USAWC STRATEGY RESEARCH PROJECT

DETERMINATION AND EFFECTIVENESS OF WWII STRATEGIC BOMBING STRATEGY

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ABSTRACT

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The Allies chose a strategy utilizing a combination of various military actions, most notably a combined bomber offensive (CBO) to defeat Germany. The CBO was carried out through a combination of US daylight precision and UK night area bombing. The paper will show why the Allies chose this strategy and evaluate its success.

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DETERMINATION AND EFFECTIVENESS OF WWII STRATEGIC BOMBING STRATEGY

With the collapse of France in 1940, American (US) and British (UK) leadership became keenly aware that the continued security of their nations required the defeat of the Axis powers, particularly Germany.[1] The Allies chose a strategy utilizing a combination of various military actions, most notably a combined bomber offensive (CBO). The CBO would be carried out through a combination of US daylight precision and UK night area bombing.[2, 3]

The purpose of this paper is to show why the Allies chose this strategy and evaluate its success. To accomplish this task, the paper will first describe the events that brought about the conflict and the strategy. Crowl's Questions are used as a framework to analyze the factors that influence strategy development and adoption and will illustrate why Allied leaders chose this path. This is followed by a detailed description of the campaign. The principles of war (mass, objective, offensive, maneuver, surprise, security, simplicity, unity of command, and economy of force) are accepted as proven methods for employing forces in combat and are used to evaluate the CBO's effectiveness.[4] The paper closes with a summary of the findings and doctrinal implications.

The paper will show the Allies adopted US daylight precision and UK night area bombing based on leadership's belief that it could most effectively reduce Germany's means of war and hasten its earliest possible defeat. The Allies successfully achieved this objective primarily through adherence to the principles of mass, objective, offensive, and maneuver.

BACKGROUND

EVENTS LEADING TO CONFLICT

Hitler became Chancellor of Germany in 1933 propelled on promises to a disillusioned post-WWI population that he would rebuild Germany's military and lead his country in a series of wars to recover German hegemony. His racially based doctrine held that the rise or fall of civilizations is due to their success or failure in maintaining racial purity. Space, in the form of agriculturally useable land that can only be gained through war, is a prerequisite to racial vitality, and is the fundamental objective in the racial struggle for existence. World peace can come only when one power has attained complete and uncontested supremacy. He felt eastward expansion into Russia would be the easiest due to its weakened state after WWI and the Bolshevik Revolution. But since France would never stand by and watch Germany gain power, a preemptive war with *the great enemy* would be required prior to annexation of Russian lands.[5] His aggressive rearmament program, begun in 1934, created a superior military force. The air

arm was a formidable threat by 1936 and continued to grow (3350 bombers on hand in June 1938 with a production rate of 12 bombers a day). German air power so intimidated England, France, Russia, and Czechoslovakia that they allowed Hitler to place a substantial military presence in the Rhineland in 1936 and annex Austria and Sudetenland in 1938 without intervention. Hitler began territorial expansion in earnest with successive military invasions of Poland (1939), Scandinavia and the Low Countries (1940), and Russia (1941).[6, 7]

EVENTS LEADING TO STRATEGY ADOPTION

With the collapse of France in 1940, leadership became keenly aware that the continued security of their nations required combined military action to defeat the Axis powers.[8] Combined planning began in January 1941 (Arcadia Conference) and was documented in American-British Conversations (ABC-1). ABC-1 assumed war would involve Japan and Italy but considered Germany the predominant threat. The overall plan was to wear down German resistance by closing a ring around Axis-held territory and tightening it as fast as resources permit. A Continental invasion by land armies launched from England into France and then on to Germany would provide the final knockout punch. Erosion of German resistance would be accomplished through a combination of naval blockade, Russian Army onslaughts, intensive cultivation of resistance in Nazi-occupied countries, limited Anglo-American offensives with locally superior mobile forces, and a combined strategic bombing offensive. [9, 10]

British aviation doctrine was dominated by its Chief of Staff, General Trenchard, who believed "the aim of the RAF was to break down the means of enemy resistance by attacks on objectives selected as most likely to achieve this end."[11] He felt psychological damage from bombing had more effect than the physical. Victory belongs to the nation that conducts the heaviest bombing offensive to destroy enemy industries and, above all, lower morale.[12,13] US doctrine, deeply influenced by Brigadier General Mitchell, held that modern nations and their means for supporting war were dependant on an intricate web of public works (water, fuel, electric power, etc) and industrial, agricultural, and transportation centers. Airpower could most quickly and efficiently destroy this economic web for it can leap over armies and navies and conduct precision attacks on those vital centers.[14, 15]

After the Arcadia Conference, Roosevelt requested an estimate of military production requirements to support the ABC-1 strategy. Rather than offer just requirements, air planners took this opportunity to create and submit AWPD-1, a comprehensive air plan for the defeat of the Axis powers. AWPD-1 delineated their vision of required missions with attendant operational concepts, target lists, and force structure requirements. It held that the primary air

mission in Europe would be a bomber offensive aimed at the German economic structure. Targets were selected based on their criticality to German means to wage war (see Table 1).

