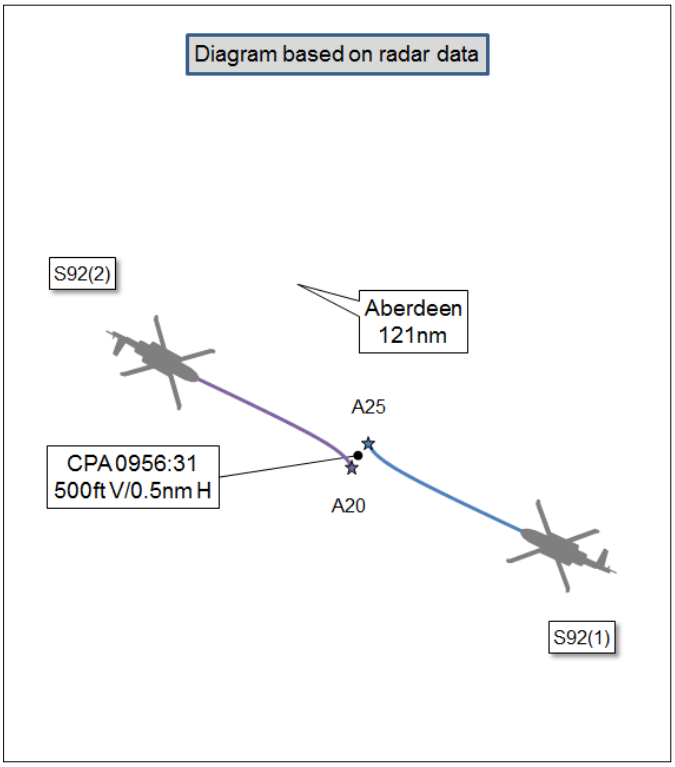
AIRPROX REPORT No 2017022

Date: 22 Feb 2017 Time: 0957Z Position: 5637N 00111E Location: ADN 113 radial, 121nm

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	S92(1)	S92(2)
Operator	Civ Comm	Civ Comm
Airspace	Scottish FIR	Scottish FIR
Class	G	G
Rules	IFR	IFR
Service	Traffic[1]	Traffic[1]
Provider	Aberdeen	Aberdeen
Altitude/FL	2000ft	2500ft
Transponder	A, C, S	A, C, S
Reported		
Colours	White/blue	White/blue
Lighting	Nav, HISL	Nav, landing, anti-col
Conditions	VMC	VMC
Visibility	>10km	8nm
Altitude/FL	2000ft	3000ft
Altimeter	QNH (977hPa)	QNH (997hPa)
Heading	NK	120°
Speed	NK	140kt
ACAS/TAS	TCAS II	TCAS I
Alert	TA	TA
Separation		
Reported	400ft V/0.5nm H	400ft V/0.5nm H
Recorded	500ft V/0.5nm H	



THE S92(1) PILOT reports being in straight-and-level cruise in 'good VMC'. He suddenly received a TA on TCAS with the target showing +400(ft). At the same time, the crew saw opposite direction traffic, a white and blue S92, slightly left of track, 400ft above. Both aircraft's pilots took avoiding action by manoeuvering to the right. The S92(1) pilot noted that ATC reconfirmed the QNH setting with the other pilot.

He assessed the risk of collision as 'None'.

THE S92(2) PILOT reports that the crew transferred frequency as normal at 80nm outbound from the ADN and believed that they were instructed to set the McCabe regional pressure setting of 997hPa at 90nm. This was read back, recorded on the OFP and set on the standby altimeter. At 90nm, 997hPa was applied and the aircraft descended to maintain 3000ft altitude outbound as standard procedure. The crew were alerted by a TCAS TA, and the handling pilot (captain) acquired the opposite direction traffic, an offshore helicopter, almost straight away. It had little relative movement but appeared lower and TCAS was displaying it as 400ft below. They turned approximately 30° to the right onto a diverging track and it is believed the other aircraft may also have deviated to their right. The other pilot reported an Airprox once clear of the conflict and subsequently the McCabe pressure was established to be 977hPa. The S92(2) pilot stated that, unusually, due to an increased sea state over most of the north sea and strong westerly winds there were very few aircraft operating in the area and apart from the initial contact with ATC there were very few opportunities to detect the incorrectly set McCabe pressure, if any. He also noted that communications were often problematic in the area, with transmissions only available 'on test function'. Additionally, crews are issued with headsets so volume

