

CAP 1824

Display Season 2019 Mid-Season Update

We are half way through Display Season 2019 (DS19) already, but the busiest months are still to come! This update is designed to assist those of you that have been or are about to be, an Event Organiser (EO), Flying Display Director (FDD) or a Display Pilot during DS19, by providing you with regulatory feedback on the Display Season so far.....

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Incidents

There have been two noteworthy incidents thus far in DS19. One where a Gazelle received a 'STOP' call due to ending up too low after the pilot became disorientated during a break manoeuvre, not helped by poor horizons and 'goldfish bowl' conditions over the sea. The pilot's DA was temporarily suspended and following a CAA investigation, was reinstated 4 days later. The other involved an aircraft which ended up too low as a result of the pilot choosing to undertake a manoeuvre which was executed incorrectly, putting them in a position where they needed to accelerate the aircraft in the vertical which placed them below minima. The individuals involved and one of the FDDs has kindly written about each incident; both of which can be found at Appendix A.

Incident Reporting

We have illustrated two examples of incident reports within this update and emphasise the importance of developing a reporting culture across the Flying Display industry. As indicated at the Flying Display Symposia; there are several ways to submit a report, whether it be formally in response to a particular incident in the form of a Mandatory Occurrence Report (MOR) for civilian participants or a Defence Aviation Safety Occurrence Report (DASOR) for the military, or, in the form of a confidential report by using the Confidential Human Factors Incident Reporting Programme (CHIRP) or the Defence Confidential Occurrence Reporting Scheme (DCORS). If submitting a DASOR, consider the parallel submission of a MOR to enable the CAA to develop a more comprehensive understanding of incidents across the Flying Display industry. If you have any problems with the submission of a MOR or a DASOR then contact the CAA via GA@caa.gov.uk or the MAA via DSA-MAA-Display@mod.gov.uk and we will assist you to submit your report.

Feedback

We both encourage open and honest feedback from any member of the Flying Display community operating in any capacity to enhance the safety and performance of the Flying Display industry. We would like to receive any comments / observations / lessons learnt related to the safety of either a specific Flying Display or Flying Displays in general. Any issue can be reported, no matter how insignificant it may seem, and can cover aspects such as Human Factors, concerns over performance, near misses and matters that might have led to an incident or accident. All reports will be treated confidentially. Either submit an occurrence report or contact the CAA or MAA directly via GA@caa.co.uk or DSA-MAA-Display@mod.gov.uk respectively.

We are particularly interested in your hazard observations, ie those events that 'nearly happened' as understanding these will help prevent your friends and colleagues from having an accident.

Regulatory Knowledge

We would like to take this opportunity to remind those involved in Flying Display activities, including Event Organisers and display participants, of the amendments included in Edition 16 of [CAP 403](#), Issue 9 of [RA 2335](#) and Edition 1 of [CAP 1724](#) where applicable. It is vitally important that the regulatory rule set is followed consistently to ensure the safety of all events. Any questions about the regulation of either civil and military events should be directed to the CAA or the MAA respectively.

Key issues identified to date during DS19

Applications

A huge thank you to all of you who have submitted your applications with more than 42 days to run until your event. We have had more early applications than ever which has really helped us to process permissions in a timely manner. For those of you that are still applying inside the 42-day timeline, please be aware that we cannot guarantee you a permission, therefore please apply early! Despite the positive shift towards the early submission of applications, we continue to receive applications that have key information omitted. Therefore, please note the following points:

Maps

To process an application, the CAA requires a current 1:50,000 map that shows the Display Area, primary spectator area(s) and any avoids. We encourage you to provide supporting imagery, such as Google Earth, to help us understand any specific requirements at your event. Each submission (whether it relates to the same location or not) will be treated as a new application.

Maps have been a particular challenge; please follow the guidance in CAP 403

Risk Assessments

When compiling a risk assessment, applicant FDDs should always review and include, **as a minimum**, reference to the following key safety considerations:

1. Propulsion Failure (e.g. engines, rotor blades, propellers, turbine blades)

2. Aircraft Collision (e.g. between display or non-display aircraft, birds, UAS' etc)
3. Spectators and Secondary Spectators
4. Pilot Human Factors
5. Latent aircraft hazards (eg. Pyrotechnics, Ejection Seats, Hydraulic fluid etc)
6. Display area topography (e.g. congested areas, tall hazards, occupied properties etc)

If in doubt, follow the guidance in CAP 403 Appendix A

Correspondence

Once your application is received by the CAA it will be allocated to a Flight Standards Officer (FSO) and you will receive an email acknowledging receipt and it will highlight areas where further information may be required. Applicants should respond promptly to any requests for information from the FSO. We have been unable to process a number of applications due to tardy responses from applicants which has had the effect of delaying the issue of the permission.

Application Quality

The basis of a good quality application will be the inclusion of a comprehensive risk assessment and an accurate map. The CAA is not responsible for approving or validating a risk assessment, this responsibility sits with the FDD. Instead, the CAA will review the risk assessment, as one part of the application process to determine whether an FDD is competent to fulfil that role at a specified event. Further details can be found in CAP 403.

