

<b>1. Report Security Classification:</b> UNCLASSIFIED			
<b>2. Security Classification Authority:</b>			
<b>3. Declassification/Downgrading Schedule:</b>			
<b>4. Distribution/Availability of Report:</b> DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			
<b>5. Name of Performing Organization:</b> JOINT MILITARY OPERATIONS DEPARTMENT			
<b>6. Office Symbol:</b> C		<b>7. Address:</b> NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207	
<b>8. Title (Include Security Classification):</b> PLANNING FOR THE SYNERGY OF SYNCHRONIZED FIRES (UNCLASSIFIED)			
<b>9. Personal Authors:</b> Major Christopher D. Harness, USAF			
<b>10. Type of Report:</b> FINAL		<b>11. Date of Report:</b> 4 FEB 2002	
<b>12. Page Count:</b> 22 <b>12A Paper Advisor (if any):</b> Professor Paul Romanski			
<b>13. Supplementary Notation:</b> A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.			
<b>14. Ten key words that relate to your paper:</b>  Effects-Based Operations, Effects-Based Targeting, Strategic Fires, Operational Fires, Operational Art, Tactical Fires, Synchronizing Fires, OVERLORD, Air Superiority, Battlefield Interdiction			
<b>15. Abstract:</b>  This paper categorizes the three types of fires: strategic, operational, and tactical based on the effects they achieve in relation to the tactical battlespace. Strategic fire affects begin at the level of war spanning multiple operations, operational fires affect an in-progress campaign or major operation and the tactical level only affects the battle. Each level also is unique in the relative amount of time required for the effects to impact the battlefield: strategic the longest and tactical almost immediately. By carefully synchronizing the three types of fires in time and space, a synergistic effect is created at the tactical level of warfare that can be exploited by the operational commander.  Specific examples are used to identify similar characteristics in each type of fire, concentrating primarily on the time required for the effect to manifest at the tactical level. Lastly, Operation OVERLORD is cited as a case example of how the effects of the three types of fires combined to provide synergy to Eisenhower, albeit unintentionally.			
<b>16. Distribution / Availability of Abstract:</b>	Unclassified  X	Same As Rpt	DTIC Users
<b>17. Abstract Security Classification:</b> UNCLASSIFIED			
<b>18. Name of Responsible Individual:</b> CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
<b>19. Telephone:</b> 841-6461		<b>20. Office Symbol:</b> C	

NAVAL WAR COLLEGE  
Newport, R.I.

**PLANNING FOR THE SYNERGY OF SYNCHRONIZED FIRES**

by

Christopher D. Harness  
Major, United States Air Force

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: \_\_\_\_\_

4 February 2002

\_\_\_\_\_  
Captain Paul Romanski  
Professor, JMO Department

## Abstract of

### PLANNING FOR THE SYNERGY OF SYNCHRONIZED FIRES

This paper categorizes the three types of fires: strategic, operational, and tactical based on the effects they achieve in relation to the tactical battlespace. Strategic fire affects begin at the level of war spanning multiple operations, operational fires affect an in-progress campaign or major operation and the tactical level only affects the battle. Each level also is unique in the relative amount of time required for the effects to impact the battlefield: strategic the longest and tactical almost immediately. By carefully synchronizing the three types of fires in time and space, a synergistic effect is created at the tactical level of warfare that can be exploited by the operational commander.

Specific examples are used to identify similar characteristics in each type of fire, concentrating primarily on the time required for the effect to manifest at the tactical level. Lastly, Operation OVERLORD is cited as a case example of how the effects of the three types of fires combined to provide synergy to Eisenhower, albeit unintentionally.

## INTRODUCTION

Milan Vego in his book, Operational Warfare, categorizes fires based on their ultimate purpose: strategic, operational, and tactical.<sup>1</sup> These fires are compartmentalized as to who conducts the planning: theater-strategic commanders and staffs plan strategic fires, operational planners control operational fires, and tactical commanders direct tactical fires.<sup>2</sup> Air Force Doctrine Document 1 (AFDD1) also categorizes aerospace effects in three levels: strategic, operational, and tactical.<sup>3</sup> Unity of effort gets muddled in the nature of their separation. What becomes cloaked and forgotten is that effects of higher level fires will impact the lower levels of warfare as well as their level of “ultimate purpose.” This paper argues that by carefully synchronizing the three types of fires in time and space, a synergistic effect is created at the tactical level of warfare that can be exploited by the operational commander.

