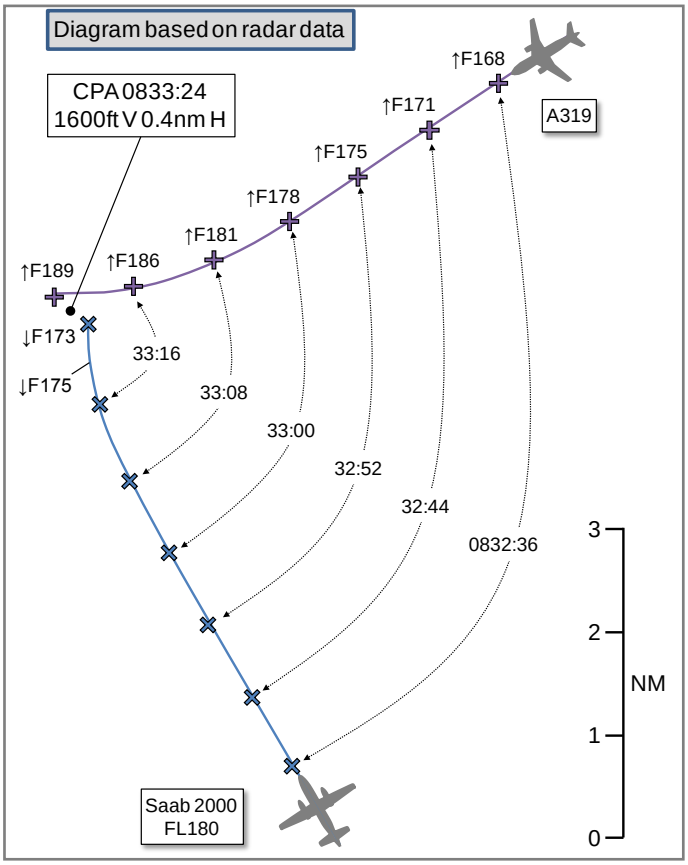
AIRPROX REPORT No 2012094

Date/Time:	3 Jul 2012 0833Z	
Position:	5552N 00405W (12nm E Glasgow)	
Airspace:	Scottish TCA	(*Class: A*)
	Reporting Ac	*Reporting Ac*
Type:	Saab 2000	A319
Operator:	CAT	CAT
Alt/FL:	FL180	FL170
Weather:	VMC CLAC	VMC NK
Visibility:	>10km	10km
Reported Separation:	0ft V/0.5nm H	0ft V/500ft H
Recorded Separation:	0ft V/2.4nm H 1600ft V/0.4nm H	

BOTH PILOTS FILED



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 2000 PILOT reports operating a scheduled passenger flight under IFR in VMC, level in the cruise at FL180, heading 355° at 360kts, with a RCS from ScATCC [from the Talla SC]. He was flying a white and blue ac with external lights and strobes selected on. The SSR transponder was selected on with Modes A, C and S selected. TCAS was also fitted. Climbing traffic appeared on the TCAS display [the subject A319] at a range of 5-10nm in the 1 o'clock position and 1200ft below. The traffic continued to climb towards him, becoming proximate when less than 1000ft below his level. ATC then transmitted 'avoiding action, turn left, he thought, onto 090°'. As the autopilot was disengaged and a R turn onto 090° started, a TCAS TA 'traffic traffic' warning was issued, immediately followed by RAs 'monitor vertical speed' and then 'descend descend', which were followed. The conflicting ac was observed directly in front of him, turning R and climbing. The RA ceased and the ac was recovered to the assigned FL and heading.

He assessed the risk of collision as 'Medium'.

THE A319 PILOT reports operating a scheduled passenger flight under IFR [with a RCS from the ScATCC Galloway SC], on the initial climb passing FL170, heading 240° at 290kts, and cleared to FL250. During the climb he observed a TCAS TA warning and became visual with the conflicting traffic. ATC issued an avoiding turn R on to heading 300° which was followed by TCAS RAs of 'adjust vertical speed' and 'monitor vertical speed' with a demanded climb of 3000fpm for a short while. This was followed by a vertical speed demand of zero as he passed clear of the conflict.

