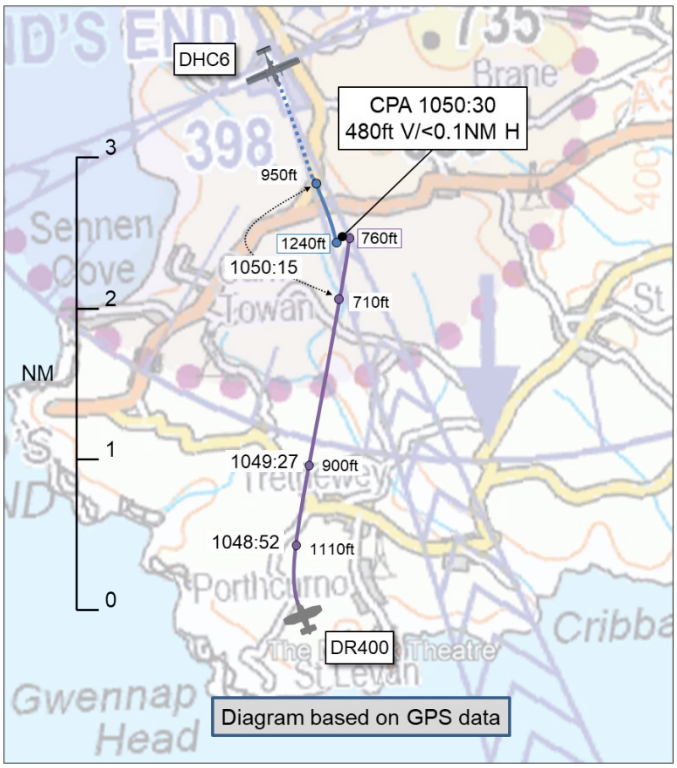
AIRPROX REPORT No 2024229

Date: 31 Aug 2024 Time: 1051Z Position: 5005N 00540W Location:1NM SSE of Land's End Airfield

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	DHC6	DR400
Operator	CAT	Civ FW
Airspace	Land's End ATZ	Land's End ATZ
Class	G	G
Rules	VFR	VFR
Service	ACS	Basic
Provider	Land's End Tower	Land's End Tower
Altitude/FL	1240ft	760ft
Transponder	A, C, S	A, C, S
Reported		
Colours	White	White/blue/red stripe
Lighting	Anti-collision, bcn, nav, landing & taxi	Nav.
Conditions	VMC	VMC
Visibility	>10km	5-10km
Altitude/FL	800ft	1000ft
Altimeter	QNH (1020hPa)	QNH (1019hPa)
Heading	160°	070°
Speed	90kt	90kt
ACAS/TAS	TAS	PilotAware
Alert	None	None
Separation at CPA		
Reported	200ft V/0.25NM H	400ft V/1NM H
Recorded	480ft V/<0.1NM H	



THE DHC6 PILOT reports that they were operating a scheduled service to the Isles of Scilly departing RW16 with the intention to turn right on track climbing to a cruising altitude of 1500ft. [The DR400] was routeing from Exeter to Land's End around the south coast past the Lizard and Penzance at 2300ft. [The DR400 pilot] had reported south abeam and was instructed to join right-base for RW07. [The DHC6 crew] knew that the flightpaths would cross in the right crosswind area, so planned to climb straight ahead until the DR400 had been acquired visually and then turn on track. At flap retraction height of 400ft (800ft QNH) the first officer reported that the DR400 was 200ft low and within 1/4 of a mile, at this point the flightpaths were diverging. On the initial climb, just after rotate, the TAS did show an aircraft at +300ft but it disappeared due to masking of the fuselage.

