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Pre-Season
Flying Display Symposium

2025

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Evan Davies

Display Symposium Co-ord

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Planes TV Video

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Paul Sall

Air Display Lead
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Picture: Steven Comber

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Tendai Mutambirwa

SARG - Head of Safety Operations

Picture: Steven Comber

Aims of the Symposium

- Regulatory feedback
- Safety awareness
- Human factors training
- Identification of lessons learnt and to disseminate best practice to DAEs, Display Pilots, Event Organisers and Flying Display Directors (FDDs).
- To provide the opportunity to share feedback with regulators.

Paul Sall
Air Display Lead

Picture: Steven Comber

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Tuesday 18th March 2025

Start	End	Session
1200	1300	Main Symposium Registration
1300	1315	Welcome and Introductions
1315		Display Season 2024 Trends Analysis and DS 24 Safety Survey
	1430	CAP 403, CAP 1724 and RA2335 BADA Update
1430	1500	The Blades – Emergency at Duxford
1500	1530	Coffee/Tea (Provided)
1530	1630	Incident at Stow Maries
1630	1715	HF Presentations
1715	1745	ATC at Flying Displays
1745	1800	Washup/ Questions & Brief for Day Two
1800	2000	Fork Supper (Provided) **Cash Bar**

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Wednesday 19th March 2025

Start	End	Session		
0900	0930	RFFS Presentation/ Update		
0930	1000	C-UAS Operations		
1000	1030	RAF Tutor		
1030	1100	AFDD Best Practice		
1100	1120	Coffee/Tea (Provided)		
		Syndicate 1 Room	Syndicate 2 Room	Syndicate 3 Room
		DAE / Display Pilots	FDD	EO
1120	1300	Sea Fury engine failure HF incident Gazelle Sqn Consequences of HF in the Real World	FDD Stories Stop Videos FCC construct Mil FDD construct	Dr Geoff Coxon (BADA)
1300	1400	Lunch (Provided)		
1400	1430	DAE / Display Pilots Summary to Main Forum	FDD Summary to Main Forum	EO Summary to Main Forum
1430	1515	FIA Best Practice		
1515	1535	Reflections of 10 Years of Display Flying		
1535	1540	Future Events /Dates		
1540	1550	Closing Remarks		

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Display Season 2024

Safety Survey and Trends Analysis

Paul Sall
Air Display Lead

Picture: Steven Comber

Trends Analysis and Safety Survey

- *Open between 28th Sept to 30th Nov 2024*
- *Open to all who play a role in UK Flying Displays*
- *Anonymous*
- *Aim:*
  - *To gain a broader perspective of issues or perceived risks that otherwise would not be known through normal reporting channels*
  - *To inform future regulatory amendments*
- *Advertised through Skywise, DAE Seminar and DS24 Post Season Symposium*

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Trends Analysis and Safety Survey

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- *2024 - 62 respondents*

	2021	2022	2023	2024
Answer Choices	**Responses**	**Responses**	**Responses**	**Responses**
Tyro Display Pilot (TDA)	0	3	5	1
Display Pilot (DA)	55	40	48	38
Display Pilot Evaluator (DAE)	12	22	22	16
Flying Display Director (FDD)	29	13	23	14
Flying Control Committee (FCC)	20	11	18	13
Event Organiser (EO)	7	1	3	5
Air Display Event Commentator	3	0	2	1
Air Display Team Commentator	3	1	1	0
Air Display Team Manager / Staff	5	6	4	2
SAG member	3	3	1	1
Other	6	4	5	7
Answered	**84**	**58**	**77**	**62**

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Trends Analysis

- *Safety Survey*
- *1305*
- *Assurance Visit*
- *General Observations/Engagement*

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Trends Analysis

Richard Crockett
Flight Standards Officer

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DS24 - Trends Analysis Unlocking Key Lessons

UK Civil Aviation Authority

Just Culture is Thriving

95% feel the flying display community has a strong just culture

Response to Safety Survey is Low

Only **62** members of the display community responding

Human Factors Matter

98% use human factors knowledge to improve display safety.

Incident Reporting Needs Focus

Nearly 20% of all respondents reported feeling apprehensive about reporting safety concerns

Fatigue Monitoring Needs Attention

11% of you feel that you are participating in flying displays when fatigued.

Picture: Steven Comber

DS24 - Trends Analysis Unlocking Key Lessons

Bottom Line:

The flying display community appears **more engaged, compliant, and safety-conscious than ever before!**

Regulations Awareness at Its Peak

100% of respondents ensure they are conversant with current regulations, **up** from 83% in 2023.

Stakeholder Reporting Holds Strong

Stakeholders reporting remains high at **90%**, showing a positive trend up from 77% in 2022.

Confidence in CAP Guidance

97% of respondents believe that changes to CAP403 and CAP1724 have **enhanced flying display safety**—a **23% increase** since 2021

Picture: Steven Comber

DS24 - Trends Analysis Unlocking Key Lessons

Briefings

- Consistency in briefings, especially for formations is essential.
- Briefings should be clear and unambiguous.

Picture: Steven

DS24 - Trends Analysis Unlocking Key Lessons

Formations

- Increasing instances of mixed formations.
- Formations put together at short notice can affect ability to practice.

Picture: Steven Comber

DS24 - Trends Analysis Unlocking Key Lessons

Attitudes & Behaviours

- Pilots should be willing to admit errors rather than let ego get in the way.
- Approachability, openness, and knowledge-sharing are key to improving safety.
- Arrogance and overconfidence in display pilots poses a safety risk.

Picture: Steven

DS24 - Trends Analysis Unlocking Key Lessons

Culture

- Near misses should be reported and reviewed for learning opportunities.
- Some pilots consider warning calls to be punitive.
- Pressure to perform unplanned, unbriefed formation flypasts still exists.

Picture: Steven Comber

DS24 - Trends Analysis Unlocking Key Lessons

STOP & Warning Calls

- Improve the use of STOP and warning calls; ensure they are actually made.
- Some FDDs hesitate to make a STOP call, even when necessary.
- Some hesitation to make warning and safety calls to formation teams.
- FCCs sometimes lack the knowledge make warning and safety calls.

Picture: Steven Comber

DS25 – Focus Areas: Warning Calls

- Safety and warning calls aim to support the FDD and pilots.
- FDDs should consider the most suitable moment to issue a warning or safety call

Picture: Steven Comber

DS25 – Focus Areas: Warning Calls

- The FDD must ensure the FCC is SQEP

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DS25 – Take Aways

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We, the community, should:

- Treat warning calls as standard practice and make them whenever needed;
- Ensure that FCCs are SQEP;
- Keep promoting clearer and more unambiguous briefings;
- Continue to encourage positive attitudes and behaviours.

Picture: Steven Comber

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DS25 – Take Aways

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We should also:

Play further attention to mixed formations, and;

Make sure they are fully briefed;

Ensure that leaders are fully aware of their members capabilities;

Work to create briefing environments where everyone feels heard and, most importantly, empowered to say ‘no’.

Picture: Steven Comber

DS25 – Take Aways

Lastly, we must;

Keep reporting and providing feedback on essential safety information.

And **most** importantly**;**

Don't hesitate to speak up if **you** have **any** concerns!

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Wg Cdr Russ Lavis
Wg Cdr Dave Middleton

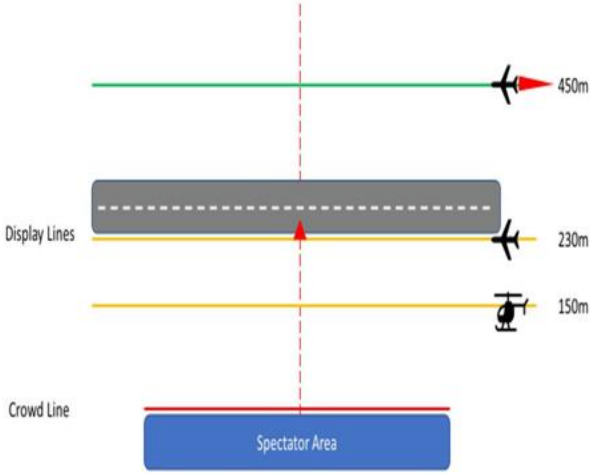
Picture: Steven Comber

FDD vs ATCO - PRIMACY

- FDD – ATCO relationship:
  - Agree who has primacy and control of the runway/airfield at any given time.
  - During a display, the FDD **should** always have primacy.
  - Non-standard Warning Calls serve to distract Display participant during critical stages of flight.
  - ATCOs – don't be instinctive – chat to the FDD – think before you TX.
  - Mil perspective, 2 Gp looking to develop training for ATCOs to allow better understanding display activity.