The first part of this paper illustrates how each type of fire affects the tactical battlespace. Specific examples are used to identify similar characteristics in each type of fire, concentrating primarily on the time required for the effect to manifest at the tactical level. Lastly, Operation OVERLORD is cited as a case example of how the effects of the three types of fires combined to provide synergy to Eisenhower, albeit unintentionally.

Although this paper addresses functions and levels primarily attributed to airpower, technological advances have blurred the lines that traditionally separated Service capabilities. By airpower, this author intends any weapon system that uses aerospace as a medium to transmit combat capability beyond the tactical level of war. Navy Tomahawks and Army ATACMS have the range and capabilities to contribute to every level of fire. Where once only close air support required intensive coordination between ground and air forces, now a

more robust “jointness” is required to manage properly overlapping combat power from each Service. Future planners must be able to integrate such emerging weapons with established capabilities to achieve desired effects with efficiency. The ultimate focus of the synergistic fires is at the tactical level, but this is also an operational issue. Such synchronization must be managed by the operational commander because these fires influence the environment the tactical commander exploits. In addition, the temporal aspect of the synchronization requires action long before the tactical engagement or battle begins.

### **STRATEGIC FIRES**

Strategic fires affect the strategic level of war spanning multiple operations.<sup>4</sup> They force the enemy to reassess his theater strategy or amend plans for future operations. Examples of strategic fires would be activities designed to establish air superiority, attacking industrial capability, or attacking strategic logistic reserves. Although not intended to be all-inclusive, these examples provide an overview sufficient to establish the nature and character of this level of fire that will be useful to planners.

“Air Superiority is a necessity,” John Warden bluntly states in his book, The Air Campaign.<sup>5</sup> Indeed, since the conquest of Poland in 1939, the victor in every battle has enjoyed air superiority and no one has prevailed against an adversary who enjoyed air superiority.<sup>6</sup> No other military task has had so pronounced and consistent an effect on the outcome of modern warfare. Yet no Service, including the United States Air Force, considers air superiority operations to be a strategic fire. The Air Force considers it an important first step.<sup>7</sup> It is the first goal in a serial air operations plan. The establishment of air superiority provides the freedom to fire or the freedom from fire.<sup>8</sup>

One reason for air superiority's peculiar categorization is its effects have virtually guaranteed success in the past. The Air Force does not consider air superiority an end in itself, but rather a means to an end.<sup>9</sup> The synergy of combined effects from different levels of fire is lost in the conventional paradigm of serial operations. This serial context does not consider air superiority from the vantage point of how it can affect the enemy and how multiple effects occurring simultaneously can compound an enemy's difficulties.

Another reason air superiority resists fitting neatly into a category of fire is because there are multiple mission types designed to reduce or deny enemy use of the aerospace medium. For this paper, the term "air superiority" is used to denote these missions. Defensive Counterair, Offensive Counterair, and Suppression of Enemy Air Defenses (SEAD) are just a few examples. Air superiority became a desired condition derived from many different tasks, instead of a vehicle for producing premeditated effects against the enemy. By concentrating on the effects of air superiority in both time and space instead of as merely a prerequisite to continued operations, it is better synchronized with all fires. What are these effects that achieving air superiority produce and how do they apply to the tactical battlespace?

The most pronounced effect that air superiority provides is operational initiative. If the enemy cannot mount and sustain a major offensive because there is no protection from air attack, then all that remains is to defend. In essence, this produces a strategic culminating point for the enemy. There is no better example of this effect than the Battle of the Bulge. The Germans staged their counter-offensive to coincide with the onset of bad weather, which grounded the Allied Air Force for nine days.<sup>10</sup> During that time, the Germans created a salient 40 miles wide and 60 miles deep. When the skies cleared, however, no German

vehicles were safe from Allied air fire, and the attack quickly faltered and collapsed.<sup>11</sup> What is a convincing testament to the potency of air superiority is that the German general staff knew the attack was doomed to fail. Hitler's insistence on the offensive was the only motivation for its execution.<sup>12</sup> To the soldiers planning the defense of Germany, offensives were impossible against overwhelming Allied air superiority. This provided the Allies with the operational time required to plan any attack they desired.

