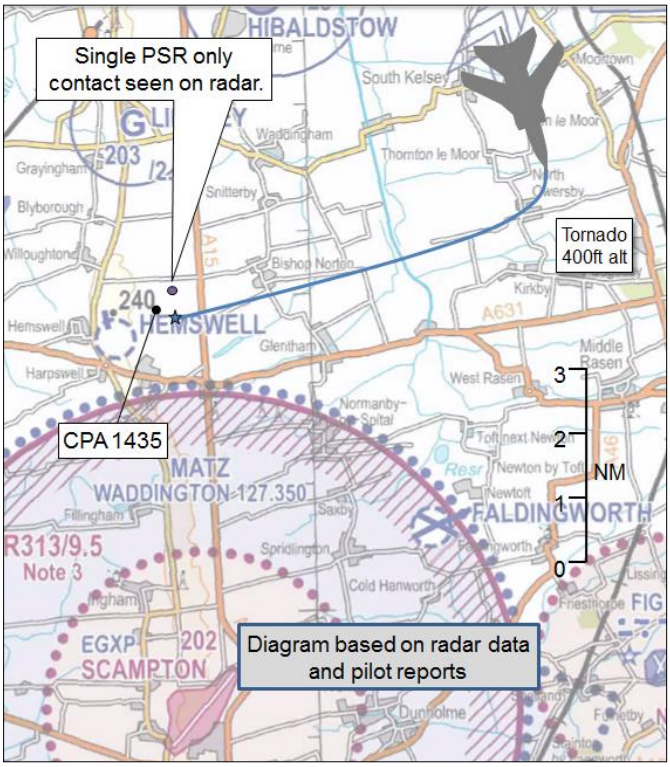
## AIRPROX REPORT No 2016181

Date: 24 Aug 2016 Time: 1435Z Position: 5324N 00034W Location: N of Scampton

## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

| Recorded | Aircraft 1 | Aircraft 2 |
|---|---|---|
| Aircraft | Tornado GR4 | Glider |
| Operator | HQ Air (Ops) | Unknown |
| Airspace | Lon FIR | |
| Class | G | |
| Rules | VFR | |
| Service | None | |
| Provider | NA | |
| Altitude/FL | FL004 | |
| Transponder | A, C, S | |
| **Reported** | | |
| Colours | Grey | White |
| Lighting | NK | |
| Conditions | VMC | |
| Visibility | >10km | |
| Altitude/FL | 250-350ft AGL | |
| Altimeter | RPS (1012hPa) | |
| Heading | 270° | |
| Speed | 420kt | |
| ACAS/TAS | TCAS II | |
| Alert | None | |
| **Separation** | | |
| Reported | 0ft V/80m H | |
| Recorded | NK | |




**THE TORNADO PILOT** reports that he was conducting a low-flying portion of a sortie, which had been planned, input into CADS and low-level bookings made. Whilst flying west through the Scampton/Kirton-in-Lindsey gap, the pilot saw a light aircraft, believed to be a glider, flying in the opposite direction. It appeared to be co-altitude, approximately 70-100m offset, and banking away. When spotted, it was already in the 2:30 position and too late to take any avoiding action. The crew were listening out on the low-level common frequency at the time, although were in the process of trying to raise Waddington ATC to ask for an ATS from them.

He assessed the risk of collision as 'Low'.

**The glider pilot could not be traced.**

### Factual Background

The weather at Scampton was recorded as follows:

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METAR EGXP 241450Z 07009KT 9999 FEW034 25/16 Q1019 BLU=
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### Analysis and Investigation

#### UKAB Secretariat

The Tornado and glider pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard[1]. If the incident geometry

[1] SERA.3205 Proximity.

is considered as head-on or nearly so then both pilots were required to turn to the right[2]. If the incident geometry is considered as converging then the Tornado pilot was required to give way to the glider[3].