Use of Optical Tracking Systems at Air Displays

- ✅ **Purpose of Optical Tracking Systems:**
- **Improve safety and situational awareness.**
- **Used to monitor aircraft position with relation to display lines or airspace (regulatory compliance).**
- **Assist FDD/FCC with display management and post-event analysis (if recording system available?).**



- ✅ **Lessons Identified:**
- **If used, make sure you have an SOP – needs to be understood when and how display line monitoring equipment is employed.**
- **Make sure the system is fit for purpose for your display.**
- **Not a replacement for the Mk I eye-ball – get your head out of the window.**
- **Placing an FCC member of placed on the display line, whenever practicable, is still the best way of for monitoring the display line.**

Insurance for Civil Displays over MOD-Occupied Property

JSP 360
Use of Military Aerodromes by Civil Aircraft

Part 2: Guidance

TEAM RAVEN

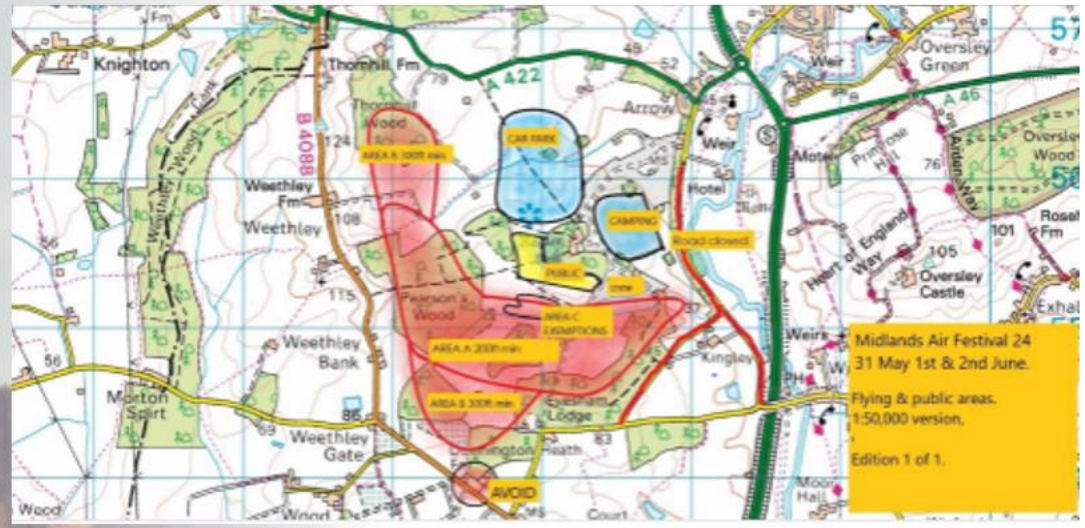
- JSP 360 update due to be published shortly.
- Insurance Levels per aircraft are now:
  - £50M when the Maximum Take Off Mass (MTOM) is greater than 2700 kg.
  - £25M when the MTOM is 2700kg and below.
- Currently no MOD appetite to adjust further.
- Note - scale already in place for Landing Fees – 3 levels.
- RC need a champion to take issue forward – policy not regulation.

MTOM* of aircraft (Including gliders, balloons, microlights and airships) (Metric Tonnes (MT))	Sum insured not less than (£)
Up to 0.45 MT / 450 kg	2,000,000
Over 0.45 MT / 450 kg and less than 14.5 MT / 14,500 kg	7,500,000
Over 14.5 MT / 14,500 kg	25,000,000

* MTOM = Maximum Take Off Mass (sometimes described as the Maximum Take Off Weight or MTOW)

Other Issues

- **Drones:**
  - **Increasing threat – have a plan for dealing with them.**
- **Display Maps:**
  - **Get them to MOD Teams asap to allow Desk Top Reviews to be conducted.**



RA2335 – V13 – Changes

- Alignment with RA2330: Low Flying regarding Public Assemblies – 1000 bodies.
- RA2335 better aligned with Stanag 3533 – Mach limit now M0.95 but weather still more restrictive in RA2335.
- GM on RPAS operations at Displays lifted to AMC.
- GM on Flying Display Director Accreditation moved to sperate section (RA2335(4)) and GM lifted to AMC.
- GM related to Validation of Foreign Mil lifted to AMC.
- Para numbers have changed!! Check your documents.

RA2335 – V13 – Changes – Cont'd

Introduction of regulation associated with the conduct of Display Parachuting (RA2335(5) – RA2335(7)):

- **Parachute Display Team Organization and Management.**
- **Display Parachute Training and Practices**
- **Display Parachute Separation Distances, Minima and Restrictions.**

Impact on FDD – Foreign Mil Parachute Display Teams need to be validated.

Specific Parachute Display forms developed (Forms 6 – 10).

CAA issue Permission for use of G Registered Aircraft

RA2335 applies once out of the aircraft

CAP660/RA2335 if NoN MOD Property or G Reg aircraft

RA2335 - Mil	CAP403 - Civ	Comments
HoE approves flying display: FDD INFORMS MAA	CAA issue Article 86	Mil has no 'permission' as such
HoE accountable for risk: accountable for ALARP and Tolerable decisions: Must record decisions	FDD (or accountable manager) accountable for risk	Separate RA for risk assessment process. FDDs trained to same process as civ FDD: many refer to2335 and CAP403 when planning
Mapping by FDD for approval by HoE: CAP 403 mapping guidance generally used (update to RA2335??)	Mapping submitted to CAA.	Forms part of CAA issues Art 86 permission
CAA DA accepted by MAA but risk due to any RA non-compliance accepted by HoE (on recommend of FDD)	FDD accountable for managing display. CAA Art 86 allows mil to use PDA at discretion of the FDD	
Generally, FDD part of a larger team	FDD often stand alone	
Para at a display now regulated by RA2335. FDD extra regs to know	Para still a dark art (CAP660)	Some key para regs in CAP403
FDD can apply for waivers for foreign mil (on behalf of HoE)	Foreign mil are RA2335 regulated	If in doubt apply the most restrictive of CAP403 or RA2335 (Waivers)

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Regulatory Update

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Paul Szluha

Flight Standards Officer

CAA Air Display Regulation Team

Picture: Steven Comber

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Scope:

- *CAP 403 / CAP 1724 consultation*
- *CAP 403 / CAP 1724 common changes*
- *CAP 403 changes*
- *CAP 1724 changes*
- *DA Changes*

Picture: Steven Comber

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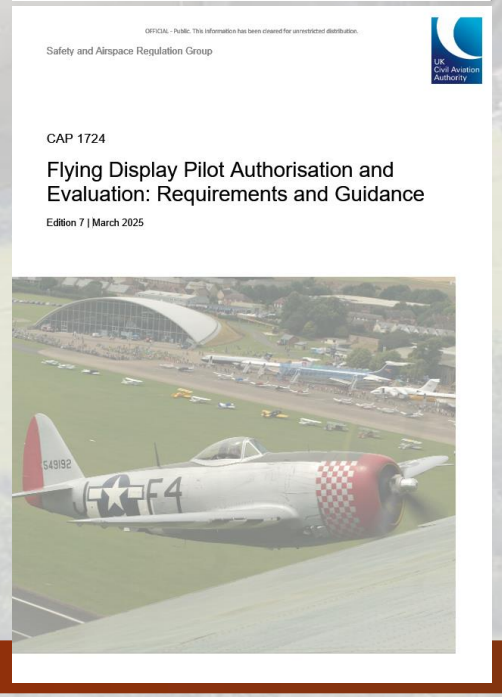
CAP 403

- *Public consultation 09/12/24 - 03/01/25*
- *12 respondents, 65 comments*
- *Published 04/02/25*

CAP 1724

- *Public consultation 16/01/25 - 12/02/25*
- *15 responses, 49 comments*
- *Published 10/03/25*



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Picture: Steven Comber

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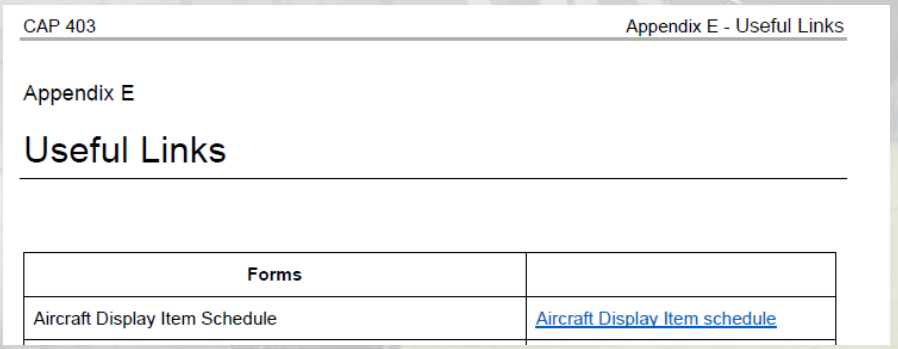
CAP 403 / 1724 common changes

