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Document information

Document title	Independent review of the Civil Aviation Authority's Air Display Enhanced Measures
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Produced for	Civil Aviation Authority
Version	Final
Date of release	19 April 2017
Document reference	P2328D001

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Executive summary

In early 2016, in response to the accident at the Shoreham Air Show, the Civil Aviation Authority (CAA) announced enhanced regulatory requirements on air displays to further improve public safety. On behalf of the CAA, Helios has undertaken an independent review of these enhanced measures and this report presents the results of that review.

The purpose of the review was to identify whether the changes that the CAA introduced have had the desired impact and whether the CAA had done everything it said it would do in the reports published as part of their review. To establish this, Helios gathered information through a public survey at five different air displays in the UK, two workshops with air display industry representatives, distribution of two industry surveys (one each for pilots and organisers), establishment of a dedicated email address via which additional comments were made, and consultation with a specialist insurance broker. In addition, Helios attended a stakeholder discussion organised by the CAA in September, and the joint British Air Display Association (BADA)/Military Aviation Authority (MAA)/CAA Post-Season Air Display Symposium in Shrivenham in November. The study lasted three months towards the end of the 2016 display season.

Overall we found that the CAA's focus on public safety was reflected in public perceptions and in third party risk. Regarding the former point, the public survey we undertook at air displays found that 97% of the respondents felt safe whilst watching the display. Regarding the latter point, there is evidence of a reduction in third party spectators in non-permitted areas. However, there are also concerns that changes in the separation distances and the greater, perceived, consequences of STOP calls have had an unintended impact on pilots, who told us that they feel less safe because were more distracted and more restricted during their displays.

The points below summarise our other findings:

- There is evidence that the enhanced measures had the desired effect of increasing public safety from the perspective of a reduction in third party spectators in non-permitted areas. However, consultees complain that some of the other changes could negatively impact safety. Changes in the separation distances and the greater consequence of STOP calls have had an unintended impact on pilots, who told us that they feel less safe because were more distracted and more restricted during their displays. It appears that there is confusion over some of the regulations that could have left pilots feeling under more pressure than intended.
- There was a significant reduction in the number of events in 2016, with around 30% fewer applications. The reasons appear to be related to a combination of increased costs associated with running air displays, greater workload in making applications and a greater awareness of the liabilities/risks associated with air displays. Some of the reasons are related to the impact of the Shoreham accident on the industry, rather than the enhanced measures.
- Stakeholders complained that some of the enhanced processes are time consuming, complicated, lack clarity and that they need more guidance. There is also evidence to suggest that the relationship between stakeholder and regulator is more strained. There are many examples where consultees show their frustration in the process and documentation. For example, there is evidence that late approval from the CAA has put strain on event organisers, Flying Display Directors (FDDs) and pilots.

- Some pilots feel their interaction with the crowd has reduced and that display quality was compromised due to the enhanced measures. They believe overall that the industry will suffer.
- The Shoreham accident has increased awareness of risk and liabilities associated with air displays. Whilst it has not generally lead to increases in insurance premiums, it has resulted in additional cover being taken out. As one consultee observed: *'In truth, the risks have always been present but Shoreham has just bought them to the fore.'*
- The increase in costs of organising air displays had an impact on the 2016 display season, particularly on smaller events. Changes to CAA costs (including the introduction of post-event charges), additional risk mitigation costs, and changes to insurance arrangements have had an impact. There is also evidence of shows reducing the number of display items to avoid some CAA charges. It appears that the greater cost, perceived risks and workload of organising air displays means that some organisers of small shows have decided against doing it at all.
- The CAA has done what it said it would do in the 2016 display season, however some actions, as anticipated by the CAA, are still ongoing. For example, the work to increase understanding of human factor influences on display flying.
- The public survey did not show a widespread dissatisfaction with the air displays. Around 20% respondents felt that there were not enough aircraft on display. This could be a partial consequence of the enhanced measures, although some of the display items were cancelled because of bad weather. Pilots told us they expected that the increased separation distances would reduce the enjoyment of spectators. Our survey did not find any significant complaints regarding separation distances, although three of the five events had exemptions which meant they could fly closer than the enhanced measures would usually allow.

