

American Bombardment Policy against Germany, 1942-1945

By Richard G Davis

The bombing of political centers is prohibited by the laws of warfare. However, since they are the nerve centers of the nation, they are apt to be important targets for bombardment in reprisal for attacks made by the enemy on such centers in our own country, especially since they are apt to contain important factories or stores of war matériel.
(US Army Air Service Tactical School, Bombardment Course Text Book, 1926.¹)

The U.S. Strategic Air Forces have not at any time had a policy of making area bombing attacks upon German cities. Even our attacks against the Berlin area were always directed against military objectives. Our pathfinder attacks against communications centers have often resulted in an area type of bombing because of inaccuracy in this method of bombing.

(Major General Frederick L. Anderson, Deputy for Operations, U.S. Strategic Air Forces in Europe, April 10, 1945)

An air force is a captive of its technology. The capabilities of an air service's support systems, aircraft, and weapons play a pre-dominant role in shaping its doctrines, policies, and methods of operation, and strictly circumscribe its effectiveness. From 1942 through 1945 the U.S. Army Air Forces (AAF) pursued a strategic bombing offensive against Germany. This campaign provides a prime example of the effect of technology on bombardment policy. Bombardment policy, or in current terminology the Rules of Engagement for air-to-ground combat, was a set of guidelines established by the Anglo-American civilian leadership and interpreted by the bomber commanders. It governed the physical release of bombs over enemy territory. This paper examines the bombardment policy of the US Eighth Air Force.

The Eighth began bombardment operations on July 4, 1942. By October 9, it had conducted

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B-17s of the US 8th Air Force on a high altitude bombing mission



fourteen heavy bomber raids over Occupied France. These raids highlighted the need to define the American bombardment policy, particularly as it affected the safety of friendly civilians in German occupied territory.² Major General Carl A. Spaatz, the Eighth's commander, had the following notification broadcast over the BBC to occupied France:

American bombing aims only at the Nazis and towards activities in France and occupied countries that contributed to the German war effort. Therefore, all people of France living within two kilometers of recognized German war effort factories are advised to vacate such residences.³

On October 29, either in response to the American initiative, or as part of an effort to clarify its own

policy, the RAF issued new instructions to all its commands. Spaatz adopted it as the official policy of the Eighth as well.⁴ The Allies drew a sharp distinction between the bombing of enemy occupied territory and Germany itself. In British, Allied, or neutral territory occupied by the Germans the following rules applied:

1. Bombing confined to 'military objectives' only.
2. Bombing of civilian populations, as such, forbidden.
3. It must be possible to identify the objective.
4. The attack must be made with reasonable care to avoid undue loss of civilian life and if any doubt exists as to accuracy or an error would involve the risk of serious loss to a populated area, make no attack, and
5. Observe the provisions of the Red Cross conventions.

The memorandum supplied a listing of authorized targets in occupied territory, including enemy units and facilities, dockyards, war factories and associated power plants, and fortifications. It specifically excluded lighthouses and the power stations feeding the electrical pumps keeping the Netherlands from flooding. The memo made 'special provisions' for lines of transportation and communications and means of intercommunication 'serving military purposes' in occupied territory. The Allies limited daylight attacks to locomotives and freight trains, but forbade attacks on passenger trains and attached locomotives. At night all rail traffic was subject to attack. However, the instructions included a blanket clause. Subject to the provisions of avoiding loss of civilian life, it allowed the attack of any objective 'the destruction of which is an immediate military necessity.'

The memo further described a unique problem: British territory occupied by the Germans – the Channel Islands. The memo limited attacks to those 'necessitated by operational considerations of real importance,' and confined those attacks only to the objectives targeted. The Allies added a last restriction, 'Owing to the difficulty of discriminating between troops and civilians, machine-gun attacks on personnel are not to be made.' By inference machine-gun attacks on personnel in occupied and enemy territory was authorized or at least not explicitly forbidden.

