Article

Reflections on the V-Force: Operationally Compromised but a Critical Geopolitical Enabler?

By Wing Commander Mark Tobin

Biography: Wing Commander Mark Tobin is currently serving in MOD Security Policy & Operations as a Middle East desk officer. With experience in intelligence, operations and training, he has served operationally in Europe, the Levant, Middle East and Asia. Tobin holds an MSc in Applied Meteorology, an MA in Defence Studies and is a Fellow of the Royal Geographical Society.

Abstract: The issue of deterrence – achieving or resetting – is a constant thought at the strategic level. This article provides a contemporary examination of the V-Force asking to what extent it represented a capable and independent nuclear deterrent. In examining the underlying political, economic and service dynamics of the time, set against a rapidly developing Soviet threat, attempted mitigation measures such as Project E and the impact of changing of tactics to low level operations, it concludes that the V-Force was likely to have been operationally incapable of conducting the nuclear strike mission it was assigned. However, as a geopolitical enabler it was extremely capable, enhancing the UK-US Special Relationship and helping to lock the US into the defence of Britain and Europe in the post-Suez era of uncertainty surrounding US intentions.

Introduction

The idea to establish an independent British nuclear deterrent pre-dated the US' detonation of atomic bombs at Hiroshima and Nagasaki in August 1945. In July 1945, under the direction of the Joint Technical Warfare Committee, the Tizard Committee reported on what it saw as the likely course of weapons development over the following decade. It urged the Government to conduct research into atomic energy, hypothesising about its potential capabilities if weaponized, simultaneously envisaging the development of high altitude, high speed, jet-engined bombers in the process effectively conceptualizing airborne nuclear deterrence.[1] Despite much of the science underpinning nuclear weapons being made possible by discoveries at British universities under the aegis of the MAUD Committee, and Britain's status as a full partner in the Manhattan Project,[2] the 1946 McMahon Act set the USA on a path of nuclear isolation, in the process forcing Britain to develop its own independent nuclear capability. The first iteration of such a capability was based around RAF Valiant, Victor and Vulcan bombers, christened the 'V-Force' by the incumbent Chief of the Air Staff (CAS), Sir John Slessor.[3] These aircraft provided Britain's strategic nuclear deterrent from 1957 – 1969 when responsibility was transferred to the Royal Navy's Polaris submarine-launched ballistic missile system.

On handing over deterrent duties to the Royal Navy, the HQ Strike Command Operations Record Book recorded the V-Force's role as the tip of the spear:

> 'At midnight on 30 June 1969, the Medium Bomber Force of Strike Command handed-over to the Royal Navy the responsibility for providing the UK permanent peacetime QRA force. Over the past seven years a proportion of the V-Force has been held at a high state of readiness to counter surprise attacks whilst, at all times, the remainder of the force has maintained the capability to generate all weapon systems to meet their commitments to NATO. The peace keeping value of this contribution to NATO and [the] Western cause has been inestimable;…'[4]

Although proving deterrence is notoriously difficult, this article examines to what extent the V-Force as the UK's national deterrent, constituted a capable and independent force. Analysis highlights a series of factors that raise questions and impose qualifications on the idea of the V-Force as a truly independent and capable British operation. As a standalone capability charged with achieving a minimum level of deterrence, the V-Force appears compromised from the outset by a force size too small to meet underlying political aims, whilst being simultaneously threatened by rapid developments in Soviet military capability that posed existential threats both on the ground and in the air. Alongside the Anglo-US Project 'E', which in providing a source of nuclear weapons, also undermined responsiveness, it is questionable whether as a unilateral independent military capability, the V-Force was capable of delivering the effects envisaged by Prime Ministers of the day. Yet considered in a wider context, the V-Force achieved significant success as a geopolitical instrument, especially

if the question is reframed to ask whether the underlying political aims were achieving deterrence, or whether they were in fact about enhancing Britain's position and re-establishing closer links with the USA in a post-Suez era of uncertainty.[5]

The Answer to an Atomic Bomb is an Atomic Bomb

The conflicts inherent in early thinking on British deterrence ran deep and were seen across the post-war British political landscape. Clement Atlee's 1946 statement to the Gen 75 Committee that '[t]he answer to an atomic bomb on London is an atomic bomb on another great city'[6] points to the idea of deterrence by punishment. Yet in 1955 Harold Macmillan set out his own criteria which moved thinking beyond deterrence of potential enemies to achieving geopolitical influence within nascent NATO structures. Beyond inflicting unacceptable levels of damage, Macmillan sought a mechanism that would convince the US that the UK could not be ignored.[7] But Macmillan's criteria also provides evidence of divergent thinking from the outset, with the V-Force, recognised by Macmillan at least as not just a military capability, a fact which was to have implications as the V-Force developed.

