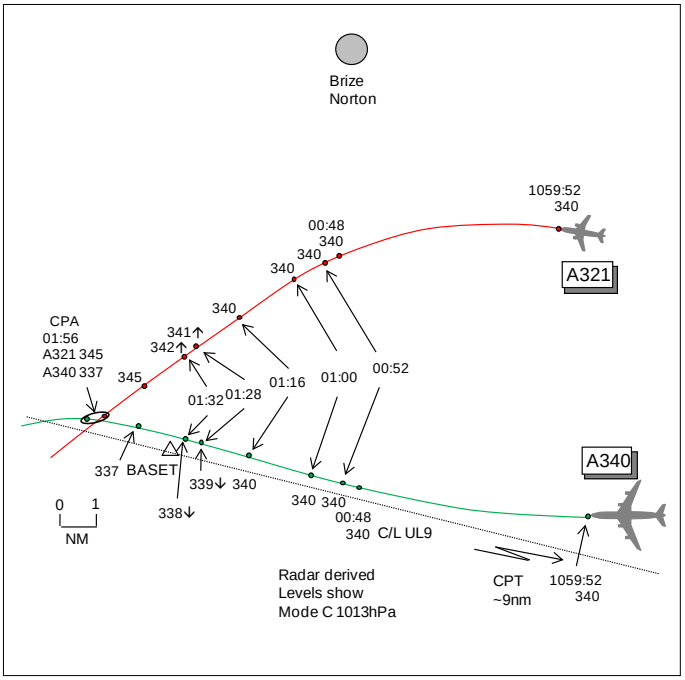
AIRPROX REPORT No 2012020

Date/Time:	25 Feb 2012 1102Z (Saturday)	
Position:	5135N 00146W (21nm WNW CPT)	
Airspace:	UAR UL9	(*Class: C*)
	Reporting Ac	*Reporting Ac*
Type:	A321	A340-600
Operator:	CAT	CAT
Alt/FL:	FL340	FL340
Weather:	VMC CLNC	VMC NR
Visibility:	NR	NR
Reported Separation:	500ft V/1-2nm H	500ft V/1000m H
Recorded Separation:	800ft V/0·4nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321 PILOT reports cruising at FL340 heading 270° at 450kt near BASET intersection and in communication with London on 135·255MHz, squawking with Modes S and C. Behind them, also at FL340, was an A340. Both flights reported light to severe turbulence and since Met conditions were similar at both higher and lower levels they needed frequent heading changes for about 15min (Wx avoidance). They were cleared BASET – LIPGO, he thought, when the FO came back to the flightdeck after a short absence; the Capt had been alone for some minutes. The clearance read back was not challenged by the controller, the read back was supposedly correct. The crew were about to confirm the turn to BASET when ATC changed the clearance to another waypoint followed by heading changes to them and the A340. Before the turn could be performed a TCAS RA 'climb' was received and this was executed; the A340 received a TCAS RA 'descend'. At the CPA there was 500ft vertical and 0·5nm horizontal separation and he assessed the risk as high.

THE A340 PILOT reports cruising at FL340 at 480kt near CPT routeing direct to SLANY and in communication with London, squawking with Modes S and C. The Wx was VMC. There was dense traffic in the London area with several ac on ATC headings. They were aware of an A321 which approached from their R and behind which triggered a TCAS TA and then an immediate RA 'descend', which was executed. At the CPA 500ft vertical and 1000m horizontal separation existed and he assessed the risk as medium.

THE LAC S8/35T CONTROLLER reports the A321 was en-route to Dublin and the A340 was routeing to N America both at FL340 and were transferred to him from London Upper Sector (LUS) on parallel headings; the A321 was on the N side of the A340. He sent the A321 direct to BADSI then LIPGO which involved a R turn and then he sent the A340 direct to SLANY which is also a R turn. He then noticed STCA flashing red [high severity alert] because the A321 had turned L towards the A340. He turned the A321 R onto heading 310° or 315° but thought the turn instruction was not acknowledged. He then gave avoiding action to the A321 to turn R onto heading 315° and gave avoiding action to the A340 to turn L onto 180°. He thought the A321 flight acknowledged but the A340 flight didn't. He then gave the turns again however, another flight checked-in immediately after the avoiding action was given but he ignored the call. The A321 flight reported a TCAS RA which he acknowledged.

