Ministry of Defence

DEFENCE SAFETY AUTHORITY

ANNUAL ASSURANCE REPORT

APRIL 2015 – MARCH 2016

CONTENTS

INTRODUCTION

1. This is the second Defence Safety Authority (DSA) Annual Assurance Report to the Secretary of State (SofS). Like last year, it provides assurance of how effectively safety is being managed across Defence and outlines what I consider to be the most significant safety-related risks to the Department. With regard to risk, the Annual Assurance Report does two things. Firstly, it informs the SofS of the significant safety risks which although classified as low or improbable have the potential to cause catastrophic consequences through significant loss of life (including public) if realised and require continued attention. Secondly, now that the DSA has completed its first year of operation and has developed an overview of safety across the Department, it informs the SofS of where the day-to-day operating Risk-to-Life (RtL) reside which claim the lives or seriously injure a significant number of our personnel every year. The DSA and Top Level Budget holders (TLBs) are now targeting these operating risks, which will not reduce to zero due to the inherently dangerous nature of much of our training but could reduce the number of unnecessary deaths or serious injuries.

2. It is my judgement that the safety risks detailed within this report pose an RtL of sufficient magnitude to provide such reputational damage and societal impact to have strategic level consequences for the Department if realised. For several reasons, including resource, these risks are not easy to address and as a result I do not expect them to change on a frequent basis. This is the case this year for those risks associated with the shortages of Suitably Qualified and Experienced Personnel (SQEP); Maritime Safety; Mid-Air Collision (particularly Typhoon with Commercial Air Traffic); and our ability to adequately maintain the Defence Fuel infrastructure to the required safety standard. These risks continue to endure and are largely recognisable from last year's Annual Assurance Report. Despite significant senior intervention and much staff activity, there has in reality been mixed progress made against some of these risks. Reported for the first time this year, from observation and study of accident related data and near-misses, there is an emerging risk around our "training and exercise activity" across the pan-Top Level Budget (TLB) Land domain (not just the Army) that has become more evident. This is borne out in the number of serious accidents, fatal and non-fatal, that have occurred during activities for which Defence is bound under the Health and Safety at Work Act 74 (HSWA). There are no exceptions made for Defence in regard to this Act and therefore the DSA does not regulate conventional occupational "health and safety" activity – and is not resourced to do so. The Regulator's view is that there are varying degrees of internal assurance and often a lack of independent TLB assurance in relation to some of this activity. In my view, this reinforces the requirement for further oversight of this whole area, not by seeking increased oversight from the Health and Safety Executive (HSE) nor by increasing the size and scale of DSA's 3rd party assurance but rather through the provision of high quality 1st and 2nd party assurance by the TLBs; which they should be doing anyway under their Duty of Care responsibilities. Finally, a common theme that has emerged from our accident reporting is the variable and generally poor standard of risk assessments being made at the operating level. I will cover this later in the report.

3. Since my last report, the DSA has declared its Full Operating Capability and concluded the Defence Safety Review[1] (DSR), which provides the organisational blueprint for how the DSA will shape safety within Defence and enable the TLBs to deliver improvements. One of the important milestones achieved has been the formation of the Defence Accident Investigation Branch (Defence AIB) on 1 Oct 15, providing a high readiness, globally deployable accident investigation capability across the full range of Defence activity. The detailed examination of the factors surrounding recent accidents together with the assurance activity conducted by the Regulators and analysis completed within the DSR, now provide a more comprehensive understanding of safety across the Department than at any time in memory. The recent focus of the House of Commons Defence Sub-Committee on military training and the Duty of Care or "Beyond Endurance"[2] paid particular attention to our ability to prevent avoidable accidents. With this in mind, the importance of prompt, independent and in-depth accident investigation and subsequent Service Inquiries (SIs) has never been clearer. With responsibility as the primary Convening Authority across Defence for safety-related SIs now vested in DG DSA, analysis of the information gathered from SIs has enabled the DSA to develop an understanding of the underlying themes common across all of our fatalities and serious injuries. It has also enabled lessons to be promulgated across the whole of Defence.

4. DSA accident investigation, analysis and data have highlighted 5 activity areas where we continue to witness fatalities or life-changing serious injuries. These are shown below in descending order of severity; it is interesting to see that Adventurous Training and Sport feature so highly. Less surprising is the number of aircraft accidents, although significantly reduced in recent years, these will historically claim up to half of Defence's fatalities annually; the rest are spread across the remaining areas:

a. Aircraft accidents;
b. Adventurous Training and Sport, specifically, parachuting, rock climbing, mountaineering, water transportation (rafting, canoeing);
c. Land transport accidents, including crushing from heavy or armoured machinery or equipment;
d. Live firing;
e. Endurance training and selection, fitness training/testing, heat injury.

5. I have made these themes a priority for the DSA, working with the TLBs, to tackle. Work has already been initiated in the Defence Safety Committee to consider Adventurous Training and Sport governance, re-enshrinement of the Duty Holding concept across Defence and safety risk assessment training at the operational/tactical levels. Five years after the inception of the Military Aviation Authority (MAA) and full embracement of aviation safety by the TLBs, aircraft accidents against flying rates are being driven to what are likely historic lows. The HSE as the statutory regulator for activity under the HSWA is keen to work with the DSA and look at a number of our risk areas including endurance activity (in the wake of Brecon) and live firing accidents. This requirement was placed on the HSE by the

[1] Defence Safety Review
[2] http://www.publications.parliament.uk/pa/cm201516/cmselect/cmdfence/598/598.pdf

House of Commons Defence Sub-Committee during their Beyond Endurance inquiry and Defence should welcome HSE activity in this area.

6. The tragic loss of 4 lives during on-duty safety-related accidents in this reporting period reminds us that the focus on safety needs to be an enduring responsibility. This figure is lower than it has been over the previous 2 years, but is consistent with rates over the last 4, which average 3.25 safety-related deaths annually for every 100,000 members of the Regular and Reserve Forces. The overall figure this year includes 2 RAF personnel killed in a Puma helicopter which crashed in Afghanistan[3], an on-duty road traffic accident[4] and an Adventurous Training parachuting accident in Germany. This report also includes the details of 3 fatalities during fitness training/testing which are recorded as "natural causes". Although not technically safety-related deaths, I feel it is important to include these in the report as they occurred during physical training activity and there are many lessons that all domains can learn in relation to these tragic events. In one case some very positive lessons were learnt from the conduct of training at the Royal Marine Commando Training Centre which has enabled best practise to be spread. The names of those lost in service with the armed forces in accidents (and the 3 recorded as natural causes) for the year 2015/16 are recorded at Appendix 1.

7. Overall, I can report to the SofS a much improved level of safety governance across the Department with a good understanding of the most serious, but less likely to occur, strategic risks (improbable/catastrophic) and importantly the day-to-day operating risks where we see fatalities and life changing injuries on an annual basis. It is these risks that the DSA and TLBs will focus on during 2016/17 with the aim of preventing those accidents that are classified as avoidable – not all will be. Finally, whilst the day-to-day operating risks will continue to be driven down by the DSA, it is for the Defence Board to decide if they are comfortable with the strategic risk mitigation, particularly with the Defence Fuel infrastructure and Typhoon Mid-Air Collision risk with an airliner. These are both well documented risks.