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Acronyms

AAIB	Air Accidents Investigation Branch
AME	Aeromedical Examiner
ANO	Air Navigation Order
AOC	Air Operator Certificate
ATC	Air Traffic Control
BADA	British Air Display Association
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
DA	Display Authorisation
DAE	Display Authorisation Evaluator
FAA	Federal Aviation Administration
FCC	Flying Control Committee
FDD	Flying Display Director
FIA	Farnborough International Airshow
FTE	Full Time Equivalent
GA	General Aviation
GAU	General Aviation Unit
MAA	Military Aviation Authority
MEZ	Maritime Exclusion Zones
MOD	Ministry of Defence
NATS	National Air Traffic Services
PDA	Public Display Authorisation
RA	Risk Assessment
RAF	Royal Air Force
RIA	Regulatory Impact Assessment
SAG	Safety Action Group
SN	Safety Note
SQEP	Suitably Qualified and Experienced Person

1 Introduction

1.1 Overview

In early 2016, in response to the accident at the Shoreham Air Show, the Civil Aviation Authority (CAA) announced enhanced regulatory requirements on civil air displays. On behalf of the CAA, Helios has undertaken an independent review of the impact of these enhanced measures.

1.2 Background

Safety procedures at air displays are defined by the CAA in document CAP403 (Flying Displays and special events: A guide to safety and administrative arrangements). Following the accident at the Shoreham Air Show in August 2015, the CAA conducted a review of its approach to air display regulation and oversight and developed a series of measures to enhance public safety.

The enhanced measures were defined and published in two reports: CAP 1371 (Action Report, January 2016) and CAP 1400 (Final Report, April 2016). In total, the CAA published 29 actions in these reports.

The measures were in place throughout the 2016 display season, and towards the end of the season, the CAA asked Helios to review their impact.

1.3 Objectives

The review had the following objectives:

- to assess whether the changes that the CAA put in place had the desired impact; were the changes efficacious; were they beneficial;
- to identify whether the CAA has done everything it said it would do in CAPs 1371 and 1400.

1.4 Approach

The review included the following tasks to gather information:

- Engagement with the public through a questionnaire survey at five civil air displays in the UK. The survey results are contained in Annex C and summarised in Section 6.
- Two workshops for air display industry representatives. These were held in Manchester (12 participants) and Farnborough (23 participants). Participants included pilots, Flying Display Directors (FDDs), event organisers, and Display Authorisation Evaluators (DAEs). Annex A lists the workshop attendees.
- Two industry surveys (one for pilots and one for organisers). We received a total of 40 responses. Feedback was not restricted to the surveys and many other comments were received via a dedicated email address set up by Helios. The surveys can be found in Annex B, and results in Annex C.
- Consultation with a specialist insurance broker.

In addition to our approach outlined above, we attended a stakeholder consultation meeting organised by the CAA in September and the joint British Air Display Association

(BADA) /Military Aviation Authority (MAA)/CAA Post-Season Air Display Symposium in Shrivenham in November.

1.5 Document Overview

The structure of the report is as follows:

- Section 2 summarises the feedback we received during consultation about the risk assessment process, separation distances, STOP Calls, and post-event reporting.
- Section 3 summarises the feedback we received during consultation about costs including air display charges, risk mitigation costs and insurance.
- Section 4 summarises the feedback we received during consultation about cancellations.
- Section 5 summarises the feedback we received during consultation about the CAA, DAEs, FDDs and pilots.
- Section 6 summarises the feedback we received during public engagement.
- Section 7 summarises the review findings.

1.6 Acknowledgements

We would like to thank all the individuals and organisations who provided input to this review by attending workshops, responding to surveys or otherwise giving feedback.

2 Process

2.1 Introduction

This section identifies and describes key processes which were impacted by the enhanced measures.

2.2 Risk Assessments

In January 2016, the CAA published CAP 1371 describing changes to the existing risk assessment process. The CAA introduced a strengthened risk assessment process for flying display applications together with a new risk assessment template and a revised display application form. The need for this was confirmed by the reviews that the CAA commissioned from the Health and Safety Laboratories, that showed that those applying for permission to hold an air display did not always follow the CAA guidance on risk assessments. The revised process (supported by revised guidance) was published in CAP 403 in March 2016 and improved the CAA's ability to scrutinise applications. The obligation to complete a risk assessment is not a new requirement, but previously it did not have to be submitted to the CAA.

