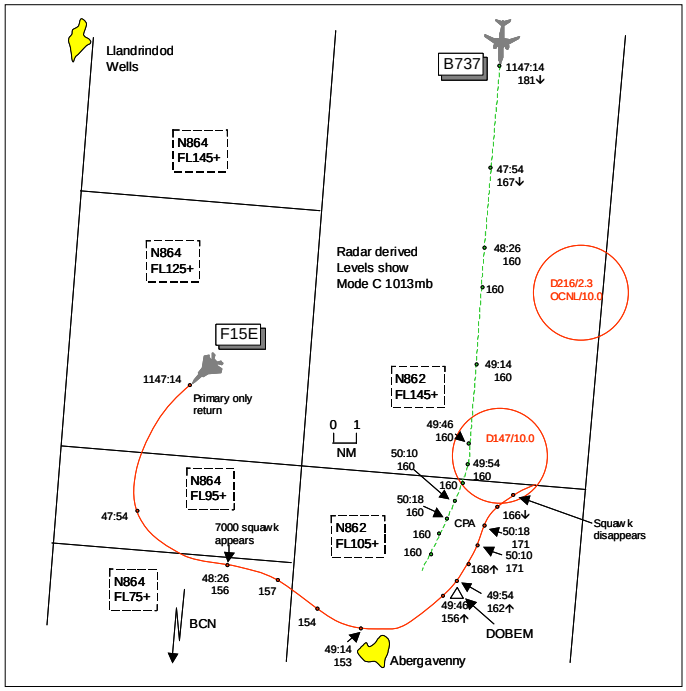
AIRPROX REPORT No 2010018

Date/Time:	5 Mar 2010 1150Z	
Position:	5155N 00255W (18nm NE BCN)	
Airspace:	N862	(*Class: A*)
Reporter:	Cardiff APR	
	1st Ac	*2nd Ac*
Type:	B737-800	F15E
Operator:	CAT	Foreign Mil
Alt/FL:	FL160	(N/K)
Weather:	VMC CLOC	VMC
Visibility:	25km	
Reported Separation:		
ATC	1000ft V/2nm H	
	500ft V/2nm H	1000ft V/2nm H
Recorded Separation:		
	1100ft V/1·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CARDIFF RADAR CONTROLLER reports that he was instructing a low time trainee and, just before the incident, had taken over the RT from the trainee to resolve an unrelated situation developing near BCN. The B737 was inbound to Bristol from the N and was placed on a radar heading against outbound traffic from Bristol that was joining airway L9 W'bound. As the B737 passed RILES an unknown intermittent contact appeared on radar about 8nm SW of the B737 tracking E'bound at >300kt and it briefly indicated FL150. At this point he thought the ac might have been infringing CAS but that it posed no hazard to the B737 owing to its E'ly track. He left the B737 on its present heading as he thought it was the best course of action at this stage. The unknown contact was then observed to turn NE'bound still at FL150 (intermittent Mode A and C) so he turned the B737 R onto heading 210° to take it away from the unknown contact's predicted track. When about 6nm S of the B737 the unknown traffic then turned towards the B737 and began to climb, the B737 pilot reporting that he had 'TCAS' traffic range 5nm and then an unintelligible phrase relating to 'avoiding'. He believed this reference to 'avoiding' and 'TCAS' meant that the B737 was following his own response to a TCAS RA so he told the pilot that it was unknown traffic, possibly military, and to continue as required to avoid. The pilot elected to continue on the assigned heading and remained at FL160 before reporting visual with the other ac, commenting that it was a military type. There were intermittent Mode C readouts as the unknown traffic passed 2nm E and 1000ft above the B737, before it then descended about 3nm behind the B737, indicating FL166. After this the Mode A and C readout from the unknown traffic were no longer visible and the primary contact also disappeared shortly thereafter.

THE B737 PILOT reports inbound to Bristol IFR and in receipt of a RCS from Cardiff on 125·85MHz, squawking an assigned code with Modes S and C. During the level phase of their arrival about 25nm N of Bristol at 250kt and FL160 Cardiff issued a radar heading 180° before they noticed traffic on TCAS at FL150 about 6nm ahead of them closing relatively quickly. The target then proceeded to climb and then it generated a TA but they only saw the other ac, a grey coloured twin-tailed military ac, probably an F15, as it passed their 9 o'clock position range 2nm about 500ft above. At the time the visibility was 25km flying clear of cloud in VMC. They queried the traffic but radar did not know who it was so they confirmed to ATC that it was a military jet. ATC asked whether they had had a

TCAS RA to which they replied 'negative'. No avoiding action was required as the TA never became an RA and the jet had manoeuvred away from their flightpath before any avoiding action was required. He assessed the risk as high as the controller was not aware of the other ac.