The concern for their own and for the people of their subjugated Allies did not extend to the enemy. In two pithy sentences AVM John C. Slessor, Assistant Chief of Staff (Policy), wrote:

Consequent upon the enemy's adoption of a campaign of unrestricted air warfare, the Cabinet have [sic] authorized a bombing policy which includes the attack of enemy morale. The foregoing rules governing the policy to be observed in enemy occupied countries do not,

therefore, apply in our conduct of air warfare against German, Italian, and Japanese territory, except that the provisions of the Red Cross Conventions are to be continued to be observed.⁵

The multi-tiered system of bombing restrictions tied to the nationality of ground targets this policy established remained in effect throughout the war.

Although the new directive gave the AAF and the RAF the same bombardment policy in theory, it

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did not have that effect in practice. The Eighth, following its doctrines operated over occupied Europe and with its high altitude precision techniques that could not avoid collateral damage. Strict compliance with the directive would have halted American heavy bomber operations. Consequently, the Eighth would appear to have made no changes to bring its day-to-day operations into compliance with the new policy.

But the broadcasts ordered by Spaatz indicated the Americans did not purposely intend to injure civilians, whatever the limitations of their technique. Throughout the strategic bombing campaign against Europe, American bombing policy would oscillate, sometimes at virtually the same instant, between the very genuine American desire to avoid harming civilians, a feeling shared by all top American air commanders, and the realities of weather and bombing accuracy.

At the Casablanca Conference in January 1943, the CCS placed the Eighth under the overall guidance of the Chief of the RAF Staff, Air Chief Marshal Charles A. Portal. This, in effect, made the Americans' day-to-day bombardment policy dependent on political sensitivities of the British government.

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from the Belgian government stating that the raid had killed 1,200 civilians. Whereupon Sir Anthony Eden, the British Foreign Minister, asked the Air Ministry if it were possible that, 'the Americans only bomb targets which are sufficiently far removed from residential districts to allow a safe margin for error.'⁶ Portal's assistant, Air Vice Marshal Norman H. Bottomley, wrote to Eighth to

by lower headquarters allow definition of American policy both by inference and by the old bromide 'watch what I do, not what I say.'

Up until the end of September 1943, the Eighth conducted all its bombing by the sole means available to it visually, with the Norden bombsight. In their raids on occupied Western Europe and on

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request, 'that as far as is possible targets in Occupied territory be selected in such a way as to avoid the risk of heavy casualties of the civilian population.'

Lt. General Frank Andrews, the American theatre commander, reported to General Marshall that the War Cabinet wished to limit collateral damage in occupied territory, a policy which if 'interpreted strictly would necessitate abandonment of such bombing since inevitable strays will occur.' However, Andrews added that he had achieved a compromise. The Americans would suggest a list of targets for War Cabinet approval and then the Allies and their civilian populations would be warned. Thereafter, such targets could be bombed as the situation warranted.⁷

The Cabinet accepted 19 targets, but decided, for reasons of operational security, not to inform their Allies of specific targets.⁸ The Vice Chief of the Air Staff cautioned the Americans, 'I think it would be advisable to avoid the added risk which might result from employing forces consisting of mainly freshman groups,' and added, 'I am sure that in light of the Prime Minister's instructions you will plan these operations with a view to reducing the risk of casualties to civilians to a minimum.'

American policy towards collateral damage and area bombing lacked the clear and concise definition of British policy and procedure. Nonetheless, remaining records and mission reports submitted

Germany the Americans invariably used the tactics of the high altitude visual attack. Given the incomplete training of some crews, German defenses, the relatively compact nature of some of the targets selected and, the smoke and dust thrown up by previous bombing, the Eighth's efforts were, at best inconsistent. In France, it is said, the saying 'up with the RAF and down with the Americans,' became prevalent. The Eighth apparently did take what precautions it could, such as briefing the crews to identify the proper target, refusing to authorize the selection of alternate targets in occupied countries, and selecting approach angles that directed bombs away from populated areas. The basic inaccuracy of their bombing method betrayed their good intentions.