SAFETY ASSURANCE STATEMENTS

8. One of the other roles of the DSA, in its capacity as the Defence Safety Regulator[5], is to assure the safety management systems across all the Defence domains and within the TLBs on behalf of the SofS. Using a combination of the assurance assessments provided by each Regulator for their domain, coupled with my own judgement, this year's assurance assessments are summarised in the table below:

[3] There were 5 NATO fatalities as a result of this accident of which 2 were UK RAF personnel.
[4] Road Traffic Accidents that occur off-duty and involve off duty personnel are not included.
[5] The Defence Safety Review defined the 3 roles of the DSA as Defence Authority for Safety, Defence Safety Regulator and the Defence Accident Investigator.

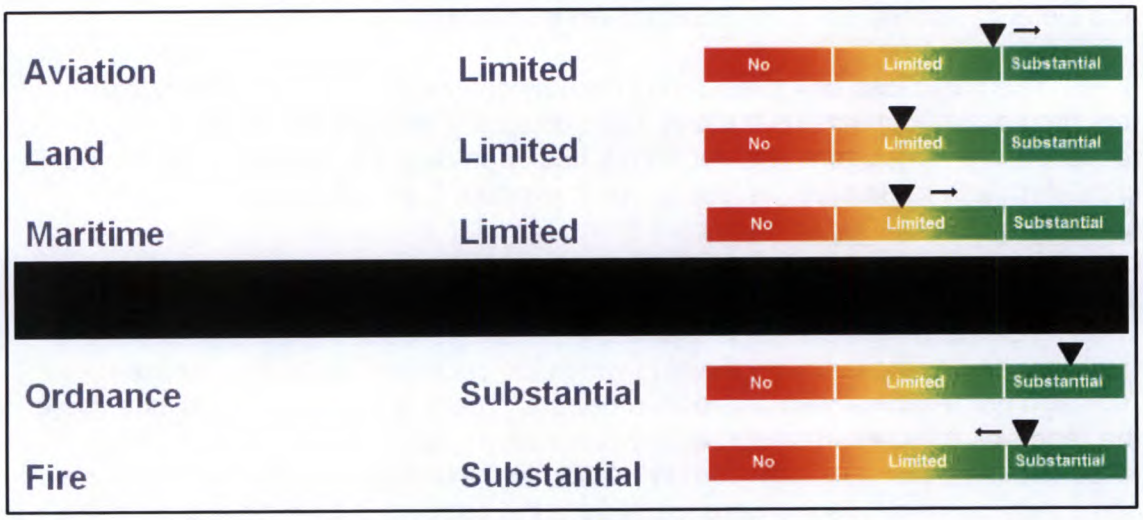

Figure 1. 2015/16 Assessments of Safety Assurance.[6]

AVIATION

9. Director Military Aviation Authority (D MAA) reports a discernable trend towards improving safety management across Defence Aviation as understanding and application of the Aviation Duty Holding model continues to mature. Regulatory compliance continues to improve across the regulated community, as evidenced by the reducing number of Corrective Action Requirements generated by MAA-led assurance teams. Pleasingly, the trend in Air Safety Management Systems development is also broadly positive, though this is not universal. This year has also seen significant progress in terms of mutual airworthiness Recognition[7] with other European military aviation regulators, most notably when, under the UK's leadership, German, Italian and Spanish airworthiness regulators completed[8] Mutual Recognition[9] work to support the delivery of significant efficiencies in the Eurofighter Typhoon programme. This work was conducted under the auspices of the Typhoon Ministerial Task Force. It is highly likely that previous Recognition activity conducted with US airworthiness regulators will also enable significant efficiencies to be realised in the Apache and P8 (Poseidon) programmes. The support provided by the MAA to these programmes, which is estimated to be worth in excess of £400M in cost avoidance and reduced whole-life costs, has derived from irreducible spare capacity which is under threat because of wider resource pressures. Alternative means of covering this work are being considered, including through an ABC17 option.

10. These are all positive developments in the Defence Aviation Environment and are encouraging. However, the overall assurance assessment for aviation is

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[6] Defence Internal Audit Classifications as updated July 2014: Substantial Assurance: System of internal control established and operating effectively with some minor weaknesses; Limited Assurance: System of internal control operating effectively except for some areas where significant weaknesses have been identified.
[7] Recognition is a formal process that compares another nation's military airworthiness regulatory and assurance activities with the UK's. It provides a structured evidence base to accept airworthiness artefacts from other nations as underpinning evidence to support national approvals while identifying areas of difference and residual risk.
[8] Reported to Min (DP) in MAA/DG/COMMS/SENIOR/MOD dated 23 Feb 16.
[9] Recognition can be undertaken on a one-way 'Internal' or two-way 'Mutual' basis depending on the Business Needs of the Recognition Partners involved.

counterbalanced by a number of negative factors. For example, insufficient SQEP continues to impact in a number of air safety critical areas and these are expanded on later in the report. Similarly, and given the plethora of change across the Defence Aviation Environment, it has been apparent that the air safety aspects of change management activity have not always been well considered. In places this has undermined attempts to maintain proactive risk management strategies. The tragic civilian Hawker Hunter accident at Shoreham in 2015 resulted in considerable focus on the management and assurance of air display activity and the MAA supported the Civil Aviation Authority's "Civil Air Display" Review. Internal MAA re-prioritisation of resource has been necessary to provide increased oversight and assurance for the 2016 display season, and we will continue to work closely with the Civil Aviation Authority to define a clear delineation of responsibilities given that the seam between military and civilian regulation and assurance of air displays is complex. On balance, therefore, while the judgement is more equivocal than in previous reporting periods, I agree with D MAA's overall assessment of **Limited** Assurance of air safety.

LAND (ALL TLBS)

11. Our understanding of the Land domain and how safety management is currently conducted has markedly improved in the year since the formation of the DSA. Presently, the Defence Land Safety Regulator (DLSR) comprises the Land Systems Safety Regulator (LSSR), Fuel and Gas Safety Regulator (FGSR), Movement and Transport Safety Regulator (MTSR) and, as a result of a successful ABC16 outcome, the fledgling Adventurous Training Safety Regulator (ATSR). While there appears to be comprehensive coverage of all the major areas of activity in the domain, it has become apparent that DLSR's attention is rightly focussed on specific areas where the Department has Dis-applications, Exemptions or Derogations (hereafter referred to collectively as 'dispensations')[10] from UK statutory legislation. In practice, this means that the assurance level provided by the DLSR during the reporting period did not cover the full spectrum of risk-bearing activity conducted within the domain. This excluded activity can stretch far and wide and includes some of the themes that we have identified as high risk; for example, for activities such as military physical training, selection exercises and Adventurous Training, Defence is bound under the HSWA. There are no exceptions made for Defence in regard to this Act and the DSA does not regulate conventional occupational "health and safety" activity and is not resourced to do so. Oversight of the HSWA legislative framework is clearly the responsibility of the HSE as the statutory regulator, who should regulate the TLBs' activity in this area. However, the HSE's role is often described as being 'light touch' with Defence seen as being a responsible agent for ensuring its own compliance with regard to health and safety. In reality the HSE simply doesn't have the resources to perform a comprehensive programme of assurance for our activities that are covered by the Act. Whilst I do not regulate this area, as a Defence Authority I take a great deal of interest in the TLBs' performance and intervene where I see issues. The HSE is responsive to Defence accidents and will investigate deaths covered by the HSWA in the pursuit of health and safety failings. Indeed, it is noteworthy that 17 Crown Censures have been served on the MOD since 1999 for breaches of the HSWA. A Crown Censure indicating that, but

[10] A Disapplication refers to an element of law or regulation that explicitly does not apply to Defence; an Exemption from law or regulation is granted on application to the SofS in the interests of national security; and Derogation is lessening of the requirements of law or regulation for justifiable practical or operational reasons.

for the MOD having Crown immunity, the HSE has sufficient evidence to pursue a realistic prospect of criminal prosecution.

