NOTICE OF PROPOSED AMENDMENT FOR DASR CHANGE PROPOSAL 001-2024 Revision 0

DASR SPA.30

AIR DISPLAYS

References:

A. DFSB ASIR: *Near Controlled Flight Into Terrain During Flying Display – C130J, A97-440, Sydney Harbour*, of 26 Jan 19 (BP52222213)

B. ASOR-CFS-003-2005: *Roulette Practice – Mid-Air Collision,* of 21 Jan 05

C. AAIB AAR: *Report on the accident to Hawker Hunter T7, G-BXFI near Shoreham Airport*, 22 Aug 15 (BP38859164) and accompanying *Safety Recommendation Document* (BP38864898)

D. DASR Interim Style Guide V1.1, of 6 Aug 2021 (BP18335994)

E. Email: B Collenette / M Masini, *SRG MAOC OpSpec – E-7A Flying Displays – Handling Notes*, of 20 Dec 23 (BP39417061)

F. Brief for DG DASA: *Proposed Amended Regulation Concept DASR SPA.30 'Flying Displays and Flypasts'*, of 15 May 24 (BP38898125)

INTRODUCTION

Applicability

1. This proposal is applicable to Military Air Operators (MAOs) and UAS Operators.

Purpose

2. The purpose of this NPA is to enable community input into the development of DASR SPA.30, ahead of its formal release in Feb 25, to address the:

a. relevant recommendations and findings from Refs A-C

b. principles of Ref D.

Background

3. DASA conducted a comprehensive review of DASR SPA.30 *Flying Display and Flypasts* and related OIP, as directed at Ref E, and following Class A and Class B events (Refs A-C refer). The review included benchmarking against equivalent Civil Aviation Authorities (CAA) and Military Aviation Authorities (MAA) regulations. The review concluded that Defence lacks sufficient regulation for the effective management of Aviation Safety risks associated with Flying Displays and Flypasts. Ref F provided DG DASA with a proposed amended regulation concept, to resolve concerns with the assurance of Defence Flying Displays and Flypasts.

4. This NPA forms part of the stakeholder consultation process.

Scope of proposed changes

5. This NPA proposes the amendment of DASR SPA.30 consistent with best practice. The proposed amended DASR SPA.30 is retitled to *Air Displays*[1], and incorporates:

a. additional Hazard controls, including:

   i. planning and approval requirements

   ii. supporting Risk Management (RM) requirements

   iii. considerations for UAS

   iv. *Display Crew* and *Air Display Director* selection criteria, training, Competency and Currency requirements

   v. requiring MAOs and UAS Operators to define *Air Display* manoeuvres and display sequences (including 'alternate' and 'special venue' shows)

   vi. requirements for the use of ground special effects during *Air Displays*.

b. additional supporting material

c. Regulated Community (RC) suggestions[2]

d. the principles of Ref D by:

   i. defining terms specific to the regulation

   ii. providing a standard structure to the Part, AMC and GM.

6. Additionally, the proposal incorporates an editorial change to the extant DASR SPA.05, replacing the phrase *Flying Display and Flypast* with *Air Displays*.

Benefits of proposed changes

7. The benefits of this proposal include:

a. improved regulatory clarity and risk considerations for the Hazards associated with *Air Displays*, leading to improved Aviation Safety

b. alignment to DASA-recognised CAA and MAA *Air Display* regulation benchmarks.

Effects of proposed changes

8. The proposed regulation increases regulated community compliance obligations through the implementation of *Air Display*-specific Hazard controls for:

a. Crew training, Competency and Currency requirements

b. *Air Display Director* training, Competency and Currency requirements

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1 Title changed to 'Air Displays' to align with CASA. *Air Displays* is defined as 'any event, or rehearsal for any event, at which Display Flying or Flypasts, are deliberately performed for the purpose of providing an exhibition of Defence Aviation's capabilities, values and professionalism'. The term 'Display Flying' replaces the extant term *Flying Display*; and the definitions for both *Display Flying and Flypasts* have been amended as part of this proposal.

2 Raised by RC and DASA staff during early consultation.

c. *Air Display* manoeuvres and standard display profiles

d. the use of ground special effects.

9. However, DASA does not foresee significant RC impediments to implementing the improved regulatory Hazard controls.

Proposed regulation

10. The proposed regulation is in Enc 1.

Implementation strategy

11. DASA will release the proposed regulation in Feb 25. DASA proposes a transition[3] timeframe of 12 months from DASR release.

HOW TO SUBMIT COMMENTS ON THIS NPA

Format

12. Record responses to this NPA on the NPA Response Sheet included in Annex A. Submit responses by email to dasa.fltops@defence.gov.au. Hardcopies are not required.

Timing

13. Please forward comments on NPA 2024-001 to DASA by close of business **20 Sep 24**.

Additional information

14. Additional information on this NPA is available from WGCDR Bruce Collenette, DD-FLTOPS (DAVNOPS-DASA), at bruce.collenette@defence.gov.au or (02) 5130 4757.

DISPOSITION OF RESPONSES RECEIVED

15. A Comment Response Document will be prepared and published on the DASA Website. DASA will not individually acknowledge or respond to comments or submissions.

Chris.Pouncey
Digitally signed by Chris.Pouncey
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DAVNOPS
Defence Aviation Safety Authority
Tel: (03) 5169 8204

Aug 24

Annex:
A. NPA for DCP 2024-001 Revision 0 – Response Sheet.

Enclosure:
1. NPA for DCP 2024-001 – Proposed DASR SPA.30.

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3 During transition DASA will not enforce compliance with the new regulation—allowing organisations time to implement new requirements.

NPA FOR DCP 2024-001 Revision 0 Response Sheet

DASR SPA.30

AIR DISPLAYS

Please forward this sheet as an email attachment to dasa.fltops@defence.gov.au **by 20 Sep 24. Response formats in MS Excel (preferred) and MS Word can be found at Obj No:** BP34901852 **and** BO3960659 respectively, or alternatively contact DASA.

Please indicate your acceptance or otherwise of this proposal by ticking the appropriate box below. Additional comments, suggested amendments or alternative action are welcome and may be provided on this response sheet or by separate correspondence.

[ ] The proposal is **acceptable without change**.

[ ] The proposal is **acceptable but would be improved if the following changes were made**:

[ ] The proposal is **not acceptable but would be acceptable if the following changes were made:**

LSN	NPA Reference: (i.e Regulation number, NPA paragraph etc)	Comment or suggested change	Explanation
1			
2			
3			
4			
5			

RESOURCE IMPLICATIONS

Please provide specific comment on any significant resource implications that this proposal may have for your organisation, for both its implementation and ongoing compliance. Your comments should address both financial and human resource considerations.

Resource implications – Proposal implementation	
Resource implications – Proposal sustainment	

RESPONDENT DETAILS

Your name:	
Submission date:	
Your organisation:	
Email address:	
Postal address:	
Phone:	
Whose views are represented in your response? **i.e. Is your response the authoritative response from your organisation?**	Responding on behalf of : Individual [ ] Regulated Military entity [ ] Regulated Commercial entity [ ] Wing HQ [ ] Group HQ [ ] ADF Regulatory, Technical or Logistics policy agency [ ] Other commercial entity [ ], Other [ ] Please describe:
Do you consent to your name being published as an NPA respondent within the NPA Summary of Responses:	YES [ ] NO [ ]

NPA 2024-001 REVISION 0

DASR SPA.30 FOR FEB 25 DASR RELEASE

'AIR DISPLAYS'

Contents

SECTION 1: AMENDMENTS TO THE DASP GLOSSARY AND ACRONYMS LIST

1. The following **new**, **modified** and **removed** definitions are proposed for the DASP Glossary:

Air Display* (new)

Any event, or rehearsal for any event, at which Display Flying or Flypasts, are deliberately performed for the purpose of providing an exhibition of Defence Aviation's capabilities, values and professionalism.