Waiver Submissions.

FDDs are reminded of the timelines associated with the submission and approval of regulatory waiver requests and of the requirement to provide justification for any non-compliance, supported by confirmation from the appropriate accountable person that the Risk to Life associated with non-compliance is As Low As Reasonably Practicable and Tolerable.

Display Pilot, FDD and FCC Safety Responsibilities

Once an aircraft is performing at a Flying Display, the Displaying Pilot, the FDD and the FCC are all responsible for the safety of the display. **This applies for the duration of the display both inside and outside of the Display Area.** If an issue occurs outside the Display Area, whilst it would be unlikely that there would be the need for the FDD or FCC to call 'Too Low' or 'Too Close', there may be occasions where a 'STOP' call is required. Likewise, either the Display Pilot, FDD or FCC can call a 'Terminate' at any point. Display Pilots should consider terminating their display if they become disorientated or find themselves out of sync with their Display Sequence. **There is no pressure to keep going – safety of the participant and the general public is paramount!**

Feedback

The feedback we have received to date for DS19 has provided us with the following safety data:

Event	Number of Events (mid-season DS18)	Number of Events (mid-season DS19)
STOP Calls	0	1
Too Low Calls	7	4
Too Close Calls	3	3

Incidents	3	2
Undesirable Events ¹	3	3
Third Party Airspace Infringements	7	2
Mechanical Failures	4	2
Drone related Safety Issues	2	2

Good Practice

Pilots Notes

FDDs, please get products to your pilots as early as possible to allow them to plan; this is particularly important for participants in fast jets who have several constraints to consider. The quality of mapping and imagery provided is extremely helpful in helping pilots plan displays.

Arrivals and Departures

All arrivals and departures must be conducted in accordance with standard aerodrome procedures. Unbriefed or unexpected manoeuvres are extremely dangerous if conducted during the arrival or departure at or from a Flying Display. Captains of static display aircraft should be reminded they must adhere to the standard aerodrome procedures in order to avoid any inadvertent manoeuvres on arrival or departure from the event.

Pilots Briefings

The formal Pilots Brief is the final opportunity FDDs and FCCs have to review the arrangements in place for their display and run through the sequence of events in a chronological order. This should ensure both the FDD and the participants have a clear understanding of how the day should unfold. FDDs are encouraged to take the time to run through the event flying programme in detail, highlighting any unusual activity (eg pyrotechnics), and confirm all parties involved are content with the arrangements prior to commencement of the event. Display minima should be covered in detail confirming any waivers or exemptions held by and expected to be employed by participants.

Both the CAA and MAA continue to monitor trends across all the events, civil and military, and will engage with FDDs and/or Display Pilots to highlight issues should there be any recurrent themes.

CAP 1724

The new Display Standards document has been received well and thank you to those of you that took time to comment on the document prior to publication. Work will commence on incorporating comments and improvements towards the end of the season following which there will be a period for comment which you are urged to participate in.

¹ Defined as events other than accidents, serious incidents and incidents.

SRG 1300

The new online [Display Authorisation Application form](#) went live in March. Thank you to those that provided feedback on the form; all suggestions have been incorporated. Please note that when submitting a DA initial application, upgrade or renewal the CAA requires an [SRG 1303B: Application for fitness assessment for a Flying Display role](#) to be submitted alongside the SRG 1300 **for every submission**.

The applicant, **not the DAE**, is responsible for submitting SRG 1300 to the CAA within **14 days of the evaluation**. When submitting an application for a renewal or a revalidation, applicants will not be charged. Charges are levied for upgrades and for the initial issue of a DA. When DAEs complete the recommendation section please ensure that the category, associated disciplines and skill levels that have been evaluated are listed in addition to annotating them on the application form as detailed in CAP 1724.

DA certificates are now issued electronically to the applicant. In the period between submission and receipt of the new DA, **which should be no longer than 28 days**, the DAE should complete the temporary certificate on the original DA to allow the applicant to continue Display Flying. This temporary certificate is valid until the new DA is issued. A reminder that Appendix D of CAP 1724 should be completed for every evaluation and DAEs should retain copies for their records. It is also recommended that Appendix D is submitted as part of the SRG 1300 application.

Display Authorisation Evaluators (DAE)

Thank you to those DAEs that have agreed to have their names and email addresses published on the CAA website to enable DAs and aspiring DAs to contact you directly for advice and guidance. A gentle reminder for those that are yet to respond, to reply to ga@caa.co.uk if you are content to have your email listed. Those DAEs that are still awaiting oversight visits this year are encouraged to engage with the CAA at the earliest opportunity via ga@caa.co.uk to agree visit dates.

SRG 1327

Display Pilots should fill out [SRG 1327: Pilot's Certified Declaration for Submission to the Flying Display Director](#) completely and correctly, paying particular attention to the Hazard Information. Think about the information the emergency services will require to rescue you from your aircraft. As a minimum, information such as fuel, oil, batteries, explosive materials etc should be recorded. Information on the location of hazards and how to isolate them could save critical time. Additional information to assist emergency crews can also be sent to the FDD; an example is at Appendix B.