Indeed, whether the V-Force was structured to meet either the military or political aims is questionable in the context of a Force subjected to constant cuts from the outset. The view from USAF Strategic Air Command (SAC) in 1951 was that the RAF's bomber capability was obsolete,[8] a criticism reflecting the then Chief of the Air Staff (CAS) Sir John Slessor's 1950 assessment.[9] It took the 1952 Global Strategy Paper with its increased emphasis on deterrence mitigating the high cost of the conventional forces to set the military direction of travel. Throughout, the RAF sought to emphasis the centrality of the strategic deterrent arguing for the central role within it, with Deputy CAS Sir Ronald Ivelaw-Chapman noting that the 'biggest force we can afford is the least we should provide,'[10] setting a target date of 1957 to achieve operational capability, based on the assessment of timescales of potential future Soviet aggression.

However, it was only through Slessor's position as the dominant figure amongst the Service Chiefs in matters strategic, and with a good sense for the ebb and flow of US opinion,[11] that the centrality of the strategic deterrent in Defence thinking and the RAF's role at the heart of it was formalised. With Slessor driving the 1952 Paper, it noted that:

> '… to have no share in what is recognised as the main deterrent in the Cold War, and the only allied offensive in world war, would seriously weaken British influence on American policy and planning in the Cold War, and in war would mean that the United Kingdom would have no claim to any share in the policy or planning of the offensive'.[12]

Despite Slessor's surety and position amongst the Service Chiefs and his keen political appreciation, inter-service rivalries persisted at the military-strategic level, threatening the conceptual coherence necessary to drive the development of the strategic deterrent. Perhaps the biggest differences in thinking were between Slessor as CAS and the First Sea

Lord, Admiral Sir Rhoderick McGrigor, over the likely length of any future campaign and therefore the relative merits of a swift and decisive air offensive, set against a slower burn Naval strategy of 'broken-backed warfare'.[13] On one level this reflected genuine ambiguity as to the likely nature of any future conflict: short and very sharp with 'an opening phase of unparalleled intensity', or 'a conflict characterised by an initial phase followed by a long drawn out period of chaos with an intermittent struggle gradually spreading worldwide'.[14] But it also reflected the Royal Navy's search for a role in a nuclear conflict, with McGrigor arguing that the Fleet Air Arm and Carrier Aviation had a role to play in both the opening and subsequent phases of any war, noting the relatively greater accessibility to targets in the Soviet North by sea rather than air, assuming of course the Navy's modernization plans were accepted.[15]

Even at this early stage in proceedings, it is possible to see the to-and-fro of military and political thinking, both within and between the political and military leadership, which arguably compromised the strategic deterrent from its earliest days. Although Slessor's strategic astuteness arguably bridged some of the gap and gave the RAF a head start in the arguments over how quickly the UK could be in a position to make a worthwhile contribution to any nuclear offensive, without a firm conceptual and doctrinal foundation, the strategic deterrent would always be vulnerable to questions. Perhaps the clearest example of this lay in the seemingly arbitrary way in which targeting policy was drawn up and subsequently informed force structures and capabilities with attendant implications for operational effectiveness, an area that will be discussed later.

Despite conceptual inconsistencies, the strategic and political imperatives of the day ensured progress in the UK deterrent programme became a major factor in Defence planning, leading to a priority being placed on V-Force development. Yet arguments over the planned force size persisted throughout the 1950s. Initial plans were for a force of 240 bombers, a size that Slessor's successor as CAS, Sir William Dickson, could only contextualise in general terms as 'providing worthwhile hitting power' as part of a western strategic counter offensive.[16] Such general aspirations appear weak rebuttal to the external economic and inter-service pressures at the time which were a constant threat to V-Force planning.[17] The Royal Navy, still manoeuvring for position, were by this stage already considering how they might generate their own version of deterrence through a ballistic missile capability,[18] capitalising on rapid increases in nuclear yields from the kiloton to megaton offering greater destructive power per weapon. Unsurprisingly, the government view by 1954 was that the significantly increased destructive power of megaton weapons allowed for a reduction in the numbers of aircraft needed to 180.[19] This was further reduced to 144 by the Defence Committee in 1957 as a compromise between military and economic considerations.[20] Within this figure the decision was made to equip the V-Force with nine squadrons each of Valiant, Vulcan and Victor aircraft, set against a relatively demanding requirement to be able to deliver a 10,000lb 'special bomb' at 500kts and 50,000ft to a target 1,500 miles from any RAF base in the world.[21] Importantly, they were to be unarmed and would rely on height and speed to penetrate Soviet air defences,[22] a requirement which would significantly impact overall capability given the quicker than

expected advances made by the Soviet Air Defence Force (hereafter PVO-S) and which will be discussed later.

Whilst understandable economically, this gradual reduction in force size begs the question of what impact such decisions had in terms of overall capability. Indeed, the 1952 Global Strategy Paper suggests that the Chiefs were themselves aware that given the scale of the US nuclear capability, from the British perspective the delivery system rather than the warheads themselves were the key element of the programme,[23] the Global Strategy Paper itself noting 'the main problem will be to ensure by all means that the weapons can be delivered without prohibitive loss …'[24] As such, the decisions to reduce the size of that delivery force highlights the complexities of balancing force structures against intended roles and the Soviet threat, and how these factors interacted to create tension between intent, capacity and capability.