Crowd Line (removed)

Display Flying* (new)

A subset of an Air Display whereby the flying activity is designed to demonstrate an Aircraft's handling and operational capabilities, in the approved envelope for the Type, using a display sequence flown by specifically qualified display Flight Crew.

Flypast* (modified)

A subset of an Air Display whereby a flight of one or more Aircraft is tasked to pass over a specific location on a constant track and at a constant height at a specified time.

SECTION 2: AMENDMENTS TO DASR SPA.05

The following is an editorial amendment to SPA.05 *Flying Rules for Special Missions and Tasks (yellow highlight shows differences):*

Current SPA.05 *Flying Rules for Special Missions and Tasks*

(a) The MAO must ensure promulgation of OIP that addresses, where applicable, rules and requirements relating to:

1. flypasts and flying displays
2. formation flying
3. airborne emergency training
4. missions and tasks involving search and rescue and aeromedical evacuation1
5. missions and tasks involving civil and community support activities
6. missions and tasks involving use of automated flight control, Communication, Navigation and Surveillance (CNS) and Air Traffic Management Systems (ATMS)
7. flights involving interaction with UAS
8. any other task or mission which requires special consideration.

(b) Flying rules and requirements with applicability under this regulation must be based upon a Risk Management assessment.

Amended SPA.05 *Flying Rules for Special Missions and Tasks*

(a) The MAO must ensure promulgation of OIP that addresses, where applicable, rules and requirements relating to:

1. Air Displays
2. formation flying
3. airborne emergency training
4. missions and tasks involving search and rescue and aeromedical evacuation1
5. missions and tasks involving civil and community support activities
6. missions and tasks involving use of automated flight control, Communication, Navigation and Surveillance (CNS) and Air Traffic Management Systems (ATMS)
7. flights involving interaction with UAS
8. any other task or mission which requires special consideration.

(b) Flying rules and requirements with applicability under this regulation must be based upon a Risk Management assessment.

SECTION 3: REVISED DASR SPA.30 DASR PART ONLY

The following replaces the extant DASR SPA.30 Part **in toto**.

DASR SPA.30 – AIR DISPLAYS

▸ GM

(a) MAOs and UAS Operators must apply management controls for Air Displays to ensure Aviation Safety. MAOs and UAS Operators' management controls must:

1. ensure Air Display-related risks are managed IAW DASR SMS ▸ GM ▸ AMC
2. ensure personnel involved in Air Displays are competent, current, authorised and supervised ▸ GM ▸ AMC
3. include OIP that:
   - i. specifies Air Display:
     - a. approval requirements ▸ GM ▸ AMC
     - b. Flight conduct and manoeuvre limitations ▸ GM ▸ AMC
   - ii. supports the planning and execution of Air Displays ▸ GM ▸ AMC
   - iii. ensures release of objects and use of ground special effects during Air Displays will not compromise Aviation Safety or pose a risk to other Aircraft and property. ▸ GM ▸ AMC
4. constrain personnel on board the Aircraft during Air Displays to Crew and Mission Essential Passengers only.

SECTION 4: REVISED DASR SPA.30 DASR PART, AMC and GM

The following replaces the extant DASR SPA.30 Part **in toto**. AMC in purple text. GM in brown text.

DASR SPA.30 – AIR DISPLAYS

▾ GM

GM SPA.30 – Purpose statement and context (AUS)

a. **Purpose. (Context)** Air Displays enable Defence to demonstrate the capabilities, values and professionalism of Defence Aviation. **(Hazard)** Ineffective management of Defence Aircraft operations during Air Displays can compromise Aviation Safety. **(Defence)** This regulation requires MAOs and UAS Operators to establish effective management controls for Air Displays to ensure Aviation Safety.

b. **Applicability**. This regulation applies to MAOs and UAS Operators conducting Air Displays, whether as part of a Defence, international or civil event, and regardless of event location. Additionally, unless stated otherwise, Air Displays includes rehearsals.

c. **Specific terminology and definitions:**

i. **Air Display Director (ADD).** The person responsible for ensuring Defence Aircraft are operating in a safe and appropriately planned Air Display environment (commonly referred to as a 'Flying Display Supervisor' (FDD) or the 'Ringmaster'). An ADD should not be confused with the ADEO. However, the ADD and ADEO may in some cases be the same person.

ii. **Air Display Committee (ADC).** A group of suitably experienced persons appointed to assist the ADEO and ADD with the safety management of an Air Display. An ADC Chair may be appointed for complex Air Displays.

iii. **Air Display Event Organiser (ADEO).** The person responsible for all matters pertaining to the wider planning and execution of an Air Display; and for the safety of the general public, both at the event and those affected by the wider impacts of the Air Display. The ADEO is a separate role to that of the ADD. However, the ADEO and ADD may be the same person.

iv. **Crowd Line.** The line delineating the closest edge of any area, including car parks, accessible to Spectators with respect to the Display Area/Display Line.

v. **Display Area.** The ground area footprint of the Airspace in which Aircraft conducting Display Flying may manoeuvre.

vi. **Display Box.** The ground area footprint within the Display Area, that is controlled by an ADD, free of obstacles and significant terrain, and sanitised of all Spectators, Secondary Spectators and third-parties; and where Aircraft may

manoeuvre at the minimum height limitations prescribed in AMC SPA.30(a)3i.b.iv.

vii. **Display Crew.** A generic term describing Flight Crew who are qualified and authorised to perform Display Flying.

viii. **Display Flying Supervisor (DFS).** Suitably qualified and experienced person selected by the MAO or UAS Operator to supervise Display Crew during their rehearsal period. The DFS is a separate role to that of the FLTAUTHO. However, the DFS and FLTAUTHO may be the same person.

ix. **Display Line/Display Axis.** A line defining the track along which Aircraft conducting Display Flying should operate relative to.

x. **Display Sequence**. Defined as:

(a) **Alternate Display Sequence.** Modified display sequence flown in circumstances where the weather (commonly referred to as a 'low show'), personnel or Aircraft serviceability (in the case of Display Teams) precludes flying the Standard Display Sequence.

(b) **Special Venue Display Sequence.** Modified display sequence flown in circumstances where the venue for the Air Display precludes flying a Standard Display Sequence. For example, an Air Display along a river can limit the Display Area laterally, requiring predominantly vertical manoeuvres along the Display Line.

(c) **Standard Display Sequence.** All the individual manoeuvres, in chronological order, that are intended to be demonstrated during Display Flying.

xi. **Display Team.** A formation or group of Aircraft, flying as one single Display Flying 'act'.

xii. **Secondary Spectator.** A person viewing an Air Display from a location which has not been specifically designated for Spectators. This definition may include third parties.

xiii. **Spectator.** A person attending an Air Display specifically to witness the event.

d. The *Professional ADF Aviators' Reference Manual* (PAARM) provides additional Air Display supporting material.