AWPD-1 Target Priorities	AWPD-42 Target Priorities	CBO Target Priorities
1. German Air Force – Aircraft factories – Aluminum plants – Magnesium plants – Engine factories	1. German Air Force – Aircraft factories – Aircraft engine plants – Aluminum plants	1. German Air Force – Fighter aircraft factories – Aircraft engine plants – Combat attrition
2. Electric Power – Power plants – Switching stations	2. Submarine Building Yards	2. Submarine Building Yards and Bases
3. Transportation – Rail – Water	3. Transportation – Rail – Water	3. Ball Bearings
4. Petroleum Refineries and Synthetic plants	4. Electric Power – Power plants – Switching stations	4. Petroleum Refineries and Synthetic plants
5. Morale	5. Petroleum Refineries and Synthetic plants	5. Rubber Synthetic Plants 6. Military Transportation
Total number of targets: 191 Programmed time of initiation: Mid-1943 Bomber forces planned: 3800	Total number of targets: 177 Programmed time of initiation: Late 1943 Bomber forces planned: 3000	Total number of targets: 76 Programmed time of initiation: Late 1943 Bomber forces planned: 3500

TABLE 1. TARGET LISTS[16]

The attacks would be carried out by large formations of high speed, high altitude aircraft using daylight precision techniques. Forces required: 10 groups of medium bombers (B-25/26), 20 groups of heavy bombers (B-17/24), and 24 groups of very heavy bombers (B-29/32) – 3800 bombers in all. AWPD-1 and AWPD-42 (updated target list) found support in the UK and became the de facto bombing doctrine. The Japanese attack on Pearl Harbor in December 1941 officially brought the US into the war. Combined execution of ABC-1 began immediately.[17, 18]

In 1943, American and British political and military leaders met in Casablanca to discuss strategic war plans. With their forces mired in North Africa and critical military resources low, the conferees agreed to delay the Continental campaign until mid-1944, limit operations in the

Mediterranean (MTO) to only those actions required to eliminate Italy, and replace renewed emphasis on execution of the CBO.[19, 20] The Casablanca Directive ordered the strategic bombing forces to:

> …conduct a joint United States-British air offensive to accomplish the progressive destruction and dislocation of the German military, industrial, and economic system, and the undermining of the morale of the German people to a point where their capacity for armed resistance is fatally weakened. This is construed as meaning so weakened as to permit initiation of final combined operations on the continent.[21]

It further directed that the offensive would be carried out through the combined day and night effort of the US and UK bomber forces on all-out attacks against targets which are *mutually complementary* in undermining a limited number of selected objective systems.[22]

At the time of the conference, US leadership adopted a phased concept of operations (CONOP) based primarily on growing availability of US heavy bombers (see Table 2 below). US forces were still in a buildup and largely non-deployed. Leadership adopted a 4-phase CONOP based on the anticipated growth of the fleet. Phase timeline was based on anticipated production/deployment rates and planned six months of full strength attacks on the primary objectives before the mid-1944 channel crossing.[23, 24]

Phase	Expected US Heavy Bomber Strength	Dates	Operational Limitation	Targets
1	800	April - July 1943	Limited to range of escort fighters	Submarine yards, aircraft installations
2	1192	July - October 1943	400 miles from base (England)	Fighter assembly/ factories, airdromes, and repair facilities and submarine yards
3	1746	October 1943 - January 1944	500 miles from base (England)	German fighter force and other sources of power
4	2702	January - April 1944	Limited by bomber operating radius	Sustain effects already produced and prepare the way for invasion
Note: If the forces required as set forth above are made available on the dates indicated, it will be possible to carry out the mission prescribed in the Casablanca Conference. If those forces are not made available, then that mission is not attainable by mid-1944.				

TABLE 2. US OPERATIONAL PHASES[25, 26]

STRATEGY ANALYSIS

CROWL'S QUESTIONS

Dr. Philip Crowl and many other military/political theorist and historians contend that threat, doctrine/policy, resources (quantity), technology (quality of resources), political-military relationships, national style (demographics, societal values, culture, history), relationships with allies, and leadership attributes influence military strategy in some form or fashion. This analysis will use Crowl's Questions as an analytical framework to examine these factors. The Allies adopted US daylight precision and British night area bombing based on leadership's belief that it could most effectively reduce Germany's means of war and hasten its earliest possible defeat.

WHAT IS IT ABOUT?

Hitler's campaign to gain uncontested European dominance was a direct threat to US and UK national security. UK grand strategy held that its national interests and continued security depended on a balance of powers in continental Europe. Its enemy was any nation seeking to upset that balance. American grand strategy was built on the premise that the continued security of the US was based on a Roosevelt vision of a vibrant United Nations which required a strong US, UK, Russia, and China. Both nations felt Nazi Germany's drive for dominance was the most immediate threat to Britain and Russia and military action was required. Germany must be defeated first (vice Japan) and forced to unconditional surrender at the earliest possible date. The UK could not defeat Germany alone. Military and post-war success required an effective Anglo-American coalition and Russia receive unwavering aid. For the US, a quick German defeat would not only insure survival of Britain and Russia but would allow complete attention to be focused on the Pacific theater which held more importance to the American people.[27, 28, 29]

A combined bombing campaign was a natural selection for inclusion into the overall military plan. Both countries' bombing doctrine was congruent with the strategic military objective to erode German resistance. The RAF believed bombing's primary aim was to break down the means of the enemy resistance through destruction of enemy industries and, above all, lowering morale.[30] US bombing doctrine believed that the purpose of warfare was to gain submission of the enemy by concentrating power and, at the earliest moment, deliver a decisive blow at their means for supporting war – an intricate web of public works (water, fuel, electric power, etc) and industrial, agricultural, and transportation centers.[31, 32]

IS THE NATIONAL MILITARY STRATEGY TAILORED TO MEET THE NATIONAL POLITICAL OBJECTIVE?