Another point is that air superiority insures the synergy of combined arms and denies it to the enemy. The commander of the XIV Panzer Corps during World War II, General Frido von Senger, complained after the war:

“The enemy's mastery of the air immediately behind the front under fire was a major source of worry to the defender, for it prevented all daylight movements, especially bringing up reserves. ...In a battle of movement a commander who can only make the tactically essential move by night resembles a chess player who for three of his opponent's moves has the right to only one.”<sup>13</sup>

Combined arms is a force multiplier allowing planners to complete more objectives with less aggregate combat power. Another relevant example was DESERT STORM where air superiority helped produce an overwhelming victory with an overall force ratio of one to one.<sup>14</sup> Admittedly, there were other factors contributing to the success, such as superior tank weapon ranges and excellent intelligence. Nonetheless, tank commanders had almost complete protection from enemy air, and air superiority allowed constant surveillance by AWACS and JSTARS aircraft.<sup>15</sup>

It is an easy task to illustrate the potency of air superiority, but not so considering the time required to achieve the desired effects. There are historical examples where air superiority took years to achieve and others where it could be measured in days. In the European theater of World War II, the Combined Chiefs of Staff directive called Pointblank on June 10, 1943, initiated a concerted effort to achieve air superiority.<sup>16</sup> Every type of

mission was used to control the skies over Germany. By April 14, 1944, tentative air superiority had been achieved against an enemy that was producing 1200 fighters a month and aggressively contesting the bombing every day.<sup>17</sup> German defense was coordinated between ground-based air defense and fighters, and specific tactics were designed to defeat the large bomber formations arrayed against them.

In contrast, DESERT STORM took considerably less time. Then US Air Force Chief of Staff, General Tony McPeak, said, “The Iraqi Air Force never recovered from the opening attack. We took the initiative at the beginning, and we held it throughout the war.”<sup>18</sup> The entire Iraqi IADS, then considered the third most sophisticated in the world, was virtually destroyed in 36 hours.<sup>19</sup> The Coalition air forces overwhelmed the Iraqis and there were no competing priorities.

As a final example, the Israelis were able to achieve complete air superiority against Egypt in a little over two weeks in 1973.<sup>20</sup> Of particular note is the cooperation between land and air forces in dismantling a strong Egyptian SAM threat. This cooperation negated an Egyptian critical strength.

On initial examination, it seems that the more modern the fight, the quicker air superiority has been achieved. But there are many variables in both force and space. If forces are equal, little progress will be made. As the disparity of forces increases, the time required to achieve air superiority will quickly shorten. The extent of the theater of war has a direct effect on the length of the campaign. Lastly, the coordinated Israeli air-ground attack brought a quick end to what could have been a prolonged struggle for control of the air.

Air Superiority employs fires to destroy combat power already in use by the enemy. Other types of strategic fires are designed to force the enemy to a strategic culminating point

by destroying potential combat power. The first targets enemy industrial output. This originated from the theories of Giulio Douhet and was further developed by the airman/architects of AWPD-1. By attacking fragile nodes of an enemy's industrial capability, a relatively small level of effort can completely neutralize a nation's power to wage war.<sup>21</sup> Using Pointblank again as an example, the initial targets were a fighter components plant in Kassel and an aircraft assembly plant in Oschersleben.<sup>22</sup> Instead of destroying existing aircraft in the air and on the ground, such fires were designed to reduce the rate of aircraft replacement.

Another example of this type of fire with an even more wide-ranging effect than retarding aircraft production was against the German ball-bearing factories at Schweinfurt. Because ball-bearing production was heavily concentrated and all war machines required them in their design, an effective strike would have crippled all German war production for months.<sup>23</sup>

The time required for such a fire to take effect can be considerable. Using the Allied attack on German tank production as an example, August, September, and October of 1944 saw a concerted Allied effort to destroy Germany's production capability.<sup>24</sup> Although monthly production had dramatically increased when Germany ramped up to a war footing industry, production fell considerably after the Allied fires. In 1945, replacements did not approach losses.<sup>25</sup> Of course, operational tempo directly impacts when the effects will occur. If enemy consumption is nil, the loss of enemy production capability is negligible. Thus, this type of strategic fire is primarily applicable to campaigns and major operations where combat power must be replenished.