(a) MAOs and UAS Operators must apply management controls for Air Displays to ensure Aviation Safety. MAOs and UAS Operators' management controls must:

1. ensure Air Display-related risks are managed IAW DASR SMS ▾ GM ▾ AMC

AMC SPA.30(a)1 – Air Display Safety Risk Management (AUS)

a. MAOs and UAS Operators should define controls required to eliminate risk to safety so far as is reasonably practicable (SFARP) and, if it is not reasonably practicable to eliminate risks to safety, to minimise those risks SFARP, through Safety Risk Management (SRM) conducted IAW DASR SMS. MAO and UAS Operators' SRM should include consideration of:

i. environmental threats

ii. Display Sequences, including the number and complexity of manoeuvres

iii. the Display Area and Flypast route

iv. Aircraft emergencies.

GM SPA.30(a)1 – Air Display Safety Risk Management (AUS)

a. **Safety Risk Management (SRM).** The safety of Display Crew, officials, Spectators, Secondary Spectators and third parties is paramount throughout any Air Display. The application of SRM—including Air Display-generic Mission Risk Profiles (MRP)—will aid the Accountable Manager (AM) in identifying relevant Hazards and risk controls to eliminate, or where not possible, minimise risk SFARP. Additionally, documented Risk Management Plans (RMPs) specific to each Air Display, will provide opportunities to implement necessary contextual controls. Air Display approvals are based on these SRM artefacts.

b. However, SRM should also be scaled to the size and complexity of the Air Display. For example, a Flypast by a single Aircraft over a graduation parade will not require the same type of SRM as a large event encompassing Display Flying.

c. In particular, MAOs and UAS Operators should consider the following Air Display-related Hazards:

i. **Environmental threats.** Air Display performance and risks to Spectators can be affected by environmental conditions. Close scrutiny of the expected weather at the Display Area and along the Flypast route will assist with identifying and controlling conditions that can directly affect the safety of the Air Display. Understanding the expected weather will also assist with determining which Display Sequence (eg Standard or Alternate Display Sequence) should be flown.

ii. **Display Sequence threats.** The risk posed by the Display Sequence is related to its complexity, the height at which it is flown, and the proximity of the Display Sequence to Spectators, Secondary Spectators and third parties. In turn, the complexity of the Display Sequence is proportional to its energy level, the number of manoeuvres in the sequence, as well as the manoeuvres' difficulty. The energy of the Display Sequence is proportional to both Aircraft mass and the square of its airspeed (eg a heavy Aircraft flying at higher speeds will inherently be performing higher energy

sequences). Display Sequence energy considerations are important for determining potential Aircraft debris scatter patterns.

iii. Display Sequence risk considerations should consider the ability of the Aircraft to land outside of areas where Spectators, Secondary Spectators and third parties are gathered, in the event of an engine failure or other airborne emergency during an Air Display that necessitates a forced landing or ejection.

iv. **Display Area and Flypast route threats.** Risks associated with the Display Area and Flypast route are related to the geographic construct of the Display Area and Flypast route, as well as the congestion in both the air and ground space of the Display Area and Flypast route, and their adjacent areas. Crew analysis of the Display Area and Flypast route will assist in determining which Display Sequence/s (eg Standard or Special Venue Display Sequence) should be flown. Display Area and Flypast route-related pre-Flight planning should consider:

(a) geography, terrain, obstacles (including moveable obstacles such as vessels) and infrastructure

(b) elevation and density altitude

(c) the airspace, including:

1. proximity to controlled airspace, Aerodromes or areas with specific limitations (eg flight plan requirements or special procedures)

2. other airspace users (eg scheduled air transport operations)

3. constraints with Display Sequences (eg parachute displays may restrict flying, ground movement and engine starts)

(d) the availability of clear areas in the event of a forced landing or premeditated ejection

(e) available support services (eg provision of Air Traffic Services)

(f) likelihood of overflight of Spectators, Secondary Spectators and third parties, and whether these personnel are aware of risks

(g) Crowd Lines, Display Lines and adequacy of lateral separation distances

(h) the size, audience and priorities of the Air Display and how Display Flying or Flypasts are integrated with the event

(i) the presence of livestock and wildlife.

v. **Aircraft-related threats**. Operating Aircraft to their allowable Flight and performance envelope limits may provide visually exciting Display Flying, but can also introduce unnecessary risk. For example, a four–G turn looks just as tight as a six-G turn from the ground, and the general public are unlikely to detect the difference. However, reducing the G also reduces risk by providing a safety margin if the turn needs to be tightened. Consequently, MAOs and UAS Operators should consider the following Aircraft-related risks:

(a) configuration, energy, aerodynamic performance and noise

(b) potential emergencies, including:

1. emergencies resulting from mishandled manoeuvres

2. helicopter loss-of-power while operating in the avoid area of the height-velocity diagram

3. for rotary-wing Aircraft, vortex ring state.

(c) potential debris scatter patterns following catastrophic failure, collision, or CFIT

(d) rotor disc vortex, rotor downwash or prop/jet blast.

vi. Rotor downwash and prop/jet blast risk area varies with ambient wind and funnelling/channelling features (eg buildings, concrete barriers), which can direct or accelerate downwash or prop/jet blast and can cause loose debris and light/unsecured structures (eg display signs) to become airborne. DSTG rotor downwash modelling (AB26272152 refers) demonstrates that the velocity magnitude of rotor downwash from a hovering helicopter decays with radial distance from the Aircraft. The rate of decay was almost independent of the hover altitude. However, it was shown to vary with wind speed. The rotor downwash modelling allows definition of downwash risk areas and lateral separation distances.

vii. **Fatigue.** Display Flying can result in additional physical fatigue and neck muscle strain or injury. Physical fatigue and muscle strain is largely dependent on head movement, and G-forces encountered during Flight. The establishment of Display Flying-specific fatigue control measures will support the reduction of fatigue or injury SFARP, and can include training, physical fitness and conditioning programs, adaption, and rest and recovery aided by duty cycle management.

viii. **UAS-related threats.** Safety data analysis shows that unregulated recreational drone usage increases in the vicinity of Air Displays, particularly those associated with high-profile public events (eg Australia Day and ANZAC Day). However, UAS operations near an Air Display can distract Crew from the operation of the Aircraft and represent a Hazard to the display Aircraft. While Aircraft should be separated from commercial

UAS operators through NOTAMs and event planning, only limited controls are available to manage recreational UAS proximity. Therefore, MAOs and UAS Operators should consider assessing and mitigating the risks of UAS operating in the vicinity of Air Displays.

d. **Civilian locations.** At civilian locations, the ADEO/ADD or Display Crew should not assume that the same level of controls (eg site preparation or FOD awareness) to that of military controlled environments will be in place. MAOs and UAS Operators should inform their SRM accordingly.

