

Independent review of the Civil Aviation Authority's Air Display Enhanced Measures

Document information

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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

crowd separation distances were greater than civil ones, they would temporarily align with them. These changes were announced in April 2016, shortly before the start of the display season, and were introduced with immediate effect.

In an effort to minimise negative impacts of the change, CAA offered to grant exemptions to reduce the increases in distances where pilots/operators were able to demonstrate that they could define a set of conditions they would adhere to that would achieve the same level of safety.

Changes to separation distances caused frustration amongst consultees. The FDD & organiser stakeholder survey results indicate that, of the respondents that replied to this question, almost 50% thought the exemption application process was unclear and required additional guidance. In the pilot stakeholder survey, of the respondents that replied to this question, 75% thought the exemption process was unclear and required further guidance.

The CAA told us that there was no prescribed exemption process available to stakeholders because that would not be appropriate given individual operators would have to establish in each of their cases how they could achieve the same level of safety as the increased distances.

The following list summarises the concerns raised to us in consultation:

- Consultees informed us that the CAA adopted MAA separation distances without any consultation process or statistical evidence supporting the new display lines. These display lines were considered by many consultees to be disproportionate and aimed at the high-risk end of the display spectrum, without consideration for lighter/slower/non-aerobatic aircraft.

The MAA have contracted a consultancy firm to create a new model which can more accurately determine safe display distances. The CAA's ambition is to use this model and to define new display lines based on current statistical and mathematical evidence. The CAA's current separation distances remain a temporary solution, until the MAA-commissioned study has reported. The comment below was extracted from survey results:

- *'The changes to separation distances affected all of our events. The decision by the CAA to remove the option to display at 50m and 100m and to require aircraft to generally display further away was unjustified and was seen by the majority involved as a total 'knee-jerk' reaction to Shoreham, without any basis in science or mathematics or reflective of the years of safe displaying! The fact that almost immediately the CAA reacted to representations from display pilots by granting exemptions to the changed regulation highlights their failure to properly consider the issue in the first place and introducing a flawed regulation.'*
- The new display lines were announced in April 2016, shortly before the general display season commenced. Consultees said it gave them insufficient time to prepare and adapt to the changes, which in their view compromised safety and in some instances resulted in cancellations. The example below illustrates this scenario:
 - *'When the CAA published CAP 403 in late April 2016 there was no time to react or consult (Shuttleworth Collection season commenced on 8th May 2016). Display lines had to be compliant with the new regulations but the*

new separation distances at Shuttleworth would have resulted in vulnerable, priceless and historically unique aircraft flying outside the aerodrome boundary which was both unnecessary and unconscionable. We restricted operations accordingly.'

- Moving the display line pushed aircraft over areas outside of the airfield boundary, including trees, fields, farmland, housing, etc. Consultees told us that this could also put pilots at risk by pushing aircraft over areas inaccessible to emergency services. Extracts from survey results below illustrate this issue:
 - *'Initial impact placed slow speed aircraft over trees and in danger in case of engine failure. Later, our exemptions allowed smaller separation distances and much safer operation of the low energy and vintage types. Exemption/dispensation improved safety markedly.'*
 - *'In general terms, after Old Warden was granted exemptions for crowd separation distances based upon scientifically calculated risk assessments, our displays became much safer from the pilot's perspective, without any increased risk factor to the general public. It meant that we were not forced to fly low energy, vintage aircraft over woodland, houses and hangars (albeit empty), but over the edge of the active runway which meant that in the event of engine issues we could safely alight on the airfield surface rather than finish up in the trees or worse.'*
 - *'In all the cases where dispensation was applied for, to operate outside the airfield boundary would have meant that the Emergency Services could not have reached us in time to make any difference. In the case of Beverley, there was a dyke between the airfield and the 75m display line originally offered. The safety of the aircrew was not considered a valid argument by the CAA. The situation at Beverley was only resolved by the organiser moving the crowd line further back.'*
 - *'The implementation of greater distances is ill thought out. It has put many older, slower aircraft into a more dangerous position by making them display over trees, outside the airfield boundary etc. (and so making it harder for emergency services to get to them if required).'*
- A display line exemption can allow pilots to fly closer to the crowd line. Exemptions to fly at 150m and 75m have been approved by the CAA, with supporting evidence for the display type, speed, weight, etc. of the aircraft. However, some exemptions were granted this display season with caveats on height, wind speed, and wind direction, for example. Pilots told us that these additional constraints can act as a distraction when in flight. This is illustrated below:
 - *'The 75m exemption came with caveats on height at 75m and wind speed and direction. These additional caveats for different exemptions make for distractions from flying the aeroplane. Fly the aeroplane first is the priority for any form of aviation.'*

In addition to the above, FDDs raised concern about multiple aircraft at one display having different exemptions. Not only does each display adhere to a different display line, but each might also have to comply with their individual

caveats. It is the FDD's responsibility to monitor each display item with their differing criteria, which can be challenging. The comments below identify this issue:

- *'The consequence for us was that we now had new regulations though the wording in the Permission, new guidance through the various re-issues and amendments to CAP 403 and now up to 6 different display items in a single flying display programme wanting to operate to their individual exemptions, all of which were worded differently and set against different criteria! At one point we had 2 different versions of an Exemption being granted to the same team! Initially, whilst a display pilot would present an exemption to display closer than 230m or 150m, their exemption did not state what regulation it was an exemption from and there was no consideration to allowing acceptance of exemptions in the wording of the Permission! In an era of greater legal scrutiny this was yet another example of a rushed procedure being introduced to counter a regulatory change that didn't need to have been introduced in the first place! Some of the Exemptions actually allowed manoeuvres closer than the old regulations permitted and some were completely unworkable with their initial wording! At one stage, we had to suggest wording to the CAA that they could incorporate into a display team's Exemption to make it workable at our events! This whole process did nothing to enhance safety, indeed, it compromised it!'*
- *'Did not apply for any exemptions/dispensations but 5 items had their own exemptions. Of note, one of the exemptions that was granted proved difficult to police – inside 150m must be below 200ft, not more than 75kts, vector to crowd not more than 30deg, with on crowd wind not greater than 10kts (could be done with 1 aircraft but there were 5 of them!).'*
- Display lines are marked on the ground for pilots to see from above. Consultees commented that old display lines were easier to follow as they often took the form of physical objects on the ground. Our understanding is that the smaller display separations gave more flexibility as to the locations of the display line, which might be moved slightly further than the minimum to align with a physical object. New display lines are further away so organisers are keen not to move them beyond the minimum. Consequently, they don't necessarily take the form of a physical landmark. The CAA told us that it is the responsibility of the FDD to ensure that there is adequate marking on the ground for pilots to distinguish from the air.
- Consultees told us that applying for an exemption takes significant time and effort. Each applicant is required to justify how what they will do will achieve the same level of safety as the increased distances. However, although time consuming, the CAA told us that justification for an aircraft has to be done only once, and that a pilot can use their exemption for that aircraft at all air displays they attend, subject to the agreement of the Flying Display Director in each case.

There is lack of clarity about who the exemptions are applicable to. The comment below illustrates this:

- *'One of the consequences of the changes implemented this year is that identical aeroplanes are flying at different distances from the crowd line depending on what private deal they have done with the CAA to gain an*

exemption from this year's display lines. The CAA needs to allow all aircraft to use whatever exemptions have been granted. For example, at Old Warden closer distances have been allowed for flypast displays. These need to be permitted at all displays and the concept of different distances for aerobatic and non-aerobatic displays extended to all aircraft weights and speed.'

The example above references display lines at event locations. The CAA clarified that in the case of location-specific display line exemptions, the FDD must approach the CAA with a safety case. The CAA will consider the type of location and the variables associated with it, as well as the general type of aircraft which usually fly at that location.

