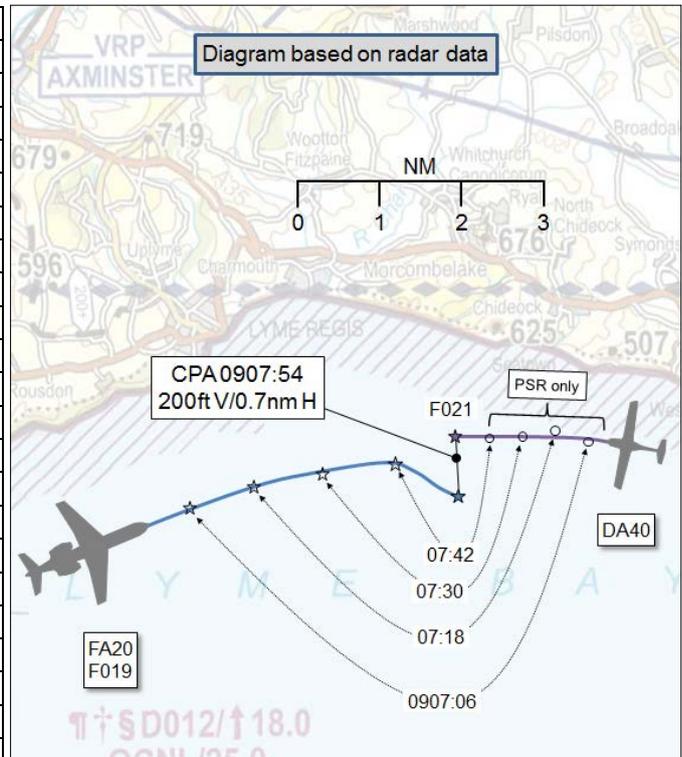


**AIRPROX REPORT No 2017078**

Date: 27 Apr 2017 Time: 0908Z Position: 5043N 00250W Location: Lyme Bay North

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

Recorded	Aircraft 1	Aircraft 2
Aircraft	FA20	DA40
Operator	Civ Comm	Civ Trg
Airspace	EG D012	EG D012
Class	Danger Area	Danger Area
Rules	VFR	VFR
Service	Traffic	None
Provider	Plymouth Mil	(Exeter)
Altitude/FL	FL019	FL021
Transponder	A, C, S	A, C, S
Reported		
Colours	NK	White, blue
Lighting	NK	NK
Conditions	VMC	VMC
Visibility	10km	>10km
Altitude/FL	2000ft	2300ft
Altimeter	RPS (NK hPa)	QNH (NK hPa)
Heading	090°	280°
Speed	230kt	120kt
ACAS/TAS	TCAS II	Not fitted
Alert	RA	N/A
Separation		
Reported	300ft V/2nm H	Not seen
Recorded	200ft V/0.7nm H	



**THE FA20 PILOT** reports coming off task and returning to Bournemouth through Lyme Bay North. The aircraft TCAS system displayed an RA and commanded a descent. At no time did either crew observe any transponder traffic on the MFD, which was unusual, or was any conflicting traffic reported by Plymouth Mil ATC. The pilot descended the aircraft in accordance with the RA instruction and, once clear of the conflict, requested further information from Plymouth Mil ATC. Plymouth stated that they had no traffic showing within about 5nm of their position, but then immediately stated pop-up traffic had appeared behind them at 2000ft. This contact subsequently disappeared and reappeared over the next few minutes. Plymouth Mil contacted Exeter radar who stated they had knowledge of a student pilot in that vicinity but didn't currently hold it on radar. On landing, the pilot entered the TCAS system into the aircraft tech-log as unserviceable to ensure that their own equipment was in good order, given the nature of the event, which it was found to be.

He assessed the risk of collision as 'Medium'.

**THE DA40 PILOT** reports that he was conducting a solo navigation exercise to Exeter, routing 'Bournemouth – Bridport – Exeter' for that part of the route, and was unaware of another aircraft in proximity during his transit.