Military action and destruction of Germany's means of war through use of strategic bombing was consistent with both nations' national political objective to secure vital national interests. The presence and potential threat embodied in a strong air force became evident to Roosevelt when Hitler used his massive air force to extort the annexation of Czechoslovakia during the 1938 Munich summit. Roosevelt "was convinced that World War II would be largely an air war" and directed a buildup of long range bombers.[33, 34] Strategic bombing was a cornerstone in British national security strategy. Strategic bombing provided a way for political leaders to directly effect actions on the continent.[35]

Societal values limit range of policy options available to leadership and war's ends and means (rules of engagement, unlimited versus limited war).[36] American and British populations fully supported the war effort and a strategic bombing strategy. English and American populations had developed a true hatred for the Axis nations due to direct enemy attacks on their homeland and a growing knowledge of their atrocities. They wanted swift victory and had no difficulty with aerial bombing of enemy cities and economic infrastructure.[37]

WHAT IS THE LIMIT OF MILITARY POWER?

Leadership was confident in strategic bombing's capability but it required a minimum amount of force structure to achieve the desired effect in time to support the mid-1944 invasion. The RAF was fully engaged but US forces were still in a buildup and largely not deployed.[38] This compelled leadership to adopt a phased concept of operation (CONOP) based primarily on availability of US heavy bombers (Table 2). The CBO CONOP was in reality a 4-phase *capability plan* for US forces whereby targets were selected that fell within the capabilities of the existing and projected bomber force.[39, 40] As the size of the US bomber fleet increased, the campaign was allowed to progress to the next phase with its new set of targets and less restrictive operational limitations. The phase timeline was based on planned production rates and ensured six months of full strength attacks on the primary objectives before the mid-1944 channel crossing.[41] "If the forces required as set forth are made available on the dates indicated, it will be possible to carry out the mission prescribed in the Casablanca Conference. If these forces are not made available, then that mission is not attainable by mid-1944."[42]

WHAT ARE THE ALTERNATIVES?

As shown earlier, Roosevelt and Churchill firmly believed an effective Anglo-American coalition was vital to national interests and military success. A coalition's strategy must fit within

the limits of each nation's abilities and desires in order to be effective.[43] The political mandate for an effective coalition resulted in adoption of *complementary* strategies as opposed to selecting one particular method/alternative.

The British concept of battle was elasticity where opportunities were seized as they arose. Forces should be shifted from one point to the next to take advantage of the enemy's weakness. The American concept was quite different in that they believed in concentrating power and delivering a decisive blow at the earliest moment. Elements of each can be seen in the strategies developed at Arcadia and Casablanca – the British *ever-closing ring and limited offensives* with the American *aimed at the final knockout punch*.[44]

Political compromise overcame collective intransigence over the most effective to conduct the CBO. The British were convinced by lessons of war, discussed in greater detail in the last section of the analysis, that night area bombing on civilian targets was the correct strategy. The Americans remained confident that new technology (B-17, improved bombsights) employed in large heavily armed formations made daylight precision bombing the most effective concept.[45] Ultimately, the British deferred to American precision bombing preferences in order to secure the more overriding political desire to delay the invasion. The offensive would be carried out through a combination of US daylight precision and UK night area bombing.[46]

US leadership was compelled to adopt a phased plan of action due to limited availability of heavy bombers. Leadership has two choices if there are insufficient resources, adjust the objective or get/wait for more resources.[47] The Casablanca directive mandated the CBO reduce German resistance to the point where a continental invasion was feasible by mid-1944. With the objective set and resources low, US leadership's only option was to create its phased capability plan.

HOW STRONG IS THE HOME FRONT?

As stated earlier, societal values limit the range of policy options available to leadership and war's ends and means (rules of engagement, unlimited versus limited war).[48] American and British populations fully supported the war effort and a strategic bombing strategy. The governments had a long history of friendly relationships and mutual support. They shared common heritage, language, and support for individual freedoms. English and American populations had developed a true hatred for the Axis nations due to direct enemy attacks on their homeland and a growing knowledge of their atrocities. They wanted swift victory and had no difficulty with aerial bombing of enemy cities and economic infrastructure.[49]

DOES STRATEGY OVERLOOK POINTS OF DIFFERENCE AND EXAGGERATE POINTS OF LIKENESS BETWEEN PAST AND PRESENT?

Doctrine delineates how leadership plans to conduct future operations. Interpretations of experience (lessons learned) are the principal source for policy and doctrine development.[50] Force structure, doctrine, and technology influence leadership's decisions as to the best way to proceed in a war.[51] Varying interpretations of past experiences drove US and UK leadership to differing bombing strategies.

War experiences and successful use of terror bombing during several colonial uprisings supported the British view that night area bombing of enemy industries and, *above all*, lowering morale was the path to victory. In WWI, German Gotha bombers conducted three attacks on British cities killing 322 people and injuring 1252 while suffering only one loss in the face of overwhelming numbers of British fighters. The invincibility and lethality of the Gothas had tremendous effect on civilian morale and created deep concern for the survival of the nation. They established the Royal Air Force and conducted their own bombing campaign a year later. Strategic bombing, with morale as its primary target, remained a cornerstone in British national security strategy into and through WWII.[52, 53] Relatively heavy losses on daylight versus night missions and technological inability to navigate and bomb accurately influenced the RAF to change from daylight precision to night area bombing.[54] Promoters of daylight precision were "peddlers of panaceas."[55]

US leaders had dogmatic faith in the logic of their analysis that concluded daylight precision bombing on economic structure vice morale was the most effective method. Aside from chivalrous objections, air planners felt it was impossible to determine how hard an attack had to be in order to break civilian morale. In addition, these attacks would at best bring temporary and non-cumulative results. They pointed to the Sino-Japanese war where Japan's bombing strengthened rather than weakened Chinese will. They felt attacking a nation's economic structure had the virtue of reducing enemy war making capacity and putting pressure on the civilian population at the same time and with equal effectiveness. Furthermore, the results of the damage to the economic structure were cumulative and lasting. Economic targets required precision that current technology could only achieve in day operations. "Switching to night tactics would undermine the idea of precision and key target selection."[56]