THE F15E LEAD PILOT reports flying a 2-ship incentive flight with a briefed plan to conduct low flying and general handling in Wales. The visibility was >10nm in VMC and the ac was coloured dark grey with HISLs switched on. Since this was an incentive flight for non-aircrew members in the back seats of both ac, the normal electronic maps and airspace overlays were not available to the pilots in flight, nor were there the normal tapes or recorders to review the flight after landing. Positional SA was only from the paper maps carried. After low-flying the formation split to conduct separate General Handling and on conclusion they were executing a flight rejoin when the Airprox occurred. His ac was in the Llandrindod Wells area whilst the No2 ac's pilot reported his position N of turning point 5 (N of Abergavenny), which was about 20nm to his SE, so he headed in that direction for the rejoin. Enroute to the position stated by the No2 pilot at 300kt, he looked at the chart to reference the green airspace lines; however, he wrongly identified the Western boundary of CAS and was flying above the 12500/9500ft base in the Western half of CAS. During this period he was using radar to locate the No2 ac and he had radar contact with other ac in the area. One of these was the subject B737 at 15nm radar range followed by visual acquisition at 5-7nm; visual separation was maintained with the B737, which passed 2nm away and 1000ft below, whilst he manoeuvred to rejoin with the No2. Approaching Abergavenny he recognised the airspace error and commenced a descent back into the low-flying structure. He completed the rejoin and proceeded W along the planned route towards turning point 6 (10nm N of Carmarthen). Approaching point 6 the flight reached 'bingo' fuel and began a climb to RTB, which was completed uneventfully. He assessed the risk as low.

ATSI reports that the Airprox was reported by the Cardiff Radar controller and occurred at 1150:18 on Airway N862, Class A CAS, at FL160 in the vicinity of DOBEM. The B737 was in receipt of a RCS from Cardiff Radar on frequency 125·85MHz. The B737 was inbound to Bristol from Belfast City and was released by London TC on a heading to provide separation from a Bristol outbound joining the airway. Shortly before the B737 flight called Cardiff, radar recordings (Clee Hill) show a number of unknown contacts operating in the area. Three of significance are high speed with one displaying 7000 Mode A only and two others showing as primary radar contacts without SSR. The subject F15E, an unknown ac at the time, is one of the primary contacts.

MATS Pt1, Section 1, Chapter 5, Page 11 states *'...aircraft operating in controlled airspace are deemed to be separated from unknown aircraft flying in adjoining uncontrolled airspace...'*. At 1147:10 the B737 flight called Cardiff Radar, *"Cardiff good day from B737 c/s descending one six zero AMRAL"* and ATC replied, *"B737 c/s roger"*. At this point the radar recordings show the subject F15E as a primary only contact 18nm to the SW of the B737 tracking away to the SW. The Cardiff Radar controller reports observing the contact turn onto an E'ly track and briefly indicate FL150 with intermittent Mode A and C at a speed of approximately >300kt. The controller determined that the ac might be an infringer, but on the E'ly track it posed no hazard. At 1148:26 radar recordings show the unknown contact displaying a squawk of 7000 indicating FL156, 17nm SW of the B737 indicating FL160.

At 1149:10, in the belief that the unknown contact was not a threat, the controller instructed the B737 flight to, *"...continue present heading"* but then observed unknown traffic turn onto a NE'ly track and at 1149:45 instructed the B737 flight to, *"...turn right heading two one zero degrees".* This was correctly readback by the B737 crew followed by, *"Confirm er we got TCAS traffic in front five miles....?????..avoiding".* The transmission from the pilot using the term 'TCAS' followed by an 'unintelligible word' and 'avoiding', led the controller to believe that the B737 was responding to a TCAS RA. The controller replied, *"B737 c/s roger that's unknown traffic and continue as you wish."* The B737 crew advised, *"Okay er two one degrees err we're keeping an eye on him B737 c/s".* At 1149:54 radar recordings show that the required separation had been lost with a minimum distance of 4·9nm and 200ft, with both ac closing. At 1150:08 the controller updated the B737 flight, *"B737 c/s yeah tha - that's unknown traffic believed to be military traffic just climbing now through flight level one seven zero"* and the B737 pilot replies, *"Yeah we got err the traffic in sight now thanks"*.

[UKAB Note (1): At 1150:10 radar recordings show the 2 ac on opposite direction but parallel tracks a range of 2nm with the B737 at FL160 and the unknown contact indicating FL171. The CPA occurs on the next sweep at 1150:18 as the subject ac pass port to port at a range of 1·6nm in level flight with vertical separation of 1100ft. The next sweep 8sec later shows the unknown ac commencing a R turn and a descent before the SSR disappears on the next sweep.]

The B737 was then given descent for a normal approach into Bristol. Tracing action was taken and it was later confirmed that the unknown traffic was an F15E.

The controller had considered that the pilot of the B737 was following a TCAS RA. This may have caused the controller to allow the pilot to continue as he wished rather than give what would have been appropriate avoiding action in order to achieve the required separation minima.