ATSI reports that the Airprox occurred at 1101:56UTC, in Class C CAS, 12nm WNW of reporting point KENET. The 2 ac involved were in receipt of a RCS from LAC, Brecon (BCN) Sector 35 (S35). Both ac were being operated by the same airline.

The A340 was operating IFR on a flight from Europe to N America and had flight planned to route UAR UL9 between CPT and SLANY (Fig 1).

The A321 was operating IFR on a flight from Europe to Dublin and had flight planned to route UAR UL9/UL18 between CPT and DIKAS then UL18 DIKAS to LIPGO (Fig 1). UL18 is classified as a conditional route which was available on the Saturday of the Airprox.

LAC BCN S8 and S35, 2 of 4 Brecon sectors, were combined and manned by a tactical controller (T) and planner controller (P), utilising the interim Future Area Control Tools Support (iFACTS) system, which uses Trajectory Prediction, Medium Term Conflict Detection, and Flight Path Monitoring. The ATSA position was not manned and the other two BCN Sectors S5 and S23 were also operating combined. The S35(T) controller had been operational at Swanwick for 2·5yr and the S35(P) controller for 6 months.

CAA ATSI had access to RT recordings and area radar recordings together with written reports from the controllers and pilots. The Eurocontrol Automatic Safety Monitoring Tool (ASMT) recorded four messages related to this encounter.

The 2 ac were maintaining FL340, radar heading 280° and established on parallel tracks. As the ac passed N abeam the WOD NDB, the A340, squawking 2514, was in the centre of the UAR and the A321, squawking 2515, was offset to the N, separated by 8·4nm. As the 2 ac approached the CPT VOR the ac were transferred from LUS to the S35(T) controller with an instruction to 'report heading'.

At 1058:41, the A340 flight contacted the S35(T) controller, *"London (A340 c/s) level flight level three four zero".* This was acknowledged, *"(A340 c/s) Roger"* and there followed a discussion regarding turbulence about 40 to 50 miles ahead.

At 1059:22, the A321 flight contacted the S35(T) controller, *"Hello London (A321 c/s) level three four zero heading two eight zero."* The S35(T) controller replied, *"(A321 c/s) good afternoon route direct to BADSI then LIPGO."* The A321 pilot responded, *"(A321 c/s) direct BASET er after to er LIPGO."* The S35(T) controller acknowledged, *"Affirm."* The incorrect read back was not detected by the controller.

The A321 pilot's written report stated, '(A321 c/s) was cleared BASET – LIPGO when FO came back to cockpit after short absence (Capt alone for some minutes). The clearance read back, however was not objected by controller (read back supposedly correct).'

At 1059:52, the S35(T) controller instructed the A340 flight, *"(A340 c/s) route direct to SLANY"* and the A340 pilot replied, *"(A340 c/s) direct to SLANY thank you."* The lateral separation between the 2 ac was 7·9nm. The S35(T) controller's expectation would be that the 2 ac would establish on tracks to SLANY and BADSI (Fig1), diverging by approximately 20°. The iFACTS system showed that the S35(T) controller had placed the 2 ac on their own navigation and that the diverging tracks were not in confliction.