In any case, the Eighth did not engage in indiscriminate bombing over occupied Europe. By June 27, 1943, the RAF notified the Eighth that all the target areas had received their warnings and specified that, 'You should continue to observe the principle that all possible measures be taken to keep to an absolute minimum the risk of casualties to the civilian population consistent with ensuring the effectiveness of your attacks.'⁹ The Eighth's implementing directive somewhat diluted this strict standard, 'In planning operations in enemy occupied countries, care should be taken to spare as many civilian casualties as is practical.'¹⁰ Throughout 1943 Eaker and his bomber commander, Maj General Anderson, and fighter commander, Maj General Kepner, observed a verbal arrange-

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ment that required both subordinates to clear, before carrying them out, any attacks on occupied territory with their commander.¹¹

The British continued to limit Allied attacks throughout 1943 and the first months of 1944. Naturally, the target list changed over time. The discovery of the CROSSBOW/V-1 system added a large number of new targets. On November 26, 1943, the British suspended bombing and strafing attacks on all electrical power installations in France and the Low Countries because they would produce no immediate or large effect on the enemy's war effort and, 'on the other hand create much distress among the civilian population, and may prejudice the success of our future military operations in those countries.'¹²

On the same day the Allies also discontinued fighter attacks on 'the railway transportation system particularly locomotives, trains, and signal boxes in occupied North-West Europe,' but noted that such attacks in conjunction with support of the cross-channel invasion could be planned and

would be authorized when appropriate.¹³ By May 20, 1944, the Allies had resumed fighter attacks on all trains, including passenger trains, in occupied territory. After the invasion of France the demands of the ground forces and their associated tactical air forces necessitated the attack of so many communications, V-1, and combat related targets that the system of tight control of bombing in occupied countries in Northwest Europe disappeared.

The bombardment of German territory

Over Germany the Eighth employed a looser set of rules. The Eighth's 'Bombardment Directive' of June 27, 1943, issued to implement POINTBLANK, stated, 'Any target in Germany is cleared for attack at any time.'¹⁴ The Americans flying in the daylight and using either 'eyeballs' and later radar could seek alternate targets with comparative ease. Consequently, the Americans distinguished target priorities within a raid, while Bomber Command normally did not. The Eighth normally had four target priorities for each mission:

1. **Primary:** visual attack on a specific war plant,

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rail facility, or military target. Chosen by the AF Headquarters in accordance with current bombing directives.

2. **Secondary:** Usually chosen by AF Headquarters in accordance with current bombing directives, with its location coordinated with the bombers' planned route and fighter protection.

- a. visual: an alternative target similar to the primary, or
- b. non-visual: area attack on city associated with either of the above.

3. **Last resort target:** A tertiary target with the same qualifications as a secondary target.

4. **Target of opportunity:** A target selected by

bomber formation leaders, while in the air, when they are unable to attack any of the above targets. If weather or enemy action scatters a formation all pilots are encouraged to seek targets of opportunity, within specified limits. Forbidden over occupied territory.

The first area raid noted in Eighth Air Force records occurred on August 12, 1943, when 106 bombers attacked the city of Bonn, visually, as a target of opportunity.¹⁵ The Eighth's first ordered city or area raid occurred on September 27 1943 when it dropped, through complete overcast, 506 tons on an objective specified as the 'city of Emden.' This was also the first raid in which the Eighth employed radar-bombing techniques. General Frederick L. Anderson, Commanding General, VIII Bomber Command, who authorized

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the raid, had been instrumental in the procurement, installation, and use of bombing radar.¹⁶

The conjunction of radar and city area bombing was not a coincidence. But tactical considerations, not strategic ones, dictated the American adoption of area bombing. In early September 1943, the Eighth obtained four H2S radar devices from the RAF. An American variant of this radar bombing device, H2X, began to equip the Eighth's B-17 and B-24 heavy bombers in December 1943. The initial scarcity of H2S and H2X meant that one or two pathfinder aircraft would lead large formations of bombers, 100 or more. When these large formations dropped through overcast on the pathfinders' markers bombing accuracy declined precipitously. Hence the switch to area bombing.

The primitive radar technology then available allowed the Eighth to locate a city through clouds, but not a specific plant or precision objective.¹⁷ Of course, if weather conditions, such as a break in the clouds, or if the situation allowed it the Americans could fall back on the Norden Bombsight and visual bombing. Within a span of two weeks after the introduction of a mere six sets of radar for the entire force, the Eighth went from a command that had never authorized a city area raid to one that would launch more than one such raid a week, on average, until the end of the war.

