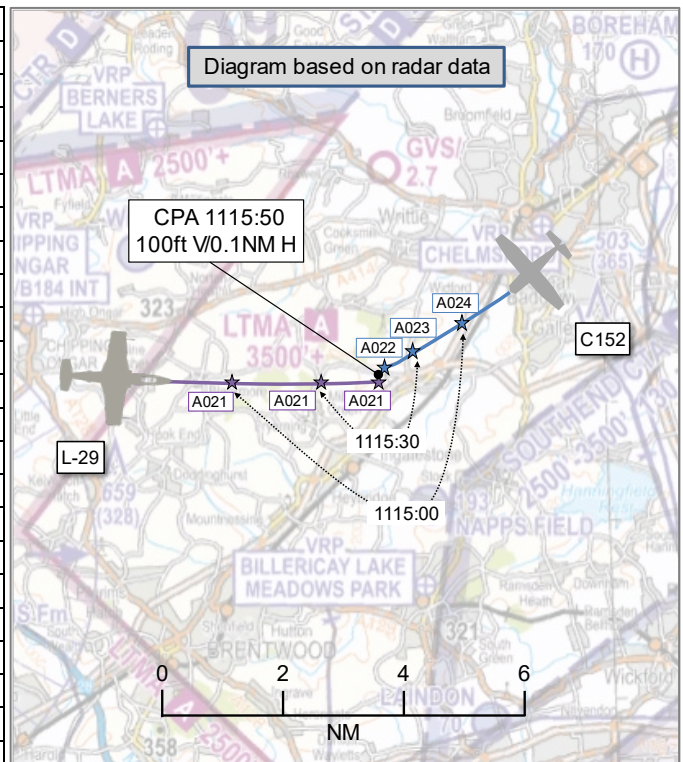


AIRPROX REPORT No 2024058

Date: 21 Apr 2024 Time: 1116Z Position: 5141N 00024E Location: 1NM SW Chelmsford

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

| Recorded | Aircraft 1 | Aircraft 2 |
|-------------------|--------------------|-----------------|
| Aircraft | C152 | L-29 |
| Operator | Civ FW | Civ FW |
| Airspace | London FIR | London FIR |
| Class | G | G |
| Rules | VFR | VFR |
| Service | Listening Out | None |
| Provider | Southend Radar | N/A |
| Altitude/FL | 2200ft | 2100ft |
| Transponder | A, C, S | A, C, S |
| Reported | | |
| Colours | White | Black |
| Lighting | Nav lights, beacon | None |
| Conditions | VMC | VMC |
| Visibility | >10km | >10km |
| Altitude/FL | 2000ft | 2000ft |
| Altimeter | QNH (1028hPa) | QNH |
| Heading | 260° | 240° |
| Speed | 90kt | 180kt |
| ACAS/TAS | SkyEcho | SkyEcho |
| Alert | None | None |
| Separation at CPA | | |
| Reported | 0ft V/300m H | 200ft V/0.5NM H |
| Recorded | 100ft V/0.1NM H | |



THE C152 PILOT reports that they were flying a navigation training sortie in [a C152] tracking the LAM and CLN VORs in VMC. The student was handling the aircraft and they were discussing how to use the VOR to aid in returning to [base]. Southend Radar [frequency] was set on the active [transceiver] with the listening squawk 5050 set, and no other traffic had been heard on frequency in some time. They had just overflown Chelmsford when they noticed a rapidly closing aircraft just left of the nose. They took immediate control from the student as they called *"I have control"* and put the aircraft into a steep turn to the right. Simultaneously, they observed the other aircraft turning to their right. They recognised it as an L-29 Delfin trainer, painted black.

When definitely clear, they noticed that [the other aircraft] had now appeared on their [navigation] display (integrated with [TAS]), still showing as a red contact for about a second before it disappeared from the display. They notified Southend of their intention to file an Airprox [report] before changing to [their en route frequency]. Between observing the L-29 and passing it, they would say, at most, two seconds had passed. They highlighted to their student that they were both in the open FIR and both pilots had performed the correct avoiding action by breaking right when head-to-head. After landing they made use of ADS-B Exchange replay to confirm type and tail code.

