

AIRPROX REPORT No 2013005

Date/Time: 2 Feb 2013 1734Z (Saturday)
(Night)

Position: 5156N 00324W (13nm
NNW BCN)

Airspace: UAR (Class: C)

Reporting Ac Reporting Ac

Type: A320 A319

Operator: CAT CAT

Alt/FL: ↓FL250 FL340

Weather: VMC NR VMC NR

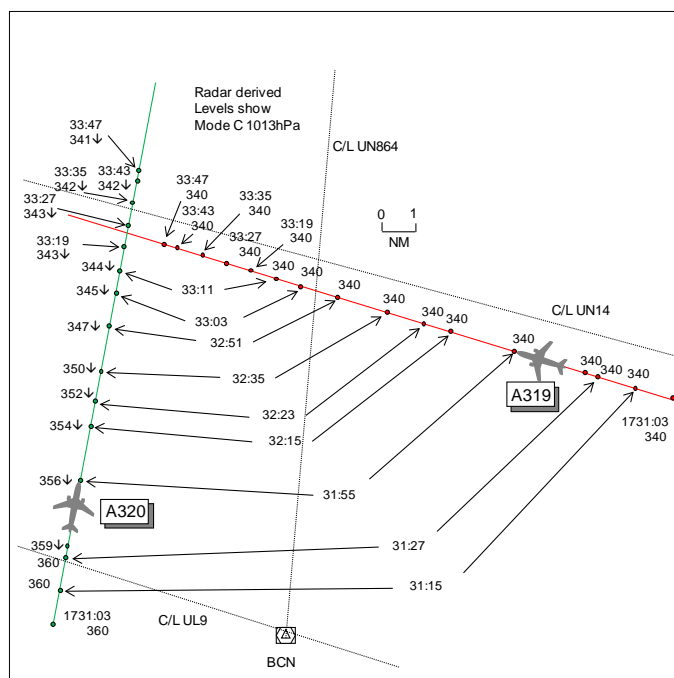
Visibility: >10km

Reported Separation:

Nil V/3nm H Nil V/1-1.5nm H

Recorded Separation:

100ft V/2.4nm H



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports en-route to Manchester, IFR and in receipt of an ATS from London on 128.815MHz, squawking 7474 with Modes S and C. Heading 360° at 320kt and descending to FL250 another ac's strobe and nav lights were seen in their 2 o'clock range 3-5nm at about their level. A TCAS TA alert was received and they reduced their ROD to 400ftpm and the other ac passed 3nm to their R and behind. He assessed the risk as low.

THE A319 PILOT reports en-route to Dublin, IFR and in receipt of an ATS from London squawking 1436 with Modes S and C. Level at FL340 at 390kt having been cleared direct LIPGO, a TCAS TA alert was received on an ac crossing their track in a leisurely descent. It was sighted at about 3-4nm range and was seen to cross and descend through their level at about 1-1.5nm range. He informed ATC and an immediate L turn was given before 'clear of conflict' was received 30sec later; no TCAS RA was received. The other ac appeared not be on their frequency, he thought, and ATC advised that a report would be filed. He assessed the risk as high.

THE S5/6/8/9/23/35/36 TACTICAL CONTROLLER reports taking over the W bandboxed Sector at 1730 with the A319 maintaining FL340 routeing MEDOG-LIPGO and the A320 N'bound at FL360 destination Manchester. The 2 ac would cross at approximately 90° E of MADOG. Because the A320 would need descent shortly, he cleared the flight to FL350 on top of the A319. The crew did not read this instruction back so he later repeated the descent clearance to FL350; this clearance was read back correctly, he thought. Whilst controlling other traffic he noticed STCA flashing white (low severity) between the 2 ac but he was not concerned as this is a regular occurrence when 1 ac is approaching 1000ft either on top of or underneath another. He was also confident that the A320 crew had read back the correct clearance and he continued to control other traffic on the sector. He did not notice the Mode S SFL readout of the A320. A short time after the A319 crew queried the presence of the A320 which was now in the A319's 1 o'clock position approximately 2.5nm away and 300ft above but flying away. He gave avoiding action to the A319 flight to re-establish 5nm separation and when clear he instructed the flight to resume own navigation to LIPGO. He did not give any avoiding action instruction to the A320 flight as its track was the best in order to achieve the

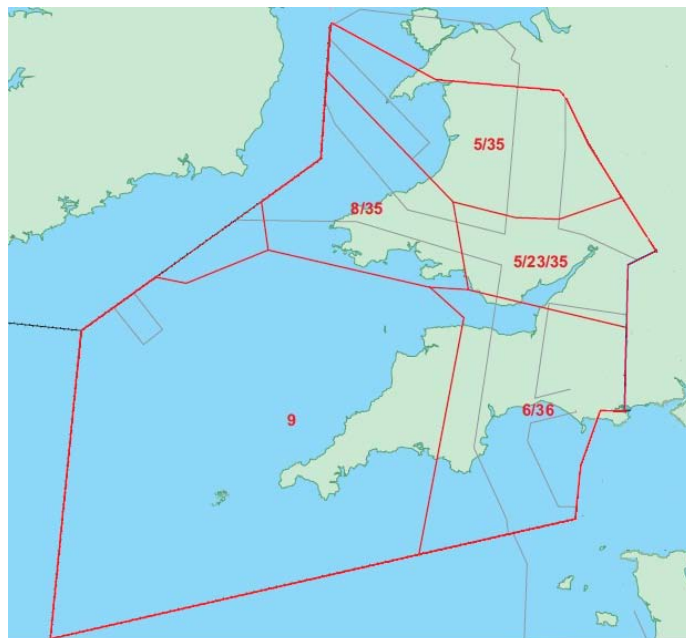
required 5nm. STCA did not flash red (high severity) until the A319 queried the A320's presence. Minimum separation was 300ft/2.5nm.