- In the case of individual pilot/team display line exemptions, the CAA told us that all pilots/teams must apply for their own exemption because each of their situations will be different. Exemptions will be granted on the basis that the conditions they have demonstrated will provide the appropriate level of safety. In each case, use of the exemption is conditional on approval agreement of the FDD at the display. Moving the display line further from the crowd line positioned aircraft further from the spectators. Consultees said that this hampered the spectators view and enjoyment of the display, and damaged the relationship between pilot and spectator. There was a concern that this will impact future recruitment to the aviation industry. Examples are illustrated below:
 - *'For Gliders, Shuttleworth Trust reduced the display line to 150m for aerobatics and flypasts. Spectators can hardly see a glider, which is quiet, this far away from the crowd line. Although Shuttleworth, working with the CAA, have managed to reduce the display line to 75m for light aircraft below 200 feet, this is unworkable for gliders.'*
 - *'The public reaction was one of disappointment at the increased distance when viewing small and slow moving historic aircraft.'*
 - *'People who visit air displays, particularly at a young age, are sometimes inspired by the pilots who do the displays. Pilots are usually personable, and like to wave at the crowd and involve them with their displays. Since the changes have been introduced, pilots are now further away from the crowd and it is hard for the crowd to see a pilot waving etc. Pilots feel less interactive with the crowd; different experience. Long term, there may be less recruitment of pilots for this reason.'*

However, the above comments were not generally reflected in the responses we received from the public survey or from general engagement with the public at the air displays we attended.

Stakeholders addressed their concerns about the suitability of display areas at the Post Season Air Display Symposium, held in early November 2016. Display areas were described as too small, limiting the amount of space available for aircraft to move in to and out of their manoeuvres, and to position themselves at the correct height ready for their display. Performing in a smaller display area restricts pilots and could inhibit smooth transition between manoeuvres. There was confusion amongst attendees at the symposium as to why requested display areas were reduced by the CAA despite being positioned over sparse ground. In addition to the above, consultees were also concerned about the complications associated

with display lines. In this instance, there is confusion about the 'depth' of the B-axis. An example is given below:

- *'It relates to the practice of marking the display axis on permissions as a single red line. In the "old days" with less scrutiny regarding display footprint this was perhaps OK - but now I feel it is quite unsatisfactory. Obviously, nobody is capable of performing a display to a pen width line on a map. At minimum, I feel that there needs to be some comment on the permission regarding B-axis 'depth', or presentation of a display area on the map and not simply a line. By way of example, from displays this season:*

Farnborough: this was challenging, but at least it was unambiguous. Briefing notes (and permission??) prescribed the display area clearly in 3 dimensions.

Old Buckenham: "No B-axis" (take 1): fortunately, a [CAA official] was performing an inspection and was therefore on hand to give a CAA view on interpreting this!

Cranfield: "No B-axis" (take 2 - really really no B-axis): A complicating factor was Cranfield village on the far side of the runway (described as 'a second crowd line'). Nevertheless, it wasn't clear what usable 'depth' we were being given.

Biggin Hill had similar issues but if I remember rightly the airfield perimeter acted as a display boundary - in the Pilot's Notes, but not in the CAA permission?

Effectively in the above situations there is a transition between 'display rules' and 'rules of the air' - but it's a bit unclear (to my mind) of the blending between the two. More clarity in the original permission coming from the CAA I think would help.'

- FDDs explained that they are under pressure trying to coordinate all display items, but additional stress is caused when display pilots are given last minute exemption approval. The following feedback illustrates this:
 - *'Display line was moved as a result of waivers given to some participants at short notice by the CAA and not discussed with me beforehand. This caused considerable confusion and was impractical to implement as it contradicted the permission and caused additional angst in its implementation.'*
- With increased restrictions and constraints, pilots may have to change their display for each event. If every display is different, pilots lose the benefits of repeating the same show, which some said was valuable to them.
- Consultees commented on the exemption application process. They told us that no guidance was evident to explain how an application should be completed. Lack of time and knowledge required to complete the exemption process is deterring stakeholders. The extracts below from the survey results support illustrate:
 - *'No guidance exists on how to apply for an exemption. Each applicant has to develop their own argument in whatever form they think appropriate. Therefore, the approach of each application will differ making it harder for*

the CAA to assess. It could save much effort if the CAA published guidance on what a successful application needs to contain.'

- *'The new display axis crowd separation distance minimum of 150m has, I am sure, ruled out many of the type of shows I have participated in over many years. I don't think individuals have the knowledge or time to come up with evidence to obtain an exemption.'*

The CAA told us that there was no prescribed exemption process and that they responded to requests on an individual basis, where operators showed they could achieve the same level of safety at a reduced separation distance.

- One consultee said that they thought that exemptions were overused this year as a result of poor rule changes:
 - *'The exemption/dispensation process has been overused this year. This is due to poorly drawn rule changes which required far too much after-the-event modification through exemption or dispensation. Better initial rulemaking, even if slightly later, would be a much better option.'*

2.4 STOP Calls

In April 2016, the CAA published guidelines in CAP 1400 explaining what should happen in an event where safety is breached during a display. The CAA announced that it would accept the Air Accidents Investigation Branch's recommendation that, where a STOP is called because an FDD, or member of the Flying Control Committee (FCC) has reason to doubt the fitness or competence of a pilot, that pilot will be subject to a provisional suspension of their DA pending an investigation by the CAA of the circumstances leading to the STOP call.

The implementation of this action frustrated many consultees. The FDD & Organiser stakeholder survey results indicate that 39% of stakeholders that responded to this question thought that the STOP call process was poorly defined, and 82% of respondents requested additional guidance. In the pilot stakeholder survey, 87% of stakeholders that responded to this question thought that the STOP call process was poorly defined, and 93% of respondents requested further guidance. Comments to support this feedback are presented below.

The following list summarises the concerns raised:

- There was confusion as to the type of STOP call that would result in a DA suspension and also if minor infringements would result in one. CAP 1400 states that DA suspensions only apply where "a STOP call is made during a display for reasons related to the fitness or competence of a pilot". Furthermore, the CAA told us that they don't believe a safely controlled misjudgement leading to a minor infringement should be given a STOP call at all. The definition of a STOP call has not changed. The concerns and confusion from consultees in this area is illustrated below:
 - *'The initial rules didn't provide a feedback means to say if it was a safety call due to external factors or due to aircraft positioning. There is still no published procedure to reinstate at (DA)? What are the full implications?'*
 - *'In the past a pilot would rather break the crowd line in a controlled and safe fashion, to allow them to reposition safely. Now, with the threat of immediate suspension hanging over them, it is entirely likely that in the*

event of misjudging distances a pilot will instead pull hard to remain clear of the line, risking a high-speed G stall in the process.'

- *'Unusually during the show the FCC requested that a STOP STOP STOP call be made for an over flight of the crowd by a vintage jet. The FDD had already said to Air Traffic Control (ATC) if the FCC calls STOP STOP STOP you transmit it, which is what happened. For the record the jet did not endanger the crowd in anyway but the FCC exercised its professional judgement.*

From all the meetings I have been to this year, I understood that if a STOP call was made for this sort of breach then the pilots DA was suspended and a call must be made to the CAA at Gatwick on a hotline. On this occasion, there was some confusion within the organiser's team as to the correct rules.'

- Consultees told us of concern over the consequences of a STOP call and the potential penalties imposed, especially on a pilot whose career is dependent on flying. Pilots said that they are under increased pressure when performing displays as they fear their DA may be suspended because of an error which doesn't breach safety (see point above). Extracts below from the survey results illustrate the concerns about the consequences of STOP calls:
 - *'At East Kirkby one of our team was so worried about being grounded if he infringed the display line, he forgot to drop a streamer.'*
 - *'Pilots became more concerned about whether they might do anything that could prompt a STOP call rather than concentrating on flying SAFELY (first) and in accordance with the rules (second).'*
 - *'Following amendment to CAP 403, stop calls have now become not just a safety issue but now also carry financial implications for display pilots. If a stop call is issued on the first display of a weekend, for example, all other displays that weekend would automatically be lost due to the immediate suspension of the pilot's DA. It is entirely possible that a stop call has been issued for reasons completely outside the pilot's control and while a subsequent investigation would exonerate the pilot, he/she would nonetheless lose business in the intervening period between the stop call being made and the judgement given by the CAA.'*
- Consultees reported confusion over who the responsibility lies with in the event of a STOP call when the pilot is due to continue to another event, and also about the expected interaction with the CAA. Consultees told us that the confusion generated in this scenario is distracting for FDDs/FCCs at both events concerned. Consultees provided examples and their views on this matter below:
 - *'The Vintage jet was touring and was enroute to its next display, 18 minutes later. Meanwhile ATC kept this show running on time whilst the FDD and senior FCC member phoned the CAA and the FDD of the other show. It has been commented that while this was going on they were both totally out of the loop and not acting in the roles they were appointed to for the display.'*
 - *'The concept of making the FDD responsible for contacting the FDD of the pilots next display venue to tell of a STOP call is misguided and*

impractical. If the pilot has received a STOP call he knows his DA has been suspended – in which case, he is no longer authorised to carry out a flying display and if he did so he could be prosecuted under a number of ANO articles – this should be enough to prevent him from continuing to display at a subsequent event. There should be no need for the FDD to stop monitoring his ongoing flying display while he attempts to contact another FDD as shown in this requirement.'