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

THE L-29 PILOT reports that they were on recovery from the north of Abberton Reservoir to [their destination] at 2000ft QNH. The weather was very good with 10km plus visibility and no cloud below 3500ft to the best of their recollection. They had a late sighting of a high wing monoplane at about half a mile range about 200ft above them. The late sighting was due to obscuration caused by the canopy arch, and on seeing the aircraft they manoeuvred away to increase separation.

[They commented] that a contributory factor was the funnelling of aircraft into a choke point west of Southend CTA due to the amount of airspace allocated to Southend to support [what they perceive to be] an almost non-existent level of commercial flying.

They further added that they were on an instructional sortie, with an ADS-B that was fitted and believed to be fully functional. Although a GPS is fitted to both cockpits, because of a recent incident where a GPS had failed due to overheating, they teach trainees mental dead reckoning (MDR) navigation as it additionally enhances lookout and reduces heads in the cockpit time.

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

THE SOUTHEND RADAR CONTROLLER reports that [a C152 pilot] had been receiving a Basic Service, operating to the north and northwest of Southend. They had been on frequency from 1033 until 1105 when they free-called London Distress and Diversion for a practice call. At 1116 they came back on frequency to report an Airprox. They identified the other aircraft as being a jet type, with a T-tail and straight wing, black in colour. [The C152 pilot] believed it was an L-29 Delfin, and had reported the other aircraft to have been 'head-on' at 2000ft altitude. At this time [the C152] was squawking 5050, the Southend Frequency Monitoring Code. They were in the vicinity of Boreham, Chelmsford tracking west and indicating 2000ft altitude. The other contact, believed to be the subject aircraft, was now 5NM east of them, also indicating 2000ft altitude, squawking 7000 and tracking east. Their Mode S transponder displayed the registration [of the L-29]. This aircraft remained in the area of Great Oakley manoeuvring for some time, but did not receive a service.

Factual Background

The weather at Southend was recorded as follows:

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METAR EGMC 211050Z 01012KT 340V050 9999 SCT037 10/02 Q1028=  
METAR EGMC 211120Z 01013KT 340V050 9999 SCT038 BKN049 10/02 Q1028=
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Analysis and Investigation

Southend ATSU

Synopsis

Prior to the occurrence, the C152 pilot had received a Basic Service from Southend Radar whilst on a local VFR flight. The aircraft was operating on a dual navigational exercise north of London Southend Airport, in Class G (uncontrolled) airspace. The C152 pilot had left the Southend Radar frequency to contact the Distress and Diversion Cell (D&D), presumably to simulate a PAN call, they did not call Southend again until after the Airprox had occurred. At the time of the occurrence, the C152 was squawking the Mode Alpha code 5050 (Southend Frequency Monitoring Code) and was likely to have been operating autonomously. The pilot of [the C152] called Southend Radar specifically to report the Airprox. When the surveillance recordings were subsequently reviewed, the identity of this aircraft was confirmed using Mode S data as [the L-29's registration], an ex-military Aero Vodochody L-29 Delfin jet training aircraft. At the time of the Airprox, the L-29 pilot was also not in communication with Southend Radar, and was squawking the Mode Alpha code 7000 (VFR conspicuity).

Factual History

Whilst investigating this occurrence, the investigator had access to the recorded R/T, and surveillance data consisting of the 'at the glass' recordings of the Southend Radar Controller Working Position (CWP). When the C152 pilot called Southend to report the Airprox, Southend Radar was operating in combined 'band-boxed' configuration, traffic loading was low and non-complex.

At 1033:14 [the C152 pilot] called Southend Radar, requested a Basic Service, and reported at Brentwood on a navigational exercise [from/to their base]. The Southend Radar controller instructed them to squawk 4575, and a Basic Service was agreed. The Southend Radar controller then passed the Southend QNH (1029hPa) and requested that they report their level. The pilot of [the C152] reported at 2300ft on the Southend QNH.

There was a change of controller between these times.