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

THE DR400 PILOT reports that they were [flying] along the south coast of Cornwall, landing at Land's End. The Air Traffic controller had asked them to join right-base for RW07 approaching [the coast]. Their passengers asked them if they could descend so they could get a photo of the Minack Theatre. This had distracted them and made it hard to see the runway when they realised that they were at the upwind end of RW07. Noticing an aircraft had just taken off, they remained on the heading so they could remain visual with the departing aircraft and notified Air Traffic Control that they were downwind right-hand for RW07 and [that they were landing]. They were asked to speak to the Air Traffic Controller in the Tower which they did, and explained it was their fault, they should have joined right-base RW07 as requested.

The pilot assessed the risk of collision as 'None'.

THE LAND'S END TOWER CONTROLLER reports that [the DR400 pilot] initially free-called in the vicinity of the Lizard with the correct ATIS information, and at an altitude 2300ft; they placed them under

a Basic Service and instructed them to report passing abeam Penzance. [The DR400 pilot] reported passing Penzance, and said that they wanted to route to RW07 via the coast, so they instructed them to join via a right-base for RW07, gave a restriction of not below altitude 2000ft, along with Traffic Information regarding the, soon to be departing, DHC6 and requested that they report south abeam of the airport; they acknowledged all appropriately. Meanwhile, [the DHC6] was on the RW16 threshold conducting power checks. [The DR400 pilot] reported passing the Minack Theatre (south abeam), they couldn't see them out of the window, and repeated their previous instruction, *"join and report right-base RW07"*. [The DHC6 pilot] called ready for departure; they passed 2-way Traffic Information to both them and the DR400 pilot. Since [DR400 callsign] had reported passing south-abeam the airport they deemed it safe to issue a take-off clearance to [DHC6 callsign], as they would route behind [the DR400] as it routed around the coast for right-base RW07. They were looking for [the DR400] towards the Land's End complex (southwest) as they were watching [the DHC6's] take-off, and still couldn't see it. [The DR400 pilot] called visual with the DHC6, they asked the ATC Assistant (ATCA) to help them look for it and, as [the DHC6] was climbing out, the ATCA brought their attention to a low-level aircraft which was heading right-left across the RW16 climb-out, passing below the departing DHC6. [The DR400 pilot] called that they were on right-base for RW07, they told them that they were on right-base for RW34, and reiterated the restriction of not below 2000ft.

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

Factual Background

The weather at Land's End was recorded as follows:

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METAR EGHC 311050Z 10018KT 9999 FEW007 SCT011 16/14 Q1020
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The Land's End Airport layout from the UK AIP (Figure 1).