- *'The CAA have discussed an obligation on the FDD to contact any downstream FDD in the event of a STOP call to a transiting (i.e. no land-on) act. This should be set aside; the FDD often has no knowledge of the act's further bookings nor how to contact them. Furthermore, doing so will distract him from monitoring his own show. It is the pilot's responsibility to remain within the law; once a STOP call has been issued they do not have a DA and can no longer display. That should suffice.'*
- *'Having used a STOP call there was some confusion as to the consequences of a call, but my interpretation of the additional message with the STOP call 'hot line' was correct. The CAA 'hot line' proved little help when used to gain clarification in a very dynamic situation as the person on call had to check with his supervisor. The display item involved was displaying at another event 20 mins after the stop call was made. The increased workload made stopping the whole display a consideration.'*

The CAA told us that they don't believe a safely controlled misjudgement leading to a minor infringement should be given a STOP call. The CAA believe that a lack of understanding of the policy might have led to confusion since, as noted above, DA suspensions only apply where "a STOP call is made during a display for reasons related to the fitness or competence of a pilot" (CAP1400). Further guidance on STOP calls will be provided for the 2017/2018 display season.

- Consultees told us that they have concerns about inexperienced or unfamiliar FDDs/FCCs and whether they are able to identify correctly a serious problem. There is fear that some FDDs/FCCs could call STOP for a non-safety related breach. The examples below illustrate this:
 - *'The FCC is supposed to be made up of "Experienced" people in the various displays taking place. It must be well-nigh impossible to fulfil this requirement and in reality, we never know if an overzealous FCC member unused to our routine will call stop and ground us until we can clear ourselves at Gatwick.'*
 - *'There are many types of display, some unique e.g. Truck top landing, Limbo. It is well nigh impossible to get an "expert" in all fields. To be displaying knowing that some FDDs or FCCs may not have seen your display before is an invidious position to be in.'*
 - *'Under this requirement, the CAA state that if a display pilot is stopped because of a safety concern related to the pilot's performance then the pilot's DA is suspended forthwith. While this is not inappropriate it is dependent on what the FDD/FCC judge to be a safety concern arising from some shortfall in the pilot's performance. FDD's which are (or were recently) practising display pilots will have a different view to an FDD with*

little or no display experience. Therefore, some guidance is required in order to avoid FDD's making nugatory stop calls.'

In response to the concerns about the experience of FDDs, the CAA told us that there will be an accreditation scheme for FDDs which will include the definition and explanation of a STOP call. Further information about the FDD Accreditation Scheme can be found in section 5.2.

- Consultees expressed apprehension about airborne FDDs and their role and responsibilities in monitoring displays from the air. Consultees said that, with the new regulations, they were unsure how an airborne FDD could monitor a display, whilst distracted with their own performance and staying within the regulatory boundaries.
- STOP calls are made when safety is compromised, however no detail is provided about whether a STOP call should be made during or after a manoeuvre that might have breached safety. Consultees told us that a STOP call during a manoeuvre is distracting and itself could compromise safety.

Consultees suggested that different terminology should be used to warn pilots about mispositioning or making other errors which don't affect safety. Other terminology might include 'Too Close' and 'Too Low'. In addition to this, consultees are eager to have a warning system which allows them to make corrective actions before a STOP call is made.

In response to the concerns about STOP calls, the CAA told us that they are improving the STOP call guidance (definition and explanation) in CAP 403, and will include this process in the training for FDD Accreditation. Overall, there appears to be a need for additional clarifications and communications in this area.

2.5 Post-Event Reporting

From April 2016, the CAA required all event organisers and FDDs to submit, within seven days of the event, a post-air display report. The report includes detail about what went well at the display, as well as information on any lapses or breaches from the required standards. Pilots were also encouraged to report any aspect of their display that could have caused a significant safety risk.

The CAA told us they will use this information to help inform their review of the new rules, and will share important findings with stakeholders through briefings, the pre- and post-season seminars held each year, and the annual seminar that the CAA will organise for DAEs. Some stakeholders expressed their frustration about certain aspects of the post-event feedback process. The following list summarises the concerns raised to us in consultation:

- There was confusion amongst some consultees about the post-event feedback process for private events when the pilot is acting as the FDD. We were told that pilots had to provide feedback about their own performance as they were not only a pilot, but also the FDD for the event. Consultees were concerned about the competency of a pilot in an FDD role, and whether they could be considered an FDD without formal FDD approval from the CAA. This raised further concerns about the liability of a pilot acting as an FDD.

- Some consultees said they were frustrated at the lack of feedback or acknowledgement of receipt from the CAA (see section 5.2). The extract below from the survey results demonstrates this:
 - *'The CAA changes included a requirement for FDDs to send a post show report within 10 days of the airshow. Not one acknowledgement or single bit of feedback has been received for any of the 10 shows conducted by Shuttleworth this year, raising the inevitable question as to whether they are actually being read and have any useful purpose.'*
- One consultee told us that he thought the post-event report might be “held against him” at a later date.
- The post-event report provides feedback about the event and will help inform the CAA’s review of the new rules. One consultee requested that events leading up to the display be included in this report so that the CAA can reflect on the implications of their new rules during the preparation phase, and not just the event itself.

The CAA stated that they would share important findings with stakeholders through briefings, the pre- and post- season symposiums held each year, and the annual seminar that the CAA will organise for DAEs. However, some consultees expected to receive feedback sooner than these events. For example, one consultee told us they had raised a concern on the post-event report and never received any feedback or resolution advice for this issue from the CAA. The CAA shared information with FDDs towards the end of 2016.

3 Cost

3.1 Introduction

The UK Government requires that the CAA's costs are met entirely from charges levied on those to whom they provide a service or regulate, and not from the tax-payer. Historically there has been a certain amount of cross-subsidy between fee payers within the CAA. However, the CAA is moving towards a full cost-recovery situation with cross-subsidies. On the 1 February 2016, the CAA launched their consultation on the proposed fees and charges for 2016/2017. The proposals included an increase in charges for UK civil air displays for two reasons:

1. Historically, the regulation of air displays had been subsidised by other aviation industry charge payers. Thus, the charges paid by the air display sector have not accurately reflected the true cost of the CAA's work. In 2014/15, the CAA's under-recovery on flying displays was £241,000. The higher charges are not aimed at recovering historic under recovery, but at ensuring future work is correctly funded.
2. The charges also reflect the increased cost of implementing the enhanced safety activities which were outlined in the Action and Final reports published by the CAA. The CAA Board agreed that these activities were necessary to improve further the safety of air displays in the UK. The post-event charge was introduced to reflect the increased regulatory resources required from the CAA for the enhanced measures.

To reduce the impact of the increased charges on the air display community, the CAA decided to phase in the new post-event charges over 3 years. The 2016/17 charges were set to recover £100,000 of the expected £200,000 of additional costs, with the remaining £100,000 being absorbed by the CAA. The post-event charge is expected to cover 75% of the additional costs in 2017/18, and 100% of the additional costs by 2018/19. The basic application charge, which increased for the 2016/17 display season, will remain unchanged for the time being.

The CAA told us that they have recruited 3 extra FTEs (Full Time Equivalents) to cover the workload necessary for implementing the enhanced measures. If more staff are required by the CAA in the future it will be reflected in the post-event charge.

Consultees expressed frustration about the increase in charges and the effect it has had on air displays this season. The concerns raised to us in consultation are described below.

3.2 Air Display Charges

- Post-event charges are dependent upon the duration and size of the event. Only shows that have 7 or more display items are subject to this charge, which must be paid for each day of the event. Consultees told us that this additional charge made them think twice about the number of items they employed at their event. Extracts from the survey results demonstrate this below:
 - *'Due to the time available 13 or 14 items is probably the maximum this event can have, although this year there was a conscious effort not to go above 12 items to avoid going into the next charging band, (an extra £800 once above 12 items).'*
 - *'Although I did not get a directive from the organisers the increased fees were always in the back of my mind during the planning phase (going to*

13 items increased costs by nearly £2000) – not sure if enhanced measures include the cost increase. The budget for the 2016 display was set in November the previous year.'