- *Minimal change, mostly focusing on further clarity and minor editorial changes*
- *Changes to both CAPs for accessibility reasons*
- *New appendix in each CAP with links*



CAP 403 Appendix E - Useful Links

Appendix E

Useful Links

Forms	
Aircraft Display Item Schedule	Aircraft Display Item schedule

- *Clarification that all references to 'pilot' are referring to 'Pilot-in-Command'*

Picture: Steven Comber

Regulatory Update

CAP 403 / 1724 common changes

Revised criteria for LTPs for display practice

- *Risk assessments must be carried out by a CAA accredited / appointed person (i.e. FDD / DAE) or the airfield's accountable manager.*
- *Pilots may practice within the privileges and scope of a valid DA.*
- *Initial issue DAs, or upgrades, must have a briefing and authorisation from their DAE.*
- *DAEs to keep records of each flight they authorise.*

Picture: Steven Comber

Regulatory Update

CAP 403 / 1724 common changes

Revised criteria for LTPs for display practice

- *Requires the authorisation of the Permission holder*
- *The Permission holder must keep records of those authorised to practice (Schedule VI template provided)*
- *As for Art 86, minimum crew only (DAE may be onboard)*
- *Min height may now be specified by DAE for initial issues and upgrades*

Picture: Steven Comber

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Regulatory Update

CAP 403 / 1724 common changes

Change to Symposium attendance requirements

- *Must attend a Pre-Display Season Symposium at least once every **4 years.***
- *Initial DA holders must attend a Pre-Display Season Symposium within the first **24 months** of point of issue of the DA.*

- *No more CAA post-season Symposiums*
- *No change to DAE seminar attendance requirement*
- *Investigate on-line participation*

Reminder: Sign the sign-in sheet

Picture: Steven Comber

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Regulatory Update

CAP 403 changes

Revised methodology for the use of separation distances

- *All lateral separation distance Exemptions have been revoked*

Previous

The minimum lateral Separation Distances between display aircraft and Crowd Line are as follows:

Type of aircraft	Type of display	Separation distance
All aircraft	All fixed and rotary-wing aircraft displays	230 metres
All aircraft	Speed greater than 300KIAS with velocity vector towards crowd	450 metres

For the following aircraft and activities, reduced minimum separations are permitted:

Type of aircraft	Type of display	Separation distance
Light Aircraft (MTOM less than 1200kg and speed less than 150KIAS[32])	Fixed wing aircraft displays	150 metres
Rotary-wing	Non-aerobatic flight and under-slung load operations	150 metres
VSTOL Aircraft	Vertical take-off and landing, and non-wing borne flight at low speed	150 metres
VSTOL Aircraft	Conventional wing borne flight	230 metres

New

The minimum lateral Separation Distances between display aircraft and Crowd Line are as follows:

Type of aircraft	Type of display	Separation distance
All aircraft	All displays	230 metres
All aircraft	Speed greater than 300KIAS with velocity vector towards crowd	450 metres

For the following aircraft and activities, reduced minimum separations are permitted:

Type of aircraft	Type of display	Separation distance
All fixed wing displays	Refer to 150 metre speed / mass limitations graph	150 / 230 metres
Rotary-wing	Non-aerobatic flight and under-slung load operations	150 metres
VSTOL Aircraft	Vertical take-off and landing, and non-wing borne flight at low speed	150 metres
VSTOL Aircraft	Conventional wing borne flight Refer to 150 metre speed / mass limitations graph	150 / 230 metres

Picture: Steven Comper

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CAP 403 changes

Revised methodology for the use of separation distances

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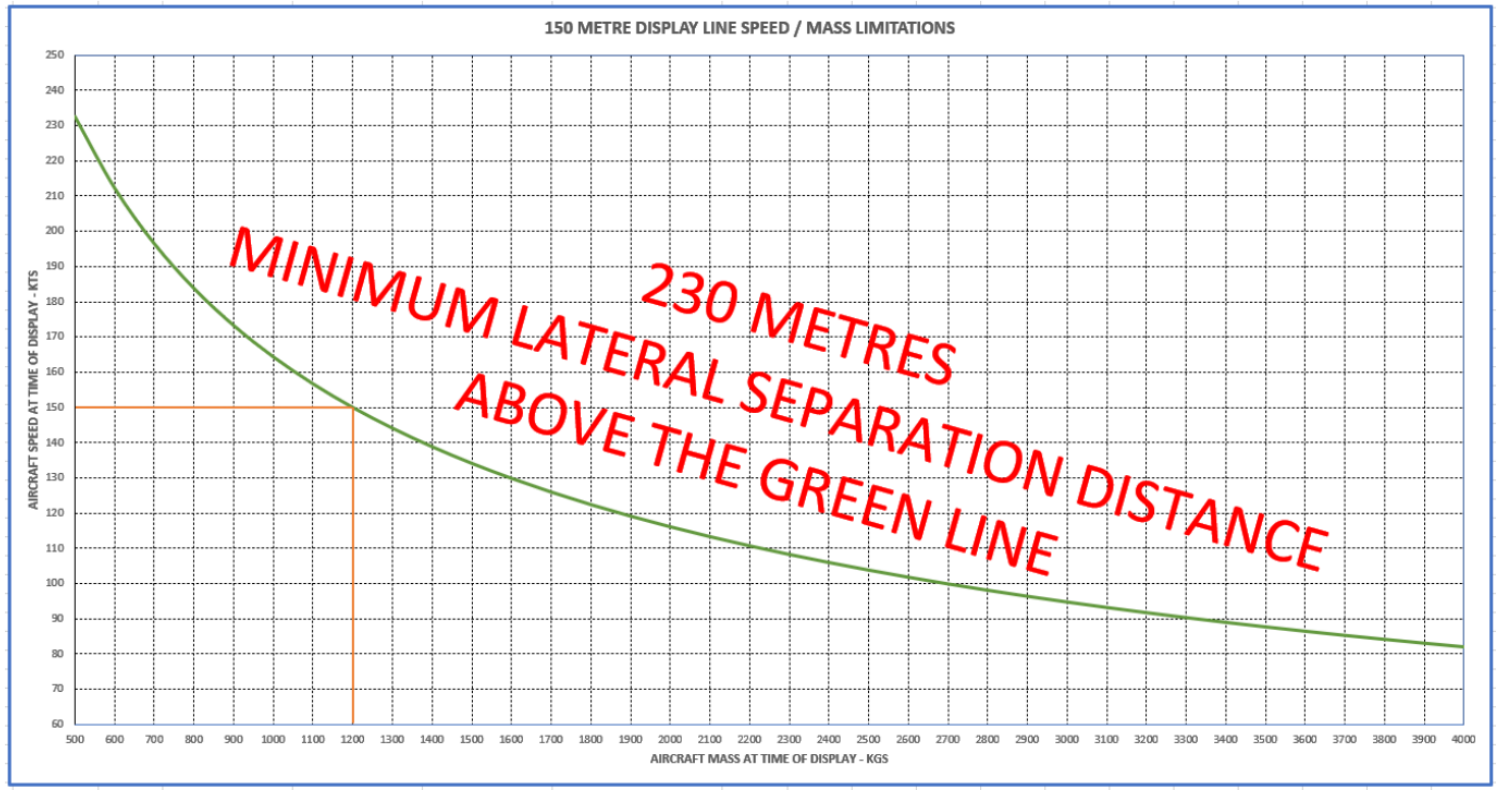

5.42 The graph shows a line of constant kinetic energy equivalent to a 1200kg aircraft flying at 150kt. Displays involving combinations of mass and speed under the line may use a lateral separation distance of 150m, subject to FDD agreement. Displays involving combinations of mass and speed that are above the line must use a lateral separation distance of not less than 230m.

Picture: Steven Comber

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CAP 403 changes

Revised methodology for the use of separation distances

For aircraft with a maximum speed of 100KIAS and mass of less than 1200kg (at the time of display), the following reduced minimum separation is permitted:

Type of display	Maximum height inside 150 metres	Maximum on-crowd wind component inside 150 metres	Separation distance
Non-aerobatic	200 feet	10 kts	75 metres

Inside 150 metres:

a) when turning onto, or parallel to the 75m line, the maximum permitted bank angle is 45 degrees

b) height-gaining manoeuvres with any on crowd vector **must not** be performed

Use of the 75m line is not permitted at any Flying Display where the minimum height stated on the CAA Permission is 200 feet AGL or higher.

