

Written evidence submitted by the Ministry of Defence

Introduction

1. The Integrated Review (IR), Defence Command Paper (DCP) and Integrated Operating Concept (IOpC) all describe a deteriorating global security environment, the increasing and evolving nature of the threats posed to the UK, and how the UK's Armed Forces must adapt to operate, fight, and win in this increasingly competitive age.

2. The UK's military aviation capabilities – from combat air and rotary wing to our mobility and Intelligence, Surveillance and Reconnaissance (ISR) fleets – and the people who operate and support them, play a vital role in meeting these threats. UK air and space power will continue to provide the UK choice through the ability to act globally, at range and speed, and with precision, across the military domains. Whether it be provision of UK Air Defence, global power projection, rapid delivery of humanitarian aid, strengthening relationships with our allies, or delivery of decisive and lethal action, the UK's air and space power protects the people of the UK helps to prevent conflict, stands permanently ready to fight the UK's adversaries, and plays a key role amplifying UK global influence with a global network of relationships with key allies and partners. As well as protecting our people and projecting the UK's global influence, the industrial support for UK military aviation sustains a vibrant aerospace technology sector employing tens of thousands of people across the UK and supporting Defence exports across the globe.

Q1. Will the proposals set out in the Integrated Review and Defence Command Paper deliver the aviation capabilities (fixed-wing and rotary), combat mass and interoperability required of UK Armed Forces, particularly in light of the changed security situation in Europe?

2. The March 2021 IR and DCP were clear that Russia posed: “*the greatest nuclear, conventional military and sub-threshold threat to European security*”. Russia's illegal invasion of Ukraine shows more than ever that the UK must be ready to defend and deter against threats in a deteriorating global security environment. It validates the commitments made in the IR and DCP for Defence to strengthen its deterrence, become increasingly adaptable and integrated with partners, and improve its ability to intervene and fight decisively. The IR and DCP also emphasised the need to strengthen NATO, the cornerstone of UK defence and critical to preserving the security and prosperity of the Euro-Atlantic region. The UK's military aviation capabilities play a key role in delivering on all those commitments.

3. The MOD continues to monitor the situation in Ukraine closely to ensure our strategic approach remains threat-led. In line with the agile planning and delivery mechanisms developed following the IR, the MOD will continue to review its capabilities and readiness levels, but the choices spelled out through the IR and DCP will deliver the required aviation capabilities, combat mass and interoperability required of UK Armed Forces to meet the threats we may face. The centrality of NATO has again been validated through the response to the Ukraine crisis, and it also important to recognise that the UK's membership of – and contribution to – the alliance also provides combat mass, over and above that of individual nations.

4. The IR provided an opportunity for the Royal Air Force (RAF) to re-focus itself to better meet the shared vision for the Armed Forces: networked, digital, and more capable in the newer domains of Space and Cyber. To do this, the RAF committed to deliver enhancements to combat air and ISR through an innovative mix of crewed and un-crewed

capabilities, including combat drones, and the development of novel technologies and new weapons, both kinetic and non-kinetic. Ongoing growth and spiral upgrades of Lightning and Typhoon, including investments in the European Common Radar System Mk2 (ECRS2), and bringing Protector and Wedgetail into service are key in achieving this, boosting lethality, capability and increasing political choice. Sufficient stockpiles of weapons and consumables (e.g. air countermeasures and sonobuoys) are required to maintain sufficient resilience and rates of effort against a peer adversary.

5. Despite the record Spending Review (SR) settlement for defence, the IR recognised that, to deliver this future force, some difficult but necessary choices were needed to optimise and modernise the Armed Forces to meet the future Defence ambition. While Russia's aggression in Ukraine has starkly highlighted the threat it poses, the transformative approach set out in the IR will ensure the UK remains capable of fighting the evolving and increasing threats of the future, and these decisions remain valid.