SRG 1328

The [UK Flying Display Questionnaire](#) (similar to the [MAA Form 2](#): UK Flying Display approval questionnaire) should be submitted to the CAA by the FDD if you plan to include any foreign registered civilian aircraft or foreign civilian Display Pilots in your display. This allows the CAA to issue DA Exemptions to those pilots. As with all submissions, the earlier they are received by the CAA, the greater the chance of approvals being issued in time for your event.

SRG 1330

The [Airborne Flying Display Director Checklist](#) can be used to supplement any existing procedures that Airborne Flying Display Directors (AFDD) use prior to participating in a Flying Display or

Private Flying Display as defined in CAP 403 and should be passed to the nominated individual present on the ground at the display venue responsible for contacting the emergency services in the event of an incident or accident.

Review of CAP 403 and CAP 1724

The annual review of CAP 403 should be available for public consultation in November 2019 so please provide us with your feedback through the consultative process. Likewise, Edition 2 of CAP 1724 should be out for your review and feedback just after Christmas.

Post-Season Flying Display Symposium

This will be held on the 12th and 13th of November at the Defence Academy, Shrivenham. It will be a great opportunity to share lessons from DS19 and to continually improve the safety of UK Display Flying. Civilians should sign up via the [CAA website](#) and military delegates via the [MAA website](#).

DS20 FDD Accreditation Courses

Up to four courses consisting of an initial FDD Accreditation Course, two re-validation courses and an AFDD course will be available for you to attend next year so please, as soon as they become available, book early to avoid disappointment!

Conclusion

We have had a very safe and successful first half of DS19, please keep up the good work! We hope that this update has been informative and has provided some assistance to you. Please feel free to feedback anything you wish via the GA@CAA.co.uk or DSA-MAA-Display@mod.gov.uk mailboxes. Here's to an equally successful second half of DS19.

Chris Kidd

Chris Kidd

CAA Air Display Regulation Manager

Marshall Kinnear

Wing Commander M R Kinnear

MAA Flying Display Regulation and Assurance

Sign up to Skywise for Display Season updates

Appendix A

Flying Display Incident at Weston Air Festival

I was flying a Gazelle Helicopter as the lead aircraft in a two-ship formation display at Weston Air Festival on 23rd June 2019. We had performed an identical display the previous day without any issues. The weather had started to deteriorate prior to our display and it was becoming difficult to make out the horizon. The loss of a discernible horizon had happened insidiously over a period of approximately thirty minutes.

The display routine started well but I felt mild disorientation during the second manoeuvre. I ended up out of position for the third manoeuvre which is a level break to depth from the datum at 200ft. I wasn't unduly concerned at this point and intended to communicate the change of position to my team mate once we had completed the break manoeuvre.

As we turned hard to depth I lost all horizontal reference and felt disorientated. I glanced at the AH1 which confirmed that the aircraft was in a nose down attitude, I pulled aft on the stick to level the aircraft and looked back outside to see that I had lost a lot of height. The FDD called "STOP STOP STOP" and we recovered to our point of departure. I was disorientated for only a few seconds, but it felt like much longer.

The disorientation I encountered was a classic case of the 'goldfish bowl' effect which we all recognise but never believe will happen to us as individuals.

There is much to learn from a case like this and the most significant point is that you don't have much time to react at 200ft. As a display team we have called a safety meeting and we will modify our display routine to cater for similar meteorological conditions in future. A second and no less significant learning point is that the system detailed in CAP 403 works, there is no 'witch hunt' in situations like this, the FDD team and the CAA were sympathetic and supportive post incident and my DA was reinstated within 4 working days. My advice is to be as open and honest with the reporting aspect of these incidents, that way we can share our experiences and learn from them.

Incident at Dunsfold Wings & Wheels – Pilot Narrative

I share this information in the hope others will learn from the errors I allowed to creep into my display routine at a Dunsfold in June 2019.

This season's routine was almost identical to the previous but, as I had done in the past, I had added in, a choice of two manoeuvres at one point in the routine.

At Dunsfold the optional manoeuvre, with similar gate height, was not executed correctly, and I was left in an unstable condition starting at approximately 1100 ft. I was slow to apply full power and subsequently I needed to accelerate the aircraft in the vertical, before levelling at much lower low level than intended. It felt very uncomfortable. It was not planned and there was little or no margin for further error.

The whole incident is discussed in the full chirp report, but to summarise learning points to share.

1. If one flies a fixed routine. Keep it as fixed as possible and don't allow unnecessary choice to creep in, particularly in the air. If you do have prepared options, make sure they have similar gate heights and are individually risk assessed.