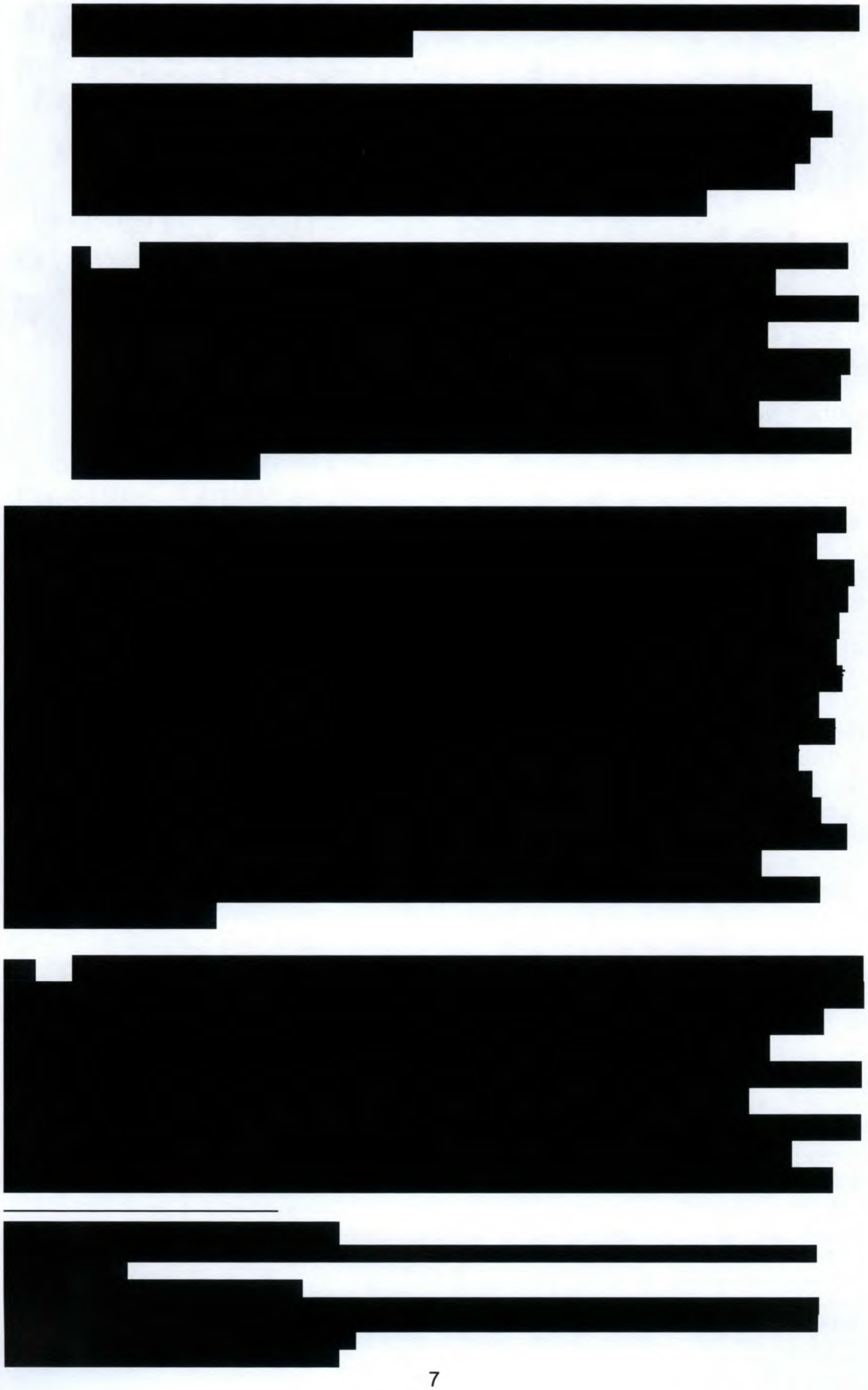
12. The fact that DLSR's 3rd party assurance function is focussed only on Defence's dispensations from statutory legislation leads to an incomplete risk picture. While it is acknowledged that the DLSR has no authority to set or enforce regulation beyond this boundary it could, and arguably should, assure the activities that take place in these areas, either directly or with support from the HSE. This potential 'blind spot' will be the focus of future work emanating from the DSR, but until addressed, it significantly constrains the Regulator to an assessment of **Limited** Assurance, which I endorse. Within this overall assessment, I have taken into account the findings of the HSE audit of LSSR in Feb 15 and the effect that the modest additional resource provided to the DLSR through ABC16 has delivered[11].

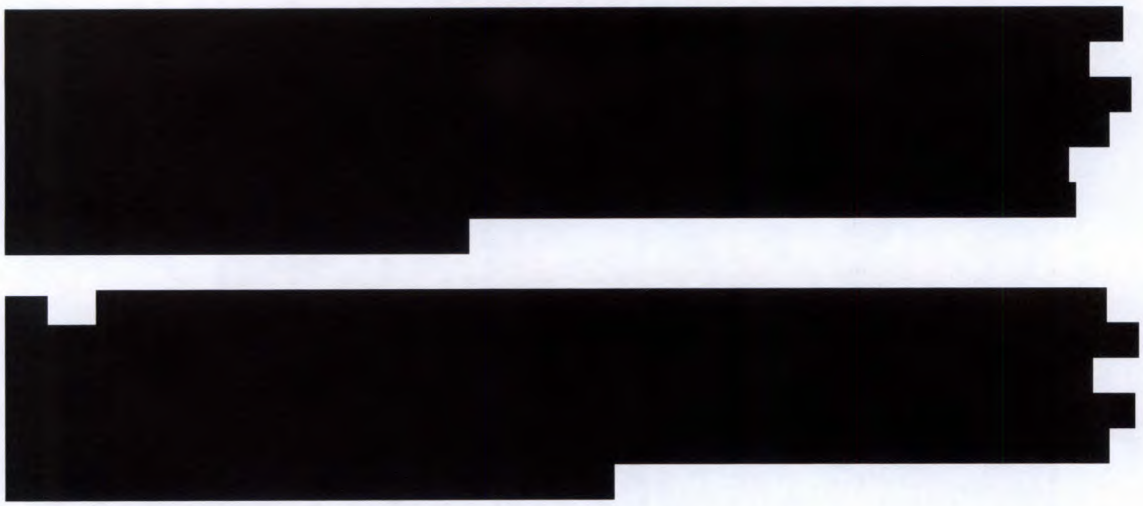
MARITIME

13. The Defence Maritime Regulator's (DMR) resource limitations - specifically the significant gapping and SQEP shortfalls within the DMR Shipping Inspectorate - mean that the conclusions in this report remain caveated by the DMR's own inability to deliver comprehensive 3rd party assurance as yet. However, the internal publication of the Third Independent Maritime Safety Review was of great assistance to the DMR, Defence Equipment & Support (DE&S) and Navy Command in galvanising efforts to improve upon the situation first reported last year. The provision of a 1* Royal Navy officer to lead the DMR; the establishment of a Navy Command-led safety implementation team and Maritime Safety Board; and the re-design of the 3-tier Duty Holder construct across Navy Command has signalled the intent to grip Maritime safety positively. On balance, the DMR judges that the evidence available supports only **Limited** Assurance of the Maritime Safety and Environmental Management System. I support this assessment but also recognise and welcome the renewed focus that safety is receiving in this particular domain.