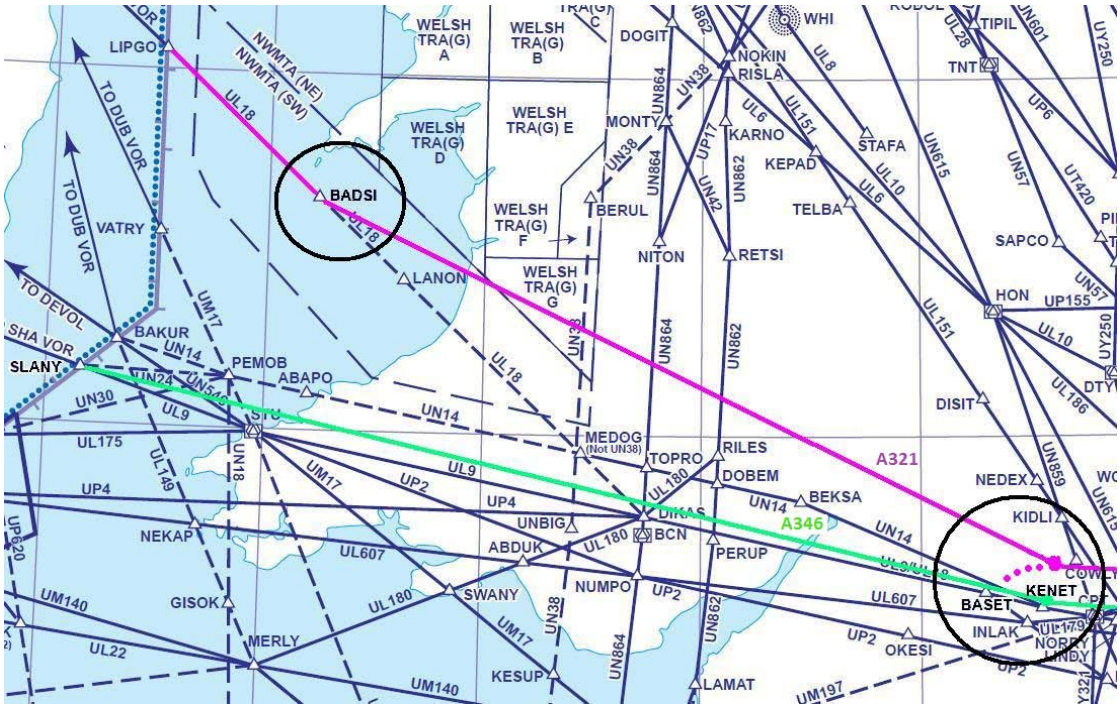


Fig 1

At 1100:48, the radar shows the A321 had commenced a L turn towards BASET. At 1100:52, the distance between the ac was 6·4nm. The S35(T) controller instructed the A321 to turn R 'now' to BADSI and at the same time STCA activated. The S35(T) controller immediately gave avoiding action to both ac. The three transmissions occurred in quick succession, with 1sec between each, as shown below:

> *"(A321 c/s) er turn right now to BADSI, right now to BADSI."*
>
> *"(A321 c/s) avoiding action turn right heading two correction turn right heading three two five."*
>
> *"(A340 c/s) avoiding action turn left heading one eight zero degrees."*

The A321 pilot mistakenly replied to the avoiding action given to the A340, "*(A321 c/s) turn left heading one eight zero degrees."* The S35(T) controller responded, *"(A321 c/s) negative right heading three two five."* The A321 pilot replied, *"Right heading three two five (A321 c/s)."* However, during this conversation a TCAS TA was recorded by the Eurocontrol ASMT at 1101:01, followed by a TCAS RA at 1101:15. The A321 received a 'climb alert' and the A340 a 'descend alert'.

The A321 pilot's written report stated that, 'Pilots were about to confirm the turn to BASET when ATC changed the clearance to another waypoint followed by heading changes given to (A340 c/s) and (A321 c/s). Before turn could be performed TCAS RA came up with climb for (A321 c/s) and descent for (A340 c/s)."

At 1101:16, (distance 3·9nm) the S35(T) controller instructed the A340 flight, *"(A340 c/s) left heading one eight zero degrees now."* There was no response and the S35(T) controller made 2 further transmissions to the A340 flight:

> *"(A340 c/s) left heading one eight zero degrees."*
>
> *"(A340 c/s) left heading one eight zero degrees"* and after this third transmission the pilot responded, *"(A340 c/s) left heading one eight zero TCAS descent.*" This was followed with a transmission from the A321 pilot, *"(A321 c/s) we have TCAS climb."*

The S35(T) controller responded with *"Roger."*

The A340 continued on the W'ly track as it responded to the TCAS RA.

At 1101:32, radar shows the 2 ac converging with a lateral separation of 2·4nm. The A340 is at FL338 descending and the A321 at FL342 climbing. The A340 levels-off at FL337 and the A321 at FL345.

[UKAB Note (1): The CPA occurs at 1101:56, the A321 passing 0·4nm behind the A340 with vertical separation of 800ft].

The Local Area Supervisor (LAS) arranged for the S35(T) controller to be relieved by the adjacent S35(P) controller and an oncoming supervisor took over the planner position. Additional staff was called to provide relief. At this point, it was not clear to the S35(P) controller, what clearances were valid as the electronic strip marking was no longer up to date.

At 1102:06, the A340 crew reported, *"…clear of conflict returning to as assigned erm clearance."* The A340 commenced a L turn to the previously assigned heading of 180°. The S35(P) controller instructed the A340 flight to stop the turn heading 220°. Radar shows the 2 ac tracking SW, separated by a distance of 2·2nm. The A340 flight, being the W'ly of the 2 ac, was then instructed to route direct to SLANY.

