

THROUGH ROSE COLORED GLASSES: TARGETING IN ITS HEYDAY

BY

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A THESIS PRESENTED TO THE FACULTY OF
THE SCHOOL OF ADVANCED AIR AND SPACE STUDIES
FOR COMPLETION OF GRADUATION REQUIREMENTS

SCHOOL OF ADVANCED AIR AND SPACE STUDIES

AIR UNIVERSITY

MAXWELL AIR FORCE BASE, ALABAMA

JUNE 2018

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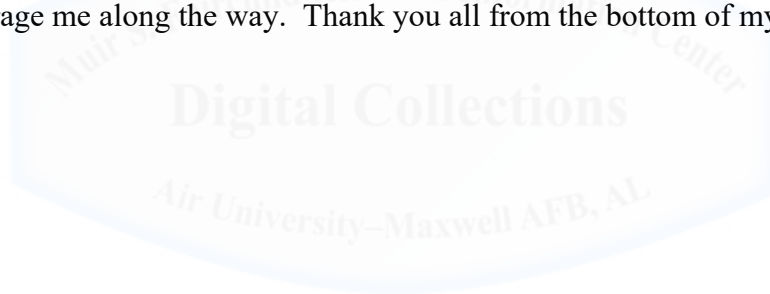
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Acknowledgments

I would like to express my sincere thanks to the many individuals at Air University who assisted me and influenced me during the 11 months at the School of Advanced Air and Space Studies. Thank you first and foremost to Dr. Richard Muller, my thesis advisor for your guidance and support through this process and helping me see my vision through, even when I had my own doubts. Thank you also to Dr. Stephen Wright, my thesis reader for helping me formulate my initial concept and for your continued encouragement. To the faculty and staff of the School of Advanced Air and Space Studies; the staff of the Air Force Historical Research Agency; and, last but not least, my amazing classmates in Class XXVII, who have influenced me greatly throughout the year, thank you.

Most importantly, I wish to thank and recognize my family, who have supported me through this experience. They fielded countless phone calls and were forced to listen to me as I found my way through this process. Thank you also for all the times you told me to stop procrastinating and get back to work. I think they are all just as happy as I am to be done this thesis, but I could not have done it without their support. Thank you to my many mentors who encouraged me to take on the challenge of this course and have supported me throughout this endeavor. Finally, a thank you to my closest friends whom I consider to be family who have helped drag me through this experience and continued to encourage me along the way. Thank you all from the bottom of my heart.



Abstract

This thesis explores the historical development of targeting. It discusses how the targeting enterprise was shaped to ensure the successful application of airpower and assesses the effectiveness of targeting during two of the most successful conflicts of all time: the Second World War (WWII) and Operation Desert Storm. Targeting studies in the last 12 years focus on the decline of targeting, and everyone that knows anything about targeting thinks that we have lost ground, but have we really lost as much ground as we think? This thesis will offer a depiction of targeting at potential high points in its history and seeks to answer whether the art of targeting has deteriorated since WWII and 1991. If it has not, what persistent challenges still face the targeting community today?

The WWII case study describes the origins of targeting leading up to and during the Combined Bomber Offensive, and highlights the clear antecedents of present day targeting principles and practices. While many challenges were surmounted as the concepts of modern targeting came of age in 1944 and the years immediately following WWII, with these advances came many other targeting challenges we still struggle with today.

Similar challenges with organization, processes, training, and force management are evident in the Operation Desert Storm case study. Although the importance of targeting was identified early in its history, efforts to solve targeting lessons learned in WWII were of mixed emphasis and success. As a result, although Desert Storm is viewed as one of the most successful campaigns of all time for the United States, the targeting portion was not as successful as many might expect. Challenges with organization, processes, training, and force management again hindered targeting throughout the conflict and into the post-war era.

While the post-war era led to many changes that attempted to address the lessons re-learned in Desert Storm, due to resource constraints and an Air Force-wide reorganization, these attempts were met with mixed success. Ultimately this led to what several studies would describe as the atrophy or deterioration of targeting. Each of these reports addresses challenges in organization, processes, training, and force management that are similar to those identified in WWII and Desert Storm and makes recommendations for how to move forward to rebuild targeting skills and capacity. The similarities between the lessons learned across the conflicts and in the most recent reports raise the question of whether targeting really ever reached a golden age in history or if the golden age is still to come.

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Chapter 1

Introduction

In essence, airpower is targeting; targeting is intelligence; and intelligence is analyzing the effects of air operations.

- Col Phillip S. Meilinger

The successful application of air power relies on targeting, but targeting has been under critical scrutiny for the last two decades.¹ If targeting is the nexus between intelligence, operations, and planning, it is integral to joint operations. If the common lament that “targeting is broken” is correct, there is a problem.² There have been continued discussions across the Air Force and especially within the intelligence community about targeting capacity declining, capabilities atrophying, and the need to re-establish and revitalize targeting as a core concept. Revitalizing Air Force targeting capability will, in turn, ensure the Air Force is organized, trained, and equipped to support Joint and Coalition Forces.³

The “Air Force Targeting Road Map: Reinvigorating Air Force Targeting,” published in 2012 by Air Combat Command’s Intelligence, Surveillance, and Reconnaissance Directorate (ACC/A2) stated, “Over the last 20 years, the Air Force experienced a significant decrease in target intelligence capacity.”⁴ This conclusion implies that at some point before 1992, targeting was somehow “better,” and there is a desire to return to this better state. This historical timeframe aligns with the aftermath of what many deem the most successful air campaign of all time, Operation Desert Shield/Desert Storm. The question is—what did targeting look like leading up to and during the Gulf War, and were things as good as they have been made out to be? Or are

¹ John R. Glock, “The Evolution of Air Force Targeting,” *Airpower Journal* 8, no.3 (Fall 1994), 15.

² Air Force Lessons Learned (AFL), “The United States Air Force (USAF) Targeting Enterprise at the Operational Level,” Air Force Lessons Learned Report, (Maxwell AFB, AL: Air University Curtis E. LeMay Center, 26 October, 2015), 1. (FOUO) Information extracted is not sensitive or critical.

³ Air Combat Command Intelligence Directorate (ACC/A2), “Air Force Targeting Road Map: Reinvigorating Air Force Targeting,” (Langley AFB, VA: Air Combat Command Intelligence Directorate, 30 September 2012), 8.

⁴ ACC/A2, “Air Force Targeting Road Map,” 13.

we looking through rose-colored glasses at targeting because of the success of that iconic campaign?

From 2006 to 2015 alone, there were over 15 targeting studies and reports published, all looking at ways in which targeting is broken or has atrophied over the years. The focus of each study has been slightly different; some have exclusively focused on functional management, training, and automation while others emphasized the overall state of the targeting discipline throughout the United States Air Force (USAF). All have analyzed targeting capacity in some form and have made recommendations to revive targeting, with the most recent recommendations and plans still in the implementation process.⁵ Many of the targeting challenges in recent years are similar to those faced in Desert Storm, and even those experienced as far back as the Second World War (WWII) when targeting came of age. The recent targeting studies have enabled the Air Force and Department of Defense to put many processes and programs in place to fix these historical deficiencies as well as new insufficiencies that have arisen since Desert Storm. Before delving further into these studies, it is essential to understand some of the basic definitions associated with the targeting field, to include the definition of targeting itself.

What Is Targeting: Definitions and the Process

According to Joint Publication 3-60 *Joint Targeting*, “Targeting is the process of selecting and prioritizing targets and matching the appropriate response to them, considering operational requirements and capabilities.”⁶ A targeteer is an individual who has completed formal training in targeting at an established Service or joint school and participates in the joint targeting cycle (JTC) as part of his/her current duties.⁷ Targeting is more than weaponeering, point mensuration, and collateral damage estimates (CDE); it encompasses many processes and disciplines that are all linked and guided by the JTC.⁸ The six-phase JTC is an iterative process that “continuously seeks to analyze, identify, develop, validate, assess, and prioritize targets for engagement to create the effects

⁵ AFLL, “USAF Targeting Enterprise,” 47.

⁶ Joint Publication (JP) 3-60, *Joint Targeting*, 31 January 2013, vii.

⁷ JP 3-60, *Joint Targeting*, vii.

⁸ JP 3-60, *Joint Targeting*, vii; AFLL, “USAF Targeting Enterprise,” 1.

needed to help achieve the commander's objectives."⁹ The six phases are: end state and commander's objectives, target development and prioritization, capabilities analysis, commander's decision and force assignment, mission planning and force execution, and assessment. Through these phases, the JTC provides a logical methodology for development, planning, execution, and assessment of targeting, weapons, and capability effectiveness and ability to meet overall commander's objectives.¹⁰ The first phase, End State and Commander's Objectives, is the foundation for the entire targeting process. To develop and select targets for execution, one must understand the commander's intent and the desired military end state. A commander's guidance and intent translate into objectives which help scope target development and ensure the achievement of the overall desired effects.

Phase 2 consists of Target Development and Prioritization. "Target development is the analysis, assessment, and documentation processes to identify and characterize potential targets that, when successfully engaged, support the achievement of the commander's objectives."¹¹ This phase has three steps: target system analysis; entity-level target development; and target list management. Target System Analysis (TSA) evaluates a target looking at the system, its components, and its relationship to other targets to determine its relevance to the planning effort. High priority and high payoff targets are identified and depending on how the target links to the objectives from Phase 1, its military importance, will determine its priority.¹² Entry-level target development then builds off the TSA. Once identified as a potential target, the entity is developed further to determine its characteristics to the level of detail needed for execution. The information is saved in a target folder (hardcopy or electronic) containing the target details and any target materials (graphics, textual, tabular, digital, video or other presentations of target intelligence) developed to support operations against the designated target.¹³ Finally, in Phase 2, nominated targets for development are vetted to assess the accuracy of the supporting evidence, validated to ensure the target meets the

⁹ JP 3-60, *Joint Targeting*, I-6.

¹⁰ JP 3-60, *Joint Targeting*, I-6.

¹¹ JP 3-60, *Joint Targeting*, II-5.

¹² JP 3-60, *Joint Targeting*, II-8.

¹³ JP 3-60, *Joint Targeting*, II-11, GL-9.

objectives and criteria outlined in Phase 1, and are prioritized and maintained within a target nomination list (TNL). The Joint Integrated Prioritized Target List (JIPTL) prioritizes nominated targets from the various components, national agencies, and supporting command TNLs, according to the Joint Force Commander (JFC) objectives and once approved focuses targeting efforts for a specific time period and enables Phase 3.¹⁴

During Phase 3, Capabilities Analysis, targeteers evaluate all available capabilities against a target's critical elements to determine what options are available for target engagement, highlighting the best possible solution for the circumstance.¹⁵ The target's vulnerabilities are analyzed and capabilities, lethal or nonlethal, are assigned against the vulnerabilities. Next, the process most often associated with targeting, weaponeering, occurs. Weaponeering is done for all lethal and some nonlethal capabilities and is the process of determining the quantity of lethal or non-lethal means required to create the desired effect on a given target.¹⁶ The feasibility of the capability and target pairing is then established, followed by an effects estimate. CDE is part of the effects estimate and determines the possible secondary effects of engaging a target with the identified capability/munition. The overall purpose of this phase is to match specific capabilities against identified target vulnerabilities and maximize efficiency while minimizing collateral damage and wasted resources.

Phase 4 of the JTC, Commander's Decision and Force Assignment, is when the process of resourcing targets identified on the JIPTL with available forces or systems and intelligence, surveillance, and reconnaissance (ISR) assets, occurs. Once the JFC approves the JIPTL, it is used to produce tasking orders such as the Air Tasking Order (ATO) as part of the joint operations cycle, and taskings are released to the components and their forces to execute. The process in this phase links theoretical planning to actual operations, and while it is primarily an operations function, intelligence personnel and specialized targeteers play a critical role. Intelligence personnel ensure the correct integration of ISR assets into the plan, and because the pairings of capabilities against

¹⁴ JP 3-60, *Joint Targeting*, II-12.

¹⁵ JP 3-60, *Joint Targeting*, II-13.

¹⁶ JP 3-60, *Joint Targeting*, GL-11.

targets use nominal weapon and weapon system performance data, additional support may be needed from targeteers to refine or amplify target data. During this phase, targeteers work closely with operational planners to match the most appropriate capabilities to targets to create the desired effects. They also provide target status updates, to include CDE updates. Targeteers also assemble the data they developed in Phases 2 and 3 and distill it down for planners, providing only the pertinent information on each target required for tactical-level planning and execution. The target briefs will summarize the target folders, and at a minimum include target development data, capabilities analysis or the number of assets required, CDE, and attrition calculations, or any data necessary for the JFC to determine how a target's engagement will contribute to achieving the overall desired objectives. Planners then assign forces, munitions, nonlethal capabilities and ISR assets to specific targets and aim points and develop force packages, assign supporting assets, and work out timing, sequencing, and execution deconfliction issues. Throughout this process, targeteers may need to assist planners if any changes are necessary that could affect the targeting plan. The JFC is the final approval authority for this process, and once approved, tasking orders are prepared and issued to the executing components and forces.¹⁷

The next phase, Phase 5, Mission Planning and Force Execution, is where detailed planning occurs for the execution of operations. The joint targeting process provides the necessary target information to the planners and warfighters and monitors changes to the dynamic environment during execution to ensure commanders can seize and maintain the initiative and handle any emerging targets as required. Force Execution may also identify new targets for further development, or it may meet the JFC's criteria for a time-sensitive target and require an "immediate response because it is a highly lucrative, fleeting target of opportunity or it poses (or will soon pose) a danger to friendly forces."¹⁸ Either way, the targeting process ensures the necessary monitoring and support to handle emerging targets.

Finally, after execution, Phase 6 of the JTC, Assessment, evaluates the effectiveness of the first five phases of the JTC. It determines if ends, ways, and means

¹⁷ JP 3-60, *Joint Targeting*, II-19, II-20.

¹⁸ JP 3-60, *Joint Targeting*, GL-10.

of targeting created the desired effects and achieved the desired objectives. Phase 6 results in Battle Damage Assessments (BDA), munitions effectiveness assessment (MEA), collateral damage assessment and finally reattack recommendations. Assessment occurs at the tactical, operational, and strategic levels and the output of this phase feeds back into the JTC. Now that there is a baseline for essential definitions and explanation of the targeting cycle, the next step is to look at some of the key findings and trends identified in the recent targeting studies.

One final definition that is important to targeting is the Air Force Targeting Enterprise (AFTE). The term AFTE is a term that encompasses many aspects of targeting. The AFTE is an integrated system of technologies, standards, data, processes, procedures, organizations and people that are used to develop, plan, execute, assess, and support military operations. It includes the architecture, infrastructure and life-cycle capabilities and the supporting systems for targeting. It also encompasses intellectual and technical competencies and ensures sustainable and responsive Air Force targeting capabilities through compliance with Intelligence Community (IC) and Department of Defense (DoD) policy, guidance, and standards. The goal of the AFTE also guarantees synchronized, synergistic, interoperable targeting operations.¹⁹

Targeting Studies and Findings

The 2007 Greybeard targeting study was one of the critical investigations that sparked debate on the Air Force need to reinvigorate targeting. The 480th Intelligence Wing (IW), which had by that time emerged as the Air Force's lead organization for targeting, commissioned the Science Applications International Corporation (SAIC), with assistance from PatchPlus Consulting, to perform an objective study of the wing's ability to execute its targeting mission.²⁰ The investigation initially focused on the 480 IW, but at the request of Lieutenant General David Deptula, Air Force Deputy Chief of Staff for

¹⁹ Air Combat Command Intelligence Directorate (ACC/A2), "Targeting Plan of Actions & Milestones (POA&M): The Execution Plan for the Air Force Targeting Roadmap," (Langley AFB, VA: Air Combat Command Intelligence Directorate, 21 March, 2013), 38.

²⁰ Maj Paul A. Rozumski, "Air Force Intelligence Officer Targeteers: A Discussion on Specialization" (master's thesis, Fort Leavenworth, KS: U.S. Command and General Staff College, 2011), 7; Science Applications International Corporation (SAIC), "Greybeard Targeting Study for the 480th Intelligence Wing: Final Report," (Hampton VA: SAIC, 9 January 2008), 3. (FOUO) Information extracted is not sensitive or critical.

Intelligence, Surveillance, and Reconnaissance (AF/A2), it was expanded to include targeting throughout the USAF.²¹ The goal of the study was to report findings and develop recommendations to improve 480 IW and USAF targeting capabilities in support of joint targeting efforts.²²

The study team assumed at the start of their study that, based on their shared experiences, the “USAF intelligence targeting capabilities had eroded and we believed that we would be documenting an impending train wreck. Once the study was completed, we realized that the situation is far worse. The train wreck has already occurred, and it will take strong leadership to get it back on track.”²³ The study determined that “Targeting is broken and it needs to be fixed.”²⁴ The study also concluded that the main cause of the train wreck was a decrease in the priority given to deliberate planning, resulting from the increased emphasis on the global war on terrorism (GWOT) and counter-terrorism. The shift in focus also resulted in the joint and national organizations responsible for production and targeting support were realigned and ceased providing targeting production support. Additionally, the study determined there was no longer any semblance of targeting management within the USAF, which allowed targeting as a core competency to atrophy and nearly collapse. Finally, the study determined that as the Air Force continued to develop its inventory of precision weapons and delivery systems, there was no serious provision for the necessary intelligence tail to employ said weapons effectively.²⁵

The study team broke up their results into 18 findings and recommendations to put targeting on a get-well path to help reestablish the Air Force’s targeting dominance. Their findings fell into three categories: organization and leadership; training and personnel, focusing on force management issues; and systems and other materials, focusing on acquisition, systems, and production issues.²⁶ Within the organization and leadership category, the study identified seven findings, a few that pertain directly to the

²¹ Heritage Pamphlet, “480th Intelligence, Surveillance, and Reconnaissance Wing,” 116; SAIC, “Greybeard Targeting Study,” 3.

²² SAIC, “Greybeard Targeting Study,” 3.

²³ SAIC, “Greybeard Targeting Study,” 5-6.

²⁴ SAIC, “Greybeard Targeting Study,” 6.

²⁵ SAIC, “Greybeard Targeting Study,” 6.

²⁶ SAIC, “Greybeard Targeting Study,” 6.

argument of this paper. First, oversight of targeting in the DoD was determined to be fragmented. The team emphasized the jointness of the targeting enterprise, but each Combatant Command (CCMD) owned and managed its process, resulting in wide disparities in capabilities, procedures, and systems across CCMDs. There was also a lack of standardization and information sharing across the CCMD targeting communities. As a result, the DoD should either identify and empower a single executive authority to direct targeting policy, processes, and standards throughout the DoD, or create a Joint Targeting Center of Excellence (CoE).²⁷ The second key finding articulated that deliberate planning was in disarray due to its low priority focus because of the GWOT. The deliberate planning tasks assigned to CCMDs had fallen by the wayside in some cases and existing operational plans (OPLANs) and contingency plans were not executable.²⁸ Next, the current tasking for targeting support within the IC, was unresponsive to theater needs and federated operations and reachback processes were inadequate. The current tasking system was determined to be ad hoc and reliant on personal relationships, phone calls, and emails to get the job done. There was a lack of clear delineation of “lanes in the road,” and it was critical to identify and formalize functions best performed via federation and reachback instead of in theater. Finally, the Air Force did not have enough resources assigned to manage the targeting mission, so identifying a USAF Targeting CoE was also critical for targeting management and execution.²⁹

Within the Personnel and Training category, the study identified force management as being inadequate for building and sustaining a professional targeting cadre capable of planning and executing air operations. The study identified that personnel were poorly trained, had little depth or breadth in the areas required, and targeting billets were often reallocated for more pressing requirements. The study also determined that AF Intelligence had only a vague definition of what constituted a targeteer at the time of the study. At one time, there were distinct officer and enlisted Air Force Specialty Codes (AFSCs), but the Special Experience Identifiers (SEIs) used at the

²⁷ SAIC, “Greybeard Targeting Study,” 6-7.

²⁸ SAIC, “Greybeard Targeting Study,” 7.

²⁹ SAIC, “Greybeard Targeting Study,” 8-9.

time of the study were not sufficient as a force management tool. The study highlighted that targeting requires a great deal of training and that skills can atrophy if not used, which was a problem considering targeting personnel deploy to fill contingency operation billets often or PCS to non-targeting billets. Furthermore, targeting personnel commonly had only one operational assignment in targeting, and there was no visible career path for promotion within the targeting discipline. The study identified that the problem was exacerbated by the fact that AF targeting training was insufficient to build and sustain the necessary targeting cadre.³⁰

Finally, regarding Systems and Other Material, the study brought nine additional findings to light, several of which are pertinent to this paper. First, the study determined that the lack of effective joint applications, tools, and databases was a critical obstacle to effective planning and employment at the Air Force and joint level. The inconsistency, inefficiency, and inadequacy of automated tools to include the primary systems of record did not meet targeting needs. Individuals were forced to create workarounds or develop their systems as gap fillers, and these temporary solutions create further communication problems, stovepipes, and incompatibilities, and the lack of interface between tools and systems further hampers execution. Moreover, the identified issues with the tools created mistrust in the precision and accuracy of the recommended solutions, exacerbating the problems.³¹

The study also identified challenges with TSAs, Precise Point Mensuration (PPM), and Combat Assessment. TSAs, being among the most critical requirements for successful target development that assist planners in optimizing the employment of weapons, were also not accomplished. TSAs identify critical components, nodes, and vulnerabilities in target systems within a country and need to be produced early in the deliberate planning process because they require time-intensive studies to develop.³² Meanwhile, PPM requirements were not well defined, and USAF and DoD capabilities were most likely insufficient to support precision weapons employment without a federated process and an increased number of certified point droppers.³³ Additionally,

³⁰ SAIC, "Greybeard Targeting Study," 11-13.

³¹ SAIC, "Greybeard Targeting Study," 13-14.

³² SAIC, "Greybeard Targeting Study," 16.

³³ SAIC, "Greybeard Targeting Study," 16-17.

Combat Assessment issues to include BDA and MEA continued. Combat assessments were not timely enough and therefore of little use to decision makers. Historically, Combat Assessment and especially BDA has continuously been singled out as a fundamental targeting problem. Analyses of Operations Desert Storm, Allied Force, Enduring Freedom, and Iraqi Freedom all identified BDA as a perennial intelligence problem. The lack of training and tools, as well as poor information flow throughout the federated environment, all contributed to the insufficiency of the Combat Assessment processes and capabilities. There is a need to not only train individuals and develop tools but also to model and simulate combat assessment in exercises and experiments to understand the full range of Combat Assessment activities and needs.³⁴

Another deficiency identified that, if corrected, could help overcome the issues identified with TSAs, PPM, and BDA is that AF Intelligence does not fully leverage other organizations to augment its targeting capabilities. The Air Force can capitalize on the Air National Guard (ANG) and Air Force Reserve Command (AFRC) through Total Force Integration (TFI) to augment targeting production capabilities especially in the areas mentioned above. Organizations such as the National Air and Space Intelligence Center already produce analytical products that are useful and may meet some of the TSA or other product needs, but the AF needs to expand its partnerships if it is going to capitalize on these resources.³⁵

Finally, one of the acute findings articulated by the Greybeard Targeting Study addressed the lack of emphasis within the USAF and DoD on targeting in a coalition environment. Rarely do we fight in a US-only scenario. Despite this fact, systems have not been built, and standards have not been developed, with coalition operations in mind. Releasability and training continue to limit the seamless integration of coalition members into targeting processes. Coalition partners require access to targeting systems, tools, and training for integration.³⁶

The results of the Greybeard Targeting Study in 2008 ignited senior intelligence officers' focus on restoring targeting as an Air Force core competency. Lieutenant

³⁴ SAIC, "Greybeard Targeting Study," 13-18.

³⁵ SAIC, "Greybeard Targeting Study," 18-19.

³⁶ SAIC, "Greybeard Targeting Study," 15.

General Deptula, made several changes as part of his Air Force ISR Flight Plan to improve ISR capabilities, and because of the identified targeting issues. He directed the stand-up of the Air Force Targeting Center and a return to an enlisted targeting AFSC designated as the 1N1X1B career field.³⁷ These two changes are among many that were a result of the 2008 study and led to some improvements in targeting capability and capacity, but by 2012 after Operation Odyssey Dawn/Unified Protector (OOD/OUP) concerns remained as to whether the Air Force, from a targeting perspective, could conduct larger operations.³⁸

After discussion at the 2012 CORONA South conference and a review of OOD/OUP lessons learned including analyses of CCMD planning efforts, senior Air Force leaders acknowledged that there is insufficient targeting capacity.³⁹ As a result, the Secretary of the Air Force (SECAF) and the Air Force Chief of Staff (CSAF) directed ACC to develop a targeting roadmap to identify shortfalls and the actions required to address long-standing issues within Air Force targeting. The Air Force Targeting Roadmap (AFTRM) combined findings from numerous studies, to include the 2008 Greybeard targeting study, with lessons learned from past and more recent real-world contingency operations. Consequently, the AFTRM efforts identified the most critical impediments to effective targeting support for Air Force Component warfighting operations.⁴⁰

The Roadmap grouped the deficiencies into five major focus areas: targeting requirements and production capacity; reachback and distributed operations; systems, tools and architectures; training; and force management. The AFTRM also identified short-, mid-, and long-term actions necessary to “reinvigorate Air Force targeting and put our Service back on the path to employ airpower effectively and efficiently to support our nation’s security.”⁴¹ The five objectives to address the identified deficiencies are listed below in Table 1. Additionally, the AFTRM’s goal was to provide fundamental guidance

³⁷ Lt Gen David Deptula, “AF ISR Flight Plan: Implementing the Air Force Strategy to improve ISR Capability,” Briefing, 6 July 2009.

³⁸ AFLL, “USAF Targeting Enterprise,” 9.

³⁹ AFLL, “USAF Targeting Enterprise,” 10; ACC/A2, “Air Force Targeting Road Map,” 4.

⁴⁰ ACC/A2, “Air Force Targeting Road Map,” 4.

⁴¹ ACC/A2, “Air Force Targeting Road Map,” 4.

on “how to better organize, train, equip, conduct, and manage our targeting and targeting-related personnel and resources to ensure efficient and effective targeting operations during peacetime, contingency, and war.”⁴²

Table 1. Air Force Targeting Roadmap Objectives

#	Objective
1	Establish an efficient Air Force targeting requirements process and increase production capacity needed to support air component targeting requirements
2	Enable efficient and reliable reachback and distributed operations
3	Build a standardized, interoperable set of systems, tools, and architecture
4	Reinvigorate Air Force targeting through education and training
5	Improve force management processes

Source: Adapted from Air Combat Command Intelligence Directorate (ACC/A2), “Air Force Targeting Road Map: Reinvigorating Air Force Targeting,” 30 September 2012, 8.

Within the five core deficiencies and objectives, the roadmap identified 23 specific action items. The AFTRM states, “The 23 actions and their 165 associated tasks will drive changes in target intelligence production standards; manpower levels (active duty, civilian, and Air Reserve Component (ARC)); identification of target production and services “Lanes in the Road” by specifying organizational roles and responsibilities; concepts of operation (CONOPS); tactics, techniques, and procedures; improvements to the development, testing, and fielding of multi-domain intelligence systems which complement or contribute directly to USAF and Joint targeting; requirements for certain Air Force Specialty Codes (AFSCs); and training to develop an experienced targeting force and leadership.”⁴³ Within the first core deficiency/objective, the focus was on improving AF deliberate planning, and developing air target materials to meet air component requirements and supplement CCMD target materials. Additionally, it addressed the need for joint target intelligence standards and the need for identifying current and future target intelligence capacity. Finally, this objective also concentrated on target-related education, training and certification requirements and establishing a method to track personnel with target training and experience.⁴⁴

Enabling efficient and reliable reachback and distributed operations emphasized the need for formalizing the prioritization of target intelligence production and

⁴² ACC/A2, “Air Force Targeting Road Map,” 5.

⁴³ ACC/A2, “Air Force Targeting Road Map,” 5.

⁴⁴ ACC/A2, “Air Force Targeting Road Map,” 9-10.

strengthening the reachback and distributed targeting support processes. Part of the strengthening of the processes includes the need to establish a stable and interoperable architecture and decentralized execution and also provide interoperability with allies and coalition partners.⁴⁵ The third objective--build a standardized and interoperable set of systems, tools, and architecture--also focuses on the architecture required to ensure interoperability.

The reinvigorating of AF targeting education and training objective centered on how to increase targeting knowledge by maturing target intelligence training through improved courses and access to professional development for the targeting cadre.⁴⁶ The final objective, improving force management processes, builds off of the education and training objective concentrating on how to create and sustain the expertise and optimize AF targeting resources. Included is the focus on creating sustainable targeting billet structures, fostering kinetic/non-kinetic capabilities, reestablishing AF nuclear targeting expertise, and creating a mechanism to integrate the ARC capability to help meet expertise and surge targeting requirements.⁴⁷ The AFTRM study then analyzed the causes, issues and most effective way to eliminate or mitigate the impact of targeting support on operations resulting in specific actions and tasks. These actions and tasks were then used to develop a comprehensive AF Targeting Plan of Actions and Milestones (POA&M) managed by ACC as the Combat Air Force targeting lead to oversee the implementation of the corrective actions putting the AF on a path to revitalizing its targeting program. At the time of this paper's publishing, the Air Force was approximately nine months into a two year POA&M with the overall effort guided by the five overarching goals of the AFTRM that they are looking to accomplish over a five year period.⁴⁸

Following the AFTRM and POA&M, in 2015, the Air Force Lessons Learned (AFL) Office did a study on the AF targeting enterprise at the operational level, focusing on issues related to AF-assigned target intelligence tasks and how the AF

⁴⁵ ACC/A2, "Air Force Targeting Road Map," 10.

⁴⁶ ACC/A2, "Air Force Targeting Road Map," 10.

⁴⁷ ACC/A2, "Air Force Targeting Road Map," 10.