[redacted]

[11] Approved ABC16 option to uplift LSSR by 6 posts as an initial tranche to enable an increased audit and inspection capability. ABC16 also saw an uplift of one post in the DLSR to provide limited capacity to run the independent inspection and licensing scheme for Adventurous Training centres.





ORDNANCE, MUNITIONS AND EXPLOSIVES

19. Regulatory performance within the Defence Ordnance Safety Regulator (DOSR) continues to develop and improve favourably with a focus on better ways of working through joint auditing with other DSA Regulators where practicable. The DOSR assesses that safety assurance across all related Defence ordnance, munitions and explosives activity is assessed as **Substantial** and I concur, noting that there is evidence emerging of an upward trend towards Full Assurance.

FIRE SAFETY

20. In its first year of operating as a fully independent regulator, the Defence Fire Safety Regulator (DFSR) judges that the level of assurance for the fire safety domain is **Substantial**. While I endorse his assessment, I place it low in the substantial range as evidence suggests that a combination of a lack of awareness by unit staff, poor safety culture in terms of fire risk awareness and minimal maintenance regimes are having an adverse effect. The minimalistic approach to maintenance in particular may have contributed to at least one fire incident at a critical Defence capability[18] during the reporting period. The majority of these issues were raised in the 2014/15 report and have either not been addressed or, where they have, the improvements have in many cases relied on regulatory intervention rather than a proactive approach. The lack of sustained corrective effort means that the assurance rating is trending downwards.

SAFETY RISKS

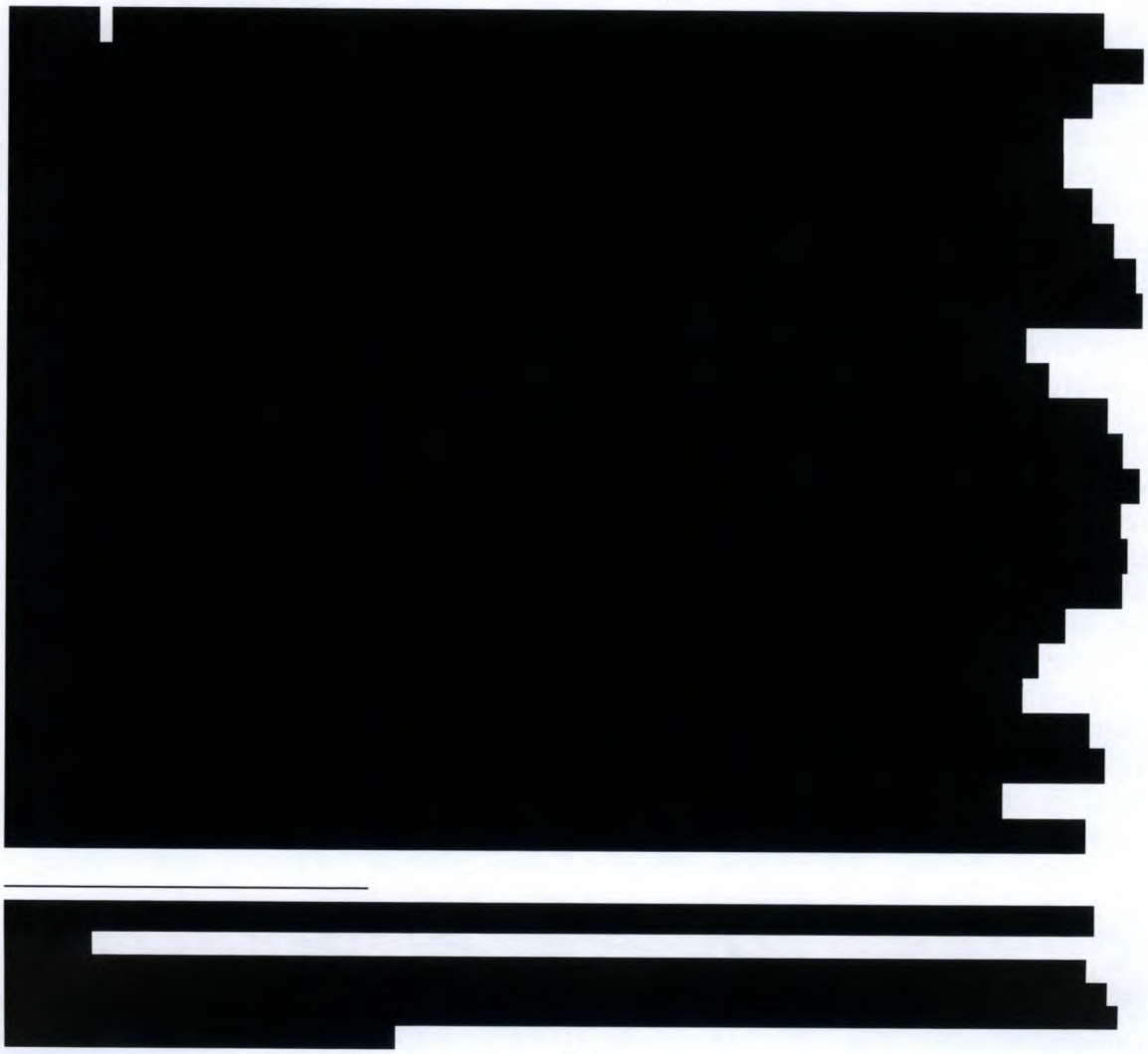
21. The following are the safety risks that, in my judgement, have the potential to manifest themselves with sufficient physical or financial magnitude, reputational damage or societal impact as to have strategic level consequences. Of the top 5 risks I have identified this year, 4 have been previously reported[19]. Together they comprise: the enduring consequence of a lack of SQEP in roles and posts that can influence safety outcomes; Maritime safety concerns; the risks of Mid-Air Collision;

[18] The DFSR advises that the MOD Feltham post-fire investigation highlighted minimalistic electrical maintenance that may have significantly contributed to the degradation of critical Defence capability.
[19] Mid-Air Collision, Maritime safety and Fuels Infrastructure concerns raised as strategic issues in 2014/15 Annual Assurance report, SQEP raised every year in Annual Assurance Report since 2010.

the ability of the Defence Infrastructure Organisation (DIO) to adequately maintain and manage the Fuel infrastructure estate; and finally, the emergence of the potential RtL consequences of inadequate safety assurance of activity in the Land domain across all of the TLBs.

