

**REVIEW OF PROGRESS IN THE MILITARY AVIATION AUTHORITY (MAA)
REPORT BY THE MAA EXTERNAL AUDIT PANEL (MEAP)**

SUMMARY

In response to Mr Justice Haddon-Cave's (H-C) Nimrod review¹, the Military Aviation Authority (MAA) has rapidly and purposefully started to recalibrate the military air safety regime in its first 2 years of activity. There is strong evidence that the key dutyholder concept is well understood. The building blocks to address and eliminate the frailties in the system for military air safety are being progressively established. There is significant work still to do further to embed the changes but the right direction and tempo has been set.

CONTEXT

1 In his 2009 report into the crash of Nimrod XV230, Sir Charles Haddon-Cave said:

I recommend that, in two years time from the publication of this Report, an independent auditor be appointed to report to the Secretary of State for Defence and 2nd Permanent Under-Secretary on progress in implementing these Recommendations for a New Military Airworthiness Regime. The independent auditor should preferably be from the Civil Aviation Authority or the Health & Safety Executive (and, for the avoidance of doubt, should not be a serving or past member of the RAF or Services, nor anyone connected with the Nimrod Review).

2 Air Marshal Timo Anderson asked me to chair the review. I was supported by colleagues from HSE, the Civilian Aviation Authority (CAA), the Dutch MAA and the US Navy (Annex 1). Our Terms of Reference (ToR) were to examine and report on 3 areas:

- Implementation of the 76 Nimrod Review Recommendations that the MAA is responsible for
- The effect being created in the UK Defence Air domain by implementation of these Recommendations and
- Areas of risk.

3 We carried the work out over 2 weeks, beginning on 23 April. Our aim was to provide a snapshot of progress rather than a deep dive into process detail. The ToR confirmed that our main source material should include:

- Primary evidence relating to the implementation of the Recommendations
- Interviews with key stakeholders including, but not necessarily limited to, the MOD's Safety Process Owner, MAA staff, Aviation Duty Holders and their staffs, DE&S Chief of Materiel (Air) and Royal Air Force Chief Air Engineer, and the MAA Safety Advisory Committee.

APPROACH

4 Following the publication of the Nimrod report, the then Secretary of State, Bob Ainsworth, set out the government response in a statement to Parliament on 28 October 2009. Before our review began, MAA provided a comprehensive and cross-referenced update on each of the recommendations for which they were responsible.

¹ <http://www.official-documents.gov.uk/document/hc0809/hc10/1025/1025.asp>

We used this throughout the review as our point of reference. We tested the robustness of these conclusions and commented on the evidence for progress against each. The full commentary on the four separate elements (H-C recommendation, Secretary of State response, MAA update and MEAP comment) is set out in Annex 2.

5 We questioned individuals on particular issues related to their areas of expertise and/or their direct involvement in the post H-C military air safety environment. A full list is at Annex 3. The interviewees represent a vertical slice through the dutyholder responsibility chain and a cross-sectional sample across the key military and non-military personnel. In particular, we asked them about their experience and views on the new approach, how they thought things had changed (for better or worse) and their general views about regulating military air safety.

6 We visited two operational bases at RAF Coningsby (No 1 Group) and RAF Benson (Joint Helicopter Command) as well as Joint Helicopter Command HQ at Andover where in addition to speaking to frontline dutyholders, we spoke more informally to larger groups of staff. We also visited a number of DE&S Project Teams at Yeovil.

7 At the MAA, we discussed progress with the three Directors and some of the members of the MAA Safety Advisory Committee (MSAC). We interviewed over 20 MAA staff who provided further detail and explanation about specific strands of the post-H-C effort. H-C created a heavy workload for the MAA who managed implementation through 10 separate workstreams (see Annex 4). We used these as prompts for the MAA interviews. We also interviewed MAA staff on other matters including:

- The MAA approach to auditing – to find out how it was developing and maturing with experience
- The MAOS (Maintenance Approved Organisation Scheme) and DAOS (Design Approved Organisation Scheme) to understand the arrangements for assuring organisations with whom Defence contracts design, maintenance and operation of military air systems
- The CAMO (Continuing Airworthiness Management Organisation) arrangements
- Dashboard reporting – to discuss various strands of current work within MAA to develop accurate and reliable measures of improvement in the air safety regulatory environment.

8 We referred to specific Regulations, Instructions, Standard Operating Procedures, Audit reports and other papers but only to the extent that we concluded it was necessary to confirm understanding. We devoted the bulk of our effort to face-to-face interviews to surface individuals' views².

