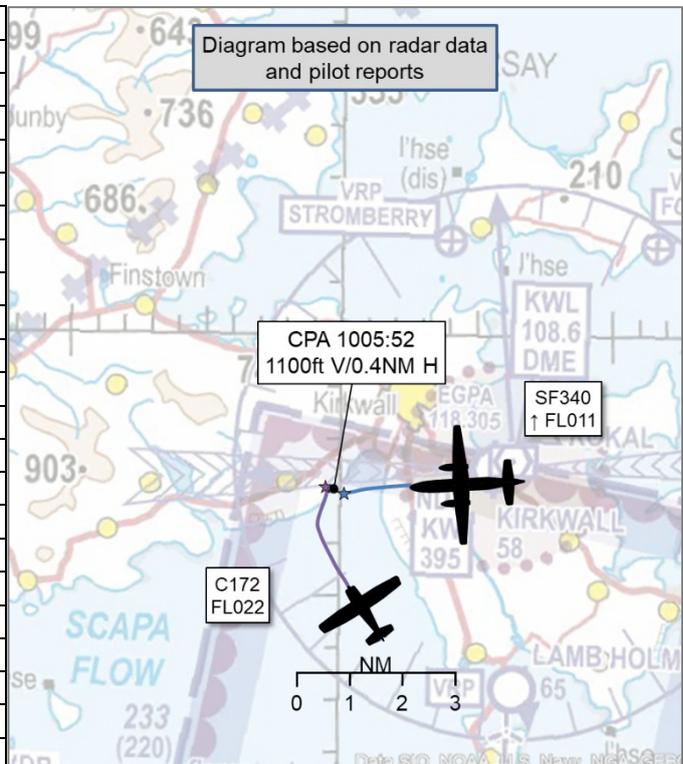


**AIRPROX REPORT No 2021099**

Date: 26 Jun 2021 Time: 1005Z Position: 5857N 00259W Location: 2.5NM west of Kirkwall

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

Recorded	Aircraft 1	Aircraft 2
Aircraft	SF340	C172
Operator	CAT	Civ FW
Airspace	Scottish FIR	Scottish FIR
Class	G	G
Rules	IFR	VFR
Service	Procedural	Listening Out
Provider	Kirkwall	Kirkwall
Altitude/FL	FL011	FL022
Transponder	A, C, S	A, C
Reported		
Colours	Company	White, Green
Lighting	Standard	Not reported
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	1500ft	Not reported
Altimeter	QNH (NKhPa)	NK
Heading	270°	005°
Speed	160kt	120kt
ACAS/TAS	TCAS II	TAS
Alert	Information	TA
Separation		
Reported	1000ft V/0NM H	1000ft V/2000m H
Recorded	1100ft V/0.4NM H	



**THE SF340 PILOT** reports that they heard several light aircraft on Kirkwall’s frequency. One was on its way up from the south going into Lamb Holm. They could see 2 aircraft on TCAS once they were lined up on RW27. They were given a local clearance to climb on RW heading. The course bars changed to 270 to remind them. They were cleared for take-off and, once cleaned up and climbing away to the west, could see the light aircraft on TCAS. They mentioned to the FO that it looked like the other aircraft was coming their way, flying towards Kirkwall town. They could then see the aircraft and they levelled off at 1500ft rad alt, as the other aircraft was at 2500ft and flying through the extended centreline of RWY 27. They couldn’t speak on the radio to inform the Tower as the controller was very busy. Their projected flight paths looked like they would certainly have had a collision if they didn’t have visual contact and the help of their TCAS II. They informed the controller once it was quieter.

The pilot assessed the risk of collision as ‘High’.

**THE C172 PILOT** reports that once clear of the Lamb Holm circuit they switched to the Kirkwall frequency. They noted the SF340’s RW27 clearance for departure. They had not heard the route clearance but probably sub-consciously assumed this was an inter-island flight as they could see the aircraft in the distance from their 3NM position and observed a relatively small, high wing, twin engine, passenger aircraft. Due to radio chatter, they were unable to alert Kirkwall of their position and routing despite trying to. This lasted for a significant period of time (at least until their priority shifted to observing the SF340). They noted the aircraft starting its take-off roll as they were routing around the Kirkwall ATZ and asked their front-right seat passenger to keep an eye on it while they divided their duties. At about the time the SF340 reached 1000ft they realised for the first time that the aircraft was definitely not an Islander due to its size, speed and climb rate. There was possibly a brief element of “paralysis by analysis” at this point as there was no clear safe course of action due to their being quite close to crossing the runway extended centreline. They considered turning left (away) or right (towards) before reaching the RW27 centreline but turning right to comply with the “give way” rule to pass behind would