SUITABLY QUALIFIED AND EXPERIENCED PERSONNEL

22. The challenge posed by the shortage of sufficient SQEP to support safety functions continues to endure. The Defence safety community as a whole has again this year recorded this as one of their key risks. The reporting of this risk might be uniform across the domains, but in my judgement, the Department now has a solid understanding of its potential implications, not just in relation to safety outcomes but also in terms of how it impacts our ability to meet broader operational commitments. We are also beginning to take the first meaningful steps[20] to address the situation. However, given the challenges in the personnel space over the next few years, I do not expect to be able to report tangible and large scale improvements for some time to come. From the safety perspective, concern remains around the provision of sufficient SQEP in engineering appointments generally across the 3 Services; in certain aviation cadres; and in appointments providing safety expertise to DE&S. A degree of risk will inevitably endure until recruitment and retention measures take effect and deliver trained people where they are most needed.



[redacted]

25. Within the Aviation domain, the MAA report that while Air Safety Management Systems have been effective in highlighting the risks posed by the lack of SQEP, there is little evidence to demonstrate that shortfalls are being resolved. Examples include the availability of engineers and air safety staff in DE&S which remains at a similar level to that of 12 months ago; and manning levels in RAF Trade Group 1 and REME aviation engineering trades which have both continued to trend downwards. The availability of Qualified Helicopter Instructors remains a concern but measures have been taken to stabilise the problem in the Army Air Corps and broader retention policies for the aircrew cohort remain a priority within the Chief of Defence People's area and for the Armed Forces Pay Review Body. The MAA also anticipates that the introduction of new capabilities such as the Multi-Mission Aircraft (P8 Poseidon) and Protector Remotely Piloted Air Systems, while simultaneously extending or upgrading current fleets such as Sentry or Sentinel, will prove challenging to resource at the appropriate levels for both air and ground crew SQEP.

26. In the Maritime domain, the DMR reports that the levels of SQEP are insufficient to meet current demand. Manning levels are assessed as having no resilience and in particular there are measurable shortfalls in staff levels in maritime engineering and for maritime support services, such as port traffic managers. Moreover, there is little evidence that the rate of gapping is being arrested and TLBs are all competing with each other to secure sufficient numbers from the limited pool to meet their individual needs. The DMR has noted that there has been some improvement, made possible by efforts to identify safety-critical functions, review concessions and use the FOST-SARC[23] process to mitigate known shortfalls. However, the Regulator is unsighted on mitigation plans that have been put in place as a result of this process other than a reduction in Operational Sea Training capacity. Finally, the small size of the DE&S diving team remains of significant concern as they struggle to deal with their volume of work, an ageing demographic

[redacted]

[23] Flag Officer Sea Training – Safety and Readiness Check (FOST-SARC): a series of checks designed to give CO/SNO confidence that the ship and ship's company are safe to proceed to the next milestone.

and the possible loss of their entire strength through retirement in the next few years. There is an urgent requirement to revitalise this important team so that it can maintain a suitable level of SQEP, in order to avoid a future loss of diving capability. Navy Command has moved to create a 2nd party assurance capability for diving but this remains limited and there continues to be a strong reliance upon DMR's SQEP (the 3rd party capability) to meet the requirement. This arrangement contradicts the principle of organisational separation that we have been seeking to create between the delivery and assurance layers. However, the very limited SQEP in this specialist discipline is set to continue and we must seek to mitigate the risk in innovative ways. Also, where such SQEP pressures exist we must ensure that the limited SQEP is employed where it is needed most and not diluted by employing personnel in more generalist appointments.

MARITIME SAFETY

27. Last year, I expressed concern about some of the indicators reflecting the overall state of Maritime safety and the lack of oversight that the DMR was able to conduct across the domain, predominantly as a result of resource constraints. I have been heartened by the manner in which the Navy TLB has responded. Steps taken include the appointment of a 1* Royal Navy head of the DMR; intelligent re-design of the Duty Holder construct focussing on the operational needs of the flotilla; and the re-invigoration of the Royal Navy Safety Centre under a 1* military lead. The publication of the Third Independent Maritime Safety Review with a 2*- led implementation team to enact its major recommendations was an important signal of intent. The establishment of the Maritime Safety Board by the Fleet Commander, drawing on input from all stakeholders, is further evidence of the will that exists to get on top of safety matters within the domain. Combined, these measures have undoubtedly shifted the Maritime safety vector in a positive direction, but there remains a significant amount of work to do.

28. Of the challenges that remain, vessel fragility continues to be the most significant issue observed by the limited 3rd party assurance available. This has manifested itself in Duty Holders in Navy Command having limited ability to issue full Ship Management Certificates, a prerequisite for going to sea. This has been mitigated by the Naval Authority issuing a full set of key hazard certificates for the first time to all boats and ships[24], a notable first during this reporting period. The Regulator recognises that such processes improve Duty Holder commitment and support the management of safety issues across the ageing elements of the surface and submarine flotillas. However, although each vessel's state may soon be better understood, the underlying problems of a high maintenance burden, limited technical SQEP availability, sub-optimal technical documentation[25] and sustained op tempo all remain. The challenges faced today across the domain will be exacerbated in the near future as the ambitious naval equipment programme gathers pace. The Regulator has been strengthened with additional manpower through ABC16 and the ability to undertake independent 3rd party regulatory oversight of Maritime equipment

[24] A Ship Management Certificate is issued by the ODH to declare that the ships' management arrangements (safe to operate and operate safely) are compliant. The Naval Authority Certificate declares that a specific key hazard meets the agreed standard for safe to operate (design and material state) as defined in JSP430.

[25] The Regulator observed that both Naval Defence Standards and Technical Documentation (BR and OEM manuals) have attracted 1/7th of the necessary funding estimate in recent Planning Rounds and Budgetary Cycles. This risk was first declared in 2011/12 by D Ships Chief Engineer and by his successor (MPS-Hd) in 2013/14 and has estimated the cost of remedial work at £70M, equal to a large capital ship refit, spread over ten years. The ABC13 funding bid that initiated an accelerated "get well programme" over 5 years, now appears to represent approximately 1/3 of that needed.

programmes ahead of a vessel type's entry into service is improving but there is still room for significant improvement. The certification approach being adopted in support of Queen Elizabeth Class ships is indicative of the complexity that currently exists, particularly as this activity is not undertaken by the DMR but by the Naval Authority Group, which is funded from the same stream as the maritime delivery area of the DE&S. Resolving this issue will not be straightforward particularly as Maritime SQEP is in short supply. Cumulatively, the issues concerning in-service fleets, weaknesses in the assurance of future programmes and the enduring shortfalls in Regulator SQEP continue to present a challenging risk picture in the Maritime domain.

29. Overall, while the indications of intent from within the Maritime domain are entirely positive, the underlying challenges cannot be quickly resolved. The improved oversight now being applied by Navy Command and the increasing capability of the Regulator are welcome, but my sense is that in this large and complex domain, we are carrying more risk than we are aware of, and more risk than our current safety management and risk control systems are able to oversee and understand. For these reasons, I have elected to maintain vigilance in this area over the coming year despite the emphasis that Navy Command has clearly placed on safety since my previous report.

