Des Barker Report 2022

Airshow Incident and Accident Review

This report does not seek to pass judgement on airshow accidents other than reporting on information in the public domain in an effort to identify and alert the airshow community worldwide, to accident trends in airshow safety.

Introduction

The current report is a continuation of the legacy that Des Barker left to the international airshow community. All efforts will be taken to provide an annual accident and incident review of the previous display season in the same format to the one Des was working with, including comments provided in the final investigation reports, without any attempt to put blame, but rather to share lessons learned.

2022 Statistical Overview

Figure 1 provides an annual airshow incident accidents total, and upon analyzing the data, one could posit that 2022 was one of the safest years in the history of airshows. With only nine identified or recorded accidents, this number is considerably lower than the historical average of 13 accidents per year over the past twenty years, as reported by Barker.

However, the interpretation of this data is subjective and depends on the context. When considering the entire history of airshows over the past century, this number is low and indicates a positive trend towards a safer airshow community. Nevertheless, a closer analysis of the data reveals that the number of accidents in 2022 increased compared to the previous years, such as 2020 with only one accident and 2021 with five accidents. This trend is concerning, and it is crucial to evaluate the safety protocols and procedures in place to ensure the safety of all involved.

Moreover, the gradual resumption of airshow events in 2022 after the pandemic-induced hiatus could have contributed to the increase in accidents. The influx of participants and crowds attending airshow events could have increased the pressure to the airshow performers and organizers, and therefore the likelihood of accidents occurring. Consequently, the airshow community must remain vigilant and prioritize safety to reduce the number of accidents.

In conclusion, while the data suggests that 2022 was one of the safest years in airshow history, the airshow community must continue to prioritize safety and work towards reducing the number of accidents. By doing so, we can continue to provide thrilling and entertaining spectacles while also ensuring the safety of all involved.