6. The **Defence Rotary Wing (RW) strategy** will provide the roadmap for the modernisation and continued evolution of the RW portfolio towards 2040. This is a tri-service, multi-platform strategy which will capitalise on the IR and SR outcomes to ensure the portfolio becomes sustainable, aligned to a changing operational demand signal and able to address evolving threats. The settlement, combined with an unsentimental view of those capabilities that will be less relevant to the changing threat, provides Defence with the resource needed to be more agile, lethal, integrated, and adaptable. The Army's Global Response Force (GRF), being built around 16 Air Assault Brigade Combat Team (BCT) and 1st Aviation BCT, which will be ready to respond to emerging crises from humanitarian relief through to warfighting, will also benefit from modernisation activity across the rotary wing portfolio. Part of this modernisation included the commitment to invest in the New Medium Helicopter (NMH) programme. The NMH will undertake the tasks currently conducted by Puma, Griffin and other platforms as well as providing aviation support to our Special Forces in support of their global activities.

7. As part of the Defence RW Strategy roadmap, the Merlin helicopter fleet will be extended in service until 2040. This will provide continued capability outputs in protection of the continuous at sea deterrent and anti-submarine warfare through Merlin Mk2, and battlefield aviation lift to the Future Commando Force through Merlin Mk4. The out of service (OSD) date for the Navy and Army Wildcat fleets is currently 2045. These fleets will require a mid-life update in the late 2020s/early 2030s, and work is being undertaken through the Maritime Uncrewed Air System Programme to ascertain what roles could be undertaken using uncrewed air systems in the future. Such capabilities could both enhance the delivery of Carrier Strike, and potentially enable adjustments to both Wildcat's mid-life upkeep and its OSD. The RN's Future Maritime Aviation Force (FMAF) programme will shape this pathway and frames the whole force changes necessary to exploit future uncrewed maritime Strike, ISR and supporting capabilities.

Q2. What is the rationale behind, and what are the implications of, planned reductions to the existing fleet, including:

- (a) **Combat air, with the early retirement of Tranche 1 Typhoons and the apparent scaling-back of commitments to purchase additional F35-B fighter aircraft.**
- (b) **Fleet mobility, with regard to the early retirement of the C-130J Hercules, and the removal of the Puma and older Chinook helicopters from service.**
- (c) **Airborne early warning and control, with the early retirement of the E-3D Sentry and the decision to reduce the number of E – 7A Wedgetails entering service from 5 to 3.**

8. Decisive hard power and the credibility to fight are essential parts of being able to operate and deter. But not everything we do now may be relevant in 2030. In a world of multi-domain operations, our effectiveness can no longer be judged solely by numbers of people or platforms; the conflict in Ukraine has further reinforced that competitive advantage no longer stems from mass alone. For example, Russian negation of mass advantage in firepower through inadequate ISR and targeting capability; failure to equip platforms to fight in multi-domain operations; and failure to adapt to evolved threats in the Air environment. The investments following the IR aim to maximise the value of all current and future platforms to Defence and to our allies, while improving their survivability and lethality. The IR was clear in its recognition of the need to support and thicken the UK's air capabilities; the importance of digitisation and data; and a shift to synthetics in all areas such as digital twins, training, mission rehearsal and decision support: the RAF is now focused on delivering the outcomes of the IR against these priorities.

9. **Combat Air:** The decisions taken in the IR ensured investment was directed to capabilities that would endure and provide relevance well into the next decade. Careful consideration was made regarding the withdrawal of legacy platforms in order to create the capacity to invest in the future. The IR also highlighted that we would continue to develop the Future Combat Air System (FCAS), which will replace and improve on the capability delivered by Typhoon today. Work is underway on the FCAS Acquisition Programme Concept and Assessment phase to define and begin to design the future system and enable major programme decisions by 2024.