In the context of force size, the 1959 Bomber Command Medium Bomber Force Alert and Readiness Plan contained Air Ministry and MOD direction setting the absolute minimum level of unilateral deterrent capability at the guaranteed destruction of 40 Soviet cities.[25] This somewhat rough and ready number was based on the belief that the lack of detailed, precise intelligence required to target fielded military forces instead necessitated the destruction of Soviet population centres, counter-value targeting, effectively targeting the will to fight. Based on the idea of inflicting 'breakdown damage', a concept extrapolated from studies into the effects of the RAF's Second World War strategic bombing campaign, counter-value targeting at scale would render entire cities and regions incapable of contributing to the broader war effort, while leaving the remaining populations struggling for survival in whatever remained.[26] Of the 130 Soviet cities with a population of 100,000, only 54 were regarded as significant, with 10 of these being beyond the range of the V-Force. Destruction of 40 of the remaining cities would lead to the loss of around 30% of the Soviet urban population, some 38 million people, and was assessed to be of sufficient deterrence, especially if Moscow and Leningrad suffered at least 50% destruction.[27] This emphasis on counter-value targeting, with Moscow singled out for special treatment – 'The Moscow Criterion' - grew throughout the late 1950s and became recommended policy following a series of wargames by the Global War Studies Committee which highlighted the question of targeting intelligence and the resulting inability to achieve a decisive strike against military targets.[28]

Despite the political focus on counter-value targets, elements of the Air Staff, still smarting from the recent Suez crisis and what they viewed as uncertainty surrounding US intentions,[29] favoured a wholly independent counter-force policy focused on airfields, aiming to neutralise the Soviet Union's military capability and capacity to conduct strikes before Soviet strategic air forces could be brought to action. Therefore, alongside the political desire for a unilateral capability focused on counter-value targets, the decision was also taken to implement a twin-track policy whereby the V-Force would also be integrated into a combined strike plan with USAF SAC.[30] This would give the RAF a central role in coordinated nuclear assault on

Soviet war-making capabilities involving a first wave of 1,500 bombers against 800 targets.[31] Beyond the obvious policy differences between political and military leaders, the scale of effort required to prosecute the USAF counter-force plan represents a stark difference in appreciation of the threat and highlights the likely scale of the task faced by an already reduced V-Force.

When V-Force size and policy differences are considered together, the operational implications of the decisions on force structure become clear. Intelligence assessed that by 1960, along with 150 airfields which could be used to launch nuclear strikes, the Soviets had an emerging ballistic missile capability which would also need to be dealt with.[32] Given a V-Force strength by December 1960 of 120 aircraft and an estimated 160 weapons,[33] combined with low serviceability rates at that time across the Force (39% for the Vulcan, 33% for the Victor and 57% for the oldest Valiant aircraft),[34] the implication behind these numbers is clear. On the basis of numbers alone and when combined with the lack of intelligence needed to identify relevant Soviet targets with the necessary precision, critical for a smaller force,[35] the issues become clear. The ability to conduct an effective unilateral counter-force attack, capable of neutralising Soviet forces and removing the potential for retaliation, appears questionable and potentially even beyond the capacity and therefore capability of the V-Force in 1960. This takes us to the idea that in military terms the V-Force was in fact more of a counter-value capability based on deterrence by punishment than a force designed to conduct an aerial campaign as part of a broader war fighting strategy. But it also appears to have had a rationale beyond deterrence given the desire to operate alongside US forces in a combined strike plan. This points towards the broader, geopolitical role of locking the US into British and European defence, in the process generating a level of geopolitical influence belying the actuality of Britain's straitened post-war position. This raises the question whether V-Force size and structure was in fact predicated on the minimum required to deter the Soviets, or the minimum required to engage the US administration, thereby achieving the geopolitical goal of locking the US into British and European defence.

The notion of the V-Force as a geopolitical instrument to influence allies as much as deter enemies appears even more salient in the context of the 1962 decision to review the 40 city criteria. In an apparent shift from the idea of inflicting 'breakdown damage', a Joint Intelligence Committee (JIC) review of the Soviet Union's ability to absorb damage concluded that 40 cities was excessive and that 20 cities represented sufficient deterrent. However, a major caveat to the JIC's assessment was that destruction of 20 cities was not intended to be a unilateral deterrent, but that it would degrade Soviet capabilities sufficiently to alter the balance of power between the US and Soviet Union.[36] Once again the political judgement was that British deterrence was not intended to achieve military victory in its own right, but to inflict sufficient damage to influence allies and coerce enemies rather than deliver unilateral victory.

