allowed for when planning the display and its execution.

3.10.2 The first bullet point comment was made in relation to an inflight aircraft break-up when performing a high 'g' turn onto the display line. Although in flight break-up, whether due to structural failure or collision, is a rare event the effects of such an event can be minimised by strict adherence to display heights and the display line. The concerns regarding on-crowd winds have already been addressed in CAP 632 with the following text:

'**Display Awareness.** Pilots are to be aware of, and make due allowance for, any on-crowd wind component. Note that if flying towards the crowd, but inadvertently too close to turn safely, an early decision to terminate the manoeuvre and climb, even if this involves the final resort of overflying the crowd, is preferable to risking an overstress or departure from pulling too hard.'

The Group considered the above text adequately addressed the problem of the second bullet point and should be incorporated in CAP 403.

3.11 Aerodromes Located in or Near Congested Areas or Near Motorways

3.11.1 The Group considered the current arrangements for the vetting of applications and where necessary imposing limitations, prior to granting Article 61 permissions, to be adequate. However, a need for additional guidance in respect of minimum heights and the promulgation of avoidance areas within the flying display area, particularly those located outside the aerodrome perimeter, was considered advisable. Exhibition Organisers should also be reminded that the CAP 403 material addressing 'Public Enclosures and Car Parks' applied equally to parked aircraft and any other personnel not directly connected with aircraft operation.

3.12 Air Traffic Control

3.12.1 A number of separate issues were identified under this heading as worthy of debate, they were:

- availability of discreet squawks for aerobatic aircraft;
- availability of discreet frequencies for display aircraft;
- specialist training for controllers involved in display related activities;

- provision of an appropriate checklist for ATS[16] personnel;
- additional guidance in CAP 403.

3.12.2 Spare codes for discreet squawks were identified as being available, however, allocation might prove difficult. The Group were advised that the correct terminology was not 'discreet' but 'national conspicuity code'. The Group remained of the opinion that the allocation of a national conspicuity code would do much to enhance the safety of display aircraft.

3.12.3 As far as discreet radio frequencies were concerned allocation might prove difficult as there were only a few spare frequencies available. However, where such frequencies existed, ATS personnel should be encouraged to use them.

3.12.4 Specialist training for controllers could create difficulties with respect to controller licensing and the preferred approach would be for additional guidance material in addressing the final three bullet points. It was agreed that CAP 403 should mention that suitable guidance material could be obtained from ATSSD[17].

3.13 **Availability of Flight Planning Information**

3.13.1 It was noted that the 'Review of General Aviation Fatal Accidents - 1985-1994', published as CAP 667, had already recommended that 'A research project should be implemented to review availability, clarity and layout of all information necessary in the UK for safe and legal General Aviation flying'. The Group were advised that CEEFAX and the Internet had been identified as additional means by which display related flight planning information could be made available to the aviation community.

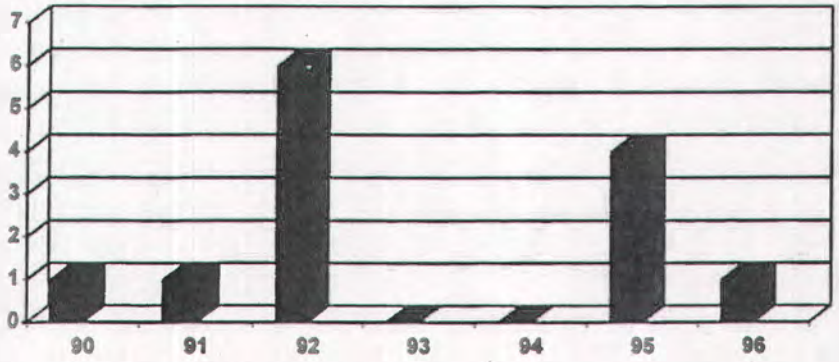
3.13.2 Contact had been made with CEEFAX and the advice obtained was that the system was under considerable pressure and that it was unlikely that extra pages could be introduced to accommodate additional demands.