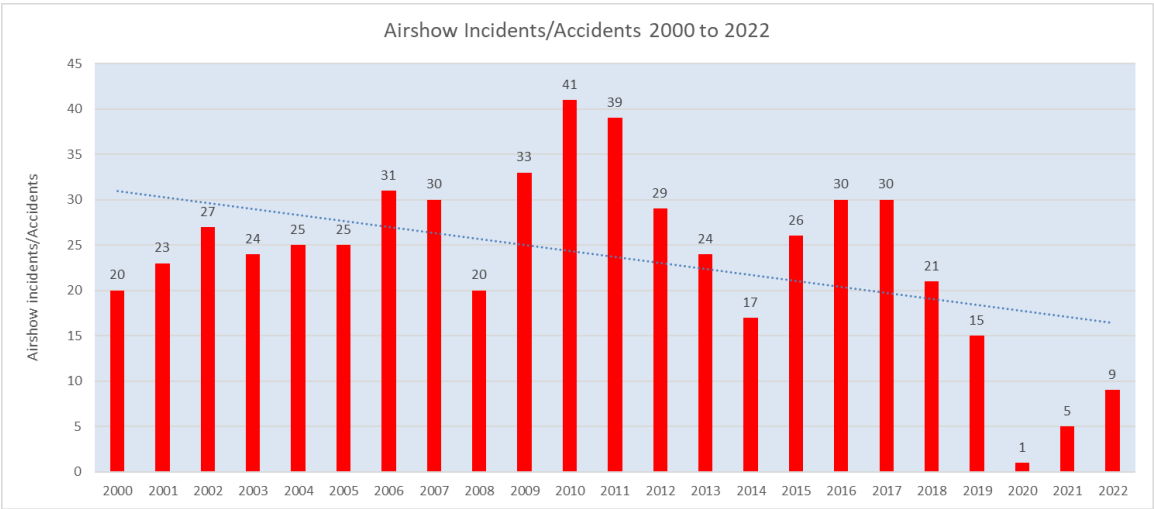


Figure 1, Annual Airshow Incident/Accident, 2000-2022

Casualties

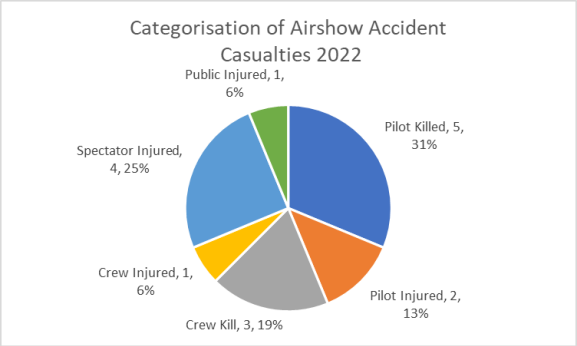
In 2022, the number of pilots killed in airshow accidents was well below the historical average of 13 pilots per year. However, the deaths of three crew members, in addition to the three pilots, during the MAC of the B-17 with the P-63 are a reminder of the risks associated with multicrew aircraft. When such aircraft are involved in accidents, the risk of increased losses is multiplied.

Additionally, one jetpack/jet-hoverboard user was injured but managed to recover from their injuries. Although this type of flying machine seems to be on the rise and may be more frequently observed in future airshow events, their development is still ongoing. Event organizers and FDDs must pay attention when introducing such performances and be fully aware of the potential for crashes and fires, as well as the extraction and detachment procedures of these devices, which are "pocket rockets" worn either as a hoverboard or a parachute pack. It is also essential to ensure that the insurance company fully covers such events.

However, the most concerning aspect of the 2022 airshow season was the collateral effects. Once again, spectators and people in the public, outside the premises of the airshow's crowd area, were injured. In total, five people were injured, and their current physical and psychological conditions are unknown. The injuries and fatalities of people from the public are not only untenable but also unacceptable to the airshow community.

As Des Barker stated in his 2019 report, "*Fatalities remain untenable, and if the airshow community is to continue to exist without regulatory and insurance interventions that would impose additional constraints on the ability to host air events, airshow accidents must decrease*." Sponsors are not typically supportive of events in which fatalities occur, which is damaging to their brand.

In conclusion, while the number of pilots killed in airshow accidents in 2022 was relatively low, the injuries and fatalities of people from the public are unacceptable. The airshow community must take steps to reduce the number of accidents, increase safety measures, and ensure that event insurance fully covers all potential risks. We should keep focusing on safety first and put good mitigation strategies in place to deliver thrilling and entertaining displays while protecting the safety of everyone involved.



Causal Factors

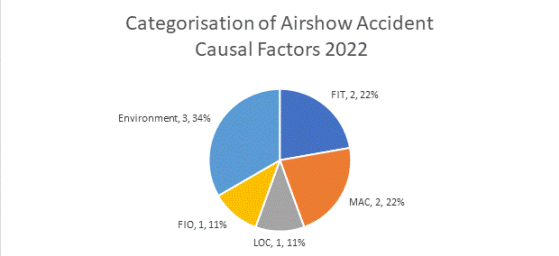
During the 2022 display season, three incidents (34%) related to the environment, such as bird strikes, were recorded. Fortunately, one of these incidents led to the successful ejection of the pilot.

Two mid-air collision accidents (22%) were also recorded, involving a total of four aircraft. Formation flights can increase the complexity of the display and minimize the tolerance for any errors. When more than one aircraft is flying in the airshow box or display zone, an increased risk is introduced. Proper planning is critical for both the FDD and display team to ensure safety.

Two "Flight-Into-Terrain" accidents (22%) occurred, which was lower than the historical average of 26%, while one "Flight-Into-Object" incident took place (11%).

Only one Loss-of-Control accident was recorded (11%), which is lower than the historical average of 18%. This improvement could be attributed to a reduction in "up and away" loss of control accidents, as Des Barker reported in 2019.