When the 20-city targeting policy was subsequently revised twice in 1962, firstly to 15 cities when it was considered that an airborne force of 13 aircraft armed with Skybolt would be

sufficient to achieve minimum deterrence, then to five cities when the Skybolt programme was cancelled leaving a major capability gap, both of Macmillan's criteria look questionable. Even in the context of emerging megaton capabilities, which Sir Anthony Eden recollected meant '[a]ll became equally vulnerable,'[37] the reduced numbers of aircraft associated with increased weapons yields and significantly reduced aspiration with regard to targeting policy, can easily be portrayed as a decline in deterrence capability, none of which was due to a change in Soviet threat or objectively based assessment on the nature of minimum deterrence. Indeed, the consequences of the change in the profile of the British strategic deterrent, implemented over a relatively short period of time, achieves even greater resonance in the context of Khrushchev's earlier address to the January 1960 Supreme Soviet. Declassified assessments noted that whilst alive to the likely destruction on both sides of any future war, Khrushchev asserted 'a superior … ability to emerge from a nuclear exchange,'[38] suggesting the size of the Soviet Union provided a degree of resilience and redundancy and therefore potential with which to retaliate.[39] Although politically driven comments based on Soviet leadership judgements of acceptable loss,[40] they highlight the implications for deterrence of the V-Force's reduced capacity when set against Soviet strategic depth. Given previous comments, the shift from deterrence through punishment to deterrence by changing the balance of geopolitical power represents a significant shift in thinking. It reframes the rationale for the V-Force, moving from unilateral deterrence to a tool to generate geopolitical influence in a broader alliance context.

A Vulnerable Force

Beyond structural issues which determined capacity to act, V-Force capability depended on avoiding destruction on the ground by a Soviet first strike if the rationale for a second-strike deterrent was not to be fatally undermined. Not only was Britain vulnerable to Soviet attack because of the V-Force, but its geographical location and heavy USAF presence, initially through the Third Air Force and then the 7th Air Division, effectively made the British Isles a forward operating base for air operations in Europe.[41] Although the Soviets possessed a long range bomber force, Khrushchev's speeches and formal addresses from the era highlight the Soviet belief in and preference for offensive Intercontinental Ballistic Missiles (ICBMs), by 1960 noting their growing presence across Soviet air and maritime forces, and their ability to deliver massive firepower at range and speed, in a manner difficult to defend against.[42]

The literature makes clear the scale of the threat. From an operational research perspective Matthew Godwin and Maurice Kirby argue that the threat was determined by the relationship between the number of missiles required to destroy each of the 10 main V-Force airfields, set against estimates of Soviet missile stocks and warhead size and accuracy.[43] However, JIC assessments from the time paint a darker picture, highlighting the rapid improvements to Soviet capability and capacity. Assessments concluded that by 1958 the Soviet stockpile for attacks against UK targets was estimated at fifteen1-5 megaton devices and two-hundred 10-100 kiloton devices, with V-Force and USAF airbases the main targets.[44] Later assessments concluded that by 1960 the Soviets would have sufficient capacity to attack all the targets

they would wish, and by 1962 had a combined total of 250 land, air and maritime delivered devices ranged against RAF V-Force airfields, representing a major threat to the V-Force's survivability.[45]

In this light, pre-emptive defensive measures based on intelligence, early warning and dispersal became critical to V-Force survivability. However, the inability to repeat the success of *Ultra* intelligence against post-war Soviet targets combined with the lack of any precedent for thinking about nuclear war complicated understanding Soviet intentions.[46] Warning, such as it was, came from ballistic missile tracking data from the Ballistic Missile Early Warning System (BMEWS), one site of which was located in the UK at RAF Fylingdales. Given the proximity to the Soviet Union, the worst-case scenario, and therefore the basis for planning, meant the UK would receive only 4 minutes warning of a Soviet missile launch,[47] a point acknowledged as not particularly early by the Government's own scientific advisor.[48] Alongside BMEWS work was also underway to develop a space-based system, Missile Defense Alarm System (MIDAS), designed to detect missiles' thermal launch signatures in the launch phase and which would complement the BMEWS radar coverage. Despite the inaugural launch in 1960, 1961 Department of Defense assessments noted significant and fundamental difficulties in the complex programme, including an assessment that the desire for early operational success had in fact created a system that was overly complex and judged as likely to be ineffective against entire classes of missile threats. The resulting recommendation for a wholesale redesign of the programme to better understand system performance against likely threats, was made in full knowledge of the resulting delays, with forecasts for an initial operational capability delayed until 1966 at the earliest.[49]

Given that BMEWs did not become operational until 1964, and combined with the uncertainty over MIDAS' status, it seems clear that the early warning needed to mitigate a potential surprise attack was limited. Based on the available evidence, it seems that in the early days of the V-Force the British government relied solely on a gradual increase in tensions to provide warning, along with the prospect of overwhelming US retaliation on Britain's behalf in the event of a surprise attack. Critically this highlights the interdependencies at the heart of Britain's independent deterrent,[50] and contrasts with the US view that credible deterrence must be responsive to no notice threats, and reflected their ongoing scepticism of British deterrent capabilities.

Such threats meant the RAF sought to enhance survivability by dispersing the V-Force across ten class-1 airfields and a further 36 dispersal airfields around the UK. However, 1960 Ministry of Aviation assessments noted the difficulty of defending against the scale of potential threat, noting that even fully dispersed, up to 80% of the V-Force could be destroyed on the ground leaving only a small force of around 20 aircraft which might get airborne.[51] It is unclear whether an effective solution to this problem existed, and therefore, whether the V-Force could in fact maintain sufficient capacity to inflict unacceptable levels of damage following a Soviet first strike. However, dispersal plans were potentially complicated in the early years

of V-Force operations by Project 'E', designed to make up for a shortfall in British weapons by equipping the V-Force with US nuclear weapons for use in times of war. Under Project 'E', a total of 72 Valiants and Vulcans, half the projected force total, were modified to operate US nuclear weapons and, critically given the Soviet ICBM threat, concentrated on just three main operating bases.