Germany's defeat in the Battle of Britain and heavy British daylight losses did not shake US faith in daylight operations. The German loss was blamed on poor fighter tactics, inadequate bomber armament, collapse of air force replacements, and friction between

Luftwaffe leaders. British bomber losses were due to incorrect procedures, mechanical and maintenance difficulties, and inadequate training. The Air Staff was convinced improved equipment and training would solve British problems. Dramatic losses at the hands of German fighters in 1943 did alter their belief in the *invincible bomber* and led to urgent development of an effective long-range escort but it never shook their faith in day precision.[57, 58]

AIR CAMPAIGN EXECUTION

DESCRIPTION

US forces planned to execute in accordance with their phased plan. The RAF was directed to provide unilateral defense of the UK and be employed "in accordance with their main aim in the general disorganization of German industry their action will be designed as far as practicable to be complementary to the operations of the [US forces]."[59] US forces planned to attack CBO targets using daylight precision techniques while UK forces would attack the industrial areas surrounding US targets using night area techniques. Operations would be conducted from England, and when possible, the Mediterranean Theater of Operations (MTO).[60] See map view below.

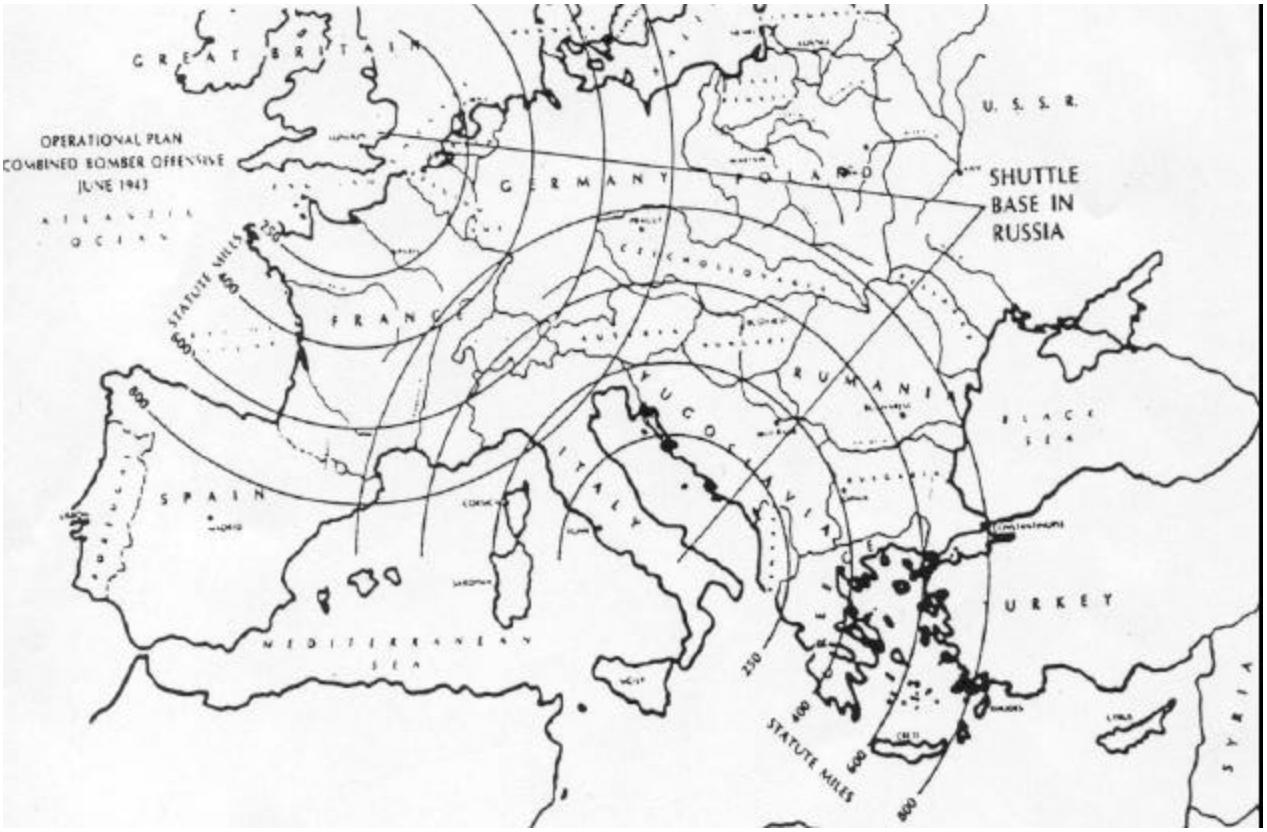

FIGURE 1. MAP VIEW OF CBO OPERATIONAL PLAN[61]

EXECUTION HIGHLIGHTS

1942

The RAF experimented briefly in 1940 with daylight attacks on German industrial targets. Heavy losses forced a switch to night. Attacks on oil, aluminum, and aircraft plants proved fruitless primarily due to their inability to find the targets. They ultimately resorted to area bombing of cities and in May mounted its first *1000-aircraft* raid. US force buildup, begun in December 1941, was beginning to show in theater by mid-year. Operations began in August but the force was too small and its range limited. Operations were fairly ineffective.[62]

1943

Changing political priorities and delays immediately upset the US force buildup. Four heavy bomber groups were diverted to the Pacific, which was granted equal priority to future aircraft, to quell public outcries for action against Japan. Roosevelt's support for British desire to extend North Africa operations throughout the MTO resulted in more diversions as shown in the figure below.