On October 10 the Eighth, employing visual sighting struck the city of Munster as a primary target and the German city of Coesfeld and the Dutch city of Enschede as targets of last resort.¹⁸ The day after this raid the Commander of VIII Bomber Command, General Anderson, outlined American target priorities, 'first destruction of the Luftwaffe, its factories and planes; second essential German industries, and third, the cities themselves.'¹⁹

Anderson also introduced another change in Eighth Air Force policy. It began to take effect at the same time as the introduction of H2S - a large increase in use of incendiary bombs. Anderson

had begun to encourage greater use of firebombs, in July 1943.²⁰ The September 27 Emden mission was the first of the Eighth's mission to load more than 20% incendiaries, while the October 2 mission against Emden was the Eighth's first strike to deliver more than 100 tons of fire bombs on a single target. Henceforth, the Eighth would not only conduct intentional area bombing, it would do so using area bombing techniques.

After the Second Battle of Schweinfurt bombing policy changed. On the next mission, October 18, the Eighth instructed its bombers to hit as their primary 'Duren, Center of City,' and as their secondary 'Any German city which may be bombed using visual methods without disrupting fighter support.'²¹ On October 30 the Eighth amended the bombing instructions for secondary targets to, 'Any German city which may be bombed without disrupting the Fighter Support.'²² On November 30, 1943 the formulation became 'Any industrial city positively identified in Germany.' The term 'industrial' tended to be a distinction without difference as almost any city in Germany qualified as such. By the end of Lt. General Ira C. Eaker's tenure with the Eighth, the formulation for secondary city targets had reverted to 'Any city positively identified as being in Germany which can be attacked without disrupting fighter support.'²³ The exact wording of the field orders may have changed from mission to mission, but the Eighth's intent to authorize area bombing in a broad range of circumstances remained constant.

Upon their arrival in January 1944, Spaatz, now in overall charge of US Strategic Bombardment operations, and James H. Doolittle, new commander of the Eighth, continued area bombing. On January 29, 1944 the Eighth dispatched 763 effective bomber sorties to Frankfurt-am-Main, with their primary target the city's marshalling yard. As a secondary or last resort target the field order authorized, 'Any city or industrial area positively identified as being in Germany & which can be attacked without disrupting fighter support.'²⁴ The

next day 701 bombers attacked, Brunswick, weather prevented attack on their primary. Instead they dropped 1,681 tons on their secondary target, 'Brunswick, City.'

Their last resort target instructions reflected the Eighth's drive, in the winter and spring of 1944, to destroy the Luftwaffe, 'Any airdrome in enemy territory or any city or any industrial area positively identified as being German and which can be attacked without disrupting fighter support.'²⁵ The orders to the Eighth's fighters echoed those to

attacked in occupied territory. When these targets are so obscured that normal bombing accuracy cannot be expected, the bombs will not be released.

Doolittle added, 'Specific admonition that grave consequences will ensue for errors in identification will be repeated and emphasized in the pre-mission briefing of all combat crews.'²⁷

On the last day of March, when Doolittle informed Spaatz's Headquarters of his operations plans for

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the bombers. On February 9, 1944, Kepner informed his pilots that, 'any target of opportunity within the boundaries of Germany can be attacked.'²⁶

On March 7, Doolittle clarified the Eighth's bombing policy by issuing a new set of SOPs. The document bore the singularly unfortunate designation, 'Indiscriminate Bombing.' Doolittle established the following three bombing zones:

a. Unrestricted Areas. Any military targets in Germany proper more than 50 miles from occupied territory may be attacked under any conditions provided the mission instructions of the Field Order are followed.

b. Restricted Areas. Military targets in Germany proper that are in a zone less than fifty miles from occupied territory may be attacked if they can be positively identified, bombed visually, and attacked without any risk of bombs falling in occupied territory.

c. Occupied Territory. Only those targets listed in the Field Order for the particular operation may be

the first half of April, he further stated his policy for use of his force in overcast conditions. His policy explicitly established the link between city area bombing and H2X stating:

When overcast bombing technique must be employed, attacks will be directed against:

- a. Munich
- b. Berlin
- c. Other large German cities.²⁸

By July 1944 USSTAF intelligence had compiled a list of cities and towns for H2X attacks. The list consisted of 100 targets (53 cities judged 'suitable' and 47 cities judged as 'poorer targets').²⁹ In that month the Eighth reached its wartime high for authorized area bombing 10,000 tons.