⁴⁸ Mr. Thomas J. Mahoney, Targeting Branch ACC/A2 Langley AFB, VA, to the author, e-mail, 1 March 2018.

organizes, trains, and equips to meet them.⁴⁹ The purpose of the AFLL report was to document successes and shortfalls in AF targeting. It also assessed the currency of findings from the 14 official AF and joint targeting studies that had been conducted over the prior eight years, to include the Greybeard study and the AFTRM. Through the AFLL process and the interviews conducted for the study, it is clear that many of the findings in the 14 previously published reports remained unsolved.⁵⁰ The AFLL report identifies seven observations focusing on the capacity and capability of the AFTE at the AF Component Headquarters and their air and space operations centers (AOCs) level and their ability to support geographic CCMDs. The report includes discussion of the seven observations, lessons identified, and recommended actions based on potential Doctrine, Organization, Training, Material, Leadership and Education, Personnel and Facilities and Policy (DOTMLPF-P) implications.⁵¹ The seven observations focus on the need to do more to address the challenges that contribute to the lack of targeting capability and capacity and are listed below in Table 2.

Table 2. Air Force Lessons Learned Targeting Study Observations

#	Observation
1	The Air Force has made significant investments and worked to address some of the challenges that contribute to the lack of targeting capability and capacity; however, most interviewees believe more needs to be done.
2	The relatively new concept of federated, reachback Targeting has only been exercised in Operation ODYSSEY DAWN.
3	Targeteer training and personnel management require additional attention in order to maximize the potential of the AFTE.
4	There is a broad consensus that Target System Analysis is a fundamental component of deliberate planning, yet it is not receiving the resources or prioritization necessary to increase readiness and efficiency
5	The AFTE is not optimized for current Counterterrorism/counterinsurgency operations and planning.
6	The integration of non-kinetic capabilities into targeting processes is a widely recognized requirement, but progress is slow.
7	A sustained lack of funding toward targeting computer automation, to include targeting applications, databases, equipment, and the communications bandwidth required, hinders DoD targeting mission execution.

Source: Adapted from Air Force Lessons Learned (AFLL), "The United States Air Force (USAF) Targeting Enterprise at the Operational Level," 26 October 2015, 1. (FOUO) Information extracted is not sensitive or critical.

⁴⁹ AFLL, "USAF Targeting Enterprise," 4.

⁵⁰ AFLL, "USAF Targeting Enterprise," 6.

⁵¹ AFLL, "USAF Targeting Enterprise," 1,4.

As seen from the above discussion, targeting studies/reports published over the past 11 years identify challenges across a broad range of topics within targeting. They include everything from technology, training, force management, reachback support, ARC involvement, resources and funding, interoperability and integration, organization and leadership, processes, priorities, and standards, to name a few. Many of these challenges are not new and have been addressed in some capacity from targeting's first origins and its coming of age in WWII.

Layout

This thesis explores the development of targeting during World War II and its expansion through Operation Desert Storm to discuss how the targeting enterprise was shaped to ensure the successful application of airpower and will assess the effectiveness of targeting at its alleged height. WWII and Desert Storm will provide historical case studies to help examine the effectiveness of targeting during major combat operations as a means of comparison to today's challenges, as identified in studies over the past 11 years. This thesis will compare two case studies using four areas highlighted by these recent targeting studies: organization, processes, training, and force management.

The next chapter begins with a discussion of the origins of targeting leading up to and during the Combined Bomber Offensive (CBO) against Germany in WWII which became the baseline for targeting today. It chronologically walks through targeting development and describes the organizations and processes developed to systematically identify critical targets to support wartime objectives. Additionally, it discusses the recognized need for dedicated and trained intelligence personnel to support targeting and describes training challenges. Further, it identified the critical targeting outcomes and lessons learned from WWII.

The third chapter chronologically outlines the targeting processes of Operation Desert Shield/Desert Storm. It seeks to describe the processes along with the challenges and lessons learned during the Gulf War. This chapter seeks to provide insight on the targeting shortfalls that occurred during the Gulf War in order to compare them to the challenges identified in the studies and reports since targeting's alleged decline.

Lastly, chapter four seeks to discuss the common challenges in organization, processes, training, and force management across both WWII and Operation Desert Shield/Desert Storm. It will then compare those challenges to the challenges identified in the more recent targeting studies and reports that seek to salvage the “atrophying” targeting career field today. The thesis will offer a depiction of targeting at key high points in its history, and will attempt to answer the questions: has the art of targeting actually deteriorated since WWII and 1991? And if not...what persistent challenges still face the targeting community?



Chapter 2

Targeting's Coming of Age: A WWII Case Study

Target intelligence is the basic requirement because a Strategic Air Force is nothing more than a large collection of airplanes unless it has a clear conception of what to use its planes against.

- Major General George C. McDonald

Centuries before the invention of flying machines, individuals envisioned them as platforms for dropping explosives and causing death and destruction to rain from the skies above.¹ With these images came the initial visions of present-day aerial targeting. The initial experiences of dropping bombs from balloons and aircraft as an extension of artillery in WWI set forth the development of targeting philosophy and practice. Present day targeting principles and practices have clear antecedents in the theory of the interwar years and the WWII practice of targeting. The Joint Targeting Cycle, target vulnerability assessments, targeting databases, fusing multi-intelligence sources for target analysis, coalition integration, and damage assessments all have roots in WWII targeting processes. Many challenges were surmounted as the concepts of modern targeting came of age in 1944 and the years immediately following WWII, but with it came many other targeting challenges we still struggle with regarding organization, processes, training, and manning. This chapter traces the development of targeting from the influences of the First World War (WWI) through the development of the Combined Bomber Offensive in Western Europe during WWII, highlighting the influences on present-day targeting.

WWI Influence

The air weapon evolved quickly during WWI, demonstrating its value as a means of conducting reconnaissance, spotting and correcting fire for artillery, and gaining air

¹ Tami Davis Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas about Strategic Bombing, 1914-1945* (Princeton, NJ: Princeton University Press, 2002), 12; David MacIsaac, "Voices from the Central Blue: The Air Power Theorists," in *Makers of Modern Strategy: from Machiavelli to the Nuclear Age*, ed. By Peter Paret (Princeton, NJ: Princeton University Press, 1986), 625.

superiority over specific areas.² During this time aircraft also demonstrated their bombing potential. Bombers, viewed as an extension of artillery, were used initially in direct support of ground forces with few exceptions. It was the French that first considered the idea of strategic bombardment and targeting the German industrial centers to impede the German war effort.³ The French carried out such a bombing campaign in 1916, the first bombing campaign to have military-strategic aims.⁴ The Germans followed suit, developing a strategic application of a nascent air power concept focused on bombing enemy cities to undermine the civilian population's morale. The Germans and British would go on to bomb each other's cities, and the British and Americans began sending bombers against deep targets such as marshaling yards, airfields, supply depots, and factories later in the war. As Robert Ehlers in his book *Targeting the Third Reich: Air Intelligence and the Allied Bombing Campaign* states, "These new forms of bombing presaged what became known as strategic bombing during World War II."⁵

With this new form of bombing, the French air staff quickly realized the need to pay attention to target selection and damage assessment. Between the French planners and their British counterparts, some of the first concepts of today's targeting cycle emerged. They developed a target list, ranked targets by their importance to the German war effort, and then ascertained whether each objective was in range and vulnerable (equivalent to Phase 2 Target Development and Prioritization). Next, they prioritized the targets based on the feasibility of damaging or destroying each target (Phase 2 and Phase 3 Capabilities Assessment). Where the Allies found they were unprepared was not in target selection, but in judging effects and effectiveness. They relied on aircrew observations for targets beyond the range of artillery and ground forces because the ground commanders, who had tasking authority over the scarce observation and reconnaissance platforms, were reluctant to give up their assets to assess bomb damage (Phase 6 BDA/Combat Assessment). By November 1917, one British bomber per squadron began carrying a camera to record results which eased some of the assessment

² Robert S. Ehlers, Jr., *Targeting the Third Reich: Air Intelligence and the Allied Bombing Campaigns* (Lawrence, KS: University Press of Kansas, 2009), 14.

³ John H. Morrow Jr., "The First World War, 1914-1919," in *History of Air Warfare*, ed. John A. Olsen (Dulles, VA: Potomac Books Inc., 2010), 6-7.

⁴ Ehlers, *Targeting the Third Reich*, 19.

⁵ Ehlers, *Targeting the Third Reich*, 19.

issues, but a limited number of cameras, a lack of reconnaissance aircraft for post-strike imagery, and small and ineffective bombs still complicated their early targeting cycle problem. Technological improvements in photographic equipment, bombs, fuzes, and other intelligence-related technologies did reinforce the targeting-bombing-assessment (aka Targeting Cycle) feedback loop and intelligence officers and aircrews incorporated lessons learned in previous missions, and from the development process for bombs, into damage assessments.⁶

Leading up to WWI, the US lacked any form of air intelligence organization and coordinated effort to support flying operations and targeting.⁷ In fact, the US lagged in every aspect of military aviation development at the time. The sustained British bombing campaigns and the realization of the necessity of the targeting-bombing-assessment feedback loop drove the British and then their American counterparts to establish intelligence and photographic sections in their bomber units and assign individuals to higher headquarters. Following Britain's lead, the American Air Service component of the American Expeditionary Force formed an independent air staff. The American air intelligence organization included Subsection G-2 A-7, (the Air Intelligence Section (A-7) of the Intelligence Division of the General Staff (G-2)) and the new branch intelligence officers at bomb and observation squadrons.⁸

Intelligence officers at the branch level were responsible for debriefing aircrews, collecting observations, and creating raid reports which included information from the photographic interpretation officers who analyzed the post-raid imagery for bombing effects and contributed to the damage assessments the intelligence officers forwarded to higher echelons for further analysis. Primary duties of G-2 A-7 personnel in the Bomb Targets Section were responsible for building target folders, making targeting recommendations to the Operations Division (G-3), compiling records of bomb results,

⁶ Ehlers, *Targeting the Third Reich*, 20, 23.

⁷ Aspin-Brown Commission, "The Evolution of the U.S. Intelligence Community—A Historical Overview," in *Strategic Intelligence: Windows Into a Secret World*, ed. Loch K. Johnson and James J. Wirtz, (Los Angeles, CA: Roxbury Publishing Company, 2004), 6; Thomas A. Fabyanic and Robert F. Futrell, "Early Intelligence Organization in the Army Air Corps," in *Piercing the Fog*, ed. John F. Kreis (1996; repr., Washington, DC: Air Force History and Museums Program, 2004), 11.

⁸ Ehlers, *Targeting the Third Reich*, 26; John R. Glock, "Evolution of Air Force Targeting," *Airpower Journal* 8, no.3 (Fall 1994), 15.

and keeping track of enemy air defense assets. Once operations officers made their targeting decisions, personnel sent maps and photographs of the targets to the bombing squadrons tasked to carry out the raids.⁹ The G-2 A-7 staff developed their role from scratch with the assistance of the British and the French, and by the time squadron and staff intelligence operations were active in the summer of 1918, the Americans had their first nascent air intelligence organization capable of supporting strategic bombing operations.¹⁰ Although damage-assessment capabilities were rudimentary, the intelligence and targeting infrastructure that emerged and was able to provide effective damage assessments at least some of the time, had a huge impact on operations in the future. Experiences in WWI led American airmen to a theory of airpower, independent of ground forces, that would continue to shape not only air intelligence but the field of targeting as well.

Interwar Years

During WWI, the US developed its initial concepts of independent air operations and strategic bombing that would continue to take shape during the interwar years and into WWII. During WWI, Edgar S. Gorrell, an American Airmen developed America's first plan for a strategic air campaign.¹¹ William "Billy" Mitchell, Chief of the American Expeditionary Force (AEF) Air Service, hired Gorrell to direct the Air Service's new Technical Section that Mitchell stood up to explore the possibilities of bombing Germany. He tasked Gorrell with determining Air Service requirements including the various types of aircraft needed and as a result, Gorrell considered the prospects of strategic bombing.¹²

Gorrell adopted many of his ideas from European airpower theorists such as the Italian Gianni Caproni, and Britain's Hugh Trenchard and Lord Tiverton. The cornerstone of Gorrell's plan was Caproni's assertion that for bombing to be effective it had to be "systematic, thorough, and consistent."¹³ Gorrell also borrowed the concept

⁹ Fabyanic and Futrell "Early Intelligence Organization," 17.

¹⁰ Ehlers, *Targeting the Third Reich*, 22, 26.

¹¹ Mark Clodfelter, *Beneficial Bombing: The Progressive Foundations of American Air Powers, 1917-1945* (Lincoln, NE: University of Nebraska Press, 2010), 16-17.

¹² Clodfelter, *Beneficial Bombing*, 16-17.

¹³ Clodfelter, *Beneficial Bombing*, 13.

from Caproni that the key to destroying an army was to take away its means of fighting. Thus, Allies could either obtain a victory by exceeding an enemy's armament production or by wrecking the factories that built the weapons. Airpower provided the weapon capable of targeting the factories and the heart of the enemy's war effort.¹⁴ Caproni's ideas meshed well with those of Lord Tiverton who Gorrell relied on for the base of his own plan for "strategical bombing," which Gorrell defined as air attacks on commercial centers and lines of communication to stop the flow of enemy supplies to the front lines.¹⁵

Gorrell asserted that there were "a few certain indispensable targets without which Germany cannot carry on the war," and Tiverton was one of the first to view targets in terms of functional targets sets that if damaged, could sufficiently collapse the enemy's war effort.¹⁶ Tiverton focused on identifying critical vulnerabilities and underlying weaknesses in the German war economy that could create bottle-necks, crippling the war economy and causing the collapse of the German war effort. Identifying and targeting these key components that linked the German industrial complex became the crux of Gorrell's proposal and the central pillar of the American approach to strategic bombing.¹⁷

Many of Tiverton's notions of strategic bombing are reflected in targeting today. He focused on identifying target sets that were within range of British bombers, easy to locate, vulnerable to bombing, and not capable of dispersing their operations or moving to locations out of bomber range similar to today's Phase 2 and 3 of the JTC.¹⁸ Additionally, Tiverton recognized that a systematic analysis was necessary to identify critical targets making it necessary for British Air Ministry officers to consult with engineers, industrialists, and technicians to identify the best targets, a concept that was adopted by both the US and the British in WWII. In addition to advocating for systematic targeting according to their effects on key industries, Tiverton emphasized early concepts of weaponeering. He recognized the necessity of using specific bomb

¹⁴ Clodfelter, *Beneficial Bombing*, 18.

¹⁵ Glock, "Evolution of Air Force Targeting," 15; and Ehlers, *Targeting the Third Reich*, 35; Clodfelter, *Beneficial Bombing*, 19.

¹⁶ Clodfelter, *Beneficial Bombing*, 20; Ehlers, *Targeting the Third Reich*, 29, 33.

¹⁷ Clodfelter, *Beneficial Bombing*, 20; Ehlers, *Targeting the Third Reich*, 29, 33.

¹⁸ Ehlers, *Targeting the Third Reich*, 29, 33.

types for each target, and he acknowledged the importance of the targeting-operations-assessment feedback loop. The targeting-operations-assessment feedback loop concept is what is known today as the targeting cycle. Although nothing came of Tiverton's ideas in Britain, Gorrell adopted Tiverton's concept of systematic target analysis and strategic bombardment against vulnerabilities in the enemy's war industry.¹⁹

Furthermore, Gorrell's plan reflected the belief that attacks on industrial targets would also break the morale of the German workforce. Similar to Trenchard, Gorrell believed that a nation's will to fight equated to the population's willingness to endure the conflict. By inducing discontent and alarm among the population, Gorrell believed he could indirectly weaken the power of the enemy while simultaneously interrupting the German industrial centers in direct attempts to weaken the enemy. Gorrell's plan aimed to achieve both material and moral effects reflective of Tiverton and Trenchard respectively.²⁰

Gorrell combined Tiverton and Trenchard's concept of strategic bombing with his own views that attacks would occur both day-and-night, around-the-clock with day bombers flying at high altitude in tight formations to overcome enemy defenses while night bombers flew with "the impunity that he believed allowed them to conduct the most accurate bombing."²¹ This plan became known as the Gorrell Plan, and both the Chief of the AEF Air Service and General John Pershing, the AEF commander, approved the plan.²² Gorrell's plan for American strategic bombing was never executed in WWI, but his plan combined with the influences of the post-WWI bombing surveys became foundational for US strategic bombing theory and targeting processes leading up to and during WWII.²³

The post-WWI US bombing survey criticized the inefficiencies of British bombing in WWI for lacking a "predetermined program carefully calculated to destroy by successive raids those industries most vital in maintaining Germany's fighting

¹⁹ Ehlers, *Targeting the Third Reich*, 35

²⁰ Clodfelter, *Beneficial Bombing*, 23.

²¹ Ehlers, *Targeting the Third Reich*, 35; Clodfelter 24

²² Clodfelter, *Beneficial Bombing*, 22.

²³ Ehlers, *Targeting the Third Reich*, 28-29, 33-34.

forces.”²⁴ It determined that in future wars, “A careful study should be made of the different kinds of industries and the different factories of each. This study should ascertain how one industry is dependent on another and what the most important factories of each are. A decision should be reached as to just what factories if destroyed would do the greatest damage to the enemy’s military organization as a whole.”²⁵ This careful study would be necessary to achieve useful results in future wars.²⁶ These results emphasized the need for dedicated and trained personnel to undertake this careful study, and Gorrell was one of the first American airmen to advocate the importance of air intelligence in strategic bombing and how intelligence could contribute to the systematic analysis of target selection.²⁷ General William “Billy” Mitchell, also identified the need for (target) intelligence officers at the staff and unit level. He saw the need for these officers to compile and maintain “all information of value in the preparation of bombing missions,” and “to keep an indexed file of photographs, and a stock of maps” showing bombing targets and intelligence concerning them.²⁸ By the end of WWI, airmen could see a requirement for target intelligence to contribute to the effective preparation and conduct of air operations.²⁹

The ideas in the Gorrell Plan, combined with the results from the post-WWI bombing survey and Billy Mitchell’s prophecy that air power alone could defeat a nation by paralyzing its “vital centers,” became the foundation for the Air Corps Tactical School’s (ACTS) airpower theory and doctrine.³⁰ Mitchell’s prophecy and his belief in Air Corps autonomy became the focal point of American airpower study during the interwar years. ACTS faculty shaped Mitchell and Gorrell’s concepts into what became strategic bombing theory focused on targeting and enemy’s industrial web using high altitude precision daylight bombardment (HAPDB). Major Harold George, one of the

²⁴ Glock, “Evolution of Air Force Targeting,” 15; Maurer Maurer ed., *The U.S. Air Service in World War I*, Vol. 4 (Washington, DC: Government Printing Office, 1979), 501.

²⁵ Glock, “Evolution of Air Force Targeting,” 15; Maurer Maurer ed., *The U.S. Air Service in World War I*, Vol. 4, 502, 561; Maurer Maurer ed., *The U.S. Air Service in World War I*, Vol. 2 (Washington, DC: Government Printing Office, 1978), 143. Ehlers, *Targeting the Third Reich*, 38.

²⁶ Biddle, *Rhetoric and Reality*, 67.

²⁷ Ehlers, *Targeting the Third Reich*, 43.

²⁸ Glock, “Evolution of Air Force Targeting,” 15; Maurer, *U.S. Air Service in World War I*, Vol. 2, 279.

²⁹ Fabyanic and Futrell, “Early Intelligence Organization,” 17.

³⁰ Clodfelter, *Beneficial Bombing*, 33, 41.

ACTS instructors, argued that overcoming hostile will was the true objective of war and denying an enemy the essential things for not only prosecuting war but to sustain life itself were key. He also insisted that the essential elements that sustained normal life were the same that enabled a nation to wage war so interrupting the economic web would likely defeat a nation. The concept that the industrial apparatus essential to a state's war-making capability was also necessary to sustain its population became the fundamental tenet of the school's "industrial web theory."³¹

The school's theory reflected the belief that military, political, economic and social facets were closely linked, and interrupting the delicate balance between them could defeat an enemy state. Bombing the "vital centers" of the industrial complex would disrupt the equilibrium and destroy the enemy's war-making capability. This would wreck the enemy nations capacity to sustain normal day-to-day life and in turn, destroy the will of the population to fight. This concept reflected the ideas of both Gorrell and Mitchell equating the will of the nation with its populace.³² ACTS instructors considered the prospect of destroying enemy will by directly attacking the populace, but dismissed the idea because they believed it to be both less effective than attacks on key industries and inhumane.³³

Targeting the industrial web would reduce a country's capacity to wage war and apply pressure to the population and indirectly target their morale. Furthermore, ACTS devoted a great deal of time to determining which particular elements in the industrial web would have the greatest impact if destroyed focusing on efficiency. The school also focused on daylight bombing believing it was more efficient and necessary to pinpoint key targets. Understanding that attacking in daylight exposed aircrews to enemy defenses forced them to attack at high altitudes which were more inaccurate than lower levels, but overall ACTS instructors were confident in their concept of HAPDB against a hostile country's industrial web.³⁴ Instructors, instrumental in the theory's development

³¹ Clodfelter, *Beneficial Bombing*, 55-57.

³² Clodfelter, *Beneficial Bombing*, 58-59.

³³ Clodfelter, *Beneficial Bombing*, 59.

³⁴ Clodfelter, *Beneficial Bombing*, 61, 63.

would utilize this theory later in their careers to develop Air War Plans Division Plan-1 (AWPD-1).³⁵

Unfortunately, the ACTS theory and doctrine presupposed that a systematic intelligence structure existed that could provide the necessary economic and target analysis to identify vital centers to be struck. It was also presumed that the intelligence support required for the development and execution of wartime plans existed, but this was not the case leading up to WWII. No such specialized personnel existed to carry out the careful study essential to providing targeting and intelligence support. Postwar reductions cut the total number of intelligence personnel assigned to the War Department General Staff (WDGS) Intelligence (G-2) known as the Military Intelligence Division (MID), and the Air Service air intelligence organization that came to be known as the Air Corps Information Division, Office of the Chief of the Air Corps (OCAC).³⁶

The MID G-2 was responsible for all intelligence collection, evaluation, and dissemination and as an Army organization, was focused on intelligence to support ground forces. The MID blocked the Air Corps from collecting their own information, and the OCAC Information Division intelligence section personnel were restricted to evaluating the information collected by the MID instead of independently collecting air intelligence to support strategic bombing.³⁷ While the intelligence section was responsible for supporting the War Department strategic planning, it was limited to technical aeronautical information not target systems analysis. Therefore the Air Corps relied on the MID to maintain sufficient data and target materials to support planning and execution of air operations which it did not do.³⁸ The new ACTS strategic bombardment doctrine, focused on vital enemy targets, led to a greater need for target intelligence. Despite this need, no intelligence architecture existed at either national or service levels for collecting and examining foreign economic intelligence. Additionally, the US

³⁵ Ehlers, *Targeting the Third Reich*, 37; Maurer, *The U.S. Air Service in World War I*, Vol. 2, 141-142; Biddle, *Rhetoric and Reality*, 54.

³⁶ Fabyanic and Futrell, "Early Intelligence Organization," 17-18.

³⁷ Thomas K. Hensley, "Creating Air Intelligence: The Influence of the Intelligence on US Air Strategies in Western Europe During World War II" (master's thesis, Maxwell AFB, AL: School of Advanced Air and Space Studies, June 2006), 9.

³⁸ Fabyanic and Futrell, "Early Intelligence Organization," 17-18; Glock, "Evolution of Air Force Targeting," 19.

military intelligence community did not have a systematic analytical process for assessing intelligence.³⁹ Furthermore, even if such a system existed, individuals did not have the training or know how to support the new theory of airpower and independent strategic bomber operations. There were no trained intelligence officers in the Air Corps except for a few officers detailed from other branches. According to Harold Hinton in his book *Air Victory*, "In the all-pilot Air Corps that had been built up during the lean years, there had been no time to train officers in combat intelligence, nor was there much interest in that staff function on the part of commanders."⁴⁰ If tactical squadrons had intelligence officers, Hinton said they were usually staffed by "some luckless pilot" given intelligence in addition to other duties. "He would secure a few maps and he was in business," Hinton stated.⁴¹ Intelligence was a low priority in terms of both budgets and manpower, and as a result, the US military intelligence system failed to conduct economic intelligence analysis, develop Air Corps objective target folders, and provide the necessary intelligence information for planning and wartime execution of plans.⁴² As a result of this shortfall, ACTS faculty took it upon themselves to determine potential economic targets to support their theory. They attempted to analyze and identify targets by mirror-imaging US industrial-economic complexes, failing to understand different industrial nations had different centers of gravity. Eventually, ACTS theorists realized that they required specific intelligence on individual nations to determine appropriate target sets.⁴³

When Hap Arnold became the Chief of the Air Corps in 1938, he thought that the weakest area in the entire air program was the air intelligence organization and it was necessary to establish an intelligence division at the air staff level. In 1940 he received permission to establish an air intelligence organization under the chief of the Air Corps. The OCAC Information Division, established during the First World War, was re-

³⁹ Fabyanic and Futrell, "Early Intelligence Organization," 17-18; Glock, "Evolution of Air Force Targeting," 19.

⁴⁰ Harold B. Hinton, *Air Victory: The Men and the Machines*, (New York, NY: Harper & Brothers Publishers, 1948), 145.

⁴¹ Hinton, *Air Victory*, 145.

⁴² Hensley, "Creating Air Intelligence," 8; Michael I. Handle, "Commentary," in *The Conduct of the Air War in the Second World War*, ed. Horst Boog (New York, NY: Berg Publishers, 1992), 597.

⁴³ Hensley, "Creating Air Intelligence," 43-44.

designated the OCAC Intelligence Division in November 1940. Later all Air Corps intelligence functions were consolidated under the Assistant Chief of Air Staff (AC/AS), Intelligence (A2) nine months after the establishment of the Army Air Forces (AAF) in June 1941.⁴⁴ Despite the name change, the War Department was still only willing to agree to the Air Corps Intelligence Division having responsibility for technical air intelligence, but the division broadly interpreted what was considered ‘technical’ intelligence.

The division successfully justified the preparation of air-objective target folders under its Operations Planning Branch and the Foreign Intelligence Section, even though they were based upon economic and political values of the enemy.⁴⁵ The Intelligence Division fought for more autonomy from the MID, but the G-2’s concerns over duplication of intelligence efforts led to the War Department issuing a directive delineating intelligence responsibility. The directive confirmed the MID as the organization responsible for the collection, evaluation, and dissemination of military information, including what applied to the AAF. AAF intelligence personnel were to be maintained to compile and evaluate technical and tactical information received from the MID and other sources within the US, plus collect technical intelligence from sources abroad through cooperation with the MID.⁴⁶ Airmen were only authorized to evaluate intelligence and create Air Corps objective target folders based on the intelligence provided to them by the MID which had drastic implications for AWPDP planners.⁴⁷

With the MID unable and unwilling to provide the necessary air-centric and strategic bombing focused material that the Air Corps desired, American air intelligence personnel and planners would find themselves reliant on Britain for a large portion of their targeting information for the European theater. At the outbreak of war in Europe, an agreement was reached between British and American leaders allowing for the relatively free exchange of military, economic, and political information. Britain was also willing

⁴⁴ Arthur R. Kooker, “The Foundations of a War Training Program,” in *The Army Air Force in World War II*, Vol. 6, *Men and Planes*, ed. Wesley F. Craven and James L. Cate (Chicago, IL: The University of Chicago Press, 1955), 480-481.

⁴⁵ Robert F. Futrell, “US Army Air Forces Intelligence in the Second World War,” in *The Conduct of the Air War in the Second World War*, ed. Horst Boog (New York, NY: Berg Publishers, 1992), 531.

⁴⁶ Futrell, “US Army Air Forces Intelligence,” 531.

⁴⁷ Hensley, “Creating Air Intelligence,” 27.

to allow American military observers in the war zone to gather information. Major Haywood Hansell, assigned to the Intelligence Division, OCAC was responsible for standing up the division's ad hoc Strategic Air Intelligence Section (SAIS). He was sent to Britain in the summer of 1941 as one of the observers to examine British targeting and intelligence information and processes. This trip would prove critical to American intelligence and targeting efforts in WWII.

Hansell's SAIS created air estimates and performed economic-industrial-social analyses of major foreign powers culminating in the analysis and description of the vulnerable systems, and finally target selection and target folders.⁴⁸ Target selection and target folder development was a new venture for Hansell and his small team, and they found it to be slow and tedious work. The entire Intelligence Division in 1941 included twelve officers and nine civilians, limiting the manpower available for targeting efforts. Rising concerns in the US about Hitler's Germany aided Hansell and his targeting efforts because several men with extensive backgrounds in international business, extensive travel experience, and with expertise in industrial economics and oil joined the Service bringing their knowledge to the targeting process.

Malcolm W. Moss, a former international businessman, and Dr. James T. Lowe, a specialist in diplomatic history and international relations, were two of the notable civilians turned military, whose experience greatly contributed to targeting during WWII.⁴⁹ Additionally, civilian experts were hired with money that became available during the period leading up to the conflict. By 1 June 1945, the Intelligence Division consisted of 245 officers, five warrant officers, 296 airmen and 420 civilians and was the largest of all the AAF HQ functions in Washington. In 1941, the number of intelligence personnel available and dedicated to air intelligence, targeting, and planning limited Hansell.⁵⁰

⁴⁸ Haywood S. Hansell, Jr, *The Air Plan that Defeated Hitler* (Atlanta, GA: Higgins-McArthur/Longino & Porter, 1972), 51; Fabyanic and Futrell, "Early Intelligence Organization," 42.

⁴⁹ Mark Clodfelter, *Beneficial Bombing: The Progressive Foundations of American Air Powers, 1917-1945* (Lincoln, NE: University of Nebraska Press, 2010), 91; Fabyanic and Futrell, "Early Intelligence Organization," 41.

⁵⁰ Futrell, "US Army Air Forces Intelligence," 535.