At 1102:37, the A321 crew reported clear of conflict and the S35(P) controller instructed the A321 flight to descend to FL330 on the S'ly heading. At 1103:36, lateral separation has increased to 5·5nm and the S35(P) controller instructed the A321 flight to turn R heading 280°.

At 1104:55, the S35(P) controller was also relieved from the operational position and the oncoming controller continued to provide a service to the 2 flights.

Within 2min of the ac coming on frequency the S35(T) controller had issued direct routeings to both flights with an expectation that their tracks would diverge by approximately 20°. (Fig 1).

The A321 crew was instructed to, *"route direct to BADSI then LIPGO"*, but gave an incorrect read back "*direct BASET er after to er LIPGO."* This was not detected by the S35(T) controller and resulted in the A321 commencing a L turn to intercept the UAR C/L at BASET, bringing it into conflict with the A340. A number of contributory factors may have caused the pilot to mistake BASET for BADSI and the S35(T) controller to miss the incorrect read back:

> The next waypoint in the A321 Flight Management System (FMS) after KENET was 'BASET' and this may have influenced the pilot's mindset/ perception of what he heard and his belief that BASET was the next way point, despite the controller's reference to BADSI.
>
> It was not clear if the reported absence/return of the FO to the flightdeck, was a distracting factor which may have contributed to the incorrect read back.
>
> CAA ATSI considered that the pilot's accented read back of BASET, with an emphasis on phonetics 'B' 'A' and 'S', could easily have been misconstrued by the controller in the operational environment as BADSI. It was only with the benefit of a number of recorded playbacks that CAA ATSI was able to identify the waypoint as BASET.
>
> The controller's bias of expectation, (hearing what he expected to hear or half hearing) together with the phonetic similarities, very likely predisposed the S35(T) controller into believing that the read back was correct, which he acknowledged with *"Affirm."*

Once the controller was alerted to the error and potential conflict, the S35(T) controller instructed the A321 to turn R 'now' for BADSI but almost immediately, probably as a result of the STCA activation and the urgency of the situation, gave avoiding action to both ac. This resulted in the 3 rapid transmissions with only 1sec interval between each:

"(A321 c/s) turn right now for BADSI – right now to BADSI."

The A321 crew indicated that they were about to confirm the routeing to BASET when ATC changed the clearance to another waypoint. The A321 crew would not have been familiar with BADSI, previously affirmed as BASET and there was insufficient time for the pilot to assimilate the information before immediately being given avoiding action:

"(A321 c/s) avoiding action turn right heading two correction turn right heading three two five."

"(A340 c/s) avoiding action turn left heading one eight zero degrees."

The A321 crew mistakenly responded to the heading instruction meant for the A340, which was corrected by the S35(T) controller, but it was then too late as both crews reacted to the TCAS RA. The rapid delivery of these instructions to the 2 flights with the same company callsign-prefix was very likely confusing and did not afford the crews the opportunity to assimilate or acknowledge them. The flightdeck workload was likely to have been very high in response to the TCAS RA alerts.

The Manual of Air Traffic Services (MATS), Part 1, Appendix E Pages 1/2 state:

'Radiotelephony provides the means by which pilots and ground personnel communicate with each other. Used properly, the information and instructions transmitted are of vital importance in assisting in the safe and expeditious operation of aircraft. However, the use of non-standard procedures and phraseology can cause misunderstanding. Incidents and accidents have occurred in which a contributing factor has been the misunderstanding caused by the use of non-standard phraseology. **The importance of using correct and precise standard phraseology cannot be over-emphasised.'**

'Be aware that the mother tongue of the person receiving the message may not be English. Therefore, speak clearly and use standard radiotelephony (RTF) words and phrases wherever possible.'

'It should be noted that standard phraseology with clear enunciation and an urgent tone must be used for collision avoidance instructions.'

The avoiding action did not contain the word **'**immediately**'** or provide TI. MATS Part 1, Appendix E (Attach), Page 11, specifies the phraseology to be used when giving avoiding action:

"(A/c identity) avoiding action, turn left/right immediately heading (three digits) traffic (left/right) (number) o'clock (distance) miles opposite direction/crossing left to right/right to left (level information).* (**Clear enunciation and an urgent tone must be used.)"*

The Airprox occurred as a result of the incorrect read back by the pilot of the A321, which was not detected by the S35(T) controller and resulted in the 2 ac coming into conflict with a loss of separation. The situation was resolved by the interaction of the TCAS RA.