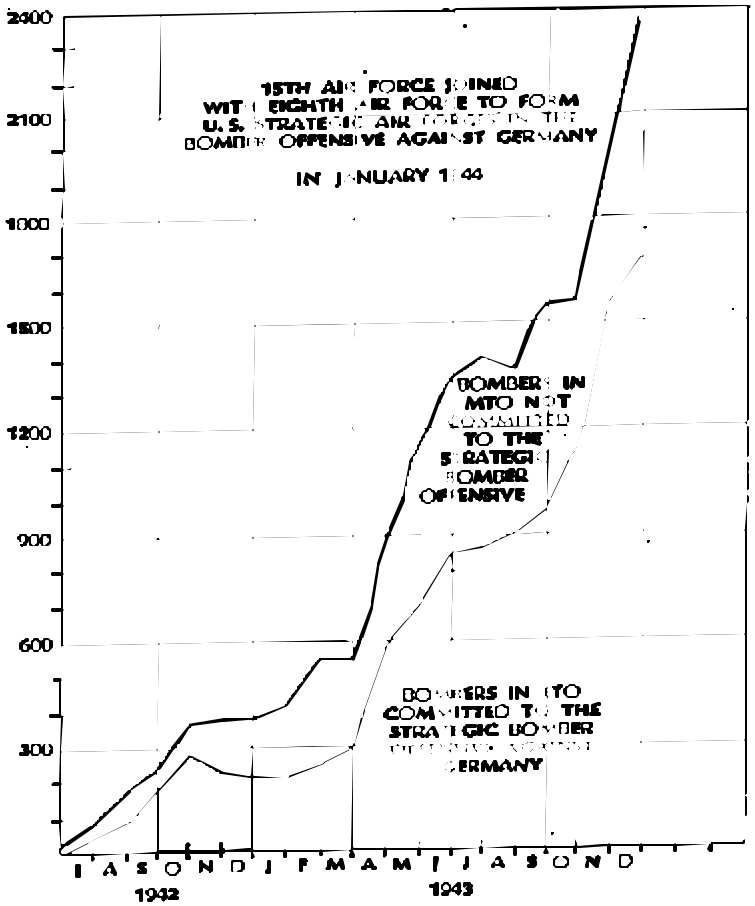

FIGURE 2. MTO FORCE DIVERSIONS[63]

This was especially hard-hitting as these forces would not be available for CBO targets again until January 1944. By November 1943, asset diversion and reprioritized provisioning left the CBO force 11 groups short in Europe and another 56 groups stalled in the US waiting training and equipment.[64]

US bombing effectiveness was disappointing due to ineffectual bomb loads and fighter attacks. Tables of bomb effectiveness developed in peacetime were inaccurate which consistently threw off planners and resulted in bomb loads too small for their target. German fighters were exacting heavy losses and disrupting bomb runs. Losses sustained in two attacks on Schweinfurt ball-bearing plants had far-reaching implications on tactics (August 17: 36 of 200 planes lost, October 14: 62 lost, 138 damaged [many beyond repair] out of 228). In response, deep penetrations without escort, of which these were among the earliest, were immediately suspended and combat box formations adopted. Experience proved this tactic to be 67% less effective than normal bomb run methods. Only the advent of long-range P-47 and P-51 escort fighters in November solved the German fighter problem.[65, 66]

UK attacks on cities continued with increasing ferocity. The 3-night attack of Hamburg was noteworthy in that it destroyed 33% of the houses and killed an estimated 60,000 – 100,000 people. This brought serious concern to German officials; even Hitler thought further attacks of similar weight might end the war. The RAF proceeded to destroy one major urban center after another.[67]

1944

Winter fogs severely restricted operations until 20 February when six days of perfect weather allowed bomber forces, with escort protection, to drop 3,636 tons on every known airframe plant. “The Big Week” and a tactics change permitting fighter escorts to seek and engage German fighters brought Allied air superiority by spring. With the most immediate objective of the CBO attained, focus shifted to oil and transportation and communication centers in preparations for D-Day.[68, 69]

In the spring and early summer, all air forces based on England were used to prepare the way for the invasion. CBO planners had anticipated this diversion and had accounted for it in the plan, but they expected these forces to return once the land forces broke out from their beachheads. Eisenhower maintained the diversion long after ground force break out. Three-eighths of the total heavy bomber effort in Europe (380,000 tons of bombs) was diverted from planned CBO targets. Eventually, he released the bombers from invasion support in September.[70, 71]

Despite the diversions, operations during the second half of 1944 were especially effective due to air superiority and increased force availability (see Figure 3 below). MTO forces and the