## Comments

### HQ Air Command

The Tornado crew had planned their mission in accordance with all extant procedures, including submission of the low-level routing onto CADS. The TCAS II fitted to the Tornado was set to 'TA' mode and, whilst there were indications of other contacts, the Airprox aircraft was not apparent on the Tornado's TCAS display. The crew were flying at 250-350ft AGL and were monitoring the low-level common frequency which, in this part of the UK, is a UHF frequency and therefore is unlikely to be monitored by anything other than military aircraft; the crew was also in the process of raising Waddington ATC with a view to agreeing an Air Traffic Service. Therefore, and in the assumption that the other aircraft was not carrying any form of electronic conspicuity (due to lack of TCAS contact and no SSR return apparent), the only viable barrier to MAC in this instance was 'see-and-avoid'. The Tornado crew spotted the other aircraft with insufficient time to materially affect the separation, but the other aircraft was seen to be banking away so may well have seen the approaching Tornado and taken avoiding action. This encounter once again highlights the indispensability of disciplined lookout in the detection and avoidance of other air systems.

## Summary

An Airprox was reported when a Tornado and a glider flew into proximity at 1435 on Wednesday 24th August 2016. The Tornado pilots was operating under VFR in VMC and not in receipt of an ATS. The glider pilot could not be traced.

## PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the Tornado pilot, radar photographs/video recordings, and a report appropriate operating authorities.

The Board first looked at the actions of the Tornado pilot; he had planned his sortie, entered it into CADS and was conducting his low-level routing in accordance with all of the relevant regulations. Members noted that he had reported that the other aircraft was approximately the same height as he was, and the Board thought that 300ft was very low for a glider, even if it was trying to return to Kirton-in-Lindsey, although it could have been a motor-glider who was starting his engine. The glider member commented that, without power or a fortuitous thermal, a glider wouldn't have made it back to Kirton-on-Lindsey at that height. Other members commented that the aircraft was also quite low for a light aircraft, and some members even opined that it could have been a model, closer than the Tornado pilot perceived. In truth they just didn't know. The Board noted that, without a transponder, whatever it was wouldn't give any indications on the Tornado's TCAS and, even if the Tornado pilot had been receiving an ATS from Waddington, it wouldn't show on their radar anyway. This left look-out as the final mitigation against mid-air collision; although the Tornado pilot had seen the other aircraft late, the Board noted that he described it as banking away, and they wondered whether in fact the other pilot had seen the Tornado and was manoeuvring to avoid it.

In assessing the effectiveness of the safety barriers associated with this incident, the Board concluded that the key factors had been that:

[2] SERA.3210 Right-of-way (c)(1) Approaching head-on.
[3] SERA.3210 Right-of-way (c)(2) Converging.

- **Situational Awareness** and **See–and-Avoid** had both only been **partially effective**; the Tornado pilot had not been aware of or seen the glider until he had effectively passed it.

- **Onboard Warning/Collision Avoidance Equipment** had been **ineffective**; the lack of transponder signals from the glider/aircraft had meant that the Tornado TCAS could not provide warnings.

Turning to the cause, given the lack of information from the glider pilot regarding whether he had seen the Tornado, and the fact that the glider would have been a difficult object to see any earlier head-on, at high-speed at low-level, the Board thought that the best way to describe the situation was as a conflict in Class G airspace. Noting that the Tornado pilot saw the other aircraft too late to take avoiding action, some members thought that the risk category was fairly high given that he reported the separation as only 80m. Others thought that the risk might be less than this if the other pilot had already seen and manoeuvred to avoid the Tornado. In the end, the Board felt that there was not enough evidence to make a proper judgement on the risk, and therefore reluctantly recorded the risk as Category D; not enough information to assess.

The Board noted that the low-level frequency the Tornado pilot was listening out on was a UHF frequency and as such was unlikely to have been available to most GA traffic. In this respect, and following on from a previous trial in Scotland, members were heartened that the RAF Safety Centre was currently trying to secure a VHF common frequency in England/Wales for all to use; however, it was impossible to say whether the availability of such a frequency would have prevented this Airprox.

## PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace.

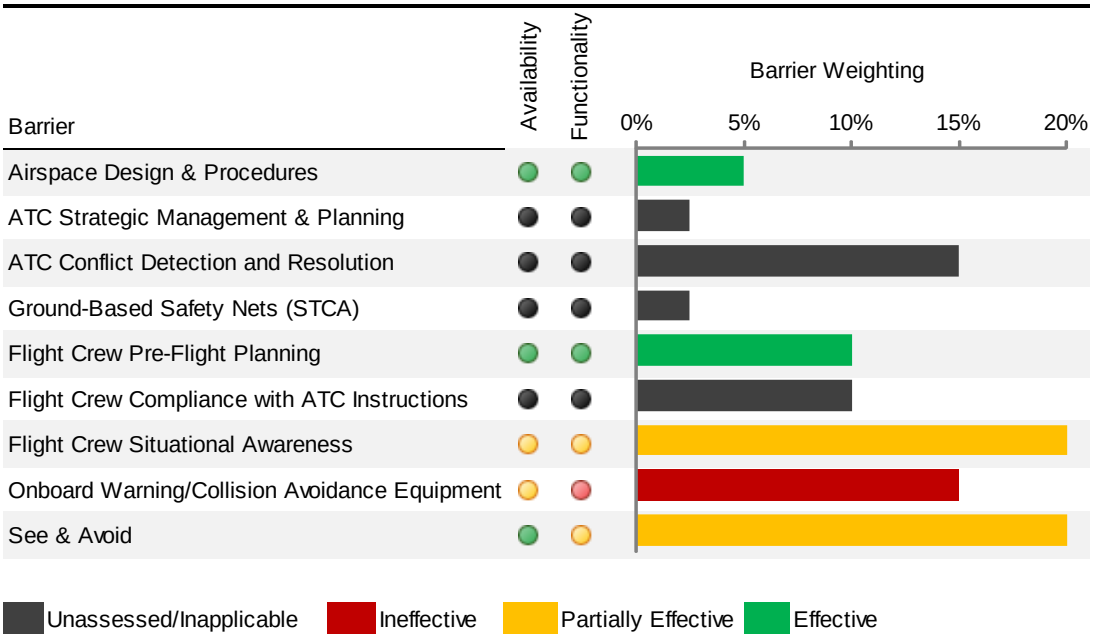
Degree of Risk: D.

Barrier assessment:

Modern safety management processes employ the concept of safety barriers that prevent contributory factors or human errors from developing into accidents. Based on work by EASA, CAA, MAA and UKAB, the following table depicts the barriers associated with preventing mid-air-collisions. The length of each bar represents the barrier's weighting or importance (out of a total of 100%) for the type of airspace in which the Airprox occurred (i.e. Controlled Airspace or Uncontrolled Airspace).[4] The colour of each bar represents the Board's assessment of the effectiveness of the associated barrier in this incident (either Fully Effective, Partially Effective, Ineffective, or Unassessed/Inapplicable). The chart thus illustrates which barriers were effective and how important they were in contributing to collision avoidance in this incident.

[4] Barrier weighting is subjective and is based on the judgement of a subject matter expert panel of aviators and air traffic controllers who conducted a workshop for the UKAB and CAA on barrier weighting in each designation of airspace.

**Airprox Barrier Assessment:** Outside Controlled Airspace




| Barrier Effectiveness | | Consequence | | |
|---|---|---|---|---|
| | | Non-functional | Partially Functional | Functional |
| **Availability** | | **1** | **2** | **3** |
| Completely Unavailable | **1** | 1 | 2 | 3 |
| Partially Available | **2** | 2 | 4 | 6 |
| Available | **3** | 3 | 6 | 9 |

Key:

Effective

Partially Effective (If the system was partially available but fully functional score availability as 2.5)