MID-AIR COLLISION

30. The risk of Mid-Air Collision remains a concern for the MAA. During the period of this report, the number of reported aircraft proximity hazard reports (Airprox) involving UK military aircraft reduced from 95 to 65[26] compared to the previous year. This figure considers all types of airspace users, but there was a notable reduction in the Airprox incidents reported between military and general aviation aircraft (34 incidents were reported in 2015/16 compared to 58 in the previous year). It is difficult to categorically determine why the level of reporting has reduced. While Duty Holder's active management of the Mid-Air Collision risk and the MAA's efforts to raise awareness of it across the Defence Aviation Environment through training and promotional documentation might have had some effect, I suspect that a reduction in UK based activity by the fast jet community and increased use of Collision Warning Systems are also factors. While military employment of these systems on fast jet aircraft was originally envisaged to mitigate risk during training and non-operational flying, recent reporting has also recognised their positive effect in current operations. In the congested multinational airspace where current operations are underway, coalition aircraft fitted with the system have been able to take action to avoid collisions on several occasions. Taking our eye off this particular risk, on the basis of a single year's worth of positive Airprox statistics would therefore be, in my view, premature.

31. Reporting of Airproxes involving Typhoon with Civil Air Transport has also reduced this year[27]. However, for the reasons outlined above, I remain concerned that no decision on the fitment of a Collision Warning System to Typhoon has yet been taken. It was unsuccessful in ABC16 and there is currently no identified,

[26] Figures are for Calendar year 15/16 and include one incident of a military aircraft flown by a civilian crew – this is recorded as a civilian commercial incident by the Airprox Board but counted as military by the MAA.
[27] Typhoon Mid-Air Collision with Civil Airliner risk remains elevated and identification of a suitable technical solution for Typhoon CWS remains on-going work. Total Airprox reports between Military and Commercial Air Transport have fallen from 6 to 2.

funded solution. The possibility of a Typhoon Mid-Air Collision with Civil Air Transport remains an issue of societal concern at the Departmental level and hence this particular element of the risk has been transferred in writing[28] by the Chief of the Air Staff to the SofS for Defence.

32. There are also emergent challenges in the Mid-Air Collision context and during the next period there will be a focus on better understanding and mitigating the hazard posed by the risk within current Operational Theatres and the proliferation of the use of 'drones' by the public at home. These drones lack both the visual and electronic conspicuity barriers to a loss of safe separation making them much harder to avoid than larger aircraft. The growing body of evidence from gliders, micro-lights and parascenders, which also lack similar barriers, shows the propensity of these aircraft for generating a significant proportion of risk bearing Airprox; our continued engagement with the Civil Aviation Authority will be key as we jointly seek solutions to this challenge. In sum, providing assurance to SofS that the Duty Holders are actively managing the Mid-Air Collision risk remains an area of focus for the MAA.

FUEL INFRASTRUCTURE

33. The condition and maintenance of Defence's Fuel infrastructure remains a high safety risk in the Land domain and it is disappointing to see that, despite the issue being included in my last Annual Assurance Report and being discussed at Defence Board level, there appears to have been little tangible progress in realising improvement to the situation at the front line over the last 12 months. The most significant event this year was the simultaneous closure of all 3 aviation Bulk Fuel Installations (BFIs) at RAF Brize Norton in Oct 15 due to maintenance failures[29]. While this episode might provide the most compelling single piece of evidence, the subsequent VCDS-directed investigation highlighted the effect that a long-term lack of sufficient investment has had across the fuel infrastructure estate[30]. It also exposed concerning inadequacies in the competency and capacity of the DIO and their Next Generation Estates Contract to oversee the maintenance and operation of this type of facility on behalf of Defence.

34. The audit and inspection activity carried out by the FGSR this year largely corroborates the findings of the Brize Norton investigation. Of the 376 fuel installations inspected/reviewed this year, 44 resulted in the issuing of Enforcement Notices, representing an 11.7% 'failure rate', which is an increase from 9.5% in 2014/15. If we consider Defence Bulk Fuel Installations alone, e.g. West Moors and RAF Brize Norton, this failure rate increases to over 30%.

35. There is no quick and easy fix for the whole Fuel infrastructure issue. The impetus provided by VCDS' direct personal engagement and the establishment of the Defence Strategic Fuels Authority did have some positive effect. However, the £23M injection provided by DIO in 2014/15 represented only a small proportion of the likely total resource required to bring the fuel infrastructure estate up to an

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[28] CAS/16 dated 21 Oct 14.

[29] One BFI was out of use due to repairs on the pumps over-running from the planned completion date of Apr 15; a second BFI was closed due to technical failures in Sep 16 that should have been prevented if the maintenance contractor (Carillion Amey) had carried out the required scheduled maintenance and had the maintenance contractor been properly monitored by DIO; finally, the third BFI was removed from service in Oct 15 by the DDH as this lack of maintenance and contact monitoring gave no assurance that the BFI was safe to operate.

[30] DSA/DLSR/04/06/12/AIR/RAF Brize Norton Defence Safety Authority Investigation Report RAF Brize Norton Fuel Incident – October 2015, dated 9 Dec 15.

acceptable level. Even this investment, intended to rectify the most pressing defects in the estate, was disrupted by the transition to the Next Generation Estates Contract and has had no discernable effect on the safety of the infrastructure and thus reducing the need for enforcement activity by the Regulator. ABC16 measures allocating £96M to address issues at some of the more high-profile sites, e.g., Senoko, Singapore, should help, but in reality this represents a reactive response to a much larger problem. Increasing maintenance funds without also conducting a fundamental review of Defence's total Fuel infrastructure requirement is an unsustainable approach. The problem will only become manageable when DIO is in a position to remove from service those installations that are no longer required and focus funding on maintaining and sustaining the remainder.

INADEQUATE SAFETY ASSURANCE IN THE LAND DOMAIN

36. The tragic loss of 3 Reservist soldiers while undergoing physical aptitude training in Brecon in 2013, and other more recent incidents[31] has served to highlight what I consider to be a significant anomaly in the approach we employ when providing safety assurance outside of Aviation. In the Land domain (covering all TLBs) in particular, the vast majority of non-operational activity such as military training, Adventurous Training and Sport is subject to statutory regulation by the HSE under the authority of the HSWA. However, partly due to their own resource constraints and partly because of our reputation for self-regulation in other areas, the HSE's method of operating is not to provide assurance but to intervene where there has been a breach of the HSWA, thereby only becoming involved once individual incidents have occurred. This same type of activity also suffers from limited internal assurance at the Unit and TLB level; therefore this expansive area has incomplete assurance from a safety perspective. The House of Commons Defence Sub-Committee also agreed this was an anomaly in their Beyond Endurance report. Given the number of personnel that are killed and injured during military training[32], including Adventurous Training and Sport-related activities, and the number of Crown Censures lodged as a consequence, the current approach seems to me to be inadequate.

37. Our experience in the Aviation domain has proven that once commanders become risk aware and understand the true picture of what they are responsible and accountable for, they actually become more forward leaning and better equipped to spot where the danger lies and develop effective mitigation strategies. It also makes individuals better able to accept the responsibility and accountability that comes with the Duty Holding role, addressing a further observation of the House of Commons Defence Sub-Committee Beyond Endurance report[33]. If a similar approach can be adopted in the Land domain, not only will the number of preventable deaths during the conduct of military training likely reduce, so too should the scope for future reputationally damaging incidents. In order for this goal to be reached, TLBs need to undertake more comprehensive 1st and 2nd party assurance than is currently the case and Defence as a whole needs to support, and if required resource, the need for stronger self-regulation of such activities. Achieving the full implementation of an

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[31] Including the death of a young officer undertaking an endurance march on Dartmoor in May 15 and a serviceman during his annual fitness test in Jun 15. Service Inquiry reports on Gov.UK

[32] Chapter 2, Para 2 of the House of Commons Sub-Committee report "Beyond Endurance" states "Between the 1 Jan 2000 and 20 Feb 2016, 135 Armed Forces personnel have died whilst on training and exercise.