Hansell and his team focused initial inquiries into the industrial-economic structure of German electric power, steel, petroleum products, the aircraft industry, and transportation. Learning from Malcolm that American banks had provided the Germans with most of the capital to construct their newer electric power system, Hansell and his team were able to tap into US banks for targeting information.⁵¹ Normally, banks are unwilling to lend large sums of money for capital equipment without careful investigation into the proposed construction. Hansell's team was able to access drawings and specifications of German electric plants and systems from international banks, especially those in New York.

Using this information, together with scientific journals and trade magazines, they were able to put together a comprehensive target study on the German electrical system, and they could prepare target folders to include aim points and required bomb sizes.⁵² Their efforts also yielded diagrams of oil refineries that they used along with information from US-based oil industries and from civilian oil experts that had previously worked in Germany.⁵³ Through this target development, they began to understand the importance and vulnerabilities of electric power, steel, and petroleum products but were less successful when it came to transportation and aircraft industries, grossly overestimating German aircraft production. They still knew enough to keep these target sets high on the priority list but found themselves reliant on the information Hansell gleaned from British intelligence personnel on his trip to the United Kingdom.⁵⁴

When Hansell went to Britain in the early summer of 1941 as an observer, his purpose was to explore British Intelligence and bring home what he could. He sought out target materials and found that while his team was better informed on German electrical power, petroleum, and synthetic-product resources, the Royal Air Force (RAF) intelligence personnel knew more about German aviation and transportation. He brought back nearly a ton of classified intelligence from Britain, mostly in the form of target

⁵¹ Clodfelter, *Beneficial Bombing*, 91.

⁵² Hansell, *The Air Plan that Defeated Hitler*, 51.

⁵³ Clodfelter, *Beneficial Bombing*, 91; Victor H. Cohen, "Target Intelligence: 1918-1945," (unfinished United States Air Force Historical Division Manuscript), Call # 106-87 Ch. 13, P. 13, IRIS # 467832, in the 106-87 Collection, AFHRA, Maxwell AFB, AL.

⁵⁴ Cohen, "Target Intelligence," 3

folders rather than target systems analysis, but they included a complete set of intelligence files and target maps.⁵⁵

Hansell found British targeting philosophy to be similar to ACTS theory; both focused on collapsing German industry through the destruction of carefully selected targets.⁵⁶ Both countries even focused on similar target systems. The primary difference that would become a factor later after US entry into the war was a difference in US focus on precision targeting versus the British focus on area targeting because of their war-experience and struggles to carry out daylight precision bombing. In Hansell's final report he also praised the RAF intelligence system and urged that the AAF build a comparable intelligence system. He recommended that Air Corps intelligence officers also be sent to England as soon as possible for training in intelligence activities. He identified the need for the AAF to not only have its own intelligence agencies for the analysis and interpretation of air intelligence and saw the need for the US to have its own intelligence experts to rely on to prepare for air employment. In the absence of such experts, Hansell was aware of the need for Americans to rely on the British and the change of target data with British intelligence would prove critical to the execution of US strategic bombing in WWII.⁵⁷

AWPD-1

Shortly after Hansell returned to the US with British targeting materials, he transferred to the new Air War Plans Division (AWPD).⁵⁸ President Roosevelt called upon the War and Navy Departments to provide an estimate of "the overall production requirements required to defeat our potential enemies."⁵⁹ Arnold tasked his recently stood-up AWPD to develop an aircraft production plan that would become the air annex for a war plan that would guide American airpower through WWII.⁶⁰ Hansell was one of

⁵⁵ Futrell, "US Army Air Forces Intelligence in the Second World War," 532; Hansell, *The Air Plan that Defeated Hitler*, 52.

⁵⁶ Futrell, "US Army Air Forces Intelligence in the Second World War," 532; Hansell, *The Air Plan that Defeated Hitler*, 52; Hensley, "Creating Air Intelligence," 51.

⁵⁷ Hinton, *Air Victory*, 146.

⁵⁸ Fabyanic and Futrell, "Early Intelligence Organization," 47.

⁵⁹ Futrell, "US Army Air Forces Intelligence," 532.

⁶⁰ James C. Gaston, *Planning the American War: Four Men and Nine Days in 1941: An Inside Narrative*, (1982; repr., Washington, DC: National Defense University Press, 1992), 3-4.

the four people, all former ACTS instructors and proponents of HAPDB and the industrial web bombardment theory, to shoulder this task. Since estimating the number of aircraft to be built depended on determining the purpose of the aircraft, planners realized they would need to adopt the optimum concept for the wartime employment of these forces.⁶¹ AAF planners adapted US strategic bombing concepts to predominantly British intelligence objectives instead of identified US objectives to project force requirements and ultimately developed an airpower strategy for defeating Germany.⁶² AWPB-1 became the de facto plan for bombing Germany.⁶³ The plan, developed in just over a week, called for a sustained air offensive with attacks against the industrial and economic structure of Germany. The goal was to “break down the capacity of the German nation to wage war,” and it assumed that the air force would support a final invasion of the continent if a successful strategic offensive did not render such an invasion unnecessary.⁶⁴ They focused on determining Germany’s key industrial and economic nodes, destruction of which would eliminate Germany’s ability to wage war, in line with the ACTS theory.⁶⁵

AWPB planners relied on an ad-hoc intelligence organization led by Hansell that incorporated a small group of like-minded airmen, civilian experts, and coalition partners to develop the initial target set. The established US military intelligence community did not play a role in analyzing the German economy, creating target folders, or assessing target priorities.⁶⁶ Planners selected 154 targets, focusing on the principal objectives in priority order of electrical power, transportation, oil and petroleum supplies, along with the morale of the German population. Submarines and submarine pens remained lower on the list but could be moved to a higher priority if necessary to maintain the security of bases. It also focused on the intermediate objective of neutralizing the German Air Force (GAF) by attacking air bases, aircraft factories, and aluminum and magnesium factories

⁶¹ Hensley “Creating Air Intelligence,” 52; Hansell, *The Air Plan that Defeated Hitler*, 54.

⁶² Futrell, “US Army Air Forces Intelligence,” 532.

⁶³ Ehlers, *Targeting the Third Reich*, 356n26.

⁶⁴ Biddle, *Rhetoric and Reality*, 206.

⁶⁵ Hensley, “Creating Air Intelligence,” 52-53.

⁶⁶ Hensley, “Creating Air Intelligence,” 55.

to accomplish the principal objectives.⁶⁷ AWPD-1 envisioned a six-month non-stop air offensive against the industrial structure of Germany to break the countries capacity to wage war. The plan, developed in just over a week was approved by the War Plans Division and sold to the Secretary of War.⁶⁸ Alongside the quick progress, there were concerns. Despite the efforts of the AWPD ad-hoc intelligence organization used to develop the plan, the “inadequacy of existing intelligence for specifically locating and demolishing the vital points within the selected target system” remained troubling despite Hansell and his team doing their best with their knowledge and the information available at the time.⁶⁹

AWPD-42

After entry into the war, Roosevelt asked for another estimate of future requirements a year later in August 1942. The Air Staff responded with AWPD-42, the successor to AWPD-1.⁷⁰ No fundamental changes were made to AWPD-1. AWPD-42 was a more thorough effort, but proposed target systems and priorities remained much the same. A few systems were added, and submarine pens were given a higher priority while electric power plants were pushed further down in priority. The plan focused on the GAF, to include fighter factories, bomber factories, and engine plants; submarine building yards; transportation infrastructure such as building shops, repair works, marshaling yards, and canals; electrical power; oil; aluminum; and rubber.⁷¹

The new plan addressed several issues and recognized that the strategic bombing campaign would be a combined campaign; it acknowledged the requirement for an invasion of Europe after the strategic bombing campaign, and it included provisions for an air offensive against Japan after the defeat of Germany. But the plan was still prepared before the division developed a satisfactory body of intelligence to serve as the plan’s foundation. It was not until several months after AWPD-42 was published that General Arnold authorized the creation of a group to provide the analytical infrastructure

⁶⁷ Arthur B. Ferguson, “The CBO Plan,” in *The Army Air Force in World War II*, Vol. 2, *Europe: Torch to Pointblank, August 1942 to December 1943*, ed. Wesley F. Craven and James L. Cate (Chicago, IL: The University of Chicago Press, 1949), 368.

⁶⁸ Biddle, *Rhetoric and Reality*, 206; Clodfelter, *Beneficial Bombing*, 96, 99.

⁶⁹ Cohen, “Target Intelligence,” 2.

⁷⁰ Gaston, *Planning the American Air War*, 105-106.

⁷¹ Ferguson, “The CBO Plan,” 368.

to perform the necessary detailed and accurate analysis of the enemy war economy for selective targeting that was instrumental to AWPD-42's follow-on, the Combined Bomber Offensive (CBO) plan.⁷²

COA Report

Arnold, recognizing the need for a more thorough and systematic targeting effort that could provide sustained support, ordered the creation of the Committee of Operations Analysts (COA) which stood-up in December 1942. The COA was a group of service and civilian personnel tasked with assimilating and analyzing industrial intelligence from all available resources, but its true function was target selection. Recognizing the lack of trained personnel with the necessary intelligence experience to support the airpower theory, Arnold recruited and integrated top US civilian specialists.⁷³ The committee combined regular members of the AC/AS A2 staff office such as the Chief Intelligence and the Chief of Targets, along with a representative from the G-2 and a distinguished group of civilian experts with experience in finance and industry, as well as in military affairs.

The committee also included representatives from financial firms, the Board of Economic Warfare (BEW), and representatives from the Office of Strategic Services (OSS). The committee borrowed heavily from resources of both British and American intelligence agencies and organization. These organizations included, but were not limited to, the War Department, OSS, BEW, Office of Naval Intelligence, Office of Scientific Research and Development, Bureau of Foreign and Domestic Commerce, Department of Justice, Department of State, the Treasury Department, and the British Ministry of Economic Warfare (MEW), the British Air Ministry, and the RAF. The focus remained on industrial targets in Germany that the destruction of which would weaken the enemy most decisively in the shortest amount of time, but the COA attempted to apply a scientific method to the problem of target selection.⁷⁴

⁷² Biddle, *Rhetoric and Reality*, 210.

⁷³ Hensley, "Creating Air Intelligence," 59-60.

⁷⁴ William A. Goss, "The AAF," in *The Army Air Force in World War II*, Vol. 6, *Men and Planes*, ed. Wesley F. Craven and James L. Cate (Chicago, IL: The University of Chicago Press, 1955), 41; Ferguson, "The CBO Plan," 349; Biddle, *Rhetoric and Reality*, 210.

There was a feeling that “a more selective system in analysis of objectives was needed. The committee’s actions were founded solidly upon faith in the scientific method and on the specific belief that that method could be applied successfully to aerial warfare.”⁷⁵ Preconceptions inherent in American doctrine of precision bombing did, however, color their view throughout the process. The belief that industrial analysis should make it possible to destroy the keystone in the arch of German production without expanding effort needlessly or indiscriminately on objectives of less than vital importance governed their process remained strong.⁷⁶

The 1943 Casablanca Conference between President Roosevelt, British Prime Minister Winston Churchill and the US and Britain Combined Chiefs of Staff (CCS) provided objectives for which the COA used in their targeting process. The Casablanca Directive called for the “sustained and unremitting air offensive against Germany, including both daylight and night operations.” The objective of the air offensive was “to bring about 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 the capacity for armed resistance is fatally weakened.”⁷⁷ With the objectives in mind, the COA was able to start its target development and selection process. The COA first concentrated on bringing the enemy economy into its proper focus for strategic bombing operations, anatomizing it, and defining the relationships of each part to the enemy war effort. Next, they eliminated as many industries as possible from the selection as suitable targets and then the individual industries were taken apart plant by plant and the feasibility of destruction for each was considered. Once this process was accomplished, each industry could be listed in order of priority for bombing, and each target within each industry could also be prioritized.⁷⁸ The COA had a list of questions that had to be answered in its investigation (Table 3. *COA Target Investigation Questions*). They used these questions to analyze the German economy and divided into subcommittees to study each pertinent industrial system.⁷⁹

⁷⁵ Ferguson, “The CBO Plan,” 349.

⁷⁶ Ferguson, “The CBO Plan,” 349.

⁷⁷ Hansell, *The Air Plan that Defeated Hitler*, 151.

⁷⁸ Ferguson, “The CBO Plan,” 349.

⁷⁹ Ferguson, “The CBO Plan,” 350, 354.

Table 3. COA Target Investigation Questions

#	Question
1	What are the minimum requirements of the enemy? At what point would a shortage impair the front-line military effort?
2	What are the production capabilities of the enemy? What would the total be if every facility in the European country, including occupied USSR, were utilized to the utmost?
3	How nearly self-sufficient is the enemy? What relationships exist between capacity and minimum requirements, taking into consideration stockpiles and available substitutes?
4	Where are the enemy plants located and what percentage of total capacity is represented by each plant?
5	What are the physical characteristics of the installations themselves? To what extent are the building's machinery structurally resistant to high-explosive and incendiary and attack? To what extent are they replaceable?
6	What is the time lag between the destruction of each plant and the effect on front-line strength?
7	What is the force required to effect the necessary destruction? What, in short, will be the cost?

Source: Adapted from Arthur B. Ferguson, "The CBO Plan," in *The Army Air Force in World War II*, Vol. 2, *Europe: Torch to Pointblank, August 1942 to December 1943*, ed. Wesley F. Craven and James L. Cate (Chicago, IL: The University of Chicago Press, 1949), 350.

The approach taken by the COA was substantially the same as that used by the British since 1929. Realizing the possible need for strategic bombing due to their proximity to the German-dominated continent of Europe and their extreme vulnerability in the event of war, the British had been analyzing the industries of potential enemies, but as mentioned previously, they focused on bombing areas versus installations. Before the CBO, US personnel were dependent upon British intelligence sources for target planning and campaign execution, but the efforts of the COA would make Americans less reliant on the British for their analysis of the German industry. Based on US precision bombing doctrine, Americans had somewhat different requirements than the British.⁸⁰

The development of the COA was the first time the US made the assimilation of industrial intelligence from all sources and the analysis of that information for air target selection clearly the responsibility of a single agency.⁸¹ The added benefit of the COA was that it removed target selection from ordinary military channels where it could be performed free of the restrictions and biases inherent in staff work. Much of the initial

⁸⁰ Ferguson, "The CBO Plan," 350-351.

⁸¹ Ferguson, "The CBO Plan," 349.

work involved bringing up to date, checking, and supplementing whenever possible the work that was already done by the Intelligence Division and various government organizations. Like Hansell and his team, the assumptions that industrial systems in one highly industrialized country would be essentially similar to that of any other highly industrialized country resulted in the COA paying close attention to US industries and gathering information from private industry, but the COA was able to do it in greater detail and quantity.⁸²

The committee completed its studies of 19 German war industries in March 1943 and submitted the final report to Arnold. Part of the committee's conclusion in regards to target selection determined that it was better to cause a high degree of destruction against a few essential industries than to cause a small degree of destruction to many industries focusing on the cumulative efforts of relentless bombing against those essential industries.⁸³ The COA identified 60 targets that they felt would impair and might paralyze the Western Axis war effort, but it stressed the need for continued target analysis and close cooperation with British and American agencies. Unlike AWPD-1 and AWPD-42, the report published by the COA did not prioritize targets, due to security reasons (so it claimed). The report presented arguments for each target system and based on the arguments, it was clear that the systems listed were most likely in prioritized order (See Table 4. *COA High Priority Target System List*). One of the targets that the COA did not include in its list of high-priority targets, which had been on the target lists for AWPD-1 and AWPD-42 was the electric power system. Electric power was left off the top group of the list because the COA believed that although the German industry was largely dependent on electrical energy, there was no single industry dependent on one electric generating plant, a network of plants existed, and they questioned the validity and vulnerability of targeting the electrical power system.⁸⁴

Unlike the previous plans, the COA identified the ball bearing industry as a high-priority target placing it second only to GAF targets. Other differences from previous plans included the COA downgrading submarines, transportation, and electrical power

⁸² Ferguson, "The CBO Plan," 354.

⁸³ Ferguson, "The CBO Plan," 350-355.

⁸⁴ Ferguson, "The CBO Plan," 362.

priorities with the latter two prioritization downgrades being the most significant. The decision regarding the lower prioritization of transportation and electric power was predicated on the committee's assumption of operational capabilities, not on the intrinsic value of either system, which was of concern since the committee promised not to focus on the operational concerns in their target systems analysis. Also, the committee determined that the actual selection of targets within the target categories would be the responsibility of authorities in England, such as the Eighth Air Force on the American side and the RAF Bomber Command on the British side or the CCS overseeing operations for both. This proposal was due to the idea that commanders in the theater had knowledge of operational factors such as weather and the disposition of the enemy and were in the best position to decide daily targets.⁸⁵ Actual target selection occurring in theater helped reassure the commanders that Washington was not, in fact, trying to assume a function that was thought to be performed better in theater. This incident would not be the last time that there were concerns over Washington's involvement in planning and target selection.⁸⁶ Operators, planners, and intelligence personnel would have similar concerns in the Vietnam and Gulf Wars.

Table 4. COA High-Priority Target System List

	Target System
1	GAF- final assembly, component erecting, and engine assembly plants
2	Ball bearings
3	Petroleum- hydrogenation plants and refineries
4	Oil
5	Grinding Wheels and Crude Abrasives
6	Nonferrous Metals (copper, aluminum, zinc)-production plants, mines, smelters
7	Submarines-operating bases and construction yards
8	Military Motor Transport Vehicles
9	Transportation System (rail and water)
10	Coke Batteries-plants
11	Iron and Steel- plants
12	Machine Tools- plants

Source: Adapted from Arthur B. Ferguson, "The CBO Plan," in The Army Air Force in World War II, Vol. 2, Europe: Torch to Pointblank, August 1942 to December 1943, ed. Wesley F. Craven and James L. Cate (Chicago, IL: The University of Chicago Press, 1949), 356-361.

⁸⁵ Ferguson, "The CBO Plan," 356; Robert C. Ehrhart, Thomas A. Fabyanic, and Robert F. Futrell, "Building an Air Intelligence Organization and the European Theater," in *Piercing the Fog*, ed. John F. Kreis (1996; repr., Washington, DC: Air Force History and Museums Program, 2004), 154-155.

⁸⁶ Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 153.

After being accepted by Arnold and his advisory council, the COA sent their report to the United Kingdom for coordination with British authorities and the 8AF. The joint committee established to review the COA report included representatives from the Air Ministry, the MEW, the RAF, and the 8AF. They found the report to be sound and determined its conclusion coincided with the information they had available. The MEW, Britain's equivalent of the COA that was in existence since long before the COA, was a group of British civilian experts with backgrounds in economic, financial, and industrial specialties and provided intelligence and economic and industrial targeting support to British intelligence and planners. The MEW was in close agreement with the COA on most of the latter's primary target sets and those that the MEW diverged mattered little because they related to industries which neither agency considered likely adoption as primary targets.⁸⁷ According to Arthur Ferguson in the *Army Air Forces in World War II* Volume 2, *Europe: TORCH to POINTBLANK*, "On the basis of the COA report—and on the advice of the MEW, the British Air Staff, and the Eighth Air Force—a final list of primary objectives was drawn up consisting of seventy-six targets in six systems." In order of priority the six target systems included: submarines construction yards and bases, German aircraft industry, ball bearings, oil, synthetic rubber and tires, and military transport vehicles. After identifying the principal target systems, an operational plan was needed to accomplish the destruction of the targets.⁸⁸

CBO Plan

General Arnold tasked General Ira Eaker, then Commander of the 8AF, to evaluate the COA report and modify it as necessary to develop a plan for implementing a strategic air campaign to weaken Germany to a level that would make possible an invasion of Europe. Eaker appointed a board of 8AF and RAF officers chaired by now Brigadier General Haywood Hansell, the Commander of the 1st Bomber Wing, to execute this task.⁸⁹ This committee's task was to determine "based on operating experience, what force of planes would be required to do the job and what chronological

⁸⁷ Ferguson, "The CBO Plan," 364.

⁸⁸ Ferguson, "The CBO Plan," 364-365.

⁸⁹Robert C. Ehrhart, "The European Theater of Operations, 1943-1945," in *Piercing the Fog*, ed. John F. Kreis (1996; repr., Washington, DC: Air Force History and Museums Program, 2004), 191.

order of attack against the six target systems would make best use of the increasing forces being made available.”⁹⁰ The planners inserted German fighter strength as an intermediate objective to be attacked prior to, or simultaneous with, operations against the six primary objectives previously drawn up. The concern was that the Germans were increasing the strength of their fighter defenses after realizing the vulnerability of their vital industries, and German fighters were already taking a toll on Allied bombing forces by day and night.⁹¹ Targeting German fighter strength first would be critical to the effectiveness of targeting the other primary objectives helping ensure that the bombers would get through to their targets. The committee also determined that synthetic rubber and tires would be secondary objectives because of their locations outside of Germany which made them suitable for weather alternates and as break-in missions for new bomber crews, along with military motor transport vehicles.

Within the board itself, there was some difference of opinion regarding transportation and electrical power systems, but not wanting to openly challenge the COA’s target analysis function and the process of scientific objectivity, Hansell did not dispute the prioritization originally recommended by the COA. The prioritization of transportation and oil and the lack of focus on electrical power would continue to come up over the course of the conflict and in the post-war bombing surveys. The target focus would slightly change over the course of execution, especially as ULTRA intercepts provided evidence the campaign was achieving the desired effects, or it would provide the basis for target changes and adjustments to target system priorities. But, the plan in conjunction with the target list became known as the “Plan for the Combined Bomber Offensive from the United Kingdom.” More commonly the plan was referred to as the Eaker plan or the CBO plan.⁹² The plan assumed that American and British bomber forces would conduct a “complementary and coordinated offensive,” to neutralize a given percentage of each of the industrial systems. Eaker presented the report to the Joint

⁹⁰ Ferguson, “The CBO Plan,” 365.

⁹¹ Ferguson, “The CBO Plan,” 367; Ehrhart, “European Theater of Operations,” 191.

⁹² Ferguson, “The CBO Plan,” 365-367; Ehrhart, “European Theater of Operations,” 191; Alexander S. Cochran, Jr., Robert C. Ehrhart, and John F. Kreis, “The Tools of Air Intelligence: ULTRA, MAGIC, Photographic Assessment, and the Y-Service,” in *Piercing the Fog*, ed. John F. Kreis (1996; repr., Washington, DC: Air Force History and Museums Program, 2004), 84-85; Ehlers, *Targeting the Third Reich*, 76-77.

Chiefs of Staff (JCS) in Washington on 29 April 1943. The plan received little opposition from the JCS who approved the plan on 4 May. Furthermore, the US and British Combined Chiefs of Staff (CCS) approved the plan and designated it Operation POINTBLANK on 18 May 1943, with the RAF Chief of Air Staff appointed to oversee the execution for both the British and American bomber forces. The CCS would be responsible for determining the overall priority of targets for the CBO.⁹³

After receiving directives outlining objectives and target priorities, advanced planning began in the Intelligence Division (A2) and the Plans Division at the 8AF. In mid-1942, Colonel George McDonald was appointed as the 8AF/A2 and found that he lacked an experienced staff, equipment, and intelligence. There were no materials provided by the intelligence agencies in Washington in any useful form at the beginning of the war. They had to borrow from the British and remained reliant on British intelligence sources for everything but crew reports and certain phases of photointerpretation and technical intelligence for the majority of the war.⁹⁴ At the start of CBO planning and into the spring of 1944, they were still getting the bulk of their intelligence from the British Air Ministry and the MEW. In a December 1943 report, Eaker stated “Almost no information regarding targets in Germany, strength, and disposition of GAF, etc., or target material, pictures, maps, etc. was available in the US. In effect, we had no intel information and material about Germany and occupied territories.

The solution for Eighth Air Force in England was to obtain intelligence and target materials from RAF intelligence which had the advantage of production nearest the area of interest the sources of latest info.”⁹⁵ Intelligence officers at the AAF HQ realized the American Air Forces in Europe were able to depend on RAF objective folders, target charts, and the processing of other types of target materials. They focused on sending to Europe all possible intelligence available in the US which could supplement RAF materials but primarily focused on developing target materials for Japan and other parts

⁹³ Ehrhart, “European Theater of Operations,” 191; Ferguson, “The CBO Plan,” 372; Ehrhart, Fabyanic, and Futrell, “Air Intelligence Organization,” 156.

⁹⁴ Futrell, “US Army Air Forces Intelligence,” 539.

⁹⁵ Cohen, “Target Intelligence,” 6.

of the western theater such as targets in Italy and North Africa, leaving Germany to primarily the British.⁹⁶

In addition to target materials, Americans were almost fully reliant on their British counterparts for signals intelligence (SIGINT). ULTRA was the designation for the SIGINT derived from the radio communications which the Germans encrypted on their high-grade cipher machine called ENIGMA, while Y-intelligence referred to intelligence derived from lower-grade codes and ciphers that consisted largely of radio messages between lower command echelons and between ground stations and aircraft in flight.⁹⁷ The Germans knew their enemies were listening to their secret radio communications, but their confidence in the ENIGMA led them to use the system extensively, believing the information was undecipherable.⁹⁸

The British, improving on past Polish capabilities to decipher ENIGMA ciphers, cracked the ever-advancing ciphers of the German machine. At the heart of deciphering, translating, emending, evaluating, and analyzing the German messages that became ULTRA intelligence were British cryptanalysts and intelligence personnel at the Government Code and Cypher School located at Bletchley Park (BP).⁹⁹ Although the Americans had started intercepting Japanese SIGINT before the war, they were unable to intercept German military traffic of sufficient quantity and quality from their listening stations on the North America continent and would need to rely on the British for timely SIGINT in Europe.¹⁰⁰

A British delegation visited the US and briefed authorities on British success against German codes and ciphers in the spring of 1942, but British personnel were hesitant to share the data with Americans for security reasons due to past security violations and information leaks. Because of the distrust, the Anglo-American SIGINT

⁹⁶ Cohen, "Target Intelligence," 7.

⁹⁷ Diane T. Putney, "The U.S. Military Intelligence Service: The ULTRA Mission," in *ULTRA and the Army Air Forces in World War II*, ed. Diane T. Putney (Washington, DC: Office of Air Force History United States Air Force, 1987), 81; Diane T. Putney, "Introduction," in *ULTRA and the Army Air Forces in World War II*, ed. Diane T. Putney (Washington, DC: Office of Air Force History United States Air Force, 1987), ix.

⁹⁸ Putney, "Introduction," ix.

⁹⁹ Cochran, Ehrhart, and Kreis, "The Tools of Air Intelligence," 59; Putney, "Introduction," xi.

¹⁰⁰ Putney, "The U.S. Military Intelligence Service," 74.

exchange and operational integration evolved more slowly than the sharing and integration of general intelligence information, but the two countries reached a formal agreement in May 1943.¹⁰¹ They agreed to cooperate in their endeavors and exchange SIGINT info on the Axis powers. The British would remain focused on German and Italian signals while US personnel would focus on Japanese codes.¹⁰²

Over the next year and a half, the US sent an increasing number of people to integrate into the British system and serve as liaison officers to army and air headquarters to provide operational commanders with ULTRA intelligence. These individuals were known as Special Security Officers (SSOs) with the primary duty of receiving and safeguarding ULTRA information, providing the information to commands and authorized recipients, and they assisted in fusing it with intelligence from other sources.¹⁰³ The British system was centrally controlled at BP and ULTRA intelligence was sent via teleprinter and couriers to British and US leadership or via special radio links to approved combat field commanders.¹⁰⁴ The information was not to be intermingled with general intelligence from other sources and commanders were not to take action based on ULTRA information alone without plausible deniability to protect the source.¹⁰⁵ The SSOs were responsible for “fusing” the information with intelligence from other sources and advising commanders on how to use ULTRA to ensure the source was not compromised.

ULTRA information proved critical in shaping the character and strategy of operations and the targeting process. ULTRA’s influence in American strategic operations fell into three broad categories: target selection, damage assessment (which will be discussed in more detail in the BDA section), and information about the primary opponent, the GAF. Until 1944, ULTRA provided only limited assistance in the selection of targeting systems and individual targets. None of the plans discussed were primarily based on ULTRA because a lot of the information on industrial capacity and capabilities did not go through German military channels, so it rarely provided the

¹⁰¹ Cochran, Ehrhart, and Kreis, “The Tools of Air Intelligence,” 62-63.

¹⁰² Putney, “Introduction,” xii; Putney, “The U.S. Military Intelligence Service,” 81.

¹⁰³ Putney, “Introduction,” xiii.

¹⁰⁴ Putney, “The U.S. Military Intelligence Service,” 78.

¹⁰⁵ Putney, “The U.S. Military Intelligence Service,” 82.

strategic information planners needed. Intelligence personnel and planners based the initial selection of targets on the analysis of the COA, but what ULTRA did provide was validity and proof that the targets selected by American airmen were correct.¹⁰⁶

ULTRA intelligence yielded insight on GAF strength, disposition, composition, production, reserves, serviceability and even monitored the build-up of fighter defenses influencing targeting decisions. As Allied powers targeted GAF strength to enable follow-on bomber missions against the primary targets, ULTRA provided the information necessary to determine when efforts could be shifted away from the intermediate GAF objective to the principal CBO objectives.¹⁰⁷ As the strategic air campaign progressed, ULTRA also provided the basis for several target and target system prioritization changes. ENIGMA intercepts highlighted German concerns about the criticality of oil to the German war-making capacity and their concerns about defending oil facilities.¹⁰⁸ Overall, the rigid compartmentalization of ULTRA intelligence created some administration and logistic issues with fusing the information with other intelligence sources. The reluctance to clear individuals in key intelligence positions also contributed to the difficulties of using ULTRA most effectively but ULTRA, and US reliance on their British counterparts for access to the information proved critical in the targeting process.¹⁰⁹

Overreliance on the British for intelligence and targeting data was not lost on the Americans. Despite the integration between the Allied powers, Americans were aware that British efforts focused first on support for their own strategy and theory. Aware that tailored intelligence support for America's HAPDB strategy did not exist, and before the creation of the COA, the US established another unit in theater to help fill the gap. The Economic Objectives Unit (EOU), established in 1942 was also often referred to as the Enemy Objectives Unit. The EOU was a team of American civilian economic experts, with its members pulled from the OSS Research and Analysis Division and the Economic

¹⁰⁶ Cochran, Ehrhart, and Kreis, "The Tools of Air Intelligence," 74-75.