Picture: Steven Comber

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CAP 403 changes

Revised methodology for the use of separation distances

- *Pilots to notify FDDs via 1327 (or FDDs equivalent)*

e) I intend to use the following CAP 403 minimum lateral separation distance(s) during my display:

230 metres ☐ (450 metres for speeds greater than 300kts with velocity vector towards crowd)

150 metres ☐ The maximum aircraft speed inside 230 metres will be _____ kts
The maximum aircraft mass inside 230 metres will be _____ kgs

75 metres ☐ The maximum aircraft speed inside 150 metres will be _____ kts
The maximum aircraft mass inside 150 metres will be _____ kgs

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Regulatory Update

CAP 403 changes

Revised appendix A

- *Definition of Hazard*
  - *Old*

Hazard / risk definition

A11 A hazard is defined as something (eg: an object, a property of a substance, a phenomenon or an activity) that can cause adverse effects.[71].

  - *New*

Hazard / risk definition

A13 A hazard is defined as a condition, object or activity with the potential of causing injuries to personnel, damage to equipment or structures, loss of material or reduction of ability to perform a prescribed function.

- *Use of term 'safety risk'*

Picture: Steven Comber

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Regulatory Update

CAP 1724 changes

New initial DA notification form

- *Process for initial DA applicants (like that in USA)*
- *Why do we need it?*
  - *To give CAA more oversight of new DA candidates*
  - *To bolster the SRG 1303B assessment*
  - *To help DAEs with decision making / spread the burden*
  - *To prevent applications without prior awareness (done deal)*

Picture: Steven Comber

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CAP 1724 changes

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New initial DA notification form

Purpose

- *Filter out unsuitable candidates*
- *A closer look at an applicant's experience / background / suitability*
- *To communicate with the DAE and share any intel*
- *A move towards preventing DAE shopping*

Picture: Steven Comber

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CAP 1724 changes

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New initial DA notification form

- *To be submitted in advance of initial DA application, ideally before mentoring / workup has commenced*
- *Once processed, the CAA will:*
  - *Contact DAE with a 'Yes' / 'No' and share any intel*
  - *Issue provisional DA number*
- *DA number field on existing SRG1300 now mandatory.*

Picture: Steven Comber

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Regulatory Update

CAP 1724 changes

Merging of turboprop aircraft into existing Cats

Description	Group	Category	Description
Single Engine Piston, Turbo Prop & Electric Aeroplanes	SE	A	≤200 hp (shp) / 149 kW
		B	201 hp (shp) / 150 kW to ≤600 hp (shp) / 447 kW
		C	>600 hp (shp) / 448 kW
Multi Engine Piston, Turbo Prop & Electric Aeroplanes	ME	D	≤300 hp (shp) / 223 kW total
		E	301 hp (shp) / 224 kW to ≤600 hp (shp) / 448 kW total
		F	>600 hp (shp) / 448 kW total, single pilot
		Z	>600 hp (shp) / 448 kW total, multi-pilot/crew

Picture: Steven Comber

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Regulatory Update

CAP 1724 changes

Min currency requirements for aerobatics

Aerobatic Skill Level	Within 90 days of date of display	Within 30 days of date of display
Standard Intermediate	3 complete display routines flown or practised	1 complete display routine flown or practised at appropriate aerobatic skill level **in DA category**
Advanced Unlimited	3 complete display routines flown or practiced at appropriate aerobatic skill level **in DA category**	1 complete display routine flown or practised at appropriate aerobatic skill level **in DA category**

Picture: Steven Comber

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CAP 1724 changes

Amendments to Appendix C DAE Checklist

- *Removal of GDPR info from front page*
- *Question added to ask candidate about any other DAE engagement*
- *New item to discuss / assess the understanding of any skill level not being evaluated*

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CAP 1724 changes

DA Certificate proposed changes

- *Rotate Schedule 1*
- *Schedule 3 & 4 only show definitions of Cats and skill levels held*
- *Symp date recorded on cert*
- *History of evaluations to become 'rolling'*

- *Explore notifications of expiry dates*
- *New database….teething problems!*

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QUESTIONS?

Picture: Steven Comber

BADA (& APPG)

Pre Season Symposium 2025

BADA


CR3A
appg
All-Party Parliamentary Group for
AVIATION

Save the Date

13th and 14th October 2025

BADA

Farnborough International Exhibition and Conference Centre

- 1300 on the 13th October to
- 1400 on the 14th
- Formal Supper 13th, followed by Drinks Reception
- Break out rooms
- EO Summit, BADA AGM & More
- Special Hotel Rates
- All info at bada.uk.com

BADA


BADA

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Dealing with the Unexpected

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Andy Evans

‘The Blades’

Picture: Steven Comber

Dealing with the Unexpected

DUXFORD – 18/19 JUN 22

PLAN

- Blades take-off into display
- B-17 lines up on the runway before the final manoeuvre
- B-17 departs after final manoeuvre whilst Blades get back into formation
- Blades join formation with the B-17 and perform 2 flypasts.
- Blades separate from formation and hold off
- B-17 displays
- On B-17 completion, Blades land, then B-17 land

Saturday Flypast

Internal Footage

Formation Brief with B-17

- Standard domestics brief
- What was covered in detail
  - Formation to be used for flypasts
  - When and how the B-17 was going to get airborne
  - How Blades were going to get back together and how to join B-17
  - What was the ground track for the flypasts
  - How to separate the formation at the end
  - Loser plan
    - Same brief as above – this time with 3 Blades
- What Ifs and Emergencies within the mixed formation

Sunday – Blades Show

The Unexpected

- Started Loop
  - I looked at wingmen and saw escape.
- Expected to hear ‘Blade 2 escaping’
- Standard escape is up and out, No 2 stopped pulling
- Heard nothing so I asked if he was OK.
- Completed loop and when visual again (smoke left on), manoeuvred formation away from No 2

The MOR

- The incident aircraft (callsign Blade 2) was part of a 4-ship aerobatic formation sortie displaying in support of Duxford Summer Air Show. The pre-sortie brief was conducted in the presence of the Flying Control Committee (FCC) and pre-flight preparations, checks, start up and take off were conducted without incident.

- Approximately 7 minutes into the display routine, the 4 aircraft were in 'Box' Formation (with Blade 2 on the right of the Leader and slightly behind) for the next planned manoeuvre - a loop flown parallel to the display line. As the Leader called 'Pulling Up' to commence the manoeuvre, a change of pitch loading was felt in the controls of Blade 2, followed by elevator 'flutter' and a loud banging. The aircraft was swiftly manoeuvred away from the rest of the formation and a call of 'Blade 2 has escaped' made on the display frequency. The pitch oscillations and banging got progressively worse and a structural failure of some part of the elevator control system was suspected. The aircraft was climbed away from the ground and positioned to the rear of the crowd/display site in anticipation of loss of control/abandonment.

- After approx. 25-30 secs pitch control was regained and the banging ceased. Suspecting the loss of the pitch trim tab, a visual inspection was requested. This confirmed that part of the trim tab had detached, but that the remainder was embedded in the rudder (on the right hand side). Damage to the rudder and vertical stabiliser was also reported. Armed with this information, a slow speed handling check was conducted at 4,000ft to the south of Duxford and no further handling discrepancies were apparent. The aircraft was positioned for a long straight in approach to Rwy 06 and landed without further incident.


YUASA
by GS YUASA


by GS YUASA

The Unexpected

- Put No 4 onto the right wing, loosened up the formation
- Talked No 4 eyes onto No 2 and then cleared him to depart and conduct a visual inspection
- Informed the FDD what we were doing
- Let Ben sort out his plan and offer help if required.
- B-17 at hold for 06 Hard, undershoot for 06 Grass
- Checked with No 2 which runway he wanted to land on – Let FDD know and asked the B-17 to remain where he was as No 2 wanted to use the hard runway.

The Unexpected

- Once No 2 landed safely, cleared No 4 to rejoin main formation.
- Due time – no thought of continuing Blades display
- However, happy to fly flypasts with B-17
- Checked with wingmen that they were happy to fly flypasts with B-17 and checked their fuel state.
- When happy, confirmed with FDD and B-17 that they were happy to fly the flypasts using the loser plan briefed prior to flight.
- Quickly, confirmed the formation shape to all, and the formation join and split which was different.
- With all parties happy, flew the loser plan

Sunday Flypast

Questions ?

