

20110810-DG MAA Annual Report

10 Aug 11

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DG MAA DEFENCE AIR SAFETY ANNUAL REPORT 10/11

ISSUE

1. DG MAA's annual report on Defence Air Safety¹ for the period 01 Jul 10 to 30 Jun 11.

RECOMMENDATIONS

2. 2nd PUS is invited to note the following headlines:

a. Work to reset and invigorate Air Safety in the Dept is proceeding well, although achieving the necessary cultural and behavioural changes is likely to remain work in progress for a period yet. (Paras 5 & 6)

b. The MAA is on track for full operating capability by Apr 12. (Annex A, Para 5)

c. Implementation of the 76 Nimrod Review recommendations that I am responsible for is proceeding apace and all but one are on schedule for completion by Oct 11. (Annex A, Para 6)

d. At this stage, I can provide Limited Assurance of Defence Air Safety. My provisional estimate to achieve Substantial Assurance is a further 18 to 24 months. (Annex A, Para 22)

and that:

e. MAA manpower and operating resources are stretched, but manageable. However, as a start up organization, any substantial erosion of in-year resource, or planned uplifts, would inevitably impact directly on core outputs. (Annex A, Para 2)

f. I have established a Safety Advisory Ctte comprised of external subject matter experts to provide challenge and guidance to my Executive Board. (Annex A, Para 3)

g. On current plans, final MAA collocation in the Abbey Wood (North) site will be accomplished as part of the Bath Accommodation Plan by Feb 12. (Annex A, Para 4)

¹ '...the state of freedom from unacceptable risk of injury to persons, or damage, throughout the life cycle of military air systems. Its purview extends across all Defence Lines of Development and includes Policy and the apportionment of Resources. It does not address survivability in a hostile environment.' - MAA/DG/RN/02/10 – UK Military Air Domain Safety Definitions dated 1 Oct 10.

~~RESTRICTED~~

- h. A profoundly novel Aviation Duty Holder construct that aligns to the maximum practical extent responsibility, accountability and authority for managing Risk to Life (RtL) in Defence aviation activities is now in place and having beneficial effect. (Annex A, Paras 7& 8)
- i. Clear regulations on the identification, ownership and management of aviation RtL are now in place. (Annex A, Para 9)
- j. A significantly revised and reduced body of integrated Air Safety regulations have been enacted. (Annex A, Paras 10 & 11)
- k. A Military Aircraft Certification process is now in place, which includes the requirement for a new system's airworthiness strategy to be endorsed formally prior to Main Gate, to ensure there are 'no surprises' downstream. (Annex A, Para 13)
- l. Following design and a successful Field Development Phase, a pan-Defence Aviation Error Management System will commence roll out in Sep 11. (Annex A, Paras 14-16)
- m. An independent Military Air Accident Investigation Branch, working directly to me, has been established, collocated with DfT's world-renowned Air Accident Investigation Branch at Farnborough. (Annex A, Para 18)
- n. I have commenced a deliberately intrusive assurance programme of inspections and audits across the technical and operating airworthiness spectrum, designed to deliver over a 24 month cycle. At this stage, understanding of unit level operations remains weak and I am yet to examine the Release to Service Authorities, DE&S HQ functions, the CAP area and Industry in any detail. (Annex A, Paras 19-22)
- o. Handling procedures for the latter stages of PR11 meant that only partial Air Safety Regulator oversight of the Planning Round was achieved. However, it was clear that scrutiny and treatment of Air Safety related Options was inadequate, a failing that 2nd PUS is in the process of addressing for PR12. (Annex A, Paras 23-25)
- p. Appropriate emphasis on, and the management of, RtL stood out during the reporting period as the weakest area of understanding across Defence. (Annex A, Para 27)
- q. Whilst there was welcome evidence of positive change during the period, DE&S PT audits and a review of a sample of air platform Safety Cases exposed systemic weaknesses in procedures and controls that will require continuing focus and positive leadership to address. (Annex A, Para 29)
- r. Whilst there are challenges, my staff are closely engaged with the relevant PTs to guide them through the process of achieving certification of a number of major systems destined to come into service in the next few years. (Annex A, Paras 30 & 31)
- s. MAA manpower constraints are driving a significant backlog of Industry approvals under the Maintenance and Design Approved Organization Schemes. Moreover, common shortfalls in companies' Safety and Quality management processes identified to date are a cause for concern, particularly as the Duty Holder construct relies on such approvals to underpin the Duty Holders' management of RtL when they are not in direct control of supporting continuing airworthiness agencies. (Annex A, Paras 32 & 33)
- t. Since Aug last year, I have acted as the sole Convening Authority for Aviation Service Inquiries. I convened two during the remainder of the period, one of which has concluded following a streamlined reporting process. The second is due to report later this month. Aircrew human factors feature in both cases and I intend to examine and develop our understanding of any broader underlying trends going forward. (Annex A, Para 35)

u. At this stage, I have identified 3 strategic Air Safety operating risks: recirculating dust obscuration ('brownout') in helicopters, including management of austere helicopter landing sites in Afghanistan; mid-air collisions involving military aircraft, both at home and in Afghanistan; and helicopter collisions with wires and obstructions. Ensuring they attract an appropriate profile and emphasis on their mitigation will be a priority for me in the coming period. (Annex A, Para 36)

v. Going forward, my focus will be on (Annex A, Para 44):

(1) completing transformation of the MAA and implementation of the Nimrod Review recommendations

(2) broadening and deepening Air Safety assurance activities

(3) further refining the regulations set

(4) addressing the balance of risk ownership between Industry and the Dept

(5) continuing to guide and drive behavioural and cultural change

(6) and, preparing for external audit of the MAA in Mar 12

TIMING

3. Routine.

BACKGROUND

4. The MAA was created just over 18 months ago in Apr 10 and this is my inaugural² formal assurance report on Defence Air Safety. The reporting period has been selected to capture the first meaningful period of MAA oversight and also to ensure that this and subsequent annual reports fall after any loose ends of the preceding Planning Round have been resolved and in time to inform actions in the decision stages of the upcoming one.

5. Clearly, the cumulative benefits for the Defence Aviation Environment that will emerge from implementing the recommendations of the Nimrod Review will take time to realise in full. Notwithstanding, the then SofS' unequivocal acceptance of the majority of the Nimrod Review recommendations provided the necessary springboard from which to restructure and revitalize the management of Air Safety and the Dept's approach to minimising aviation RtL. Over the period, the MAA has therefore led an aggressive and innovative programme to drive the necessary behavioural changes required to underpin an engaged Air Safety culture; and, across the regulated community, the early signs are encouraging.

6. Whilst the operating component of Defence aviation was by no means broken, there were significant areas of process, accountability and communication within and between organizations that required review, re-focus and improvement. The instigation of the Aviation Duty Holder (DH) construct has started to address these issues and, in this area, I am beginning to see the desired behavioural and cultural changes occurring that will progressively reduce RtL. Senior operators are now in no doubt that it is they who are personally and legally accountable for reducing and managing RtL across their areas of responsibility. Nevertheless, it is also vital that those organizations and systems that support the DHs become more DH-facing, to enable them to discharge their responsibilities effectively; behavioural change here is proving more pedestrian.

² An interim progress report was submitted to 2nd PUS in Aug 10 – MA/DG/01 dated 26 Aug 10.

7. The Regulator's effectiveness will increase as the 'bow-wave' of implementing new regulation and structures is passed, the MAA future operating model is deployed and the Authority is resourced to the required strength. Notwithstanding, in addition to addressing the shortcomings identified in this report, Defence will need time to embed the regulatory regime being developed by the MAA and to develop a truly engaged Air Safety culture. This is a considerable undertaking when balanced against other Departmental priorities and processes that are primarily structured to deal with delivering Current Operations and resolving the short-to-medium term fiscal challenge. However, Departmental Transformation and implementation of Lord Levene's Defence Reform agenda offer the prospect of achieving an equilibrium that truly accommodates a Safety culture that not only better protects life but, in doing so, also strengthens operational capability through more efficient use of 'low density, high value' resources and less waste. At present, there is no formal mechanism for quantifying the total cost to Defence of air accidents³. Nevertheless, a coarse review of FY 10/11, which was thankfully a relatively 'quiet' year for major air accidents, suggests that the cost to Defence was still: one fatality; 139 reportable injuries, of which 13 were serious; and in excess of £50M in materiel costs. The priority that should be placed on, and the opportunity cost of, measures necessary to underpin and enhance Defence Air Safety must therefore be viewed in that light.