The other type of strategic fire is that against an enemy's logistic reserves. If the enemy's stockpile of commodities such as ammunition or petroleum can be destroyed, it would create critical planning perturbations affecting current and future operations. Citing again the strategic bombing against Germany, petroleum production became a priority target in April of 1944.<sup>26</sup> The bombing was so effective that in two months output was reduced to a third of the total output prior to the attacks.<sup>27</sup> In another three months, total production was at 10 percent. The effects of these fires manifested themselves in a reduction of pilot training hours for the Luftwaffe, which at the tactical level of war meant inferior pilots.<sup>28</sup> Another effect was reduced mobility of deployed Panzer units.<sup>29</sup> In what could have been the ultimate successful strategic logistic fire, the Japanese decimated Battleship Row at Pearl Harbor but inconceivably spared the tank farm holding the entire Pacific Theater's fuel reserve!<sup>30</sup>

To realize the effects of this type of strategic fire again is variable based on the operations tempo. Fires against German oil had operational and tactical results just months after the initial fires. American planners immediately would have had to face the consequences of losing the precious oil reserve in their plans to retaliate against Japan.

Strategic fire has been the domain of airmen since the Wright brothers' first flight fired the imagination of war theorists. John Warden is the latest of a long line who see the capabilities of airpower, and now long-range surface to air missiles, surpassing the other arms to predominance. This has naturally bred partisanship among the Services and consequently strategic fires remain the pariah of operational planning. What cannot be denied is that strategic fires produce effects throughout the levels of warfare. By its neglect, operational capability has been squandered in the name of Service parochialism.

## OPERATIONAL FIRES

The consequences of operational fires affect an in-progress campaign or major operation.<sup>31</sup> Their effects may not be in connection with a particular battle or engagement, but will impact that and all subsequent battles within the operation. Examples of this category of fire would be interdiction and fires against command and control elements. Although the effects of these fires can be related more directly to the battlefield, the timing of these effects is still problematic. Therefore a clear understanding is required in order to coordinate these fires in time with both the strategic and tactical effects.

The military theorist Jomini believed victory went to the tactical commander who could maneuver his forces in such a way as to threaten the enemy's line of communication while protecting his own.<sup>32</sup> If so, then operational interdiction is the answer he sought. Operational interdiction is, in the context of this paper, the equivalent of an aerial blockade. The objective is to prevent combat capability, in the form of forces or supplies, from participating effectively against one's own forces in an operation.<sup>33</sup> It is not strategic in that the combat power has already been created, in the form of finished product or resources. It is not battlefield interdiction where the forces have been deployed for battle and are attempting to engage, or disengage from, one's own forces. A good example of this level of interdiction is operation STRANGLE in World War II. Its intent was to cut off German units defending in Northern Italy from supplies in Germany.<sup>34</sup> Its target was every rail line entering Italy from the north. Pressure from an Allied ground offensive in conjunction with the interdiction campaign caused a complete collapse of the German defense.<sup>35</sup> Similarly, if Argentina had been able to prevent British troops from landing on the Falkland Islands, either by destroying the troop ships reroute or mining the waters surrounding the islands, that would have been a

form of operational interdiction against forces. If they could have isolated the British after they had landed, that would have been a form of supply interdiction.

Like the strategic fire of air superiority, different targets can provide the same effect in operational interdiction. Some examples of valid targets would be choke points in the lines of communication, vehicles carrying the supplies, the units, or the supply depots. Each target has its own nuance in effect. If enemy supplies are the target, high operations tempo is then required to deplete the enemy's existing operational supplies. In Operation STRANGLE, cutting the rail lines by themselves had no effect until an Allied ground offensive was initiated.<sup>36</sup> If chokepoints are targeted, then all must be interdicted before complete isolation is achieved. After that, the enemy will begin repairs, which will limit the length of isolation unless fires are continued. If the units are destroyed, immediate effect is achieved.

In a Rand Note written by J.W. Higgins, the effectiveness of force interdiction is compared to that of supply interdiction. Overall, the capacity of any given line of communication is stressed more by the movement of the military unit itself than by the supplies that same unit will use in combat.<sup>37</sup> Any disruption of the line of communication has a better chance to disrupt the unit moving than the unit's supply. The logical goal is to interdict the unit before it can deploy for the operation. If this is infeasible, any hope of effectively interdicting supplies must depend on completely destroying the line of communication, at a bridge for instance, plus some method to reduce the enemy's existing supplies.

