SECTION 1.4.7 – SUMMARY OF FINDINGS

1.4.7.1 **Cause.** The Panel concluded that **the cause** of the accident was a lack of recognition of converging flight paths, resulting in the controlled flight of both aircraft into the same airspace at the same time.	1.4.4.138
1.4.7.2 **Contributory Factors.** The Panel identified 19 contributory factors to the accident:	
1.4.7.3 Ineffective intra-Squadron deconfliction.	1.4.2.141
1.4.7.4 The absence of, and inability of the procurement process to provide, an electronic planning (deconfliction) aid.	1.4.2.144 1.4.6.137
1.4.7.5 Ineffective Sqn level supervision of ASTON and ABBOT.	1.4.2.177
1.4.7.6 The inefficiencies of the ergonomics and information display of the Auth's Desk and Ops Desk.	1.4.2.178
1.4.7.7 Ineffective authorisation of ASTON.	1.4.2.206.a.
1.4.7.8 The airmanship decisions of ASTON 1 which led to the descent into the Moray Firth environs without a radar service.	1.4.3.51
1.4.7.9 Insufficient Situational Awareness of ASTON 1, ABBOT 2 and AWRCs.	1.4.4.36
1.4.7.10 Lack of SSR.	1.4.4.43
1.4.7.11 The degradation of safeguards as a result of procedural drift of AWR procedures and practices.	1.4.4.48
1.4.7.12 The limitations of See and Avoid.	1.4.4.95
1.4.7.13 The meteorological conditions in the Moray Firth.	1.4.4.97
1.4.7.14 ASTON 1's lack of RHWR.	1.4.4.98
1.4.7.15 The lack of, and inability of the procurement process to equip, a CWS on Tornado GR4.	1.4.4.132 1.4.6.523
1.4.7.16 The lack of a formalised and effective care plan of ASTON 1 WSO.	1.4.6.231
1.4.7.17 Ineffective assurance of the OCU.	1.4.6.323
1.4.7.18 AWR Culture.	1.4.6.359
1.4.7.19 The shortcomings of the risk management process.	1.4.6.606
1.4.7.20 **Aggravating Factors.** The Panel did not identify any aggravating factors to the accident.	
1.4.7.21 **Other Factors.** The Panel identified seven other factors to the accident:	
1.4.7.22 Aircrew Safety and Survival Currency.	1.4.2.38
1.4.7.23 Ineffective authorisation of ASTON and ABBOT.	1.4.2.206.b.

1.4.7.24 The altitude at which the incident occurred and the ineffectiveness of automated alerting mechanisms.	1.4.5.97
1.4.7.25 Elements of the PSP design and configuration.	1.4.6.58
1.4.7.26 Survival/platform organisation, survival policy, survival training and survival equipment integration.	1.4.6.120
1.4.7.27 Breaches of recognised and mandated engineering safeguards.	1.4.6.288
1.4.7.28 Inadequate safeguarding of the MSSR and TACAN.	1.4.6.402
1.4.7.29 **Observations.** The Panel made 56 observations:	
1.4.7.30 The TGRF simulator projectors are limited in their ability to display realistic entities (other aircraft) to facilitate lookout training and assessment. Furthermore, very little emphasis is placed on lookout training and it is not routinely assessed.	1.4.1.23
1.4.7.31 "See and Avoid" has known limitations, which are mitigated through training and education.	1.4.1.31
1.4.7.32 Primary Surveillance Radar (PSR) maintenance is scheduled for Sundays, it is often completed during the week due to watch patterns not supporting Sunday maintenance.	1.4.1.61
1.4.7.33 SSR user availability may not be fully understood by HQ 1Gp; BM ATM Eng RO availability figures for Jul 12 do not reflect the extent of SSR availability to ATC. The confusion lay in the definitions between actual availability to the end user vs reported serviceability.	1.4.1.72
1.4.7.34 The chip to ZD812 left hand quarterlight had not been blended/polished out.	1.4.1.86
1.4.7.35 TACTS had not been updated to allow the currency of TR Selection from the rear cockpit by RS qualified pilots to be tracked.	1.4.2.21
1.4.7.36 OC XV(R) did not have TORs.	1.4.2.49
1.4.7.37 The Stn Cdr had not promulgated local orders defining the minimum level of experience required before an individual may be considered for selection or to fill the position of DCF.	1.4.2.50
1.4.7.38 The Stn Cdr had not promulgated local orders defining the minimum level of experience required before an individual may be considered for selection or to fill the position of DA.	1.4.2.51
1.4.7.39 Where possible, external aircrew should adhere to the regulations of the sqn with which they are flying, including attending scheduled Met/Ops briefs.	1.4.2.84
1.4.7.40 Only Records of Flight from other flying sqns are displayed at the Auth's Desk.	1.4.2.116
1.4.7.41 Irrespective of the serviceability of the monitor at the Auth's Desk, the Flypro that would have been displayed would not have been an updated version.	1.4.2.175
1.4.7.42 The DA did not ask for evidence of the waiver to Sea Survival drills for ASTON 1 WSO to be held by the authorisation sheets as this is not mandated in any order book.	1.4.2.200