8. I look forward to meeting the challenges ahead in achieving the necessary transformation in Defence Air Safety philosophy and practice and to the essential continuance of strong leadership and support from the Dept's senior leadership.

DG MAA

Annex:

A. DG MAA Defence Air Safety Annual Report 10/11 - Supporting Detail.

³ I aspire to developing a better understanding of the cost to Defence~~4~~ of air accidents in the coming months.

DG MAA DEFENCE AIR SAFETY ANNUAL REPORT – 01 JUL 10 TO 30 JUN 11
SUPPORTING DETAIL

“If you think safety is expensive, try a crash.”

ESTABLISHING THE MAA

1. **Context.** The Nimrod Review⁴ conducted by Mr Haddon-Cave QC (H-C) found UK military air safety practices and competences to be manifestly inadequate. The then SofS' acceptance in Dec 09 of 80 of the 84 recommendations made by H-C required fundamental changes to the way UK military aviation was regulated and delivered, including the establishing of an independent, autonomous and empowered regulator in the MAA. The MAA was established quickly and successfully on 01 Apr 10 and its responsibilities and authority are enshrined in its Charter⁵. The Authority's declared purpose is set out in its High Level Statement, Vision and Mission⁶. In essence, this is to:

- a. Enhance the delivery of Defence aviation operational capability.
- b. Develop the regulation, practices and behaviours that will underpin a military Air Safety culture that is proactive, imaginative, modern and effective.
- c. Become a world class military Air Safety Regulator.

2. **Resources.** An Enhancement Option in PR10 funded the establishment of the MAA on 01 Apr 10. However, the Option was constructed rapidly in the period between the release of the Nimrod Review in Oct 09 and the then SofS' acceptance of the majority of the Recommendations in Dec 10, and was based on a 'best guess' at the time of what the Authority would be required to deliver and how. Moreover, since the MAA's formation, unanticipated pressures have come to bear, not least those prompted by the growing understanding of the scale of the challenge facing the Authority in implementing the Review's Recommendations and driving the accompanying cultural change that they demand across the Defence Air Environment. These pressures range across both manpower headcount and operating funding.

- a. **Manpower.** Agreed and anticipated MAA resource levels were subject to non-discretionary Laurence Protocol manpower profiling in the latter stages of PR10. Therefore, at its formation it was necessary to fill a number of MAA senior leadership, business management and technical posts at financial risk, or the substantive and timely progress achieved in the Authority's first year would not have been possible. Similarly, financial cover for manpower resources required for key activities, such as implementation of the Military Type Certification process and Industry approvals, will not be made available until Apr 12 and progress in these areas has therefore been limited thus far to a best endeavours basis. Elsewhere, the MAA has executed its role to the extent that its currently allocated resources have allowed. Nonetheless, delivering the scale and pace of assurance activity required⁷ remains a significant challenge due to the difficulty encountered in recruiting and retaining suitably qualified and experienced personnel

⁴ The Nimrod Review, 28 October 2009, The Stationery Office.

⁵ [MAA Charter](#)

⁶ [MAA High Level Statement](#)

⁷ Across an MOD working population in excess of 30 000, plus significant elements of the international aerospace sector.

(SQEP) to fill the wide range of highly specialized posts found within the MAA⁸. The most significant shortfall identified thus far is in technical skills at the critical C2 grade working level. Of further note are the pending downsizing programmes for Civil Service and Military staffs, which may serve to exacerbate the challenge of recruiting and retaining SQEP staff of the desired quality.

b. **Operating Funding.** The MAA HLB is hosted within the Centre TLB (CTLB). During the period, the CTLB has been under significant pressure to respond to the combined effects of the wider Defence financial context and its own, severe, internal resource challenges. Unfortunately, by virtue of finding itself resident in the CTLB and despite only being established recently, the MAA HLB has not been spared from the consequences, in terms of budgetary management, control and savings, of such pressures. To date, I have been able to meet the requirements placed on me by the TLB Holder, but I am not sanguine about my ability to continue to respond as positively. I will of course continue to make best efforts to support the CTLB's work to achieve financial balance, including driving efficiencies into the MAA's future operating model (see para 5 below). Nevertheless, I sense that my room for manoeuvre is becoming severely restricted, assuming my outputs are to be sustained at similar breadth and pace in preparation for the external audit the MAA will be subjected to in Mar 12.

3. **Internal Governance.** The governance framework within which the MAA operates is depicted at Appendix 1. Internally, the MAA Executive Board (MEB) is the senior board responsible for the strategic leadership and management of the MAA's regulatory activities. Via oversight of a series of ten complementary projects, the subordinate MAA Development Board is specifically responsible for directing and controlling the implementation of the accepted H-C recommendations in the Air Environment. In accordance with Government guidelines, the Authority has established the MAA Operators Council (MOC), which enables formal engagement at the operational level with all stakeholder groups. Additionally, in an innovative initiative that is attracting favourable comment externally, the MAA's strategic direction is guided and challenged by leading experts in academia and industry who come together to form DG MAA's Safety Advisory Committee (MSAC). The constructs of the MOC and MSAC are as follows:

a. **MOC.** Focussed on RtL, its ownership and management, the MOC is the MAA's senior consultative forum with the regulated community. It has proven to be successful in conveying Authority intent quickly and, reciprocally, in highlighting the needs of the FLCs. A 2* forum, membership of the MOC includes the FLC Operational Duty Holders, the Services' Release to Service (RTS) Authorities and representatives of CJO, DCDS(Cap), CoM(Air) and DSF. Depending on the agenda, Industry representation is also catered for.

b. **MSAC.** The MSAC has been commissioned to provide independent challenge and advice to the MEB. The inaugural meeting⁹ was held on 18 Feb 11, at which I outlined the progress made by the MAA to date and the operating context for the MSAC. The MSAC's membership comprises:

- (1) Air Marshal (Ret'd) Sir Colin Terry – Air Engineer, former Chief Engineer (RAF) and MSAC Chairman.
- (2) Professor Rhona Flin, School of Psychology, University of Aberdeen – specialist in Organizational Safety Culture and Safety Leadership, notably in the offshore oil and gas, and clinical medicine environments.
- (3) Mr Kevin Myers - Deputy Chief Executive, Health and Safety Executive.

⁸ Vacancy rate currently 22% against FY11/12 liability and 28% against PR10 Option.

⁹ MSAC Minutes

- (4) Mr Neil Molyneux – Former H&SE Inspector, independent HSW Act consultant and Independent Safety Advisor to the DESB.

4. **Collocation.** Collocation of the MAA's constituent parts, spread originally over 6 main sites across the south of England, was a major Nimrod Review recommendation. We have made significant efforts and achieved some notable early successes in identifying and securing suitable working accommodation and collocating some 190 staff, at least in the same region, although it took a full year to transfer all technical personnel to MOD Abbey Wood and relocate the majority of operations staff to MOD Ensleigh. Transformation of the disparate legacy organizations that were drawn together to form the MAA is well under way and we are already delivering a much more unified and efficient output. I welcome the recent decision to migrate all CTLB staff from Bath to Abbey Wood (North) (ABW(N)), which gives much needed certainty in respect of the MAA's ultimate location, although at this stage timescales remain uncertain. I am confident of even greater efficiency and effectiveness once the full collocation of MAA staffs at ABW(N) is complete, hopefully by the end of FY 11/12 at the latest.

5. **Future Operating Model.** With the aim of going beyond mere implementation of the Nimrod Review recommendations and, not least, in acknowledgement that Departmental resource pressures are unlikely to ease in the short-term, I commissioned work late last year to design a future operating model for the MAA (MAA(F)) that will better facilitate the achievement of our Vision and Mission. My intention was that the model would build on organizational best practice from both the public and private sectors and exploit global regulatory and service delivery experience where applicable. Its primary objectives will be: firstly, to deliver effective, integrated regulation and assurance; and, secondly, to promote and elicit enterprise-wide air safety conscious behaviours from both Defence and Industry stakeholders. This very important work will also lead ultimately to the consolidation of the MAA as a mature, world class regulator. Work with a leading organizational design agency has now concluded and I have defined a model (depicted at Appendix 2 and, in 'rich picture' form, at Appendix 3) based on centralized strategy, risk assessment, programming and planning functions supporting better integrated oversight, approvals, permissioning and regulation functions. Implementation of the MAA(F) model, which has been designed from the start to be scalable and to exploit flexible working practices, has commenced and will be achieved in the latter part of this FY as an integral activity in the final phase of the Authority's collocation in ABW(N).