He reported the severity of risk to the ac as 'Nil'.

THE GALLOWAY CONTROLLER reports that he was working Galloway combined with a planner available. He stated that traffic was moderate, occasionally busy, but not unmanageable; that there were departures from Glasgow and Edinburgh, all requiring vectoring and stepped climbs, and that Edinburgh outbound traffic was requiring higher levels as there were several diversions from the N

due to poor weather at Aberdeen. He co-ordinated the Saab 2000 at FL180 with the Talla SC, from the original planned level of FL240, routeing to FOYLE from MARGO direction. He took this flight in to consideration for several departures that would be crossing the aircraft's track. The A319 was transferred from Edinburgh on a heading, climbing to FL110 as per co-ordination. He knew prior to the A319 coming on frequency that the Saab 2000 was factor traffic but couldn't explain why he gave the A319 a straight climb to FL250. He stated that he did not know why he had forgotten about the conflict. As the ac converged, STCA activated white with the A319 passing about FL160. He immediately tried to stop the A319 at FL170 but Mode C indicated this was not going to be achievable so he issued an avoiding action turn [R] on to 290°, further increasing to 300° with TI. The A319 pilot advised that he had a TCAS RA and was visual with traffic; in the background he heard the autopilot disconnect alarm on his RT. He advised the pilot he was under his own control. He also heard the Talla SC issuing avoiding action to the Saab 2000 and let him know that the A319 was taking TCAS avoiding action. The STCA turned red for several sweeps as the A319 increased climb rate to pass above the Saab 2000. Once clear of conflict, a revised heading was given and the A319 transferred to DCS. He advised the pilot that he would be filing on the incident. The pilot responded that there was no problem. The Galloway SC stated that he couldn't think of 'any good reason' as to why he didn't take account of the Saab 2000 when climbing the A319, having already identified that there was a possible confliction. He also reported that he had no distractions, that it was 'known traffic' and he had already assessed in my mind that there would be a possible conflict, that workload was busy but not excessive, that he was not fatigued and that he had recency on the sector.

THE TALLA CONTROLLER reports working as a combined T & P on the Talla sector with light to moderate traffic. He had taken over the sector approximately 10min before the incident. During the handover, the outgoing controller had said that he had coordinated the Saab 2000 with the Galloway controller at FL180. The outgoing controller said that 'he should point out the Saab 2000 to Galloway again when it was further N, just to confirm whether Galloway wished to work it or not'. When the Saab 2000 was in the vicinity of Lowther Hill he re-coordinated the Saab 2000 with the Galloway controller, specifying that it was locked on a radar heading and asked whether he wished to work it. The Galloway controller declined but said that he would climb his traffic with regard to the Saab 2000. His attention was then taken up by other traffic in his sector. A few minutes later, just after responding to traffic checking in on his frequency S of MARGO, he heard the Galloway controller giving an avoiding action R turn. He immediately looked up and saw that the STCA had activated between the A319 and his traffic, the Saab 2000, and, given that he had heard the Galloway controller turn his traffic R, he too gave the Saab 2000 an avoiding action R turn with TI onto, he believed, 090°. He did not receive a response so reiterated the avoiding action but he though this transmission might have been 'stepped on' by the Saab 2000 querying the direction of the avoiding action turn. The Galloway controller told him that the A319 had received a TCAS climb instruction, shortly after which the Saab 2000 said that he had received a TCAS descent, which he acknowledged. Once vertical separation had been re-established, he advised the Saab 2000 to resume FL180 and proceed to FOYLE.

ATSI reports that an Airprox was reported 40nm S of GRICE when a Saab Scania AB 2000 (Saab 2000) came into proximity with an Airbus Industrie A319 (A319) at FL180. ATSI had access to both pilot reports, controller reports from the Galloway (GAL) and Talla (TLA) sectors and the ANSP's unit investigation.

The Saab 2000 had departed Leeds-Bradford and was IFR, inbound Inverness, in receipt of a RCS from the Prestwick Centre (PC) TLA sector on 126.300MHz. (Mode A code 5403). The A319 had departed Edinburgh for an IFR flight to London Heathrow and was in receipt of a RCS from the PC GAL sector on 124.825MHz. (Mode A code 5415).