A positive feature of 2022 is that no accidents occurred due to mechanical or structural failures. This could be an indication that aircraft are well maintained, and display pilots respect their flying machines' limitations.



Event Categories

In 2022, 89% of incidents occur during airshows, while 11% occur during practice. Historically, 76% of airshow accidents and incidents occurred during actual displays, with only 24% occurring during practice. In 2019, the occurrence rates were similar, with actual airshows and air events at 80%, versus 20% during practice.

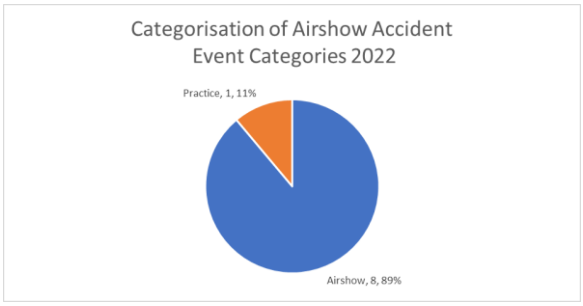
This raises the question of whether the military adage of "*fight like you train*" is not being applied by display pilots. Instead, pilots may be focusing too much on the showmanship aspect of their performances, and not enough on safety. It's important to remember that safety should be the top priority, and that "*display like you practice*" should be the mantra for all involved in airshows. Anything else is unrealistic.

Another factor that may be contributing to the discrepancy between incidents during airshows versus practices is the lack of recording and sharing of close calls or mishaps during practices. This information may not be formally or officially shared with the rest of the community, which could contribute to a false sense of security and complacency.

The fact that airshow accidents showed an increase in 2022 compared to practices may be indicative of poor preparation that leads to poor performance, not only from the airshow performers but also from the display directors. Display directors may not be completing a thorough risk assessment for the airshow prior to and during the event. This may demonstrate a lack of oversight by display directors and regulators, who should be providing a thorough risk assessment that includes planning for risks such as bird strikes, potential collisions, additional pressures and distractions to the display pilots.

Furthermore, we should not rule out the possibility of the pandemic contributing to issues with airshow performers' preparation, coordination, and oversight. For many display directors, it's been more than a year since they've organized an airshow, and this could have led to a lack of confidence, recency, currency, or overall preparation for the event.

In conclusion, the airshow community must prioritize safety and take steps to ensure that thorough risk assessments are completed, and that all involved in airshows understand that safety should always be the top priority. Thus, by implementing effective mitigation strategies, such as recording and sharing close calls and mishaps during practices, the airshow community can work towards reducing the number of accidents and ensuring the safety of all involved.



Aircraft Categories

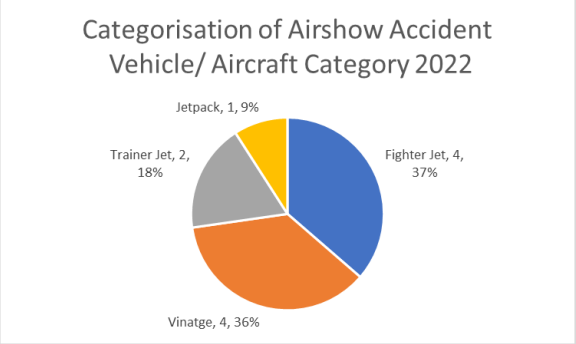
In 2022, vintage aircraft and fighter jets contributed significantly to airshow accidents, each accounting for 36% of incidents. Trainer jets accounted for the remaining airshow performer accidents, with one jetpack incident also contributing to the total number of airshow accidents.

Interestingly, if we combine the number of fighter jets and trainer jets involved in airshow accidents or incidents, the total number of jet aircraft was more than 50% of all aircraft involved in accidents. This may be due to the fast speeds at which these aircraft are flying, which can significantly reduce the reaction time of the pilot in the event of bird strikes.