2. Do not allow too much choice in air if you are not used to operating in that manner.
3. Avoid switching manoeuvres without detailed reappraisal of gate heights. Make sure the manoeuvres are individually risk assessed for escape options.
4. Do not allow distractions before you get in the cockpit.
5. "Terminate" call can be used by pilot or FCC to create a penalty free break in any routine at any time.
6. Avoid self-imposed, perceived pressure, to fly a slightly different routine on day two of a show. No one has ever mentioned this to me, so it is a self-inflicted pressure I put on myself.

I value what risk assessment and mitigation processes bring in my display flying. I thought I had used them appropriately in my planning, but I still made a basic mistake in the process when I introduced options in my routine. If you make a mistake, consider using "Terminate" and take a break.

Incident at Dunsfold Wings & Wheels – FDD Narrative

FDD Narrative

The display was the penultimate item on a very safe and satisfactory weekend of flying and the aircraft was flying a gyroscopic/tumbling manoeuvre to the east of the airfield (crowd right). The aircraft was some distance from crowd centre at the time and the manoeuvre was apparently mishandled requiring the aircraft to be recovered from the vertical, during which it came close to the minimum height. The mishandling of the manoeuvre was seen by two members of the FCC outside the cabin but not by me or another FCC member inside the cabin as we were engaged in other business. We only witnessed the end of the recovery.

We all discussed what had happened, but a call was not immediately made on the R/T and the display continued, safely, for the last minute of the display. I was aware that the pilot was flying home that evening and so I dispatched two members of the FCC to go to the parking area and debrief him. In addition to that discussion, the pilot was also very keen to come and talk to me and other FCC members and the whole incident was thoroughly debriefed face to face. He admitted that he had made an error and talked through some possible causes. Throughout he was honest, contrite, and receptive to feedback. He also had the chance to speak to one of his DAEs.

One comment worthy of mention was that the pilot was apparently not clear on the fact that he could have self-terminated his display, whether he called it on the radio or not, and could have recommenced if we had both agreed. This is clear in CAP 403 but is perhaps not that well understood by DAs.

Following the debrief with the pilot, and over the following week, my FCC and I debriefed our actions and believe that we should have acted differently. We all agree, with the benefit of hindsight, that a 'Terminate' or potentially a 'STOP' call would have been appropriate in this situation. Had it happened over the airfield, or had it been more obvious, then a call would likely have been made instantly, and the fact that it happened where it did should have no bearing on our decision making. My FCC are all empowered through their TORs to make warning calls if need be and I think that we all got distracted by discussing what had happened rather than taking the

immediate action based on the impression that **something** unusual had happened. It has been a valuable debriefing and learning process for us all.

Appendix B

Example of Amplifying Hazard Information for Emergency Crews

BRONCO DEMO TEAM

CREW RESCUE AND FIREFIGHTING INFORMATION

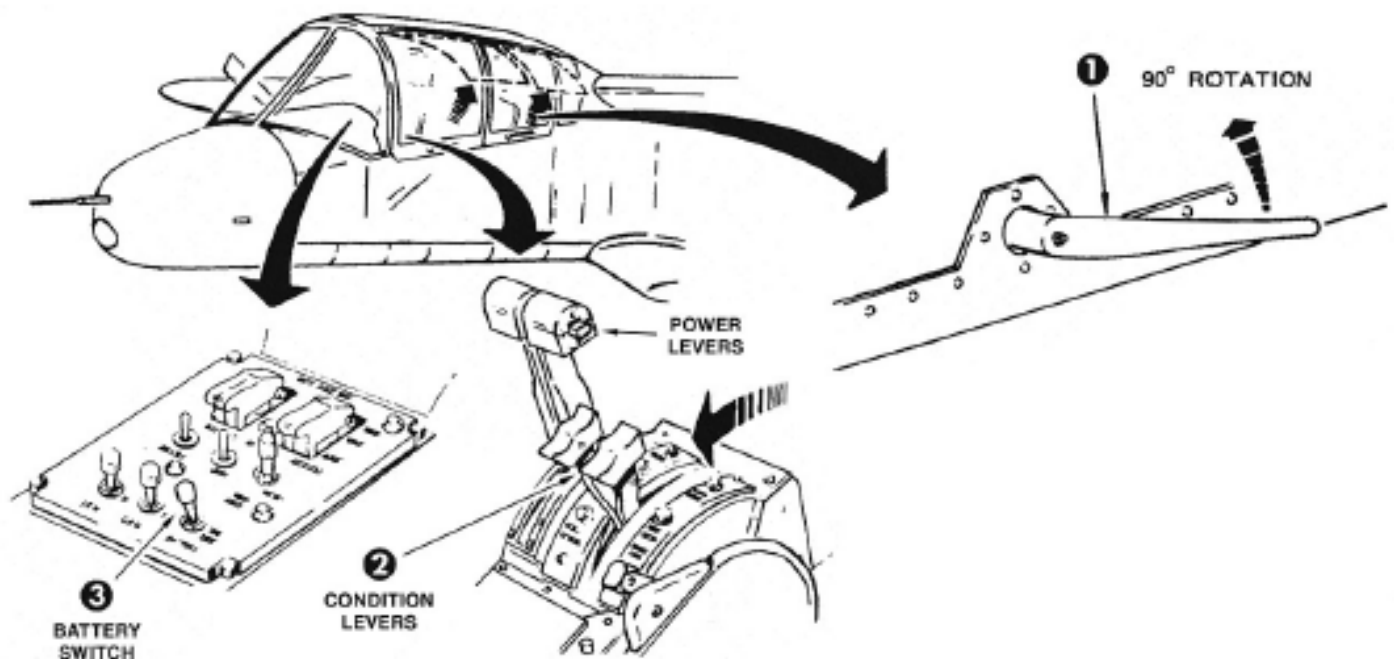
OV-10B
G-ONAA (99+18)