IMPLEMENTATION OF THE HADDON CAVE RECOMMENDATIONS

9 Annex 2 summarises our findings under each of the relevant H-C Recommendations. The key points are summarised below.

² The MAA website was an extremely useful source of data during the review and we saw plans for an upgrade that would further improve its useability

10 In response to the H-C review, the MAA has rapidly and purposefully started to recalibrate the military air safety regime in its first 2 years of activity. In particular it has:

- Created a new regulatory organisation headed at 3-star level
- Completed an exercise to co-locate nearly all MAA staff at Abbeywood³
- Re-structured and published the Military Regulatory Publication (MRP) set
- Clearly established the Dutyholder and Risk to Life concepts which, for H-C, were the unifying spine to a new air safety regime
- Set in place the arrangements to embed and reinforce this core concept through training in airworthiness and air safety
- Started to consolidate the new regulatory set through a comprehensive series of audits to assess performance – described by the MAA as ‘deliberately intrusive’
- Established an independent MAA Military Air Accident Investigation Branch (MilAAIB) and been involved in 11 separate Service inquiries
- Begun to populate a new error management database and embed a culture of improved error management and reporting through a heavy commitment to staff training.

11 These achievements have to be seen against the following background:

- A dense regulatory environment where, as one interviewee remarked, there always needs to be ‘a meticulous eye for detail’
- The high numbers of staff across all the Services involved in aviation safety-related activity who come within scope of the new training and development requirements
- The fact that the MAA itself has not reached full planned staffing numbers in its first 2 years.

12 The speed at which MAA has made progress on addressing the H-C recommendations is therefore impressive. Where the original H-C recommendation was binary, we made a straightforward judgement about whether the job was done or not. Where recommendations required new arrangements to be developed, we assessed the progress made to date.

13 The MAA reported that they closed out all 10 workstreams by the end of 2011 and that the appropriate arrangements were in place to underpin a new air safety environment. In our assessment, we looked at what had been achieved to date and what the next stage of effort would entail.

14 The MAA approach to H-C implementation has had two beneficial effects:

- The links and dependencies between different areas of work are transparent. This is an important point in the wider H-C context because of the multiple strands and scale of parallel activity and the associated H-C warning about becoming a slave to process for its own sake.
- It reinforces the iterative character of the process. It would not be realistic to expect the MAA to complete every H-C recommendation at the same pace. The front-end groundwork to establish and staff the organisation, publish the

³ MilAAIB staff are based at Farnborough alongside their civil aviation counterparts and there is a small HQ staff based at Main Building in London

MRP, set up the MilAAIB and design and hold the dutyholder courses necessarily took precedence. Work to establish and embed a tauter safety case regime, develop a different approach to certification and approvals, CAMO and address longstanding training and SQEP (Suitably Qualified and Experienced Personnel) matters will take (much) longer.

15 Our analysis, based on the summary of progress at Annex 2, is that the main areas where the H-C response is still important work in progress are:

- Rollout below dutyholder level of the appropriate training in airworthiness management and regulatory skills
- Further embedding the new arrangements for mandatory error reporting and analysis
- Reinforcing the single safety case and single risk management system across the air safety domain
- Creating coherent flight safety management across the three Services
- Clarifying project team responsibilities and interfaces with others who have air safety responsibilities
- Continuing to address aircraft ageing and legacy aircraft matters through the new CAMO arrangements.

16 In our view, none of these findings should come as a surprise in view of the scale of the task. Two years after H-C, MAA have now reached a much better-informed position from which to judge the impact of their initial efforts, profit from their own knowledge management and chart a path for what follows. We deal with this in more detail below.

THE EFFECT BEING CREATED IN THE DEFENCE AIR DOMAIN

17 An organisational shift on the scale prompted by H-C will create shockwaves. A common theme in our discussions with those on the receiving end of MAA attention was that the MAA had been authoritarian and focussed in its approach. Conversely, the MAA interviewees confirmed that had been precisely their intent. Given the scale and breadth of the ambition, coupled with the speed of change we did not find either position surprising or inappropriate. Reassuringly, we concluded that the dutyholder concept had rapidly gained traction in the military air environment⁴.

18 There was a general and welcome view that the MAA had created a more accessible MRP. The MAA confirmed that it had not set out to do a complete re-write of the rule set (there were too many moving parts to do it all at once) but to put it into a better structure, shrink it and aim to make it more proportional. The MRP was therefore pushed out to staff without consultation. For some, this was frustrating as the pace of concomitant change was intense.