- *'We were conscious about the band of charges for aircraft and we were careful about how many we booked.'*

The CAA told us that there were fewer display items at events this year compared to previous years and thus they have recovered less than expected through the post-event charge. As well as reducing the number of display items, many organisers submitted their applications before April 2016 to avoid having to pay the increased charges or the new post-event charge.

In addition to the comments above, one consultee told us that the post-event charge doesn't consider the size of the event site. As a result, smaller events (with fewer spectators) will be forced to reduce the number of display items to compensate for the additional charges. The comment below identifies this concern:

- *'Cost burden. This will undoubtedly have a prolonged and serious effect on future air show activity – we are only in the first year of the new charging regime, so we have yet to understand the longer-term effects. It is wholly unreasonable to base the charges on the number of items in an air display; how can it be right for Farnborough to be charged a sum for 15 acts with an attendance of well over 100000 people when Old warden has to pay the same, with only the ability to get around 7500 spectators onto their site?'*
- Increased CAA charges, including the new post-event charges, must be met out of existing flying display budgets. Consultees said that limited funds have restricted options for booking civilian display items and as a result, some of the smaller acts are missing out. Consequently, these pilots must self-fund practises and fly less frequently. The explanation below provided in consultation explains this:
 - *'The increased CAA charges, including the new post-event charge, had to be met out of the existing flying display budgets. Given the limited funds this further restricted the options for booking civilian display items. Sadly, acts that miss out on bookings tend to be the 'filler acts' – the cheaper, often light aerobatic aircraft flown by part-time, very enthusiastic, yet either relatively inexperienced or the 'old and bold' retired professional, display pilots! These are also the acts that have been hardest hit by the significant reduction in flying displays at minor events like County Shows, fetes, weddings etc. The challenge for them is that they are self-funding with limited sponsorship opportunities open to them. Reducing the number of bookings they can attract, limits their ability to gain experience displaying at different venues and in different conditions. The consequence is that they have to self-fund practices at their home base – inevitably they fly less, struggle to keep current or gain in the vital experience to be able to cope in the larger arena or in more challenging conditions.'*

3.3 Risk Mitigation Costs

- Consultees described increased costs due to the additional third party risk mitigation measures (see Section 2.2). Costs associated with closing roads, employing additional signage, policing sites, monitoring maritime exclusion zones, etc. have increased this year compared to previous years. In total, 5 out of the 23 respondents to the FDD & Organiser stakeholder survey provided their additional risk mitigation costs, totalling £233,337. Several consultees described supplementary costs accompanying the increased time spent completing paperwork (i.e. risk assessment, exemption documents), implementing changes, and corresponding with the CAA (costs can be found in Appendix B). Extracts from the survey results are illustrated below:
 - *'Protection measures to keep public outside Ministry of Defence (MOD) land outside the airfield- £150,000+.'*
 - *'Costs to relocate and loss of revenue from Hospitality offer due to its relocation as a result of the movement of the datum line - £20,000.'*
 - *'Writing a case for the CAA to grant an exemption to CAP 403 changes to separation distances. Costed at £100/hour for a SQEP - £10,000.'*
 - *'Costs arising from road and footpath closures security, police and traffic management for remaining 5 Sunday air shows at £3934 per show (Warbird footprint) - £19,670.'*

3.4 Insurance

Aircraft operators are liable for damage resulting from an aircraft crash. Property occupiers are also obliged to take reasonable care for the safety of those who come onto their property. Increased awareness of liability and exposure, resulting from the accident at Shoreham, has resulted in changes to insurance cover this display season.

Our FDD & Organiser stakeholder survey results indicate that, of the stakeholders that responded to this question, 33% experienced an increase in their insurance costs compared to the previous year, and 18% of respondents made changes to their insurance arrangements. The results from our pilot stakeholder survey show that, of the stakeholders that responded to this question, 67% experienced an increase in their insurance costs compared to the previous year, and 38% of respondents made changes to their insurance arrangements.

During consultation, it became apparent that there were fewer changes to insurance cover at larger events, with more changes at the smaller end of the event spectrum. One consultee said that he suspected that smaller events will have made adjustments, or in some cases, as with Minehead Summer Festival, chose to exclude aviation activity from their event. The examples below capture the feedback provided:

- One consultee provided an example of a small event which was cancelled due to the cost of increased insurance cover (Felixstowe Carnival). We were told that, historically, the display organiser would acquire insurance cover for the display site on which the event was held. This would cover activities on the ground but exclude activities in the air. The organiser would rely on the insurance cover obtained by the aircraft operator in the event of an accident. This is no longer the case. The consultee told us that additional cover has always been acquired at

larger events by the event organiser, and hence they have experienced little change in their insurance arrangements.

- We were told that a known typical insurance product, which is taken out by organisers to cover their own and the FDD's liability, now stipulates minimum levels of cover for participants. In some instances, established acts/teams had to increase their level of cover to the minimum required to secure bookings. This is explained below in the extract taken from survey results:
 - *'For the same circumstances and level of cover, there was no increase in premiums for event Public Liability insurance cover this year, post-Shoreham. However, the standard 'Airshow Meet' policy that the majority of our organisers take out to cover theirs and our liabilities, did stipulate minimum levels of cover for participants:*

"CONDITIONS PRECEDENT: Current Aircraft Third Party Liability Insurance for all participating aircraft to be evidenced to Hayward Aviation Limited prior to inception and that, when such evidence is provided, insurance carries shall have not less than an A rating from Standard and Poor or AM Best.

Minimum Third Party Liability Insurance to be carried:

Rotor Wing and Non-Jet Fixed Wing aircraft: GBP 5,000,000 or EU minimum 785/2004 whichever is the greater

Fixed Wing Jet aircraft: GBP 20,000,000 or EU minimum 785/2004 whichever is the greater"

This level of cover is generally greater than required for day-to-day flying operations, as highlighted by the Tiger Moth team at the Farnborough workshop, but we certainly do not consider it to be unreasonable for display flying. Many established acts/teams already carried far higher levels of cover anyway but a few did have to increase their level of cover to the minimums required in order to secure bookings. Any additional premium costs were generally passed onto the event organiser as part of their display charge.'
- One pilot told us that his insurance cover increased this year compared to last, but said that this wasn't a result of increased premiums or additional insurance cover. This example is illustrated below:
 - *'I can give you the overall figures for 2015/16 (£14,864) and 2016/17 (£18,616) based on a hull value of £400,000. The difficulty in making a valid comparison is that the period of ground risks (closed display season) and flight and ground risks (open display season) are not the same. This is because the insurance company only takes on risk as we are preparing to fly and that differs each season. Further, we have also revalued the hull mid-season which also distorts comparison. I can say, though, that we have not been subjected to any increase in premium due solely to "enhanced measures" and we did not take out any additional insurance. We did have to adjust our liability figure to £90,000,000 due to currency revaluations.'*

- Additional time and effort is required by an event organiser to examine a participant's cover. This is indicated in the feedback below:
 - *'We have also all been far more particular in stipulating and examining participant's cover. None of this is a bad thing, but has increased the workload on all involved. Additionally, the advice from the insurance brokers has been that organisers should be included as 'Additional Insured' on participant's policies; this is purely a further administrative action, at no cost – some participants achieved the requirement in a single action at the start of the season listing all their confirmed and expected events in a schedule, others opted to action it as each booking was confirmed, significantly increasing theirs and their broker's administrative burden and frustration at the additional work.'*
- During consultation, one pilot told us that their personal life insurance cover has 'tripled to quadrupled' this year, making it unaffordable.
- We were informed that DAEs are also taking out additional liability insurance which has increased their costs.
- Some pilots have increased their display charge to cover additional insurance premium costs. This increased charge affects event organisers.

We spoke with an insurance broker from Hayward Aviation Limited. We were told that it wasn't the CAA's enhanced measures which encouraged stakeholders to take out more cover. It was, rather, a consequence of the accident at Shoreham which increased awareness of liability in the event of an accident. In addition to this, they confirmed that the enhanced measures introduced by the CAA won't reduce premiums in the future. The following comments were also made by the insurance broker:

- Insurance companies have not generally increased their premiums following the Shoreham accident. Hayward Aviation Ltd has not increased their premiums in the last 12 months.
- There has been a noticeable increase in the amount of cover being taken out this year.
- Prior to the accident at Shoreham, some stakeholders acquired their insurance from companies that weren't necessarily specialised in aviation, and thus paid slightly lower premiums. Post-Shoreham, increased awareness of the impact of an aircraft accident has caused some of these non-specialised companies to leave the aviation market, leaving more specialised companies to supply aviation insurance. As a result, some stakeholders have paid higher premiums this year.