There were several positive effects of the revised risk assessment process identified. The FDD & Organiser stakeholder survey results indicate that 8 out of the 23 respondents experienced a reduction in the number of spectators standing in non-permitted areas compared to previous years. Of the remaining 15 respondents, 6 said that the number of people standing in non-permitted areas was unchanged and 9 didn't provide any feedback. Consultees said there was better coordination with and cooperation from farmers, who protected their land from third party spectators. Consultees agreed that more road closures, better policing, better maritime collaboration and other mitigation processes have contributed to reducing the number of spectators in non-permitted areas. Some consultees told us that the risk assessment process made them think about things they might have otherwise missed.

However, consultees also expressed frustrations to us about some of the changes:

- The FDD & Organiser stakeholder survey results indicated that a third of the 23 respondents thought the risk assessment process was unclear (4 respondents didn't provide feedback), and almost half requested additional guidance. There is uncertainty about how far an assessment should go and what should be included. Extracts from the survey results below illustrate the issues:
 - *'Difficult to judge what should be included as no real guidance from CAA. We closed down a golf course more than 1km from datum – possibly overkill, especially as a height restriction was already in place.'*
 - *'Detail/Data was never specified and much was left to individual's initiative and judgement. A very variable feast.'*
 - *'The risk assessment template which the CAA provides is not entirely satisfactory. Only minimal guidance is given. More guidance on the scope is required so that an FDD has a reasonable chance of producing an acceptable document.'*
 - *'The term 'Risk Assessment' means different things to different people and there was no guidance within CAP 403 as to what the CAA really expected. Therefore, when submitting a risk assessment, you had no idea*

if it would be accepted. I worked around this by talking regularly with the CAA staff up to Board level to ensure what was developed was likely to be acceptable to them; this would not have been feasible if I was involved in several different events.'

- *'The risk assessment template provided by the CAA is somewhat generic and should be described as an exemplar only; each operator will almost certainly need to produce something more specific to their circumstances.'*
- *'2015 - Normal 'non-ticketed' spectator areas are over 5km from display site, so considered irrelevant for 'site' risk assessment. 2016 - New rules insisted on risk assessments being carried out for ALL 'non-ticketed' spectator sites, so risk assessments were completed for sites well away from display area in locations where Air Navigation Order (ANO) rules are extant. Consider this possible nugatory effort.'*

The CAA told us that their new risk assessment guidance allows any format to be used to complete the risk assessment so long as it contains the set of required information.

We were told by consultees that, at the beginning of the display season, there was a rush of organisers submitting applications before April 2016 to avoid the additional charges introduced by the CAA.

- The CAA published their revised risk assessment process in March 2016, ready for stakeholders to implement throughout the display season. The process, which was published in the risk assessment guidance section of CAP 403, states:

"Risk assessment need not be complicated and the procedure that follows should suit the needs of most flying display and Special Events. However, other alternative systems can be equally effective."

However, some consultees said that their applications were rejected because they were not in the CAA format. In one instance, we were told that a risk assessment was rejected and then copied and pasted into the CAA's template and then subsequently approved without additional changes.

- There was some confusion over the level of detail required for the CAA's revised risk assessment process, which was compared with existing risk assessment processes by some stakeholders. Consultees told us that the CAA's process downgraded their existing process, and that the template provided by the CAA was generic. Extracts from the survey results below demonstrate this concern:
 - *'The previous Farnborough International Airshow (FIA) risk assessment was more comprehensive than that submitted in 'CAA required format' in 2016. Rather than follow the CAA direction to 'remove assessment of any risks covered by CAP 403 rules', as they instructed, these were retained so that all the mitigations needed for a safe event were still evident. Even so, the revised format was not as effective in allowing the organiser and FDD to track and identify the status of all mitigations, so it was more likely that something would be missed using the new format than the previous one. (We considered trying to run two different risk assessments in parallel to cover this off but decided that would just become too difficult.)*

This is an example of a well-intentioned change that had not been thought through at the operational level, and had an opposite impact to that intended. We now have a risk assessment process that is completed to achieve a CAA Permission, rather than to keep the (whole) event safe. Of course, a Risk Assessment alone does not tell the whole story; Farnborough operates to a (independently audited) Safety Management System that sits on top of a Risk Log (Assessment) and a Change Log. It would have been better for everyone if CAA had asked to review the entire safety process (which they had been shown in 2014) rather than invent a new system.'