IMPLEMENTING THE RECOMMENDATIONS OF THE NIMROD REVIEW

6. The MAA is responsible for implementing the 76 of the accepted Nimrod Review recommendations that are specific to the Defence Air Environment¹⁰. Implementation of these recommendations has been grouped into 10 projects and associated workstreams, for which formal project plans and governance arrangements are in place. I have set the target date for implementation of all of these recommendations, save for final collocation of the Authority, as the end of Oct 11. Nevertheless, in most cases implementation will merely put in place the necessary structures and processes that are required to underpin an appropriate Air Safety environment – but the essential cultural and, thereby, behavioural changes required across the Defence air domain are significant and will inevitably need longer to develop and mature. In general, the regulated community understands the need for, and is welcoming of, the necessary changes, but some areas have been more apt than others to resist what they perceive as an assault on their power and authority. I am continuing to work with MOD Centre and the DE&S to explain, educate and elicit the appropriate DH-facing behaviours and working practices. The responses from the FLCs have exhibited tolerable variation for these early stages in the process, with Navy Command demonstrating some notably constructive engagement. The following paragraphs detail progress in critical areas.

¹⁰ Implementation of the remaining 4 recommendations is the responsibility of DBR under the H-C Wider Aspects work.

AVIATION DUTY HOLDER CONSTRUCT

7. H-C concluded that the MOD's legacy airworthiness regime was manifestly unsatisfactory as there was no clearly recognizable structure within which those who carried RtL fully understood the extent of their responsibility, the nature of the risks and were accountable for managing them appropriately. Moreover, those who should be accountable did not necessarily have the authority or resources needed to exercise their duties properly and mitigate the risks they held. To begin to address this critical and systemic shortcoming, I have put in place an Aviation Duty Holder (DH) construct¹¹ that came into effect on 01 Jan 11 and which directs where and in whom responsibility and accountability for managing RtL lies. DHs are a limited number of named senior operators at 3 prescribed levels¹² who are personally and legally accountable for managing RtL arising from the operation of military Air Systems within their areas of responsibility. They are routinely vested with Full Command authority and responsibility for their subordinates and have direct control over their subordinates' activities. The relevant regulation requires such DHs to be authorized by the Service Chiefs of Staff, as *de facto* Senior Duty Holders (SDH), and trained and endorsed by the MAA.

8. Implementation of the aviation DH construct and validation of the Level 1 structures within each FLC has been achieved swiftly and, given the scale of the shift in responsibilities and authorities, with only minor teething problems. Refinement of structures and processes is being guided by the MAA assurance programme, which assesses whether proposed solutions are workable and consistent with regulatory principles. More widely, there is much work still to do to inculcate fully the required behaviours and responses in supporting organizations, such as PTs, resource planning and programming staff and Industry, but progress is being made. In parallel, the Regulator's role is beginning to transition from one of implementation, advice and guidance towards one of assurance of compliance through inspection and audit. The aviation DH construct is the cornerstone of the new Defence Air Safety environment and its role as a profound cultural and behavioural change driver cannot be overestimated.

AIR SAFETY RISK MANAGEMENT

9. In his report, H-C identified a number of problems with the management of RtL and criticized legacy safety management systems of varying maturity and effectiveness across the Defence Aviation Environment. He made 7 specific recommendations on risk, most notable that '*The MAA shall facilitate and ensure a comprehensive, coherent, consistent and meaningful assessment of Aviation Safety in terms of Risk to Life across all lines of development in Defence*'. To address these criticisms, the MAA has positioned Air Safety Risk Management as the central pillar of a revised Aviation Safety Management System (ASMS). The MAA Air Safety Risk Management Regulation¹³ mandates a standardized Defence Aviation risk register and hazard risk matrix, underpinned by a clearly defined risk referral and escalation protocol to support DHs in managing their ASMSs in a coherent and consistent manner. The adoption of this common process is essential for the higher control and management of Air Safety risk and will lead to senior decision makers being able to more-effectively direct the allocation of Defence resources. I am also taking steps to ensure that DHs, together with their supporting staff, are SQEP in the employment of risk management techniques, including through the DH Air Safety Course (DHASC – see below).

REWRITE OF AIR SAFETY REGULATIONS

10. H-C was scathing in his criticism of legacy Air Safety regulations, which he deemed impenetrable and not fit for purpose for either the Regulator or the user community. He highlighted their shortcomings as being overly complex, repetitive and overlapping in nature, and containing a mixture of policy, regulation and guidance that was prone to misinterpretation and used *post hoc* to

¹¹ RA 1020

¹² Senior Duty Holder (SDH) (COS), Operational Duty Holder (ODH) (2*), Delivery Duty Holder (DDH) (typically OF5).

¹³ RA 1210

justify action already taken. I therefore commissioned a very significant body of work, in an aggressive timescale¹⁴, that was aimed at developing and delivering a completely revised suite of Air Safety regulatory publications, including an overarching governance document that is focussed on RtL. This seminal work has necessitated a fresh approach to the structure and method of regulation delivery, as well as the content of current military aviation regulations, informed by analysis of global best practice from other military and civil regulators and related organizations.

11. Supported by NiteWorks¹⁵, who have provided technical and editorial support, the project had by the end of May delivered a unified, fully integrated and coherent set of Military Regulatory Publications (MRP) applicable equally to Defence and our Industry partners¹⁶, by which time some 4000 pages of legacy UK Defence aviation regulations, policy and guidance had been reduced by a third and collated and distilled into clearer and more usable, discrete Regulatory Articles, Policy and Guidance¹⁷. Following internal QA, the new publications were rolled out at the end of Jun and came into effect on 01 Aug 11. Going forward, over the next 6 months my aim is to further refine the MRP and, financial resources permitting, port them to a modern, internet-hosted digital platform with a graphical user interface and integrated Google-like search facilities.

AVIATION SAFETY CASES

12. H-C identified that the MOD had allowed a plethora of different approaches to, and uses of, Safety Cases (SCs) to emerge and that a culture of 'box-ticking' had evolved. In addition, the volume and complexity of the documentation had grown exponentially, with SCs being used in the Defence Aviation Environment primarily to underpin platform design, rather than support the operator at point of use. In order to address these structural weaknesses, I have set work in hand to radically overhaul the approach to aviation SCs, with their purpose defined as delivering to the DH clear and identifiable, living safety evidence, underpinned by an independently assured aircraft certification system to assure the technical safety of a platform type. Thus, the technical safety assessment of the equipment DLoD will form but one element of a comprehensive, concise, accessible and easily digested aviation SC that supports pro-active, through-life management of platform type, pan-DLoD, Air Safety risks. The SC will also form the basis upon which the ODH will sign an annual Safety Statement, declaring that he is content that RtL are at least tolerable and ALARP. The regulations defining this revised approach to aviation SCs are currently in final draft form and will be integrated into the recently promulgated MRP by the end of Aug 11.

MILITARY TYPE CERTIFICATE

13. In his examination of aircraft certification practices, H-C contrasted the military Release to Service (RTS) process, which is underpinned by a SC, with the relative simplicity and clarity of a Civil Aviation Authority (CAA) Type Certificate (TC). There are obvious parallels in the effect they are both trying to achieve, through setting boundaries within which the equipment can be used safely by the user. However, the RTS is significantly more than a statement that the platform is technically safe and built to recognised standards, as it aims to offer the DH a greater level of assurance across the DLoDs that the Air System will be safe to operate. Nevertheless, to address H-C's observations, the MAA has developed a new Military Aircraft Certification Process¹⁸, which provides a logical framework within which to scrutinize technical evidence used to support RTS Recommendations. Importantly, the new process is driving towards a requirement for formal endorsement of a system's airworthiness strategy before Main Gate, to ensure there are 'no

¹⁴ Experience of other regulators indicated a 24 to 36 gestation was not unusual. Phase 1 of the MAA MRP was designed and delivered in 6 months.