19 There is a big job still to do on training to embed more deeply the necessary dutyholder and air safety behaviours and attitudes. MAA have set the ball rolling. Dutyholders are responsible for ensuring that their staff are SQEP and can get access to the appropriate training events when they need them. Based on our sample, we concluded that this commitment would remain challenging, especially if

⁴ This was reinforced at a Q&A session on a dutyholder course being held at Shrivenham that we attended. It was clear from the questions being asked about the role of the dutyholder 'in theatre' that the basic principles held firm and that dutyholders were in no doubt about what was expected of them (and what they actively sought in terms of accountability and responsibility in return).

there is a tightening resourcing position. However, we also saw positive evidence that the MAA is adjusting the content of some courses - notably the Duty Holder Air Safety Course, which is the main course for dutyholders - in the light of experience to reflect better the relevant needs of staff who will attend in future⁵.

20 Our assessment of progress on error management data systems is positive, though the pace of change will continue to be influenced by the rate of data accumulation, the changing approach of staff feeding the system with data and the capacity in the MAA for detailed analysis of the material itself.

21 H-C severely criticised the safety case regime. MAA has published the necessary Regulations to address the detailed shortcomings identified but this remains a fertile area for improvement. We heard of examples about specific platforms which had not initially gone well and which confirmed that there is still work to do to lubricate and simplify the process, particularly at the various designer, customer and user interfaces. In his first annual report on air safety, the DG MAA confirmed that the outcomes from project team audits and MAOS/DAOS audits did not paint a reassuring picture at that point. Our interviews confirmed that this remains an important area for MAA effort. However, the dutyholder (and dutyholder-facing) and Risk to Life concepts must be a sensible basis on which to continue to seek improvements.

22 The creation of an independent MilAAIB was a core H-C recommendation. It has stopped any running commentary from 'live' inquiries that previously might have occurred under single Service inquiries. This jarred with some interviewees but in our view, is the price to pay for independent investigation. There was no evidence to indicate that the new approach had prevented the MAA from moving swiftly when necessary to disseminate important information or early learning to maintain ongoing airworthiness or air safety.

23 A number of Service Inquiry reports will be issued from May 2012 onwards. This will create a bow wave of information but also the first feedback loop on investigation findings for the new MilAAIB. We would expect this to provide the regulated community with food for thought.

24 The MAA has been involved in certification and Release to Service endorsement of five air systems since the new certification system went live, one of which was problematic. We did not address specific areas raised during our interviews in detail but the general impression we formed was that there was less likelihood that the tensions would be repeated on the back of what had now been learned. However, we do not underestimate the task still faced by the military air community and the MAA in reaching a solid landing on future certifications and Release to Service decisions.

25 The same comment applies to the issue of proportionality in demonstrating Continued and Continuing Airworthiness in ageing fleets; this is work in progress.

26 The MAA can point to specific impacts on MOD planning and budgeting decisions on air safety grounds where the safety 'flag' has been influential. They include the reprieve of the Tornado Collision Warning System programme and engagement on behalf of Rotary Wing safety measures such as airborne collision warning and wire strike protection.

⁵ The feedback from many of the interviewees who had attended the dutyholder course was that it had been one of the best courses they had attended in their Service careers

27 Overall, we detected a strong level of support for the general approach and the fine detail of what the MAA had done in its first 2 years. We detected a mixed picture on the issue of risk appetite. Some interviewees felt that there was a more risk-averse mindset now prevalent but others described the current situation as one where they were more risk-aware.

28 The MAA has so far been predominantly in 'transmit' mode. There is a reasonable expectation on the part of the regulated community that once the foundations of the post H-C structure are in place that the MAA will set a clear direction for what comes next and consider the extent to which it can maintain progress in improving air safety in 'receive' mode as well. We deal with this in the next section.

AREAS OF RESIDUAL RISK

29 The Haddon-Cave Review recommended transformational change in the MoD and therefore did not offer a quick fix for air safety. Our main conclusion is that the MAA is, 2 years on, in a strong position to embark on Phase 2 of its aim to meet its own aspiration to be a world-class regulator (as set out in the MAA Vision). Implicit in what follows are the questions the MAA needs to ask itself about the shape and direction of the emerging regulatory environment, the appropriate level of air safety assurance, what mix of regulatory approaches it considers are likely to be most effective and what compelling evidence of air safety improvement the regulator should seek.

30 We have highlighted five key risks based on the findings set out in the previous section.

The Department stops short of full implementation of H-C

31 There is a risk that the MoD stops short of completing what H-C unambiguously said needed to be done to improve air safety. As noted above, the MAA has built a new structure but has not yet fully fitted it out. Throughout its first 2 years, MAA has been at approximately 70% in terms of staffing. This has restricted its capacity to take forward work in some key areas, notably knowledge exploitation.