10. Typhoon Tranche 1 is an early 4th generation platform that is at risk of losing relevance against an increasingly complex and challenging threat. The decision to retire Typhoon Tranche 1 by 2025 reflects the obsolescence challenges that will otherwise mount in the second part of this decade, and the marginal return these platforms would offer as a result. Taking the decision to withdraw 30 Tranche 1 aircraft at this point enables the reinvestment required in the rest of the Typhoon fleet (107 aircraft) to see them through to an earliest OSD of 2040, although Typhoon's final OSD remains under consideration.

11. Unlike the older Tranche 1 aircraft, Typhoon Tranche 2/3 will incrementally develop through the Future Capability Programme, including enhancements to defensive systems and weapon integration. Major European collaborative programmes will address airframe, regulatory, safety, survivability, and lethality requirements. Further, the ECRS2 was a major IR investment that will deliver a step change in the ability of Typhoon to operate well into the next decade. Upgrading the Typhoon radar from a mechanically scanned to an active electronically scanned array is essential for maintaining pace against a versatile, modern, and increasingly proliferated threat. It offers a path for incremental development to carry Typhoon into the heavily contested and complex electro-magnetic environment throughout the next decade and across the spectrum of conflict set out in the IOpC. Development of the ECRS Mk2 radar by UK industry is also an essential step in delivering a future radar capability for the FCAS. This retention of seven front line Typhoon squadrons, equipped with fewer, but more modern and reliable aircraft, backed by networked synthetic training devices, will ensure no deterioration in combat effect, while also preserving an effective and sustainable operational model for our personnel.

12. Currently, both F-35 Lightning and Typhoon are working very closely together, enabling their strengths to be multiplied and ensuring 4th and 5th Gen combat aircraft are integrated seamlessly, using each other's impressive capabilities to maximise survivability and lethality.

13. F-35B Lightning offers Defence a 5th generation, low-observable combat air platform capable of operating from the land or maritime environment. The RAF is mid-way through

the initial procurement and expects to have taken ownership of the first 48 Tranche 1 aircraft by 2025. The successful Carrier Strike Group deployment in 2021 of 617 Squadron, alongside a deployed United States Marine Corps Squadron, and undertaking exercises with, amongst others, Japanese, Italian, Israeli and US F-35 forces, further demonstrated the international interoperability offered by the ever-expanding F-35 global fleet.

14. As set out in the IR, the MOD remains committed to an F-35B fleet beyond the 48 aircraft delivered in Tranche 1 and in the revised equipment plan has made provision to buy additional aircraft in a 'Tranche 2' purchase. The final decision on that number will be dependent on the F-35 Joint Program Office demonstrating improvements in support costs and progress on fitting British weapons on to the aircraft. Details remain subject to negotiation, but the MOD's planning assumption is that it will purchase a further 26 F-35B aircraft, taking the total in service to 73 by the end of the Tranche 2 purchase. The Department expects to be able to make a definitive judgement on the final size of the overall fleet by 2025, with the investment decision and delivery schedule driven by factors including the number required to maintain planned force elements through the life of the Queen Elizabeth Carriers (earliest OSD of 2068).

15. **Training:** the ability to train effectively and evaluate highly-classified tactics, techniques and procedures is a significant force enabler, driving Defence's commitment to re-balance live/synthetic training. Approximately 50% of all combat air training is already completed utilising synthetic devices, including an ability to deploy such capabilities forward onto our aircraft carriers, the benefits of which were proven on the Carrier Strike Group deployment in 2021. The Defence Operational Training Capability (DOTC) has been introduced as the Defence standard for synthetic training. It will enable complex individual and collective training to be conducted within a secure environment, protecting the UK's freedom of action. This is especially pertinent with the 5th generation F-35B Lightning where the synthetic environment is the only way we can truly hone capabilities against peer adversaries. It will not remove the need for live flying but shift the balance to more synthetic training and evaluation which will add resilience to the maintenance of competency of the combat air force, and the ability to sustain a greater number of points of presence by reducing the number of aircraft required for Force Generation training. By 2040, the RAF expects to conduct up to 80% of training synthetically (though figures will vary by platform). The flying hours that would otherwise have been used for training can then be used for more operational missions and global deployments.