In addition to air display charges, risk mitigation costs, and insurance costs, consultees raised the following points:

- Display organisers sometimes choose less experienced pilots because they are cheaper to book than more experienced pilots. Consultees said that this could compromise safety at an air display.
- Consultees that required an aviation medical by an Aeromedical Examiner (AME), resultant of the enhanced measures, have experienced an increase in medical costs. The example below from the survey results illustrate this:

- *'For gliding, I use a DVLA group 2 type Medical Declaration, issued by my local doctor, for £30. For displaying, I now need an Aviation Medical, which cost £185.'*

Our pilot stakeholder survey results indicate that, of the stakeholders which replied to this question, only 1 respondent was affected by the changes to medical standards. In addition to this, one consultee remarked *'I already held a class 1 medical and a military aviation medical for fast jet aircraft. I agree the imposition of higher medical standards.'*

In conclusion, rising costs have been a contributory factor to increased pressure on the air display industry and there is evidence of shows reducing the number of display items in response. However, the increase is only partly due to changes in CAA charges. Other cost pressures were caused mainly by the extra cost of the additional risk mitigation measures and the changes in insurance arrangements.

4 Cancellations

4.1 Introduction

This section provides the feedback we received during consultation about air display cancellations in the 2016 season.

4.2 Cancellations

Consultees were concerned about the impact of the enhanced measures, particularly on organising smaller events. Some consultees expressed the view that smaller events will be eradicated in the long term. From the 2016 air display event calendar on the British Airshows website¹ we identified that 6 of the 19 cancelled events in 2016 referenced the enhanced measures as the cause for their cancellation.

One consultee however told us that the CAA's enhanced measures had little to do with the reasons for their cancellation, despite being stated otherwise on the event's website:

- *'Great Yorkshire Air Fest - Cancelled - Although the show organisers did suggest the enhanced measures were part of the reason for the cancellation of the event (quote below), I believe them to have limited impact as I submitted the permission request early which incurred the 2015 fees the only increase would have been the after-event fees (£900 for this particular event).*

"A combination of factors has led the GYAF organisers to take the difficult decision to cancel the event. These include increased fees following the new CAA regulations, heavy investment required to support the show's infrastructure and, despite public interest in the event, a slow uptake in ticket sales."

In addition to cancellations, it is important to consider the display organisers that chose not to submit an application in 2016. The table below shows the number of applications submitted to the CAA over 4 years (2013-2016), and the number of events which took place. The number of submitted applications between 2015 and 2016 decreased by 31%. However, the proportion of events to submitted applications remained high at 94% which means that the reduction in event numbers was not due to organisers failing to meet the new requirements (and therefore not getting approval).

Year	Event applications (% change on previous year)	Events which took place (% of applications)
2013	243	241 (99%)
2014	281 (+15%)	249 (89%)
2015	267 (-5%)	239 (90%)
2016	184 (-31%)	173 (94%)

Table 1. CAA data for air display event applications and events which took place (2013-2016)

¹ <http://britishairshows.com/british-uk-airshow-calendar-dates-2016.html>

The CAA commented that a number of display organisers didn't contact them directly to raise their concerns prior to cancelling.

There was a widely held view amongst consultees that the full impact of increased costs has not yet been recognised, particularly since event organisers who applied before April 2016 were exempt from charge increases. In addition, increased costs were not generally reflected in ticket prices because they were already published when the enhanced measures were implemented.

Increased charges and additional costs required to mitigate third party risk were not a major cause of event cancellations. Consultees told us that other factors, such as STOP call pressures, late application approval, new display lines, and increased awareness of risk and liabilities, have also resulted in event cancellations. The examples below were extracted from the survey results:

- *'As a pilot, I have been the victim of a number of cancelled displays this year, which did not go ahead either because of the costs, or the bureaucracy involved. CAA figures in terms of the number of Article 162 permissions issued in 2016 compared to recent years should provide a reasonable insight.'*
- *'We had 4 bookings cancelled in all, two were because I operate an ex-military jet and it was an overland show (Welshpool, Old Sarum) and two for the uncertainty of the financial aspect and CAA lack of clarity on venues (Llandudno, Barton).

I took part in approximately 18 other displays and the comments on the Torbay feedback hold pretty well for all of them especially the extra insurance charge, uncertainty about stop calls, and most importantly for many of the early displays they did not receive approval for until one or two days before.'*
- *'We lost 7/12 displays because the display lines got pushed back. They were small displays.'*
- *'The reason was simply the increased awareness of risks and liabilities for the event organiser and the FDD following Shoreham, and the breadth, depth and far-ranging investigation that appears to be being undertaken by the Sussex Police. For event organisers of events where flying was only a 'side-act' or an additional attraction to the main event, many were just not willing to accept the risks and liabilities. In truth, the risks have always been present but Shoreham has just bought them to the fore.'*

In conclusion, there has been 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, greater workload in making the application and a greater awareness of the liabilities/risks associated with air displays. Some of this is the result of the Shoreham accident on the industry. The impacts of CAA charge increases may not have fully impacted the industry yet and could lead to more cancellations.

5 Stakeholders

5.1 Introduction

This section contains additional stakeholder feedback concerning the CAA, DAEs, FDDs and pilots.

5.2 The Civil Aviation Authority

In January and April 2016, the CAA published two reports which outlined 29 actions to enhance safety at air displays. This section provides stakeholder feedback on CAA activities and a brief update on some ongoing actions.

Stakeholder feedback

Stakeholders described some positive effects of the actions. They told us that the risk assessment process made them think about things they might otherwise have missed, and that coordination and cooperation has improved between stakeholders and Farmers/Landowners/Harbourmasters, etc. Fewer third party spectators were located in non-permitted areas in some instances this year (see Section 2.2). They pointed out that the enhanced measures identified several valid points which needed addressing, and there was an understanding for the need of an improved 'audit trail'. Some consultees thought that restricting civilian vintage jet aircraft from performing high energy aerobatic manoeuvres overland was a positive decision, based on the pilot's experience (see Section 3).

However, consultees showed frustration at the CAA's approach to consulting on and implementing the actions. The comments below capture the concerns raised to us in consultation:

- Some consultees questioned why the CAA made significant changes to the regulations without knowing the outcome of the AAIB's final report. The comment below was captured from the survey results:
 - *'Firstly, it goes without saying that the driving force for instigating all the changes that the CAA have implemented following the Shoreham accident should be designed to stop such a tragedy happening again. But until the official report comes out as to the cause of the accident, how can this goal be achieved? The overwhelming view amongst the display community is that the process the CAA has followed to date is little more than a bureaucratic exercise designed to show that the regulator is seen to be doing something, and regrettably I concur with that opinion. The changes lack an evidence base, are largely made by people with absolutely no practical experience of what they are dealing with and subsequently do not address the fundamental of an improved safety case, but in some instances, actually reduce it.'*
- A stakeholder who was involved in the CAA consultation process to set the actions, said he felt that they weren't being taken seriously and agreements which were made during these meetings were not implemented. Others were concerned that consultation didn't involve enough people who could represent the breadth of experience in the industry. The feedback below was extracted from the survey results:

- *'The CAA's engagement with industry at the start of this process bordered on the adversarial; it quickly became clear that the initial consultation was a "form over function" activity to demonstrate compliance, but without useful purpose or intent. ... The great sadness is that the display industry was very willing and prepared to engage with the regulator to produce a revised set of regulations which were effective, proportionate and consistent. The CAA did not need to pick this fight, and have clearly had to recognise (albeit late) that they really do need to leverage the expertise in the industry.'*

The situation is not irretrievable; a slightly humbler and engaging regulator will find that there is still a strong desire to improve effective safety and a willingness to engage and help amongst large parts of the display industry.'