[33] Chapter 3, paras 31-33 of House of Commons Defence Sub-Committee report "Beyond Endurance".

effective Duty Holding model across the Land domain[34], will be a personal priority throughout the remainder of my tenure as DG DSA.

38. Adventurous Training forms an essential part of military training, conducted by all 3 Services, involving 'controlled' exposure to risk with a view to supporting the development of the key skills, judgement and courage vital to operational capability. Following the 59% increase in Adventurous Training major injuries from 2013/2014 to 2014/15 reported in last year's Annual Assurance Report, the Defence Safety Committee approved the proposal for the DLSR to implement an independent inspection and licensing scheme for Defence Adventurous Training centres, a process similar to that conducted by the HSE for civilian centres. Following a successful pilot on the Cadet Centre for Adventurous Training in Capel Curig in Mar 16, the scheme will be rolled out over the next 12-24 months, focussing initially on cadet and Phase 2 training centres. Further clarification of the governance around Adventurous Training and Sporting activity was carried out by the Head of Training, Education, Skills, Recruiting and Resettlement at the request of the Defence Safety Committee which resulted in a paper[35] being presented to the Committee in Jun 16. However, as the majority of Adventurous Training is conducted at Unit level there is a view that this is where Defence is exposed to the most risk. The DSA will work with the TLBs in the coming year to substantiate this view and consider options for mitigating this risk through a more appropriate assurance regime.

SAFETY GOVERNANCE AT THE DEPARTMENTAL LEVEL

39. The changes in the safety sphere that the Department has implemented since 1 Apr 15 are now becoming well established. At the Departmental level, the establishment of Safety as a Defence Authority alongside the other 17 Authority[36] functions has worked as intended. In both inward and outward-facing roles the independence of the DSA as an organisation and the direct personal "line of sight" that I have to the SofS have been critical. The credibility of the organisation and difficult function that it performs is dependent on this status and we should be careful to safeguard it despite the inevitable changes that will continue to affect the Head Office. While safeguarding its independent role for safety matters it has also been able to contribute to the corporate risk awareness and management function as overseen by the Defence Audit Committee, Defence Internal Audit and Defence Audit Risk and Assurance. In terms of safety-related risks we now have an increasingly understood method of using both mathematical modelling and personal judgement (by accountable individuals) to first identify and then categorise RtL. The Duty Holding construct provides a clear pathway of accountability for these RtL that stretches from the very top of the organisation, the Senior Duty Holders or in exceptional circumstances the SofS[37], down to the front line and into the Units, as managed by the Delivery Duty Holder layer. This provides an enhanced awareness of major RtL throughout TLBs and Defence as a whole, and the means by which they can be transferred to the appropriate level of the organisation for effective mitigation action to be undertaken. However, outside of these relatively well defined operating or activity based RtL, there is less clarity about how we manage other risks that may still have safety implications e.g. those posed by Fuel infrastructure that

[34] The agreement and implementation of Duty Holding models is being taken forward through the Defence Safety Committee.
[35] TESRR/AS&S/10 - Review of Adventurous Training and Sport - Safety and Coherence dated 25 May 16.
[36] HowDefenceWorksV4_2.pdf
[37] For example where there is societal concern.

have, at best, indirect RtL implications. More work is required in such areas to accurately identify where RtL do and do not occur and to agree the necessary accountabilities.

40. Despite this area of concern, the safety leadership increasingly evident at the very top of the Department is having a beneficial trickle-down effect. The re-invigorated Defence Safety Committee now attracts 3* attendance from across the TLBs and has so far sought to resolve some long standing, intellectually and organisationally challenging subjects. These include improving the regulation and governance of Adventurous Training and Sport across Defence; achieving improved coherence and uniformity in each TLBs interpretation and implementation of the Duty Holding construct; and the development of a revised set of simplified Duty Holder principles. It will shortly consider the matter of Safety Risk Management in Defence to ensure that this important risk identification and mitigation activity is being used effectively[38] and in a manner that achieves the balance between appropriate safety outcomes and operational effectiveness and flexibility that we are striving to achieve.

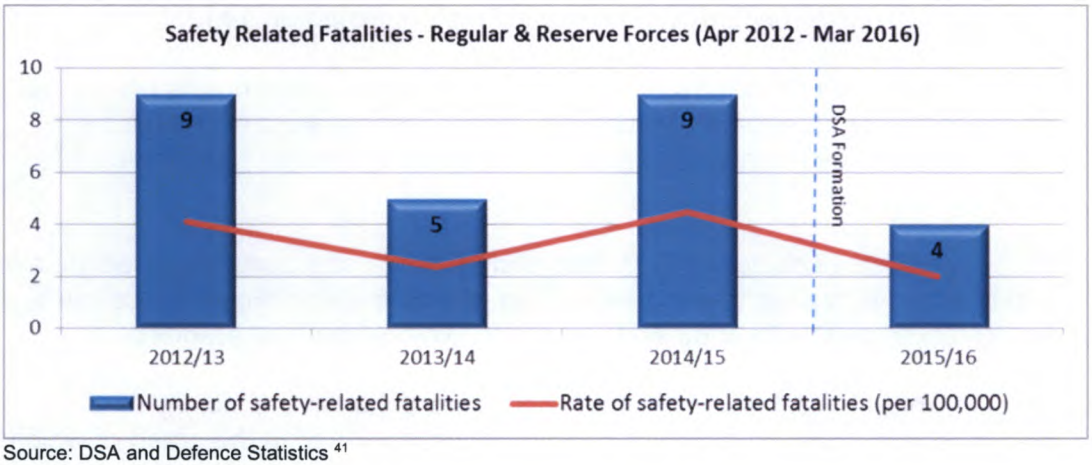
41. I am therefore satisfied that the value of a strong safety culture is increasingly being recognised across the Department. To reinforce this I am actively promoting the concept of 'operating safety'. This is not intended to replace our current understanding of traditional workplace 'health and safety', instead it is deliberately aimed at ensuring we prioritise managing RtL and minimising unnecessary deaths during routine military activity ahead of it. This is gaining traction amongst the more senior layers of our leadership, as is our understanding of what accountability and responsibility for safety really means for the Department, both on a collective and individual basis. The subordinate leadership layers will quickly be influenced by this example, leading to a more embedded awareness of operating safety and a focus on real RtL, alongside the basic principle of Duty of Care, in all that our people do.

42. External to the organisation, we have been scrutinised heavily this year on our approach to safety management matters both by Coroners and through a House of Commons Defence Sub-Committee inquiry[39]. Overall, the findings of the Sub-Committee are supportive of the steps that the Department is undertaking to achieve appropriate balance between achieving realism in training while reducing the risk of incurring life changing injuries and deaths in the process. Indeed, achieving this balance is fundamental to the concept of 'operating safety' that guides me as I continue to develop the DSA to support Defence's delivery of military effect. Unfortunately things will go wrong and we will need to investigate to learn from our mistakes and where appropriate hold those to account for the safety of our personnel. I am confident our people know and accept this fact but it will be incumbent on us to continually remind others, including families, that there is no such thing as absolute safety and the risk of injury or death is something that we must be constantly alert to and attend to carefully.

