

Example of the greatest weapon - adaptability and creativity term paper

[War](#), [World War 2](#)



ABSTRACT

During World War II, the Allies faced an enemy with technological capabilities that matched their own. The Germans and Japanese boasted precision weaponry that was, in many ways, the envy of the world, and this skill had much to do with the success the Axis forces encountered during the war's early years. But as the conflict wore on, the Americans and British showed a remarkable ability to adapt not only their design and manufacture of aircraft and armaments to meet the challenge of the enemy, but also their combat tactics. The speed and maneuverability of modern aircraft required pilots to think and act independently of the greater whole, particularly when circumstances required them to engage in dog-fights. Such flexibility, combined with prolific American manufacturing facilities, gave the Allies one of the most overwhelming military forces the world had ever seen.

The Greatest Weapon: Adaptability and Creativity in the Production of Allied Aircraft

Remarkable progress was made in aviation tactics and technology in the quarter century that spanned the two world wars. Technologically advanced combatants progressed from hurling bricks out of slow-moving bi-planes over the battlefields of France and Belgium to sophisticated, highly maneuverable fighter planes and long-distance bombers capable of crossing hundreds of miles of land and ocean. Air power had given the great military powers unprecedented mobility and a dynamic weapon that revolutionized modern warfare. It is remarkable how much aviation technology advanced between

the war years 1939-1945. In World War II's early years, Nazi Germany's vaunted Luftwaffe made possible blitzkrieg war, which allowed the Germans to conquer most of continental Europe.

Germany's domination of the air war early in the conflict was due largely to a preponderance of aircraft. Control of the skies meant the Luftwaffe could enhance and protect Nazi ground forces. But when the Allies were at last able to match the Nazis plane for plane, the air war became a matter of tactics, of formations and the skills and experience that came from dog-fighting. The adaptation of more flexible flight formations enabled highly maneuverable Allied aircraft to gain the upper hand, gradually eroding enemy air power in both theaters of war. Superior engineering helped the Allies gain air superiority in terms of materiel, but the implementation of tactics learned from countless air battles and the need to protect long-range bombing groups helped transform that physical superiority into a devastating weapon, the likes of which the world had never seen.

Dog-fighting-the British advantage

The classic air-to-air combat tactic during World War II was dog-fighting, a means of engagement that relied on advances in aerodynamic engineering as well as pilot skill and experience. " Dog-fighting involved engaging enemy aircraft in tight turns in an attempt to gain a firing position on the opponent's tail - the more manoeuvrable aircraft with the smaller turning circle would be a huge advantage" (Barber, 2008). The British Seafire, for instance, was able to exploit its greater mobility to spectacular effect against German fighters. This was born out in the Battle of Britain, during which more agile

aircraft designs helped carry the day for the Royal Air Force. The Seafire's design allowed for a greater roll rate, which gave it an edge in airborne combat over the German Fw 190A, an enemy plane that the Allies frequently squared off against over France.

The most legendary British aircraft from World War II was the Spitfire, which also enabled the RAF to overcome numerical disadvantages during the early stages of the air war in Europe and in Asia. A tactical memo issued by RAF India revealed that the Spitfire matched up favorably against the Japanese "Zeke" fighter, which had helped spearhead the inexorable Japanese advance across the Pacific. The Spitfire boasted maximum level speed at all heights and greater maneuverability at high speeds, an important factor when British pilots engaged their Japanese counterparts in one-on-one combat (Delve & Price, 2007). However, given that the Spitfire was apt to experience a high-speed stall when turning with a Zeke, RAF officials were forced to conclude that the Zeke had the advantage when it came to dog-fighting.

Nevertheless, through painstaking observation and trial and error, the RAF was able to compile a considerable dossier on the capabilities of the Zeke and the tendencies of its pilots during dog-fights. The British "book" on the Zeke offers an excellent example of how tactics, preparation and anticipation could carry the day. The RAF pilots' adherence to a detailed blueprint for countering the Zeke gradually paid off, overcoming the Japanese craft's built-in advantage. RAF India recommended a course of action that depended on British pilots taking "station at least 1,000 to 2,000ft above and up sun of fighter(s) to be attacked" (Delve & Price, 2007). Spitfire pilots were advised that any attack on a Zeke should be undertaken "only with the

advantage of height,” and that short-range actions were likely to favor the Spitfire’s sturdier armor construction; it is instructive that British pilots were cautioned “ DO NOT ATTEMPT TO REMAIN AND DOGFIGHT” (2007).