The GAL controller described traffic levels as moderate and later stated that the sector was running smoothly at a level that required constant attention but was still easily manageable as a one-man operation. There were no operational or personal distractions. The controller was current on the sector and recalled being very comfortable with the session.

The Saab 2000 had been co-ordinated to transit the GAL sector, maintaining FL180 on a heading of 335°, and remaining in contact with the TLA sector controller.

At 0826:52 Edinburgh APP telephoned the GAL controller and requested co-ordination on the A319, which had just departed, against other traffic. The A319 was co-ordinated into the GAL sector climbing to FL110.

At 0829:34 the GAL controller called the PC West Coast sector and requested a higher level for an ac that had just departed Glasgow. FL250 was agreed and the call ended with the GAL controller affirming, "*Roger flight level 250"*. As the GAL controller's call to West Coast terminated the A319 called on the GAL frequency climbing to FL110. The GAL controller responded immediately by instructing the A319 to continue on its heading and climb FL250. At this time the A319 was climbing through FL105, 30nm NNE of the Saab 2000.

Low-level STCA activated at 0832:34 between the Saab 2000 and A319. Four seconds later the GAL controller issued avoiding action, "[A319 C/S] *stop the climb flight level 170 avoiding action turn right heading 290 degrees.*" The A319 crew did not respond to this instruction and the ATSI recording indicated simultaneous transmissions. The first instruction was followed-up by the GAL controller with, "*avoiding action turn right now heading three zero zero degrees traffic in your left one o'clock range five miles a thousand feet above."* The A319 pilot acknowledged the heading, reported visual with the Saab 2000 and informed the controller that a TCAS RA had been received.

The TLA controller issued an avoiding action turn to the Saab 2000 pilot at 0832:43, "[Saab 2000 C/S] *avoiding action turn right now immediately heading zero nine zero degrees traffic right er half past one range of five miles right to left*". The instruction was repeated three times (there were several simultaneous transmissions) before the Saab 2000 pilot reported that a TCAS RA was being responded to.

Separation was lost at 0832:52 as the A319 climbed through FL175 in the Saab 2000 pilot's half-past-one position at a range of 4.6nm. Minimum distance between the two aircraft occurred at 0833:08 as the A319 climbed through FL181, 2.3nm from the Saab 2000 (see Figure 1 below). Separation was restored at 0833:20 as the Saab 2000 pilot descended through FL175 with the A319 crossing right to left through its 12 o'clock climbing through FL188.

Figure 1: 0833:08 UTC (Prestwick Multi Radar Tracking)