2. ensure personnel involved in Air Displays are competent, current, authorised and supervised ▾GM ▾AMC

AMC SPA.30(a)2 – Selection, qualification, Competency, Currency and supervision (AUS)

a. **Selection.** MAOs and UAS Operators should:

i. select Crew, FLTAUTHO, ADD and DFS based on their skill and experience

ii. define selection criteria for Display Crew.

b. In addition to requirements in DASR ORO.30, for Display Flying, the FLTAUTHO should hold or previously have held a Display Flying qualification.

c. **Qualification and Competency.** MAOs and UAS Operators should implement Competency requirements for Display Crew and ADD which:

i. reference the applicable Learning Management Plan (LMP)

ii. for Display Crew:

(a) includes both knowledge and skills-based training and assessment

(b) is conducted by a QFI, OFI or Fighter Combat Instructor (FCI) that the MAO or UAS Operator has authorised to implement a Display Flying course

(c) ensures the candidate:

1. can fly the published Display Sequences safely and effectively

2. is proficient in escape manoeuvres.

iii. for ADD, includes the requirement that they complete the *Display Flying Supervisor Accreditation Course* delivered by:

(a) AFHQ Air Shows Team (AST)

(b) a qualified and current ADD, in consultation with Head of Airshows (HAS) AFHQ.

d. Display Crew skills-based training should:

i. maximise the use of Flight Simulation Training Devices (FSTD)

ii. be initially conducted in familiar environments (eg over the Display Crew's own Aerodrome)

iii. commence at higher altitudes and progressively reduce height to the minimum approved Display Flying height limitation.

e. **Currency.**

i. **For Display Crew.** MAO and UAS Operators should define Currency requiring Display Crew to perform the Display Sequence in the preceding 30 days at the relevant approved minima.

ii. To regain Currency, MAO and UAS Operators should require the Display Crew to:

(a) if the Display Crew has performed the Display Sequence in the preceding 31 to 60 days, perform the Display Sequence at the:

1. relevant approved minima plus 500 feet, and then

2. relevant approved minima.

(b) if the Display Crew has performed the Display Sequence in the preceding 61 to 90 days, perform the Display Sequence at the:

1. relevant approved minima plus 1 000 feet, and then

2. relevant approved minima plus 500 feet, and then

3. relevant approved minima.

iii. If the Display Crew have not performed the Display Sequence in the preceding 90 days, MAOs and UAS Operators should promulgate requirements to regain privileges of the qualification.

iv. **For ADD.** MAO and UAS Operators should define Currency requiring ADD to act as an ADD at an Air Display at least once every two years.

v. MAO and UAS Operators should define requirements for ADD to regain Currency. MAOs and UAS Operators may refer to AFHQ AST OIP when defining ADD Currency.

f. **Records.** MAOs and UAS Operators should record:

i. Display Crew and ADD training, Competency and Currency IAW DASR AIRCREW.10(a)6

ii. Air Display FLTAUTHO approvals IAW DASR ORO.30.

g. **Supervision.** MAOs and UAS Operators should ensure the appointment of:

i. a DFS for Display Teams

ii. a suitably experienced ADD where the complexity of the event, types or numbers of Aircraft participating or other factors warrant appointing an ADD with defined responsibilities.

GM SPA.30(a)2 – Selection, Competency, Currency and supervision (AUS)

Selection

a. **Crew selection.** Air Display flying is dynamic; and physically, mentally and emotionally demanding. Manoeuvring in the low-level environment demands skill and focus, plus considerable practice and the right attitude. Crew miscalculation or ill-discipline can have serious consequences for the Crew and people on the ground. Therefore, Display Crew should be aware of, and understand, the responsibility of this role. Equally, MAOs and UAS Operators should be satisfied that candidates are appropriately skilled and experienced. Appropriate determinants of skill and experience may include:

i. for Aircraft Captains (AC)—Category B (Highly Proficient)

ii. for other Crew in multi-crew Aircraft—Category C (Proficient)

iii. hours requirements.

b. Additionally, MAOs and UAS Operators should consider whether Crews exhibit the following personal traits:

i. an ability to manage the pressure inherent in public Air Displays

ii. a high-level of in-Flight situational awareness

iii. humility.

c. Flypasts may be flown by any Type-qualified Crew. However, MAOs and UAS Operators should consider whether additional selection criteria should be defined for Crew conducting Flypasts.

d. **FLTAUTHO selection.** Flight Authorisation Officers (FLTAUTHO) holding a Display Flying qualification may support improved Hazard identification through a better appreciation of factors affecting Air Displays, including:

i. knock it off criteria

ii. exclusive use airspace and deconfliction arrangements

iii. environmental aspects (elevation (and for Display Flying QFE), contrast conditions, weather and visibility)

iv. location/display specific emergency procedures

v. Display Sequence complexity, and associated risks and controls

vi. limitations of the Flight Authorisation and approval (via AE679 – *RAAF Flight Profile Approval Proforma* (FPAP) or single service equivalent)

vii. Crew composition, qualifications and Currency.

e. **DFS selection.** DFS should be a squadron or regiment executive. However, given the heavy demands on time, particularly during initial Display Crew training, it may be beneficial to appoint a non-executive pilot as DFS. Preferably, the DFS should be both current on the Aircraft Type and have previous Display Flying experience—ideally on the Aircraft Type. MAOs and UAs Operators should consider DFS who are FLTAUTHOs, and exhibit the following personal traits:

i. personable and with good communication skills, enabling them to provide discreet and firm discussions with Display Crew when necessary

ii. possess strong foundational SRM skills, so as to be perceptive to the inherent risks of Display Flying

iii. demonstrate excellent leadership to engender a safe, yet disciplined Air Display culture.

Competency

f. **Crew Competency.** The 'knowledge' component of Display Crew training provides personnel with a common frame of reference and language, and may include topics such as:

i. Air Display approval requirements

ii. roles and responsibilities of Display Crew, FLTAUTHO, DFS, ADD and ADEO

iii. OIP supporting the planning and execution of Display Flying

iv. Non-Technical Skills (NTS) as it relates to Display Flying

v. determining Crowd Lines and lateral safety distances

vi. each manoeuvre in the Standard, Alternate, and (where applicable) Special Venue Display Sequence, including:

(a) safety gates (eg heights, speeds and Aircraft position relative to the Display Line) and recovery options

(b) adjustments for wind and density altitude.

vii. Flight conduct and manoeuvre limitations

viii. decision making in the event of an emergency.

g. MAOs and UAS Operators should consider establishing training or Competency requirements for Crew conducting Flypasts, particularly if the Flypast forms part of a complex Air Display. The Competency requirements may be the same, or a subset of the training provided to Display Crew.

h. **ADD Competency.** AFHQ AST are the centre of excellence for ADD qualification, training, Currency and supervision. MAOs and UAS Operators should consider liaising with Head of Airshows (HAS) AFHQ if delivering the Display Flying Supervisor Accreditation Course 'in-house' using a non-AST ADD.

i. MAOs and UAS Operators should consider establishing ADD Categories restricting which types of Air Displays (eg military-only Air Displays) an ADD may be appointed to. If so, it would be appropriate to establish requirements for progression through the Categories. UK MAA Regulatory Article (RA) 2335 – *Flying Displays, Display Flying, Role Demonstrations and Flypasts* provides additional guidance regarding ADD Category systems.

Currency

j. **Crew Currency**. Crew Currency requirements may differ across Crew positions. For example, MAOs and UAS Operators may set additional compliance requirements for lead Pilots of mixed-formation Air Displays. MAOs and UAS Operators may also consider establishing Currency requirements for Crew conducting Flypasts.

k. Where Currency has lapsed, MAOs and UAS Operators should consider tailored Display Crew re-Currency training that is a subset of the training provided for initial Display Crew qualification. For example, a recently lapsed Currency may be regained through skills-based recurrent training only, whereas a Currency that has long lapsed, may require both knowledge and skills-based training and reassessment.

l. **ADD Currency.** AFHQ AST are the centre of excellence for ADD qualification, training, Currency and supervision. MAOs and UAS Operators should consider liaising with Head of Airshows (HAS) AFHQ AST when determining ADD Currency requirements and re-Currency training requirements.

m. The two year ADD Currency allows the MAO or UAS Operator to set appropriate compliance periods and aligns with international best practice. However, the MAO or UAS Operator may impose more stringent Currency requirements. ADD participation at an Air Display may not, in itself, be sufficient to retain Currency.