¹⁵ An MOD/Industry partnership drawing on best athlete principles to form task-organized project teams.

¹⁶ Hitherto, flying regulations for contractors were articulated in a discrete publication (AvP67) that, over time, had diverged significantly and unnecessarily from the regulations applicable to mainstream Defence aviation activities.

¹⁷ [RN 07/11 - MRP](#)

¹⁸ [RN 03/11 - Certification](#)

surprises' downstream when the transition point from design and manufacture to in-service is reached, a discipline that is manifestly lacking today.

PAN-DEFENCE AVIATION ERROR MANAGEMENT SYSTEM (DAEMS)

14. The reporting and investigation of human error in aviation has been proven to be an essential contribution to avoiding highly expensive (in terms of both loss of life and materiel) aviation accidents and incidents, and more routinely to improving the efficiency of aviation operations. A system of defined error management processes and models was identified by H-C as an essential prerequisite for improving the MOD's performance in this important area. DAEMS will drive the identification and understanding of the erroneous actions of individuals within a just reporting culture. Unlike previous, discrete error management programmes which, whilst of value, have been confined in their application to maintenance organizations, DAEMS will expand the concept to encompass the '4-worlds' of Aircrew, Air Traffic Management, Maintainers and Aviation Support Staff.

15. Nevertheless, the practice of active error management is neither intuitive, nor automatic, and needs to be inculcated and led. The key development requirement lies in the Training and People DLoDs, in order to ensure that the right people receive the correct training through a coherent through-life strategy. To set the conditions required for the necessary Just Culture, all personnel involved in Defence Aviation will require DAEMS foundation training. The roll-out programme of initial training, which will cover the Single Service HQs, 27 main operating bases, ship-embarked aviation, AAC units in the field and 15 DE&S PTs (an initial target population of up to 20,000 personnel), will take between 24 and 36 months, beginning in Sep.

16. **DAEMS Field Development Phase (FDP).** The DAEMS FDP, delivered with external technical support, was a live refinement of DAEMS tools, processes, guidance and training requirements, delivered for the first time in a 4-worlds environment. From Oct-Dec 10, around 1000 personnel at RNAS Culdrose received foundation training in Human Factors and Error Management. Of these, some 75 personnel were also trained as Occurrence Investigators and a further 30 personnel trained as Review Group members, whose role is to verify investigation findings and uphold a Just Culture. DAEMS went live at Culdrose on 4 Jan 11 and in the short period following the volume of Air Safety occurrence reports raised has, not surprisingly, remained unchanged, but there have been 8 full investigations - a much larger number than anticipated. This volume of full DAEMS investigations is very positive and, in demonstrating that personnel at Culdrose have embraced the need to determine the root cause of error through the investigative capability offered by DAEMS, offers cause for optimism that more 'near misses' will now be identified and addressed sufficiently early to avoid downstream accidents. In parallel with rolling out DAEMS across the Defence Aviation Environment, I intend to explore feedback mechanisms that, *inter alia*, might assist in quantifying cost avoidance as a benefit of DAEMS implementation and effect.

CONTINUING AIRWORTHINESS MANAGEMENT ORGANIZATION (CAMO)

17. Examining the use of air systems through life, H-C took inspiration from the civil aviation model and recommended the application of a DH construct, supported by a Chief Air Engineer and a Senior Operator. Whilst H-C also identified a requirement for a Continuing Airworthiness Management Organization (CAMO) within the DH construct, directly in support of the DH, he did not explain in any detail what the responsibilities of the CAMO should be. We therefore established CAMO Steering and Working Groups to provide such clarification, working to the fundamental principle that the CAMO was to be situated within the DH's organization and not part of the platform PT. This is analogous to the civil regulatory model. However, it was recognised that platform PTs must continue to define and authorize the type-specific maintenance and support policies, author the *approved data*¹⁹ and *manage contracts* for maintenance, component repair and

¹⁹ Such as maintenance schedules, structural and component life, repair policies and techniques.

overhaul. Whereas, in delivering airworthiness management for the DH's aircraft, the CAMO has primacy for managing *continuing* airworthiness, is able to task Forward or Depth maintenance organizations directly as required, and subsumes the type-specific Role Office continuing airworthiness functions and responsibilities. This simple model fits comfortably where there is one unit with one aircraft type, but could create tensions with more complex operating models. Consequently, in rolling out the CAMO construct across the FLCs, the MAA has developed a solution that can be adapted to fit the unique operating context of each DH²⁰.

MILITARY AIR ACCIDENT INVESTIGATION BRANCH (MAAIB)

18. Work during the reporting period to determine the structure, location and *modus operandi* of an independent MAAIB culminated with the establishment of the Branch, collocated with the civil AAIB at Farnborough, on 01 Apr 11. From my perspective, the key requirement was to establish a sustainable and demonstrably independent military air accident investigation capability that capitalized on existing expertise, without compromising Defence's ability to respond to military air accidents world-wide, including those in operational theatres. By securing collocation with the AAIB at Farnborough, the MAAIB will be best placed to take advantage of the established world-wide reputation of the AAIB as acknowledged leaders in the field of Air Accident Investigation, whilst preserving expertise in the unique characteristics of military aviation such as high energy systems, ship-borne operations, weapon systems and Aircrew Assisted Escape Systems. This initiative will bring further mutual benefits through the use of common 3rd party specialist providers – notably in the fields of marine salvage, aircraft recovery, aviation pathology, aviation psychology, and forensic and metallurgical support.

AIR SAFETY ASSURANCE

19. In order to underpin the safe design and use of military air systems, I have implemented a comprehensive, and at this stage deliberately intrusive, assurance programme of inspections and audits across the technical and operating airworthiness spectrum. Nevertheless, my intention is that this activity complements, and ideally ultimately becomes secondary to, internal assurance activity in DE&S and the FLCs, thereby underscoring the alignment of authority, responsibility and accountability. Initial MAA assurance activity during the period has evaluated selected DH ASMSs and secondary source evidence to enable audit and inspection visits to undertake risk-led assurance activities.

20. The overall assurance programme is designed to deliver over a 24 month cycle. However, unsurprisingly, the novelty of these early audits has driven a significant resource requirement to scope, plan, execute, assess and report. To ensure the audits are conducted in a uniform and repeatable manner, 26 MAA personnel have been trained in audit principles by an external organization and accredited at BSI level. For HQ level audits, the audit reports and any associated Corrective Action Requirements inform my personal interventions with ODHs, if and when encouraging their priority attention to specific issues is warranted. In keeping with a risk-based approach to assurance, these reports also inform my judgements on an appropriate re-audit timeframe²¹.

OVERSIGHT OF AIR SAFETY

OVERSIGHT PROGRAMME

21. My staff are developing a comprehensive oversight programme that is designed to examine, audit and assure all areas of Defence aviation, including FLCs, Release to Service Authorities (RTSAs), DE&S PTs and Industry. The conduct of this activity is being prioritized on a risk basis,

²⁰ [RN 09/11 - CAMO](#)

²¹ [RN 02/11 - Audit Follow-up](#)

to focus MAA interventions on those organizations and areas of Defence Aviation activity that potentially pose the greatest RtL, although the method of doing so is primarily subjective and immature in these early stages²². In parallel during the period, in accordance with the requirements placed upon me in the MAA Charter, I sought to provide Regulator oversight of the SDSR, PR11 and '3 Month Exercise' processes. However, balancing the scale of the MAA's extensive oversight remit against organic capacity will be a constant prioritization challenge.

22. At this stage, understanding of unit level operations remains weak and we are yet to examine the RTSAs, DE&S HQ functions, the CAP area and Industry in any detail; only when a more comprehensive FLC assurance programme and review of activities contracted by DE&S have been completed will a fuller picture be obtained. Moreover, there remain a number of hybrid organizations, such as QinetiQ, Defence Ranges and contractors' activity in support of exports that, although formally under MAA regulation, are not currently assured adequately by the MAA, FLCs or DE&S. Whilst I am confident that in steady state the MAA assurance programme will provide an effective and essential contribution to understanding and managing Air Safety risk across the Defence Air Environment, there is clearly a considerable amount of work yet to be done to achieve such an outcome. On the evidence gained thus far, I can offer SofS **Limited Assurance**²³ of Defence Air Safety. My initial estimate of time to Substantial Assurance²⁴ is a further 18 to 24 months.