This did not go unnoticed at USSTAF, HQ. On July 21, a date on which six separate groups of the Eighth's bombers attacked cities visually as targets of opportunity, Anderson issued a new policy memo. He pointed to Spaatz's oft reiterated and continuing intention to direct bombing toward precision targets and categorically denied any

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intention to area-bomb. But having denied the intention, he proceeded to authorize the practice: 'we will conduct bombing attacks through the overcast where it is impossible to get precision targets. Such attacks will include German marshalling yards whether or not they are located in German cities.'³⁰

This memo had a chilling effect on reported area bombing. Three-quarters of such raids reported appeared in the Eighth's records before this memo. However, an analysis using the profile of known command city raids; always over 100 aircraft, almost always carrying over 20% incendiaries, and bombing by radar over 80% of the time, and applying it to all Eighth Air Force raids, surfaces 82 more 'area like' raids.³¹ Seventy, or 85%, of those raids occurred after Anderson's memo. In August the Eighth's area bombing of Germany dropped to a mere 401 tons. For the first three weeks in September American area bombing followed the same pattern. But by the last week of September the Germans achieved a stalemate on the Western Front. The Eighth returned to area attacks with a total of 4,700 tons on Frankfurt, Cologne, Magdeburg, and Munster.

In October 1944 the Eighth's area bombing increased as bad weather forced attacks on secondary targets. At the end of the month the Eighth Air Force issued a new SOP, 'Attack of Secondary and Last Resort Targets.' It increased the likelihood of area bombing by setting the following criteria:

1. No towns or cities in Germany will be attacked as secondary or last resort targets, targets of opportunity, or otherwise, unless such towns contain or have immediately adjacent to them, one (1) or more military objectives. Military objectives include railway lines; junctions; marshalling yards; railway or road bridges, or other communications networks; any industrial plant; and such obvious military objectives as oil storage tanks, military camps and barracks, troop concentrations, motor transport or AFV parks, ordnance or supply depots, ammunition depots; airfields; etc.

2. Combat crews will be briefed before each mission to insure that no targets other than military objectives in Germany are attacked.

3. It has been determined that towns and cities large enough to produce an identifiable return on the H2X scope generally contain a large proportion of the military objectives listed above. These centers, therefore, may be attacked as secondary or last resort targets through the overcast bombing technique.³²

Almost every city or town in Germany with a population exceeding 50,000, and a few below that figure, met the foregoing criteria. This policy made it open season for bombing Germany's major cities in any weather. If the AAF had not abandoned its precision techniques for area and terror bombing in this memo, it came perilously close.

At the end of February 1945 USSTAF prepared a comprehensive bombardment policy; THUNDERCLAP, Dresden, and CLARION, all heavily influenced its formulation. The American public's negative reaction to Dresden and the flap it created in AAF headquarters, led to a spate of telegrams back and forth between Washington and London, with Giles and Arnold demanding details of USSTAF's policies and Anderson explaining them. Spaatz was in the Mediterranean for meetings with Eaker.³³ By February 21, in preparation for CLARION, USSTAF issued a policy for the bombing of Czechoslovakia. The Sudetenland, annexed by Germany in 1938 and part of Greater Germany would be treated as German territory. In the provinces of Bohemia, Moravia, and Slovakia air forces would select visual targets 'with due regard to risk to civilian population,' and limit PFF attacks, 'to targets whose military importance clearly outweighs hazards to population.'³⁴

On March 1 USSTAF promulgated the new American bombing policy that rescinded any subordinate air force's policies. USSTAF placed Germany, Austria, the Sudetenland, and Hungary, whose territory unoccupied by the Soviets was

controlled by a Fascist regime in a formal state of war with the Allies, into one category and authorized their attack under the following conditions:

a. By visual sighting method

- (1) Military objectives will be assigned for attack so as to best fulfil the objectives outlined in current directives as amplified by priority target lists.
- (2) Military objectives may be attacked as targets of opportunity if attack on the assigned targets proves to be impracticable.

b. By instrument bombing method

- (1) Military objectives will be assigned for attack so as to best fulfill the objectives outlined in current directives as amplified by priority target lists.
- (2) If attack of the assigned targets is not practicable, military objectives may be attacked as targets of opportunity by instrument bombing technique. These attacks will be made against military objectives outlined under the current bombing directive.