When flying at high speeds, pilots have less time to react to unexpected hazards, such as birds crossing their flight path. This can be especially challenging for pilots of higher-performance aircraft, who may have less time to make split-second decisions.

To reduce the risk of accidents involving vintage and jet aircraft, it's important for airshow organizers to prioritize safety and ensure that all pilots are adequately trained and

prepared. This includes regularly reviewing and updating safety protocols and implementing effective mitigation strategies to minimize risks.



Accidents by Country

In 2022, nine accidents occurred in six different countries, including three in the USA, two in France, and one each in Argentina, Czech Republic, Turkey, and the UK. It's worth noting that no accidents were reported in other countries, which could be due to improved safety records or the fact that the airshow industry hasn't fully recovered yet in those regions.

Airshow Safety Rates

Des Barker in his ultimate airshow safety report envisioned the introduction of an airshow accident rate, with the intention of adding more clarity and subjectivity to the airshow community's safety records. To further expand Des' vision, in the current report three airshow safety rates are introduced, namely the Barker Airshow Accident Rate (BAAR), the Airshow Fatality Rate (AFR), and the Airshow Casualty Rate (ACR). These safety rates will be tracked throughout the year and will be available online at the EAC's website. In the beginning they will represent holistically the international airshow industry; yet, in the future, regional safety rates will be available to highlight any trends.

Barker Airshow Accident Rate (BAAR)

The Barker Airshow Accident Rate (BAAR) has been introduced in the 2022 Barker report to provide a standardized and objective method of measuring airshow safety. The BAAR takes into account the total number of display items and the number of accidents and incidents that occur during airshows and practice sessions. By calculating the BAAR, the airshow community can compare safety performance over time and identify areas where improvements are needed.

While the BAAR is a useful tool, it is important to note that it does not provide a complete picture of airshow safety. The airshow community must consider other factors that contribute to safety, such as the quality of training for pilots and FDDs, the effectiveness of safety protocols and procedures, and promoting a resilient safety culture.

In addition to the BAAR, the airshow community can use other metrics and tools to evaluate safety. For example, safety management systems (SMS) at adjusted scale to fit the performer's level of operations and the airshow's size. can help organizations identify and manage risks, and safety audits can provide an independent assessment of safety performance.

Ultimately, the safety of airshows depends on the collective efforts of all stakeholders, including organizers, performers, regulators, and spectators. The airshow community must continue to work together to identify potential hazards and implement effective safety measures to prevent accidents and minimize the impact of any incidents. By doing so, our community can ensure that airshows continue to be an exciting and engaging spectacle that is also safe and enjoyable for all involved.

Figure 2 shows that the Barker Airshow Accident Rate has decreased over the past decade. In 2010, the accident rate was 0.98 accidents per 10,000 events. This decreased to 0.90 in 2011, and continued to decline steadily over the following years. By 2014, the accident rate had decreased to 0.45. However, the accident rate increased in 2015 to 0.60, before declining again in 2016 and 2017 to 0.67 and 0.71 respectively. In 2018, the accident rate decreased to 0.5, before further decreasing to 0.38 in 2019. The latest available data point,

from 2022, shows that the accident rate has decreased even further to 0.32.

Figure 2, BAAR, AFR, and ACR

Overall, the trend in the BAAR over the past decade has been a decreasing one, with some fluctuations in the middle years. The highest accident rate was in 2010, and since then the trend has been consistently downwards. The most significant decrease in the accident rate occurred between 2012 and 2014, when the rate decreased from 0.69 to 0.45. This was a decrease of 34%, which is a considerable improvement. It is important to continue monitoring the BAAR to ensure that the event remains safe for all participants and attendees.

Airshow Fatality Rate (AFR) and Airshow Casualty Rate (ACR)

The Airshow Fatality Rate (AFR) and Airshow Casualty Rate (ACR) have been also introduced in this year's Barker report to provide additional metrics for evaluating airshow safety. The AFR measures the number of fatalities per airshow event, while the ACR measures the number of casualties per airshow event.