OVERSIGHT OF DEPARTMENTAL POLICY SETTING AND RESOURCE ALLOCATION

23. In keeping with the MAA's Charter, MAA staff observed DE&S Air Domain and FLC PR11 Screenings and secured sight of all issued PR11 & SDSR Options. Additionally, I encouraged senior Aviation DHs to provide me with feedback on the potential risks to Air Safety posed by SDSR and PR11. However, such feedback was patchy and generally lacked adequate analysis of such risks that would potentially be communicated to them indirectly by PR11 Options. I judge that this early weakness in engagement was more likely to be a reflection of the immaturity of the processes by which DHs execute their new responsibilities, rather than their being sanguine about the latent risks. The intent of our PR oversight activity was to ensure that the Defence Board (DB) and Ministers could be made aware of the level of Air Safety risk they might be required to carry across the Dept and, therefore, be better informed to judge what level of compound risk they were willing to tolerate. Experience during PR11 gave rise to the following observations:

a. At the time of my submission²⁵ to the DESB in support of the Board's consideration of Safety risks in PR11, when many Options were still being developed and sentenced, it was impossible to quantify in meaningful terms the total increase in Air Safety risk. Nevertheless, I reported that it was clear that, even having made reasonable assumptions on the effect of routine mitigation, there was very significant potential for compound Air Safety risk to increase materially. Now that PR11 has concluded, the situation is much the same. The quantity and scale of the measures taken in PR11 cannot fail to have some effect on Air Safety, yet that effect has not yet been quantified in any useful way.

b. The most significant strategic risk to Air Safety likely to be posed by PR11 was the cumulative effect of the proposed manpower reductions across the FLCs and DE&S and the associated challenge in ensuring SQEP were retained and engaged in key Air Safety, particularly technical, roles. That risk is extant. For example, the impact of the significant

²² A proprietary MAA tool to support risk-based planning of assurance activity is under development and will feature as a key component of the centralized planning function in MAA(F).

²³ System of internal control operating effectively, except for some areas where significant weaknesses have been identified – DIA Assurance Classifications (Oct 10).

²⁴ System of internal control established and found to be working effectively with some minor weakness – DIA Assurance Classifications (Oct 10).

²⁵ DG/03/04/DESB dated 10 Jan 11.

reductions directed in DE&S manpower, and the means by which they will be achieved, have not yet been tested against the SQEP requirement for air platform PTs – indeed, the ability of the PTs themselves to demonstrate their baseline requirement is proving to be somewhat immature, to say the least. Consequently, I am working with CoM(Air) to promote in the PTs the requirement for a better understanding of their SQEP needs going forward and to support their endeavours in this regard.

c. Unless specifically championed, safety-related measures continue to be an easy, and inadequately defended, target for in-year and PR savings - the PR11 Option to delete the Tornado Collision Warning System (CWS) programme, despite the Dept's longstanding commitment to equip the Tornado fleet with such a system and the extant compelling case for doing so, being an obvious example.

d. The pace and scale of change driven by SDSR & PR11, and structural flaws in the underlying Departmental processes, severely restricted opportunities for Aviation DHs, the Regulator and decision makers to fully analyze the implications for Air Safety and, if required, make substantive interventions.

24. The situation deteriorated rapidly in the closing stages of PR11 when, characteristically, the pace of raising, amending and selecting savings Options outstripped the ability of the stakeholder engagement process to keep up and the detail of which was opaque to all but those closest to the process. Moreover, handling restrictions surrounding the final submissions to the DB and Ministers, and the subsequent decision making process, excluded visibility for all but a very small circle that, amongst others, did not include the Air Safety Regulator. Subsequently, there was little to indicate that the Air Safety risks identified by the DESB and any subsequent Air Safety related Options had been examined in an informed and adequate manner. Whilst this may have occurred, my examination of the relevant papers has not illuminated an audit trail to provide evidence of this. On the contrary, my enquiries thus far suggest that the importance of giving due consideration to the downstream consequences, both direct and indirect, of measures with the potential to impact on Air Safety was not recognized by the authors of the DB and Ministerial submissions, nor accorded formal and adequate consideration by senior decision makers. The focus on achieving a viable bottom line distracted most involved in the process from what were perhaps regarded, if only subconsciously, as 'marginal issues', such as Air Safety. Given the dire financial context in which PR11 was conducted, it is perhaps understandable that this was the case. Notwithstanding, I am consequently unable to provide assurance that risks to Air Safety were identified, understood and mitigated satisfactorily in SDSR/PR11.

25. Following my intervention²⁶ with SofS in relation to the Delete Tornado CWS Option and the subsequent re-examination of that Option's viability, 2nd PUS has commissioned work to identify and implement planning round process improvements to ensure that such measures are handled more appropriately in future. I recommend that such work is completed and any associated improvements are in place in time to support PR12 Stage 3, at the latest. In the meantime, my staff have again engaged with Def Res and Hd Equip Prog staffs to support their efforts to ensure that their PR12 Instructions cater adequately for Safety-related Options and their handling. However, I suggest that effecting the necessary change in behaviours more widely will continue to demand unequivocal senior leadership and priority attention for some time to come.

FLC AIR SAFETY AUDITS

26. The first three of a rolling programme of FLC audits, focussing initially on the HQs of JHC, No 22 (Trg) Gp and No 1 Gp, have been completed. These initial audits were complex to plan and consumed significant resource, not only during the audits themselves, which reached down into a sample of subordinate units to examine the implementation of DH Air Safety Management

²⁶ MAA DG/03/01/MOD STRAT dated 06 May 11.

Systems (ASMSs) at the point of delivery, but also during the planning and preparation phases. Necessary activity during the preparatory phases included identifying, collating and reviewing pertinent orders, instructions, plans and risk registers to determine their coherence and inform selection of audit objectives. Unsurprisingly, these initial audits revealed compliance with extant regulation and MAA Regulatory Instructions in some areas, but significant deficiencies in others. The first two HQ-level audits²⁷ conducted during the period were graded 'Amber', requiring a re-audit in not less than 12 months, whilst the third²⁸ was graded high end Yellow, with a 12 to 18 months re-audit window. In one sense, these gradings, driven as they were primarily by immaturity of the HQs ASMSs and Risk Management processes, are not altogether surprising given the major Air Safety regulatory changes that have occurred during the period. However, in another, they are further evidence of the fragility of the legacy approach to Air Safety in the round, as the regulatory requirement, eg for an ASMS, is far from new and yet, in several instances, such a system had to effectively be created from scratch prior to the recent MAA audits.

27. Positively, there was an obvious sense of commitment from the DHs being audited and clear evidence of significant effort having been applied in a relatively short time to transition to the new Air Safety regulatory and governance structures. Nevertheless, areas of particular weakness included: the identification and direct management of RtL; implementation of ASMSs and associated Air Safety Steering and Working Groups; interfaces with and linkages between support contractors, DE&S, MOD Centre, Chief Air Engineers and Senior Operators. Indeed, appropriate emphasis on, and the management of, RtL stood out during the reporting period as the weakest area of understanding across Defence and it will take time to align the FLCs, DE&S, Centre staffs and other organizations to the same level of knowledge and to a position where they are acting together to implement and exploit ASMSs effectively. A strong lead from the ODHs themselves will be an essential enabler of this activity. Where appropriate, the MAA is providing assistance and the recently established DHASC will in the coming months provide Aviation DHs and other senior leaders with specific training to equip them better to identify and manage RtL in the activities for which they are responsible.

OVERSIGHT OF DE&S

28. Given the scale and diversity of the DE&S organization and its outputs, it should come as no surprise that the MAA is facing a considerable challenge in resourcing the required oversight activity in parallel with the necessary revision of regulations and Industry approvals. This challenge has been exacerbated by our risk-based decision at the end of last year, based on evidence collated thus far, that all Air System PTs are now to be audited on an 18 month cycle (vice the historic 36 months). Nevertheless, whilst specific and systemic weaknesses are identified below, I have already observed that the DE&S is beginning to adjust its internal organization and governance systems to enable it to better work on behalf of, and more closely with, DHs in the management of Air Safety. However, there remains some work to be done to achieve the necessary transition from PTs' focus on equipment 'business' risks (in terms of time, cost and performance) to one that includes active support of the ODHs as they discharge their mandate to own and manage RtL.