[1] An Offshore Traffic Service, with reduced separation of 500ft against other known traffic.

must be set to maximum in order to hear transmissions, and he noted that on the return leg comms with Aberdeen were not established until 150nm.

He assessed the risk of collision as 'None'.

THE ABERDEEN CONTROLLER did not file a report with UKAB.

Factual Background

The weather at Aberdeen was recorded as follows:

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METAR COR EGPD 220950Z AUTO 28019G31KT 9999 NCD 07/M00 Q0991 NOSIG=
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A transcript of the Aberdeen radar frequency was provided, as follows:

From	To	Speech Transcription
S92(1)	Aberdeen	(0936:40) [several unintelligible words]
Aberdeen	S92(1)	Station calling radar that was very broken say again
S92(1)	Aberdeen	[unintelligible word] [partial C/S] [several unintelligible words] (0937:00) [several unintelligible words]
Aberdeen	S92(1)	I believe that was [S92(1) C/S] calling radar, squawk ident, I have no known traffic to affect (0937:10) your climb to altitude two thousand feet to get better two way comms
S92(1)	Aberdeen	Copied er ident you have no known traffic to effect the climb to two thousand feet er (0937+20-) [unintelligible word] two way comms [S92(1) C/S]
S92(1)	Aberdeen	(0941:10) [S92(1) C/S] Aberdeen radar radio check
Aberdeen	S92(1)	Yeah with you now er loud and clear, how me?
Aberdeen	S92(1)	(0941:20) [S92(1) C/S] strength five, the McCabe regional pressure setting nine seven seven hectopascals, pass your details
S92(1)	Aberdeen	(0941:30) nine seven seven, we're at er two thousand feet, we have lifted from the er auk, we're currently er level er or altitude two thousand feet and er we have two zero soles on board (0941:40) r- request route er Aberdeen at (this minute?) er V F R, estimating er the field at er (0941:50) standby, er at er one one one eight
Aberdeen	S92(1)	[S92(1) C/S] you are identified Offshore (0942:00) Traffic Service S S R only, no known traffic to affect you at altitude two thousand feet with a direct track to GORSE
S92(1)	Aberdeen	Offshore Traffic Service S S R only, (0942:10) no known traffic to affect, a er direct track to GORSE estimating eighty at er one zero two five [S92(1) C/S]
Aberdeen	S92(1)	[S92(1) C/S] roger thank you
Aberdeen	S92(2)	(0942:20) [S92(2) C/S] recall me one three two decimal five five zero
S92(2)	Aberdeen	One three two five five zero [S92(2) C/S] (0942:30)
S92(2)	Aberdeen	And Aberdeen radar [S92(2) C/S] with you through the eighty
Aberdeen	S92(2)	[S92(2) C/S] Aberdeen (0942:40) radar you are identified Offshore Traffic Service S S R only at ninety miles, set the McCabe regional pressure setting nine seven seven hectopascals (0942:50)
S92(2)	Aberdeen	Ninety miles McCabe nine nine seven and it's Offshore Deconfli- er Offshore Deconfliction Service S S R only [S92(2) C/S] (0943:00)
Aberdeen	S92(2)	[S92(2) C/S] Offshore Traffic Service S S R only
S92(2)	Aberdeen	Traffic Service S S R only [S92(2) C/S] (0943:10)
S92(1)	Aberdeen	(0956:30) Aberdeen radar [S92(1) C/S]
Aberdeen	S92(1)	[S92(1) C/S] pass your message
S92(1)	Aberdeen	Okay, can you give an update er (0956+40-) please on that [company] traffic that's just come opposite direction er we had a Traffic Resolution