have required quite a dramatic manoeuvre and cause them to lose sight of the aircraft under their nose as it was still well below them at the time. Additionally, they were not aware if the aircraft was going to continue the climb, level out or make a turn during climb-out as the Islanders do. Certainly, by the end of these few seconds of consideration they believed their best course was now to maintain their current track due north (i.e., perpendicular to the runway centreline) to maximise separation. While they didn't believe an actual collision was imminent due to the SF340 starting to move down and rearwards in the passenger window, they still felt the relative speeds and distance were far from ideal and were not surprised when the SF340 pilot reported the incident and opted to file an Airprox even though it was incipient rather than actual. The SF340 pilot stated a collision was almost certain if they hadn't taken avoiding action however, if the Flight radar trace is to be believed, they would have passed quite some distance behind them. Their main plan on this flight regards traffic was to stay well clear of the Islanders by getting high and to have contact with Kirkwall as soon as possible. Unfortunately for this event they were unable to obtain contact quickly and were unfamiliar with the vastly increased performance of the SF340, otherwise they would have performed an orbit at a suitable point prior to the SF340's take-off roll or changed course to route over the ATZ to pass behind their climb-out path. Not specific for this flight but in a general attempt to reduce traffic risk they have had ADS-B 'in' as well as 'out' installed to try and improve situational awareness, although this did not trigger an alert this time. They intend to speak to the engineer who installed it as it seems to work fantastically on some occasions and not at all on others despite being a very recent fit. They don't believe it would have helped on this occasion. Looking to the future, other actions they could take would be to plan flights to route directly overhead any similarly small ATZs that operate high performance commercial flights without the protection of controlled airspace or a radar service.

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

**THE KIRKWALL CONTROLLER** reports that the SF340 departed RW27 on an IFR flight climbing to FL120. A few minutes after departure the pilot reported that they had to level off at 1500ft before continuing the climb again to avoid a C172 that was observed crossing its climb-out path. When asked, the pilot of the SF340 confirmed that they would file an Airprox. At no time was such an aircraft seen from the control tower. There is no ATM at the unit. A short time later the C172 pilot contacted ATC stating that it was the aircraft that had caused the incident and had not called ATC earlier because ATC had been busier. The C172 pilot later landed at Kirkwall and telephoned the control tower. They stated that they had been listening out on the Kirkwall ATC frequency but did not transmit because the frequency was busy. They had seen an aircraft lined up on the runway and had assumed it was an Islander aircraft that would level off below their aircraft. They then continued their northbound flight remaining outside controlled airspace [UKAB note; The Kirkwall controller believes the C172 pilot was referring to the ATZ]. They then realised the aircraft was faster and climbing higher than anticipated, they said that they decided not to turn away as that would reduce their ability to see the SF340 and they were otherwise unsure of the appropriate action to take. They observed the SF340 passing underneath and behind their aircraft.

## Factual Background

The weather at Kirkwall was recorded as follows:

METAR EGPA 260950Z 36004KT 9999 SCT024 11/05 Q1024

## Analysis and Investigation

### UKAB Secretariat

The SF340 and C172 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.<sup>1</sup> If the incident geometry is considered as converging then the C172 pilot was required to give way to the SF340.<sup>2</sup>

<sup>1</sup> (UK) SERA.3205 Proximity.

<sup>2</sup> (UK) SERA.3210 Right-of-way (c)(2) Converging.