29. Tangible evidence of positive change was the previous CDM's acceptance of my recommendation to reorganize the senior DE&S airworthiness chain to include CoM(Air), a senior qualified and experienced air engineer, vice COO. CDM has thus delegated airworthiness authority to CoM(Air), who leads the management of airworthiness across that TLB, supported by the DE&S Airworthiness Management Board and the newly formed DE&S Airworthiness Team, who will provide internal assurance. Significant observations arising from MAA assurance activity conducted thus far are listed below:

²⁷ JHC and 22 (Trg) Gp.

²⁸ 1 Gp.

a. **Project Team Audits.** The MAA audited 18 DE&S PTs in the reporting period. A number of common weaknesses in process were identified, as follows:

- (1) Inadequate management of key airworthiness and safety-related documents and records.
- (2) Lack of essential independent safety advice in constructing safety arguments.
- (3) Lack of effective risk management and decision making, compounded by actions arising from audits, safety panels and other independent reports remaining unaddressed.
- (4) Contracts that did not specify appropriate MOD safety or design standards, or the adoption of alternative standards that had not attracted the necessary endorsement of the relevant 2* Operating Centre Director.

b. **Review of Platform Safety Cases.** Shortly before the formation of the MAA, the Chairman of the then Military Aviation Regulatory Safety Board (MARSB) sought assurance from CoM(Air) that the weaknesses in the Nimrod SC were not replicated elsewhere. CoM(Air) therefore enlisted the assistance of the MAA in conducting a series of SC diagnostics, concentrating on those platforms identified by DE&S Operating Centre Directors as being most at risk. Examination of in-service platform SCs from the Helicopter and Air Support Operating Centres (a total of 9 aircraft types) exposed common shortcomings as follows:

- (1) Poorly created, managed and maintained SC arguments with incomplete supporting evidence to underpin them.
- (2) Inadequate SC Reports with little or no independent scrutiny.
- (3) Safety Management Plans in a variety of formats that did not contain adequate information.
- (4) Inconsistency in the use of hazard logs.
- (5) A high proportion of hazard logs managed by external contractors due to a lack of organic PT resource.
- (6) Lack of rigour in PTs' declarations of risks being ALARP, compounded by the lack of application of a common ALARP strategy across DE&S Operating Centres.
- (7) Poor configuration control of key safety documents, in some cases with multiple iterations of the same documents in use.

At the MAA's behest, in response to these findings DE&S PTs developed internal action plans, the majority of which were reviewed by their Operating Centre Directors and endorsed by the relevant ODHs. As part of a 'rich picture' assurance strategy, the MAA will continue to assure progress against these action plans and now includes a routine 'health check' of SCs for all platforms as part of the planned PT audit cycle.

NEW PLATFORM CERTIFICATION

30. The establishment of the MAA has seen a major shift in the method by which new and upgraded air systems are declared technically fit for service. MAA specialist engineers have been

engaged in maintaining oversight of PT compliance with, for example, existing airworthiness Defence Standards (Def Stans). However, the majority of new Air System projects are beyond the Concept and Assessment phases of acquisition; thus, we find ourselves engaging in the platform certification process later than desirable. The bulk of the current assurance activity has therefore focussed on assisting PTs in applying the principles of Certification as appropriate to the stage of development of their projects. Significant findings from the reporting period's platform certification assurance activity include:

- a. Increasing involvement with the latter stages of the Nimrod MRA4 programme, as the PT's advertised RTS Recommendation milestone approached, highlighted a significant number of design standard compliance failings, which, prior to MAA involvement, were not all well understood. It is likely that the aircraft would have entered service initially with significant limitations. Nevertheless, had the certification process run to its conclusion, MRA4 would have been subject to the most carefully scrutinized certification process of any UK aircraft procurement project thus far.
- b. Elements of the fuel systems fitted to Voyager (FSTA) and AirSeeker were found to be non-compliant with the design requirements of Def Stans, which require the design of refuelling systems to be free of couplings in hazardous zones (such as in close proximity to potential sources of ignition), in order to mitigate directly the risk of fire/explosion. The PTs are now actively involved in seeking resolution of these issues.
- c. The AirSeeker design is based on the USAF RC-135 aircraft, the origins of which can be traced back to the original C-135 design of the late 1950s, and a number of ageing aircraft issues have already been identified with AirSeeker. It will therefore be necessary to conduct a full ageing aircraft audit, an activity that the US authorities do not yet undertake generally, in order to identify any other latent risks before the platform enters service. The UK regulatory requirement to do so addresses the risks inherent in procuring a second hand aircraft with little knowledge or understanding of its design principles, prior usage and life consumed. **(S27)**.
- d. The MAA has identified shortcomings with regard to the fatigue testing method for Atlas (A400M), as it is non-compliant with the Def Stan requirement for representative load testing. This testing risk is exacerbated by a limited aircraft usage tracking system, which will count only 4 distinct sortie profiles, with no substantiated analysis of the severity of sorties available until after the fatigue test is completed in Jan 13. These shortfalls represent an un-quantified risk to the certification of the platform's life, which could translate into a restricted cleared life on initial entry into service.

31. My staffs are actively engaged with the Voyager, A400M and AirSeeker PTs to provide them with specialist regulatory guidance as they seek to gather the necessary evidence to support platform certification. Most of the issues require the PTs to build a body of evidence to satisfy the designated DE&S Type Airworthiness Authority (in this case Director Air Support) that a suitable alternative standard or method of compliance has been achieved. The MAA is closely involved in monitoring this process to provide assurance that the overall safety and airworthiness of the platforms is not compromised. If the PTs are unable to provide sufficient evidence of compliance with equivalent standards, or it proves impossible for the PTs reasonably to comply, then I may be required to withhold endorsement of all or part of the subject RTS Recommendations. It would then be for the relevant PTs to analyse the hazards and develop additional risk mitigations sufficient to enable the Senior DH to accept and manage the residual risk.

INDUSTRY APPROVALS

32. The MAA undertakes assurance of the many organizations Defence contracts with for the design, maintenance and operation of military air systems. This assurance activity is primarily conducted by means of the Maintenance Approved Organization Scheme (MAOS) and Design Approved Organization Scheme (DAOS). There are currently 100+ organisations seeking initial DAOS approval, or amendment to existing approvals, but there remains little incentive for DAOS applicants to provide timely or robust expositions to the MAA; indeed, PTs routinely place contracts with Industry prior to the granting of DAOS approval. Similarly, MAOS is being expanded to include the maintenance of critical components and contracted FLC maintenance organizations. The Lawrence Protocol manpower profiling of the PR10 Option creating the MAA currently militates against the Authority undertaking this scale of specialist assurance activity and, by way of short-term mitigation, CAA International (CAAi) has been contracted to undertake a limited sample of audits. In the last year the MAA, with CAAi assistance, undertook 27 MAOS and 55 DAOS audits, of which 19 were for initial approvals and 46 formed part of the ongoing surveillance programme; the following observations were made:

- a. **MAOS.** The MAOS surveillance programme has highlighted that it is not uncommon for maintenance organizations to have inadequate procedures, or to fail to follow the procedures that are in place. Specifically, organizations have been identified with poor internal procedures for implementing Safety and Quality management processes, including tool control and test equipment calibration procedures. Maintenance data was found to be not underwritten by the relevant MOD airworthiness authority, or documentation was poorly controlled or obsolete. There were also occurrences of organizations being unable to effectively demonstrate the competence of their own personnel, or their provision of suitable training.
- b. **DAOS.** The most common failure identified through the design approval process was the lack of justification for closing actions (including the sentencing of risks and hazards) when conducting design reviews. Other common observations included: failings in the management of safety, design, configuration control and quality; and inadequate test schedules, test results and audit trails. There were also examples where Design Organizations (DO) had modified equipment Certificates of Design with no evidence of agreement by the sponsor PTs.