3.13.3 The Internet was available and could offer a service that would provide the required information to the aviation community at a cost. The Group agreed that the report should contain a recommendation that the Authority investigate using the Internet as a means of disseminating display related information. The Group noted the FAA had already installed such a facility on the Internet which was available to all ATPL holders free of charge.

[16] Air Traffic Services
[17] Air Traffic Services Standards Department

3.14 Airspace Infringements

3.14.1 During the period of the report a total of 13 display related airspace infringements had been identified as follows:



The number of display related airspace infringements were not considered to be a serious threat to safety and it was concluded that actions resulting from the recently concluded 'Review of General Aviation Fatal Accidents - 1985-1994' and from para 3.11 should help in reducing the number of airspace infringements.

3.15 Maintenance Procedures

3.15.1 Many of the older aircraft involved in display flying faced potential fatigue problems: the Group were advised that the Authority had reminded Regional Offices to include aircraft operating on Permits-to-Fly in the aircraft monitoring scheme. The recent import of numerous foreign military aircraft raised the question of the available expertise in BCAR A8-20[18] approved organisations to deal with such aircraft, in particular, the turbine powered aircraft. The Group were advised that A8-20 was in the process of being re-written, would include a requirement for a Quality System and make the existing Airworthiness Information Leaflet No 70 redundant.

3.15.2 It was noted that some Permit aircraft were maintained to LAMS[19] and it was considered that these aircraft's Maintenance Schedules should be reviewed and updated where necessary in Sections 10 and 11 to reflect the manufacturer's and/or military Maintenance Schedule requirements.

3.16 Safety Monitoring

3.16.1 The Authority had conducted 37 display inspections during 1996 and it was intended to maintain that level of inspection for the 1997 season. The Group felt that the current level of inspection was adequate although it was noted that Inspectors were seldom seen at the smaller single item displays. Several inspections are made each year on a random selection of smaller displays. Furthermore, with the establishment of the ADC[20] and a proposed plan of supervisory visits by them of smaller display events, it is considered that an acceptable level of safety monitoring in this regard will occur.

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[18] British Civil Airworthiness Requirements - Airworthiness and Maintenance Requirements
[19] Light Aircraft Maintenance Schedule
[20] Air Display Council

3.16.2 In addition to the inspection procedures detailed above the Group noted that earlier debate had supported the use of Flying Control Committees and had recommended, at para 3.2.5, that DAEs take a more pro-active role in monitoring display flying.

3.17 Disciplinary Procedures

3.17.1 The existing formal disciplinary procedure for display pilots appeared to work well although a recently completed Historic Aircraft Association questionnaire had revealed a perception that the existing procedures were not always applied fairly. Internal Authority procedures gave clear instructions to Inspectors as to the manner in which they should conduct inspections and enforce disciplinary procedures. The Group members had been given sight of the Authority's disciplinary procedures and external members complimented the Authority on the content.

3.18 Confidential Reporting

3.18.1 The Authority indicated that they were currently discussing the catchment area for CHIRP[21] reports with a view to expanding the system to include, among other things, air display activity. The Group fully supported the inclusion of display flying in the CHIRP system.

3.19 Spinning

3.19.1 It was noted that the current PPL(A)[22] syllabus, based on the AOPA[23] recommendations, still contained spin training, however, it was not a mandatory item for PPL(A) issue. Spin training was a mandatory item for Flying Instructor courses as well as BCPL(A)[24], CPL(A)[25] and ATPL(A)[26] approved courses. It was possible that the younger generation of non-military pilots might never have experienced a spin. An addendum to CAP 403, issued in January 1996, had contained additional guidance/requirements for spin training and spin departure awareness. The Group also considered that there was a need for display pilots to be aware of the need to specify a recovery height, taking account of the entry height, number of turns and recovery characteristics, when spins were included in a display sequence. The Group concluded that additional material be developed for CAP 403 addressing this issue.