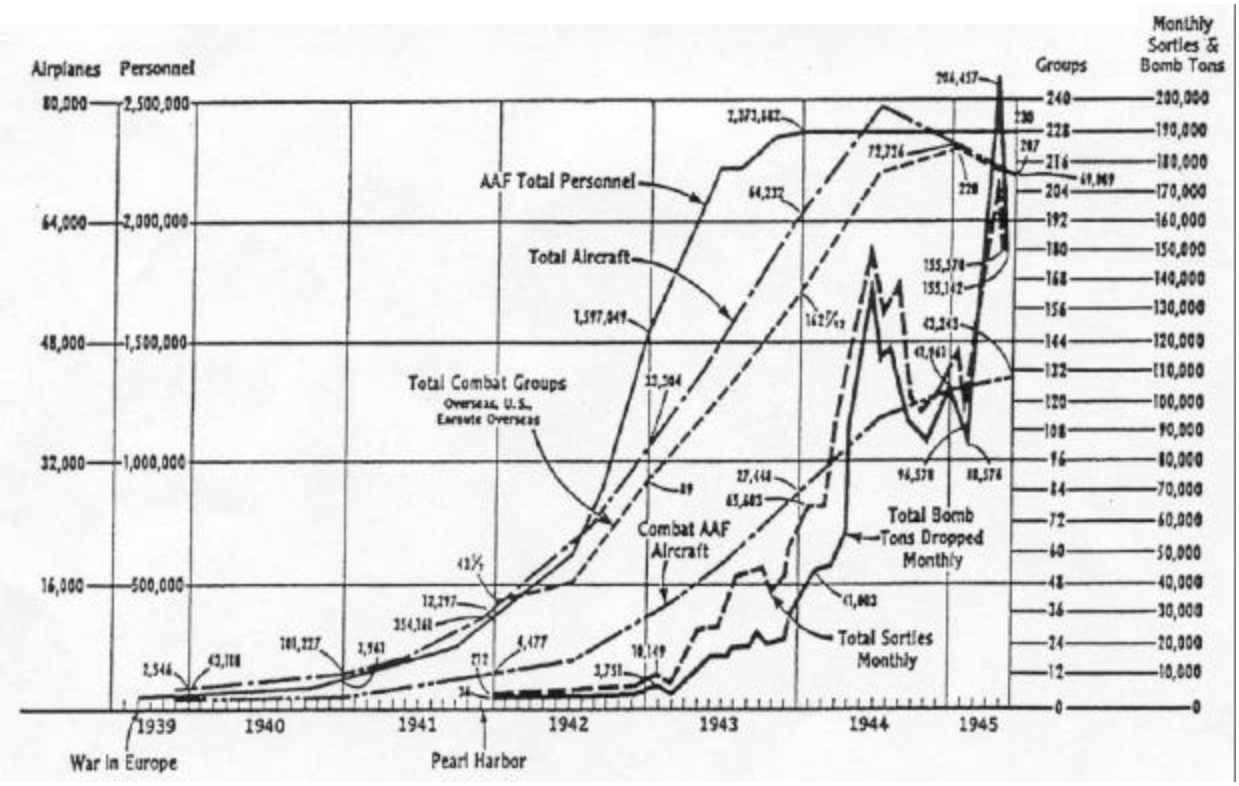

FIGURE 3. US OPERATIONS TEMPO[72]

RAF finally joined in a fully coordinated attack on German industry and dropped 481,400 tons during this period – a 219% increase over all of 1943.[73] US bombing effectiveness greatly improved while loss rates became more palatable. In contrast, British losses began to soar. German perfection of night fighter defenses soon made night missions costlier than day.[74] Despite their growing losses, the British were able to drop 676,000 tons in 1944. A dramatic improvement compared to efforts earlier in the war (1940 – 16,000 tons, 1941 – 46,000 tons).[75]

1945

Air superiority was so completely established that the British reverted back to daylight operations but continued area urban bombing in the continuing effort to destroy German cities.[76] Winter fogs again severely affected the ability of the bombers to launch/hit their targets. With improved weather in March, the campaign went back to full speed and reached all-time highs for sorties and bomb tonnage. The planners ran out of targets in March and strategic bombing stopped in April.[77]

OVERALL RESULTS

Nearly 2.7 million tons of bombs were dropped and more than 1.44 million bomber sorties and 2.68 million fighter sorties flown in the Allied air campaign (all years). More than 18,000 US and 22,000 UK planes were lost or damaged beyond repair. For the campaign, the US lost 9,949 bombers in 754,818 sorties, or 1 in every 76 sorties; UK lost 11,965 bombers in 687,462 sorties, or 1 in every 57.5 sorties. In Germany, 3.6 million dwelling units (approx. 20% of total) were destroyed or heavily damaged; 300,000 civilians killed, 780,000 wounded, 7.5 million homeless. All principal German cities were destroyed and industry was still paralyzed 5 months after cessation.[78, 79]

German industry proved to be more resilient to attack than perceived. German leadership never fully mobilized war production which resulted in excess capacity. Although buildings were heavily damaged, plant equipment was surprisingly resilient to attack. The German people kept going to work and continued to create ingenious ways to work around damage despite their growing discontent over the war. Industrial production never really slowed until late 1944. Ultimately, destruction of the Luftwaffe and transportation systems was the decisive blow. Air superiority provided freedom of action for the bomber forces which was absolutely vital to the success of follow-on operations. The loss of the transportation system brought complete disorganization and *fatally weakened* the German economy.[80]

AIR CAMPAIGN EVALUATION

The objective of the CBO was to so fatally weaken Germany's means of resistance as to permit an invasion of the Continent by mid-1944. The Allies adopted US daylight precision and British night area bombing based on leadership's belief that it could most effectively reduce Germany's means of war and hasten its earliest possible defeat. The Allies successfully achieved their objective primarily through adherence to the principles of mass, objective, offensive, and maneuver.

PRINCIPLES OF WAR

MASS

"Concentrate combat power at the decisive place and time."[81] At its core, bombing is mass on objective (bombs on target). The CBO sought to achieve its objective through the cumulative effects of concentrating attacks on its specified targets. The planned 9-month 237% growth in US bomber strength, sorties and tonnage dropped, as well as, single raids by 1000-bomber formations on German cities are testimonies to the CBO commitment to mass.[82]

The campaign was fairly ineffectual when it was unable to achieve sufficient mass. This was primarily in 1943 and was due to German fighter countermeasures, weather, lack of readiness, and forces diverted to other operations. Bombing from defensive combat box formations proved to be 67% less effective than normal methods.[83] Figure 3 illustrates the dip in sorties and tons dropped during the winter fogs and the training lag between conscription and rise in operational sorties/tonnage. Leadership's diversion of forces to MTO is discussed in greater detail under economy of force.