Military Aviation Authority
MAA

Facilitated Discussion

UK Civil Aviation Authority

Stow Maries Episode

Bob Grimstead
Terry Dann

Facilitated by
Ian Holder

Picture: Steven Comber

Military Aviation Authority
MAA

Facilitated Discussion

UK Civil Aviation Authority

Stow Maries Episode

youTube Video Link

Picture: Steven Comber

Military Aviation Authority
MAA

UK Civil Aviation Authority

Human Factors

Ian Holder
Baines Simmons

Picture: Steven Comber

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Air Traffic Control

ATC at Flying Displays

Ian Revell

Picture: Steven Comber

Military Aviation Authority
MAA

UK
Civil Aviation
Authority

Pre-Season Flying Display Symposium 2025

Day Two

Picture: Steven Comber

Rescue and Firefighting Services

Al Daniels
Senior Airfield Fire Officer
Duxford RFFS

Picture: Steven Comber

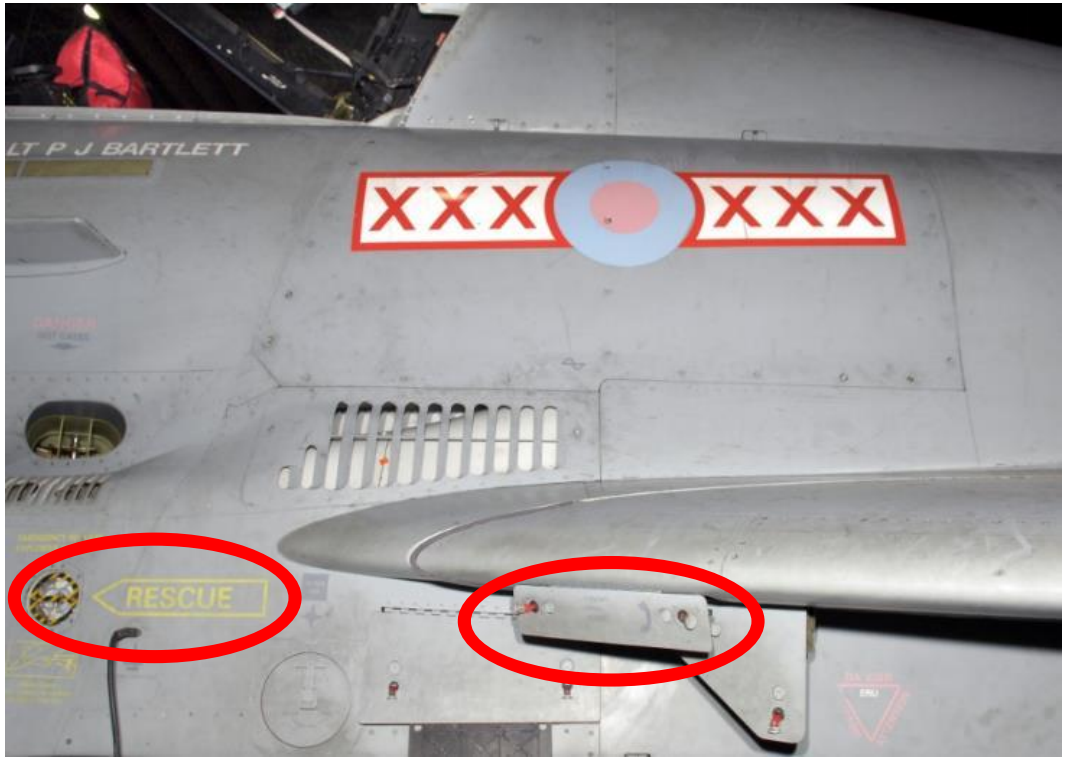
AIRCRAFT ACCESS AND HAZMAT MANAGEMENT

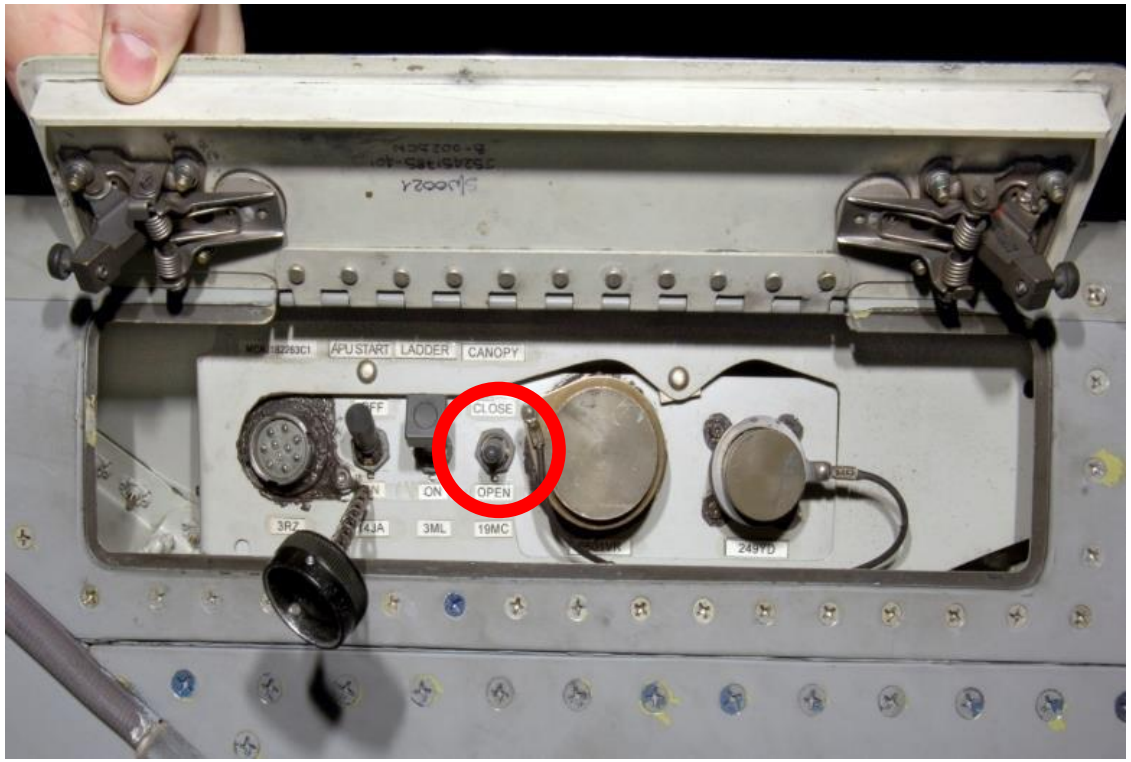
AIMS

- To illustrate the potential problems faced by aerodrome RFFS in;
  - Gaining initial access in to an aircraft
  - Shutting down an aircraft if crew are incapacitated
  - Releasing crew and occupants from harnesses
  - Obtaining HAZMAT information for an aircraft
  - SRG 1327
  - ANO 217
  - Having the correct agencies in place
  - Considerations gained from experience