3.20 Carriage of Passengers on Board Display Aircraft

3.20.1 Some members of the Group considered the existing text in CAP 403, addressing the carriage of persons on board display aircraft, should be reviewed. There was a feeling that only those persons required for the operation of the aircraft, in the air, should be permitted on board during a flying display. Whilst acknowledging the convenience of carrying groundcrew to facilitate a speedy departure for further displays on the same day, the general consensus was that it was unfair to expose those non-required

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[21] Confidential Human Factors Incident Reporting Programme
[22] Private Pilot's Licence (Aeroplanes)
[23] Aircraft Owners and Pilots Association
[24] Basic Commercial Pilot's Licence (Aeroplanes)
[25] Commercial Pilot's Licence (Aeroplanes)
[26] Airline Transport Pilot's Licence (Aeroplanes)

personnel to the additional risks associated with display flying. The Group recommended that the existing text in CAP 403 be revised such that a written approval would be required to carry persons, during a flying display, in addition to the minimum crew specified in the aircraft documentation (Permit-to-Fly, Pilot's Notes etc).

3.21 **Training on Permit-to-Fly aircraft**

3.21.1 The Group were appraised of the problems associated with the training of pilots to fly Permit-to-Fly aircraft. The Group were advised that this subject was currently being debated within the Authority as a separate item and should remain outside the terms of reference of this Group.

3.22 **Hazardous Material**

3.22.1 The Group were advised of the increasing use of man-made mineral fibres such as carbon fibre composites in the manufacture of modern aircraft. Such materials, although harmless in their normal state, might change state when exposed to the forces and intense heat produced in an aircraft crash and pose a serious hazard to personnel in the near vicinity of the incident. The Group were further advised that the Authority and the HSE[27] were studying the problem and that ASD[28] would be issuing appropriate guidance to licensed aerodromes later this year. The Group considered that CAP 403 should make reference to this topic to ensure that the information was available to unlicensed aerodromes and organisations involved in air display activity.

4 CONCLUSIONS

4.1 The Group identified a number of areas where the interface between DAEs and the Authority could be improved. There was a need for the DAE to be made aware of the latest requirements governing the issuance of DAs and a need to increase vigilance beyond the initial issue of an authorisation.

4.2 The DA recency requirements were considered inadequate and the report contains a recommendation that additional practices be required to maintain a 90 day recency.

4.3 The Group thought that the existing requirements governing formation flying did not adequately address participation in the larger formations and considered that the existing formation approvals should be revised. The Group also considered that participation in a Tail Chase should attract a separate approval that should be dependant upon the applicant holding a basic formation approval.

4.4 A number of areas were identified where additional guidance material should be developed for CAP 403 covering such topics as operation of heritage aircraft, airshow separation distances, spin recovery heights etc.

4.5 A number of areas were also identified where additional ATS facilities could help improve the safe operation of display aircraft, ie a national conspicuity code, discreet radio frequencies and better dissemination of display related information.

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[27] Health and Safety Executive
[28] Aerodrome Standards Department

4.6 The Group were aware that there were occasions when persons, not essential to the operation of an aircraft, had been carried during flying displays: the Group were of the opinion that this practice should be prohibited.