THE S5/6/8/9/23/35/36 PLANNER CONTROLLER reports the W End Sector was all bandboxed. At a position just N of DIKAS the A320 flight was cleared to FL350 on top of crossing traffic, an A319, at FL340 which was routeing MEDOC-LIPGO. The A320 crew read back FL350 and shortly afterwards the ac labels merged. The A319 crew reported traffic level with them at range 1.5nm so she pulled the labels of the 2 ac apart and couldn't believe the A320 was now also at FL340. The Tactical controller issued avoiding action to the A319 flight to turn L heading 250°. Minimum separation was 300ft and 2.4nm.

ATSI reports that the Airprox occurred at 1733:25 (UTC) within Class C CAS, 7nm ESE of waypoint MEDOG, between an A319 and an A320.

The A319 was W'bound IFR at FL340, inbound to Dublin and in receipt of a RCS from London Control on frequency 134.75MHz. The A320 was N'bound IFR at FL360, inbound to Manchester and in receipt of a RCS from London Control on frequency 128.815MHz.

London Area Control (LAC) Swanwick Local Area Group West (LAG (W)) known as 'West End' were operating as London Control in a combined 'bandboxed' mode, combining sectors 5, 6, 8, 9, 23, 35, and 36, with cross-coupled combined frequencies; 133.6, 126.075, 129.375, 132.95, 134.75, 135.255 and 128.815MHz. The area covered by the combined sectors is shown below in Figure 1.



(Figure 1 – Area covered by the combined LAC(W) sectors).

Swanwick LAC utilise the interim Future Area Control Tools Support (iFACTS), which uses Trajectory Prediction, Medium Term Conflict Detection, and Flight Path Monitoring, to provide controllers with decision-making support and to assist in managing workload. LAC MATS Part2, GEN-46, paragraph 3.5.1.1, states:

'The iFACTS tools are to be used, in conjunction with the radar display, for the detection of conflicts and assessment prior to issuing clearances. All data, including Tactical Data, must be input into the tools.

When entering Tactical Data electronically, the principal of "Enter As you Speak, Read As you Listen" should be applied, in order to ensure the accuracy of the data entry and pilot read back. Team members shall check for system conditions and error messages, including the Flight Messages Window as part of their routine scan and ensure that other team members are informed as appropriate.'

The combined West End sector was manned by a Tactical (T) and Planner (P) controller. The T controller had taken over the position at 1730:00, 3min prior to the incident and the P controller had been in position since 1700:00. Both controllers were experienced on the sector. The T controller is a Local Area Supervisor (LAS) with additional watch management responsibilities, required to work a minimum of 14hr on operational position within the preceding 30 day period in order to maintain operational competence. The operational hours for the 2 controllers is shown below:

Month	T controller	Planner controller
December 2012	12hrs 38mins	41hrs 12mins
January 2013	15hrs 43mins	32hrs 23mins

CAA ATSI had access to RT recordings, area radar recordings, the written reports from the pilots of each ac, together with written reports from the T controller, P controller and the watch management investigation report. CAA ATSI interviewed the two controllers involved and was able to view a replay of iFACTS recording.

A frequency occupancy analysis (clock busy chart) was provided by the ANSP for the period 1700 to 1759 and showed that the sector workload increased at 1731:00, just prior to the incident (Figure 2).

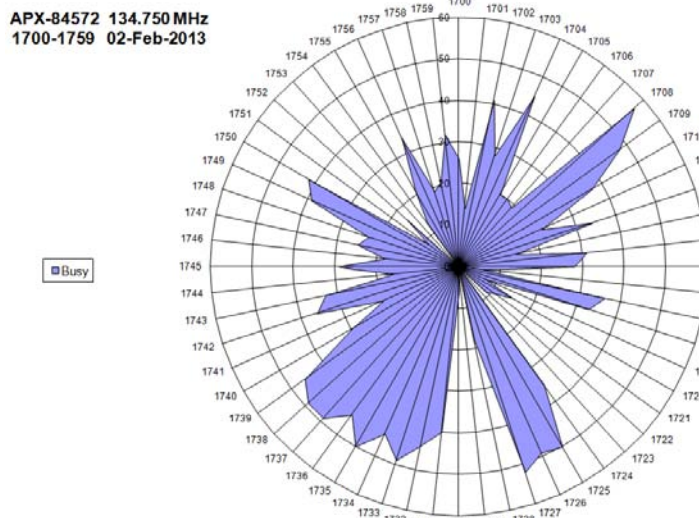
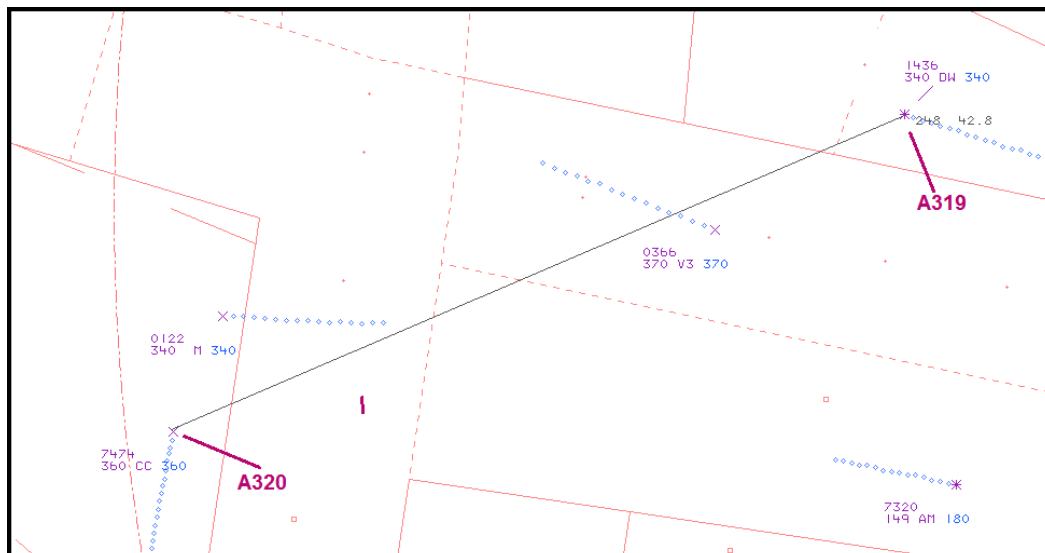


Figure 2 – Clock busy chart for LAG(W) for the period 1700–1759 UTC.