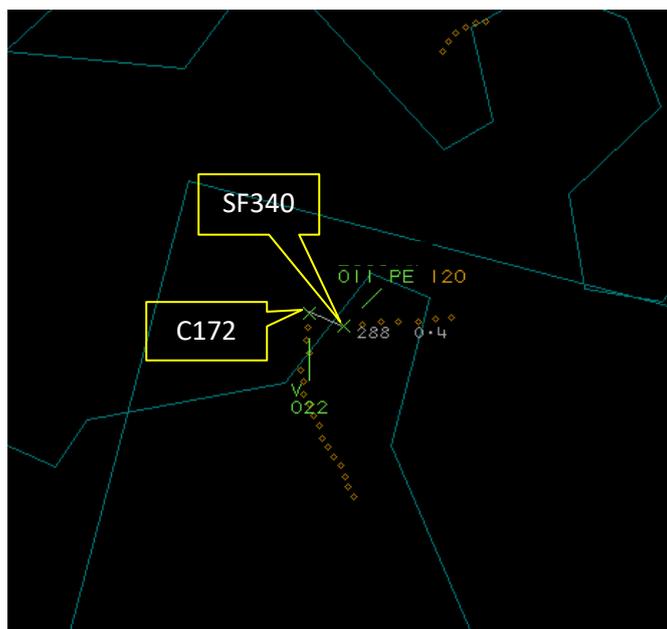


Figure 1: CPA 1005:52

## Summary

An Airprox was reported when a SF340 and a C172 flew into proximity 2.5NM west of Kirkwall at 1005Z on Saturday 26<sup>th</sup> June 2021. The SF340 pilot was operating under IFR in VMC and in receipt of a Procedural Service from Kirkwall, the C172 pilot was operating under VFR in VMC and listening out on the Kirkwall frequency whilst trying to obtain a service.

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

Information available consisted of reports from both pilots, radar photographs/video recordings 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.

The Board first considered the actions of the Kirkwall controller. The SF340 had been on a Procedural Service, as such the Kirkwall controller could only provide Traffic Information about known traffic. Because the C172 had not managed to establish contact with the Kirkwall controller, due to a busy frequency, the controller could not identify the conflict (**CF1**) and therefore could not have had any situational awareness on the C172 (**CF2**).

The Board then turned to the actions of the SF340 pilot. They had TCAS II derived information about the C172, which they believed might have presented a threat as they climbed to join controlled airspace (**CF3 & 5**). When they saw the C172, they decided to stop their climb until they were clear of it. Some Board members wondered why the SF340, having seen the C172 on their TCAS II whilst still on the ground, had not requested further information from the Kirkwall controller which may have prompted the C172 pilot to transmit their position and intentions. Regardless, the actions of the SF340 pilot ensured at least 1000ft of vertical separation was maintained.

The Board then turned to the actions of the C172 pilot. They had planned to talk to the Kirkwall controller prior to entering their area, unfortunately the high level of radio transmissions had prevented this. The Board opined that the C172 pilot should have adapted their plan when they could not make contact with Kirkwall as expected. They offered that one option available to crews, when not able to establish contact, is to fly above the ATZ and across the central point as this tracking avoids both inbound and outbound lanes. The C172 pilot had heard the SF340 on the radio, but unfortunately they had incorrectly assumed that the departing SF340 was an Islander as this type of aircraft normally operates to and from Kirkwall. As such they had based their appreciation of the SF340's departure profile on the

performance of a typical Islander and, therefore, had not allowed for the SF340's greater speed and rate-of-climb. This had indeed caught them out (**CF5**) and had resulted in them acting more slowly than they normally may have done as they processed the different flight characteristics of the SF340. Board members were pleased with the depth of self-analysis conducted by the C172 pilot in their report.

Finally, the Board considered the risk involved in this Airprox. The SF340 pilot had received TCAS II information about the C172, looked out and saw the aircraft, they levelled off and maintained 1100ft of separation. As such, the Board determined that there was no risk of collision and consequently, the Board assigned a Risk Category E to this Airprox.

## **PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK**

### Contributory Factors:

2021099				
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
<b>Ground Elements</b>				
<b>• Situational Awareness and Action</b>				
1	Human Factors	• Conflict Detection - Not Detected	An event involving Air Navigation Services conflict not being detected.	
2	Contextual	• Traffic Management Information Action	An event involving traffic management information actions	The ground element had only generic, late or no Situational Awareness
<b>Flight Elements</b>				
<b>• Situational Awareness of the Conflicting Aircraft and Action</b>				
3	Human Factors	• Unnecessary Action	Events involving flight crew performing an action that was not required	Pilot was concerned by the proximity of the other aircraft
<b>• See and Avoid</b>				
4	Human Factors	• Incorrect Action Selection	Events involving flight crew performing or choosing the wrong course of action	Pilot flew close enough to cause concern
5	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: E.

### Safety Barrier Assessment<sup>3</sup>

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 **ineffective** because the Kirkwall controller was not aware of the presence of the C172.

#### **Flight Elements:**

**Situational Awareness of the Conflicting Aircraft and Action** were assessed as **partially effective** because the SF340 pilot was concerned about the presence of the C172.

**Electronic Warning System Operation and Compliance** were assessed as **not used** because the aircraft were not close enough for the EWS to alert.

<sup>3</sup> 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: 2021099		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	✓	✓				
<b>Key:</b>		Full	Partial	None	Not Present/Not Assessable	Not Used	
Provision	✓	!	✗	●			
Application	✓	!	✗	●		○	
Effectiveness							