REVISION 1.0 / RELEASED

INTRODUCTION

THIS DOCUMENT GIVES A BRIEF OVERVIEW OF THE RESCUE AND FIREFIGHTING PROCEDURES FOR THE OV-10B BRONCO. IT IS INTENDED AS A FIRST LOOK OR REMINDER. IT DOES NOT SUPERSEDE A BRIEFING AT THE AIRCRAFT. IF YOU REQUIRE A SAFETY BRIEFING, DO NOT HESITATE TO CONTACT ANY MEMBER OF THE BRONCO DEMO TEAM.

EMERGENCY ACCESS AND CREW EVACUATION



- 1** OPEN CANOPY DOORS BY ROTATING HANDLES APPROXIMATELY 90° (CLOCKWISE ON RIGHT DOOR, COUNTERCLOCKWISE ON LEFT DOOR). BUNGEEES WILL RETAIN DOORS IN THE OPEN POSITION ON RIGHT HAND SIDE ONLY!
- 2** SHUT DOWN ENGINES IF NECESSARY BY PULLING CONDITION LEVERS FULLY AFT.
- 3** PLACE BATTERY SWITCH TO „OFF“. THE BATTERY SWITCH IS LOCATED FRONT LEFT IN THE COCKPIT, ABOUT NEXT TO PILOTS LEFT KNEE.

NOTE
NORMAL COCKPIT ENTRANCE AND EXIT IS THROUGH RIGHT SIDE CANOPY DOORS, BUT EMERGENCY ACCESS MAY BE MADE FROM EITHER THE RIGHT OR LEFT SIDE.

NOTE
IF CANOPY SIDE PANELS ARE JAMMED AND CANNOT BE OPENED, CUT THROUGH THE ACRYLIC PLASTIC WINDOWS.

BRONCO DEMO TEAM

CREW RESCUE AND FIREFIGHTING INFORMATION

OV-10B
G-ONAA (99+18)