At 1104:54, the pilot of [the C152] reported that they were changing frequency to 121.500MHz. The Southend Radar controller instructed them to squawk conspicuity, and to free-call London Centre.

At 1115:10 (Figure 1), the recorded surveillance data indicated that [the L-29] was 6NM west of [the C152] tracking eastbound, indicating 1900ft altitude unverified, descending, and squawking the Mode Alpha code 7000.¹ At this time, [the C152] was indicating 2300ft altitude, also in a descent, and was squawking the Mode Alpha code 5050.²



Figure 1 – Southend Radar at 1115:10

At 1115:50, (Figure 2) CPA occurred. [The C152's] Mode C was indicating 2100ft altitude, unverified, and descending, and [the L-29] was indicating 2000ft altitude, unverified, and also descending.



Figure 2 (CPA) – Southend Radar at 1115:50

¹ On the RDS 1600 radar display, 7000 codes are presented as 'Z.'

² On the RDS 1600 radar display, 5050 codes are presented as 'SEN'.

At 1116:12, [the C152 pilot] called Southend Radar and requested to file an Airprox report. The Southend Radar controller requested that they pass their message. The pilot of [the C152] then transmitted [their Airprox details]. The Southend Radar controller acknowledged the report and asked the colour of the conflicting traffic, to which the pilot responded [that it] looked to be a black jet, with a T-tail and a straight wing so they thought it was an L-29. The Southend Radar controller asked the C152 pilot whether they wished Southend to submit the Airprox report, however, the pilot replied that they would file it. The Southend Radar controller acknowledged that and commented that there was no known traffic on the frequency. They also commented, however, about an eastbound contact that was 5NM astern of the C152. The C152 pilot then reported that they were changing frequency to [en route].

Analysis

At the time of the Airprox, neither pilot involved was receiving an Air Traffic Service (ATS) from Southend ATC. The C152 was flying in Class G (uncontrolled airspace), and was likely to have been operating autonomously. Due to the C152's proximity to London Southend Airport's controlled airspace however, the C152 pilot had selected the Mode Alpha transponder code 5050. This code is allocated to Southend for the purpose of a Frequency Monitoring Code (FMC). FMCs are also known as 'listening squawks', and were introduced as a measure to reduce the number and impact of airspace infringements. Use of an FMC does not imply that the pilot is receiving an ATS, and in Class G airspace the responsibility for avoiding other traffic is the pilot's. The L-29 pilot was also not in receipt of an ATS from Southend, and was also likely to have been operating autonomously. The aircraft was transponding the Mode Alpha code 7000, which is allocated in the UK's SSR Code Allocation Plan for the purpose of a VFR Conspicuity code. The L-29 pilot was also operating within Class G airspace and, therefore, was also responsible for avoiding other traffic. Whilst the Southend Radar controller, post occurrence, commented on the eastbound traffic astern of the C152, this does not imply that they had been monitoring either radar contact before the Airprox occurred, nor in this instance were they required to.

UKAB Secretariat

The C152 and L-29 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.³ If the incident geometry is considered as head-on or nearly so then both pilots were required to turn to the right.⁴ If the incident geometry is considered as converging then the C152 pilot was required to give way to the L-29.⁵

Summary

An Airprox was reported when a C152 and an L-29 flew into proximity 1NM southwest of Chelmsford at 1116Z on Sunday 21st April 2024. Both pilots were operating under VFR in VMC, and neither pilot was in receipt of an Air Traffic Service.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, GPS tracks, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate operating authorities. Relevant contributory factors mentioned 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.

Board members first discussed the actions of the C152 pilot, and noted that they had not requested an Air Traffic Service with Southend when returning to frequency after making a practise call to London's Distress and Diversion cell. This had ultimately left the C152 pilot only 'listening out' on the Southend frequency and therefore without the possibility of receiving any information from Southend regarding the presence of the L-29 (**CF1**). However, members felt that the C152 pilot had done well to see the

³(UK) SERA.3205 Proximity.

⁴ (UK) SERA.3210 Right-of-way (c)(1) Approaching head-on.