**THE PLYMOUTH LARS EAST CONTROLLER** reports that he had one aircraft on frequency [the subject FA20]. The aircraft was vacating EG D012 (Lyme Bay North) approaching the coast (ivo Bridport) and high ground. He therefore reminded the pilot of his responsibility for terrain clearance. A short time later the FA20 pilot asked if the controller had any radar contacts in his vicinity. There was nothing displaying within the FA20's immediate location but there were a number of spurious contacts south east at 7-8 nm (ivo Weymouth). The pilot reported that he had had a TCAS RA, no other indications from the TCAS equipment, no prior warning of any conflicting aircraft and nothing visual. During this second transmission an SSR Mode 3A contact appeared approximately 2-3nm behind the

FA20. The contact quickly disappeared from radar and there was no associated Mode 3C. The controller reported this to the FA20 pilot who informed him that his cockpit indications were unusual. The Mode 3A contact reappeared long enough for the controller to associate the squawk with Exeter radar. He informed the FA20 pilot that he was going to contact Exeter for Traffic Information and the FA20 pilot stated that he would hold in the Weymouth area. Exeter were aware of the aircraft inbound with a student pilot on a solo navigation exercise but that the pilot had not yet established communications with Exeter Radar. The controller informed the FA20 pilot of the details he had obtained, and the FA20 pilot reaffirmed his intention to file an Airprox. Throughout this time, the conflicting aircraft's SSR appeared and disappeared a number of times. Whilst there is an area of high ground in the vicinity, with the potential to lose contact with aircraft at low level, there were other aircraft a short time later that were operating in the same location, and lower, but were not fading in and out of radar coverage.

Plymouth Mil does not operate with a radar supervisor.

**THE EXETER CONTROLLER** did not submit a report to the Airprox Board but in subsequent conversation it was established that the DA40 pilot had been pre-noted by Bournemouth at 0848, who were requested to send the DA40 pilot to the Exeter South frequency. The DA40 pilot called at 0903 but evidently could not hear the controller reply. The DA40 pilot then called on the Exeter North frequency at 0905, 0906, 0908 and 0909 with the controller replying on each occasion that he was heard. The controller called the DA40 pilot at 0912 and 2-way communication was established.

**THE BOURNEMOUTH CONTROLLER** did not submit a report to the Airprox Board but in subsequent conversation it was established that the DA40 pilot had been in receipt of a Traffic Service and was transferred to Exeter radar at 0902, at a position 6nm northwest of Weymouth.

## Factual Background

The weather at Yeovilton was recorded as follows:

METAR EGDY 270850Z 29009KT 9999 FEW030 SCT120 08/01 Q1021 BLU NOSIG=

## Analysis and Investigation

### UKAB Secretariat

The FA20 and DA40 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 head-on or nearly so then both pilots were required to turn to the right<sup>2</sup>, which the FA20 did.

TCAS modelling of the closing geometry indicated that the FA20 TCAS would have generated an RA at about 1.4nm separation had the DA40 SSR transponder been selected on. The first indication of the DA40 SSR on area radar replay was at a separation of 1.1nm, inside the FA20 TCAS RA boundary and hence generated an immediate TCAS RA, in this case a 'DESCEND' RA.

Plymouth Mil is the controlling authority for access to EG D012 (Lyme Bay North). No permission was given to the DA40 pilot to enter the danger area.

Figure 1 below shows the DA40 within the EG D012 range complex heading west as the FA20 turns away, presumably in response to the TCAS RA, and the aircraft pass each other with a CPA of 200ft V and 0.7nm H.

<sup>1</sup> SERA.3205 Proximity.

<sup>2</sup> SERA.3210 Right-of-way (c)(1) Approaching head-on.