According to John Warden, one of the most valuable fires is against the highest level of enemy command and control.<sup>38</sup> It is the "inner ring" of his theory. Elements of command

and control exist from the squad level to the head of state. The higher in the chain of command and control one disrupts the more of the enemy's forces one affects. Warden believed this was a strategic fire. He envisioned an attack that would either figuratively or literally decapitate national leadership. But the effect covered in this paper has better applicability at the operational level because in modern war a president, king, or dictator would rarely exercise operational command of forces where the need for fluid and responsive command and control is essential. Therefore, disrupting operational command and control is more productive at the tactical level of warfare, which is the focus of this paper, than a disruption at the strategic level.

To operate effectively, commanders must have a way to maintain situational awareness at the front, must be able to make effective and timely operational decisions based on that information, and must be able to relay those decisions to subordinates.<sup>39</sup> If any or all of these functions can be disrupted, its effect is a degradation of combat effectiveness. Explained in another way, the effect increases the time required to complete a decision loop. If one force has a decision loop larger than its opponent, it is fighting at a disadvantage. A historical operational level fire against command and control occurred in DESERT STORM. The first six weeks of the war were fought in the air, and Iraqi command and control relied on a centrally controlled IADS to provide information. That information network was destroyed in the first eight hours of the war and for the rest of the fighting, the Iraqi defenses operated in a severely degraded mode without timely data to make informed decisions.<sup>40</sup> The ability to control the half-million men in the Iraqi armed forces was lost in the first days of the war.

The time required to produce this effect is inversely proportional to the amount of pressure applied on the enemy. If operational tempo in the theater is slow because there is little combat or little situational change, then a large amount of direction is not necessary and a considerable amount of time will be required before the effect become apparent.

Conversely, a high operational tempo requires considerable guidance, and disruption of the decision loop can be felt almost immediately. Interestingly, the magnitude of the effect will increase as operational tempo increases as well. Conceivably, the stress of repeated fires coupled with no direction can render a military unit completely powerless, much like the Iraqi front lines in DESERT STORM.

### **TACTICAL FIRES**

Fires are tactical when their consequences affect only the battle in question. Their extent rarely exceeds the destruction or disruption of soldiers and vehicles. Examples of this type of fire would be battlefield interdiction and close air support. Very little time will be spent defining these examples or the effects these fires impose on the enemy because, of the three types of fires, these are the most familiar, and the effects are instantaneous and straightforward.

Battlefield interdiction is designed to limit the enemy's ability to react to the changing environment of the battlefield. As a battle progresses, adversaries will attempt to make adjustments and commit reinforcements in order to capitalize on opportunities or recover from setbacks. Disrupting and delaying these maneuvers, or destroying the forces outright, is the essence of battlefield interdiction. It is important to note that there are many

systems available in every Service to conduct this type of fire. Off shore bombardment, ATACMS, attack helicopters, and fixed wing aircraft are a few examples.

Close air support differs from battlefield interdiction primarily in the intent of the fire. The intent is to neutralize the target's combat capability through lethal fire. As its name implies, these fires must originate from the air because their desired effect is identical to the primary missions of the ground forces of the Army and Marines. John Warden defines close air support as any air operation that theoretically could and would be accomplished by ground forces, if sufficient force were available.<sup>41</sup> It is a machine gun, a tank, or an artillery piece by another name.

### **SYNCHRONIZING THE FIRES**

After categorizing and defining the three types of fires in the context of their effects, it is now time to synthesize the data into a coherent construct for planning. The intent is not to create a separate "Air Campaign," but to employ airpower's inherent capability to reach beyond the tactical battlespace in order to shape that battlespace with effects from strategic and operational fires. If the capabilities of Tomahawks, ATACMS, CALCMs, and aircraft are not coordinated into one integrated plan of fire, the full potential of combat capability will go unrealized.

The effects of each type of fire were presented in isolation with focus on how those effects impact forces on the front line. Although debate continues about other effects more strategically oriented, they are not germane to this paper. When these effects are considered in relation to one another, the challenge to the enemy is increased geometrically. A commander of a tank battalion moving to the front without air defense has much less of a

problem than that same tank battalion commander moving to the front with a fuel shortage and every bridge out between him and the front, all the while under constant air attack!