⁵ (UK) SERA.3210 Right-of-way (c)(2) Converging.

fast-moving traffic, albeit a late sighting requiring them to have taken control of the aircraft from their student to perform an avoidance manoeuvre (CF4). The Board agreed that, with the lack of any input over and above their lookout, and prior to the visual acquisition of the L-29, the C152 pilot had not had any situational awareness of the L-29's position or track (CF2) and no alert had been seen or heard from their EC device in time to assist them (CF3). Members wondered whether the EC device had been appropriately positioned for the pilot to have seen a traffic alert with sufficient time to consider that information.

Turning their attention to the L-29 pilot, members were disappointed that the pilot had not requested any sort of Air Traffic Service from Southend while conducting training just outside the vicinity of their CTA/CTR. Members' expectations were such that the pilot of a fast moving jet on an instructional sortie would be well served to have a Traffic Service to assist them in detecting traffic in a busy training area (CF1). The Board was in agreement that, as with the C152 pilot at that time, the L-29 pilot had not had any situational awareness of the position or track of the C152 (CF2) and also that they had not had any warning of the C152's presence from their EC device (CF3). Nonetheless, members agreed that the L-29 pilot had made a late but 'good spot' by sighting the C152 in time to make an evasive manoeuvre and increase separation (CF4). They further agreed that the L-29 pilot's lookout had been hindered by obscuration from the L-29's canopy arch (CF5).

Concluding their discussions, and in determination of risk, members agreed that the separation between the C152 and the L-29 had been such that safety had been much reduced and that there had been a risk of collision (CF6). As such, the Board assigned Risk Category B to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

| | 2024058 | | | |
|---|---------------|--|---|--|
| CF | Factor | Description | ECCAIRS Amplification | UKAB Amplification |
| Flight Elements | | | | |
| • Tactical Planning and Execution | | | | |
| 1 | Human Factors | • Communications by Flight Crew with ANS | An event related to the communications between the flight crew and the air navigation service. | Pilot did not request appropriate ATS service or communicate with appropriate provider |
| • Situational Awareness of the Conflicting Aircraft and Action | | | | |
| 2 | Contextual | • Situational Awareness and Sensory Events | Events involving a flight crew's awareness and perception of situations | Pilot had no, late, inaccurate or only generic, Situational Awareness |
| • Electronic Warning System Operation and Compliance | | | | |
| 3 | Human Factors | • Response to Warning System | An event involving the incorrect response of flight crew following the operation of an aircraft warning system | CWS misinterpreted, not optimally actioned or CWS alert expected but none reported |
| • See and Avoid | | | | |
| 4 | Human Factors | • Identification/ Recognition | Events involving flight crew not fully identifying or recognising the reality of a situation | Late sighting by one or both pilots |
| 5 | Contextual | • Visual Impairment | Events involving impairment due to an inability to see properly | One or both aircraft were obscured from the other |
| • Outcome Events | | | | |
| 6 | Contextual | • Near Airborne Collision with Aircraft | An event involving a near collision by an aircraft with an aircraft, balloon, dirigible or other piloted air vehicles | |

Degree of Risk:

B.

Safety Barrier Assessment⁶

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

Flight Elements:

Tactical Planning and Execution was assessed as **partially effective** because neither pilot was in receipt of an ATS whilst flying in an area served by Southend LARS.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because neither pilot was aware of the other’s aircraft presence or position prior to sighting it.

Electronic Warning System Operation and Compliance were assessed as **ineffective** because although both the C152 and L-29 pilots were carrying compatible equipment, neither of the systems had alerted the pilots.

See and Avoid were assessed as **partially effective** because the late sighting by the C152 pilot on the L-29 resulted in the need for immediate evasive action, as did the late sighting by the L-29 pilot of the C152.

| Airprox Barrier Assessment: 2024058 | | 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: | | | | | | | | |
| Provision | ● | ● | ● | ● | ○ | | | |
| Application | ● | ● | ● | ● | ○ | | | |
| Effectiveness | ■ | ■ | ■ | ■ | ■ | | | |

⁶ The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).