MATS Pt1, Section 1, Chapter 5, Page 9, Use of Mode C for Vertical Separation states *'Aircraft Under a Radar Control Service: If the intentions of Mode C transponding aircraft are not known, the minimum separation must be increased to 5000 feet. Unverified Mode C data may be used for separation purposes provided a minimum vertical separation of 5000 feet is maintained and radar returns, however presented, are not allowed to merge'.*

MATS Pt1, Section 1, Chapter 5, Page 13, Unknown Aircraft states: *'The action to be taken by controllers when they observe an unknown aircraft, which they consider to be in unsafe proximity to traffic under their control, in various types of airspace is as follows: in Class A, C and D airspace - If radar derived, or other information, indicates that an aircraft is making an unauthorised penetration of the airspace, is lost, or has experienced radio failure – avoiding action shall be given and traffic information shall be passed'. 'When avoiding action is issued to an aircraft under a Radar Control Service, controllers must seek to achieve the required minima and pilots must comply with the instructions given, even if they report visual with the other aircraft. It is recognized that it may not always be possible for controllers to achieve the required separation minima against unknown traffic infringing controlled airspace due to the potential for their sudden appearance and/or unpredictable manoeuvres; however, controllers shall apply all reasonable endeavours'.*

HQ 3AF comments that the Airprox, thanks to the F-15E lead pilot's candid report, would appear to be the result of a basic navigational error by a pilot accustomed to having a WSO in the back seat. Moreover, a WSO, in addition to operating the ac's suite of navigation aids, adds significantly to the overall SA of the crew. Nevertheless, and notwithstanding his unauthorised penetration of Class A CAS, the pilot acquired the B737 on radar at 15nm and subsequently kept it in sight until clear but understandably, neither the Cardiff APR nor the B737 crew was aware of the fact.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Although Members agreed unanimously that the cause was the unauthorised penetration of CAS by the F15E pilot, the Board discussed at length some underlying points uncovered during the investigation. First, the Cardiff Radar Controller had placed the B737 on a tactical heading, which was changed to 210° when he saw the F15E radar return turn NE'ly. However, after receiving the B737 crew's transmission mentioning 'TCAS' and 'avoiding' with an unintelligible word between, the Cardiff Radar Controller had believed that the B737 crew were responding to a TCAS RA so he had deliberately elected not to issue any positive control instructions when separation was lost. Members agreed that some phraseology used by aircrew when mentioning TCAS could be potentially misleading particularly if coupled with poor RT. Examples mentioned, which are routinely used/heard during RT exchanges, are when TI is passed by ATC and the response from aircrew is 'TCAS contact' or 'we have traffic on TCAS'. Standard ACAS/TCAS phraseology only mentions the word TCAS in 2 phrases - 'TCAS RA' or 'unable, TCAS RA'. Members believed that if there was any doubt

about the crew's intention, the controller should have asked for clarification. A commercial pilot Member opined that pilots reacting to RA demands might be unable to provide immediate clarification. In this incident the controller could have issued 'avoiding action' against the F15E and if the crew were unable to comply owing to a TCAS RA event, they would have reported it. As Members were concerned that pilots could potentially mislead controllers and there appeared to be a need for controllers to be able to clarify the TCAS status of a flight, Members agreed that a recommendation should be addressed to the CAA and MoD to remind pilots of the need to comply with correct phraseology and to remind controllers of the need to seek clarification of any RT transmission that is unclear.

It was unfortunate that the F15E pilot had not taken due regard of the airspace prior to climbing out from low-level, something that military pilot Members opined should have be taken into account during the pre-flight planning process. The pilot was flying in the area he had planned to be in and the CAS boundaries/base levels are clearly depicted both on the UK Military low-flying charts as well as on the RAF enroute chart.

Turning to risk, the Radar Controller had noticed the CAS penetration very quickly after the F15E's SSR appeared on his display and had monitored its track, giving tactical headings intended to keep the B737 clear of the F15E's predicted flightpath. Members could not reconcile why the F15E's squawk only appeared for 2min when it was thought that it should have been showing for some time both before and after the CPA. However, when the B737 flight was given its second radar heading and the crew informed the Radar Controller of their TCAS contact and 'avoiding', the controller advised the crew that it was unknown traffic and to *"...continue as you wish"*. The B737 crew had acquired the F15E on TCAS and monitored its flightpath which generated a TCAS TA and did not require 'avoiding action' to be taken, the F15E being visually acquired as it passed 2nm away to their L and 500ft above. The F15E pilot had established radar contact on the B737 at 15nm as he manoeuvred his ac to rejoin with his No2, sighting the airliner at 5-7nm and taking visual separation against it, climbing 1000ft above it and 2nm clear. Although this had had the potential for being a more serious confliction, the visual sighting by the B737 crew and the action taken by the F15E pilot was enough to allow the Board to conclude that any risk of collision had been quickly and effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The F15E pilot entered CAS without clearance and flew into conflict with the B737.

Degree of Risk: C.

Recommendation: The CAA and MoD are recommended to:

1) Remind pilots to comply with standard phraseology in order to minimise the possibility of misleading controllers about TCAS contacts and reactions.

2) Remind controllers to seek clarification whenever a received transmission is ambiguous.