Missions against occupied countries would operate under more restrictive conditions.

a. By visual bombing method

- (1) Military objectives will be assigned for attack so as to best fulfill the objectives outlined in current directives as amplified by priority target lists.
- (2) The attack of targets of opportunity is prohibited and crews will be briefed to insure that no such attacks are made.

b. By instrument bombing method

- (1) Military objectives will be assigned for attack when their military importance is so great that the risk of causing civilian casualties by bombing with normal accuracy is warranted.
- (2) The attack of targets of opportunity is prohibited and crews will be briefed to insure that no such attacks are made.³⁵

This policy, for all its draconian tone, in actuality established less expansive bombing guidelines

than its predecessors. It explicitly recognized the inaccuracy of radar attacks, limiting their application to occupied countries, but not to Greater Germany. The new policy defined a military objective as one which 'materially' aided the enemy: a judgment call, perhaps, but one whose implication was clear – control indiscriminate bombing practices.

The rapidly changing situations of the final months of the war in Europe meant that modifications of the bombardment policy came quickly. The bombings of Switzerland, on March 4, led to a prohibition, on March 6, of attacks on targets of opportunity within 50 miles of a neutral country.³⁶ On March 29, Eisenhower sharply limited air attacks on Denmark and occupied Holland for humanitarian reasons - only road and rail traffic definitely identified as military should be attacked and only road and rail centers directly connected to the ground battle should be struck. Attacks on V-2 sites near residential areas would require specific SHAEF approval.³⁷

On April 2, Spaatz forbade attacks within 25 miles of Berlin.³⁸ Spaatz went further the next day, ordering that henceforth all targets would be cleared through USSTAF.³⁹ The actual effect of these moves on bombardment policy and on operations was minimal. In March the Eighth reached its all-time highs for tonnage dropped and sorties flown. It conducted 4 command area bombings in March and two in April. The old ways die hard and the air crews may well have continued past practice until almost the end of the war.

In summation, analysis of the US Eighth Air Force's bombardment policy reveals a set of procedures that strictly differentiated between the nationality of targets and accommodated the operating techniques of the force. In so far as limitations of equipment and considerations of personal safety allowed, American policy encouraged aircrews to do their best to avoid inflicting harm on friendly civilians. As for Greater Germany, the Eighth, offered no quarter. It cannot be overemphasized that this was in keeping with the overwhelming wartime anti-German sentiment of the Allied governments and their civilian

populations. To use the terminology of a later era – the Eighth made the Reich a ‘free-fire’ zone.

Notes:

1. Air Service Tactical School, Langley Field, Virginia, BOMBARDMENT (Washington, DC: GPO, 1926), pp. 63-64; USAF History Support Office (AFHSO), Bolling AFB, DC, microfilm collection, reel A2686, frames 502-503.
2. For example the Eighth's raid of September 5, 1942, on the Rouen-Sotteville marshalling yard purportedly killed 140 and wounded 200 French civilians, while at the same time landing a dud bomb on the city hospital, and the October 9, 1942, raid on Lille killed 40 and wounded 90 civilians. See, Craven and Cate, *Torch to Pointblank*, pp. 218, and 220-221.
3. Memo, HQ Eighth Air Force, Col. George C. McDonald, Chief of Intelligence, to AVM Charles Medhurst, Spaatz Papers, Subject File, 1928-1945.
4. Memo, CG, Eighth Air Force, to CG, VIII Bomber Command, VIII, Fighter Command, etc., November 6, 1942, subject: *Bombardment Policy*, Spaatz Papers, Subject File, 1928-1945.
5. Air Ministry, C.S.15803/A.S.P.1., Letter to all AOCs, 'Bombardment Policy,' signed AVM J.C. Slessor, A.C.A.S. (Policy), October 29, 1942, enclosure to Ltr M.P./6496/D.B.Ops, Air Commodore Bufton to Spaatz, subj: [USSTAF] Bombardment Policy in Regard to Enemy Occupied Territories,' January 22, 1945: AF/HSO microfilm reel A5616, frs. 16 and 17. Bufton states that the Slessor letter has remained in force up until the date of his letter. There is no reason to suppose it was withdrawn before the end of hostilities.
6. Ltr, Eden to Sinclair (Secretary of State for Air), April 25, 1943, PRO AIR 19/218. This letter refers to complaints from the French, Belgians, and Dutch and indicates that at a War Cabinet meeting on April 19 the Cabinet asked Portal to approach the Americans.
7. Msg 9013, 23 April 1943, Andrews to Marshall, cited in Msg J.S.M. 909, 28 April 1943, Joint Staff Mission, Washington, to Chiefs of Staff (COS), London, PRO AIR 19/218.
8. Msg OZ 1349, Air Ministry to Britman, 12 May 1943, PRO AIR 19/218.
9. Msg. AX837, Air Ministry to CG Eighth Air Force and AOCs Bomber and Fighter Commands, June 22, 1943 cleared French targets, Msgs. AX751 (June 15, 1943) and AX 166 (June 25, 1943), Air Ministry to same addressees cleared the Dutch and Belgian targets; AF/HSO microfilm reel A5885, frs. 622, 623, and 632.
10. Memorandum, Brigadier General C.C. Chauncey, Chief of Staff Eighth Air Force, to CG, VIII Bomber Command and CG VIII Fighter Command, Subject: *Bombardment Directive*, June 27, 1943; AF/HSO microfilm reel A5885, fr. 615.
11. Memorandum, Col George W. Jones, Jr., Eighth Air Force A-2 Operational intelligence Unit, to Col William N. Cleveland, Eighth Air Force Executive, A-3 Section, Subject: *Restrictions on Bombing in Enemy Occupied Countries in Northwest Europe*, January 27, 1944; AF/HSO microfilm reel A5885, fr. 870.
12. S.46368/IV/A.C.A.S.(Ops.), AVM W.A. Coryton to CG, USAAFUK, and AOC's Bomber Command and AEAFF, Subject: *Attacks on electrical installations in Occupied Countries in N.W. Europe*, November 26, 1943; AF/HSO microfilm reel A5885, fr. 687.
13. S.3119/A.C.A.S.(Ops.), AVM W.A. Coryton to AOC Allied Expeditionary Air Force (copies to CG, USAAFUK, and AOC Bomber Command), Subject *ADGB and Tactical Air Force Offensive Operations*, November 26, 1943.
14. Memorandum, Brigadier General C.C. Chauncey, Chief of Staff Eighth Air Force, to CG, VIII Bomber Command and CG VIII Fighter Command, Subject: *Bombardment Directive*, June 27, 1943; AF/HSO microfilm reel A5885, fr. 615.
15. Ltr V.C.A.S., Sir Douglas C.S. Evill, to Maj. General Ira C. Eaker, CG, Eighth Air Force, 10 May 1943, PRO AIR 19/218.
16. Charles W. McArthur, *Operations Analysis in the U.S. Army Eighth Air Force, Vol 4: History of Mathematics* (Providence, RI: American Mathematical Society, 1990), p. 69.
17. My assessment of the overall accuracy of H2S/H2X aided bombing is based on perusal of many Eighth Air Force's Operations Analysis Section Reports on bomb accuracy and on the many after action reports filed in the Eighth's mission folders. Others have taken a more positive view of the American's radar bombing accuracy, which has led to deny, I believe incorrectly, the extent of actual American city area bombing. For the most cogent and well-reasoned expression of this more optimistic view see, Conrad C. Crane, *Bombs, Cities, & Civilians: American Airpower Strategy in World War II* (Lawrence, KS: University of Kansas Press, 1993.)
18. Planner's Data Sheet, Mission 114, AF/HSO reel A5873, fr. 460.
19. HQ, Eighth Air Force, Office of the Commanding General, Memo, 1st Lt. E.D. Whitley, to Lt. Col. Agan, Subject: *Visit to 3rd Bomb Division Critique of Bremen, Marienburg-Gydnia and Munster Missions*, held 11 October 1943, n.d. [c.a. October 12, 1943], HSO microfilm, reel A5883, fr. 1944.
20. McArthur, *Operations Analysis in the Eighth Air Force*, p. 65. For examples of Anderson's interest in incendiaries see his receipt of a special U.S. National Defense Research Committee report on European industrial plants as incendiary targets [Memo, Lt. Col George W. Jones, Jr., VIII B.C., Operational Intelligence, to Brig. Gen. Frederick L. Anderson, CG VIII B.C., July 17, 1943, HSO Microfilm, reel A5500, fr. 1058] and his circular to the Eighth's heavy bomber wing commanders on the usefulness of incendiary attacks [Memo, C.G. VIII B.C. to C.G.'s 1st, 2nd, and 4th Bombardment Wings, subject: *Effectiveness of Incendiaries*, September 9, 1943, HSO Microfilm, reel B5549, fr. 1492.]
21. Planner's Data Sheet, Mission 116, AF/HSO microfilm, reel A5873.
22. Planner's Data Sheet, Mission 119 A [Aborted], AF/HSO reel A5873, fr. 457.