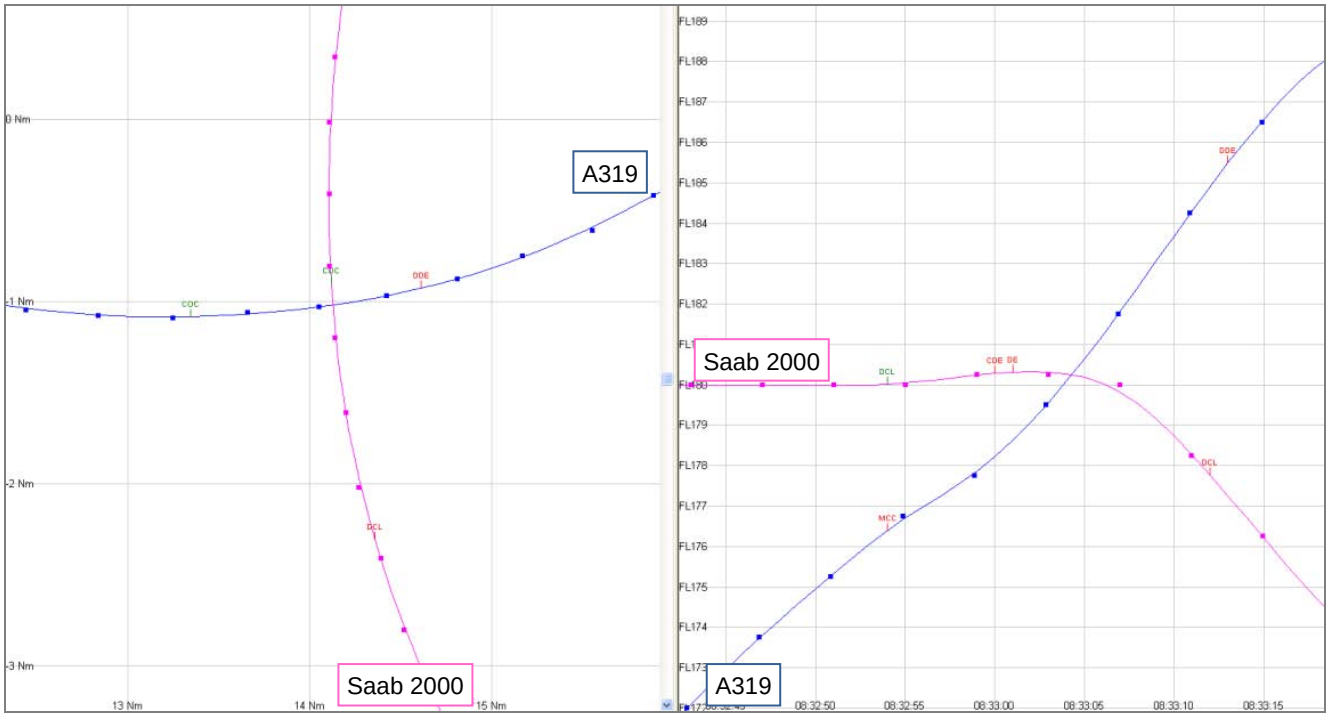
The Airprox occurred 13nm E of Glasgow at FL180 when the GAL controller climbed an A319 through the level of a Saab 2000 without ensuring standard separation would be maintained.

[UKAB Note(1): The radar data that the diagram is based on shows that when range separation of 5nm was lost shortly after 08:32:48, altitude separation was reducing through approximately 650ft, as the A319 climbed through FL173 in the Saab 2000's R 2o'clock position. Minimum vertical separation occurred shortly before 0833:07 when the two ac were co-altitude at a range of approximately 2.4nm. Separation was restored at about 0833:18 as the Saab 2000 descended

through FL177 with the A319 crossing R to L through its 12o'clock, climbing through FL187. At this point the range separation was 0.9nm. The minimum slant range occurred some 6sec later, at 0833:24, when the two ac were separated by 0.5nm.]

[UKAB Note(2): A comprehensive HF report was submitted as part of the ANSP's unit investigation and accepted by ATSI. The report covered the Galloway controller HF aspects of the incident in detail, using the Endsley (1999) Taxonomy of SA Errors. The report remained inconclusive in that no positive cause could be identified as to why the controller did not carry out his planned actions.]

[UKAB Note(3): The ANSP helpfully provided a TCAS review of this Airprox using the Eurocontrol Automatic Safety Monitoring Tool (ASMT) to analyse TCAS RA messages downlinked via Mode S (TAs are not downlinked) and the InCAS simulation tool. As TCAS interrogates once every second and the radar recordings used for the simulation give data updates rates of up to 8sec intervals, interpolation is necessary. Hence, there can be variations between the InCAS simulation and what actually occurred in the cockpit. The InCAS simulation here used interpolated single source radar data from Glasgow. The main elements of this simulation are summarised herein.



Encounter Diagram (Note that the square markers on the above image show the positions recorded by the Glasgow radar, while the solid lines show the InCAS-interpolated tracks)

Eurocontrol's Automatic Safety Monitoring Tool (ASMT) recorded several RAs relating to this encounter via Mode S downlink. [A319 C/S] received (in the following order) a Maintain Crossing Climb (MCC), a Keep Vertical Speed and an Adjust Vertical Speed. [Saab 2000 C/S] received an unknown type of RA, followed by Crossing Descend (CDE), Descend (DE) and finally an Adjust Vertical Speed.