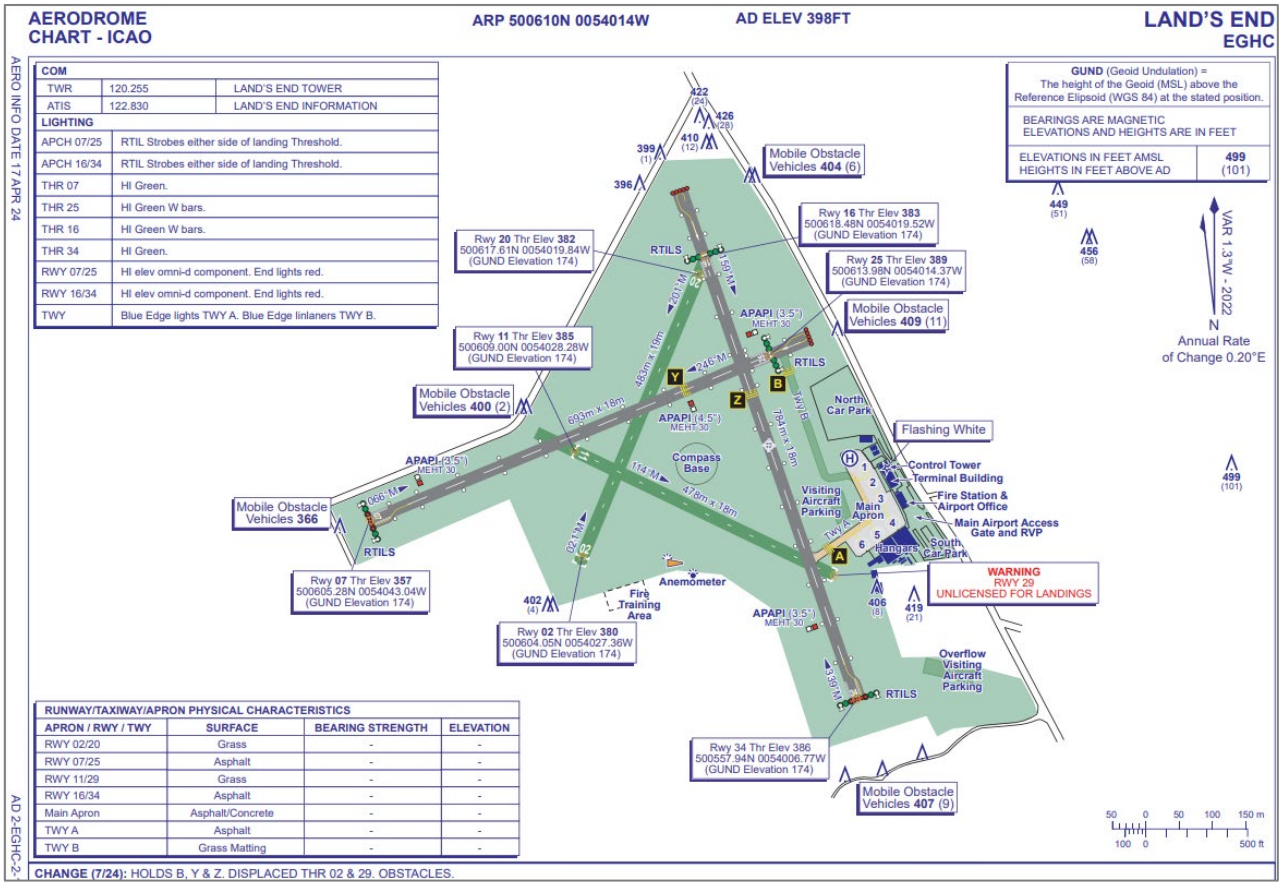


Figure 1 – Land's End Aerodrome Chart

Analysis and Investigation

Land's End Airport

The investigation reviewed the Tower controller's report, operational duty hours, runway conditions and weather. Material evidence included R/T recordings, radar video, watch log, secondary ADS-B software screenshots, flight progress strips and CCTV. The following was noted:

An Airprox occurred between a DHC6 passenger flight and a private DR400 flight in the RW16 climb-out area. [The DR400 pilot] had descended below the agreed level and diverged from the agreed routeing resulting in flying very low up the climb-out of RW16 having confirmed visual with the departing traffic.

There were no obvious ATCO competency issues identified and, after a 90min break, the duty ATCO resumed the duty watch and remained on the roster. No other ATC, airport equipment or human factor issues were identified.

The follow up action was to remind ATCOs of the need to be extra vigilant when non-based aircraft are in the vicinity. A discussion was had about visual scanning from the Visual Control Room (VCR) and this was deemed satisfactory as confirmed by two other ATC staff present in the VCR. A further discussion was had whether a FID (Flight Information Display) may have alerted the ATCO sooner to the DR400's deviation and it was agreed that this could have been helpful.

CAA ATSI

ATSI does not have the facility to select individual radar heads when using the area radar replay. Consequently, ATSI was unable to observe either aircraft.

Based on the reports received, it appears that the pilot of [the DR400] became disorientated when descending in the area of the Minack Theatre. Having already passed through the RW16 extended centreline whilst on the coast from east-to-west, they appeared to have then turned back inland positioning for the wrong runway and passing through the RW16 climb-out area on a west-to-east track, bringing their aircraft into confliction with the DHC6 departing RW16.