GAINING ACCESS INTO AN AIRCRAFT ANO 217

GAINING ACCESS INTO AN AIRCRAFT TYPHOON FGR4

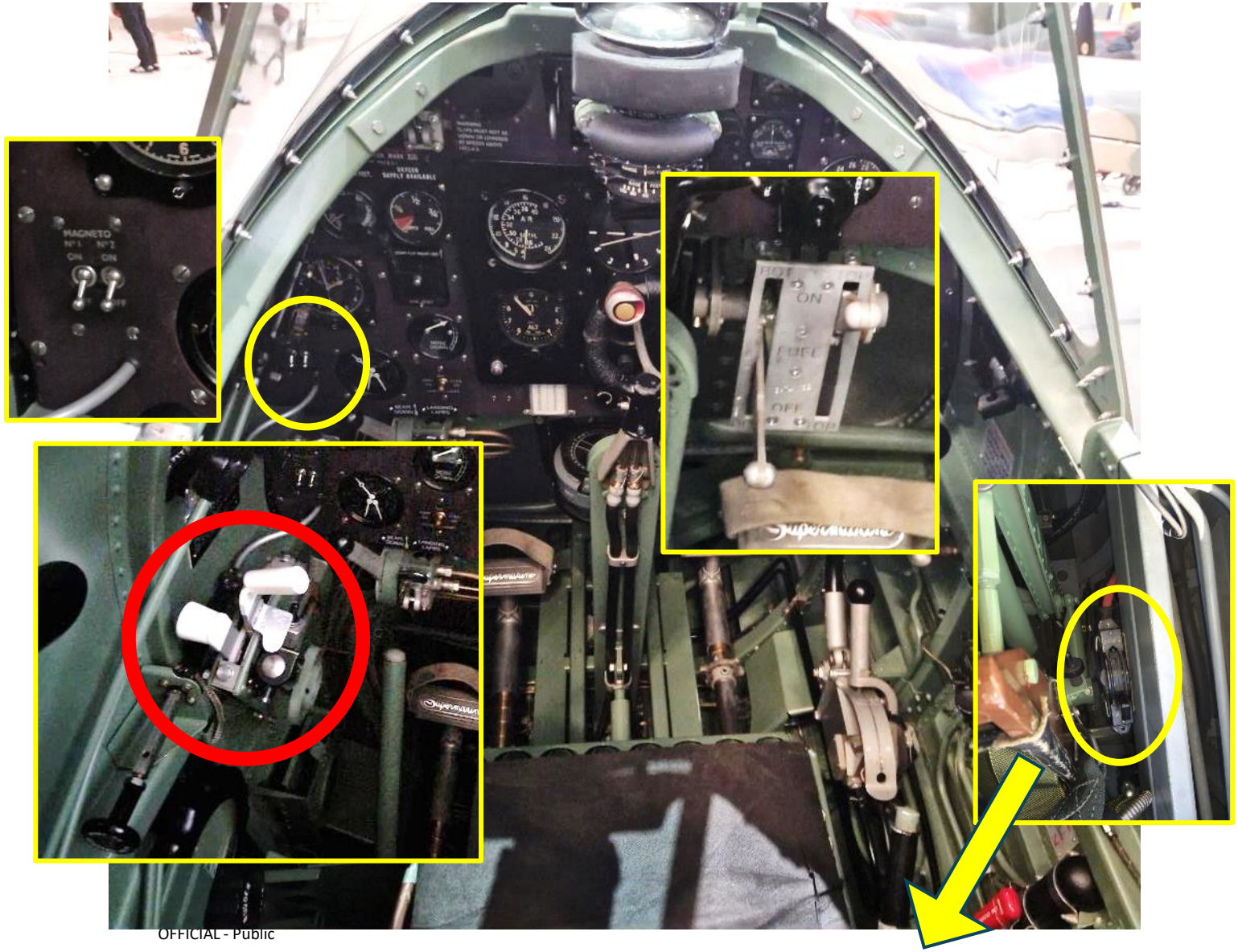




GAINING ACCESS INTO AN AIRCRAFT GRUMMAN WILDCAT

SHUTDOWN OF AN AIRCRAFT – SPITFIRE Mk 1

- Throttle fully shut & Mixture to fully lean
- Fuel selector to OFF
- Magnetos OFF
- Battery Master to OFF or isolate battery - Immediately behind pilots seat in this aircraft (other Mk 1s battery may be inside access hatch on rear right of fuselage)



SHUTDOWN OF AN AIRCRAFT – LANCASTER

- Throttles closed
- Master Fuel Cocks OFF
- Fuel Selectors (engineers panel on right of cockpit) OFF
- Magnetos OFF
- Battery Master (by step into cockpit by Navigators position) OFF

HARNESS AND BELT RELEASE

- There is a huge variety in the type of restraints for aircrew and passengers;
- Top row 2 point / Lap strap: 1) Twist release, 2) Lift buckle
- Middle row 3 point : 1) 3 point hook (shoulder and bottom strap) 2) 3 point shoulder strap and lap strap (seat belt)
- Bottom row 4 point: 1) Hook latch - Lap strap with shoulder straps 2) Twist release with side mounted lock 3) Twist release with side mounted handle 4) Twist release (no lock) 5) Press and turn release
- This is just a selection of the types that may be encountered – and there are also 5 point types…..

HAZMAT (HAZARDOUS MATERIALS) IN AIRCRAFT

HAZMAT (HAZARDOUS MATERIALS) IN AIRCRAFT

- **This contains HAZMAT….**
- **But what about this?…….**

HAZMAT (HAZARDOUS MATERIALS) IN AIRCRAFT

NOTHING TO DECLARE?.....

- From an SRG1327 submitted at Duxford 3 years ago
- No mention of:
  - Avgas
  - Engine Oil
  - Hydraulic Fluid
  - Lead Acid Battery
  - Lithium Batteries in any devices onboard

Display Pilot's / Aircraft Owner's / Aircraft Operator's Certified Declaration for Submission to the Flying Display Director

Form SRG1327 Part 2

(for completion by the display pilot or aircraft owner or aircraft operator)

Civil Aviation Authority

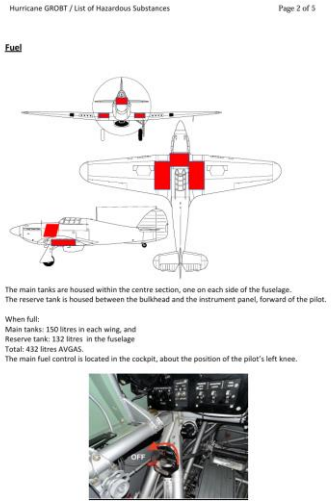
The following table contains details of hazardous materials contained on or within the said aircraft and contact details for competent personnel or organisations available on the day of the said Flying Display able to advise, or assist, in making safe should an incident occur.

Hazardous material	Location on aircraft	Competent person or organisation available on the day able to advise
		Contact name: ..... Organisation: ..... Contact telephone: ..... Alternative contact: .....
		Contact name: ..... Organisation: ..... Contact telephone: ..... Alternative contact: .....
		Contact name: ..... Organisation: ..... Contact telephone: ..... Alternative contact: .....
Continue on separate sheet if required		

c.) Examples of hazardous materials include pyrotechnics contained in jettison/ejection release units, canopy jettison systems, MDC (miniature detonating cord), fire bottle squibs, cartridge engine starters, etc. Consideration should also be given to any hazardous materials used in the manufacture of aircraft structures and components such as phenolic asbestos drop tanks. Note: Details of pyrotechnics used as part of a "pyro display" must be entered in Part 1 of this form

THIS IS HOW IT SHOULD BE DONE

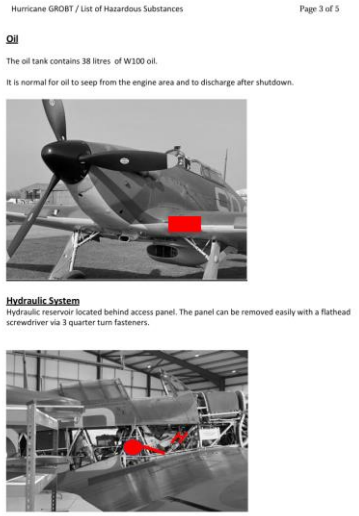
List of Hazardous Substances/Rescue info
Hurricane G-ROBT
Appendix to **Form SRG1327 Part 2**


Hurricane GROBT / List of Hazardous Substances Page 2 of 5

Fuel

The main tanks are housed within the centre section, one on each side of the fuselage.
The reserve tank is housed between the bulkhead and the instrument panel, forward of the pilot.

When full:
Main tanks: 150 litres in each wing, and
Reserve tank: 132 litres in the fuselage
Total: 432 litres AVGAS.
The main fuel control is located in the cockpit, about the position of the pilot's left knee.


Hurricane GROBT / List of Hazardous Substances Page 3 of 5

Oil

The oil tank contains 38 litres of W100 oil.

It is normal for oil to seep from the engine area and to discharge after shutdown.

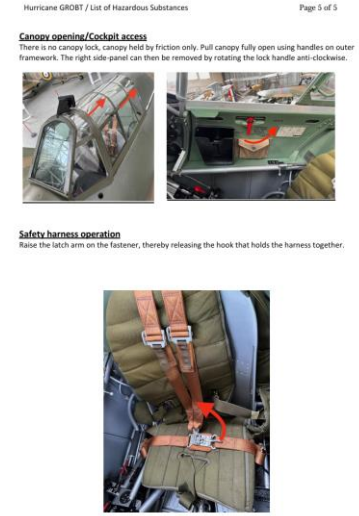
Hydraulic System
Hydraulic reservoir located behind access panel. The panel can be removed easily with a flathead screwdriver via 3 quarter turn fasteners.


Hurricane GROBT / List of Hazardous Substances Page 4 of 5

Compressed Air for brakes
Compressed air cylinder in the forward undercarriage bay: maximum pressure 300psi.

Main battery
Sealed lead acid 24V battery in fuselage behind pilot seat. Accessed by removing side panel via 3 quarter turn fasteners.

Main electrical shut off
The 'ground/flight' switch ("GROUND" = OFF) is on the cockpit floor to the right of the pilot's seat.