The time required for each level of fires to affect the enemy was discussed as well. This is the hardest variable to nail down but there are general rules that will help. It is safe to say that generally, strategic fire effects will take longer than operational level fires, while tactical fires effects are almost instantaneous. Operational tempo has the biggest influence on the rate of effects dealing mainly with logistics. Persistence of fire is important on all levels. The Schweinfurt raids against ball-bearing production were effective, but because of massive losses to the unescorted bombers no follow on attacks were attempted.<sup>42</sup> The effects were negated by repairs within a few months and the factories were dispersed to mitigate the vulnerability.<sup>43</sup> If operational interdiction is discontinuous, the effects of those fires will last as long as it takes to repair the line of communication and for a vehicle to complete the trip.

If each fire requires different timing for the manifestation of its effects, and compounding these effects will result in a synergistic effect on the enemy more debilitating than the sum of the whole, the operational planner's goal should be synchronization of these various fires. An "Operational Fires Timeline" should be developed to ensure that the effects of the strategic fires coincide with the effects of the operational fires, which should occur at the planned commencement of a ground offensive, where airpower can contribute its tactical fires effect. It is certainly conceivable to have a single aircraft, an F-16 as an example, in the first week attack airfields and SAM sites in an effort to achieve air superiority. The next week this same aircraft shifts to the destruction of bridges in an effort to isolate enemy forces in the area of proposed operations, and finally on D-Day, this same aircraft conducts close air support missions against enemy positions on the front line. If the effects of these three

separate fires were synchronized correctly, to the enemy it is as if that single F-16 became three separate aircraft or tripled its payload. That is the synergy that can be achieved with the three levels of fires synchronized.

### **FIRES IN PREPARATION FOR D-DAY**

Operation OVERLORD is a good example of how these effects can be coordinated in time. It first must be stated that there was never any intent to synchronize these fires. Eisenhower benefited from a military serendipity that resulted from the introduction of the escort fighter to the European Theater, in conjunction with increased numbers of heavy bombers beginning to produce results from the strategic bombing campaign.

The first fire that affected the landings at Normandy began a year prior with Pointblank. As stated earlier, Pointblank was the Allied attempt to win air superiority over Germany. It began by attacking aircraft factories to affect production.<sup>44</sup> Although effective, extensive bomber losses made these attacks too costly to maintain. Many months of frustration ended when fighter aircraft developed the range to escort bombers deep into Germany. The Allies won air superiority not only from restricting the production of German fighters, but also by the escort fighters destroying existing German aircraft and their pilots in the air.<sup>45</sup> By D-Day, air superiority over the beaches was assured.

In early 1944, General Dwight D. Eisenhower, as commander of OVERLORD, assumed control of all Allied air, including the strategic bombers.<sup>46</sup> He was not interested in continuing the strategic bombing campaign and intended to use all air assets to prepare the battlespace for the landings. Despite some disagreements with General Spaatz, the operational “transportation plan” was adopted which targeted the rail system on the French-

German frontier.<sup>47</sup> Its intent was to isolate the beach head from reinforcements and supplies originating in Germany. Spaatz had countered with an oil plan design to cripple German movement by denying refined crude, strategic in its nature.<sup>48</sup> Eisenhower compromised with the primary effort going to the transportation plan and when weather was unfavorable, Spaatz was given the green light to hit oil refineries.

The effects of these two plans were devastating to the Germans at Normandy. By D-Day, rail transportation capacity was reduced to 38 percent of normal operations.<sup>49</sup> The effects of the oil attacks were discussed earlier in this paper. At the time of the Allied landings, the German Seventh Army had no fuel stockpiles to maneuver against the invasion.<sup>50</sup> These attacks were made easier by the reduced influence of the Luftwaffe. In addition, this freed the fighters to assist in the fires by hitting locomotives on the rail lines and hunting for German fighters in extended fighter sweeps.<sup>51</sup> This is an example where a strategic fire was secondary to an operational fire, both commenced at the same time, and both fires' effects were felt by D-Day.

The initial day planned for the landings was dominated by foul weather. Besides the obvious difficulties in attempting the landings, Eisenhower felt he needed good flying weather for tactical air to support the landing.<sup>52</sup> The landing was delayed until more favorable weather dominated the beaches. There were over 10,000 Allied aircraft supporting the landings. The Germans could muster only 319.<sup>53</sup> Allied artillery could fire without fear of German observation from the air and naval forces could close as near as safe navigation permitted without fear of air attack. Having air superiority, coupled with Germany's severe shortage in fuel and inability to maneuver, led to the tremendous success of the landings. In

fact, the setbacks the Allies suffered on the first day would have been fatal if the fires prior to the landing had not occurred.