MAOs and UAS Operators should consider the minimum functions and roles to be performed at the Air Display to meet ADD Currency. For example, an ADD that only has a supporting role as part of an ADC may not be considered to have met Currency requirements. Similarly, acting as an ADD at an Air Display that only involves Flypasts may be insufficient to meet ADD Currency.

n. Where Currency has lapsed, MAOs and UAS Operators should consider tailored ADD re-Currency training that includes a review of planning, organisation and management considerations for Air Displays, as well as supervision and/or assessment by another current ADD at an Air Display.

Supervision

o. **Flight Authorisation.** Air Display FLTAUTH conducted in person will improve Flying Supervision oversight. DASR ORO.30 includes specific requirements and considerations for FLTAUTH, or changes to FLTAUTH, which are given verbally or via electronic means.

p. FLTAUTH includes oversight of the full spectrum of the Air Display. However, FLTAUTHO emphasis of the following Air Display elements will enhance the effectiveness of the FLTAUTH process:

i. adherence to minima and safety gates (eg heights, speeds and Aircraft position relative to the Display Line)

ii. contingency and emergency procedures

iii. Crew decision making, including:

(a) the use of dynamic SRM to support decisions

(b) key decision points for transitioning from Standard to Alternate and Special Venue Display Sequences, or for cancelling the Air Display.

iv. the Crew's primacy in making any cancellation decisions (vice ADEO, ADD and DFS). That is, if the Display Crew identify any trigger to cancel the display (eg poor weather or breakdown in deconfliction) then no other appointment should attempt to override the Display Crew's cancellation decision. However, any responsible appointment (eg FLTAUTHO or ADD) may also make a cancellation decision. The FLTAUTHO or ADD should convey any cancellation messages via radio (eg Crews should not use informal messaging applications). A 2019 near-CFIT incident during an Air Display in Sydney Harbour highlighted some of the Hazards associated with using an informal messaging application:

> *The message thread was used by a number of participants who provided weather updates, opinions on the ability of the crew to conduct the display, and advice on how to achieve the display. Notably, the authorising officer was one of those participants. In addition, there were increasing communications about the need to make a decision on whether the Aircraft would be able to conduct the display, given the weather…*

…The informal nature of the communications introduced misunderstandings (e.g. the differing understanding of the AC and the authorising officer with respect to the special VFR approval), and ambiguity. It is possible that the directive tone of some of the authorising officer's messages influenced the crew to subconsciously defer the decision about the display to the authorising officer.

v. Display Crew workload management in the lead up to and during the Air Display.

q. **DFS.** The DFS acts as both a mentor to Display Crew, and safety observer for each Display Flying rehearsal. Preparation and training of the Display Crew requires near continuous supervision. Therefore, in nominating a DFS, MAO-AMs and UAS Operators should be cognisant of, and facilitate the close supervisory requirements of a DFS, particularly during early rehearsals, when continuity, trust and communication are vitally important to the success of the rehearsal.

r. **ADD/ADC appointment.** AFHQ AST are the ADF lead for the provision of ADD. The role of the ADD is vital to a complex Air Display— they are responsible to the MAO-AM or UAS Operator for ensuring Defence Aircraft are operating in a safe and appropriately planned Air Display environment, including:

i. reviewing risk management artefacts to ensure:

(a) validity of nominal conditions, assumptions and limitations

(b) implementation of SRM controls.

ii. ensuring that an appropriate ERP is in place

iii. submitting designated airspace change proposals (eg to activate a Temporary Restricted Area(TRA)) and NOTAMS

iv. providing pre (and where relevant and feasible post) Air Display briefings' provision

v. scrutinising of Display Sequences for compliance with ADEO requirements

vi. coordinating and controlling—and ensuring the safety control discipline (eg Display Line maintenance) of—all Display Sequences

vii. controlling the Defence components of the Air Display programme, including:

(a) cancelling or modifying (in case of adverse weather, or other conditions that directly affect) the Air Display

(b) coordinating pyrotechnics and other ground special effects.

viii. enabling CAA inspectors (where applicable) to ensure civil compliance by civil participants

ix. coordinating the completion and submission of post-activity reports.

s. In the civil context, the CAA appointed ADD holds legal and regulatory accountabilities. At civil events, MAO-AMs and UAS Operators should consider whether a Defence ADD is required to confirm the civilian ADD has undertaken the above planning requirements.

t. The establishment of an ADC and appointment of an ADC Chair for complex Air Displays will enhance overall coordination and safety of the Air Display, and will enable administrative duties to be distributed among committee members—allowing the Chair to primarily focus on Air Display Flight control. The construct of the ADC will be dependent on the complexity of the Air Display. However, it should comprise suitably experienced ADDs from the various commands displaying at the event, and may be supplemented by ATS and civil representatives. The ADC Chair should delegate ADD tasks, based on the areas of expertise and experience of its members.

3. include OIP that:

i. specifies Air Display:

a. approval requirements ▾ GM ▾ AMC

AMC SPA.30(a)3i.a – Approval requirements (AUS)

a. A MAO or UAS Operator must not conduct an Air Display without approval from the relevant single service approval authority.

b. MAO and UAS Operators' Air Display approval OIP should require that:

i. management controls are established IAW this regulation

ii. where applicable, CASA approval has been granted for civil Aircraft participating in Defence-organised Air Displays.

c. Specifically, for formation Display Flying:

i. opposition manoeuvres involving vectors towards the crowd are prohibited except as specifically authorised by the MAO

ii. formation Display Flying teams may not:

(a) practise new manoeuvres or sequences without MAO approval

(b) perform new manoeuvres or sequences in public without MAO approval.

GM SPA.30(a)3i.a – Approval requirements (AUS)

a. Air Displays require four distinct approvals, as follows:

i. the 'Authority to Conduct' IAW AC SI (OPS) 03-08 or single service equivalent considering reputation, finance and legal aspects

ii. the Air Tasking Order (or single service equivalent)

iii. the approval of the flight profile, airspace coordination measures, risk assessment and the required public affairs support to generate community awareness of the profile IAW AC SI (OPS) 03-08 or single service equivalent

iv. FLTAUTH.

b. **Multiple Flypasts in a single sortie.** The MAO may conduct multiple Flypasts in a single sortie. The intention is that DASR SPA.30 should not prevent the efficient use of Defence Aircraft for Public Relations (PR) purposes. For example, if a C-130J transits from Richmond to the Gold Coast to conduct a PR activity, the MAO has the freedom to approve more than one Flypast for that Aircraft.

c. If any manoeuvres or formation changes necessary to reposition for subsequent Flypasts are conducted in proximity to and in full view of Spectators, then such an activity would constitute Display Flying and require all of the associated Hazard controls. The intent is to prevent a liberal interpretation of the definition of Flypast from alleviating the requirement for appropriate Hazard controls—that are lessons learnt from the 2005 Roulette accident and the 2019 C-130J near-CFIT.

d. However, these Hazard controls are scalable. If for example, additional passes are flown, linked by simple non-dynamic manoeuvring (and where appropriate formation changes) then the required Crew selection, rehearsal, etc is limited. Conversely, for a display of comparable complexity to a Roulette display, then the rehearsal should be comprehensive, the Crew selection demanding, etc.