Ineffective

Unassessed/Inapplicable

| Barrier | Availability | | | Functionality | | | Unassessable / Absent |
|---|---|---|---|---|---|---|---|
| | Fully (3) | Partially (2) | Not Available (1) | Fully (3) | Partially (2) | Non Functional (1) | |
| **Airspace Design and Procedures** | Appropriate airspace design and/or procedures were available | Airspace design and/or procedures were lacking in some respects | Airspace design and/or procedures were not appropriate | Airspace design and procedures functioned as intended | Airspace design and/or procedures did not function as intended in some respects | Airspace design and/or procedures did not function as intended | The Board either did not have sufficient information to assess the barrier or the barrier did not apply; e.g. TCAS not fitted to either aircraft or ATC Service not utilised.<br><br>Note: The Board may comment on the benefits of this barrier if it had been available |
| **ATC Strategic Management and Planning** | ATM were able to man and forward plan to fully anticipate the specific scenario | ATM were only able to man or forward plan on a generic basis | ATM were not realistically able to man for or anticipate the scenario | ATM planning and manning functioned as intended | ATM planning and manning resulted in a reduction in overall capacity (e.g. bandboxed sectors during peak times) | ATM planning and manning were not effective | |
| **ATC Conflict Detection and Resolution** | ATS had fully serviceable equipment to provide full capability | ATS had a reduction in serviceable equipment that resulted in a minor loss of capability | ATS had a reduction in serviceable equipment that resulted in a major loss of capability | The controller recognised and dealt with the confliction in a timely and effective manner | The controller recognised the conflict but only partially resolved the situation | The controller was not aware of the conflict or his actions did not resolve the situation | |
| **Ground-Based Safety Nets (STCA)** | Appropriate electronic warning systems were available | Electronic warning systems is not optimally configured (e.g. too few/many alerts) | No electronic warning systems were available | Electronic warning systems functioned as intended, including outside alerting parameters, and actions were appropriate | Electronic warning systems functioned as intended but actions were not optimal | Electronic warning systems did not function as intended or information was not acted upon | |
| **Flight Crew Pre-Flight Planning** | Appropriate pre-flight operational management and planning facilities were deemed available | Limited or rudimentary pre-flight operational management and planning facilities were deemed available | Pre-flight operational management and planning facilities were not deemed available | Pre-flight preparation and planning were deemed comprehensive and appropriate | Pre-flight preparation and/or planning were deemed lacking in some respects | Pre-flight preparation and/or planning were deemed either absent or inadequate | |
| **Flight Crew Compliance with Instructions** | Specific instructions and/or procedures pertinent to the scenario were fully available | Instructions and/or procedures pertinent to the scenario were only partially available or were generic only | Instructions and/or procedures pertinent to the scenario were not available | Flight crew complied fully with ATC instructions and procedures in a timely and effective manner | Flight crew complied later than desirable or partially with ATC instructions and/or procedures | Flight crew did not comply with ATC instructions and/or procedures | |
| **Flight Crew Situational Awareness** | Specific situational awareness from either external or onboard systems was available | Only generic situational awareness was available to the Flight Crew | No systems were present to provide the Flight Crew with situational awareness relevant to the scenario | Flight Crew had appropriate awareness of specific aircraft and/or airspace in their vicinity | Flight Crew had awareness of general aircraft and/or airspace in their vicinity | Flight Crew were unaware of aircraft and/or airspace in their vicinity | |
| **Onboard Warning/Collision Avoidance Equipment** | Both aircraft were equipped with ACAS/TAS systems that were selected and serviceable | One aircraft was equipped with ACAS/TAS that was selected and serviceable and able to detect the other aircraft | One aircraft was equipped with ACAS/TAS that was selected and serviceable but unable to detect the other aircraft (e.g. other aircraft not transponding) | Equipment functioned correctly and at least one Flight Crew acted appropriately in a timely and effective manner | ACAS/TAS alerted late/ambiguously or Flight Crew delayed acting until closer than desirable | ACAS/TAS did not alert as expected, or Flight Crew did not act appropriately or at all | |
| **See and Avoid** | Both pilots were able to see the other aircraft (e.g. both clear of cloud) | One pilots visibility was uninhibited, one pilots visibility was impaired (e.g. one in cloud one clear of cloud) | Both aircraft were unable to see the other aircraft (e.g. both in cloud) | At least one pilot takes timely action/inaction | Both pilots or one pilot sees the other late and one or both are only able to take emergency avoiding action | Neither pilot sees each other in time to take action that materially affects the outcome (i.e. the non-sighting scenario) | |