32 Continuing to operate below the planned staffing level or dialling down the intensity of the current efforts could forestall or foreclose unrealised benefits. In our view, therefore, the MAA needs to properly 'bank' the first 2 years of activity, to reflect properly on what it has learned about regulating air safety and think about how to align itself both strategically and tactically for what comes next and the level of resource required to achieve it. This is unlikely to be 'more of the same'. We were persuaded that having been round the loop at least once already on a range of audits, the MAA realised it would be a missed opportunity simply to repeat the exercise without capturing the key points about risk-based intervention and using them to inform the next iteration. As H-C confirmed, compliance is not an end in itself.

The MAA does not make best use of available data

33 The prospects for the MAA to make good use of an increasingly useful and rich set of error management data are good. The risk is that they do not use it to best impact or effect. There are parallels with safety management in the high-hazard civilian environment where high-performing organisations maintain a clear and sharp

focus on the development of reliable and accurate leading indicators of process performance to focus attention on core risks and to inform risk management priorities and improvements.

34 The availability of this information offers multiple opportunities to *inter alia*:

- Complete trend analysis on key performance data
- Develop better performance measures to assist in regulatory targeting and planning to sharpen the risk-based intervention agenda
- Develop better leading indicators with dutyholder organisations to monitor progress on safety critical activity (and seek efficiencies in doing so)
- Look for ways to share performance data across all the Services.

The regulated community falls back into old habits unless the regulatory pressure for behavioural change persists

35 There is a risk of a return to a purely compliance-driven environment if the regulator does not keep up the necessary pressure – targeted at the right places - for fundamental behavioural and cultural change. The MAA showed us it was enthusiastic to develop an operating model based on greater assurance and further evolution of the regulatory role. This is not to argue for light-touch oversight but for the MAA to retain a sharp capacity for targeted and effective action/sanction when required.

36 The ability of the MAA to send clear messages about proportional oversight to those being regulated will be informed by two things: the MAA's own expanding evidence base for current performance and, second, what it demonstrates about the capacity for self-regulation in the dutyholder population itself. This is liable to be a continuous iterative process for the medium term.

The cultural changes recommended by H-C do not materialise

37 Our review surfaced views about the extent to which cultural change is being truly embedded and evidenced through a shift in behaviours and attitudes. These were often anecdotal and personal (and there were many examples quoted in our interviews) but there was also evidence that the impact is already becoming more visible and positive. In particular, the MAA can look forward to:

- Being able to show – and feed back information to the regulated community on - an end to end process on new aircraft as current work cycles through to conclusion
- A maturing system as more staff complete the dutyholder and air safety training courses.
- A more self-sustaining system that will further expand through the command cycle and natural spread
- A more transparent direction of travel on air safety as the greater availability and visible use of performance data improves
- Greater awareness of and exposure to a risk-based intervention regime leading to increased ownership and self-regulation of air safety in the regulated community.

38 The MAA therefore needs to capture, share and spread more widely any positive news and feedback resulting from these shifts, targeting its communications effort as necessary.

The MAA does not address or measure the right things to gauge wider improvements in air safety

39 The MAA might fail to assess wider progress on air safety improvements. This could arise if they lack access to the right tools or if they do not themselves define and effectively communicate to dutyholders exactly what they are looking for in the post-H-C air safety world. These topics already appear to be on the MAA radar through work being done in the Analysis and Plans Group, work on Knowledge Management and also through access to outside sources of expertise, particularly in the MSAC, the civilian aviation community and elsewhere. There are, again, clear parallels with work in the high-hazard civilian context. Sustained effort here is likely to pay dividends.

FOLLOW UP

40 In 18 months to 2 years the MAA ought to be able to demonstrate progress on addressing the second order H-C effects described above. There would therefore be value in a repeat independent review focused more tightly on the matters listed in para 15.

ACKNOWLEDGEMENTS

41 The MAA Chief of Staff and her team provided exemplary support throughout the review. The visits to the operational stations were hugely helpful in providing additional feedback from the sharp end and we are extremely grateful to the respective station commanders for arranging them.