At 1728:04, the A320 squawking 7474 was N'bound at FL360 and the A319 squawking 1436 was W'bound at FL340. The distance between ac was 42.8nm as shown in Figure 3.



(Figure 3 – Swanwick MRT at 1728:04)

At 1730:45, the T controller having just taken over the position, transmitted, “(A320 c/s) London you can descend to flight level three five zero” and then simultaneously entered 350 as the new Cleared Flight Level (CFL) into iFACTS. However there was no reply from the A320 crew and the controller transmitted to another flight (AC1).

ATC “(AC1 c/s) set course to SOMAX”
AC1 “Set course to SOMAX (AC1 c/s)”

At 1731:03, iFACTS generated a Selected Flight Level (SFL) alert to show that the A320’s CFL (350) entered into iFACTS differed from the SFL (360) and the alert is shown on the bottom line of the Target Data Block (TDB) as a white (360) in figure 4.



(Figure 4 – iFACTS alert showing A320 CFL as 350 and SFL as 360 – 1731:03)

At 1731:14, the T controller transmitted again, “(A320 c/s) descend flight level three five zero” and the A320 pilot responded, “Descend flight level ????? five zero (A320 c/s).” The A320’s SFL then changed to 250 and, at 1731:28, iFACTS generated a white (250) alert showing that the SFL did not agree with the CFL entered into iFACTS (Figure 5).



(Figure 5 – iFACTS alert showing A320 CFL as 350 and SFL as 250 - 1731:55)

The P controller was engaged in an operational phone call from 1731:15 until 1731:27 and did not hear the read-back.

The T controller indicated that he was aware of the first alert (360) but not the second (250). The controller was confident that the A320 pilot had given a correct read-back "FL350" and felt assured that separation would be maintained. CAA ATSI analysed these transmissions and made the following observations:

- a) the two instructions transmitted by the T controller to the A320 giving descent clearance to FL350 were clearly distinguishable.
- b) the read back from the A320 on a single replay could easily have been mistaken for FL350.
- c) neither the controller nor pilot used the phonetic 'TREE' to distinguish between '2' and '3'.
- d) by slowing the speed of the recording, varying the tone and looping the track, CAA transcription were clearly able to identify the read-back as FL250.
- e) CAA ATSI did not have access to any cockpit voice recordings and were therefore unable to evaluate the transmissions received by the A320 crew.

At 1731:34, the T controller continued talking to other flights.

AC2 *"London Control good evening (AC2 c/s) climbing FL 150 SUPAB"*
 ATC *"(AC2 c/s) London roger climb to FL260"*
 AC2 *"Level 260 (AC2 c/s)"*
 ATC *"(AC3 c/s) contact Brest on 135 260"*
 AC3 *"35 26 (AC3 c/s) Bye Bye"*
 ATC *"Goodbye"*
 AC4 *"Good evening (AC4 c/s) climbing FL350"*
 ATC *"(AC4 c/s) London route direct SUPAB"*

At 1732:15 low-level Short Term Conflict Alert (STCA) activated. The A320 was passing FL354 (1400ft vertical separation) and the distance between the 2 ac was 11.4nm (Figure 6). At the same time AC4 queried its routing.

AC4 *"Please repeat that point where we are cleared to navigate (AC4 c/s)"*



(Figure 6 –STCA activates at 1732:15 – vertical separation is 1400ft)

The T controller indicated that he had observed the STCA alert and reported that it wasn't uncommon for such alerts to be generated when ac approached their cleared level. The T controller remained confident that the A320 would stop descent at FL350. At 1732:23 whilst responding to another flight, the T controller repositioned the label of A320 (FL353) as shown in Figure 7.



(Figure 7 – STCA alert after the T controller moved the A320 label - 1732:23)

ATC "Are you routeing via KORUL"
 AC4 "Standby"
 ATC "(AC5 c/s) descend FL220 level VATRY"
 AC5 "220 to be level by VATRY (AC5 c/s)"
 ATC "(AC4 c/s) Say again"

At 1732:35, the A320's Mode C indicated FL350 and the distance between the 2 ac was 9nm.

AC6 "London (AC6 c/s) climbing altitude FL - climbing FL130 heading 290 degrees"
 ATC "(AC6 c/s) climb to FL150 what's your requested level"

At 1732:52, as the A320 passed FL347 (700ft vertical separation) iFACTS generated a White 'CFL' Deviation Alert on the top line of the A320's TDB, indicating that the A320 had deviated from the CFL by more than 200ft. Radar showed the distance between the 2 ac was 7.1nm (Figure 8).



(Figure 8 - STCA, the CFL deviation alert and incorrect SFL alert - 1732:52)

At the same time the iFACTS Separation Monitor, situated on the bottom LHS of each of each controller's situation display showed interactions between the 2 ac. The top red/black flashing interaction is generated when separation is predicted to be lost within 3min and the bottom white/black flashing interaction is generated when the system recognised that there is uncertainty in the outcome. These are circled yellow in Figure 9.



(Figure 9 – iFACTS separation monitor interactions - 1732:52)

At this point the P controller was engaged in the coordination of an AT75 ac into the sector, routing from Birmingham to join CAS at MOSUN. The P controller was busy inputting route details into iFACTS and the P controller's situation display showed the labels of the 2 ac overlapping, as shown in Figure 10.