Individual combat tactics were important during World War II, but improvements in the way fighter groups moved and engaged the enemy changed the nature of air-to-air combat during the war. Barber notes that close-formation fighting was typical in the early years of the war. But the greater speed and mobility of World War II aircraft dictated a far more flexible style of attack (Barber, 2008). The notion that a group, or sub-group, of planes could be grouped together as one so as to maximize firepower proved misguided during the Battle of Britain and in subsequent actions over Europe. In fact, British and German pilots alike had learned that “ looser formations and more flexible tactics were required for modern air-to-air combat” (2008). The British adaptation was a more spread-out formation that offered the flexibility of concentrated action or individual pilot initiative when the situation arose.

Most formations early in the war flew in echelon, left or right; when an enemy fighter was spotted, each plane separated and sought to engage individually (Merriam, 2000). One of the productive tactical changes in flight formation was the departure from a “ flying v” triad. Greater flexibility came from the “ four finger” configuration, in which fighters flew in a roughly arced formation; as such, two craft could split off, with the leader free to maneuver and the other serving as wingman (Barber, 2008). The wisdom of this strategy became clear when compared to the drawbacks of a tight

formation, which tended to turn multiple planes into one large and vulnerable target.

Design and manufacture

The United States' formidable manufacturing capacity made it the arsenal of the Allied war effort even before America committed its forces. Through the Roosevelt administration's Lend Lease program, American designed and manufactured armaments and supplies had an impact on the war in Europe as early as mid-1941, roughly seven months before the U. S. declared war on Japan. The U. S. automobile industry suspended production in 1941 and committed its resources to the manufacture of aircraft. By the end of 1943, 81 plants had been converted to the production of combat aircraft, with more than 2 million workers on the job (Rumerman, 2010).

One often overlooked tactical advantage of the American supply network was the adaptability of the aircraft that came off the line. Standardization of design was made necessary by Roosevelt's goal of producing 50, 000 aircraft a year, but did not allow for design changes that only became necessary after a plane was tested in combat. " Changes were needed based on front line experience and the armed forces had centers to refit planesadditional changes were often made when planes reached front-line bases" (Rumerman, 2010). In this way, the experience of combat pilots could be applied even after aircraft was designed. Adaptability became a hallmark of American wartime productivity and enabled the Allies to deal with new challenges and combat deficiencies in a timely fashion.

The one factor that the Germans, Japanese and their allies could not

overcome during the war was the ability of the Americans and the British to keep new, cutting-edge aircraft coming off the line. American factories produced planes designed to accomplish specific tasks, many of which the enemy simply had no answer for, planes that would come to define air warfare and alter the course of the war. The B-29 Super Fortress, F6 Hellcat, A-26 Invader and the Black Widow were all produced during the war years. Each proved highly effective in their separate ways; their cumulative effect overwhelmed overtaxed German and Japanese production facilities, which simply couldn't keep up the pace of innovation and supply.

Perhaps the most impactful American contribution to the Allies' air war was the development of the P-51 Mustang, a fighter designed by North American Aviation along the lines of a smaller, more maneuverable British plane (Rumerman, 2010). Upgrades continued beyond the original Mustang design. A new, more powerful engine was designed, which arguably made the Mustang the most versatile fighter of the war (2010). North American Aviation's design creativity had a major effect on the course of the war. Between 1938 and 1945, more than 43, 000 aircraft rolled off North American's production lines in facilities that had been quickly retro-fitted to accommodate the special needs of building combat planes.

The Battle of Britain

The early stages of the German bombing campaign against Great Britain had nearly driven the British to their knees. The combined power of the Wehrmacht and Luftwaffe had swept away every enemy of the German Reich in the West. With only England in the way, Hitler concentrated on

leveling British resistance at its source. The valiant but undersized RAF was being overwhelmed by superior German air power, yet when Hitler altered the Luftwaffe's objective to a bombing campaign of the British populace and industrial installations, the momentum began to shift. With attention shifted away from the RAF, the British were given a badly needed interval during which they were able to restore their ability to defend England from the air. This was not the only strategic mistake committed by Hitler and the German High Command, but it very likely was the most costly in the long run.

The German Messerschmitt proved superior to the slower British Hurricane in the early stages of the battle. The German shift in September 1940 to massed attacks on London enabled the British to develop tactics that would make the Spitfire the scourge of its German foes. While the Messerschmitt proved more agile and responsive about 5,000 feet, highly resourceful Spitfire pilots were able to use unorthodox methods to place the German fighters in vulnerable situations. "At low altitudes, with emergency engine boost, the Spitfire allowed for three minutes of extra power, and was definitely better all-round in performance than the (Messerschmitt)" (Delve & Price, 2007). While the Messerschmitt could fly at speeds that matched the Spitfire, and could in general climb and dive faster, the British fighter proved the more maneuverable (Woolf, 2004).