David Snowball
A/Director, Hazardous Installations Directorate
HSE

23 May 2012

Annexes

- 1 MEAP team members
- 2 Progress against Haddon-Cave recommendations
- 3 List of individuals seen during the review
- 4 MAA workstreams

Annex 1 - Members of the MEAP

Dr David Snowball (HSE) - Chair
 Capt Keith A Kimberley (US Navy)
 Simon Roberts (UK Civil Aviation Authority)
 Lt Col Jaap van Boven (Royal Netherlands Air Force)
 Maj Frank Prins (Royal Netherlands Air Force)
 Dr John Rowe (HSE)
 Ian Copland (HSE)

Annex 3 – Interviewees

Context	Interviewee(s)
Nimrod Report	Mr Justice Charles Haddon-Cave
MSAC	Air Marshal (Retd) Sir Colin Terry, Prof Rhona Flin, Mr Neil Molyneux
MoD Safety Process Owner	Mrs Ursula Brennan (PUS)
Senior Duty Holder level	Adm Sir Mark Stanhope (1SL/CNS), Gen Sir Peter Wall (CGS), ACM Sir Stephen Dalton (CAS).
Operational Duty Holder level	R Adm T Cunningham (ACNS A&C), Capt RN (CAE to ACNS A&C) AVM P Osborn (AOC 2 Gp), AVM J Young (AIR Cmd CAE), Gp Capt (CAE to AOC 1Gp), AVM C Dixon (Comd JHC), Col (SO JHC), Gp Capt (CAE JHC)
Delivery Duty Holder level	Gp Capt Sampson (Stn Cdr RAF Coningsby), Gp Capt Mason (Stn Cdr RAF Benson), Air Cdre C Jones (Former Stn Cdr RAF Waddington)
MAA Executives	AM TM Anderson DG MAA, R Adm S Charlier D Ops, AVM C Ness D Tech
MAA Work Stream Leaders	Gp Capt , Cdr (<i>establishing the MAA</i>) Air Cdre Barmby (<i>establishing Aviation Duty Holders</i>) Cdr , Mr (<i>re-write aviation safety regulations</i>) Wg Cdr , Wg Cdr , Wg Cdr , Sqn Ldr (<i>deliver system for pan-defence aviation error management</i>) Cdr / Maj (<i>review project team manpower and responsibility</i>) Col (<i>establish the MAAIB and a new investigation process</i>) Cdr (<i>aviation safety training review and implementation</i>) Cdr , Wg Cdr (<i>develop a new approach to safety cases</i>) Capt RN, Wg Cdr , Sqn Ldr (<i>Air System certification</i>) Wg Cdr / Mr (<i>review airworthiness of ageing aircraft fleets</i>) Mr J Allen (SCS) (<i>develop MoD aviation safety risk management system</i>)
Other MAA staff	Capt RN, Wg Cdr , Sqn Ldr , Mr , Sqn Ldr

DE&S	AM Sir Kevin Leeson (CoM Air), AVM S Bollom (DCA), Mr N Barnett (Hd DE&S Airworthiness Team), Gp Capt (Typhoon PT), Gp Capt (Typhoon PT), Sqn Ldr Typhoon PT), Mr (Apache PT), Lt Col (Apache PT), Mr (Apache PT), Capt RN (Wildcat PT), Mr (Wildcat PT), Cdr (Wildcat PT).
Operational Units	Wide cross section of frontline operational and engineering staff at RAF Coningsby and RAF Benson.
DRTSA	Gp Capt (RAF DRTSA)

Annex 4 - MAA Workstreams

This annex lists the MAA workstreams used to deliver the specific H-C recommendations for which the MAA were responsible.

WS	Title	Recommendations covered
1	Establishing The MAA	21A - 1,2,3,6,7,8,9,10,12,14,15,17,20,21 21C - 5 27.4,6
2	Establishing Duty Holders	21A - 13,19 21B - 1,2,3 21C - 3 21H - 1 21I - 1,2,3 21J - 1
3	Rewrite Aviation Safety Regulations	21A - 11,18 21G - 1,2,3 21H - 2
4a	Defence Aviation Error Management System	21D - 1,2,3,4.1,4.2,4.3,4.4,4.5,4.6
4b	Maintenance Data Reporting, Analysis and Exploitation	As above
5	Ac PT Manpower and Responsibility Review	21C - 1,4 21I - 4
6	Establishing the MAAIB and a new Joint Independent Accident Investigation Process	21F - 1,2,3,4,5,6,7 27.7
7	Aviation Safety Training Review and Implementation	21A - 16 21C - 2 27.5
8a	Ac Safety Cases	21E - 1,2,6 22 - 1,3,4,5,6
8b	Ac Certification system	As above
9	Review Airworthiness of aging Ac Fleets	23.1
10	Develop MOD Aviation Safety Risk Management System	21A.5 21E - 3,4,5,7