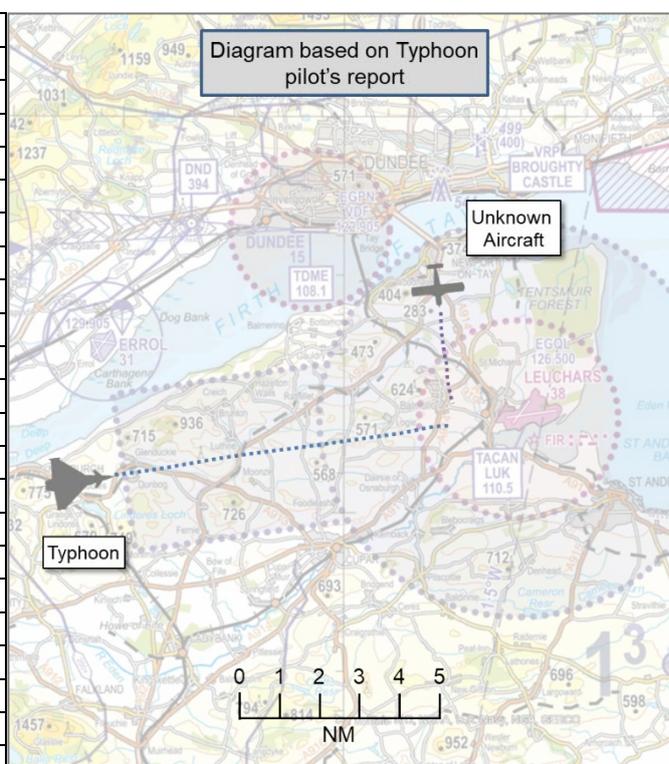


AIRPROX REPORT No 2021135

Date: 27 Jul 2021 Time: 1216Z Position: 5622N 00255W Location: Leuchars Diversion Airfield

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Typhoon	Unk light-aircraft
Operator	HQ Air (Ops)	Unknown
Airspace	Leuchars ATZ	Leuchars ATZ
Class	G	G
Rules	VFR	Unknown
Service	Traffic	Unknown
Provider	Leuchars Talkdown	Unknown
Altitude/FL	NR	Unknown
Transponder	A, C, S	Unknown
Reported		
Colours	Grey	NK
Lighting	Strobe and Nav	
Conditions	VMC	NK
Visibility	<5km	NR
Altitude/FL	500ft	NK
Altimeter	QFE (1005hPa)	NK
Heading	085°	NK
Speed	NR	NK
ACAS/TAS	Not fitted	Unknown
Separation		
Reported	400-500ft V/NR H	NR
Recorded	NK V/NK H	



THE TYPHOON PILOT reports that, whilst conducting the first of multiple PAR [approaches] at Leuchars Diversion Airfield, on exiting IMC at 500ft they observed an unknown light-aircraft in close proximity. The mission recording media was checked after flight and the following is the recorded sequence of events:

1215:53 – 700ft IMC on a PAR [approach] to RW08, [the Typhoon] radar built a radar track [of the unknown aircraft]. The position of the track was 12 o'clock, 2-3 miles relative to [the Typhoon], with a readout of <1000ft. The radar track was not observed by [the Typhoon] pilot.

1216:11 – [The Typhoon] exited IMC at 500ft.

1216:17 – Passing Decision Height at 380ft, [the Typhoon pilot] reported to Leuchars Talkdown that an unknown aircraft was seen 'left 11 o'clock, high', and requested further information. The Leuchars Talkdown controller replied that, due to working SSR only, there was no information on non-squawking traffic. They had no information regarding the potential conflict.

[The Typhoon pilot] elected to extend down the runway centreline before climbing to VMC at 3000ft QFE, and repeated the message to Leuchars Approach, estimating the height of the unknown aircraft at 1000ft.

Operational considerations were identified as follows:

Weather – VMC above 3000ft, BKN layers from 500-3000ft

Airfield serviceability – Leuchars was operating SSR only, and therefore unable to pass Traffic Information regarding non-squawking traffic.

[The Typhoon pilot's] observation of the unknown aircraft was fleeting, due to it being obscured by clouds shortly after the pilot sighting it.

The pilot assessed the risk of collision as 'Medium'.

THE LIGHT AIRCRAFT PILOT could not be traced.