¹⁰⁷ Cochran, Ehrhart, and Kreis, "The Tools of Air Intelligence," 76-77.

¹⁰⁸ Hensley, "Creating Air Intelligence," 87.

¹⁰⁹ Cochran, Ehrhart, and Kreis, "The Tools of Air Intelligence," 65-66.

Warfare Division (EWD) of the BEW.¹¹⁰ The EOU became the primary liaison between the 8AF and MEW and would come to work almost directly for the Target Section of HQ 8AF first in the A2 and then in the Plans Division and helped provide the necessary economic and target intelligence for 8AF planning.¹¹¹

The debate over the proper location of the Target Section caused its location to fluctuate between intelligence and plans over the course of the war. The EOU filled the gap between the policy of HAPDB and the lack of precise data available.¹¹² British targeting analysis and materials focused on nighttime area bombing, so the EOU leveraged intelligence from the Air Ministry and MEW resources but conducted additional target analysis of German industries to create tailored targeting data to support US precision bombing. The EOU identified critical nodes and analyzed vulnerabilities. For vulnerability considerations, it analyzed target location, target construction, aimpoints, types, and numbers of bombs required and the expected level of damage. They provided aimpoint recommendations and what would today be considered weaponeering recommendations which were critical to 8AF target selection and planning.¹¹³ After the war, the EOU was credited with having done detailed research into the operation, design, and construction of every individual target bombed by the 8AF during the war, and for developing the majority of information that went into individual target folders. Additionally, the EOU personnel supported 8AF planners in drafting the air plans and provided target advice during execution.¹¹⁴

Using the information provided by British intelligence and the EOU, the Targeting Branch prepared a brief for the 8AF Commander addressing the nature and relative importance of each target. Additionally, it would procure and distribute all necessary target materials. These materials included target materials for the briefing and

¹¹⁰ Hensley, "Creating Air Intelligence," 64; Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 137.

¹¹¹ Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 137.

¹¹² Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 137.

¹¹³ Economic Objectives Unit, *Handbook of Target Information*, Call # 118.042-2, P. 6-7, IRIS # 110538, 22 May 1943, in the 118.042 Collection, AFHRA, Maxwell AFB, AL; Hensley, "Creating Air Intelligence," 71.

¹¹⁴ Walter W. Rostow, *War Diary: Economic Outpost with Economic Warfare Division*, Call # 520.056-167, P. 1-3, IRIS # 1075566, 30 April 1945, in the 520.056-167 Collection, AFHRA, Maxwell AFB, AL; Hensley, "Creating Air Intelligence," 64-65; Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 137-138.

materials for combat crews that would execute the operations. Briefing target materials included an information sheet describing the location of the target and two large scale maps (1:6000), one of which was annotated to show the functions of various buildings. Combat crew materials included small-scale photos (1:32000) showing the target and large sections of the surrounding area. They also included RAF night targeting maps with a seven-mile radius around the target. Additionally, intelligence personnel included a perspective target map showing the appearance of the target in perspective from various headings, and finally, an air map (1:250000) was included covering the route to and from the target.¹¹⁵

Furthermore, 8AF targeting personnel focused on target vulnerability. They procured the special studies completed by the EOU that showed the most vital buildings of a target, described the structure of buildings, and included the computation of potential aimpoints. The studies furnished information on construction to the Ordnance Officer and Operations Research Section who did all the weaponeering computations for optimum bomb loading and fuzing recommendations to put in the target folders. Intelligence personnel also handled collateral target information through the continuous procurement and study of general information pertaining to target priority. This information included information on the production of enemy aircraft, U-boat and other industrial production to include numbers of U-boats currently being built in various yards or numbers that had been launched.¹¹⁶

Additionally, A2 personnel provided information on enemy defenses in the target area. Anti-aircraft officers computed the number of heavy and light guns in the target area and procured additional imagery as required. Intelligence planners also helped determine the disposition of enemy fighters in the area, identifying disposition, type, and number. Finally, the section was also responsible for identifying any camouflage, concealment, and deception (CC&D). They determined whether smoke screens existed near the target or if Germans camouflaged the targets themselves.¹¹⁷

¹¹⁵Headquarters Eighth Air Force, "Resumé of Intelligence Functions," Call # 2248.501-98, P. 2, IRIS # 165032, 27 March 1944, in the 2248.501-98 Collection, AFHRA, Maxwell AFB, AL.

¹¹⁶ Headquarters, Eighth Air Force, "Resumé of Intelligence Functions," 2.

¹¹⁷ Headquarters, Eighth Air Force, "Resumé of Intelligence Functions," 2.

During the actual planning and ordering of the mission, intelligence personnel were responsible for many of the same things we see intelligence and targeting personnel dealing with today. The A2 advised the commander of the location and relative priority of the targets in those areas, while the operations staff briefed and advised the commander on the capabilities of the bomber force against targets in such areas and the fighter force needed to support each operation. The 8AF commander selected the specific targets and then the A2 personnel plotted the target locations on a planning map and produced photos of each target for the operations personnel who would then determine the size of the force to put against each target. Intelligence personnel were then responsible for preparing the list of all the targets with target code numbers, suggested aimpoints, and the bomb loading recommendations produced by the ordnance officers. The Director of Operations (A3) approved the bomb loading recommendations or directed variances as required.¹¹⁸

Controllers within the A3 would then pass information to the controllers at the individual Bombardment Divisions and Fighter Command and any other required air units in the theater of operations. They provided the target code numbers, aimpoint recommendations, bomb loading information, and tentative routes. A2 personnel were responsible for following up with each Division and providing any special information on the nature and importance of the targeting objectives for the mission. If there were any late information changes regarding the disposition of enemy forces in the area or any changes to CC&D, A2 handled this as well. This information was normally passed via a scrambler telephone because teletype was too slow. Information passage between the Division level and lower echelons normally occurred via teletype.¹¹⁹ Final selection of precise aimpoints for bombing release and bomb/fuze combinations were done at the Bomber Command level and unit level intelligence personnel used the 8AF planning materials and data originally from the EOU to provide pre-mission intelligence briefs and critical target materials for the aircrews.¹²⁰

¹¹⁸ Headquarters, Eighth Air Force, "Resumé of Intelligence Functions," 2.

¹¹⁹ Headquarters, Eighth Air Force, "Resumé of Intelligence Functions," 2.

¹²⁰ Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 138; Hensley, "Creating Air Intelligence," 89.

During actual execution of the mission, A2 personnel tracked the progress of operations after takeoff and began collecting information on the status of the missions. They collected the information flowing up from lower echelons and then created Intelligence Operations Folders that included all information on the mission starting with the initial Field Order directing execution and included all the required reports, reproduction, analysis and dissemination of information and immediate photographic interpretation of bomb damage which they forwarded to higher HQ.¹²¹

Battle (Bomb) Damage Assessment¹²²

The birth of damage assessment occurred in WWI and reemerged in WWII, during which the air intelligence organization required to perform such assessments came of age.¹²³ Although not addressed by early airpower theorists such as Tiverton and Trenchard, the importance of damage assessments was recognized in WWI.¹²⁴ BDA gave airmen key insights on bombing's individual effects and its aggregate effectiveness in support of the grand and military strategy, but there was one problem.¹²⁵ At the start of WWII, the US did not have a BDA process. According to Thomas Hensley in his paper "Creating Air Intelligence: The Influence of Intelligence on US Air Strategies in Western Europe During World War II," at the start of WWII, "The US intelligence community lacked an organized, systematic mechanism for collecting, analyzing and disseminating BDA." Although the US did conduct BDA, by July 1943, there was no central intelligence organization maintaining overall procedural control.¹²⁶ What this meant was there was not a coherent and organized method for determining the mission effectiveness of strategic bombing.¹²⁷

In a memorandum to his leadership in July 1943, Captain James T. Lowe noted there was no organization in the US or abroad that kept complete bomb damage records. He argued that there was some damage to almost every one of the nineteen basic

¹²¹ Headquarters, Eighth Air Force, "Resumé of Intelligence Functions," 3.

¹²² During WWII, BDA, (bomb damage assessment versus battle damage assessment incorporated both bomb damage assessments and munitions effectiveness assessments Ehlers, *Targeting the Third Reich*, 352n3.

¹²³ Ehlers, *Targeting the Third Reich*, 12, 15, 19.

¹²⁴ Ehlers, *Targeting the Third Reich*, 33.

¹²⁵ Ehlers, *Targeting the Third Reich*, ix.

¹²⁶ Hensley, "Creating Air Intelligence," 93.

¹²⁷ Hensley, "Creating Air Intelligence," 93.

industries of the Western Axis. Additionally, he believed there was a need to calculate the aggregate effects on the targets and target system from the damage achieved. The concern was there was no single organization which had all the information and assessments regarding the extent of structural damage to enemy industrial installation, the production loss due to damage or destruction of industrial plants, and the overall effects on the enemy's front line strength. He goes on to state, "There are a half-dozen or more organizations in this Headquarters [AAF HQ] doing different parts of this work [BDA]. A similar state of confusion exists aboard. Some efforts are now being made in England to bring a kind of order out of the existing confusion. We could make notable contribution, I believe, by taking the lead in this sort of work in the United States."¹²⁸

Lucky for the US, the British had established a BDA process before US entry into WWII, and as they were willing to do with their other intelligence processes, the British helped train and integrate American intelligence officers into their BDA structure.¹²⁹ The British trained American air intelligence officers and initially integrated them into standing British intelligence organizations responsible for doing BDA. Americans, at the mercy of the British, were more than willing to work within the integrated and British-led BDA structure and would continue to do so for most of the war. Like their targeting materials, Britain was also willing to provide all their BDA-related intelligence for American use.¹³⁰ American intelligence personnel found similar issues with British BDA that they did with their targeting materials.

The differences between British and American bombing doctrine created several problems as the British sought to meet the Americans' requirements while training them and integrating them into their organizations and processes.¹³¹ In March 1943, a meeting was called by the Air Ministry, seeking to resolve these issues and ensure that the damage assessments produced were satisfactory to both parties. Also identified at this meeting was that while the production of damage assessments for precision and area attacks was

¹²⁸ Capt James T. Lowe, to General Sorenson, "Bomb Damage Assessments," memorandum, 6 July 1943, Call # 142.042-25 Vol. 3, P. 2, IRIS # 115293, in the 142.042 Collection, AFHRA, Maxwell AFB, AL.

¹²⁹ Robert S. Ehlers Jr., "BDA: Anglo-American Air Intelligence, Bomb Damage Assessment, and the Bombing Campaign Against Germany, 1914-1945," (PhD diss., Ohio State University, 2005), 338; Hensley, 93 "Creating Air Intelligence," 93.

¹³⁰ Ehlers, "BDA," 338.

¹³¹ Ehlers, *Targeting the Third Reich*, 159.

in place to ensure a mature intelligence capability for assessing effects, no one was producing anything assessing aggregate effects of area and precision bombing.

First-phase photointerpretation was carried out at the recovery bases of the flying units. These bases included both American bombardment units and British Photographic Reconnaissance Units (PRUs) who were flying reconnaissance missions for the 8AF.¹³² Photointerpretation Officers at each of the bombardment units provided the first-phase interpretation of their units' strike photos and provided operational commanders and their staffs with a quick initial assessment of their air strikes. On average this took approximately two to three hours from when the reconnaissance plane landed. The same individuals, or at least the same units as first-phase interpretation, often accomplished second-phase interpretation. Second-phase interpretation included a more thorough examination and analysis of the same footage with individuals looking for anything of operational value or anything they might have missed in their initial assessments. This process occurred within 24 hours. The third-phase interpretation was done at a central facility by personnel assigned to specific subject areas of expertise. Photointerpreters forwarded unit photos to central units such as the Allied Central Interpretation Unit (ACIU) which was the primary unit for third-phase interpretation until the 8AF developed its own capabilities. Third-phase interpretation included detailed and often long-term analysis for strategic and policy decisions and could take anywhere from a week to a month. Once completed, the ACIU would send annotated prints and the attached reports back to the flying units.¹³³ At the March 1943 meeting, it was agreed upon that the ACIU would continue to produce damage assessments for area and precision raids. Meanwhile, the MEW would take on the task of assessing the aggregate damage done by both, and it also could determine how attacks on one industry affected the larger war economy, and by extension military capabilities and operations at the fighting fronts.¹³⁴

¹³² Cochran, Ehrhart, and Kreis, "The Tools of Air Intelligence," 84-85; Ehlers, *Targeting the Third Reich*, 161.

¹³³ Cochran, Ehrhart, and Kreis, "The Tools of Air Intelligence," 84-85; Hensley "Creating Air Intelligence," 83.

¹³⁴ Ehlers, *Targeting the Third Reich*, 159-160.

As the war progressed, more Americans arrived in theater, and with the help of British intelligence, US BDA processes matured. While the British fully integrated Americans into British BDA processes, General Spaatz, Commander of the US Strategic Air Forces in Europe (USSTAF), created to oversee 8AF and 15AF operations in theater, wanted to uncouple American photoreconnaissance and interpretation capabilities in the event of having to send his forces to another theater. He was also concerned with the development of an air intelligence organization that would be able to continue after the war in the absence of a close British alliance. The Eighth Photo Reconnaissance Wing was established in February 1944 to ensure continued reconnaissance, photointerpretation, and BDA support for American bombing efforts.¹³⁵

The Americans moved first and second-phase interpretation to the USSTAF HQ, but third-phase exploitation remained at the ACIU. As these capabilities matured, Americans placed more reliance on targeting and damage-assessments produced by Americans. The EOU would also become a central figure in the BDA processes the targeting data, damage assessments fed from the British intelligence organizations into the EOU and EOU members correlated it with targeting and economic data and utilized the information to provide follow-on targeting recommendations to 8AF planners.

Despite developing the intelligence infrastructure to support the damage assessment process, the collection and exploitation of imagery created problems for targeteers, analysts, and planners. The timing of photographic missions was a particular challenge for post-strike damage assessments. Reconnaissance aircraft sent to collect over a target within hours of an attack often returned with photographs that were not worth the danger. Smoke frequently obstructed the targets in the photos, and blazing fires and buildings collapsing resulted in an overestimate of damage. Reconnaissance missions delayed too long resulted in the clearing away of debris in the target areas resulting in inaccurate damage estimates as well.¹³⁶

Some believe, as implied in the Gulf War Air Power Survey, that BDA was easier in WWII, and analysts were able to overcome the limitations of photographic evidence

¹³⁵ Cochran, Ehrhart, and Kreis, "The Tools of Air Intelligence," 89; Hensley "Creating Air Intelligence," 95.

¹³⁶ Cochran, Ehrhart, and Kreis, "The Tools of Air Intelligence," 90-91.

easily. The assumption was that unguided weapons dropped on targets typically resulted in widespread damage in and around desired aimpoints. As a result, many assumed that this made BDA easy to determine because targets were either heavily damaged, partially damaged, or even missed altogether, and photographic interpreters were easily able to distinguish the level of damage done to a target.¹³⁷ This was not the case. In addition to the difficulties assessing the physical destruction mentioned above, it was even more difficult for photointerpreters to accurately assess interior damage and the impact of such damage on the facility's output. Postwar analysis by the United States Strategic Bombing Survey (USSBS) revealed that photointerpreters almost always overestimated the destruction of essential machinery at production and repair facilities. The ability for factory personnel to make repairs locally and often unobserved also complicated damage assessments. Also finding the target in aerial photographs was typically difficult unless photointerpreters knew exactly what to look for in an image.¹³⁸

American intelligence personnel learned that they could fuse intelligence from multiple sources to produce the best damage assessments and overcome some of the limitations of photo intelligence for BDA. Information from flying unit Operational Reports (present-day mission reports (MISREPs)), Prisoner of War Interrogations, SIGINT from British ULTRA and Y-intelligence proved useful.¹³⁹ ULTRA especially helped correlate photo intelligence with German reports of structural damage and improve the estimate of the impact on a target. The tendency to assume that physical damage to a plant automatically reduced or halted production could be kept in check with ULTRA data. ULTRA intercepts often revealed the amount of damage to a plant and the expected timeline for resumption of production influencing decisions on when to restrike specific targets or shift bombing focus.

Sometimes ULTRA intercepts even revealed that there was no interruption to production despite the physical damage assessed via photointerpretation. ULTRA was used to both support and counterbalance photo intelligence to provide more accurate

¹³⁷ Thomas A. Keaney and Eliot A. Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning* (Washington, DC: Department of the Air Force, 1993), 302.

¹³⁸ Cochran, Ehrhart, and Kreis, "The Tools of Air Intelligence," 90-91.

¹³⁹ Cochran, Ehrhart, and Kreis, "The Tools of Air Intelligence," 92; Hensley "Creating Air Intelligence," 95.

damage reports.¹⁴⁰ ULTRA intercepts were especially helpful when the weather was bad and prevented aerial reconnaissance and could provide damage assessments even in the absence of photo intelligence. Unlike today, without any corroborating evidence, intelligence analysts often assumed target destruction, but by utilizing multiple sources of intelligence, even if the photographic interpretation was insufficient or unavailable, intelligence personnel could often still conduct BDA to some degree.¹⁴¹

A USSTAF report on 6 July 1944 highlighted the importance of the post-strike photographic interpretation information provided by the ACIU combined with information from ULTRA intercepts and information gleaned from prisoner of war (POW) interrogations. It stated, “The combined information provided damage assessments that gave intelligence personnel a clear understanding of airpower’s key role in the transportation campaign. Reconnaissance photos and ULTRA intercepts provided a nearly complete picture of the status of marshaling yards and bridges, rates of repair, and the proper moment for reattacks.”¹⁴² The damage assessments for the offensive campaigns during the CBO were central to its success. Photoreconnaissance, photointerpretation, and ULTRA intercepts came together in a complementary damage assessment that allowed the Allies to gauge effects and effectiveness within days or hours of strikes and confirm the direction of the strategic air campaign.¹⁴³

By 1944, the 8AF/A2 had developed a mature BDA mechanism whereby it could determine the accuracy of attacks, assess strike effects, make reattack recommendations, and provide a basis for target prioritization changes. Despite America’s slow start in BDA and reliance on the British, it was able to complete the targeting-bombing-assessment (Targeting Cycle) feedback loop and provided a method for evaluating HAPDB against industrial web targets before the end of the war.¹⁴⁴ “The Allied BDA effort during WWII reached a degree of efficiency and effectiveness never equaled in any

¹⁴⁰ Cochran, Ehrhart, and Kreis, “The Tools of Air Intelligence,” 75.

¹⁴¹ Capt James T. Lowe, to General Sorenson, “Western Axis Rubber Position 1943,” memorandum, 2 July 1943, Call # 142.042-25 Vol. 3, P. 2, IRIS # 115293, in the 142.042 Collection, AFHRA, Maxwell AFB, AL; Cochran, Ehrhart, and Kreis, “The Tools of Air Intelligence,” 76.

¹⁴² Ehlers, *Targeting the Third Reich*, 225-227; Cochran, Ehrhart, and Kreis, “The Tools of Air Intelligence,” 79.

¹⁴³ Ehlers, *Targeting the Third Reich*, 183.

¹⁴⁴ Hensley, “Creating Air Intelligence,” 95.

conflicts that have followed. The intellectual infrastructure built up at such great costs during the war withered away until only a shadow remained,” according to Roberts Ehlers.¹⁴⁵

Sure, They Did A Good Job—But Was It Golden?

WWII highlighted the importance of air intelligence and target. As a result of WWII experiences, these two fields saw significant changes in organization, processes, and training from the interwar years to the post-war years in the late 1940s and early 1950s. Senior leaders like Hap Arnold attempted to overcome intelligence and targeting shortfalls by standing up an organization such as the COA add to address target selection concerns, but there was still a lack of formal intelligence and targeting organization. The post-war USSBS for both Germany and Japan highlighted the importance of target selection. The German USSBS report stated, “The importance of careful selection of targets for air attack is emphasized by the German experience...In the field of strategic intelligence, there was an important need for further and more accurate information, especially before and during the early phases of the war. The information on the German economy available to the United States Air Forces at the outset of the war was inadequate. And there was no established machinery for coordination between military and other governmental and private organization. Such machinery was developed during the war. The experience suggests the wisdom of establishing such arrangements on a continuing basis.”¹⁴⁶

The Japan survey further emphasized the inadequacy of intelligence leading up to the war, highlighting the effects of faulty interpretation of information and the fact it took several years to gain the necessary information for planning and targeting purposes. The report stated, “If a comparable lack of intelligence should exist at the start of a future national emergency, it might prove disastrous...The basis for adequate intelligence can only be laid in peacetime”¹⁴⁷ As a result, in November 1945, the JCS authorized the

¹⁴⁵ Robert S. Ehlers Jr., “BDA,” 656.

¹⁴⁶ United States Strategic Bombing Survey, *The United States Strategic Bombing Survey: Summary Report (European War)* (1987; repr., Maxwell AFB, AL: Air University Press 2003), 39.

¹⁴⁷ United States Strategic Bombing Survey, *The United States Strategic Bombing Survey: Summary Report (Pacific War)* (1987; repr., Maxwell AFB, AL: Air University Press 2003), 117.

establishment of an Air Intelligence Division on a permanent peacetime basis to study targets on a worldwide basis.¹⁴⁸

The purpose of establishing this agency was to ensure that in the future, there would be a pre-analysis made of the vulnerability of all the countries of the world, to strategic air attacks, to the point that targeteers could recommend the right bomb for the right target.¹⁴⁹ The JCS wanted to ensure in future wars the US would not be reliant on a foreign partner for 100 percent of their target intelligence as in Germany, and they wanted to make sure they had sufficient operational target intelligence at the beginning of a strategic campaign, unlike the US experience in Japan.¹⁵⁰ The Division was established not as a joint agency but an agency to be staffed jointly by the Air Force and the Navy and funded by both services.

The Division was divided into four sections: The General Analysis Section, the Physical Vulnerability Section, the Central Section, and the East-West Section. The General Analysis Section was responsible for supervising the sociological, political, and psychological aspects of target selection. The Physical Vulnerability Section was responsible for studying the construction of targets and the bombs required for their destruction. This section included physical scientists to help study things like the configuration of a city based on the land, buildings, building structure, and what would burn or not burn if fires broke out, or when to use high explosives versus incendiaries, and for atomic bombs, what bursts would produce the most extensive effects. This section determined the cost of strategic bombardment in terms of the type of bombs required on a target.¹⁵¹ The regionally focused Central and East-West Sections concentrated on industrial analysis. The Central Section's jurisdiction included the USSR and the part of Europe and Asia which the Russian Ground Forces could overrun in 90 days. The East-West Section was concerned with analyzing the strategic vulnerability of the US itself, but also included within its jurisdiction all the rest of the

¹⁴⁸ Dr. James T. Lowe, "Strategic Vulnerability," 6 Apr 1950, Call # K239.716250-43, P. 1, IRIS # 0483142, in the K239.716250 Collection, AFHRA, Maxwell AFB, AL.

¹⁴⁹ Dr. James T. Lowe, "Strategic Target Systems," lecture, Air War College, Maxwell Field, AL, 13 Nov 1947, typed transcript, Call # K239.716247-50, P. 1-2, IRIS # 0482902, in the K239.716247 Collection, AFHRA, Maxwell AFB, AL.

¹⁵⁰ Lowe, "Strategic Target Systems," 1.

¹⁵¹ Lowe, "Strategic Vulnerability," 3.

world not covered by the Central Section. Despite the JCS guidance, for a worldwide focus, it was already seen in the late 1940s and early 1950s that the focus was not, in fact, worldwide but primarily oriented towards the USSR.¹⁵² The goal was to be able to do the necessary pre-analysis of a country's vulnerability to enable the right bombs on the right targets as soon as a decision was made to wage a strategic air campaign, efforts already being focused Post-WWII on the USSR.

The Strategic Vulnerability Branch had a plan to achieve their work in three phases. First, they would compile a bombing encyclopedia (BE) of the world, second, they would produce a system of strategic vulnerability analysis, and then finally prepare operational target folders on recommended target systems. Decisions were made on the third point, operational target folders, early on. The branch would produce the necessary textual or factual data to put in target folders and would include what intelligence personnel referred to as the target information sheets and weapons recommendations sheets during WWII that included the information produced by the EOU for targets in Germany. The sheets would contain the target name, the name of the installation, a description of the installation to include what it does. Target folders would also include maps and charts. According to Dr. James Lowe who worked in targeting throughout the war, "The only thing that saved us in World War II, from the map and chart point of view, was that we found in England, an ally who was ready, willing, and able to give us all the maps and charts we needed in order to defeat the German enemy....It is impossible that in a third world war, we will find any ally capable of furnishing us the maps and charts we need against the USSR, and it is unlikely that we will have a two and a half year period after the outbreak of the war in order to prepare the maps and charts. For that reason, the decision was made to prepare the maps and charts necessary to support combat operations in advance."¹⁵³ The maps and charts included both navigational charts and target charts. For navigational charts, a World Aeronautical Chart was included in folders, along with radar charts to enable world-wide radar navigation, and then any Pilotage Charts required.

¹⁵² Lowe, "Strategic Vulnerability," 4; Lowe, "Strategic Target Systems," 5.

¹⁵³ Lowe, "Strategic Vulnerability," 4-5.

Targeteers also produced target charts for visual bombardment. These charts included a 1:100000 urban area chart for each of the 189 important cities in and on the USSR periphery. Personnel prepared a city plan map (1:25,000) for each of the cities in the USSR and a 1:10000 chart similar to those used in WWII for over 2100 USSR or periphery installations. The goal was, once completed it would provide the Air Force with all the maps and charts they needed to conduct combat operations initially and would provide the framework upon which intelligence personnel and operators could easily plot last minute information obtained in the field.¹⁵⁴ The goal was to have operational target folders that would be adequate for all purposes, i.e., crew navigation, target identification, and even intelligence and planning purposes, readily available in case of conflict.

The Bombing Encyclopedia was another step in the Strategic Vulnerability Section's plan and a critical development that still exists today as the Basic Encyclopedia. The Section's goal was to develop an index of basic factual information on all potential objectives or possible targets throughout the world. It was viewed as a means for handling the massive amounts of data available. The encyclopedia would first pinpoint all the potential bombing objectives in the world, and then certain basic data would be kept on each of the objectives and punched into the International Business Machine (IBM) cards. The information would include the name of the objective, location, geographic coordinates, purpose, and function of the objective, and transportation routes, etc. The idea was that the information would include all the necessary detailed facts that would be needed later for target analysis. Each object would include the information punched into the IBM card and a combination of maps and codes capturing critical objective information. With all the information on IBM cards, they could pull listings of all the plants for example in Russia or all the power plants in a specific city and send them to other agencies for correction or additions, or even just to share information.¹⁵⁵ The idea was that the Bombing Encyclopedia could be used the baseline to develop a systematic approach to target selection.¹⁵⁶

¹⁵⁴ Lowe, "Strategic Vulnerability," 5-6.

¹⁵⁵ Lowe, "Strategic Vulnerability," 6. Lowe, "Strategic Target Systems," 7-8.

¹⁵⁶ Glock, "Evolution of Air Force Targeting," 20.

Finally, the Strategic Vulnerability Section worked to develop a system for strategic vulnerability assessment. The two aspects the Section identified for bombing objective consideration were whether the destruction of the objective was within the capabilities of the attacking air force, and would destroying that target make the maximum contribution toward the attainment of the mission of the attacking force. They understood that the mission of the attacking force would not be the same in every case.¹⁵⁷

These two issues were taken into consideration when the section developed its methodology for analyzing and selecting targets. They developed processes for narrowing down the potential targets based on the above two criteria and then further narrowed down targets based on either industrial analysis or area analysis. Analysts would be assigned specific target systems or system subsets, and they made recommendations based on vulnerability principles still used today: depth, dispersion, cushioning recuperation, reserves, location, and effective bombing range. The overall efforts of the Strategic Vulnerability Section are to identify country vulnerabilities, and post-WWII, especially those of the USSR, to provide the necessary information for targeting and war planning that did not exist leading up to WWII.¹⁵⁸

Not only did WWII emphasize the need for a systematic approach to targeting and an organization to perform the function, but it also emphasized the need for competent, trained personnel.¹⁵⁹ Prior to attacks on Pearl Harbor and US entry into WWII, there had been no real provision for formal air intelligence training.¹⁶⁰ The almost total absence of qualified officers and the lack of even basic air intelligence training programs were obstacles to the development of effective air intelligence in the AAF when the US entered the war.¹⁶¹ During the years leading up to WWII, small quotas had been allotted to the Air Corps for the attendance of its officers at the Command and General Staff School at Fort Leavenworth, Kansas. The few Air Corps officers that attended received some intelligence orientation, but it emphasized ground warfare and training staff officers for

¹⁵⁷ Lowe, "Strategic Vulnerability," 7.

¹⁵⁸ Lowe, "Strategic Vulnerability," 17-18.

¹⁵⁹ Glock, "Evolution of Air Force Targeting," 20.

¹⁶⁰ Thomas H. Greer, "Other Training Programs," in *The Army Air Force in World War II*, Vol. 6, *Men and Planes*, ed. Wesley F. Craven and James L. Cate (Chicago, IL: The University of Chicago Press, 1955), 687.

¹⁶¹ Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 126.

infantry divisions. There was also an Air Corps quota for the photographic interpretation course at the Engineer School at Fort Belvoir, Virginia but again the focus was not on air intelligence but was presented from the Corps of Engineers point of view. The ACTS at Maxwell Field, Alabama included a block of intelligence instruction, but after it closed in June 1940, there was no US air intelligence instruction available.¹⁶² Again, US intelligence personnel would rely on their British counterparts for air intelligence training this time until the Americans established their own capabilities.