16. The development of additive capabilities and un-crewed platforms within the force mix to deliver the outcomes conventionally delivered by combat air, will also provide resilience and a route towards additional mass. Investment in swarming drones in the very short-term, and the expansion of our experimentation with other uncrewed platforms in the LANCA (Lightweight Affordable Novel) initiative, offers additional mass including potentially from our aircraft carriers. The next IR will be informed by the latest thinking from the Services on un-crewed and autonomous platforms. This transition to high-quality synthetic training, and an investment in additive capabilities and un-crewed platforms, will achieve greater operational effect while delivering a networked, digital, and more capable combat air force for Defence.

(b) *Fleet mobility, with regard to the early retirement of the C-130J Hercules, and the removal of the Puma and older Chinook helicopters from service.*

17. **Hercules C Mk4/5 (C-130J):** in line with the broader IR direction to retire equipment with increasingly limited utility in the digital and future operating environment, the decision to bring forward the retirement date of Hercules to 2023 was based on a balance of operational capability against accelerating the Atlas development programme.

18. Brought into service in 1999, the Hercules C Mk4/5 has been the backbone of the Air Mobility fleet during a period of intense and enduring operations. However, as it ages, it requires ever greater investment to remain operationally viable. The Atlas capability development plan, coupled with the forecast improvement in aircraft serviceability, highlighted the potential to bring forward the Hercules retirement date.

19. The decision was based on several factors, including:

- the operational role of the Hercules and the support it provides to wider Defence;
- the current fatigue life remaining in the Hercules and the cost of upgrading so that it could continue to operate through to the 2030s;
- the arrival of the last two Atlas aircraft, to be delivered to the UK in 2022 and 2023;
- the delivery schedule of the International A400M Atlas programme;
- the delivery schedule of the capability upgrades in the UK Atlas programme, including those required to take on the full range of Tactical Air Mobility disciplines;
- projected future Atlas serviceability and productivity;
- the operational implications of any capability gaps; and,
- the number of Air Mobility aircraft that would be left after the Hercules retirement.

20. Taking all these factors into account, it was judged that retiring the Hercules in 2023 offered the right balance in terms of delivering future Atlas capability against any risk associated with growing operational capability as Atlas fully matures.

21. The RAF vision has always been a homogenous, flexible, and capable tactical air mobility fleet. Atlas is the next generation of air mobility aircraft, and the IR provided an opportunity to accelerate the modernisation of our Air Mobility Force to meet current and future threats. Compared to Hercules, Atlas has an improved lift capacity and range, is increasingly capable in the tactical role and has proven operational credibility in the airlift role. It offers Defence flexibility with its ability to deploy in both strategic airlift and tactical war fighting roles. It has deployed successfully in the Middle East and Falkland Islands and was used to good effect on Op PITTING and on current operations in support of NATO and in respect of Ukraine. It has supported COVID-19 (PPE & Patient Transport) and numerous humanitarian assistance and disaster relief operations (such as in the Caribbean, Indonesia, and Mozambique). The option to purchase additional Atlas aircraft remains under consideration.

22. With the retirement of the Hercules, and as part of the planned spiral development of the capability, the RAF is now expanding the Atlas's tactical capabilities such as landing on natural surfaces, despatch of parachuted supplies as well as paratroopers and their fighting equipment both day and night. The Atlas is now being used by RAF crews in some of these roles, with plans to expand their expertise over the coming months and years. It will take time to build experience levels, but the transfer of Hercules crews will accelerate the improvement.

23. The Department recognises that the availability of Atlas has not yet fully met the expectations from the IR. All A400M Partner Nations have suffered recently due to shortfalls in the Airbus Global Supply Chain, unrelated engine and propeller faults, and a lack of resilience in some support areas. The situation is under direct and focused high-level scrutiny with significant improvements demanded before Hercules retires. The workforce released from the Hercules fleet will be redistributed to meet Defence needs elsewhere, some of whom will be transferred onto Atlas to support its growing utilisation by Defence.