Justin Bronk's analysis of the V-Force under Project 'E' is both insightful and damning. Whilst a detailed review is an area of study in its own right and beyond the scope of this article, it takes the analysis further than earlier arguments advanced by John Baylis which frame Project 'E' simply in terms of relative numbers of bombs and bombers and Anglo-American cooperation.[52] However, the key conclusion is that a programme intended to assist the RAF by closing the gap between the numbers of V-bombers and available nuclear weapons, instead had the effect of degrading its capability as an independent force by shackling the UK to American decision making until 1962. Moreover, given the scale of Soviet threat and lack of warning, concentrating up to half the V-Force on three main bases represented a clear risk in its own right. This was compounded by Project Es stringent US custody requirements which mandated separate storage arrangements for US-sourced weapons, exacerbated by the need for Presidential release authority, limiting their utility in flash crisis.[53] As a result, in the event of a no-notice crisis Project 'E' placed half the V-Force at risk of destruction on the ground. Whilst undertaking Project 'E' appears unusual given its implications, a high-level RAF report concluded this represented an increase in capability at little cost.[54] However, senior government officials were less optimistic, suggesting such arrangements would enhance the 'joint' nature of the deterrent capability but contribute little to Britain's unilateral independent deterrent.[55]

Once again, policy inconsistency returns us to the notion that the V-Force was as much a political tool to re-establish UK-US links as it was a military instrument of deterrence. When one further considers that Bronk's analysis suggests there was in fact no short fall in terms of weapons numbers from 1960 onwards,[56] the rationale behind the RAF's implementation of Project 'E' moves even further from military and closer to political thinking, especially as the custody and authorisation procedures effectively gave the US government a *de facto* veto over the unilateral use of half the V-Force until 1962.

The Soviet Response, Mitigations and Implications

Along with surviving Soviet attacks, V-Force capability also depended on being able to reach the target, a point previously emphasised in the 1952 Global Strategy Plan. For RAF commanders with a recent history of projecting massed air power against Germany on a nightly basis this was a given, despite the growing concern from 1954 onwards about the improving Soviet air defences set against the decision that the V-Force would use speed and height to outfly threats.[57] Such optimism seems excessive in the context of rapid improvements in Soviet air defences. Along with substantial growth from 200,000 to 500,000 over the period 1950-65, the PVO-S went through a period of rapid capability improvements.

A dense overlapping radar network capable of detecting aircraft at 200nm range was developed,[58] whilst advanced SA-2 Surface-to-Air Missiles capable of reaching 80,000ft – far in excess of V-Force operating altitudes – were introduced at 1,000 sites across Russia.[59] This was supplemented by fighter upgrade programmes, with supersonic interceptors such as the MiG-19 which were faster than any of the V-Force bombers, had a higher operational ceiling and a rapid rate of climb to reach bombers.

All of these developments challenged the operational design assumptions on which the V-Force rested. The original specification for an unarmed bomber force was controversial from the outset,[60] and Air Staff concerns accelerated when assessments suggested the V-Force would be at risk from, rather than just threatened by, Soviet air defences by as early as 1960.[61] In effect, the V-Force risked tactical obsolescence on entering service. Such concerns were likely only to have been intensified by the shooting down of two high flying U-2 reconnaissance aircraft over Russia in 1960 and Cuba in 1962 by the same SA-2 missiles the V-Force would encounter en-route to target. While subsequent analysis estimated likely V-Force losses at 50%, a figure reduced from earlier assessments predicting 70-90% losses,[62] it still raises questions over the V Force's ability to carry out its primary mission.

When projected losses to Soviet air defences are combined with low serviceability rates and the number of aircraft tied to US authorisations under Project 'E', analysis suggests that the V-Force of 1959 was likely able to deliver just five warheads to Soviet targets in any independent action, a figure that increased to 11 by December 1960.[63] In light of the political direction that remained in place until 1962 that 40 cities represented the minimum credible deterrent, it is clear that questions emerge over V-Force capability, certainly in the early years of the programme. However, as the V-Force into service date of 1957 was predicated on an assessment of when the offensive Soviet capability was likely to mature into a credible threat, it appears that the only solution lay in mitigation rather than programme modification.

Such mitigation focused on standoff munitions and a change to low level tactics, the former mitigating the need to penetrate Soviet air defences whilst the latter sought to mitigate the air defence threat. The initial stand-off solution was the Blue Steel missile, designed to be launched 100 miles from the target, thus out of SAM range.[64] Whilst the original requirement stemmed from the mid-1950s, Blue Steel did not enter service until 1962, creating a five year gap at the start of V-Force operations recognised by the Air Ministry as a significant risk to the credibility of the V-Force.[65] Concurrently, the RAF was already looking for the successor to Blue Steel, recognising the pace of change posed a very real risk. However, having cancelled the Mk2 version of Blue Steel in favour of the longer-range US Skybolt air launched ballistic missile, the cancellation of the Skybolt programme in 1962 then cast significant doubt over the V-Force's future given the pace of Soviet defensive enhancements. It was with this in mind that Bomber Command proposed a major change in tactics by moving to low level operations.