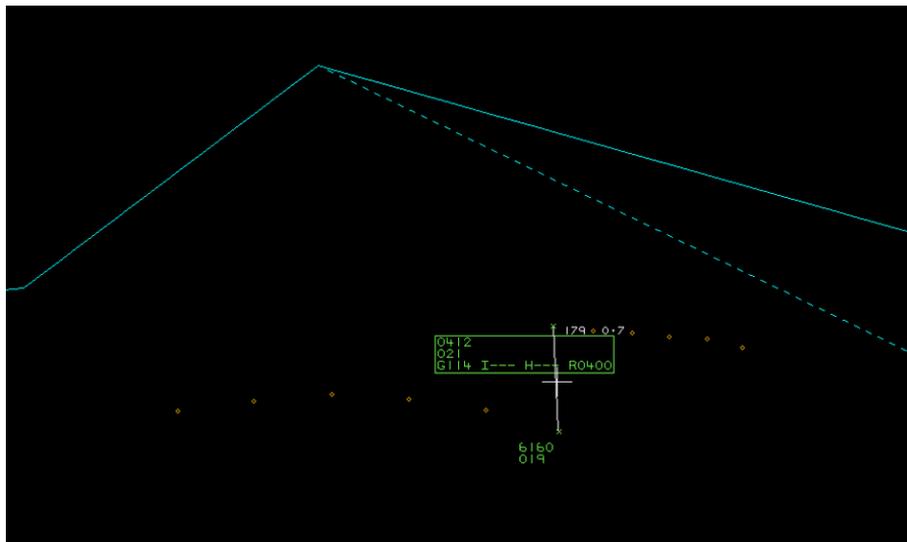


Figure 1 – CPA of 200ft V, 0.7nm H

### Occurrence Investigation

The Plymouth Mil investigation reported that it had been unable to establish the cause of the TCAS RA, nor how close together the aircraft came, despite the occurrence being in an area of 'solid radar cover'. A number of aggravating casual factors had been identified; however, they ultimately reflected the nature of operations within Class G airspace. It should also be noted that the DA40 pilot was a student on an early solo navigation exercise. The only possible cause of the TCAS RA that the report could identify was as a result of a faulty transponder on the DA40, which potentially provided the FA20 TCAS with erroneous data. Both aircraft's operators were contacted to obtain their opinion of the incident and to inform them of the potential for a faulty TCAS and/or transponder. Both operators reported that their aircraft systems had been checked and no faults had been identified. Because of the limited amount of data available to the Plymouth Mil controller at the time, the minimum separation between the aircraft could not be determined by ATC. Plymouth Mil has no function to record radar data. Due to the fact that the separation between the aircraft, beyond the reported altitudes, cannot be established, and this report considers that both pilots and the ATCO responded correctly to the data available at the time, no recommendations were made in this report.

### Comments

#### Navy HQ

At the time of the incident, the Plymouth Mil LARS East controller had been on console for approximately 7 minutes and was providing a Traffic Service to one aircraft (the FA20), using the combined Portland and Wembury PSR/SSR radars which were reported as being fully serviceable. The other aircraft was not displaying a contact in either primary or secondary radar coverage at his console and therefore no Traffic Information was passed to the FA20 pilot until the conflicting traffic appeared behind it. It is considered unlikely that distraction or fatigue contributed to the controller not seeing the conflict developing.

The conclusions drawn by the Local Investigation are valid in that no reason could be ascertained for the lack of radar contact with the DA40, however both aircraft were flying in VMC in Class G airspace, with the FA20 pilot expecting the added protection of being within D012 without any reported conflicting traffic. The intermittent TCAS information provided to the FA20 pilot seems to have prompted the conversation with ATC as well as a course alteration that generated additional separation between the aircraft, despite the pilots not being visual with each other.

## Summary

An Airprox was reported when a FA20 and a DA40 flew into proximity at about 0908 on Thursday 27<sup>th</sup> April 2017. Both pilots were operating under VFR in VMC, the FA20 pilot in receipt of a Traffic Service from Plymouth Mil and the DA20 pilot in the process of establishing 2-way communication with Exeter Radar, not in receipt of a Service.

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

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

Members first discussed the actions of the FA20 pilot and agreed that he could reasonably have expected a degree of protection by dint of his being in EG D012, although it was noted that the normal Rules of the Air/SERA still applied, including see-and-avoid, whether or not an aircraft had been cleared to enter a danger area. That the DA40 was also in the danger area highlighted the oft repeated advice to 'expect the unexpected'. The fact that the FA20 pilot was confronted by a TCAS RA 'out of the blue' could perhaps be explained by the fact that the area radar recording showed the DA40 as a primary-only contact until changing to a secondary response only shortly before CPA. That the FA20 turned right at about the same time that the DA40 SSR appeared on area radar indicated to the Board that the FA20 pilot only became aware of the relative position of the DA40 at a later stage than was desirable. The Board commended the FA20 pilot for taking proactive action after the flight by requesting a check of the serviceability of his TCAS; undoubtedly a wise move after the unexpected and previously not observed sequence of events on the TCAS display.

The Board then discussed the actions of the DA40 pilot and were perplexed as to why he was flying within EG D012 without clearance to do so. It was recognised that a student pilot will be prone to error but, in this case, he was operating in good weather conditions and had a significant track feature to assist his navigation (namely the southern coast of England). It was also assumed that the presence of EG D012 to the south of his planned track would have been specifically briefed as one of the Threat and Error management considerations for his navigation exercise, with the previously mentioned track feature being an effective mitigation to inadvertent entry by his remaining overland. Members were also surprised that it had taken the DA40 pilot 9 minutes to establish radio contact with Exeter ATC, in the course of which he had switched from the briefed contact frequency to a different frequency, and which was eventually successful when Exeter finally managed to establish 2-way contact. Members surmised that the DA40 pilot was probably task focused on flying the aircraft to the apparent exclusion of navigation and communication.

Turning to ATC involvement, the Plymouth Mil controller could not have provided Traffic Information to the FA20 pilot by virtue of there being no radar contact on the DA40 until after CPA. Members were unable to provide an insight as to why the Plymouth Mil radar did not generate a track on the DA40, given that it was considered an area of 'solid radar cover'.