The turning point in the campaign, and the war, came in early 1944. Finally armed with sufficient bombers and escort fighters, US leadership took advantage of a spell of good weather to concentrate all efforts on the fighter threat. They successfully crushed the German Air Force in 6 days. Air superiority gained in The Big Week and subsequent concentrations on enemy transport and communication systems directly contributed to timely and successful accomplishment of the Continental invasion.[84]

OBJECTIVE

"Every military operation should be directed toward a clearly defined, decisive, and attainable goal."[85] As stated above, the CBO sought to achieve its objective through the cumulative effects of concentrating mass on objective (targets thought to be vital to Germany's means of resistance). In depth understanding of a nation's means of war and maintaining focus on those objectives was vital to CBO success. Air planners conducted exhaustive analytical studies of German, industrial, and economic systems to determine its most vital resources. When not diverted for other missions, air leaders steadfastly used the CBO target list to guide their efforts. Post war studies and interviews of German experts confirmed that the CBO target sets effectively led to the destruction of German means to resist.[86, 87]

OFFENSIVE

"Seize, attain, and exploit the initiative."[88] US and UK leadership felt bombardment aviation, as the primary weapon for destruction in war, should be employed as an offensive striking force directed at the enemy's national structure.[89] This doctrinal view was manifest in the CBO concept of operations – kill the German fighter force through bombing and combat action, then exploit the resultant air superiority to strike at Germany's means of war.[90]

Lack of available force structure limited target selections until late 1943. Allied leadership acted decisively during a break in the weather to mount six days of large-scale attacks on its highest priority set of targets – aircraft frame factories and assembly plants. Taking this initiative allowed the Allies to seize and retain air superiority. They exploited their newfound

freedom of action to expand their attacks to more directly support the invasion and fatally weaken Germany's industrial capability.[91]

MANEUVER

"Place the enemy in a position of disadvantage through the flexible application of combat power."[92] Mobility, maneuverability, and flexibility form the foundation for all air doctrine. The CBO sought to exploit the strategic bomber's inherent speed, range, and payload to *vertically* flank surface defenses, overcome their advantage of interior lines, and concentrate combat power on vulnerable rear areas. The original plan was to conduct the entire offensive from bases in England. The Allied decision to begin operations from Italy greatly improved the overall flexibility of the strategic forces and made possible concentrated attacks on Rumanian and Hungarian oil fields critical to Germany's war effort.[93]

SURPRISE

"Strike the enemy at a time or place of your choosing and in a manner for which he is unprepared."[94] The campaign sought its objectives through the brute force of large formations aimed at specific targets. Choice in tactics was driven by target preference, ability to hit your target with precision, and combat losses. No doubt, incidental surprise was achieved at the tactical level. This was due more to the maneuverability of airpower and the offensive nature of the campaign.

Strategically, the bombing level of effort and intensity contemplated was without precedent and, to the Germans, a surprise. The German concept of war was the Blitzkrieg – rapid mobilization of a powerful ground force employed to overwhelm enemies in quick campaigns. Their focus was overrunning the enemy's entire country quickly. Little notion was given to targeting a nation's war means. This lack of strategic thought hampered Germany's ability to understand or anticipate the threat of strategic bombing and the CBO.[95, 96]

SECURITY

"Never permit the enemy to acquire an unexpected advantage."[97] CBO adherence to this principle was a by-product of airpower's inherent mobility which gives it the advantage of not being committed to position in battle, as are surface forces. CBO leadership took advantage of the bomber's long range to conduct operations relatively safe bases in England and Italy. This essentially insulated combat forces from attack while in garrison, which facilitated repair and preparation for the next mission.[98] Given the reliance on mass, any activity that protected the fleet's ability to concentrate power added to the effectiveness of the overall campaign.

Effectiveness of the campaign skyrocketed after overcoming the misconception of the invincible bomber. Heavy US losses sustained in the two attacks on Schweinfurt ball-bearing plants in 1943 had far-reaching implications on US tactics. Up to that point, leadership believed that heavily armed bombers flying well-designed formations could penetrate that far unescorted. Deep penetrations without escort, of which this was among the earliest, were immediately suspended and special emphasis was placed on obtaining escort fighters. This tactical adherence to security brought effective long-range escorts into the fray. This and the decision to allow them to engage at will were key to gaining vital air superiority.[99, 100]

SIMPLICITY

"Prepare clear, uncomplicated plans and clear, concise orders to ensure thorough understanding."[101] At the tactical level, bombing was a simple concept – mass on objective. As illustrated earlier, the CBO was necessarily a very complicated operation at the operational level. The objective to fatally weaken Germany mandated multiple well-defined targets be repeatedly attacked. These required literally thousands of bombers, and later escort fighters, with attendant logistics tail. The cumulative effect had a mid-1944 deadline, which added urgency, increased the need for mass, and resulted in a 4-phase plan of action. In addition, it was a 24-hour combined operation, which added its own set of complications. This campaign would be difficult to manage today with the help of computers; one can only imagine what it was like to manage this scale of operation in the 1940s. This analysis could find no evidence to suggest the operations complexity detracted from its mission.

UNITY OF COMMAND

"For every objective, there should be unity of effort under one responsible commander."[102] At the highest political and military levels, it is impossible to achieve absolute unity of command in a coalition. There were too many cooks in the kitchen. A coalition's strategy must fit within the limits of each nation's abilities and desires in order to be effective therefore each has great influence on the objective and strategy.[103]

Roosevelt and Churchill firmly believed an effective Anglo-American coalition was vital. US and UK interests and certainly their concept of battle diverged on some points. Political compromise, in the name of coalition preservation, was necessary. This meant one nation's interests and way of doing business would at time predominate. From the perspective of the militaries, they were serving a two-headed monster. Its effect on the campaign is most apparent in economy of force.