From	To	Speech Transcription
Aberdeen	S92(1)	(0956:50) [S92(1) C/S] that [company] traffic er should of over flown you altitude three thousand feet, I had er no warning (0957:00) that they were any er different, standby
Aberdeen	S92(2)	[S92(2) C/S] radar
S92(2)	Aberdeen	[S92(2) C/S] we had a Traffic Advisory as well, we took a right-hand (0957:10) turn, er we are on McCabe nine nine seven
S92(1)	Aberdeen	[S92(1) C/S] (0957:20) we're on McCabe nine seven seven
Aberdeen	S92(2)	[S92(2) C/S] say (0957:30) again the Q N H
S92(2)	Aberdeen	McCabe nine nine seven
Aberdeen	S92(2)	[S92(2) C/S] negative, (0957:40) the McCabe regional pressure setting nine seven seven hectopascals
S92(2)	Aberdeen	Okay, nine seven seven (0957:50) [S92(2) C/S]

Analysis and Investigation

CAA ATSI

ATSI had access to reports from both pilots and the air traffic controller involved. Unit investigation reports were also used and a full field investigation and an interview with the controller was undertaken. The local area surveillance and radio recordings were also reviewed. Screenshots produced in this report are provided using recordings of the Aberdeen Radar. Levels indicated are altitudes (Figures 2 and 6 depict raw radar data). All times UTC. At the time of the Airprox both S92 pilots were operating under IFR in VMC in receipt of a Limited Offshore Traffic Service from Aberdeen Radar on the same frequency, the S92 (1) inbound to Aberdeen from an offshore oil installation 132nm to the southeast of Aberdeen, the S92 (2) outbound to an offshore oil installation 180nm to the southeast of Aberdeen.

The Aberdeen HELS and REBROS sectors (Figure 1) were combined with one Radar controller, seated at the HELS console, responsible for both sectors (using the adjacent REBROS console as well). The REBROS sector uses a separate frequency for each of its northern and southern areas, however, the northerly area had no aircraft operating within it at the time of the Airprox.

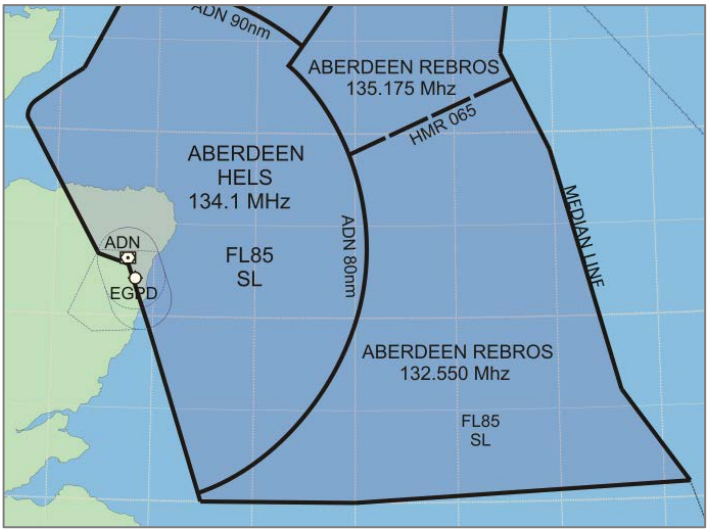

Figure 1

At 0929:00, a Radar controller handover took place and reference to the prevailing weather conditions was highlighted because the air pressure was very low. At approximately this time the S92(1) could be seen on area radar departing from an oil rig 148nm to the south east of Aberdeen, on the ADN VOR 113 radial, on the return flight to Aberdeen. At this time the outbound S92(2) was on the HELS frequency, approximately 62nm from Aberdeen, tracking to an oil rig some 180nm southeast of Aberdeen, also on the ADN 113 radial.