b. Flight conduct and manoeuvre limitations ▾ GM ▾ AMC

AMC SPA.30(a)3i.b – Flight conduct and manoeuvre limitations (AUS)

a. MAOs and UAS Operators should ensure that Crew and DFS (and where applicable ADEO/ADD) conduct briefings (and where relevant and feasible debriefs) for all Air Displays.

b. MAOs and UAS Operators should define Air Display Flight conduct and manoeuvre limitations that include:

i. **Aircraft limitations.** MAOs and UAS Operators should ensure that during Air Displays, Aircraft do not:

(a) operate with an engine deliberately shut down

(b) carry live weapons and that Aircraft weapons' circuit-breakers/switches are in a 'safe' condition (except for flare systems when dispensing flares is incorporated into the Air Display).

ii. **Weather minima.** MAOs and UAS Operators should publish weather minima for Air Displays that:

(a) are appropriate to Crew experience, Aircraft performance (including formation manoeuvrability), type of Air Display, Display Sequence and Display Area

(b) ensure Crew remain clear of cloud with a visibility sufficient to maintain both situational awareness and separation from Spectators, other Aircraft and terrain.

iii. **Speed limitations.** Aircraft speed during Air Displays should not exceed:

(a) Mach 0.90 or 600 KIAS, whichever is least, so as to avoid accidental generation of a sonic disturbance (Aircraft flying at, or approaching this limit, should reduce speed further before initiating any manoeuvre to avoid in inadvertent sonic disturbances)

(b) 300 KIAS, or operate at high power settings, when approaching the Display Area from the rear of the crowd during Display Flying.

iv. **Height limitations.** Aircraft height during Air Displays should not be less than:

(a) for fixed-wing Aircraft:

1. **Display Flying.** Display Flying may be performed down to 500 feet HAOW 600m outside a Display Box or over an unsurveyed location; or 200 feet Minimum Separation Distance (MSD) for non-aerobatic Display Flying conducted in a Display Box or at a location surveyed for low-level operations.

2. **Flypasts.** Flypasts may be flown not below 500 feet HAOW 600 m outside a Display Box or over an unsurveyed location; or 200 feet MSD in a Display Box or at a location surveyed for low-level operations.

3. **Spinning.** Recovery to erect flight from spinning should be completed by 1 000 feet HAOW 600 m.

(b) for rotary-wing Aircraft:

1. **Display manoeuvres.** Display manoeuvres (eg wingovers/pedal turns) may be performed down to a minimum of 100 feet HAOW 100m.

2. **Low speed handling manoeuvres.** Low speed handling manoeuvres may be performed down to a minimum of 50 feet MSD except for live winching demonstrations which may be conducted at a height that provides the maximum degree of safety for the wireman (person being winched).

3. **Flypasts.** Low level runs or Flypasts may be flown to a minimum of 100 feet MSD.

(c) for all Aircraft when dispensing flares, heights specified in AAP 7039.001-1 – *Air Force Explosive Ordinance Operations Manual*.

v. **Safe distances from Spectators.** MAOs and UAS Operators should ensure Aircraft avoid manoeuvres over Spectator areas without MAO-AM or UAS Operator approval, unless the manoeuvre is a single aircraft in erect Flight, not below 500 feet HAOW 600 m, when positioning for the beginning of, or on departure from, a Display Sequence.

vi. MAOs and UAS Operators should publish minimum lateral safety distances between the Crowd Line and Display Line appropriate to Crew experience, Aircraft performance (including formation manoeuvrability), type of Air Display, and Display Sequence; and which should not be less than:

(a) for crewed fixed-wing Aircraft in Flight, 200 m—however the MAO should:

1. increase the distance when Aircraft have a vector towards the Crowd Line, taking into account the complexity of the manoeuvre, formation type/size, Aircraft Speed and Aircraft debris scatter patterns.

2. where the displaying Aircraft is at a speed in excess of 300 KIAS, and has a velocity vector towards a Spectator Area, increase the minimum lateral separation distance to 450 m.

3. conduct further Hazard analysis regarding the location of people and fragile objects such as marquees or advertising hoarding, that are closer than the Crowd Line to ensure personnel safety is not compromised.

(b) for crewed rotary-wing Aircraft:

1. 65 m without an underslung load, and 100 m with an underslung load; during normal take-off, landing, and transitional manoeuvres

2. 100 m when low speed manoeuvring

3. 200 m in all other stages of Flight

4. Notwithstanding, the MAO should conduct further risk Hazard analysis regarding the location of people and fragile objects such as marquees or advertising hoarding, that are closer than the Crowd Line to ensure personnel safety is not compromised. Additionally, the MAO must account for rotor downwash effect that will vary with channelling or funnelling objects (eg buildings, concrete barriers etc) during Air Display planning and execution (assessing the risk of rotor downwash). This may require the MAO to increase the minimum distance based on the channelling or funnelling object.

vii. Lateral safety distances for crewed rotary-wing Aircraft:

(a) are based on a medium wake turbulence category Aircraft (as defined in ADF FLIP), and should be increased using SRM, for heavy wake turbulence category Aircraft

(b) should be increased downwind by an additional 20 m per 10 knots of wind during take-off, landing and transitional manoeuvres. (*S-70B-2 N24-006 (875) Rotor Downwash Incident* (DDAAFS/OUT/2015/AB23962744) and *DSTO Rotor Downwash Modelling* (AB26272152) refers).

viii. For UAS, the UAS Operator should apply a minimum lateral separation distance of 200 m. However, the UAS Operator must not operate the UAS in a manner that presents undue risk or Hazard to any person, vehicle, vessel or structure.

ix. The Display Crew must plan the Display Line to provide the minimum lateral separation from Spectators and foreseeable Secondary Spectators (eg if there is a public road that passes next to the display venue boundary then that is a likely location

for Secondary Spectators). The MAO OIP must include guidance to Display Crews that, if on approaching the Display Area, the Display Crew identify that there are Spectators infringing the minimum lateral separation from the Display Line, then the Display Crew must either not commence, or discontinue the Air Display. The MAO OIP should emphasise that Display Crews should not weigh observation of Spectators and consideration of this decision to the detriment of good airmanship. That is, the Display Crew should not unduly divert their attention from achieving/assessing entry gates/height/speed, G-awareness, formation leadership, correct technique, making weather decisions, ensuring de-confliction, fuel awareness, etc—to assess the Spectators' positon. However, if on approach to a display it becomes obvious to the Display Crew that the separation with Spectators is compromised, then the Display Crew must 'knock it off'.

x. **Display Flying limitations.** Display Flying must only be conducted:

(a) by Display Crew

(b) if the Display Area is in an airspace reservation or a restricted area as defined in ADF FLIP (which may include a TRA) that excludes all other non-participating Aircraft. Participating Aircraft may hold in, or depart or recover through, the Display Area provided:

1. there is deconfliction (eg positive control by an ADD or Air Display instructions for deconfliction) between a displaying Aircraft and other participating Aircraft

2. participating Aircraft remain clear of the Display Box.

xi. **Rehearsals.** Display Crew should rehearse the Standard, Alternate, and Special Venue Display Sequences. Display Flying rehearsals should:

(a) be documented in OIP to ensure a standardised approach to training and preparing Display Crew

(b) be conducted IAW AMC SPA.30(a)2.d

(c) be flown by the Crew that will participate in the Air Display event

(d) where practicable, be authorised by the FLTAUTHO that will provide FLTAUTH for the Air Display event.