- *'At the Post Season BADA conference in 2015 the Head of the GAU was asked in conference whether the CAA would be consulting or conducting an RIA before changing the regulations. His answer was 'No, if we feel we need to change something we will.' This policy (probably imposed for political reasons rather than rational ones) has resulted in many unnecessary and/or ill thought through changes which all came with unintended consequences. One of the main purposes of consultation is to identify all the unintended consequences – by denying a consultation process the inevitable happened. Inevitable because the CAA was so hollowed out of Suitably Qualified and Experienced Persons (SQEP) that the regulations that were drafted were full of errors that would have been addressed in a consultation process. In place of consultation the CAA appointed a review board but the constitution of this was devoid of flying display subject matter experts and the 'so called' Challenge Panel had just one flying display representative but his experience was with the world's largest air shows and he had limited appreciation of the lower end of the activity which was therefore inadequately represented.'*

The CAA told us that consultee views and opinions are considered and valued, and that consultation was limited by the need to make changes in time for the 2016 season, rather than jeopardise the whole season. The CAA also said that where an immediate safety action was needed, the CAA had to act and if necessary without consultation if the delay was deemed unacceptable on safety grounds.

- Some consultees told us they think the enhanced actions are a means for the CAA to move the responsibility and liability from themselves onto FDDs and DAEs. The CAA told us that there has been no change in liabilities. The FDD is responsible for the safety of the flying display, and the pilot is responsible for the safe operation of their aircraft at all times.
- Some consultees complained about the quality of the action definitions. They said the changes are open to interpretation, not specific enough, use poor terminology, lack definition, and contain grammatical errors. The comments below illustrate some of these concerns:
 - *'CAP 1371 (3.20) - This definition of 'relevant hours' is unrealistic when applied to the requirements stated above. In effect, it means that the*

500/300P1 hours referred to are all associated with display type manoeuvres. An experienced display pilot may have 10000 hours total and have been displaying aircraft for over 20 years but not have achieved anything like 500 'relevant hours' by this definition.'

- *'CAP 403 Recency 5.40:
"Have flown or practiced in the specific type of aircraft to be displayed within the 30 days of the display."

'Specific types' has no relevance to glider displays as all gliders are similar in judgement and handling, so being current on one type of glider makes you safe to fly other types.'*
- *'There is very little differentiation with the new rules in Flypast displays and aerobatic displays. The rules also don't really work for those flying very similar types, as you need to have displayed it within 30 days, 3 in 90 etc. There is little difference in piloting between a Flypast in a Tiger Moth then a month later a Flypast in a Chipmunk. There are huge differences in display aerobatics in a simple jet trainer one month and a high-performance jet fighter the next. There should be a lot greater difference in rules for Flypast v aerobatics. I don't fly display aerobatics but am very aware that almost all recent display fatalities involve aerobatics; I think this is the area that should be focused on.'*

In addition, one consultee told us that the ambiguous regulations restricted him to fly-pass and low energy manoeuvres only. This meant he couldn't do his full display over water and was unable to practise, which in turn made it hard to comply with the currency rules.

- We were told by consultees that, in their opinion, the CAA had made changes to the regulation without any statistical evidence or justification (see Section 2.3).
- Concerns about slow paperwork turnaround and late approval were repeatedly raised during consultation. A slow response time to applications was claimed to inadvertently compromise safety as last minute changes were challenging for all stakeholders involved in an event (see Section 2.2). In addition to this, consultees told us they were not happy with the technical errors they found in their returned applications from the CAA, as it further delayed the approval process. Extracts from survey results below illustrate this concern:
 - *'I'm content with the application process but it would be good to know if there are problems with the application sooner rather than a couple of weeks before the event.'*
 - *'When I make an application some 60 days in advance of an event, I find it extremely disconcerting to then be phoned two days before the event with a question about the risk assessment that makes it sound as if the permission might not be granted!'*
 - *Applications now have to be submitted by a 42-day deadline (previously 28 days). They take the fee immediately but then nothing happens until a few days before the event. Pilots' Notes have to be produced and circulated to participants well in advance of the event. But now, frequently, the Permission only arrives one or 2 days before the event and includes*

restrictions that require assimilation, being risk assessed and briefed to display crews, potentially changing previously briefed procedures and arrangements. In some cases, this required a complete re-think of a display routine or display profile. This cannot be safe! And, of course, in some cases the Permission has been declined, forcing the cancellation of the flying, often with considerable commercial penalties to the organiser and the participants, none of which seems to concern the CAA!

- *'Most of us submitted in excess of the perceived need but the CAA staff were overwhelmed and inadequately briefed/trained to deal with many of the technicalities of air display flying.'*

The CAA has recognised the issue of late approval in the 2016 season and the impact this had on stakeholders. They said that they plan to introduce performance targets for the permission process. The CAA also told us that they have recruited three extra FTEs to cover the workload associated with the enhanced measures (see Section 3). However, the CAA also stressed that the FDD is responsible for the safety of the air display. While the CAA recognised the significant and additional pressures the enhanced measures introduced after the Shoreham accident, it also said that the decision to go ahead or not with a display or any element of a display lies with the FDD. If the FDD considered that the public would not be sufficiently protected, then the FDD should not go ahead.

- Consultees expressed their frustration about limited availability of CAA members to discuss issues, whether at the weekend or during the normal working week. Survey result extracts below identify concerns:
 - *'A further frustration has been the availability of CAA officers to discuss issues with, even during normal working hours – we have lost count of the number of times we have been told by the ever-helpful support staff that everyone is out – often, 'on leave' or apparently, 'working from home'! And, given that we are largely a weekend activity, surely for a host of reasons a 'duty officer' should have always been contactable – would they really want to hear about an incident from Sky News rather than hearing about it first hand from the FDD or pilot!'*
 - *'I received a late demand for extra information and change to my RA's with only weeks to go to the event; the intimation was that no permission would be issued until all issues were dealt with. I had asked repeatedly if the General Aviation (GA) office was happy with my paperwork and had always been assured that all was OK. The e-mail was received on Friday evening so there was no opportunity to contact the GA office before the following Monday. I suddenly found myself under severe stress... I do feel that an initial phone call, or even a 'personal' e-mail rather than the obvious 'formulaic' e-mail received would have alleviated most if not all of the stress and anxiety involved.'*
- Consultees commented on lack of feedback from the CAA when submitting documents. They told us that a simple email automated response would be adequate to confirm receipt of documentation. In addition to this, there was enthusiasm for creating an online system for sharing stakeholder information and improving the process.

- One consultee was disgruntled with the CAA because he thought they were 'spying' on him at his event.

The CAA told us that they have always inspected air displays and that it is an important requirement which enables them to check regulations are being adhered to. The CAA usually inspect approximately 15% of events.

In addition to the stakeholder concerns listed above, suggestions were also made throughout consultation about possible ways to improve safety further. Two suggestions are captured below:

- Currency;
 - *'The currency rules have improved but further changes can be made. Flying the full display sequence 3 times within 90 days prior to the show is not enough.'*
- Minimum relevant hours required to obtain a DA;
 - *'All display aircraft categories should be required to have a minimum of 500 hours total time flying, not 200 hours.'*

In our pilot stakeholder survey, we asked whether respondents thought the changes to the minimum hours flying requirement in a high-performance aircraft would increase safety. Our results indicate that 6 out of the 17 respondents thought it would increase safety, 7 respondents were undecided, and 3 respondents thought it wouldn't enhance safety (1 respondent didn't provide feedback).

CAA - Action Update

The enhanced measures (29 Actions) published by the CAA at the start of the display season were implemented throughout the year. The CAA have done what they defined they would do this display season, but some actions, as anticipated by the CAA, are still ongoing. The CAA informed us of each action status, and told us about their expectations going forward. The list below identifies the ongoing actions and provides a brief update:

1. **FDD Accreditation** - In response to the concerns about the competency of FDDs, the CAA told us that there will be an accreditation scheme in 2017 for FDDs that coordinate from the ground, and an accreditation scheme in 2018 for FDDs that coordinate from the air. FDD Accreditation will be phased in and will be repeated every three years to assess knowledge and experience. The CAA fulfilled their requirement to do a taster training session during the Pre-Season Air Display Symposium in 2016.
2. **DAE Competency and Professional Development** - To support this requirement, the CAA organised a seminar for all DAEs in 2016. The 2017 seminar is in the planning stage, and will be used to talk about the previous season and the lessons learned. The intention of the seminar is to ensure that all DAEs have the correct and relevant competencies and knowledge required for their role. This will be an annual event, to which all DAEs must attend at least once every three years.
3. **Post-Event Reports** - The CAA have introduced a new reporting process to capture important information about the display event. In response to comments about the lack of feedback from stakeholders, the CAA have stated that they will share important

findings with stakeholders through briefings, the pre- and post- season seminars held each year, and the annual seminar that the CAA will organise for DAEs.