- *'All Risk Assessments (RA), which had never been scrutinised previously by the CAA, now had to be submitted as part of the Permission application process but the guidance and template incorporated within the CAP 403 remains woefully inadequate. Initially we were advised that RAs had to be submitted on the CAA template and we had to argue that we would not 'dumb down' our RAs, when they were also being considered by experienced multi-agency Safety Advisory Groups for our events.'*

The CAA told us that they do accept different formats of the risk assessment, so long as they contain all the information that the template requires. It appears that there is confusion over the risk assessment process that could be resolved through additional guidance, communication and/or training.

- The risk assessment is essential for identifying any potential risks to spectators, pilots and third parties in and around the airfield. It is the FDD's responsibility to mitigate this risk. Consultees expressed frustration about increased costs associated with mitigating additional third party risk which has resulted from increasing the separation distance. Additional road closures, signage, police enforcement, time, etc. have had a cost implication on some displays this year (see section 3.3).
- Consultees said they were frustrated with the labour-intensive process required to complete a risk assessment. They indicated that their workload had increased significantly compared to previous years. One consultee specified that their workload had at least doubled this display season. However, they recognised that 2016 was the first year of change, and from 2017 onwards the risk assessment process should be less intensive. The example below was extracted from consultation feedback:
 - *'Of course we had always undertaken and produced RA on our activity and that had always formed a key part of the individual over-arching Event Safety Management Plan and Event RA. In the post-Shoreham era, and with the new requirement from the CAA, far more consideration, time and effort went into the preparation of the RAs. Another significant factor was the total change of focus from the primary crowd at the event to consideration (as a stated higher priority) of the secondary and incidental crowds outside of the event footprint. For our seafront shows the major issue was determining how we could mitigate the risk to secondary crowd spectators that chose to view the flying from out at sea. We enlarged our Maritime Exclusion Zones (MEZs) to create a larger 'controlled' area over which much of the flying could be contained. However, the majority of the MEZs were only advisory as they are only legally enforceable in estuarial*

waters – river estuaries and harbour entrances – and only one of our venues meets that criteria! So, we had to undertake/produce additional publicity and briefings to yacht clubs, marinas and charter operators prior to the event, then supplemented by additional resources over the event to steward the enlarged areas to ‘encourage’ compliance.’

- In one instance, an applicant experienced problems because the CAA did not spot early on that a show had become effectively “non-viable” under the changed rules. In correspondence with us, the CAA accepted it should have noticed that this was the case earlier in the application process:
 - *‘The Yakovlevs have been displaying at the Titanic Maritime Festival, held annually in Belfast Harbour, since 2010. This year was the first time that we were unable to display and this was entirely down to the introduction of new display crowd line separation distances defined in CAP 403’s 2016 amended version.*

Unsure whether we would receive permission from the CAA under these new regulations, before entering into a contract with Belfast City Council to deliver the display, we first contacted the Authority to ask for an initial consideration and were assured that there would be no issue with grant of permission. We then made a formal application for a permission, entering it with the CAA some 50 days in advance of the show.

With this assurance in place we signed a contract with Belfast City Council to deliver our normal display. As the display date drew closer we contacted the CAA on numerous occasions concerning the permission and finally, just three days before the event, the Authority responded with a permission that would have put our display 1.5km from the crowd line, out beyond Belfast Harbour, making us virtually invisible to the spectators. We were therefore forced to withdraw from the festival.

Belfast City Council had in the meantime spent money on promoting our appearance at the festival and sought to recover its costs from us, citing legal action for miss-selling our ability to deliver the contract. We asked the CAA to provide evidence that we had done everything in our power to ensure our ability to deliver the display ahead of signing the contract. The CAA’s response was guarded, as they clearly wanted to avoid any liability being placed on them, but it did help assuage Belfast City Council’s claims that we had failed to carry out due diligence ahead of signing the contract, and so no legal action was started. It has however left both Belfast City Council and ourselves out of pocket and has soured a well-established relationship – we are unlikely to be invited to return next year.’

2.3 Separation Distances

AAIB Bulletin S1/2016 Special into the Hawker Hunter T7, G-BXFI accident, identified that CAA separation distances (defined as the distance between the crowd line and the display line) tolerated the risk, however unlikely, that display aircraft wreckage could enter the crowd and cause serious injury to spectators, and that the distances in use were shorter than those used by the Federal Aviation Administration (FAA) and Military Aviation Authority (MAA). Following this, as an interim measure, the CAA decided that where MAA