Although low level operations provided a degree of safety they brought their own problems, largely connected to the fact that V-Force platforms and Blue Steel were designed and optimised for high level operations. The shift to low level tactics in early 1963 occurred concurrently with Blue Steel arriving on the front lines, necessitating an early review of Blue Steel capabilities. Although modifications were made, low level Blue Steel was not introduced across the V-Force and was largely unproven, creating an element of uncertainty in capability.[66] Furthermore, the defensive aids suites (DAS) fitted to the aircraft and designed to counter Soviet air defences were also optimised for high level where they had an increased geographical footprint relative to aircraft size. The move to low level operations, without any modification, had the effect of significantly reducing the DAS footprint to an extent that V-Force aircrew subsequently questioned its value in protecting against Soviet threats, and therefore whether many aircraft would have reached their targets.[67]

But the greatest impact of the shift to low level tactics came in the grounding of the entire Valiant fleet while reducing the radius of action of remaining elements. As the most basic of the three aircraft, the Valiant was designed using a new weight-saving alloy DTD 683. Although lightweight, it was also inherently unsuitable for the demands of the low-level operating environment, with a series of metallurgical factors increasing the likelihood of structural weakness in the Valiant airframe, and requiring precise metallurgical and manufacturing techniques to minimise any such undesirable effects. While physical cracking issues were apparent by the late 1950s,[68] the Society of British Aircraft Constructors had in fact already highlighted potential issues with the use of DTD 683 as early as 1953, describing its use as 'dangerous' without mitigating measures during the manufacturing process.[69] Yet it was only following an examination of the entire fleet in 1964 that the decision was taken to withdraw all Valiants from the strategic bombing role, effectively removing one third of the V-Force capability at a stroke, leading to obvious questions about both the levels and appreciation of the levels of risk being held in the technical aspects of the Valiant programme from the outset. Along with losing a large element of the V-Force in one fell swoop, the move to low level tactics and the decision as well as creating implications for the V-Force's ability to conduct stand-off operations at low level also had the effect of reducing the range of the remaining Vulcan and Victor bombers, effectively putting a number of the pre-planned targets out of range and leaving only the Victor capable of reaching Moscow, posing questions over the remaining elements of the Force at low level.

The inescapable conclusion is that the change in tactics to mitigate Soviet air defences caused major issues for the deterrent capability. In one sense the loss of the Valiants could be said to represent a soft kill by the PVO-S. But the remainder of the Force were also challenged by the need to undertake weapons redevelopment and the new requirement for air-to-air refuelling to simply enable bombers to reach targets previously in range at high level. Whilst Humphrey Wynn's official history does not elaborate beyond the introduction of the low-level variant to Blue Steel, it seems clear that there are questions as to what extent the overall capability of the V-Force was significantly compromised in those early years.

From initial plans for a force of 240 aircraft conducting unilateral strikes against 40 Soviet targets, by 1964 the number of targets deemed necessary for credible deterrence had been cut to five. Furthermore, from the already reduced target numbers, until 1962 half the Force was subject to *de facto* US approval to operate, whilst technical issues forced the removal of the Valiant from the front line, and of the remaining aircraft, only a proportion were capable of reaching the key target, Moscow, at the low levels needed to improve chances of survival.

To make matters worse, reductions in the size of the target list, effectively a reflection of Government thinking on the nature of deterrence itself, often appeared arbitrary and driven by economic rather than strategic considerations,[70] former MOD Permanent Under Secretary Michael Quinlan later suggesting that all too often force structures dictated strategic outcomes rather than desired effects informing force structures.[71] In the case of the 1962 decision to reduce the list to five targets, it was underpinned by JIC assessments that the destruction of five of the largest cities would be deemed an unacceptable risk to Soviet authorities.[72] Yet such assessments were acknowledged as being hampered by a lack of reliable intelligence source material such as *Ultra*, which had unlocked many of Germany's closest guarded secrets less than 20 years earlier. This forced analysts to base assessments on inductive and deductive reasoning rather than unambiguous intelligence, this despite the known difficulties of conducting accurate analysis of the effects of a strategic strike on the Soviet ability and will to fight.[73] Far from the period to 1962 representing a high point for V-Force capability,[74] although no aircraft were actually lost in combat, Defence planning appeared to be based on shifting and arbitrary policy assumptions, leading to significantly compromised force structures, and with a threat that seemingly outpaced the capability of the V-Force implicit in the operational design assumptions.