4. **CAA and MAA Harmonisation** – The CAA told us they now have meetings with the MAA every two months to discuss areas of common interest and regulation. This was initiated six months ago. However, harmonisation of the two regulators was not a direct result of the enhanced measures. The CAA told us that their relationship with the MAA was strengthening before the changes were introduced.
5. **Human Factors** – The CAA told us that the National Air Traffic Services (NATS) are supporting them with this programme. In early January 2017, NATS are facilitating a workshop for all stakeholders at which they plan to address human factor issues. In the long term, human factor training will be included in the FDD Accreditation process, and there will be publications and/or training organised for pilots.

In addition to the above, the CAA informed us that restrictions on civilian vintage jet aircraft aerobatics over land will be reviewed early next year.

5.3 Display Authorisation Evaluator

The number of DAEs reduced by 40% for the 2016 display season, from 70 active DAEs to 41. The CAA told us that they intended to reduce the number of DAEs this year, and reinstated fewer compared to previous years. They believe there are enough DAEs to cover the required workload. In addition to this, some DAEs retired due to old age, and some because they were unhappy with the new regulations and the perceived increased liability placed upon them.

The reduction in the number of DAEs has created challenges for pilots who wished to obtain a new, or revalidate their existing, Display Authorisation (DA). Consultees told us that DAEs are harder to find, the costs associated with travelling to the DAE have increased and DAE expenses have increased. The comments below were extracted from survey results:

- *'Prevailing upon a DAE to visit your airfield and perform the evaluation is complicated in itself: logistics, timing, asking him/her do you an (unpaid) favour etc. To then have to find and ask another, who will inevitably live further away, perhaps be less inclined if they do not know you, pushes the boundaries of their generosity and makes the process a degree more complex.'*
- *'There was no provision made for DAE's to be in place before the start of the season and a unilateral change of privileges meant I had to modify my display at the last minute, this does not enhance safety. The CAA failed to respond to repeated requests for a DAE and eventually sent me a list of ten persons in early June, only two of whom responded. The CAA did not follow the CAP403 DAE appointment process.'*
- *'As a result of the changes there is now a shortage of DAEs, I have not flown in front of a DAE this year and now face the additional expense of making a flight specifically to renew my DA.'*

DA Renewal Process

The CAA also made changes to the DA renewal process. We asked stakeholders whether they thought that changing their DAE would impact their DA revalidation assessment in a

negative way. Our results indicate that nine out of the 17 respondents thought it would have a negative impact, and six respondents thought it would have no impact on the revalidation assessment (two respondents didn't provide feedback). Comments to support this feedback are presented in this section.

There was confusion from pilots regarding the need to "carry out an unrehearsed linked manoeuvres as part of their DA issue/revalidation". Several consultees complained about this being a requirement, although the CAA has told us it is not in fact a requirement at all. The CAP1371 says: "... the display pilot will have to brief their DAE on what manoeuvres they intend to perform and how those manoeuvres will be linked ... The pilot will then be required to demonstrate the series of practised manoeuvres and link them safely ... the DAE will then tell the pilot to demonstrate an alternate combination." There is a need to resolve the confusion through training or guidance.

In addition to the above, the question of 'who' supervises newly appointed display pilots and the revalidation process was raised during consultation. Prior to the enhanced measures, the same DAE revalidated the pilot after 6 months and then again after 13 months, and continued revalidating on a 13-month cycle. The CAA introduced a new process requiring revalidation of a pilot by their DAE after 6 months, again after a further 6 months, but then by a different DAE after 13 months. The CAA told us that DAEs can be alternated on the 13-month revalidation cycle, and therefore pilots can use their original DAE once every 26 months.

During consultation, it became apparent that consultees were unhappy with other aspects of the changes to DAE-related procedures:

- *'I actually believe that the display evaluation itself is less important than the knowledge the DAE has of you – your history, attitude, past experience, performance at previous air-shows, willingness to listen, attitude to risk etc. As long as a professional relationship can exist between DAE and Pilot, I take comfort that the DAE knows about my flying experience and how I have performed over a period of time.'*
- *'As a DAE I'm undecided about minimum hours, innate skill and training count for more. I haven't managed to display in front of a DAE this year as so many have resigned. For our team and those I usually revalidate I know how they normally perform and can keep an eye on them from a skill and mental approach. AMEs have been encouraged to keep their pilots to ensure they can notice any deterioration mentally as a result of the German Wings accident. The CAA hasn't thought this through.'*
- *'A change of DAE after a prescribed period makes it potentially increasingly difficult to organize a renewal in practical terms, and negates the examiner from detecting a change in the candidate's previous standard.'*
- *'The DAE renews the DA on the display he watches and his knowledge of you and your attitude to displaying and competency. My DAE is my mentor and coach, finding a different one would put a burden on that (volunteer) DAE to accept that the one flight he witnesses is a true reflection of your skills and attitude.'*

- *'There is no way for a DAE to find out what concerns (if any) a previous DAE may have had. The CAA wants "mentoring" to take place, changing DAEs will not assist that requirement.'*

5.4 Flying Display Directors & Pilots

FDD and pilot consultation feedback has been presented throughout this report. This section captures additional remarks made during consultation, including some suggestions made to improve processes.

During consultation, we heard from FDDs that their increased workload, insufficient guidance, and perceptions over changes to liability made the 2016 display season challenging. Comments extracted from the survey results below identify their frustrations:

- *'If the FDD's feel they could be taken to court in the event of an accident I think many will leave the roll. Most are ex-military or civil commercial pilots, unpaid giving back to the aviation community towards the end of their careers and wouldn't want to put themselves or families in a position where they could lose much of what they have worked for. I am aware of two that have left.'*
- *'The FDD spent 75% of time worrying about paper work for the DA process rather than the air display safety itself. As a result, I personally feel the air show this year is much less safe than last year.'*

The comment above, does not appear to be reflected in public concerns, as the public survey found that 97% of public respondents felt safe whilst watching the air display.

There appears to be a lack of consistency from one FDD to the next regarding the necessary pilot checks. These checks must be done by the FDD before granting approval to fly at an event. The example below illustrates this issue:

- *'We had very considerable issues with the scope of documentation our FDD required when compared against other FDD's supervising other displays. She required, on CAA advice, a considerable amount of documentation covering both the pilot and aircraft. The issue is not the requirement to do so at all; it is that other FDD's were asking for far less detail. Anecdotally, the range of requirements across the various shows seems to have ranged from mere sight of the pilot's licence through to us, with requirement to see a range of documentation for the aircraft so extensive that MOST acts were unprepared for being asked for the documents. Many warned us that we were asking for too much and that this would potentially stop them performing for us in future. The issue is clear; all FDD's need a standardised list of documents required. All the display acts will, of course, need to know this list at the start of the season so that there are no surprises. I need to make clear that we are not arguing with the need to see and handle all the documentation the CAA asks us to hold. Our issue is that we appear to be at a considerable commercial disadvantage by following the guidance of the CAA to the letter.... The Display Community NEEDS standardisation in the form of a simple, comprehensive list of documents an FDD requires from an ACT. This needs to be clearly laid out in CAP 403.'*

As a suggestion; the Declaration should be sufficient. Essentially the way it is worded now covers all of the aspects required and the pilot gives a solemn undertaking that all is in place. Perhaps they should be taken at their word (there is no history of fraud that I can see in the Airshow world) and therefore the paperwork burden on both FDD and, more importantly, pilot can be minimised. As you will have seen pilots have not had a fulfilling year and this issue cannot have helped.'

In response to this concern, the CAA told us that there is a publicised certificate in CAP 403, Appendix B, that must be supplied to the FDD from a pilot participating in a flying display. This certificate contains the requirements necessary. The CAA said that the only change to this document resulting from the enhanced measures is the requirement for a hazardous material list and a manoeuvre list.

Consultees expressed their frustration at the 'Fitness assessment for a flying display role' form, required by the CAA to assess the applicant's attitudes and behaviours to fulfil the role of an FDD. They said that the self-assessment form is inadequate and a pointless exercise. The survey extract below illustrates this:

- *'Form SRG 1303B "Fitness assessment for a flying display role"! A total deflecting of responsibility/liability exercise by the CAA to be able to say that they have on file a signed certificate from a prospective FDD self-declaring that they are not a nutter, no really they are not a nutter.....!'*

Consultees also made the following suggestions to help improve processes:

- Consultees told us that employment of a 'Hot Debrief' is useful after an air display. Feedback, both positive and negative, is provided by the FDD which can help pilots improve their performance in the future.
- One consultee suggested that the application form should include a named deputy FDD who can take over in an event where the primary FDD can't attend. This will avoid any last-minute confusion.