At 0937:01 (Figure 2) an unintelligible transmission was received on the REBROS frequency. The Radar controller took this call as having come from the S92(1) pilot (there was no other traffic on the radar display or known to be on the REBROS frequency). The controller advised:

"I have no known traffic to affect your climb to altitude 2000ft to get better two way comms"

At 0941:12, the radar controller established two-way communication with the S92(1) pilot and an Offshore Traffic Service (limited to SSR only) was agreed. The QNH of 977hPa was issued and read-back correctly. At approximately this time, as a consequence of increased traffic loading at Aberdeen, the adjacent Aberdeen Approach sectors were split when the Finals controller (FIN) position was opened, resulting in Aberdeen Approach Radar having two controllers, the FIN and the Intermediate controller (INT).

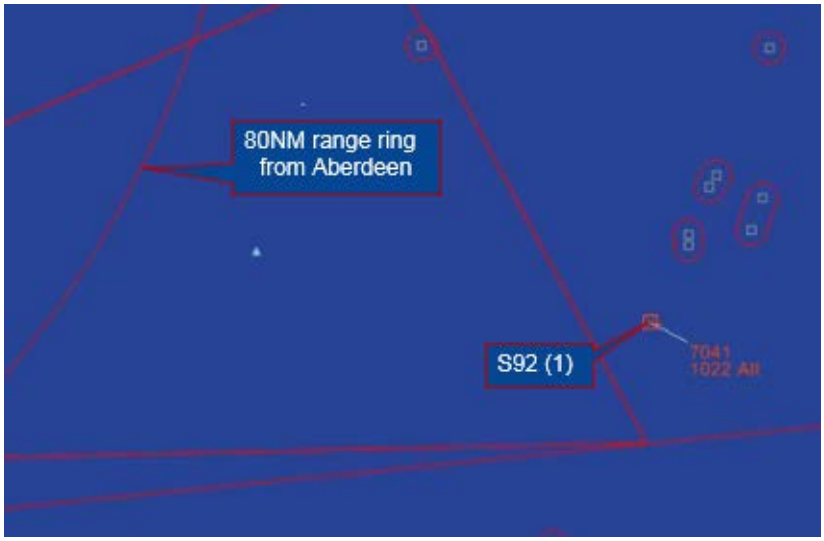

Figure 2: 0937:01

At 0942:20, as the outbound S92(2) pilot approached the sector boundary between the HELS and REBROS sectors, the Radar controller instructed him to recall him on the REBROS frequency. At 0942:32, the S92(2) pilot called the Radar controller on the REBROS frequency and reported passing through 80nm from Aberdeen. The Radar controller acknowledged the call, identified the aircraft and stated:

"Offshore Traffic Service, SSR only, at 90 miles set the McCabe regional pressure setting Nine Seven Seven Hectopascals"

At 0942:51, the S92(2) pilot replied:

"Ninety Miles McCabe, Nine Nine Seven and it's Offshore Deconfli- er Deconfliction Service, SSR only, (callsign)"

At 0943:02 (Figure 3), the Radar controller corrected the S92(2) pilot by confirming it was an Offshore Traffic Service, which was correctly read-back. However, the controller did not correct the S92(2) pilot's incorrect readback of the QNH as 997hPa.

Figure 3: 0943:02

At 0945:45 (Figure 4), the S92(2) passed 90nm from Aberdeen and the radar data block changed to indicate an altitude of 2500ft. The selected altitude (in orange) remained at 3000ft.The S92(1) was at a range of 135nm from Aberdeen at this time.

Figure 4 0945:45

At 0954:45, the HELS radar recording showed the Radar controller moving a cursor around a contact which was approaching Aberdeen. This was an aircraft that had been transferred to the Aberdeen Approach INT controller by the Radar controller some 3 minutes earlier. The Radar controller was aware that the situation for Aberdeen approach had become busy, and that this aircraft had been instructed to hold. The Aberdeen Approach INT controller then made a general broadcast of a wind-shear report that he had been advised of by Aberdeen Tower.