1.4.7.43 A difference between the timing of ABBOT 2's Strafe Checks and the guidance provided by OC Standards.	1.4.4.15
1.4.7.44 JSP 403 mandatory joining call information differs from the ACAWEWROs mandatory joining call.	1.4.4.27
1.4.7.45 US AWRCs monitor AWR users by either radar or Mode 3 (squawk) repeater displays. US AWRCs do not offer any ATS other than a Basic Service. However, the Situational Awareness provided by radar/Mode 3 repeater displays allows US AWRCs to provide traffic information to aircrew if they consider that a conflict could arise.	1.4.4.33
1.4.7.46 ACAWEWROs do not reflect current operating practices.	1.4.4.46/8
1.4.7.47 The resolution and generation of traffic information for TCAS II equipped aircraft is markedly increased above 1000 ft and should be considered during sortie planning and execution.	1.4.4.133
1.4.7.48 ASTON's sortie took place over remote sections of NW Scotland, where, had the accident occurred in similar circumstances with no beacon location, DF, squawk or radio alert, it could have resulted in extended detection times.	1.4.5.92
1.4.7.49 The provision of TRiM for supernumerary crew is not mandated and is provided on a best practice basis.	1.4.5.106
1.4.7.50 ASTON and ABBOT callsigns were confused during PCM, particularly as they were both from the same Sqn.	1.4.5.152
1.4.7.51 On the day of the accident the 2nd DA was also the Orderly Officer. The 2nd DA received a number of telephone calls directing him to report to the MGR, which he was unable to comply with due to his role as DA.	1.4.5.153
1.4.7.52 Due to a reconfiguration of the building, the ECC had recently been moved. At 17:00 hrs, all ECC telephone lines went down as they were limited to daytime working hours only. The ECC staff reverted to mobile telephones.	1.4.5.154
1.4.7.53 The creation of an ECC Group email and limited folder did much to improve communication to and within the ECC. This was particularly apparent in the first week when the ECC Clerk was inputting information in to the ECC log which prevented personnel from reviewing the log to verify information.	1.4.5.155
1.4.7.54 ASTON 1 WSO's e-folder was not impounded following the accident and was subsequently deleted.	1.4.5.156
1.4.7.55 The XV(R) STANEVAL Training Folder was not impounded as part of the PCM process. ABBOT 2 RS Pilot also had another Training Folder which was kept in the STANEVAL office which was not impounded following the accident.	1.4.5.157
1.4.7.56 LITS cannot function with aircraft quarantined on the system, as is required by MRP RA 4305. It is not possible to run database maintenance without affecting those aircraft which are supposed to be quarantined.	1.4.5.158