GM SPA.30(a)3i.b – Flight conduct and manoeuvre limitations (AUS)

a. **Air Display briefings and debriefings**. At larger Air Displays, the ADEO/ADD should circulate in advance, written Air Display instructions—to include all operational information relevant to the Air Display—to enhance situational awareness for all participants. The ADEO/ADD should supplement the Written Air Display instructions with a verbal briefing on the day of the Air Display. The ADEO/ADD should (where feasible) conduct a debrief with participants at the conclusion of the Air Display. The purpose of the debrief is to determine any safety, organisational or administrative lessons that may impact Aviation Safety at future Air Displays. The *Professional ADF Aviators' Reference Manual* (PAARM) provides additional guidance.

b. **Aircraft configuration.** Configuring the Aircraft for an Air Display in a way that maximises Aircraft performance (eg removing external stores or operating with low fuel loads) can in the event of an emergency, aid in recovery or reduce the likelihood of CFIT. However, where relevant, MAOs and UAS Operators should consider carrying additional fuel where that additional fuel will afford greater protection against structural damage. Similarly, where relevant, MAOs and UAS Operators should consider using configurations for Display Flying that will afford optimal protection against structural damage, for example for C-130J:

> *effects of secondary fuel management on service life and inspection requirements have not been established; therefore, secondary fuel management should be used advisedly, especially when operating near the gross weight limit for the applicable manoeuvre or airspeed. (AAP 7211.031-1 refers)*

c. **HAZMAT.** Where practical, MAOs and UAS Operators should remove hazardous materials (HAZMAT) from Aircraft for Air Displays. If this is not practicable, MAOs and UAS Operators should advise first responders of HAZMAT and its location on the Aircraft. Additionally, MAOs and UAS Operators should include HAZMAT considerations in the ERP.

d. **Speed limitations.** MAOs and UAS Operators should consider publishing minimum operating speeds that:

   i. provide sufficient margin above the stall (eg 1.3 times the stall speed for the Aircraft configuration)

   ii. enable multi-engine fixed-wing Aircraft to climb away, without change of configuration, if any one engine fails.

e. **Safe distances from Spectators.** Displaying Aircraft perform relative to Display Line/s which provide Display Crew with a visual reference

of the safe lateral separation distance from Spectators. Display Crew should use obvious ground features (eg runways) to define Display Lines. Where the Display Line cannot be defined by an obvious ground feature, ADEOs/ADDs should define Display Lines with visual markers or lighting. ADEOs/ADDs should use hi-visibility buoys or marker floats for over water Air Displays. ADEOs/ADDs or Display Crew should also note any other distracting line features (eg non-parallel taxiways) which might hamper the Display Crew in identifying the intended Display Line.

f. For Air Displays at locations where Spectator Areas (and/or concentrations of Secondary Spectators) are on, or expected to be on, both sides of the Display Axis, the minimum lateral separation distance between the Display Line and the Crowd Line, should apply on both sides of the Display Line.

g. MAOs and UAS Operators should consider the likelihood of Secondary Spectators and third parties gathering outside the designated Spectator Areas—and any effect the Air Display might have on members of the public in the vicinity. MAOs and UAS Operators should consider the proximity of major roads, railway lines and local infrastructure and how busy they are likely to be during the event.

h. **Crowd Lines and Display Lines.** Once defined, ADEOs/ADDs should annotate Crowd Lines on suitable scale map or image which is included in the written Air Display instructions, and briefed to Display Crews during the verbal briefing on the day of the Air Display. The MAO or UAS Operator should annotate both Crowd Lines and Display Lines on a suitable map or image (eg airfield crash map).

i. **Officials.** People operating in an official capacity at an Air Display may be required to be closer to the displaying Aircraft than the designated Crowd Line. During planning, the Display Crew should modify the Crowd Line to include those officials. Where it is essential to the display that personnel are between the Crowd Line and the displaying Aircraft, the ADEO/ADD or Display Crew should provide a safety briefing to the exposed officials to enable appropriate precautions. If the Display Crew observe personnel between the Crowd Line and the displaying Aircraft (in a manner inconsistent with the safety brief) on arrival to conduct the Air Display, the Display Crew should cancel or discontinue the Air Display.

j. **Secondary Spectators.** The ADEO/ADD or Display Crew should identify areas likely to be occupied by Secondary Spectators and third parties and take all reasonable steps to prevent Secondary Spectators and third parties gathering in high-risk areas. In the case where the ADEO/ADD or Display Crew cannot prevent Secondary Spectators and third parties gathering in high-risk areas, the

ADEO/ADD or Display Crew should take all reasonable steps to inform Secondary Spectators of the risk to them and record mitigations taken.

k. **Rehearsals.** The Display Crew and DFS may consider developing an Air Display rehearsal programme that defines specific requirements and conditions for each rehearsal event. The Display Crew and DFS should consider Crew experience, type of Air Display, Display Sequence and Display Area in developing rehearsal programme. All Display Crew should be integrated into the planning, preparation and rehearsals. The Display Crew and DFS may consider conducting the final rehearsal at the event location without Spectators, to confirm SRM artefacts are appropriate.

ii. supports the planning and execution of Air Displays ▾ GM ▾ AMC

AMC SPA.30(a)3ii – Documentation that supports planning and execution of Air Displays (AUS)

a. MAO and UAS Operator OIP to support the planning and execution of Air Displays should include:

i. approved Air Display manoeuvres and Standard, Alternate and Special Venue Display Sequences specific to Aircraft Type

ii. Air Display Handling Notes that document:

(a) planning and execution of Air Display manoeuvres and sequences

(b) altimeter setting procedures for Air Displays, including using QFE for Display Flying

(c) safety calls to be used during Air Displays

(d) normal and in-Flight emergency recovery procedures.

iii. for Display Teams only:

(a) permissible alterations to Display Sequences in case Display Teams are degraded (eg due to an Aircraft unserviceability or Flight Crew illness)

(b) formation normal and in-Flight emergency recovery procedures.

iv. Emergency Response Plans (ERP) appropriate to the scale of the event.

GM SPA.30(a)3ii – Documentation that supports planning and execution(AUS)

a. **Approved manoeuvres and sequences.** Air Display risk and Display Crew workload increases if Display Sequences are modified while mid-display. Display Crew should not make significant modifications to the Display Sequence airborne (eg changing entry gates for manoeuvres, or adding or substituting manoeuvres). However, Display Crews should make standard adjustments for wind (eg adjusting the timing of pitch up for vertical manoeuvres and switching Cuban eights and lazy eights for reversal manoeuvres (for wind along the Display Line), adjusting angle of bank during looping manoeuvres (for wind across the Display Line)). Display Crew rehearsal of the standard manoeuvres and approved Display Sequences offers the following advantages:

   i. Consideration of risks associated with each manoeuvre can be included in the development of a Display Sequence.

   ii. A consistent approach is developed to training and preparing Crew for Display Flying.

   iii. Crew workload is reduced, and crew cohesion is improved, collectively improving the ability to mitigate other human performance limitations.

b. The *Professional ADF Aviators' Reference Manual* (PAARM) provides additional guidance to support the development of safe Display Sequences. However, MAOs, UAS Operators and Display Crew should consider the following when developing and approving Display Sequences:

   i. how weather and Display Area affect the Display Sequence

   ii. Aircraft and Crew capabilities

   iii. manoeuvre energy states (eg losing or gaining energy) and the interrelationship with:

      (a) turn performance, cornering velocities and energy preservation

      (b) height and speeds requirements

      (c) safety gates (eg heights, speeds and Aircraft position relative to the Display Line)