## **CONCLUSION**

In the past, airpower held the monopoly on delivery of fires behind the enemy's armed forces. Today there are many more weapon systems that can affect these areas. As more of the battlespace becomes accessible to all the Services, the need increases for a comprehensive concept on how to integrate fires from the FEBA to the enemy's capital. Effects based targeting offers a way to analyze fires of diverse nature with the same measuring stick.

Strategic fires affect an entire theater of war spanning multiple operations. They may force the enemy to reassess national policy or plans for future operations. Fires are operational when their consequences affect the current operation. Their effects may not be in connection with a particular battle or engagement, but will impact that and all subsequent battles within the operation. Fires are tactical when their consequences affect only the battle in question. The weapon system delivering the fire is meaningless: only the effect and its timing need concern the operational planner.

Just as an operational planner is concerned with the phasing of forces into an area of operation, that planner should also be concerned with phasing the effects of fires. To ensure maximum disruption of the enemy and synergy for friendly forces, the strategic, operational, and tactical fires should be synchronized so their effects occur simultaneously on the battlefield. If that time should coincide with the beginning of the planned ground offensive, optimum synergy is attained.

## NOTES

- 
- <sup>1</sup> Vego, Milan N. Operational Warfare. Newport: Naval War College, 2000. p.239.
- <sup>2</sup> Ibid.
- <sup>3</sup> Secretary of the Air Force, Organization and Employment of Aerospace Power. Air Force Doctrine Document 2. Washington DC: 17 February 2000, p.46.
- <sup>4</sup> Vego, p.239.
- <sup>5</sup> Warden, John A. III. The Air Campaign. San Jose: toExcel, 1998, p.10.
- <sup>6</sup> Ibid.
- <sup>7</sup> Secretary of the Air Force, Air Force Basic Doctrine. Air Force Doctrine Document 1. Washington DC: September 1997, p.29.
- <sup>8</sup> Ibid.
- <sup>9</sup> Ibid.
- <sup>10</sup> Stokesbury, James L. A Short History of World War II. New York: William Morrow and Company, 1980, p.353.
- <sup>11</sup> Ibid, p.354-355.
- <sup>12</sup> Ibid, p.352.
- <sup>13</sup> Egginton, Major Jack B. "Ground Maneuver and Air Interdiction: A Matter of Mutual Support at the Operational Level of War" Maxwell AFB, AL: Air University Press, 1994, p.15.
- <sup>14</sup> Lambeth, Benjamin S. The Transformation of American Air Power. Ithaca: Cornell University Press, 2000, p.103.
- <sup>15</sup> Ibid, p.122-123.
- <sup>16</sup> Perret, Geoffery. Winged Victory. New York: Random House, 1993, p.262.
- <sup>17</sup> Ibid, p.295.
- <sup>18</sup> Lambeth, The Winning of Air Supremacy in Operation Desert Storm. P-7837. Santa Monica, CA: Rand, 1993, p.4.
- <sup>19</sup> Ibid, p.5.
- <sup>20</sup> Herzog, Chaim. The Arab-Israeli Wars. New York: Random House, 1982, p.347.
- <sup>21</sup> Perret, p.50.
- <sup>22</sup> Ibid, p.263.
- <sup>23</sup> Department of Defense. The United States Strategic Bombing Survey: European War. Washington, DC: 30 September, 1945, p.5.
- <sup>24</sup> Ibid, p.66.
- <sup>25</sup> Ibid.
- <sup>26</sup> Ibid, p.9.
- <sup>27</sup> Ibid.
- <sup>28</sup> Ibid.
- <sup>29</sup> Ibid.
- <sup>30</sup> Prange, Gordon W and Donald M. Goldstein and Katherine V. Dillon. Miracle at Midway. New York: Penguin Books, 1982, p.4.
- <sup>31</sup> Vego, p.239.
- <sup>32</sup> Jomini, Baron Antoine H. The Art of War. Westport, Connecticut: Greenwood Press, 1862, p63.
- <sup>33</sup> U.S. Joint Chiefs of Staff. Department of Defense Dictionary of Military and Associated Terms. Joint Pub 1-02. Washington DC: 1 December 1989, p.187.
- <sup>34</sup> Mark, Eduard. Aerial Interdiction in Three Wars. Washington DC: Center for Air Force History, 1994, p.144.
- <sup>35</sup> Egginton, p.15.
- <sup>36</sup> Ibid.
- <sup>37</sup> Higgins, J.W. Military Movements and Supply Lines as Comparative Interdiction Targets. RM-6308-PR. Santa Monica, CA: Rand, 1970, p.13.
- <sup>38</sup> Warden, p.44.
- <sup>39</sup> Ibid, p.45.
- <sup>40</sup> Lambeth, The Winning of Air Superiority, p.3.
- <sup>41</sup> Warden, p.87.