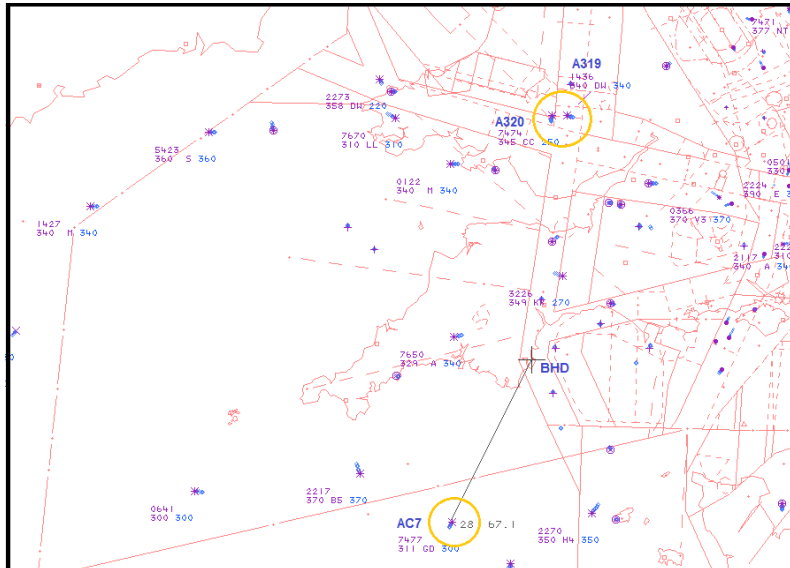
(Figure 10 – Overlapping labels on the P controller's situation display - 1732:52)

AC6 *"Climb FL150 and requesting FL360 (AC6 c/s)"*
 ATC *"Copied"*

A TCAS simulation tool (see report below) suggested that each ac received a TCAS TA at 1733:02, as the A320 passed FL346 and crossed the track of the A319 from L to R, when the distance between the 2 ac was 5.7nm. The A320 pilot's written report indicated that at this point he adjusted the ROD from 1000fpm to 500fpm then to 0fpm.

At the same time 1733:03, AC7 contacted the sector. AC7 was positioned 67nm S of BHD on the Southern edge of the T controller's situation display as shown in Figure 11.

AC7 *"London good evening to you it's the (AC7 c/s) descending FL300 towards Berry Head"*



(Figure 11 – NODE radar showing the relative position of AC7 at 1733:03)

ATC “(AC7 c/s) hello route to EXMOR for the Bristol 2B correction Bristol 2D”

At 1733:11, separation was lost between the 2 ac as horizontal distance reduced to 4-8nm whilst the vertical separation was 400ft (Figure 12).



(Figure 12 – the T controller’s situational display at 1733:12)

AC7 “Route to EXMOR for the 2D and don’t suppose there are any rugby fans amongst you over there.”

[The T controller responded with a short non-standard comment.]

At 1733:21, the P controller, having completed coordination, then separated the 2 overlapping labels on the situational display. The A320 was passing FL343 and the range between the ac had reduced to 4nm.

At 1733:24, the T controller initiated a telephone call to LAG N Sector and at the same time the A319 pilot reported, “London er (A319 c/s) we’ve got a contact at 200ft about 2 miles ahead of us.” At 1733:27 the T controller highlighted the TDB of the A319 (Figure 13).



(Figure 13 – iFACTS T controller's display - 1733:24)

At 1733:33, high level (RED) STCA activated and the T controller immediately responded, “(A319 c/s) roger turn avoiding action turn left immediately heading 250 degrees (crossed transmission from A319) it’s actually out of our way but er he’s level with us right now about a mile and a half two miles. The controller replied “Copied.” The vertical distance was 200ft (Figure 14).



(Picture 14 - High Level STCA activated at 1733:33)

[UKAB Note (1): Minimum horizontal separation of 2.4nm is shown on the 2 radar sweeps at 1733:43 and 1733:47, the A319 maintaining FL340 as the A320 is shown descending through FL342 and 341 respectively.]

At 1733:47, the T controller asked the A320 pilot, “(A320 c/s) just tell me your cleared level” and the pilot replied, “Cleared level two five zero (A320 c/s).” The T controller still had the telephone line open to LAG N and advised them to disregard, terminating the telephone call.

The A319 flight was then cleared to resume own navigation to LIPGO and advised that the other ac was clear of them.

At 1734:23, separation was re-established as horizontal distance increased to 5nm.

At 1736:00, the T controller handed-over the position to an oncoming controller.

At 1737:34 the A319 pilot confirmed that he would be making an Airprox report.

The P controller handed over the position to an oncoming controller at 1747.

Later the T controller indicated that he considered it to be a normal working day; there were no distractions and he was operating the combined bandboxed sector with a light to medium workload. The T controller observed the SFL – 360 alert after the initial missed call but did not see it subsequently change to 250.

The T controller was convinced that the A320 crew had given a correct read back of FL350 and even after hearing a replay of the recording remained certain that this had been the case. The controller was interested to know about the circumstances that led to the A320 crew mishearing 350 and indicated that there had been some general discussion on the unit about the difficulty in distinguishing between '2' and '3' and the emphasis of using phonetics such as 'TREE'.

When the T controller observed the STCA and noted that the vertical separation was 1400ft, he commented that this was a routine occurrence when an approach their cleared level and was confident, because of the read back, that the A320 would level off at FL350. He was then absorbed talking to other flight and had not observed the CFL deviation alert or interaction shown on the separation monitor, which indicated that the A320 had descended more than 200ft below its cleared level. In discussion, the T controller did not consider that these alerts were sufficiently visible or eye catching and suggested an alternative such as flashing red text.