24. The MOD also recognises that advancing the Hercules out of service date has an impact on our industry partner in Hercules maintenance, Marshall Aerospace and Defence Group (MADG). The Department continues to work closely with the company to manage the drawdown of the Hercules, including some disposal options that could secure future work for MADG.

25. Through balancing the operational capability of Hercules against its increasing cost of maintenance, the Department considers the decision to retire it early remains valid, but the transition is kept under constant review. The ongoing, focused activity to improve Atlas availability and to accelerate the transfer of operational capability from Hercules reduces the risk incurred through the decision. When operating alongside the C-17 Globemaster and Voyager transport aircraft and tankers, the overall outcome is a more capable and flexible fleet of air mobility aircraft for use by Defence.

26. **Medium Rotary Wing Lift:** As part of the Department's continuing drive to reduce the number of platforms it operates, investment in a NMH aims to enable a consolidation of Defence's disparate fleet of medium lift helicopters from four platform types, including Puma, to one. The resultant commonality achieved by reducing the number of different in-service rotary wing platforms will allow for an increase in efficiency, especially in relation to training, maintenance, and logistics. It is likely that we will be seeking an existing commercial or military off-the-shelf helicopter to meet our requirement. The expectation is that the NMH will be fielded in the middle of this decade. A Market Interest Day was held in November 2021 to initiate early market engagement with interested suppliers. This has confirmed a competitive market exists and the competition for the NMH contract will be launched shortly. The OSD for Puma is dependent upon the delivery timelines for the New Medium Helicopter being confirmed.

27. **Chinook:** Following decisions made in the IR and DCP, the Army is also retiring nine legacy CH-47 Chinook helicopters and investing, alongside the US, in newer variants of this operationally proven aircraft, enhancing capability, efficiency and interoperability. The legacy aircraft will be phased out of service between now and 2025, resulting in a reduction of the overall fleet from 60 to 51 aircraft. Although Forward Fleet numbers shall remain at 41, there will be a reduction in the Sustainment Fleet, which provides the resilience to sustain spiral modification programmes and absorb attrition aircraft to minimise impact on Chinook output. Reducing the Sustainment Fleet does add risk to the successful completion of these modifications or the ability to recover/repair attrition aircraft without impact on Forward Fleet numbers or Depth production. Chinook remains the rotary wing lift asset of choice for Defence and is consistently in high demand to cover multiple defence tasks. The Department accepts that a reduction will add some risk to meeting concurrent defence tasks while also sustaining war-fighting capability, but this will be mitigated by changes in fleet management and absorption of modification activity in depth and in service environments.

28. A £1.4 billion contract to modernise the Chinook existing fleet will see the Army invest in newer variants of this operationally proven aircraft, enhancing capability, efficiency, and interoperability. The deal will see British forces benefit from 14 of the latest variant, purchased from the US via a Foreign Military Sales agreement. The final fleet size of 51 aircraft will include, once delivered, the new 14 aircraft as these will replace the older aircraft currently in-service, meaning a younger and more resilient overall fleet. Deliveries are scheduled to start in 2026.

c. Airborne early warning and control, with the early retirement of the E-3D Sentry and the decision to reduce the number of E – 7A Wedgetails entering service from 5 to 3.

29. After more than 30 years of service, acquiring serviceable parts to maintain the Sentry AEW Mk1 had become increasingly difficult and expensive. Serviceability rates have decreased over the lifetime of the fleet while costs of incorporating modern system upgrades have increased in parallel. Maintaining the ageing Sentry therefore offered decreasing value for money, increasing obsolescence issues, and decreasing operational utility in the face of current and emerging threats.

30. The Wedgetail AEW Mk1 Programme replaces the Sentry Airborne Warning and Control System aircraft, providing a capability until 2042. The Wedgetail is a world-leading Air Command & Control (C2) platform and will be an essential component of the future NATO Air Surveillance capability, offering unparalleled multi-domain integration opportunities to our Allies.