- 
- <sup>42</sup> Strategic Bombing Survey, p.5.  
<sup>43</sup> Ibid.  
<sup>44</sup> Perret, p.263.  
<sup>45</sup> Ibid, p.295.  
<sup>46</sup> MacIsaac, David. Strategic Bombing in World War Two. New York: Garland Publishing, 1976, p.18.  
<sup>47</sup> Verrier, Anthony. The Bomber Offensive. London: B.T. Batsford Ltd, 1968, p.267.  
<sup>48</sup> Perret, p.298.  
<sup>49</sup> Ambrose, Stephen E. Eisenhower. New York: Touchstone, 1990, p.127.  
<sup>50</sup> Perret, p.307.  
<sup>51</sup> Perret, p.299.  
<sup>52</sup> Ambrose, p.137.  
<sup>53</sup> Ibid, p.305.

---

## Bibliography

- Ambrose, Stephen E. Eisenhower. New York: Touchstone, 1990.
- Dews, Edmund. A Note on Tactical Vs. Strategic Air Interdiction. RM-6239-PR. Santa Monica, CA: Rand, 1970.
- Dews, Edmund and Felix Kozaczka. Air Interdiction: Lessons from Past Campaigns. N-1743-PA&E. Santa Monica, CA: Rand, 1981.
- Department of Defense. The United States Strategic Bombing Survey: European War. Washington, DC: 30 September, 1945.
- Eggington, Major Jack B. "Ground Maneuver and Air Interdiction: A Matter of Mutual Support at the Operational Level of War" Maxwell AFB, AL: Air University Press, 1994.
- Herzog, Chaim. The Arab-Israeli Wars. New York: Random House, 1982.
- Higgins, J.W. Military Movements and Supply Lines as Comparative Interdiction Targets. RM-6308-PR. Santa Monica, CA: Rand, 1970.
- Joint Chiefs of Staff. Doctrine for Joint Operations, Joint Pub 3-0. Washington, DC: 10 September 2001.
- Jomini, Baron Antoine H. The Art of War. Westport, Connecticut: Greenwood Press, 1862.
- Lambeth, Benjamin S. The Transformation of American Air Power. Ithaca: Cornell University Press, 2000.
- \_\_\_\_\_. The Winning of Air Supremacy in Operation Desert Storm. P-7837. Santa Monica, CA: Rand, 1993.
- MacIsaac, David. Strategic Bombing in World War Two. New York: Garland Publishing, 1976.
- Mark, Eduard. Aerial Interdiction in Three Wars. Washington DC: Center for Air Force History, 1994.
- Momyer, General William W. Air Power in Three Wars. n.p.n.p., n.d.
- Perret, Geoffery. Winged Victory. New York: Random House, 1993.

---

Prange, Gordon W and Donald M. Goldstein and Katherine V. Dillon. Miracle at Midway. New York: Penguin Books, 1982.

Secretary of the Air Force, Air Force Basic Doctrine. Air Force Doctrine Document 1. Washington DC: September 1997.

Secretary of the Air Force, Organization and Employment of Aerospace Power. Air Force Doctrine Document 2. Washington DC: 17 February 2000.

Stokesbury, James L. A Short History of World War II. New York: William Morrow and Company, 1980.

U.S. Joint Chiefs of Staff. Department of Defense Dictionary of Military and Associated Terms. Joint Pub 1-02. Washington DC: 1 December 1989, p.187.

Vego, Milan N. Operational Warfare. Newport: Naval War College, 2000.

Verrier, Anthony. The Bomber Offensive. London: B.T. Batsford Ltd, 1968.

Warden, John A. III. The Air Campaign. San Jose: toExcel, 1998.