At interview the Radar controller reported that they heard the Aberdeen INT controller make the wind-shear broadcast, and knowing that a record of essential aerodrome information was kept on a whiteboard behind the controllers, turned round and recorded it for the Aberdeen INT controller.

At 0955:31 (Figure 5), the first stage of Short Term Conflict Alert (STCA) began to show on the REBROS radar display. The two S92 aircraft were 5nm apart at this stage.

Figure 5: 0955:31

The second stage STCA triggered at 0955:51, when the aircraft were 3nm apart. CPA occurred at 0956:31 (Figure 6), with the radar displaying 500ft vertical and 0.51nm lateral separation. Both aircraft could be seen on radar to have turned slightly to the right.

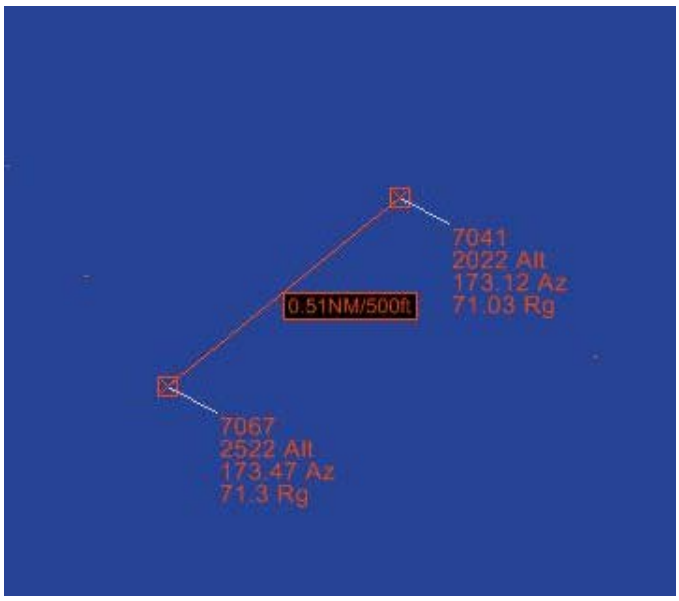

Figure 6: 0956:31 - CPA

Following CPA, the S92(1) pilot queried the controller as to the height of the other S92 (S92(2)). Following an exchange of information between the controller and the two S92 pilots it was established that an incorrect QNH of 997hPa had been set by the S92(2) pilot.

The provision of ATC services by Aberdeen to offshore flight operations in support of the oil industry is unique in the UK. A surveillance system known as Wide Area Multi-lateration (WAM) is used to provide surveillance coverage down to very low altitudes over a vast area. Although the surveillance system is capable of monitoring aircraft to low levels, radio communications are more limited and the system architecture is not comprehensive enough for a full Deconfliction Service sufficient to meet regulatory approval. It is this factor that limits the type of ATC service available. Within 80nm of Aberdeen a Deconfliction Service *is* usually provided (by utilising land based radar and communications), but outside of this area, the highest level of service available is a Traffic Service. As the surveillance system being used beyond 80nm is based on Secondary Surveillance equipment only, then the Traffic Service is limited to SSR data only.

Aircraft within the HELS and REBROS sectors can be assigned one of three QNHs depending on the area in which they are operating. The Aberdeen QNH is used within a range of 90nm from Aberdeen. Beyond 90 miles it is usual to use either the 'Fulmar' or 'Miller' QNH's, which are obtained from specific off-shore installations. However, on the day of the event, the server that provided meteorological data relating to these installations was unserviceable, and hence the McCabe QNH procedure was adopted. At the time of the occurrence, a regional QNH known as the McCabe was being used. This QNH is calculated by using the lower of either the Rattray or Skua regional QNHs (Figure 7).