      (d) linking manoeuvres.

   iv. Display Crew ability to exit a sequence, or recover the Aircraft in the event of an emergency

   v. avoidance of sustained G or G-reversal

   vi. safe integration of object release that considers failures and ‘fall out’ zones (in the case of flare dispensing).

c. **Standard Display Sequence.** The term 'Standard Display Sequence' does not imply that all Display Crew in any particular MAO must only fly the same sequence. In developing well rounded Display Crew, it is a useful exercise (as a part of their Display Crew training) to design and develop a bespoke Display Sequence—consistent with the MAO's OIP and this regulation. The Display Crew must seek MAO-AM (or delegate) approval to fly any bespoke Display Sequence (eg CO CFS approves Display Sequences for graduates of the PC-21 low level aerobatics course in CFS, documented in a Minute or decision brief).

d. **Handling Notes.** MAOs and UAS Operators' Handling Notes form a consolidated reference for Air Display Crew. However, Handling Notes are not intended to replace information in OIP. Rather, Handling Notes should include information on Air Display 'domestics' (eg start, taxi, take-off and recovery procedures) and 'how to' plan and fly specific manoeuvres and Display Sequences, as well as:

i. **Altimeter setting.** Safety data analysis highlights the disastrous consequences that can occur if flying an Air Display on QNH instead of QFE. Setting QFE for Air Displays enables Display Crew to use the altimeter as the primary height reference throughout the Air Display—decreasing Crew workload and increasing height awareness. All low-level Air Displays should use QFE. However, setting QNH may be more appropriate for Flypasts. Crew should be aware that setting QFE can introduce new forms of error and hence should be carefully considered. Handling Notes and Crew procedures should provide sufficient guidance to Display Crew on the Hazards of incorrect altimeter settings, which sub-scale setting to use, when to make sub-scale setting changes, and system checks required following sub-scale setting changes.

ii. **Safety calls.** Table 1 includes suggested safety calls that Display Crew and ADD/DFS may use during Display Flying to assist in assessing height and distance, warn of a safety incident (eg minima being breached), or to cease a Display Sequence. Standardising the use of these calls will assist with interoperability during civil and international Air Displays.

Warning call	**Pilot response**
'(Callsign) Too Low'	'Roger (Callsign)'
'(Callsign) Too Close'	'Roger (Callsign)'
Terminate call	**Pilot response**
'(Callsign) Terminate	'Terminate (Callsign)'
Knock it off call	**Pilot response**
'(Callsign) Knock it off'	'Knock it off (Callsign)'

Table GM SPA.30(a)3ii-1 – Safety calls

iii. The context of safety calls is as follows:

(a) **'Too Low' call.** The ADD or DFS should make a 'Too Low' call if they assess that an Aircraft has descended below the minima.

(b) **'Too Close' call**. The ADD or DFS should make a 'Too Close' call if they assess that an Aircraft has breached the minimum lateral separation distance.

(c) **'Terminate' call.** The ADD, DFS or Display Crew should make a 'Terminate' call when an Aircraft is required to suspend the Air Display for a reason other than Display Crew competence (eg intruder Aircraft, birds, etc). At the discretion of both the ADD and the Display Crew, the Air Display may be resumed if safe to do so.

(d) **'Knock it off' or 'Stop' call.** The ADD, DFS or Display Crew should make a 'Knock it off' call if safety is compromised. Additionally, the ADD or DFS should make a 'Knock it off' call if a third 'Too Low' or 'Too Close' call is required. Once a 'Knock it off' call has been made, the Air Display should not be resumed.

iv. If a 'Knock it off' call is directed, the ADD or DFS should confirm the Crew understands the reason the call has been made, and consider whether:

(a) an Aviation Safety Report (ASR) should be submitted

(b) the event should be included in the post-activity report.

e. **Emergency Response Plan (ERP).** An ERP is an important requirement for any Air Display, providing documented procedures to be followed in the event of an incident or accident. ERP scope is discussed in DASR SMS. However, the ERP for Air Displays should also include:

i. the requirements for:

(a) on-site emergency services, and where there is a need to augment on-site emergency services

(b) off-site emergency services.

ii. the types of occurrences that may require the cancellation of the event

iii. the roles, responsibilities and procedures for:

(a) providing emergency services with the details and locations of incidents or accidents

(b) controlling accidents, including those involving multiple accident sites

(c) controlling HAZMAT incidents and communicating HAZMAT controls

(d) managing communications between officials and with Spectators following incidents and accidents.

iii. ensures release of and use of ground special effects during Air Displays will not compromise Aviation Safety or pose a risk to other Aircraft and property. ▾GM ▾AMC

AMC SPA.30(a)3iii – Release of objects and use of ground special effects (AUS)

a. MAOs and UAS Operators should:

i. establish controls for the release of objects and use of ground special effects during Air Displays through SRM

ii. document these controls in Air Display MRP or RMP

iii. document the approval of the release of objects or use of ground special effects

iv. if conducting parachuting as part of an Air Display, and in addition to the controls in ADFP 3.9.1–*Airborne Operations Procedures*, require that from the time of dispatch until all parachutists are on the ground:

(a) all flying activity in the drop area (as defined in ADFP 3.9.1 and *Manual of Air Traffic Services*) is to cease, except that which is necessary for dispatching parachutists

(b) propellers and rotors of Aircraft in the drop area, excluding those of the drop Aircraft, are not turning.

v. ensure the object(s) to be released have technical and operational clearance for release from the participating Aircraft

vi. ensure flares are dispensed IAW AAP 7039.001-1—*Air Force Explosive Ordinance Operations Manual*

vii. require ground special effects to be discharged from a location:

(a) that ensures remnants of the device will not land among officials, Spectators, Secondary Spectators, third parties, Aircraft or ground equipment

(b) that is not accessible to anyone except those directly involved with discharging the special effects.

GM SPA.30(a)3iii – Release of objects and use of ground special effects (AUS)

a. **Parachuting and airdrop.** ADFP 3.9.1 – *Airborne Operations Procedures* provides guidance on parachuting and airdrop planning, procedures and drop area/drop zone requirements, and should be read in conjunction with this regulation.

b. **Dispensing of flares and use of ground special effects.** AAP 7039.001-1 – *Air Force Explosive Ordinance Operations Manual* provides guidance and controls for the dispensing of flares and use of ground special effects, and should be read in conjunction with this regulation.

c. Falling flares and debris can present additional risks to vessels and marine fauna when Crew conduct flare dispensing over water. Additionally, third parties may mistake the flare release for a distress signal. Therefore, it may be appropriate in these circumstances to:

   i. raise a NOTAM

   ii. advise the Australian Marine Safety Authority (AMSA).

d. MAOs and UAS Operators should, in addition to the mitigations in AAP 7039.001-1 – *Air Force Explosive Ordinance Operations Manual*, consider the following if using ground special effects during an Air Display:

   i. documenting the location of special effects in Air Display instructions, and briefing it during the verbal pre-Air Display briefing

   ii. ensuring the ADEO and the ADD are fully aware of the safety radii and how ground special effects can impact the Air Display or Handling Demonstration

   iii. offsetting ground special effects from the Display Line so that Aircraft are not overflying the effects—reducing the likelihood of debris striking the Aircraft

   iv. impact to Aircraft visibility from smoke emitted by ground special effects.

4. constrain personnel on board the Aircraft during Air Displays to Crew and Mission Essential Passengers only.