The introduction of these new metrics highlights the importance of continually assessing and improving airshow safety. While the airshow community has made significant strides in improving safety over the years, there is always room for improvement.

The airshow fatality rate (AFR**)** can be a volatile metric due to the rare occurrence of fatalities at such events. The available data from 2019 and 2022 shows an increase in the fatality rate at airshows. In 2019, the fatality rate was 0.24 fatalities per 10,000 events. However, in 2022, the fatality rate increased to 0.57, a significant increase of 138% (see *Figure 2*).

Then the available data shows an increase in the airshow casualty rate (ACR) between 2019 and 2022. In 2019, the casualty rate was 0.19 casualties per 10,000 events. However, in 2022, the casualty rate increased to 0.29, a significant increase of 53%.

While the increase in both AFR and ACR is concerning, it is important to note that the data is limited to only two years, and the sample size is small. Therefore, it is difficult to draw a concrete conclusion about the trend in the airshow fatality and casualty rate. It is possible that the increase in the casualty rate in 2022 is due to a one-time event or anomaly. However, this increase in fatality rate in 2022 is a matter of concern, and it is essential to investigate the cause of the increase to prevent any further rise in these rates.

Airshow Excellence Rate (AER)

This report took into account the perspectives of survey participants in airshow-related research, recognizing that evaluating airshow safety performance should not only focus on negative outcomes but also consider factors of excellence and high performance. In light of this, the author proposes the introduction of a new metric, the Airshow Excellence Rate (AER), which captures the quality and excellence of the airshow industry. Therefore, the AER would provide an opportunity to acknowledge the outstanding work of airshow performers and organizers, and recognize the positive impact the airshow community has on the aviation industry.

In addition, the introduction of the AER would encourage the airshow community to strive for excellence, and provide a benchmark to measure progress over time. As with the BAAR and the other safety metrics, the AER would be useful for organizers, performers, to evaluate the airshow community and make improvements.

Furthermore, the AER could be used to incentivize excellence and innovation in the airshow community. Organizers and performers could be recognized for their outstanding achievements and encouraged to continue pushing the boundaries of what is possible in airshow performances. The AER could also be used to attract more spectators to airshows, as they would be drawn to events that are exceptional and of high quality.

It is important to note that the AER should not be considered a substitute for the safety metrics, such as the BAAR, AFR, and ACR, which are crucial for evaluating and improving airshow safety. Instead, the AER should be viewed as a complementary metric that recognizes the positive impact of the airshow community on the aviation industry.

In conclusion, the introduction of the Airshow Excellent Rate would provide a new way to evaluate airshow performance and promote a culture of excellence across our community and our valuable spectators and sponsors. The AER would incentivize excellence, innovation, and high performance, and provide a benchmark to measure progress over time. By introducing the AER, the airshow community can celebrate the outstanding work of performers and organizers and continue to push the boundaries of what is possible in airshow performances.

AER, Promoting Excellence

The Airshow Excellent Rate (AER) formula could be defined as the number of outstanding and exceptional airshow events divided by the total number of airshow events held during a specific time period, multiplied by 100 to obtain a percentage.

$$AER = \frac{Outstanding\ and\ Exceptional\ Airshow\ Events}{Total\ Number\ of\ Airshow\ Events} \times 100\%$$

The criteria for what constitutes an outstanding or exceptional airshow event could be determined by a panel of experts within the airshow community, taking into account factors such as creativity, innovation, and overall excellence. The total number of airshow events could be determined by a comprehensive listing of airshow events held during the specific time period in question. The resulting percentage obtained from the AER formula would provide an overall measure of the level of excellence and high performance achieved by the airshow community during that time period.

Therefore, it is important to use the appropriate metrics for each aspect of airshow performance evaluation. While safety metrics such as the BAAR, AFR, and ACR are critical for evaluating and improving airshow safety, the AER provides a complementary metric that recognizes the positive impact of our airshow community on the aviation industry, in general.