The ATSU watch investigation report suggested that consideration be given to providing the T controller with an iFACTS refresher session together with a UCE. iFACTS was fully implemented in November 2011 and the T controller was asked if he considered that working the minimum number of hours to maintain competency levels was sufficient to maintain his familiarity with the iFACTS. The T controller indicated that whilst he and other supervisors would prefer to work more operational hours this was not always possible, but regarded himself as experienced and the number of hours worked as sufficient to maintain competency.

The P controller confirmed that the day had been normal with no distractions. Traffic levels were low to medium and the complexity and workload consistent with bandboxed operations. In discussion, the P controller indicated that it was sometimes a balance to ensure that workload was sufficient to maintain the concentration levels. The P controller did not consider the range of the situation display in bandboxed configuration was excessive for the levels of traffic. When questioned about random or nuisance STCA alerts, the P controller indicated that these did occur but were not really an issue, provided that the alert was monitored, taking appropriate action as required until the situation was resolved. With regard to iFACTS alerts, the P controller commented that these were not easily noticeable especially when things started to happen quickly and in discussion suggested perhaps an alert flashing red and also flashing red on the strip bay.

As a result of this incident a number of actions have been taken by the ANSP:

- a) A review of the Separation Monitor to examine the saliency of alerts.
- b) A two stage flashing SFL alert (in line with the development of Swanwick AC iFACTS track data block human factors review) is being developed with the aim of making the information more prominent.
- c) A defensive controlling package is being produced which will include reference to the passing of TI in situations where STCA has, or is likely, to activate.
- d) The ANSP human factors group are conducting a review of the risks associated with supervisors achieving minimum hours on radar over a prolonged period.

Analysis of the RT recordings showed that at 1730:45, the controller transmitted a clear instruction to the A320, “(A320 c/s) London you can descend to Flight level three five zero.” In the absence of a response from the A320 crew, the controller made a second clear transmission at 1731:14, “(A320 c/s) descend Flight Level three five zero.” The response from the A320 pilot “Descend Flight Level ????? five zero (A320 c/s)” was unclear and could easily have been mistaken for FL350. The T controller indicated that he believed that the A320 pilot had given a correct read-back of FL350 and still believed that this was the case. An analysis of the recording by CAA transcription unit showed that whilst the read-back could easily have been mistaken for FL350, it was FL250. CAA ATSI considered that given the nature and quality of the incorrect read back, the T controller could reasonably have accepted it as being correct.

In consultation with CAA FOI, the A320 operating company were asked to comment on the flight deck perspective and possibility of distraction or workload factors that may have contributed to the first missed first call and then the incorrect read back by the A320. The operating company had not completed their own investigation but provided the following response from the crew:

First Officer (PNF):

“I remember the event pretty well. I heard a clearance of descend FL250 which I read back over the radio, the captain set on the FCU what I read back and so we started to descend. At first I did wonder to myself that the clearance was a little early for our descent profile and to a lower FL than expected with so many track miles to go however I remember reading the clearance back very clearly and that my response was not challenged by ATC. Therefore I rightly or wrongly thought that it must have been correct. I should have in hindsight challenged my gut instincts with ATC. It is very possible that I miss heard the clearance but I am 100% sure that I read back the clearance that I thought I heard very clearly. After we realised that we had an Airprox event the captain and I had a discussion it [sic], the captain also thought he had heard FL250 and that was backed up by my response to ATC and so what he set on the FCU”.

Captain (PF):

“I've no issues or anything to contradict [FO's] recollection of events. Like he, I too thought the clearance to FL250 was early, but not unusual in my experience in that airspace, we'll often get FL330 by EXMOR, but not on this occasion. As [FO] said, we had a lot of track miles and I'm sure I mentioned it in the ASR (MOR) I selected -1000fpm because of this. As we got the TA I backed this off first to -500fpm and then to 0fpm until clear of the other traffic when I resumed the -1000fpm ROD to FL250 and [FO] as PNF, along with the A319 crew, queried the original clearance, the new controller, who had taken over, asked us what we had been cleared to, and confirmed our continued descent.”

The increase in workload, just prior to the Airprox, together with the effect of the combined banded sectors and the scale and range of the controller's situational display were considered by CAA ATSI.

The LAG(W) sectors sector configuration is shown below.

Time	Sector configuration
00:00 – 06:20	Operating as 5/6/8/9/23/35/36 all banded
06:20 – 06:35	Operating as 5/23 and 6/8/9/35/36
06:35 – 11:18	Operating as 5/23 and 6/9/36 and 8/35
11:18 – 14:20	Operating as 5/8/23/35 and 6/9/36
14:20 – 00:00	Operating as 5/6/8/9/23/35/36 all banded

The LAC MATS Part 2, page MORS-50 and MOPS-46, state:

'The Local Area Supervisor (LAS), in consultation with the sector team, shall decide when a sector can be banded. The LAS shall also use flow and staffing information to make the decision about banding.

Ensure all sector team members are informed that banding will take place.

It is recommended that the LAS should use flow information and information from the sector team operating a banded sector to pre-empt the need for staff to be recalled.'

The Traffic Load Prediction Device (TLPD) histogram charts for 0630, 0930, 1330 and 1630 on the 2 Feb 13 are shown in Figure 15 below:

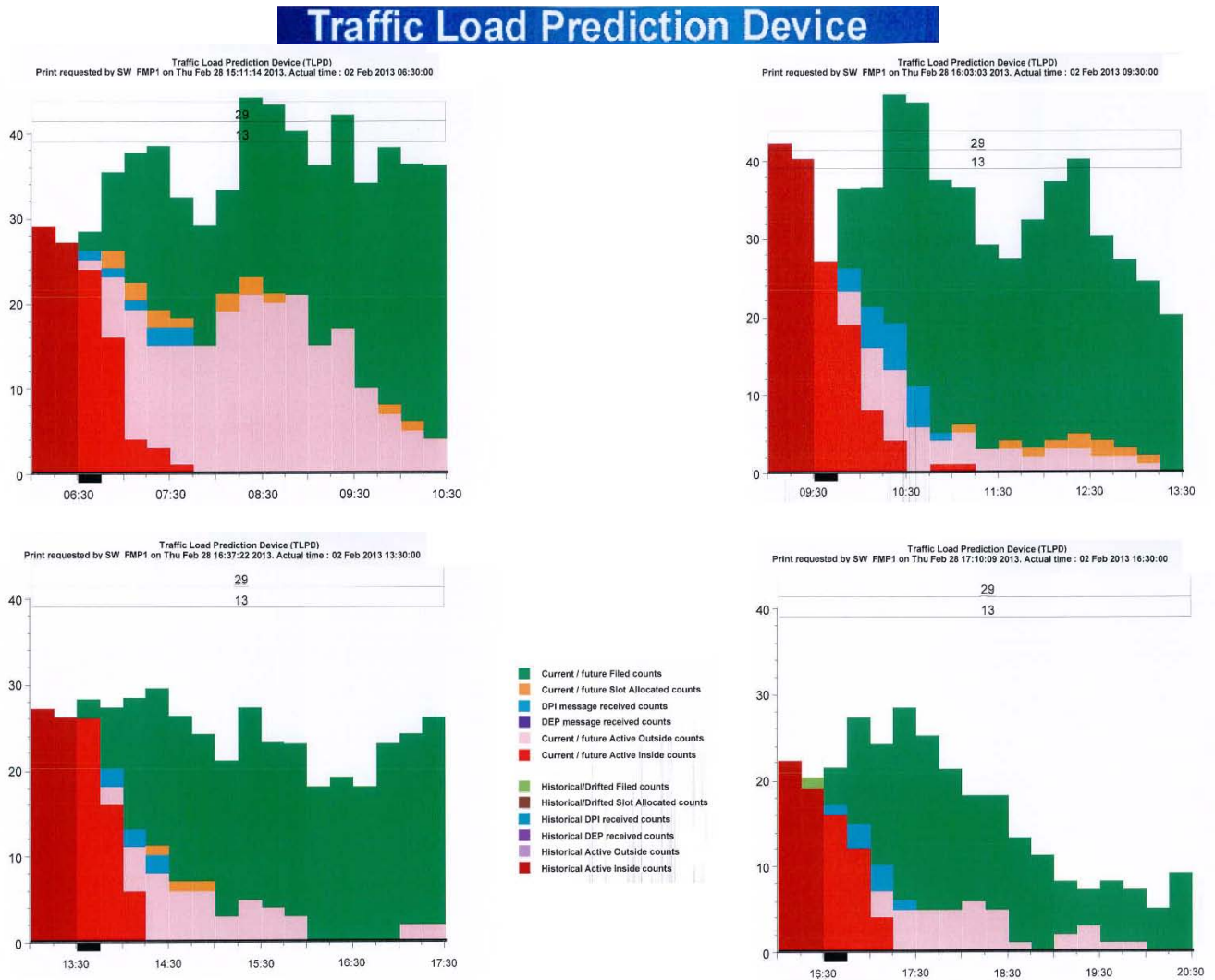


Figure 15 – TLPD histogram charts for 0630, 0930, 1330 and 1630.

An interrogation of the TLPD showed a reduction in predicted traffic levels after 1230. With these predicted traffic levels the afternoon LAS (W) agreed to combine all of the sectors at 1420. Network Management subsequently confirmed that these predicted traffic levels would be manageable in banded configuration. Anecdotal evidence suggested that this was quite early in the afternoon for all LAG (W) sectors to be combined but not unheard of for the predicted traffic level. The sectors remained combined for the remainder of the day with TLPD predicting that a split would not be necessary.

During further discussion, the operational controllers regarded the traffic levels on the combined sectors as being light and that the range of the situational display was normal for that mode of operation.

The number of operational hours on console completed by the T controller was considered to be the minimum required to maintain competence. The LAC MATS Part 1, 8/2/1 2.1(b), states:

‘Air Traffic Controllers must comply with the unit competency scheme.’

NATS Unit Competency Scheme, Page 14, states:

‘Paragraph 11:

Rostering

The Operational Resource Team will provide individual controllers with a monthly roster which, as far as reasonably possible, provides sufficient rostered duties to satisfy currency requirements.

Swanwick:

GSs with radar validations and LASs with tactical validations should be rostered, as far as is reasonably possible, for a minimum of 4 radar duties per calendar month. P controller only LASs should be rostered a minimum of 3 P controller duties per month.

Page 15 Para 12

Maintaining Currency - Minimum Monthly Hours

In order to maintain competence controllers shall be required to maintain a minimum level of currency in their tasks. The achievement of the relevant number of hours below will not in isolation be considered sufficient to maintain competence.

Time spent operating as an OJTI or under training for an additional UE/rating will not count towards the currency requirement.

Controllers’ hours should be reasonably spread over the month and they must record their hours in an approved medium which must be produced upon request.’

The operational hours of the T controller during the 2 previous months was regarded by NATS and the CAA to be the minimum required to satisfy competency requirements. However ATSU Watch investigation report suggested that consideration be given to providing the T controller with an iFACTS refresher session together with a UCE.

It was not possible to determine why the A320 crew missed the first clearance (FL350) which at this point was entered into iFACTS by the T controller. This resulted in iFACTS generating an alert to show that the CFL (350) did not agree with the SFL (360). This was noticed by the T controller who transmitted the clearance again (350). The second transmission was misheard by the A320 crew and an analysis of their read back transmission determined that it was difficult to distinguish between FL350 and FL250. The T controller was, and remains, convinced that the read back of 350 was correct. It was unfortunate that neither the T controller or the A320 crew made use of the phonetic term ‘TREE’ which may have helped distinguish between ‘2’ and ‘3’. CAP 413, Chapter 2, Page 1, Paragraph 1.1, states:

‘... 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.'