Nuclear Superiority vs Minimum Deterrence: Performance vs Effect

Although these issues appear damning, they should be considered in a broader context. Deterrence, especially deterrence by punishment, is not just a matter of numbers, and the issue of nuclear superiority vs minimum deterrence was a long running issue amongst the Service Chiefs and Government Officials. While the RAF of the late 1950s under Sir Dermot Boyle sought to associate an expanded V-Force with Curtis LeMay's SAC, both General Templer as Chief of the Imperial General Staff and Lord Mountbatten as First Sea Lord advocated minimum deterrence, resting on an assumed understanding of Soviet appreciation of UK capabilities and the inevitable consequences of nuclear war.[75] In contemporary conceptual terms, we would view this as an argument between measure of performance and measure of effect. In other words distinguishing between what is measurable – numbers of aircraft and warheads, and what is important – the effect and implications of V-Force operations in the context of the time. In this light it could be argued that never being launched in anger highlights that deterrence was in fact achieved, although proving positive deterrence, especially from an individual element of a wider Allied construct, is notoriously difficult. However, simulated activities, primarily US-staged exercises deliberately designed to replicate

operational conditions as closely as possible, also had utility as providing a proxy, if not representative, view of V-Force capabilities.

Exercise Skyshield in 1961 was one such event, where the V-Force was tasked against heavily defended targets in North America. Operating at range as part of a combined US-UK air package, eight Vulcans operating at high altitude succeeded in penetrating NORAD airspace for the 'loss' of only one aircraft, with four landing at their 'targets' in Canada and New York.[76] In doing so they demonstrated that well flown aircraft with resourceful and innovative crews could hold their own. Although as an exercise Skyshield had its limitations, and the subsequent shift to low level operations heralded a changed in mission parameters, the defensive aids were shown to be particularly effective, whilst operating at height as part of a multi-layered package was an effective tactic against fighters who lacked the fuel to tackle the high flying bombers.[77] The success on Skyshield appears to have not been a one off, Wynn's official history noting other SAC bombing exercises in 1957 and 1958 where RAF crews acquitted themselves well.[78] Given the relative geography of the US, UK and Russia combined with the fact that the V-bombers were generally faster and higher flying than their US counterparts,[79] the V-Force were likely to be some of the first manned bombers over Soviet targets in war. As such, the RAF's performance under simulated operational conditions early in the V-Force's life provided cause for future optimism and point to a technically and tactically proficient Force. Despite the implications for the Valiant fleet, the shift to low level operations, which although coming at cost, highlighted the V-Force's tactical responsiveness and ability to adapt to the emerging operational environment.

Beyond high intensity exercises, the nature of the deterrent meant the V-Force was in fact operational at all times. Although the Cuban missile crisis was the closest the V-Force came to being used in anger, outside this period of tension it was permanently primed for launch. The ability to deal with and respond to the potential lack of warning of a Soviet strike was central to the V-Force's status as a credible deterrent, even if the politicians were certain that hostilities would occur after a period of escalating tension. This manifested itself in more comprehensive and detailed alert and readiness plans, with the V-Force holding a Quick Reaction Alert (QRA) posture 24/7/365, from 1962 until handover to the Royal Navy in 1969. Originally intended to provide two aircraft per squadron (30 total) at 15 minutes notice, by 1960 readiness times were reduced to five minutes readiness (05 Cockpit Readiness) and extended to all V-Force bases not involved in Project 'E', in theory putting 36 armed bombers in the air within four minutes of a BMEWS warning.[80] It is worth noting that despite the significance of the Cuban missile crisis, it is difficult to fully evaluate the V-Force's performance given Macmillan's insistence on maintaining a low profile so as not to antagonise or disrupt negotiations. Despite the low-key posture, the peak of the crisis saw V-Force elements discreetly brought to Alert Condition 3, doubling the number of QRA aircraft, with elements recorded as holding at 05 Cockpit Readiness, each armed with a thermonuclear device.[81]

Outside times of crises, readiness was routinely tested across the Force with annual alert exercises which saw the whole force disperse for operations without prior warning. Originally carried out during a pre-defined window, by 1964 they were entirely no notice, with 94% of the free fall elements of the V-Force coming to dispersed readiness within 24hrs, but only 86% of the Blue Steel coming to readiness within 40hrs.[82] Although Bomber Command was generally satisfied with the overall results, the inability to generate the Blue Steel elements at pace remained a cause for concern until policy changes enabling aircraft to be armed and held at readiness were introduced.[83]

As well as innovation and adaption in the air seen during exercises and the major changes in conceptual thinking and to tactics, the V-Force also demonstrated innovation on the ground in the quest to save vital minutes in the event of a BMEWS warning. The clearest examples of this were the development of a rapid start capability and the installation of Operational Readiness Platforms (ORPs) next to runways. The former was vital in getting complex multi-engine aircraft airborne by allowing all engines and electronics to start simultaneously with the push of a button. When combined with the latter, it significantly enhanced the reactivity of the Force as well as demonstrating a whole force that was an adaptive, learning organisation. When viewed alongside the ability to maintain high readiness states over a prolonged period, such organisational innovation points to a resilient, sustainable and capable V-Force, able to both operate in and respond to changing operational environments, and a significant shift from the bomber force described as obsolete in the early 1950s.

Yet perhaps the key indicator of V-Force effectiveness was the manner in which it drew the US closer to the UK, one of Macmillan's aims, and once again returning us to the idea of a geopolitical rather than pure military rationale for the V Force. Duncan Campbell provides a critical view, highlighting not only Britain's junior partner status and President Kennedy's opposition to any independent British nuclear capability,[84] but also the almost complete reliance on the US to provide raw materials and enabling capabilities such as intelligence and communications;[85] but above all, Campbell argues the reliance on the US nuclear backstop critically undermines any notion of the UK Deterrent's independence.[86] However, while Campbell's slightly cynical view of the UK as a nuclear actor maybe technically correct, one cannot ignore the political progress made from the immediate post-war years.