The available data from 2010 to 2022, as depicted in Figure 3, shows an increase in the airshow excellence rate. The improvement is a positive trend, indicating that airshow organizers have implemented stringent safety measures to minimize the risk of incidents and accidents. The airshow excellence rate has improved from 99.990% in 2010 to 99.997% in 2022, which is a significant improvement of 0.007% over the 12-year period. Nonetheless, airshow organizers must continue to prioritize the safety of the event and take necessary measures to ensure the well-being of the participants and attendees to maintain and improve the airshow excellence rate.

Figure 3, AER

How Safe Were Airshows in 2022? A Statistical Paradox.

The safety of airshows in 2022 presents a statistical paradox. Although there were fewer fatal airshow accidents, the lower number of airshow events resulted in higher airshow accident rates compared to 2019.

However, in 2022, while the BAAR has reduced slightly, the ACR (Airshow Casualty Rate) and AFR (Airshow Fatality Rate) have doubled compared to 2019 figures. The increase in fatalities was mainly due to multicrew aircraft involved in the Mid-Air Collision (MAC) of the B-17. Also, the significant increase in casualties, including spectators and the public being injured, is a significant cause for concern. The airshow community must make all efforts to minimize or even better, eliminate casualties.

Although it may be difficult to make the BAAR zero during an active display season that is not affected by pandemics or other geopolitical issues, the airshow community can set an achievable goal to **zeroize the AFR and ACR**.

Other high-risk events such as F1 or WRC races have achieved a high level of reliability and safety, so it is possible for the airshow community to think out of the box and learn from their effective practices, and achieve this as well.

Accidents and Incidents Overview 2022

1. 22 May 2022, Rafale (Cognac, France)

Two Rafale planes collided mid-air during an airshow at the 709 base in Cognac-Châteaubernard on Sunday, May 22 but fortunately, both planes were able to land safely.

One of the aircraft lost part of its tailfin in the collision, and the debris fell and damaged a house in the town of Gensac-la-Pallue. The two aircraft landed without difficulty, and no injuries were reported on the ground.

Figure 4, French Rafales MAC (Credit: @oneday_onephoto)

2. 29 May 2022, Jetpack (Biscarosse Lake, France)

The French inventor Franky Zapata has been injured after his homemade jetpack, called a flyboard, crashed into a lake in the town of Biscarrosse. Mr Zapata was taking part in an exhibition event when he appeared to lose control of his invention and fell about 15m (49ft) into Lake Biscarosse.

He was taken to hospital and officials said he was recovering well.

In video footage posted to social media, Mr Zapata can be seen rising in a spin onboard his invention, before seemingly losing control of the flyboard and spiralling into the lake.

Figure 5, Franky Zapata Crash (Credit: @sacha_alex_)

3. 08 June 2022, RCAF F-18 (Michigan, USA)

The Canadian Forces CF-18 Demonstration Team was set to headline the midweek evening airshow on Wednesday, June 8, 2022, at Willow Run Airport in Ypsilanti, Michigan, when their aircraft experienced a bird strike, resulting in an engine failure and a loud explosion that could be heard throughout the airport. When questioned if a bird strike caused the engine explosion and flame out during the demonstration being flown by Capt. Jesse Haggart-Smith, RCAF Safety Pilot Capt. Kevin Mittelholtz replied, "Absolutely, he saw it [the bird] airborne."

The crowd witnessed a bright explosion coming from the CF-18's right engine when the aircraft drew close to the upper part of the aerobatic box. A second later, as the crowd heard the explosion, Capt. Haggart-Smith quickly ended his demonstration and resumed landing without further problems.