[38] The mandatory requirements for risk management activities within MOD are set out in JSP 892.
[39] http://www.publications.parliament.uk/pa/cm201516/cmselect/cmdfence/598/598.pdf

DEFENCE SAFETY RELATED FATALITIES

43. There were a total of 4 safety-related fatalities in the period covered by this report. This represents a 56% decrease from the 9 safety-related fatalities in FY 2014/15 and 33% from the 6[40] in the year before that. In addition this report includes details of 3 fatalities recorded as natural causes but in circumstances from which safety lessons may be learned. A brief summary of each of the incidents that resulted in potentially safety-related fatalities is at Appendix 1. The graph below illustrates, by FY, both the actual number, and the rates per 100,000, of safety-related deaths involving Regular & Reserve Forces during the period Apr 2010 – Mar 2016.



Source: DSA and Defence Statistics [41]

SERVICE INQUIRIES

44. During the period of this Annual Report, as DG DSA and the primary Convening Authority for safety-related SIs, I have convened 6 SIs and a number of non-Statutory Safety Inquiries. Although each accident is different in its circumstances, a number of underlying themes have emerged that are broadly common including: a lack of appreciation and appropriate management of risks; inadequate supervision and control of activities and training; and a failure to comply with correct drills and procedures.

45. The SIs convened or completed during this period were:

a. **Lynx (26 Apr 14)**. The SI report into the accident involving an Army Lynx AH Mk9A helicopter, which crashed in Afghanistan with the loss of all 5 Service personnel on board, was published in Jul 15 and provided the primary source of evidence for the inquest held in Oxford in Mar 16.

b. **Watchkeeper (16 Oct 14)**. A Watchkeeper Remotely Piloted Air System, operated by Industry, crashed whilst landing at West Wales Airport, Aberporth due to weaknesses in the automatic take-off and landing system,

[40] Five Regular and Reserve Forces; one civilian.
[41] Crude rates for safety-related fatalities include UK Regular and Reservist Armed Forces Personnel (excluding cadets).

and inappropriate use of a master override facility. The lengthy inquiry is now complete and was published on 10 Aug 16.

c. **Brecon (30 Jul 13).** A SI was convened in Jul 15 to investigate the circumstances surrounding the loss of 3 soldiers who died whilst undertaking an endurance march as part of selection for a specialist military unit. The inquiry is also reviewing the safety arrangements now in place for the whole of the selection process for Regulars and Reserves.

d. **Commando Training Centre Royal Marines (28 May 15).** A young officer collapsed and died undertaking a 30 mile endurance march on Dartmoor Training Area. Although the SI concluded that his death was due to natural causes and not preventable in the circumstances, there were still valuable lessons to be learnt. The report was published on 14 Mar 16.

e. **5 RIFLES (18 Jun 15)**. A soldier collapsed and died during his annual fitness test, also due to natural causes. The SI report, which includes 19 recommendations to enhance safety, is complete and was published on 17 Aug 16.

f. **1 RIFLES (29 Sept 15)**. While undertaking basic parachute training as part of an adventurous training expedition, a soldier died following a collision and entanglement with another parachutist. The SI remains on-going.

g. **Puma (11 Oct 15)**. A Puma helicopter crashed in the vicinity of a landing site in Kabul. Tragically, 5 NATO personnel died in the crash of which 2 were RAF crew. This inquiry is on-going.

h. **Watchkeeper (02 Nov 15**). A second Watchkeeper crashed whilst landing at MOD Boscombe Down. A provisional report was received in Aug 16.

46. **Support to Non-Statutory Safety Inquiries**. Where I have elected not to conduct a SI but the potential existed for Unit level lessons to be learned, the DSA has carried out a number of Non-Statutory Safety Inquiries including:

a. Fire fighting casualty – BATUS, Canada (Aug 15).
b. Fast roping inquiry (Sep 15).
c. Recruit collapsed and died during a fitness assessment – ATC Pirbright (Sep 15).
d. AS90 self-propelled gun rolled over – Germany (Oct 15).
e. Soldier trapped between 2 vehicles - Salisbury Plain (Nov 15).
f. Three vehicle collision – Salisbury Plain (Jun 15).
g. Support Vehicle road traffic collision – Scotland (Jun 15).
h. Parachuting mid-air collision - Blythe, California (Jan 16).
i. Vehicle collision resulting in 2 civilian fatalities - Kenya (Feb 16).

SUMMARY

47. The DSA has made much progress over the last year and in particular has reconfirmed the strategic safety risks that the Department faces, which are largely the same as the previous year but showing varying degrees of attention and mitigation. Whilst these major risks are low or improbable in their chance of being realised, the impact of one of them happening is potentially catastrophic in terms of loss of military and civilian life. It should be noted that some of these risks are now extremely well documented and much reported over recent years and would leave the Department open to significant criticism should one of them be realised. I recommend these strategic safety risks should be of continuing interest to the SofS, Defence Board and Chiefs. Overall, the assurance statements represent a mixed picture with the notable changes from last year being a forecast improvement in Aviation to Substantial by 2016/17 [redacted] Fire remains at Substantial but action is required to prevent this from dipping to Limited next year.

48. Of significance, the last year has allowed the DSA to look across Defence and identify the more routine day-to-day operating risks that claim the lives of a small number of our people each year. The Defence AIB and lessons from the SIs have been fundamental in generating this recognised picture of Defence safety. The risks include aviation, Adventurous Training, land-based transport, live firing and physical training and will have the focus of the DSA over the next year. It is also clear that we need to focus our efforts across TLB Land domain activity which appears to be light on internal and independent assurance and represents an area where we see significant fatalities and life changing injuries.

49. By providing a powerful, single focus for Defence Safety, the DSA will continue to raise the profile of the ever present need to safeguard people and equipment across Defence. Overall, across Defence, I can report to the SofS an aggregated assessment of **Limited Safety Assurance** for the year ending 31 Mar 16.

APPENDIX 1: DEFENCE SAFETY – RELATED FATALITIES

There were 4 safety-related fatalities during the period 1 Apr 15 – 31 Mar 16[42]:

Road Traffic Accident (on-duty), A9 near Aviemore – 22 Jun 16
Marine Andrew Dawes

Parachuting Incident, Bad Lippspringe, Germany – 29 Sep 15
Lance Corporal Ali Woodford

PUMA Helicopter Crash, Kabul, Afghanistan – 11 Oct 15
Flight Lieutenant Alan Scott
Flight Lieutenant Geraint Roberts

Plus a further 3 fatalities from which safety lessons may be learned;

Physical Training, Dartmoor Training Area, Devon (natural causes) – 28 May 15
Lieutenant Gareth Jenkins

Physical Training, Paderborn, Germany (natural causes) – 18 Jun 15
Rifleman Mathew Evans

Physical Training, Pirbright (natural causes) – 16 Sep 15
Private Megan Park

[42] Only Defence safety-related fatalities included – Road Traffic Accidents occurring off-Duty not included.