Hurricane GROBT / List of Hazardous Substances Page 5 of 5

Canopy opening/Cockpit access
There is no canopy lock, canopy held by friction only. Pull canopy fully open using handles on outer framework. The right side-panel can then be removed by rotating the lock handle anti-clockwise.

Safety harness operation
Raise the latch arm on the fastener, thereby releasing the hook that holds the harness together.

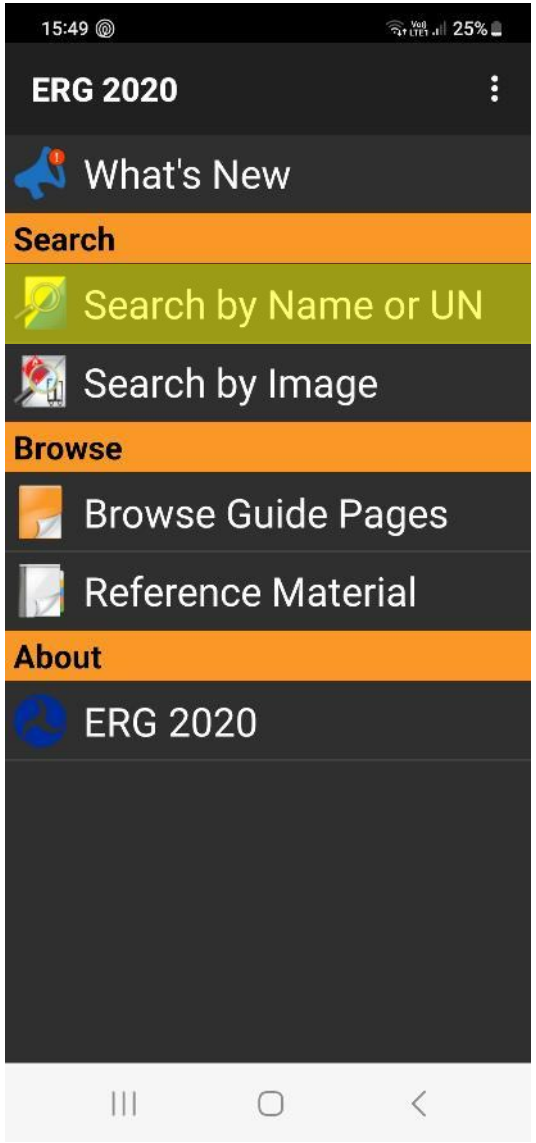
Summary

	Substance	Location	Comments
1	Fuel	Left and Right centre section stubs (inboard wings) and forward fuselage	AVGAS petrol. When full: 150 litres in each wing and 132 litres in the fuselage, in front of pilot
2	Oil	Port wing, inboard, leading edge	34 litres W100
3	Hydraulic Fluid	Starboard side fuselage, just behind pilot right hip.	
4	Compressed Air	Below pilot's feet, in the undercarriage bay	Compressed air cylinder. Maximum system pressure 300psi
5	Nitrogen / Hydraulic mix in gear legs	Undercarriage legs	
6	Battery	Port side fuselage, behind access panel.	24 volt lead acid battery
7	Li-ion battery	Cockpit	iPhone/iPad PED

ERG 2020 APP

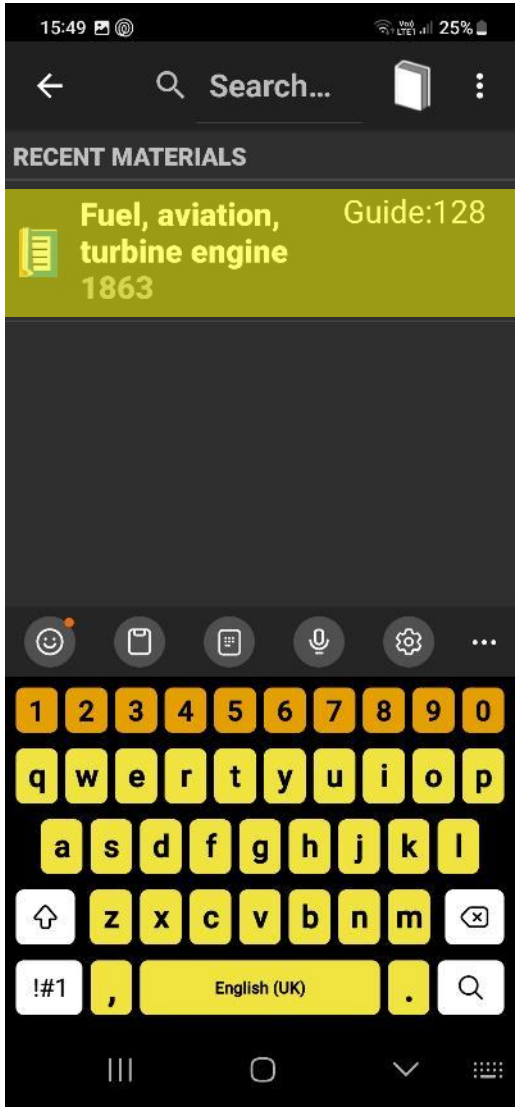
ERG 2020 APP

- Press on Search by Name or UN and type in Name of substance or UN ID number



- This will give you search results found,

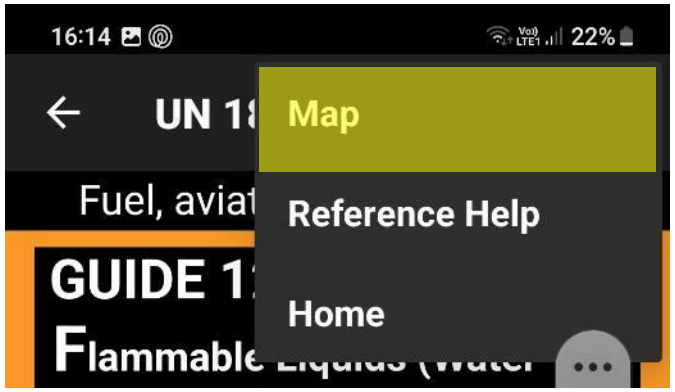
  Click on the appropriate entry



- You should then see this screen
- Click on the 3 dots top right to bring

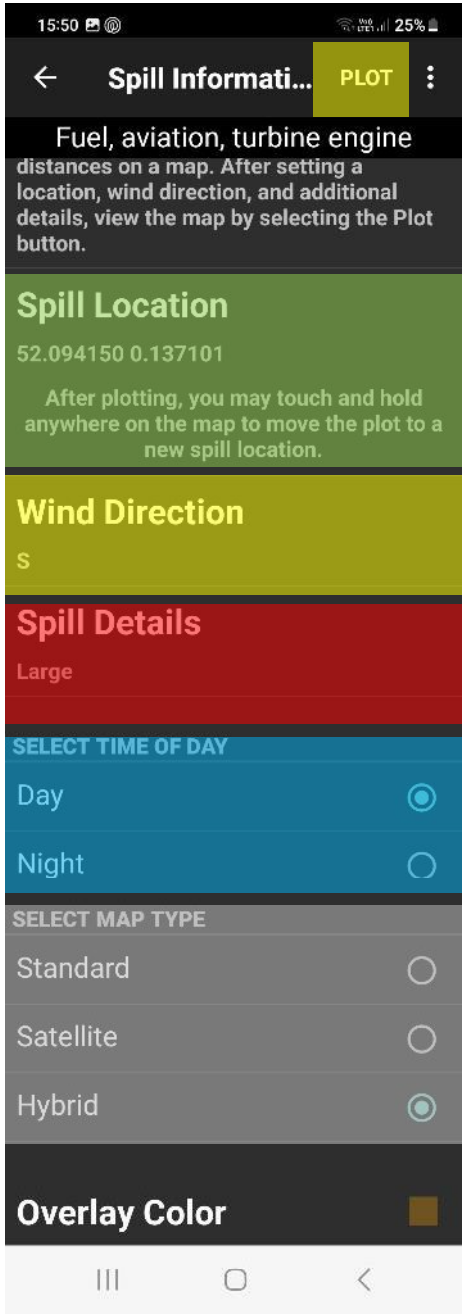
  Up the sub-menu shown on the right.