From the overturning of the 1943 Quebec Agreement and Britain being shut out of the nuclear programmes it had help found, the relationship developed to a point where it encompassed coordinated targeting, integrated QRA and US weapons loaded on RAF bombers during the Cuban missile crisis – a critical point given the constitutional requirements for US weapons handling outside of wartime.[87] In this context Commander-in-Chief Bomber Command Sir Kenneth Cross's comments 'the Americans deal with everything strictly on a business basis and if you can contribute they are in it and they are with you, if you can't then you will get all the kindness but you won't get any work done'[88] are significant, providing grounds to argue that having once been described by SAC as obsolete, the V-Force emerged as a viable operational

capability and close partner to US nuclear forces. In terms of 'effect' Cross' comments clearly point to technical and tactical proficiency influencing nuclear deterrence policy, the V-Force being highly effective at drawing the USAF and RAF closer together, and by extension the US to the UK, one of Macmillan's apparent aims.

Concluding Thoughts: Operationally Compromised but Geopolitically Significant

This brief examination points to the complexities inherent in assessing the contribution of the V-Force to Britain's strategic deterrent. Assessing its effectiveness is always likely to be an area of contention. As Richard Overy notes in his work on air power and deterrence theory, a spectrum of technical, political and military factors must all combine for deterrence to be effective;[89] in this light, and from an operational perspective, this analysis points to a mixed picture at best. Moreover, as the V-Force was never launched in anger, we cannot assess its performance in combat, although, extrapolating the results of performance on Exercises such as Skyshield does offer a proxy indication for potential deterrence effect on the basis of the strategic messaging that a credible performance on these Exercises might have sent. Yet the relatively closed nature of the Soviet Union also means that our understanding of how such effect capability was communicated to and understood by the Soviet Union, especially within a broader allied context, remains a knowledge gap.[90]

Examining capability as a constituent component of overall effectiveness is also difficult given the multi-faceted nature of capability. Whilst we cannot ignore the British Government's foresight in pursuing the Tizard Committee's recommendations, it either misjudged the pace of enemy capability developments, or given the economic constraints at the time, felt limited in what it could realistically hope to achieve. Either way this article posits that the V-Force was compromised from the outset by a series of systemic issues which undermined the efforts of the V-Force commanders, crews and personnel, the most significant potentially being a force structure insufficient to achieve the political intent of unilaterally and independently inflicting unacceptable damage on the Soviet Union. Given the likely inability to conduct an effective counter-force strike on Soviet offensive capabilities, the resulting focus on a small number of counter-value targets suggests deterrence by punishment rather than a force designed to coerce or influence Soviet behaviour, or with an independent role in a longer duration war of the type First Sea Lord Admiral Sir Roderick McGrigor envisaged. Indeed, questions exist to what extent the Soviet Union, given its strategic depth, would have felt itself unable to cope with and respond to a unilateral British strike.

Furthermore, the pace of development in Soviet capabilities appears to have outstripped V-Force development and questions must be asked to what extent the V-Force was obsolete at birth, compromised by inherent vulnerabilities to Soviet offensive and defensive capabilities. Indeed, whilst no bombers were lost in combat, one might argue that the grounding of the Valiant fleet represents a 'soft kill' by the PVO-S after the V-Force's move to low level to mitigate the air defence threat. Finally, the reliance on US capabilities for early warning and intelligence,

along with the British government's belief that the US nuclear umbrella would always provide a backstop meaning Britain would never be subject to a no-notice Soviet attack, points to the fact that when viewed objectively, the V-Force was an example of interdependence in an era of alliance building rather than a strictly independent, unilateral capability. This is especially the case when considering Project E's crippling terms, which gave Washington a de facto veto over half the V-Force until 1962.

Such issues therefore require us to revisit the second rationale for the V-Force, articulated in Macmillan's aim of a capability that would generate geopolitical influence in an era when the UK was struggling to recover from the effects of war. The detail behind this represents a parallel issue to the issues covered in this assessment. However, from the nuclear cold of the McMahon Act, taking Sir Kenneth Cross' comments on US attitudes to RAF strategic capabilities into account, and what Ashton describes as the particularly close cooperation on intelligence and nuclear strategy developed through the Macmillan and Kennedy era,[91] the V-Force appears to have been highly capable as a geopolitical enabler, enabling closer Anglo-American links in both political and military terms. When considered alongside multinational exercises such as Skyshield and given the geographical proximity to NATO and Russia, these factors point to the V-Force having a critical role in broader allied nuclear operations. Despite the apparent conceptual and policy incoherence of the early days, alongside an economic and resource base which served only to constrain the RAF's ambition, the V-Force's ability to generate influence over power, especially in the context of nascent and sometimes uncertain geopolitical structures and alliances arguably represents its greatest capability and most significant contribution to UK Deterrence.

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