Once the read back error passed undetected, iFACTS changed the SFL alert to show that the CFL 350 did not agree with the SFL 250. However this alert went unnoticed by the T controller, very likely because once the first alert was highlighted and noticed by the T controller, the second alert would not have been as apparent, especially as the T controller then started to interact with other flights. LAC MATS Part 2, GEN-115, paragraph 8.4.3, states:

'The checking of SFL is not a mandatory task for the controller, although it is encouraged for early identification of possible level busts. The display of SFL is not a substitute for RT read back, which remains a mandatory controller task.'

STCA will trigger when an ac is operating outside the parameters set for STCA, and a contributory factor can be the high ROD of an ac, which may be the first indication of a potential level bust. Some STCA alerts are considered by controllers to be spurious and the P controller indicated that these are not really an issue provided that appropriate measures were taken to monitor the situation, taking appropriate action as required. The Manual of Air Traffic Services (MATS) Part 1, Section 1, Chapter 5, page 18, paragraph 21.1, states:

'In the event an STCA is generated in respect of controlled flights, the controller shall without delay assess the situation and, if necessary, take action to ensure that the applicable separation minimum will not be infringed...'

It is likely that the trajectory and ROD of the A320 (1000fpm) with traffic crossing 1400ft below infringed the STCA parameters and triggered the low level alert. After the STCA was generated (1732:15) the T controller was convinced that the A320 would level off at FL350 and assessed the STCA to be spurious. As the T controller spoke to another flight he deconflicted the TDB labels, which was probably an automated response and he did not notice the SFL alert showing the A320 had selected the incorrect level. The T controller was then absorbed talking to other flights (5 transmissions) and did not observe the A320 as it passed FL350 (1732:38) or the iFACTS (2 transmissions) deviation alert (1732:52) when the A320 passed FL347 (2 transmissions). Then at 1733:03 AC7, 67nm S of BHD and at the southern edge of the T controller's situation display, called. It is likely that at this crucial point the controller's focus of attention was on AC7. At 1733:24 the A319 reported the A320 was crossing 2nm ahead and 200ft above.

The T controller's conviction that the 2 ac were safely separated likely lulled him into a false sense of security. This perception and expectation bias probably caused the controller not to monitor STCA alert at a crucial point when Mode C showed the A320 descend below its cleared level and when iFACTS generated the deviation alert.

The T controller had just taken over the combined 'West End' sectors 3min prior to the Airprox. Team members are required to check iFACTS system conditions and error messages as part of their routine scan ensuring that other team members are informed as appropriate. However the P controller was engaged in a coordination task, leaving just the T controller to monitor the combined LAG (W) sector at the time of the STCA alert and encounter. The range of coverage of the banded sectors, together with the increase in workload and the relative positions of the other ac, likely contributed to diverting the T controller's focus of attention away from the STCA and iFACTS alerts.

The T controller had completed the minimum number of hours required to maintain operational competency, the subsequent watch investigation report recommended that consideration be given to providing the T controller with iFACTS refresher training. The policy of combining the sector in quiet periods is determined by the predicted traffic levels and staffing information. Although the predicted traffic levels indicated that traffic levels would be manageable in banded configuration, CAA ATSI consider that had the sector remained split for longer in the afternoon period, the T controller would

have had more time to monitor the 2 ac, with the possibility that adjacent sector team members may have provided a prompt or warning to alert the T controller.

Both the T controller and P controller commented on the fact that the iFACTS deviation alert was not attention grabbing and suggested that a more prominent flashing red would be more appropriate together with a red warning on the strip bay.

The nature and quality of the A320 crew's incorrect read back, not unreasonably, caused the T controller to accept it as being correct (FL350). The T controller did not notice that the A320's SFL was indicating FL250. When STCA activated the T controller was convinced that it was spurious and that the A320 would level off at FL350 with vertical separation assured. As a result the T controller did not monitor the 2 ac labels or observe the Mode C readout of the A320 as it descended through FL350. The T controller did not notice the deviation/interaction alerts generated by iFACTS at the crucial point, when the A320 continued its descent and into conflict with the A319. CAA ATSI considers that the T controller's expectation bias resulted in him not giving sufficient priority to the monitoring of the STCA or to iFACTS at a time when alerts were being generated.

Recommendations

CAA ATSI is content with the actions already underway by the ANSP.

It is recommended that the ANSP, in the course of their future development of iFACTS, give consideration to making deviation alerts more prominent and noticeable.

It is recommended that the ANSP review the guidance for bandboxed operations with a view to taking into account the combined sectors' ability to sufficiently monitor and interact with generated alerts.

NATS TCAS PERFORMANCE ASSESSMENT

Mode S Downlink – no TCAS RAs were recorded via Mode S downlink.

InCAS Alert Statistics

A319

Alert Time	Alert Description	Altitude (FL)	Intruder Range (nm)	Vertical Sep (ft)
1733:02	TRAFFIC ALERT	340	5.57	470

A320

Alert Time	Alert Description	Altitude (FL)	Intruder Range (nm)	Vertical Sep (ft)
1733:02	TRAFFIC ALERT	345	5.57	476

CPA

CPA Time	Horizontal Sep (nm)	Vertical Sep (ft)
1733:42	2.47	162

Minimum Lateral Separation

Min LatSep Time	Horizontal Sep (nm)	Vertical Sep (ft)
1733:42	2.47	162

Minimum Vertical Separation

Min VertSep Time	Horizontal Sep (nm)	Vertical Sep (ft)
1734:14	4.59	2

Greatest Erosion of (5nm/1000ft) Standard Separation

Time	Horizontal Sep (nm) (% of Std)	Vertical Sep (ft) (% of Std)
1733:42	2.47 (49%)	162 (16.2%)

Eurocontrol's automatic safety monitoring tool (ASMT) did not record any RAs relating to this encounter.

InCAS simulation based on Cleve Hill single source radar data suggested that each ac received a traffic alert (TA) at 17:33:02.