The encounter was modelled in InCAS and equivalent RAs were produced with a maximum of two seconds difference between modelled RA time and actual RA time, indicating that the simulation is a reasonable representation of the actual encounter. The Mode S downlink received by the ASMT contains several pieces of information about an RA, from which the type of RA may be deduced. In some cases, these data do not translate directly into a specific RA type and the result is an 'unknown' RA. The data received relating to this unknown RA are consistent with a Don't Climb RA (DCL, enunciated 'Adjust vertical speed, adjust') as seen in simulation. The simulated time of the DCL advisory is within four seconds of the downlinked time of the unknown RA (which itself is only known with a 5 second confidence).

The InCAS modelled TAs were both issued at 08:32:35. From the NODE recordings, STCA activated at 08:32:34 with a low severity alert becoming high severity by 08:32:46. In the simulation, the Maintain Crossing Climb (MCC) and Don't Climb (DCL) RAs were issued at the same time. Shortly after the simulated time of the DCL, the Mode C of [Saab 2000 C/S] increased from reporting 18,000ft to 18,025ft for two radar cycles as shown.

Separation minima were as follows:

Minimum Lateral Separation

Min. Latsep Time	*Horizontal Sep. (NM)*	*Vertical Sep. (ft)*
08:33:22	0.47	1541

Minimum Vertical Separation

Min. Vertsep Time	*Horizontal Sep. (NM)*	*Vertical Sep. (ft)*
08:33:04	2.55	18

Closest Point of Approach (CPA)

CPA Time	*Horizontal Sep. (NM)*	*Vertical Sep. (ft)*
08:33:21	0.48	1505

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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 photographs and video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board initially considered the pilots' actions, given the adjacency of the sector controllers issuing avoiding action and the generation of TCAS RAs. It was agreed that avoiding action was issued just before each ac's TCAS alerted but in the light of multiple and potentially blocked and misheard transmissions, it was not possible to determine what was heard on each flight deck. Notwithstanding a potential degree of confusion, each pilot could be seen to implement a degree of avoiding action in response to their respective sector controller's transmissions after reacting correctly to their TCAS RA alerts. These combined actions ensured that separation minima were re-established in a timely fashion. The ANSP Advisor commented that, due to the airspace structure in the area, it was common for ac transits of the Galloway sector to take only a few minutes and that ac were therefore not routinely handed over to the sector controller in order to avoid RT congestion. He also noted that STCA was the primary safety trigger in this incident and that TCAS resolved the conflict.

Board Members also discussed ac handling techniques in these circumstances, specifically with regard to manual or autopilot (using autopilot heading selector) manoeuvering in azimuth. It was noted that there is no regulation covering the use or deselection of autopilot in response to an avoiding action turn. Civilian CAT pilot Members were of the opinion that prompt autopilot handling should suffice for most avoiding action instructions but that the SA of the crew played a critical role in the decision; manual handling should be used if the situation was urgent or there was doubt as to the extent to which separation minima had been breached. Civilian ATC Members commented that with older RT equipment it was possible for the controller to detect the interference of simultaneous transmissions, and hence mitigate the consequent risk, and that this was normally not the case with replacement RT equipment. A Member commented on increasing use of the word 'Blocked' by pilots who perceived that RT transmissions had not been received due to simultaneous transmission, iaw current CAP413 phraseology.

The Board considered the actions of the Galloway Controller and concurred that, as he had agreed coordination with the Talla controller, it was his responsibility to achieve deconfliction between the A319 and the Saab 2000. Members noted the contents of the HF assessment with interest. It was felt however that the Board did not have sufficient competence in HF to validate its conclusions. Regrettably, the Board concluded that it was not possible to establish a definitive reason as to why

the Galloway controller did not account for the Saab 2000 when clearing the A319 to FL250, but that this was the Cause of the Airprox.

On the question of risk, the Board considered the degree to which safety had been compromised. It was agreed that separation had deteriorated to such an extent that it was the activation of STCA that provided the trigger to the subsequent controller issued avoiding action and TI. Subsequent to the STCA, it was not possible to establish the chronology of events with regard to pilot-flown avoiding action and TCAS RA compliance with absolute certainty but Members were satisfied that, whilst the degree of risk was probably marginally increased by the initial RT confusion, overall, effective and timely actions had been taken to prevent the risk of ac collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The controller cleared the A319 to climb into conflict with the Saab 2000.

Degree of Risk: C.