After Hansell's trip to England in 1941, one of his recommendations was that Air Corps intelligence officers be sent to England as soon as possible for training in the Intelligence activities of the RAF. He also emphasized the need for the AAF to have their own intelligence agencies for the analysis and interpretation of air intelligence, in the event of US participation in the war in Europe. He reiterated the importance of the AAF having its own experts upon whom to rely in preparation for plans of air employment.¹⁶³ Major Lauris Norstad, who had traveled to England with Hansell, reported back to HQ AAF Combatant Command at Bolling Field where he attempted to start the first modern class in air intelligence. The first course was a ten-day class with eight students, and Norstad taught the photointerpretation material he had been able to pick-up while in England. His supervisor thought highly of his training attempts and directed a second class that included 30 personnel, but it became obvious to some that a much bigger effort was necessary.¹⁶⁴

The AAF Combat Command urged the development of an independent school, and after lengthy agitation by the AAF, the Army Chief of Staff approved to expand the facilities at Bolling Field for an air intelligence school during December 1941 and January 1942.¹⁶⁵ Congress approved the funds, and the AAF Air Intelligence School was formally established at Bolling on 13 January 1942, with the first class set to arrive two weeks later. The University of Maryland offered the necessary facilities for the first

¹⁶² Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 126; Greer, "Other Training Programs," 687.

¹⁶³ Hinton, *Air Victory*, 146.

¹⁶⁴ Hinton, *Air Victory*, 177; Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 127.

¹⁶⁵ Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 126; Hinton, *Air Victory*, 177; Greer, "Other Training Programs," 687.

photointerpretation class delaying the start date to 16 February 1942. Recognizing the need for greater expansion, the AAF moved the school to a property at Harrisburg, Pennsylvania and was officially designated the Army Air Forces Air Intelligence School.¹⁶⁶

The school was originally known for photographic interpretation, but with the move to Harrisburg, the school expanded its instruction into combat intelligence training which consisted of one-third of the curriculum. The first courses were six weeks in length and devoted the first three weeks to general intelligence and the final three to photointerpretation and combat intelligence. The course continued to expand and lengthened to eight weeks. The school also added courses for base intelligence and POW interrogators. General intelligence covered national characteristics of the enemy, combined operations, intelligence planning, evaluation, and interpretation of information, sources of information, enemy order of battle, estimates of the situation, situation maps, and intelligence records, summaries, and reports, along with basic air strategy and tactics among other topics. Photointerpreter specialists were additionally trained in the identification of all types of objects as seen in aerial photographs and the three phases of photointerpretation. Base intelligence specialists learned about counterintelligence and air base defense while instructors drilled POW interrogators in techniques and questioning of POWs. The increasing emphasis of the school fell on the combat intelligence course.¹⁶⁷

The combat intelligence course was concerned with target information, briefing, crew debriefings, basic map, and chart reading, along with techniques for visual recognition of aircraft, naval and ground vehicles. The US intended to copy the RAF intelligence training system and recruited businessmen, lawyers, and bankers to commission directly from civilian life and train as intelligence personnel. Commissioning straight from civilian life, these individuals required some military indoctrination, and it was determined after the second class that future intelligence officers would also need to be graduate of the AAF Officer Candidate School (OCS).

¹⁶⁶ Greer, "Other Training Programs," 687; Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 127; Hinton, *Air Victory*, 177.

¹⁶⁷ Greer, "Other Training Programs," 687; Hinton, *Air Victory*, 178.

The rapid expansion over the course of 1942 resulted in significant changes to the composition and caliber of the intelligence school's student body. The initial class consisted of 68 highly qualified and motivated personnel, but as enrollment expanded to over 900 students per class by October 1942, the quality of students declined. With a decline in OCS quotas in the winter of 1942, the number of students available for intelligence school also declined, and the school was not able to meet the 350-400 students needed every six weeks to meet the overseas manning requirements. Some individuals were shipped directly to the theaters for training at the unit level to meet the demands, while some trained intelligence personnel assigned to units stateside were reassigned overseas.¹⁶⁸

The school moved to Orlando, Florida in 1944 and added an intelligence officer course which gave training for positions up to and including the combat wing level and even established a senior intelligence officers course in 1945, placed at the major command level emphasizing broad intelligence planning and policy making.¹⁶⁹ Over the course of the war, the intelligence school graduated just over 9,000 officers. More than half of the graduates received training in combat intelligence which focused provided limited targeting training. The course focused on the preparation of objective folders, target charts and maps, briefing, debriefing, and the use of intelligence data such as enemy air order of battle, tactics, and targets.¹⁷⁰ While for the first time, the AAF had officially trained intelligence personnel, there was still a lack of formal training for targeting intelligence personnel and a lack of a clear career path for intelligence personnel overall.

Experiences in both World Wars identified the importance of targeting and the need for specially trained personnel. Post-WWII surveys continued to emphasize the importance of targeting and some actions were taken to correct deficiencies, especially in organization and processes. Unfortunately, General McDonald believed that although air intelligence had come of age in both Europe and the Pacific during WWII, the experiences were either forgotten or not considered relevant to air warfare with a shift to

¹⁶⁸ Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 130.

¹⁶⁹ Greer, "Other Training Programs," 688-689.

¹⁷⁰ Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 130.

absolute weapons after the war. Nuclear weapons could destroy whole cities making it unnecessary for laborious targeting processes and procedures to attack specific objectives.¹⁷¹ Robert Futrell also argued that “Much learning about the intimate relationship of air intelligence and air operations was lost with the rapid demobilization of the pre-dominantly non-regular wartime intelligence force.”¹⁷² As a result, the US found itself unprepared five years later at the start of the Korean War. The US still did not possess the organization, personnel, database, or target materials to support the application of aerospace forces on the Korean Peninsula.¹⁷³

The complaints in Korea were comparable to those of WWII, many of which would be similar to those in Vietnam and again in the Gulf War. No organization maintained and analyzed the North Korean target base, contingency plans for war with North Korea were lacking; there was a limited number of trained intelligence personnel to support targeting functions. The targeting system throughout the war was improvised and resulted in a lack of sufficient understanding of the enemy for targeting purposes and an inability to provide complete weapon recommendations which all hindered the Korea campaign.¹⁷⁴ The Korean War resulted in relearning many of the same lessons learned in WWI and WWII. The US military was once again insufficiently prepared to conduct target system analysis, and there was no establishment or trained personnel prepared to conduct target analysis and selection.¹⁷⁵

In an effort to correct deficiencies identified in now both world wars and the Korean War, the Air Force took the lead as the Air Target Materials Program (ATMP) executive agent for the Department of Defense to ensure the adequacy of air targeting materials. Additionally, the USAF created the targeting officer career field in 1954, but efforts were short-lived when the career field went away again in the 1960s.¹⁷⁶ In 1962, the Defense Intelligence Agency (DIA) took over a lot of the functions previously done

¹⁷¹ Futrell, “US Army Air Forces Intelligence,” 547.

¹⁷² Futrell, “US Army Air Forces Intelligence,” 548.

¹⁷³ Glock, “Evolution of Air Force Targeting,” 20-21.

¹⁷⁴ Glock, “Evolution of Air Force Targeting,” 21-23.

¹⁷⁵ Michael N. Waddle, “Air Force Targeting Reform: Addressing the need for change” (master’s thesis, Monterey, CA: Naval Post Graduate School, December 2003), 28.

¹⁷⁶ Glock, “Evolution of Air Force Targeting,” 22; Mr. John Glock, Chief, Targeting Branch ACC/A2 Langley AFB, VA, to the author, e-mail, 12 March 2018.

by the services to centralize non-service specific functions which some believed was both important and beneficial. The DIA became responsible for maintenance of the targeting database, the ATMP program, and the Tactical Target Materials Program, but in the nuclear age, the maintenance of targeting databases and materials for conventional operations was largely ignored.¹⁷⁷ Not surprisingly, as a result, the complaints regarding targeting and in the Vietnam conflict would be sadly familiar. A shortage of trained intelligence personnel and a lack of target materials and understanding of the enemy for targeting purposes rang true once again. The targeting career field was brought back online in the 1970s and having realized that it was not sufficient to assign intelligence personnel to targeting billets, the USAF established the Armed Forces Target Intelligence Training Course specifically for targeting intelligence officers in the newly established 8085 AFSC.¹⁷⁸

The development of intelligence and targeting in the interwar years and WWII set the stage for modern-day targeting. Present day concepts such as the Joint Targeting Cycle, target vulnerability assessments, fusing multi-intelligence sources for target analysis, coalition integration, targeting databases, and damage assessments all trace back to this period. Modern targeting came of age by 1944, but with it came many of the challenges that we still deal with today, especially regarding organization, processes, training, and manning. WWII experiences highlighted the importance of targeting, the need for subject matter experts (SMEs) to include integrating savvy civilians, a need for systematic targeting methodology, better reach-back centralized targeting support, and increased BDA capabilities and processes. Efforts post-WWII attempted to at times fix the numerous challenges with varying levels of success but often fell by the wayside as the focus shifted from conventional targeting to nuclear weapons in the Cold War. The Soviet focus through the late 1980s would leave targeteers again scrambling for target information and materials as a conventional war in the Gulf became inevitable as the Cold War came to a close.

¹⁷⁷ Glock, "Evolution of Air Force Targeting," 22.

¹⁷⁸ Glock, "Evolution of Air Force Targeting," 23.

Chapter 3

Were the Good Old Days Really That Good: A Desert Storm Case Study

We won! Most everything that follows pales in the light of the fact that we did win. People can argue with the way it was done. I certainly did. But that does not alter the fact. The victory, however, is not so sweet as it might have been...

- Lt Col F. L. Talbot CENTAF/INT

“Building on nearly eight decades of history and lessons learned, the Air Force entered the Gulf War more prepared to apply aerospace forces than at any time in the past,” stated John Glock in his article “The Evolution of Air Force Targeting.”¹ But had we really fixed the targeting problems brining targeting to its height in Desert Storm? Unfortunately, but there were still problems, and preparations were still inadequate, leading to targeteers, intelligence personnel, planners, and operators re-learning in Desert Storm many of the lessons identified in past conflicts. There were organizational and procedural challenges along with training and force management issues that contributed to the targeting struggles often overlooked by those not close to the targeting problem. As a result, Desert Storm targeting, may not be the golden standard some think it was with which to compare targeting today.

Iraqi Targeting Study

Throughout the 1980s the principal US concern in the Middle East was the threat of a Soviet invasion of Iran. This was considered the most likely regional scenario, but as the Cold War was winding down, the Secretary of Defense (SECDEF) approved a shift in US focus in the Fall of 1989. With Iraq’s military capabilities and ambitions growing, the likelihood of conflict on the Arabian Peninsula increased.² The Chairman of the Joint Chiefs of Staff (CJCS), General Colin Powell directed the Commander in Chief for USCENTCOM (CINCCENT), General Norman Schwarzkopf to develop Persian Gulf war plans that reflected this shift in emphasis. In February 1990, Schwarzkopf tasked the

¹ John R. Glock, “The Evolution of Air Force Targeting,” *Airpower Journal* 8, no.3 (Fall 1994), 23-24.

² Col James R. Blackburn Jr, “USAF-AFIA/INT Support to Desert Shield/Storm,” Call # TF4-8-150 26 Feb 1992, P. 3, IRIS # 0872549, in Task Force IV Collection, AFHRA, Maxwell AFB, AL.

commander of his air component, Lieutenant General Charles Horner, Ninth Air Force (9AF) and Central Command Air Forces (CENTAF) Commander, and ultimately the Desert Storm Joint Forces Air Component Commander (JFACC), to develop an air campaign concept for OPLAN 1002-90. OPLAN 1002-90 was a new contingency plan for the defense of the Arabian Peninsula (particularly Saudi Arabia) against an attack from Iraq.³ As a foundation for planning, Horner laid out three primary objectives for the campaign: gain air superiority; protect friendly nations, their oil fields, and transshipment facilities; and delay and attrit Iraqi forces. In addition to these general objectives, Horner also added the requirement to counter the potential Iraqi chemical threat with a series of retaliatory strikes against high-value facilities in Iraq.⁴ The 9th Tactical Intelligence Squadron (TIS) Target Intelligence Division, the Air Force targeting element that supported CENTCOM, used the objectives set by Horner to begin target development for OPLAN 1002-90.⁵ Targeting officers developed seven traditional target sets and selected targets in Iraq and Kuwait to support Horner's objectives (See Table 5. *CENTAF Target Sets by OPLAN 1002-90 Objectives*). Leadership targets were limited to facilities directly involved in military command and control, and targeteers selected Iraqi infrastructure targets with the intent to limit Baghdad's offensive capability by denying direct support to the military. Intelligence personnel selected high value targets (HVTs) to dissuade Baghdad's use of chemical or biological weapons against US and friendly forces.⁶

Unfortunately, the post-Cold War transition from Soviet-European emphasis to smaller, but more numerous regional conflicts caught intelligence analysts and planners off balance. As a result of the region's relatively low priority and lack of previous focus on Iraq, the available information was not comprehensive and often out of date by

³ Glock, "Evolution of Air Force Targeting," 24; Thomas A. Keaney and Eliot A. Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning* (Washington, DC: Department of the Air Force, 1993), 191.

⁴ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol.1, *Planning and Command and Control: Part I, Planning*, 191.

⁵ Glock, "Evolution of Air Force Targeting," 24.

⁶ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 192.

upwards of 17 years.⁷ Intelligence planners developed specific target lists for each of the major target categories. They used the Joint Target List (JTL) from CINCCENT OPLAN 1002-88, the plan to counter a Soviet attack through Iran to the Persian Gulf, as a baseline. Additionally, they used target information from the Automated Installation File (AIF), the DIA's computerized system used to store, manipulate, and retrieve target intelligence that ideally covers nearly every known installation or place of potential military significance to develop their lists.⁸

Table 5. CENTAF Target Sets by OPLAN 1002-90 Objectives

Objective	Target Set	Components
Gain and maintain air superiority	Air Defense System	Air Defense C3 network, Early Warning/Ground Control Intercept Radars, Surface-to-air missile sites, Airfields
Protect friendly nations, oil fields, and transshipment facilities	Offensive Air System	Airfields, Air Force C3
	Offensive Missile System	Ballistic Missile Sites, Offensive Missile C3, Missile Support Facilities
	Weapons of Mass Destruction System	Nuclear, Biological, and Chemical (NBC) storage facilities, NBC production facilities
Delay and attrition of ground forces	Ground Force System	Ground Forces, Ground Forces C3, Lines of Communication (LOC), Logistics/support facilities
Counter chemical	NBC system	NBC Storage, NBC production
	HVT System	Targets of high value to the enemy

Source: Adapted from Thomas A. Keaney and Eliot A. Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning* (Washington, DC: Department of the Air Force, 1993), 193.

⁷ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 191.

⁸ Air Force Pamphlet (AFPAM) 200-18, *Target Intelligence Handbook Unclassified Targeting Principles*, 1 October 1990, 59; Glock, "Evolution of Air Force Targeting," 24; Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 192.

Intelligence planners only selected targets or facilities they believed directly supported Horner's stated objectives for OPLAN 1002-90.⁹ Targeting personnel further developed the identified targets and began building target folders intending to include an annotated 1:250,000 map, existing imagery, available miscellaneous data on the target, and a weaponeering sheet. Unfortunately, intelligence analysts discovered during this phase that the overwhelming focus on the Soviet Union, and the fact Iraq was considered a third world country, many of the installation files in the AIF were incomplete and lacked supporting information to include target construction, function, or military significance.¹⁰ Additionally, less than half of the 218 potential targets identified had imagery, and what existed was generally outdated (some dated back to 1973) and therefore of limited use.¹¹ Of the 90 targets that had imagery, only 30 had additional target materials. Bottom line, the AIF records fell short of providing the necessary information for accurate targeting, and CENTAF planners had to make do with what was available.¹² When CENTAF targeteers submitted their target recommendations to Horner in April 1990, they informed him of the existing intelligence shortfalls. CENTAF targeteers completed their Iraqi Targeting Study by mid-June of the same year and would use the information during Exercise Internal Look 90 and as the foundation for initial defensive and retaliatory planning during Operation Desert Storm. Additionally, CENTAF submitted its target nominations to CENTCOM for inclusion on the CENTCOM JTL for OPLAN 1002-90 which was completed on 27 June 1990 but did not include all CENTAF recommended targets.¹³

Neither the CENTAF nor the CENTCOM targeting lists were intended to contain all identified potential targets in Iraq. They detailed only those installations listed in the AIF that intelligence and operations planners thought necessary to achieve the objectives of that specific contingency plan. For that reason and the general lack of data available

⁹ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 192.

¹⁰ Glock, "Evolution of Air Force Targeting," 24.

¹¹ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 194.

¹² Glock, "Evolution of Air Force Targeting," 24.

¹³ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 194, 199.

on Iraqi targets, both target lists lacked info on NBC target sets, civilian leadership, and even SCUD target sets that would be critical to the plan executed in Desert Storm.¹⁴ It was not until 2 August 1990, when Iraq invaded Kuwait and the CJCS issued a Warning Order, that Iraq became the primary focus for the intelligence community and there was a surge in intelligence gathering and analysis. Iraq's increased priority resulted in significant growth of the AIF's Iraq entries. New threats identified were added to the AIF, and existing installation files were updated and expanded as new information became available. The Iraqi AIF grew over 38% between August 1990 and January 1991, but at the initiation of hostilities, only 11% of installations struck during the war had the necessary target materials.¹⁵

Initial Planning

The US response was uncertain in the first few days following Iraq's invasion of Kuwait, but by 6 August, General Powell instructed military leadership to focus on OPLAN 1002-90 for possible execution despite the inadequacy of the existing plan. Recognizing the possible need for an additional offensive option to retaliate immediately should Saddam Hussein use chemical weapons, or harm hostages, General Schwarzkopf turned to the Air Force. Knowing that 9AF/CENTAF's focus was on preparing folks for deployment, theater bed down, and the defense of Saudi Arabia OPLAN, Schwarzkopf turned to the Air Staff, rather than his component staff. Speaking with Vice CSAF General John Loh, due to the CSAF Gen Michael Dugan being away, Schwarzkopf requested help in finding a way to retaliate against Iraq if the need should arise.¹⁶ Col John A. Warden, III, Deputy Director for Warfighting Concepts, and his planning team on the Air Staff, later referred to as Checkmate, had begun several days earlier thinking about the possibility of an air campaign to eject Iraqi forces from Kuwait. When the official tasking arrived on 8 August, his team was prepared to take on the effort.¹⁷ Taking

¹⁴ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 200.

¹⁵ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 211.

¹⁶ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 108.

¹⁷ Richard T. Reynolds, *Heart of the Storm: The Genesis of the Air Campaign Against Iraq* (1995; repr., Maxwell Air Force Base, AL: Air University Press, 2008), 24.

the objectives from President Bush's speech on 8 August, Checkmate planners developed four military objectives: (1) force an Iraqi withdrawal from Kuwait; (2) degrade Iraq's offensive capability; (3) secure oil facilities; (4) render Saddam ineffective as a leader.¹⁸ In many ways, this was the beginning of the schism between the operational planners and the intelligence community in the Gulf War.

By the time they brought targeteers into the planning, Warden and his team had already identified ten target sets (that would later expand to 12) for their plan that would come to be known as Instant Thunder. Warden believed that the fourth objective was the most important and that leadership was the true center of gravity to target.¹⁹ He developed the rest of the target sets around this theory, and after the war, he would go on to expand and publish his ideas as his five rings model that is still well known today. The next step in fleshing out the plan was selecting specific targets within each target set determining bomber run-in headings, aim points, types of ordnance, and getting the necessary imagery to support targeting.²⁰ Since Warden's team was composed entirely of operations and staff officers, they did not have access to the type of intelligence necessary nor the expertise to select, study, and plan against discrete targets.²¹

Knowing the importance of intelligence and the targeting role, Major General Robert "Minter" Alexander, AF Director of Plans and Warden's boss, reached out to Major General James Clapper, AF Chief of Intelligence, on 8 August 1990 requesting targeting intelligence support.²² At first, Clapper pushed back, questioning why the Air Staff was undertaking campaign planning considering Goldwater-Nichols legislation, and at the same time keenly concerned about his own thin manning that would make detailed

¹⁸ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 109.

¹⁹ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 109.

²⁰ Edward C. Mann, *Thunder and Lightning: DESERT STORM and the Airpower Debates* (1995; repr., Maxwell Air Force Base: Air University Press, 2001), 42.

²¹ Mann, *Thunder and Lightning*, 42-43.

²² Oral History Interview of Lt Gen Robert M. Alexander by Lt Col Suzanne Gehri, Lt Col Richard Reynolds, and Edward Mann, June 3, 1992, typed transcript, p.5, Call # K239.0472-70, IRIS # 0876232, Desert Story Collection, AFHRA, Maxwell AFB, AL; Diane T. Putney, *Airpower Advantage: Planning the Gulf War Air Campaign, 1989-1991* (Washington DC: Air Force History and Museums Program, 2004), 57; Oral History Interview of Colonel Jim Blackburn, by Col Edward Mann, Lt Col Suzanne Gehri, and Lt Col Richard Reynolds, April 21, 1993, typed transcript, p.2, Call # K239.0472-73 Copy 2, IRIS # 0876239, Desert Story Collection, AFHRA, Maxwell AFB, AL.

targeting difficult.²³ Additionally, Clapper, not fully understanding the tasking given to Warden and his staff, was under the impression from his recent visit to the 9 TIS that a strategic air campaign already existed after being briefed on the Iraqi Targeting Study. When Clapper remonstrated, General Loh got involved, and Clapper was informed that CENTAF apparently had only about 44 targets and not the strategic air campaign that Schwarzkopf wanted. Reluctantly, Clapper tasked the Air Force Intelligence Agency (AFIA) Targets Intelligence Branch (INT) to assist. At the request of Clapper, Chief of Targeting, Col James Blackburn, sent one of his majors to Checkmate on 8 August to find out what was going on, and within 24 hours, Blackburn and his team of 13 targeteers were rounding up any target materials they had available at their office on Bolling.²⁴ The targeting staff deployed en masse to Checkmate's workspace in the Pentagon on 10 August and began aiding Warden and his team.²⁵

Like Clapper, Blackburn thought it unwise for the Air Staff to get involved in war planning. He remembered the Vietnam War and the issues with target selection occurring outside the theater in Washington D.C. Additionally, under the Goldwater-Nichols Act, warfighting and the necessary planning had been made the responsibility of Combatant Commands. As the air component for CENTCOM, the CENTAF/9AF should have been responsible, not the service staff. While the Air Staff had a group of experienced targeteers, they were not SMEs on Iraq and did not conduct target development in their role on the staff. They were responsible for administrative type targeting functions such as managing the career field and developing policy, not theater targeting.²⁶

The CENTAF targeteers had been working on target development in Iraq since the beginning of the year and were more familiar with Iraqi target sets. With the 9 TIS focusing on the defensive plan and preparing to deploy, their already undermanned staff

²³ Putney, *Airpower Advantage*, 46

²⁴ Putney, *Airpower Advantage*, 46; Oral History Interview of Colonel Jim Blackburn, 5-7, 34; Blackburn, "USAF-AFIA/INT Support to Desert Shield/Storm," 4.

²⁵ Mann, *Thunder and Lightning*, 43; Oral History Interview of Lt Gen Robert M. Alexander, 6; Reynolds, *Heart of the Storm*, 44.

²⁶ Oral History Interview of Captain John Glock by Maj Sandy Terry, Frank Kistler, and Dr. Mark Mandeles, 30 January 1992, typed transcript, p. 18, Call # TF4-8-153, IRIS # 0872552, in the Task Force IV Collection, AFHRA, Maxwell AFB, AL.

did not have the bodies to support the Checkmate planning effort. Leading up to the war, the 9 TIS targeting officer manning was down as low as fifty percent. Of the six officers assigned, only two were fully upgraded while the remaining four lacked experience as only entry-level targeteers.²⁷ Furthermore, the enlisted targeting career field did not train the enlisted targeteers to perform weaponeering, and they did little target development. They primarily managed charts, maps, and target materials. Overall, the 9 TIS targeteers were not in a position to aid the Air Staff targeteers, but the Checkmate planning team did receive a copy of the 44 CENTAF targets Clapper referenced.²⁸

Once the AFIA targeteers arrived at Checkmate, the very first thing planners wanted was imagery, but the targeteers first needed to understand the objectives and guidance the planners had devised that would direct the targeting process.²⁹ Blackburn was briefed on the political and military objectives, the plan's strategy and assumptions and the five strategic rings. Blackburn was familiar with the five rings model having received a briefing from Warden a few months earlier where Warden pitched his centers-of-gravity theory.³⁰ To Blackburn, this concept was "nothing more than good sound targeting, and what we try to teach folks at Targeting [School]."³¹ Walking into Checkmate, Blackburn realized that intelligence personnel were already behind. They were working with an outdated database and the lack of Iraqi intelligence exacerbated his problem. Blackburn identified early on that they would need to find workarounds and work long hours if they were going to be able to help planners deliver an executable plan to CENTCOM in less than a week.³²

Targeteers needed to analyze the planner identified target sets to select additional targets and work the target development process. For the plan to be executable, they

²⁷ Oral History Interview of Captain John Glock, 5; "9 TIS/INT Planning Procedures for Internal Look-90 and Operation DESERT SHIELD" (U), Call # K239.0472-33, Vol. 1, Mar-May 1991, P.1-2, IRIS # 0876189, in the Desert Story Collection, AFHRA, Maxwell AFB, AL. (SECRET//NOFORN) Information extracted is unclassified; Thomas A. Keaney and Eliot A. Cohen, *Revolution in Warfare? Air Power in the Persian Gulf War* (Annapolis, MD: Naval Institute Press, 1995), 111. (Originally published as the *Gulf War Air Power Survey Summary Report* in 1993 by the US Government Printing Office.)

²⁸ Reynolds, *Heart of the Storm*, 36.

²⁹ Putney, *Airpower Advantage*, 47.

³⁰ Oral History Interview of Colonel Jim Blackburn, 7; Putney, *Airpower Advantage*, 47.

³¹ Oral History Interview of Colonel Jim Blackburn, 7.

³² Oral History Interview of Colonel Jim Blackburn, 22, 31-32, 55.

would need target materials, precision coordinates, imagery collection production, and weaponeering for each target. They found themselves having to jump ahead in the target development process and work several steps simultaneously.³³ The outdated, incomplete, and sometimes erroneous information available to targeteers hindered their efforts to identify and analyze targets sufficiently to meet the objectives and guidance they had received from planners. Targeteers attempted standard target system analysis to understand the target systems, characteristics, functions, and interrelations.³⁴ If available, they used the Automated Tactical Target Graphics (ATTG), documents containing annotated target photographs and textual descriptions of the installations, for initial imagery for target development and specific aimpoint selection.

The targets branch submitted requests to their sister imagery directorate on the staff to gain access to additional imagery not available in ATTGs, but all the imagery was from archives. On average, imagery dated back to 1982 and was often of poor quality. Getting overall targeting and intelligence support, to include new imagery, through official channels to DIA was also extremely difficult for targeteers. As a service, their requests fell below CCMD requests, and DIA was already working imagery support requests submitted by CENTCOM. DIA would not fill the staff targeteer's requests until after they had completed CENTCOM's taskings because they viewed Blackburn and his staff's requests as service taskings, not war-related taskings.³⁵ Blackburn found himself often sending a liaison to DIA to go door to door informally asking for support because it was the fastest way he could get what he needed due to the service element's low priority.³⁶

Targeteers helped planners compile a target list of 84 installations. They developed target working files with whatever imagery and information were available. Since they were pressed for time and lacking target information, including target size and construction, targeteers accomplished only rudimentary weaponeering. Initial desired mean points of impact (DMPI) were selected with operator support the Defense Mapping

³³ Oral History Interview of Colonel Jim Blackburn, 35, 60; Putney, *Airpower Advantage*, 47.

³⁴ Joint Publication (JP) 3-60, *Joint Targeting*, 31 January 2013, II-8, II-11; Putney, *Airpower Advantage*, 47.

³⁵ Oral History Interview of Colonel Jim Blackburn, 52; Putney, *Airpower Advantage*, 48.

³⁶ Blackburn, "USAF-AFIA/INT Support to Desert Shield/Storm," 5.

Agency Aerospace Center (DMAAC) was on standby to mensurate coordinates as needed. The target list was frozen at 84 targets on 15 August to finalize preparations for the 17 August brief by Warden and Blackburn to the CINCCENT.³⁷ While all the necessary target materials necessary for execution were incomplete at the time of the brief, Schwarzkopf approved the plan's concept, but Blackburn was not clear on exactly what that meant as far as getting the plan pushed to General Horner and CENTAF.

Despite being told not to contact CENTCOM at the outset of planning, Blackburn was aware of the need for coordination with CENTCOM J2 Targeting during planning efforts. He sent a liaison, Major Christian, to CENTCOM on 11 August to facilitate targeting and augment the CENTCOM J2 targeting branch which consisted of only three people. Christian, appointed to head the targeting branch for CENTCOM's planning efforts, kept Blackburn abreast of CENTCOM efforts. The day before Checkmate's brief to CINCCENT, CENTCOM promulgated its own target list of 109 installations for intelligence production and planning, 76 of which overlapped with Checkmate's list.

Blackburn attributed the difference to what he interpreted as a slight variance in CENTCOM objectives as well as more time and capability for CENTCOM targeteers to look at the next level of targets. For example, Checkmate only went down to the Sector Operations Center (SOC) level for air defense targets while the CENTCOM list included targets down to the Intercept Operations Center level, which Checkmate had not had time to do. CENTCOM was also more interested in chemical and biological weapons capability and delivery so, at airfields, they were only looking at chemical bunkers.³⁸ The unified command structure allowed the CENTCOM team to receive far more direct support from DIA than Checkmate did and Christian's team was able to tap into DIA databases and analytical capabilities to nominate and validate targets resulting in the separate CENTCOM targeting list.³⁹ Despite CENTCOM's priority status, the CENTCOM targeteers suffered from the same limitations as CENTAF and Air Staff targeteers. The lack of complete, current installation databases, target materials, and current intelligence studies on Iraq hampered the target development process at

³⁷ Blackburn, "USAF-AFIA/INT Support to Desert Shield/Storm," 5-6.

³⁸ Oral History Interview of Colonel Jim Blackburn, 75-76.