Figure 6, RCAF F-18's Bird Strike (Credit: Tom Demerly)

4. 14 August 2022, Hawker Hurricane Mk. IV (Cheb, Czech Republic)

On Sunday the 14th of August 2022, a Hawker Hurricane (OO-HUR) belonging to the Aviation Museum in Tocna near Prague crashed during its display at the Aviation Days in Cheb a town in the Karlovy Vary Region of the Czech Republic. Sadly, the pilot was tragically killed in the accident.

The airshow organizers released a statement saying that:

"There was a plane crash at the airport. The event was terminated in accordance with the emergency plan. All emergency services are on site to deal with the situation. The tragic accident happened behind the airport grounds, in a field, outside the development,"

The accident took place close to the Cheb Airfield where the aircraft was based for the weekend. According to witnesses the plane suddenly lost altitude while turning and disappeared from sight. The plane has crashed into a family house but thankfully no one on the ground has been injured.

Figure 7, Hawker Hurricane Crash (Source: youtube.com)

5. 28 August 2022, Hawk T1 - Red Arrows (North Wales, UK)

A Red Arrows show came to an abrupt end after a bird strike smashed a Hawk T1 canopy during a flight display at the Rhyl Airshow in North Wales on August 28, 2022.

The British aerobatics team was performing at the airshow, when the Red 6 aircraft suffered a bird strike forcing the pilot to declare an in-flight emergency and land at Hawarden Airport.

Figure 8, Red #6 Bird Strike (Credit: Steve Bridge)

6. 18 September 2022, L-29 (Reno, USA)

The Stihl National Championship Air Races in Reno, Nevada, ended in tragedy on September 18 when air race competitor and 2021 Rookie of the Year Aaron Hogue, 61, was killed piloting the number 29 jet, an Aero Vodochody L–29 Super Delfin, during the final Jet Gold race.

Hogue's L–29 Ballista was closely matched heading into the final heat with another L–29 flown by Peter Stavrides. The two were separated by a fraction of a second going into the race and were running neck and neck in the third lap. Rounding a gate, Hogue eased out of the roll and began to climb, which the announcers remarked as unusual. Suddenly, the L–29 stopped climbing and rolled right, veering away from the course, then back to the left, but the nose had dropped and the jet maintained a shallow descent, left wing low, into the ground.

Figure 9, Reno Air Race L-29's Control Flight Into Terrain (Credit: tmz.com)

7. 05 November 2022, DHC-1 Chipmunk (Argentina)

At the Bragado Vuela airshow in Argentina a plane piloted by an Aerolineas Argentinas employee hit an antenna while performing stunts. The right wing of the DHC-1 Chipmunk aircraft collided with the antenna, causing the pilot to make an emergency landing. Sadly, four spectators were hit by debris and suffered minor injuries, and two required hospitalization. Such incidents are unacceptable and do not align with the culture of excellence and safety that the international airshow community represents.

This incident highlights the importance of identifying and addressing hazardous attitudes and behaviors among airshow performers. Egotistic or showoff attitudes have no place in the airshow community and should be identified early on to ensure that all performers meet the highest standards of safety and professionalism. It's essential to take steps to minimize the risk of accidents and ensure that all participants are adequately trained and mentally prepared to perform at the highest level of safety and excellence.

Figure 10, DHC-1 Chipmunk's Flight Into Object (Credit: ViralPress)

Furthermore, this incident in Argentina has brought attention to the need for greater inclusivity within the international airshow community. It's vital that the industry works to engage and include airshow performers, air bosses, organizers, and policymakers from all countries, not just those in Europe and North America.

By expanding our community to include members from a more diverse range of countries, we can foster a more inclusive and open culture that prioritizes safety and excellence. Additionally, by working together and sharing our experiences and best practices, we can minimize the risk of repeating the mistakes of the past and ensure that all airshow performers and organizers are adequately trained and prepared to perform at the highest level.

Lastly, with the widespread availability of social media, any airshow accident in any part of the world could negatively impact our industry's reputation. As such, it's crucial that we work together to remove the silos that may have previously separated certain members of the airshow community and to create a more collaborative and supportive environment that promotes excellence and safety for all involved.