THE LEUCHARS DIVERSION AIRFIELD APPROACH OJTI reports that, as the Primary Radar was unavailable, they were operating SSR alone. No pilots called within the time in question for a MATZ penetration and, as far as they were aware, the airspace was sterile. No contacts were observed on PAR.

The controller perceived the severity of the incident as 'negligible'.

THE LEUCHARS DIVERSION AIRFIELD APPROACH TRAINEE CONTROLLER reports the Typhoon pilot, conducting an instrument approach to Leuchars, reported spotting an aircraft within the Leuchars MATZ. At the time Leuchars was operating SSR only, nothing painted on the radar screen and no other aircraft were on frequency. The Typhoon pilot conducted a missed approach and came back to [the Approach] frequency and then reported seeing something and also that something had painted on their radar. The controller reminded the pilot that Leuchars was operating SSR only.

The controller perceived the severity of the incident as 'Low'.

THE LEUCHARS DIVERSION AIRFIELD TALKDOWN OJTI reports they were sat behind [the ATCO] as instructor for a UT carrying out a PAR. The colour code was YLO2 and a practise diversion was being carried out by a Typhoon pilot, conducting a PAR approach to RW08. The PAR was standard and, at around 1.5 miles from touchdown, the Typhoon pilot called traffic 'left 11 o'clock...' asking the controller to confirm that it wasn't a factor. No contact was observed on either the talkdown console or the adjacent radar console. The pilot was advised that there was nothing observed but that only transponding aircraft could be seen due to working SSR alone. The Typhoon pilot then continued with Leuchars Departures who then advised the same, nothing known to effect.

The controller perceived the severity of the incident as 'Low'.

THE LEUCHARS DIVERSION AIRFIELD TALKDOWN TRAINEE CONTROLLER reports they were UT carrying out a PAR for a Typhoon conducting an approach to RW08 at the time of the occurrence. The colour code was YLO2 and the Typhoon pilot had been advised by the Approach controller that Leuchars was operating SSR alone.

At 1.5NM the Typhoon pilot was advised that they were approaching decision height, to which the response was [for the Typhoon pilot] to ask to confirm that traffic 'left 11 o'clock high' was not a factor. No contacts were observed on either the PAR console or the adjacent radar console and the controller advised the Typhoon pilot that they could only see transponding aircraft due to working SSR only. The Typhoon pilot advised the controller that they were VMC.

As the Typhoon was no longer visible on the PAR console, the Typhoon pilot was instructed to continue with Leuchars Departures. The Typhoon pilot gave further information on the traffic to the Departures controller, who reiterated that there were no contacts visible on radar.

The controller perceived the severity of the incident as 'Low'.

Factual Background

The weather at Leuchars was recorded as follows:

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METAR EGQL 271250Z 14003KT 9999 FEW003 SCT026 19/15 Q1006 RMK BLU=
METAR EGQL 271150Z 11007KT 4000 VCFG OVC003 17/15 Q1007 RMK YLO2=
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Analysis and Investigation

Military ATM

An Airprox occurred on 27th July 2021 at approximately 1215, during an approach to Leuchars Diversion Airfield (LDA) between a Typhoon and an unknown aircraft. The Typhoon pilot was in receipt of a reduced Traffic Service from the LDA radar controller whilst under the control of the Talkdown controller. The unknown aircraft has not been identified therefore, no details are known.

Although LDA was operating SSR alone the PAR was not affected by this limitation, therefore, [the PAR] would have been expected to detect any aircraft [that crossed the approach], regardless whether they were transponding or not. Both the trainee [Talkdown controller] and their instructor reported that no tracks were observed on the PAR, therefore, they were unable to pass any Traffic Information. The [Approach] radar controller confirmed that there were no tracks identified on their radar, therefore, no Traffic Information could be passed. The unit investigation made every effort to identify the potential conflicting [aircraft] however, despite contacting a number of local flying clubs, no information could be obtained as, due to the poor weather conditions, most appeared to not be flying.

UKAB Secretariat

An analysis of the NATS radar replay was undertaken. The Typhoon could be seen to the NW of Leuchars Diversion Airfield descending and positioning for a PAR to RW08. At 1212, whilst on a high base leg, at a range of approximately 13NM to the WNW of the airfield and descending through FL036, the Typhoon disappeared from radar. It reappeared at FL033 after completing the missed approach procedure, approximately 7NM to the east of the airfield. The unknown light-aircraft was not detected on radar during this time, nor was the pilot in contact with Leuchars Air Traffic Control.