³⁹ Putney, *Airpower Advantage*, 75.

CENTCOM and CENTCOM could not even determine or verify some of the BE numbers for targets on the list.⁴⁰

Due to the existence of two separate target lists, Blackburn was unclear as to which list his team should focus now that the CINCCENT had accepted the plan. He viewed Checkmate's list as the conceptual list and CENTCOM's as the definitive list, but Warden was concerned about the growing target list. Warden, concerned that adding targets to the list would expand out of his seven-day air campaign window, was hesitant to increase the list of 84 targets further.⁴¹ Still unclear if the plan briefed to Horner in Riyadh would include the 84 or 109 installation target list, Blackburn, back in Washington, shifted his focus to support the CENTCOM targeting list.⁴²

Not wanting to waste anyone's time on further developing targets that planners would not use, Blackburn consulted his targeting counterpart at CENTCOM J2. Colonel Roger Cannon requested that the Air Force handle DMPI selection and further target development for the list of 109 CENTCOM targets and CENTCOM objectives vice Checkmate list. Where Blackburn had been weaponeering and picking DMPIs for one weapon system per target, Cannon wanted them to pick DMPIs for all weapon systems to give the commanders options and flexibility. In return, Blackburn requested an official CINC message from CENTCOM stating that Blackburn and his staff were working on CENTCOM's behalf which would give them production tasking authority, a previous limitation to INT planning. The delegation of imagery tasking authority did not result in as much influence as Blackburn had hoped. He found that direct requests from CENTCOM to DIA still took precedence. DIA continued to prioritize CENTCOM requests for operational support package OSP graphics, focused on groups of targets by geography or function, over Blackburn's request for the imagery they needed for selection of individual target aimpoints.⁴³

Blackburn and his targeting team collected three copies of any available imagery for the 109 CENTCOM targets. With the help of the operators assigned to the Checkmate planning team, they identified aimpoints and pinpricked imagery to send to

⁴⁰ Putney, *Airpower Advantage*, 75-76.

⁴¹ Oral History Interview of Colonel Jim Blackburn, 84-85.

⁴² Oral History Interview of Colonel Jim Blackburn, 87-91.

⁴³ Putney, *Airpower Advantage*, 84.

DMAAC for precise coordinate generation. One set of the target imagery was hand delivered to DMAAC on 22 August, one to CENTCOM, and the INT staff kept the third copy for reference at Checkmate. Any additional targets identified Checkmate targeteers sent to DMAAC via phone. DMAAC began delivering the precise coordinates once daily via a special category(SPECAT) coordinate mensuration message (text only) starting 27 August. By that point, the target list had grown to 119 targets and 493 DMPIs.⁴⁴ The coordinate mensuration message included the coordinates, target location along with a description of the coordinate location (ex. Northwest corner of East Building in Southwest quadrant of the facility) but it was necessary to reference a copy of the imagery for the coordinate information to be useful.⁴⁵

Shift to In-Theater Planning

Meanwhile, after the 17 August briefing to the CINCCENT at MacDill AFB, Schwarzkopf directed Warden to brief the Instant Thunder plan to Horner in theater. The plan was passed on to Horner on 20 August at Riyadh to use as he saw fit to produce the real-world plan. While Warden believed Instant Thunder was THE plan, Horner had concerns and felt it was only a partial answer to the requirement for an offensive air campaign.⁴⁶ Horner brought in Brigadier General Buster Glosson and kept three members of the Checkmate planning team, including Lieutenant Colonel David Deptula, to stand-up a Special Planning Group (SPG) focusing on offensive air campaign planning. Warden was not one of the three kept in theater for planning. The SPG would come to be known as the Black Hole. Leaders stressed the secrecy of the SPG efforts because of concern that acknowledgment of US offensive strike planning could complicate or terminate ongoing diplomatic negotiation efforts.⁴⁷ The compartmentalization of the plan would result in ongoing challenges for intelligence and targeting support.

Targeteers from the 9 TIS/CENTAF had forward deployed to stand-up the targeting division at Riyadh. Augmentees from Strategic Air Command (SAC) and reservists helped plus up the Targets Division and further augmentees from the Navy;

⁴⁴ Blackburn, "USAF-AFIA/INT Support to Desert Shield/Storm," 6; Putney, *Airpower Advantage*, 151.

⁴⁵ Oral History Interview of Captain John Glock, 25.

⁴⁶ Putney, *Airpower Advantage*, 119.

⁴⁷ Putney, *Airpower Advantage*, 137.

Supreme Headquarters Allied Powers, Europe (SHAPE); US Air Forces in Europe (USAFE); and Pacific Air Forces (PACAF) were deployed later to support the war efforts.⁴⁸ Of the 19 targeteers assigned to the CENTAF targets division, only five were read-in to the plan on 20 August. Of those brief, Captain John Glock, a SAC targeteer, and three of the others were tasked to support the SPG to build the strategic air campaign.⁴⁹ Of the four targeteers assigned, Glock was the only formally trained targeting officer in the Black Hole planning cell.⁵⁰ The remainder of the targeteers not briefed into the SPG continued to support D-Day defensive plan preparation and development and execution of the daily theater ATO leading up to combat.

The first issue faced by Glock and the targeteers attached to the SPG was that no one briefed them on the full Instant Thunder plan. They were briefed the 84 targets air campaign that was allegedly going to win the war in six days by decapitating Saddam Hussein and planners believed would most likely end via his overthrow. Unfortunately, no one took the time to explain to the intelligence personnel and targeteers the basis of the conceptual plan and particularly the “mechanism” by which it was supposed to work.⁵¹ Glock’s team started working on what they thought the plan should be because they did not think the plan militarily made sense. The targeteers viewed it as more of a political plan to isolate Hussein versus a military plan due to its lack of targeting more traditional centers of gravity. Additionally, the deployed targeteers struggled because they initially did not have any connectivity to anything back in the US such as targeting databases. They used one hard copy list of installations (that was also outdated) to start their initial target development along with the July CENTAF Iraqi Study used for OPLAN 1002-90, the Air Staff’s Instant Thunder target list, and CENTCOM’s 109 target list.⁵²

⁴⁸ Lt Col F. L. Talbot, “Inadequate Targets Manning of the 9 TIS to Support COMCENTAF,” Call # TF4-62-598 13 Mar- 25 Mar 1991, P. 3-21, 3-22, IRIS # 0872719, in Task Force IV Collection, AFHRA, Maxwell AFB, AL.

⁴⁹ Capt John Glock, “Targeting and the Black Hole,” Call # TF4-8-150 26 Feb 1992, P. 8, IRIS # 0872549, in Task Force IV Collection, AFHRA, Maxwell AFB, AL; Oral History Interview of Captain John Glock, 7.

⁵⁰ Maj Matt McKeon, “Joint Targeting: What’s Still Broke?” (master’s thesis, Maxwell AFB, AL: School of Advanced Airpower Studies, June 1999), 42.

⁵¹ Oral History Interview of Captain John Glock, 13.

⁵² Oral History Interview of Captain John Glock, 12; Putney, *Airpower Advantage*, 135.

Targeteers were concerned when told that the plan was approved (the 84 target list) and it had to be ready for execution within the first two weeks of September. The targeteers knew the area of responsibility (AOR), and what they were normally supposed to be doing for a traditional military approach to the problem. In their opinion, the Instant Thunder plan was not in concert with what they knew the stated objectives to be: defend Saudi Arabia, kick the Iraqis out of Kuwait and restore the legitimate Kuwaiti government. The targeteers also got the impression that Horner did not like the plan and with Warden already sent home, the targeteers assumed the other three Checkmate planners would soon follow. They were under the perception that no one was supposed to support this plan and instead the targeteers were supposed to start working from scratch to develop an alternative proposal to present to Horner. The initial Black Hole cadre, therefore, perceived the intelligence planners as hostile and unsupportive of their needs and proceeded to write off the in-theater targeting support, which plagued the intelligence and targeting/operational planner interface throughout the conflict.

The targeteers were actually trying to be supportive but were also trying to improve the plan. They focused on doing additional, more detailed target development because to them it appeared the target analysis had not been done well. They were concerned that targets key to achieving the objectives and destroying Iraq's long-term offensive capabilities were left off the list. They were unaware at the time of the details of the plan's evolution, including the involvement of the targeteers from AFIA in the target development. To Glock and his team, the target development and plan looked superficial without any serious military planning.⁵³

There was no evidence to suggest that Checkmate operational planners who had developed the Instant Thunder plan used intelligence information to sculpt their concept of operations. Rather, they built their plan using intelligence and targeting data to locate and define targets within the objective-orientated categories.⁵⁴ Additionally, the targeteers attached to the Black Hole were concerned that Blackburn and his people were not familiar with the target set. The CENTAF targeteers had been working on Iraq target

⁵³ Oral History Interview of Captain John Glock, 17.

⁵⁴ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part I, Planning*, 214.

development since January 1990, and they did not feel that the AFIA targeteers had the expertise and background to do it.⁵⁵ Glock's team found it odd that the AFIA targeteers had been doing Iraqi targeting without first consulting the in-theater planners. As a result, the theater targeteers added and deleted targets as they thought appropriate for the needed offensive campaign.⁵⁶

Glock informed Deptula that they did not have the target materials to support the Instant Thunder plan that the Air Staff brought over because they had limited resources, and many of the required materials did not exist. Glock emphasized the lack of focus the intelligence community previously placed on Iraq and discussed that many of the targets identified on Deptula's list were not the type of targets that targeteers would have selected, (i.e., AM/FM radio stations, etc.) and were a low priority for target development. Deptula informed the SPG targeting team that the target folders were already built and were on their way from CONUS. The planners also wanted mensurated points for the aircrews which the targeteers could not accomplish without imagery. Again, they were told that it had all been done and that it should be arriving from DMAAC by the first week of September. In-theater targeteers had been completely unaware of all the "reachback" taking place previously due to their previous lack of read into the planning. When the coordinate message did show up, it was useless to Glock and his team without the corresponding imagery. Deptula continued to be convinced that the imagery and what he considered "existing target folders" was going to come from stateside, but nothing ever arrived. Blackburn viewed the existence of the "target folders" differently and was unwilling to send the limited materials his team had directly to CENTAF/IN targeteers as target folders.⁵⁷

Under Glosson's pressure to produce a viable military option with an executable ATO for Phase 1 of the offensive air campaign as soon as possible, the Air Staff planners in the Black Hole reached back to their Checkmate counterparts for support. Requests for the "target folders" and imagery that Deptula assured Glosson existed for the 84 Instant Thunder targets went unsatisfied. Blackburn refused to send any of the imagery

⁵⁵ Oral History Interview of Captain John Glock, 20-21.

⁵⁶ Oral History Interview of Captain John Glock, 24; Putney, *Airpower Advantage*, 135.

⁵⁷ Oral History Interview of Captain John Glock, 25.

the Air Staff targeteers had acquired and denied having target folders. He reasoned that a target folder should contain good imagery, enlargements of aimpoints, specific building dimensions, construct of the building, and everything needed to support weaponeering. He described the material in his possession as “working folders” or “target workups.” He was concerned that faxing imagery (for example, a five-year old image from a book) from an old study was pointless and might even jeopardize the success of the air campaign.⁵⁸

Blackburn hoped that by denying Glosson’s planners access to his subpar materials, they would turn to CENTCOM for support through standard channels and invigorate the system and force it to work to get the good quality targeting materials necessary and possible via DIA, if tasked accordingly.⁵⁹ In theater intelligence’s inability to rapidly provide the necessary target materials frustrated the SPG planners further solidified Blackburn’s unwillingness to send his products, no matter how terrible the products were, further undermined theater intelligence and targeting personnel. The theater perception was that anything was better than nothing, and they had next to nothing to produce an executable ATO.

Theater targeteers were further frustrated by the lack of CENTAF intelligence architecture and plan for getting the necessary target materials and imagery for planning and BDA during execution. There was no comprehensive plan to acquire and integrate data to produce timely intelligence. Delineation of responsibilities for collection, production, and dissemination of intelligence at the national and theater levels for support for the units was unclear. The understaffed CENTCOM and CENTAF intelligence units were ill-prepared even had there been processes in place.⁶⁰ The federated concept CENTCOM developed to compensate for its small staff size delegated the targeting responsibilities down to the component level. CENTCOM J2 had limited ability to support CENTAF/IN and in turn the SPG. CENTAF/IN lacked a collection management program until November and had no local imagery production capability during the initial months of the deployment.

⁵⁸ Oral History Interview of Colonel Jim Blackburn, 102-104.

⁵⁹ Oral History Interview of Colonel Jim Blackburn, 110-111; Putney, *Airpower Advantage*, 152.

⁶⁰ Putney, *Airpower Advantage*, 153.

CENTAF had no authority to directly task the DIA or any of its delegated imagery and target graphics producers such as the 480th Tactical Intelligence Group at Langley AFB, Virginia and the 544th Strategic Intelligence Wing at Offutt AFB, Nebraska to provide new target materials. Captain Glock, or one of his counterparts, had to prepare written requests to give to the CENTAF/IN production tasking monitor. The production monitor sent the request to CENTCOM, which forwarded it to DIA, which tasked a delegated producer for it, which waited its turn to acquire the national overhead imagery on the target, analyze it, and produce the target material, and then sent the material to the DIA, which sent it to CENTCOM, which sent it to CENTAF/IN, which gave it to the targeteers attached to the SPG, who then gave it to the planners sometimes weeks after requested.⁶¹ Targeteers, awaiting delivery of the requested materials, had to make do with what they could access until the requested materials were either flown into the theater via courier in bulk shipments or sent on a case by case basis through satellite links to the Tactical Data Facsimile (TDF) which was slow and had poor resolution.⁶²

Targeteers tried to support the plan the best they could with what they had at the time. They started to maintain the target list for the Black Hole planners and started weaponeering the targets they were aware of as they waited for more data. Both tasks resulted in further disagreement between targeteers and the operational planners. First, there was no overall prioritized target list. The 84 targets, though prioritized within their categories, were not prioritized into a single target list. Targeteers normally integrated all target categories into a prioritization so one could get an idea of the relative importance of each target in relation to all the targets, not just within a single category.⁶³

Additionally, the Black Hole planners did not use BE numbers, they used their own Alpha-numeric system that had been created by the Air Staff. Planners identified each target by a category label and a number within the category. For example, they labeled targets that fell in the targets in the Strategic Air Defense category as SAD01, SAD02, etc. There was no ranking of relative importance; planners added targets

⁶¹ Putney, *Airpower Advantage*, 157.

⁶² Putney, *Airpower Advantage*, 156; Capt Elder, "Intelligence Requires Dedicated/Reliable Air Courier Support," Call # TF4-62-598 13 Mar- 25 Mar 1991, P. 8-37, IRIS # 0872719, in Task Force IV Collection, AFHRA, Maxwell AFB, AL.

⁶³ Oral History Interview of Captain John Glock, 25.

chronologically. Blackburn and his team had addressed the issue back at Checkmate, but operators refused to change their labeling convention. Their self-developed labeling was easier for them to understand and allowed them to quickly decide what to attack and the Master Attack Plan (MAP) was already started using this convention.⁶⁴ The targeteers insisted on using BE numbers not because they couldn't use the Black Hole numbering system but primarily because, to get any support from the intelligence community, one was going to need to use the BE number. Additionally, the SPECAT list, not widely disseminated, meant that outside the planning cell, targets had to be referred to by BE number for common reference.

The JCS previously mandated the use of BE numbers as the unique identifier to reduce confusion and errors in products, and Glock reiterated to Deptula the same issues identified by Blackburn, but the argument fell on deaf ears.⁶⁵ As a result of Deptula's unwillingness to use the standard, DoD-wide recognized target identifiers, the special planners kept and maintained the target list, not the targeteers.⁶⁶ The simultaneous use of two distinct numbering systems created some confusion throughout the entire operation and remained a contentious topic between planners and targeteers. Moreover, planners did not maintain a single prioritized list and did not prioritize targets within each category list. They continued to mix targets from all the category lists to craft the daily MAP throughout the war.⁶⁷

Furthermore, weaponeering was a point of contention between operators and targeteers during planning. In the Capabilities Analysis Phase, previously known as the Weaponeering Assessment Phase, targeteers "quantify the expected results of lethal and nonlethal weapons employment against prioritized targets."⁶⁸ Weaponeering is the process of determining the quantity of a specific type of weapon required to achieve a

⁶⁴ Oral History Interview of Captain John Glock, 26.

⁶⁵ Thomas A. Keaney and Eliot A. Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part II, Command and Control* (Washington, DC: Department of the Air Force, 1993), 175-176; Oral History Interview of Captain John Glock, 28-35; Putney, *Airpower Advantage*, 159; Oral History Interview of Colonel Jim Blackburn, 137-150.

⁶⁶ Putney, *Airpower Advantage*, 161; Oral History Interview of Colonel Jim Blackburn, 137-150.

⁶⁷ Putney, *Airpower Advantage*, 161; Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part II, Command and Control*, 175-176.

⁶⁸ Air Force Pamphlet (AFPAM) 200-17, *An Introduction to Air Force Targeting*, 23 June 1989, 21.

specified level of damage to a given target.⁶⁹ The goal of a targeteer is to weaponeer to make recommendations for the most suitable airframe and munitions loads for particular targets, but they base their recommendations on achieving a “specified level of damage” to a given target. Unless given guidance on what level of damage to achieve, targeteers tend to look at what to do to that facility to not necessarily destroy it but to at least deny its primary function.⁷⁰ “You don’t need to level it but you weaponeer to the degree it will put the facility out of operation,” Glock stated in a post-war interview.⁷¹ Glock recalled that Deptula told them to destroy targets and kill the air defense facilities which they interpreted to mean they should weaponeer for destruction despite having options in standard targeting methodology to weaponeer to disrupt, delay, neutralize, deceive or harass.⁷² Targeteers relied on the methodologies prepared by the Joint Technical Coordinating Group for Munitions Effectiveness and published in the Joint Munitions Effectiveness Manuals to develop the weaponeering recommendations for planners. Deptula rejected the recommendations provided by the targeteers realizing that based on the number of targets and the number of assets available, they were not going to be able to achieve the level of destruction identified on every single target because it would suck up too many resources and it was not necessary.⁷³

Deptula wanted to focus on not leveling buildings per se; rather, on disrupting targets to achieve specific effects and paralysis via what he called “parallel warfare.”⁷⁴ His goal was to achieve specific simultaneous effects against portions of a target system to render the entire system ineffective. By hitting a wide spectrum of targets/target systems, he believed it would shock the enemy and overwhelm them. Meanwhile, Glock’s interpretation of Deptula’s view of targeteers was that targeteers focused on destroying “this, this, and this tonight and then tomorrow we’re going to destroy this,

⁶⁹ AFPAM 200-17, *An Introduction to Air Force Targeting*, 21.

⁷⁰ Oral History Interview of Captain John Glock, 34.

⁷¹ Oral History Interview of Captain John Glock, 34.

⁷² Putney, *Airpower Advantage*, 161; AFPAM 200-17, *An Introduction to Air Force Targeting*, 15.

⁷³ Putney, *Airpower Advantage*, 162.

⁷⁴ Oral History Interview of Captain John Glock, 24; Putney, *Airpower Advantage*, 162; Brig Gen David A. Deptula, “Effects-Based Operations: Change in the Nature of Warfare,” (Arlington, VA: Aerospace Education Foundation, 2001), 3.

this, and this,” rather than destroying a wide spectrum of targets each day.⁷⁵ Deptula had a fundamentally different idea regarding the employment of airpower that he believed was counter to how the targeteers trained and exercised.⁷⁶ Deptula felt that his approach would free up more aircraft to strike targets from all of the categories simultaneously and achieve the same effects by disrupting their military function instead of destroying each target.⁷⁷

Instead of needing eight F-117s to deliver a mixture of 2,000-pound laser-guided bombs against a SOC as recommended by the targeteer, Deptula felt that one 2,000-pound Guided Bomb Unit (GBU)-27 could create the desired effects.⁷⁸ As a targeteer, Glock disagreed, believing that the GBU-27 would not penetrate the mission space before it detonated and not achieve the desired effects. Furthermore, he was concerned about the ability of BDA imagery to reveal if a SOC was disrupted using Deptula’s methodology. Glock agreed that one did not have to destroy the target physically to achieve effects, but he wanted to make sure enough damage occurred to reduce the operational level of the target to achieve the objectives.⁷⁹

One of the campaign objectives was to eliminate Iraq as a regional threat. Therefore, facilities supporting Iraq’s ability to threaten its neighbors had to be sufficiently damaged. Glock’s concern was that if Iraq surrendered in the first couple of days, Saddam would not only remain in power but they would not have appreciable decreased Iraq’s ability to threaten its neighbors. Glock thought Deptula’s targeting plan wasted weapons and resulted in an unfocused air campaign, but his concerns did not affect Deptula’s plan. Deptula determined that rudimentary, rule-of-thumb weaponeering was sufficient and the experience of his operations officers in the Black Hole rendered targeteer support from the traditional intelligence system unnecessary.⁸⁰

⁷⁵ Oral History Interview of Captain John Glock, 37.

⁷⁶ Oral History Interview of Captain John Glock, 37.

⁷⁷ Putney, *Airpower Advantage*, 162-163; Oral History Interview of Captain John Glock, 37.

⁷⁸ Putney, *Airpower Advantage*, 162; Deptula, “Effects-Based Operations,” 12.

⁷⁹ Putney, *Airpower Advantage*, 164.

⁸⁰ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part II, Command and Control*, 174.

His approach also reinforced his view that a single prioritized target list was unnecessary, much to the dismay of the targeteers.⁸¹ Planners continued to build the MAP without weaponeering inputs from targeteers. As a formality, targeteers continued to accomplish the weaponeering despite the fact their inputs did not change the MAP or affect the ATO.⁸² Targeteers were never allowed to do targeting in accordance with their training. Additionally, the SPG planners, in their targeting for effects strategy, never developed clear criteria to determine when structural damage was sufficient to produce the functional disruption and destruction needed to achieve their desired effects.⁸³ Disagreement over targeting strategy and weaponeering reinforced the SPG and Glosson's impressions that intelligence and the targeteers were never going to support them and drove further division of the groups.

How It All Went Down

Frustration between the planners and intelligence mounted throughout the planning and into the war. Geographic dislocation exacerbated the initial distrust between the groups. The targeteers operated out of the SPECAT planning area set-up in the Sensitive Compartmented Information Facility (SCIF) in a tent on the soccer field. The SCIF was a quarter of a mile away, approximately a 10-minute walk, from the rest of the Black Hole planners operating out of the Royal Saudi Air Force (RSAF) HQ Compound. The planners' chose not to join the targeteers in the SPECAT planning area in the SCIF. The lack of co-location between targeteers and planners meant that once the war kicked off, there was a possibility of the two parties being isolated from each other for up to hour after SCUD attacks, delaying the necessary exchange of information and impede planning efforts while they waited for the all clear...⁸⁴ Primarily, targeteers saw the operators when they would deliver information and products to the Black Hole, but the planners often failed to keep targeteers in the loop and utilized. Due to the controversy and dislocation of targeteers, the planning cell maintained their own target lists, did not rely on targeteer weaponeering, and built and maintained separate target

⁸¹ Putney, *Airpower Advantage*, 164.

⁸² Oral History Interview of Captain John Glock, 35.

⁸³ Putney, *Airpower Advantage*, 162; Glock, "Targeting and the Black Hole," 9-11.

⁸⁴ STRATFOR/IN, "DESERT SHIELD/DESERT STORM USCENTAF/STRATFOR After Action Report," Call # TF4-62-598, P. 15-11, IRIS # 0872719, in Task Force IV Collection, AFHRA, Maxwell AFB, AL.

folders. Additionally, the SPG's lack of trust in the targeteers and intelligence led to planners in the Black Hole relying on other intelligence and targeting organizations for support.

The CENTAF targeteers tried to recommend targets, provide weaponeering, and maintain target lists but the SPG mainly took inputs from Checkmate, DIA, or the JCS/J2. Glosson had cultivated relationships with highly-placed intelligence officers in Washington to include one of his most important intelligence-sharing relationships with the JCS/J2, Rear Admiral John "Mike" McConnell, whom Glosson personally relied on amongst his Washington and national agency contacts.⁸⁵ Often intelligence and targeting information would go directly to Deptula or Glosson without going through CENTAF intelligence personnel. Washington agencies often phoned target nominations directly to the Black Hole Planning Staff and while expeditious, bypassed theater intel channels.⁸⁶

Targeteers were regularly unaware of new target nominations until the planning cell or even tactical units called asking for imagery of the target because it was on the MAP or the ATO.⁸⁷ Black Hole planners added and subtracted targets from their list, but did not keep targeteers abreast of changes. Targeteers and intelligence personnel normally only received a copy from planners after list production, or they would get a copy via the MAP. This process concerned targeteers, not just because it kept them out of the loop, but also caused them always to be behind. Intelligence officers had concerns that the targets nominated through this informal intelligence network often did not meet CINCCENT targeting objectives, did not have appropriate preparatory analysis to identify aimpoints and DMPIs, and bypassed standard target material production.⁸⁸

⁸⁵ Mann, *Thunder and Lightning*, 155-156; Lt Col Angelina M. Maguinness, "The Imperfect Storm: Intelligence-Operations Integration in the Gulf War" (master's thesis, Maxwell AFB, AL: School of Advanced Air and Space Studies, June 2014), 53; Putney, *Airpower Advantage*, 165-168, 190-195, 240-241.

⁸⁶ Col Richard S. Rauschkolb, "CENTAF/IN After Action Report and Lessons Learned Attachment 2: 9 TIS Commander," March 25, 1991, Call # TF4-62-598 13 Mar- 25 Mar 1991, P. O-5, IRIS # 0872719, in the Task Force IV Collection, AFHRA, Maxwell AFB, AL; Col Richard S. Rauschkolb, "CENTAF/IN After Action Report and Lessons Learned Attachment 3: INT-Targets," March 25, 1991, Call # TF4-62-598 13 Mar- 25 Mar 1991, P. O-6, IRIS # 0872719, in the Task Force IV Collection, AFHRA, Maxwell AFB, AL.

⁸⁷ Oral History Interview of Captain John Glock, 45.

⁸⁸ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part II, Command and Control*, 202; Maguinness, "The Imperfect Storm," 68.

When the Black Hole planners felt that CENTAF/IN did not produce, they sought and found other sources of intelligence.⁸⁹ While Washington agencies often had the benefit of better and more timely info, they did not keep theater intelligence personnel in the loop on information passed to the planning staff.⁹⁰ Intelligence personnel in the field were frustrated at the lack of heads-up from their Stateside intelligence counterparts, especially those in Checkmate. The Joint Staff would also send imagery directly to the planning staff without providing the targeteers any copies, compounding the credibility problem and forcing targeteers to consistently scramble to provide unit support, often under impossible time constraints.⁹¹ As a result, intelligence personnel and targeteers were constantly in react mode causing their credibility to suffer further. Planners felt as though they were continuously having to pull information from intelligence personnel and were frustrated at the lack of information pushed to them without having to ask.⁹² In theater, targeteers were mostly shut out of targeting processing and took a back seat to developing targets, especially for the first 10 to 16 days of the war.⁹³

The month before the war kicked off, at the pleading of the SPG, Glock was moved from the SCIF to a room in the Black Hole planning space on a full-time basis to support planning for the offensive.⁹⁴ It helped some because he was at least present when inputs arrived from Checkmate or other agencies, and he could immediately try to collect information and target materials. Some planners did not want him there for fear he would just disagree with everything they said and create more problems. A second targeteer was added within a few days to allow for twenty-four-hour targeteer coverage in the planning cell.⁹⁵ Eventually, planners realized intelligence personnel could help if they were willing to work with them. At that point though, a lot of damage had already been

⁸⁹ Putney, *Airpower Advantage*, 284.

⁹⁰ Col Richard S. Rauschkolb, "CENTAF/IN After Action Report and Lessons Learned," March 25, 1991, Call # TF4-62-598 13 Mar- 25 Mar 1991, P. O-4, IRIS # 0872719, in the Task Force IV Collection, AFHRA, Maxwell AFB, AL; Rauschkolb, "CENTAF/IN After Action Report and Lessons Learned Attachment 2," O-5.

⁹¹ Rauschkolb, "CENTAF/IN After Action Report and Lessons Learned," O-4; Rauschkolb, "CENTAF/IN After Action Report and Lessons Learned Attachment 2," O-5.

⁹² Putney, *Airpower Advantage*, 165.

⁹³ Rauschkolb, "CENTAF/IN After Action Report and Lessons Learned, Attachment 3," O-6.

⁹⁴ Putney, *Airpower Advantage*, 286; Oral History Interview of Captain John Glock, 45; STRATFOR/IN, "DESERT SHIELD/DESERT STORM USCENTAF/STRATFOR After Action Report," 15-11.

⁹⁵ Putney, *Airpower Advantage*, 286.

done and the targeteers now permanently assigned to the Black Hole were not able to fully repair the disconnect between planners and intelligence personnel.⁹⁶ The overall ill-will, perceived lack of support, and lack of understanding between the Black Hole planners and intelligence drove the Black Hole planners' dependence upon their ad hoc and informal information conduits and processes that they relied on throughout the war.⁹⁷

The early challenges with lack of imagery and target materials along with lack of coordination between in-theater intelligence personnel and operations planners had further consequences for force execution and assessment (phases 5 and 6 in the targeting cycle). Delayed knowledge of the finalized target lists for the MAP and ATO, and last-minute changes to the ATO that Glosson decided needed to go through Black Hole planners instead of the Tactical Air Control Center (TACC), affected intel's ability to support the flying units and acquire necessary imagery for BDA. Changes driven by weather or some hot piece of intelligence Glosson or his planning team received from Checkmate, Rear Admiral McConnell, or through another member of the SPG's ad hoc intelligence network drove changes to the ATO, at times as late as two hours before aircrews stepped to their aircraft. At times, Glosson would even call flying units directly and instruct them to strike specific targets.⁹⁸

Planners did not fully understand the second and third order effects of the ATO changes on the units tasked with supporting and executing the ATO. Once they selected the targets, targeteers at CENTAF or CENTCOM normally worked with DIA and DMAAC to obtain the most precise coordinates for striking the aimpoints. The last-minute changes or changes that planners failed to communicate to intelligence personnel often resulted in individual units selecting aimpoints and/or the Black Hole passing less precise coordinates than those available through the bypassed intelligence channels.⁹⁹ This introduced further friction into the targeting process. Some was a result of unit's imagery expectations. Certain units depended on high-quality current imagery for mission preparation and intelligence personnel would jump through hoops to try to get

⁹⁶ Oral History Interview of Captain John Glock, 45-46.