33. These are very significant deficiencies, as DHs must rely on DAOS approvals and assurance activities to underpin their management of RtL where their activities are supported by external organizations that they do not have direct control over. Therefore, it is imperative that the planned uplift in MAA manpower resource for Industry approvals occurs as planned by Apr 12, to enable a suitably comprehensive and robust DAOS to be implemented. Going forward, clarity is required in the relationship between the Regulator and the Defence Industry in design, maintenance and flight test scenarios when operating under MOD approvals and contracts. The current position of MOD holding a degree of liability for safety of life, whilst regulating, approving and providing so-called 'command' oversight of Defence Industry activity, runs against the grain of the principles of independent regulation. This area will be a focus for the MAA in the coming months.

AUDIT OF INDUSTRY FLIGHT TEST ORGANIZATIONS

34. The MAA Flt Test directorate has recently audited 22 organizations approved by the MOD for flight test of military systems; with a few exceptions, the majority of these non-FLC organizations demonstrated a satisfactory level of compliance against the legacy regulatory framework²⁹. However, there is some evidence that over recent years the freedom accorded approved organizations under that framework, particularly at the margins of core Defence support, such as

²⁹ AvP67 – Regulations for Contractors.

display flying and training of export customers, has created an assumption in some quarters that there is an automatic right of access to the Military Register and the privileges thereof, including 3rd party supervision. I am keen to regain an appropriate balance between MOD support to industry in relation to, for example, export sales and the necessary governance and assurance to ensure that risk transfer to the Dept is minimized. Greater inter-departmental co-operation is required before acceptance that the MOD (and therefore the MAA) will approve and underwrite flight test operations for all foreign military sales; and trials and training programmes must be formalized and agreed prior to contract, with charges levied where appropriate. This re-balancing will be facilitated both by the MAA Flt Test directorate being more fully integrated into MAA(F), the adoption of a common set of regulations for Defence and Industry in the MRP and more effective scrutiny of proposals for activities conducted on the Military Register. The underlying principle will be to ensure that accountability lies where it is most appropriate with, in return, greater clarity and flexibility offered by a fit for purpose regulatory framework that enables Industry to be masters of their own destiny.

AVIATION SERVICE INQUIRIES

35. During the reporting period, but prior to my appointment as Convening Authority (CA) for aviation Service Inquiries (SIs) on 1 Aug 10, an SI was convened by Comd JHC into an accident involving a Merlin HC3 in Afghanistan on 26 Jun 10. Subsequently, I have convened 2 SIs and have taken steps to improve the pace of the Inquiries, along with rigour and clarity in identifying, categorizing and articulating causal factors; the associated new Report structure has also been pulled through into an Executive Summary (ES) covering a narrative of events, the SI Panel's Findings and Recommendations and my concluding remarks as CA. As a feature of future aviation SIs, I will retain this structure and the early internal release of an ES, prior to redaction and release of the full report, with the aim of communicating as expeditiously as possible to the operators essential information to prevent recurrence. Progress of the SIs I have convened is as follows:

- a. A SI investigating a fatal accident involving a Chinook HC2A in Afghanistan on 10 Aug 10 was concluded in a little over 6 months. Having overcome an initial degree of resistance, I disseminated immediately a Restricted ES to the operator community via their DHs, including an assessment of factors contributing to the accident and recommendations to prevent recurrence, in order that the lessons are swiftly learnt. A copy of the ES was made available to HM Coroner and, in advance of the Inquest, the NOK have been provided with a redacted version and an accompanying brief by the SI President under privilege. **(S22)**. I have endorsed the Panel's recommendations with respect to training, supervision and management of RW operations in Theatre and the MAA will play an active role in ensuring the recommendations are implemented without undue delay
- b. A second SI, convened to investigate the accident involving a Tornado GR4 off the coast of Scotland on 27 Jan 11, is still under investigation. **(S22)**. Nevertheless, I have instructed the SI Panel President to plan on presenting me with a preliminary report dealing with events following **(S22)**, about which there is greater understanding, by the end of Aug. In the interim, I have provided advice to the Aircraft Operating Authority and recommended he reviews training for handling of specific emergencies.

STRATEGIC AIR SAFETY OPERATING RISKS

36. Prior to formation of the MAA, ACAS, in his capacity as Chairman of the MARSB, reported annually to the DESB on the most significant Aviation Risks. Subsequently, the MAA has issued Air Safety Risk Management Regulation to standardize and instruct the Defence aviation community on the management of such risk; this regulation is being reinforced through MAA-led training of the DH community. Internally, the MAA is beginning to synthesise data in order to identify Air Safety risk trends that require upstream interventions. However, this analysis does not absolve DHs of the need to be proactive in analysing and exploiting occurrence and maintenance data for themselves. Whilst the Air Safety Risk Management System is not yet of a maturity that significant risks can be readily identified through objective analysis, the following risks, identified through subjective analysis, remain of concern.

a. **Brownout.** Brownout obscuration is caused by recirculating dust as helicopters approach the ground, preventing crews from picking their exact landing spot and/or avoiding hazards in the landing zone. In the worst case, brownout can lead to complete disorientation and an accident. In 2009 there were 2 accidents³⁰ in which the subsequent investigations cited brownout or recirculation as causal factors. In 2010 there were a further 2 brownout-related accidents,³¹ one of which sadly resulted in a fatality. A continuing high operational tempo in Afghanistan during the period, a concomitant and significant increase in the number of austere Helicopter Landing Sites (HLSs) and dust suppression efforts competing with other essential combat engineering tasks, combine to underpin retention of brownout as a significant Air Safety risk. There is also anecdotal evidence that brownout is increasingly being regarded by some as a natural operating risk in Theatre and, therefore, may not be routinely reported as aircrew become normalized to it. Yet, more helicopters have been damaged in brownout incidents than by enemy action. Whilst a technical solution is currently being pursued by DCDS(CAP) staff, as no funded programme is in place, it is questionable if sufficient priority is being accorded the mitigation of this risk across the DLODs. I therefore intend to examine the mitigation of brownout risk as a specific case when the CAP area ASMS is audited later this calendar year.

(1) **HLS Management in the Afghanistan Theatre.** The Air Safety risks posed by austere HLSs are not confined to brownout, but also include risks posed by HLS management and configuration. This issue is an example of where Air Safety risks can manifest on the periphery of the air domain; the major causal factor for most of the incidents seen in recent years is lack of awareness of ground troops responsible for managing the respective HLSs. However, in response to the recommendations of the Service Inquiry (SI) into the Chinook accident in Afghanistan in Aug 10, CJO instigated a review of HLS Management Procedures and I am now more confident that the issues identified are being addressed by the command chain.

Recommendations from the Aug 10 Chinook SI also included more realistic brownout training for aircrews and improved supervision in Theatre. The MAAIB is tracking implementation of the recommendations and there is already some evidence of improvement in these areas.

b. **Mid-air Collision involving Military Aircraft.**

(1) It is generally accepted that Collision Warning Systems (CWS) provide the best mitigation against mid-air collision between transponding traffic. However, not all General Aviation (GA) aircraft use transponders, which limits the benefits of CWS. Part of a mitigation strategy proposed in 2009 by the MARSB was to encourage the CAA to mandate wider carriage of a transponder in GA types, especially in areas of Class G

³⁰ Chinook in Afghanistan and Merlin Mk 3 in California.

³¹ Merlin HC3 and Chinook HC2, both in Afghanistan.

(uncontrolled) airspace that are considered to have become congested. Thus far, little progress has been made. The rate of Category A and B³² Mil vs Civ Air Proximity Hazards (Airprox) in the UK has averaged around one per month for the last 2 years. My assessment of the risk of mid-air collision between Mil/Civ is that it remains significant, with high reputational and societal concern components. In this context, the relieving of the Delete Tornado CWS PR11 Option is welcome, but there is likely to be more that could and should be done. I will shortly be inviting ACAS³³ to write to the CAA's Director of Airspace Policy to seek an update on the CAA's policy developments with respect to transponder carriage in GA aircraft, including gliders.