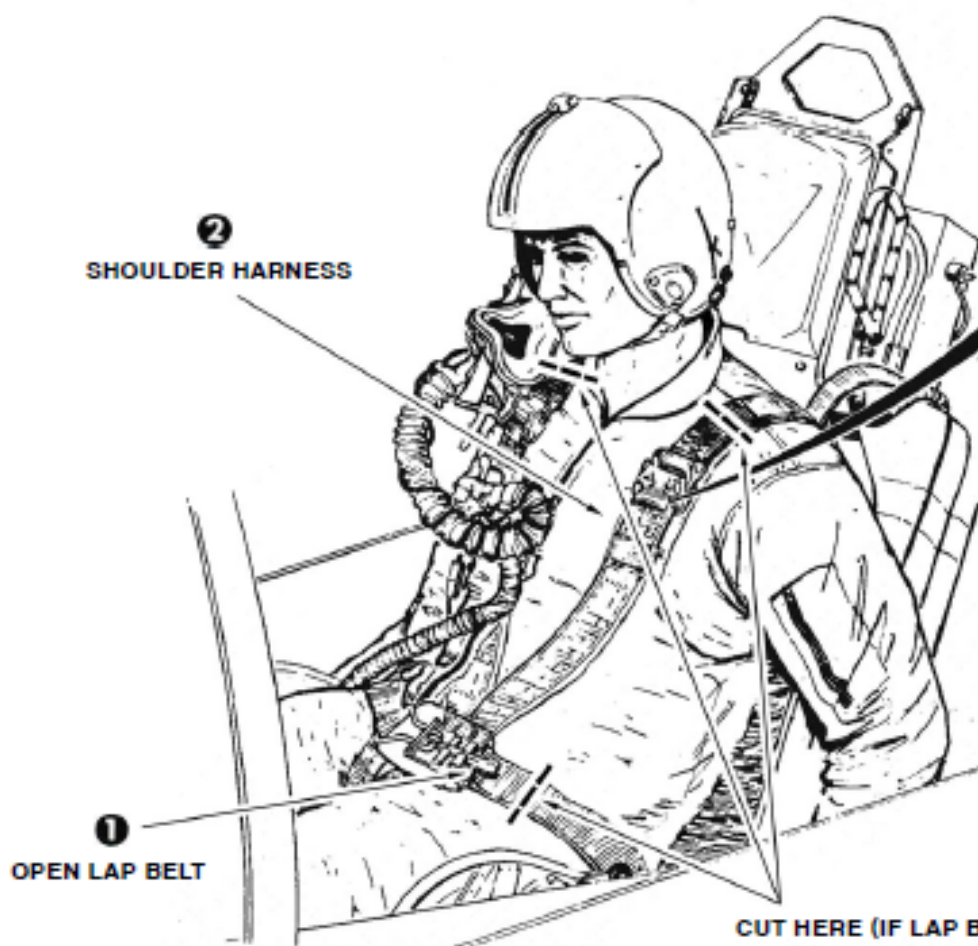
REVISION 1.0 / RELEASED

DISCONNECT CREWMEN FROM AIRCRAFT

- 1 OPEN LAP BELT. SHOULDER HARNESS COMES LOOSE WHEN LAP BELT OPENS.

INFO
IF LAP BELT DOES NOT OPEN, CUT
HARNESS AT INDICATED LOCATIONS.

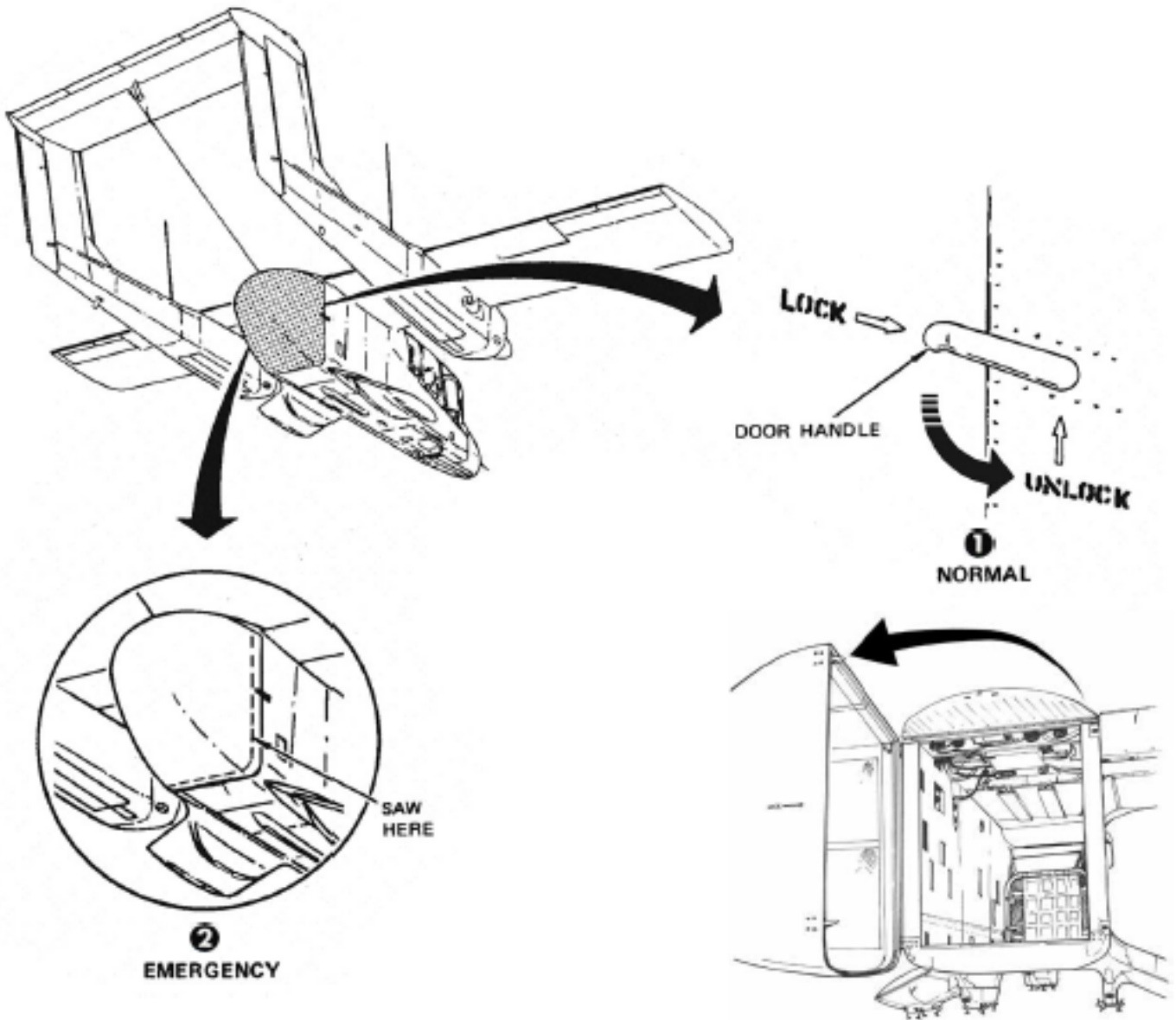
- 2 IF SHOULDER HARNESS NEEDS TO BE LOOSENED, PULL LOOSE SHORT END UPWARDS. NOTE THAT IT CAN NOT BE OPENED WITH THIS PROCEDURE.