The time to closest point of approach (tau) required for an RA at this altitude is 35sec. In simulation the minimum value of tau observed was 32sec, however no RA was issued, because the horizontal miss distance filter (HMD) was active.

The HMD is designed to minimise nuisance RAs. Above FL100, unless the horizontal and vertical separations are predicted to be simultaneously less than 2nm and 750ft respectively an RA would be considered as nuisance. In this case, the predicted (and actual) horizontal miss distance was approximately 2.5nm and therefore no RA was issued.

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.

Although it was clear to Members that the initial trigger element to this Airprox was the RT exchange between the A320 crew and the LAC West End Tactical controller regarding the ac's descent clearance, the comprehensive ATSI report had uncovered several other elements which resulted in a lengthy discussion by the Board. A CAT pilot Member commented that the descent clearance to FL350 issued twice by the Tactical controller had been clear but the quality of the A320 crew's read back received by the Tactical controller had been unclear and the Tactical controller was unable to detect the incorrect read back. An ATCO Member noted that when the Tactical controller issued the descent clearance for the first time he had used non-UK standard phraseology by inserting the word 'to' ahead of the cleared flight level. This word should always be omitted when clearing a flight to a FL but should be used when altitudes or heights are involved. The Board also discussed the apparent widespread lack of use, in the experience of Members, of the phonetic pronunciation of the number 'tree' which may have highlighted to the crew the correct 'tens of thousands' of feet in the cleared FL issued or made the crew's read back clearer. The use of the word 'to' in the first transmission ahead of the FL may have influenced the A320 crew's assimilation of the descent instruction was to FL250; however, it is equally possible that the first descent clearance went unheard by the crew as they did not reply. The correct phraseology was used on the second transmission, which was acknowledged by the A320 crew. Without any further information it was unclear why the A320 crew had not replied to the first descent clearance or why they had misheard their cleared level of 350 which was read back as 250. Pilot Members advised that there may have been valid operational reasons - cockpit noise or crew carrying out a briefing (Top of Descent); however, for whatever reason, the crew perceived FL250 to be their cleared level and, as this was not challenged by the controller, the ac was descended into conflict with the A319 which had caused the Airprox.

After the A320 had started to descend there were a number of elements that could have broken the chain of events. The Tactical controller had seen the discrepancy between the CFL and SFL when he first entered the CFL 350 into iFACTS and before the A320 crew changed their SFL; however, the subsequent change to FL250 went unnoticed. A pilot Member remarked that the colour used to highlight the discrepancy appeared not to be outstanding enough and that perhaps another form of 'attention getting', such as a flashing alert, would be more appropriate. A controller Member commented that at ScACC a CFL/SFL discrepancy would generate a flashing alert to the controller. The NATS Advisor informed Members that the 2 systems were indeed different but that HF work is ongoing, with respect to optimising the use of flashing alerts as warnings particularly when STCA is available. Putting aside that it was not mandatory for controllers to check for CFL/SFL discrepancies

– a controller Member advised that it would be impractical in a busy TC sector - Members were concerned that the frequency of STCA alerts had apparently created a mindset that, more often than not, these alerts were spurious. The NATS Advisor informed Members that STCA parameters are adjustable and, through fine tuning over time, trigger levels have been set to give a warning in enough time for a controller to assess the situation and take action to resolve a conflict; both NATS and CAA are content with the STCA parameter set-up. In the firm belief that the A320 was descending to FL350 and would level-off (expectation bias), the Tactical controller had repositioned the A320's label but he did not assess the deteriorating situation and turned his attention to other sector traffic. As the workload increased, the A320's descent through FL350 and the iFACTS Deviation alert also went unnoticed to both Tactical and Planner controllers. After the A319 crew had informed the Tactical controller of the A320 crossing ahead he highlighted the A319's TDB and then, immediately after STCA triggered a high-severity (red) alert, he issued the flight with an avoiding action L turn. However, by then the ac had crossed, with the CPA occurring shortly afterwards with the flights diverging.

A CAT pilot Member questioned the wisdom of clearing the A320 flight to descend just 1000ft at this range from its destination since every clearance takes up some of the available time on the RT and provides opportunities for errors. CAT pilot Members noted that both of the A320 pilots had thought that the descent clearance, erroneously believed to be to FL250, was earlier than that required for their flight profile and that with the benefit of hindsight, they should have questioned it. Members also discussed the A320 crew's action of reducing their ROD in response to a TCAS TA, which was contrary to the published guidance. The TA should be looked upon as a 'heads-up/get-ready' warning that action may be needed in anticipation of an RA. Adjusting the flight path in response to a TA may cause TCAS to recalculate the optimum resolution at a critical stage as the ac are approaching the 'protective bubble' point when an RA would be generated. That said, the A320 crew had spotted the A319's lights prior to the TCAS TA, and the A319 gained visual contact after receiving a TA; both crews then monitored their flight paths, the A320 crew assessing that remaining above the other ac was their safest option. The radar recording shows the A320 crossing 4nm ahead and 300ft above the A319. Taking all of these elements into account, the Board concluded that any risk of collision had been effectively removed.

Assessing the safety barriers, the Board acknowledged how difficult it had been for the controller to detect the incorrect read back. However, none of the procedures, systems or warnings that might have alerted him to the developing conflict were successful, leading the Board to conclude that the suite of ATC barriers was ineffective in this incident. What remained was the aircrews' SA from their TCAS and, providentially in Class C airspace, visual sightings with TCAS RAs 'in reserve'. Given the crews' SA, and with every prospect that the robust barrier of TCAS RAs would have been effective, the Board assigned an ERC score of 50 to the Airprox.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The A320 crew believed they had been cleared to FL250 and read back FL250. The controller was unable to detect the incorrect read back and the A320 descended into conflict with the A319.

Degree of Risk: C.

ERC Score: 50.