8. 12 November 2022, B-17G, and P-63F (Dallas, USA)

Section from the NTSB preliminary report:

On November 12, 2022, about 1322 central standard time, a Boeing B-17G airplane, N7227C and a Bell P-63F airplane, N6763, collided in midair at the Dallas Executive Airport (RBD), Dallas, Texas. A post impact fire ensued. The pilot, co-pilot, and three crewmembers onboard the B-17G and the pilot of the P-63F were all fatally injured. There were no ground injuries reported. Both airplanes were operated under the provisions of Title 14 Code of Federal Regulations Part 91 in the Wings Over Dallas Airshow.

The P-63F was number 3 of a three-ship formation of historic fighter airplanes and the B-17G was lead of a five-ship formation of historic bomber airplanes.

According to the recorded audio for the airshow radio transmissions and Automatic Dependent Surveillance-Broadcast (ADS-B) data, the air boss directed both formations to maneuver southwest of the runway before returning to the flying display area, which was the designated performance area. He directed the fighter formation to transition to a trail formation, fly in front of the bomber formation, and proceed near the 500 ft show line. The bombers were directed to fly down the 1,000 ft show line. The 500 ft show line and 1,000 ft show line were 500 ft and 1,000 ft respectively from the

airshow viewing line behind which the audience viewed the airshow.

There were no altitude deconflictions briefed before the flight or while the airplanes were in the air. When the fighter formation approached the flying display area, the P-63F was in a left bank and it collided with the left side of the B-17G, just aft of the wing section. Both airplanes broke up in flight and impacted terrain in a grassy area on airport property south of the approach end of runway 31. A fire ignited in the wing center section of the B-17G as it descended to the ground. The B-17G exploded upon ground impact.

Note:

Since the NTSB's accident investigation is still underway, no further remarks will be made, other than the observation that formation flying during airshows provides excitement and thrill to the spectators; yet, escalates the inherent risk for both airshow performers and air bosses.

Figure 11, B-17 and P-63 Mid-air Collision (Credit: Larry Petterborg)

9. 06 December 2022, NF-5 - Turkish Stars (Konya, Türkiye)

An NF-5 aircraft of the Turkish Stars crashed in the central Turkish province of Konya on the 6th of December. As per the Turkish Ministry of National Defense both engines failed due to bird strike, while the pilot managed to eject and survived the accident.

Conclusion

The conclusion of the 2022 Barker report could not be anything other than Des's own words, as stated in the conclusion section of his 2019, ultimate, report:

"*Based on statistical evidence, as an international airshow community, we seem rather limited in our ability to reduce airshow accidents and incidents and we have not been able to arrest the decline effectively which raises the question: Can we afford then to just continue and accept an average of 27 accidents/incidents per annum over the past twenty years?*

We continue to lose approximately 13 display pilots per year on average and have not yet managed to consistently prevent any passenger or spectator deaths or injuries. It is pointless to introduce additional regulations, there are already enough in place; what is required, however, is to zero-in on human factors across the entire airshow community, from first responders, through vendors, safety officers and display pilots alike, through a continuous 'in your face' safety programme, which includes occupational health and safety. Considering the fact that airshow accidents is a worldwide phenomenon, there is an urgent need to preach, implement and share the 'airshow gospel' and 'lessons learned' across all countries in an attempt to reduce airshow accidents.

The purpose of this report is not for shock value; it is not to preach. It is so that we all may learn. Airshow flying is hazardous and despite all our preparations, our skills, and our training, something may still go wrong. And if something should go wrong, we only hope that others may learn from our experience, so that it won't happen again. Based on the fickleness of human judgement in the low-level display environment, we need to understand that we are the weakest link in the safety chain."

Prepared by:

Dr Manolis Karachalios
Board Member, EAC