23-Planners' Data Sheet, Mission No. 156, AF/HSO microfilm reel A5873, fr. 438.

24-Planners' Data Sheet, Mission 198, AF/HSO microfilm reel A5873, fr. 418.

25-Planners' Data Sheet, Mission 200, AF/HSO microfilm reel A5873, fr. 417.

26-Msg. 8FC F67AE, CG, VIII Fighter Command to CO's 65, 67, and 70 Fighter Wings, February 9, 1944; AF/HSO microfilm reel A5885, fr. 812.

27-Memo 55-2, HQ Eighth Air Force, SOPs, Operations; 'Indiscriminate Bombing,' March 7, 1944, AF/HSO microfilm reel A5616, fr. 119.

28-Memorandum, Doolittle to Spaatz (attn: Anderson), Subject: 'Tentative Operations Plans, Eighth Air Force,' March 31, 1944, HSO microfilm reel A5885, fr. 1063.

29-Memo to General McDonald [USSTAF Director of Intelligence], from Dr. David Griggs, Advisor Special Group [Radar], July 5, 1944, Spaatz Papers, Subject File 1929-1945, Targets.

30-Memo, Anderson to Director of Operations, July 21, 1944, Spaatz Papers, Subject File 1929-1945.

31-This consists of all Eighth Air Force Raids of over 100 heavy bombers, sighting with H2X, and carrying over 20% fire bombs.

32-Memo 55-24, Headquarters Eighth Air Force, Office of the Commanding General, Standard Operating Procedures: Operations, subject: Attack of Secondary and Last Resort Targets, October 29, 1944, Air Force Historical Research Agency, Maxwell AFB, Ala., File no. 519.5991-1.

33-See Davis, Spaatz, pp. 558-562 for a more detailed examination of the trans-Atlantic exchange.

34-Msg UAX 64650, USSTAF to Fifteenth Air Force, February 21, 1945, AF/HSO microfilm reel A5616, fr. 81.

35-HQ, USSTAF, Office of the Deputy Commander, Operations, Bombardment Policy, March 1, 1945; AF/HSO microfilm reel A5616, frs. 95-97.

36-Msg UAX 65405 USSTAF to MAAF, March 6 1945, AF/HSO microfilm reel, A5616, fr. 109.

37-Msg A 277, Air Staff SHEAF Forward to USSTAF, March 29, 1945, AF/HSO microfilm reel A5616, fr. 140.

38-Msg, UAX 66845 USSTAF to Eighth Air Force, April 2, 1945; AF/HSO microfilm reel A5616, fr. 144.

39-Msg UA 66900, USSTAF to et. al., April 3, 1945, AF/HSO microfilm reel A5616, fr. 145.





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