IMPORTANT:
EJECTION SEATS ARE
INOPERATIVE!
NO ACTION REQUIRED!

CUT HERE (IF LAP BELT DOES NOT OPEN)

CARGO COMPARTMENT ENTRY



CARGO COMPARTMENT ENTRY NORMAL PROCEDURE ①

ROTATE DOOR HANDLE COUNTERCLOCKWISE
AND PUSH DOOR OPEN.

CARGO COMPARTMENT ENTRY EMERGENCY PROCEDURE ②

USE POWER SAW AND CUT THROUGH DOOR AS
INDICATED IF NORMAL RELEASE HANDLE
MECHANISM FAILS TO OPEN DOOR

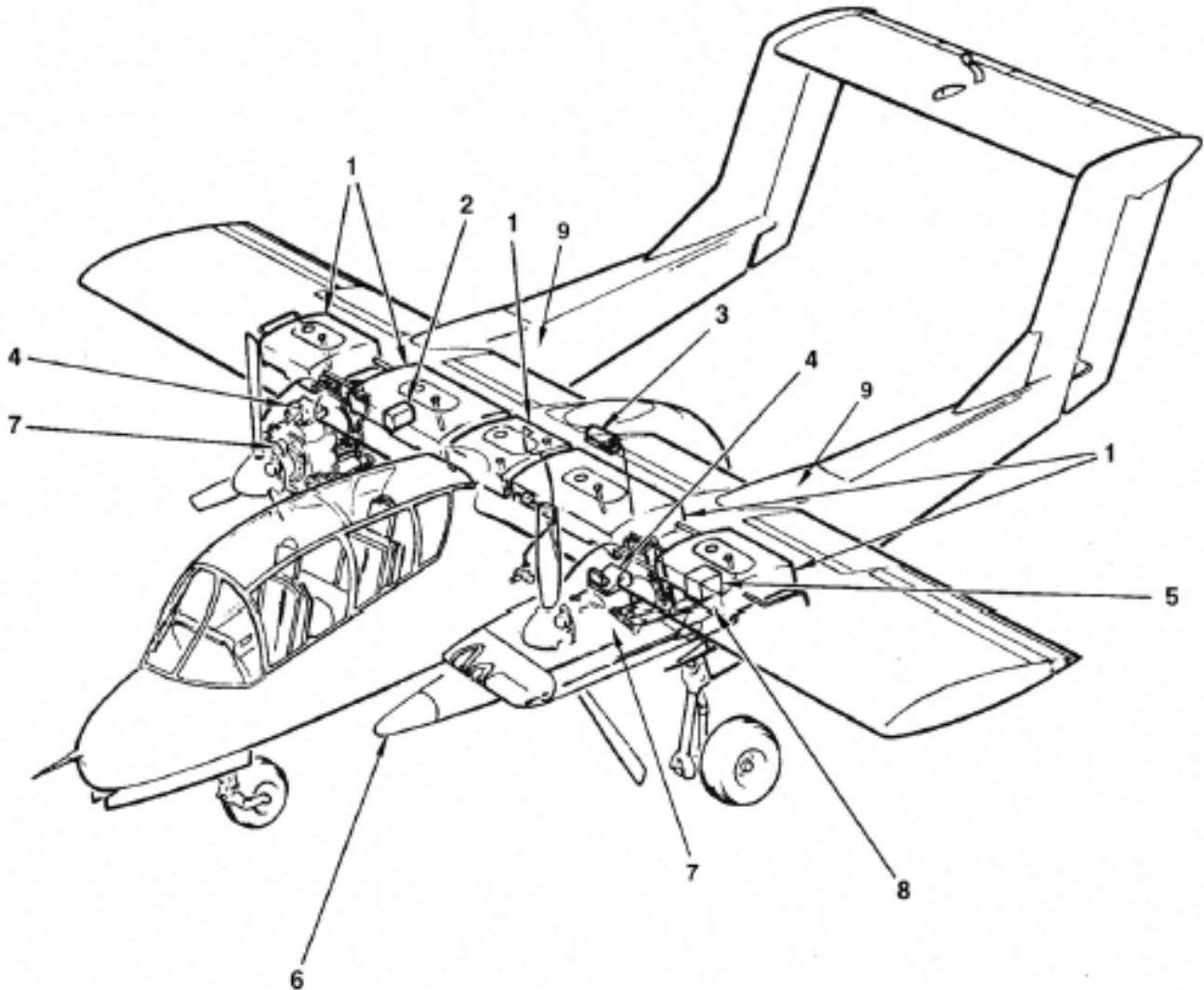
BRONCO DEMO TEAM

CREW RESCUE AND FIREFIGHTING INFORMATION

OV-10B
G-ONAA (99+18)

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FLAMMABLE MATERIALS AND EXPLOSIVES