ECONOMY OF FORCE

"Allocate minimum essential combat power to secondary efforts."[104] One of the key strengths of the CBO was its application of this principle. It planned to concentrate forces on primary objectives (prioritized CBO targets) and minimize force placed on objectives of lesser import (direct support to ground forces, invasion).[105] In determining effectiveness of the CBO, economy of force is in the eye of the beholder. What are viewed as diversions from this principle on one hand are arguments for adherence on the other. From the perspective of political leaders, economy of force was always applied. From the perspective of the CBO, diversions of force to support post-invasion ground operations and especially the MTO stole mass away from *its* primary targets and lengthened the time it took to achieve *its* objective – fatally weaken Germany.

OPERATION TORCH was a politically motivated campaign initiated in 1942 to open a second German front in the MTO to relieve pressure on Russia and reopen trade routes vital to the British economy. This, coupled with a later decision to further extend operations, severely hampered the bombing effort in Europe. Only 800 bombers, 66% of planned strength, were available for the German offensive in November 1943. This "scatterization" essentially limited the US force to Phase 1 targets throughout 1943.[106, 107] The Big Week and subsequent exploitation of air superiority overcame this lack in unity of effort to make feasible a timely invasion. Only conjecture can determine if the invasion could have been accomplished with fewer casualties.

Planners anticipated a portion of the CBO force would be diverted to directly support invasion land forces and accounted for this in the CBO plan. However, these forces were expected to return to their primary mission once the land forces broke out from their beachheads. General Eisenhower, now Supreme Commander of all forces, maintained the diversion long after ground force breakout. Three-eighths of the total heavy bomber effort in Europe (380,000 tons of bombs) was diverted from planned CBO targets in Germany to support the ground offensive in France.[108] The subsequent full strength assaults on German war production, especially transportation systems, proved to fatally weaken Germany and play a decisive role in its defeat.[109]

SUMMARY AND DOCTRINAL IMPLICATIONS

SUMMARY

The Allies adopted US daylight precision and UK night area bombing based on leadership's belief that it could most effectively reduce Germany's means of war and hasten its earliest possible defeat. Hitler's campaign to gain uncontested European dominance was a direct threat to US and UK national security. Successful mitigation of the threat depended on an effective Anglo-American military coalition. They planned to defeat Germany by Continental invasion and use the CBO to insure the invasion's success by wearing down German means of resistance. Roosevelt and Churchill were strong advocates of strategic bombing due to its demonstrated utility in achieving political objectives. UK and US bombing doctrine were in congruence with the attrition goals of the strategic military plan. The CBO was a natural for inclusion.

Varying interpretations of past experiences drove US and UK leadership to differing bombing methodologies. Heavy day losses and technological inability to navigate and bomb accurately pushed the RAF to night area bombing. The Americans were equally confident that new technology and techniques made daylight precision bombing the most effective. In the end, the political mandate for an effective coalition gave rise to a complementary day precision/night area bombing strategy.

The Allies successfully achieved their objective primarily through adherence to the principles of mass, objective, offensive, and maneuver. The CBO sought to exploit the strategic bomber's inherent maneuverability to vertically flank surface defenses, overcome their advantage of interior lines, and concentrate combat power on vulnerable rear areas. This offensive action was directed at a limited number of prioritized targets selected for their criticality to German means of war. Taking further advantage of inherent maneuverability, CBO leadership conducted operations from relatively safe bases in England and Italy to insulate them from attack while in garrison. This facilitated repair and mission preparation which in turn preserved the ability to muster the large formations required for successful execution.

Unity of effort and economy of force, especially in times of limited resources, were vital to is success. CBO effectiveness was intermittently reduced during periods of MTO *scatterization* and direct support to the post-invasion land offensive. Ultimately the CBO was successful and decisive in its contributions to the defeat of Germany.

DOCTRINAL IMPLICATIONS

The vital role of the CBO I achieving victory was acknowledged by top military leaders and had a permanent effect on doctrine. Strategic bombing was pushed to the forefront of US doctrine. Military budgets, force structures, equipment procurement, and training were all based on the deterrent and warfighting decisiveness of strategic bombardment. Bombing doctrine assumed that all US wars would be unlimited and that America's enemies would be modern industrialized states. Deterrence was the Cold War primary mission; even tactical forces were modified and given a bombing role.[110]

The CBO's basic principles and lessons learned can be seen in today's Global Vigilance, Reach, & Power air doctrine as core competencies (Aerospace Superiority, Global Attack, Precision Engagement, and Rapid Global Mobility) and commitment to innovation and adaptation. Aerospace Superiority, a direct descendent of The Big Week, prevents adversarial interference assuring freedom to attack and freedom from attack. Global Attack exploits the speed, range, and flexibility of airpower to project power and presence. The essence of Precision Engagement is to reliably apply selective force against specific targets and achieve discriminate strategic, operational, and tactical effects. Rapid Global Mobility again takes advantage of inherent strategic agility (maneuverability) to respond quickly to unexpected challenges to national interests and attack rapidly and persistently anywhere on the globe at any time. Commitment to innovation and adaptation harkens to the days of Billy Mitchell and demonstrates airpower's continued belief in and reliance on technology. Just as in the doctrinal beliefs of CBO leadership, Global Vigilance, Reach, & Power seeks to seize and maintain the offensive through exploitation of airpower's inherent maneuverability to strike directly at an adversary's centers of gravity and prevail at all levels of warfare.[111, 112]

WORD COUNT = 6699.

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