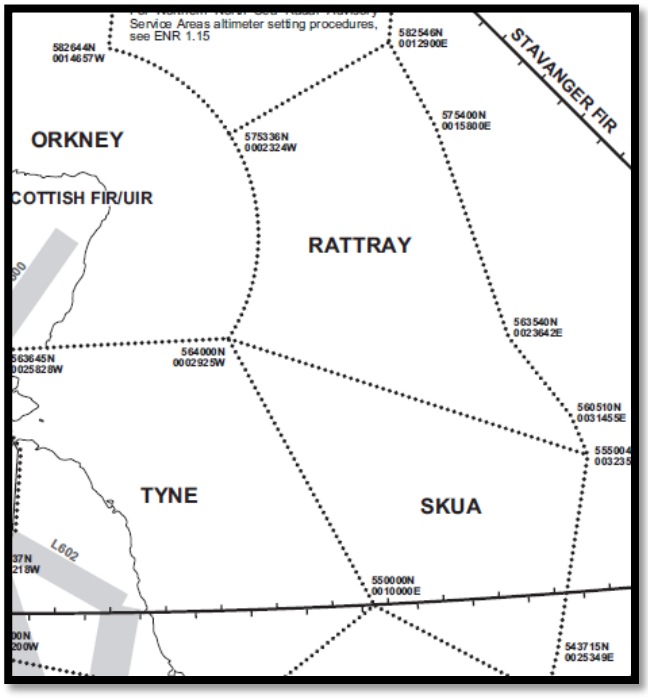

Figure 7

The radar controller had been a validated controller on these sectors for around 18 months. The traffic levels were judged as low, although the controller was aware of the potential for this to increase (on the HELS sector) as weather was beginning to affect aircraft approaching Aberdeen. The Aberdeen Approach Radar position is adjacent and to the left of the HELS sector, although separated by a spare console position (Figure 8).

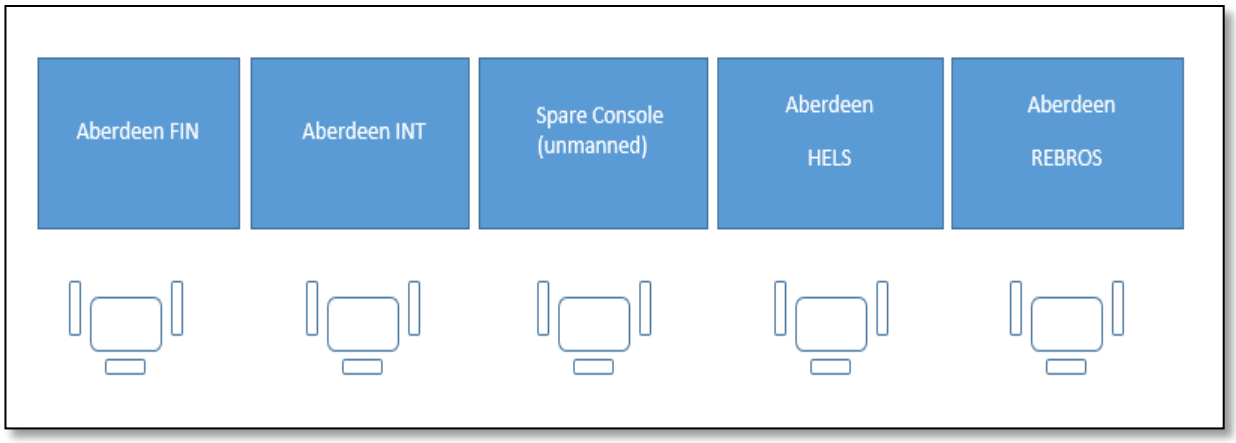

Figure 8 – Seating plan for Aberdeen Radar

An increase in traffic for Aberdeen Approach can have a knock-on effect on HELS traffic. The Radar controller was therefore interested in activity on the Aberdeen Approach INT sector for his situational awareness.

The decision to combine the sectors was the responsibility of the Watch Manager. At interview, the Radar controller reported that combining the sector is more common in the late afternoon, but due to a phenomenon known as 'Triggered Lightning', existing east of the Shetland Islands that morning, flying in the East Shetland Basin Area north of the 062 ADN (VOR) radial, had ceased. Consequently, even though this was mid-morning, a lack of traffic had led to the HELS and REBROS sectors being combined.