England's fleet of Spitfires and the resilient pilots who flew them proved a deadly combination for the Luftwaffe in the Battle of Britain. But the RAF benefited from an even greater advantage, one that quite likely turned the tide. British scientists had experimented with a sophisticated new means of

detecting enemy aircraft activity as early as 1935. Radar, or the practice of bouncing radio waves off aircraft, allowed the RAF to anticipate air raids, providing advance knowledge that fighter squadrons used to sortie at advantageous times and places. “ The use of radar changed the whole nature of air warfare, making it possible for a defending country to accurately anticipate a bomber attack early enough to intercept it” (Woolf, 2004). The widespread use of radar would greatly aid the British war effort not only in the air, but at sea as well.

Long-range bombing

The Luftwaffe’s defeat in the Battle of Britain, which many historians have ascribed to Hitler’s decision to shift attention away from the RAF’s destruction, provided Great Britain with a tremendous morale boost at a crucial point in the war. What is more, it helped encourage direct involvement from the Americans, who shored up England’s ability to defend itself and to launch bombing raids of its own. Massive American production capacity swung the balance of air power decidedly in favor of the Allies. With their superior firepower, the Allies could drastically change their strategy from one of defense to aggressiveness. “ At the center of the strategy was a commitment to strategic bombing, the long-range and independent assault on the economic and military infrastructure of the enemy state” (Overy, 2011).

The development of the long-range fighter, which could protect the powerful bomber armadas that decimated Germany and Japan, played a key role in the Allies’ eventual victory in 1945. The American P-47 and P-51 Mustang

were highly effective in escorting bomber groups that fire-bombed every major German city. American technical ingenuity proved an important advantage here, with planes that could cover unprecedented distances for a fighter. “ When fitted with extra fuel tanks, the escorts had the range of heavy bombers” (Zabecki, 1999). The Republic P-47 Thunderbolt was the first example of the American air force putting the lessons learned from the air war into practice (1999). The largest single-seat fighter of its era, the Thunderbolt could reach a top speed of 430 mph despite its thick armor and plentiful weaponry.

The war in the Pacific was a carrier war, and it was here that the United States put into action a technical advancement that led directly to the Americans’ hard-fought victory. Air-to-air combat was crucial in this theater, and the Zero had helped give the Japanese an advantage in terms of speed and maneuverability. The Americans sent the F4F Wildcat up against its quicker Japanese opponent. More durable with larger guns, the Wildcat suffered from deficiencies in dog-fighting situations – common in the Pacific war – that told the Americans a better alternative was needed (Masters, 1998).

The answer proved to be the Grumman F6F Hellcat. The larger, more powerful Hellcat’s larger, 18-cylinder engine represented a significant advance in terms of speed and placed it easily in the same class as the Zero in terms of agility (Masters, 1998). The Hellcat featured six machine guns, with some versions offering rocket launching capability. All in all, 11, 000 Hellcats were built and introduced into the Pacific conflict, where many observers believe that it, more than any other single weapon, was

responsible for carrying the Americans to victory over the Japanese (1998). It was the ideal aircraft carrier fighter in a war that required nothing less. As in Europe, American engineers had carefully assessed the experiences and input of fighter pilots and developed an aircraft during the war that was capable of giving the Americans a decided advantage against the Japanese. Introduced in 1943, in just two years the Hellcat accounted for roughly 75 percent of all U. S. Navy aerial combat kills in the Pacific. It almost single-handedly gave the Americans control of the air war, an absolutely crucial advantage in what had been a brutal and desperate struggle for survival since Pearl Harbor. “ The arrival of the U. S. Navy’s F6F Hellcat put the brakes on Japanese air superiority, unbroken throughout the Pacific since 1937” (Neufeld, 2009). It also represented a dramatic turnaround for the Americans, whose fighters in the war’s early years had exhibited alarming weaknesses in comparison to Japanese aircraft (2009).

Conclusion

Modern wars are technological in nature. The ability to visit widespread destruction on one’s enemy is of the utmost importance and is, intrinsically, a matter of technical advancement rooted in experience and tested in battle. During World War II, the most devastating war in human history, the Allies proved more adept at coolly and objectively determining where improvements were needed, perhaps nowhere moreso than in the ongoing campaign to put faster, more maneuverable and more powerful planes in the air against the Germans and Japanese. Superior production capacities powered the Allied war machine and, by 1943, the Americans and British

were sending an overwhelming amount of weaponry into the fray (Smith, 2008).

Ultimately, it was the resourcefulness and courage of the pilots who put those remarkable machines into action that enabled the Allies to strike the fatal blow. Their skill and tactical adaptability gave them the edge over their opponents and provided engineers with the knowledge they needed to design better aircraft. Flexibility, an invaluable advantage in war, was an edge the Germans and Japanese were simply unable to maintain in the face of a power capable of devastating their homelands. That airborne power gave the Allies one of the most potent military forces in history.

Conclusion

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