5 RECOMMENDATIONS

5.1 Having completed its work the Group made the following recommendations:

a) DAEs to inform new DA applicants that they must obtain an appropriate application form/application number from the Authority before a test (3.2.2);

b) DAEs to ensure that completed Forms 2199 are returned to the Authority irrespective of whether a candidate has passed or failed (3.2.2);

c) DAEs be sent the latest edition of CAP 403 and receive a complimentary copy at each revision (3.2.2);

d) Briefing/checklist for DAEs should be developed for inclusion in Appendix G to CAP 403 (3.2.4);

e) DAEs should take a more pro-active role in ensuring that individual display standards are maintained and report incidents to the Authority (3.2.5);

f) DA recency requirement be amended to three full display sequences flown or practised with at least one display sequence flown or practised on the type or category of aircraft to be displayed in the previous 90 days (3.3.2);

g) The existing formation approval system should be revoked and reissued in accordance with the following levels of competence (3.4.2):

(i) Close Formation member in up to four aircraft formations;
(ii) Close Formation member in unlimited formations;
(iii) Close Formation leader in up to four aircraft formations;
(iv) Close Formation leader in unlimited formations.

h) A Tail Chase approval should be introduced which would be conditional on holding a Close Formation member approval (3.4.3);

i) Exhibition Organisers/Display Co-ordinators of flying displays, comprising 7 or more items, should be discouraged from actively participating in the flying display (3.5.1);

j) Suitable guidance material for CAP 403 should be developed:

(i) highlighting the advantages of a Flying Control Committee and that such committees, when used, should have at least one member with a current DA and have defined communication links with the Authority (3.5.2);

(ii) addressing the sympathetic operation of heritage aircraft (3.6.2);

(iii) addressing the use of the fly-by height during an aerobatic display (3.6.3);

(iv) containing a recommendation that all DA holders conduct pre-season training (3.3.2);

(v) addressing low speed display flying in multi-engine aircraft (3.7.1);

(vi) addressing airshow separation distances (3.10.1);

(vii) additional guidance addressing recovery height when spins are included in a display sequence (3.19.1);

(viii) additional guidance in respect of minimum heights and the promulgation of avoidance areas within the flying display area (3.11.1);

(ix) additional guidance for ATS personnel (3.12.4);

(x) indicate where unlicensed aerodromes/organisations could obtain information on post accident effects of hazardous materials (3.22.1);

k) The Authority should develop additional guidance material for the air display community along the lines of the RAF Flying Display Notes (3.5.4);

l) Aircraft having perceived difficult characteristics should attract a separate type rating (3.8.1);

m) A national conspicuity code (squawk) be allocated to aerobatic aircraft (3.12.2);

n) Discreet frequencies, monitored by ATS, be made available for display aircraft (3.12.3);

o) The Authority to investigate the use of the Internet as a means of disseminating display related information (3.13.3);

p) BCAR A8-20 should be revised and incorporate a Quality System (3.15.3);

q) LAMS schedules should be updated (3.15.2);

r) That CHIRP coverage be expanded to cover air display activity (3.18.1);

s) Carriage of persons other than those required to operate an aircraft in accordance with the aircraft documentation (Permit-to-Fly, Pilot's Notes etc) should have the written approval of the Authority (3.20.1).

MEMBERS OF THE CIVIL AIR DISPLAY REVIEW GROUP

Industry:

[redacted]

Civil Aviation Authority:

[redacted]

[redacted] General Aviation Department (Chairman)
[redacted] General Aviation Department (Secretary)
Aerodrome Standards Department
Flight Department
Flight Crew Licensing Department
Air Traffic Services Standards Department
Aircraft Maintenance Standards Department

APPLICABLE DOCUMENTATION:

CAP 53	The Private Pilot's Licence and Associated Ratings
CAP 54	Professional Pilots' Licences - A Guide to Licensing and Rating Requirements
CAP 403	Flying Displays and Special Events: A Guide to Safety and Administrative Arrangements
CAP 632	Arrangements for the Operation of Ex-Military Aircraft on the UK Register with a 'Permit-to Fly'
BCAR A8-20	Airworthiness and Maintenance Requirements
JAR/IL No 22	The Organisation and Conduct of Flying Displays

OCCURRENCE DATABASE - DISPLAY RELATED ITEMS

OCCUR No	Aircraft Type	Regn	COMMENT
[redacted]			

[1] Bold text indicates an accident occurring at a flying display or during a display practice