⁹⁷ Maguinness, "The Imperfect Storm," 49-50.

⁹⁸ Maguinness, "The Imperfect Storm," 67.

⁹⁹ Maguinness, "The Imperfect Storm," 117.

units all the required information for mission planning and execution; however, pilots often flew with outdated pictures of the targets or no imagery at all because of last minute changes.¹⁰⁰

In addition, the last minute ATO changes affected an already struggling BDA process. In the absence of knowledge on new targets, targeteers and intelligence personnel could not ensure collection prioritization for such critical targets. The result was a lag in imagery collection and therefore delayed BDA. These delays made intelligence personnel look incompetent and unsupportive as they continued to be behind the power curve due to the ATO alterations and lack of communication from the planners. Additionally, unit DMPI selection further complicated BDA analyst efforts to assess damage because they did not know the DMPIs chosen by individual units.¹⁰¹ The issues with BDA for last minute changes to the ATO exacerbated the BDA problem. When the war kicked off, intelligence personnel expected BDA to be a big problem. “BDA was eight times harder than I thought, and I knew it was going to be hard. There were so many issues that we were wrestling with,” stated Colonel William Armstrong, the CENTCOM Deputy J2, during a post-war interview.¹⁰²

One of the problems was that the intelligence community did not have a BDA methodology for the type of war they faced, putting the targeting process further behind the power curve.¹⁰³ According to the *Gulf War Air Power Survey*, “The intelligence staffs were not prepared for the enormity of the task [BDA/Combat Assessment (CA)], either in numbers of qualified personnel or established and rehearsed procedures. Those staffs were particularly unprepared to deal with the number of attack sorties that occurred every day of the war.”¹⁰⁴ BDA and overall CA are difficult to simulate during operational exercises, and it was not a task intelligence personnel had adequately trained for due to the fact BDA was most often simulated during exercises.

¹⁰⁰ Maguinness, “The Imperfect Storm,” 117.

¹⁰¹ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part II, Command and Control*, 299.

¹⁰² Putney, *Airpower Advantage*, 276; Oral History Interview of Colonel William P. Armstrong by Lt Col Richard Reynolds, October 23, 1991, typed transcript, Call # K239.0472-71, P. 12, IRIS # 0876235, Desert Story Collection, AFHRA, Maxwell AFB, AL; Putney, *Airpower Advantage*, 57.

¹⁰³ Oral History Interview with Col William P. Armstrong, 8.

¹⁰⁴ Keaney and Cohen, *Revolution in Warfare*, 139; Maj Scott B. Gere, “Struggling to Target: Airpower’s Historical Challenges Continue” (master’s thesis, Maxwell AFB, AL: Air Command and Staff College, April 2002), 16.

CENTAF carried the primary responsibility for BDA for Phases I and II of the air campaign against the strategic and air supremacy targets which included the enemy Integrated Air Defense System, interdiction targets, and even bridges. Army Forces Central and Marine Forces Central were tasked by Schwarzkopf to complete BDA for Phase III battlefield preparation which involved measuring air power's destruction of Iraq's ground forces. CENTAF/IN had an insufficient number of people trained to do BDA for the task at hand in the opening days of the war. They also had three different BDA cells that intelligence personnel were supporting.¹⁰⁵ The first cell was in the TACC, located in the RSAF HQ building. CENTAF targeteers in this cell supported the TACC combat operations staff by receiving and keeping track of MISREPs which hypothetically would include information from aircraft-gun camera film (cockpit videotapes) describing what they saw and indications of successful strikes. Unfortunately, there were no standardized procedures for crew debriefings; the reports often lacked essential elements of information about strike sorties, so even though timely, were often useless.¹⁰⁶

The second BDA cell that CENTAF supported was the official Combat Assessment (CA) cell in the Combat Intelligence Division (CID) in the SCIF. This cell received all transmitted intelligence reports, made target recommendations, and produced an Air Combat Assessment Summary that was a fused report of the air campaign and distributed to the wings and the JFACC.¹⁰⁷ CENTAF/IN staff tracked BDA from MISREPs, in-theater reconnaissance imagery, and tapped directly into the DIA system. DIA established a formal BDA system to exploit the products from satellites and provide strategic BDA directed at strategic targets in Iraq.¹⁰⁸

The CENTAF/IN, Colonel Christopher L. Christon, contracted with DIA representatives to provide CENTAF/IN personnel with initial indications of weapons impact and follow up with more detailed information on the impact of the strikes on the target sets and the objectives of the war.¹⁰⁹ The in-theater intelligence team relied on DIA

¹⁰⁵ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part II, Command and Control*, 296.

¹⁰⁶ Putney, *Airpower Advantage*, 279.

¹⁰⁷ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part II, Command and Control*, 297.

¹⁰⁸ Putney, *Airpower Advantage*, 278.

¹⁰⁹ Putney, *Airpower Advantage*, 278.

for judgments as to whether strikes accomplished the anticipated target damage to augment their internal analysis. The cell was then responsible for informing the TACC on hit or miss data for potential re-tasking and passed information to the SPG to incorporate into future ATO day planning.

CENTAF/IN personnel were also responsible for sending post-strike photos to the flying units which Christon decided had to be sent a hard copy via couriers versus electronically. The TDF used for electronically sending photos was slow, and it was extremely time-consuming for his limited staff to send all the BDA photos to every unit electronically. He considered the photos to be nonessential and prioritized sending the critical, prestrike mission planning imagery electronically via TDF.¹¹⁰

The Black Hole planners created the third assessment cell. They originally relied on Christon's staff to supply the SPG with BDA intelligence; however, Glosson tasked one of his planners to lead a team within the Black Hole to track target-sets and determine if targets needed to be re-struck. The SPG once again found that they did not get the information they wanted and needed from the TACC or CID CA Cell fast enough for their planning efforts.¹¹¹ BDA often took a couple of days and even lagged as long as 12 days for some targets, arriving too late to affect retargeting decisions. They did not take the same approach as intelligence personnel and planners did in WWII. Instead of assuming target destruction in the absence of evidence, Desert Storm intelligence personnel and planners assumed the opposite which often resulted in unnecessary restrikes due to the delay of BDA.

Due to frustrations regarding the timeliness of BDA, the Black Hole began making their own damage assessments often relying on cockpit videos and MISREPs, which some did not consider credible unless the national or tactical reconnaissance confirmed the information reported.¹¹² As a result, the SPG again relied on their ad hoc intelligence resources back in Washington. After planning moved to the theater, Blackburn redistributed his AFIA targeteers that had been chopped to support

¹¹⁰ Putney, *Airpower Advantage*, 289.

¹¹¹ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part II, Command and Control*, 297.

¹¹² Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part II, Command and Control*, 300.

Checkmate. Blackburn's personnel embedded themselves in several organizations around Washington, to include with DIA BDA analysts. The Black Hole relied on their ties to the J2 and DIA amongst other organizations to provide damage assessments and push information directly to the SPG in theater. In turn, the Black Hole used the information from their ad hoc resources and their own information and analysis to create a separate BDA list. This resulted in further confusion due to the development of two separate BDA lists, one developed and maintained by the intelligence personnel in the CID and a separate list produced and used by planners themselves.

Imagery issues also continued to plague the targeting process. Intelligence personnel struggled to get the quantity, quality, and resolution of imagery they needed for accurate BDA.¹¹³ While the weather often prevented adequate reconnaissance of many of the strategic targets in the early days of the war, the few qualified CENTAF/IN collection managers had to set priorities for the imagery collected from limited assets. Having not taken part in the target planning or being aware of changes to the ATO, each day's reconnaissance taskings did not always match air campaign planners' requirements.¹¹⁴ Again, Glosson often relied on his ad hoc personal relationships to get the imagery he needed. In the case of a last-minute high priority targets, Glosson was afraid they would not get collected through standard channels. So, Glosson would telephone McConnell with last minute requests, and McConnell would task an image collect if the asset had not already passed over the target.¹¹⁵ Regardless, the imagery requirements for BDA could not keep up with the demand.

Additionally, multiple BDA cells using different assets caused problems and confusion over target destruction resulting in conflicting BDA reports.¹¹⁶ BDA analysts were not trained to support an air campaign with such a high sortie rate, but they were also not prepared to assess the effects of so many kinds of air units. 9AF analysts trained to support 9AF assets, not the "multi-service, multinational air armada which was

¹¹³ Oral History Interview with Col William P. Armstrong, 13.

¹¹⁴ Maguinness, "The Imperfect Storm," 120-121.

¹¹⁵ Putney, *Airpower Advantage*, 282.

¹¹⁶ "Determine and Assess the Actors and Process in Targeting/BDA," Call # K239.0472-33, Vol. 1, Mar-May 1991, P. 137-139, IRIS # 0876189, in the K239.0472 Collection, AHRA, Maxwell AFB, AL.

eventually pulled together under Horner's leadership."¹¹⁷ DIA was reliant on Checkmate's assistance because DIA BDA analysts lacked expertise in aircraft and weapons delivery. Checkmate's support helped analysts better understand and interpret penetrating-weapon effects, but they did not have the workforce to continuously supply data on Desert Storm targets in relation to the types of aircraft flown against them, nor on weapons and fuzing, aim points, target objectives, and other essential elements of information. Analysts had to know the aircraft, munitions, and objectives to know what to look for as they studied post-strike photos.¹¹⁸

Deptula's concept of targeting for effects also created problems for BDA analysts. Per Deptula's concept, they were targeting for effects, not for mass destruction. Unfortunately, destruction is easier to assess, and because of the capabilities of precision-guided munitions, there may be little damage that appears in post-strike imagery. Classic photo-interpretation would describe the target as slightly damaged showing only a small entry hole but not the damage inside, for example, a hardened aircraft shelter. Analysts misinterpreted weapons effects and consequently mission success at times unless cockpit videos captured the weapon's impact and any secondary explosions venting out the door and ventilators.¹¹⁹ Because an assessment of functional, not just physical damage, was necessary based on Deptula's notion, analysts also needed to look at damage across the target sets and not just at individual targets to understand the synergistic effects and success in achieving objectives.¹²⁰ This higher level of analysis that was needed was more difficult and took longer, frustrating the already impatient planners.

Historically cited as one of the biggest failures of the conflict, BDA proved to be one of the biggest challenges and frustrations for intelligence personnel and planners alike during Desert Storm. According to the CENTAF/IN *Targets Division After War Report*, "Everyone had a different set of criteria and hence different assessments—no one trusted others' results, there was a failure to agree within CENTAF never mind outside

¹¹⁷ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part II, Command and Control*, 304.

¹¹⁸ Putney, *Airpower Advantage*, 281-282.

¹¹⁹ Keaney and Cohen, eds., *Gulf War Air Power Survey*, Vol. 1, *Planning and Command and Control: Part II, Command and Control*, 300.

¹²⁰ Putney, *Airpower Advantage*, 282.

from national agencies. It made everyone look bad and created confusion.”¹²¹ The lack of a centralized BDA cell and lack of a clear division of responsibility between national and theater level agencies caused confusion and duplication of effort.

At the end of the war, one of Schwarzkopf’s biggest critiques of intel was BDA. “BDA... was one of the major areas of confusion. And I feel that was because there were many people who felt they were in a better position to judge battle damage assessment from a pure analysis of things like photography, and that sort of thing, alone, rather than allowing the theater commander, who is the person that really, in the final analysis, has to make the ultimate assessment to apply good military judgment to what he is seeing. That led to some reports that were confusing. It led to some disagreements. As a matter of fact, it led to some distancing on the part of some agencies from the position of the Central Command at the time, as to what the battle damage assessment really was...,” stated Schwarzkopf in his testimony before Congress in June 1992.¹²² But victory has a way of making people forget about the difficulties. Despite all the challenges seen throughout the targeting process in Desert Storm, the campaign from an outside perspective seemed to be a stunning success. The ingredients for a durable myth about targeting’s heyday were already taking root.

Targeting’s Not So Golden Age

Overall, Air Force targeting officers did not provide the support that decision makers, planners, and aircrews both desired and required in Desert Storm.¹²³ Although the importance of intelligence and targeting for planning and execution were recognized during Desert Storm, the organization, processes, training, and management of targeteers resulted in less than optimal targeting support. The lessons learned in Desert Storm left a lot of room for improvement in targeting and the relationship between intelligence personnel and targeteers with their operational planning counterparts.

¹²¹ Lt Col Sarah L. Cunningham, “BDA,” March 25, 1991, Call # TF4-62-598 13-25 Mar 1991, P. 5–15, IRIS # 0872719, in the Task Force IV Collection, AFHRA, Maxwell AFB, AL.

¹²² US House of Representatives, *Intelligence Successes and Failures in Operations Desert Shield/Storm: Report of the Oversight and Investigations Subcommittee of the Committee on Armed Services*, 103rd Cong., 1st sess., 1993, 29.

¹²³ Glock, “Evolution of Air Force Targeting,” 24.

Instead of continuing to build off the targeting lessons learned in Desert Storm, post-war Air Force targeting saw some major changes that not all people deemed beneficial for targeting's growth. The targeting career field suffered in the wake of the war as the military was restructured and downsized. The Air Force was forced to achieve efficiencies in a climate of fiscal and manpower shortfalls.¹²⁴ The nine intelligence subdivisions with their separate AFSCs were consolidated first into three categories in 1992 and finally melded into a single 14N intelligence AFSC doing away with the AF officer targeting career field.¹²⁵ The policy at the time was to develop "broadened specialists" with an understanding of intelligence beyond specific individual technical areas. Enlisted targeteers underwent a similar transition as their career field was absorbed into one of six enlisted intelligence specialties and further consolidated in 2007. In response to the Greybeard targeting study, the enlisted targeteer specialty reemerged in 2009, but the consolidation of officer intelligence specialties and specifically the elimination of the targeting officer career field remains controversial today.

Furthermore, after the Gulf War, Congress encouraged the SECDEF, heads of military services, and the CJCS, and the director of DIA to make resources available for a Joint Target Training Program. For the first time, the Air Force took a backseat role in joint targeting, and the Navy became the executive agent for the training program.¹²⁶ Since then, targeting training has been through many iterations at the joint and Air Force levels. The Air Force's Combat Targeting Course (CTC) has fluctuated over the years in name, length, and offerings of in residence versus online. Targeting has also seen multiple iterations organizationally and in processes. Ultimately, individual hard work, flexibility, and creativity enabled the success of the Desert Storm targeting campaign, but many of the lessons remained lessons observed versus true lessons learned as they were never solved in the post-Desert Storm era leading to the present day targeting studies and findings.

¹²⁴ Maj Paul A. Rozumski, "Air Force Intelligence Officer Targeteers: A Discussion on Specialization" (master's thesis, Fort Leavenworth, KS: U.S. Command and General Staff College, 2011), 2.

¹²⁵ Marygail K. Brauner, Hugh G. Massey, S. Craig Moore, and Darren D. Medlin, "Development and Utilization of U.S. Air Force Intelligence Officers," A RAND Project Air Force Technical Report, prepared for the United States Air Force, (Santa Monica, CA: RAND Corporation, 2009) xi.

¹²⁶ Glock, "Evolution of Air Force Targeting," 26.

Chapter 4

So Was it Ever Really Golden: Analysis and Implications

In the past, to our sorrow, we have had to relearn several times that targeting is a key element in both peacetime readiness and wartime effectiveness.

*- Major General John B. Marks,
Assistance Chief of Staff, Intelligence*

The importance of targeting was identified as far back as WWI and the emphasis continued after targeting came of age in WWII. Those who have written about or employed aerospace power have long recognized the importance of targeting, but we still struggle to fully appreciate its importance, and targeting has continued to have difficulty assuming its proper place. “Targeting has always been a specialty caught between operations and intelligence,” according to the AFLL report.¹ One of the goals of the POA&M is to ensure that targeting is recognized as integral, and foundational, to the application of air power. The need to insert language into doctrine, policy, and guidance that emphasizes targeting as a foundation remains today despite early airpower leaders’ recognition of targeting’s value, and it needs to be championed by both the operations and intelligence communities.²

As we move forward to fix targeting, it is important to understand from where it came. The foundations are seen in late WWI and the interwar years and it came of age during the execution of WWII, but neither of the two most successful conflicts in US history—WWII and Desert Storm—can be considered the golden age of targeting. Despite awareness on the part of targeteers and those close to the targeting problem, the Air Force writ large often overlooks the many problems that plagued targeting in both

¹ Air Force Lessons Learned (AFLL), “The United States Air Force (USAF) Targeting Enterprise at the Operational Level,” Air Force Lessons Learned Report, (Maxwell AFB, AL: Air University Curtis E. LeMay Center, 26 October, 2015), 17. (FOUO) Information extracted is not sensitive or critical.

² Mr. Thomas J. Mahoney, Targeting Branch ACC/A2 Langley AFB, VA, to the author, e-mail, 1 March 2018 (e-mail included current excel document for tracking POA&M action items) AFLL, “USAF Targeting Enterprise,” 17.

WWII and Desert Storm.³ So, while we continue to develop the way forward for targeting, it is critical to understand the history to which we compare it. From the case studies described, we can see the many recurring challenges with regards to targeting across many decades, specifically, in terms of organization, processes, training, and force management.

Organization

Organizationally, the need for an intelligence structure capable of conducting the systematic analysis required for proper targeting was identified during the interwar period. ACTS theorists developed their strategic bombing theory on the assumption that a capable organization and structure existed. During this period, air force personnel struggled to gain autonomy from the Army with the authorization to provide the necessary intelligence and targeting support required for the new strategic bombardment theory. The small, ad hoc, SAIS was the first real attempt to stand up a group to analyze Germany's industrial-economic infrastructure. Lacking personnel and experience, Hansell's group relied on civilian experts for analysis. In developing AWPD-1, Hansell drew on the work from the SAIS and that of Britain to develop the first war plan, but all targeting efforts were still via ad-hoc processes. The COA, the AC/AS A2, the EOU, and the 8AF ended up being the four primary organizations developed in WWII to provide the necessary structure and organization to support targeting.

The COA was the first central intelligence organization, staffed with civilian experts and military representatives in Washington, tasked and organized for the systematic targeting analysis required for operations against Germany. The COA identified and provided target system recommendations to the theater. The AC/AS A2's goal was to provide all of the intelligence materials needed to support operations, to include objective target folders and the required target maps and charts. Early on, as a stateside staff organization, they realized they were not capable of providing the necessary materials for Germany, and instead tasked the 8AF with this responsibility in theater. The 8AF had access to all the necessary materials through the EOU which liaised with British intelligence. It was up to the 8AF to select and prioritize targets

³ Mr. John Glock, Chief, Targeting Branch ACC/A2 Langley AFB, VA, to the author, e-mail, 12 March 2018.

based on COA recommendations. The EOU would then pull the necessary targeting data from the RAF and translate it into the required products for the 8AF. While the organizations were slow to develop, the AAF was able to create the necessary framework to support target system analysis and execution providing a baseline for AAF organizations and processes post WWII.

There were three primary organizational lessons learned as a result of experiences in WWII. First was the need for a structure and organization responsible for providing the necessary intelligence and targeting support. The second was the realization of the need for an intelligence organization focused on targeting during peacetime, because in the future the US might not be able to rely on its allies for all the necessary materials like it did with Britain for German targeting. Additionally, there would not necessarily be enough advanced notice to collect and analyze the necessary targeting data and produce the required materials if efforts were not made during peacetime. As a result, the JCS developed the Air Intelligence Division in the years following WWII, tasking it with studying targets worldwide during peacetime. Unfortunately, the organization shifted away from the worldwide focus and concentrated on the USSR throughout the Cold War. Consequently, the US did not have adequate targeting information and materials available or prepared to support conflicts in Korea, Vietnam, and finally in Iraq for Desert Storm. Although the intent was there, the execution did not address the lesson learned in WWII.

The final lesson learned in WWII was in regards to BDA. Although there were clear lines of responsibility for the three phases of BDA, Phase 1 and 2 occurred at the unit level and Phase 3 at the ACIU, as Dr. Lowe identified, there was no central organization for BDA. There was a lack of consolidated information providing an understanding of aggregate destruction for a target or target system. The lack of a comprehensive targeting picture hindered future planning and target selection. All three of these lessons learned in WWII were again highlighted in the Gulf War, creating challenges for intelligence personnel and planners.

Unlike in WWII, the AF entered Desert Storm with clear guidelines on roles and responsibilities for war planning. The Goldwater-Nichols Act established that Combatant Commands were responsible for warfighting and all necessary planning. Based on organizational structure and guidelines, the assumption was that CENTCOM's air

component, CENTAF, would be responsible for air planning. Within CENTAF, the targeting support would, therefore, fall to the CENTAF Intelligence Division which was dual-hatted in peacetime as the 9 TIS. When Schwarzkopf delegated the initial campaign planning to Checkmate, this created controversy and confusion. When Checkmate took on the planning, they utilized targeteer support from the Air Force Intelligence Agency Targets Intelligence Branch (INT). AFIA/INT had no role or responsibilities with targets planning and no role in CENTCOM planning; they were normally tasked with administrative type targeting functions for the Air Force overall. Their role as a targeting administrative function meant that they were not a high priority to receive support from other agencies in the intelligence community. They had to create ad hoc processes with organizations like DMAAC and work via personal relationships to get the initial support they needed, but also were not able to task or access the most current targeting information. This was why getting CENTCOM delegation was so critical to Blackburn after the plan was approved by Schwarzkopf before it went to theater.

Concerns in Desert Storm were similar to those in WWII and Vietnam. In all three conflicts, there were concerns and frustrations with what appeared to be planning and target selection being accomplished in Washington instead of by in-theater planners and targeteers that were hypothetically more experienced in their areas of responsibility and they were directly tasked for planning theater specific operations. In WWII, the 8AF was initially skeptical of the targeting and planning recommendations coming from the COA and the AWPB. The COA was able to smooth tensions by recommending a “non-prioritized” list of target systems but did not select individual targets—that was left to in-theater planners. In Vietnam, and then in Desert Storm, there was greater controversy, and in Desert Storm, hostility especially between Checkmate planners and the intelligence and targeting personnel tasked to support the planning in theater.

Furthermore, the lack of clear roles and responsibilities among the organizations involved in Desert Storm created redundancy and confusion with the Black Hole keeping their own target lists and building their own target folders and materials separate from theater intelligence and targeting personnel. When the Black Hole did not get the information they needed and wanted, they created their own ad hoc reachback targeting support system. Glosson relied on personal relationships that he had developed with the

J2, and Black Hole planners continued to reach back to their Checkmate counterparts who tapped into intelligence organizations for information throughout Washington. Most often, this information fed only to the Black Hole, leaving out CENTAF intelligence and targeting personnel, further exacerbating the issues and distrust between the two organizations. Although US policy and military doctrine dictated that CENTCOM and in turn CENTAF were responsible for planning, and therefore providing the primary intelligence and targeting support, first Schwarzkopf and then his air planners did not stick to standard organizations and processes. This created confusion, duplication of effort, and a great deal of frustration.

Another lesson re-learned in Desert Storm was the importance of having an organization that handles peacetime targeting studies and maintains up-to-date target materials for countries worldwide. The Cold War focus on the USSR left targeteers scrambling for Iraqi targeting information and materials leading up to Desert Storm. DIA, the organization tasked with keeping the targeting database up to date, was aware that the available materials leading up to Desert Storm were outdated and insufficient. Even though an organization was identified, and the roles and responsibilities clear, the US prioritization of the USSR resulted in inadequate targeting information and materials for conflicts such as Iraq.

Finally, from an organizational standpoint, the BDA structure was another challenge faced and a lesson re-learned in Desert Storm. CENTAF was primarily responsible for Phase I and II BDA for the air campaign and reached back to DIA for national and strategic level BDA. Because in-theater intelligence staff was unprepared to deal with the enormity of the BDA task, CENTAF/IN was also able to contract with DIA for initial weapons impact indications and more detailed follow-up information on the impact of strikes in relation to the target sets and wartime objectives. Meanwhile, the Black Hole set up their own BDA cell, creating another organization, and complicating matters as they reached back to their Washington resources. This created confusion, redundancy, and further complicated the BDA process as roles and responsibilities were blurred. The struggles with BDA in Desert Storm reiterated the importance and need for a centralized organization responsible for coordinating and overseeing BDA.

Similar organizational concerns exist today. The Greybeard Targeting Study, the AFTRM, and the AFLL Report all identified similar organizational issues that need to be addressed. The Greybeard Targeting Study once again identified the need for a single entity to oversee targeting policy, processes, and standards throughout the DoD. It also recommended that the AF/A2 formally identify an organization as the USAF Targeting CoE to oversee and manage all AF intelligence support to the air component and to joint targeting operations, which sounds eerily reminiscent of the lessons learned as far back as WWII.⁴ By designating a CoE, it provides a centralized organization to provide more effective reachback support to theater operations. Enabling efficient and reliable reachback support and distributed operations is also one of the key goals of the AFTRM.⁵ The AFTRM recognizes that having codified, reachback/distributed processes is a key enabler for effective intelligence sharing and targeting.⁶

The more recent AFTRM study identifies the need to not only define clear “lanes in the road” but also the need to reinforce them, unlike what was observed in Desert Storm. In the resource-constrained environment of today, reducing duplication of effort is critical. Another important area identified is the need to establish working relationships with organizations that specialize in specific mission areas and ensure that AF component planners can access these capabilities to support deliberate planning.⁷ This was done on an ad hoc basis in Desert Storm that often resulted in greater confusion and frustration. As a result of these organizational lessons learned from WWII, through the most recent targeting studies, the Air Force developed the Air Force Targeting Center which went on to become the 363rd ISR Group (ISRG) and now a part of the 363 ISRW Targeting and Analysis Wing, which stood up as the primary targeting reachback center for the Air Force in 2015. The intent is that the organization will provide support in the areas of targeting analysis via TSAs, weaponeering, point mensuration, CDE, target

⁴ Science Applications International Corporation (SAIC), “Greybeard Targeting Study for the 480th Intelligence Wing: Final Report,” (Hampton VA: SAIC, 9 January 2008), 9. (FOUO) Information extracted is not sensitive or critical.

⁵ Air Combat Command Intelligence Directorate (ACC/A2), “Air Force Targeting Road Map: Reinvigorating Air Force Targeting,” (Langley AFB, VA: Air Combat Command Intelligence Directorate, 30 September 2012), 4.

⁶ ACC/A2, “Air Force Targeting Road Map,” 21.

⁷ ACC/A2, “Air Force Targeting Road Map,” 17.

materials, and BDA products as required by CCMDs.⁸ It creates a centralized AF organization to provide targeting support. While the 363 ISRW is still in its infancy, most of the units it oversees have been in the targeting business for much longer. Bringing all the primary AF targeting units under a central body is a step in the right direction to solve the organizational challenges that were identified as far back as WWII and re-emphasized by the experiences of Desert Storm. Creating a wing specifically focused on targeting and analysis also reflects leadership's acknowledgement of targeting's importance and helps create a distinct place for it as the AF's central targeting support organization.

Targeting's organizational challenges are not new, and various changes have been made over the years to try to address the problems. One of the POA&M focus areas is on "Lanes in the Road." The POA&M Execution Plan for the AFTRM states, "'Lanes in the Road" concentrate on defining the roles and responsibilities of organization having targeting equities within the AFTE. Targeting is not an exclusive province of one type of specialty or division, such as intelligence or operations, but blends the expertise of many disciplines throughout the core functions of the Air Force. This overarching effort requires a comprehensive evaluation of every Air Force participant in the targeting enterprise. The intent is to build a synergistic approach to leveraging the AFTE while eliminating duplication of effort."⁹ Continuing to define organizational roles and responsibilities and reinforce the expectations will be critical in ensuring the targeting community continues to move forward and posture to meet increased targeting needs.

Processes

After identifying organizations and determining clear lanes in the road, the next step is to ensure that there are clear processes and standardization to increase effectiveness and efficiency. This assurance is essential if organizations are to do their jobs and customers know how to leverage support. Each of the three studies, Greybeard Targeting Study, AFTRM, and AFLL identify the need for, and deficiencies in, clear processes and procedures and standardization across organizations. Each of the studies

⁸ AFLL, "USAF Targeting Enterprise," 16.

⁹ Air Combat Command Intelligence Directorate (ACC/A2), "Targeting Plan of Actions & Milestones (POA&M: The Execution Plan for the Air Force Targeting Roadmap)," (Langley AFB, VA: Air Combat Command Intelligence Directorate, 21 March 2013), 6.

specifically addresses the need for TSAs as part of the targeting process and issues with the BDA process.

In WWII, there were not clear processes, procedures, and standardized products at the outset of the war because such things had not been developed. Americans were completely reliant on their British counterparts to teach them their intelligence processes and procedures and relied on their ally's products as their baseline templates and standards for all targeting materials. US dependence on their British ally in some respects was a blessing in disguise because it meant that all allied intelligence personnel were getting trained on the same processes and procedures, and integration between the two nations was ultimately easier. The standards used by both countries were those of the British who even agreed to adopt their own processes, procedures, and product standards to meet US needs until the Americans developed their own intelligence and targeting capabilities. Even then, Americans tended to tweak the British processes and procedures designed to support night time area bombing to meet US needs for precision daylight bombing instead of completely redevise targeting products.