Whilst the Land's End controller believed they had coordinated an agreement with the DR400 pilot to be not below an altitude of 2000ft, that was not confirmed by the RTF, nor the written report from the DR400 pilot who makes no mention of it.

At 1045:20 the controller passed Traffic Information to the pilot of the DR400: "*Traffic is a Twin Otter departing Land's End airport shortly on runway 16. Not below altitude 2000ft for coordination"*

The DR400 pilot readback: *"Looking out for traffic at 2000ft on 1020".*

CAP493 Section 1 Chapter 11: Consideration for Traffic receiving a Service Outside Controlled Airspace states:

> *Basic Service. Unless the pilot has entered into an agreement with a controller to maintain a specific course of action, a pilot receiving a Basic Service may change level, heading, or route without advising the controller.*

Whilst the definition of coordination in CAP493 is heavily focussed on controller to controller, the same principles apply when coordinating with a pilot in that both parties must be in no doubt that an agreement has been reached.

CAP774 UK Flight Information Services Chapter 1: ATS Principles refers to *"Agreements"*.

> *Agreements can be established between a controller (not a FISO due to limits of the licence) and a pilot on a short-term tactical basis, such that the operation of an aircraft is laterally or vertically restricted beyond*

the core terms of the Basic Service or Traffic Service. This is for the purposes of co-ordination and to facilitate the safe use of airspace, particularly those airspace users with more stringent deconfliction requirements.

The RTF used did not suggest that the pilot of the DR400 was asked if they could accept a *"not below altitude 2000ft",* rather, it was imposed on them by the controller. From the DR400 pilot's response and subsequent written report, they appeared to have not assimilated this and so descended.

The controller passed reciprocal Traffic Information to both pilots. The controller was not visual with the DR400, and they reported the aircraft's level as 2300ft based on the previous report by the pilot when, in fact, the pilot had already descended. It appears, however, that it was the turn back onto an easterly track by the DR400 pilot which brought them into confliction with the departing DHC6.

UKAB Secretariat

An analysis of the NATS radar replay was undertaken and the DR400 was positively identified using Mode S data, although the last point that it was visible on radar prior to the Airprox was at 1025:24 at 36.9NM from the reported Airprox area. Neither aircraft could be seen on radar when operating at low level in the vicinity of Land's End.

An analysis of ADS-B data was undertaken with both aircraft visible throughout. The CPA was assessed to have occurred at at 1050:30 with 480ft vertical and less than 0.1NM lateral separation (Figure 2).

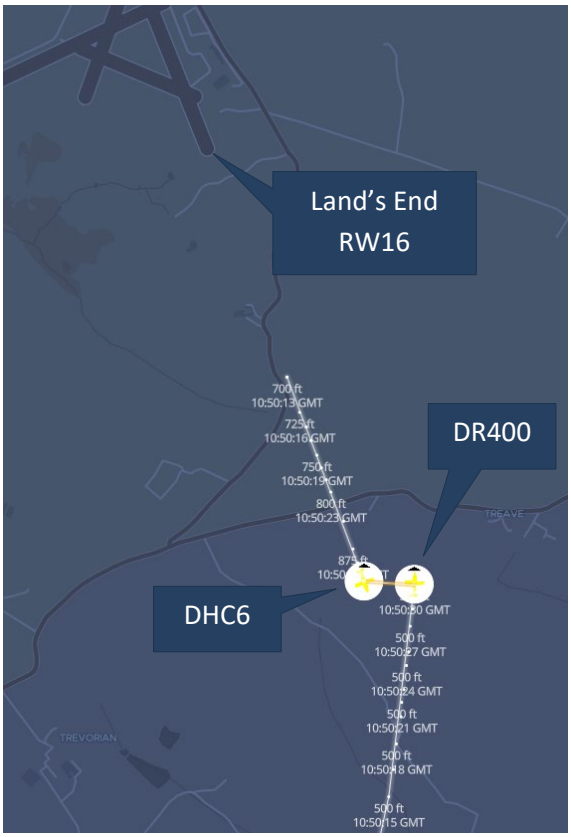


Figure 2 – 1050:30 CPA separation 480ft and <0.1NM

It was noted that the closest recorded vertical separation was 240ft when the DHC6 appeared on ADS-B software data and the DR400 was at 0.8NM horizontally at 1050:15. Tracks and altitudes were taken from the GPS navigation data supplied by both pilots which verified the ADS-B tracks.