A number of factors were considered to be contributory;

The A321 was cleared to route direct BADSI-LIPGO when coincidentally BASET was the next waypoint in the FMS. This may have caused the A321 pilot's misperception and response, 'BASET-LIPGO.' It is considered likely that neither of the reporting points BASET or BADSI would have been familiar to the pilot.

The A321 pilot's accented read back, together with the controller's bias to hear what he was expecting to hear, caused the controller to accept the read back as being correct.

The speed of events, the use of same company callsign prefix and the rapid succession of RT transmissions from the S35(T) controller in attempting to recover the situation was very likely confusing to the crews.

The avoiding action phraseology was non-standard and did not allow the crews to acknowledge or respond. This resulted in the A321 crew acknowledging the heading meant for the A340. It was then too late as the 2 crews responded to the TCAS RA alerts.

Recommendations:

CAA ATSI recommends that NATS Swanwick ATSU include this or a similar scenario, together with lessons learned in controllers' Training in Unusual Circumstances and Emergencies (TRUCE) module.

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 authorities.

It was clear that that there were several human factor elements underlying the primary cause of this incident. When the A340 flight first called on frequency, the crew did not report their radar heading, as instructed by the previous controller on the LUS, and the S35T did not confirm this fact which was essential to ensure that the radar separation from the A321 was maintained. That said, Members agreed the crucial point occurred when the A321 flight made its initial call on frequency. The S35T controller intended that the A321 and the A340 should take up divergent tracks. He instructed the A321 flight to take a direct routeing to BADSI that should have placed the ac onto a more NW'ly track away from the A340 flight, which was given a direct track to SLANY; this track divergence was confirmed by iFACTS. However, the A321 crew did not assimilate the 5-letter name-code designator given and had read back BASET, the next waypoint on the ac's FMS. This incorrect read back went undetected by the S35T controller, which had led to the A321 turning towards the A340 and caused the Airprox. Members sympathised with the S35T's predicament, as the accented reply by the A321 crew had made the controller's recognition of the BASET waypoint read back more difficult. However, the onus is on a controller to ensure an accurate read back of instructions passed. The RT recorded playback, analysed by ATSI, had found the waypoint read back to be unclear i.e. open to misinterpretation. This, when combined with the controller's expectation bias had led to him believing that the read back was correct. The BADSI waypoint was apparently not expected by the A321 crew and, as their read back of BASET had gone unchallenged, the crew believed that it was correct. Notwithstanding that their read back was not challenged, the crew was unsure about the instruction but by the time they were ready to query it, the controller was transmitting avoiding action. A CAT pilot Member stated that the FMS would list several waypoints on a page for the intended route and that BADSI could have been off the bottom of the page listing and the list may have needed scrolling to bring the waypoint onto the FMS page. Around this time, the FO was returning to the flightdeck which would have meant there was no cross-cockpit confirmation of RT transmissions while the flight was operating single crew. While accepting that "needs must", a CAT pilot Member opined that single pilot operation in such busy airspace, particularly when Wx avoidance and turbulence was reported, was unfortunate timing.

Although the A321 crew had started the L turn to BASET, Members agreed that the situation was recoverable. However, when S35T noticed it, he gave the A321 flight a R turn to BADSI and then avoiding action to both flights in rapid succession. This left insufficient time for A321 crew to assimilate the waypoint information ahead of the avoiding action heading instructions and for either crew to acknowledge. The A321 crew read back the heading instruction meant for the A340 flight, which was corrected by the controller, however this delay had resulted in the ac flight paths broaching the ACAS 'safety bubble' leading to TCAS RAs on both flightdecks. Neither crew acted on the avoiding action issued but both reacted promptly to the coordinated RAs which resulted in the ac

passing with 800ft vertical separation at the CPA of 0·4nm. These actions were enough for the Board to conclude that any risk of collision had been effectively removed.

Owing to the close similarities between BASET and BADSI waypoints, and noting another waypoint BAKUR in the same area, Members were minded that a safety recommendation was required to ensure that the 5 letter name-code designators were reviewed by the CAA to avoid potential future confusion.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The S35T controller did not detect the A321 pilot's incorrect read back.

Degree of Risk: C.

Recommendation: The CAA is recommended to review the 5-letter name-code designators in this area to avoid potential confusion between BASET, BADSI and BAKUR.