Britain's willingness to share all target materials meant US access to the necessary targeting information and materials was a non-issue. Today, the tables have turned, and one of the process concerns highlighted in the AFTRM was "classification policies and processes enabling timely access to Air Force intelligence production by allied and coalition partners."¹⁰ Because the classification policies and releasability processes and guidelines were not readily accessible by USAF production centers, US allies and partners did not receive required targeting support in a timely fashion. The only area in which US personnel were limited due to classification and compartmentalization for security concerns in WWII was in regards to ULTRA data. The two countries were able to reach a sharing agreement, and created processes involving imbedded liaisons to ensure critical information was passed. Establishing these processes and expectations was critical to the flow of critical targeting information between the two countries. The US relied on the British and adopted their BDA processes, and although initial training and methodology were lacking, everyone was trained to the same British standards, which is not the case today for US and allies and

¹⁰ ACC/A2, "Air Force Targeting Road Map," 24.

coalition partners creating integration and sharing issues from both a processes and access standpoint.

In Desert Storm, while there were some access and integration issues with the US and its coalition partners, the problems discussed in the case study show that there were critical access and integration issues between teams within the USAF alone. The sensitive nature of the Black Hole plan meant that very few intelligence and targeting personnel were read-in to the program and the compartmentalization caused issues with sharing information and integrating operational planners and intelligence and targeting personnel. Only five intelligence personnel had access to the plan and the Black Hole working area at the outset.

Additionally, planning was not conducted in the SCIF where and targeting personnel had access to the highest level of information available to them for planning. Furthermore, not all non-intelligence planners had the correct security clearances for unescorted access within the SCIF so intelligence personnel had to halt their work when some of the planners visited the SCIF to gather information. The lack of mutual access due to non-co-location, security, and compartmentalization issues resulted in a lot of the distrust between USAF players and resulted in a fair amount of duplication of effort. Efforts to move Captain Glock into the Black Hole on a permanent basis as the targeting liaison was somewhat similar to the British and US SSO liaison program in WWII, but the move was late in the planning process and relationships were already established that were hard to overcome. Coalition integration in WWII appears as though it may have been smoother than integration between teams within the USAF in Desert Storm.

Another area that was critical for US personnel in WWII was the need to establish basic target development process. The need for a systematic method was identified, but slow to develop due to a lack of expertise. The ad hoc processes the US initially developed were similar to what present-day TSA is meant to provide. Present day TSAs identify, describe, and evaluate the composition of an adversary's target system and its components to determine its various functions, critical capabilities, nodes, and vulnerabilities.¹¹ Initially, this target analysis was not accomplished at all, but became an ad hoc process once ACTS developed the industrial web theory. First attempts at target

¹¹ AFLL, "USAF Targeting Enterprise," 27-28.

analysis and development took place within Hansell's small team of military and civilian experts and the information informed planners' decision making. The processes started to become more formalized and regimented with the development of the COA, which still relied on British targeting data for many target sets. In-theater, US personnel relied on British target studies, and the EOU utilized the British data to do further target development and identify individual targets to meet commander's objectives, identify aimpoints, and provide target specific weaponeering recommendations.

As early as WWII, the need to do target development as far to the left of planning as possible prior to the campaign was recognized by senior leaders. As now Mr. John Glock states, "Targeting is a systematic, comprehensive, and continuous analytical process. Targeting occurs prior to target material production...Targeting must be done before and during OPLAN/JAOP development. Targeting inside of an ATO cycle is merely refining the location and sequence of striking a target."¹² The need for early target development was a realization that was part of the driving force behind the JCS standing up the Air Intelligence Division and the Strategic Vulnerability Branch after WWII. The division was tasked with target analysis and development during peacetime so that the necessary target information and materials would be readily available for campaign planners and targeteers in the event of a conflict. WWII saw the early institutionalization, or at least recognition of the need for, of such peacetime and wartime processes.

In Desert Storm, personnel comprehended the need for target development processes and early target system analysis. At the start of planning, targeteers recognized the severe lack of data due to prioritization issues leading up to the conflict. Targeting development processes had been designed, the materials were simply not available to provide the accurate level of analysis necessary. Early in the planning processes, planners also failed to incorporate targeteers into the planning process. They developed their own methodology for identifying target systems without the inputs of individuals trained in established targeting processes. Despite the fact such processes existed,

¹² Mr. John Glock, Chief, Targeting Branch ACC/A2 Langley AFB, VA, to the author, e-mail, 12 March 2018.

planners like Warden felt that he had established a better process though it was not that fundamentally different from the processes in which targeteers were historically trained.

The targeteers supporting Checkmate had to rely on ad hoc processes with DMAAC and utilize personal relationships, and phone calls to DIA to try to get the support they needed for planning. Although prioritization processes were established for getting targeting support, the AFIA/INT personnel were not high on the prioritization list. CCMDs like CENTCOM took precedence, which was fine until INT was tasked with the planning by Schwarzkopf and INT struggled to get the recognition necessary to gain prioritized support. Black Hole planners worked around official processes and created ad hoc procedures and relied on personal relationships to get things faster than the normal targeting and intelligence channels causing confusion, resentment, and frustration with targeteers and intelligence personnel attempting to follow established processes.

Additionally, there was a lack of understanding of processes between targeteers and planners. Planners assumed targeteers were too rigid in their weaponeering processes, believing that targeteers would not weaponeer for anything less than complete destruction. Meanwhile, targeteers were willing to weaponeer for other damage levels, but this was never communicated to them. Planner perception that targeteers to stray from their “by the book approach” created frustration amongst the planners feeling like they were not getting the targeting support they needed.

Targeteers on the other hand were frustrated because they felt like planners were not allowing them to do their jobs as trained targeteers and they felt planners did not understand the reasoning for their methods and processes, and their willingness to flex to meet planners needs. As we have seen much throughout history and was clear in Desert Storm, targeting was a specialty caught between operations and intelligence. A lack of understanding on both sides, on the planner’s side for not appreciating targeting processes and procedures, and on the targeteers side for not fully comprehending the planners’ approach, led to a great deal of frustration. It also led to the creation of redundant target and BDA lists leading to confusion between targeteers and planners hastening frustration on both sides leading to a further decline in operations and intelligence relationships. While flexibility and adaptability is important in the fog and

friction of war, creating new processes and procedures is not always of best interest as it can lead to further chaos and confusion.

While processes existed in Desert Storm, they were not always followed, sometimes due to miscommunication and sometimes do to impatience with the process. Colonel Blackburn tried to enforce processes by not sending targeting materials directly to CENTAF/IN and instead sending them to CENTCOM who should be providing the information to CENTAF as their parent organization. Colonel Blackburn believed he was reinforcing the use of correct processes but this further frustrated CENTAF targeteers. If AFIA/INT was already providing support outside of normal processes, why start enforcing correct processes now at the detriment of fellow targeteers and intelligence personnel? Since Black Hole and Checkmate planners were not following many of the standard processes, CENTAF targeteers were being forced into processes that further weakened their support to the planners.

In Desert Storm, BDA also suffered from a lack of processes. Although DIA allegedly was responsible for establishing BDA processes, targeteers were unaware of them and were not trained to them if they did exist. Again, this created a great deal of redundancy and often-contradictory analysis. Organizations were often doing BDA because they could, not because they should, and this further complicated the matter. Processes were a big issue in Desert Storm, but as important as processes and standards are, individuals still need to be able to flex based on the mission and the environment. Black Hole planners argued that the targeteers and intelligence personnel were unable to do this, and therefore could not provide the support they needed. The breakdown of processes and/or lack of processes in Desert Storm was a limiting factor for planning and targeting support in the conflict.

The current-day targeting studies and reports focus on the importance of establishing processes and standards, and although they recognize TSAs as the cornerstone of targeting and operational effectiveness and efficiency, this is one of the primary processes that has broken down. In 2007, the Greybeard Targeting Study stated that the process for tasking and producing TSAs had largely fallen by the wayside. For those still using them, they were largely outdated. One of the problems with TSA is that they are time intensive studies which make it even more important to establish them prior

to hostilities, but the information can become quickly outdated. Once planning has kicked off for a campaign, it is often too late by the time TSAs are completed for them to be useful to decision makers. The 363 ISRG is today largely tasked with providing TSA reachback support, and the 15th Intelligence Squadron (IS) has made great strides in developing more timely and effective TSAs to support mission planners.

Additionally, the AF/A2 and AF/A3 hosted the first Service Targeting Summit (STS) in July 2017 at the Pentagon to determine how Services, Joint Staff, and Office of the Under Secretary of Defense satisfy a CCMD's demand for targeting and target development. The AF/A3 Lt Gen Chris Nowland, highlighted the difficulty of collecting BDA, conducting munitions effectiveness assessments, and providing reattack recommendations when necessary. It was also highlighted at the conference, the need for the CCMD Operations Directorate to do a better job of what is needed for strikes. Furthermore, the shift from AOR-centric planning to the revised Global Campaign Plans was highlighted by Lt Gen Veralinn "Dash" Jamieson, which could create the need for CCMDs to operate under a single targeting standard. By operating under a single targeting standard, targeteers could plug and play into processes to support target development and planning independent of geographic region. One of the primary discussion areas was this need to develop joint targeting standards and establishing a governing body to enforce adherence to targeting standards.¹³ A combined operations and intelligence effort, joint standards, and an enforcing body will help ease many of the process and procedure frustrations and tensions that occurred during Desert Storm. As quoted in the Greybeard targeting study, "99% of targeting occurs before hostilities begin," therefore the standardization and focus on processes need to remain a priority to ensure effective target development and targeting capacity to support operational planning requirements.¹⁴

Training

For organizations and processes to be effective, it is necessary for targeteers to have proper training and develop the required expertise necessary to fulfill their targeting

¹³ Lt Gen Chris Nowland, Deputy Chief of Staff for Operations and Lt Gen Veralinn Jamieson, Deputy Chief of Staff for Intelligence, Surveillance, and Reconnaissance, US Air Force, memorandum for record, "Service Targeting Summit (STS) 17-01 Minutes, 24 July 2017.

¹⁴ AFLL, "USAF Targeting Enterprise," 16.

roles and responsibilities. In WWII, training was certainly an issue. No formal American air intelligence training existed before the war, much less specialized targeting training. Americans were fully reliant on their British counterparts for all intelligence training; the RAF welcomed Americans not only into their training schools but willingly provided on the job training and fully embedded Americans into their organizations and operations, working side by side in the early days of the war to provide targeting support and BDA. It was not until 1942 that the US developed its intelligence training school in Harrisburg, but targets related training remained minimal. Targeting instruction fell under the Combat Intelligence Officer training course which was only eight weeks long and included everything from general intelligence to briefing and debriefing, limiting the amount of time spent on targeting specifics. BDA training mainly fell to the photointerpreters who were also initially trained by the British until the Photointerpretation Course also stood up at the intelligence school. Air Force leaders recognized the need for organizations to have trained, competent, and capable target intelligence officers and it was even reflected in the post-war USSBS which stated, “the present shortage of trained and competent intelligence personnel gives cause for alarm and requires correction.”¹⁵ The shortage was even after the US put over 9,000 individuals through their intelligence training school from 1942 until the end of the war.

To offset the lack of available air intelligence and targeting training, the AAF relied on the expertise of civilians. They recruited civilian experts like Malcolm Moss and Dr. James Lowe to serve during WWII and capitalized on their knowledge of international business, finance, and industry, or they hired individuals in their civilian capacity to augment the small number of military personnel involved in target analysis and development for organizations like the COA and the EOU. Reliance on civilian experts was critical to the early development and application of targeting methodology and processes and helped to offset the lack of intelligence and targeting training for military personnel.

¹⁵ United States Strategic Bombing Survey, *The United States Strategic Bombing Survey: Summary Report (Pacific War)* (1987; repr., Maxwell AFB, AL: Air University Press 2003), 118.

While the Air Force developed a targeting AFSC after the same lack of adequately trained personnel lesson was learned in Korea, they also realized that it was not sufficient simply to assign intelligence officers to targeting positions.¹⁶ This realization led to the development of the first formal course ever developed to train personnel in essential targeting functions. Targeting Officers were initially selected after one or two assignments in other intelligence-related career fields. Additionally, they needed supervisor recommendations and were hand-selected by intelligence officer career field managers before they could become targeting officers. The Armed Forces Target Intelligence Training Course held at Lowry AFB in Colorado was developed to provide fundamental targets training not just to Air Force targeting officers, but to targeting officers across the joint force.¹⁷ It trained members from the three services in capabilities and limitations of all the services' weapons systems supporting air operations and trained students in analytical methodologies for selecting, prioritizing, and recommending targets to meet commander's objectives and guidance.¹⁸

With the increased focus on targeting training, one would think that lack of training and expertise would not have been at the top of the list of takeaways for Desert Storm, but in fact it was. A lack of training and expertise was also highlighted in Desert Storm. Specifically, the 9 TIS/INT targeting officer manning was down as low as fifty percent leading up to the war. Of the six officers assigned, while they had graduated from the targeting training course, four were not fully upgraded and lacked experience. As only entry-level targeteers, they did not have the desired expertise to fully support operational planning.¹⁹ Exercises like Internal Look 90 were developed for individuals to train the way they fight, but this exercise, like many exercises even today, lacked realistic targeting training. The processes followed during Desert Storm planning and execution were not always reflective of the processes and procedures practiced during the exercise.

¹⁶ John R. Glock, "The Evolution of Air Force Targeting," *Airpower Journal* 8, no.3 (Fall 1994), 23.

¹⁷ AFLL, "USAF Targeting Enterprise," 11.

¹⁸ Glock, "Evolution of Air Force Targeting," 23.

¹⁹ Oral History Interview of Captain John Glock, 5, 37; "9 TIS/INT Planning Procedures for Internal Look-90 and Operation DESERT SHIELD" (U), Call # K239.0472-33, Vol. 1, Mar-May 1991, P.1-2, IRIS # 0876189, in the Desert Story Collection, AFHRA, Maxwell AFB, AL. (SECRET//NOFORN) Information extracted is unclassified; Thomas A. Keaney and Eliot A. Cohen, *Revolution in Warfare? Air Power in the Persian Gulf War* (Annapolis, MD: Naval Institute Press, 1995), 111. (Originally published as the *Gulf War Air Power Survey Summary Report* in 1993 by the US Government Printing Office.)

Additionally, those tasked in AFIA/INT, while they were trained targeteers with past operational targeting assignments, they did not necessarily have the theater expertise required to effectively support the target development efforts effectively.

Desert Storm targeteers were even more lacking in BDA training. BDA is a difficult process to simulate during exercises and is often either left out of exercises or white carded so that targeting personnel did not get necessary BDA training. Moreover, the Armed Forces Target Intelligence Course provided only five hours of instruction on combat assessment.²⁰ BDA training remains a challenge today and was identified as an issue in each of the highlighted more recent targeting studies and reports. The Greybeard targeting study identified the lack of “train as you intend to fight” emphasizing the need for the increased exercising of BDA and increasing modeling and simulation to training individuals in BDA.²¹ The AFTRM highlights the overall insufficiency of AF target training and education to build and sustain a professional targeting cadre with the multi-discipline skill sets necessary to successfully plan and execute air, space, and cyberspace operations. It also calls attention directly to the need for targeting training programs to ensure an in-depth understand of the entire targeting cycle (to include BDA/Combat Assessment) and integrate the skills, processes, and systems into that cycle for existing and future training exercises across targeting.²² Training and education have lacked this full in-depth training of the entire targeting cycle since before Desert Storm.

AFTRM also identified the need for ensuring rated personnel placed in targeting positions to receive appropriate targets-related training.²³ This training could have been useful in Desert Storm had the pilots in Checkmate, and those that stayed on in the Black Hole, received targets training. It would have provided them a better understanding of targeting processes and could have eased some of the tension between the operators and intelligence personnel in the planning process. Providing the operator planners even baseline targets training could have helped them understand targets methodology that could have aided with the initial target system selection, weaponeering, target list

²⁰ Glock, “Evolution of Air Force Targeting,” 25-26.

²¹ SAIC, “Greybeard Targeting Study,” 17.

²² ACC/A2, “Air Force Targeting Road Map,” 44.

²³ ACC/A2, “Air Force Targeting Road Map,” 47.

management, and BDA management. This might have eased some of the issues that caused controversy during planning and execution.

Post-Desert Storm, the Air Force eliminated both the enlisted and officer targeting career fields. The Air Force combined multiple intelligence AFSC's into one general intelligence officer AFSC, and with it, much of the targeting training was lost. The Combat Targeting Course was stood up at Goodfellow AFB, Texas (where all officer intelligence training moved in the late 1980s and early 1990s) to provide target specific training for intelligence officers assigned to targeting billets. Over the years, CTC has changed multiple times in its length, scope, and name, and there are ongoing discussions on how to best improve targeting training. An enlisted targeting AFSC was re-established and the new AFSC awarding enlisted targeting course came online in January 2010. Additional targeting training courses such as the Intermediate Target Development course offered by the 363 ISRG, were developed to address some of the training issues among other courses.²⁴ Overall though, the AFTRM identifies that there is limited intermediate and advanced training available for the enlisted, officer or civilian career fields and training has not matured to the point that is desired for professional development of Air Force targeting personnel.²⁵

As officers remain unspecialized, the ongoing debate continues how best to train intelligence officers in breadth and depth to ensure they are well versed in targeting. The Air Force's goal, according to the AFTRM, is to have a highly qualified force that can effectively work with planners and operators, develop systems and entity-level targets, and support operational execution and assessment across all domains. The July 2017 STS also focused on establishing joint targeting training standards to create a common set of joint targeting skillsets to better support CCMD targeting requirements.²⁶ This focus and the AFTRM goal highlights many of the challenges the Air Forces faced in Desert Storm, and to some extent as far back as WWII. While some may consider the lead-up to before Desert Storm to be the height of targets training based on a specialized targeting officer

²⁴ AFL, "USAF Targeting Enterprise," 25.

²⁵ ACC/A2, "Air Force Targeting Road Map," 45.

²⁶ Lt Gen Chris Nowland, Deputy Chief of Staff for Operations and Lt Gen Veralinn Jamieson, Deputy Chief of Staff for Intelligence, Surveillance, and Reconnaissance, US Air Force, memorandum for record, "Service Targeting Summit (STS) 17-01 Minutes, 24 July 2017.

AFSC, and a designated targeting officer training course, it was not reflected in the effectiveness of targeting processes in WWII. This begs the question as to whether targets training was as effective during this time as it is often made out to be?

Force Management

With organizations, processes, and training in place, there is still one missing piece to the puzzle. How does one effectively manage the targeting force to ensure the required expertise and manning is available in the required organizations at the right time to effectively carry out the necessary processes? Not only is building a capable targeting force important, but sustaining that force is also critical to the successful planning and executing of air operations. The AFTRM remarked that as the demand for precision targeting has increased, the force management structures and policies in place have not kept pace. They also have not adapted to the creation and maintenance of a stable, experienced cadre of targeting professionals, so the AF needs to look at new and creative ways to create and nurture the necessary targeting expertise to effectively perform in the joint force. The AFTRM's goal was to increase the depth of targeting expertise available to commanders.

One of the recommendations to achieve this goal was to use a professional civilian targeting cadre to ensure continuity and depth of expertise. Military personnel filling specific targeting positions is often short-lived due to standard PCS cycles, but civilian personnel can help ensure longevity in critical targeting positions. Especially with the OCONUS and CONUS targeting billet mix being unsustainable as the study found, using the civilian force to help fill gaps is essential to provide depth and expertise. Furthermore, the Greybeard targeting study identified the need to leverage ANG and AFRC personnel through the TFI structure to help meet manning shortfalls.²⁷ Once again, the problems identified in these recent studies are not new to targeting. In WWII there were similar force management issues.

First, targeting and even air intelligence was in the early stages of development. In 1941, the entire Intelligence Division consisted of twelve officers and nine civilians. Of the military officers, none had a formal air intelligence training baseline, considering the AAF's air intelligence school yet to be created. Hansell did just as the current

²⁷ SAIC, "Greybeard Targeting Study," 18.

targeting studies recommend; he optimized his section's targeting capabilities by utilizing civilian expertise to fill key targeting positions, in this case, they were used on the staff to provide targeting support analysis support. Hansell and the rest of the four-man team assigned to produce AWPD-1 also relied on civilian SMEs for planning and target development. A civilian workforce was developed to fill the primary positions in the COA and the EOU in the absence of trained intelligence and targeting personnel, a recommendation similar to the one made by the AFTRM today. Unfortunately, one of the challenges not solved in WWII and that the targeting field still struggles with is maintaining these experts to build the stable force and provide continuity. After WWII, many of the civilians in uniform, or the civilians used in primary targeting roles, went back to their jobs, and the military lost the expertise these individuals gained and provided during the conflict.

Once the Air Force stood-up the Army Air Forces Intelligence School in 1942, it continued to have force management issues. In the winter of 1942, the number of students available for intelligence school did not meet the necessary quotas to meet the OCONUS manning demands. As a result, they had to shuffle trained individuals from CONUS billets to OCONUS billets or individuals were set directly to theater without formal intelligence training. Today's increased OCONUS targeting billet requirements have also led to a decrease in time on station in CONUS where individuals are able to maximize their training and maintain certifications that they are sometimes unable to do overseas.²⁸

In Desert Storm, there were similar force management issues. First, as mentioned previously, the 9 TIS targeting officer manning was as low as fifty percent leading up to the war and of the six individuals assigned, all but two individuals were not fully upgraded targeteers with minimal expertise. The intelligence and targeting jobs at the 9 TIS were not high priority positions consistently staffed with the best and most experienced individuals. Additionally, CCMDs did not have the billets and were not staffed to be able to carry out war planning and execution without augmentation fully.

²⁸ ACC/A2, "Air Force Targeting Road Map," 51; Ehrhart, Fabyanic, and Futrell, "Air Intelligence Organization," 130.

In the “CENTAF/IN After Action Report and Lessons Learned,” 9 TIS leadership identified that they were not organized or properly manned to support the conflict.²⁹ They were especially reliant on augmentees from SAC and AFRC as well as targeteers from other theaters to fill critical targeting positions once the unit was deployed to theater. The augmentation by members from other commands and theaters further emphasizes the need for standardized processes, so those individuals can plug-and-play as augmentees into targeting constructs anywhere as required. Incorporating augmentees, especially AFRC and ANG personnel into training exercises are also critical to ensuring their smooth integration into organizational structures and processes to help fill manning shortfalls. Also identifying and exercising with augmentees would allow us to “train as we fight,” and it is important to include all who will be involved in real-world planning and execution.

Force management is not a new issue. It has been a constant battle for decades to determine how to balance manning and requirements and try to build and sustain the most capable force possible. There has never been a perfect system, even in the wars of greatest success when there was a distinct officer targeting career field, as there was in Desert Storm, issues with force management existed and challenged targeting personnel in achieving their mission.

Conclusion

Over 75 years after the US made its initial efforts to establish a systematic methodology for targeting, we continue to struggle with the challenges identified by the early planners, intelligence professionals, targeting personnel, and Air Force leadership. Perhaps surprisingly, it has been difficult to pinpoint a “high point” from which targeting has supposedly deteriorated, much less a “golden age” of targeting. Instead, the study concludes that the challenges/lessons learned have been broadly consistent, or at least similar, across time. The fifty years between two of our most successful conflicts saw a great deal of changes, some positive, some negative, but the broad challenges with organization, processes, training, and manning have remained.

²⁹ Col Richard S. Rauschkolb, “CENTAF/IN After Action Report and Lessons Learned,” March 25, 1991, Call # TF4-62-598 13 Mar- 25 Mar 1991, P. O-1, O-2, IRIS # 0872719, in the Task Force IV Collection, AFHRA, Maxwell AFB, AL.

History provides a good baseline for understanding how targeting got where it is today, but we need to be careful when saying that it has come completely off the tracks or that capabilities have atrophied if we do not clearly define the baseline from which it has “deteriorated.” Saying that targeting has atrophied for the past 20 years (from 2012) as it did in the AFTRM creates an impression that targeting was at its height just before that time and creates a perception that there is some golden age of targeting or a gold standard that we are comparing targeting to today. While improvements have been made with more or less success over the years, the success of our conflicts like WWII and Desert Storm are not a direct reflection on the success of the targeting processes and enterprise. Despite the challenges in these conflicts, Airmen did what needed to be done to enable the success of the mission. Was it perfect? No. Was it the most effective and efficient that it could have been? No. Will these same organizational, processes, training, and force management challenges continue to plague us in the future? Most likely. But the critical thing to remember is the importance of targeting as a foundational component of air power. We must ensure that we do not let it fall by the wayside and continue to press forward to continuously improve the Air Force Targeting Enterprise. The AFTE way forward is in good hands as we continue down the POA&M implementation timelines. Targeting is getting the increased attention it needs and deserves, and we must ensure that it continues to remain on this track and so that the golden age and heyday of targeting is in our near future and not the past.

APPENDIX A

Glossary of Acronyms

A2: 1. Intelligence Directorate(Division) 2. Director of Intelligence

A3: 1. Operations Directorate (Division) 2. Director of Operations

AAF: Army Air Forces

AC/AS: Assistant Chief of the Air Staff

ACC: Air Combat Command

ACC/A2: 1. Air Combat Command Intelligence Directorate; 2. Air Combat Command Director of Intelligence

ACIU: Allied Central Interpretation Unit

ACTS: Air Corps Tactical School

AEF: American Expeditionary Force

AF: Air Force

AF/A2: Air Force Deputy Chief of Staff for ISR

AFB: Air Force base

AFHRA: Air Force Historical Research Agency

AFIA: Air Force Intelligence Agency

AFL: Air Force Lessons Learned

AFRC: Air Force Reserve Command

AFSC: Air Force Specialty Code

AFTE: Air Force Targeting Enterprise

AFTRM: Air Force Targeting Roadmap

AIF: Automated Installation File

ANG: Air National Guard

AOC: air and space operations center

AOR: area of responsibility

ARC: Air Reserve Component

ATMP: Air Target Materials Program

ATO: air tasking order

ATTG: Automated Tactical Target Graphics

AWPD: Air War Plans Division
BDA: 1. bomb damage assessment 2. battle damage assessment
BE: 1. bombing encyclopedia 2. basic encyclopedia
BEW: Bureau of Economic Warfare
BP: Bletchley Park
C3: command, control, communications
CA: Combat Assessment
CBO: Combined Bomber Offensive
CC&D: camouflage, concealment, and deception
CCMD: Combatant Command
CCS: Combined Chiefs of Staff
CDE: Collateral Damage Estimate
CENTAF: Central Command Air Forces
CENTCOM: Central Command
CID: Combat Intelligence Division
CINCCENT: Commander-in-Chief, USCENTCOM
CJCS: chairman of the Joint Chiefs of Staff
COA: Committee of Operations Analysts
CoE: Center of Excellence
CONUS: contiguous United States
CSAF: Chief of Staff of the Air Force
CTC: Combat Targeting Course
DIA: Defense Intelligence Agency
DMAAC: Defense Mapping Agency Aerospace Center
DMPI: desired mean point of impact
DoD: Department of Defense
DOTMLPF-P: Doctrine, Organization, Training, Material, Leadership and Education, Personnel and Facilities and Policy
EOU: Economic (Enemy) Objectives Unit
G-2: 1. Intelligence Section of the General Staff 2. Director of the Intelligence Section of the General Staff

G-2 A-7: Air Intelligence Section A-7 of the Intelligence Division of the General Staff

G-3 Operations Division of the General Staff

GAF: German Air Force

GBU: Guided Bomb Unit

GIISR: Global, Integrated, Intelligence, Surveillance, and Reconnaissance

GWOT: global war on terrorism

HAPDB: high altitude precision daylight bombardment

HQ: headquarters

HVT: high value target

IBM: International Business Machine

IC: Intelligence Community

IN: 1. Intelligence directorate; 2. The senior intelligence officer of an organization

INT: target intelligence branch

IS: Intelligence Squadron

ISR: Intelligence, Surveillance, and Reconnaissance

ISRG: Intelligence, Surveillance, and Reconnaissance Group

ISRW: Intelligence, Surveillance and Reconnaissance Wing

IW: Intelligence Wing

J2: 1. Joint Staff Intelligence Directorate; 2. Joint Staff Director of Intelligence

JAOP: Joint Air Operations Plan

JCS: Joint Chiefs of Staff

JFACC: Joint Forces Air Component Commander

JFC: Joint Force Commander

JIPTL: Joint Integrated Prioritized Target List

JP: Joint Publication

JTC: Joint Targeting Cycle

JTL: Joint Target List

LOC: Lines of Communication

MAP: Master Attack Plan

MEA: munitions effectiveness assessment

MEW: Ministry of Economic Warfare
MID: Military Intelligence Division
MISREP: mission report
NBC: nuclear, biological, and chemical
OCAC: Office of the Chief of the Air Corps
OCONUS: outside the contiguous United States
OCS: Officer Candidate School
OOD: Operation Odyssey Dawn
OPLAN: operational plan
OSS: Office of Strategic Services
OUP: Operation Unified Protector
PACAF: Pacific Air Forces
PCS: permanent change of station
POA&M: Plan of Actions and Milestones
POW: prisoner of war
PPM: Precise Point Mensuration
PRU: Photographic Reconnaissance Unit
RAF: Royal Air Force
RSAF: Royal Saudi Air Force
SAASS: School of Advanced Air and Space Studies
SAC: Strategic Air Command
SAIC: Science Application Internal Corporation
SAIS: Strategic Air Intelligence Section
SCIF: Sensitive Compartmented Information Facility
SECAF: Secretary of the Air Force
SECDEF: Secretary of Defense
SEI: Special Experience Identifier
SHAPE: Supreme Headquarters Allied Powers, Europe
SIGINT: signals intelligence
SME: subject matter expert
SOC: Sector Operations Center

SPECAT: special category
SPG: Special Planning Group
SSO: Special Security Officers
TACC: Tactical Air Control Center
TDF: Tactical Data Facsimile
TFI: Total Force Integration
TIS: Tactical Intelligence Squadron
TNL: Target Nomination List
TSA: Target Systems Analysis
USAF: United States Air Force
USAFE: US Air Forces in Europe
USCENTCOM: United States Central Command
USSBS: US Strategic Bombing Survey
USSR: Union of Soviet Socialist Republics
USSTAF: US Strategic Air Forces Europe
WDGS: War Department General Staff
WWI: First World War
WWII: Second World War

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