A review of the R/T recording revealed possible errors and misunderstandings. The Tower controller had one departure and two other arrivals at the time of the Airprox.

At 1037:20 the DR400 pilot called inbound at 2400ft with information 'P' and requested a Basic Service, which was confirmed and a choice of runway was given. The DR400 pilot chose RW07, and was asked to report abeam Penzance. The DR400 pilot called at Penzance as requested and was asked to report south abeam and to join right-base RW07.

At 1045:20 the Tower controller called the DR400: '*[DR400 c/s], traffic is a Twin Otter departing Land's End Airport shortly, on runway one six. Not below 2000ft for coordination',* to which the DR400 pilot responded *"Looking out for traffic at 2000ft on 1020"*.

The Tower controller informed the DR400 pilot at 1049:00 that *'departing traffic is a Twin Otter climbing to altitude one thousand five hundred feet from runway one six',* and the DR400 pilot responded they were *'looking out for traffic'*.

At 1050:10 the DR400 pilot called *'[c/s] visual with the Twin Otter'* which was acknowledged, and at 1050:40 the Tower controller asked *'[DR400 c/s] confirm you are not below 2000ft?'*
The DR400 pilot responded *'I am below 2000ft [c/s], joining right-base for zero seven'*.

The DHC6 and DR400 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]

Summary

An Airprox was reported when a DHC6 and a DR400 flew into proximity in the vicinity of Land's End Airport at 1051Z on Saturday 31st August 2024. Both pilots were operating under VFR in VMC, the DHC6 pilot in receipt of an Aerodrome Control Service from Land's End Tower and the DR400 pilot in receipt of a Basic Service from Land's End Tower.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings, GPS track data from both pilots, a report from the air traffic controller involved and a report from the appropriate operating authority. 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.

The Board first discussed the radiotelephony exchanges between the Land's End Tower controller and the DR400 pilot. Members agreed that the DR400 pilot had not understood that a *'not below 2000ft'* call from the controller had been intended as an instruction for them rather than, perhaps, an indication of the DHC6's final altitude clearance and, as such, the DR400 pilot had lacked situational awareness due to not having assimilated the information provided (**CF9**). Members agreed that, reciprocally, the controller had not assimilated the DR400 pilot's readback of '*looking out for traffic at 2000ft on one zero two zero*' and had neither queried the response nor correctly entered a coordination agreement with the DR400 pilot under a Basic Service to maintain a specific course of action (**CF1**) and, as such the DR400 pilot had been able to change level, heading, or route without advising the controller.[3]

Further considering the actions of the Land's End Tower controller, one controller member had specifically noted the incorrect order of the Land's End controller's radio call to the DR400 pilot. The Board agreed that the manner in which the request had been made could have been clearer and that the lack of clarity of those instructions had contributed to the Airprox (**CF4**). Controller members believed that, while it had been quite clear to the controller what they had intended, their plan would have been effective had it been correctly executed. As it was, the Board agreed that the controller had

[1] (UK) SERA.3205 Proximity.
[2] (UK) SERA.3225 Operation on and in the Vicinity of an Aerodrome.
[3] CAP 493 Manual of Air Traffic Services Part 1, Section 1-5.5 Basic Service

expected the DR400 to remain above 2000ft (**CF2**) and that this had led to the controller's inaccurate situational awareness (**CF3**) on the positioning and altitude of the DR400, although it was also noted that it had not been the DR400's altitude that had contributed to the Airprox, but it's position, which could equally have been managed more cautiously by the controller. Members also wondered why the controller had not waited to become visual with the DR400 before providing the DHC6 with a departure clearance and the Board agreed that this had been a consequence of their expectations and inaccurate situational awareness.