Members quickly agreed that the Airprox had been caused by the DA40 pilot flying into conflict with the FA20 after entering EG D012 without clearance. Although the event had undoubtedly been alarming for the FA20 pilot, he had generated sufficient separation at CPA that the Board was content that a risk of collision had been averted.

### **PART C: ASSESSMENT OF CAUSE, RISK AND SAFETY BARRIERS**

Cause: The DA40 pilot entered EG D012 and flew into conflict with the FA20.

Degree of Risk: C.

### 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:

#### ANSP:

**Situational Awareness and Action** were assessed as **ineffective** because the Plymouth LARS controller did not have a secondary or primary radar track for the DA40.

#### Flight Crew:

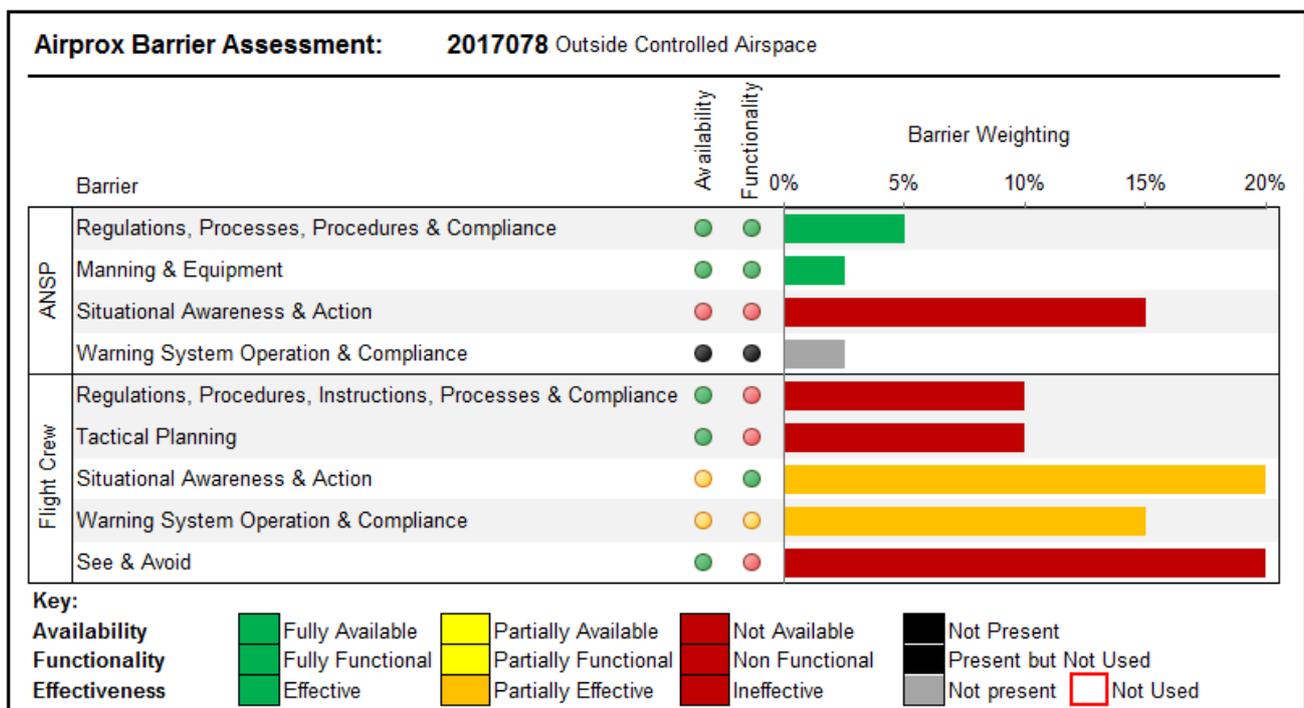
**Regulations, Processes, Procedures, Compliance and Instructions** were assessed as **ineffective** because the DA40 pilot entered EG D012 without clearance.

**Tactical Planning** was assessed as **ineffective** because the DA40 pilot did not follow his planned route.

**Situational Awareness and Action** were assessed as **partially effective** because the FA20 pilot received Situational Awareness only from his TCAS at a late stage.

**Warning System Operation and Compliance** were assessed as **partially effective** because the DA40 squawk was evident until shortly before CPA when the FA20 TCAS issued an RA without a preceding TA warning (which would otherwise have been expected given the closing geometry).

**See and Avoid** was assessed as **ineffective** because neither pilot saw the other aircraft.



<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](#).