1.4.7.57 Electronic copies of online documents were not provided as part of the PCM process, nor was it detailed within Op DERMIS. The current practices of using website repositories of online documentation means these should be captured in the PCM impounding process.	1.4.5.159
1.4.7.58 Accommodation and financial support to the PCMIO team was lacking; an advance of pay was issued to personnel when an imprest would have been more appropriate, particularly given the length of the deployment.	1.4.5.160
1.4.7.59 The Sqn aircrew crewroom was no longer regularly used, particularly during lunch time. An important by-product of crewroom use is the opportunity to learn from others' flying experiences, spread flight safety information and, on an OCU, for students to learn from more experienced operators.	1.4.5.161
1.4.7.60 The direction, worded in mandatory language, within RAF SAR Force SOPs was contravened in both instances where aircrew were recovered, but this was not identified by the Sqn OC or highlighted as a significant safety lesson.	1.4.6.14
1.4.7.61 The RAF SAR Force SOPs retain the same mandatory language and can convey confused/mixed messaging particularly with the new suggested amendment (unusual items attached to the winch hook), which could be considered as inviting another contravention.	1.4.6.15
1.4.7.62 The recovery of subsurface loads is not covered in RAF SAR Force SOPs, however this only occurred on this occasion due to the winchman paramedic carrying a diving mask.	1.4.6.16
1.4.7.63 RN SAR had not developed a set of SOPs outside of the Maritime Sea King Flying Guide.	1.4.6.17
1.4.7.64 The significance of the potential for the liferaft valve assembly to fail under tension due to loads exerted through the PSP lowering line cannot be assessed because the full range of survivable water entry speeds is not fully understood.	1.4.6.57
1.4.7.65 Both the RAF Lossiemouth FOB and JSP 911 SERE are in error, wrt SAR helicopter readiness states.	1.4.6.100
1.4.7.66 JSP 898 Part 3 Chapter 3 Generic SERE Training Policy requires updating. JSP 898 details Commander Joint Operations as the Training Requirements Authority for <u>all</u> SERE training rather than just operational SERE. The ownership and review process for updating JSP 898 Part 3 Chapter 3 is unclear.	1.4.6.104
1.4.7.67 There is no evidence that trials have been conducted to assess wavé splash with RAF life preservers.	1.4.6.111
1.4.7.68 A lack of a coherent auditing process of FMO currency for AvMed training.	1.4.6.196
1.4.7.69 There is no tracking of MAME CME, although AP1269 states Air-Health-GPSO1 at HQ Air Command is responsible for collating it.	1.4.6.202
1.4.7.70 The RAF Lossiemouth CMP was out of date for Aviation Medicine Continuation Training, attending a MAME update in Apr 09	1.4.6.203
1.4.7.71 The SMO stated he did not know if there was a currency requirement for training.	1.4.6.204

1.4.7.72 The MoD F700 Quality Checklist in use for the Mgt 8 checks in Feb 12 was at amendment level (AL) 14 and contained out of date references to Joint Air Publications (JAP). The Mgt 8 checklist in use had been printed from an out of date version of AESOs. 1.4.6.248

1.4.7.73 An individual's understanding of general conduct of maintenance had stagnated at the point at which he last received formal training from a training organisation. 1.4.6.252

1.4.7.74 The use of a STANEVAL representative from another platform could improve the effectiveness of assurance visits and facilitate cross-pollination between platforms. 1.4.6.314

1.4.7.75 OCU staff Operational Status Certificate (OSC) would be easier to interpret if they broke down the various categories of instructor qualification. Furthermore, an OSC for OCU students would make it easier to identify clearances and qualifications rather searching through the detailed course-progess paperwork. 1.4.6.322

1.4.7.76 There are no regulations defining who has the authority to award ATC endorsements or to what level the award of ATC controller endorsements can be delegated. 1.4.6.355

1.4.7.77 An infringement of a GRI had been identified during an EQA. The ATM Eng RO took no action to ensure that the unit either requested an EA from ADATS DT or had the infringement removed. 1.4.6.385

1.4.7.78 MAA Certification Electronic Systems are responsible for ATM equipment regulation within the MAA, but are not involved with the concession process. There is no coherent regulatory policy on military aerodromes to continue to use infringed GRIs. 1.4.6.388

1.4.7.79 There was no single repository to enable detailed and comprehensive audit of spending on the Tornado CWS. 1.4.6.408

1.4.7.80 There were no easily auditable records for Planning Round options and impact statements before 2007. 1.4.6.410

1.4.7.81 Ineffective information management within MoD placed a burden on this SI which elongated timescales and delayed analysis. 1.4.6.416

1.4.7.82 Within the DAAT there were subsets of MAC for both Non-Cooperating military and civilian aircraft. (MAC-GA – Mid Air Collision with General Air Traffic). There could be a misinterpretation of the risk by DHs if they were not considered as a sum rather than discrete entities. 1.4.6.430

1.4.7.83 In 2005, options with an impact on safety were not specifically identified as such or set apart from other options. 1.4.6.499

1.4.7.84 Although the DESB commented on the safety implications of deleting CWS, there was no evidence of substantive debate at the DMB on the subject. 1.4.6.542

1.4.7.85 Intervention from a risk management process and an independent regulator was required to re-instate the CWS programme albeit with further delay and at extra cost. 1.4.6.590

1.4.7.84 The review of the planning and programming situation that led to Tor CWS being deleted as directed by 2nd PUS could not be provided by MoD. 1.4.6.591