Moving their attention back to the actions of the DR400 pilot, the Board noted that although the pilot had requested RW07 and had agreed to join on a right base, they had incorrectly positioned the aircraft and descended below 2000ft (**CF5**). Furthermore, members remarked that, although the pilot had been made aware that the DHC6 had been departing from RW16, they had not adapted their plan by taking this into account when operating around the Minack Theatre area (**CF6**) and had then positioned themselves poorly for the departing traffic. The Board noted that the pilot had manoeuvred back towards the airport through the approach feathers of RW34 and had crossed the path of the departing DHC6. The Board agreed that the DR400 pilot had, therefore, not avoided the pattern of traffic already formed by the departing DHC6 (**CF7**). The Board further agreed that, although the DR400 pilot had reported visual with the DHC6 aircraft, they had flown close enough to cause its pilot concern (**CF11**) and that, despite their proximity at low level, they had not received an alert from their electronic conspicuity equipment as expected (**CF10**).

The Board then discussed the actions of the DHC6 pilot and noted that the pilot had done as much as could have been expected to have visually acquired the DR400. Members agreed that the flicker of a traffic indication on the DHC6's TAS signified that the TAS had not alerted as would have been expected (**CF10**). Members agreed that the DHC6 pilot had taken into consideration that the DR400 would potentially have crossed their path near the RW07 crosswind area, and had planned to climb straight ahead until visual, but instead the crew had sighted the DR400 after it had crossed underneath their departure path. The Board agreed that the DHC6 pilot had, therefore, had inaccurate situational awareness of the position of the DR400 (**CF8**) due to the actions of the DR400 pilot not matching their mental model.

In concluding their discussions, the Board agreed that the DHC6 pilot had been concerned by the proximity of the DR400 (**CF12**) and that safety had been degraded. However, members noted that the circumstances were fortuitous, in that neither pilot had been required to take avoiding action to prevent the aircraft coming into close proximity, and that nonetheless there had been almost 500ft of vertical separation at CPA. As such, the Board assigned a risk category C to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2024229			
CF	**Factor**	**Description**	**ECCAIRS Amplification**	**UKAB Amplification**
	Ground Elements			
	• Situational Awareness and Action			
1	Human Factors	• ATM Personnel Hear back	An event involving the hearback (listening) of ATM personnel to communications	
2	Human Factors	• Expectation/Assumption	Events involving an individual or a crew/ team acting on the basis of expectation or assumptions of a situation that is different from the reality	
3	Contextual	• Traffic Management Information Action	An event involving traffic management information actions	The ground element had only generic, late, no or inaccurate Situational Awareness
4	Human Factors	• Traffic Management Information Provision	An event involving traffic management information provision	The ANS instructions contributed to the Airprox
	Flight Elements			
	• Tactical Planning and Execution			

5	Human Factors	• Action Performed Incorrectly	Events involving flight crew performing the selected action incorrectly	Incorrect or ineffective execution
6	Human Factors	• Insufficient Decision/Plan	Events involving flight crew not making a sufficiently detailed decision or plan to meet the needs of the situation	Inadequate plan adaption
7	Human Factors	• Monitoring of Environment	Events involving flight crew not to appropriately monitoring the environment	Did not avoid/conform with the pattern of traffic already formed
	• Situational Awareness of the Conflicting Aircraft and Action			
8	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
9	Human Factors	• Understanding/Comprehension	Events involving flight crew that did not understand or comprehend a situation or instruction	Pilot did not assimilate conflict information
	• Electronic Warning System Operation and Compliance			
10	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			
11	Human Factors	• Incorrect Action Selection	Events involving flight crew performing or choosing the wrong course of action	Pilot flew close enough to cause concern
12	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

Degree of Risk: C.