The Typhoon and unknown aircraft 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 An aircraft operated on or in the vicinity of an aerodrome shall conform with or avoid the pattern of traffic formed by other aircraft in operation.² If the aerodrome has an air traffic control unit the commander must obtain the permission of that unit to enable the flight to be conducted safely within the aerodrome traffic zone.³

Comments

HQ Air Command

This occurrence was subject to a Local Investigation. The incident occurred on a precision approach, close to Decision Height, as the Typhoon pilot caught a fleeting glimpse of a light aircraft in their 11 o'clock before it was obscured by cloud. After landing, the [Typhoon] pilot verified this sighting with the aircraft radar replay which confirmed that there had been another aircraft present. Over the course of the investigation, many different sources were used to try to determine the identity of the unknown aircraft but with no success: Scottish Information could not identify it; Swanwick radar could not detect any aircraft below 4000ft; and the local airstrips and flying clubs [which were] contacted had no aircraft flying at the time due to the poor weather. It was fortunate that the [Typhoon] pilot caught a brief sight of the aircraft and took action by extending along the runway to ensure deconfliction. All RAF [personnel] involved were operating within regulations and procedures and, without the other aircraft pilot's account, there is little more that can be learned to prevent reoccurrence. See and Avoid was the only mitigation left against a non-squawking aircraft, the pilot of which was non-communicating, in the vicinity of Leuchars' runway.

Summary

An Airprox was reported when a Typhoon and an unknown aircraft flew into proximity approximately 1NM W of Leuchars at approximately 1216Z on Tuesday 27th July 2021. The Typhoon pilot was operating under VFR in intermittent IMC and was in receipt of a Reduced Traffic Service from Leuchars Talkdown. The light aircraft pilot could not be traced.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of a report from the Typhoon pilot, reports from the air traffic controllers involved and reports from the appropriate operating authorities. Relevant contributory factors mentioned

¹ (UK) SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.

² (UK) SERA.3225 Operation on and in the Vicinity of an Aerodrome. MAA RA 2307 paragraph 17.

³ Rules of the Air Regulations 2015 Article 11, Flights within aerodrome traffic zones paragraph 5.

during the Board's discussions are highlighted within the text in bold, with the numbers referring to the Contributory Factors table displayed in Part C.

The Board had limited information available as it had not been possible to trace the pilot of the light aircraft involved and Leuchars Diversion Airfield had been operating SSR only. Members were satisfied however, that the information presented held sufficient detail for them to be able to examine the event and to assign a risk category because they were confident that the Typhoon aircraft's onboard radar system had detected the unknown aircraft.

The Typhoon pilot had been conducting a PAR into Leuchars Diversion Airfield in intermittent IMC. Members questioned whether the PAR may have detected the unknown aircraft but a military adviser member stated that a PAR only detects aircraft on, or crossing, the approach path. They also stated that the PAR is not recorded. It was noted that, although ground elements were present, the unserviceability of the primary radar and the fact that there had been no mode C or S readout from the unknown aircraft (**CF1**) meant that the Leuchars Diversion Airfield controllers were unaware of its presence (**CF2, CF3**).

The Board then discussed the location of the unknown aircraft at the time of the Airprox and, given that the Typhoon's radar had enough information for its algorithms to build a track which was presented as being within 1000ft of the Typhoon and slightly ahead, agreed that the unknown light-aircraft pilot had most likely flown into Leuchars Diversion Airfield ATZ. Furthermore, as the Leuchars controllers were not aware of the aircraft and the pilot had not made contact with them, the light-aircraft pilot had infringed the Leuchars ATZ (**CF4, CF5**). Members considered that the light aircraft pilot's pre-flight planning had most likely not considered contingencies such as inadvertent IMC leading to an unintended penetration of the Leuchars ATZ (**CF6**).

The Typhoon pilot had been operating in intermittent IMC and, as the Leuchars controllers were not aware of the presence of the unknown aircraft, they were unable to provide any Traffic Information. The presence of the unknown aircraft had only become known when the Typhoon pilot briefly saw it at around the time of CPA and so the Typhoon pilot had not had any situational awareness of the presence of the unknown light-aircraft (**CF7**).