Each of the offshore positions in this event (HELS and REBROS) were controlled via two separate radar screen monitors. The nature of the sectors is such that they have a long north-south axis, and therefore the radar console for each sector has one radar screen in front of the controller and another mounted into the console furniture approximately half a metre above, effectively creating a north and south picture for the respective sector. Although the Radar controller was effectively monitoring 4 radar screens as the sectors were combined, there were no aircraft on either of the two upper screens and therefore the controller was monitoring the two lower screens (whilst sat in front of the left hand HELS sector screen). The label size applied to the radar data for the REBROS sector, had been set to normal.

Due to the large area over which these operations occur, there are various radar (surveillance) data processing areas. This enables the data displayed to the controller to be accurate within the given region as the appropriate QNH is assigned to the appropriate area. For this reason, the change from the Aberdeen QNH to the McCabe QNH (or when appropriate, the Miller or Fulmar) takes place at a range of 90nm from Aberdeen. Occasionally, as in this occurrence, controllers issue the next QNH prior to the actual 90nm range for the aircrew to change as they cross the QNH area boundary. When the Radar controller issued the QNH to the S92(2) pilot he did so by combining the QNH with the type of service. The readback from the pilot included an incorrect QNH element and incorrect type of service. The controller immediately corrected the type of service in the transmission, but did not correct the QNH element. In this case, the S92(2) callsign also contained a suffix including the digits '99', which itself sounded similar to the correct QNH value. Whilst all transmissions were enunciated clearly and the quality of the reception was good at Aberdeen, it is possible that when the Radar controller listened to the readback of the whole transmission in real time, the original error of the wrong QNH (the subtle difference between the

997 and the 977 values) was missed in the desire to correct the second error pertaining to the type of service. The similar digits in the callsign suffix may also have been a contributory factor in this error.

The difference between the two QNH settings represents an altitude difference of 540ft, meaning that the S92(2) pilot was flying 540ft below the expected altitude. This would indicate on radar as a 500ft difference (rounded to the nearest 100ft) and may account for the 400ft altitude separation (rounded to the lowest 100ft) that the pilots reported receiving via their TCAS alerts.

The Radar controller appeared to be monitoring the aircraft track and progress by glancing over to the REBROS console. The electronic flight progress strips were kept up to date and displayed the altitudes at which the controller expected the S92s to be flying. However, at interview the Radar controller was aware that monitoring of the radar targets did not extend to monitoring the accuracy of SSR data and the subsequent triggering of STCA. It was following his assistance to the Aberdeen INT controller (by annotating the whiteboard), that the Radar controller first became aware of the STCA. Although initially the controller thought it was possibly a false indication, on closer inspection he observed the incorrect altitude of the S92(2). By the time the controller had observed and understood the height difference between the two aircraft, they had passed each other. Consequently, Traffic Information was not issued. Opportunities to correct the S92(2) pilot QNH error were not employed due to deficiencies in the Radar controller's surveillance monitoring task. The combination of a combined sector (although appropriate), smaller than optimum radar labels, and distractions from the adjacent Aberdeen Approach INT sector contributed to the Radar controller not fully monitoring the two S92 aircraft. As the QNH change was issued approximately 5 minutes prior to the crew actually changing it, the change of altitude information (SSR Mode C) on the radar screen would not have been immediately apparent, unless the Radar controller was monitoring the flight as it crossed the 90nm range from Aberdeen.

Under a Traffic Service, a controller is not required to achieve de-confliction minima and the pilots remained responsible for their own collision avoidance. However, a controller 'shall' provide specific radar (surveillance) derived information in order to assist the pilot to avoid other aircraft. In the offshore environment, a segregation of 500ft is routinely used (when aircraft are known to be VMC), not only whilst providing an Offshore Traffic Service but also when providing an Offshore Deconfliction Service. However, under such circumstance the controller is required to issue Traffic Information.