Safety Barrier Assessment[4]

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

Ground Elements:

Situational Awareness of the Confliction and Action were assessed as **partially effective** because the Tower controller had inaccurate situational awareness of the DR400's altitude and position, having expected the DR400 to remain at an altitude that they perceived to have been agreed.

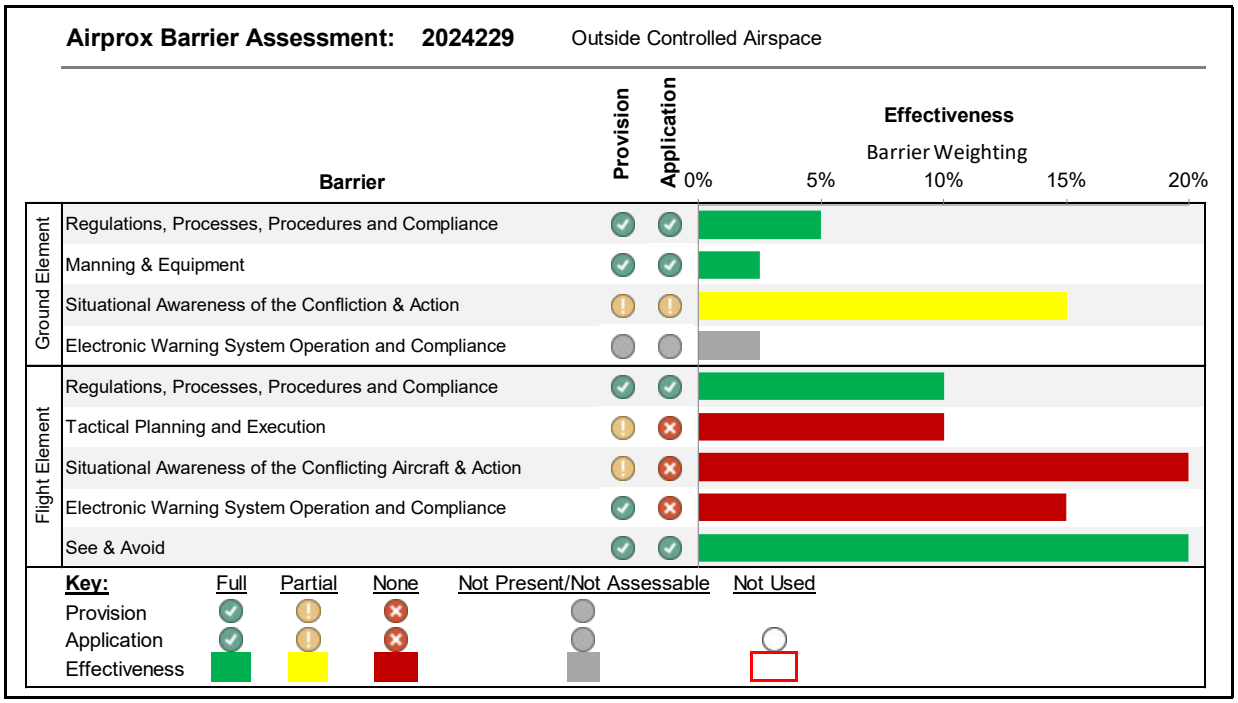
Flight Elements:

Tactical Planning and Execution was assessed as **ineffective** because the DR400 pilot incorrectly positioned for the wrong runway in confliction with departing traffic.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because the DR400 pilot had misunderstood a request and not assimilated information from an initial R/T call. The DHC6 pilot had inaccurate situational awareness of DR400's position based on their expectations.

Electronic Warning System Operation and Compliance were assessed as **ineffective** because neither the DHC6's TAS nor the DR400's electronic conspicuity equipment had alerted as expected.

[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: 2024229
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