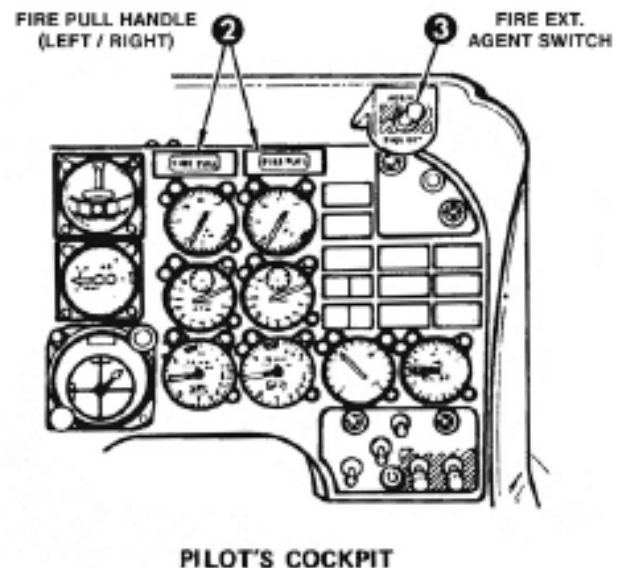
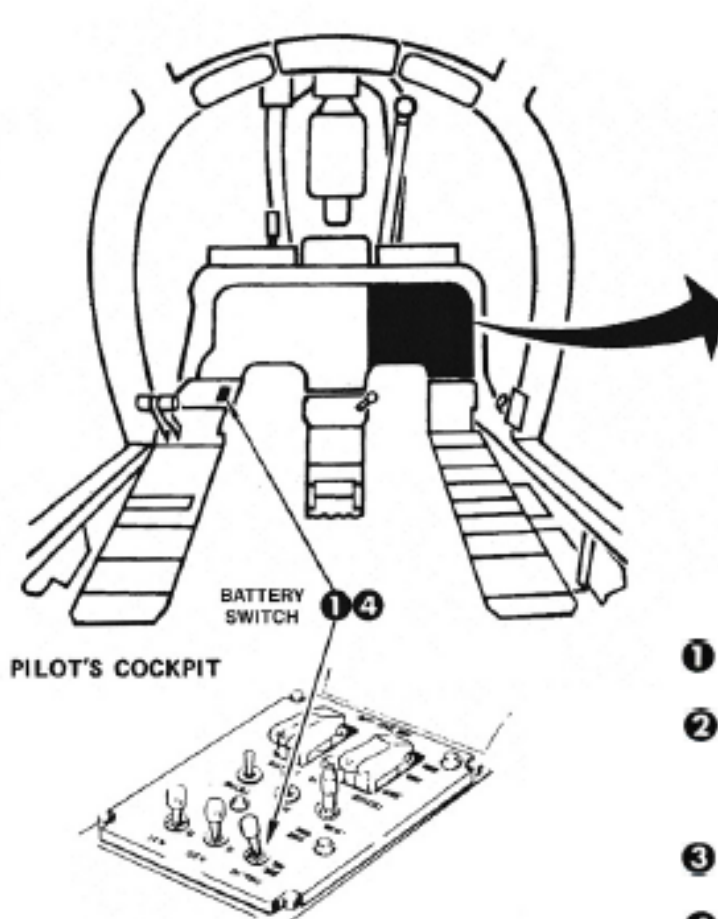


- 1: FUEL TANKS (5x)
- 2: RIGHT BATTERY
- 3: HYDRAULIC RESERVOIR
- 4: ENGINE OIL TANK (LEFT AND RIGHT)
- 5: LEFT BATTERY
- 6: EXTERNAL FUEL TANK
- 7: ENGINES
- 8: FOG OIL TANK (LEFT BOOM ONLY)
- 9: HIGH PRESSURE FIRE BOTTLES

INFORMATION:
EJECTION SEATS INOPERATIVE! NO EXPLOSIVE CHARGES FITTED!
NEITHER WEAPONS NOR AMMUNITION ON BOARD!

CAUTION:
HIGH PRESSURE FIRE
BOTTLES IN BOOMS.
(SMALL EXPLOSIVE CHARGES)

EMERGENCY ENGINE FIRE EXTINGUISHING



- 1 POSITION BATTERY SWITCH TO „ON“.
- 2 PULL APPLICABLE FIRE PULL HANDLE (LEFT HANDLE FOR LEFT ENGINE AND RIGHT HANDLE FOR RIGHT ENGINE).
- 3 ACTUATE FIRE EXTINGUISHER AGENT SWITCH.
- 4 POSITION BATTERY SWITCH TO „OFF“.

CAUTION:

DO NOT CHOP BELOW THIS LEVEL TO PREVENT DAMAGE TO FUEL LINES

- 5 TO EXTINGUISH ENGINE FIRE FROM OUTSIDE THE AIRPLANE, CHOP HOLE IN ENGINE NANNELLE AND INJECT CO₂ OR A DRY CHEMICAL AGENT INTO THE ENGINE COMPARTMENT.