ATSI recommend that the procedures for combining the REBROS and HELS sectors be reviewed with regard to the circumstances when such a combination is appropriate. This should include:

- Considering the impact that an elevating traffic environment on Aberdeen Approach has on the HELS position, both as a potential distraction, and also the likelihood of traffic levels having a knock-on effect to HELS.

- Mandating the use of large labels in the radar data-block on the REBROS sector when combined with the HELS sector. The investigation has established that the labels are occasionally enlarged (by some controllers), in order to maximize the clarity when reading from further away, but this is not a practice that is currently standard procedure.

UKAB Secretariat

The S92 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard[2]. If the incident geometry is considered as head-on or nearly so then both pilots were required to turn to the right[3], which they did. Of note, the Aberdeen QNH was 991hPa, which may have played a part in the S92(2) pilot's expectations.

[2] SERA.3205 Proximity.
[3] SERA.3210 Right-of-way (c)(1) Approaching head-on.

Summary

An Airprox was reported when two S92s flew into proximity at 0957 on Wednesday 22nd February 2017. Both pilots were operating under IFR in VMC, both in receipt of an Offshore Traffic Service from Aberdeen.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, a transcript of the relevant RT frequency, radar photographs/video recordings and a report from the appropriate ATC authority.

The Board quickly agreed that the Airprox had been caused by the S92(2) pilot using an incorrect pressure setting for the McCabe RPS. Members noted that the resulting Airprox was due to a classic line-up of 'holes' in safety barriers. The controller had not detected the pilot's incorrect read-back of the RPS (which was considered contributory), perhaps due in part to other incorrect elements in the read-back and the pilot's '99' callsign suffix. The controller had passed the RPS at a relatively early stage in the S92(2) outbound flight, did not see the change in altitude at the REBROS/ABERDEEN boundary and did not notice the difference between the S92(2) SCL and actual altitude. The controller had also been distracted and had then not assimilated the STCA warning (also considered contributory). With relatively few aircraft operating on the day, the pilot also did not have the opportunity to hear the RPS being broadcast to other pilots. It was noted that had Traffic Information been passed to both pilots then the actual vertical separation of 500ft would have been within the terms of the service provided. Members also noted that all personnel were aware of the weather conditions, with a deep low pressure to the southwest and wondered whether the S92(2) pilot should have questioned the RPS he thought he had been passed, which was higher than the QNH at Aberdeen and that which he would have presumably been briefed during his pre-flight met briefing. In the event, both pilots received TCAS information which allowed them to assess the hazard and take appropriate action; as a result, the Board determined that timely and effective action had been taken to avoid collision.

PART C: ASSESSMENT OF CAUSE, RISK AND SAFETY BARRIERS

Cause: The S92(2) pilot set the wrong QNH and flew into conflict with the S92(1).

Contributory Factors: 1. The controller did not detect the incorrect QNH readback from the S92(2) pilot.

2. ATC distraction resulted in the controller not assimilating the STCA warning.

Degree of Risk: C.

Safety Barrier Assessment[4]

In assessing the effectiveness of the safety barriers associated with this incident, the Board concluded that the key factors had been that:

ATC Strategic Management & Planning was assessed as **partially effective** because the Aberdeen Radar controller was distracted by other tasks, such as writing information on the whiteboard, and did not assimilate the STCA warning in a timely fashion.

ATC Conflict Detection and Resolution was assessed as **ineffective** because the controller was not able to assimilate the radar picture in time to pass Traffic Information.

[4] The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the UKAB Website.

Ground-Based Safety Nets (STCA) was assessed as **ineffective** because the controller did not pass information based on the STCA warning.

Flight Crew Pre-Flight Planning was assessed as **partially effective** because the S92(2) pilot had accepted an RPS that did not conform to the synoptic weather situation.

Flight Crew Compliance with ATC Instructions was assessed as **partially effective** because the S92(2) pilot did not set the correct McCabe RPS.