31. Since deciding to procure the Wedgetail in 2018, the programme has been re-evaluated and two key changes have been made to ensure the programme offers Defence best value for money: a decision to base the fleet at RAF Lossiemouth rather than RAF Waddington, and a reduction of fleet size from five aircraft to three. Basing the aircraft at RAF Lossiemouth will allow MOD to exploit synergies of operating two Boeing 737 type aircraft (Wedgetail and Poseidon) at the same location and allow us to take advantage of the existing RAF Lossiemouth infrastructure including the Poseidon Strategic Facility and the upgrades to the operating surfaces, delivering better value for money. Operationally, basing the Wedgetail at RAF Lossiemouth permits rapid operational access to the North Atlantic region.

32. Whilst Defence originally committed to the purchase of five aircraft, analysis concluded that a fleet of three Wedgetail aircraft, with improved availability when compared to the Sentry, would provide Defence with the capability it needs and provide the UK's contribution to NATO. As with everything else in the IR and DCP, this is something we will continue to review in light of the rapidly changing global context. Even with three platforms, the Wedgetail will offer Defence a step-change in capability compared to the Sentry.

Q3. *Will the uplifted contracts for both rotary and fixed wing Military Flying Training effectively and rapidly resolve capacity issues?*

33. A steady flow of trained aircrew is vital to deliver our future capability. MFTS is and will continue to deliver sufficient trainees to the front line to meet current and future demands. Recent investment into the UK Military Flying Training System (UKMFTS) programme has increased capacity in rotary wing flying training, with four additional helicopters and a synthetic training uplift delivered at RAF Shawbury. Equally, fewer helicopter pilots now require completion of fixed wing training, which has increased availability within the fixed wing training system for pilots going to fast jet, multi-engine or remotely-piloted air systems. The Army Air Corps commenced rotary-only training from December 2021, with the Royal Navy following in the first quarter of 2022.

34. In September 2020, a contract was awarded to increase the capacity of the UKMFTS programme in Basic Fast Jet Flying Training. Four more Texan aircraft are now in service with ten additional instructors. Additional synthetics and further infrastructure improvements at RAF Valley will increase maximum input from 36 up to 53 trainees per year by 2025.

35. As of 4 April 2022, the current number of pre-Elementary Flying Training holding student aircrew in the training pipeline is 20, well below our working target level of 80 (25 Royal Navy, 25 Army and 30 RAF). The time undertaking training between the end of Initial Officer Training to the end of phase 2/MFTS has also steadily fallen and is now more focused upon relevance and preparedness for operations.

36. We recognise there have previously been Hawk TMk2 aircraft availability issues, but availability has improved substantially and is now sufficient to meet the Department's flying training plan. For Financial Year 2021/22 aircraft availability has delivered at the planned levels to meet the fast jet training programme, underpinned by revised Hawk contract metrics to assure availability and resilience. The MOD is continuing to work with its partners to ensure the improvements are sustained. The new Hawk Support Contracts with BAE Systems and Rolls Royce will further deliver improved operating efficiencies from April 2022.

37. Changes in demand from Operational Conversion Units – reduced ab-initio demand from air mobility, rotary and ISTAR forces due to IR decisions, and the movement of aircrew from retiring aircraft rather than ab-initio – has created additional holding for graduates from our flying training system while they wait for training places to be available to convert them to their front-line aircraft types. The downturn in the global aviation industry due to the COVID 19 pandemic also saw fewer aircrew leaving the Armed Forces, coupled with a rise in those re-joining. This also contributed to a fully populated frontline with a commensurate impact on frontline conversion training for ab-initio students. As a result, in the IR we decided not to proceed with uplift of an additional synthetic training device to fulfil the increased demand in multi-engine pilot training from SDSR15, but this remains in our plans to allow for an increase in future training demand.

12th May 2022