(2) Occurrences in the Afghanistan Theatre related to the complexities of Joint Battlespace Management continue to arise. At best, this situation results in regular delays to providing support to ground operations but, at worst, it increases the likelihood of an Airprox, of which there were 42 involving UK aircraft reported during the period Aug 10 to Aug 11³⁴. Moreover, AOC 1 Gp has assessed that the risk of a mid-air collision in Afghanistan is significantly greater than that in statistical analyses of past or projected Airprox rates for UK-based aviation activity. In the past year, Air Traffic Management (ATM) at Bastion has improved with the addition of radar to dynamically de-conflict aircraft within the base's AoR (albeit still only out to about 40 miles) and the Theatre is now subject to regular scrutiny by the RAF ATM Force Commander. Also, PR10 provided for a permanent Flight Safety officer in Theatre, a move that has enhanced Flight Safety visibility and reporting. Nevertheless, mid-air collisions remain a major concern and were one of the main discussion points at the last NATO Flight Safety Panel. The MAA is working with the DHs and PJHQ, as the UK's conduit to ISAF's command organizations, to better understand options and help drive improvements in this area.

c. **Helicopter Collision with Wires and Obstructions.** A 2008 report examining the risk of wirestrike hazards to rotary wing aviation made 28 recommendations to mitigate this risk through a combination of: planning and procedures; mapping, training, technology and research (including mission planning aids, wire-cutters & wire detectors); publicity; and post-incident procedures. The majority of these recommendations have been implemented, but some significant ones remain outstanding, particularly in the technology and research area. I will be encouraging the relevant DHs to review this area to confirm whether or not all that can and should be done is being done, with appropriate priority. There were 4 reports of wire strikes or near misses in 2010, thankfully without major injury.

OTHER OUTPUTS

37. **Operational Waivers.** From time to time, compliance with 'peace time' regulations can be tested as legitimate operational imperatives threaten to infringe regulatory boundaries. I have therefore issued guidance³⁵ on the roles and responsibilities of Aviation Duty Holders in operations, which has been well received. In doing so, I have emphasized the ultimate right of operational commanders in the field to make judgements on acceptable levels of risk³⁶, but that when time permits, such judgements should be informed by the relevant DHs and, where appropriate, the Regulator. Accordingly, I received a number of requests from Theatre during the reporting period for approval to operate outside current regulations. Such requests have invariably been accompanied by a statement of the requirement, a risk assessment and have been bounded

³² Category A: Risk of collision – an actual risk of collision existed; Category B: Safety not assured – the safety of the aircraft was compromised.

³³ National Security NED on the CAA Main Board and Departmental policy lead on Airspace usage.

³⁴ Only recently, as the risk has increased and been recognized, have ISAF been collecting coherent Airprox statistics.

³⁵ RN 05/11 - DH in Operations

³⁶ Clearly, within the bounds of their Directive, Laws of Armed Conflict etc.

by time and set parameters. Considered constructively and as a matter of priority within an established and responsive MAA process, turnaround of such requests has routinely been achieved within 24 hrs, thereby holding to my declared aim for the MAA of acting to enhance operational effectiveness through Air Safety, rather than hinder it.

38. **Air Safety Training.** One of the donor organizations drawn into the MAA in Apr 10 had been responsible for delivering training interventions across a wide range of Flight Safety and supervisory aspects of Defence aviation. However, training delivery conflicts with the MAA's role of regulating and accrediting such training and its outcomes. I am therefore finalizing details with DCDS (Pers&Trg) such that future Air Safety training will be sponsored by the MAA, but delivered under the auspices of the Defence Academy at Shrivenham, an arrangement that has been working very successfully under an interim agreement since Jan of this year. The one exception to this arrangement is the DHASC³⁷. Given the pivotal role of Aviation DHs in the new Defence Air Safety construct, I believe that their personal training is unique and can only be delivered effectively and credibly by the Regulator. I have therefore retained this specific training in house and in Jun hosted the inaugural 2-day, residential DHASC at Beckett House, which was attended by, *inter alia*, all but one of Defence's 2* ODHs and a strong showing of DDHs, SOs and CAEs. The Course, which was well received, was delivered by senior members of the MAA and invited SMEs, and Mr Haddon-Cave was the dinner guest and evening speaker. The main course will be biannual, although additional *ad hoc* courses will be run to cater for other stakeholders, including from Industry. I and selected members of my staff will also provide the COS with bespoke SDH training in the coming weeks. Encouragingly, tangible evidence of a much increased understanding and awareness of Air Safety has been seen during audits of DHs who have attended this senior level of training.

39. **Civilian Air Charter.** Following an incident in 2010, the then 2nd PUS sought my assistance in reviewing the Dept's arrangements for contracting with civilian air charter companies. Although such agencies fall outside the MAA's regulatory purview, I provided recommendations³⁸ designed to deliver a tauter internal governance mechanism and which have now been largely implemented.

40. **European Harmonization.** Carrying on with an initiative instigated by one of its predecessor organizations, the MAA is engaged with its European counterparts to undertake work to harmonize military airworthiness arrangements across Europe; this work is being undertaken under the remit of the European Defence Agency. The 18 participating member states have already agreed to the principles by signing a Basic Framework Document, which seeks to deliver the agreement through 4 Task Forces. The MAA now leads 2 of the Task Forces whilst retaining a pivotal role in the remaining 2. The first deliverable will be known as European Military Airworthiness Requirement (EMAR) 145 - a pan-European requirement for maintenance organizations that offers opportunities for mutual recognition by other European military aviation authorities, with the aims of consistency of approach and savings in both time and cost. In anticipation of this new framework, the MAA has taken steps to ensure that its own regulation is compliant and has already enshrined the emergent arrangements in the appropriate Def Stan.

41. **Aviation Safety Information Management System (ASIMS).** Historically, flight safety reporting was carried out using the Military Signal Messaging System, utilising a defined reporting framework. This data was codified to enable searching at a later date and stored in a database called Pandora, which was state-of-the-art in the 1970s, but had become increasingly difficult and expensive to maintain. In addition, the codification system in being was fairly crude, having developed over the years without appropriate discipline, meaning that searches for data from the Pandora database gave variable results dependent on the way the question was asked. These limitations drove a requirement for an improved flight safety reporting mechanism that could better underpin effective analysis and the learning of lessons. The electronic Defence Flight Safety

³⁷ RN 01/11 - DHASC

³⁸ MOD Air Charter Procedures – Safety - DG/04/06 dated 26 May 11.

Occurrence Report (D-FSOR) system was introduced in Apr 09 as part of ASIMS and introduced a new codification system tailored for the nuances of the UK Defence Aviation Environment. ASIMS now holds 143,493 occurrence reports and, very significantly, since its introduction reporting traffic has increased from an average of 380 reports per month to 640 per month in the last year. ASIMS V2.0 will be rolled out in this coming Sep and has been designed specifically to support the DH framework and safety related investigations, replacing a plethora of legacy reporting formats, in addition to collating recommendations from across Defence to improve awareness of them and assist in their broader implementation.

42. **Defence Exports.** The MAA is required to ensure that contractors are appropriately regulated when operating UK military registered aircraft in support of Defence exports. **(S43).**

43. **Wider Aspects of Haddon-Cave.** The MAA is engaged with the MOD's Director of Business Reform, who is leading on implementing the remaining Nimrod Review recommendations with relevance more widely than the Defence Air Environment, to ensure alignment of strategic thinking and policy. Matters of mutual interest during the period have included the MOD's relationship with Industry, DHs, SCs, safety governance and independent regulation.

WAY AHEAD

44. My main priorities for the forthcoming period are as follows:

- a. Complete the establishment of a sustainable MAA, supported by collocation at ABW(N) and transformation to the MAA(F) integrated operating model.
- b. Complete implementation of the Nimrod Review Recommendations that are the responsibility of the MAA.
- c. Extend effective MAA audit and inspection activities across the Defence Air Environment to develop a richer assurance picture and drive continual improvement.
- d. Further develop, refine and consolidate the MRP, including transferring it to a fully digitized platform.
- e. Restore the correct balance of risk ownership between the Dept and Industry, underpinned by more effective regulatory oversight.
- f. Continue to guide and drive the necessary end-to-end Air Safety cultural and behavioural change in the Defence Air Environment.
- g. Prepare for external audit of the MAA in Mar 12.

DG MAA

Appendices:

1. MAA Governance Framework.
2. MAA(F) Target Operating Model.
3. MAA(F) Rich Picture.