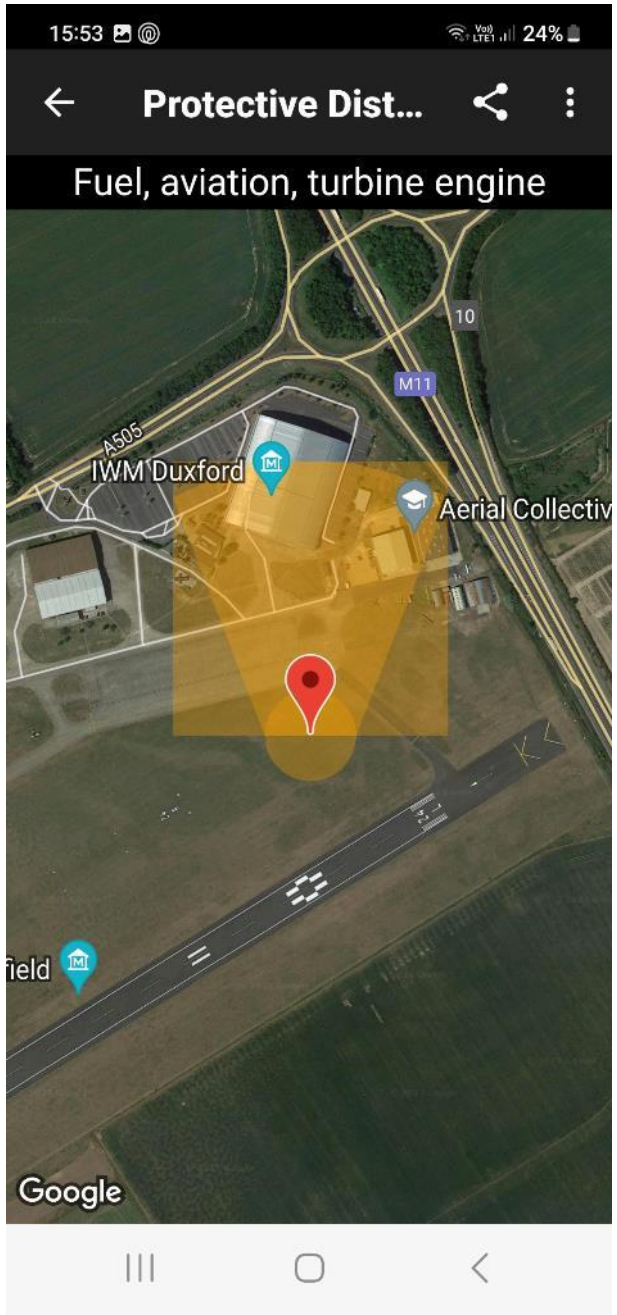
  Click on Map

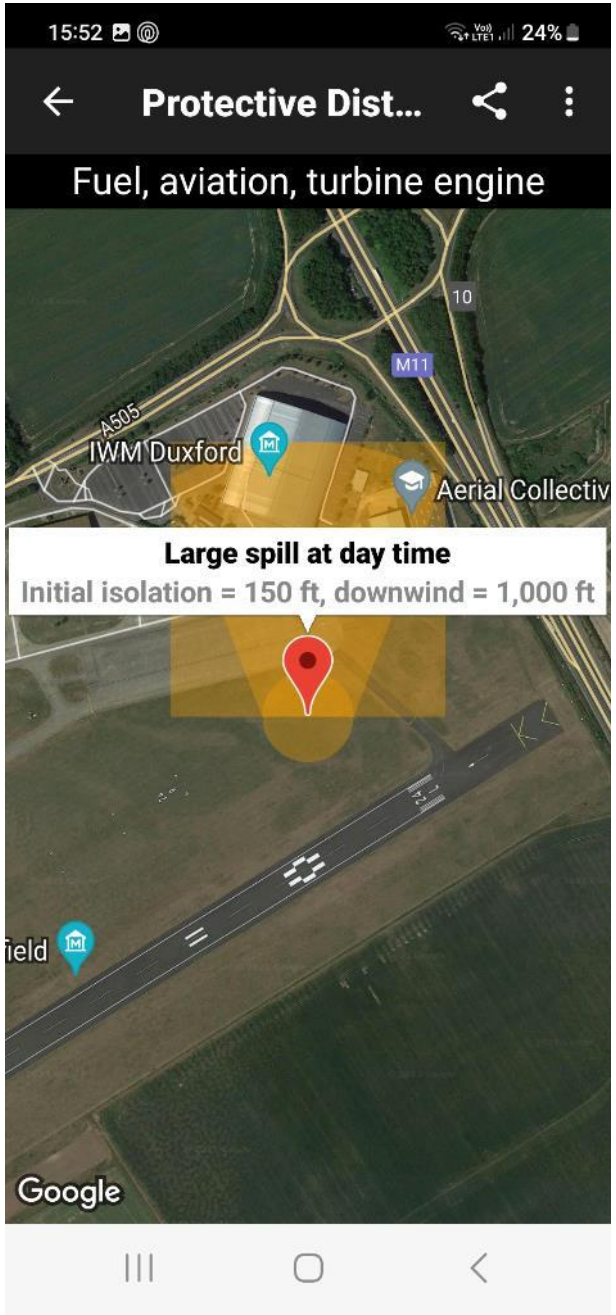


Enter the relevant details;

- Spill location (use CURRENT LOCATION – you can then carry out fine adjustment of position on the map)
- Wind Direction – press to bring up the compass rose on the Right and set the direction.
- Spill details – a Small spill is less than 200 litres of fluid or 300 Kg of a solid.
- Select Day or Night.
- Select Map type
- Press plot to show the map (next slide)




15:53
24%
Protective Dist...
Fuel, aviation, turbine engine
10
M11
A505
IWM Duxford
Aerial Collectiv
Google


15:52
24%
Protective Dist...
Fuel, aviation, turbine engine
10
M11
A505
IWM Duxford
Aerial Collectiv
Large spill at day time
Initial isolation = 150 ft, downwind = 1,000 ft
Google

CORRECT AGENCIES IN PLACE?

- Do you have the correct agencies & working groups in place?
- **SAG**
- **LRF**
- **JESIP**
  - **TCG**
  - **SCG**
- **RAFLO**
- **DCDSDO**
- **ANO 217**

CONSIDERATIONS GAINED FROM EXPERIENCE

- Runway blocked
- Thousands of people arriving
- CAT ‘Zero’ (no available Category Cover)
- Aircraft participating in display inbound
- Crane in use
- AAIB – engage with them as soon as possible
- Selfie from 11 year old rescued from aircraft
- CAT restored as soon as possible
- Crews have been at incident for $2^{1}/_{2}$ hours

Any Questions?

Thank you

Military Aviation Authority
MAA

UK Civil Aviation Authority

Drones at Flying Displays

Mike Paterson
Metropolitan Police Force

Picture: Steven Comber

Military Aviation Authority
MAA

UK Civil Aviation Authority

Display Brief

RAF Tutor Display 2024

Bob Dewes

RAF Tutor Display Pilot

Picture: Steven Comber

Military Aviation Authority
MAA

Best Practice

UK Civil Aviation Authority

AFDD Best Practice

Dave Barrell
Bruce Buglass

Picture: Steven Comber

Military Aviation Authority
MAA

Syndicates

UK
Civil Aviation
Authority

Syndicate Rooms:

DAE/ Display Pilots:

FDD:

EO:

Picture: Steven Comber

Military Aviation Authority
MAA

UK
Civil Aviation
Authority

Syndicate Reports

DA / DAE Breakout Session

Jon Windover

Picture: Steven Comber

Military Aviation Authority
MAA

UK
Civil Aviation
Authority

Syndicate Reports

FDD Breakout Session

Roger Steele

Picture: Steven Comber

Military Aviation Authority
MAA

UK
Civil Aviation
Authority

Syndicate Reports

EO Breakout Session

Peter Reoch & Geoff Coxon

Picture: Steven Comber

Military Aviation Authority
MAA

Best Practice

UK Civil Aviation Authority

Risk Management, Farnborough Style

Rich Pillans
FDD, FIA

Picture: Steven Comber

Military Aviation Authority
MAA

UK Civil Aviation Authority

Best Practice

Reflections of 10 Years of Display Flying

Matt Jones

Picture: Steven Comber

Military Aviation Authority
MAA

Closing Remarks

UK Civil Aviation Authority

Closing Remarks

Paul Sall

Air Display Lead
CAA General Aviation Unit

Paul.Sall@caa.co.uk

Picture: Steven Comber

Closing Remarks

BADA Seminar – 13 -14 October 25 Farnborough

DAE Seminar – 11 November 25 – The Cambridge Belfry Hotel, Cambourne

FDD Courses – Early December 2025/2026/2027

Pre-Display Symposium – March 2026

Paul.Sall@caa.co.uk

Picture: Steven Comber

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Closing Remarks

UK Civil Aviation Authority

Closing Remarks

MAA

Group Caption Holland

Picture: Steven Comber