6 Public Engagement

6.1 Introduction

As part of the review, we visited five air displays around the UK. At each display, we surveyed the public through a questionnaire. The displays range from flying-focused events through to festivals and charity days which incorporated air display items:

- 1) Seething Charity Air Day;
- 2) Southport Air Show;
- 3) Cranfield Festival of Flight;
- 4) Sywell Classic - Pistons and Props;
- 5) Shuttleworth Season Finale - Race Day & Roaring Twenties Finale.

The questionnaire presented to the public is in Annex B. It was designed to capture the views of the public so we could build an impression of their experience of the air display they visited. The first half of the survey was intended to capture the demographic of our respondents so we could better understand their interest in air displays, i.e. aircraft enthusiasts versus members of the public on a family day out. No personal data was collected.

The visited air displays took place in September and the first weekend in October. We were not able to attend any air displays at the beginning of the season, soon after the enhanced measures were announced. As a result, the survey is a snapshot of a selection of events. It is considerably affected by factors other than the introduction of the enhanced measures, such as weather.

6.2 Event Circumstances

Each event had different circumstances and these influenced the survey replies:

- 1) **Seething Charity Air Day:** The display line was moved to 230m (from 150m), however, we were told that some acts were exempt from this. To avoid crossroads to the south-east of the airfield, an offset display line was employed which pushed the display line further from the crowd line. No display items cancelled because of the enhanced measures (pilots were aware of the changes when they started planning the event). The weather was poor in the morning but improved throughout the day.
- 2) **Southport Air Show:** Some aircraft that used the 150m display line in 2015 had to use the 230m display line in 2016. No other changes were made to site layout (seaside display). No display items were cancelled because of the enhanced measures. The weather was good for the entirety of the display.
- 3) **Cranfield Festival of Flight:** The display line was moved to 230m (from 150m), however, we were told that some acts were exempt from this. A village east of the display line was considered a secondary crowd and therefore a 230m buffer zone was placed either side of the display line, limiting the aircraft to one axis only. No display items cancelled because of the enhanced measures (pilots were aware of the enhanced regulation when they started planning the event). Some aircraft cancelled due to poor weather conditions on the day.

- 4) **Sywell Classic – Pistons and Props:** The display line was moved to 230m (from 150m), and was utilised by all aircraft. No display items cancelled because of the enhanced measures. The weather was good for the entirety of the day, however, one display item had to cancel due to weather conditions affecting their journey to the display.
- 5) **Shuttleworth Season Finale – Race Day & Roaring Twenties Finale:** The CAA granted an exemption for Shuttleworth (reduced lateral separation distance) a little over half way through the season. The display items which participated in this event in October flew at the 'exempted' distances. Some pilots chose not to display at Shuttleworth because of the enhanced measures. The weather was good for the entirety of the display.

6.3 Public survey results

We surveyed 372 people in total over the five air displays. The full results can be found in Annex C. The feedback below summarises our findings from our quantitative survey. For questions with ranged answers (1 to 5), we have grouped choices 1 & 2 and 4 & 5 together:

- In total, 173 of the 372 respondents told us that they had visited the air display in question before. We asked these respondents whether they noticed a difference in the air display this year compared to previous years. 43% experienced no change whilst 28% said that they noticed a difference. Some of the comments we received from those that thought there was a difference included 'busier than previous years', 'better layout', and 'more parking', as well as 'fewer aircraft' and 'less variety of aircraft', for example.
- We asked all respondents whether they could see the air display clearly. Of the 372 respondents, 90% said that they had good visibility of the display and 4% said they had poor visibility.
- We asked all 372 respondents if the air display met their expectations. Our results indicate that 70% thought the display was above expectation and 10% thought it was below expectation. When asked about the reasons for the display not meeting expectations, only 115 respondents provided feedback. Of these, 64% indicated that there were not enough aircraft, 8% thought that there was a poor variety of aircraft type, 7% were unable to see the aircraft clearly, 5% thought the air display was too expensive, and 3% thought that the flying display was poor. In addition, 13% of respondents selected 'Other' which included event related issues such as poor parking facilities, poor accessibility to disabled toilets and no availability of family tickets.
- We asked all respondents if they thought that the air display in question was value for money. Of the 372 respondents, 63% thought the air display was good value for money and 11% thought it was poor value for money.
- We asked all respondents if they felt safe whilst watching the air display in question. Our results show that 97% of respondents felt safe whilst watching the air display and 1% felt anxious. One respondent said that a helicopter display which went over the crowd made them feel nervous.

- We asked all respondents if they would attend the air display in question again in the future. 95% of respondents said they would attend the air display again, and 5% wouldn't.

In summary, the survey did not show a widespread dissatisfaction with the air displays, nor widespread concerns about safety. Of those indicating the display was below expectation, the main complaint was that there were not enough aircraft (about 20% of all people surveyed felt this). Weather was a significant causal factor for this because at least two shows were affected by bad weather which caused cancellations.

7 Summary

The CAA developed a series of measures to enhance public safety at air display events. The enhanced measures (29 actions) published by the CAA at the start of the 2016 display season were implemented through the year.

Regarding the enhancement of public safety, 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. We also found that 97% of the respondents to the public survey felt safe whilst watching the display.

Within the aerodrome, the increased separation distance moved the display line further from the observing crowd also to enhance public safety. While this seems to have minimal impact on those members of the public to whom we spoke with at air displays, pilots told us that they feel less safe because they were more distracted and more restricted during their displays. In some instances, the movement of the display line pushed pilots over areas inaccessible to emergency services, compromising their safety in the event of an accident.

The consequence of a STOP call has placed more pressure on pilots, some of whom say they have had to focus their attention on avoiding this rather than the display itself they are performing. This is another example of pilots reporting they feel less safe. However, it is also clear that there is confusion over the STOP call regulations which mean that some of this pressure may arise from misunderstandings.

Consultees complained that some of the new processes were time-consuming, complicated, lacked clarity and needed more guidance. There was evidence to suggest that the relationship between stakeholder and regulator has become more strained. For example, there was evidence that late approvals from the CAA have put strain on event organisers, FDDs and pilots. Communications between stakeholder and CAA have not been as effective as they could be. Stakeholders also felt there was not enough feedback from the CAA from the post-event reports that they submit.

The consultation processes for the enhanced measures were not as extensive as they could be. The CAA has acknowledged that the short timescales and the changing landscape caused by the ongoing AAIB investigation, were the main reasons resulting in limited consultation.

Some pilots felt that their interaction with the crowd has reduced and display quality was compromised due to the enhanced measures. This was not borne out from the discussions we carried out with members of the public at air displays. They believe that the industry will suffer because their display is now so far from the crowd that the relationship with spectators may be compromised. This could affect recruitment to aviation-related industries and advertising revenue (since advertisements on the side of aircraft can't be seen as well).

The Shoreham accident has increased the 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 taking out which has increased the overall cost of insurance to the industry. 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 has had an impact the 2016 display season, particularly on smaller events. The CAA increased its own charges by 100% and

introduced a post-event charge for those air displays where seven or more items were displaying. The post-event charge is being phased in over a three year period for the “more than eight items” air displays. These changes were introduced so that the CAA could fully recover its costs on air display regulation and oversight, rather than having a cross-subsidy situation.

These changes, along with additional risk mitigations costs and changes to insurance arrangements, have meant that some events did not take place. However, less than a third of 19 cancelled events in 2016 (British Airshows website) referenced the enhanced measures as the cause for their cancellation. There was a 31% reduction in the number of submitted air display applications between 2015 and 2016. There was also evidence of shows reducing the number of display items to avoid some CAA charges (e.g. to avoid the post-event charge which starts at seven or more display items). It appears that the greater cost, perceived risk and workload of organising air displays means that some organisers of small shows have decided against doing it at all.

The review found that the CAA has done what it said it would do in the 2016 display season, but 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. 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. The most significant result is that 20% of the 372 respondents indicated that they didn't think there were enough aircraft. Of these 74 respondents, 36 (49%) made this comment at the Sywell Classic (Pistons and Props) event, and 26 (35%) made this comment at the Cranfield Festival of Flight event. Both events experienced display act cancellations due to poor weather conditions. This factor is thought to have contributed to the feedback we received from the public at both events.