Finally, when assessing the risk of collision, the Board discussed that the Typhoon pilot and Leuchars controllers had had no situational awareness about the unknown aircraft. When the Typhoon pilot saw the unknown aircraft there had been no time to take any effective avoiding action. However, the vertical separation assessed by the Typhoon pilot of 400-500ft was such that no risk of collision had existed. The Board did agree that there had been a reduction on safety and subsequently assigned a Risk Category of C to this Airprox.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2021135			
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
Ground Elements				
• Manning and Equipment				
1	Technical	• Radar Coverage	Radar Coverage	Non-functional or unavailable
• Situational Awareness and Action				
2	Human Factors	• Conflict Detection - Not Detected	An event involving Air Navigation Services conflict not being detected.	
3	Contextual	• Traffic Management Information Action	An event involving traffic management information actions	The ground element had only generic, late or no Situational Awareness
Flight Elements				
• Regulations, Processes, Procedures and Compliance				
4	Human Factors	• Use of policy/Procedures	Events involving the use of the relevant policy or procedures by flight crew	Regulations and/or procedures not complied with

• Tactical Planning and Execution				
5	Human Factors	• Airspace Infringement	An event involving an infringement / unauthorized penetration of a controlled or restricted airspace.	E.g. ATZ or Controlled Airspace
6	Human Factors	• Pre-flight briefing and flight preparation	An event involving incorrect, poor or insufficient pre-flight briefing	
• Situational Awareness of the Conflicting Aircraft and Action				
7	Contextual	• Situational Awareness and Sensory Events	Events involving a flight crew's awareness and perception of situations	Pilot had no, late or only generic, Situational Awareness
• See and Avoid				
8	Human Factors	• Perception of Visual Information	Events involving flight crew incorrectly perceiving a situation visually and then taking the wrong course of action or path of movement	Pilot was concerned by the proximity of the other aircraft
9	Contextual	• Visual Impairment	Events involving impairment due to an inability to see properly	One or both aircraft were obscured from the other

Degree of Risk: C.

Safety Barrier Assessment⁴

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

Ground Elements:

Manning and Equipment were assessed as **partially effective** because Leuchars was operating SSR only at the time of the Airprox and therefore only able to detect transponding aircraft.

Situational Awareness of the Confliction and Action were assessed as **ineffective** because the Leuchars radar controller was unable to detect any conflict due to working SSR only and therefore had no situational awareness regarding the unknown aircraft.

Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **ineffective** because, based on the information from the Typhoon pilot's report, the unknown aircraft was within Leuchars' ATZ and had not made contact with, or gained the necessary permission to enter from, Leuchars.

Tactical Planning and Execution was assessed as **ineffective** because the unknown aircraft pilot found themselves in poor weather and appeared not to have considered a contingency for calling the Leuchars controller prior to penetration of the Leuchars ATZ.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because the Typhoon pilot did not have any situational awareness of the presence of the unknown aircraft and it is likely that the unknown aircraft pilot did not have any situational awareness of the Typhoon's presence.

See and Avoid were assessed as **ineffective** because, when sighted by the Typhoon pilot, the proximity of the unknown aircraft was such that the Typhoon pilot had no opportunity to materially increase the separation.

⁴ The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).

Airprox Barrier Assessment: 2021135		Outside Controlled Airspace					
Barrier	Provision	Application	Effectiveness				
			Barrier Weighting				
			0%	5%	10%	15%	20%
Ground Element	Regulations, Processes, Procedures and Compliance	✓	✓				
	Manning & Equipment	ⓘ	ⓘ				
	Situational Awareness of the Confliction & Action	✗	✗				
	Electronic Warning System Operation and Compliance	●	●				
Flight Element	Regulations, Processes, Procedures and Compliance	✓	✗				
	Tactical Planning and Execution	✓	✗				
	Situational Awareness of the Conflicting Aircraft & Action	✗	✓				
	Electronic Warning System Operation and Compliance	●	●				
	See & Avoid	✗	✗				
Key:			Full	Partial	None	Not Present/Not Assessable	Not Used
Provision	✓	ⓘ	✗	●			
Application	✓	ⓘ	✗	●		○	
Effectiveness							